



BULETIN MAGNET BUMI 2019

**BADAN METEOROLOGI, KLIMATOLOGI DAN GEOFISIKA
STASIUN GEOFISIKA MANADO**

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BULETIN MAGNET BUMI 2019

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Diterbitkan : Januari 2020

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KATA PENGANTAR

Stasiun Geofisika Kelas 1 Winangun Manado, selanjutnya disebut Stasiun Geofisika Manado, adalah salah satu dari enam UPT BMKG (Badan Meteorologi Klimatologi dan Geofisika) yang melakukan pengamatan variasi medan magnet bumi. Pengamatan ini mulai dilakukan pada tahun 1991 di Pos Pengamatan Magnet Bumi di kota Tondano, Kabupaten Minahasa Sulawesi Utara.

Pos pengamatan magnet bumi ini terdaftar pada World Data Centre for Geomagnetism (Edinburgh) dengan nama stasiun TONDANO dan kode IAGA TND. Terdapat tiga peralatan yang dioperasikan yaitu Proton Processor Magnetometer (PPM) dan Fluxgate Magnetometer untuk variasi harian, sementara untuk pengamatan absolut menggunakan Declination Inclination Magnetometer (DIM) LEMI-204 dan DIM Bartington.

Buletin magnet bumi diterbitkan sebagai rangkuman kegiatan pengamatan medan magnet bumi yang dilakukan sepanjang tahun 2019. Buletin ini berisi data pengukuran absolut, variasi harian dan bulanan dari medan magnet bumi, serta analisa bulanan A-indeks dan K-indeks yang mengindikasikan terjadinya gangguan terhadap medan magnet bumi.

Ucapan terima kasih disampaikan kepada semua pihak yang telah bersama-sama bekerja sampai buletin ini dapat diterbitkan.

Kami berharap buletin ini dapat berguna dan secara umum memberikan sumbangsih untuk kemajuan pengamatan magnet bumi di Indonesia.

Manado, Januari 2020

Kepala Stasiun Geofisika Manado,

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DAFTAR ISI

KATA PENGANTAR	I
DAFTAR ISI	II
DAFTAR TABEL	IV
DAFTAR GAMBAR	VII
DAFTAR ISTILAH	VIII
I. PENDAHULUAN	1
A. MEDAN MAGNET BUMI	1
B. STASIUN MAGNET BUMI TONDANO	1
II. TABEL DAN GRAFIK NILAI RATA-RATA VARIASI HARIAN KOMPONEN MAGNETIK DI TAHUN 2019	3
A. NILAI RATA-RATA BULANAN VARIASI HARIAN SETIAP KOMPONEN	3
B. NILAI RATA-RATA TAHUNAN VARIASI HARIAN PER JAM UNTUK SETIAP KOMPONEN	6
III. NILAI PENGAMATAN ABSOLUT MEDAN MAGNET BUMI	9
IV. NILAI VARIASI HARIAN DAN GANGGUAN BADAI MAGNET	15
A. JANUARI 2019	15
1. Nilai variasi harian bulan Januari 2019	15
2. Gangguan badai magnet	22
B. FEBRUARI 2019	24
1. Nilai variasi harian bulan Februari 2019	24
2. Gangguan badai magnet	31
C. MARET 2019	33
1. Nilai variasi harian bulan Maret 2019	33
2. Gangguan badai magnet	40
D. APRIL 2019	42
1. Nilai variasi harian bulan April 2019	42
2. Gangguan badai magnet	49
E. MEI 2019	51
1. Nilai variasi harian bulan Mei 2019	51
2. Gangguan badai magnet	58
F. JUNI 2019	60
1. Nilai variasi harian bulan Juni 2019	60
2. Gangguan badai magnet	67
G. JULI 2019	69
1. Nilai variasi harian bulan Juli 2019	69
2. Gangguan badai magnet	76
H. AGUSTUS 2019	78

1. Nilai variasi harian bulan Agustus 2019	78
2. Gangguan badai magnet.....	85
I. SEPTEMBER 2019	87
1. Nilai variasi harian bulan September 2019	87
2. Gangguan badai magnet.....	94
J. OKTOBER 2019	96
1. Nilai variasi harian bulan Oktober 2019	96
2. Gangguan badai magnet.....	103
K. NOVEMBER 2019	105
1. Nilai variasi harian bulan November 2019	105
2. Gangguan badai magnet.....	112
L. DESEMBER 2019	114
1. Nilai variasi harian bulan Desember 2019	114
2. Gangguan badai magnet.....	121

DAFTAR TABEL

TABEL 1 NILAI RATA-RATA BULANAN VARIASI HARIAN SETIAP KOMPONEN MAGNETIK DI TAHUN 2019.....	3
TABEL 2 TABEL NILAI RATA-RATA TAHUNAN VARIASI HARIAN PER JAM DI TAHUN 2019	6
TABEL 3 NILAI PENGAMATAN ABSOLUT MEDAN MAGNET BUMI TAHUN 2019.....	9
TABEL 4 NILAI VARIASI HARIAN KOMPONEN H - HORIZONTAL (NT) BULAN JANUARI 2019.....	15
TABEL 5 NILAI VARIASI HARIAN KOMPONEN Z - VERTICAL (NT) JANUARI 2019	16
TABEL 6 NILAI VARIASI HARIAN KOMPONEN F - TOTAL (NT) JANUARI 2019	17
TABEL 7 NILAI VARIASI HARIAN KOMPONEN X - NORTH (NT) JANUARI 2019	18
TABEL 8 NILAI VARIASI HARIAN KOMPONEN Y - EAST (NT) JANUARI 2019	19
TABEL 9 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) JANUARI 2019	20
TABEL 10 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) JANUARI 2019.....	21
TABEL 11 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI JANUARI 2019.....	22
TABEL 12 HASIL ANALISA K-INDEKS DAN A INDEKS JANUARI 2019.....	22
TABEL 13 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) FEBRUARI 2019.....	24
TABEL 14 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) FEBRUARI 2019.....	25
TABEL 15 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) FEBRUARI 2019	26
TABEL 16 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) FEBRUARI 2019	27
TABEL 17 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) FEBRUARI 2019	28
TABEL 18 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) FEBRUARI 2019	29
TABEL 19 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) FEBRUARI 2019	30
TABEL 20 MONITORING WAKTU GANGGUAN	31
TABEL 21 HASIL ANALISA K-INDEKS DAN A-INDEKS FEBRUARI 2019.....	31
TABEL 22 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) MARET 2019	33
TABEL 23 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) MARET 2019	34
TABEL 24 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) MARET 2019	35
TABEL 25 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) MARET 2019.....	36
TABEL 26 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) MARET 2019.....	37
TABEL 27 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) MARET 2019.....	38
TABEL 28 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) MARET 2019.....	39
TABEL 29 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI MARET 2019.....	40
TABEL 30 HASIL ANALISA K-INDEKS DAN A-INDEKS MARET 2019	40
TABEL 31 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) APRIL 2019	42
TABEL 32 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) APRIL 2019	43
TABEL 33 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) APRIL 2019	44
TABEL 34 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) APRIL 2019.....	45
TABEL 35 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) APRIL 2019.....	46
TABEL 36 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) APRIL 2019.....	47
TABEL 37 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) APRIL 2019.....	48
TABEL 38 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI APRIL 2019.....	49
TABEL 39 HASIL ANALISA K-INDEKS DAN A-INDEKS APRIL 2019	49
TABEL 40 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) MEI 2019.....	51
TABEL 41 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) MEI 2019.....	52
TABEL 42 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) MEI 2019.....	53
TABEL 43 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) MEI 2019	54
TABEL 44 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) MEI 2019	55
TABEL 45 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) MEI 2019	56

TABEL 46 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) MEI 2019	57
TABEL 47 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI MEI 2019	58
TABEL 48 HASIL ANALISA K-INDEKS DAN A-INDEKS MEI 2019	58
TABEL 49 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) JUNI 2019	60
TABEL 50 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) JUNI 2019	61
TABEL 51 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) JUNI 2019	62
TABEL 52 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) JUNI 2019	63
TABEL 53 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) JUNI 2019	64
TABEL 54 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) JUNI 2019	65
TABEL 55 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) JUNI 2019	66
TABEL 56 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI JUNI 2019	67
TABEL 57 HASIL ANALISA K-INDEKS DAN A-INDEKS JUNI 2019	67
TABEL 58 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) JULI 2019	69
TABEL 59 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) JULI 2019	70
TABEL 60 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) JULI 2019	71
TABEL 61 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) JULI 2019	72
TABEL 62 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) JULI 2019	73
TABEL 63 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) JULI 2019	74
TABEL 64 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) JULI 2019	75
TABEL 65 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI JULI 2019	76
TABEL 66 HASIL ANALISA K-INDEKS DAN A-INDEKS JULI 2019	76
TABEL 67 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) AGUSTUS 2019	78
TABEL 68 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) AGUSTUS 2019	79
TABEL 69 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) AGUSTUS 2019	80
TABEL 70 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) AGUSTUS 2019	81
TABEL 71 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) AGUSTUS 2019	82
TABEL 72 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) AGUSTUS 2019	83
TABEL 73 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) AGUSTUS 2019	84
TABEL 74 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI AGUSTUS 2019	85
TABEL 75 HASIL ANALISA K-INDEKS DAN A-INDEKS AGUSTUS 2019	85
TABEL 76 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) SEPTEMBER 2019	87
TABEL 77 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) SEPTEMBER 2019	88
TABEL 78 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) SEPTEMBER 2019	89
TABEL 79 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) SEPTEMBER 2019	90
TABEL 80 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) SEPTEMBER 2019	91
TABEL 81 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) SEPTEMBER 2019	92
TABEL 82 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) SEPTEMBER 2019	93
TABEL 83 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI SEPTEMBER 2019	94
TABEL 84 HASIL ANALISA K-INDEKS DAN A-INDEKS SEPTEMBER 2019	94
TABEL 85 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) OKTOBER 2019	96
TABEL 86 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) OKTOBER 2019	97
TABEL 87 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) OKTOBER 2019	98
TABEL 88 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) OKTOBER 2019	99
TABEL 89 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) OKTOBER 2019	100
TABEL 90 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) OKTOBER 2019	101
TABEL 91 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) OKTOBER 2019	102
TABEL 92 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI OKTOBER 2019	103
TABEL 93 HASIL ANALISA K-INDEKS DAN A-INDEKS OKTOBER 2019	103

TABEL 94 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) NOVEMBER 2019.....	105
TABEL 95 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) NOVEMBER 2019.....	106
TABEL 96 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) NOVEMBER 2019.....	107
TABEL 97 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) NOVEMBER 2019	108
TABEL 98 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) NOVEMBER 2019	109
TABEL 99 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) NOVEMBER 2019	110
TABEL 100 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) NOVEMBER 2019	111
TABEL 101 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI NOVEMBER 2019.....	112
TABEL 102 HASIL ANALISA K-INDEKS DAN A-INDEKS NOVEMBER 2019	112
TABEL 103 NILAI VARIASI HARIAN KOMPONEN H – HORIZONTAL (NT) DESEMBER 2019.....	114
TABEL 104 NILAI VARIASI HARIAN KOMPONEN Z – VERTICAL (NT) DESEMBER 2019.....	115
TABEL 105 NILAI VARIASI HARIAN KOMPONEN F – TOTAL (NT) DESEMBER 2019.....	116
TABEL 106 NILAI VARIASI HARIAN KOMPONEN X – NORTH (NT) DESEMBER 2019	117
TABEL 107 NILAI VARIASI HARIAN KOMPONEN Y – EAST (NT) DESEMBER 2019	118
TABEL 108 NILAI VARIASI HARIAN KOMPONEN D – DECLINATION (MENIT) DESEMBER 2019	119
TABEL 109 NILAI VARIASI HARIAN KOMPONEN I – INCLINATION (DERAJAT) DESEMBER 2019	120
TABEL 110 MONITORING WAKTU GANGGUAN PADA PENGAMATAN MAGNET BUMI DESEMBER 2019	121
TABEL 111 HASIL ANALISA K-INDEKS DAN A-INDEKS DESEMBER 2019.....	121

DAFTAR GAMBAR

GAMBAR 1 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN H - HORIZONTAL.....	3
GAMBAR 2 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN Z - VERTICAL	4
GAMBAR 3 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN F - TOTAL	4
GAMBAR 4 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN X - NORTH.....	4
GAMBAR 5 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN Y - EAST.....	5
GAMBAR 6 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN D - DECLINATION	5
GAMBAR 7 GRAFIK NILAI RATA-RATA BULANAN VARIASI HARIAN KOMPONEN I - INCLINATION.....	5
GAMBAR 8 NILAI RATA-RATA HARIAN KOMPONEN H - HORIZONTAL.....	6
GAMBAR 9 NILAI RATA-RATA HARIAN KOMPONEN Z - VERTICAL.....	7
GAMBAR 10 NILAI RATA-RATA HARIAN KOMPONEN F - TOTAL	7
GAMBAR 11 NILAI RATA-RATA HARIAN KOMPONEN X - NORTH	7
GAMBAR 12 NILAI RATA-RATA HARIAN KOMPONEN Y - EAST	8
GAMBAR 13 NILAI RATA-RATA HARIAN KOMPONEN D - DECLINATION.....	8
GAMBAR 14 NILAI RATA-RATA HARIAN KOMPONEN I - INCLINATION	8
GAMBAR 15 GRAFIK NILAI ABSOLUT KOMPONEN H - HORIZONTAL TAHUN 2019	12
GAMBAR 16 GRAFIK NILAI ABSOLUT KOMPONEN Z - VERTICAL TAHUN 2019	12
GAMBAR 17 GRAFIK NILAI ABSOLUT KOMPONEN F - TOTAL TAHUN 2019	12
GAMBAR 18 GRAFIK NILAI ABSOLUT KOMPONEN X - NORTH TAHUN 2019	13
GAMBAR 19 GRAFIK NILAI ABSOLUT KOMPONEN Y - EAST TAHUN 2019	13
GAMBAR 20 GRAFIK NILAI ABSOLUT KOMPONEN D - DECLINATION TAHUN 2019	13
GAMBAR 21 GRAFIK NILAI ABSOLUT KOMPONEN I - INCLINATION TAHUN 2019	14
GAMBAR 22 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN JANUARI 2019	23
GAMBAR 23 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN FEBRUARI 2019.....	32
GAMBAR 24 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN FEBRUARI 2019.....	41
GAMBAR 25 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN APRIL 2019.....	50
GAMBAR 26 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN MEI 2019.....	59
GAMBAR 27 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN JUNI 2019.....	68
GAMBAR 28 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN JULI 2019	77
GAMBAR 29 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN AGUSTUS 2019.....	86
GAMBAR 30 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN SEPTEMBER 2019	95
GAMBAR 31 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN OKTOBER 2019	104
GAMBAR 32 PLOT HASIL ANALISA K-INDEKS DAN A-INDEKS SAAT TERJADI GANGGUAN MAGNET BUMI DI BULAN NOVEMBER 2019.....	113

DAFTAR ISTILAH

- Atmosfer : ruang di sekitar bumi yang batas bawahnya adalah permukaan bumi dan batas atasnya tidak tentu.
- Magnet bumi : merupakan medan magnet yang dihasilkan oleh bumi, dimana kutub Utara magnet bumi berada di kutub selatan geografis bumi dan kutub Selatan magnet bumi berada di kutub utara geografis bumi.
- Komponen X, Y dan Z : komponen pengukuran medan magnet bumi, dimana:
- X = medan magnet bumi komponen horizontal yang searah dengan arah utara geografis (berarah Timur-Barat geografis bumi).
 $X = H \cos D$.
- Y = medan magnet bumi komponen horizontal yang searah dengan arah timur geografis (berarah Utara-Selatan geografis bumi).
 $Y = H \sin D = X \tan D$.
- Z = medan magnet bumi komponen vertikal.
 $Z = F \sin I = H \tan I$.
- H : Resultan pengukuran medan magnet bumi dari komponen X dan Y .
 $H = \sqrt{x^2 + y^2}$, dan merupakan medan magnet bumi komponen horizontal
- D : sudut Deklinasi dari medan magnet bumi dengan formula
 $D = \arctan (Y/X)$.
- I : sudut Inklinasi medan magnet bumi dengan formula
 $I = \arctan (Z/H)$.
- F a : medan magnet bumi total
 $F = \sqrt{x^2 + y^2 + z^2}$,
- nT : satuan besaran medan magnet bumi dengan satuan nano Tesla (nT).
- K-indeks : sebuah indeks lokal kuasi-logaritmik dalam periode 3 jam dari aktivitas magnetik bumi
- A-indeks : nilai maksimum yang terjadi dalam rentang waktu 24 jam, dimana diperoleh dengan menghitung rata2 dari 8 titik amplitude (a-indeks)
- a-indeks : konversi linier dari K-indeks dalam periode 3 jam

I. PENDAHULUAN

A. Medan Magnet Bumi

Bumi memiliki medan magnetik yang menyelubungi bumi dan membentuk lapisan pelindung. Lapisan ini dinamakan Magnetosfer. Magnetosfer berfungsi untuk melindungi bumi dari partikel dari matahari yang berbahaya karena memiliki energi tinggi dan berguna untuk melindungi atmosfer agar tidak terganggu oleh angin matahari. Medan magnetik yang terukur di bumi disebut medan magnet bumi (medan geomagnetik). Medan geomagnetik merupakan superposisi medan magnet yang berasal dari medan magnet utama, medan magnet eksternal dan medan magnet anomali. Medan geomagnet di setiap titik permukaan bumi berbentuk vektor, yaitu memiliki arah dan besaran. Komponen-komponen vektor pada medan geomagnet yaitu komponen X, Y, Z, H, F, I, D.

Intensitas medan magnet bumi yang terukur di suatu titik mengalami perubahan secara signifikan terhadap waktu. Waktu perubahan intensitas medan magnet dapat terjadi dalam hitungan detik hingga jutaan tahun, secara periodik maupun acak. Variasi terhadap waktu ini dapat dikategorikan menjadi variasi jangka panjang atau variasi jangka pendek. Variasi jangka panjang (secular variation) memiliki rentang waktu 5 tahun atau lebih, perubahan ini disebabkan karena variasi medan magnet utama bumi akibat perubahan posisi kutub magnet. Sedangkan variasi harian disebabkan akibat variasi medan magnet luar yang dipengaruhi oleh radiasi matahari. Selain kedua variasi tersebut, medan magnet bumi juga dapat berubah sementara akibat adanya badai magnetik.

B. Stasiun Magnet Bumi Tondano

Nama Stasiun	: Stasiun Geofisika Manado
Nama observatorium	: TONDANO
Kode Stasiun	: TND
Alamat observatorium	: Jl. Papakelan, Kelurahan Kendis, Kecamatan Tondano Timur, Kabupaten Minahasa, Provinsi Sulawesi Utara.
Lintang Geografis	: 1.295 Lintang Utara / North
Bujur Geografis	: 124,925 Bujur Timur / East
Ketinggian	: 704 meter
Waktu lokal	: UTC + 8
Peralatan	:
Variometer	- DMI-Fluxgate Magnetomer, untuk data HDZ Resolusi digital : 0.1 nT Sampling rate : 5 detik

- Quantum Magnetometry Laboratory - POS-1 Proton
Precision Magnetometer (PPM)
Resolusi digital : 0.5 nT
Sampling rate : 5 detik

- Absolut: - LEMI-204, Declination Inclination Magnetometer (DIM) Theodolite
Dan DIM Bartington

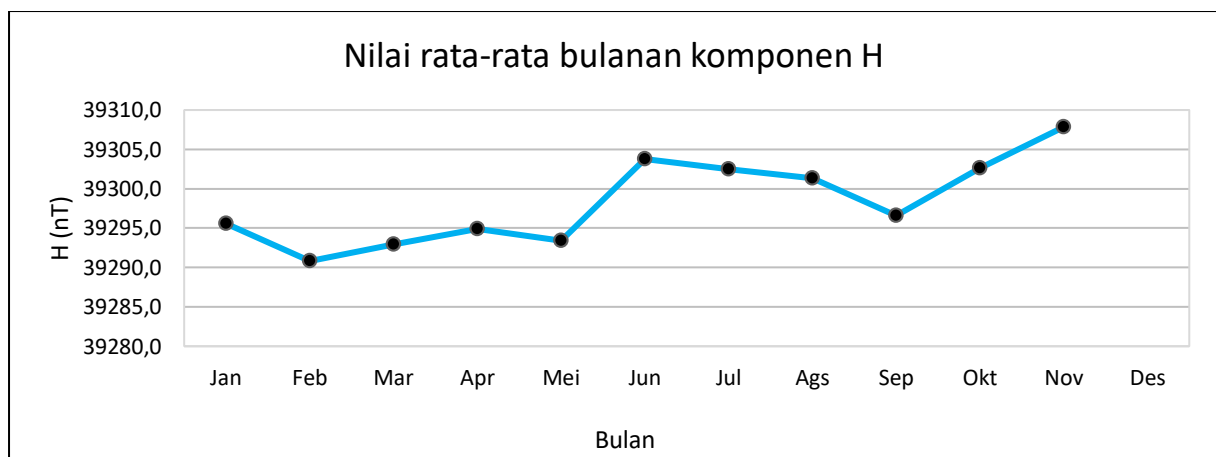
II. TABEL DAN GRAFIK NILAI RATA-RATA VARIASI HARIAN KOMPONEN MAGNETIK DI TAHUN 2019

A. Nilai Rata-rata Bulanan Variasi Harian Setiap Komponen

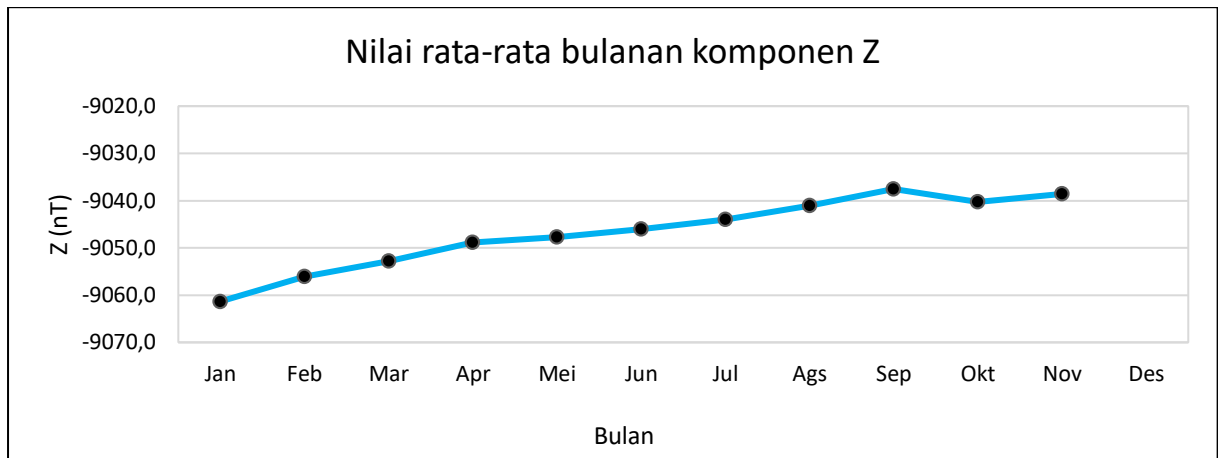
Tabel 1 Nilai rata-rata bulanan variasi harian setiap komponen magnetik di tahun 2019

Bulan	H (nT)	Z (nT)	F (nT)	X (nT)	Y (nT)	D (menit)	I (derajat)
Jan	39295.6	-9061.3	40326.8	39291.8	543.3	47.5	-12.99058
Feb	39290.8	-9056.1	40321.0	39287.5	507.8	44.5	-12.98485
Mar	39292.9	-9052.8	40322.3	39290.4	443.6	38.8	-12.97959
Apr	39294.9	-9048.9	40323.3	39292.5	437.9	38.3	-12.97358
Mei	39293.4	-9047.7	40321.6	39291.1	431.1	37.7	-12.97237
Jun	39303.7	-9046.1	40331.32	39301.4	425.6	37.2	-12.96687
Jul	39302.4	-9044.0	40329.6	39300.2	420.0	36.8	-12.96439
Ags	39301.3	-9041.1	40327.8	39299.2	412.3	36.1	-12.96067
Sep	39296.6	-9037.5	40322.4	39294.5	406.5	35.6	-12.95732
Okt	39302.6	-9040.2	40328.9	39300.5	402.9	35.3	-12.95913
Nov	39307.8	-9038.6	40333.6	39305.8	399.2	34.9	-12.95518
Des	-	-	-	-	-	-	-

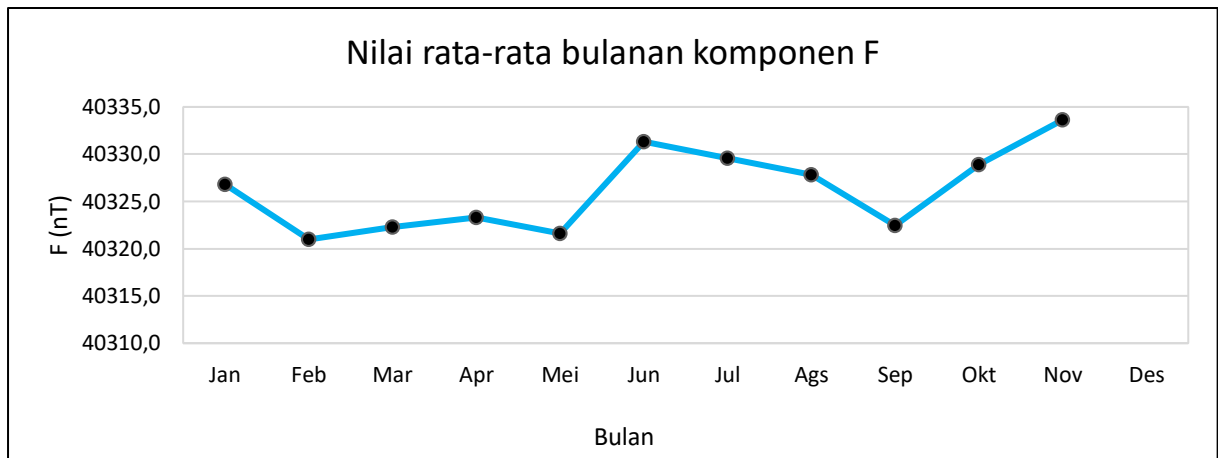
- Keterangan : bulan Desember 2019 dilakukan renovasi gedung magnet



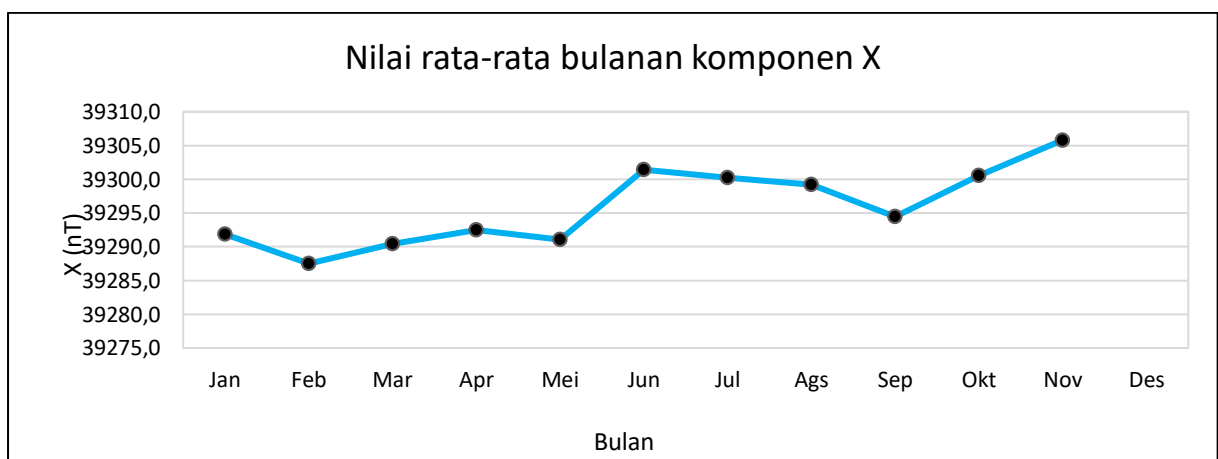
Gambar 1 Grafik nilai rata-rata bulanan variasi harian komponen H - horizontal



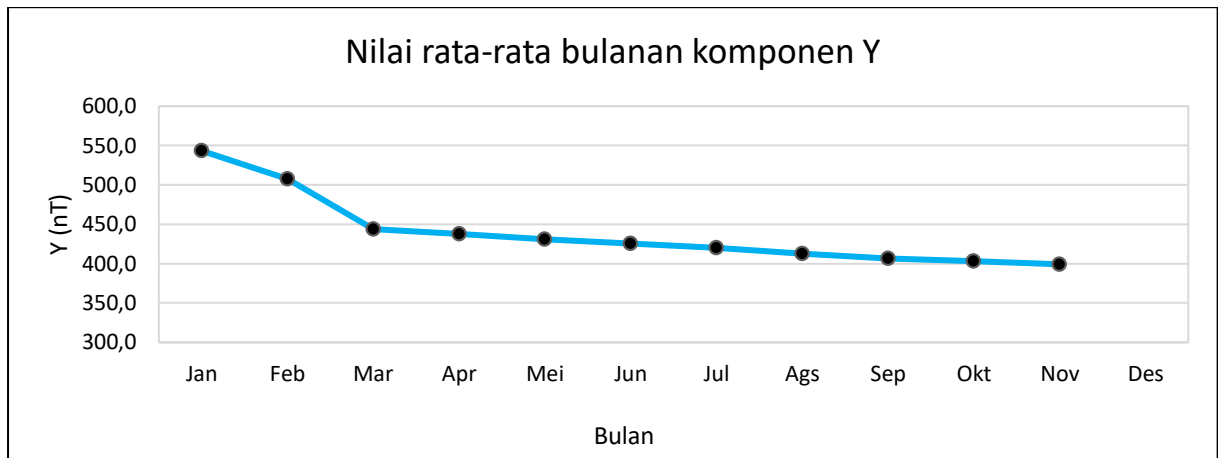
Gambar 2 Grafik nilai rata-rata bulanan variasi harian komponen Z - vertical



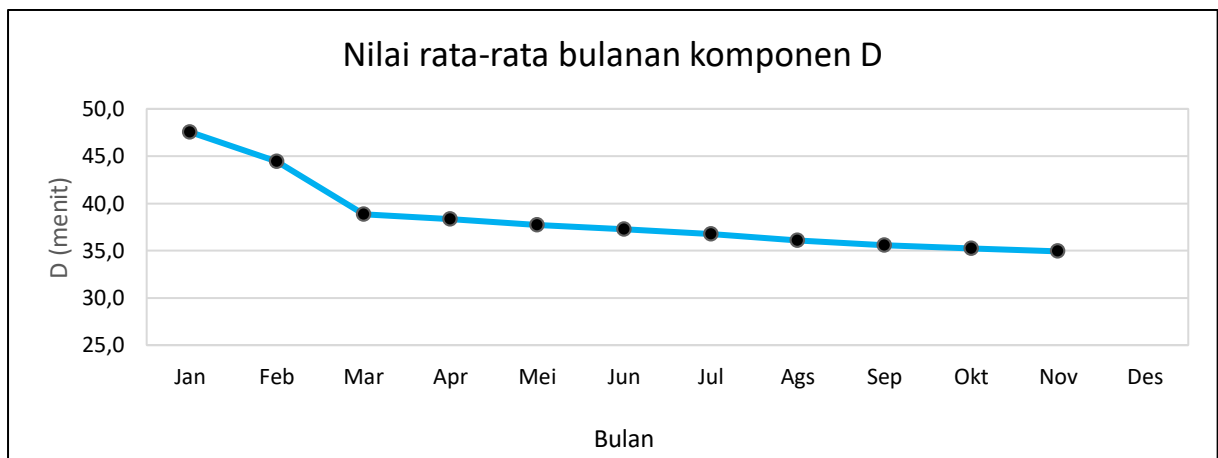
Gambar 3 Grafik nilai rata-rata bulanan variasi harian komponen F - total



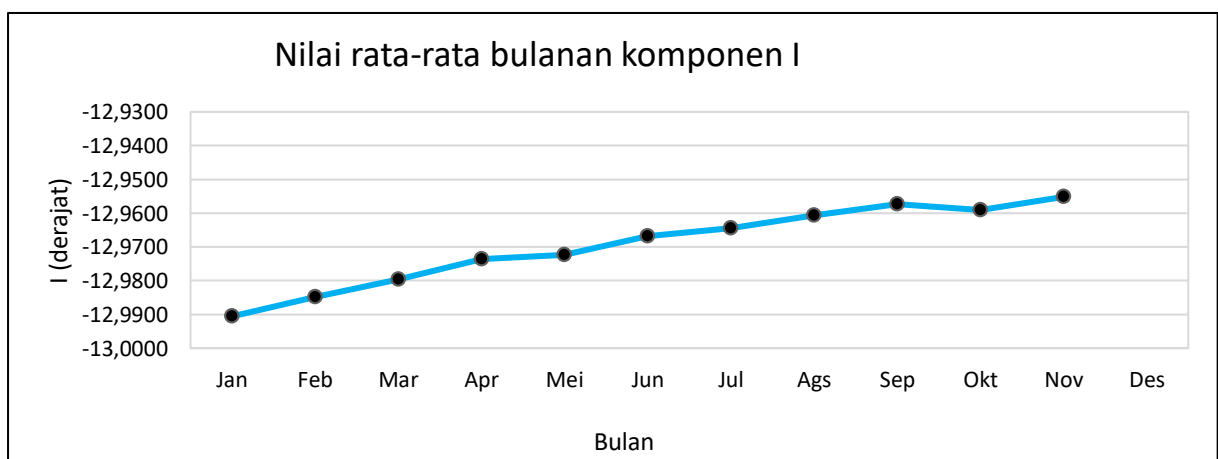
Gambar 4 Grafik nilai rata-rata bulanan variasi harian komponen X - north



Gambar 5 Grafik nilai rata-rata bulanan variasi harian komponen Y - east



Gambar 6 Grafik nilai rata-rata bulanan variasi harian komponen D - declination

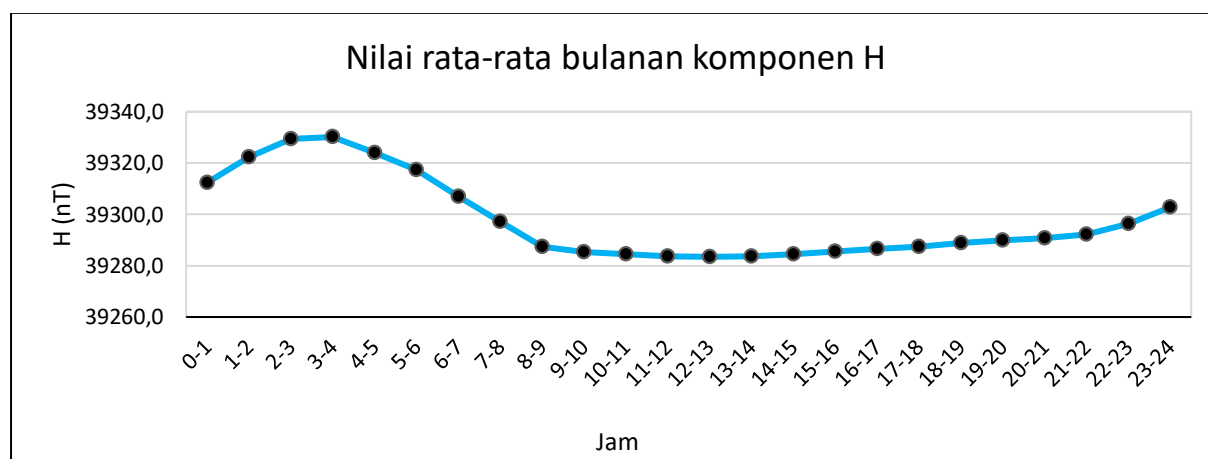


Gambar 7 Grafik nilai rata-rata bulanan variasi harian komponen I - inclination

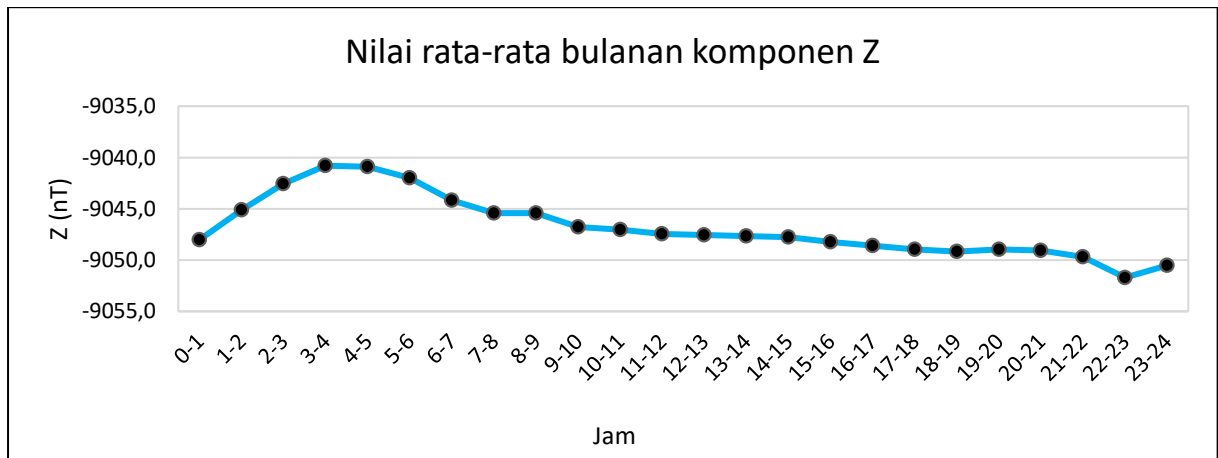
B. Nilai Rata-rata Tahunan Variasi Harian Per Jam Untuk Setiap Komponen

Tabel 2 Tabel nilai rata-rata tahunan variasi harian per jam di tahun 2019

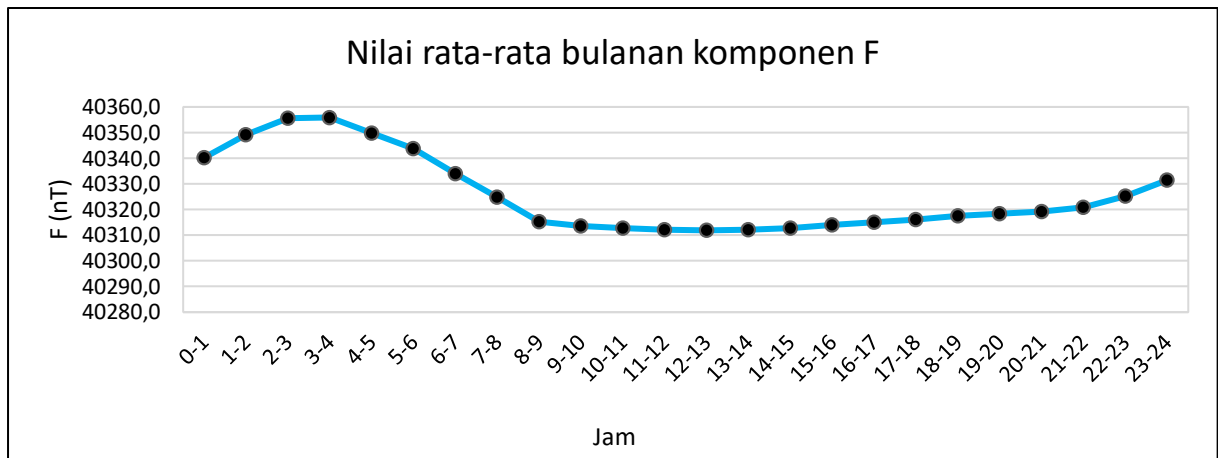
Bulan	H (nT)	Z (nT)	F (nT)	X (nT)	Y (nT)	D (menit)	I (derajat)
0-1	39312.4	-9048.0	40340.2	39310.0	432.2	37.814	-12.9667
1-2	39322.4	-9045.1	40349.3	39320.0	428.9	37.510	-12.9596
2-3	39329.4	-9042.5	40355.5	39327.0	428.2	37.442	-12.9538
3-4	39330.2	-9040.8	40355.9	39327.8	430.3	37.631	-12.9511
4-5	39324.0	-9040.9	40349.9	39321.5	432.7	37.844	-12.9533
5-6	39317.3	-9042.0	40343.7	39314.9	436.9	38.215	-12.9569
6-7	39307.0	-9044.2	40334.0	39304.4	441.2	38.600	-12.9632
7-8	39297.3	-9045.4	40324.9	39294.7	443.9	38.850	-12.9680
8-9	39287.4	-9045.4	40315.3	39284.9	445.3	38.979	-12.9712
9-10	39285.4	-9046.8	40313.6	39282.8	444.4	38.910	-12.9737
10-11	39284.5	-9047.1	40312.8	39282.0	442.1	38.704	-12.9743
11-12	39283.7	-9047.5	40312.1	39281.2	440.6	38.577	-12.9751
12-13	39283.5	-9047.6	40311.9	39281.0	440.0	38.523	-12.9754
13-14	39283.8	-9047.7	40312.2	39281.3	439.5	38.480	-12.9754
14-15	39284.4	-9047.8	40312.9	39281.9	439.3	38.458	-12.9754
15-16	39285.5	-9048.3	40314.0	39283.0	439.7	38.490	-12.9757
16-17	39286.6	-9048.6	40315.1	39284.1	440.2	38.539	-12.9759
17-18	39287.4	-9049.0	40316.1	39284.9	441.0	38.610	-12.9761
18-19	39288.9	-9049.2	40317.6	39286.4	441.6	38.659	-12.9759
19-20	39289.8	-9048.9	40318.4	39287.3	441.8	38.669	-12.9753
20-21	39290.7	-9049.1	40319.3	39288.2	442.0	38.688	-12.9751
21-22	39292.2	-9049.7	40320.9	39289.7	443.2	38.792	-12.9755
22-23	39296.3	-9051.7	40325.3	39293.8	444.4	38.893	-12.9770
23-24	39302.8	-9050.5	40331.4	39300.4	438.5	38.373	-12.9733



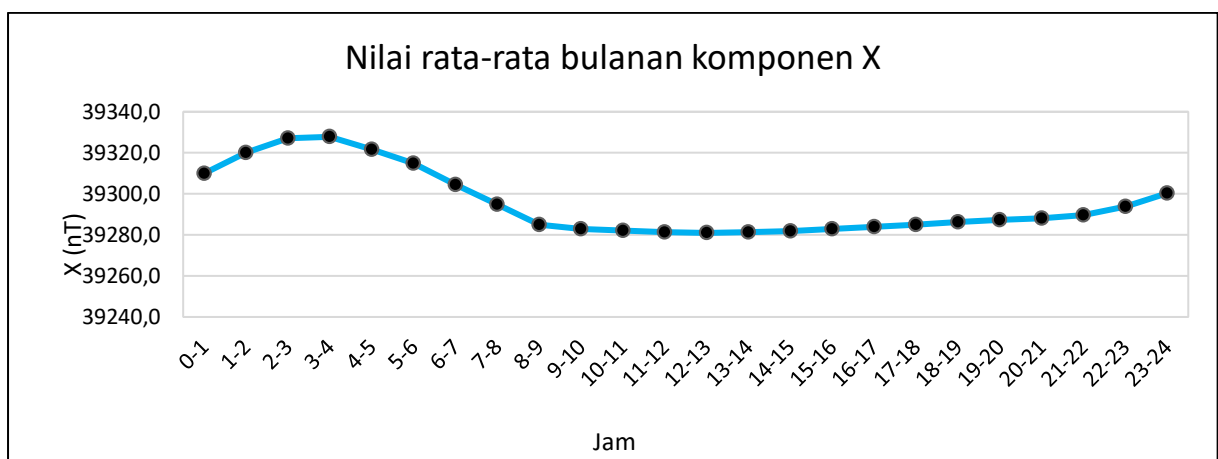
Gambar 8 Nilai rata-rata harian komponen H - horizontal



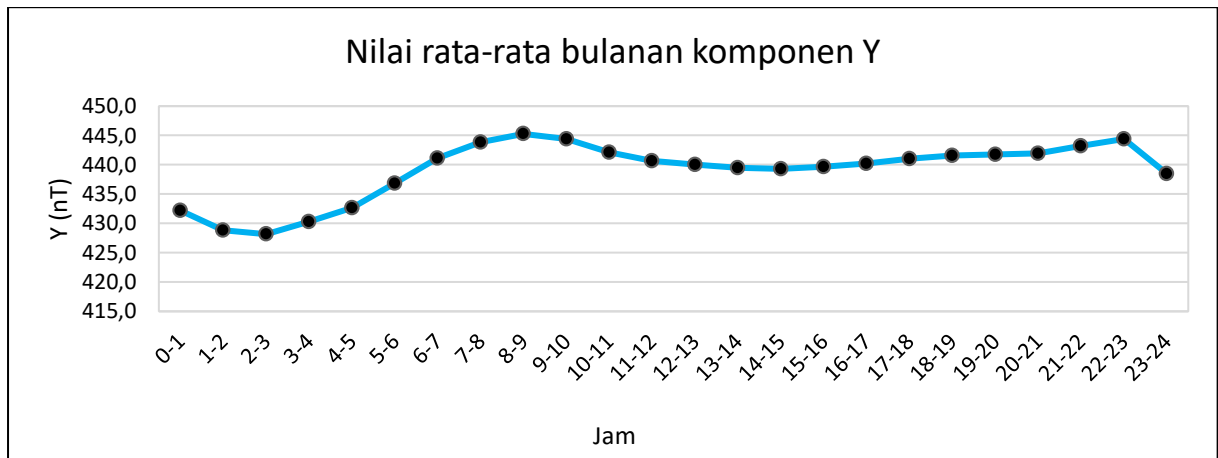
Gambar 9 Nilai rata-rata harian komponen Z - vertical



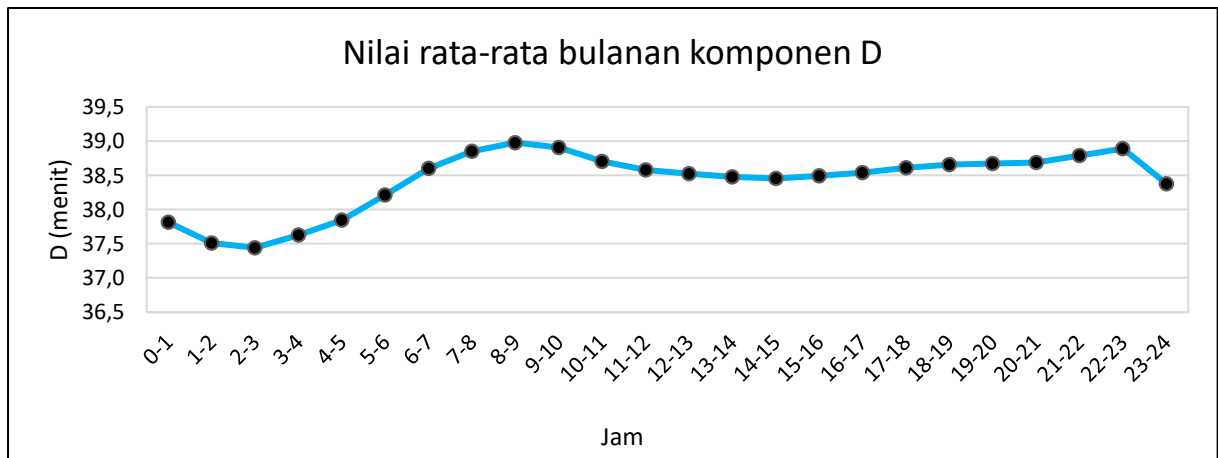
Gambar 10 Nilai rata-rata harian komponen F - total



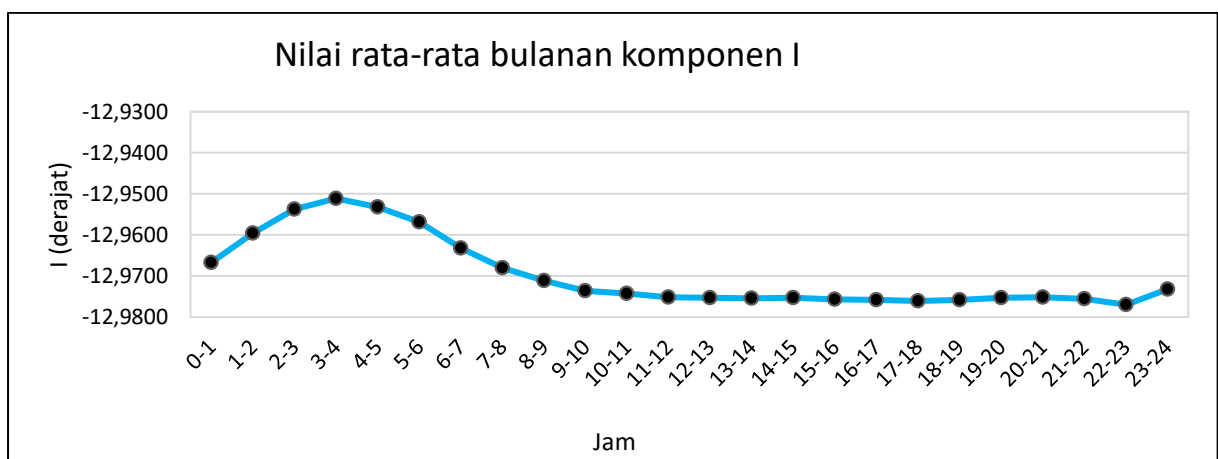
Gambar 11 Nilai rata-rata harian komponen X - north



Gambar 12 Nilai rata-rata harian komponen Y - east



Gambar 13 Nilai rata-rata harian komponen D - declination



Gambar 14 Nilai rata-rata harian komponen I - inclination

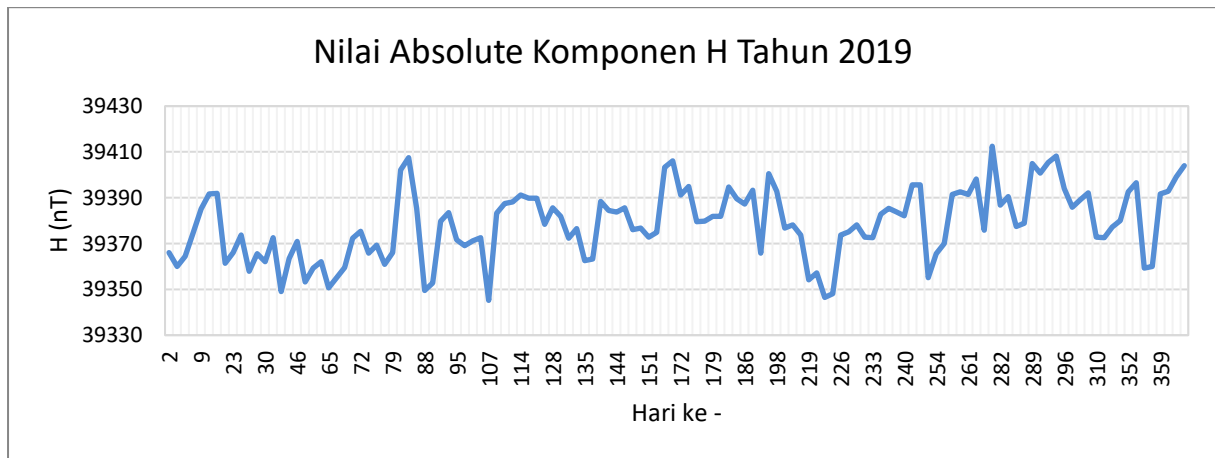
III. NILAI PENGAMATAN ABSOLUT MEDAN MAGNET BUMI

Tabel 3 Nilai pengamatan absolut medan magnet bumi tahun 2019

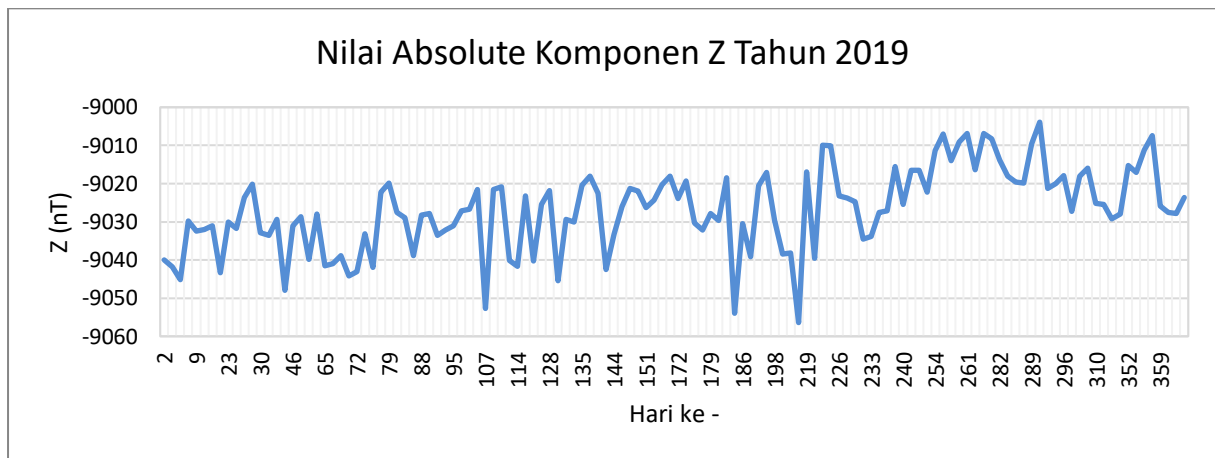
Tanggal	DOY	Jam D (UTC)	D(deg)	jam I (UTC)	I (deg)	H (nT)	Z (nT)	F (nT)	X (nT)	Y (nT)
02-Jan-19	2	01:31:00	0.0378	01:44:00	-12.9332	39366	-9040	40390.6	39366.0	25.971
04-Jan-19	4	00:54:00	0.0187	01:13:00	-12.9376	39359.9	-9041.8	40385.1	39359.9	12.846
04-Jan-19	4	01:23:00	0.0435	01:34:00	-12.9408	39364.4	-9045.1	40390.3	39364.4	29.886
09-Jan-19	9	00:26:00	0.0138	00:35:00	-12.9163	39374.7	-9029.8	40396.9	39374.7	9.484
09-Jan-19	9	00:49:00	0.0162	01:03:00	-12.9167	39385.2	-9032.5	40407.7	39385.2	11.136
11-Jan-19	11	01:31:00	0.0846	01:50:00	-12.914	39391.6	-9032	40413.8	39391.6	58.164
11-Jan-19	11	02:02:00	0.0083	02:15:00	-12.9124	39392	-9031	40413.9	39392.0	5.706
18-Jan-19	18	00:40:00	0.1429	00:57:00	-12.9392	39361.4	-9043.3	40386.9	39361.3	98.170
23-Jan-19	23	00:19:00	0.0007	00:39:00	-12.9194	39366.1	-9030.1	40388.6	39366.1	0.481
23-Jan-19	23	00:57:00	-0.0084	01:18:00	-12.9194	39373.8	-9031.8	40396.4	39373.8	-5.773
25-Jan-19	25	00:28:00	0.0937	00:46:00	-12.913	39358	-9023.6	40379.2	39357.9	64.365
25-Jan-19	25	00:59:00	-0.0076	01:13:00	-12.9059	39365.5	-9020.2	40385.7	39365.5	-5.222
30-Jan-19	30	00:36:00	-0.0065	00:51:00	-12.9244	39362	-9032.8	40385.1	39362.0	-4.465
30-Jan-19	30	01:30:00	0.0034	01:57:00	-12.9222	39372.5	-9033.6	40395.6	39372.5	2.336
13-Feb-19	44	00:43:00	0.033	00:57:00	-12.9238	39349.1	-9029.3	40371.8	39349.1	22.663
15-Feb-19	46	00:38:00	0.0035	01:06:00	-12.9449	39363.4	-9047.9	40389.9	39363.4	2.405
15-Feb-19	46	01:27:00	0.0013	01:39:00	-12.9192	39370.9	-9031	40393.4	39370.9	0.893
20-Feb-19	51	01:02:00	0.0157	01:21:00	-12.9215	39353.3	-9028.7	40375.7	39353.3	10.783
27-Feb-19	58	01:13:00	0.0273	01:27:00	-12.935	39359.4	-9039.8	40384.1	39359.4	18.754
01-Mar-19	60	01:29:00	0.0041	01:47:00	-12.9178	39362	-9028	40384	39362.0	2.817
06-Mar-19	65	00:25:00	0.0251	00:35:00	-12.9401	39350.7	-9041.5	40376.1	39350.7	17.239
06-Mar-19	65	00:47:00	0.0161	00:36:00	-12.938	39355	-9041	40380.1	39355.0	11.059
08-Mar-19	67	01:13:00	0.0325	01:21:00	-12.9336	39359.5	-9038.8	40384	39359.5	22.326
13-Mar-19	72	01:38:00	0.026	01:47:00	-12.9369	39372.4	-9044.2	40397.8	39372.4	17.867
13-Mar-19	72	01:58:00	0.0267	02:08:00	-12.9344	39375.4	-9043.1	40400.5	39375.4	18.349
15-Mar-19	74	01:15:00	0.0118	01:24:00	-12.9239	39365.8	-9033.2	40388.9	39365.8	8.107
15-Mar-19	74	01:31:00	0.0166	01:37:00	-12.9347	39369.3	-9041.9	40394.3	39369.3	11.406
20-Mar-19	79	00:53:00	-0.0093	01:05:00	-12.9101	39361	-9022.2	40381.8	39361.0	-6.389
20-Mar-19	79	01:16:00	-0.0041	01:27:00	-12.9054	39366	-9019.9	40386.1	39366.0	-2.817
22-Mar-19	81	01:06:00	0.0198	01:16:00	-12.9044	39402.1	-9027.5	40423.1	39402.1	13.616
22-Mar-19	81	01:25:00	0.021	01:37:00	-12.9046	39407.6	-9028.9	40428.7	39407.6	14.444
27-Mar-19	86	01:45:00	0.0093	01:53:00	-12.9254	39385.3	-9038.8	40409.1	39385.3	6.393
29-Mar-19	88	00:45:00	-0.0009	00:54:00	-12.9221	39349.4	-9028.2	40371.8	39349.4	-0.618
29-Mar-19	88	01:01:00	0.0043	01:09:00	-12.9204	39352.8	-9027.8	40375	39352.8	2.953
03-Apr-19	93	00:54:00	0.0097	01:02:00	-12.9198	39379.9	-9033.5	40402.7	39379.9	6.667
03-Apr-19	93	01:11:00	0.0121	01:18:00	-12.9167	39383.6	-9032.2	40406	39383.6	8.317
05-Apr-19	95	01:07:00	0.0117	01:14:00	-12.919	39371.7	-9031	40394.2	39371.7	8.040
10-Apr-19	100	01:29:00	0.0278	01:37:00	-12.9143	39369	-9027.1	40390.7	39369.0	19.102
10-Apr-19	100	01:43:00	0.0285	01:48:00	-12.9131	39371.2	-9026.7	40392.8	39371.2	19.584

12-Apr-19	102	01:50:00	0.0064	01:59:00	-12.9054	39372.6	-9021.5	40393	39372.6	4.398
17-Apr-19	107	07:53:00	0.0302	08:18:00	-12.9573	39345.2	-9052.7	40373.2	39345.2	20.738
19-Apr-19	109	01:02:00	0.0138	01:12:00	-12.9022	39383.3	-9021.6	40403.4	39383.3	9.486
19-Apr-19	109	01:20:00	0.0014	01:26:00	-12.9	39387.4	-9020.9	40407.3	39387.4	0.962
24-Apr-19	114	01:17:00	0.0034	01:27:00	-12.9263	39388.1	-9040.1	40412.2	39388.1	2.337
24-Apr-19	114	01:35:00	-0.0028	01:42:00	-12.9275	39391.1	-9041.7	40415.4	39391.1	-1.925
01-May-19	121	01:08:00	-0.004	01:19:00	-12.9023	39389.9	-9023.2	40410.2	39389.9	-2.750
01-May-19	121	01:26:00	-0.0051	01:35:00	-12.926	39389.7	-9040.3	40413.8	39389.7	-3.506
03-May-19	123	01:16:00	0.0162	01:23:00	-12.9092	39378.4	-9025.5	40399.5	39378.4	11.134
08-May-19	128	01:20:00	-0.0035	01:27:00	-12.9019	39385.5	-9021.8	40405.6	39385.5	-2.406
08-May-19	128	01:35:00	-0.0046	01:43:00	-12.9356	39381.9	-9045.4	40407.3	39381.9	-3.162
10-May-19	130	01:16:00	0.0018	01:25:00	-12.9163	39372.3	-9029.3	40394.4	39372.3	1.237
10-May-19	130	01:33:00	-0.0013	01:40:00	-12.916	39376.5	-9030	40398.7	39376.5	-0.893
15-May-19	135	01:53:00	-0.0048	02:01:00	-12.9071	39362.6	-9020.4	40382.9	39362.6	-3.298
15-May-19	135	02:09:00	-0.0083	02:20:00	-12.9037	39363.3	-9018.1	40383.1	39363.3	-5.702
22-May-19	142	01:09:00	-0.0082	01:21:00	-12.9019	39388.3	-9022.5	40408.5	39388.3	-5.637
22-May-19	142	01:27:00	-0.0135	01:35:00	-12.9307	39384.5	-9042.5	40409.2	39384.5	-9.280
24-May-19	144	01:28:00	0.0145	01:34:00	-12.9183	39383.7	-9033.3	40406.4	39383.7	9.967
24-May-19	144	01:40:00	0.0107	01:48:00	-12.9076	39385.7	-9026	40406.7	39385.7	7.355
29-May-19	149	01:08:00	0.0164	01:15:00	-12.904	39376.1	-9021.2	40396.2	39376.1	11.271
29-May-19	149	01:21:00	0.0129	01:30:00	-12.9049	39376.7	-9022	40397	39376.7	8.866
31-May-19	151	01:11:00	0.0107	01:17:00	-12.9121	39372.7	-9026.3	40394.1	39372.7	7.353
31-May-19	151	01:22:00	0.0043	01:28:00	-12.9088	39374.9	-9024.4	40395.8	39374.9	2.955
19-Jun-19	170	01:25:00	0.0116	01:32:00	-12.894	39403.4	-9020.3	40422.7	39403.4	7.978
19-Jun-19	170	01:37:00	0.0095	01:41:00	-12.89	39406.2	-9018	40424.9	39406.2	6.534
21-Jun-19	172	01:08:00	0.0154	01:14:00	-12.9029	39391.1	-9023.9	40411.5	39391.1	10.588
21-Jun-19	172	01:18:00	0.0109	01:24:00	-12.8954	39394.9	-9019.3	40414.1	39394.9	7.495
26-Jun-19	177	01:47:00	0.0052	01:52:00	-12.9156	39379.5	-9030.4	40401.6	39379.5	3.574
26-Jun-19	177	01:56:00	0.0033	01:59:00	-12.9179	39379.7	-9032.1	40402.2	39379.7	2.268
28-Jun-19	179	01:25:00	0.0028	01:29:00	-12.9113	39381.8	-9027.8	40403.3	39381.8	1.925
28-Jun-19	179	01:34:00	0.0027	01:38:00	-12.9138	39381.9	-9029.6	40403.8	39381.9	1.856
03-Jul-19	184	01:14:00	0.0072	01:20:00	-12.8942	39394.6	-9018.4	40413.7	39394.6	4.950
03-Jul-19	184	01:57:00	-0.0011	02:21:00	-12.9449	39389.6	-9053.9	40416.7	39389.6	-0.756
05-Jul-19	186	00:51:00	0.0068	01:03:00	-12.9133	39387.3	-9030.5	40409.3	39387.3	4.675
10-Jul-19	191	02:08:00	0.0035	02:12:00	-12.9233	39393.3	-9039.1	40417	39393.3	2.406
12-Jul-19	193	01:13:00	-0.0198	01:22:00	-12.9065	39365.7	-9020.6	40386.1	39365.7	-13.604
17-Jul-19	198	01:51:00	-0.0119	02:12:00	-12.8904	39400.5	-9017	40419.1	39400.5	-8.183
17-Jul-19	198	02:27:00	-0.0198	02:39:00	-12.9104	39392.8	-9029.7	40414.5	39392.8	-13.613
24-Jul-19	205	00:58:00	0.0018	01:04:00	-12.9275	39376.7	-9038.4	40400.7	39376.7	1.237
24-Jul-19	205	01:08:00	0.0018	01:12:00	-12.9267	39378.1	-9038.1	40402	39378.1	1.237
31-Jul-19	212	01:17:00	-0.0014	01:29:00	-12.9533	39373.8	-9056.4	40401.9	39373.8	-0.962
07-Aug-19	219	01:08:00	-0.0238	01:17:00	-12.905	39354.2	-9016.9	40374	39354.2	-16.347
07-Aug-19	219	01:38:00	-0.0298	02:13:00	-12.9354	39357.2	-9039.6	40382	39357.2	-20.470
09-Aug-19	221	01:02:00	-0.0244	01:08:00	-12.8979	39346.5	-9010	40364.9	39346.5	-16.756
09-Aug-19	221	01:29:00	-0.019	01:57:00	-12.8975	39348	-9010.1	40366.4	39348.0	-13.048

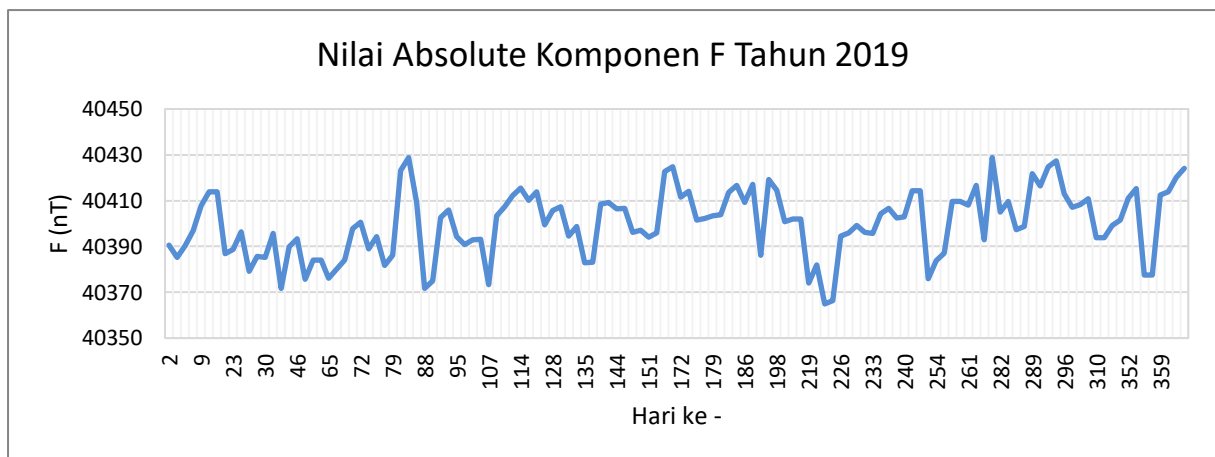
14-Aug-19	226	01:32:00	-0.0346	01:40:00	-12.9075	39373.7	-9023.2	40394.4	39373.7	-23.777
16-Aug-19	228	00:03:00	-0.0059	00:09:00	-12.9079	39375.2	-9023.8	40396	39375.2	-4.055
16-Aug-19	228	00:14:00	-0.0086	00:20:00	-12.9081	39378.2	-9024.7	40399.1	39378.2	-5.911
21-Aug-19	233	00:03:00	-0.0065	00:09:00	-12.9233	39372.9	-9034.5	40396.1	39372.9	-4.467
21-Aug-19	233	00:14:00	-0.0107	00:18:00	-12.9225	39372.6	-9033.8	40395.7	39372.6	-7.353
23-Aug-19	235	00:15:00	-0.0048	00:24:00	-12.9107	39382.8	-9027.6	40404.2	39382.8	-3.299
23-Aug-19	235	00:31:00	-0.0086	00:36:00	-12.9092	39385.3	-9027.1	40406.6	39385.3	-5.912
28-Aug-19	240	01:27:00	-0.0451	01:52:00	-12.8937	39383.7	-9015.5	40402.5	39383.7	-31.001
28-Aug-19	240	02:05:00	-0.0514	02:28:00	-12.9079	39382.1	-9025.4	40403	39382.1	-35.330
30-Aug-19	242	00:56:00	-0.0357	00:16:00	-12.8913	39395.7	-9016.5	40414.3	39395.7	-24.547
30-Aug-19	242	01:07:00	-0.0407	01:15:00	-12.8913	39395.6	-9016.5	40414.2	39395.6	-27.985
04-Sep-19	247	00:16:00	-0.0273	00:21:00	-12.9121	39355	-9022.2	40375.9	39355.0	-18.752
11-Sep-19	254	00:35:00	-0.0348	00:41:00	-12.8938	39365.5	-9011.4	40383.8	39365.5	-23.910
11-Sep-19	254	00:50:00	-0.0378	00:56:00	-12.8862	39369.9	-9007	40387.1	39369.9	-25.974
18-Sep-19	261	01:39:00	-0.0378	01:45:00	-12.8892	39391.5	-9014	40409.7	39391.5	-25.988
18-Sep-19	261	01:51:00	-0.0378	01:55:00	-12.8821	39392.6	-9009.1	40409.6	39392.6	-25.989
18-Sep-19	261	02:00:00	-0.0378	02:05:00	-12.8792	39391.4	-9006.8	40408	39391.4	-25.988
20-Sep-19	263	01:07:00	-0.0336	01:13:00	-12.8902	39398.1	-9016.3	40416.6	39398.1	-23.104
20-Sep-19	263	01:18:00	-0.0336	01:24:00	-12.8842	39375.9	-9006.8	40392.9	39375.9	-23.091
04-Oct-19	277	02:22:00	-0.0543	02:51:00	-12.8745	39412.5	-9008.2	40428.8	39412.5	-37.352
09-Oct-19	282	00:39:00	-0.0423	01:17:00	-12.8904	39386.8	-9013.9	40405.1	39386.8	-29.078
09-Oct-19	282	01:27:00	-0.0405	01:35:00	-12.895	39390.5	-9018	40409.6	39390.5	-27.844
11-Oct-19	284	01:08:00	-0.0417	01:17:00	-12.9013	39377.5	-9019.6	40397.3	39377.5	-28.659
11-Oct-19	284	01:23:00	-0.0429	01:29:00	-12.9012	39378.9	-9019.8	40398.8	39378.9	-29.485
16-Oct-19	289	00:25:00	-0.0582	00:25:00	-12.8787	39404.9	-9009.5	40421.8	39404.9	-40.027
16-Oct-19	289	00:37:00	-0.059	00:44:00	-12.8723	39400.7	-9003.9	40416.4	39400.7	-40.573
18-Oct-19	291	01:38:00	-0.0411	01:48:00	-12.8948	39405.5	-9021.3	40424.9	39405.5	-28.267
18-Oct-19	291	01:55:00	-0.0419	01:59:00	-12.8922	39408.2	-9020	40427.4	39408.2	-28.819
23-Oct-19	296	02:15:00	-0.0557	02:20:00	-12.8938	39394	-9017.9	40413	39394.0	-38.297
25-Oct-19	298	02:03:00	-0.0532	02:09:00	-12.9092	39385.9	-9027.2	40407.2	39385.9	-36.570
30-Oct-19	303	01:19:00	-0.0778	01:26:00	-12.8956	39389.1	-9018.1	40408.2	39389.1	-53.485
30-Oct-19	303	01:33:00	-0.0798	01:38:00	-12.8917	39392.2	-9016	40410.8	39392.2	-54.864
06-Nov-19	310	00:54:00	-0.0682	01:01:00	-12.9106	39372.8	-9025.2	40393.9	39372.8	-46.866
06-Nov-19	310	01:07:00	-0.0688	01:11:00	-12.911	39372.5	-9025.5	40393.7	39372.5	-47.278
08-Nov-19	312	00:45:00	-0.0653	00:51:00	-12.9146	39377.3	-9029.2	40399.2	39377.3	-44.878
08-Nov-19	312	00:57:00	-0.0673	01:04:00	-12.9121	39380	-9028	40401.5	39380.0	-46.256
18-Dec-19	352	00:54:00	-0.0828	01:02:00	-12.8904	39392.6	-9015.2	40411	39392.6	-56.928
18-Dec-19	352	01:09:00	-0.0844	01:17:00	-12.8917	39396.5	-9017	40415.2	39396.5	-58.033
20-Dec-19	354	00:51:00	-0.0744	00:57:00	-12.8954	39359.2	-9011.2	40377.6	39359.2	-51.109
20-Dec-19	354	01:00:00	-0.0748	01:05:00	-12.89	39360.1	-9007.4	40377.6	39360.1	-51.385
25-Dec-19	359	01:30:00	-0.0528	01:36:00	-12.9054	39391.7	-9025.8	40412.5	39391.7	-36.301
25-Dec-19	359	01:43:00	-0.0565	01:48:00	-12.9075	39392.8	-9027.6	40413.9	39392.8	-38.846
27-Dec-19	361	01:20:00	-0.0698	01:26:00	-12.9058	39399.1	-9027.8	40420.1	39399.1	-47.998
27-Dec-19	361	01:33:00	-0.0665	01:39:00	-12.8985	39404.1	-9023.6	40424.1	39404.1	-45.734



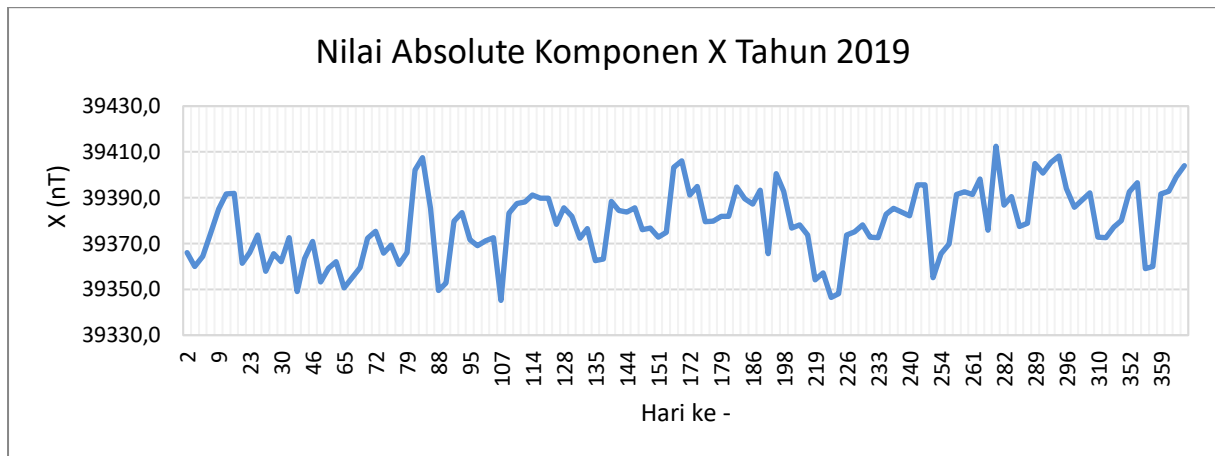
Gambar 15 Grafik nilai absolut komponen H - horizontal tahun 2019



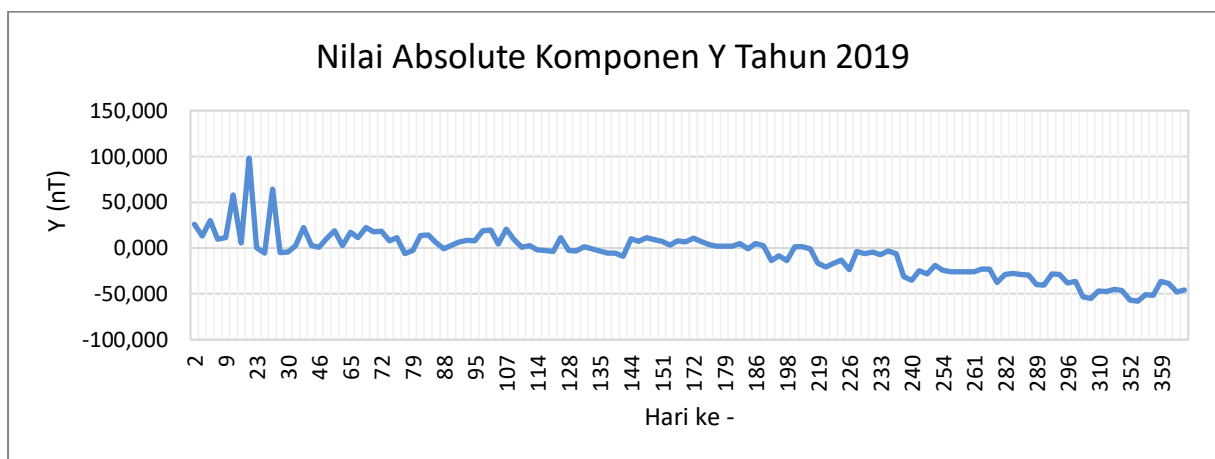
Gambar 16 Grafik nilai absolut komponen Z - vertical tahun 2019



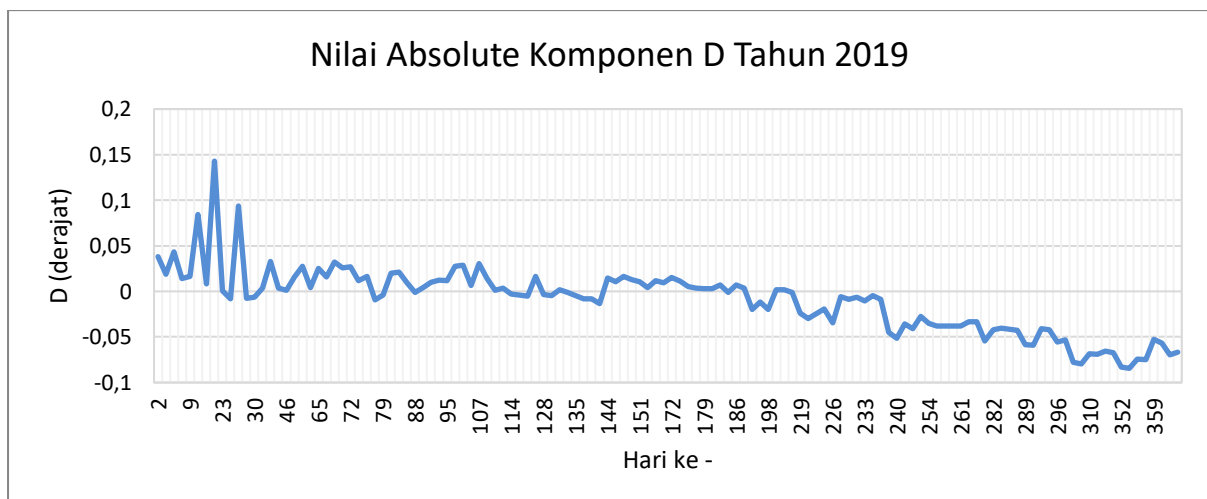
Gambar 17 Grafik nilai absolut komponen F - total tahun 2019



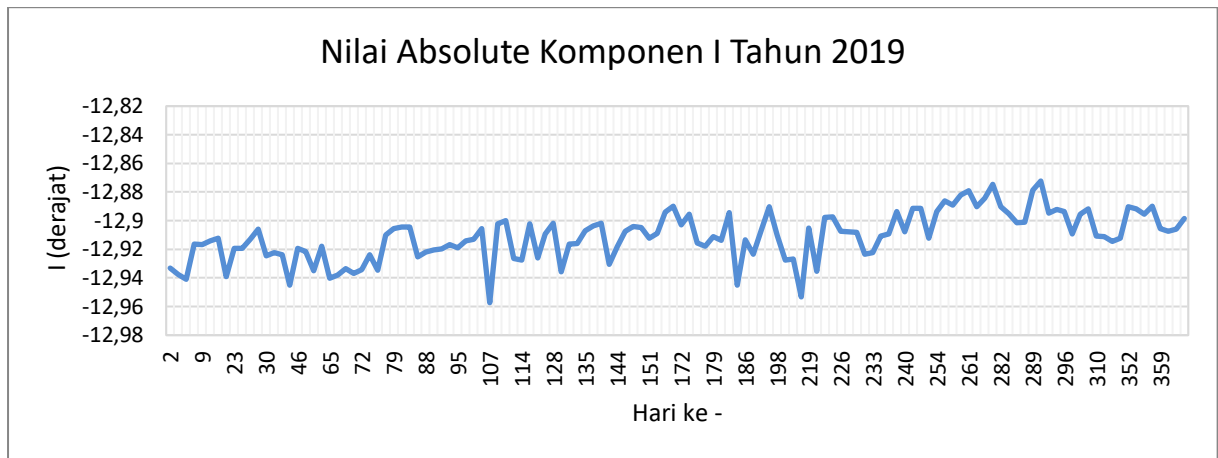
Gambar 18 Grafik nilai absolut komponen X - north tahun 2019



Gambar 19 Grafik nilai absolut komponen Y - east tahun 2019



Gambar 20 Grafik nilai absolut komponen D - declination tahun 2019



Gambar 21 Grafik nilai absolut komponen I - inclination tahun 2019

Tabel 5 Nilai variasi harian komponen Z - vertical (nT) Januari 2019

Tondano Magnetic Observatory

Januari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9059.2	-9057.5	-9054.8	-9056.2	-9057.3	-9061.9	-9064.0	-9062.2	-9062.2	-9062.7	-9064.5	-9064.6	-9062.0	-9062.2	-9062.0	-9062.8	-9062.9	-9063.9	-9064.8	-9064.2	-9064.0	-9063.1	-9062.7	-9065.6	-9062.0
2	-9069.5	-9063.5	-9058.8	-9059.9	-9059.0	-9060.0	-9062.8	-9066.6	-9066.6	-9067.0	-9065.4	-9064.2	-9063.0	-9062.8	-9063.5	-9062.6	-9062.4	-9061.7	-9062.8	-9062.9	-9063.0	-9062.7	-9060.6	-9059.9	-9063.0
3	-9058.9	-9059.0	-9059.0	-9056.4	-9056.2	-9060.8	-9064.9	-9067.6	-9067.6	-9067.3	-9066.7	-9065.2	-9063.7	-9063.1	-9064.0	-9063.5	-9063.5	-9063.4	-9063.1	-9062.6	-9062.7	-9064.2	-9059.2	-9056.2	-9062.5
4	-9058.9	-9065.8	-9066.1	-9062.2	-9055.8	-9056.0	-9058.6	-9059.5	-9059.5	-9060.1	-9063.1	-9068.8	-9063.8	-9064.0	-9063.2	-9065.1	-9062.5	-9061.8	-9063.4	-9067.7	-9067.8	-9066.1	-9059.2	-9056.0	-9062.3
5	-9059.1	-9061.5	-9059.7	-9051.4	-9050.7	-9057.3	-9056.7	-9055.5	-9055.5	-9060.3	-9064.5	-9059.3	-9063.8	-9063.9	-9063.6	-9063.0	-9062.0	-9064.9	-9066.0	-9063.1	-9064.5	-9064.0	-9064.1	-9059.1	-9060.6
6	-9060.3	-9063.0	-9063.1	-9061.0	-9066.8	-9065.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9063.0	-9062.9	-9063.2
7	-9060.9	-9058.9	-9057.4	-9054.8	-9060.0	-9061.0	-9064.4	-9062.6	-9062.6	-9061.3	-9062.7	-9063.0	-9062.4	-9062.5	-9063.6	-9064.2	-9063.4	-9064.6	-9064.1	-9063.8	-9064.5	-9063.4	-9064.3	-9059.8	-9062.1
8	-9056.6	-9057.2	-9058.5	-9058.9	-9063.7	-9069.4	-9074.7	-9069.0	-9069.0	-9064.7	-9063.8	-9063.6	-9064.1	-9064.2	-9062.6	-9062.9	-9064.4	-9064.1	-9064.3	-9063.1	-9063.1	-9063.3	-9059.0	-9055.5	-9063.3
9	-9058.2	-9063.1	-9065.9	-9067.0	-9066.1	-9066.4	-9067.6	-9071.5	-9071.5	-9063.8	-9062.8	-9063.3	-9064.6	-9065.5	-9064.0	-9064.2	-9063.8	-9063.6	-9064.4	-9064.2	-9065.2	-9064.2	-9062.2	-9058.5	-9064.7
10	-9055.8	-9051.1	-9044.7	-9045.6	-9045.7	-9042.5	-9052.7	-9060.1	-9060.1	-9061.2	-9060.6	-9061.7	-9061.3	-9062.0	-9061.0	-9065.8	-9065.8	-9065.1	-9064.0	-9064.2	-9064.2	-9064.4	-9062.8	-9061.9	-9058.5
11	-9058.5	-9057.8	-9056.8	-9064.8	-9069.4	-9068.0	-9067.2	-9067.4	-9066.7	-9065.2	-9063.2	-9061.9	-9063.4	-9062.9	-9063.5	-9064.1	-9063.5	-9065.5	-9063.5	-9063.5	-9062.9	-9063.6	-9065.6	-9066.3	-9064.1
12	-9067.9	-9065.4	-9062.2	-9062.9	-9064.6	-9065.3	-9068.1	-9067.7	-9067.7	-9066.7	-9064.9	-9064.3	-9063.8	-9062.4	-9062.9	-9063.9	-9065.0	-9063.9	-9063.5	-9063.9	-9064.0	-9063.9	-9065.5	-9066.4	-9064.9
13	-9063.6	-9058.9	-9056.3	-9052.2	-9052.5	-9056.6	-9056.9	-9059.3	-9059.3	-9061.7	-9062.6	-9064.8	-9065.3	-9063.4	-9062.7	-9062.5	-9062.6	-9062.8	-9062.7	-9062.8	-9064.5	-9062.7	-9062.4	-9063.3	-9060.9
14	-9062.5	-9064.0	-9063.1	-9057.0	-9048.5	-9047.5	-9054.1	-9062.0	-9062.0	-9062.3	-9063.4	-9063.8	-9061.9	-9063.3	-9063.2	-9062.0	-9062.4	-9065.5	-9062.1	-9063.7	-9063.8	-9062.2	-9059.0	-9059.8	-9060.8
15	-9062.0	-9065.2	-9068.1	-9063.9	-9061.9	-9058.0	-9054.9	-9058.3	-9060.9	-9060.2	-9060.3	-9061.9	-9062.7	-9063.4	-9063.9	-9061.9	-9062.9	-9063.4	-9063.9	-9064.7	-9062.1	-9062.4	-9064.3	-9065.4	-9062.4
16	-9067.9	-9070.8	-9072.5	-9069.0	-9064.9	-9063.3	-9061.2	-9061.2	-9061.2	-9064.1	-9064.7	-9063.7	-9064.3	-9063.7	-9063.1	-9063.1	-9062.5	-9062.5	-9062.6	-9062.8	-9061.7	-9063.2	-9063.0	-9069.1	-9064.4
17	-9073.2	-9077.2	-9074.6	-9072.3	-9072.7	-9068.4	-9058.2	-9058.2	-9058.2	-9061.3	-9061.6	-9060.0	-9060.6	-9060.5	-9061.9	-9058.9	-9061.1	-9062.1	-9064.8	-9062.8	-9063.5	-9062.2	-9063.2	-9064.0	-9064.2
18	-9067.3	-9071.6	-9072.5	-9070.9	-9070.9	-9064.7	-9063.7	-9066.7	-9066.7	-9065.9	-9062.8	-9063.4	-9065.0	-9064.3	-9062.0	-9062.8	-9063.4	-9064.9	-9062.7	-9061.4	-9061.6	-9062.2	-9062.5	-9060.2	-9065.0
19	-9062.1	-9064.6	-9063.4	-9060.0	-9060.0	-9062.8	-9064.8	-9062.1	-9062.1	-9058.2	-9061.4	-9062.4	-9062.5	-9060.9	-9061.0	-9061.4	-9061.3	-9061.1	-9063.7	-9062.6	-9062.7	-9062.4	-9061.4	-9061.1	-9061.9
20	-9056.7	-9056.1	-9056.8	-9058.5	-9058.5	-9060.2	-9069.6	-9075.2	-9075.2	-9062.3	-9063.0	-9062.2	-9061.8	-9060.8	-9061.4	-9061.5	-9062.2	-9062.8	-9062.2	-9062.0	-9061.6	-9061.5	-9060.1	-9058.9	-9062.1
21	-9055.3	-9053.1	-9059.6	-9066.7	-9066.7	-9065.7	-9066.9	-9068.4	-9068.4	-9057.4	-9059.8	-9060.0	-9060.3	-9061.0	-9060.5	-9060.2	-9060.9	-9061.4	-9061.8	-9061.1	-9061.0	-9060.5	-9056.6	-9053.0	-9061.1
22	-9054.4	-9052.5	-9053.0	-9057.8	-9057.8	-9055.6	-9058.3	-9062.7	-9062.7	-9061.8	-9061.0	-9060.3	-9060.7	-9060.7	-9060.4	-9060.2	-9060.6	-9061.8	-9060.2	-9061.4	-9060.7	-9060.3	-9061.5	-9059.8	-9059.4
23	-9058.0	-9055.3	-9056.9	-9057.8	-9057.8	-9063.2	-9067.2	-9066.6	-9066.6	-9060.1	-9055.5	-9058.0	-9065.2	-9061.8	-9059.5	-9061.1	-9064.4	-9063.6	-9064.0	-9060.8	-9059.6	-9061.6	-9058.2	-9061.7	-9061.0
24	-9064.4	-9056.1	-9055.2	-9058.8	-9058.8	-9062.6	-9066.7	-9063.4	-9063.4	-9066.1	-9067.2	-9064.1	-9061.8	-9061.8	-9060.6	-9061.6	-9060.1	-9059.9	-9058.9	-9061.1	-9063.5	-9064.1	-9064.5	-9057.9	-9061.8
25	-9051.3	-9051.3	-9050.7	-9047.6	-9047.6	-9045.7	-9047.6	-9052.5	-9052.5	-9059.8	-9060.2	-9058.5	-9058.6	-9058.9	-9059.7	-9061.7	-9059.6	-9059.4	-9062.9	-9062.7	-9060.1	-9060.8	-9063.7	-9062.5	-9056.5
26	-9065.9	-9058.7	-9053.8	-9051.0	-9051.0	-9051.9	-9057.0	-9059.8	-9059.8	-9061.0	-9061.6	-9060.8	-9059.7	-9057.4	-9061.5	-9058.4	-9060.6	-9061.2	-9060.0	-9060.6	-9060.8	-9059.3	-9054.7	-9051.1	-9058.2
27	-9048.9	-9048.0	-9046.0	-9045.0	-9045.0	-9045.2	-9055.7	-9060.3	-9060.3	-9058.1	-9058.3	-9060.0	-9059.4	-9059.6	-9059.0	-9057.5	-9058.6	-9059.2	-9059.3	-9060.0	-9060.5	-9062.1	-9063.7	-9062.0	-9056.3
28	-9060.8	-9057.1	-9052.3	-9052.0	-9052.0	-9053.0	-9059.5	-9061.8	-9061.8	-9063.2	-9063.5	-9061.1	-9061.0	-9060.7	-9059.5	-9059.1	-9059.5	-9059.4	-9059.5	-9059.6	-9059.9	-9059.9	-9058.1	-9056.3	-9058.8
29	-9056.2	-9053.3	-9054.6	-9058.4	-9058.4	-9058.9	-9061.1	-9062.9	-9062.9	-9052.5	-9055.3	-9056.4	-9057.6	-	-	-	-	-	-	-	-	-	-9056.9	-9056.3	-9057.5
30	-9059.0	-9061.0	-9061.2	-9064.2	-9064.2	-9064.7	-9060.4	-9057.9	-9054.3	-9057.0	-9059.5	-9059.3	-9059.4	-9059.2	-9059.1	-9058.7	-9058.5	-9058.3	-9058.9	-9059.5	-9059.8	-9059.6	-9057.7	-9056.0	-9059.5
31	-9058.7	-9056.8	-9058.2	-9060.4	-9061.3	-9056.1	-9054.4	-9053.6	-9055.1	-9055.5	-9056.7	-9057.9	-9058.6	-9055.2	-9056.7	-9056.8	-9061.6	-9064.3	-9061.5	-9062.7	-9059.9	-9055.4	-9064.5	-9061.4	-9058.5
HOURL MEANS	-9060.4	-9059.8	-9059.2	-9058.9	-9058.9	-9059.3	-9061.3	-9062.8	-9062.8	-9061.7	-9062.1	-9062.0	-9062.0	-9061.8	-9061.7	-9061.8	-9062.2	-9062.6	-9062.7	-9062.6	-9062.5	-9062.2	-9061.4	-9060.3	-9061.3

Tabel 6 Nilai variasi harian komponen F - total (nT) Januari 2019

Tondano Magnetic Observatory

Januari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	40329.8	40340.8	40348.1	40352.1	40351.0	40344.4	40329.3	40312.5	40298.3	40295.7	40295.9	40301.9	40304.6	40304.8	40304.7	40305.3	40307.2	40308.5	40310.2	40311.3	40312.7	40312.4	40312.1	40316.4	40317.1
2	40329.5	40340.6	40346.3	40343.9	40335.7	40326.8	40321.1	40317.5	40311.9	40311.5	40311.8	40312.4	40312.2	40311.3	40313.0	40314.8	40318.3	40316.8	40317.6	40318.7	40320.0	40319.8	40316.7	40321.2	40321.2
3	40331.5	40346.9	40353.2	40350.8	40341.0	40334.0	40326.9	40318.8	40313.3	40313.7	40316.3	40316.8	40317.9	40318.2	40318.8	40318.9	40319.6	40320.7	40321.6	40320.9	40319.6	40321.6	40321.2	40323.4	40325.2
4	40331.3	40342.4	40351.4	40353.4	40348.2	40343.4	40339.8	40330.4	40323.4	40316.0	40310.5	40322.3	40324.0	40317.8	40315.6	40325.3	40324.1	40314.0	40310.8	40312.1	40319.6	40324.7	40324.6	40330.6	40327.3
5	40337.1	40347.5	40356.6	40348.0	40328.9	40329.0	40322.1	40310.6	40301.1	40298.1	40308.8	40300.8	40299.4	40303.9	40305.5	40305.3	40300.4	40301.6	40306.2	40307.0	40308.8	40306.8	40311.6	40312.9	40314.9
6	40324.6	40341.0	40352.0	40341.0	40335.3	40325.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40311.9	40317.8	40331.2
7	40330.6	40343.8	40350.0	40344.7	40334.0	40323.1	40316.4	40305.8	40300.1	40303.0	40306.7	40306.6	40309.9	40311.6	40311.5	40316.3	40314.6	40316.2	40317.8	40319.0	40320.8	40316.6	40319.3	40327.7	40319.4
8	40349.0	40368.4	40377.3	40377.3	40366.8	40358.4	40345.4	40333.0	40321.3	40319.1	40321.1	40318.3	40318.5	40318.3	40316.3	40315.4	40316.7	40317.4	40318.3	40320.0	40320.0	40320.7	40317.9	40321.2	40332.3
9	40348.5	40366.5	40377.1	40375.7	40355.8	40336.2	40324.8	40322.3	40319.1	40314.6	40310.0	40313.5	40313.4	40317.6	40315.1	40319.8	40318.4	40317.1	40319.8	40321.9	40323.7	40324.7	40325.6	40330.6	40329.7
10	40334.5	40346.9	40359.5	40370.5	40362.9	40347.2	40338.6	40334.6	40324.3	40321.2	40320.4	40323.2	40321.3	40317.3	40312.1	40318.1	40322.0	40324.8	40324.5	40325.7	40326.3	40324.3	40323.4	40329.7	40331.4
11	40341.4	40361.7	40369.3	40363.6	40360.5	40354.7	40342.3	40322.3	40309.4	40313.9	40316.1	40315.5	40313.2	40313.4	40314.3	40314.0	40316.0	40315.9	40320.9	40317.6	40318.1	40317.6	40319.3	40324.9	40328.2
12	40334.1	40347.5	40353.8	40357.1	40349.7	40339.7	40329.2	40321.8	40319.2	40319.0	40317.8	40316.8	40315.4	40313.5	40312.7	40312.7	40316.2	40318.1	40317.5	40318.4	40318.8	40318.6	40321.0	40329.1	40325.7
13	40340.9	40355.6	40367.0	40366.5	40355.1	40342.4	40329.5	40321.3	40317.7	40319.0	40317.9	40320.5	40322.5	40320.8	40320.0	40321.4	40321.3	40321.1	40321.6	40322.6	40327.8	40331.3	40337.5	40349.6	40332.1
14	40350.2	40369.3	40387.2	40391.7	40378.8	40360.6	40347.0	40337.9	40325.2	40321.3	40322.4	40320.3	40317.3	40319.1	40324.6	40322.1	40321.8	40328.3	40324.7	40325.3	40330.0	40330.9	40327.8	40331.5	40338.1
15	40333.5	40340.5	40351.3	40354.7	40353.6	40342.5	40330.1	40321.9	40320.2	40318.3	40317.9	40316.4	40316.6	40318.8	40322.6	40322.0	40321.2	40322.0	40324.9	40330.0	40326.7	40326.2	40326.2	40330.1	40328.7
16	40338.7	40349.1	40360.9	40368.6	40366.8	40346.4	40327.0	40315.7	40318.2	40318.8	40317.7	40319.0	40317.9	40317.5	40320.9	40321.4	40322.8	40323.8	40320.6	40311.7	40309.0	40303.8	40301.8	40326.9	
17	40308.0	40316.4	40326.3	40338.5	40342.2	40341.7	40327.1	40327.1	40319.8	40322.6	40323.7	40318.7	40318.9	40316.8	40317.9	40310.4	40312.6	40311.7	40314.5	40316.0	40318.6	40316.2	40318.4	40323.6	40321.2
18	40333.0	40348.5	40360.6	40361.7	40357.6	40356.2	40342.6	40330.7	40320.3	40316.9	40309.7	40308.1	40311.7	40313.9	40310.5	40310.3	40312.2	40316.9	40316.7	40313.3	40314.0	40315.4	40316.1	40315.3	40325.5
19	40317.1	40322.1	40323.0	40325.3	40326.3	40327.0	40327.3	40323.4	40315.6	40312.7	40315.1	40314.8	40316.4	40316.7	40317.4	40318.3	40316.0	40313.3	40315.8	40313.6	40314.7	40315.3	40316.4	40325.0	40318.7
20	40337.7	40349.5	40350.8	40343.9	40330.7	40331.1	40327.4	40323.1	40319.3	40316.5	40316.7	40313.9	40315.7	40314.4	40315.7	40316.1	40321.8	40322.1	40323.0	40325.0	40323.0	40319.2	40319.7	40328.7	40325.2
21	40338.9	40348.8	40363.8	40360.6	40352.8	40352.6	40343.8	40334.6	40322.9	40317.2	40319.8	40320.4	40320.8	40322.2	40322.7	40324.3	40325.5	40328.9	40328.4	40327.6	40327.5	40330.3	40331.4	40338.4	40333.5
22	40351.9	40362.1	40371.8	40375.3	40363.4	40362.9	40344.7	40326.9	40319.9	40323.0	40324.3	40323.0	40323.8	40323.9	40324.8	40324.0	40323.6	40327.6	40324.9	40324.7	40323.9	40319.9	40321.9	40326.9	40335.0
23	40338.8	40350.7	40360.0	40359.2	40348.0	40349.2	40343.7	40334.4	40329.4	40325.0	40311.6	40303.8	40312.9	40313.1	40304.4	40307.1	40315.2	40320.3	40327.6	40326.8	40323.7	40326.0	40324.8	40327.0	40328.4
24	40346.2	40354.5	40361.4	40359.3	40340.8	40341.6	40323.8	40306.2	40300.3	40310.3	40317.6	40318.9	40317.6	40317.1	40314.0	40317.4	40316.8	40315.5	40316.9	40323.9	40320.0	40320.3	40319.9	40323.7	40325.2
25	40331.4	40342.9	40347.0	40344.0	40333.3	40332.9	40317.9	40307.5	40297.7	40307.5	40313.5	40310.8	40306.8	40303.7	40300.6	40306.4	40313.4	40309.0	40312.5	40317.1	40315.9	40314.8	40318.2	40321.1	40317.7
26	40330.4	40345.9	40351.0	40352.8	40347.9	40348.1	40338.3	40325.8	40310.7	40315.5	40316.5	40315.5	40315.0	40307.1	40313.3	40312.4	40312.9	40314.7	40314.3	40315.8	40317.3	40315.9	40316.7	40320.4	40323.9
27	40325.8	40331.6	40337.2	40341.5	40341.4	40341.4	40337.7	40332.8	40320.5	40315.0	40311.0	40311.8	40312.9	40313.8	40315.3	40312.8	40313.1	40313.2	40312.8	40313.4	40314.6	40316.7	40318.9	40323.9	40322.1
28	40330.9	40340.1	40347.2	40350.0	40345.0	40345.2	40341.1	40331.1	40319.2	40319.6	40319.8	40317.4	40317.7	40318.3	40317.1	40315.6	40318.2	40318.7	40317.9	40318.5	40318.3	40318.4	40317.3	40317.4	40325.8
29	40324.5	40336.8	40350.3	40359.1	40358.5	40358.6	40354.1	40350.8	40331.7	40323.6	40322.0	40317.8	40315.5	-	-	-	-	-	-	-	-	-	40319.0	40322.7	40336.3
30	40332.4	40344.0	40348.1	40356.2	40352.6	40352.7	40346.2	40338.9	40323.4	40323.2	40324.4	40324.1	40324.7	40324.4	40324.1	40323.6	40323.9	40324.8	40324.2	40324.3	40325.9	40328.0	40327.5	40330.4	40332.2
31	40341.4	40352.6	40375.6	40386.9	40388.9	40376.1	40353.9	40338.4	40330.5	40325.2	40319.6	40314.6	40314.9	40314.0	40307.0	40297.7	40302.3	40305.2	40313.3	40318.3	40320.5	40309.5	40320.9	40319.1	40331.1
HOURL MEANS	40334.6	40346.9	40356.0	40357.2	40350.1	40344.2	40334.6	40325.6	40316.7	40315.9	40315.9	40315.2	40315.7	40315.3	40314.8	40315.5	40316.8	40317.5	40318.7	40319.6	40320.1	40319.7	40320.2	40324.6	40326.8

Tabel 8 Nilai variasi harian komponen Y - east (nT) Januari 2019

Tondano Magnetic Observatory

Januari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	535.1	544.3	543.6	541.2	539.7	548.5	561.8	566.7	566.9	563.1	561.5	557.4	551.7	549.0	546.2	544.5	543.3	543.6	544.8	545.0	544.9	542.6	539.1	540.7	548.5
2	549.8	545.3	549.2	549.9	542.6	544.6	550.7	551.4	551.3	554.4	554.3	552.3	550.7	549.1	546.9	545.1	543.2	542.9	542.9	542.8	542.7	541.8	534.4	525.2	546.0
3	524.8	538.6	547.2	544.5	543.5	548.4	551.8	549.6	547.1	548.7	551.0	549.5	547.9	547.5	547.8	546.0	544.9	543.9	543.0	542.4	542.1	543.4	538.1	535.3	544.5
4	538.5	551.9	555.6	546.3	538.4	542.0	550.5	560.2	563.2	558.3	557.2	558.2	554.8	553.1	548.6	544.3	540.1	538.0	535.5	538.9	538.9	534.0	523.8	516.0	545.3
5	523.7	538.1	541.5	536.8	535.6	545.6	550.4	556.3	557.9	557.4	554.5	549.4	550.8	548.5	547.0	545.5	545.0	545.4	547.2	544.9	545.6	545.7	542.9	537.0	545.5
6	531.4	525.5	529.5	549.8	555.3	559.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	536.9	529.8	539.7
7	521.7	517.0	521.2	539.2	566.6	580.0	576.2	565.1	557.7	554.8	554.1	552.3	547.8	546.1	545.6	545.4	543.9	544.5	543.8	543.2	542.7	542.1	535.0	522.0	546.2
8	530.7	528.5	530.5	538.5	547.6	557.7	565.7	564.1	559.0	555.7	553.1	551.6	551.0	549.9	547.9	546.6	547.1	546.6	546.6	544.2	543.8	543.4	531.4	521.6	545.9
9	521.7	535.9	547.8	555.3	562.7	569.7	570.0	563.2	555.5	551.1	550.1	546.0	547.1	548.3	548.0	545.3	545.5	545.1	544.1	543.5	544.5	544.1	540.1	533.1	548.2
10	515.1	514.7	517.5	527.5	543.8	552.3	568.7	571.2	564.9	559.1	555.5	552.6	551.0	549.8	545.2	547.2	547.2	546.0	545.0	544.1	543.9	545.2	539.3	531.5	544.9
11	521.7	518.8	518.2	525.7	536.0	553.3	564.4	564.2	554.2	555.0	555.6	552.9	549.7	548.3	546.9	546.7	546.8	546.3	547.1	546.3	543.7	543.8	541.2	532.4	544.1
12	530.4	533.7	537.9	541.7	546.0	554.6	556.7	553.8	554.0	554.0	552.2	551.1	549.0	546.5	546.3	546.2	546.2	545.9	546.0	546.3	546.2	546.3	543.1	531.0	546.0
13	522.2	524.9	524.8	528.3	540.3	553.0	554.6	555.7	553.5	553.2	553.8	553.5	552.0	549.0	547.9	546.6	546.2	546.3	545.7	544.5	544.0	541.3	536.5	525.3	543.5
14	519.8	518.1	526.5	545.6	560.8	567.4	567.1	565.6	562.9	554.9	554.1	553.4	550.7	549.3	547.5	546.1	545.5	546.9	545.0	545.0	543.8	540.4	531.2	524.1	546.3
15	525.1	525.9	532.7	539.9	553.8	558.6	553.6	560.0	558.7	553.2	550.5	550.1	548.9	547.6	547.3	546.0	546.5	546.2	545.3	545.0	543.9	543.3	541.1	529.8	545.5
16	524.4	529.3	534.4	545.4	558.6	563.2	559.1	559.1	552.6	551.5	553.2	551.1	550.4	549.5	548.0	546.5	545.8	545.1	545.1	545.6	544.6	543.0	538.1	531.6	546.5
17	524.2	528.3	526.9	529.4	541.9	551.7	552.1	552.1	557.8	556.6	554.2	550.5	548.2	545.7	545.9	543.9	540.8	542.1	545.1	544.0	543.8	542.3	536.2	528.9	543.0
18	523.4	527.7	528.2	539.9	539.9	546.6	548.1	549.5	549.1	549.2	548.8	547.5	547.4	547.1	545.3	545.0	545.6	546.5	546.0	543.8	541.6	540.5	534.3	525.9	541.9
19	530.5	532.9	532.2	532.8	532.9	542.8	549.9	550.8	555.7	551.7	549.6	549.1	549.0	546.9	545.1	543.7	543.9	543.4	545.4	546.3	544.9	543.2	535.6	521.1	542.5
20	517.2	528.5	535.1	542.1	541.9	554.0	559.5	554.0	548.2	550.9	551.8	549.2	546.6	545.5	545.0	544.4	544.1	545.4	544.8	543.4	543.1	542.5	534.8	522.7	543.1
21	514.6	514.0	524.9	542.9	542.8	558.5	561.5	566.1	560.2	548.4	547.5	546.4	546.0	545.9	545.2	544.1	543.8	544.0	545.8	545.3	544.3	540.9	526.0	508.3	542.0
22	500.2	502.5	522.0	540.3	540.1	553.5	557.7	558.5	547.0	545.1	546.8	546.8	546.6	546.0	545.2	544.1	543.1	542.4	542.1	541.3	540.7	541.1	536.6	525.8	539.8
23	517.0	516.7	527.8	540.6	540.5	550.5	555.2	559.8	558.2	553.0	546.8	544.5	547.1	544.9	541.7	539.7	539.9	539.5	541.4	539.5	538.3	537.5	528.2	516.9	540.2
24	510.2	513.5	523.4	529.4	529.2	540.9	550.9	550.9	546.9	550.8	555.5	552.2	548.8	547.0	544.3	542.0	539.3	537.7	531.6	531.9	537.4	538.9	538.7	527.1	538.3
25	519.0	520.2	524.8	530.4	530.3	539.7	552.5	562.2	560.9	555.0	553.1	549.9	546.4	544.6	542.8	540.4	538.6	538.6	541.5	542.3	541.8	542.2	539.2	528.8	541.1
26	527.4	523.1	525.6	533.9	533.8	550.2	557.3	559.8	557.7	554.0	553.7	550.6	547.6	544.0	541.9	539.2	539.9	540.4	539.5	539.7	540.9	540.2	536.7	537.0	542.3
27	535.8	531.1	526.4	520.9	520.9	522.6	534.4	544.9	557.2	553.5	550.1	548.3	546.1	545.5	543.9	541.9	541.6	541.8	541.3	541.4	542.0	545.7	549.0	539.9	540.3
28	530.5	521.5	512.4	518.3	518.3	530.5	543.7	550.6	546.2	548.2	551.5	548.8	547.1	545.7	544.0	543.0	541.9	541.3	540.9	540.5	540.8	540.5	534.7	530.8	538.0
29	531.3	533.4	533.8	535.3	535.3	539.2	546.7	555.3	559.9	554.8	549.6	547.6	547.6	-	-	-	-	-	-	-	-	-	531.5	523.6	541.7
30	515.9	514.3	517.9	537.6	537.6	548.2	553.5	555.9	546.3	547.0	549.1	547.8	546.4	545.2	544.1	542.7	541.5	540.2	540.2	540.0	539.6	539.6	535.3	525.5	539.6
31	523.8	517.6	522.6	531.4	543.2	552.7	557.3	561.2	559.6	551.9	550.4	549.5	547.3	539.4	539.5	536.3	538.9	541.8	539.3	542.1	539.5	535.0	530.8	526.9	540.7
HOURL MEANS	524.4	526.3	530.4	537.4	541.9	551.0	556.1	557.9	555.7	553.1	552.3	550.3	548.7	547.1	545.6	544.1	543.4	543.4	543.2	542.9	542.5	541.7	536.1	527.6	543.3

Tabel 9 Nilai variasi harian komponen D – declination (menit) Januari 2019

Tondano Magnetic Observatory

Januari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	46.83	47.62	47.55	47.34	47.20	47.99	49.17	49.62	49.65	49.33	49.18	48.82	48.31	48.08	47.83	47.69	47.58	47.60	47.70	47.72	47.71	47.51	47.20	47.33	48.02
2	48.12	47.71	48.04	48.11	47.48	47.67	48.21	48.28	48.27	48.55	48.54	48.36	48.22	48.08	47.89	47.73	47.55	47.53	47.52	47.52	47.51	47.4	46.8	46.0	47.80
3	45.9	47.1	47.9	47.63	47.55	47.99	48.30	48.12	47.91	48.04	48.24	48.11	47.97	47.93	47.95	47.80	47.70	47.61	47.54	47.48	47.46	47.57	47.11	46.85	47.66
4	47.12	48.29	48.60	47.78	47.09	47.42	48.17	49.03	49.29	48.88	48.79	48.87	48.57	48.42	48.03	47.65	47.28	47.10	46.89	47.18	47.17	46.74	45.85	45.16	47.72
5	45.83	47.1	47.4	47.0	46.9	47.75	48.18	48.71	48.86	48.82	48.55	48.12	48.24	48.03	47.90	47.77	47.73	47.77	47.92	47.72	47.78	47.79	47.54	47.01	47.76
6	46.51	45.97	46.32	48.11	48.60	48.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.01	46.38	47.23
7	45.66	45.23	45.59	47.17	49.58	50.77	50.45	49.5	48.9	48.6	48.52	48.37	47.96	47.82	47.77	47.75	47.62	47.67	47.61	47.56	47.50	47.46	46.83	45.69	47.81
8	46.42	46.20	46.37	47.07	47.88	48.77	49.49	49.36	48.94	48.65	48.42	48.29	48.23	48.14	47.96	47.86	47.90	47.86	47.85	47.64	47.60	47.57	46.52	45.66	47.78
9	45.64	46.85	47.88	48.54	49.21	49.85	49.90	49.30	48.63	48.25	48.17	47.81	47.90	48.00	47.98	47.74	47.76	47.73	47.63	47.57	47.66	47.63	47.27	46.65	47.98
10	45.08	45.03	45.25	46.11	47.54	48.31	49.76	49.98	49.45	48.94	48.63	48.37	48.23	48.14	47.74	47.90	47.90	47.80	47.70	47.62	47.60	47.72	47.21	46.52	47.69
11	45.65	45.36	45.30	45.97	46.88	48.40	49.38	49.39	48.53	48.60	48.64	48.40	48.13	48.00	47.88	47.9	47.9	47.8	47.9	47.8	47.6	47.6	47.4	46.60	47.62
12	46.42	46.69	47.04	47.37	47.76	48.52	48.73	48.48	48.50	48.50	48.34	48.25	48.06	47.85	47.83	47.83	47.82	47.79	47.80	47.83	47.81	47.83	47.54	46.47	47.79
13	45.69	45.90	45.89	46.19	47.25	48.38	48.53	48.64	48.46	48.43	48.49	48.45	48.32	48.06	47.96	47.85	47.81	47.82	47.77	47.66	47.61	47.37	46.94	45.95	47.56
14	45.46	45.30	46.01	47.67	49.01	49.61	49.61	49.49	49.27	48.58	48.50	48.45	48.22	48.08	47.93	47.80	47.75	47.87	47.70	47.71	47.59	47.30	46.49	45.87	47.80
15	45.95	46.01	46.59	47.22	48.44	48.87	48.45	49.02	48.91	48.43	48.19	48.16	48.05	47.93	47.91	47.79	47.84	47.81	47.73	47.70	47.60	47.55	47.36	46.37	47.75
16	45.89	46.30	46.73	47.68	48.84	49.27	48.93	48.93	48.38	48.28	48.43	48.25	48.18	48.11	47.97	47.84	47.78	47.72	47.71	47.76	47.69	47.55	47.13	46.56	47.83
17	45.90	46.26	46.12	46.33	47.4	48.3	48.3	48.3	48.8	48.72	48.51	48.19	47.99	47.77	47.79	47.62	47.35	47.47	47.73	47.62	47.60	47.48	46.94	46.30	47.54
18	45.80	46.16	46.19	47.22	47.22	47.81	47.95	48.09	48.07	48.08	48.05	47.94	47.93	47.90	47.75	47.72	47.77	47.85	47.80	47.61	47.42	47.32	46.78	46.04	47.44
19	46.45	46.64	46.58	46.64	46.64	47.51	48.13	48.21	48.65	48.30	48.12	48.08	48.06	47.88	47.72	47.60	47.62	47.58	47.75	47.83	47.71	47.56	46.89	45.61	47.49
20	45.25	46.23	46.80	47.43	47.43	48.49	48.97	48.50	48.00	48.23	48.31	48.08	47.86	47.76	47.72	47.66	47.63	47.74	47.69	47.56	47.54	47.49	46.81	45.75	47.54
21	45.02	44.96	45.90	47.47	47.47	48.85	49.13	49.54	49.04	48.01	47.92	47.83	47.79	47.79	47.72	47.62	47.60	47.61	47.77	47.73	47.64	47.34	46.03	44.5	47.43
22	43.75	43.94	45.63	47.23	47.23	48.40	48.79	48.88	47.88	47.72	47.86	47.86	47.84	47.79	47.72	47.62	47.54	47.48	47.45	47.38	47.33	47.37	46.97	46.02	47.24
23	45.24	45.20	46.15	47.28	47.28	48.16	48.57	48.98	48.85	48.40	47.88	47.69	47.91	47.71	47.44	47.26	47.27	47.23	47.39	47.22	47.12	47.04	46.23	45.24	47.28
24	44.63	44.91	45.77	46.30	46.30	47.33	48.22	48.24	47.90	48.23	48.63	48.34	48.04	47.89	47.65	47.45	47.21	47.08	46.54	46.56	47.04	47.17	47.16	46.13	47.11
25	45.41	45.51	45.91	46.40	46.40	47.23	48.37	49.23	49.13	48.60	48.43	48.15	47.85	47.69	47.54	47.32	47.15	47.16	47.41	47.48	47.43	47.47	47.20	46.29	47.37
26	46.16	45.76	45.97	46.69	46.69	48.13	48.76	49.00	48.83	48.50	48.47	48.21	47.94	47.64	47.45	47.21	47.27	47.32	47.24	47.25	47.36	47.29	46.98	47.00	47.46
27	46.89	46.48	46.05	45.57	45.57	45.72	46.76	47.68	48.78	48.46	48.17	48.01	47.81	47.76	47.62	47.45	47.42	47.44	47.40	47.40	47.45	47.78	48.06	47.26	47.29
28	46.43	45.63	44.82	45.34	45.34	46.41	47.6	48.2	47.8	48.0	48.3	48.0	47.9	47.77	47.63	47.53	47.44	47.39	47.36	47.32	47.34	47.32	46.81	46.47	47.09
29	46.50	46.67	46.69	46.81	46.81	47.16	47.81	48.57	49.00	48.56	48.11	47.93	47.94	-	-	-	-	-	-	-	-	-	46.52	45.83	47.40
30	45.14	44.99	45.30	47.02	47.02	47.95	48.42	48.63	47.81	47.88	48.06	47.95	47.83	47.72	47.62	47.50	47.39	47.28	47.28	47.26	47.23	47.23	46.85	45.99	47.22
31	45.83	45.27	45.68	46.44	47.46	48.31	48.74	49.10	48.97	48.30	48.18	48.11	47.92	47.23	47.25	46.97	47.19	47.45	47.22	47.45	47.23	46.84	46.47	46.13	47.32
HOURL MEANS	45.89	46.04	46.39	47.00	47.40	48.20	48.66	48.83	48.65	48.43	48.35	48.18	48.04	47.90	47.76	47.63	47.58	47.57	47.55	47.52	47.49	47.42	46.93	46.18	47.55

Tabel 10 Nilai variasi harian komponen I – inclination (derajat) Januari 2019

Tondano Magnetic Observatory

Januari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.99	-12.98	-12.97	-12.97	-12.98	-12.99	-12.99	-13.00	-13.00	-13.00	-13.01	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99
2	-13.00	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-13.00	-13.00	-13.00	-13.0	-13.0	-13.0	-12.99
3	-13.0	-13.0	-13.0	-12.98	-12.98	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-13.00	-13.00	-12.99	-12.98	-12.99
4	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.98	-12.99
5	-12.98	-12.98	-12.98	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99
6	-12.99	-12.99	-12.98	-12.99	-13.00	-13.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-13.00	-13.00	-12.99
7	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99
8	-12.98	-12.97	-12.97	-12.97	-12.98	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.98	-12.99
9	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-13.00	-13.01	-13.01	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99
10	-12.98	-12.97	-12.96	-12.95	-12.96	-12.96	-12.97	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-13.00	-12.99	-12.98
11	-12.98	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-13.00	-13.01	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.00	-12.99
12	-13.00	-12.99	-12.98	-12.98	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00
13	-12.99	-12.98	-12.97	-12.96	-12.97	-12.98	-12.98	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
14	-12.98	-12.98	-12.97	-12.96	-12.95	-12.96	-12.97	-12.99	-12.99	-12.99	-13.00	-13.00	-12.99	-13.00	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
15	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-12.99	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-12.99
16	-13.00	-13.00	-13.00	-12.99	-12.98	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.01	-13.00
17	-13.01	-13.02	-13.01	-13.00	-13.0	-13.0	-13.0	-13.0	-13.0	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00
18	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-13.00
19	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-13.00	-12.99	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99
20	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-13.00	-13.01	-13.01	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
21	-12.98	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-13.0	-12.99
22	-12.97	-12.97	-12.96	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
23	-12.98	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
24	-12.99	-12.97	-12.97	-12.98	-12.98	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-12.99	-12.99
25	-12.97	-12.97	-12.97	-12.96	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-12.99	-12.99	-13.00	-13.00	-12.99	-12.99	-13.00	-12.99	-12.99
26	-13.00	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.99
27	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.98
28	-12.99	-12.98	-12.97	-12.97	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
29	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-	-	-	-	-	-	-	-	-	-12.99	-12.98	-12.98
30	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99
31	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-13.00	-12.99	-12.99
HOURL MEANS	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-13.00	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99

2. Gangguan badai magnet

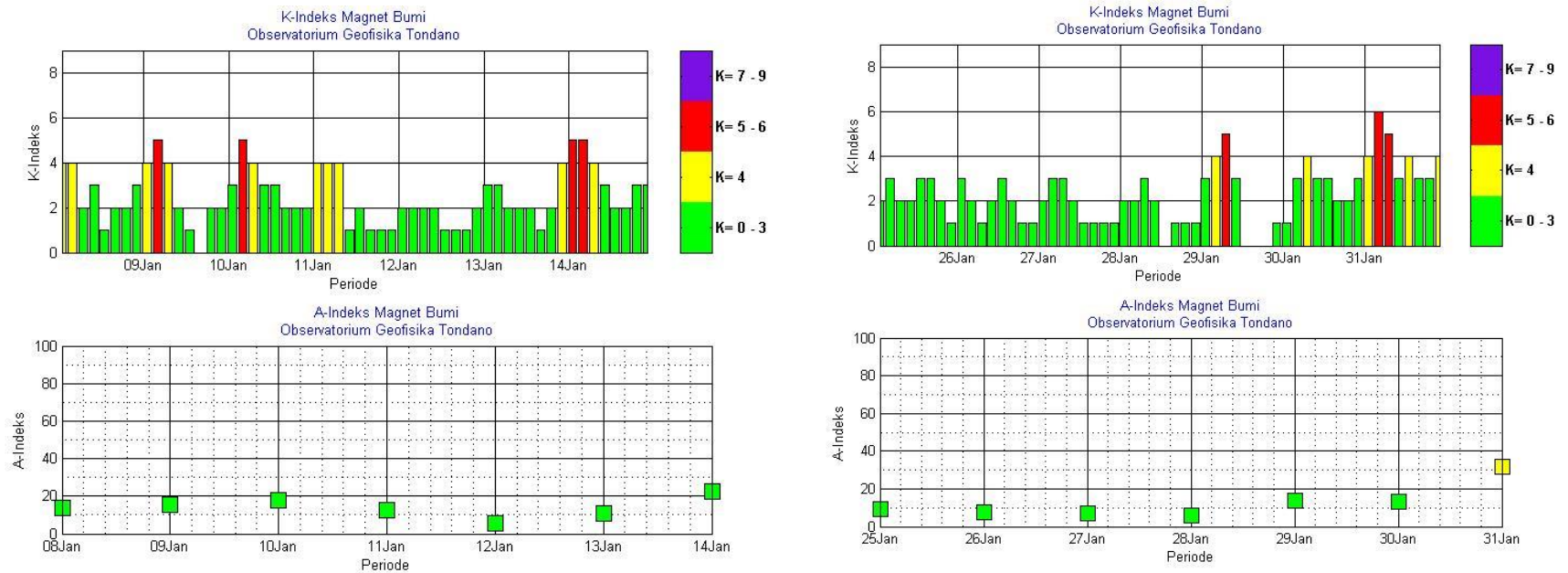
Tabel 11 Monitoring waktu gangguan
pada pengamatan magnet bumi Januari 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	1	2019					
2	2	1	2019					
3	3	1	2019					
4	4	1	2019					
5	5	1	2019					
6	6	1	2019					
7	7	1	2019					
8	8	1	2019					
9	9	1	2019					
10	10	1	2019					
11	11	1	2019					
12	12	1	2019					
13	13	1	2019					
14	14	1	2019					
15	15	1	2019					
16	16	1	2019					
17	17	1	2019					
18	18	1	2019					
19	19	1	2019					
20	20	1	2019					
21	21	1	2019					
22	22	1	2019					
23	23	1	2019					
24	24	1	2019					
25	25	1	2019					
26	26	1	2019					
27	27	1	2019					
28	28	1	2019					
29	29	1	2019					
30	30	1	2019					
31	31	1	2019	12	44	0		Badai Kecil

Tabel 12 Hasil Analisa K-indeks dan A indeks Januari 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	2	3	3	2	1	0	1	1	6.6	Tenang
2	2	1	2	1	0	1	1	1	3.6	Tenang
3	2	0	0	0	0	0	0	0	0.9	Tenang
4	1	3	3	3	3	3	3	3	13.5	Tenang
5	2	3	2	3	2	2	2	2	9.0	Tenang
6	3	3	0	0	0	0	0	2	4.6	Tenang
7	2	2	1	0	2	1	1	3	5.6	Tenang
8	4	4	2	3	1	2	2	3	13.5	Tenang
9	4	5	4	2	1	0	2	2	15.8	Tenang
10	3	5	4	3	3	2	2	2	17.6	Tenang
11	4	4	4	1	2	1	1	1	12.5	Tenang
12	2	2	2	2	1	1	1	2	5.5	Tenang
13	3	3	2	2	2	1	2	4	11.0	Tenang
14	5	5	4	3	2	2	3	3	22.8	Tenang
15	2	3	3	2	2	1	3	2	9.5	Tenang
16	2	4	2	2	1	1	3	3	10.5	Tenang
17	2	4	2	2	2	2	2	1	9.0	Tenang
18	3	3	2	3	2	2	2	1	9.5	Tenang
19	3	3	2	1	0	2	1	2	7.1	Tenang
20	3	2	3	2	1	2	2	3	9.5	Tenang
21	3	3	3	2	2	3	3	4	14.5	Tenang
22	4	4	2	3	2	2	2	2	13.0	Tenang
23	2	3	4	4	3	3	2	3	16.0	Tenang
24	3	4	4	2	2	2	3	2	14.0	Tenang
25	2	3	2	2	3	3	2	1	9.5	Tenang
26	3	2	1	2	3	2	1	1	7.5	Tenang
27	2	3	3	2	1	1	1	1	7.0	Tenang
28	2	2	3	2	0	1	1	1	5.6	Tenang
29	3	4	5	3	0	0	0	1	13.5	Tenang
30	1	3	4	3	3	2	2	3	13.0	Tenang
31	4	6	5	3	4	3	3	4	31.8	Badai Kecil

Gambar 22 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Januari 2019



B. Februari 2019

1. Nilai variasi harian bulan Februari 2019

Tabel 13 Nilai variasi harian komponen H – horizontal (nT) Februari 2019

Tondano Magnetic Observatory

Februari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39292.0	39304.3	39315.1	39311.8	39300.1	39283.1	39273.8	39259.0	39255.1	39260.3	39259.4	39265.4	39266.4	-	-	-	-	-	-	-	-	-	-	-	39280.4
2	-	-	-	-	39292.3	39291.0	39289.3	39273.2	39263.6	39260.7	39261.6	39265.7	39265.6	39269.1	39265.1	39276.7	39273.9	39273.2	39285.2	39285.3	39279.6	39275.2	39278.3	39283.8	39275.4
3	39289.3	39292.3	39295.4	39300.4	39298.5	39287.3	39279.2	39270.4	39272.2	39272.7	39271.8	39271.3	39271.2	39269.1	39275.2	39272.3	39272.4	39275.2	39280.2	39278.6	39277.2	39275.9	39274.5	39279.6	39279.3
4	-	-	-	-	-	-	39288.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39288.3
5	-	-	-	-	-	-	39297.1	39288.8	39280.6	39278.2	39278.2	39277.1	39277.8	39278.2	39277.2	39279.0	39280.8	39284.1	39281.5	39280.9	39279.6	39278.2	39277.2	39282.8	39281.0
6	39295.2	39314.8	39330.8	39334.4	-	39317.4	39307.7	39292.1	39279.8	39281.1	39277.0	39266.1	39253.1	39262.4	39270.9	39273.4	39282.1	39277.2	39280.5	39281.7	39280.9	39284.5	39281.7	39280.6	39287.2
7	39284.8	39293.4	39301.0	39305.4	39302.8	39297.3	39290.8	39282.6	39279.6	39281.5	39281.8	39280.9	39280.9	39280.8	39277.7	39279.0	39277.3	39278.9	39281.0	39281.1	39280.3	39280.7	39274.8	39273.2	39284.5
8	-	-	-	-	-	-	-	39278.5	39274.9	39265.6	39267.7	39274.2	39277.6	39278.4	39278.3	39279.0	39278.2	39280.2	39281.0	39280.7	39284.3	39280.9	39279.5	39274.7	39277.3
9	39277.6	39290.2	39302.9	39314.4	39311.6	39308.5	39298.7	39287.9	39274.6	39269.0	39275.5	39278.0	39278.0	39278.6	39284.9	39283.2	39282.2	39280.4	39288.2	39291.5	39287.5	39285.9	39286.6	39289.5	39287.7
10	-	-	-	-	-	-	-	-	-	-	39284.0	39282.7	39283.0	39284.0	39283.4	39282.3	39282.1	39284.2	39283.9	39284.1	39283.4	39283.7	39280.9	39282.4	39283.2
11	39289.6	39300.5	39312.8	39316.7	39313.0	39303.7	39292.8	39284.6	39283.2	39285.1	39286.1	39282.8	39283.7	39283.0	39279.6	39267.8	39265.2	39272.1	39278.6	39283.4	39283.6	39285.7	39287.2	39292.3	39288.0
12	39305.6	39313.9	39319.8	39318.8	39311.9	39306.0	39299.8	39291.7	39286.2	39289.9	39293.4	39293.2	39288.9	39280.8	39276.2	39278.2	39279.8	39282.2	39282.4	39283.6	39285.2	39289.5	39287.5	39291.2	39293.2
13	39291.8	39301.0	39313.3	39318.2	39319.2	39307.9	39294.5	39283.7	39275.7	39273.1	39268.2	39255.1	39243.1	39256.7	39266.6	39270.9	39274.2	39282.7	39275.9	39283.2	39286.7	39286.2	39284.3	39287.9	39283.3
14	39290.9	39299.5	39301.9	39307.6	39310.8	39302.6	39295.7	39284.2	39275.3	39266.1	39275.0	39278.1	39280.4	39280.3	39279.2	39279.6	39279.7	39280.8	39281.7	39281.1	39283.6	39282.8	39285.9	39293.0	39286.5
15	39304.9	39314.7	39316.1	39316.3	39315.5	39308.9	39299.0	39288.8	39281.8	39282.3	39281.8	39280.8	39279.4	39280.6	39280.7	39280.1	39279.0	39279.2	39282.5	39283.9	39283.7	39284.2	39285.5	39292.3	39290.9
16	39303.1	39314.4	39322.1	39323.3	39318.1	39305.4	39293.3	39293.3	39282.1	39282.8	39285.1	39284.7	39283.8	39283.3	39279.7	39280.5	39279.3	39278.1	39277.5	39282.1	39285.1	39285.6	39286.5	39290.9	39291.7
17	39300.0	39311.3	39320.0	39321.9	39315.6	39312.0	39304.1	39304.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39311.1
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	39311.0	39303.6	39287.4	39285.2	39284.5	39281.7	39279.3	39279.1	39280.0	39280.2	39280.3	39281.5	39281.8	39284.1	39285.2	39286.0	39284.0	39283.2	39285.5
20	39288.4	39299.5	39311.7	39320.9	39323.2	39323.2	39318.4	39310.8	39296.3	39294.9	39294.9	39292.7	39291.0	39289.5	39289.8	39292.2	39291.8	39296.8	39298.0	39298.9	39299.8	39296.7	39291.3	39293.0	39300.1
21	39299.4	39298.5	39309.5	39318.4	39322.7	39322.7	39316.9	39309.7	39296.0	39293.2	39289.1	39280.5	39270.9	39269.3	39276.8	39280.1	39282.2	39283.4	39283.7	39284.7	39286.1	39286.3	39286.4	39288.3	39293.1
22	39295.2	39301.9	39310.3	39314.5	39315.1	39315.1	39311.1	39302.3	39286.8	39282.5	39285.7	39283.1	39281.1	39281.1	39283.1	39285.3	39285.4	39286.3	39286.0	39286.1	39288.1	39289.2	39290.4	39294.4	39293.3
23	39306.5	39319.9	39333.5	39338.7	39333.0	39333.0	39321.5	39309.7	39295.4	39294.4	39293.2	39292.5	39291.2	39289.2	39289.1	39288.5	39289.6	39289.4	39290.6	39290.9	39291.5	39292.7	39294.5	39300.7	39302.9
24	39311.8	39325.0	39338.2	39344.4	39339.4	39339.4	39328.7	39316.9	39295.1	39293.4	39293.2	39293.9	39292.2	39292.9	39291.9	39288.6	39289.3	39291.3	39292.7	39293.5	39294.3	39295.9	39297.8	39304.2	39306.0
25	39317.9	39329.3	39338.2	39344.9	39342.2	39342.2	39334.6	39322.9	39300.4	39293.7	39292.6	39293.4	39292.9	39294.9	39295.6	39296.3	39294.6	39292.9	39294.7	39296.3	39296.6	39296.1	39296.9	39296.9	39308.2
26	-	-	39303.2	39312.6	39318.0	39318.0	39316.3	39314.0	39299.4	39292.5	39289.6	39292.5	39293.1	39292.1	39291.7	39289.0	39291.7	39294.1	39295.6	39296.0	39296.2	39295.1	39291.7	39290.6	39298.8
27	39296.5	39305.1	39311.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39304.4
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	39296.9	39306.8	39315.4	39320.2	39316.0	39311.2	39302.7	39293.6	39282.8	39280.8	39281.3	39280.3	39278.5	39279.7	39280.6	39281.0	39281.4	39282.9	39284.7	39286.0	39286.3	39286.2	39285.6	39288.4	39290.8

Tabel 14 Nilai variasi harian komponen Z – vertical (nT) Februari 2019

Tondano Magnetic Observatory

Februari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9058.7	-9061.2	-9060.7	-9061.7	-9061.3	-9061.0	-9062.0	-9060.8	-9060.8	-9060.2	-9059.9	-9061.2	-9060.6	-	-	-	-	-	-	-	-	-	-	-	-9060.8
2	-	-	-	-	-9056.2	-9059.6	-9060.9	-9058.3	-9058.3	-9055.5	-9058.9	-9059.0	-9059.4	-9059.7	-9056.4	-9062.0	-9054.9	-9059.3	-9061.7	-9056.8	-9057.9	-9061.8	-9060.8	-9061.4	-9058.9
3	-9062.9	-9063.3	-9067.3	-9070.1	-9071.5	-9068.0	-9065.8	-9063.6	-9063.6	-9061.5	-9059.8	-9058.5	-9058.5	-9057.5	-9058.3	-9056.3	-9058.9	-9060.6	-9060.1	-9058.7	-9059.6	-9061.7	-9058.2	-9055.2	-9061.7
4	-	-	-	-	-	-	-9055.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9055.1
5	-	-	-	-	-	-	-9062.1	-9059.0	-9059.0	-9054.5	-9056.6	-9056.3	-9056.6	-9056.5	-9056.2	-9056.7	-9057.5	-9057.8	-9056.2	-9057.2	-9058.8	-9059.3	-9057.5	-9052.5	-9057.2
6	-9052.6	-9050.8	-9042.9	-9045.6	-	-9051.8	-9057.2	-9058.0	-9058.0	-9059.9	-9054.8	-9054.5	-9054.7	-9061.2	-9059.5	-9058.6	-9059.4	-9057.8	-9060.6	-9059.2	-9061.3	-9062.2	-9061.9	-9061.8	-9056.7
7	-9063.9	-9063.1	-9056.3	-9053.2	-9055.2	-9057.9	-9061.2	-9059.7	-9059.7	-9059.5	-9059.3	-9058.3	-9058.3	-9058.7	-9057.0	-9058.0	-9057.8	-9058.9	-9059.1	-9058.8	-9059.6	-9061.1	-9059.6	-9059.6	-9058.9
8	-	-	-	-	-	-	-	-9061.6	-9061.6	-9057.9	-9060.7	-9060.3	-9058.9	-9056.9	-9057.1	-9057.5	-9057.6	-9058.3	-9059.0	-9059.2	-9060.7	-9062.7	-9064.6	-9060.1	-9059.7
9	-9059.7	-9057.5	-9049.3	-9050.4	-9058.0	-9058.1	-9059.7	-9061.1	-9061.1	-9058.3	-9059.8	-9058.6	-9058.2	-9058.6	-9057.3	-9057.6	-9057.0	-9057.3	-9059.6	-9059.6	-9058.2	-9059.0	-9060.6	-9056.7	-9058.0
10	-	-	-	-	-	-	-	-	-	-	-	-9058.5	-9056.7	-9056.1	-9056.0	-9055.8	-9056.9	-9058.3	-9057.7	-9058.3	-9058.4	-9059.8	-9060.3	-9057.8	-9057.6
11	-9056.1	-9055.0	-9053.9	-9055.1	-9057.5	-9056.4	-9054.7	-9053.2	-9053.2	-9055.4	-9056.3	-9057.0	-9056.5	-9056.7	-9054.0	-9052.4	-9058.1	-9060.6	-9061.7	-9059.0	-9058.3	-9059.5	-9057.3	-9055.4	-9056.4
12	-9054.7	-9052.1	-9052.9	-9051.3	-9052.1	-9049.8	-9051.1	-9051.5	-9051.5	-9056.5	-9057.8	-9056.4	-9055.4	-9053.5	-9054.5	-9056.4	-9057.2	-9057.9	-9057.3	-9058.1	-9058.9	-9059.3	-9059.3	-9057.9	-9055.1
13	-9052.3	-9050.6	-9053.3	-9051.0	-9050.2	-9048.5	-9049.4	-9054.8	-9054.8	-9054.5	-9055.8	-9049.6	-9054.8	-9062.6	-9060.9	-9059.3	-9059.0	-9056.5	-9056.9	-9059.3	-9058.4	-9056.2	-9056.0	-9054.1	-9054.9
14	-9055.5	-9055.1	-9055.1	-9055.6	-9057.6	-9054.6	-9055.2	-9050.2	-9050.2	-9051.4	-9058.6	-9057.3	-9056.7	-9056.0	-9055.6	-9055.5	-9055.9	-9056.2	-9057.2	-9057.6	-9059.0	-9057.9	-9058.1	-9058.6	-9055.9
15	-9058.6	-9052.3	-9049.9	-9050.3	-9054.1	-9055.2	-9056.2	-9054.4	-9054.5	-9056.4	-9057.3	-9057.3	-9057.2	-9057.6	-9057.3	-9056.6	-9057.0	-9057.5	-9059.2	-9057.9	-9057.5	-9057.4	-9056.6	-9055.3	-9056.0
16	-9053.4	-9052.5	-9054.6	-9058.1	-9057.0	-9055.7	-9056.9	-9056.9	-9056.9	-9055.4	-9057.1	-9055.8	-9055.8	-9055.7	-9054.5	-9056.1	-9055.2	-9054.8	-9055.9	-9058.6	-9058.2	-9057.3	-9054.2	-9052.4	-9055.8
17	-9051.1	-9046.3	-9038.0	-9041.6	-9044.7	-9049.8	-9049.0	-9049.0	-9049.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9046.5
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-9047.5	-9048.7	-9048.7	-9051.4	-9052.2	-9054.0	-9055.3	-9055.8	-9055.9	-9055.9	-9056.4	-9056.2	-9057.0	-9057.7	-9057.6	-9057.4	-9055.7	-9052.4	-9054.2
20	-9051.8	-9052.4	-9050.0	-9048.3	-9048.3	-9047.1	-9051.7	-9051.5	-9051.5	-9054.2	-9054.8	-9054.1	-9054.3	-9054.5	-9054.7	-9055.3	-9055.5	-9056.2	-9056.4	-9056.0	-9055.3	-9054.6	-9056.2	-9054.5	-9053.3
21	-9052.1	-9050.9	-9052.6	-9054.1	-9054.1	-9054.0	-9053.0	-9052.6	-9052.6	-9052.0	-9053.6	-9053.3	-9054.3	-9056.3	-9056.9	-9055.8	-9055.2	-9055.8	-9056.5	-9056.5	-9056.6	-9055.3	-9054.3	-9052.4	-9054.2
22	-9054.4	-9050.1	-9043.3	-9041.1	-9041.1	-9045.5	-9047.1	-9047.1	-9047.1	-9050.5	-9053.8	-9053.1	-9053.6	-9054.4	-9054.5	-9055.1	-9054.8	-9055.5	-9055.3	-9056.1	-9056.5	-9056.9	-9058.1	-9060.2	-9051.9
23	-9059.1	-9054.8	-9046.5	-9039.0	-9039.0	-9043.5	-9048.8	-9054.5	-9054.5	-9055.7	-9055.5	-9055.5	-9054.4	-9053.9	-9054.0	-9054.6	-9055.0	-9054.7	-9056.0	-9055.5	-9056.5	-9057.5	-9060.5	-9060.8	-9053.3
24	-9058.0	-9054.1	-9051.1	-9042.0	-9042.0	-9039.0	-9046.3	-9053.2	-9053.2	-9056.9	-9056.5	-9056.2	-9055.4	-9055.3	-9054.4	-9053.6	-9055.0	-9056.0	-9055.8	-9055.3	-9055.9	-9057.3	-9062.3	-9066.7	-9053.8
25	-9066.1	-9058.9	-9053.8	-9052.9	-9052.9	-9052.6	-9055.8	-9056.9	-9056.9	-9056.5	-9057.1	-9055.9	-9055.2	-9055.8	-9055.2	-9055.2	-9054.2	-9054.5	-9055.5	-9055.0	-9054.2	-9054.7	-9058.1	-9058.1	-9055.9
26	-	-	-9065.4	-9061.7	-9061.7	-9051.9	-9049.5	-9050.2	-9050.2	-9053.0	-9054.6	-9054.2	-9053.9	-9053.8	-9053.7	-9053.6	-9055.0	-9055.4	-9055.3	-9054.9	-9055.3	-9055.0	-9056.4	-9055.9	-9055.0
27	-9059.6	-9063.0	-9063.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9062.0
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-9056.9	-9054.9	-9053.0	-9051.7	-9053.4	-9053.0	-9054.6	-9055.1	-9055.1	-9055.8	-9056.9	-9056.2	-9056.3	-9056.7	-9056.1	-9056.3	-9056.5	-9057.1	-9057.7	-9057.5	-9057.8	-9058.4	-9058.5	-9057.3	-9056.1

Tabel 15 Nilai Variasi harian komponen F – total (nT) Februari 2019

Tondano Magnetic Observatory																								Februari 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS	
1	40322.8	40335.3	40345.6	40342.7	40331.2	40314.6	40305.7	40291.0	40287.2	40292.2	40291.3	40297.4	40298.1	-	-	-	-	-	-	-	-	-	-	-	40311.9	
2	-	-	-	-	40322.4	40321.9	40320.5	40304.4	40294.9	40291.5	40293.1	40297.2	40297.2	40300.7	40295.9	40308.5	40304.2	40304.5	40316.8	40315.8	40310.4	40307.0	40309.8	40315.3	40306.6	
3	40321.1	40324.1	40328.0	40333.5	40331.9	40320.2	40311.8	40302.7	40304.5	40304.6	40303.3	40302.5	40302.4	40300.1	40306.2	40303.0	40303.7	40306.8	40311.5	40309.7	40308.5	40307.7	40305.6	40309.8	40311.0	
4	-	-	-	-	-	-	40318.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40318.3	
5	-	-	-	-	-	-	40328.4	40319.6	40311.7	40308.3	40308.8	40307.6	40308.4	40308.8	40307.8	40309.6	40311.5	40314.8	40312.0	40311.6	40310.7	40309.4	40308.1	40312.3	40311.6	
6	40324.4	40343.2	40357.0	40361.1	-	40346.0	40337.7	40322.7	40310.7	40312.3	40307.2	40296.5	40283.9	40294.4	40302.3	40304.5	40313.2	40308.1	40312.0	40312.8	40312.5	40316.2	40313.4	40312.3	40317.6	
7	40316.8	40325.1	40331.0	40334.5	40332.5	40327.7	40322.1	40313.8	40310.9	40312.7	40312.9	40311.8	40311.7	40311.8	40308.4	40309.9	40308.2	40310.0	40312.1	40312.1	40312.1	40311.5	40312.3	40306.2	40304.6	40315.4
8	-	-	-	-	-	-	-	40310.3	40306.7	40296.8	40299.4	40305.7	40308.8	40309.1	40309.0	40309.7	40309.0	40311.1	40312.1	40311.8	40315.7	40312.8	40311.8	40306.2	40308.6	
9	40308.9	40320.7	40331.2	40342.6	40341.7	40338.7	40329.5	40319.2	40306.3	40300.2	40306.9	40309.1	40308.9	40309.6	40315.5	40313.9	40312.8	40311.1	40319.2	40322.4	40318.2	40316.8	40317.9	40319.8	40318.4	
10	-	-	-	-	-	-	-	-	-	-	40314.9	40313.2	40313.4	40314.3	40313.8	40312.6	40312.7	40315.0	40314.6	40314.9	40314.3	40314.9	40312.3	40313.2	40313.9	
11	40319.8	40330.1	40341.9	40345.9	40342.9	40333.6	40322.7	40314.3	40312.9	40315.2	40316.4	40313.3	40314.2	40313.5	40309.6	40297.8	40296.4	40303.7	40310.4	40314.4	40314.5	40316.7	40317.7	40322.3	40318.3	
12	40335.0	40342.6	40348.5	40347.1	40340.6	40334.4	40328.6	40320.8	40315.4	40320.1	40323.9	40323.4	40319.0	40310.6	40306.4	40308.7	40310.5	40313.0	40313.0	40314.4	40316.2	40320.4	40318.5	40321.7	40323.0	
13	40321.1	40329.6	40342.2	40346.5	40347.4	40335.9	40323.1	40313.7	40306.0	40303.4	40298.8	40284.7	40274.2	40289.2	40298.5	40302.3	40305.4	40313.2	40306.6	40314.3	40317.5	40316.5	40314.6	40317.7	40313.4	
14	40320.9	40329.2	40331.6	40337.2	40340.8	40332.2	40325.6	40313.2	40304.6	40295.8	40306.1	40308.8	40310.9	40310.7	40309.6	40309.9	40310.1	40311.2	40312.3	40311.8	40314.6	40313.5	40316.6	40323.7	40316.7	
15	40335.2	40343.4	40344.2	40344.5	40344.6	40338.4	40328.9	40318.7	40311.8	40312.8	40312.4	40311.4	40310.1	40311.4	40311.4	40310.6	40309.7	40310.0	40313.6	40314.7	40314.3	40314.9	40315.9	40322.3	40321.0	
16	40332.4	40343.1	40351.1	40353.1	40347.8	40335.1	40323.6	40323.6	40312.6	40313.0	40315.7	40315.0	40314.1	40313.5	40309.8	40311.0	40309.5	40308.3	40307.9	40313.0	40315.9	40316.2	40316.3	40320.3	40321.7	
17	40328.8	40338.7	40345.3	40348.0	40342.6	40340.2	40332.3	40332.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40338.5	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
19	-	-	-	-	-	-	40338.7	40331.8	40316.0	40314.5	40313.9	40311.6	40309.6	40309.5	40310.4	40310.6	40310.8	40311.9	40312.4	40314.8	40315.9	40316.6	40314.2	40312.7	40315.3	
20	40317.6	40328.6	40340.0	40348.5	40350.8	40350.5	40346.9	40339.4	40325.3	40324.5	40324.6	40322.3	40320.7	40319.4	40319.7	40322.1	40321.8	40326.8	40328.1	40328.8	40329.6	40326.3	40321.4	40322.7	40329.4	
21	40328.5	40327.3	40338.4	40347.4	40351.6	40351.6	40345.7	40338.6	40325.2	40322.4	40318.7	40310.3	40301.1	40300.1	40307.5	40310.4	40312.4	40313.7	40314.2	40315.1	40316.5	40316.4	40316.3	40317.7	40322.8	
22	40324.9	40330.5	40337.0	40340.7	40341.2	40342.2	40338.7	40330.1	40315.0	40311.6	40315.5	40312.8	40310.9	40311.1	40313.1	40315.4	40315.4	40316.4	40316.1	40316.3	40318.4	40319.6	40321.0	40325.4	40322.5	
23	40336.9	40349.0	40360.4	40363.8	40358.2	40359.3	40349.3	40339.0	40325.1	40324.4	40323.1	40322.5	40321.0	40318.9	40318.8	40318.4	40319.5	40319.3	40320.8	40321.0	40321.8	40323.1	40325.6	40331.7	40332.1	
24	40341.8	40353.8	40366.0	40370.0	40365.1	40364.5	40355.6	40345.7	40324.5	40323.7	40323.4	40324.0	40322.1	40322.8	40321.7	40318.2	40319.3	40321.4	40322.8	40323.4	40324.3	40326.2	40329.1	40336.4	40335.2	
25	40349.6	40359.1	40366.7	40373.0	40370.3	40370.2	40363.6	40352.4	40330.5	40323.9	40323.0	40323.5	40322.8	40324.9	40325.4	40326.1	40324.2	40322.6	40324.6	40326.1	40326.2	40325.8	40327.4	40327.3	40337.9	
26	-	-	40335.1	40343.5	40348.7	40346.5	40344.3	40342.2	40328.0	40321.9	40319.5	40322.1	40322.7	40321.7	40321.3	40318.6	40321.6	40324.0	40325.5	40325.8	40326.0	40324.9	40321.9	40320.7	40328.5	
27	40327.3	40336.5	40342.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40335.5	
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HOURLY MEANS	40327.0	40336.3	40344.2	40348.6	40344.9	40340.2	40332.2	40323.5	40313.0	40311.2	40311.9	40310.7	40309.0	40310.3	40311.0	40311.5	40311.9	40313.5	40315.4	40316.6	40317.0	40317.0	40316.4	40318.9	40321.0	

Tabel 16 Nilai Variasi harian komponen X – north (nT) Februari 2019

Tondano Magnetic Observatory																								Februari 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS	
1	39288.7	39300.9	39311.6	39308.1	39296.2	39279.1	39269.9	39255.1	39251.3	39256.5	39255.6	39261.6	39262.6	-	-	-	-	-	-	-	-	-	-	-	39276.7	
2	-	-	-	-	39288.5	39287.1	39285.3	39269.3	39259.6	39256.8	39257.8	39261.9	39261.8	39265.4	39261.3	39272.9	39270.2	39269.5	39281.5	39281.7	39275.9	39271.4	39274.6	39280.3	39271.6	
3	39285.9	39289.0	39292.0	39296.8	39294.8	39283.5	39275.3	39266.5	39268.3	39268.9	39268.0	39267.5	39267.4	39265.3	39271.5	39268.6	39268.7	39271.5	39276.5	39274.9	39273.5	39272.1	39270.8	39276.0	39275.6	
4	-	-	-	-	-	-	39284.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39284.5	
5	-	-	-	-	-	-	39293.1	39284.8	39276.7	39274.4	39274.4	39273.3	39274.1	39274.5	39273.5	39275.3	39277.1	39280.4	39277.9	39277.2	39275.9	39274.5	39273.5	39279.2	39277.2	
6	39291.7	39311.4	39327.4	39330.9	-	39313.6	39303.8	39288.2	39275.9	39277.2	39273.2	39262.3	39249.4	39258.7	39267.2	39269.7	39278.4	39273.5	39276.8	39278.0	39277.1	39280.6	39277.8	39276.9	39283.5	
7	39281.2	39289.9	39297.5	39301.9	39299.2	39293.5	39287.0	39278.8	39275.8	39277.7	39278.0	39277.1	39277.1	39277.0	39274.0	39275.3	39273.6	39275.2	39277.3	39277.4	39276.6	39276.9	39271.1	39269.6	39280.8	
8	-	-	-	-	-	-	-	39274.7	39271.1	39261.8	39263.8	39270.4	39273.9	39274.7	39274.5	39275.2	39274.5	39276.5	39277.3	39276.9	39280.5	39277.1	39275.6	39271.0	39273.5	
9	39274.0	39286.7	39299.5	39311.0	39308.0	39304.8	39294.8	39283.9	39270.7	39265.2	39271.7	39274.3	39274.2	39274.8	39281.2	39279.5	39278.5	39276.8	39284.5	39287.8	39283.8	39282.1	39282.9	39285.8	39284.0	
10	-	-	-	-	-	-	-	-	-	-	-	39280.2	39278.9	39279.2	39280.2	39279.7	39278.6	39278.4	39280.5	39280.1	39280.4	39279.7	39279.9	39277.1	39278.8	39279.4
11	39286.1	39297.1	39309.4	39313.2	39309.5	39300.0	39289.0	39280.8	39279.4	39281.3	39282.3	39279.0	39280.0	39279.2	39275.9	39264.2	39261.5	39268.4	39274.9	39279.7	39279.9	39281.9	39283.5	39288.8	39284.4	
12	39302.1	39310.5	39316.4	39315.3	39308.3	39302.4	39296.0	39287.8	39282.4	39286.1	39289.6	39289.4	39285.1	39277.1	39272.5	39274.5	39276.1	39278.5	39278.7	39279.9	39281.5	39285.8	39283.7	39287.4	39289.5	
13	39288.2	39297.3	39309.6	39314.6	39315.6	39304.2	39290.7	39279.7	39271.8	39269.3	39264.4	39251.4	39239.4	39253.0	39262.9	39267.2	39270.5	39279.0	39272.2	39279.5	39283.0	39282.5	39280.7	39284.4	39279.6	
14	39287.3	39295.9	39298.3	39303.9	39307.1	39298.9	39291.9	39280.4	39271.5	39262.2	39271.2	39274.3	39276.6	39276.6	39275.5	39275.9	39276.0	39277.1	39278.0	39277.4	39279.8	39279.0	39282.1	39289.3	39282.8	
15	39301.3	39311.2	39312.5	39312.7	39311.9	39305.2	39295.2	39285.1	39278.0	39278.5	39278.0	39277.0	39275.7	39276.9	39277.0	39276.4	39275.3	39275.5	39278.8	39280.2	39279.9	39280.5	39281.8	39288.6	39287.2	
16	39299.5	39310.8	39318.5	39319.5	39314.3	39301.6	39289.5	39289.5	39278.3	39279.1	39281.4	39281.0	39280.1	39279.6	39276.0	39276.8	39275.6	39274.4	39273.8	39278.4	39281.4	39281.9	39282.9	39287.4	39288.0	
17	39296.4	39307.8	39316.5	39318.2	39311.9	39308.2	39300.2	39300.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39307.4	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
19	-	-	-	-	-	-	39308.3	39300.9	39284.7	39282.6	39281.9	39279.1	39276.7	39276.6	39277.5	39277.6	39277.8	39279.0	39279.3	39281.6	39282.7	39283.5	39281.5	39280.8	39282.9	
20	39286.0	39297.1	39309.3	39318.5	39320.8	39320.7	39315.7	39308.1	39293.7	39292.2	39292.2	39290.1	39288.4	39287.0	39287.2	39289.6	39289.2	39294.2	39295.5	39296.3	39297.3	39294.1	39288.7	39290.5	39297.6	
21	39297.0	39296.1	39307.1	39316.0	39320.3	39320.2	39314.2	39307.0	39293.3	39290.6	39286.5	39277.9	39268.2	39266.7	39274.2	39277.6	39279.7	39280.9	39281.2	39282.1	39283.6	39283.8	39284.0	39285.9	39290.6	
22	39292.8	39299.5	39307.8	39312.1	39312.6	39312.5	39308.5	39299.6	39284.1	39279.9	39283.1	39280.6	39278.5	39278.5	39280.6	39282.8	39282.8	39283.7	39283.5	39283.5	39285.5	39286.7	39287.8	39292.0	39290.8	
23	39304.1	39317.5	39331.2	39336.4	39330.7	39330.7	39319.1	39307.1	39292.8	39291.8	39290.5	39289.9	39288.6	39286.6	39286.5	39285.9	39287.1	39286.9	39288.1	39288.4	39289.0	39290.1	39291.9	39298.1	39300.4	
24	39309.2	39322.5	39335.8	39342.0	39337.0	39337.0	39326.2	39314.3	39292.5	39290.8	39290.6	39291.3	39289.6	39290.3	39289.4	39286.0	39286.8	39288.7	39290.2	39291.0	39291.7	39293.4	39295.2	39301.6	39303.5	
25	39315.3	39326.7	39335.8	39342.4	39339.7	39339.7	39332.0	39320.2	39297.8	39291.1	39290.0	39290.8	39290.3	39292.3	39293.0	39293.7	39292.0	39290.3	39292.2	39293.8	39294.1	39293.6	39294.4	39294.4	39305.7	
26	-	-	39300.6	39310.1	39315.5	39315.6	39313.8	39311.5	39296.7	39289.9	39287.0	39289.9	39290.5	39289.5	39289.2	39286.4	39289.1	39291.5	39293.1	39293.5	39293.6	39292.6	39289.2	39288.2	39296.2	
27	39294.1	39302.6	39309.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39302.0	
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
HOURLY MEANS	39293.7	39303.7	39312.3	39317.0	39312.7	39307.9	39299.3	39290.2	39279.4	39277.4	39277.9	39276.9	39275.1	39276.4	39277.3	39277.7	39278.1	39279.6	39281.4	39282.7	39283.0	39282.9	39282.3	39285.2	39287.5	

Tabel 17 Nilai Variasi harian komponen Y – east (nT) Februari 2019

Tondano Magnetic Observatory																								Februari 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	515.2	512.9	522.8	538.2	550.5	559.3	553.2	553.1	549.3	546.1	546.3	545.8	544.9	-	-	-	-	-	-	-	-	-	-	-	541.4
2	-	-	-	-	545.1	553.0	554.4	555.6	555.6	548.5	549.0	547.2	546.1	544.4	541.3	541.0	536.5	539.3	538.8	536.4	538.6	542.8	536.4	526.6	543.8
3	517.4	513.4	515.5	531.1	540.7	547.0	551.1	552.4	549.4	548.4	548.0	546.3	544.7	542.8	539.8	538.0	538.9	540.2	540.3	540.9	542.4	546.4	539.6	527.6	539.3
4	-	-	-	-	-	-	544.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	544.6
5	-	-	-	-	-	-	558.7	558.2	552.6	548.4	548.9	545.7	543.8	542.7	541.3	539.8	539.8	538.7	538.0	537.9	540.0	542.0	538.7	528.4	543.5
6	524.8	522.4	518.3	527.3	-	550.6	553.8	555.0	553.7	551.3	545.7	543.5	539.7	540.4	539.0	539.4	538.6	539.6	541.8	542.3	545.0	549.2	549.3	537.1	541.2
7	526.8	523.7	525.8	527.4	536.4	540.7	543.4	546.1	548.1	548.3	547.5	545.4	544.2	543.9	541.7	540.4	539.3	539.9	540.4	541.1	542.9	546.0	544.3	535.7	540.0
8	-	-	-	-	-	-	-	550.2	547.1	546.8	547.6	545.5	543.9	542.1	541.7	541.3	540.6	539.7	540.7	541.7	543.3	549.2	551.0	537.2	544.1
9	529.0	523.8	516.9	517.0	531.0	545.6	554.1	556.6	551.7	549.0	546.8	545.2	544.1	543.9	540.5	540.3	538.4	537.1	537.7	539.8	541.8	544.1	544.2	533.7	539.7
10	-	-	-	-	-	-	-	-	-	-	548.8	546.4	544.3	542.3	541.2	539.8	539.1	539.9	539.9	540.7	541.4	544.7	543.5	532.3	541.7
11	521.3	514.2	514.6	519.6	526.7	539.7	548.5	550.2	546.3	544.4	544.5	544.1	542.8	542.4	539.0	534.8	536.5	539.2	541.0	540.6	541.9	544.6	539.3	527.6	536.8
12	521.2	516.7	518.0	523.4	528.7	535.8	544.6	547.7	545.9	546.8	547.2	545.9	544.6	542.7	540.6	539.9	539.7	540.1	539.4	539.9	541.2	542.7	543.4	541.5	538.2
13	537.0	535.3	536.7	532.7	536.8	544.2	550.0	557.5	552.5	548.0	545.8	539.0	538.2	540.0	538.9	539.1	539.0	536.1	538.2	539.3	539.3	537.7	533.8	526.9	540.1
14	528.7	529.4	532.8	535.2	541.4	542.3	546.4	546.3	548.7	547.8	547.0	544.1	542.8	541.4	540.0	538.5	537.8	537.3	538.1	538.6	540.8	542.1	542.2	537.8	540.3
15	530.5	524.0	526.5	531.6	535.4	543.7	544.8	543.9	544.7	546.6	545.0	543.5	542.7	541.7	540.7	539.6	539.3	539.8	541.2	541.2	540.8	540.4	540.1	538.6	539.4
16	535.3	534.5	535.4	545.2	550.7	550.4	549.4	549.4	541.0	542.4	544.6	542.3	541.2	540.2	538.6	538.3	537.0	535.6	535.2	537.1	537.7	537.5	533.0	529.6	540.1
17	526.3	523.4	525.6	534.9	541.4	547.5	555.1	555.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	538.7
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	457.1	461.2	460.3	454.4	451.1	451.1	451.0	449.3	448.8	448.3	448.2	447.7	447.5	448.0	448.3	448.5	444.2	434.8	450.0
20	429.0	427.5	432.2	438.4	438.4	445.1	455.5	457.3	454.7	455.8	454.9	452.3	451.0	449.7	448.4	447.4	447.4	446.8	447.2	447.1	446.7	447.3	447.6	439.7	446.1
21	434.7	432.7	431.2	434.5	434.5	440.0	457.7	466.4	457.4	455.2	455.5	453.2	452.4	450.1	447.9	445.7	443.7	444.0	444.3	444.5	444.5	443.2	438.3	429.5	445.1
22	433.0	440.0	439.7	439.4	439.4	448.1	455.9	457.0	460.0	454.8	453.6	450.3	449.5	448.9	447.1	446.9	446.2	446.1	445.2	445.9	446.1	447.8	445.7	438.1	446.9
23	431.9	427.1	424.0	421.2	421.2	428.7	438.3	446.4	454.4	454.1	454.5	453.7	452.0	450.4	448.9	448.1	446.6	445.7	446.3	446.1	447.6	450.9	456.9	451.7	443.6
24	444.9	439.5	435.2	429.9	429.8	429.0	436.2	444.7	453.5	452.8	453.4	452.5	451.4	449.5	448.0	447.0	446.7	447.0	446.7	445.5	445.4	447.6	453.0	453.1	445.1
25	451.3	446.0	442.7	444.6	444.5	444.9	449.7	453.5	451.8	451.9	453.2	451.2	449.5	449.0	448.6	448.4	446.4	445.7	445.8	444.7	442.7	442.8	445.9	443.5	447.4
26	-	-	448.2	447.2	447.2	438.3	438.6	444.8	454.8	455.0	454.4	450.8	449.5	448.6	447.3	446.6	446.1	446.7	446.6	446.0	445.8	445.2	443.8	433.7	446.6
27	433.4	441.3	442.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	439.0
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	493.2	491.0	489.2	495.7	501.1	508.7	514.8	517.8	515.2	513.5	514.5	512.4	511.1	508.5	506.8	505.8	505.1	505.1	505.5	505.7	506.6	508.3	507.0	499.3	507.8

Tabel 18 Nilai Variasi harian komponen D – declination (menit) Februari 2019

Tondano Magnetic Observatory

Februari 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	45.09	44.88	45.74	47.09	48.18	48.97	48.45	48.46	48.12	47.84	47.86	47.80	47.73	-	-	-	-	-	-	-	-	-	-	-	47.40
2	-	-	-	-	47.71	48.40	48.53	48.66	48.67	48.05	48.09	47.93	47.83	47.68	47.41	47.37	46.98	47.23	47.17	46.96	47.16	47.5	47.0	46.1	47.62
3	45.3	44.9	45.1	46.48	47.32	47.88	48.26	48.38	48.12	48.03	47.99	47.85	47.70	47.54	47.27	47.12	47.20	47.30	47.31	47.36	47.49	47.85	47.26	46.20	47.22
4	-	-	-	-	-	-	47.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.67
5	-	-	-	-	-	-	48.90	48.87	48.39	48.02	48.06	47.79	47.62	47.52	47.40	47.27	47.27	47.16	47.11	47.10	47.28	47.46	47.17	46.27	47.59
6	45.94	45.70	45.32	46.11	-	48.17	48.5	48.6	48.5	48.3	47.8	47.6	47.3	47.3	47.2	47.2	47.2	47.3	47.4	47.5	47.7	48.1	48.10	47.03	47.38
7	46.12	45.84	46.01	46.15	46.94	47.32	47.56	47.8	48.0	48.0	47.94	47.76	47.65	47.62	47.43	47.31	47.23	47.27	47.32	47.38	47.54	47.81	47.66	46.91	47.28
8	-	-	-	-	-	-	-	48.17	47.91	47.89	47.97	47.77	47.63	47.46	47.43	47.40	47.33	47.26	47.34	47.43	47.57	48.09	48.24	47.04	47.64
9	46.32	45.86	45.24	45.23	46.46	47.74	48.49	48.73	48.31	48.08	47.89	47.74	47.64	47.63	47.32	47.30	47.14	47.03	47.07	47.25	47.43	47.63	47.64	46.72	47.24
10	-	-	-	-	-	-	-	-	-	-	48.04	47.84	47.66	47.48	47.38	47.26	47.20	47.27	47.27	47.33	47.40	47.69	47.59	46.61	47.43
11	45.63	45.00	45.02	45.46	46.08	47.23	48.01	48.17	47.83	47.66	47.67	47.63	47.52	47.49	47.19	46.8	47.0	47.2	47.4	47.3	47.4	47.7	47.2	46.18	46.99
12	45.61	45.20	45.31	45.78	46.26	46.89	47.66	47.94	47.79	47.87	47.89	47.78	47.67	47.51	47.34	47.27	47.26	47.29	47.23	47.27	47.38	47.51	47.57	47.40	47.11
13	47.01	46.85	46.96	46.60	46.95	47.61	48.14	48.81	48.38	47.99	47.80	47.22	47.17	47.31	47.20	47.22	47.20	46.94	47.13	47.22	47.21	47.07	46.73	46.12	47.29
14	46.28	46.33	46.62	46.83	47.37	47.45	47.82	47.83	48.05	47.98	47.90	47.65	47.53	47.41	47.28	47.15	47.09	47.04	47.11	47.16	47.35	47.46	47.47	47.08	47.30
15	46.42	45.84	46.06	46.50	46.84	47.57	47.68	47.61	47.69	47.85	47.72	47.59	47.52	47.43	47.34	47.25	47.22	47.26	47.38	47.38	47.35	47.31	47.29	47.15	47.22
16	46.84	46.76	46.83	47.69	48.18	48.16	48.09	48.09	47.36	47.49	47.68	47.48	47.38	47.30	47.16	47.14	47.02	46.90	46.86	47.02	47.07	47.05	46.66	46.35	47.27
17	46.06	45.79	45.97	46.78	47.4	47.9	48.6	48.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47.13
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	40.00	40.36	40.30	39.78	39.49	39.50	39.49	39.34	39.29	39.25	39.25	39.19	39.18	39.22	39.25	39.27	38.89	38.07	39.39
20	37.56	37.42	37.81	38.34	38.34	38.93	39.85	40.01	39.80	39.89	39.81	39.59	39.48	39.36	39.25	39.16	39.16	39.10	39.14	39.13	39.09	39.15	39.18	38.49	39.04
21	38.04	37.87	37.73	38.01	38.01	38.48	40.04	40.81	40.03	39.84	39.87	39.68	39.62	39.42	39.22	39.02	38.85	38.88	38.90	38.91	38.91	38.80	38.37	37.6	38.96
22	37.90	38.50	38.47	38.44	38.44	39.20	39.89	39.99	40.27	39.82	39.71	39.43	39.36	39.30	39.15	39.12	39.07	39.05	38.98	39.03	39.05	39.20	39.02	38.35	39.11
23	37.79	37.36	37.07	36.83	36.83	37.48	38.34	39.06	39.77	39.75	39.78	39.72	39.56	39.43	39.30	39.23	39.09	39.02	39.06	39.05	39.18	39.46	39.99	39.53	38.82
24	38.92	38.44	38.05	37.58	37.58	37.50	38.15	38.90	39.69	39.63	39.69	39.61	39.51	39.35	39.21	39.13	39.11	39.13	39.10	38.99	38.99	39.17	39.65	39.65	38.95
25	39.47	39.01	38.70	38.86	38.86	38.90	39.32	39.66	39.54	39.56	39.67	39.49	39.35	39.30	39.27	39.25	39.07	39.01	39.02	38.92	38.75	38.75	39.03	38.82	39.15
26	-	-	39.22	39.12	39.12	38.34	38.37	38.91	39.80	39.83	39.78	39.46	39.35	39.27	39.15	39.09	39.05	39.09	39.09	39.04	39.02	38.97	38.84	37.97	39.09
27	37.93	38.61	38.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.42
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	43.17	42.96	42.80	43.36	43.83	44.51	45.05	45.32	45.10	44.96	45.05	44.87	44.75	44.52	44.37	44.29	44.22	44.22	44.25	44.27	44.35	44.50	44.39	43.71	44.45

Tabel 19 Nilai variasi harian komponen I – inclination (derajat) Februari 2019

Tondano Magnetic Observatory																								Februari 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.99	-12.99	-12.98	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-	-	-	-	-	-	-	-	-	-	-	-12.99
2	-	-	-	-	-	-12.98	-12.99	-12.99	-13.00	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-13.0	-13.0	-13.0	-12.99
3	-13.0	-13.0	-13.0	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-13.00
4	-	-	-	-	-	-	-12.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.98
5	-	-	-	-	-	-	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99
6	-12.98	-12.97	-12.95	-12.96	-	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.00	-13.00	-12.99
7	-13.00	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-13.0	-13.0	-13.0	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99
8	-	-	-	-	-	-	-	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-12.99
9	-12.99	-12.99	-12.97	-12.97	-12.98	-12.98	-12.99	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
10	-	-	-	-	-	-	-	-	-	-	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
11	-12.99	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.99
12	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
13	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99
14	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
15	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98
16	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98
17	-12.98	-12.96	-12.95	-12.95	-13.0	-13.0	-13.0	-13.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.96
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98
20	-12.98	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98
21	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-13.0	-12.98
22	-12.98	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
23	-12.98	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.98
24	-12.98	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.97	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-13.00	-12.98
25	-12.99	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98
26	-	-	-12.99	-12.99	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98
27	-12.99	-12.99	-12.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.99
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98

2. Gangguan badai magnet

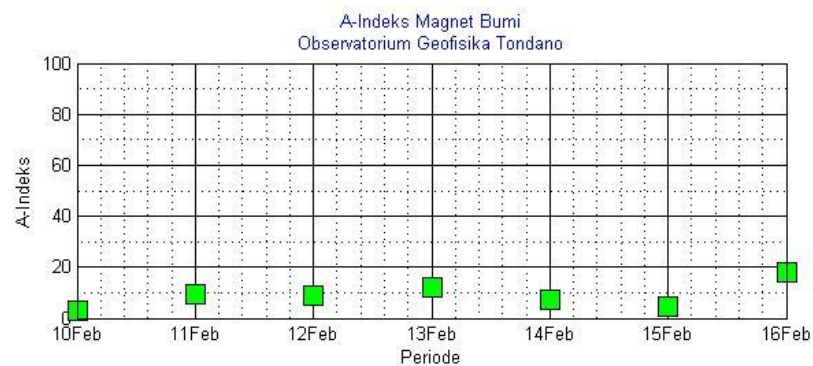
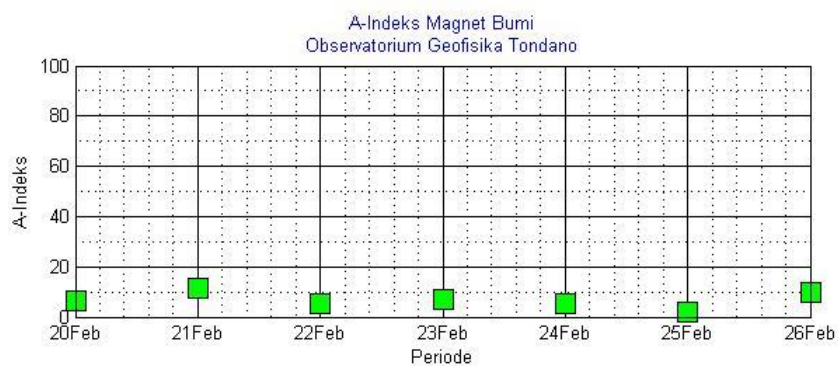
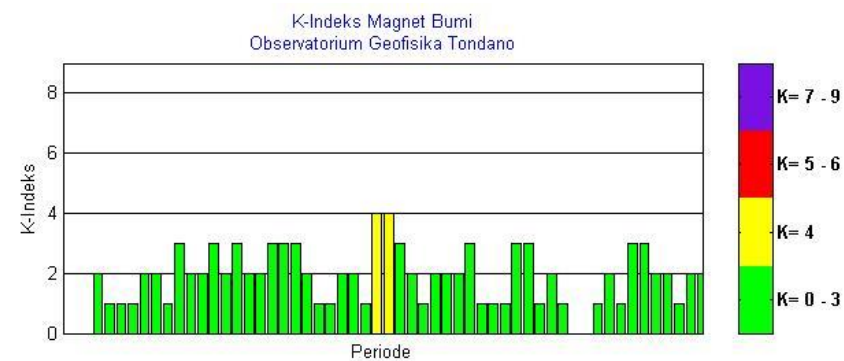
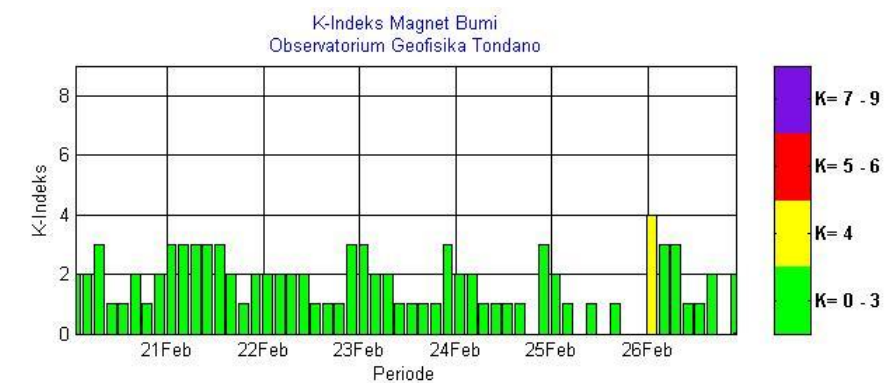
Tabel 20 Monitoring waktu gangguan
pada pengamatan magnet bumi Februari 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	2	2019					
2	2	2	2019					
3	3	2	2019					
4	4	2	2019					
5	5	2	2019					
6	6	2	2019					
7	7	2	2019					
8	8	2	2019					
9	9	2	2019					
10	10	2	2019					
11	11	2	2019					
12	12	2	2019					
13	13	2	2019					
14	14	2	2019					
15	15	2	2019					
16	16	2	2019					
17	17	2	2019					
18	18	2	2019					
19	19	2	2019					
20	20	2	2019					
21	21	2	2019					
22	22	2	2019					
23	23	2	2019					
24	24	2	2019					
25	25	2	2019					
26	26	2	2019					
27	27	2	2019					
28	28	2	2019					

Tabel 21 Hasil analisa K-indeks dan A-indeks Februari 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	3	4	3	3	4	0	0	0	12.4	Tenang
2	0	5	2	2	2	4	3	2	14.8	Tenang
3	3	2	3	2	2	2	2	2	9.0	Tenang
4	0	0	4	0	0	0	0	0	3.4	Tenang
5	0	0	4	1	0	2	2	2	6.4	Tenang
6	3	3	2	4	3	3	2	2	13.5	Tenang
7	1	1	3	2	2	1	1	2	6.0	Tenang
8	0	0	4	3	3	1	2	3	10.3	Tenang
9	3	4	2	3	2	2	2	1	11.0	Tenang
10	0	0	0	2	1	1	1	2	2.9	Tenang
11	2	1	3	2	2	3	2	3	9.5	Tenang
12	2	2	3	3	3	2	1	1	9.0	Tenang
13	2	2	1	4	4	3	2	1	12.0	Tenang
14	2	2	2	3	1	1	1	3	7.5	Tenang
15	3	1	2	1	0	0	1	2	4.8	Tenang
16	1	3	3	2	2	1	2	2	18.0	Tenang
17	1	2	3	0	0	0	0	0	3.1	Tenang
18	-	-	-	-	-	-	-	-	-	-
19	0	3	2	1	1	1	1	1	4.6	Tenang
20	2	2	3	1	1	2	1	2	6.5	Tenang
21	3	3	3	3	3	2	1	2	11.5	Tenang
22	2	2	2	2	1	1	1	2	5.5	Tenang
23	3	2	2	1	1	1	1	3	7.0	Tenang
24	2	2	1	1	1	1	0	3	5.1	Tenang
25	2	1	0	1	0	1	0	0	2.0	Tenang
26	4	3	3	1	1	2	0	2	9.6	Tenang
27	4	0	0	0	0	0	0	0	3.4	Tenang
28	-	-	-	-	-	-	-	-	-	-

Gambar 23 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Februari 2019



Tabel 23 Nilai variasi harian komponen Z – vertical (nT) Maret 2019

Tondano Magnetic Observatory																								Maret 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-9060.0	-9056.2	-9056.2	-9056.3	-9050.2	-9057.1	-9059.4	-9055.6	-9055.5	-9055.0	-9053.1	-9056.9	-9057.6	-9060.3	-9057.7	-9059.6	-9061.4	-9060.6	-9057.1
2	-9065.0	-9062.2	-9058.6	-9059.7	-9061.2	-9061.4	-9063.7	-9061.4	-9061.4	-9057.5	-9056.3	-9055.8	-9055.9	-9052.5	-9053.5	-9059.9	-9056.7	-9053.4	-9055.3	-9057.5	-9059.2	-9059.4	-9054.5	-9053.6	-9058.1
3	-9050.9	-9048.2	-9047.8	-9049.7	-9052.1	-9057.9	-9060.9	-9059.3	-9059.3	-9054.3	-9052.9	-9054.1	-9054.5	-9053.4	-9054.7	-9056.0	-9055.4	-9056.7	-9055.7	-9056.1	-9055.8	-9057.9	-9058.8	-9059.3	-9055.1
4	-9059.5	-9056.5	-9050.9	-9049.0	-9047.5	-9050.9	-9056.0	-9058.5	-9058.5	-9056.7	-9054.9	-9055.4	-9057.1	-9055.3	-9058.0	-9057.0	-9056.5	-9056.8	-9055.4	-9054.6	-9054.5	-9056.4	-9058.2	-9062.5	-9055.7
5	-9060.7	-9059.7	-9062.7	-9059.3	-9058.0	-9056.6	-9057.6	-9058.3	-9058.3	-9057.5	-9056.6	-9055.2	-9056.9	-9057.0	-9054.7	-9055.4	-9055.5	-9055.7	-9055.8	-9055.2	-9055.1	-9055.6	-9056.9	-9059.7	-9057.3
6	-9061.8	-9060.7	-9059.0	-9055.6	-9057.8	-9053.4	-9049.4	-9056.9	-9056.9	-9055.1	-9054.8	-9056.7	-9053.1	-9054.4	-9055.0	-9055.5	-9055.3	-9055.6	-9057.9	-9053.8	-9055.7	-9055.3	-9055.4	-9057.6	-9055.9
7	-9056.0	-9048.8	-9045.3	-9047.0	-9045.7	-9045.9	-9049.3	-9054.1	-9054.1	-9053.5	-9052.8	-9053.7	-9054.2	-9053.4	-9053.1	-9052.9	-9053.7	-9056.8	-9057.8	-9056.0	-9057.1	-9056.2	-9054.6	-9056.7	-9052.9
8	-9050.9	-9047.5	-9042.0	-9038.7	-9038.2	-9040.3	-9044.7	-9047.1	-9047.1	-9052.3	-9055.2	-9055.9	-9055.2	-9051.9	-9053.8	-9054.9	-9055.7	-9056.1	-9055.7	-9056.0	-9055.4	-9054.3	-9053.2	-9051.0	-9050.5
9	-9058.7	-9057.3	-9053.3	-9044.2	-9044.5	-9046.0	-9045.6	-9045.3	-9045.3	-9052.4	-9053.4	-9055.9	-9055.1	-9054.6	-9054.6	-9054.5	-9055.0	-9055.4	-9055.8	-9056.0	-9055.7	-9054.7	-9052.2	-9051.9	-9052.4
10	-9050.3	-9043.1	-9040.0	-9040.4	-9040.2	-9044.3	-9053.2	-9056.6	-9056.6	-9058.6	-9056.1	-9056.4	-9056.0	-9055.5	-9055.4	-9055.2	-9055.8	-9055.6	-9056.2	-9056.3	-9055.6	-9055.2	-9052.8	-9050.0	-9052.3
11	-9053.1	-9053.3	-9049.9	-9047.5	-9041.3	-9043.1	-9048.6	-9050.0	-9050.0	-9051.8	-9054.4	-9055.0	-9054.0	-9055.9	-9056.6	-9055.6	-9055.6	-9055.4	-9054.9	-9055.6	-9054.5	-9054.1	-9051.7	-9049.9	-9052.2
12	-9053.0	-9053.5	-9052.4	-9049.8	-9046.6	-9045.5	-9045.6	-9041.2	-9041.2	-9051.3	-9057.5	-9054.7	-9056.6	-9057.8	-9056.5	-9055.9	-9055.6	-9056.0	-9055.6	-9055.5	-9056.6	-9056.3	-9059.9	-9060.5	-9053.1
13	-9060.9	-9062.9	-9059.7	-9055.4	-9049.0	-9052.2	-9057.4	-9056.6	-9056.6	-9057.6	-9058.4	-9057.6	-9056.6	-9056.5	-9055.2	-9055.4	-9055.1	-9056.2	-9055.5	-9054.7	-9055.6	-9056.4	-9056.4	-9054.9	-9056.4
14	-9055.2	-9052.7	-9050.7	-9050.2	-9050.0	-9045.8	-9044.6	-9050.2	-9050.2	-9054.8	-9052.1	-9050.8	-9052.2	-9058.6	-9055.1	-9056.3	-9055.1	-9055.7	-9055.2	-9055.4	-9057.2	-9060.4	-9056.0	-9054.7	-9053.3
15	-9054.9	-9052.8	-9049.4	-9045.7	-9044.3	-9047.5	-9050.4	-9057.2	-9054.9	-9055.3	-9053.9	-9053.7	-9053.6	-9054.0	-9054.5	-9053.5	-9054.7	-9056.5	-9056.6	-9056.5	-9055.1	-9056.8	-9058.8	-9057.4	-9053.7
16	-9057.6	-9055.7	-9051.4	-9050.0	-9048.2	-9050.8	-9055.1	-	-	-	-	-	-	-9057.9	-9055.2	-9058.0	-9052.9	-9051.6	-9056.7	-9057.5	-9057.0	-9056.8	-9059.2	-9054.1	-9055.0
17	-9055.8	-9051.6	-9042.7	-9045.0	-9045.4	-9043.3	-9053.1	-9053.1	-9053.1	-9055.3	-9055.2	-9057.3	-9061.8	-9057.9	-9056.4	-9056.8	-9053.4	-9054.2	-9055.0	-9055.2	-9055.2	-9053.9	-9052.8	-9054.2	-9053.2
18	-9056.8	-9057.2	-9052.7	-9044.8	-9044.8	-9036.8	-9037.7	-9045.7	-9045.7	-9051.3	-9052.3	-9052.6	-9053.5	-9053.5	-9053.5	-9053.2	-9054.3	-9055.1	-9054.8	-9054.8	-9054.5	-9053.4	-9053.4	-9053.0	-9051.1
19	-9055.5	-9053.1	-9049.5	-9049.6	-9049.6	-9042.6	-9038.4	-9042.3	-9042.3	-9048.4	-9049.7	-9049.9	-9051.1	-9051.9	-9052.8	-9052.9	-9054.9	-9055.3	-9053.8	-9052.4	-9051.5	-9053.4	-9052.9	-9049.4	-9050.1
20	-9046.6	-9043.7	-9045.9	-9048.5	-9048.5	-9047.9	-9047.0	-9051.1	-9051.1	-9050.3	-9050.5	-9052.1	-9053.2	-9053.2	-9052.9	-9053.1	-9052.9	-9055.6	-9052.8	-9053.2	-9053.1	-9051.6	-9050.7	-9050.7	-9050.7
21	-9051.0	-9050.5	-9052.8	-9049.2	-9049.2	-9042.9	-9046.5	-9051.2	-9051.2	-9051.8	-9051.8	-9052.5	-9052.6	-9053.4	-9053.0	-9052.9	-9053.7	-9054.0	-9053.9	-9053.8	-9053.7	-9052.6	-9053.6	-9054.1	-9051.8
22	-9052.0	-9048.5	-9047.0	-9043.1	-9043.1	-9039.2	-9038.9	-9042.2	-9042.2	-9051.9	-9053.2	-9053.2	-9052.7	-9052.4	-9053.0	-9053.3	-9053.0	-9052.5	-9053.0	-9053.3	-9052.8	-9051.8	-9052.8	-9054.6	-9049.6
23	-9054.5	-9050.5	-9048.1	-9047.2	-9047.2	-9043.6	-9043.2	-9046.1	-9046.1	-9050.3	-9052.0	-9052.7	-9052.8	-9052.7	-9052.7	-9052.6	-9053.3	-9053.5	-9053.8	-9054.0	-9053.8	-9054.0	-9055.7	-9057.4	-9051.2
24	-9056.9	-9051.2	-9048.5	-9041.4	-9041.4	-9034.8	-9036.1	-9040.4	-9040.4	-9053.4	-9051.9	-9051.8	-9051.3	-9051.7	-9052.5	-9053.1	-9053.8	-9053.6	-9053.6	-9053.6	-9053.7	-	-	-	-9048.8
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-9054.5	-9052.7	-9052.5	-9048.9	-9048.9	-9039.4	-9041.7	-9046.3	-9046.3	-9051.4	-9050.8	-9051.4	-9051.1	-9052.6	-9052.5	-9052.7	-9051.8	-9053.2	-9053.8	-9053.8	-9053.8	-9053.9	-9058.5	-9063.2	-9051.5
27	-9062.6	-9057.7	-9054.7	-9050.0	-9050.0	-9040.9	-9038.4	-9045.8	-9045.8	-9047.9	-9049.3	-9049.1	-9051.8	-9052.7	-9053.3	-9053.0	-9053.3	-9053.4	-9055.9	-9054.4	-9054.5	-9053.4	-9055.6	-9057.5	-9051.7
28	-9053.9	-9046.5	-9041.5	-9037.7	-9037.7	-9037.5	-9040.3	-9045.7	-9045.7	-9056.0	-9053.4	-9049.6	-9049.3	-9049.2	-9048.3	-9054.5	-9054.6	-9053.8	-9053.9	-9054.9	-9056.5	-9054.3	-9053.8	-9049.0	-9049.1
29	-9046.0	-9043.2	-9042.8	-9047.1	-9047.1	-9048.9	-9052.1	-9052.6	-9052.6	-9051.9	-9051.5	-9052.2	-9051.7	-9052.2	-9052.4	-9053.5	-9053.8	-9054.2	-9054.5	-9053.5	-9055.0	-9053.8	-9052.1	-9048.4	-9051.0
30	-9042.7	-9043.5	-9046.5	-9049.7	-9049.7	-9047.0	-9048.4	-9049.2	-9050.5	-9049.9	-9050.3	-9050.7	-9051.5	-9051.2	-9051.9	-9052.2	-9052.9	-9052.7	-9053.4	-9053.3	-9053.1	-9054.7	-9056.5	-9052.2	-9050.6
31	-9051.0	-9049.1	-9049.9	-9044.0	-9042.7	-9047.1	-9054.7	-9054.6	-9058.4	-9055.2	-9051.7	-9051.7	-9049.6	-9048.9	-9051.7	-9055.4	-9056.0	-9053.9	-9054.4	-9056.9	-9053.0	-9054.0	-9055.6	-9056.2	-9052.3
HOURLY MEANS	-9054.8	-9052.2	-9049.9	-9047.9	-9047.2	-9046.0	-9048.6	-9050.9	-9051.0	-9053.4	-9053.2	-9053.6	-9054.1	-9053.8	-9054.0	-9054.5	-9054.4	-9055.0	-9055.2	-9055.1	-9055.1	-9055.3	-9055.3	-9055.0	-9052.8

Tabel 24 Nilai Variasi harian komponen F – total (nT) Maret 2019

Tondano Magnetic Observatory

Maret 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	40296.3	40292.5	40283.5	40289.8	40278.2	40278.5	40291.0	40297.0	40298.8	40313.1	40298.7	40300.4	40302.0	40308.7	40308.4	40305.9	40311.1	40312.2	40298.1
2	40319.2	40325.8	40324.4	40321.2	40315.6	40301.6	40298.2	40298.7	40296.2	40298.2	40298.2	40297.8	40303.8	40294.4	40292.5	40309.3	40314.6	40305.0	40304.0	40303.5	40306.4	40309.9	40308.0	40316.7	40306.8
3	40333.6	40341.6	40350.1	40342.5	40333.5	40323.8	40317.1	40312.9	40310.4	40307.7	40304.3	40304.8	40304.8	40303.4	40303.3	40306.7	40306.5	40309.2	40310.3	40310.4	40310.5	40313.0	40315.1	40320.9	40316.5
4	40334.1	40348.8	40353.7	40349.6	40338.0	40320.5	40311.7	40305.6	40297.6	40296.2	40288.7	40281.1	40284.7	40283.6	40286.3	40293.7	40297.9	40301.8	40303.3	40306.1	40306.2	40308.4	40310.3	40316.7	40309.3
5	40324.0	40332.4	40346.5	40352.2	40347.2	40334.7	40323.3	40314.5	40309.3	40309.7	40310.1	40307.3	40308.8	40309.4	40305.9	40305.5	40305.7	40307.8	40310.4	40311.7	40312.0	40312.0	40313.6	40319.5	40318.1
6	40327.9	40335.2	40347.2	40354.4	40354.3	40344.5	40321.9	40313.4	40320.3	40318.4	40317.5	40319.8	40310.9	40308.7	40308.6	40306.6	40306.0	40303.3	40310.7	40305.7	40306.0	40309.1	40313.1	40320.1	40320.1
7	40334.1	40342.7	40355.6	40365.7	40362.9	40352.1	40340.0	40331.7	40327.8	40322.0	40318.3	40317.9	40316.0	40312.7	40310.3	40307.9	40298.7	40298.9	40306.8	40307.7	40309.3	40310.6	40312.8	40314.9	40324.1
8	40339.2	40354.1	40366.3	40373.2	40367.9	40356.9	40342.6	40329.2	40317.5	40312.3	40314.7	40315.9	40313.4	40307.0	40306.4	40308.0	40309.4	40311.8	40312.1	40313.5	40314.2	40315.7	40316.2	40319.8	40326.5
9	40327.0	40335.8	40346.6	40352.6	40353.6	40344.5	40332.1	40317.9	40306.5	40305.4	40306.6	40309.9	40311.1	40310.4	40309.8	40309.2	40309.1	40309.8	40311.6	40312.9	40314.2	40315.0	40316.5	40325.3	40320.6
10	40332.9	40343.6	40349.2	40347.7	40342.4	40333.0	40323.3	40315.0	40310.3	40310.6	40309.4	40309.5	40311.6	40312.2	40312.6	40311.3	40312.0	40312.0	40313.8	40316.1	40317.5	40319.8	40321.3	40329.2	40321.5
11	40345.1	40363.1	40374.3	40377.2	40366.1	40353.4	40340.1	40327.2	40319.8	40317.7	40315.5	40312.7	40306.4	40306.5	40313.6	40315.2	40317.5	40318.0	40315.5	40316.4	40317.0	40318.4	40314.9	40316.7	40328.7
12	40331.3	40346.6	40355.0	40368.3	40367.1	40359.8	40346.8	40319.2	40288.4	40278.5	40285.7	40289.3	40290.3	40297.5	40300.5	40302.3	40302.7	40304.2	40305.4	40306.1	40309.0	40310.9	40313.0	40320.5	40316.6
13	40332.2	40346.0	40356.0	40365.8	40354.5	40339.6	40331.7	40320.3	40309.0	40307.8	40308.7	40309.7	40311.0	40314.4	40316.0	40316.3	40315.8	40318.0	40317.6	40315.4	40317.4	40321.2	40322.8	40329.1	40324.9
14	40342.7	40357.2	40364.6	40370.1	40366.9	40347.8	40325.0	40315.4	40315.5	40316.8	40310.7	40301.9	40290.9	40301.0	40309.8	40310.2	40309.5	40309.8	40310.4	40311.0	40314.7	40328.1	40324.7	40327.1	40324.2
15	40334.5	40343.2	40352.3	40349.0	40337.2	40325.9	40314.1	40317.7	40318.0	40317.9	40316.5	40315.8	40314.2	40314.1	40314.0	40310.0	40309.7	40312.2	40313.7	40321.6	40319.0	40321.2	40321.4	40324.6	40322.4
16	40332.7	40343.3	40351.2	40351.7	40346.5	40337.4	40331.6	-	-	-	-	-	40304.8	40305.1	40317.1	40311.7	40300.9	40297.2	40301.3	40305.5	40310.0	40310.0	40316.9	40308.0	40320.1
17	40312.4	40317.2	40316.5	40317.8	40317.7	40304.0	40295.7	40295.7	40269.9	40262.8	40253.5	40250.2	40268.1	40273.6	40282.1	40295.3	40294.8	40297.5	40301.0	40305.1	40306.7	40309.9	40312.5	40319.6	40295.0
18	40330.0	40336.6	40340.3	40344.0	40343.0	40341.2	40333.7	40329.2	40316.1	40313.5	40312.9	40310.9	40310.7	40309.6	40309.5	40309.2	40310.5	40312.7	40312.5	40314.5	40316.4	40316.3	40319.7	40330.3	40321.8
19	40345.4	40354.5	40357.6	40363.7	40360.4	40358.8	40347.6	40342.5	40334.2	40332.0	40329.0	40323.7	40315.0	40314.8	40314.1	40313.5	40315.5	40319.5	40321.9	40321.1	40317.2	40318.1	40315.8	40318.3	40331.4
20	40327.4	40337.9	40351.8	40358.9	40354.0	40353.9	40337.7	40327.9	40317.7	40317.1	40314.1	40313.7	40316.9	40316.9	40316.3	40314.8	40312.8	40317.9	40315.3	40315.0	40316.1	40316.2	40316.2	40326.8	40325.6
21	40344.9	40359.7	40370.6	40373.4	40364.0	40362.6	40350.1	40338.9	40322.0	40319.1	40318.2	40318.2	40316.4	40317.2	40317.3	40316.6	40317.0	40318.0	40317.9	40318.4	40319.8	40321.0	40326.6	40341.6	40332.9
22	40360.7	40376.0	40384.3	40385.5	40377.1	40376.2	40359.1	40344.5	40320.0	40317.3	40315.8	40315.7	40316.6	40316.4	40317.8	40319.6	40319.6	40320.0	40319.9	40321.8	40323.4	40322.8	40325.0	40335.9	40337.1
23	40352.3	40362.4	40369.9	40373.8	40372.1	40371.3	40359.9	40347.9	40327.1	40322.4	40320.7	40318.8	40318.1	40318.1	40319.7	40320.1	40321.6	40322.1	40322.8	40323.7	40324.4	40325.0	40326.7	40331.7	40336.4
24	40340.6	40352.2	40366.4	40371.9	40367.2	40365.7	40353.5	40338.2	40326.3	40326.7	40326.4	40326.7	40325.5	40324.9	40325.8	40326.7	40327.2	40327.0	40327.9	40329.6	40331.1	-	-	-	40338.4
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
26	40343.6	40348.3	40361.3	40366.7	40359.9	40357.8	40348.3	40339.6	40324.1	40323.6	40322.7	40322.4	40319.6	40319.3	40318.7	40320.0	40320.2	40320.9	40322.3	40323.8	40325.2	40327.1	40327.3	40341.4	40333.5
27	40351.7	40357.3	40365.0	40372.5	40368.1	40366.1	40350.7	40343.7	40319.0	40308.9	40308.3	40299.8	40298.1	40302.1	40306.8	40310.0	40312.2	40311.8	40317.3	40317.4	40322.7	40320.7	40322.9	40330.8	40328.5
28	40341.4	40355.0	40369.1	40367.5	40356.6	40356.6	40337.1	40318.6	40300.1	40311.7	40319.3	40317.3	40310.2	40305.4	40296.9	40302.4	40309.6	40309.1	40309.7	40310.8	40317.3	40315.0	40315.4	40314.6	40323.6
29	40321.1	40330.5	40341.2	40347.3	40338.9	40339.3	40331.6	40324.8	40303.5	40304.8	40308.8	40312.6	40310.5	40309.8	40309.9	40310.6	40313.3	40312.0	40317.3	40315.0	40315.3	40316.5	40319.4	40324.1	40319.9
30	40333.0	40345.0	40353.0	40359.7	40349.1	40348.5	40339.3	40327.0	40315.9	40315.7	40316.0	40315.5	40317.2	40316.5	40316.1	40315.5	40316.7	40316.4	40318.1	40318.0	40317.9	40319.7	40321.5	40323.1	40326.4
31	40340.3	40353.6	40367.2	40360.4	40340.1	40320.5	40317.2	40305.9	40311.9	40317.0	40317.9	40317.1	40310.8	40297.7	40293.8	40296.4	40302.6	40304.9	40307.2	40315.6	40315.5	40316.5	40318.6	40324.9	40319.7
HOURLY MEANS	40335.7	40346.4	40355.4	40358.8	40352.5	40344.7	40331.9	40322.6	40311.7	40310.4	40309.2	40308.1	40307.6	40307.3	40308.3	40310.3	40310.3	40311.0	40312.7	40314.1	40315.4	40316.3	40317.9	40323.6	40322.3

Tabel 26 Nilai Variasi harian komponen Y – east (nT) Maret 2019

Tondano Magnetic Observatory																								Maret 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	450.5	451.8	451.3	452.3	446.3	448.4	446.9	445.5	444.5	440.5	442.0	443.7	445.5	449.6	451.4	455.8	457.2	450.9	448.6
2	447.2	442.6	437.5	437.3	436.7	438.7	442.6	443.8	445.1	450.9	450.0	448.5	445.9	443.7	440.9	443.1	441.6	441.0	441.1	443.6	446.7	449.2	443.6	435.4	443.2
3	430.7	431.7	441.2	448.8	447.8	452.5	455.2	454.8	454.5	454.1	450.7	448.7	447.3	445.1	444.6	445.3	445.0	445.1	444.7	445.1	444.6	447.9	448.7	443.2	446.5
4	435.9	431.7	436.4	444.3	444.2	443.0	442.8	442.2	444.3	447.3	448.4	448.3	446.7	444.7	446.8	445.2	444.6	445.6	444.8	443.5	443.0	444.7	446.1	447.1	443.8
5	447.8	446.5	450.2	450.0	448.6	446.6	445.7	442.5	444.6	449.5	449.6	447.3	447.8	448.1	445.7	446.1	445.6	444.4	443.2	442.2	441.6	441.9	441.2	441.1	445.7
6	443.4	442.0	447.7	444.0	444.7	443.6	441.4	445.1	447.2	448.9	448.9	449.1	447.9	446.8	446.0	446.7	446.7	446.1	446.6	443.8	443.4	441.7	438.3	435.0	444.8
7	434.8	438.4	443.9	448.3	449.4	447.0	445.0	445.8	450.2	450.6	449.5	447.3	447.1	447.2	444.9	444.8	445.2	446.3	445.6	444.6	445.8	444.3	443.1	443.3	445.5
8	422.8	424.5	423.7	430.6	437.0	439.9	443.4	444.2	442.8	446.6	447.7	447.7	447.2	445.0	443.7	444.2	444.8	445.3	445.2	445.5	444.4	442.7	440.1	433.7	440.5
9	443.9	446.8	449.8	445.2	441.6	443.0	442.0	440.0	443.6	446.7	445.3	446.9	446.8	446.1	445.4	445.0	445.7	446.1	445.9	445.8	445.7	444.0	436.6	426.4	443.9
10	426.2	422.9	427.6	434.8	438.6	441.1	443.9	445.3	447.5	449.9	448.4	448.2	447.5	446.3	446.0	446.4	446.4	446.0	445.7	445.4	444.3	442.4	435.7	428.5	441.5
11	431.0	437.8	446.0	451.3	453.1	457.1	458.6	454.7	450.5	447.3	448.5	449.0	447.2	446.8	446.2	446.1	445.9	446.0	446.6	446.1	443.5	441.3	437.7	432.7	446.3
12	432.0	436.7	446.3	453.9	451.7	449.2	451.2	454.1	453.1	452.0	450.9	445.4	445.9	446.2	445.9	446.0	446.1	445.9	445.3	444.6	444.3	443.9	447.2	439.7	446.6
13	437.3	440.6	449.1	449.4	446.5	446.5	445.7	443.2	439.4	443.0	446.0	446.0	445.7	445.8	445.2	445.6	445.7	445.9	445.3	443.7	442.1	441.5	435.5	422.8	443.2
14	421.3	427.6	436.5	441.7	442.0	443.7	444.1	446.3	451.6	453.7	450.7	447.0	445.9	448.0	443.4	446.0	445.4	445.6	444.5	443.7	444.4	447.5	445.0	435.9	443.4
15	432.5	433.4	439.6	443.7	443.3	441.3	442.5	447.7	450.3	452.6	449.2	446.8	445.8	445.3	445.2	444.9	444.4	445.5	445.6	444.6	443.9	445.8	447.2	437.9	444.1
16	431.6	428.4	430.9	435.5	435.5	437.1	445.0	-	-	-	-	-	446.5	443.9	443.9	444.9	442.5	445.8	445.3	443.8	443.6	446.8	441.7	433.8	440.3
17	428.6	428.1	430.7	434.9	434.2	434.0	444.5	444.5	454.4	456.4	454.0	450.9	449.0	446.4	443.8	441.7	440.7	439.8	439.7	439.2	439.1	436.1	433.6	433.3	440.7
18	437.9	442.3	448.3	451.4	451.4	446.7	447.2	452.5	453.1	451.2	448.6	446.3	446.3	444.9	444.1	442.9	443.4	444.1	444.3	443.3	441.9	439.2	434.7	428.8	444.8
19	433.9	442.6	455.7	464.6	464.5	461.5	460.0	460.7	458.5	451.9	450.0	448.3	447.6	445.7	444.6	444.4	445.8	446.1	444.5	442.4	439.6	437.0	432.8	423.1	447.7
20	417.4	419.8	434.8	440.8	440.8	443.5	446.9	451.1	450.1	449.8	447.0	445.4	444.6	444.8	444.3	444.3	443.8	444.8	443.9	442.9	441.1	436.6	432.6	430.5	440.9
21	433.3	440.2	454.8	460.4	460.3	457.7	458.3	455.9	450.0	450.3	447.5	446.4	445.7	444.8	443.7	442.9	443.0	443.0	442.8	441.7	440.4	436.6	431.7	423.1	445.6
22	426.9	442.9	455.8	462.6	462.5	459.9	459.7	459.9	449.2	447.3	448.1	446.4	444.7	443.9	443.3	443.2	443.1	442.4	442.5	442.0	440.3	437.7	435.7	431.1	446.3
23	433.1	439.8	451.0	457.5	457.5	453.9	449.3	447.5	445.4	447.0	446.7	446.2	446.0	444.3	442.8	442.3	442.5	442.0	441.6	441.3	440.5	440.9	442.4	439.0	445.0
24	434.7	433.9	445.8	449.0	449.0	445.3	441.1	440.8	449.8	449.4	447.1	445.7	444.3	443.6	443.2	443.4	444.2	443.7	443.1	442.6	442.1	-	-	-	443.9
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	433.3	434.5	443.0	446.7	446.6	443.3	435.8	442.1	450.8	449.6	445.8	444.2	442.3	441.9	441.6	441.5	440.8	442.2	442.8	442.1	441.7	441.9	444.8	438.2	442.4
27	431.8	430.2	435.2	437.9	437.8	436.5	437.4	448.1	453.6	449.9	446.3	443.5	443.8	442.0	441.1	440.5	441.4	442.7	444.5	444.9	444.6	444.8	444.6	440.5	441.8
28	434.5	427.9	427.8	426.9	426.8	427.5	429.3	437.5	451.1	451.2	447.0	442.4	441.5	440.3	437.1	440.3	441.5	443.1	443.2	443.7	445.0	444.2	440.8	428.6	438.3
29	421.0	427.6	438.0	439.8	439.7	435.7	434.8	439.0	447.1	448.3	444.4	442.2	441.9	441.6	441.1	441.9	442.6	443.5	443.4	443.1	444.3	442.4	437.9	428.4	439.6
30	425.2	435.7	441.9	454.9	454.7	451.0	449.9	451.2	448.0	445.8	442.9	441.9	441.5	441.0	440.9	441.3	441.6	441.8	442.1	441.9	441.2	442.2	440.8	429.0	442.8
31	421.5	428.1	438.6	442.7	441.1	435.2	440.1	447.5	448.6	447.6	444.4	443.2	441.8	439.9	440.1	443.3	444.1	442.5	443.0	444.8	442.6	443.1	443.3	438.2	441.1
HOURLY MEANS	432.1	434.7	441.6	445.8	445.8	444.9	445.8	447.6	449.2	449.7	447.9	446.5	445.6	444.7	443.7	443.8	443.9	444.2	444.1	443.7	443.2	442.9	440.7	434.5	443.6

Tabel 27 Nilai Variasi harian komponen D – declination (menit) Maret 2019

Tondano Magnetic Observatory

Maret 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	39.46	39.58	39.54	39.62	39.10	39.29	39.15	39.02	38.93	38.56	38.71	38.86	39.02	39.37	39.53	39.92	40.03	39.48	39.29
2	39.15	38.74	38.30	38.28	38.23	38.42	38.77	38.87	38.98	39.49	39.41	39.28	39.05	38.87	38.63	38.80	38.66	38.62	38.63	38.85	39.12	39.3	38.8	38.1	38.81
3	37.7	37.8	38.6	39.26	39.18	39.61	39.85	39.82	39.80	39.76	39.46	39.29	39.17	38.98	38.93	38.99	38.96	38.97	38.94	38.97	38.93	39.22	39.28	38.80	39.09
4	38.14	37.76	38.17	38.86	38.87	38.78	38.77	38.72	38.91	39.18	39.28	39.28	39.13	38.96	39.15	39.00	38.95	39.02	38.96	38.84	38.79	38.94	39.06	39.15	38.86
5	39.19	39.1	39.4	39.4	39.2	39.08	39.01	38.74	38.93	39.36	39.37	39.17	39.21	39.24	39.03	39.06	39.02	38.92	38.81	38.72	38.67	38.69	38.63	38.62	39.02
6	38.81	38.68	39.16	38.83	38.89	38.80	38.6	39.0	39.1	39.3	39.3	39.3	39.2	39.1	39.1	39.1	39.1	39.1	39.1	38.9	38.8	38.7	38.38	38.08	38.94
7	38.05	38.35	38.81	39.19	39.30	39.09	38.93	39.0	39.4	39.4	39.35	39.16	39.14	39.16	38.95	38.95	38.99	39.09	39.02	38.93	39.04	38.90	38.79	38.81	38.99
8	36.99	37.12	37.04	37.64	38.20	38.47	38.79	38.87	38.76	39.10	39.19	39.19	39.16	38.97	38.85	38.90	38.95	38.99	38.98	39.00	38.91	38.76	38.53	37.96	38.55
9	38.85	39.10	39.34	38.94	38.62	38.75	38.68	38.52	38.84	39.12	38.99	39.13	39.12	39.06	39.00	38.97	39.02	39.06	39.04	39.03	39.02	38.87	38.22	37.32	38.86
10	37.29	36.99	37.40	38.03	38.37	38.59	38.86	38.98	39.18	39.39	39.27	39.25	39.18	39.08	39.05	39.09	39.08	39.05	39.02	38.99	38.89	38.72	38.14	37.50	38.64
11	37.71	38.28	38.98	39.44	39.61	39.97	40.12	39.80	39.44	39.16	39.27	39.31	39.16	39.12	39.06	39.1	39.0	39.0	39.1	39.1	38.8	38.6	38.3	37.88	39.06
12	37.81	38.20	39.03	39.68	39.49	39.28	39.47	39.75	39.69	39.61	39.50	39.02	39.06	39.08	39.05	39.06	39.07	39.05	39.00	38.93	38.90	38.87	39.16	38.49	39.09
13	38.27	38.55	39.27	39.29	39.05	39.07	39.00	38.79	38.48	38.79	39.06	39.06	39.03	39.03	38.97	39.01	39.02	39.03	38.98	38.85	38.70	38.65	38.12	37.00	38.79
14	36.86	37.39	38.17	38.61	38.64	38.81	38.87	39.07	39.54	39.72	39.46	39.15	39.06	39.23	38.83	39.05	39.00	39.01	38.92	38.84	38.90	39.17	38.95	38.15	38.81
15	37.85	37.91	38.44	38.81	38.78	38.63	38.74	39.19	39.42	39.62	39.33	39.12	39.03	38.99	38.98	38.96	38.91	39.01	39.01	38.92	38.86	39.02	39.15	38.33	38.87
16	37.77	37.48	37.68	38.09	38.10	38.24	38.94	-	-	-	-	-	39.10	38.87	38.86	38.96	38.75	39.05	39.00	38.87	38.84	39.12	38.67	37.99	38.55
17	37.52	37.47	37.71	38.07	38.0	38.0	38.9	38.9	39.8	40.01	39.81	39.55	39.35	39.12	38.89	38.69	38.60	38.52	38.51	38.46	38.45	38.18	37.96	37.93	38.60
18	38.32	38.70	39.22	39.48	39.48	39.07	39.13	39.60	39.66	39.50	39.27	39.08	39.08	38.95	38.88	38.78	38.82	38.88	38.90	38.81	38.68	38.45	38.05	37.53	38.93
19	37.96	38.71	39.85	40.62	40.62	40.36	40.23	40.30	40.12	39.55	39.38	39.23	39.18	39.02	38.92	38.91	39.03	39.05	38.90	38.72	38.49	38.25	37.89	37.04	39.18
20	36.53	36.73	38.02	38.55	38.55	38.78	39.10	39.47	39.40	39.37	39.14	38.99	38.92	38.94	38.90	38.90	38.86	38.94	38.86	38.78	38.62	38.22	37.87	37.68	38.59
21	37.90	38.49	39.76	40.24	40.24	40.02	40.09	39.89	39.39	39.41	39.17	39.08	39.02	38.94	38.84	38.77	38.78	38.78	38.77	38.67	38.55	38.22	37.78	37.0	38.99
22	37.33	38.71	39.83	40.42	40.42	40.20	40.20	40.23	39.32	39.15	39.23	39.08	38.93	38.86	38.81	38.80	38.79	38.73	38.74	38.69	38.54	38.31	38.13	37.72	39.05
23	37.88	38.45	39.42	39.99	39.99	39.68	39.29	39.14	38.98	39.13	39.10	39.05	39.04	38.89	38.76	38.72	38.73	38.69	38.65	38.63	38.56	38.59	38.72	38.42	38.94
24	38.03	37.95	38.98	39.25	39.25	38.93	38.57	38.56	39.36	39.33	39.13	39.00	38.89	38.83	38.79	38.81	38.88	38.83	38.78	38.73	38.68	-	-	-	38.84
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	37.91	38.00	38.74	39.05	39.05	38.76	38.12	38.68	39.45	39.35	39.02	38.88	38.71	38.68	38.66	38.65	38.58	38.71	38.76	38.69	38.66	38.67	38.93	38.34	38.71
27	37.77	37.62	38.05	38.28	38.28	38.16	38.25	39.19	39.71	39.39	39.08	38.84	38.87	38.71	38.62	38.57	38.64	38.76	38.91	38.94	38.92	38.94	38.91	38.55	38.67
28	38.01	37.42	37.40	37.32	37.32	37.38	37.6	38.3	39.5	39.5	39.1	38.7	38.7	38.56	38.28	38.56	38.66	38.80	38.80	38.85	38.95	38.89	38.59	37.52	38.36
29	36.85	37.41	38.32	38.47	38.47	38.12	38.05	38.42	39.15	39.26	38.91	38.72	38.69	38.7	38.6	38.7	38.7	38.8	38.8	38.8	38.9	38.7	38.33	37.49	38.48
30	37.20	38.11	38.65	39.78	39.78	39.45	39.36	39.49	39.22	39.03	38.77	38.68	38.65	38.60	38.60	38.63	38.66	38.68	38.70	38.68	38.62	38.70	38.59	37.55	38.76
31	36.87	37.44	38.34	38.71	38.59	38.09	38.53	39.19	39.28	39.18	38.90	38.79	38.68	38.53	38.55	38.83	38.89	38.75	38.79	38.94	38.75	38.79	38.81	38.36	38.61
HOURLY MEANS	37.81	38.02	38.62	38.98	38.99	38.92	39.01	39.17	39.33	39.37	39.22	39.09	39.02	38.94	38.85	38.86	38.86	38.89	38.88	38.85	38.80	38.77	38.58	38.03	38.83

Tabel 28 Nilai variasi harian komponen I – inclination (derajat) Maret 2019

Tondano Magnetic Observatory																								Maret 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-13.00	-12.99	-13.00	-13.00	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-13.00	-12.99	
2	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.0	-13.0	-13.0	-12.99
3	-13.0	-13.0	-13.0	-12.97	-12.97	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
4	-12.99	-12.98	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-13.00	-12.99	-12.99	-13.00	-13.00	-13.00	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99
5	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99
6	-12.99	-12.99	-12.98	-12.97	-12.98	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.99	-12.99	-12.98
7	-12.98	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
8	-12.97	-12.96	-12.95	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.97
9	-12.99	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98
10	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98
11	-12.97	-12.97	-12.96	-12.95	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.98
12	-12.98	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.99	-13.00	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
13	-12.99	-12.99	-12.98	-12.97	-12.96	-12.97	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98
14	-12.98	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98
15	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99	-12.99	-12.98
16	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-	-	-	-	-	-12.99	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98
17	-12.99	-12.98	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.00	-13.01	-13.01	-13.01	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.99
18	-12.98	-12.98	-12.97	-12.96	-12.96	-12.95	-12.95	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98
19	-12.98	-12.97	-12.96	-12.96	-12.96	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
20	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98
21	-12.97	-12.96	-12.96	-12.96	-12.96	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-13.0	-12.97
22	-12.97	-12.96	-12.95	-12.94	-12.95	-12.94	-12.95	-12.96	-12.96	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
23	-12.97	-12.96	-12.96	-12.95	-12.96	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
24	-12.98	-12.97	-12.96	-12.95	-12.95	-12.94	-12.95	-12.96	-12.96	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-	-	-	-12.97
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-12.98	-12.97	-12.97	-12.96	-12.96	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.97
27	-12.98	-12.98	-12.97	-12.96	-12.96	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98
28	-12.97	-12.96	-12.95	-12.94	-12.95	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.97
29	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97	-12.98
30	-12.96	-12.96	-12.96	-12.96	-12.97	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98
31	-12.97	-12.96	-12.96	-12.95	-12.96	-12.97	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98
HOURLY MEANS	-12.98	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98

2. Gangguan badai magnet

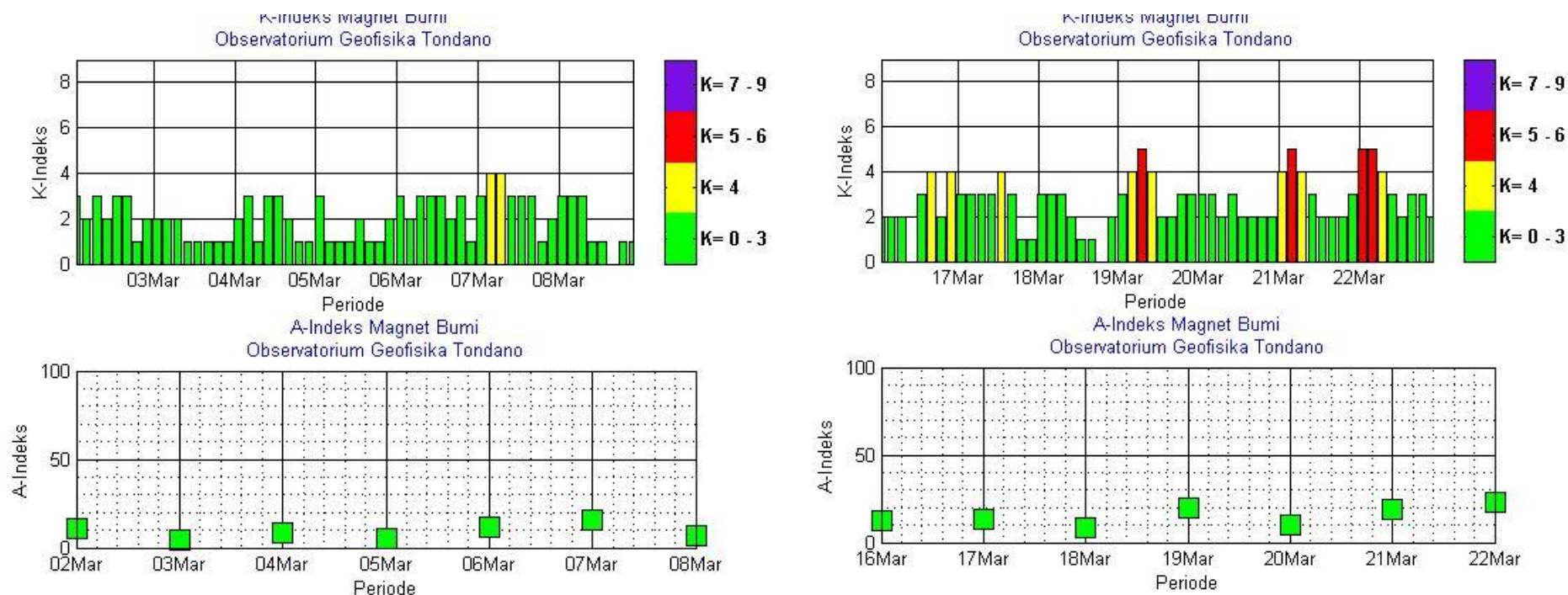
Tabel 29 Monitoring waktu gangguan
pada pengamatan magnet bumi Maret 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	3	2019					
2	2	3	2019					
3	3	3	2019					
4	4	3	2019					
5	5	3	2019					
6	6	3	2019					
7	7	3	2019					
8	8	3	2019					
9	9	3	2019					
10	10	3	2019					
11	11	3	2019					
12	12	3	2019					
13	13	3	2019					
14	14	3	2019					
15	15	3	2019					
16	16	3	2019					
17	17	3	2019					
18	18	3	2019					
19	19	3	2019					
20	20	3	2019					
21	21	3	2019					
22	22	3	2019					
23	23	3	2019					
24	24	3	2019					
25	25	3	2019					
26	26	3	2019					
27	27	3	2019					
28	28	3	2019					
29	29	3	2019					
30	30	3	2019					
31	31	3	2019					

Tabel 30 Hasil analisa K-indeks dan A-indeks Maret 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	0	0	4	3	4	4	2	3	14.75	Tenang
2	3	2	3	2	3	3	1	2	10.5	Tenang
3	2	2	2	1	1	1	1	1	4.5	Tenang
4	2	3	1	3	3	2	1	1	8.5	Tenang
5	3	1	1	1	2	1	1	2	5.5	Tenang
6	3	2	3	3	3	2	3	1	11.5	Tenang
7	3	4	4	3	3	3	1	2	15.5	Tenang
8	3	3	3	1	1	0	1	1	7.125	Tenang
9	4	5	4	2	2	1	1	2	16.125	Tenang
10	1	1	0	1	0	0	0	1	1.5	Tenang
11	4	5	4	2	2	2	1	3	17.625	Tenang
12	3	5	5	3	3	1	1	1	18.75	Tenang
13	3	3	2	1	1	2	2	1	7.5	Tenang
14	3	4	2	3	3	1	2	3	13	Tenang
15	2	2	3	3	1	1	2	2	8	Tenang
16	2	2	2	0	3	4	2	4	12.125	Tenang
17	3	3	3	3	4	3	1	1	13.5	Tenang
18	3	3	3	2	1	1	0	2	8.125	Tenang
19	3	4	5	4	2	2	3	3	20.125	Tenang
20	3	3	2	3	2	2	2	2	10	Tenang
21	4	5	4	3	2	2	2	3	19.125	Tenang
22	5	5	4	3	2	3	3	2	22.75	Tenang
23	4	5	5	4	3	3	3	2	25.25	Tenang
24	4	5	4	4	4	4	3	0	24.75	Tenang
25	0	0	0	0	0	0	0	0	0	Tenang
26	3	4	4	4	3	3	3	3	19.5	Tenang
27	4	5	4	3	2	1	2	1	17.125	Tenang
28	4	3	2	3	3	3	2	3	14.5	Tenang
29	2	2	2	2	1	2	2	1	6	Tenang
30	3	3	2	3	3	2	2	2	11	Tenang
31	3	5	3	3	4	3	2	1	18.125	Tenang

Gambar 24 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Februari 2019



Tabel 32 Nilai variasi harian komponen Z – vertical (nT) April 2019

Tondano Magnetic Observatory

April 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9054.9	-9055.0	-9059.2	-9063.8	-9064.2	-9058.5	-9055.7	-9057.3	-9057.3	-9047.2	-9048.2	-9054.2	-9054.6	-9053.1	-9053.4	-9052.7	-9054.3	-9054.6	-9054.6	-9054.0	-9054.1	-9052.3	-9051.6	-9048.2	-9054.7
2	-9043.3	-9035.6	-9034.9	-9036.8	-9040.5	-9043.1	-9044.2	-9044.8	-9044.8	-9045.9	-9048.5	-9049.3	-9050.1	-9049.4	-9050.9	-9052.3	-9053.0	-9053.5	-9053.5	-9052.3	-9054.3	-9052.4	-9053.0	-9051.6	-9047.4
3	-9052.1	-9048.5	-9041.6	-9038.8	-9039.0	-9043.7	-9046.7	-9052.8	-9052.8	-9047.4	-9042.9	-9048.4	-9050.9	-9054.0	-9056.0	-9054.7	-9053.4	-9054.5	-9056.5	-9055.5	-9051.3	-9051.2	-9053.4	-9048.9	-9049.8
4	-9046.4	-9046.4	-9045.2	-9044.3	-9043.0	-9043.2	-9044.7	-9048.4	-9048.4	-9046.8	-9044.4	-9043.5	-9056.5	-9055.2	-9055.2	-9051.3	-9051.1	-9060.3	-9055.2	-9056.0	-9052.7	-9052.2	-9054.7	-9054.5	-9050.0
5	-9051.8	-9048.1	-9041.1	-9040.2	-9049.2	-9055.7	-9055.7	-9060.5	-9060.5	-9055.7	-9053.9	-9053.5	-9052.3	-9051.3	-9050.3	-9052.3	-9055.6	-9054.7	-9054.7	-9056.7	-9051.1	-9052.0	-9051.5	-9049.3	-9052.4
6	-9047.0	-9043.6	-9042.3	-9046.5	-9049.8	-9057.6	-9057.7	-9052.5	-9052.5	-9054.6	-9052.7	-9051.4	-9052.3	-9051.3	-9052.5	-9052.9	-9052.2	-9052.3	-9052.8	-9053.9	-9053.5	-9053.7	-9057.5	-9058.9	-9052.2
7	-9054.1	-9045.5	-9036.9	-9037.1	-9037.2	-9041.6	-9048.4	-9048.3	-9048.3	-9049.7	-9049.3	-9050.4	-9051.4	-9051.5	-9051.3	-9052.2	-9052.5	-9052.3	-9052.6	-9052.8	-9053.4	-9052.9	-9058.4	-9057.0	-9049.4
8	-9047.4	-9047.1	-9043.7	-9039.1	-9033.1	-9036.3	-9044.4	-9046.4	-9046.4	-9050.8	-9051.4	-9052.1	-9051.3	-9049.5	-9050.5	-9050.0	-9051.8	-9057.0	-9055.0	-9053.1	-9053.0	-9053.4	-9055.4	-9052.8	-9048.8
9	-9053.0	-9050.0	-9048.1	-9043.7	-9041.5	-9041.5	-9052.5	-9054.3	-9054.3	-9051.6	-9050.2	-9052.8	-9052.1	-9047.8	-9053.0	-9053.2	-9053.7	-9053.1	-9052.1	-9054.3	-9054.3	-9054.5	-9055.0	-9052.9	-9051.2
10	-9043.2	-9043.3	-9043.4	-9042.8	-9051.5	-9053.9	-9058.4	-9056.6	-9056.6	-9049.5	-9050.6	-9051.6	-9050.9	-9051.2	-9047.9	-9051.9	-9054.0	-9056.6	-9053.4	-9050.1	-9052.9	-9054.0	-9055.3	-9052.8	-9051.4
11	-9046.2	-9046.6	-9048.8	-9045.4	-9044.6	-9044.7	-9042.9	-9042.5	-9042.5	-9048.7	-9049.5	-9050.8	-9051.7	-9049.7	-9050.3	-9050.7	-9053.1	-9052.2	-9053.3	-9053.8	-9053.4	-9053.2	-9052.6	-9047.6	-9048.9
12	-9041.3	-9040.8	-9041.0	-9043.4	-9044.3	-9043.8	-9045.3	-9045.4	-9045.4	-9050.1	-9052.5	-9051.6	-9050.2	-9050.4	-9051.7	-9053.5	-9052.4	-9052.9	-9054.3	-9052.2	-9054.3	-9055.7	-9058.9	-9054.6	-9049.4
13	-9050.2	-9048.9	-9047.6	-9039.6	-9035.3	-9035.6	-9043.0	-9043.4	-9043.4	-9047.7	-9048.7	-9050.4	-9050.5	-9051.3	-9051.2	-9051.0	-9051.6	-9052.3	-9053.1	-9053.3	-9053.0	-9053.7	-9055.3	-9054.0	-9048.5
14	-9052.1	-9051.8	-9051.0	-9046.3	-9043.7	-9043.3	-9041.1	-9040.8	-9040.8	-9050.0	-9049.3	-9050.0	-9048.7	-9049.3	-9049.9	-9050.9	-9051.5	-9051.4	-9051.2	-9050.9	-9051.1	-9052.6	-9058.6	-9059.7	-9049.4
15	-9061.0	-9061.7	-9058.1	-9055.2	-9053.6	-9048.7	-9047.0	-9051.5	-9048.8	-9047.2	-9049.6	-9050.7	-9050.8	-9051.0	-9050.4	-9051.3	-9051.4	-9051.8	-9053.3	-9052.6	-9052.8	-9051.9	-9058.1	-9058.2	-9052.8
16	-9054.2	-9047.6	-9039.3	-9034.6	-9038.7	-9041.4	-9042.4	-9042.3	-9042.3	-9048.6	-9047.2	-9048.1	-9049.2	-9050.3	-9050.5	-9051.0	-9051.6	-9051.8	-9051.8	-9051.7	-9052.2	-9053.4	-9054.9	-9053.5	-9047.9
17	-9049.4	-9050.2	-9050.6	-9042.0	-9040.9	-9038.1	-9042.1	-9042.1	-9042.1	-9046.1	-9046.8	-9048.2	-9048.4	-9048.2	-9048.6	-9049.3	-9049.5	-9050.3	-9051.0	-9051.5	-9051.9	-9052.2	-9056.0	-9052.7	-9047.8
18	-9047.8	-9045.4	-9042.9	-9037.1	-9037.1	-9040.1	-9040.3	-9042.7	-9042.7	-9050.8	-9048.9	-9048.5	-9049.1	-9048.8	-9048.8	-9050.0	-9050.8	-9050.4	-9051.2	-9052.2	-9052.6	-9052.2	-9056.3	-9053.8	-9047.5
19	-9044.9	-9039.4	-9038.7	-9036.2	-9036.2	-9043.2	-9049.1	-9053.3	-9053.3	-9049.4	-9050.4	-9048.5	-9047.2	-9049.4	-9051.0	-9052.0	-9050.9	-9049.4	-9050.9	-9051.4	-9051.8	-9051.4	-9050.5	-9044.5	-9047.6
20	-9039.9	-9044.2	-9045.2	-9043.3	-9043.3	-9044.1	-9046.9	-9046.9	-9046.9	-9048.0	-9046.5	-9048.3	-9049.9	-9049.4	-9049.1	-9048.2	-9050.9	-9050.8	-9050.4	-9051.2	-9050.7	-9051.7	-9057.4	-9057.5	-9048.4
21	-9054.0	-9049.1	-9041.9	-9034.2	-9034.2	-9032.5	-9036.9	-9041.6	-9041.6	-9045.7	-9046.8	-9048.2	-9049.1	-9050.3	-9050.2	-9051.1	-9051.1	-9052.2	-9051.6	-9050.8	-9050.5	-9051.8	-9056.0	-9053.4	-9046.9
22	-9049.1	-9047.1	-9042.6	-9038.3	-9038.3	-9037.4	-9040.2	-9043.9	-9043.9	-9048.9	-9048.4	-9048.0	-9047.6	-9049.0	-9050.4	-9050.5	-9051.6	-9052.2	-9052.3	-9051.8	-9050.6	-9051.8	-9054.2	-9052.5	-9047.5
23	-9044.8	-9037.3	-9034.4	-9030.5	-9030.5	-9029.5	-9032.7	-9036.3	-9036.3	-9049.0	-9048.5	-9047.7	-9047.8	-9048.6	-9049.1	-9049.8	-9051.7	-9050.9	-9052.5	-9048.5	-9050.0	-9052.6	-9061.1	-9068.7	-9045.4
24	-9069.2	-9061.9	-9054.8	-9048.8	-9048.8	-9044.3	-9041.6	-9042.8	-9042.8	-9052.1	-9051.5	-9048.2	-9051.3	-9051.2	-9052.5	-9053.2	-9051.4	-9051.2	-9052.5	-9052.8	-9053.1	-9053.1	-9059.5	-9061.2	-9052.1
25	-9054.8	-9052.0	-9045.7	-9037.4	-9037.4	-9030.8	-9027.4	-9034.3	-9034.3	-9047.9	-9048.5	-9048.0	-9049.3	-9055.3	-9051.7	-9051.2	-9051.5	-9051.7	-9052.0	-9051.6	-9052.2	-9052.9	-9053.4	-9048.0	-9046.6
26	-9044.2	-9042.2	-9034.1	-9028.8	-9028.8	-9033.0	-9039.5	-9043.7	-9043.7	-9049.7	-9050.5	-9049.8	-9049.1	-9049.6	-9049.4	-9051.3	-9052.3	-9053.5	-9052.9	-9052.3	-9051.4	-9053.5	-9056.5	-9054.1	-9046.4
27	-9049.6	-9045.4	-9045.4	-9040.3	-9040.3	-9037.1	-9040.0	-9041.9	-9041.9	-9045.1	-9046.6	-9051.8	-9053.5	-9050.3	-9050.9	-9051.7	-9051.7	-9050.5	-9051.8	-9051.9	-9054.7	-9050.9	-9053.5	-9052.6	-9047.9
28	-9048.8	-9045.5	-9039.8	-9036.2	-9036.2	-9036.5	-9037.0	-9040.9	-9040.9	-9046.1	-9046.8	-9048.6	-9049.2	-9048.8	-9049.4	-9049.9	-9050.3	-9051.1	-9050.3	-9051.1	-9049.4	-9049.5	-9057.3	-9057.4	-9046.5
29	-9053.7	-9044.8	-9038.3	-9034.1	-9034.1	-9030.6	-9030.1	-9036.9	-9036.9	-9047.0	-9047.1	-9048.9	-9048.7	-9048.4	-9048.5	-9050.8	-9053.9	-9051.1	-9051.3	-9050.3	-9050.5	-9050.7	-9054.1	-9053.0	-9045.6
30	-9048.0	-9044.1	-9043.8	-9035.6	-9035.6	-9035.6	-9036.5	-9039.7	-9042.5	-9046.5	-9047.5	-9047.4	-9048.2	-9047.6	-9049.0	-9050.4	-9051.3	-9051.4	-9050.4	-9050.9	-9053.8	-9049.8	-9053.8	-9055.0	-9046.4
HOURLY MEANS	-9049.9	-9047.0	-9044.0	-9040.7	-9041.0	-9041.5	-9043.7	-9045.8	-9045.8	-9048.8	-9048.8	-9049.6	-9050.4	-9050.4	-9050.8	-9051.4	-9052.1	-9052.6	-9052.6	-9052.4	-9052.4	-9052.4	-9055.5	-9054.0	-9048.9

Tabel 33 Nilai Variasi harian komponen F – total (nT) April 2019

Tondano Magnetic Observatory

April 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	40337.9	40343.1	40346.5	40352.0	40348.8	40337.9	40322.8	40310.8	40295.4	40279.8	40276.8	40297.0	40294.8	40294.1	40297.6	40294.7	40298.7	40302.2	40306.1	40308.5	40311.7	40312.0	40315.0	40319.7	40312.7
2	40327.5	40332.7	40338.6	40339.6	40337.2	40329.8	40321.6	40313.6	40311.6	40311.4	40312.2	40311.1	40309.8	40305.6	40303.5	40305.0	40307.0	40308.3	40310.5	40311.1	40313.2	40319.2	40319.9	40329.9	40317.9
3	40342.6	40357.9	40363.1	40351.9	40333.9	40318.8	40304.0	40299.9	40296.5	40291.4	40276.0	40268.8	40281.3	40285.5	40292.9	40296.9	40294.7	40296.3	40301.9	40312.3	40311.9	40307.4	40309.8	40315.2	40308.8
4	40324.4	40333.0	40339.0	40341.4	40333.3	40324.2	40315.9	40311.0	40311.3	40304.4	40289.6	40271.6	40282.2	40292.2	40299.1	40296.4	40286.7	40295.2	40300.5	40301.9	40305.6	40308.1	40313.7	40327.6	40308.7
5	40339.5	40349.9	40350.9	40340.8	40329.4	40321.9	40307.3	40301.2	40300.1	40302.3	40305.4	40303.6	40302.5	40309.9	40299.2	40294.9	40301.7	40308.1	40306.9	40309.8	40309.4	40309.6	40313.1	40322.3	40314.2
6	40337.3	40349.9	40354.3	40346.1	40333.0	40327.5	40321.7	40310.7	40303.1	40308.0	40308.6	40308.4	40310.0	40309.9	40311.5	40312.9	40312.3	40310.7	40309.4	40311.9	40310.6	40310.0	40314.6	40326.5	40319.1
7	40342.0	40354.5	40361.5	40358.2	40345.7	40330.1	40318.3	40309.6	40305.6	40307.6	40306.3	40304.2	40305.1	40309.7	40308.1	40310.4	40312.9	40315.2	40315.2	40315.1	40316.2	40318.2	40326.9	40336.4	40322.2
8	40329.0	40338.7	40337.6	40339.9	40330.4	40318.8	40310.3	40304.0	40296.6	40296.8	40301.2	40302.4	40302.4	40299.5	40297.7	40296.6	40297.7	40307.4	40316.7	40316.8	40318.2	40320.1	40325.9	40337.7	40314.3
9	40346.1	40358.9	40367.6	40364.4	40345.6	40321.0	40315.0	40314.2	40314.0	40309.8	40307.7	40311.5	40311.4	40300.4	40303.6	40305.2	40304.0	40308.0	40307.6	40306.3	40306.6	40306.9	40309.6	40316.9	40319.3
10	40341.1	40340.9	40346.0	40321.2	40309.0	40297.3	40298.2	40304.8	40306.9	40305.6	40307.0	40306.6	40303.2	40304.7	40298.4	40295.8	40299.1	40309.9	40317.7	40307.9	40306.7	40308.6	40313.7	40322.9	40311.4
11	40331.8	40343.4	40352.9	40347.9	40336.2	40330.0	40318.4	40310.3	40302.7	40303.0	40303.4	40305.2	40309.9	40306.2	40306.7	40305.7	40313.4	40311.2	40311.3	40312.9	40313.5	40315.5	40320.7	40329.3	40318.4
12	40332.4	40339.5	40342.1	40339.3	40336.5	40325.8	40316.9	40306.6	40299.0	40296.7	40300.0	40303.6	40301.4	40296.9	40296.2	40302.8	40305.8	40307.3	40309.7	40309.5	40312.3	40315.0	40321.9	40330.6	40314.5
13	40339.5	40354.3	40366.7	40353.7	40333.8	40321.1	40323.3	40319.7	40311.2	40310.8	40311.5	40309.6	40308.1	40309.7	40311.4	40311.3	40311.8	40312.5	40314.8	40317.4	40317.0	40318.0	40320.6	40327.6	40322.3
14	40335.0	40345.3	40354.3	40351.9	40347.1	40341.1	40332.4	40320.4	40312.7	40319.7	40319.9	40321.1	40318.5	40317.6	40317.1	40315.7	40317.3	40318.7	40319.4	40319.1	40318.8	40319.9	40325.5	40328.9	40326.5
15	40334.6	40345.9	40353.4	40353.9	40350.5	40342.9	40334.4	40329.4	40319.5	40311.5	40310.0	40312.8	40315.6	40318.0	40318.3	40318.9	40317.2	40314.0	40319.7	40318.2	40317.7	40314.3	40317.0	40325.4	40325.5
16	40338.6	40353.5	40361.4	40355.1	40354.4	40348.7	40332.9	40316.1	40307.4	40314.2	40313.0	40309.1	40310.9	40311.8	40310.7	40310.1	40312.7	40314.9	40316.1	40315.9	40316.3	40319.1	40324.6	40335.0	40325.1
17	40345.5	40359.3	40370.2	40366.9	40361.4	40349.9	40337.4	40337.4	40321.7	40320.7	40321.7	40321.7	40320.3	40319.2	40318.5	40318.6	40318.2	40316.5	40315.5	40315.1	40318.5	40322.0	40328.1	40339.5	40331.8
18	40354.4	40368.9	40376.1	40368.7	40358.8	40359.5	40347.9	40336.6	40320.3	40321.7	40321.1	40320.4	40321.6	40321.4	40320.1	40321.1	40321.9	40319.2	40319.7	40321.7	40327.0	40329.3	40336.7	40346.9	40335.9
19	40351.8	40357.4	40363.4	40364.5	40363.3	40364.9	40354.8	40343.6	40325.8	40324.5	40328.1	40323.0	40312.5	40309.3	40312.0	40318.4	40319.4	40319.0	40321.4	40325.9	40326.8	40328.1	40332.8	40339.3	40334.6
20	40352.6	40372.0	40378.6	40373.6	40362.5	40362.7	40350.1	40337.9	40321.2	40321.0	40319.0	40318.5	40321.0	40323.6	40323.5	40319.9	40320.8	40319.8	40321.5	40322.3	40321.6	40323.6	40329.2	40338.3	40335.6
21	40351.5	40368.9	40373.5	40367.7	40360.7	40360.3	40351.0	40337.8	40317.5	40312.0	40309.1	40309.2	40311.7	40313.7	40316.8	40318.8	40319.5	40320.7	40321.4	40322.5	40322.4	40323.9	40330.4	40336.7	40332.4
22	40347.2	40360.9	40364.9	40359.7	40351.1	40350.9	40341.6	40332.5	40321.0	40323.5	40324.3	40323.8	40321.3	40319.9	40319.5	40318.1	40319.3	40320.1	40322.8	40324.4	40324.3	40327.1	40332.5	40342.6	40333.1
23	40354.9	40367.9	40376.6	40370.9	40364.8	40364.6	40357.2	40342.1	40322.5	40322.4	40324.0	40323.1	40320.5	40318.5	40313.7	40311.9	40317.2	40321.8	40331.1	40328.7	40317.5	40319.0	40327.4	40332.0	40335.4
24	40349.4	40363.7	40367.1	40362.8	40361.0	40359.9	40350.5	40337.3	40318.1	40317.1	40311.5	40301.5	40298.9	40300.3	40305.5	40315.7	40317.0	40312.8	40312.2	40312.9	40313.8	40315.2	40320.9	40327.9	40327.2
25	40338.4	40356.6	40361.9	40362.5	40366.3	40364.9	40353.3	40335.0	40315.5	40315.9	40315.3	40310.2	40304.5	40315.2	40313.5	40315.0	40315.6	40316.7	40317.9	40318.6	40318.7	40321.1	40325.2	40330.0	40329.5
26	40339.7	40358.0	40365.0	40360.9	40352.5	40353.4	40344.6	40331.5	40314.5	40315.3	40316.4	40314.0	40310.3	40309.0	40308.2	40309.7	40315.1	40317.6	40317.8	40318.9	40316.9	40317.6	40322.8	40328.3	40327.4
27	40335.7	40342.4	40347.6	40349.9	40345.1	40344.4	40341.5	40336.4	40306.7	40296.6	40293.4	40298.5	40307.4	40304.8	40306.2	40307.6	40310.8	40311.5	40313.7	40315.0	40319.1	40317.9	40318.4	40318.8	40320.4
28	40326.6	40337.2	40342.0	40343.4	40341.9	40342.0	40331.7	40321.7	40310.1	40312.5	40313.7	40315.9	40315.8	40316.5	40317.6	40315.4	40313.8	40316.6	40317.5	40320.8	40317.5	40316.9	40324.5	40328.2	40323.3
29	40338.4	40350.9	40350.3	40351.6	40350.9	40350.1	40342.1	40331.4	40316.6	40319.2	40319.6	40318.9	40318.1	40313.2	40308.3	40315.1	40314.2	40313.2	40314.7	40313.2	40314.7	40316.6	40323.2	40329.7	40326.1
30	40338.7	40347.1	40348.1	40348.7	40346.0	40346.0	40338.9	40329.9	40315.4	40316.0	40317.0	40316.2	40315.2	40314.0	40313.2	40311.6	40311.6	40314.4	40314.6	40314.1	40323.7	40322.5	40331.1	40340.8	40326.5
HOURLY MEANS	40340.1	40351.8	40357.4	40353.6	40346.4	40340.3	40331.2	40322.4	40311.4	40310.4	40309.4	40308.7	40308.9	40309.0	40308.9	40309.4	40310.9	40312.7	40314.8	40315.6	40316.3	40317.4	40322.5	40330.4	40323.3

Tabel 34 Nilai Variasi harian komponen X – north (nT) April 2019

Tondano Magnetic Observatory

April 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS		
1	39306.0	39311.4	39313.7	39318.2	39314.8	39305.1	39290.2	39277.5	39261.7	39248.1	39244.9	39264.2	39261.9	39261.4	39265.0	39262.1	39265.8	39269.4	39273.4	39276.0	39279.3	39280.0	39283.3	39289.0	39280.1		
2	39298.1	39305.3	39311.4	39311.9	39308.5	39300.3	39291.7	39283.3	39281.3	39280.9	39281.0	39279.8	39278.2	39274.1	39271.6	39272.8	39274.7	39275.9	39278.2	39279.1	39280.8	39287.3	39287.9	39298.5	39287.2		
3	39311.5	39328.1	39335.0	39324.1	39305.5	39289.0	39273.0	39267.3	39263.9	39259.9	39245.3	39236.7	39248.9	39252.4	39259.5	39264.0	39262.0	39263.4	39268.6	39279.5	39280.2	39275.5	39277.5	39284.2	39277.3		
4	39294.3	39303.1	39309.4	39312.0	39303.9	39294.6	39285.7	39279.9	39280.2	39273.5	39258.9	39240.7	39248.5	39259.0	39266.1	39264.2	39254.4	39260.9	39267.5	39268.7	39273.3	39276.0	39281.2	39295.6	39277.2		
5	39308.5	39320.0	39322.6	39312.4	39298.5	39289.4	39274.5	39267.1	39265.9	39269.3	39272.9	39271.1	39270.3	39278.1	39267.4	39262.5	39268.6	39275.4	39274.2	39276.6	39277.6	39277.6	39281.3	39291.3	39282.2		
6	39307.2	39321.0	39325.7	39316.3	39302.2	39294.7	39288.7	39278.7	39270.9	39275.4	39276.4	39276.5	39277.9	39278.1	39279.5	39280.8	39280.3	39278.6	39277.2	39279.5	39278.3	39277.7	39281.4	39293.3	39287.3		
7	39310.4	39325.2	39334.4	39331.0	39318.1	39301.0	39287.4	39278.4	39274.4	39276.1	39274.9	39272.5	39273.2	39277.8	39276.3	39278.4	39280.9	39283.3	39283.2	39283.1	39284.0	39286.2	39293.8	39303.9	39291.2		
8	39298.6	39308.6	39308.2	39311.6	39303.3	39290.7	39280.1	39273.1	39265.6	39264.8	39269.2	39270.3	39270.5	39267.9	39265.8	39264.8	39265.5	39274.2	39284.2	39284.7	39286.1	39288.1	39293.5	39306.3	39283.2		
9	39314.9	39328.8	39338.1	39335.9	39317.1	39291.8	39283.1	39281.9	39281.6	39277.9	39276.1	39279.4	39279.5	39269.2	39271.3	39272.8	39267.1	39263.6	39266.3	39276.8	39285.6	39276.3	39274.4	39276.1	39281.0	39291.2	39279.6
10	39312.1	39311.7	39316.8	39291.5	39277.0	39264.5	39264.4	39271.6	39273.7	39274.1	39275.3	39274.6	39271.3	39272.8	39267.1	39263.6	39266.3	39276.8	39285.6	39276.3	39274.4	39276.1	39281.0	39291.2	39279.6		
11	39301.9	39313.6	39322.9	39318.4	39306.6	39300.3	39288.8	39280.6	39272.7	39271.5	39271.8	39273.4	39278.0	39274.7	39275.0	39274.0	39281.3	39279.2	39279.1	39280.6	39281.3	39283.4	39288.9	39298.9	39287.4		
12	39303.7	39311.0	39313.6	39310.1	39307.1	39296.1	39286.7	39276.1	39268.2	39264.8	39267.7	39271.6	39269.7	39264.9	39264.0	39270.3	39273.7	39275.1	39277.2	39277.5	39279.8	39282.3	39288.6	39298.6	39283.3		
13	39308.9	39324.4	39337.4	39325.9	39306.5	39293.4	39293.8	39289.9	39281.1	39279.8	39280.4	39278.1	39276.5	39277.9	39279.7	39279.6	39280.0	39280.5	39282.7	39285.3	39285.0	39285.9	39288.1	39295.7	39291.5		
14	39303.7	39314.3	39323.7	39322.4	39318.1	39312.1	39303.6	39291.3	39283.3	39288.4	39288.8	39289.8	39287.6	39286.5	39285.8	39284.2	39285.6	39287.0	39287.9	39287.6	39287.2	39288.0	39292.3	39295.6	39295.6		
15	39301.1	39312.6	39321.1	39322.3	39319.3	39312.6	39304.3	39298.0	39288.5	39280.7	39278.6	39281.3	39284.1	39286.5	39286.9	39287.3	39285.6	39282.1	39287.7	39286.3	39285.7	39282.4	39283.7	39292.4	39293.8		
16	39306.9	39323.7	39333.8	39328.4	39326.7	39320.2	39303.7	39286.5	39277.6	39283.0	39282.2	39278.0	39279.7	39280.3	39279.2	39278.4	39280.9	39283.1	39284.4	39284.2	39284.4	39287.1	39292.3	39303.4	39294.5		
17	39315.2	39329.1	39340.2	39338.8	39333.4	39322.3	39308.4	39308.4	39292.3	39290.3	39291.2	39290.9	39289.5	39288.4	39287.6	39287.4	39287.0	39285.1	39283.9	39283.4	39286.7	39290.3	39295.6	39308.2	39301.4		
18	39324.6	39340.0	39348.0	39341.8	39331.6	39331.6	39319.7	39307.5	39290.7	39290.2	39290.1	39289.5	39290.6	39290.5	39289.1	39289.9	39290.6	39287.9	39288.2	39290.0	39295.3	39297.8	39304.4	39315.4	39305.6		
19	39322.7	39329.8	39336.1	39337.8	39336.6	39336.5	39324.8	39312.2	39294.0	39293.5	39297.0	39292.2	39281.8	39278.0	39280.4	39286.7	39288.0	39287.8	39290.1	39294.4	39295.3	39296.7	39301.8	39310.0	39304.3		
20	39324.7	39343.6	39350.1	39345.3	39334.0	39333.9	39320.4	39307.8	39290.7	39290.3	39288.6	39287.7	39289.8	39292.6	39292.6	39289.1	39289.4	39288.4	39290.2	39290.9	39290.3	39292.0	39296.5	39305.8	39305.2		
21	39320.3	39339.3	39345.6	39341.4	39334.2	39334.2	39323.6	39308.9	39288.1	39281.5	39278.3	39278.1	39280.5	39282.3	39285.4	39287.3	39288.0	39288.9	39289.9	39291.2	39291.1	39292.3	39298.0	39305.0	39302.2		
22	39316.8	39331.3	39336.5	39332.2	39323.4	39323.3	39313.1	39303.0	39291.2	39292.6	39293.5	39293.2	39290.7	39289.0	39288.1	39286.7	39287.6	39288.4	39291.1	39292.8	39293.0	39295.7	39300.6	39311.4	39302.7		
23	39325.9	39341.0	39350.6	39345.6	39339.3	39339.3	39330.8	39314.5	39294.4	39291.4	39293.2	39292.5	39289.8	39287.5	39282.5	39280.5	39285.6	39290.5	39299.7	39298.1	39286.2	39287.2	39293.7	39296.7	39305.7		
24	39314.5	39331.0	39336.3	39333.3	39331.3	39331.3	39322.2	39308.4	39288.5	39285.3	39279.7	39270.2	39266.8	39268.3	39273.3	39283.6	39285.4	39281.1	39280.2	39280.9	39281.7	39283.1	39287.4	39294.2	39295.8		
25	39306.5	39325.8	39332.8	39335.4	39339.3	39339.3	39328.2	39307.8	39287.8	39285.1	39284.3	39279.2	39273.1	39282.6	39281.7	39283.4	39283.9	39285.0	39286.2	39287.0	39287.0	39289.2	39293.3	39299.5	39299.3		
26	39310.4	39329.7	39338.8	39335.8	39327.1	39327.0	39316.5	39302.0	39284.6	39284.0	39285.0	39282.7	39279.1	39277.6	39276.8	39277.9	39283.2	39285.4	39285.8	39287.1	39285.3	39285.5	39290.1	39296.3	39297.2		
27	39305.0	39312.9	39318.2	39321.8	39316.9	39316.9	39313.3	39307.6	39277.0	39265.9	39262.4	39266.3	39275.1	39273.2	39274.5	39275.7	39279.0	39279.9	39281.9	39283.2	39286.7	39286.4	39286.4	39287.0	39289.7		
28	39296.0	39307.6	39313.8	39316.1	39314.6	39314.6	39303.9	39292.6	39280.7	39282.0	39283.1	39285.0	39284.6	39285.5	39286.5	39284.1	39282.4	39285.0	39286.1	39289.3	39286.3	39285.7	39291.7	39295.6	39293.0		
29	39306.9	39321.8	39322.8	39325.1	39324.4	39324.3	39316.1	39303.6	39288.3	39288.7	39289.0	39287.9	39287.2	39282.2	39277.2	39275.1	39282.9	39282.5	39281.4	39281.7	39283.2	39285.1	39291.0	39298.1	39296.1		
30	39308.6	39318.1	39319.2	39321.7	39319.0	39319.0	39311.4	39301.3	39285.8	39285.5	39286.3	39285.5	39284.3	39283.2	39282.0	39280.1	39279.8	39282.7	39283.1	39282.5	39291.6	39291.4	39299.3	39309.0	39296.3		
HOURLY MEANS	39309.5	39322.1	39328.6	39325.5	39317.9	39311.6	39301.7	39292.2	39280.8	39279.1	39278.2	39277.3	39277.3	39277.4	39277.3	39277.6	39279.0	39280.7	39282.8	39283.7	39284.4	39285.5	39290.1	39298.5	39292.5		

Tabel 35 Nilai Variasi harian komponen Y – east (nT) April 2019

Tondano Magnetic Observatory

April 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	436.5	437.8	447.2	452.3	454.2	450.7	448.3	452.4	447.3	442.7	435.9	433.2	437.8	439.3	439.2	439.6	440.4	441.1	441.7	441.5	441.8	439.5	437.0	431.7	442.0
2	427.6	425.6	431.3	437.6	442.9	447.0	449.6	449.6	447.1	445.9	442.8	441.2	441.4	440.7	441.3	441.9	442.8	444.3	445.1	443.7	444.6	443.1	443.8	436.3	441.5
3	433.7	435.7	436.0	438.7	444.0	446.5	448.2	449.9	445.7	444.3	437.2	435.7	431.3	435.9	439.2	440.8	441.9	442.8	444.4	443.8	440.4	440.4	440.4	429.1	440.2
4	422.9	427.0	437.0	447.4	446.3	448.4	442.8	440.3	441.5	439.2	436.5	430.3	436.8	436.7	438.9	438.4	438.8	446.2	444.9	447.4	444.4	443.3	444.7	436.9	439.9
5	432.7	431.2	431.5	435.9	440.1	439.3	434.9	435.5	436.0	440.0	439.1	439.0	438.5	435.0	437.8	439.2	441.6	442.2	443.8	447.9	443.1	442.6	440.1	435.0	438.4
6	432.1	435.0	440.4	445.0	441.5	442.0	441.1	435.5	436.6	441.5	440.8	439.6	439.6	439.8	440.2	441.1	441.1	440.9	441.1	441.3	441.4	442.0	446.0	442.2	440.3
7	439.4	438.3	436.7	438.8	444.4	445.3	446.0	444.0	441.6	441.7	439.5	439.0	438.6	436.9	438.0	438.6	439.3	439.6	440.4	440.9	441.7	442.4	450.6	445.4	441.1
8	435.2	438.9	445.1	443.5	440.5	437.6	440.1	441.2	438.8	439.8	438.2	437.7	437.3	436.7	436.9	436.0	436.5	441.0	441.9	442.3	442.3	442.6	445.2	438.9	439.7
9	435.1	431.2	432.1	432.7	433.6	430.7	433.7	433.1	436.0	443.1	439.7	439.1	439.0	436.4	437.3	438.9	440.6	439.7	439.2	441.7	442.5	444.3	446.3	441.0	437.8
10	432.0	439.3	447.6	453.6	450.3	442.1	439.9	440.4	444.9	441.2	438.2	438.4	438.3	437.0	435.1	437.3	439.7	441.5	440.5	439.3	440.1	440.5	441.0	432.0	440.4
11	424.1	428.0	435.1	439.2	438.4	436.0	432.8	435.8	442.3	444.8	441.2	438.4	438.1	437.4	436.8	436.9	437.5	438.9	440.2	440.7	441.1	441.2	441.3	432.8	437.5
12	423.3	424.4	427.2	434.7	439.4	438.6	439.0	439.6	443.5	443.6	441.8	438.4	437.5	438.2	438.6	438.7	438.8	440.3	441.6	439.5	440.9	444.5	447.7	436.2	438.2
13	423.3	419.9	422.5	421.3	419.1	420.7	435.4	444.3	445.5	443.7	438.8	438.4	437.5	437.4	438.3	438.3	439.1	440.2	441.1	441.2	441.1	442.0	443.2	437.2	435.4
14	435.5	439.3	439.5	435.9	432.1	430.9	432.1	436.1	445.2	446.9	442.1	440.0	438.8	438.6	438.5	439.6	440.7	441.4	441.0	440.7	440.3	442.8	449.4	445.0	439.7
15	445.0	447.3	446.3	444.2	442.0	437.1	432.6	440.7	441.3	438.9	437.6	436.4	435.6	436.4	437.5	438.8	440.2	441.5	441.8	442.1	443.3	442.9	449.8	444.8	441.0
16	436.3	433.8	431.7	432.8	436.5	435.4	436.4	442.7	446.2	444.9	439.4	438.8	437.7	437.7	438.4	438.9	438.9	439.1	439.5	439.4	439.4	440.1	440.7	435.1	438.3
17	431.1	430.3	431.1	431.8	435.1	434.0	435.8	435.8	445.3	443.7	439.6	438.8	438.0	437.7	437.9	438.4	439.1	440.8	441.5	441.5	440.9	441.4	446.8	441.2	438.2
18	435.0	434.3	436.0	434.9	434.8	438.6	438.8	437.9	443.7	444.9	440.5	438.4	437.8	437.8	437.9	438.4	439.5	439.9	439.9	440.9	440.9	442.1	446.5	441.2	439.2
19	429.9	423.3	422.7	424.3	424.3	427.4	430.7	437.9	442.8	441.6	439.5	437.7	436.7	436.4	436.4	437.3	438.4	437.8	437.9	438.3	439.2	439.7	437.6	428.0	434.4
20	421.5	426.7	432.1	438.4	438.3	441.9	441.7	439.2	440.7	443.2	437.8	437.1	437.4	437.0	436.9	436.3	439.1	440.3	439.0	439.2	440.0	441.8	447.6	440.5	438.1
21	431.8	429.7	434.0	435.4	435.3	440.1	443.9	444.1	445.5	442.0	439.1	436.7	435.6	436.3	436.4	437.9	438.8	440.3	440.2	439.5	439.1	441.4	449.3	448.3	439.2
22	444.9	443.3	440.0	437.8	437.7	442.2	444.0	442.6	445.6	441.5	437.8	435.9	435.4	435.8	437.1	437.6	438.6	439.3	439.7	439.1	437.9	438.6	442.3	439.8	439.8
23	432.2	425.0	421.9	425.0	424.9	432.6	442.1	448.2	446.8	442.4	438.8	436.6	436.7	437.0	436.7	435.7	436.9	436.0	436.8	435.0	436.9	439.4	446.2	443.9	436.4
24	435.6	424.7	416.8	413.5	413.5	416.6	420.9	425.5	437.6	439.1	439.3	435.8	436.9	435.4	436.2	435.8	436.1	437.7	438.3	438.2	438.0	438.4	448.3	447.7	432.7
25	439.5	437.2	431.1	430.2	430.3	430.2	434.3	437.6	444.1	439.9	435.0	433.7	433.4	437.8	436.3	436.5	437.1	437.7	437.5	437.2	437.8	439.1	441.6	436.0	436.3
26	429.1	426.3	423.1	423.3	423.2	432.3	437.5	441.7	438.1	437.6	436.3	436.3	435.9	435.4	435.5	436.9	438.7	441.6	441.3	440.6	439.5	441.2	447.0	441.9	435.8
27	431.4	428.0	432.0	432.0	432.0	429.7	430.0	432.1	439.0	435.6	430.3	430.9	433.5	433.7	434.2	436.7	438.2	437.2	437.9	438.6	441.7	439.3	439.1	434.1	434.5
28	427.6	426.4	424.7	423.8	423.8	424.1	428.6	437.1	442.5	438.7	433.6	433.3	434.6	435.0	436.1	439.1	440.0	440.7	440.2	440.8	440.4	438.6	444.3	433.9	434.5
29	427.1	422.6	419.7	417.8	417.8	421.3	427.0	431.5	438.7	439.3	434.3	434.5	434.3	434.5	434.1	435.7	439.0	439.9	440.7	439.5	438.5	439.0	441.9	433.9	432.6
30	427.3	422.7	422.0	420.4	420.4	421.2	422.8	433.7	436.8	437.1	435.0	434.0	434.6	433.3	434.6	437.0	439.1	439.5	439.1	439.3	440.7	438.5	438.4	430.4	432.4
HOURLY MEANS	432.0	431.1	432.5	434.1	434.5	435.3	437.0	439.5	442.2	441.6	438.2	436.8	436.8	436.8	437.3	438.1	439.2	440.3	440.6	440.7	440.7	441.1	444.1	438.0	437.9

Tabel 36 Nilai Variasi harian komponen D – declination (menit) April 2019

Tondano Magnetic Observatory																								April 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	38.19	38.30	39.12	39.56	39.73	39.43	39.24	39.61	39.18	38.79	38.20	37.94	38.35	38.48	38.46	38.50	38.57	38.63	38.68	38.66	38.68	38.48	38.25	37.79	38.70
2	37.42	37.24	37.74	38.28	38.75	39.11	39.36	39.36	39.14	39.04	38.77	38.63	38.64	38.59	38.65	38.69	38.77	38.90	38.97	38.85	38.92	38.8	38.9	38.2	38.65
3	37.9	38.1	38.1	38.36	38.85	39.08	39.25	39.40	39.04	38.92	38.31	38.19	37.79	38.19	38.47	38.60	38.71	38.79	38.92	38.86	38.56	38.56	38.56	37.56	38.55
4	37.01	37.36	38.23	39.14	39.05	39.24	38.76	38.55	38.65	38.46	38.23	37.71	38.27	38.26	38.44	38.40	38.44	39.08	38.97	39.18	38.92	38.82	38.93	38.24	38.51
5	37.86	37.7	37.7	38.1	38.5	38.45	38.08	38.14	38.19	38.53	38.45	38.44	38.40	38.09	38.34	38.47	38.68	38.72	38.86	39.22	38.80	38.76	38.53	38.07	38.38
6	37.81	38.05	38.52	38.92	38.63	38.69	38.6	38.1	38.2	38.7	38.6	38.5	38.5	38.5	38.5	38.6	38.6	38.6	38.6	38.6	38.6	38.7	39.04	38.70	38.54
7	38.44	38.33	38.18	38.37	38.87	38.97	39.04	38.9	38.7	38.7	38.49	38.45	38.41	38.26	38.35	38.41	38.46	38.49	38.55	38.60	38.67	38.73	39.44	38.97	38.61
8	38.08	38.40	38.94	38.80	38.55	38.30	38.53	38.63	38.43	38.52	38.38	38.33	38.30	38.25	38.26	38.19	38.23	38.62	38.68	38.72	38.72	38.74	38.96	38.40	38.50
9	38.06	37.71	37.77	37.83	37.93	37.70	37.96	37.92	38.17	38.80	38.50	38.45	38.43	38.22	38.30	38.44	38.58	38.50	38.45	38.68	38.75	38.91	39.08	38.61	38.32
10	37.80	38.43	39.15	39.70	39.43	38.73	38.53	38.57	38.96	38.64	38.37	38.39	38.38	38.27	38.11	38.31	38.51	38.66	38.56	38.46	38.54	38.57	38.61	37.82	38.56
11	37.11	37.44	38.05	38.41	38.35	38.16	37.88	38.15	38.73	38.95	38.64	38.39	38.36	38.30	38.25	38.3	38.3	38.4	38.5	38.6	38.6	38.6	38.6	37.88	38.29
12	37.04	37.13	37.37	38.03	38.44	38.39	38.43	38.49	38.84	38.85	38.69	38.39	38.32	38.38	38.42	38.42	38.43	38.55	38.67	38.48	38.60	38.91	39.19	38.18	38.36
13	37.04	36.72	36.93	36.85	36.66	36.82	38.11	38.89	39.00	38.84	38.42	38.38	38.31	38.29	38.37	38.37	38.44	38.54	38.62	38.62	38.62	38.69	38.79	38.26	38.11
14	38.11	38.43	38.44	38.12	37.80	37.70	37.81	38.17	38.98	39.12	38.70	38.51	38.41	38.39	38.39	38.48	38.57	38.64	38.60	38.58	38.54	38.76	39.33	38.95	38.48
15	38.94	39.13	39.04	38.85	38.66	38.23	37.85	38.57	38.63	38.43	38.32	38.20	38.14	38.20	38.30	38.41	38.53	38.65	38.67	38.70	38.81	38.77	39.37	38.93	38.60
16	38.17	37.94	37.75	37.85	38.17	38.08	38.19	38.75	39.07	38.95	38.46	38.42	38.32	38.33	38.38	38.43	38.43	38.44	38.47	38.47	38.47	38.53	38.57	38.07	38.36
17	37.71	37.62	37.69	37.75	38.0	38.0	38.1	38.1	39.0	38.84	38.48	38.40	38.34	38.31	38.33	38.37	38.44	38.58	38.65	38.65	38.59	38.64	39.10	38.60	38.35
18	38.04	37.97	38.10	38.02	38.02	38.35	38.38	38.31	38.84	38.94	38.55	38.38	38.32	38.32	38.33	38.38	38.47	38.50	38.51	38.59	38.59	38.69	39.07	38.60	38.43
19	37.59	37.02	36.96	37.09	37.09	37.36	37.66	38.31	38.75	38.65	38.46	38.31	38.23	38.21	38.20	38.28	38.38	38.33	38.33	38.36	38.44	38.48	38.29	37.45	38.01
20	36.86	37.30	37.76	38.32	38.32	38.64	38.64	38.43	38.57	38.79	38.32	38.26	38.28	38.25	38.24	38.19	38.44	38.54	38.43	38.44	38.51	38.67	39.17	38.55	38.33
21	37.76	37.57	37.94	38.06	38.06	38.47	38.82	38.85	38.99	38.70	38.44	38.23	38.14	38.20	38.20	38.33	38.41	38.54	38.54	38.47	38.43	38.63	39.32	39.2	38.43
22	38.91	38.77	38.47	38.28	38.28	38.67	38.84	38.73	39.00	38.64	38.32	38.16	38.11	38.15	38.26	38.31	38.39	38.46	38.49	38.44	38.32	38.39	38.70	38.47	38.48
23	37.80	37.15	36.87	37.15	37.15	37.82	38.65	39.21	39.10	38.72	38.40	38.22	38.23	38.25	38.24	38.14	38.25	38.17	38.23	38.07	38.24	38.46	39.05	38.85	38.18
24	38.10	37.14	36.44	36.15	36.15	36.43	36.81	37.23	38.30	38.44	38.46	38.17	38.26	38.13	38.19	38.16	38.17	38.32	38.38	38.37	38.35	38.38	39.25	39.18	37.87
25	38.45	38.23	37.70	37.62	37.62	37.61	37.98	38.29	38.88	38.51	38.08	37.98	37.96	38.33	38.20	38.21	38.27	38.31	38.30	38.27	38.32	38.43	38.65	38.15	38.18
26	37.54	37.27	36.98	37.01	37.01	37.81	38.27	38.65	38.35	38.31	38.20	38.19	38.17	38.12	38.13	38.26	38.40	38.65	38.63	38.57	38.47	38.62	39.13	38.67	38.14
27	37.75	37.44	37.79	37.78	37.78	37.58	37.62	37.80	38.44	38.15	37.69	37.74	37.96	37.98	38.02	38.24	38.36	38.28	38.34	38.40	38.66	38.45	38.43	38.00	38.03
28	37.42	37.31	37.15	37.07	37.07	37.10	37.5	38.3	38.7	38.4	38.0	37.9	38.0	38.08	38.17	38.44	38.52	38.58	38.53	38.58	38.55	38.40	38.89	37.97	38.03
29	37.37	36.96	36.70	36.53	36.53	36.84	37.35	37.75	38.40	38.45	38.01	38.04	38.01	38.0	38.0	38.2	38.4	38.5	38.6	38.5	38.4	38.4	38.68	37.97	37.86
30	37.39	36.97	36.91	36.77	36.77	36.84	36.99	37.95	38.24	38.26	38.08	37.99	38.05	37.94	38.05	38.26	38.44	38.48	38.44	38.46	38.57	38.38	38.36	37.66	37.84
HOURLY MEANS	37.79	37.70	37.82	37.96	38.01	38.09	38.24	38.47	38.72	38.67	38.37	38.24	38.25	38.24	38.29	38.36	38.46	38.55	38.57	38.58	38.58	38.61	38.88	38.33	38.32

Tabel 37 Nilai variasi harian komponen I – inclination (derajat) April 2019

Tondano Magnetic Observatory

April 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.99	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.97	-12.99
2	-12.96	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-13.0	-13.0	-13.0	-12.97
3	-13.0	-13.0	-12.9	-12.95	-12.96	-12.97	-12.98	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98
4	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-13.00	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-12.98	-12.98	-12.99	-12.98	-12.98
5	-12.97	-12.96	-12.95	-12.96	-12.97	-12.98	-12.99	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.97	-12.98
6	-12.97	-12.96	-12.95	-12.96	-12.97	-12.98	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.99	-12.99	-12.98
7	-12.98	-12.96	-12.94	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.97
8	-12.97	-12.97	-12.96	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.99	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98
9	-12.97	-12.96	-12.96	-12.95	-12.96	-12.96	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98
10	-12.96	-12.96	-12.96	-12.97	-12.98	-12.99	-13.00	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98
11	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.98
12	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.99	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98
13	-12.97	-12.96	-12.96	-12.95	-12.95	-12.95	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
14	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.97
15	-12.99	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98
16	-12.98	-12.96	-12.95	-12.94	-12.95	-12.95	-12.96	-12.97	-12.97	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
17	-12.97	-12.96	-12.96	-12.95	-12.9	-12.9	-13.0	-13.0	-13.0	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
18	-12.96	-12.95	-12.95	-12.94	-12.94	-12.95	-12.95	-12.96	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
19	-12.96	-12.95	-12.95	-12.94	-12.94	-12.95	-12.96	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.96	-12.97
20	-12.95	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
21	-12.97	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-13.0	-12.97
22	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
23	-12.96	-12.94	-12.93	-12.93	-12.93	-12.93	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-13.00	-12.96
24	-12.99	-12.98	-12.97	-12.96	-12.96	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98
25	-12.98	-12.97	-12.96	-12.94	-12.94	-12.93	-12.93	-12.95	-12.95	-12.97	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
26	-12.96	-12.95	-12.94	-12.93	-12.93	-12.94	-12.95	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
27	-12.97	-12.96	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
28	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.97
29	-12.98	-12.96	-12.95	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97
30	-12.97	-12.96	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
HOURLY MEANS	-12.97	-12.96	-12.96	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97

2. Gangguan badai magnet

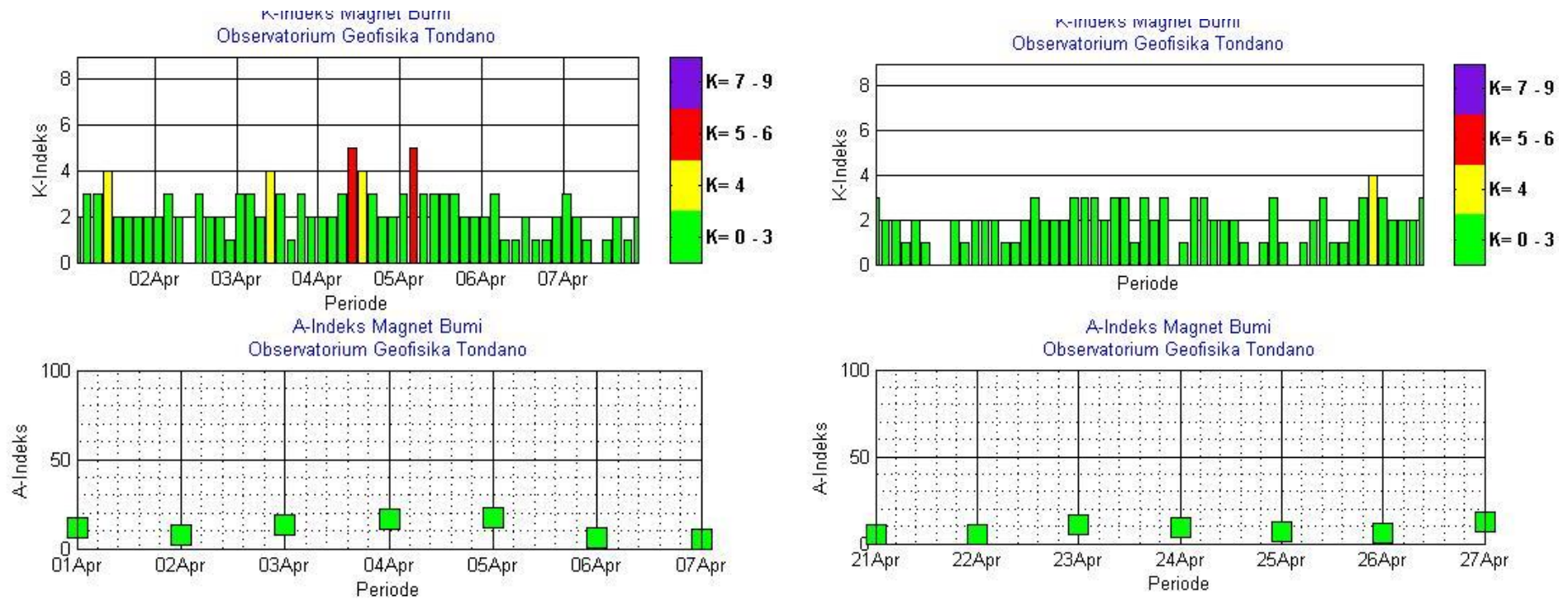
Tabel 38 Monitoring waktu gangguan pada pengamatan magnet bumi April 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	4	2019					
2	2	4	2019					
3	3	4	2019					
4	4	4	2019					
5	5	4	2019					
6	6	4	2019					
7	7	4	2019					
8	8	4	2019					
9	9	4	2019					
10	10	4	2019					
11	11	4	2019					
12	12	4	2019					
13	13	4	2019					
14	14	4	2019					
15	15	4	2019					
16	16	4	2019					
17	17	4	2019					
18	18	4	2019					
19	19	4	2019					
20	20	4	2019					
21	21	4	2019					
22	22	4	2019					
23	23	4	2019					
24	24	4	2019					
25	25	4	2019					
26	26	4	2019					
27	27	4	2019					
28	28	4	2019					
29	29	4	2019					
30	30	4	2019					

Tabel 39 Hasil analisa K-indeks dan A-indeks April 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	2	3	3	4	2	2	2	2	11.5	Tenang
2	2	3	2	0	3	2	2	1	7.6	Tenang
3	3	3	2	4	3	1	3	2	13.0	Tenang
4	2	2	3	5	4	3	2	2	16.6	Tenang
5	3	5	3	3	3	3	2	2	17.1	Tenang
6	2	3	1	1	2	1	1	2	6.0	Tenang
7	3	2	1	0	1	2	1	2	5.6	Tenang
8	3	4	3	2	3	2	1	1	11.5	Tenang
9	2	1	2	2	2	3	1	2	7.0	Tenang
10	4	3	4	1	3	4	3	1	16.5	Tenang
11	2	3	2	2	2	2	1	1	7.0	Tenang
12	3	2	1	2	3	3	2	2	9.5	Tenang
13	3	3	3	1	1	1	1	1	7.5	Tenang
14	2	3	1	1	2	1	0	2	5.6	Tenang
15	2	3	3	2	1	2	1	2	8.0	Tenang
16	3	3	3	1	2	2	0	1	8.1	Tenang
17	3	1	0	1	2	1	2	2	5.6	Tenang
18	3	1	1	0	1	1	2	3	6.1	Tenang
19	1	3	2	2	3	2	2	2	8.5	Tenang
20	3	2	0	1	1	1	0	1	4.3	Tenang
21	3	2	2	1	2	1	0	0	5.3	Tenang
22	2	1	2	2	2	1	1	2	5.5	Tenang
23	3	2	2	2	3	3	3	2	11.0	Tenang
24	3	3	1	3	2	3	0	1	9.1	Tenang
25	3	3	2	2	2	1	0	1	7.1	Tenang
26	3	1	0	1	2	3	1	1	6.1	Tenang
27	2	3	4	3	2	2	2	3	12.5	Tenang
28	1	3	2	1	1	1	1	2	5.5	Tenang
29	2	3	1	1	3	3	0	0	7.3	Tenang
30	2	3	1	1	2	1	2	2	6.5	Tenang

Gambar 25 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan April 2019



Tabel 41 Nilai variasi harian komponen Z – vertical (nT) Mei 2019

Tondano Magnetic Observatory																								Mei 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9051.2	-9043.1	-9035.1	-9036.4	-9034.6	-9035.0	-9036.0	-9037.7	-9037.7	-9045.8	-9046.9	-9047.8	-9047.1	-9046.8	-9048.0	-9049.7	-9052.0	-9046.8	-9052.9	-9045.7	-9049.4	-9053.2	-9054.7	-9047.4	-9045.0
2	-9043.5	-9039.0	-9039.7	-9040.8	-9040.7	-9044.4	-9049.6	-9050.0	-9050.0	-9052.5	-9051.3	-9052.0	-9050.3	-9048.4	-9048.5	-9050.6	-9050.8	-9052.6	-9054.0	-9046.6	-9048.3	-9049.9	-9052.7	-9050.6	-9048.2
3	-9047.5	-9042.8	-9038.9	-9040.2	-9044.7	-9051.1	-9050.4	-9050.0	-9050.0	-9049.1	-9049.0	-9048.5	-9048.0	-9050.0	-9049.6	-9050.6	-9051.2	-9051.7	-9051.4	-9048.2	-9048.7	-9052.5	-9050.9	-9044.7	-9048.3
4	-9042.1	-9041.1	-9041.1	-9042.1	-9042.1	-9048.8	-9049.3	-9053.9	-9053.9	-9050.5	-9051.5	-9053.1	-9049.4	-9049.3	-9048.6	-9049.3	-9052.6	-9051.8	-9052.7	-9049.8	-9049.9	-9051.8	-9054.6	-9050.2	-9049.1
5	-9046.3	-9043.1	-9042.0	-9038.5	-9041.0	-9044.1	-9045.3	-9047.6	-9047.6	-9051.3	-9052.0	-9050.7	-9049.1	-9048.8	-9049.4	-9050.0	-9050.5	-9050.7	-9050.8	-9051.7	-9051.8	-9053.5	-9057.9	-9054.3	-9048.7
6	-9046.0	-9035.9	-9031.9	-9032.0	-9033.7	-9039.2	-9040.5	-9041.7	-9041.7	-9047.3	-9046.8	-9048.7	-9048.1	-9048.3	-9049.6	-9049.7	-9049.7	-9051.7	-9050.5	-9051.8	-9052.1	-9053.0	-9054.4	-9051.4	-9045.7
7	-9045.8	-9038.2	-9034.1	-9029.4	-9027.7	-9033.9	-9040.2	-9044.6	-9044.6	-9046.9	-9049.2	-9049.2	-9047.4	-9047.7	-9048.0	-9049.1	-9050.1	-9050.3	-9053.8	-9050.1	-9051.1	-9052.4	-9054.2	-9049.7	-9045.3
8	-9044.8	-9040.3	-9036.7	-9037.3	-9038.3	-9041.4	-9038.0	-9039.9	-9039.9	-9047.4	-9046.3	-9050.2	-9050.5	-9048.9	-9048.8	-9049.7	-9050.9	-9051.5	-9050.8	-9051.0	-9049.9	-9050.8	-9054.3	-9054.7	-9046.3
9	-9044.6	-9043.2	-9041.4	-9040.1	-9039.3	-9042.4	-9044.7	-9043.4	-9043.4	-9047.2	-9048.9	-9049.3	-9048.7	-9048.6	-9049.3	-9050.3	-9050.4	-9050.9	-9050.5	-9050.8	-9050.4	-9051.1	-9051.3	-9048.0	-9047.0
10	-9053.2	-9049.8	-9044.1	-9036.2	-9032.6	-9037.5	-9041.0	-9040.3	-9040.3	-9046.5	-9046.7	-9048.4	-9048.8	-9048.8	-9048.5	-9049.9	-9049.4	-9050.0	-9054.0	-9051.5	-9050.9	-9056.2	-9061.4	-9063.3	-9047.9
11	-9059.4	-9053.8	-9045.4	-9053.2	-9055.1	-9057.5	-9051.9	-9045.6	-9045.6	-9049.0	-9053.5	-9053.4	-9045.1	-9055.6	-9053.5	-9053.2	-9051.1	-9052.2	-9051.7	-9051.1	-9052.4	-9052.7	-9055.9	-9060.2	-9052.4
12	-9057.6	-9055.1	-9049.3	-9045.8	-9042.0	-9042.0	-9043.5	-9047.0	-9047.0	-9049.1	-9048.6	-9048.9	-9049.1	-9048.9	-9049.1	-9049.6	-9049.9	-9049.6	-9050.3	-9050.8	-9050.4	-9053.2	-9057.5	-9058.5	-9049.7
13	-9056.3	-9056.3	-9054.8	-9052.8	-9051.1	-9051.2	-9051.8	-9051.1	-9051.1	-9045.1	-9044.0	-9049.3	-9051.1	-9050.1	-9049.6	-9046.0	-9049.5	-9049.5	-9052.0	-9050.7	-9052.2	-9052.3	-9055.5	-9052.6	-9051.1
14	-9047.1	-9039.6	-9043.4	-9042.7	-9039.9	-9033.9	-9045.9	-9043.9	-9043.9	-9055.8	-9054.1	-9050.8	-9050.0	-9050.1	-9050.4	-9050.0	-9052.6	-9053.7	-9052.7	-9055.7	-9053.3	-9050.5	-9051.2	-9050.7	-9048.4
15	-9046.0	-9041.5	-9037.7	-9038.0	-9039.8	-9045.4	-9049.7	-9045.1	-9042.9	-9044.6	-9046.3	-9047.7	-9048.8	-9048.9	-9049.1	-9051.2	-9050.1	-9052.1	-9049.8	-9049.0	-9050.0	-9052.3	-9052.6	-9048.9	-9047.0
16	-9045.0	-9041.9	-9041.5	-9042.5	-9045.8	-9052.5	-9057.1	-9058.0	-9058.0	-9049.8	-9050.3	-9052.1	-9050.1	-9048.0	-9049.3	-9049.5	-9051.3	-9051.9	-9046.6	-9051.2	-9047.9	-9049.5	-9052.7	-9045.6	-9049.5
17	-9046.6	-9042.6	-9032.8	-9031.7	-9032.4	-9036.3	-9037.4	-9037.4	-9037.4	-9046.0	-9047.5	-9047.7	-9047.5	-9048.5	-9049.1	-9049.4	-9049.7	-9050.1	-9048.7	-9050.0	-9050.4	-9050.8	-9054.8	-9052.8	-9044.9
18	-9041.0	-9035.1	-9030.8	-9033.1	-9033.1	-9034.5	-9040.3	-9044.9	-9044.9	-9049.5	-9050.7	-9051.4	-9050.1	-9049.4	-9050.0	-9048.8	-9049.3	-9049.8	-9050.4	-9049.3	-9049.3	-9050.8	-9053.6	-9051.6	-9045.5
19	-9045.0	-9037.1	-9029.9	-9027.7	-9027.7	-9032.5	-9042.1	-9047.4	-9047.4	-9048.6	-9050.7	-9051.1	-9050.5	-9049.4	-9048.7	-9049.4	-9049.6	-9050.5	-9050.0	-9049.7	-9049.8	-9051.3	-9053.4	-9050.8	-9045.4
20	-9044.3	-9042.4	-9045.5	-9049.8	-9049.8	-9041.9	-9044.2	-9044.7	-9044.7	-9046.7	-9047.5	-9049.4	-9048.0	-9049.4	-9048.1	-9049.3	-9050.5	-9050.5	-9049.5	-9049.6	-9049.4	-9049.6	-9057.5	-9059.3	-9048.4
21	-9055.7	-9049.8	-9046.7	-9043.9	-9043.9	-9041.9	-9044.1	-9042.5	-9042.5	-9049.7	-9049.2	-9049.3	-9047.3	-9048.0	-9048.2	-9048.8	-9049.5	-9049.5	-9049.5	-9050.6	-9049.8	-9052.5	-9058.2	-9057.5	-9048.7
22	-9051.2	-9041.5	-9035.8	-9031.1	-9031.1	-9033.7	-9038.4	-9040.4	-9040.4	-9044.5	-9047.1	-9048.4	-9048.2	-9048.8	-9047.8	-9048.1	-9048.7	-9049.3	-9050.4	-9049.2	-9049.1	-9052.1	-9055.7	-9055.5	-9045.3
23	-9051.8	-9049.2	-9047.8	-9039.6	-9039.6	-9040.7	-9043.5	-9043.5	-9043.5	-9049.6	-9047.3	-9049.4	-9047.1	-9047.5	-9047.8	-9049.0	-9049.0	-9049.5	-9050.4	-9050.9	-9049.2	-9051.4	-9061.3	-9064.3	-9048.4
24	-9059.6	-9051.1	-9040.4	-9037.6	-9037.6	-9036.0	-9039.7	-9040.8	-9040.8	-9049.2	-9048.9	-9048.0	-9047.8	-9047.7	-9049.0	-9048.9	-9049.2	-9049.4	-9049.0	-9049.8	-9050.1	-9051.5	-9057.2	-9056.9	-9047.4
25	-9049.7	-9042.6	-9040.3	-9036.8	-9036.8	-9035.9	-9041.6	-9045.6	-9045.6	-9046.3	-9047.9	-9048.6	-9048.7	-9048.8	-9048.7	-9048.3	-9047.8	-9049.6	-9048.7	-9050.3	-9049.3	-9050.8	-9053.6	-9050.6	-9046.4
26	-9047.8	-9044.5	-9044.7	-9040.8	-9040.8	-9039.5	-9043.6	-9048.3	-9048.3	-9048.5	-9049.7	-9049.2	-9048.7	-9048.3	-9048.0	-9048.6	-9049.1	-9050.0	-9049.1	-9049.3	-9050.1	-9049.3	-9053.2	-9053.5	-9047.6
27	-9050.6	-9040.9	-9041.1	-9043.9	-9043.9	-9041.4	-9042.8	-9040.7	-9040.7	-9047.4	-9049.7	-9052.3	-9050.5	-9049.2	-9049.9	-9051.7	-9051.0	-9053.4	-9051.0	-9048.7	-9051.3	-9050.3	-9053.3	-9048.9	-9047.7
28	-9039.9	-9037.0	-9036.6	-9043.5	-9043.5	-9047.0	-9040.8	-9043.2	-9043.2	-9047.4	-9049.6	-9049.4	-9048.8	-9048.5	-9048.1	-9049.3	-9049.0	-9049.9	-9047.7	-9049.7	-9051.4	-9050.9	-9053.4	-9048.8	-9046.5
29	-9045.3	-9043.7	-9038.6	-9035.3	-9035.3	-9039.8	-9043.6	-9047.4	-9047.4	-9048.4	-9049.3	-9053.2	-9050.9	-9050.6	-9050.1	-9047.9	-9049.7	-9047.6	-9048.5	-9052.2	-9050.8	-9050.6	-9050.5	-9047.1	-9046.8
30	-	-	-	-	-	-9052.6	-9048.9	-9044.3	-9047.3	-9047.7	-9053.6	-9052.0	-9049.4	-9049.3	-9049.8	-9050.0	-9048.9	-9048.9	-9048.9	-9049.4	-9050.4	-9050.2	-9055.8	-9055.5	-9050.2
31	-9049.9	-9047.4	-9050.0	-9043.6	-9045.1	-9051.9	-9052.5	-9047.8	-9047.9	-9049.1	-9049.6	-9050.3	-9050.6	-9050.0	-9049.2	-9051.4	-9050.2	-9050.4	-9049.9	-9049.5	-9050.6	-9048.9	-9049.7	-9047.0	-9049.3
HOURLY MEANS	-9048.5	-9043.6	-9040.6	-9039.6	-9039.6	-9042.1	-9044.5	-9045.1	-9045.1	-9048.3	-9049.2	-9050.0	-9048.9	-9049.0	-9049.1	-9049.6	-9050.1	-9050.5	-9050.5	-9050.1	-9050.3	-9051.5	-9054.6	-9052.6	-9047.7

Tabel 44 Nilai Variasi harian komponen Y – east (nT) Mei 2019

Tondano Magnetic Observatory

Mei 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	424.0	417.0	413.4	414.6	424.6	430.9	438.1	440.6	442.8	438.9	434.1	432.5	431.6	432.9	433.1	434.1	438.4	436.7	439.8	437.7	438.4	442.1	446.9	435.9	433.3
2	424.0	415.6	416.9	424.2	430.4	429.3	431.9	432.5	434.4	437.9	436.5	435.5	434.3	433.9	434.0	435.3	436.8	438.9	442.3	435.9	434.1	435.5	439.2	430.5	432.5
3	424.4	432.9	435.4	432.0	435.3	434.1	431.8	432.1	437.5	437.6	434.0	431.4	429.6	432.2	433.2	435.5	438.2	440.6	442.3	441.1	439.7	442.1	443.2	434.3	435.4
4	428.1	421.6	420.8	423.2	424.8	424.3	425.7	432.1	436.2	435.7	429.1	431.4	431.3	431.1	429.9	431.7	435.7	436.2	436.5	436.3	435.1	437.0	444.4	438.1	431.5
5	430.6	424.9	427.6	426.0	423.7	424.8	429.2	438.2	442.7	440.6	437.9	435.7	433.5	432.8	433.3	433.3	434.6	435.8	436.6	437.7	438.0	441.2	450.8	444.5	434.7
6	432.6	424.3	422.7	424.0	426.0	432.0	435.0	438.2	440.6	438.2	435.0	434.1	433.1	432.1	432.6	434.0	436.1	438.1	438.0	439.5	439.6	442.2	444.4	437.7	434.6
7	431.6	427.7	424.4	419.0	417.5	421.3	425.9	434.7	439.0	438.1	436.6	435.1	433.3	433.0	433.2	434.2	435.2	436.2	439.2	438.6	439.2	442.6	447.4	439.9	433.4
8	431.0	421.0	416.0	419.4	423.0	426.4	431.4	437.5	440.1	436.1	432.3	431.3	432.3	432.0	432.7	433.5	436.1	438.4	439.2	439.6	438.4	440.1	444.8	438.6	433.0
9	427.6	419.1	415.5	415.2	415.6	423.6	429.7	433.3	437.0	437.1	433.8	432.6	431.9	432.6	434.0	435.7	436.4	437.4	438.3	438.8	438.9	441.4	446.5	440.5	432.2
10	429.8	423.0	420.4	419.5	423.2	428.0	433.6	433.4	435.2	435.8	432.3	432.0	432.1	432.6	433.0	433.8	435.1	436.5	441.6	443.9	443.9	451.5	461.0	459.7	435.5
11	449.4	435.2	421.0	414.6	411.0	418.1	422.5	428.4	436.0	437.1	436.6	433.1	428.2	429.0	428.4	428.2	424.8	427.2	428.7	427.8	430.9	432.1	440.3	441.3	429.6
12	436.2	432.9	424.9	416.5	411.8	411.5	419.1	431.1	438.7	436.1	432.2	432.9	432.6	431.8	431.2	432.1	432.5	432.6	434.9	434.7	434.6	438.3	445.2	442.5	431.1
13	438.9	435.4	430.8	426.6	426.0	428.8	434.3	435.7	439.4	435.0	430.4	430.8	429.6	429.4	431.2	430.1	432.3	434.1	436.8	436.2	437.7	441.2	449.0	444.0	434.3
14	435.9	423.6	421.6	419.8	420.3	430.7	438.1	430.2	440.2	435.9	433.0	427.6	425.3	422.8	424.1	424.7	427.3	432.0	436.7	441.8	439.2	435.9	434.7	429.5	430.5
15	420.2	417.2	418.4	422.2	427.0	433.5	437.5	438.1	435.9	432.2	428.4	428.9	429.6	430.2	431.2	433.2	434.7	437.7	438.3	438.0	438.0	440.1	442.1	434.6	432.0
16	425.8	419.1	414.6	415.1	424.3	434.2	439.3	441.1	438.8	436.7	432.5	430.9	430.4	429.6	429.1	429.0	431.2	433.9	431.1	434.8	431.4	431.9	441.6	439.9	431.1
17	441.0	434.1	422.9	414.2	409.2	408.9	415.5	415.5	440.3	437.6	431.6	430.8	430.0	430.6	430.7	431.0	431.8	433.1	433.3	434.2	434.6	436.5	447.8	448.7	430.2
18	445.3	438.3	431.1	424.0	423.9	417.8	418.6	421.8	437.6	439.9	434.2	432.5	430.9	430.4	431.4	431.0	431.3	432.3	432.8	432.4	432.9	436.2	445.3	442.4	432.3
19	432.4	424.6	417.9	409.9	409.9	406.9	418.6	429.1	437.0	436.0	433.8	432.7	432.1	430.6	429.8	430.5	431.0	432.4	432.7	433.4	434.0	436.0	441.5	437.6	428.8
20	427.7	417.0	405.6	399.5	399.4	396.6	414.0	424.6	437.2	434.4	430.1	430.2	428.3	429.0	429.1	430.5	432.1	432.8	432.7	433.2	432.7	434.9	447.5	447.8	426.1
21	437.9	430.2	419.5	416.2	416.2	414.1	418.9	421.8	441.0	436.1	432.3	430.6	430.0	429.4	428.7	428.8	430.4	431.0	431.6	433.4	433.3	437.3	445.7	437.4	429.6
22	425.5	414.2	411.0	408.0	408.0	407.1	411.6	418.3	437.2	436.0	433.6	431.4	429.9	430.5	430.6	431.9	433.2	434.7	436.6	436.0	435.5	439.5	443.6	445.4	427.9
23	438.3	428.6	419.7	411.9	411.9	407.6	411.4	415.5	432.1	433.5	430.6	430.7	428.4	428.7	429.7	431.6	432.9	434.3	435.9	436.9	435.8	437.6	450.0	447.2	429.2
24	440.7	432.4	421.8	418.6	418.5	422.8	429.3	431.2	430.2	430.4	429.8	429.7	429.9	429.3	430.2	431.2	432.4	434.0	434.9	435.1	435.3	436.2	442.0	441.2	431.1
25	437.0	431.6	424.4	416.2	416.2	415.4	420.2	423.5	429.1	428.9	427.6	428.2	428.7	429.8	429.7	430.2	430.3	432.4	432.7	434.5	434.6	437.2	444.4	443.9	429.4
26	440.5	433.3	425.4	416.0	416.0	417.3	418.7	424.2	435.8	433.6	431.9	430.7	429.9	429.8	430.0	430.7	432.1	433.2	433.1	433.2	433.8	434.1	442.7	449.8	430.7
27	450.0	442.5	435.4	428.5	428.4	419.9	417.6	415.5	422.2	426.6	425.7	426.9	427.0	427.1	429.1	432.6	434.9	440.0	440.9	439.6	441.3	441.8	449.8	452.2	433.2
28	444.2	435.5	420.4	413.9	413.9	414.5	414.9	416.5	425.5	427.4	427.1	427.0	427.2	427.4	428.1	430.2	433.0	435.5	436.0	438.4	440.7	441.8	449.7	447.9	429.9
29	439.8	430.6	419.0	411.7	411.5	406.7	402.9	408.8	428.5	428.0	426.1	425.0	425.3	426.2	427.2	427.0	429.0	429.4	431.0	434.7	435.5	437.3	438.8	434.5	425.6
30	-	-	-	-	-	415.4	417.6	418.2	422.0	425.2	426.9	428.0	427.3	426.7	428.2	430.7	432.0	432.9	433.9	434.5	434.5	435.0	442.2	440.9	429.0
31	436.1	425.3	417.7	412.3	416.3	421.5	423.3	421.6	424.9	428.4	427.8	427.9	428.3	428.6	429.3	432.2	431.8	432.3	432.5	432.7	434.0	432.7	436.9	438.2	428.0
HOURLY MEANS	434.2	427.0	421.2	417.8	418.8	420.1	424.4	427.8	435.3	434.5	431.7	430.9	430.1	430.1	430.5	431.6	433.0	434.6	435.8	436.3	436.3	438.4	444.8	441.5	431.1

Tabel 45 Nilai Variasi harian komponen D – declination (menit) Mei 2019

Tondano Magnetic Observatory																								Mei 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	37.08	36.46	36.14	36.25	37.14	37.70	38.34	38.57	38.77	38.43	38.01	37.86	37.78	37.90	37.92	38.00	38.38	38.23	38.49	38.32	38.38	38.70	39.11	38.15	37.92
2	37.10	36.35	36.48	37.13	37.69	37.60	37.82	37.87	38.05	38.35	38.23	38.14	38.02	37.99	38.01	38.12	38.25	38.43	38.71	38.16	38.00	38.1	38.4	37.7	37.86
3	37.1	37.9	38.1	37.80	38.09	38.00	37.81	37.84	38.31	38.32	38.00	37.78	37.62	37.85	37.93	38.14	38.36	38.57	38.72	38.61	38.49	38.69	38.79	38.01	38.12
4	37.46	36.88	36.80	37.01	37.15	37.12	37.26	37.84	38.21	38.17	37.58	37.78	37.76	37.75	37.64	37.81	38.15	38.20	38.22	38.20	38.10	38.27	38.91	38.35	37.78
5	37.69	37.2	37.4	37.3	37.1	37.19	37.58	38.37	38.76	38.58	38.33	38.14	37.95	37.89	37.93	37.93	38.04	38.15	38.22	38.31	38.35	38.62	39.46	38.90	38.06
6	37.84	37.11	36.96	37.07	37.26	37.79	38.1	38.4	38.6	38.4	38.1	38.0	37.9	37.8	37.9	38.0	38.2	38.4	38.3	38.5	38.5	38.7	38.91	38.30	38.03
7	37.76	37.41	37.11	36.64	36.52	36.86	37.28	38.0	38.4	38.3	38.22	38.09	37.93	37.91	37.93	38.02	38.10	38.19	38.44	38.39	38.44	38.74	39.14	38.48	37.93
8	37.69	36.81	36.37	36.67	36.99	37.29	37.74	38.28	38.52	38.18	37.85	37.76	37.85	37.82	37.88	37.94	38.17	38.37	38.44	38.48	38.37	38.53	38.93	38.38	37.89
9	37.40	36.65	36.33	36.31	36.34	37.05	37.59	37.91	38.25	38.25	37.97	37.87	37.81	37.87	37.99	38.13	38.19	38.28	38.36	38.40	38.41	38.62	39.07	38.54	37.82
10	37.60	37.00	36.77	36.69	37.02	37.44	37.95	37.94	38.10	38.16	37.85	37.82	37.83	37.87	37.91	37.97	38.08	38.21	38.65	38.85	38.85	39.52	40.33	40.21	38.11
11	39.31	38.06	36.84	36.29	35.98	36.60	36.99	37.51	38.21	38.33	38.29	37.98	37.56	37.62	37.56	37.5	37.2	37.4	37.6	37.5	37.7	37.9	38.6	38.64	37.63
12	38.18	37.89	37.19	36.46	36.05	36.03	36.70	37.75	38.42	38.19	37.85	37.91	37.88	37.81	37.76	37.83	37.87	37.88	38.08	38.06	38.06	38.37	38.97	38.73	37.75
13	38.41	38.10	37.69	37.32	37.27	37.52	38.01	38.14	38.47	38.09	37.69	37.73	37.61	37.60	37.76	37.66	37.86	38.02	38.25	38.19	38.33	38.63	39.30	38.84	38.02
14	38.12	37.05	36.87	36.72	36.77	37.75	38.42	37.75	38.62	38.22	37.96	37.49	37.28	37.06	37.17	37.23	37.44	37.85	38.26	38.71	38.48	38.18	38.06	37.60	37.71
15	36.78	36.51	36.61	36.94	37.37	37.93	38.29	38.34	38.16	37.83	37.51	37.55	37.61	37.66	37.75	37.92	38.05	38.31	38.37	38.34	38.34	38.52	38.69	38.02	37.81
16	37.24	36.64	36.25	36.30	37.12	37.99	38.45	38.62	38.42	38.24	37.88	37.73	37.69	37.62	37.58	37.57	37.75	37.99	37.74	38.07	37.76	37.81	38.66	38.51	37.74
17	38.60	37.97	36.99	36.23	35.8	35.8	36.3	36.3	38.6	38.32	37.79	37.71	37.65	37.71	37.71	37.73	37.80	37.92	37.93	38.01	38.04	38.21	39.19	39.26	37.65
18	38.95	38.34	37.71	37.08	37.08	36.55	36.62	36.91	38.32	38.53	38.03	37.87	37.73	37.68	37.77	37.73	37.77	37.85	37.89	37.86	37.90	38.19	38.98	38.71	37.84
19	37.83	37.13	36.55	35.85	35.85	35.59	36.61	37.54	38.25	38.17	37.98	37.88	37.83	37.70	37.63	37.69	37.73	37.85	37.88	37.94	37.98	38.15	38.63	38.28	37.52
20	37.41	36.48	35.48	34.94	34.94	34.70	36.23	37.16	38.28	38.04	37.66	37.67	37.49	37.56	37.57	37.70	37.83	37.89	37.88	37.92	37.88	38.07	39.17	39.18	37.30
21	38.31	37.63	36.69	36.40	36.40	36.23	36.65	36.92	38.61	38.18	37.84	37.69	37.64	37.59	37.53	37.54	37.68	37.72	37.78	37.93	37.93	38.27	39.00	38.3	37.60
22	37.21	36.22	35.94	35.68	35.68	35.60	36.00	36.60	38.26	38.16	37.96	37.76	37.63	37.67	37.69	37.80	37.91	38.04	38.21	38.16	38.11	38.47	38.82	38.97	37.44
23	38.34	37.48	36.70	36.02	36.02	35.64	35.98	36.35	37.82	37.94	37.69	37.70	37.50	37.52	37.61	37.78	37.90	38.01	38.16	38.25	38.15	38.31	39.40	39.15	37.56
24	38.56	37.82	36.88	36.59	36.59	36.97	37.55	37.72	37.66	37.67	37.63	37.62	37.63	37.58	37.66	37.74	37.85	37.98	38.07	38.09	38.10	38.18	38.68	38.60	37.73
25	38.22	37.73	37.11	36.39	36.39	36.32	36.75	37.05	37.55	37.54	37.43	37.48	37.52	37.62	37.61	37.65	37.66	37.84	37.87	38.03	38.04	38.27	38.89	38.84	37.57
26	38.53	37.89	37.19	36.38	36.38	36.49	36.62	37.11	38.14	37.95	37.80	37.69	37.63	37.62	37.64	37.70	37.82	37.91	37.91	37.92	37.97	37.99	38.73	39.33	37.68
27	39.33	38.68	38.06	37.45	37.45	36.71	36.52	36.35	36.98	37.37	37.29	37.39	37.40	37.41	37.58	37.88	38.09	38.52	38.61	38.48	38.64	38.68	39.38	39.57	37.91
28	38.86	38.09	36.78	36.21	36.21	36.26	36.3	36.5	37.3	37.4	37.4	37.4	37.4	37.42	37.48	37.65	37.90	38.12	38.16	38.38	38.57	38.67	39.35	39.19	37.62
29	38.47	37.66	36.65	36.03	36.03	35.61	35.29	35.81	37.55	37.50	37.35	37.24	37.26	37.3	37.4	37.4	37.6	37.6	37.7	38.1	38.1	38.3	38.41	38.03	37.27
30	-	-	-	-	-	36.35	36.54	36.60	36.95	37.23	37.38	37.47	37.41	37.36	37.48	37.70	37.82	37.90	37.98	38.04	38.04	38.08	38.70	38.58	37.56
31	38.15	37.20	36.53	36.06	36.41	36.88	37.05	36.91	37.20	37.51	37.46	37.47	37.50	37.53	37.59	37.84	37.80	37.85	37.86	37.88	38.00	37.88	38.24	38.35	37.46
HOURLY MEANS	37.99	37.34	36.84	36.54	36.64	36.76	37.14	37.45	38.12	38.05	37.81	37.73	37.66	37.66	37.69	37.78	37.91	38.05	38.15	38.19	38.20	38.37	38.93	38.63	37.74

Tabel 46 Nilai variasi harian komponen I – inclination (derajat) Mei 2019

Tondano Magnetic Observatory																									Mei 2019
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.97	-12.95	-12.94	-12.94	-12.94	-12.95	-12.95	-12.96	-12.96	-12.97	-12.98	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97	-12.98	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97
2	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-13.0	-13.0	-13.0	-12.98
3	-13.0	-13.0	-13.0	-12.96	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97
4	-12.96	-12.96	-12.95	-12.95	-12.96	-12.97	-12.97	-12.99	-12.99	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.98
5	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.97
6	-12.96	-12.94	-12.94	-12.94	-12.94	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.98	-12.97
7	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
8	-12.96	-12.95	-12.94	-12.94	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
9	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
10	-12.97	-12.97	-12.96	-12.95	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.97
11	-12.98	-12.97	-12.97	-12.98	-12.98	-12.99	-12.98	-12.98	-12.99	-13.00	-13.00	-13.00	-13.00	-13.01	-13.00	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.99	-12.99
12	-12.99	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.99	-12.98
13	-12.98	-12.98	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98
14	-12.96	-12.95	-12.96	-12.96	-12.96	-12.97	-13.00	-13.00	-13.00	-13.01	-13.00	-13.00	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-12.99	-13.00	-12.99	-12.99	-12.98	-12.98	-12.98
15	-12.97	-12.96	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
16	-12.96	-12.95	-12.95	-12.95	-12.96	-12.98	-12.99	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98
17	-12.97	-12.96	-12.94	-12.94	-12.9	-12.9	-13.0	-13.0	-13.0	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97
18	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
19	-12.96	-12.95	-12.94	-12.93	-12.94	-12.94	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.98	-12.97
20	-12.96	-12.96	-12.96	-12.97	-12.97	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.97
21	-12.98	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-13.0	-12.97
22	-12.97	-12.95	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
23	-12.97	-12.96	-12.96	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-13.00	-12.97
24	-12.98	-12.97	-12.95	-12.94	-12.95	-12.94	-12.95	-12.96	-12.96	-12.98	-12.98	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97
25	-12.96	-12.95	-12.95	-12.94	-12.94	-12.94	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97
26	-12.96	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
27	-12.96	-12.94	-12.95	-12.95	-12.95	-12.95	-12.95	-12.95	-12.97	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
28	-12.96	-12.95	-12.95	-12.96	-12.96	-12.96	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
29	-12.96	-12.96	-12.95	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.99	-12.99	-12.99	-12.99	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97	-12.98
30	-	-	-	-	-	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98
31	-12.97	-12.96	-12.96	-12.95	-12.96	-12.97	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97
HOURLY MEANS	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97

2. Gangguan badai magnet

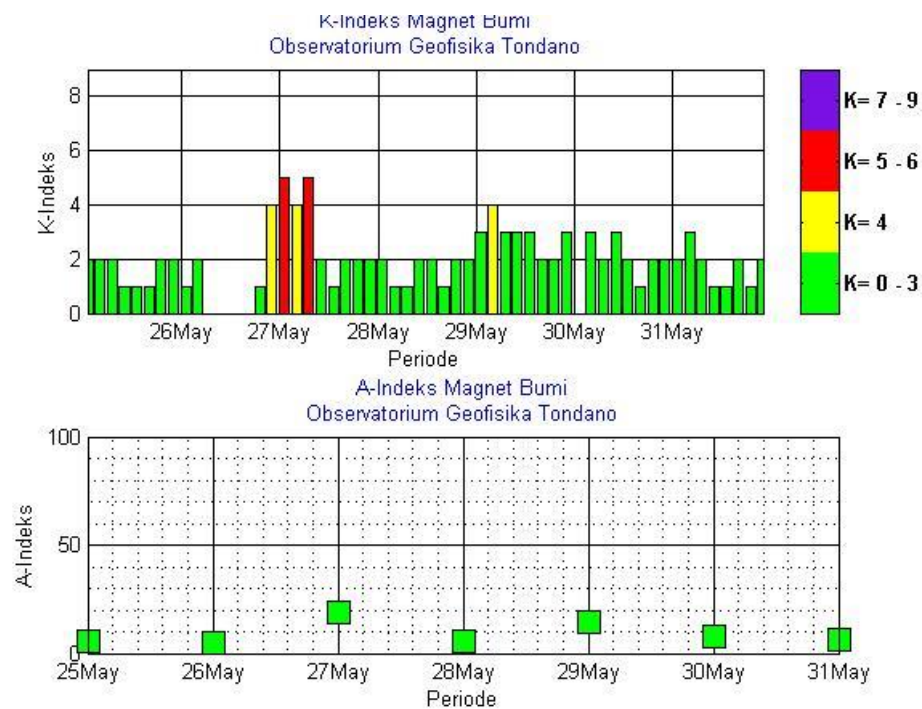
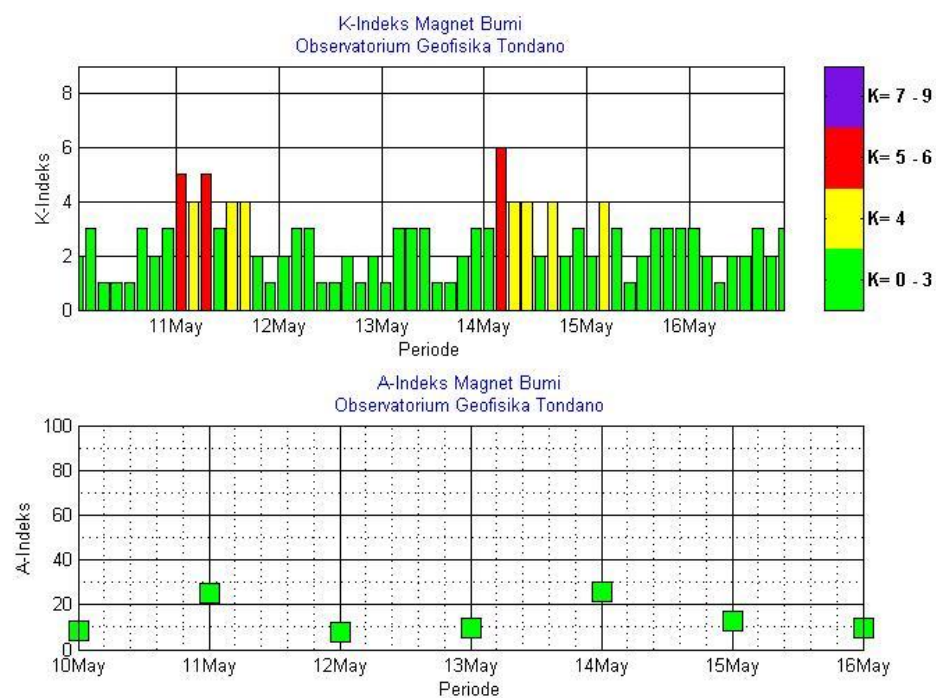
Tabel 47 Monitoring waktu gangguan pada pengamatan magnet bumi Mei 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	5	2019					
2	2	5	2019					
3	3	5	2019					
4	4	5	2019					
5	5	5	2019					
6	6	5	2019					
7	7	5	2019					
8	8	5	2019					
9	9	5	2019					
10	10	5	2019					
11	11	5	2019	01	06	00	15 jam 01 menit	Badai Kecil
12	12	5	2019					
13	13	5	2019					
14	14	5	2019	04	37	00	4 jam 48 menit	Badai Kecil
15	15	5	2019					
16	16	5	2019					
17	17	5	2019					
18	18	5	2019					
19	19	5	2019					
20	20	5	2019					
21	21	5	2019					
22	22	5	2019					
23	23	5	2019					
24	24	5	2019					
25	25	5	2019					
26	26	5	2019					
27	27	5	2019	01	12	00	07 jam 22 menit	Badai Kecil
28	28	5	2019					
29	29	5	2019					
30	30	5	2019					
31	31	5	2019					

Tabel 48 Hasil analisa K-indeks dan A-indeks Mei 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	2	2	1	2	2	3	3	2	8.5	Tenang
2	4	3	3	3	3	3	2	1	14	Tenang
3	4	3	2	1	1	3	2	3	11.5	Tenang
4	2	2	3	4	2	2	2	2	10.5	Tenang
5	1	3	3	2	2	1	0	1	6.625	Tenang
6	2	1	2	1	2	2	2	2	6	Tenang
7	2	2	2	1	2	1	2	2	6	Tenang
8	2	3	2	1	1	2	3	3	9	Tenang
9	2	3	3	2	1	1	0	2	7.125	Tenang
10	2	3	1	1	1	3	2	3	8.5	Tenang
11	5	4	5	3	4	4	2	1	25.25	Badai Kecil
12	2	3	3	1	1	2	1	2	7.5	Tenang
13	1	3	3	3	1	1	2	3	9.5	Tenang
14	3	6	4	4	2	4	2	3	25.625	Badai Kecil
15	2	4	3	1	2	3	3	3	13	Tenang
16	3	2	1	2	2	3	2	3	9.5	Tenang
17	4	3	3	2	2	1	1	2	10.5	Tenang
18	2	2	3	3	1	0	1	3	8.125	Tenang
19	1	1	2	0	1	0	1	2	3.25	Tenang
20	3	2	2	1	1	1	0	2	5.625	Tenang
21	1	1	1	2	1	0	1	3	4.625	Tenang
22	1	2	1	1	2	1	1	2	4.5	Tenang
23	1	2	2	1	1	2	2	1	5	Tenang
24	4	3	2	1	1	1	3	3	11	Tenang
25	2	2	2	1	1	1	2	2	5.5	Tenang
26	1	2	0	0	0	0	1	4	5	Tenang
27	5	4	5	2	1	2	2	2	19.25	Badai Kecil
28	2	1	1	2	2	1	2	2	5.5	Tenang
29	3	4	3	3	3	2	2	3	14.5	Tenang
30	0	3	2	3	2	1	2	2	7.625	Tenang
31	2	3	2	1	1	2	1	2	6.5	Tenang

Gambar 26 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Mei 2019



Tabel 53 Nilai Variasi harian komponen Y – east (nT) Juni 2019

Tondano Magnetic Observatory																								Jun 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	433.5	428.6	425.4	425.0	423.7	425.7	429.2	431.3	432.5	430.6	428.7	429.1	429.5	430.0	429.3	429.9	430.6	431.4	431.9	432.4	433.4	436.3	443.9	444.5	431.1
2	439.4	428.5	416.1	419.6	420.9	423.5	425.4	430.6	431.2	429.7	430.1	428.9	428.5	429.0	429.9	430.0	430.4	430.2	431.2	432.4	433.4	436.7	440.9	441.2	429.9
3	438.9	431.4	424.9	419.0	417.8	422.5	428.0	429.1	429.1	428.7	426.4	425.8	426.0	426.7	428.3	431.1	433.2	432.8	434.4	432.4	432.6	436.3	446.1	445.0	430.3
4	437.3	428.3	418.8	409.3	415.3	425.5	430.4	432.0	432.6	429.6	426.3	425.9	426.5	426.2	426.2	426.2	425.7	428.8	431.7	432.5	431.2	434.7	445.6	444.7	428.8
5	439.4	434.4	422.8	413.9	408.8	408.4	411.8	417.5	423.0	425.6	424.6	425.9	427.4	427.7	428.2	429.7	430.6	431.1	432.4	433.4	433.8	435.7	444.1	447.0	427.4
6	437.8	426.7	416.6	413.2	415.5	419.1	421.6	423.4	421.1	423.4	425.0	426.4	427.1	427.2	427.8	429.6	430.1	431.0	431.3	430.9	431.3	431.7	437.6	438.2	426.8
7	428.6	424.2	421.5	421.3	420.4	423.9	426.4	425.2	424.6	425.8	424.0	423.9	424.6	425.6	427.1	429.7	431.4	433.4	433.6	433.8	433.4	434.3	443.9	440.9	428.4
8	434.0	427.1	418.6	407.9	405.2	413.6	421.5	423.1	425.3	421.9	420.8	420.8	421.9	424.8	426.8	429.7	429.9	428.2	435.8	435.3	431.5	433.5	439.1	439.8	425.7
9	-	-	-	-	-	-	-	-	-	-	424.2	425.5	426.2	427.1	427.2	427.6	428.8	430.7	429.2	429.1	428.6	428.0	436.4	435.5	428.9
10	428.9	418.8	408.0	400.9	402.6	405.4	419.3	423.2	425.6	424.5	424.2	425.3	425.8	425.7	428.1	429.1	428.8	429.6	431.2	432.6	432.5	432.5	440.1	444.1	424.4
11	443.1	438.7	427.9	416.3	409.1	411.8	415.1	418.2	419.2	422.2	424.2	425.2	426.4	426.8	427.4	428.2	429.3	430.5	431.9	432.5	432.5	432.8	442.5	445.1	427.4
12	439.5	430.5	423.2	418.8	415.6	413.3	412.2	415.1	420.6	422.1	421.8	423.4	422.5	423.9	426.0	426.2	426.5	426.6	427.2	427.5	429.1	431.4	440.0	439.2	425.1
13	431.0	420.9	416.2	412.9	408.9	414.2	423.5	425.5	425.0	424.3	422.3	423.0	424.0	424.3	424.9	427.5	427.3	428.9	428.5	430.0	429.4	431.2	439.6	439.8	425.1
14	436.9	425.4	417.0	416.7	418.7	427.0	427.8	429.2	429.9	427.7	425.2	423.9	425.8	424.8	424.8	426.2	424.4	426.3	428.0	429.3	429.2	431.1	440.1	436.4	427.2
15	426.8	418.0	410.1	409.2	409.1	411.9	416.4	421.5	428.0	429.1	425.2	424.2	422.0	421.5	422.9	424.1	425.8	427.7	428.1	427.7	427.8	431.3	439.6	435.3	423.5
16	422.9	406.6	396.1	388.7	387.5	394.3	406.3	415.0	418.6	423.5	423.2	424.0	425.2	425.6	425.7	426.5	427.0	427.7	427.9	427.4	427.3	430.1	442.8	446.5	419.4
17	439.7	427.0	421.3	414.5	410.7	413.9	421.6	421.6	422.9	421.9	423.5	423.7	423.4	423.5	423.4	423.8	424.5	425.0	426.3	427.7	429.1	432.7	440.1	439.6	425.1
18	430.3	421.5	414.0	403.5	403.4	398.4	398.1	404.4	419.8	422.3	422.8	424.0	424.1	423.9	424.5	426.7	427.0	427.0	427.9	428.1	429.1	431.8	439.4	440.5	421.4
19	437.3	428.7	421.1	419.8	419.7	420.5	422.2	423.8	423.6	422.8	423.3	422.6	422.5	423.8	425.3	428.6	431.4	431.4	430.4	430.6	431.4	433.6	441.8	444.2	427.5
20	439.7	426.5	414.2	401.1	401.0	395.6	402.7	414.8	418.7	420.6	419.6	423.0	424.3	424.7	426.2	427.6	429.8	431.8	431.9	432.5	434.5	438.5	443.2	444.8	423.6
21	436.2	429.5	417.1	408.4	408.4	400.7	401.9	410.6	417.5	423.3	422.1	422.3	421.8	423.0	425.1	426.1	428.4	430.5	430.6	431.6	433.1	439.1	446.2	442.8	424.0
22	432.7	421.4	415.0	408.4	408.4	406.0	407.5	414.6	423.9	423.9	421.5	421.3	422.2	423.7	424.5	425.4	426.3	426.5	427.1	428.0	429.1	430.6	440.1	443.5	423.0
23	437.1	429.1	420.5	416.7	416.6	414.8	416.4	420.5	425.0	425.3	422.5	422.7	423.6	423.6	423.9	424.7	426.7	428.4	428.2	429.3	430.5	433.8	440.9	441.3	425.9
24	433.2	426.6	422.5	419.4	419.3	415.7	417.0	419.3	427.8	425.0	420.5	420.0	423.0	422.6	422.8	423.3	423.9	425.6	427.6	428.8	430.6	435.4	443.1	442.3	425.6
25	436.8	430.4	424.5	421.3	421.3	420.1	421.9	425.8	428.0	427.3	422.8	422.3	421.6	421.9	422.1	421.9	422.6	424.2	426.1	427.4	427.9	431.9	442.0	440.6	426.4
26	433.9	427.6	418.9	413.9	413.8	410.5	407.6	411.4	426.4	424.4	420.2	419.5	419.5	421.0	421.4	422.3	425.3	427.0	427.6	428.4	429.4	432.0	435.3	430.4	422.8
27	421.8	411.8	399.7	398.4	398.4	411.6	418.2	421.4	428.5	426.0	421.3	421.4	422.7	423.1	423.4	423.7	424.7	427.1	427.6	429.3	429.1	431.9	439.8	438.6	421.6
28	433.1	424.9	418.8	412.8	412.7	409.0	413.5	416.4	425.2	426.6	423.2	422.3	422.5	422.9	423.4	424.5	425.9	427.4	428.0	429.4	430.7	432.1	437.5	431.4	423.9
29	417.1	411.5	410.5	412.7	412.7	414.1	418.4	422.9	429.5	426.2	422.2	421.4	421.5	422.2	422.4	423.4	425.4	427.5	429.1	430.0	430.7	433.0	443.1	438.7	423.6
30	428.1	418.5	415.5	421.4	421.4	424.7	425.1	420.9	423.4	423.4	422.0	421.6	422.7	423.4	423.3	424.6	425.7	427.6	427.8	429.4	430.4	432.3	434.7	431.1	425.0
HOURLY MEANS	433.6	424.9	417.1	412.6	412.0	413.6	417.5	421.0	425.0	425.1	423.5	423.6	424.2	424.7	425.4	426.6	427.6	428.7	429.7	430.3	430.8	433.2	441.0	440.4	425.6

Tabel 54 Nilai Variasi harian komponen D – declination (menit) Juni 2019

Tondano Magnetic Observatory																									Jun 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS		
1	37.92	37.49	37.21	37.17	37.06	37.25	37.56	37.75	37.86	37.70	37.54	37.56	37.60	37.64	37.58	37.63	37.70	37.76	37.81	37.85	37.94	38.18	38.84	38.89	37.73		
2	38.43	37.48	36.39	36.70	36.82	37.05	37.22	37.68	37.75	37.61	37.65	37.54	37.51	37.56	37.63	37.64	37.68	37.66	37.74	37.85	37.94	38.2	38.6	38.6	37.62		
3	38.4	37.7	37.2	36.63	36.54	36.96	37.45	37.56	37.56	37.52	37.32	37.27	37.29	37.35	37.49	37.74	37.92	37.88	38.02	37.85	37.86	38.18	39.04	38.92	37.65		
4	38.25	37.45	36.62	35.80	36.33	37.23	37.67	37.82	37.88	37.61	37.32	37.29	37.33	37.30	37.30	37.31	37.28	37.55	37.81	37.87	37.76	38.06	39.01	38.92	37.53		
5	38.44	38.0	37.0	36.2	35.8	35.72	36.03	36.54	37.03	37.26	37.18	37.28	37.42	37.44	37.49	37.62	37.70	37.74	37.85	37.93	37.97	38.13	38.86	39.10	37.40		
6	38.29	37.31	36.42	36.12	36.33	36.66	36.9	37.1	36.9	37.1	37.2	37.3	37.12	37.11	37.16	37.25	37.38	37.61	37.76	37.94	37.95	37.97	37.93	38.01	38.85	38.57	37.49
7	37.49	37.11	36.86	36.84	36.76	37.08	37.31	37.2	37.2	37.3	37.12	37.11	37.16	37.25	37.38	37.61	37.76	37.94	37.95	37.97	37.93	38.01	38.85	38.57	37.49		
8	37.97	37.35	36.61	35.67	35.43	36.17	36.87	37.03	37.22	36.93	36.82	36.82	36.92	37.17	37.34	37.60	37.62	37.48	38.14	38.10	37.77	37.95	38.43	38.50	37.25		
9	-	-	-	-	-	-	-	-	-	-	37.14	37.26	37.32	37.40	37.41	37.45	37.55	37.71	37.58	37.57	37.52	37.47	38.20	38.11	37.55		
10	37.53	36.64	35.70	35.08	35.23	35.48	36.70	37.04	37.26	37.16	37.14	37.23	37.27	37.27	37.47	37.56	37.54	37.61	37.75	37.87	37.85	37.86	38.52	38.85	37.15		
11	38.76	38.36	37.42	36.40	35.78	36.02	36.32	36.60	36.69	36.95	37.13	37.22	37.32	37.36	37.41	37.5	37.6	37.7	37.8	37.9	37.9	37.9	38.7	38.94	37.40		
12	38.44	37.65	37.01	36.62	36.34	36.15	36.05	36.32	36.80	36.93	36.91	37.05	36.98	37.10	37.29	37.31	37.33	37.34	37.39	37.42	37.55	37.75	38.50	38.42	37.19		
13	37.69	36.80	36.39	36.10	35.76	36.23	37.04	37.23	37.20	37.14	36.96	37.02	37.12	37.15	37.21	37.42	37.40	37.54	37.51	37.63	37.58	37.74	38.46	38.48	37.20		
14	38.22	37.20	36.46	36.44	36.61	37.35	37.43	37.57	37.63	37.44	37.23	37.12	37.28	37.20	37.19	37.32	37.15	37.32	37.47	37.57	37.56	37.73	38.51	38.18	37.38		
15	37.33	36.56	35.86	35.78	35.78	36.03	36.44	36.89	37.47	37.57	37.23	37.14	36.94	36.90	37.02	37.13	37.28	37.44	37.48	37.44	37.45	37.75	38.46	38.08	37.06		
16	36.99	35.56	34.64	33.99	33.89	34.50	35.56	36.32	36.64	37.07	37.04	37.12	37.22	37.26	37.26	37.34	37.38	37.44	37.45	37.41	37.40	37.64	38.75	39.06	36.71		
17	38.45	37.33	36.82	36.23	35.9	36.2	36.9	36.9	37.0	36.93	37.07	37.09	37.07	37.08	37.07	37.10	37.16	37.20	37.31	37.43	37.56	37.86	38.51	38.45	37.19		
18	37.63	36.85	36.19	35.27	35.27	34.83	34.82	35.38	36.73	36.96	37.00	37.11	37.12	37.10	37.15	37.34	37.37	37.37	37.45	37.47	37.56	37.79	38.44	38.54	36.86		
19	38.24	37.47	36.80	36.67	36.67	36.74	36.90	37.05	37.06	37.00	37.04	36.98	36.98	37.09	37.22	37.51	37.75	37.75	37.66	37.68	37.75	37.94	38.65	38.85	37.39		
20	38.44	37.28	36.21	35.06	35.06	34.59	35.22	36.29	36.66	36.84	36.75	37.04	37.14	37.18	37.31	37.43	37.62	37.80	37.80	37.85	38.03	38.38	38.79	38.91	37.07		
21	38.15	37.55	36.46	35.70	35.70	35.03	35.14	35.92	36.54	37.06	36.95	36.97	36.92	37.03	37.21	37.30	37.50	37.68	37.69	37.78	37.91	38.42	39.03	38.7	37.10		
22	37.84	36.84	36.27	35.70	35.70	35.49	35.64	36.27	37.10	37.10	36.90	36.88	36.95	37.09	37.16	37.23	37.31	37.32	37.38	37.45	37.56	37.68	38.52	38.80	37.01		
23	38.23	37.52	36.77	36.43	36.43	36.27	36.42	36.78	37.20	37.22	36.98	37.00	37.09	37.09	37.11	37.17	37.35	37.50	37.48	37.58	37.68	37.97	38.58	38.61	37.27		
24	37.88	37.30	36.94	36.67	36.67	36.36	36.47	36.68	37.44	37.20	36.80	36.76	37.03	36.99	37.01	37.05	37.11	37.25	37.43	37.53	37.69	38.10	38.76	38.69	37.24		
25	38.20	37.64	37.12	36.84	36.84	36.74	36.90	37.25	37.46	37.40	37.01	36.96	36.91	36.93	36.95	36.93	36.99	37.13	37.30	37.40	37.45	37.80	38.67	38.54	37.31		
26	37.95	37.40	36.63	36.20	36.20	35.90	35.66	36.00	37.33	37.17	36.80	36.73	36.72	36.86	36.88	36.97	37.23	37.37	37.43	37.49	37.59	37.81	38.09	37.66	37.00		
27	36.90	36.03	34.97	34.85	34.85	36.00	36.58	36.87	37.51	37.29	36.88	36.88	37.00	37.04	37.06	37.08	37.17	37.37	37.42	37.57	37.55	37.79	38.48	38.37	36.90		
28	37.88	37.16	36.62	36.10	36.10	35.77	36.2	36.4	37.2	37.3	37.0	37.0	37.0	37.02	37.06	37.15	37.28	37.41	37.46	37.58	37.70	37.82	38.28	37.75	37.09		
29	36.48	35.98	35.89	36.08	36.08	36.21	36.59	36.99	37.59	37.30	36.95	36.88	36.89	37.0	37.0	37.1	37.2	37.4	37.6	37.6	37.7	37.9	38.76	38.37	37.06		
30	37.44	36.60	36.33	36.85	36.85	37.13	37.18	36.82	37.05	37.06	36.93	36.90	36.99	37.06	37.05	37.17	37.26	37.42	37.44	37.58	37.67	37.84	38.04	37.71	37.18		
HOURLY MEANS	37.93	37.16	36.47	36.08	36.03	36.18	36.52	36.84	37.20	37.21	37.07	37.08	37.13	37.17	37.24	37.34	37.43	37.53	37.61	37.66	37.70	37.91	38.59	38.53	37.24		

Tabel 55 Nilai variasi harian komponen I – inclination (derajat) Juni 2019

Tondano Magnetic Observatory																								Juní 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.96	-12.95	-12.94	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
2	-12.97	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.98	-12.97	-12.98	-12.97	-12.97	-12.97	-12.98	-13.0	-13.0	-13.0	-12.97
3	-13.0	-13.0	-12.9	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97
4	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.99	-12.98	-12.97
5	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97
6	-12.96	-12.95	-12.94	-12.93	-12.94	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97	-12.97
7	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97
8	-12.97	-12.95	-12.95	-12.94	-12.94	-12.94	-12.95	-12.95	-12.95	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.96	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.96
9	-	-	-	-	-	-	-	-	-	-	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98
10	-12.98	-12.97	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.98	-12.97
11	-12.97	-12.96	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97
12	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97
13	-12.96	-12.95	-12.95	-12.94	-12.94	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97
14	-12.97	-12.95	-12.95	-12.94	-12.94	-12.94	-12.94	-12.95	-12.95	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
15	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.97
16	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.98	-12.98	-12.99	-12.98	-12.97	-12.98	-12.98	-12.98	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97
17	-12.96	-12.95	-12.94	-12.94	-12.9	-12.9	-13.0	-13.0	-13.0	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
18	-12.96	-12.94	-12.94	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
19	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
20	-12.97	-12.96	-12.94	-12.94	-12.94	-12.94	-12.96	-12.96	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97
21	-12.95	-12.95	-12.93	-12.93	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-13.0	-12.96
22	-12.96	-12.94	-12.93	-12.93	-12.93	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
23	-12.97	-12.96	-12.95	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
24	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
25	-12.96	-12.95	-12.95	-12.94	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
26	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
27	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
28	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97
29	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.97	-12.96
30	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.97	-12.97
HOURLY MEANS	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.97

2. Gangguan badai magnet

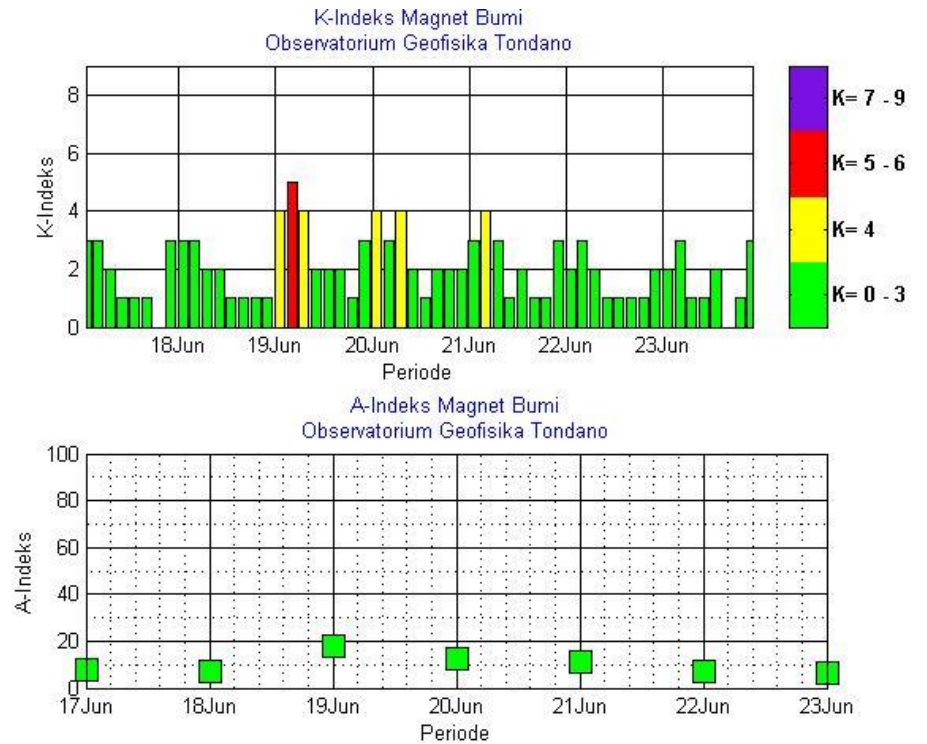
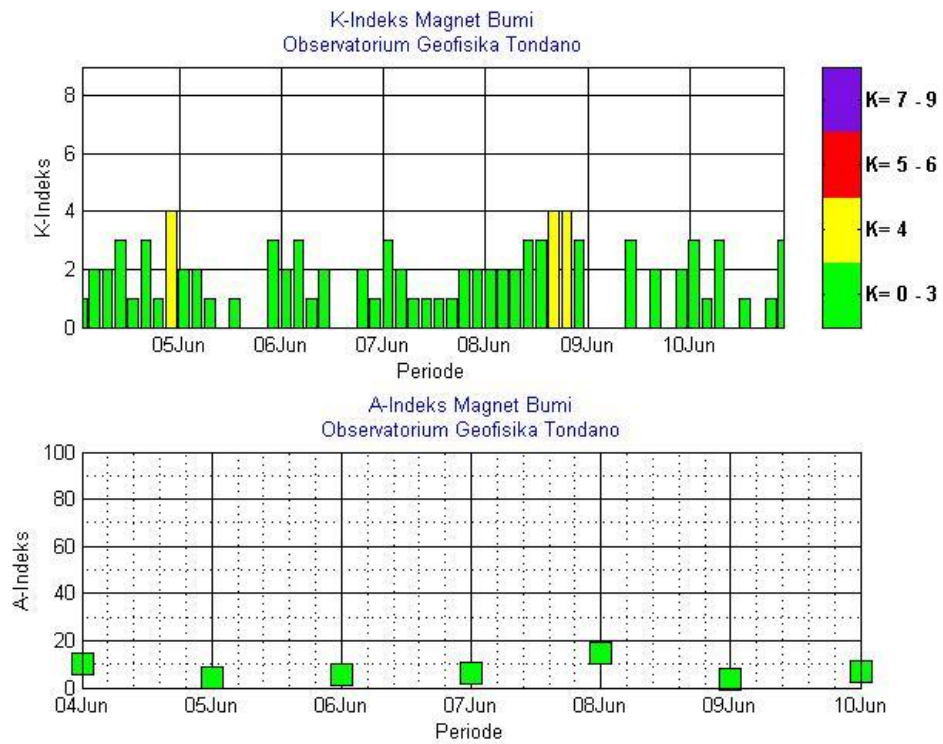
Tabel 56 Monitoring waktu gangguan pada pengamatan magnet bumi Juni 2019

Kejadian rekaman magnet bumi								
No	Hari			Waktu			Durasi	Keterangan
	Tanggal	Bulan	Tahun	Jam	Menit	Detik	gangguan	
1	1	6	2019					
2	2	6	2019					
3	3	6	2019					
4	4	6	2019					
5	5	6	2019					
6	6	6	2019					
7	7	6	2019					
8	8	6	2019					
9	9	6	2019					
10	10	6	2019					
11	11	6	2019					
12	12	6	2019					
13	13	6	2019					
14	14	6	2019					
15	15	6	2019					
16	16	6	2019					
17	17	6	2019					
18	18	6	2019					
19	19	6	2019					
20	20	6	2019					
21	21	6	2019					
22	22	6	2019					
23	23	6	2019					
24	24	6	2019					
25	25	6	2019					
26	26	6	2019					
27	27	6	2019					
28	28	6	2019					
29	29	6	2019					
30	30	6	2019					

Tabel 57 Hasil analisa K-indeks dan A-indeks Juni 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	1	2	1	1	0	0	1	2	3.25	Tenang
2	1	1	1	1	0	0	1	3	3.75	Tenang
3	2	2	2	2	2	2	2	2	7	Tenang
4	1	2	2	3	1	3	1	4	10	Tenang
5	2	2	1	0	1	0	0	3	4.375	Tenang
6	2	3	1	2	0	0	2	1	5.25	Tenang
7	3	2	1	1	1	1	2	2	6	Tenang
8	2	2	2	3	3	4	4	3	15	Tenang
9	0	0	0	3	0	2	0	2	3.625	Tenang
10	3	1	3	0	1	0	1	3	6.75	Tenang
11	2	1	1	0	0	0	1	3	3.875	Tenang
12	2	2	3	3	1	0	1	2	7.125	Tenang
13	2	3	2	2	3	2	1	2	8.5	Tenang
14	2	2	2	2	2	1	0	3	6.625	Tenang
15	1	2	1	2	2	1	1	3	6	Tenang
16	1	3	2	1	0	0	1	3	5.75	Tenang
17	3	3	2	1	1	1	0	3	7.625	Tenang
18	3	3	2	2	1	1	1	1	7	Tenang
19	4	5	4	2	2	2	1	3	17.625	Tenang
20	4	3	4	2	1	2	2	2	12.5	Tenang
21	3	4	3	1	2	1	1	3	11	Tenang
22	3	3	2	1	1	1	1	2	7	Tenang
23	2	3	1	1	2	0	1	3	6.625	Tenang
24	3	3	1	1	1	0	1	2	6.125	Tenang
25	2	2	1	1	1	0	1	2	4.125	Tenang
26	3	2	2	2	2	1	1	2	7	Tenang
27	3	3	1	1	1	1	1	2	6.5	Tenang
28	2	2	1	1	1	1	1	2	4.5	Tenang
29	2	3	2	0	1	0	1	2	5.25	Tenang
30	2	3	2	3	1	1	2	3	9	Tenang

Gambar 27 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Juni 2019



Tabel 62 Nilai Variasi harian komponen Y – east (nT) Juli 2019

Tondano Magnetic Observatory

Juli 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	421.3	414.2	412.3	413.3	412.2	417.7	422.9	429.5	428.7	423.7	419.2	417.9	418.0	418.5	419.7	421.7	422.2	424.4	426.0	425.4	428.6	433.3	438.7	434.3	422.7
2	421.5	414.0	412.3	413.5	412.6	409.8	413.0	420.2	423.5	424.5	422.7	422.6	421.1	419.7	419.1	419.2	420.6	424.7	428.5	429.4	432.5	437.7	443.5	437.0	422.6
3	432.2	425.4	418.7	418.6	418.4	415.5	418.8	427.6	433.5	430.3	422.8	419.3	419.5	418.6	419.9	421.5	422.5	424.2	425.3	426.6	429.8	435.2	444.8	436.8	425.2
4	426.1	414.1	411.9	403.8	395.9	398.1	402.5	412.4	422.9	422.4	418.4	419.6	420.0	419.5	420.0	420.0	421.0	422.6	425.3	427.7	430.7	434.2	440.1	438.1	419.5
5	431.9	430.0	426.9	419.5	413.6	412.5	417.2	423.3	424.2	420.8	420.3	419.8	419.0	420.9	421.8	422.2	424.3	425.6	426.5	426.3	426.0	425.7	432.1	431.8	423.4
6	422.4	414.4	416.3	416.6	418.1	426.9	432.3	433.3	432.6	425.4	418.4	417.5	418.3	419.7	421.3	422.2	423.9	425.5	426.2	427.0	427.2	428.1	428.0	427.2	423.7
7	423.3	420.8	415.3	410.7	413.0	419.2	427.2	425.6	424.1	421.7	419.3	419.6	420.0	420.0	421.2	423.4	423.6	425.3	426.1	427.2	428.1	431.7	439.4	432.9	423.3
8	419.4	417.0	416.7	412.8	411.4	412.9	413.9	414.9	413.1	415.3	417.2	418.7	419.7	420.8	421.7	423.2	425.1	426.2	426.9	432.6	438.3	438.4	442.3	438.2	422.4
9	431.8	427.2	418.5	414.9	413.8	421.3	424.8	420.5	420.7	423.3	419.7	417.5	416.8	416.8	417.3	415.5	419.7	423.8	425.2	422.1	434.4	429.3	440.5	441.2	423.2
10	432.0	426.3	427.4	428.0	424.2	417.8	420.9	423.1	424.8	425.6	425.7	419.9	416.2	415.4	413.7	415.8	416.8	418.7	423.5	423.4	424.2	427.0	441.5	444.2	424.0
11	440.1	428.3	415.7	407.7	405.9	406.3	411.7	421.1	426.0	422.4	418.1	417.7	417.5	415.7	414.7	414.4	416.4	419.6	421.5	421.9	423.0	424.7	431.0	425.6	419.5
12	413.2	405.8	400.4	401.2	408.8	416.8	424.6	432.2	432.8	428.6	424.7	422.3	419.4	420.8	418.4	418.2	418.1	419.6	421.5	421.9	422.5	423.0	421.2	417.2	418.9
13	413.9	404.7	399.1	391.4	391.8	399.0	409.2	419.3	426.3	422.0	418.1	418.8	417.2	418.0	419.3	418.4	419.8	423.1	423.0	427.2	425.9	427.4	430.3	425.6	416.2
14	416.8	410.4	407.8	407.1	409.0	422.0	428.8	428.5	422.4	421.8	419.0	417.7	418.0	418.1	418.4	419.0	419.6	421.3	423.7	425.1	425.8	428.6	428.9	421.8	420.0
15	416.8	411.4	409.8	407.2	409.1	414.3	420.3	427.1	429.1	426.6	420.3	417.6	417.1	416.0	415.4	416.4	418.3	419.6	421.0	422.3	422.0	424.4	429.2	423.6	418.9
16	414.7	413.1	409.6	410.9	408.5	408.3	407.8	408.7	416.6	421.8	420.9	419.7	418.1	418.2	417.5	418.1	418.9	421.9	425.7	425.7	427.6	431.8	439.4	431.5	419.0
17	420.9	415.0	411.2	413.6	417.6	418.2	418.0	421.4	422.8	418.9	417.3	416.2	416.6	417.9	418.6	419.8	420.9	421.4	421.5	422.3	426.5	431.3	428.3	419.8	
18	418.7	407.6	402.9	401.8	401.7	404.4	417.3	421.8	423.1	421.0	418.4	416.9	416.8	417.0	418.0	418.7	420.2	423.1	423.8	424.6	423.7	427.9	437.2	433.9	418.4
19	422.0	410.9	404.5	412.4	412.3	419.0	422.5	427.3	431.3	426.6	420.7	420.7	419.3	418.4	418.8	418.9	419.8	420.6	421.3	421.8	424.5	429.0	438.2	439.0	421.7
20	429.4	415.3	408.3	405.8	405.8	406.1	408.9	412.4	425.1	426.1	419.9	418.0	417.9	417.7	418.2	419.3	420.6	421.7	421.7	421.9	423.3	429.2	442.2	442.0	419.9
21	430.8	421.4	409.0	400.5	400.4	400.4	405.9	409.6	423.0	422.8	419.5	417.5	416.7	416.6	416.2	415.6	417.5	420.3	422.2	428.3	431.4	434.2	442.1	432.9	419.0
22	410.9	404.2	399.8	400.5	400.4	405.8	420.0	430.2	427.5	422.3	416.3	412.9	412.9	414.8	415.5	416.5	418.5	421.5	422.8	423.9	424.4	427.3	431.1	422.9	416.8
23	411.6	406.1	400.7	394.9	394.9	398.4	403.9	409.2	421.0	420.5	417.0	415.4	413.1	414.7	416.9	418.9	419.8	421.4	422.4	424.3	424.9	430.0	437.2	430.6	415.3
24	424.6	420.4	412.7	407.5	407.5	411.4	416.7	420.8	423.9	421.5	417.4	415.6	415.4	414.7	413.9	416.0	419.3	421.4	421.7	423.3	424.5	424.7	426.6	419.3	418.4
25	408.1	397.2	394.3	400.5	400.5	404.6	411.5	417.4	422.3	422.1	419.1	417.3	416.4	416.4	417.1	418.5	420.5	422.0	423.0	423.0	422.9	426.0	437.8	438.5	416.5
26	427.9	419.3	415.5	413.4	413.4	411.1	414.4	419.8	421.3	420.0	416.8	415.8	415.8	415.9	-	-	-	-	-	-	-	-	-	-	417.2
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	399.8	398.4	407.6	411.7	416.7	417.8	412.6	413.7	414.9	414.4	415.1	417.0	418.5	420.7	423.0	424.5	426.5	429.7	423.3	411.4	415.9
HOURLY MEANS	422.4	415.2	410.7	408.8	408.2	411.0	416.4	420.9	424.4	423.0	419.3	418.0	417.5	417.5	418.0	418.7	420.2	422.3	423.8	425.0	426.7	429.4	435.3	431.0	420.0

Tabel 63 Nilai Variasi harian komponen D – declination (menit) Juli 2019

Tondano Magnetic Observatory																								Juli 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	36.85	36.22	36.07	36.15	36.06	36.55	37.02	37.61	37.54	37.10	36.71	36.59	36.61	36.65	36.75	36.93	36.96	37.15	37.29	37.24	37.52	37.93	38.40	38.01	37.00
2	36.89	36.22	36.07	36.17	36.10	35.85	36.14	36.78	37.08	37.17	37.00	37.00	36.87	36.75	36.69	36.71	36.83	37.19	37.51	37.59	37.86	38.3	38.8	38.2	36.99
3	37.8	37.2	36.6	36.60	36.58	36.34	36.63	37.43	37.95	37.67	37.01	36.71	36.72	36.64	36.75	36.90	36.98	37.13	37.22	37.35	37.62	38.09	38.92	38.21	37.21
4	37.27	36.21	36.02	35.31	34.63	34.82	35.22	36.09	37.02	36.97	36.62	36.72	36.76	36.71	36.76	36.76	36.85	36.99	37.22	37.43	37.69	38.00	38.51	38.33	36.70
5	37.77	37.6	37.3	36.7	36.2	36.07	36.49	37.03	37.12	36.83	36.79	36.74	36.67	36.84	36.92	36.95	37.13	37.25	37.32	37.31	37.28	37.26	37.82	37.78	37.05
6	36.94	36.24	36.40	36.43	36.57	37.34	37.8	37.9	37.9	37.2	36.6	36.5	36.6	36.7	36.9	36.9	37.1	37.2	37.3	37.4	37.4	37.5	37.44	37.37	37.07
7	37.02	36.78	36.29	35.89	36.09	36.64	37.36	37.2	37.1	36.9	36.70	36.73	36.77	36.76	36.87	37.06	37.07	37.23	37.29	37.38	37.47	37.78	38.44	37.87	37.03
8	36.68	36.46	36.43	36.08	35.97	36.11	36.21	36.32	36.17	36.36	36.52	36.66	36.74	36.84	36.91	37.05	37.21	37.31	37.36	37.85	38.33	38.34	38.67	38.31	36.95
9	37.75	37.35	36.58	36.27	36.18	36.84	37.16	36.80	36.83	37.07	36.74	36.55	36.48	36.49	36.53	36.37	36.74	37.09	37.21	36.95	38.02	37.57	38.55	38.61	37.03
10	37.79	37.28	37.36	37.41	37.09	36.57	36.86	37.07	37.22	37.30	37.31	36.79	36.45	36.39	36.23	36.41	36.50	36.66	37.08	37.07	37.14	37.38	38.65	38.89	37.12
11	38.52	37.49	36.37	35.67	35.52	35.56	36.04	36.87	37.31	36.99	36.61	36.58	36.57	36.41	36.32	36.3	36.5	36.7	36.9	36.9	37.0	37.2	37.7	37.25	36.72
12	36.16	35.50	35.02	35.09	35.75	36.45	37.15	37.83	37.90	37.54	37.20	36.99	36.74	36.85	36.64	36.61	36.61	36.74	36.91	36.94	36.99	37.03	36.88	36.52	36.67
13	36.23	35.41	34.92	34.24	34.27	34.90	35.80	36.68	37.31	36.95	36.60	36.66	36.53	36.60	36.71	36.63	36.76	37.04	37.03	37.40	37.29	37.41	37.66	37.24	36.43
14	36.47	35.90	35.67	35.60	35.77	36.91	37.52	37.50	36.97	36.92	36.68	36.56	36.59	36.60	36.62	36.67	36.73	36.88	37.09	37.21	37.27	37.51	37.54	36.92	36.75
15	36.47	36.00	35.85	35.62	35.79	36.24	36.77	37.37	37.55	37.34	36.80	36.56	36.51	36.42	36.37	36.46	36.62	36.74	36.86	36.97	36.94	37.15	37.56	37.06	36.67
16	36.27	36.11	35.81	35.92	35.73	35.72	35.68	35.77	36.47	36.92	36.85	36.75	36.61	36.60	36.55	36.60	36.67	36.93	37.26	37.26	37.43	37.79	38.44	37.75	36.66
17	36.81	36.29	35.95	36.17	36.5	36.6	36.6	36.6	36.9	37.01	36.67	36.53	36.43	36.47	36.58	36.64	36.75	36.84	36.89	36.89	36.96	37.33	37.74	37.47	36.73
18	36.62	35.64	35.22	35.13	35.13	35.37	36.51	36.90	37.02	36.84	36.62	36.50	36.48	36.50	36.58	36.65	36.78	37.03	37.09	37.16	37.08	37.45	38.26	37.96	36.60
19	36.92	35.94	35.37	36.06	36.06	36.64	36.96	37.39	37.75	37.34	36.82	36.82	36.70	36.62	36.65	36.66	36.74	36.82	36.88	36.92	37.15	37.55	38.34	38.40	36.90
20	37.56	36.32	35.70	35.48	35.48	35.50	35.76	36.08	37.21	37.30	36.75	36.59	36.57	36.56	36.60	36.70	36.81	36.90	36.91	36.92	37.04	37.57	38.69	38.67	36.73
21	37.68	36.84	35.75	35.00	35.00	35.00	35.48	35.82	37.02	37.01	36.73	36.54	36.47	36.46	36.43	36.38	36.54	36.78	36.95	37.47	37.75	38.00	38.68	37.9	36.65
22	35.92	35.33	34.94	35.00	35.00	35.48	36.73	37.64	37.43	36.99	36.46	36.15	36.16	36.32	36.37	36.46	36.64	36.90	37.01	37.11	37.15	37.41	37.74	37.01	36.47
23	36.01	35.52	35.05	34.54	34.54	34.85	35.33	35.80	36.85	36.80	36.49	36.35	36.15	36.30	36.49	36.67	36.74	36.88	36.97	37.14	37.19	37.64	38.26	37.68	36.34
24	37.14	36.76	36.08	35.62	35.62	35.96	36.44	36.81	37.10	36.90	36.53	36.38	36.36	36.30	36.23	36.41	36.70	36.88	36.91	37.05	37.16	37.17	37.34	36.69	36.61
25	35.70	34.73	34.48	35.01	35.01	35.37	35.98	36.51	36.96	36.95	36.69	36.53	36.45	36.45	36.51	36.63	36.80	36.94	37.02	37.02	37.01	37.29	38.31	38.36	36.45
26	37.43	36.67	36.33	36.14	36.14	35.94	36.24	36.72	36.87	36.76	36.47	36.39	36.39	36.40	-	-	-	-	-	-	-	-	-	-	36.49
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	34.96	34.85	35.65	36.03	36.48	36.57	36.11	36.21	36.31	36.26	36.33	36.49	36.62	36.81	37.01	37.14	37.32	37.59	37.03	35.98	36.39
HOURLY MEANS	36.95	36.31	35.91	35.74	35.69	35.94	36.43	36.84	37.15	37.03	36.71	36.60	36.54	36.55	36.59	36.66	36.78	36.97	37.10	37.20	37.35	37.58	38.09	37.71	36.76

Tabel 64 Nilai variasi harian komponen I – inclination (derajat) Juli 2019

Tondano Magnetic Observatory																								July 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97
2	-12.98	-12.98	-12.97	-12.97	-12.96	-12.96	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97	-13.0	-13.0	-13.0	-12.97
3	-12.9	-12.9	-12.9	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97
4	-12.97	-12.96	-12.96	-12.96	-12.95	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
5	-12.96	-12.95	-12.94	-12.93	-12.93	-12.93	-12.95	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
6	-12.96	-12.95	-12.95	-12.95	-12.96	-12.96	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.97	-12.96
7	-12.96	-12.95	-12.94	-12.92	-12.93	-12.92	-12.93	-12.94	-12.94	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
8	-12.96	-12.96	-12.96	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96	-12.96	-12.95	-12.97
9	-12.94	-12.94	-12.93	-12.93	-12.94	-12.96	-12.97	-12.97	-12.97	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.98	-12.97	-12.98	-12.99	-12.96
10	-12.98	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.98	-12.98	-12.99	-12.99	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.99	-12.99	-12.98
11	-12.99	-12.99	-12.98	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.98	-12.97
12	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97
13	-12.98	-12.98	-12.97	-12.96	-12.97	-12.96	-12.96	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.97
14	-12.95	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96
15	-12.96	-12.96	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.97
16	-12.95	-12.95	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
17	-12.96	-12.96	-12.96	-12.96	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97
18	-12.95	-12.94	-12.94	-12.93	-12.94	-12.93	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
19	-12.96	-12.94	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
20	-12.98	-12.96	-12.95	-12.95	-12.95	-12.94	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
21	-12.97	-12.96	-12.95	-12.94	-12.94	-12.94	-12.94	-12.95	-12.95	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-13.0	-12.96
22	-12.95	-12.94	-12.93	-12.92	-12.93	-12.92	-12.94	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
23	-12.96	-12.96	-12.95	-12.95	-12.95	-12.94	-12.95	-12.96	-12.96	-12.96	-12.97	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
24	-12.98	-12.97	-12.95	-12.94	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.96	-12.97	-12.97	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96
25	-12.96	-12.95	-12.95	-12.94	-12.94	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.96
26	-12.96	-12.95	-12.95	-12.94	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-	-	-	-	-	-	-	-	-	-	-12.96
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-12.95	-12.95	-12.95	-12.95	-12.96	-12.97	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.96	-12.95	-12.96
HOURLY MEANS	-12.96	-12.96	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96

2. Gangguan badai magnet

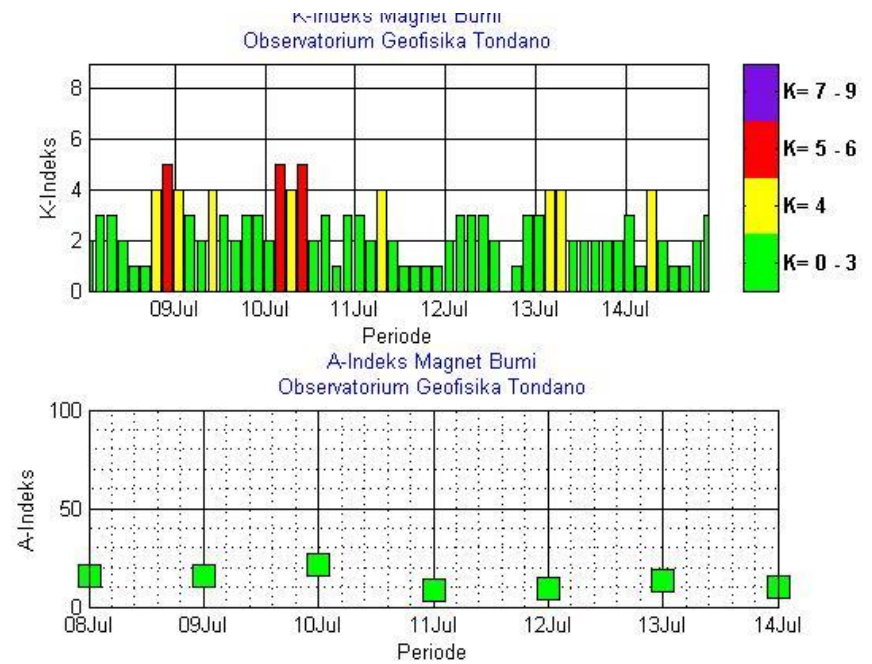
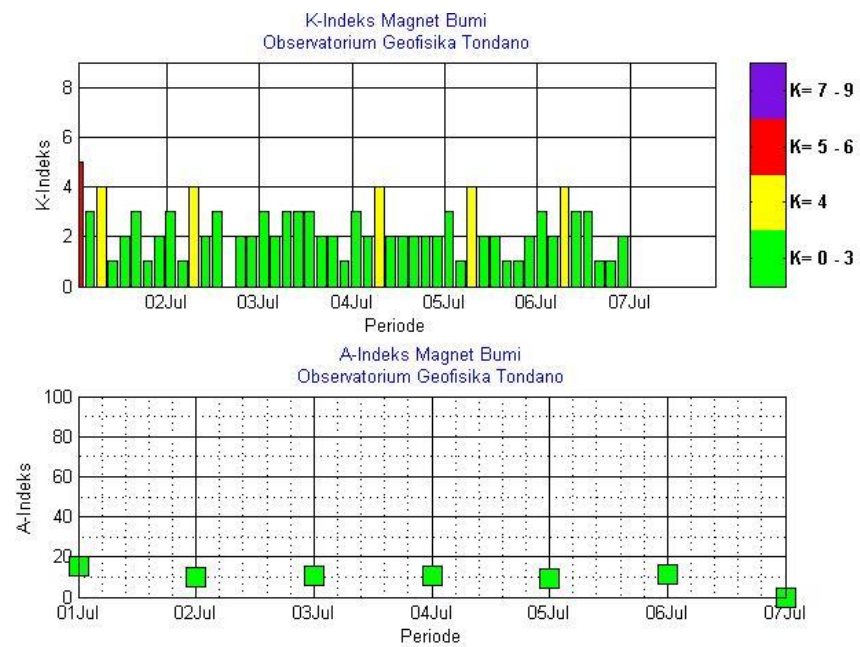
Tabel 65 Monitoring waktu gangguan
pada pengamatan magnet bumi Juli 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	7	2019					
2	2	7	2019					
3	3	7	2019					
4	4	7	2019					
5	5	7	2019					
6	6	7	2019					
7	7	7	2019					
8	8	7	2019	19	20	0	8 jam 10 menit	Badai Kecil
9	9	7	2019					
10	10	7	2019	04	42	0	5 jam 5 menit	Badai Kecil
11	11	7	2019					
12	12	7	2019					
13	13	7	2019					
14	14	7	2019					
15	15	7	2019					
16	16	7	2019					
17	17	7	2019					
18	18	7	2019					
19	19	7	2019					
20	20	7	2019					
21	21	7	2019					
22	22	7	2019					
23	23	7	2019					
24	24	7	2019					
25	25	7	2019					
26	26	7	2019					
27	27	7	2019					
28	28	7	2019					
29	29	7	2019					
30	30	7	2019					
31	31	7	2019					

Tabel 66 Hasil analisa K-indeks dan A-indeks Juli 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	5	3	4	1	2	3	1	2	15.625	Tenang
2	3	1	4	2	3	0	2	2	10.125	Tenang
3	3	2	3	3	3	2	2	1	10.5	Tenang
4	3	2	4	2	2	2	2	2	10.5	Tenang
5	3	1	4	2	2	1	1	2	9	Tenang
6	3	2	4	3	3	1	1	2	11.5	Tenang
7	0	0	0	0	0	0	0	0	0	Tenang
8	2	3	3	2	1	1	4	5	15.625	Badai Kecil
9	4	3	2	4	3	2	3	3	16	Badai Kecil
10	2	5	4	5	2	3	1	3	21.25	Badai Kecil
11	3	2	4	2	1	1	1	1	8.5	Tenang
12	2	3	3	3	2	0	1	3	9.625	Tenang
13	3	4	4	2	2	2	2	2	13	Tenang
14	3	1	4	2	1	1	2	3	10	Tenang
15	3	4	4	3	3	1	2	2	14.5	Tenang
16	3	4	4	1	2	1	2	2	12	Tenang
17	4	3	4	1	1	0	1	1	10.125	Tenang
18	3	3	4	2	3	2	1	2	12	Tenang
19	3	2	4	3	2	1	1	1	10	Tenang
20	2	2	4	2	2	2	2	1	9	Tenang
21	2	2	3	1	1	2	3	4	10.5	Tenang
22	4	3	3	3	2	1	1	1	11	Tenang
23	3	1	5	3	3	0	1	2	13.25	Tenang
24	3	2	4	1	2	1	2	3	10.5	Tenang
25	3	1	3	2	2	0	1	2	7.125	Tenang
26	3	1	3	3	2	0	0	0	6.875	Tenang
27	0	0	0	0	0	0	0	0	0	Lost Record
28	0	0	0	0	0	0	0	0	0	Lost Record
29	0	0	0	0	0	0	0	0	0	Lost Record
30	0	0	0	0	0	0	0	0	0	Lost Record
31	0	4	3	3	3	3	3	3	14.625	Tenang

Gambar 28 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Juli 2019



Tabel 70 Nilai Variasi harian komponen X – north (nT) Agustus 2019

Tondano Magnetic Observatory																								Agustus 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39322.5	39324.7	39323.2	39325.2	39326.4	39322.9	39318.1	39308.0	39300.0	39295.3	39294.9	39293.4	39291.2	39291.9	39294.6	39296.1	39297.0	39295.9	39295.8	39299.5	39299.3	39297.7	39299.7	39311.8	39305.2
2	39323.9	39337.9	39341.8	39334.6	39332.8	39326.3	39316.0	39303.2	39295.7	39291.2	39290.0	39290.3	39292.2	39293.1	39294.9	39296.3	39296.9	39299.5	39300.0	39301.6	39303.5	39306.7	39309.1	39313.7	39308.0
3	39322.8	39332.1	39340.0	39343.9	39340.2	39329.1	39316.7	39305.6	39299.2	39297.8	39296.8	39295.5	39295.4	39296.0	39296.4	39296.7	39296.2	39294.4	39294.1	39294.6	39295.7	39297.5	39303.8	39314.0	39308.1
4	39326.0	39340.8	39352.1	39351.8	39346.1	39333.6	39318.5	39315.9	39310.6	39302.2	39298.8	39296.0	39296.3	39296.8	39297.3	39294.2	39293.7	39295.7	39297.6	39298.9	39300.5	39305.3	39313.1	39323.9	39312.7
5	39334.3	39341.8	39355.2	39366.2	39354.7	39331.4	39319.1	39284.7	39245.7	39198.2	39207.2	39204.0	39199.3	39216.7	39226.0	39234.3	39248.0	39248.0	39246.8	39246.7	39248.5	39257.6	39266.8	39268.8	39268.8
6	39275.6	39277.8	39280.0	39282.4	39280.4	39280.2	39274.7	39273.3	39267.1	39260.3	39259.4	39257.9	39263.7	39270.6	39267.8	39266.3	39264.8	39270.0	39272.5	39274.3	39273.9	39276.1	39276.1	39280.6	39271.9
7	39291.7	39297.8	39304.8	39308.2	39303.6	39296.2	39288.7	39276.9	39273.5	39277.4	39276.8	39275.2	39272.5	39272.8	39274.2	39275.5	39276.7	39279.7	39279.3	39280.8	39280.6	39280.9	39284.0	39291.0	39284.1
8	39295.8	39301.3	39307.1	39307.2	39301.5	39296.8	39285.5	39279.1	39277.6	39276.3	39277.7	39278.6	39280.1	39275.7	39278.1	39268.3	39271.6	39277.0	39278.9	39281.0	39279.7	39279.7	39284.0	39287.5	39284.4
9	39290.2	39289.4	39294.9	39297.5	39296.8	39295.1	39293.2	39283.4	39277.2	39280.0	39284.9	39283.6	39283.4	39277.0	39278.2	39281.3	39280.5	39288.4	39289.1	39288.3	39290.0	39295.2	39298.6	39303.1	39288.3
10	39307.7	39305.7	39303.9	39303.2	39296.8	39293.4	39283.6	39278.4	39274.7	39270.9	39275.6	39277.5	39277.4	39279.3	39280.2	39279.9	39279.4	39281.1	39283.1	39284.7	39284.8	39285.6	39284.3	39286.8	39285.8
11	39297.6	39310.1	39318.5	39316.2	39311.7	39308.8	39302.5	39295.3	39288.8	39285.4	39285.0	39276.9	39271.2	39272.8	39276.4	39281.0	39285.4	39286.8	39285.0	39284.7	39284.5	39289.7	39297.1	39301.8	39292.2
12	39311.8	39322.9	39338.6	39347.5	39341.8	39334.1	39324.8	39314.4	39305.7	39296.5	39297.2	39294.2	39288.5	39285.2	39287.6	39285.4	39286.7	39289.3	39289.1	39289.1	39291.8	39292.8	39299.2	39304.6	39305.0
13	39315.9	39320.3	39315.1	39316.4	39309.7	39305.1	39301.3	39298.1	39295.7	39294.7	39285.3	39278.8	39285.5	39283.0	39283.5	39281.9	39282.5	39289.0	39284.1	39283.6	39283.5	39286.0	39293.4	39300.1	39294.7
14	39306.4	39314.6	39316.6	39317.5	39311.9	39305.8	39296.0	39288.3	39285.9	39283.8	39280.5	39281.7	39284.8	39284.4	39284.7	39282.5	39284.2	39285.2	39288.5	39289.1	39289.8	39292.5	39297.9	39303.3	39294.0
15	39306.2	39315.0	39322.9	39322.4	39320.2	39310.8	39303.6	39297.6	39291.7	39288.2	39285.9	39285.9	39286.2	39289.7	39293.3	39294.8	39294.1	39294.9	39295.3	39296.1	39297.6	39301.8	39309.7	39313.2	39300.7
16	39324.5	39339.5	39348.7	39347.3	39344.7	39336.6	39323.9	39310.2	39297.4	39280.4	39277.6	39281.8	39282.3	39283.3	39284.6	39287.4	39285.1	-	-	-	-	-	-	-	39308.0
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	39338.7	39305.4	39299.2	39298.0	39296.2	39293.0	39291.1	39289.8	39292.9	39292.0	39293.5	39293.3	39295.0	39296.1	39297.7	39304.1	39313.1	39299.4
21	39316.8	39332.0	39344.5	39362.4	39365.0	39365.0	39355.6	39339.6	39311.8	39302.1	39299.1	39298.4	39297.0	39295.5	39294.4	39297.9	39299.8	39299.0	39301.0	39299.4	39300.7	39301.4	39306.0	39307.8	39316.4
22	39319.0	39331.2	39345.0	39348.2	39346.9	39347.0	39338.9	39329.3	39306.9	39305.3	39305.3	39301.2	39299.5	39298.2	39298.4	39298.8	39302.8	39296.2	39294.3	39300.0	39297.2	39301.7	39307.8	39316.6	39314.0
23	39325.8	39337.8	39348.2	39350.9	39342.4	39342.4	39335.5	39319.8	39291.4	39287.7	39287.7	39286.1	39287.0	39288.1	39289.7	39291.8	39293.7	39296.1	39297.9	39298.5	39297.0	39298.5	39304.8	39313.3	39308.8
24	39320.6	39331.8	39344.1	39344.8	39342.5	39342.5	39334.9	39326.1	39303.0	39296.5	39295.7	39295.1	39295.3	39296.4	39297.0	39297.1	39297.4	39299.9	39296.1	39296.2	39295.8	39297.5	39304.7	39316.5	39311.2
25	39326.5	39340.4	39349.7	39351.5	39343.9	39344.0	39331.3	39312.8	39294.2	39292.9	39293.3	39294.9	39292.5	39292.4	39292.0	39293.8	39294.2	39295.4	39296.1	39296.3	39295.5	39300.1	39311.9	39320.4	39310.7
26	39327.8	39339.7	39352.9	39359.2	39357.2	39357.1	39344.8	39331.2	39299.3	39288.7	39280.6	39276.9	39282.9	39286.5	39289.5	39291.0	39292.0	39296.1	39304.2	39304.4	39303.7	39304.7	39311.5	39315.2	39312.4
27	39327.8	39337.4	39354.6	39359.2	39346.0	39345.9	39320.3	39307.1	39291.8	39284.3	39272.1	39267.6	39268.6	39273.2	39282.8	39286.3	39285.3	39287.8	39287.5	39290.0	39290.7	39293.8	39299.6	39305.6	39302.7
28	39314.1	39323.1	39329.2	39321.6	39319.4	39319.3	39314.0	39305.1	39289.3	39288.3	39287.8	39286.9	39285.8	39287.5	39288.6	39288.7	39286.8	39287.8	39288.5	39290.4	39292.0	39297.4	39298.8	39304.5	39299.8
29	39310.4	39318.1	39323.4	39324.5	39323.5	39323.5	39318.3	39307.7	39292.3	39293.7	39295.3	39295.0	39296.1	39295.4	39299.1	39299.0	39298.3	39297.1	39298.0	39299.3	39300.6	39303.0	39310.4	39318.4	39305.9
30	39329.2	39339.3	39344.0	39336.4	39328.8	39319.2	39309.7	39298.7	39294.3	39294.7	39298.0	39297.0	39298.4	39292.3	39285.5	39283.4	39291.3	39287.1	39286.3	39293.5	39297.3	39301.8	39306.3	39317.9	39305.4
31	39331.3	39338.9	39329.8	39314.9	39311.4	39294.9	39266.1	39259.3	39266.7	39257.3	39271.1	39250.5	39243.9	39253.4	39255.7	39265.3	39265.7	39262.3	39269.8	39272.4	39273.0	39270.6	39275.8	39278.6	39278.3
HOURLY MEANS	39314.9	39323.8	39330.7	39331.9	39327.6	39322.5	39312.4	39303.1	39290.5	39284.6	39284.2	39282.0	39281.8	39282.8	39284.3	39285.3	39286.5	39287.9	39288.6	39289.9	39290.5	39293.1	39298.5	39304.9	39299.2

Tabel 71 Nilai Variasi harian komponen Y – east (nT) Agustus 2019

Tondano Magnetic Observatory																						Agustus 2019			
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	402.0	392.4	389.9	394.0	399.9	407.1	415.0	416.0	417.4	419.8	417.2	415.5	414.8	414.9	415.8	416.4	418.7	420.5	422.7	423.7	422.3	423.9	431.1	431.7	414.3
2	425.8	423.0	416.5	405.8	401.4	401.7	405.8	408.5	412.3	417.3	413.7	414.3	415.3	415.9	416.4	416.7	418.4	419.8	421.2	422.0	422.9	423.6	423.1	417.4	415.8
3	407.7	396.5	392.6	393.7	401.4	410.6	418.3	422.2	423.5	422.4	418.1	416.4	416.3	416.5	416.9	418.0	419.0	419.8	420.5	420.6	421.2	424.7	435.9	437.6	416.3
4	428.6	416.5	401.0	389.6	391.5	402.7	413.8	420.3	420.3	419.2	414.9	413.9	415.8	415.9	414.8	414.5	416.7	419.7	421.0	421.6	423.1	427.0	433.3	426.3	415.9
5	411.1	400.2	390.9	389.0	398.8	411.7	423.8	426.7	427.7	427.0	421.2	419.3	411.2	416.4	413.0	408.3	410.1	413.7	416.2	416.4	420.0	425.6	429.4	424.9	414.7
6	415.6	406.1	393.8	389.5	391.8	398.8	408.4	419.9	422.3	420.8	417.6	415.8	415.8	412.8	411.6	412.9	415.5	417.7	419.2	419.0	420.6	422.5	425.9	423.9	413.2
7	412.7	404.5	399.8	399.5	400.9	406.9	411.5	418.3	421.6	423.9	417.1	413.8	413.0	413.3	413.9	414.8	414.8	417.2	416.4	417.4	419.1	424.3	430.6	426.7	414.7
8	419.0	412.4	404.9	397.9	397.9	406.6	413.6	421.6	421.3	417.5	413.0	412.6	413.1	412.8	411.4	413.0	415.4	418.2	419.3	419.3	418.9	422.0	421.9	415.4	414.1
9	409.8	404.8	402.0	398.9	396.7	399.9	403.8	413.5	423.0	423.6	416.2	415.6	414.2	412.9	412.3	412.2	414.7	417.3	419.4	420.1	424.3	428.4	436.9	437.5	414.9
10	429.1	416.7	403.5	394.6	395.6	404.2	409.7	416.4	419.7	419.6	416.5	414.5	413.2	413.0	412.2	412.8	414.7	417.3	418.1	419.0	420.5	423.9	425.9	421.2	414.7
11	416.6	408.3	403.0	398.2	402.1	413.6	418.9	425.6	425.8	423.0	416.4	413.4	413.2	410.9	413.8	416.6	419.5	420.6	420.5	418.2	419.2	421.5	424.2	415.4	415.8
12	402.5	397.8	393.6	393.4	397.6	402.1	407.1	413.1	418.4	419.0	416.1	412.6	414.1	413.5	414.1	413.9	415.6	417.6	418.2	419.1	419.9	421.1	424.0	419.9	411.8
13	409.5	401.0	397.5	399.0	400.8	404.8	414.0	419.4	420.1	422.1	419.1	416.8	413.6	412.1	413.7	413.8	414.4	414.7	416.4	418.6	419.1	420.1	426.3	420.3	413.6
14	409.7	398.9	387.9	385.5	388.7	401.1	414.6	421.3	422.8	421.7	417.7	414.9	413.7	413.2	412.5	412.4	414.0	415.0	416.5	416.4	416.2	419.5	428.6	420.8	411.8
15	407.0	401.7	397.5	393.8	403.2	411.4	422.5	427.1	423.5	422.0	417.6	415.5	414.2	414.6	415.7	416.3	415.9	417.3	418.8	419.6	421.3	425.2	432.9	423.8	415.8
16	415.2	405.4	397.2	392.5	398.3	405.6	413.6	418.8	419.3	419.4	416.8	413.0	412.4	412.4	413.9	412.4	412.8	-	-	-	-	-	-	-	410.5
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	411.2	421.2	419.3	415.7	414.2	413.9	413.3	413.9	415.6	416.1	416.5	416.5	415.0	416.1	419.2	428.4	423.7	417.0
21	414.5	404.0	387.0	382.7	382.7	383.8	391.9	400.3	413.7	413.2	412.1	411.9	412.3	412.8	413.6	416.5	418.4	418.5	419.5	418.2	417.4	419.0	427.5	422.7	408.9
22	418.5	415.1	411.6	407.2	407.2	399.9	396.6	405.7	415.3	416.0	414.5	412.4	412.0	412.0	412.3	412.9	416.9	414.9	415.1	419.1	415.3	417.5	426.0	424.9	413.3
23	413.9	404.4	396.8	388.5	388.4	386.4	391.9	401.3	411.4	416.3	416.0	413.8	412.8	412.6	412.6	412.9	413.2	414.5	414.9	414.6	415.5	418.1	423.9	418.8	408.9
24	405.9	395.4	388.6	392.2	392.2	399.1	408.4	417.3	417.8	416.1	414.4	413.3	412.8	412.5	412.8	413.2	413.4	413.3	414.2	415.2	415.4	419.3	427.9	420.9	410.5
25	409.8	395.2	387.3	380.1	380.0	377.8	392.4	410.9	420.4	419.4	415.5	413.3	412.9	412.9	413.0	413.5	415.3	416.7	417.4	418.1	419.8	425.8	431.8	418.2	409.1
26	399.5	386.1	375.9	371.7	371.6	373.6	385.3	402.8	420.1	418.1	414.2	413.1	412.3	411.9	412.5	413.6	414.5	416.4	417.9	418.4	418.8	422.8	427.1	414.6	405.5
27	399.5	387.6	379.7	380.6	380.4	384.5	394.8	413.6	418.9	417.1	412.0	408.2	409.6	410.3	411.6	411.8	413.3	415.5	415.8	417.5	418.6	422.0	421.9	408.8	406.4
28	398.0	390.1	385.2	388.3	388.3	396.1	405.5	413.5	419.6	415.7	412.4	411.8	411.4	410.8	410.9	413.1	413.1	415.2	416.6	417.7	418.6	424.1	421.2	404.4	408.4
29	388.7	384.5	391.4	398.9	398.9	400.7	406.9	413.6	421.4	420.3	414.7	412.3	411.1	410.0	410.0	410.7	413.4	415.5	416.8	417.8	420.3	424.6	428.1	419.1	410.4
30	405.3	388.6	378.5	377.1	377.0	404.0	415.0	424.3	426.5	421.7	414.2	411.1	408.4	405.5	405.1	406.1	407.3	408.5	412.0	418.1	419.5	424.8	428.3	418.8	408.6
31	403.6	395.0	386.1	379.1	387.8	404.4	414.6	423.2	423.6	422.5	417.6	412.1	407.9	410.1	407.0	407.3	405.9	409.2	416.8	417.0	418.0	420.7	430.7	418.2	409.9
HOURLY MEANS	410.3	401.2	394.1	391.2	393.4	400.0	408.1	415.9	420.3	419.8	415.8	413.8	412.9	412.7	412.8	413.3	414.7	416.3	417.7	418.4	419.3	422.6	427.9	421.3	412.3

Tabel 72 Nilai Variasi harian komponen D – declination (menit) Agustus 2019

Tondano Magnetic Observatory																							Agustus 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	35.2	34.3	34.1	34.5	35.0	35.6	36.3	36.4	36.5	36.7	36.5	36.4	36.3	36.3	36.4	36.4	36.6	36.8	37.0	37.1	37.0	37.1	37.7	37.8	36.25
2	37.2	37.0	36.4	35.5	35.1	35.1	35.5	35.7	36.1	36.5	36.2	36.3	36.4	36.4	36.4	36.5	36.6	36.7	36.9	36.9	37.0	37.1	37.0	36.5	36.38
3	35.7	34.7	34.3	34.4	35.1	35.9	36.6	36.9	37.1	37.0	36.6	36.4	36.4	36.4	36.5	36.6	36.7	36.7	36.8	36.8	36.9	37.2	38.1	38.3	36.42
4	37.5	36.4	35.0	34.0	34.2	35.2	36.2	36.8	36.8	36.7	36.3	36.2	36.4	36.4	36.3	36.3	36.5	36.7	36.8	36.9	37.0	37.4	37.9	37.3	36.38
5	35.9	35.0	34.2	34.0	34.9	36.0	37.1	37.4	37.5	37.5	36.9	36.8	36.1	36.5	36.2	35.8	35.9	36.2	36.5	36.5	36.8	37.3	37.6	37.2	36.32
6	36.4	35.6	34.5	34.1	34.3	34.9	35.8	36.8	37.0	36.9	36.6	36.4	36.4	36.1	36.1	36.2	36.4	36.6	36.7	36.7	36.8	37.0	37.3	37.1	36.19
7	36.1	35.4	35.0	35.0	35.1	35.6	36.0	36.6	36.9	37.1	36.5	36.2	36.2	36.2	36.2	36.3	36.3	36.5	36.5	36.5	36.7	37.2	37.7	37.3	36.30
8	36.7	36.1	35.4	34.8	34.8	35.6	36.2	36.9	36.9	36.6	36.2	36.1	36.2	36.1	36.0	36.2	36.4	36.6	36.7	36.7	36.7	36.9	36.9	36.4	36.25
9	35.9	35.4	35.2	34.9	34.7	35.0	35.3	36.2	37.0	37.1	36.4	36.4	36.3	36.2	36.1	36.1	36.3	36.5	36.7	36.8	37.1	37.5	38.2	38.3	36.32
10	37.5	36.5	35.3	34.5	34.6	35.4	35.9	36.5	36.8	36.7	36.5	36.3	36.2	36.2	36.1	36.1	36.3	36.5	36.6	36.7	36.8	37.1	37.3	36.9	36.30
11	36.5	35.7	35.3	34.8	35.2	36.2	36.7	37.2	37.3	37.0	36.4	36.2	36.2	36.0	36.2	36.5	36.7	36.8	36.8	36.6	36.7	36.9	37.1	36.4	36.39
12	35.2	34.8	34.4	34.4	34.8	35.2	35.6	36.1	36.6	36.7	36.4	36.1	36.2	36.2	36.2	36.2	36.4	36.6	36.6	36.7	36.7	36.9	37.1	36.7	36.04
13	35.8	35.1	34.8	34.9	35.1	35.4	36.2	36.7	36.8	36.9	36.7	36.5	36.2	36.1	36.2	36.2	36.3	36.3	36.5	36.6	36.7	36.8	37.3	36.8	36.20
14	35.8	34.9	33.9	33.7	34.0	35.1	36.3	36.9	37.0	36.9	36.6	36.3	36.2	36.2	36.1	36.1	36.2	36.3	36.5	36.5	36.4	36.7	37.5	36.8	36.04
15	35.6	35.1	34.8	34.4	35.3	36.0	37.0	37.4	37.1	36.9	36.6	36.4	36.3	36.3	36.4	36.4	36.4	36.5	36.7	36.7	36.9	37.2	37.9	37.1	36.38
16	36.3	35.4	34.7	34.3	34.8	35.5	36.2	36.6	36.7	36.7	36.5	36.2	36.1	36.1	36.2	36.1	36.1	-	-	-	-	-	-	-	35.92
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	36.0	36.9	36.7	36.4	36.3	36.2	36.2	36.2	36.4	36.4	36.5	36.5	36.3	36.4	36.7	37.5	37.1	36.50
21	36.3	35.3	33.8	33.4	33.4	33.5	34.2	35.0	36.2	36.2	36.1	36.0	36.1	36.1	36.2	36.4	36.6	36.6	36.7	36.6	36.5	36.7	37.4	37.0	35.77
22	36.6	36.3	36.0	35.6	35.6	35.0	34.7	35.5	36.3	36.4	36.3	36.1	36.1	36.1	36.1	36.1	36.5	36.3	36.3	36.7	36.3	36.5	37.3	37.2	36.15
23	36.2	35.4	34.7	34.0	34.0	33.8	34.3	35.1	36.0	36.4	36.4	36.2	36.1	36.1	36.1	36.1	36.2	36.3	36.3	36.3	36.4	36.6	37.1	36.6	35.77
24	35.5	34.6	34.0	34.3	34.3	34.9	35.7	36.5	36.6	36.4	36.3	36.2	36.1	36.1	36.1	36.2	36.2	36.2	36.2	36.3	36.4	36.7	37.4	36.8	35.91
25	35.8	34.6	33.8	33.2	33.2	33.0	34.3	35.9	36.8	36.7	36.4	36.2	36.1	36.1	36.1	36.2	36.3	36.5	36.5	36.6	36.7	37.3	37.8	36.6	35.79
26	34.9	33.7	32.9	32.5	32.5	32.6	33.7	35.2	36.8	36.6	36.3	36.2	36.1	36.1	36.1	36.2	36.3	36.4	36.6	36.6	36.6	37.0	37.4	36.3	35.48
27	34.9	33.9	33.2	33.3	33.3	33.6	34.5	36.2	36.7	36.5	36.1	35.7	35.9	35.9	36.0	36.1	36.2	36.4	36.4	36.5	36.6	36.9	36.9	35.8	35.56
28	34.8	34.1	33.7	34.0	34.0	34.6	35.5	36.2	36.7	36.4	36.1	36.1	36.0	36.0	36.0	36.2	36.2	36.3	36.5	36.6	36.6	37.1	36.9	35.4	35.74
29	34.0	33.6	34.2	34.9	34.9	35.0	35.6	36.2	36.9	36.8	36.3	36.1	36.0	35.9	35.9	35.9	36.2	36.4	36.5	36.6	36.8	37.2	37.5	36.7	35.91
30	35.4	34.0	33.1	33.0	33.0	35.3	36.3	37.1	37.3	36.9	36.2	36.0	35.7	35.5	35.5	35.6	35.7	35.8	36.1	36.6	36.7	37.2	37.5	36.6	35.75
31	35.3	34.5	33.8	33.2	33.9	35.4	36.3	37.1	37.1	37.0	36.6	36.1	35.7	35.9	35.7	35.7	35.6	35.8	36.5	36.5	36.6	36.8	37.7	36.6	35.89
HOURLY MEANS	35.89	35.09	34.46	34.20	34.40	34.98	35.70	36.40	36.79	36.75	36.40	36.2	36.15	36.13	36.13	36.18	36.30	36.44	36.56	36.63	36.70	36.99	37.44	36.86	36.08

Tabel 73 Nilai variasi harian komponen I – inclination (derajat) Agustus 2019

Tondano Magnetic Observatory

Agustus 2019[illegible]

2. Gangguan badai magnet

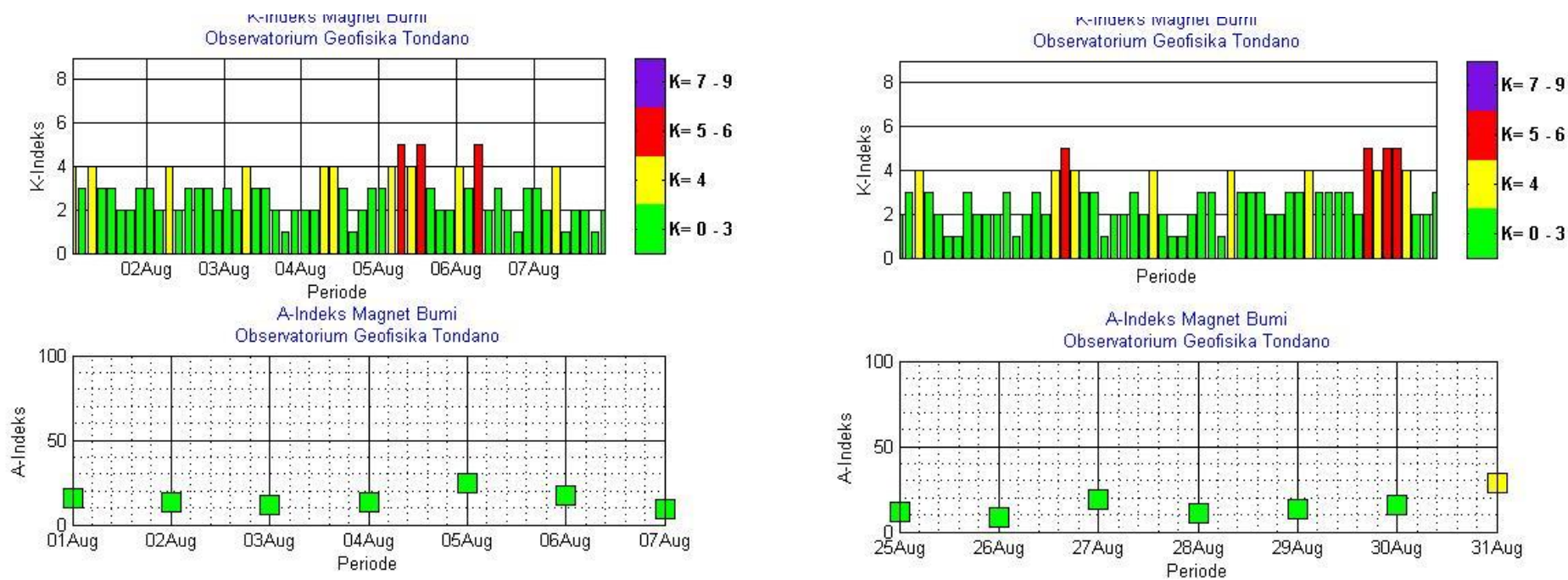
Tabel 74 Monitoring waktu gangguan pada pengamatan magnet bumi Agustus 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	8	2019					
2	2	8	2019					
3	3	8	2019					
4	4	8	2019					
5	5	8	2019					
6	6	8	2019					
7	7	8	2019					
8	8	8	2019					
9	9	8	2019					
10	10	8	2019					
11	11	8	2019					
12	12	8	2019					
13	13	8	2019					
14	14	8	2019					
15	15	8	2019					
16	16	8	2019					
17	17	8	2019					
18	18	8	2019					
19	19	8	2019					
20	20	8	2019					
21	21	8	2019					
22	22	8	2019					
23	23	8	2019					
24	24	8	2019					
25	25	8	2019					
26	26	8	2019					
27	27	8	2019					
28	28	8	2019					
29	29	8	2019					
30	30	8	2019					
31	31	8	2019	01	46	00	13jam 37menit	Badai Kecil

Tabel 75 Hasil analisa K-indeks dan A-indeks Agustus 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	4	3	4	3	3	2	2	3	16	Tenang
2	3	2	4	2	3	3	3	2	13.5	Tenang
3	3	2	4	3	3	2	1	2	12	Tenang
4	2	2	4	4	3	1	2	3	13.5	Tenang
5	3	4	5	4	5	3	2	2	24.25	Tenang
6	4	3	5	2	3	2	1	3	17.125	Tenang
7	3	2	4	1	2	2	1	2	9.5	Tenang
8	3	2	4	2	3	2	1	3	12	Tenang
9	4	3	4	3	3	2	2	2	15	Tenang
10	4	2	4	3	1	1	1	3	12.5	Tenang
11	3	2	4	2	2	2	1	2	10	Tenang
12	2	2	4	3	3	1	1	2	10.5	Tenang
13	4	2	5	3	2	3	2	1	16.125	Tenang
14	3	3	4	2	2	1	1	2	10.5	Tenang
15	3	1	4	1	1	2	1	2	8.5	Tenang
16	2	1	3	3	1	1	-	-	5.75	Tenang
17	-	-	-	-	-	-	-	-	-	Lost Record
18	-	-	-	-	-	-	-	-	-	Lost Record
19	-	-	-	-	-	-	-	-	-	Lost Record
20	-	-	3	3	2	1	2	2	6.75	Tenang
21	3	3	3	4	3	3	2	2	14.5	Tenang
22	2	2	3	4	3	3	2	2	12.5	Tenang
23	2	2	2	1	1	1	1	1	4.5	Tenang
24	3	2	3	3	3	3	2	2	12	Tenang
25	2	3	4	3	2	1	1	3	11.5	Tenang
26	2	2	2	3	1	2	3	2	8.5	Tenang
27	4	5	4	3	3	1	2	2	18.625	Tenang
28	3	2	4	2	1	1	2	3	10.5	Tenang
29	3	1	4	3	3	3	2	2	13	Tenang
30	3	3	4	3	3	3	3	2	15.5	Tenang
31	5	4	5	5	4	2	2	3	28.375	Badai Kecil

Gambar 29 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Agustus 2019



I. September 2019

1. Nilai variasi harian bulan September 2019

Tabel 76 Nilai variasi harian komponen H – horizontal (nT) September 2019

Tondano Magnetic Observatory

September 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39280.3	39288.2	39297.4	39291.5	39261.3	39242.6	39231.0	39224.1	39238.9	39246.2	39237.2	39251.9	39258.2	39244.2	39243.4	39252.2	39261.9	39260.6	39269.9	39273.9	39266.1	39267.3	39276.2	39279.0	39260.1
2	39271.9	39287.6	39301.2	39304.2	39296.6	39290.1	39276.4	39270.5	39267.4	39267.8	39270.6	39267.7	39275.0	39277.3	39273.5	39267.1	39268.0	39267.1	39276.6	39272.1	39269.0	39277.4	39286.6	39291.1	39278.0
3	39300.6	39305.5	39308.3	39309.3	39305.6	39296.0	39282.3	39267.4	39263.4	39265.6	39271.4	39271.5	39275.0	39283.1	39278.7	39278.6	39277.2	39278.7	39280.8	39280.9	39282.7	39286.7	39288.2	39293.7	39284.6
4	39300.6	39303.3	39310.0	39312.3	39306.3	39297.4	39287.7	39274.0	39264.6	39259.7	39272.3	39274.6	39276.6	39279.6	39281.6	39279.5	39279.5	39277.4	39275.7	39280.5	39286.4	39289.0	39291.0	39298.8	39285.8
5	39310.8	39320.1	39315.0	39313.9	39299.0	39271.1	39256.5	39253.7	39262.0	39262.2	39261.2	39270.0	39267.4	39273.6	39268.5	39271.3	39276.7	39282.7	39281.9	39281.3	39281.5	39283.7	39287.0	39293.3	39281.0
6	39303.0	39315.3	39327.0	39332.3	39323.7	39300.3	39295.4	39280.0	39270.6	39265.3	39262.5	39266.3	39270.0	39274.2	39277.8	39277.9	39279.6	39279.7	39277.5	39277.8	39279.4	39283.7	39292.1	39303.4	39288.1
7	39318.2	39332.2	39342.3	39342.1	39332.6	39321.1	39302.9	39286.3	39286.4	39282.0	39277.4	39273.6	39275.4	39276.8	39284.1	39284.8	39283.8	39284.6	39287.4	39287.6	39286.5	39289.0	39293.1	39302.0	39297.2
8	39312.3	39320.9	39330.2	39333.1	39333.2	39320.3	39296.6	39274.4	39263.8	39266.5	39271.0	39279.1	39276.6	39274.0	39269.6	39271.4	39276.9	39278.7	39281.2	39282.5	39284.9	39284.6	39292.6	39293.8	39290.3
9	39297.0	39300.7	39312.6	39320.1	39322.5	39309.7	39291.0	39272.7	39275.0	39277.8	39262.6	39247.3	39253.0	39263.9	39263.7	39270.2	39288.6	39277.8	39275.3	39279.4	39283.2	39286.5	39286.9	39287.4	39283.5
10	39293.4	39295.3	39301.7	39304.7	39303.3	39293.5	39290.7	39287.5	39283.8	39283.1	39282.0	39281.4	39281.3	39272.1	39273.0	39275.2	39278.4	39280.0	39281.4	39282.5	39283.7	39283.3	39286.2	39293.0	39286.3
11	39306.4	39319.6	39326.7	39332.0	39331.0	39319.4	39295.9	39275.1	39274.4	39273.8	39276.4	39274.1	39273.9	39273.4	39276.5	39281.5	39280.4	39281.2	39283.8	39285.4	39286.4	39289.1	39291.6	39293.4	39291.7
12	39298.3	39306.4	39322.1	39323.0	39318.6	39310.6	39297.6	39287.3	39279.7	39272.7	39263.8	39267.9	39278.4	39282.6	39286.9	39285.5	39289.5	39286.3	39285.1	39286.9	39292.2	39294.5	39303.2	39311.5	39292.9
13	-	-	-	-	-	-	39307.8	39299.1	39293.3	39290.8	39288.5	39287.7	39286.8	39284.6	39285.9	39288.9	39291.8	39288.2	39284.8	39283.7	39287.6	39288.0	39290.9	39297.3	39290.3
14	39311.9	39324.2	39332.0	39334.7	39331.4	39324.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39326.5
15	-	-	39359.7	39358.7	39337.2	39319.2	39305.8	39294.2	39284.8	39285.7	39287.5	39290.7	39292.0	39290.9	39291.9	39294.7	39291.2	39291.8	39290.0	39287.1	39290.3	39293.3	39300.3	39309.7	39302.1
16	39316.6	39330.8	39330.7	39319.3	39329.3	39322.8	39318.5	39311.2	39301.0	39293.1	39289.4	39288.7	39288.4	39289.3	39291.5	39288.6	39285.9	39287.4	39291.3	39294.4	39294.4	39298.6	39305.1	39311.9	39303.2
17	39322.7	39330.9	39346.3	39349.6	39343.3	39331.0	39315.6	39315.6	39295.7	39295.2	39294.4	-	-	-	-	-	-	-	-	-	-	-	-	-	39321.9
18	-	39335.7	39339.5	39341.6	39334.8	39334.8	39320.7	39308.0	39280.0	39286.7	39291.0	39286.6	39281.8	39288.6	39285.3	39286.5	39284.9	39285.3	39286.7	39289.3	39289.9	39290.8	39293.2	39301.0	39301.0
19	39315.5	39335.5	39341.8	39343.9	39336.4	39336.4	39325.2	39313.1	39295.0	39294.0	39293.9	39292.4	39294.4	39292.2	39294.1	39291.7	39292.3	39292.8	39292.8	39293.0	39297.1	39299.2	39303.6	39313.5	39307.5
20	39328.9	39344.7	39347.6	39342.9	39331.5	39331.5	39318.6	39308.6	39294.7	39292.9	39291.2	39291.1	39290.7	39292.2	39292.5	39295.6	39298.6	39298.5	39299.1	39298.6	39301.5	39302.7	39307.6	39316.5	39309.1
21	39331.9	39346.1	39353.2	39360.0	39353.7	39353.7	39343.4	39330.1	39290.4	39281.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39334.4
22	-	39309.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39309.3
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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HOURLY MEANS	39306.7	39317.6	39327.3	39328.5	39321.6	39311.3	39298.0	39286.6	39278.2	39277.1	39276.0	39275.7	39277.5	39278.5	39278.8	39280.1	39282.5	39282.1	39283.4	39284.3	39285.7	39288.2	39293.1	39299.5	39296.6

Tabel 77 Nilai variasi harian komponen Z – vertical (nT) September 2019

Tondano Magnetic Observatory

September 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9043.2	-9047.2	-9049.1	-9041.0	-9032.1	-9043.3	-9051.1	-9051.0	-9051.0	-9045.5	-9039.1	-9045.2	-9040.6	-9043.5	-9040.4	-9045.9	-9046.5	-9045.3	-9046.0	-9043.3	-9038.9	-9045.6	-9050.5	-9048.3	-9044.7
2	-9045.1	-9044.6	-9041.8	-9032.8	-9028.9	-9034.4	-9037.0	-9039.2	-9039.2	-9039.0	-9039.7	-9039.4	-9043.0	-9040.5	-9039.2	-9041.0	-9042.3	-9041.7	-9043.9	-9038.6	-9041.3	-9048.4	-9048.5	-9042.7	-9040.5
3	-9035.4	-9026.4	-9019.9	-9021.1	-9021.7	-9025.0	-9029.4	-9032.3	-9032.3	-9038.0	-9040.3	-9039.7	-9040.9	-9040.2	-9039.4	-9041.0	-9040.9	-9042.8	-9041.9	-9041.4	-9044.1	-9044.4	-9048.8	-9047.8	-9036.5
4	-9042.8	-9034.6	-9031.0	-9026.9	-9022.9	-9022.3	-9027.4	-9032.4	-9032.4	-9038.4	-9040.4	-9038.6	-9039.4	-9039.7	-9039.6	-9038.9	-9041.4	-9040.6	-9041.9	-9043.5	-9044.7	-9044.5	-9049.4	-9045.3	-9037.5
5	-9039.9	-9035.1	-9026.3	-9023.8	-9017.8	-9022.4	-9032.1	-9041.3	-9041.3	-9041.2	-9041.2	-9042.4	-9039.4	-9040.9	-9039.4	-9042.3	-9044.7	-9042.4	-9041.3	-9041.3	-9042.2	-9046.0	-9047.6	-9043.9	-9038.2
6	-9041.5	-9035.8	-9027.8	-9025.7	-9032.3	-9036.8	-9038.2	-9037.7	-9037.7	-9037.3	-9039.4	-9041.1	-9041.5	-9041.8	-9041.6	-9041.3	-9041.2	-9040.9	-9040.1	-9042.6	-9043.2	-9046.3	-9046.8	-9043.0	-9039.2
7	-9038.2	-9038.2	-9037.4	-9033.5	-9032.4	-9036.7	-9037.5	-9038.8	-9038.8	-9040.8	-9040.6	-9041.7	-9042.6	-9041.0	-9042.4	-9041.9	-9041.5	-9042.8	-9043.4	-9041.6	-9044.0	-9044.1	-9048.6	-9046.3	-9040.6
8	-9039.0	-9038.7	-9034.7	-9029.1	-9032.0	-9029.2	-9030.8	-9034.0	-9034.0	-9043.1	-9041.0	-9041.9	-9039.8	-9040.0	-9040.7	-9042.4	-9043.3	-9043.4	-9043.5	-9041.9	-9043.9	-9044.0	-9048.1	-9045.6	-9039.3
9	-9044.1	-9044.5	-9044.0	-9038.8	-9037.7	-9038.0	-9037.4	-9040.6	-9040.6	-9041.9	-9034.8	-9033.5	-9042.7	-9044.1	-9043.3	-9043.2	-9045.2	-9040.1	-9044.2	-9045.4	-9046.0	-9048.8	-9049.7	-9048.3	-9042.4
10	-9049.1	-9043.3	-9036.0	-9029.1	-9033.5	-9035.0	-9037.4	-9038.1	-9038.1	-9038.6	-9037.8	-9039.5	-9040.3	-9038.8	-9042.7	-9043.1	-9043.1	-9042.7	-9042.3	-9042.1	-9042.5	-9042.5	-9042.7	-9037.9	-9039.8
11	-9033.1	-9026.8	-9025.2	-9023.3	-9019.8	-9021.8	-9026.5	-9032.0	-9032.0	-9037.2	-9038.2	-9038.6	-9039.8	-9041.2	-9042.1	-9043.3	-9041.5	-9041.8	-9042.7	-9041.9	-9041.7	-9041.4	-9039.9	-9029.7	-9035.1
12	-9024.4	-9020.5	-9022.1	-9015.2	-9013.5	-9016.2	-9025.2	-9030.6	-9030.6	-9034.5	-9034.3	-9038.9	-9040.7	-9041.2	-9041.2	-9040.4	-9041.3	-9040.9	-9043.5	-9043.9	-9044.1	-9044.4	-9048.9	-9050.0	-9034.4
13	-	-	-	-	-	-	-9032.6	-9034.9	-9034.9	-9035.5	-9036.8	-9038.1	-9039.2	-9039.6	-9040.3	-9041.0	-9041.0	-9040.0	-9040.4	-9042.2	-9043.3	-9042.9	-9041.3	-9037.8	-9039.0
14	-9034.6	-9025.3	-9019.8	-9017.2	-9020.5	-9026.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9024.0
15	-	-	-9028.2	-9036.7	-9037.8	-9044.2	-9045.1	-9043.6	-9040.5	-9040.9	-9040.8	-9040.4	-9041.2	-9040.7	-9041.5	-9042.0	-9039.6	-9043.1	-9040.9	-9042.8	-9041.3	-9043.9	-9042.0	-9037.5	-9040.7
16	-9028.8	-9023.0	-9015.7	-9012.7	-9022.8	-9027.7	-9037.2	-9040.9	-9040.9	-9035.8	-9035.4	-9036.9	-9037.9	-9038.8	-9040.3	-9039.7	-9038.7	-9042.4	-9041.8	-9043.4	-9041.6	-9046.4	-9051.8	-9051.2	-9036.3
17	-9046.4	-9043.6	-9036.8	-9026.7	-9028.3	-9030.8	-9033.5	-9033.5	-9033.5	-9040.5	-9039.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-9035.7
18	-	-9035.6	-9024.7	-9020.1	-9020.1	-9017.4	-9018.2	-9030.1	-9030.1	-9039.4	-9039.1	-9037.7	-9037.3	-9042.9	-9041.1	-9042.0	-9040.4	-9040.6	-9041.6	-9040.1	-9040.2	-9041.8	-9042.0	-9038.1	-9034.8
19	-9035.0	-9032.8	-9024.7	-9017.8	-9017.8	-9015.3	-9024.0	-9033.6	-9033.6	-9038.6	-9038.9	-9039.2	-9040.6	-9040.1	-9041.4	-9040.8	-9041.6	-9041.0	-9040.7	-9041.2	-9043.4	-9043.9	-9043.5	-9038.5	-9035.3
20	-9034.8	-9031.5	-9030.0	-9029.7	-9029.7	-9030.2	-9033.3	-9036.1	-9036.1	-9039.3	-9039.0	-9040.7	-9041.0	-9041.6	-9040.9	-9041.6	-9041.4	-9040.6	-9040.5	-9040.9	-9041.9	-9041.1	-9042.5	-9042.4	-9037.8
21	-9042.3	-9040.4	-9039.7	-9037.6	-9037.6	-9033.3	-9038.0	-9041.2	-9041.2	-9036.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9038.8
22	-	-9035.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9035.3
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-9038.8	-9035.2	-9030.7	-9026.9	-9027.0	-9029.3	-9033.6	-9037.1	-9036.9	-9039.1	-9038.7	-9039.6	-9040.4	-9040.9	-9041.0	-9041.8	-9042.0	-9041.8	-9042.2	-9042.1	-9042.7	-9044.5	-9046.3	-9043.0	-9037.5

Tabel 78 Nilai Variasi harian komponen F – total (nT) September 2019

Tondano Magnetic Observatory																							September 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	40307.9	40316.5	40325.8	40318.3	40286.8	40271.2	40261.6	40254.8	40269.2	40275.1	40265.0	40280.6	40285.7	40272.7	40271.2	40281.0	40290.6	40289.1	40298.4	40301.6	40293.0	40295.7	40305.5	40307.7	40288.5
2	40300.1	40315.2	40327.9	40328.8	40320.5	40315.4	40302.6	40297.4	40294.4	40294.7	40297.6	40294.7	40302.6	40304.3	40300.3	40294.5	40295.6	40294.6	40304.3	40298.8	40296.4	40306.2	40315.1	40318.3	40305.0
3	40325.8	40328.6	40329.9	40331.2	40327.6	40319.1	40306.7	40292.8	40288.9	40292.4	40298.5	40298.4	40302.1	40309.9	40305.4	40305.7	40304.3	40306.2	40308.0	40308.0	40310.3	40314.4	40316.7	40322.0	40310.5
4	40327.5	40328.3	40334.0	40335.4	40328.6	40319.8	40311.5	40299.2	40290.1	40286.7	40299.4	40301.3	40303.4	40306.4	40308.3	40306.0	40306.6	40304.4	40303.1	40308.1	40314.1	40316.6	40319.6	40326.4	40311.9
5	40336.8	40344.8	40337.9	40336.2	40320.4	40294.2	40282.2	40281.5	40289.6	40289.8	40288.8	40297.6	40294.4	40300.8	40295.5	40298.8	40304.6	40310.0	40309.0	40308.3	40308.8	40311.7	40315.4	40320.7	40307.4
6	40329.6	40340.3	40349.9	40354.6	40347.7	40325.9	40321.4	40306.3	40297.2	40291.9	40289.7	40293.7	40297.4	40301.5	40305.1	40305.0	40306.7	40306.7	40304.4	40305.3	40306.9	40311.8	40320.2	40330.3	40314.6
7	40343.7	40357.3	40367.0	40365.9	40356.4	40346.1	40328.6	40312.7	40312.8	40309.0	40304.4	40300.9	40303.0	40303.9	40311.4	40311.9	40310.8	40311.9	40314.8	40314.6	40314.0	40316.6	40321.5	40329.7	40323.7
8	40338.1	40346.4	40354.6	40356.2	40356.9	40343.7	40320.9	40300.0	40289.7	40294.3	40298.3	40306.4	40303.5	40300.9	40296.9	40299.0	40304.5	40306.3	40308.8	40309.7	40312.5	40312.2	40320.9	40321.5	40316.8
9	40324.3	40328.1	40339.4	40345.6	40347.8	40335.4	40317.0	40299.9	40302.1	40305.1	40288.7	40273.5	40281.1	40292.1	40291.7	40298.0	40316.3	40304.7	40303.2	40307.5	40311.2	40315.1	40315.7	40315.9	40310.8
10	40321.9	40322.5	40327.1	40328.5	40328.1	40318.9	40316.7	40313.7	40310.1	40309.5	40308.3	40308.1	40308.1	40298.8	40300.6	40302.8	40306.0	40307.4	40308.7	40309.7	40311.0	40310.6	40313.5	40319.0	40312.9
11	40331.0	40342.5	40349.0	40353.8	40352.0	40341.1	40319.3	40300.3	40299.6	40300.2	40303.0	40300.7	40300.9	40300.7	40303.9	40309.0	40307.6	40308.4	40311.1	40312.5	40313.4	40316.0	40318.1	40317.6	40317.1
12	40321.2	40328.2	40343.8	40343.1	40338.5	40331.3	40320.7	40311.8	40304.4	40298.5	40289.8	40294.8	40305.4	40309.6	40313.8	40312.3	40316.4	40313.1	40312.6	40314.5	40319.7	40321.9	40331.5	40339.7	40318.2
13	-	-	-	-	-	-	40332.3	40324.3	40318.6	40316.3	40314.4	40313.9	40313.3	40311.2	40312.6	40315.7	40318.6	40314.8	40311.6	40310.9	40314.9	40315.3	40317.7	40323.1	40316.6
14	40336.7	40346.6	40353.0	40355.0	40352.5	40347.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40348.5
15	-	-	40381.9	40382.7	40362.0	40346.0	40333.1	40321.4	40311.6	40312.6	40314.3	40317.3	40318.8	40317.6	40318.8	40321.6	40317.7	40319.0	40316.7	40314.4	40317.1	40320.6	40327.1	40335.2	40328.5
16	40340.0	40352.5	40350.7	40339.0	40351.0	40345.8	40343.7	40337.5	40327.5	40318.7	40314.9	40314.6	40314.5	40315.6	40318.1	40315.1	40312.2	40314.5	40318.2	40321.7	40321.2	40326.3	40334.0	40340.4	40328.7
17	40349.8	40357.3	40370.7	40371.7	40365.9	40354.5	40340.0	40340.0	40320.7	40321.8	40320.7	-	-	-	-	-	-	-	-	-	-	-	-	-	40346.7
18	-	40360.1	40361.4	40362.4	40355.8	40355.2	40341.6	40331.9	40304.6	40313.3	40317.3	40312.8	40307.9	40315.9	40312.2	40313.6	40311.7	40312.1	40313.7	40315.9	40316.5	40317.8	40320.2	40326.8	40326.1
19	40340.3	40359.3	40363.6	40364.1	40356.8	40356.3	40347.3	40337.6	40320.0	40320.2	40320.1	40318.8	40321.0	40318.7	40320.9	40318.4	40319.2	40319.6	40319.4	40319.7	40324.2	40326.5	40330.6	40339.1	40332.6
20	40353.3	40368.0	40370.5	40365.8	40354.7	40354.8	40342.9	40333.9	40320.2	40319.3	40317.5	40317.8	40317.5	40319.0	40319.2	40322.4	40325.3	40325.0	40325.6	40325.2	40328.2	40329.2	40334.3	40343.0	40334.7
21	40357.9	40371.4	40378.1	40384.2	40378.1	40377.1	40368.1	40356.0	40317.2	40307.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40359.6
22	-	40334.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40334.4
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	40332.6	40342.4	40350.8	40351.1	40344.4	40334.9	40322.9	40312.6	40304.4	40303.8	40302.7	40302.5	40304.5	40305.5	40305.9	40307.3	40309.7	40309.3	40310.6	40311.5	40313.0	40315.8	40321.0	40326.5	40322.4

Tabel 79 Nilai Variasi harian komponen X – north (nT) September 2019

Tondano Magnetic Observatory

September 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39278.2	39286.2	39295.4	39289.6	39259.4	39240.6	39228.8	39221.8	39236.6	39243.9	39235.1	39249.8	39256.1	39242.1	39241.3	39250.1	39259.7	39258.5	39267.8	39271.7	39263.9	39265.1	39274.0	39276.7	39258.0
2	39269.8	39285.5	39299.2	39302.3	39294.6	39288.0	39274.1	39268.2	39265.2	39265.6	39268.5	39265.6	39272.8	39275.1	39271.4	39265.0	39265.8	39264.9	39274.4	39270.0	39266.9	39275.2	39284.3	39289.0	39275.9
3	39298.6	39303.6	39306.5	39307.5	39303.7	39294.0	39280.2	39265.2	39261.1	39263.4	39269.3	39269.3	39272.8	39281.0	39276.5	39276.5	39275.1	39276.5	39278.6	39278.7	39280.4	39284.5	39285.8	39291.5	39282.5
4	39298.6	39301.4	39308.1	39310.5	39304.4	39295.4	39285.6	39271.7	39262.3	39257.4	39270.1	39272.5	39274.5	39277.5	39279.5	39277.3	39277.3	39275.3	39273.6	39278.3	39284.2	39286.8	39288.6	39296.6	39283.7
5	39308.7	39318.2	39313.2	39312.1	39297.1	39269.1	39254.4	39251.4	39259.8	39260.0	39259.0	39267.8	39265.3	39271.5	39266.4	39269.1	39274.5	39280.5	39279.7	39279.1	39279.4	39281.4	39284.8	39291.2	39278.9
6	39301.0	39313.5	39325.2	39330.4	39321.7	39298.1	39293.1	39277.7	39268.4	39263.1	39260.4	39264.2	39267.8	39272.1	39275.7	39275.7	39277.4	39277.6	39275.3	39275.7	39277.2	39281.5	39289.9	39301.3	39286.0
7	39316.2	39330.2	39340.4	39340.1	39330.4	39318.8	39300.6	39284.0	39284.2	39279.9	39275.2	39271.4	39273.3	39274.7	39282.0	39282.7	39281.6	39282.5	39285.2	39285.5	39284.3	39286.9	39290.9	39300.0	39295.0
8	39310.4	39319.0	39328.3	39331.2	39331.1	39318.1	39294.3	39272.1	39261.5	39264.2	39268.8	39277.0	39274.5	39271.9	39267.5	39269.4	39274.8	39276.6	39279.0	39280.3	39282.7	39282.4	39290.4	39291.7	39288.2
9	39295.1	39298.9	39310.7	39318.2	39320.6	39307.7	39288.8	39270.5	39272.8	39275.6	39260.4	39245.2	39250.9	39261.8	39261.6	39268.1	39286.5	39275.7	39273.2	39277.2	39280.9	39284.2	39284.6	39285.2	39281.4
10	39291.3	39293.3	39299.8	39302.8	39301.3	39291.4	39288.5	39285.2	39281.6	39280.9	39279.9	39279.3	39279.2	39270.0	39270.9	39273.0	39276.3	39277.8	39279.2	39280.3	39281.6	39281.1	39284.1	39290.9	39284.2
11	39304.4	39317.6	39324.6	39329.9	39328.9	39317.2	39293.7	39272.9	39272.2	39271.6	39274.3	39271.9	39271.8	39271.3	39274.4	39279.4	39278.3	39279.0	39281.6	39283.3	39284.2	39287.0	39289.5	39291.4	39289.6
12	39296.3	39304.4	39320.0	39320.8	39316.4	39308.3	39295.3	39284.9	39277.4	39270.5	39261.7	39265.8	39276.3	39280.5	39284.7	39283.4	39287.4	39284.1	39282.9	39284.8	39290.0	39292.3	39300.9	39309.2	39290.8
13	-	-	-	-	-	-	39305.5	39296.9	39291.1	39288.6	39286.4	39285.5	39284.7	39282.5	39283.8	39286.8	39289.7	39286.0	39282.7	39281.6	39285.4	39285.9	39288.7	39295.2	39288.2
14	39309.9	39322.3	39330.1	39332.7	39329.3	39322.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39324.5
15	-	-	39357.7	39356.5	39334.9	39316.9	39303.5	39291.9	39282.6	39283.5	39285.3	39288.6	39289.9	39288.8	39289.8	39292.6	39289.1	39289.6	39287.8	39284.9	39288.1	39291.0	39298.1	39307.7	39299.9
16	39314.7	39329.0	39328.9	39317.5	39327.4	39320.7	39316.2	39308.9	39298.7	39290.9	39287.2	39286.5	39286.2	39287.2	39289.3	39286.5	39283.7	39285.2	39289.2	39292.3	39292.2	39296.3	39302.8	39309.7	39301.1
17	39320.7	39329.1	39344.5	39347.8	39341.5	39329.1	39313.6	39313.6	39293.5	39293.0	39292.3	-	-	-	-	-	-	-	-	-	-	-	-	-	39319.9
18	-	39333.6	39337.5	39339.6	39332.7	39332.7	39318.5	39305.8	39277.8	39284.6	39288.9	39284.5	39279.7	39286.5	39283.2	39284.3	39282.8	39283.2	39284.6	39287.2	39287.8	39288.7	39291.2	39299.0	39298.9
19	39313.5	39333.5	39339.8	39341.9	39334.4	39334.4	39323.0	39310.9	39292.8	39291.9	39291.7	39290.3	39292.2	39290.1	39292.0	39289.5	39290.1	39290.7	39290.6	39290.8	39295.0	39297.1	39301.4	39311.5	39305.4
20	39326.9	39342.7	39345.5	39340.8	39329.4	39329.5	39316.5	39306.5	39292.5	39290.7	39289.0	39288.9	39288.6	39290.0	39290.3	39293.5	39296.5	39296.3	39297.0	39296.5	39299.4	39300.6	39305.4	39314.4	39307.0
21	39329.8	39344.0	39351.2	39358.0	39351.7	39351.7	39341.3	39328.0	39288.2	39279.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39332.3
22	-	39307.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39307.3
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	39304.7	39315.7	39325.3	39326.5	39319.5	39309.2	39295.8	39284.4	39276.0	39274.9	39273.9	39273.6	39275.4	39276.4	39276.7	39277.9	39280.4	39280.0	39281.3	39282.1	39283.5	39286.0	39290.9	39297.3	39294.5

Tabel 80 Nilai Variasi harian komponen Y – east (nT) September 2019

Tondano Magnetic Observatory

September 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	403.6	397.9	392.2	386.8	383.4	398.9	413.6	418.6	420.7	415.8	409.4	407.7	402.7	405.0	401.7	403.9	407.7	409.9	411.7	412.0	408.8	415.9	422.7	417.9	407.0
2	411.2	402.2	397.1	391.3	394.8	406.5	417.5	417.5	416.1	413.8	410.9	409.3	410.5	407.9	407.0	409.4	410.7	409.5	411.4	408.0	408.9	416.7	420.7	407.4	409.0
3	392.2	380.7	371.9	374.9	382.0	397.5	412.8	420.3	421.4	417.1	412.4	409.8	409.4	407.6	408.7	410.1	410.6	413.7	414.1	414.4	417.9	421.3	426.6	417.5	406.9
4	400.2	387.3	378.5	375.5	381.5	391.8	407.3	418.8	424.7	422.7	414.6	410.7	409.3	408.0	407.5	406.6	409.3	410.0	411.0	412.8	415.3	419.9	430.3	422.3	407.3
5	409.8	395.2	381.7	380.9	385.4	398.2	412.4	419.3	416.5	415.0	411.9	408.7	407.6	407.0	406.2	408.6	411.5	411.2	412.0	412.4	412.8	417.8	419.8	409.2	407.1
6	397.0	385.4	378.2	386.8	401.6	415.6	424.1	426.5	421.2	417.4	413.6	409.8	408.8	408.9	409.5	409.3	408.8	407.9	407.8	409.3	409.7	414.3	415.9	405.2	408.0
7	396.8	392.3	391.5	398.1	409.1	419.1	424.0	422.2	415.9	414.2	413.7	412.6	411.6	408.9	407.3	407.6	408.9	411.0	412.8	410.8	414.0	415.2	416.3	404.1	409.9
8	391.7	391.5	388.8	395.3	405.6	415.5	422.3	421.8	420.3	419.1	412.8	408.6	406.6	405.1	404.6	405.4	406.4	409.5	411.0	410.4	412.5	416.0	417.0	403.9	408.4
9	388.7	380.0	379.0	383.8	392.9	405.2	415.8	417.2	418.0	418.4	411.7	404.0	403.5	404.2	406.8	405.3	405.8	407.3	412.3	414.9	417.4	424.7	426.8	416.7	406.7
10	403.7	394.8	389.2	389.2	395.9	406.1	413.4	417.0	418.9	415.8	410.8	409.6	407.4	406.7	408.3	409.2	410.2	410.9	411.1	411.1	411.3	411.9	410.8	405.5	407.5
11	399.9	397.4	402.1	404.8	410.6	414.0	416.6	418.3	416.9	415.6	410.3	408.7	407.8	408.8	408.7	409.8	409.3	410.5	411.3	410.7	410.8	411.4	411.7	402.3	409.5
12	398.8	398.4	405.3	410.2	416.6	420.4	425.1	426.0	421.1	417.0	410.6	407.8	407.0	407.7	407.9	408.8	408.6	410.0	413.3	414.6	415.2	418.6	424.6	423.1	413.2
13	-	-	-	-	-	-	422.2	418.6	415.9	416.5	411.8	410.1	409.1	409.1	408.9	409.2	409.2	409.2	408.9	409.8	410.9	411.5	408.9	399.3	411.0
14	393.9	389.1	386.3	392.6	406.3	411.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	396.6
15	-	-	402.7	414.1	421.7	426.6	427.6	423.5	416.6	415.1	412.2	409.4	409.1	409.3	410.2	411.1	409.7	412.9	413.0	415.6	413.3	417.6	415.4	403.0	414.1
16	388.5	375.7	370.6	375.3	387.5	402.1	419.8	428.0	426.1	420.2	413.4	410.1	409.2	409.3	410.0	409.9	407.9	410.3	410.0	413.2	412.3	419.1	424.6	411.2	406.8
17	392.3	382.5	373.8	371.8	378.1	389.6	399.4	399.4	413.8	416.3	411.8	-	-	-	-	-	-	-	-	-	-	-	-	-	393.5
18	-	397.9	395.2	401.2	401.2	407.0	414.2	422.5	417.9	412.9	409.9	408.5	405.9	408.0	408.9	409.9	409.4	409.1	409.9	407.2	405.9	407.6	404.5	394.1	407.3
19	391.7	391.8	391.7	395.8	395.7	401.1	411.0	419.3	414.3	412.9	410.3	409.0	409.4	409.8	410.9	411.5	412.2	411.3	410.5	409.5	410.0	411.6	407.5	397.3	406.5
20	397.2	400.4	404.8	405.3	405.2	400.8	404.6	408.3	414.4	414.5	410.3	409.7	409.9	410.9	411.3	411.5	411.4	411.3	410.6	410.3	410.3	409.7	412.6	411.8	408.6
21	408.6	405.1	402.7	397.2	397.1	390.8	400.3	412.1	412.1	411.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	403.8
22	-	394.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	394.5
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	398.1	392.0	389.2	391.6	397.6	405.9	415.2	418.8	418.1	416.1	411.7	409.1	408.0	407.9	408.0	408.7	409.3	410.3	411.3	411.5	412.1	415.6	417.6	408.4	406.5

Tabel 81 Nilai Variasi harian komponen D – declination (menit) September 2019

Tondano Magnetic Observatory																							September 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	35.34	34.83	34.33	33.86	33.59	34.96	36.26	36.71	36.88	36.44	35.88	35.72	35.28	35.49	35.21	35.39	35.71	35.91	36.05	36.08	35.81	36.43	37.01	36.60	35.66
2	36.01	35.21	34.75	34.24	34.55	35.59	36.56	36.57	36.44	36.25	35.99	35.85	35.95	35.72	35.64	35.86	35.97	35.87	36.02	35.73	35.81	36.5	36.8	35.7	35.81
3	34.3	33.3	32.5	32.80	33.42	34.79	36.14	36.81	36.91	36.54	36.12	35.89	35.85	35.68	35.78	35.91	35.95	36.22	36.26	36.28	36.59	36.88	37.35	36.54	35.62
4	35.03	33.89	33.12	32.85	33.38	34.29	35.66	36.68	37.20	37.03	36.31	35.96	35.84	35.72	35.68	35.60	35.83	35.90	35.99	36.14	36.35	36.76	37.67	36.95	35.66
5	35.85	34.6	33.4	33.3	33.7	34.88	36.13	36.74	36.49	36.36	36.08	35.79	35.70	35.64	35.58	35.78	36.03	36.00	36.07	36.10	36.15	36.58	36.75	35.82	35.65
6	34.74	33.71	33.08	33.83	35.13	36.37	37.1	37.3	36.9	36.6	36.2	35.9	35.8	35.9	35.8	35.8	35.8	35.7	35.7	35.8	35.9	36.3	36.40	35.46	35.72
7	34.71	34.30	34.22	34.80	35.77	36.65	37.10	37.0	36.4	36.3	36.23	36.14	36.04	35.81	35.65	35.68	35.80	35.98	36.14	35.96	36.25	36.35	36.44	35.36	35.88
8	34.27	34.24	34.00	34.57	35.46	36.34	36.96	36.94	36.82	36.71	36.15	35.78	35.61	35.47	35.43	35.50	35.58	35.86	35.99	35.94	36.11	36.42	36.50	35.36	35.75
9	34.0	33.3	33.2	33.6	34.4	35.5	36.4	36.5	36.6	36.6	36.06	35.41	35.36	35.40	35.63	35.50	35.53	35.67	36.10	36.33	36.54	37.18	37.37	36.48	35.61
10	35.33	34.55	34.06	34.05	34.64	35.55	36.19	36.51	36.67	36.40	35.97	35.86	35.67	35.62	35.76	35.83	35.92	35.97	36.00	35.99	36.01	36.06	35.97	35.49	35.67
11	34.99	34.76	35.17	35.40	35.91	36.22	36.46	36.63	36.51	36.39	35.93	35.79	35.71	35.80	35.79	35.9	35.8	35.9	36.0	36.0	36.0	36.0	36.0	35.22	35.85
12	34.90	34.86	35.45	35.88	36.44	36.78	37.21	37.29	36.87	36.52	35.96	35.72	35.64	35.69	35.71	35.79	35.77	35.89	36.19	36.29	36.35	36.64	37.15	37.01	36.17
13	-	-	-	-	-	-	36.94	36.63	36.40	36.45	36.05	35.90	35.81	35.82	35.80	35.82	35.82	35.82	35.80	35.88	35.97	36.02	35.79	34.95	35.98
14	34.46	34.03	33.78	34.32	35.53	36.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.69
15	-	-	35.18	36.19	36.87	37.31	37.41	37.07	36.47	36.34	36.09	35.84	35.81	35.83	35.91	35.98	35.86	36.14	36.15	36.38	36.18	36.55	36.36	35.26	36.24
16	33.98	32.85	32.41	32.83	33.88	35.17	36.73	37.44	37.29	36.78	36.19	35.90	35.82	35.83	35.89	35.88	35.71	35.92	35.89	36.16	36.09	36.68	37.15	35.98	35.60
17	34.31	33.45	32.68	32.50	33.1	34.1	34.9	34.9	36.2	36.43	36.04	-	-	-	-	-	-	-	-	-	-	-	-	-	34.42
18	-	34.79	34.55	35.08	35.08	35.59	36.23	36.97	36.59	36.15	35.88	35.76	35.54	35.72	35.80	35.88	35.85	35.82	35.88	35.65	35.53	35.68	35.40	34.48	35.65
19	34.26	34.26	34.25	34.60	34.60	35.07	35.95	36.68	36.27	36.14	35.91	35.80	35.83	35.87	35.96	36.02	36.08	36.00	35.93	35.85	35.88	36.02	35.65	34.76	35.57
20	34.73	35.00	35.38	35.43	35.43	35.05	35.39	35.72	36.27	36.28	35.91	35.86	35.88	35.97	36.00	36.01	36.01	36.00	35.93	35.91	35.90	35.85	36.10	36.02	35.75
21	35.73	35.41	35.20	34.71	34.71	34.16	34.99	36.04	36.07	36.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.30
22	-	34.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34.51
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	34.83	34.29	34.03	34.24	34.78	35.51	36.34	36.66	36.61	36.43	36.05	35.83	35.73	35.72	35.73	35.79	35.84	35.92	36.01	36.03	36.08	36.38	36.55	35.74	35.58

Tabel 82 Nilai variasi harian komponen I – inclination (derajat) September 2019

Tondano Magnetic Observatory																								September 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.97	-12.97	-12.97	-12.96	-12.96	-12.98	-13.00	-13.00	-12.99	-12.98	-12.98	-12.98	-12.97	-12.98	-12.98	-12.98	-12.98	-12.98	-12.98	-12.97	-12.97	-12.98	-12.98	-12.98	-12.98
2	-12.98	-12.97	-12.96	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-13.0	-13.0	-13.0	-12.97
3	-13.0	-12.9	-12.9	-12.93	-12.93	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
4	-12.96	-12.95	-12.94	-12.94	-12.93	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.97	-12.96
5	-12.96	-12.95	-12.94	-12.93	-12.93	-12.94	-12.96	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
6	-12.96	-12.95	-12.93	-12.93	-12.94	-12.96	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97	-12.96	-12.96
7	-12.95	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
8	-12.95	-12.95	-12.94	-12.93	-12.94	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96
9	-13.0	-13.0	-13.0	-13.0	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96	-12.97	-12.98	-12.98	-12.98	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.98	-12.98	-12.98	-12.97
10	-12.97	-12.97	-12.95	-12.94	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96
11	-12.95	-12.94	-12.93	-12.93	-12.92	-12.93	-12.94	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95	-12.96
12	-12.94	-12.93	-12.93	-12.92	-12.92	-12.92	-12.94	-12.95	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.95
13	-	-	-	-	-	-	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96
14	-12.95	-12.93	-12.92	-12.92	-12.92	-12.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.93
15	-	-	-12.92	-12.94	-12.94	-12.96	-12.96	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.96	-12.97	-12.96	-12.97	-12.96	-12.95	-12.96
16	-12.94	-12.93	-12.92	-12.92	-12.93	-12.94	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.96	-12.97	-12.96	-12.97	-12.97	-12.97	-12.95
17	-12.96	-12.95	-12.94	-12.93	-12.9	-12.9	-12.9	-12.9	-13.0	-12.96	-12.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.95
18	-	-12.94	-12.93	-12.92	-12.92	-12.92	-12.92	-12.94	-12.95	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.96	-12.97	-12.97	-12.96	-12.96	-12.97	-12.96	-12.96	-12.95
19	-12.95	-12.94	-12.93	-12.91	-12.92	-12.91	-12.93	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.96	-12.95	-12.95
20	-12.94	-12.93	-12.93	-12.93	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.95
21	-12.95	-12.95	-12.94	-12.94	-12.94	-12.93	-12.94	-12.95	-12.96	-12.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.95
22	-	-12.95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.95
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-12.96	-12.95	-12.94	-12.93	-12.93	-12.94	-12.95	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96

2. Gangguan badai magnet

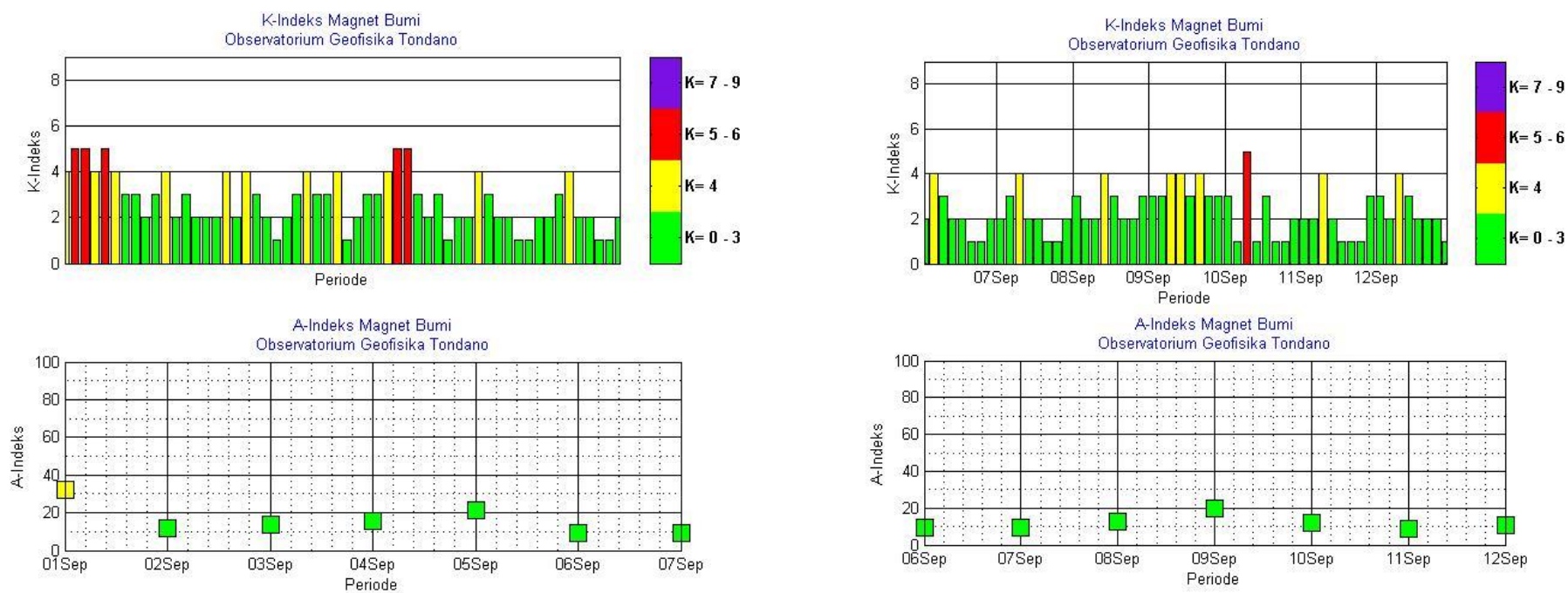
Tabel 83 Monitoring waktu gangguan
pada pengamatan magnet bumi September 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	9	2019	3	19	0	10j43m	Badai Kecil
2	2	9	2019					
3	3	9	2019					
4	4	9	2019					
5	5	9	2019					
6	6	9	2019					
7	7	9	2019					
8	8	9	2019					
9	9	9	2019					
10	10	9	2019					
11	11	9	2019					
12	12	9	2019					
13	13	9	2019					
14	14	9	2019					
15	15	9	2019					
16	16	9	2019					
17	17	9	2019					
18	18	9	2019					
19	19	9	2019					
20	20	9	2019					
21	21	9	2019					
22	22	9	2019					
23	23	9	2019					
24	24	9	2019					
25	25	9	2019					
26	26	9	2019					
27	27	9	2019					
28	28	9	2019					
29	29	9	2019					
30	30	9	2019					

Tabel 84 Hasil analisa K-indeks dan A-indeks September 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	4	5	5	4	5	4	3	3	31.875	Badai Kecil
2	2	3	4	2	3	2	2	2	11.5	Tenang
3	4	2	4	3	2	1	2	3	13.5	Tenang
4	4	3	3	4	1	2	3	3	15.5	Tenang
5	4	5	5	3	2	3	1	2	21.25	Tenang
6	2	4	3	2	2	1	1	2	9.5	Tenang
7	2	3	4	2	2	1	1	2	9.5	Tenang
8	3	2	2	4	3	2	2	3	12.5	Tenang
9	3	3	4	4	3	4	3	3	19.5	Tenang
10	3	1	5	1	3	1	1	2	12.125	Tenang
11	2	2	4	2	1	1	1	3	9	Tenang
12	3	2	4	3	2	2	2	1	11	Tenang
13	0	0	4	1	2	1	2	2	6.75	Tenang
14	4	4	0	0	0	0	0	0	6.75	Tenang
15	1	4	4	3	2	2	3	2	13.5	Tenang
16	4	3	4	2	2	2	1	2	12.5	Tenang
17	6	3	4	1	0	0	0	0	15.625	Tenang
18	3	3	3	3	2	1	2	2	10.5	Tenang
19	2	3	4	2	2	1	2	2	10	Tenang
20	3	3	4	1	2	2	2	2	11	Tenang
21	3	2	2	2	0	0	0	0	4.5	Tenang
22	4	0	0	0	0	0	0	0	3.375	Eda2Gdas Eror
23	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
24	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
25	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
26	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
27	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
28	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
29	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror
30	0	0	0	0	0	0	0	0	0	Eda2Gdas Eror

Gambar 30 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan September 2019



Tabel 86 Nilai variasi harian komponen Z – vertical (nT) Oktober 2019

Tondano Magnetic Observatory																							Oktober 2019			
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS	
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9046.0	-9043.6	-9044.8	
2	-9039.6	-9036.1	-9036.3	-9039.7	-9041.1	-9036.2	-9032.5	-9034.8	-9034.8	-9040.4	-9040.3	-9041.1	-9041.0	-9039.4	-9044.3	-9043.0	-9042.9	-9042.1	-9046.1	-9043.4	-9041.9	-9040.3	-9042.3	-9039.7	-9040.0	
3	-9037.4	-9033.9	-9031.3	-9038.9	-9042.0	-9038.0	-9037.0	-9043.5	-9043.5	-9040.6	-9041.5	-9040.6	-9040.8	-9041.7	-9041.3	-9041.4	-9041.9	-9042.0	-9041.6	-9041.8	-9043.2	-9040.5	-9040.8	-9038.0	-9040.1	
4	-9036.0	-9034.3	-9029.6	-9029.6	-9030.6	-9031.6	-9038.8	-9032.0	-9032.0	-9042.7	-9043.4	-9039.7	-9037.4	-9038.4	-9038.9	-9039.2	-9043.8	-9044.0	-9044.2	-9042.8	-9043.1	-9043.8	-9048.5	-9047.9	-9038.8	
5	-9048.2	-9043.0	-9037.6	-9035.1	-9029.7	-9032.1	-9035.4	-9037.3	-9037.3	-9040.5	-9040.3	-9041.5	-9041.7	-9040.7	-9042.0	-9042.4	-9040.6	-9042.4	-9044.9	-9041.1	-9044.1	-9045.7	-9046.7	-9051.0	-9040.9	
6	-9049.2	-9046.1	-9041.6	-9042.2	-9043.6	-9041.7	-9042.4	-9043.8	-9043.8	-9042.6	-9042.8	-9043.4	-9042.0	-9041.6	-9042.4	-9043.6	-9041.2	-9040.9	-9041.1	-9040.9	-9041.6	-9043.5	-9047.3	-9050.8	-9043.3	
7	-9047.0	-9042.4	-9039.3	-9036.6	-9040.0	-9047.6	-9046.9	-9046.4	-9046.4	-9042.2	-9041.3	-9041.9	-9041.1	-9041.3	-9041.4	-9045.0	-9044.0	-9043.4	-9043.7	-9044.2	-9041.3	-9041.8	-9039.3	-9038.1	-9042.6	
8	-9038.6	-9032.6	-9035.9	-9036.4	-9040.4	-9044.2	-9045.8	-9044.7	-9044.7	-9041.8	-9042.1	-9042.7	-9040.4	-9042.1	-9042.5	-9041.3	-9043.9	-9044.1	-9042.1	-9042.0	-9040.9	-9040.7	-9046.2	-9044.0	-9041.7	
9	-9038.6	-9035.5	-9037.5	-9035.9	-9035.2	-9037.6	-9039.3	-9037.1	-9037.1	-9036.6	-9033.3	-9044.0	-9043.9	-9045.9	-9048.6	-	-	-	-	-	-	-	-	-	-9039.1	
10	-	-	-	-	-	-9043.2	-9042.8	-9041.9	-9041.9	-9043.1	-9041.5	-9040.9	-9041.8	-9041.1	-9041.6	-9039.3	-9044.2	-9042.2	-9042.5	-9042.4	-9042.5	-9042.7	-9044.3	-9044.8	-9042.4	
11	-9040.6	-9041.0	-9041.8	-9042.7	-9039.5	-9038.7	-9038.3	-9038.5	-9038.5	-9043.0	-9042.1	-9041.7	-9040.9	-9041.7	-9041.0	-9043.4	-9043.6	-9042.1	-9045.0	-9042.3	-9043.2	-9043.2	-9042.8	-9039.7	-9041.5	
12	-9037.4	-	-9031.3	-9033.5	-9042.7	-9049.2	-9052.0	-9047.7	-9047.7	-9040.5	-9039.2	-9037.9	-9038.9	-9040.4	-9040.3	-9042.9	-9042.1	-9040.8	-9043.2	-9045.3	-9044.1	-9044.9	-9045.5	-9041.0	-9042.1	
13	-9035.2	-9027.0	-9029.3	-9030.3	-9030.8	-9031.2	-9033.0	-9036.6	-9036.6	-9041.2	-9039.6	-9041.0	-9041.7	-9039.6	-9039.2	-9040.3	-9040.6	-9039.7	-9041.4	-9041.2	-9042.2	-9045.1	-9048.4	-9048.0	-9038.3	
14	-9043.9	-9038.8	-9033.2	-9035.0	-9036.0	-9037.6	-9037.0	-9042.5	-9042.5	-9041.8	-9040.6	-9041.2	-9040.4	-9039.7	-9039.4	-9041.5	-9041.6	-9044.4	-9044.9	-9046.1	-9044.9	-9041.6	-9042.8	-9041.7	-9040.8	
15	-9040.6	-9035.8	-9029.7	-9033.0	-9037.9	-9036.7	-	-	-	-	-	-9039.5	-9039.3	-9039.5	-9039.7	-9040.2	-9042.1	-9041.9	-9040.7	-9042.7	-9043.4	-9042.0	-9038.0	-9035.9	-9038.9	
16	-9030.1	-9027.1	-9026.8	-9030.0	-9027.6	-9030.3	-9034.1	-9032.4	-9032.4	-9037.5	-9038.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-9031.5	
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-9038.6	-9041.2	-9043.7	-9044.7	-9043.7	-9045.1	-9042.8
19	-9044.0	-9038.0	-9034.0	-9029.5	-9029.5	-9030.6	-9034.7	-9036.4	-9036.4	-9039.7	-9037.7	-9038.6	-9041.9	-9042.4	-9039.9	-9042.3	-9042.3	-9039.8	-9042.5	-9040.7	-9040.7	-9041.8	-9042.3	-9045.5	-9038.8	
20	-9042.8	-9041.7	-9040.4	-9039.8	-9039.8	-9039.2	-9041.2	-9041.2	-9041.2	-9040.0	-9041.6	-9042.4	-9042.1	-9041.5	-9039.7	-9041.5	-9042.2	-9041.3	-9041.4	-9041.1	-9043.0	-9038.7	-9041.3	-9042.1	-9041.1	
21	-9044.4	-9046.2	-9044.1	-9040.7	-9040.7	-9040.4	-9039.9	-9041.9	-9041.9	-9038.3	-9042.7	-9041.2	-9039.9	-9039.6	-9038.4	-9039.6	-9039.6	-9040.7	-9040.2	-9040.8	-9039.9	-9041.9	-9042.1	-9040.4	-9041.1	
22	-9036.2	-9033.2	-9031.4	-9029.8	-9029.8	-9029.0	-9028.9	-9036.1	-9036.1	-9035.5	-9036.6	-9037.3	-9039.1	-9039.3	-9040.1	-9040.2	-9039.7	-9041.1	-9040.0	-9040.7	-9041.4	-9042.9	-9045.0	-9044.5	-9037.3	
23	-9043.0	-9039.5	-9036.8	-9035.4	-9035.4	-9033.8	-9038.0	-9040.0	-9040.0	-9038.5	-9038.9	-9040.0	-9039.7	-9038.7	-9039.2	-9039.2	-9039.5	-9041.3	-9040.7	-9039.7	-9039.7	-9043.4	-9048.0	-9051.7	-9040.0	
24	-9049.6	-9043.1	-9039.3	-9029.6	-9029.6	-9028.3	-9033.4	-9037.2	-9037.2	-9034.0	-9026.9	-9035.8	-9035.6	-9042.7	-9041.9	-9044.2	-9045.9	-9035.7	-9039.4	-9043.3	-9039.7	-9041.1	-9039.5	-9049.7	-9038.5	
25	-9051.9	-9047.6	-9043.6	-9041.7	-9041.7	-9042.5	-9040.6	-9042.4	-9042.4	-9043.7	-9044.6	-9041.4	-9042.1	-9046.5	-9037.5	-9039.9	-9042.1	-9043.6	-9042.7	-9043.6	-9042.8	-9044.7	-9042.2	-9040.3	-9043.0	
26	-9040.9	-9041.8	-9040.3	-9046.6	-9046.6	-9043.7	-9042.0	-9039.7	-9039.7	-9035.6	-9036.9	-9043.8	-9040.6	-9038.4	-9041.4	-9048.4	-9039.1	-9041.6	-9043.5	-9039.7	-9040.8	-9038.6	-9034.1	-9033.2	-9040.7	
27	-9030.4	-9025.6	-9031.4	-9033.4	-9033.4	-9036.9	-9036.5	-9038.4	-9038.4	-9039.4	-9037.9	-9037.2	-9039.1	-9041.0	-9040.1	-9043.2	-9039.8	-9039.7	-9042.9	-9040.0	-9040.0	-9040.5	-9041.9	-9043.5	-9037.9	
28	-9041.2	-9037.4	-9037.6	-9037.9	-9037.9	-9038.5	-9045.9	-9042.7	-9042.7	-9044.8	-9046.1	-9041.9	-9040.6	-9041.4	-9041.9	-9045.1	-9046.3	-9044.5	-9047.0	-9041.6	-9041.3	-9042.0	-9040.3	-9038.1	-9041.9	
29	-9033.3	-9037.4	-9036.2	-9036.9	-9036.9	-9039.6	-9043.4	-9040.1	-9040.1	-9038.5	-9039.2	-9039.5	-9040.3	-9039.3	-9038.5	-9040.5	-	-	-	-	-	-	-	-	-9038.7	
30	-9040.1	-9036.6	-9031.4	-9031.7	-9031.7	-9036.2	-9042.0	-9038.6	-9038.5	-9038.2	-9037.4	-9037.2	-9037.2	-9036.2	-9040.1	-9040.0	-9041.4	-9043.8	-9041.7	-9041.7	-9041.8	-9043.3	-9047.6	-9045.2	-9039.2	
31	-9040.6	-9047.5	-9046.7	-9036.6	-9033.0	-9032.1	-9036.1	-9037.1	-9038.6	-9039.5	-9037.3	-9037.9	-9038.4	-9038.0	-9038.1	-9038.1	-9040.6	-9041.1	-9039.1	-9038.3	-9038.6	-9041.6	-9045.5	-9046.3	-9039.4	
HOURLY MEANS	-9040.8	-9038.0	-9036.1	-9035.9	-9036.4	-9037.4	-9039.2	-9039.7	-9039.7	-9040.0	-9039.6	-9040.4	-9040.3	-9040.7	-9040.7	-9041.8	-9042.0	-9041.8	-9042.4	-9041.9	-9041.9	-9042.3	-9043.4	-9043.3	-9040.2	

Tabel 89 Nilai Variasi harian komponen Y – east (nT) Oktober 2019

Tondano Magnetic Observatory																							Oktober 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	401.3	394.5	397.9
2	389.1	389.5	399.1	413.0	416.5	411.1	412.9	413.6	409.5	409.1	405.7	405.4	404.5	404.1	407.1	408.1	408.1	407.8	411.4	408.1	405.6	402.4	401.0	392.8	405.7
3	389.7	391.6	395.1	403.0	408.5	410.7	416.0	420.1	412.0	410.8	409.0	407.4	406.3	406.7	406.1	406.5	407.8	407.7	406.8	406.3	406.5	404.6	402.8	392.6	405.6
4	387.5	388.9	389.8	393.3	401.2	407.5	418.3	418.0	416.5	414.6	412.0	407.9	406.5	406.3	406.0	404.0	408.5	409.8	408.7	407.7	408.9	410.4	411.9	399.4	406.0
5	392.6	390.2	395.9	407.7	409.4	415.9	415.3	412.8	409.9	408.2	406.5	407.3	407.0	405.6	406.9	406.9	404.8	406.4	409.7	406.7	407.6	411.7	411.3	407.9	406.9
6	403.0	412.5	418.2	417.3	420.3	414.6	414.0	414.3	408.9	408.5	407.8	406.4	404.5	404.4	404.3	404.4	404.4	404.3	404.2	403.3	403.1	406.4	406.6	398.8	408.1
7	390.1	390.1	399.1	404.0	407.3	414.3	415.3	410.6	407.6	408.3	407.9	407.1	407.1	406.5	406.2	408.1	406.7	406.2	404.4	404.5	403.1	404.1	399.4	391.0	404.5
8	385.6	381.6	394.4	405.0	413.6	416.4	415.1	411.9	407.0	409.5	409.1	408.3	406.2	406.3	405.8	405.3	408.7	407.3	405.7	404.7	403.3	403.1	405.7	397.8	404.9
9	395.2	398.0	405.6	410.2	411.9	412.2	413.7	409.4	408.7	406.5	398.2	400.4	399.7	404.4	409.9	-	-	-	-	-	-	-	-	-	405.6
10	-	-	-	-	-	429.2	426.2	422.2	413.8	411.5	409.0	406.3	405.0	403.7	402.5	400.2	401.9	402.9	403.1	403.2	403.3	404.7	407.7	403.1	408.4
11	397.1	396.5	397.9	405.2	406.3	405.3	405.2	405.3	407.1	409.5	406.2	404.7	404.2	404.9	402.8	402.4	404.8	403.5	405.2	404.5	404.9	404.0	402.6	398.8	403.7
12	399.2	-	402.7	407.3	413.9	419.4	422.2	416.9	412.5	409.7	406.7	404.8	403.2	403.0	402.7	405.5	404.5	402.4	404.9	406.6	406.2	409.5	407.0	391.5	407.1
13	378.5	376.2	389.9	402.9	410.3	412.7	411.1	405.1	406.7	411.5	406.2	407.0	407.7	405.0	404.2	404.8	404.5	403.5	404.6	403.9	405.1	410.1	410.7	405.1	403.6
14	401.1	395.4	389.9	397.7	410.2	414.1	411.6	408.9	404.4	406.7	405.7	406.9	405.5	404.8	406.5	404.9	406.0	409.4	411.5	412.7	412.1	409.9	401.5	388.7	405.2
15	388.2	392.1	394.1	400.7	408.5	411.6	-	-	-	-	-	407.7	405.4	405.3	405.2	406.6	407.4	405.7	404.4	408.0	407.6	404.4	392.9	383.8	402.1
16	386.4	396.0	406.3	418.2	426.6	428.6	425.6	416.6	410.5	408.0	406.3	-	-	-	-	-	-	-	-	-	-	-	-	-	411.7
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	390.2	392.6	397.4	400.0	400.0	404.2	407.1	406.1	404.7	405.7	403.6	402.8	405.4	405.4	403.1	405.1	406.5	404.5	405.4	403.0	401.4	403.2	399.9	395.0	402.2
20	389.9	390.6	392.0	398.3	398.2	402.9	407.6	410.5	410.9	411.0	409.9	409.4	408.4	405.6	402.1	403.2	403.9	403.4	402.7	404.0	407.6	406.9	401.3	387.8	402.8
21	385.3	392.8	399.3	404.7	404.7	407.3	409.4	411.7	411.2	407.5	408.5	407.3	404.6	403.3	402.8	403.0	402.6	403.6	402.7	403.0	401.8	403.5	397.3	383.9	402.6
22	379.6	380.2	388.0	400.1	400.0	409.4	414.3	417.4	409.0	407.2	406.4	404.6	403.4	402.7	403.1	403.2	402.9	404.0	403.5	404.7	404.0	406.6	401.3	388.0	401.8
23	384.2	383.0	384.9	396.3	396.1	410.2	414.6	414.7	409.1	406.6	404.6	404.4	403.1	402.2	402.3	402.3	402.1	404.1	402.9	402.5	403.4	407.6	403.5	388.6	401.4
24	376.7	372.2	377.8	388.0	387.9	399.7	405.9	413.0	414.8	411.3	403.2	400.6	397.9	401.0	399.7	398.9	402.5	396.5	395.4	397.2	399.4	400.5	392.9	392.3	396.9
25	389.3	386.1	386.9	397.5	397.4	407.6	409.5	418.9	416.8	415.6	412.8	409.4	405.1	403.2	398.7	398.5	398.9	401.9	402.9	404.5	402.4	401.9	395.4	389.8	402.1
26	390.9	391.6	393.5	401.1	401.0	404.1	403.7	407.1	417.0	414.1	408.9	409.0	403.9	400.1	398.1	399.2	397.0	397.2	397.7	396.9	396.9	394.4	388.2	386.1	399.9
27	386.3	382.9	390.5	395.1	395.1	397.7	404.0	410.0	410.0	410.1	404.5	402.3	401.3	400.2	398.4	400.7	397.6	397.0	398.8	398.0	398.3	400.2	399.8	397.6	399.0
28	394.8	389.3	390.0	396.2	396.1	403.5	414.1	410.6	400.7	400.8	404.1	402.0	398.8	397.2	396.9	400.8	403.2	401.5	403.3	398.8	398.7	396.8	392.2	386.2	399.0
29	382.7	386.4	389.3	395.4	395.3	399.9	405.0	401.1	402.0	402.9	401.6	401.2	402.6	401.1	399.1	399.6	-	-	-	-	-	-	-	-	397.8
30	372.6	369.0	369.3	385.7	385.6	399.6	405.4	404.4	403.5	403.0	401.7	401.7	399.2	395.5	394.7	398.0	400.7	402.5	402.0	402.8	399.1	400.6	395.8	384.1	394.9
31	381.1	388.9	393.1	396.3	399.8	401.4	400.7	400.2	405.5	408.8	405.2	403.8	402.5	402.0	401.7	400.6	401.7	401.5	399.0	397.3	396.8	401.1	404.7	402.1	399.8
HOURLY MEANS	388.4	388.6	393.7	401.5	404.5	409.7	412.0	411.5	409.3	408.8	406.3	405.4	404.0	403.4	402.9	403.1	403.9	403.8	403.9	403.6	403.4	404.3	401.2	393.3	402.9

Tabel 90 Nilai Variasi harian komponen D – declination (menit) Oktober 2019

Tondano Magnetic Observatory

Oktober 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.1	34.5	34.83
2	34.0	34.1	34.9	36.1	36.4	36.0	36.1	36.2	35.9	35.8	35.5	35.5	35.4	35.4	35.6	35.7	35.7	35.7	36.0	35.7	35.5	35.2	35.1	34.4	35.50
3	34.1	34.2	34.5	35.2	35.7	35.9	36.4	36.8	36.1	36.0	35.8	35.7	35.6	35.6	35.5	35.6	35.7	35.7	35.6	35.6	35.6	35.4	35.2	34.3	35.49
4	33.9	34.0	34.1	34.4	35.1	35.6	36.6	36.6	36.4	36.3	36.0	35.7	35.6	35.6	35.5	35.4	35.8	35.9	35.8	35.7	35.8	35.9	36.0	34.9	35.52
5	34.3	34.1	34.6	35.6	35.8	36.4	36.3	36.1	35.9	35.7	35.6	35.6	35.6	35.5	35.6	35.6	35.4	35.6	35.9	35.6	35.7	36.0	36.0	35.7	35.60
6	35.2	36.1	36.6	36.5	36.8	36.3	36.2	36.3	35.8	35.8	35.7	35.6	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.3	35.3	35.6	35.6	34.9	35.71
7	34.1	34.1	34.9	35.3	35.6	36.2	36.3	35.9	35.7	35.7	35.7	35.6	35.6	35.6	35.6	35.7	35.6	35.6	35.4	35.4	35.3	35.4	34.9	34.2	35.40
8	33.7	33.4	34.5	35.4	36.2	36.4	36.3	36.1	35.6	35.8	35.8	35.7	35.6	35.6	35.5	35.5	35.8	35.6	35.5	35.4	35.3	35.3	35.5	34.8	35.43
9	34.6	34.8	35.5	35.8	36.0	36.1	36.2	35.8	35.8	35.6	34.9	35.1	35.0	35.4	35.9	-	-	-	-	-	-	-	-	-	35.49
10	-	-	-	-	-	37.5	37.3	37.0	36.2	36.0	35.8	35.6	35.5	35.3	35.2	35.0	35.2	35.3	35.3	35.3	35.3	35.4	35.7	35.3	35.75
11	34.7	34.7	34.8	35.4	35.5	35.5	35.5	35.5	35.6	35.9	35.6	35.4	35.4	35.4	35.3	35.2	35.4	35.3	35.5	35.4	35.4	35.4	35.2	34.9	35.33
12	34.9	-	35.2	35.6	36.2	36.7	36.9	36.5	36.1	35.9	35.6	35.4	35.3	35.3	35.3	35.5	35.4	35.2	35.4	35.6	35.5	35.8	35.6	34.3	35.62
13	33.1	32.9	34.1	35.2	35.9	36.1	36.0	35.5	35.6	36.0	35.5	35.6	35.7	35.4	35.4	35.4	35.4	35.3	35.4	35.4	35.4	35.9	35.9	35.4	35.32
14	35.1	34.6	34.1	34.8	35.9	36.2	36.0	35.8	35.4	35.6	35.5	35.6	35.5	35.4	35.6	35.4	35.5	35.8	36.0	36.1	36.1	35.9	35.1	34.0	35.45
15	33.9	34.3	34.4	35.0	35.7	36.0	-	-	-	-	-	35.7	35.5	35.5	35.5	35.6	35.6	35.5	35.4	35.7	35.7	35.4	34.4	33.6	35.17
16	33.8	34.6	35.5	36.5	37.3	37.5	37.2	36.5	35.9	35.7	35.6	-	-	-	-	-	-	-	-	-	-	-	-	-	36.01
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.0	35.1	35.2	35.1	34.7	34.89
19	34.1	34.3	34.7	35.0	35.0	35.3	35.6	35.5	35.4	35.5	35.3	35.3	35.5	35.5	35.3	35.5	35.6	35.4	35.5	35.3	35.1	35.3	35.0	34.6	35.19
20	34.1	34.2	34.3	34.8	34.8	35.2	35.7	35.9	36.0	36.0	35.9	35.8	35.7	35.5	35.2	35.3	35.3	35.3	35.2	35.3	35.7	35.6	35.1	33.9	35.25
21	33.7	34.4	34.9	35.4	35.4	35.6	35.8	36.0	36.0	35.7	35.7	35.6	35.4	35.3	35.2	35.3	35.2	35.3	35.2	35.3	35.2	35.3	34.8	33.6	35.22
22	33.2	33.2	33.9	35.0	35.0	35.8	36.2	36.5	35.8	35.6	35.6	35.4	35.3	35.2	35.3	35.3	35.3	35.4	35.3	35.4	35.4	35.6	35.1	33.9	35.15
23	33.6	33.5	33.6	34.6	34.6	35.9	36.3	36.3	35.8	35.6	35.4	35.4	35.3	35.2	35.2	35.2	35.2	35.4	35.3	35.2	35.3	35.7	35.3	34.0	35.12
24	32.9	32.5	33.0	33.9	33.9	34.9	35.5	36.1	36.3	36.0	35.3	35.1	34.9	35.1	35.0	34.9	35.2	34.7	34.6	34.8	34.9	35.0	34.4	34.3	34.72
25	34.1	33.8	33.8	34.8	34.8	35.7	35.8	36.7	36.5	36.4	36.2	35.9	35.5	35.3	34.9	34.9	34.9	35.2	35.3	35.4	35.2	35.2	34.6	34.1	35.21
26	34.2	34.3	34.4	35.1	35.1	35.4	35.3	35.6	36.5	36.3	35.8	35.8	35.4	35.1	34.9	35.0	34.8	34.8	34.8	34.8	34.8	34.5	34.0	33.8	35.02
27	33.8	33.5	34.2	34.6	34.6	34.8	35.4	35.9	35.9	35.9	35.4	35.2	35.1	35.0	34.9	35.1	34.8	34.8	34.9	34.8	34.9	35.0	35.0	34.8	34.94
28	34.5	34.1	34.1	34.7	34.7	35.3	36.2	36.0	35.1	35.1	35.4	35.2	34.9	34.8	34.8	35.1	35.3	35.2	35.3	34.9	34.9	34.7	34.3	33.8	34.93
29	33.5	33.8	34.0	34.6	34.6	35.0	35.4	35.1	35.2	35.3	35.2	35.1	35.2	35.1	34.9	35.0	-	-	-	-	-	-	-	-	34.82
30	32.6	32.3	32.3	33.7	33.7	35.0	35.5	35.4	35.3	35.3	35.2	35.2	35.0	34.6	34.6	34.8	35.1	35.2	35.2	35.3	34.9	35.1	34.6	33.6	34.55
31	33.3	34.0	34.4	34.6	35.0	35.1	35.1	35.0	35.5	35.8	35.5	35.3	35.2	35.2	35.2	35.1	35.2	35.1	34.9	34.8	34.7	35.1	35.4	35.2	34.99
HOURLY MEANS	33.97	33.98	34.42	35.10	35.37	35.83	36.05	36.02	35.82	35.78	35.57	35.49	35.37	35.31	35.27	35.29	35.36	35.34	35.35	35.33	35.31	35.38	35.11	34.41	35.25

Tabel 91 Nilai variasi harian komponen I – inclination (derajat) Oktober 2019

Tondano Magnetic Observatory

Oktober 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-13.0	-13.0	-12.97
2	-13.0	-13.0	-12.9	-12.9	-13.0	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
3	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
4	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95
5	-13.0	-13.0	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
6	-13.0	-13.0	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
7	-13.0	-13.0	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
8	-13.0	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-	-	-	-	-	-	-	-	-	-12.96
10	-	-	-	-	-	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97
11	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
12	-12.9	-	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
13	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95
14	-13.0	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
15	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-	-	-	-	-	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.9	-12.95
16	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-12.94
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
19	-13.0	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
20	-13.0	-13.0	-12.9	-12.9	-13.0	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
21	-13.0	-13.0	-13.0	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
22	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95
23	-13.0	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
24	-13.0	-13.0	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95
25	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97
26	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97
27	-13.0	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
28	-13.0	-13.0	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.97
29	-12.9	-13.0	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-	-	-	-	-	-	-	-	-12.96
30	-13.0	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
31	-13.0	-13.0	-13.0	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96
HOURLY MEANS	-12.95	-12.95	-12.94	-12.94	-12.94	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96

2. Gangguan badai magnet

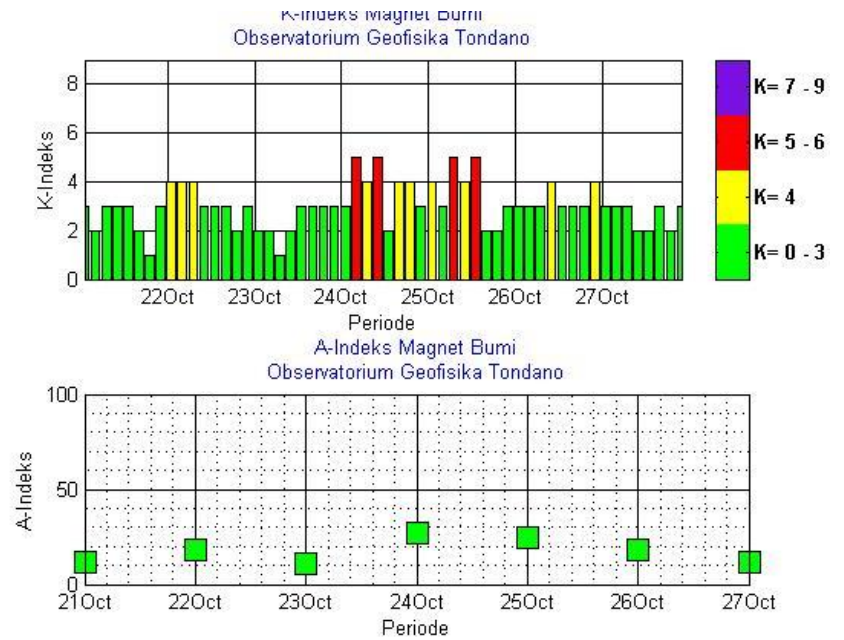
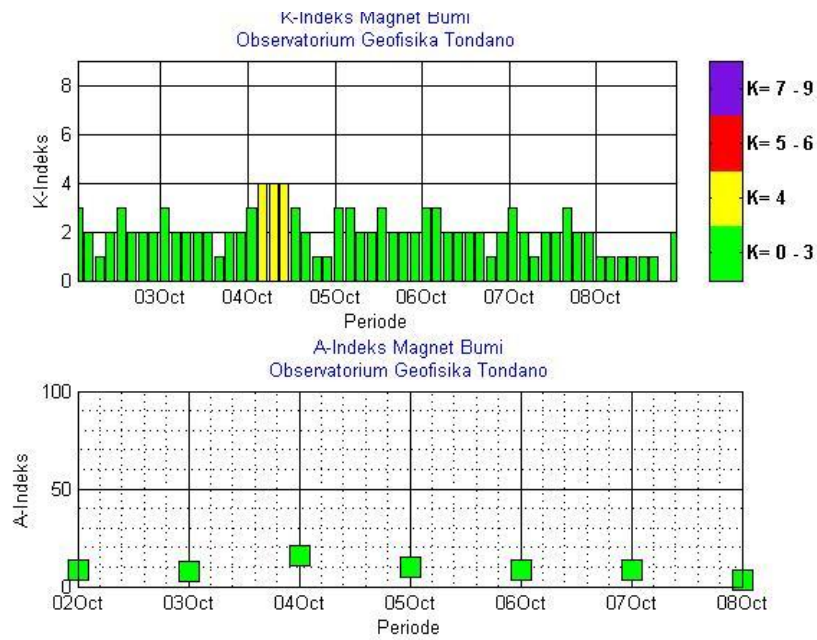
Tabel 92 Monitoring waktu gangguan
pada pengamatan magnet bumi Oktober 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	10	2019					
2	2	10	2019					
3	3	10	2019					
4	4	10	2019					
5	5	10	2019					
6	6	10	2019					
7	7	10	2019					
8	8	10	2019					
9	9	10	2019					
10	10	10	2019					
11	11	10	2019					
12	12	10	2019					
13	13	10	2019					
14	14	10	2019					
15	15	10	2019					
16	16	10	2019					
17	17	10	2019					
18	18	10	2019					
19	19	10	2019					
20	20	10	2019					
21	21	10	2019					
22	22	10	2019					
23	23	10	2019					
24	24	10	2019					
25	25	10	2019					
26	26	10	2019					
27	27	10	2019					
28	28	10	2019					
29	29	10	2019					
30	30	10	2019					
31	31	10	2019					

Tabel 93 Hasil analisa K-indeks dan A-indeks Oktober 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	0	0	0	0	0	0	0	3	1.875	Tenang
2	3	2	1	2	3	2	2	2	8.500	Tenang
3	3	2	2	2	2	1	2	2	7.500	Tenang
4	3	4	4	4	3	2	1	1	15.500	Tenang
5	3	3	2	2	3	2	2	2	10.000	Tenang
6	3	3	2	2	2	2	1	2	8.500	Tenang
7	3	2	1	2	2	3	2	2	8.500	Tenang
8	1	1	1	1	1	1	0	2	3.125	Tenang
9	2	2	3	4	4	0	0	0	10.375	Tenang
10	0	2	4	2	2	2	2	2	8.625	Tenang
11	2	3	2	3	3	3	3	3	13.000	Tenang
12	2	2	2	2	1	3	2	2	7.500	Tenang
13	3	2	2	2	3	3	2	3	11.000	Tenang
14	3	4	2	3	3	3	2	3	14.500	Tenang
15	5	3	0	2	4	3	4	4	20.750	Tenang
16	5	3	2	2	0	0	0	0	9.625	Tenang
17	0	0	0	0	0	0	0	0	0	Lost Record
18	0	0	0	0	0	0	2	3	2.750	Tenang
19	3	4	4	3	2	2	2	2	14.000	Tenang
20	2	2	2	2	2	2	3	4	10.500	Tenang
21	3	2	3	3	3	2	1	3	11.500	Tenang
22	4	4	4	3	3	3	2	3	18.500	Tenang
23	2	2	1	2	3	3	3	3	10.500	Tenang
24	3	5	4	5	2	4	4	3	26.750	Tenang
25	4	3	5	4	5	2	2	3	24.250	Tenang
26	3	3	3	4	3	3	3	4	18.000	Tenang
27	3	3	3	2	2	3	2	3	12.000	Tenang
28	2	2	3	3	2	3	2	2	10.000	Tenang
29	3	4	2	1	3	3	0	0	10.250	Tenang
30	2	3	3	2	3	3	3	3	13.000	Tenang
31	4	2	2	2	2	1	1	2	8.500	Tenang

Gambar 31 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan Oktober 2019



K. November 2019

1. Nilai variasi harian bulan November 2019

Tabel 94 Nilai variasi harian komponen H – horizontal (nT) November 2019

Tondano Magnetic Observatory																							November 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39315.5	39327.3	39332.4	39325.8	39319.9	39317.1	39308.6	39304.7	39303.0	39302.9	39296.2	39293.3	39290.9	39292.3	39291.6	39292.4	39292.9	39293.6	39294.5	39295.4	39295.9	39297.4	39300.6	39300.6	39303.5
2	39306.3	39312.6	39318.9	39325.2	39325.4	39322.0	39315.1	39307.5	39302.9	39302.1	39300.4	39299.1	39298.7	39298.6	39299.5	39304.0	39305.2	39303.3	39301.8	39303.4	39303.1	39305.9	39310.0	39314.7	39307.7
3	39323.3	39329.2	39336.0	39338.0	39334.1	39324.8	39311.2	39302.8	39300.0	39302.5	39301.3	39300.4	39300.5	39300.9	39300.9	39302.0	39302.6	39302.4	39302.5	39302.5	39303.3	39302.5	39301.7	39307.5	39309.7
4	39307.7	39316.8	39326.8	39330.1	39326.6	39323.3	39323.0	39333.9	39330.9	39325.8	39317.5	39306.5	39300.1	39296.3	39301.0	39299.9	39297.9	39297.7	39297.6	39299.8	39300.0	39297.8	39304.7	39311.0	39311.4
5	39318.4	39323.6	39326.4	39333.8	39329.7	39321.6	39313.8	39309.0	39305.8	39306.9	39303.2	39302.8	39298.7	39294.5	39289.6	39289.2	39290.2	39297.3	39292.7	39293.7	39296.9	39300.2	39303.6	39308.2	39306.2
6	39313.8	39324.1	39324.4	39325.4	39321.6	39315.3	39307.5	39297.0	39295.2	39295.9	39293.0	39291.0	39289.9	39291.5	39296.6	39300.9	39298.1	39296.4	39298.7	39301.8	39302.6	39307.1	39305.2	39309.5	39304.3
7	39322.8	39329.0	39336.3	39334.9	39323.5	39313.7	39305.8	39299.6	39297.1	39296.8	39290.8	39290.2	39291.4	39291.9	39298.1	39297.6	39298.9	39300.1	39301.2	39300.9	39300.4	39298.2	39301.7	39310.3	39305.5
8	39319.9	39328.3	39341.8	39344.5	39335.4	39326.1	39315.5	39308.5	39304.6	39305.0	39302.2	39298.1	39298.3	39298.0	39299.2	39301.5	39300.2	39302.5	39303.5	39302.3	39302.6	39302.2	39307.3	39317.8	39311.1
9	39324.6	39333.2	39338.7	39339.5	39335.9	39323.0	39311.2	39305.4	39301.9	39301.5	39299.3	39298.0	39297.8	39296.5	39296.8	39300.6	39299.8	39303.7	39306.9	39305.1	39303.3	39304.9	39311.0	39319.2	39310.7
10	39327.3	39332.8	39337.5	39335.3	39328.4	39323.8	39314.8	39309.0	39308.2	39301.7	39298.5	39297.4	39297.7	39298.3	39300.1	39302.5	39303.5	39302.5	39302.5	39303.5	39305.7	39308.9	39315.2	39319.4	39311.4
11	39326.0	39332.9	39336.8	39332.7	39325.8	39317.1	39315.1	39310.7	39305.3	39309.9	39301.9	39279.9	39263.2	39264.4	39270.1	39272.5	39270.5	39277.9	39284.2	39285.6	39289.1	39294.1	39314.8	39321.8	39300.1
12	39333.4	39337.4	39330.1	39321.8	39311.4	39306.3	39295.2	39289.3	39293.0	39295.6	39298.8	39300.5	39302.1	39301.9	39300.9	39304.0	39305.9	39301.9	39297.2	39295.9	39297.6	39300.5	39312.0	39322.0	39306.4
13	39332.3	39340.5	39343.7	39339.7	39332.3	39325.8	39317.9	39308.7	39305.0	39304.1	39300.6	39299.8	39304.5	39305.5	39304.4	39304.7	39304.5	39303.7	39304.9	39305.7	39305.7	39307.4	-	-	39313.7
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HOURLY MEANS	39320.9	39328.3	39333.1	39332.8	39326.9	39320.0	39311.9	39306.6	39304.1	39303.9	39300.3	39296.7	39294.9	39294.6	39296.1	39297.8	39297.7	39298.7	39299.1	39299.7	39300.5	39302.1	39307.3	39313.5	39307.8

Tabel 95 Nilai variasi harian komponen Z – vertical (nT) November 2019

Tondano Magnetic Observatory

November 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-9043.9	-9043.6	-9034.6	-9026.9	-9026.9	-9033.5	-9036.2	-9039.3	-9039.3	-9038.9	-9037.8	-9037.2	-9037.5	-9039.5	-9038.4	-9039.1	-9039.6	-9040.0	-9041.3	-9040.8	-9040.3	-9043.4	-9048.2	-9047.5	-9038.9
2	-9039.8	-9030.2	-9025.0	-9021.9	-9020.9	-9025.9	-9031.5	-9032.9	-9032.9	-9037.7	-9038.4	-9038.7	-9038.4	-9038.1	-9038.9	-9042.4	-9041.6	-9041.8	-9042.3	-9042.1	-9040.2	-9039.9	-9045.2	-9047.1	-9036.4
3	-9048.0	-9045.6	-9046.0	-9041.7	-9041.7	-9045.3	-9042.2	-9041.7	-9041.7	-9042.2	-9041.1	-9040.6	-9040.6	-9040.7	-9040.4	-9041.1	-9041.4	-9040.5	-9040.1	-9039.5	-9039.4	-9039.3	-9039.5	-9043.0	-9041.8
4	-9038.9	-9038.5	-9036.4	-9035.1	-9031.0	-9035.5	-9041.8	-9045.2	-9045.2	-9040.5	-9037.1	-9036.2	-9037.0	-9038.6	-9041.2	-9041.9	-9040.6	-9040.8	-9040.4	-9041.0	-9039.9	-9037.3	-9039.9	-9037.0	-9039.0
5	-9035.3	-9034.2	-9038.1	-9037.6	-9033.8	-9032.5	-9031.8	-9034.4	-9034.4	-9037.8	-9037.3	-9038.2	-9036.5	-9036.3	-9036.6	-9040.5	-9043.6	-9043.7	-9039.9	-9039.8	-9040.9	-9039.0	-9036.9	-9039.5	-9037.4
6	-9042.2	-9045.7	-9046.2	-9043.2	-9037.7	-9037.8	-9037.2	-9034.9	-9034.9	-9039.0	-9037.5	-9037.6	-9037.7	-9037.3	-9039.4	-9038.4	-9038.1	-9038.4	-9040.6	-9040.3	-9039.2	-9039.7	-9039.4	-9043.8	-9039.4
7	-9045.5	-9036.5	-9031.8	-9030.5	-9031.5	-9036.0	-9037.7	-9037.1	-9037.1	-9038.6	-9037.6	-9038.2	-9039.1	-9039.0	-9041.1	-9041.8	-9042.4	-9043.2	-9042.7	-9042.2	-9041.7	-9037.5	-9041.8	-9042.7	-9038.9
8	-9045.8	-9046.1	-9047.6	-9047.0	-9038.8	-9038.0	-9038.3	-9038.7	-9038.7	-9038.8	-9038.3	-9037.9	-9037.9	-9038.3	-9038.3	-9039.6	-9038.5	-9041.2	-9041.5	-9040.2	-9038.5	-9037.3	-9037.4	-9038.8	-9040.1
9	-9038.2	-9037.4	-9034.7	-9035.2	-9033.8	-9031.6	-9033.8	-9034.5	-9034.5	-9035.4	-9037.4	-9039.5	-9038.9	-9037.9	-9038.8	-9039.9	-9038.9	-9041.5	-9042.3	-9040.1	-9039.1	-9038.1	-9040.9	-9046.6	-9037.9
10	-9050.2	-9050.9	-9043.4	-9038.4	-9037.3	-9037.5	-9037.0	-9039.9	-9039.9	-9037.3	-9036.2	-9038.4	-9038.7	-9038.5	-9039.3	-9039.5	-9039.7	-9039.4	-9039.5	-9038.8	-9038.1	-9039.1	-9041.9	-9043.8	-9040.1
11	-9047.3	-9051.0	-9049.7	-9040.7	-9037.1	-9039.4	-9041.4	-9038.7	-9038.7	-9038.8	-9031.7	-9027.5	-9034.3	-9040.7	-9042.3	-9043.0	-9043.0	-9042.7	-9043.0	-9041.0	-9040.7	-9040.6	-9042.5	-9039.6	-9040.6
12	-9040.0	-9041.9	-9040.0	-9042.2	-9044.6	-9047.2	-9040.7	-9038.4	-9038.4	-9038.9	-9039.7	-9039.2	-9039.0	-9037.9	-9037.7	-9039.9	-9041.8	-9041.1	-9040.5	-9039.9	-9039.5	-9037.0	-9038.9	-9039.2	-9040.1
13	-9037.0	-9032.6	-9026.0	-9028.1	-9033.0	-9042.4	-9041.9	-9038.5	-9038.5	-9040.9	-9039.9	-9040.2	-9027.5	-9022.6	-9023.4	-9025.1	-9024.6	-9025.1	-9025.7	-9024.3	-9022.8	-9019.8	-	-	-9030.9
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HOURLY MEANS	-9042.5	-9041.1	-9038.4	-9036.0	-9034.5	-9037.1	-9037.8	-9038.0	-9038.0	-9038.8	-9037.7	-9037.6	-9037.2	-9037.3	-9038.1	-9039.4	-9039.5	-9040.0	-9040.0	-9039.2	-9038.5	-9037.6	-9041.0	-9042.4	-9038.6

Tabel 96 Nilai Variasi harian komponen F – total (nT) November 2019

Tondano Magnetic Observatory																							November 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	40342.2	40353.7	40356.7	40348.5	40342.8	40341.5	40333.9	40330.8	40329.0	40328.9	40322.1	40319.1	40316.9	40318.7	40317.7	40318.7	40319.3	40320.0	40321.2	40322.0	40322.4	40324.6	40328.8	40328.6	40329.5
2	40332.4	40336.4	40341.4	40346.8	40346.8	40344.6	40339.1	40332.1	40327.6	40327.8	40326.3	40325.1	40324.7	40324.5	40325.6	40330.7	40331.8	40329.9	40328.6	40330.1	40329.4	40332.0	40337.2	40342.2	40333.0
3	40350.8	40356.0	40362.7	40363.7	40359.9	40351.6	40337.8	40329.4	40326.7	40329.3	40327.8	40326.8	40326.9	40327.3	40327.3	40328.5	40329.2	40328.8	40328.8	40328.6	40329.4	40328.6	40327.8	40334.3	40336.2
4	40333.6	40342.3	40351.6	40354.5	40350.2	40348.0	40349.1	40360.5	40357.6	40351.6	40342.7	40331.8	40325.7	40322.3	40327.6	40326.7	40324.4	40324.2	40324.1	40326.4	40326.2	40323.5	40330.9	40336.4	40337.2
5	40343.1	40348.0	40351.7	40358.7	40353.9	40345.6	40337.9	40333.8	40330.7	40332.5	40328.9	40328.6	40324.3	40320.1	40315.4	40315.9	40317.6	40324.5	40319.2	40320.1	40323.5	40326.3	40329.1	40334.2	40331.8
6	40340.2	40351.1	40351.5	40351.8	40346.9	40340.7	40333.0	40322.3	40320.5	40322.1	40318.9	40317.0	40316.0	40317.4	40322.9	40326.8	40324.0	40322.4	40325.1	40328.2	40328.6	40333.1	40331.2	40336.5	40330.3
7	40349.7	40353.8	40359.9	40358.2	40347.3	40338.7	40331.4	40325.3	40322.8	40322.9	40316.8	40316.3	40317.7	40318.2	40324.7	40324.4	40325.8	40327.2	40328.1	40327.7	40327.1	40324.0	40328.4	40337.0	40331.4
8	40347.0	40355.2	40368.8	40371.2	40360.5	40351.3	40341.0	40334.3	40330.5	40331.0	40328.1	40324.0	40324.2	40324.0	40325.2	40327.6	40326.2	40329.0	40330.1	40328.6	40328.5	40327.9	40332.8	40343.4	40337.1
9	40349.9	40358.0	40362.8	40363.7	40359.9	40346.8	40335.9	40330.3	40327.0	40326.8	40325.0	40324.2	40323.9	40322.4	40322.9	40326.9	40325.9	40330.3	40333.6	40331.4	40329.3	40330.7	40337.2	40346.5	40336.3
10	40355.2	40360.7	40363.7	40360.3	40353.4	40349.0	40340.1	40335.0	40334.3	40327.4	40324.0	40323.5	40323.8	40324.3	40326.2	40328.6	40329.7	40328.7	40328.6	40329.4	40331.4	40334.8	40341.6	40346.1	40337.5
11	40353.3	40360.9	40364.3	40358.4	40350.8	40342.8	40341.4	40336.4	40331.2	40335.7	40326.3	40303.9	40289.1	40291.8	40297.7	40300.2	40298.2	40305.4	40311.6	40312.5	40315.8	40320.7	40341.3	40347.5	40326.5
12	40358.9	40363.1	40355.7	40348.0	40338.4	40334.0	40321.7	40315.5	40319.2	40321.8	40325.0	40326.7	40328.1	40327.7	40326.7	40330.2	40332.5	40328.4	40323.7	40322.3	40323.9	40326.1	40337.7	40347.5	40332.6
13	40357.2	40364.1	40365.8	40362.4	40356.2	40352.0	40344.2	40334.4	40330.9	40330.5	40326.9	40326.2	40327.9	40327.8	40326.9	40327.6	40327.3	40326.6	40327.9	40328.3	40328.0	40329.0	-	-	40337.6
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HOURLY MEANS	40347.2	40354.1	40358.2	40357.4	40351.3	40345.1	40337.4	40332.3	40329.8	40329.9	40326.1	40322.6	40320.7	40320.5	40322.1	40324.1	40324.0	40325.0	40325.4	40325.8	40326.4	40327.8	40333.7	40340.0	40333.6

Tabel 97 Nilai Variasi harian komponen X – north (nT) November 2019

Tondano Magnetic Observatory																							November 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	39313.4	39325.2	39330.4	39323.8	39317.9	39315.0	39306.5	39302.6	39300.8	39300.8	39294.2	39291.2	39288.9	39290.3	39289.5	39290.3	39290.9	39291.5	39292.4	39293.3	39293.9	39295.4	39298.5	39298.6	39301.5
2	39304.3	39310.7	39317.0	39323.2	39323.4	39319.9	39312.9	39305.4	39300.9	39300.0	39298.3	39297.0	39296.7	39296.6	39297.5	39301.9	39303.2	39301.2	39299.8	39301.4	39301.1	39303.9	39307.9	39312.6	39305.7
3	39321.4	39327.3	39334.1	39336.0	39332.0	39322.7	39309.2	39300.8	39298.0	39300.5	39299.2	39298.3	39298.4	39298.8	39298.8	39300.0	39300.6	39300.4	39300.5	39300.5	39301.3	39300.5	39299.7	39305.6	39307.7
4	39305.8	39315.0	39325.0	39328.2	39324.7	39321.3	39320.9	39331.7	39328.8	39323.7	39315.4	39304.4	39298.0	39294.2	39299.0	39297.9	39295.8	39295.6	39295.6	39297.8	39297.9	39295.8	39302.7	39309.0	39309.3
5	39316.4	39321.6	39324.4	39331.6	39327.6	39319.4	39311.6	39306.8	39303.7	39304.8	39301.2	39300.7	39296.7	39292.5	39287.6	39287.1	39288.2	39295.3	39290.7	39291.7	39294.9	39298.2	39301.7	39306.3	39304.2
6	39312.0	39322.2	39322.5	39323.5	39319.6	39313.2	39305.5	39295.0	39293.1	39293.8	39290.9	39288.9	39287.9	39289.4	39294.6	39298.9	39296.1	39294.4	39296.6	39299.8	39300.6	39305.1	39303.2	39307.6	39302.3
7	39320.9	39327.2	39334.3	39332.8	39321.4	39311.6	39303.7	39297.5	39295.0	39294.7	39288.8	39288.2	39289.4	39289.9	39296.1	39295.6	39296.9	39298.1	39299.1	39298.8	39298.4	39296.2	39299.8	39308.4	39303.5
8	39318.0	39326.5	39340.0	39342.5	39333.3	39324.1	39313.4	39306.4	39302.5	39303.0	39300.2	39296.1	39296.2	39295.9	39297.2	39299.4	39298.2	39300.5	39301.5	39300.3	39300.6	39300.2	39305.3	39315.8	39309.1
9	39322.6	39331.2	39336.7	39337.4	39333.8	39320.9	39309.1	39303.3	39299.9	39299.5	39297.2	39295.9	39295.8	39294.5	39294.8	39298.6	39297.8	39301.7	39304.9	39303.1	39301.3	39302.9	39309.0	39317.2	39308.7
10	39325.4	39330.8	39335.5	39333.1	39326.3	39321.7	39312.7	39306.9	39306.1	39299.7	39296.5	39295.4	39295.7	39296.2	39298.0	39300.4	39301.5	39300.5	39300.4	39301.5	39303.7	39307.0	39313.3	39317.5	39309.4
11	39324.1	39331.0	39334.8	39330.7	39323.7	39315.0	39313.0	39308.6	39303.2	39307.8	39299.9	39277.9	39261.2	39262.4	39268.1	39270.5	39268.5	39275.9	39282.2	39283.6	39287.1	39292.2	39312.9	39320.1	39298.1
12	39331.7	39335.6	39328.3	39319.8	39309.3	39304.2	39293.1	39287.3	39291.1	39293.6	39296.7	39298.5	39300.1	39299.9	39298.9	39302.0	39303.9	39299.9	39295.1	39293.9	39295.6	39298.5	39310.0	39320.1	39304.5
13	39330.5	39338.6	39341.8	39337.8	39330.3	39323.7	39315.8	39306.6	39303.0	39302.1	39298.6	39297.8	39302.2	39303.0	39302.0	39302.3	39302.1	39301.3	39302.5	39303.3	39303.3	39305.1	-	-	39311.5
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HOURLY MEANS	39319.0	39326.4	39331.1	39330.8	39324.9	39317.9	39309.8	39304.5	39302.0	39301.8	39298.2	39294.7	39292.9	39292.6	39294.0	39295.8	39295.7	39296.6	39297.0	39297.6	39298.4	39300.1	39305.3	39311.6	39305.8

Tabel 98 Nilai Variasi harian komponen Y – east (nT) November 2019

Tondano Magnetic Observatory																							November 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	398.8	398.1	396.4	398.9	403.2	407.7	407.9	409.1	407.2	406.5	404.2	401.2	399.9	400.7	399.6	399.7	399.7	400.4	401.1	399.5	398.5	402.9	405.2	400.1	401.9
2	394.7	386.8	383.6	395.0	404.3	406.3	408.3	405.9	402.5	402.4	402.1	402.1	401.3	400.3	400.4	403.7	403.2	403.1	402.8	401.6	399.5	398.5	400.6	397.4	400.3
3	389.3	383.0	384.7	391.3	400.6	405.7	403.9	401.8	401.2	403.2	401.8	401.1	400.5	400.3	399.9	400.5	400.6	399.7	399.2	398.1	397.9	398.2	391.8	388.2	397.6
4	379.9	375.5	374.9	382.7	386.3	398.0	406.0	410.9	411.4	408.4	404.1	402.0	399.4	398.6	400.6	401.7	400.0	398.8	398.6	399.1	398.8	396.4	398.5	397.0	397.0
5	394.9	391.7	401.4	409.8	413.2	414.1	408.7	407.9	407.2	406.7	403.4	401.3	398.7	397.1	395.8	398.4	399.1	399.7	398.4	396.9	397.8	394.1	385.1	380.6	400.1
6	378.4	383.6	389.3	393.0	397.9	403.1	404.3	401.4	403.0	405.1	402.4	400.5	398.9	397.7	396.0	395.6	396.2	396.3	397.8	398.6	397.9	396.2	391.6	387.1	396.3
7	381.5	380.7	393.7	404.0	404.5	403.1	403.9	402.6	403.1	405.0	402.2	400.1	399.1	397.4	399.2	401.0	401.5	402.1	402.5	402.6	401.9	396.4	390.7	383.9	398.4
8	379.6	375.2	381.5	391.0	397.9	405.1	403.5	401.9	401.7	404.0	402.9	400.6	399.1	398.8	397.6	398.7	396.1	399.1	399.3	398.3	397.1	395.7	395.1	393.9	396.4
9	396.3	395.5	395.7	403.6	407.7	406.1	404.2	403.0	401.9	400.6	400.9	401.2	398.9	397.3	396.8	397.8	396.9	399.4	400.8	398.0	396.0	392.9	394.0	393.4	399.1
10	392.3	395.9	401.5	407.6	407.1	407.0	406.1	405.3	405.4	402.9	399.6	399.9	399.7	399.0	399.3	399.2	398.8	398.3	397.5	395.8	393.8	390.9	388.0	382.8	398.9
11	382.2	387.5	394.5	398.4	401.2	403.9	409.8	408.3	405.8	407.1	401.0	392.5	392.5	395.6	396.4	399.3	399.3	398.7	398.2	396.9	396.1	390.5	379.2	367.2	395.9
12	364.8	372.4	384.8	393.9	400.0	402.7	398.9	394.1	394.6	397.3	398.0	398.6	398.9	398.8	398.2	399.9	402.0	400.8	399.0	397.7	396.4	391.4	390.2	387.4	394.2
13	381.6	385.9	388.6	394.6	401.5	405.1	404.8	400.3	396.5	398.8	398.7	399.5	428.1	438.4	435.8	435.4	434.3	435.1	434.2	432.5	429.9	422.1	-	-	412.8
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HOURLY MEANS	385.7	385.5	390.0	397.2	402.0	405.2	405.4	404.0	403.2	403.7	401.6	400.0	401.2	401.5	401.2	402.4	402.1	402.4	402.3	401.2	400.1	397.4	392.5	388.3	399.2

Tabel 99 Nilai Variasi harian komponen D – declination (menit) November 2019

Tondano Magnetic Observatory

November 2019

Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	34.89	34.82	34.66	34.89	35.27	35.67	35.69	35.80	35.63	35.57	35.37	35.12	35.00	35.07	34.98	34.99	34.99	35.04	35.11	34.96	34.88	35.26	35.46	35.01	35.17
2	34.54	33.84	33.56	34.55	35.36	35.53	35.72	35.52	35.22	35.21	35.19	35.19	35.12	35.03	35.04	35.32	35.28	35.27	35.24	35.15	34.96	34.9	35.0	34.8	35.02
3	34.0	33.5	33.6	34.21	35.02	35.49	35.34	35.16	35.11	35.28	35.16	35.10	35.05	35.03	35.00	35.05	35.05	34.98	34.93	34.83	34.82	34.85	34.29	33.97	34.79
4	33.24	32.85	32.79	33.47	33.78	34.81	35.51	35.92	35.97	35.71	35.35	35.17	34.96	34.88	35.06	35.15	35.01	34.90	34.88	34.92	34.90	34.69	34.87	34.73	34.73
5	34.54	34.3	35.1	35.8	36.1	36.22	35.75	35.68	35.63	35.58	35.30	35.12	34.90	34.76	34.65	34.87	34.94	34.99	34.87	34.74	34.82	34.49	33.70	33.30	35.01
6	33.11	33.55	34.05	34.37	34.81	35.26	35.4	35.1	35.3	35.5	35.2	35.1	34.9	34.8	34.7	34.6	34.7	34.7	34.8	34.9	34.8	34.7	34.26	33.86	34.68
7	33.36	33.29	34.42	35.32	35.37	35.26	35.34	35.2	35.3	35.4	35.21	35.02	34.93	34.79	34.94	35.10	35.13	35.19	35.22	35.23	35.17	34.70	34.19	33.59	34.86
8	33.20	32.81	33.35	34.18	34.79	35.43	35.29	35.17	35.15	35.35	35.25	35.06	34.93	34.90	34.79	34.89	34.66	34.92	34.94	34.85	34.75	34.62	34.57	34.45	34.68
9	34.7	34.6	34.6	35.3	35.7	35.5	35.4	35.3	35.2	35.1	35.08	35.11	34.91	34.77	34.73	34.81	34.74	34.95	35.07	34.82	34.65	34.38	34.47	34.41	34.92
10	34.31	34.62	35.10	35.64	35.60	35.60	35.53	35.46	35.47	35.26	34.97	35.00	34.98	34.92	34.94	34.93	34.90	34.85	34.78	34.64	34.46	34.20	33.94	33.48	34.90
11	33.42	33.88	34.49	34.84	35.09	35.34	35.84	35.72	35.51	35.62	35.09	34.37	34.38	34.65	34.72	35.0	35.0	34.9	34.9	34.8	34.7	34.2	33.2	32.12	34.65
12	31.90	32.56	33.65	34.45	35.00	35.23	34.92	34.50	34.54	34.77	34.83	34.88	34.90	34.90	34.84	35.00	35.17	35.07	34.92	34.81	34.69	34.26	34.14	33.88	34.49
13	33.4	33.7	34.0	34.5	35.1	35.4	35.41	35.02	34.70	34.90	34.89	34.96	37.46	38.36	38.13	38.10	38.00	38.07	38.00	37.84	37.62	36.93	-	-	36.11
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29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	33.74	33.71	34.11	34.73	35.15	35.45	35.47	35.35	35.28	35.32	35.15	35.01	35.11	35.14	35.11	35.22	35.19	35.22	35.20	35.11	35.02	34.78	34.34	33.97	34.92

Tabel 100 Nilai variasi harian komponen I – inclination (derajat) November 2019

Tondano Magnetic Observatory																							November 2019		
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-12.96	-12.96	-12.94	-12.93	-12.94	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.97	-12.96
2	-12.96	-12.94	-12.93	-12.93	-12.93	-12.93	-12.94	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-13.0	-13.0	-13.0	-12.95
3	-13.0	-13.0	-13.0	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96
4	-12.96	-12.95	-12.95	-12.94	-12.94	-12.95	-12.95	-12.96	-12.96	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.95	-12.95
5	-12.95	-12.94	-12.95	-12.95	-12.94	-12.94	-12.94	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.97	-12.97	-12.96	-12.96	-12.96	-12.96	-12.95	-12.96	-12.95
6	-12.96	-12.96	-12.96	-12.96	-12.95	-12.95	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.96	-12.96	-12.96
7	-12.96	-12.95	-12.94	-12.94	-12.94	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96
8	-12.96	-12.96	-12.96	-12.96	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.95	-12.95	-12.96
9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-13.0	-13.0	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.95
10	-12.97	-12.96	-12.95	-12.95	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96
11	-12.96	-12.96	-12.96	-12.95	-12.95	-12.95	-12.96	-12.95	-12.96	-12.95	-12.95	-12.95	-12.96	-12.97	-12.97	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-13.0	-12.95	-12.96
12	-12.95	-12.95	-12.95	-12.96	-12.96	-12.97	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.95	-12.95	-12.96
13	-12.9	-12.9	-12.9	-12.9	-12.9	-13.0	-12.96	-12.95	-12.96	-12.96	-12.96	-12.96	-12.94	-12.93	-12.94	-12.94	-12.94	-12.94	-12.94	-12.94	-12.93	-12.93	-	-	-12.94
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-12.96	-12.95	-12.95	-12.94	-12.94	-12.95	-12.95	-12.95	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96	-12.96

2. Gangguan badai magnet

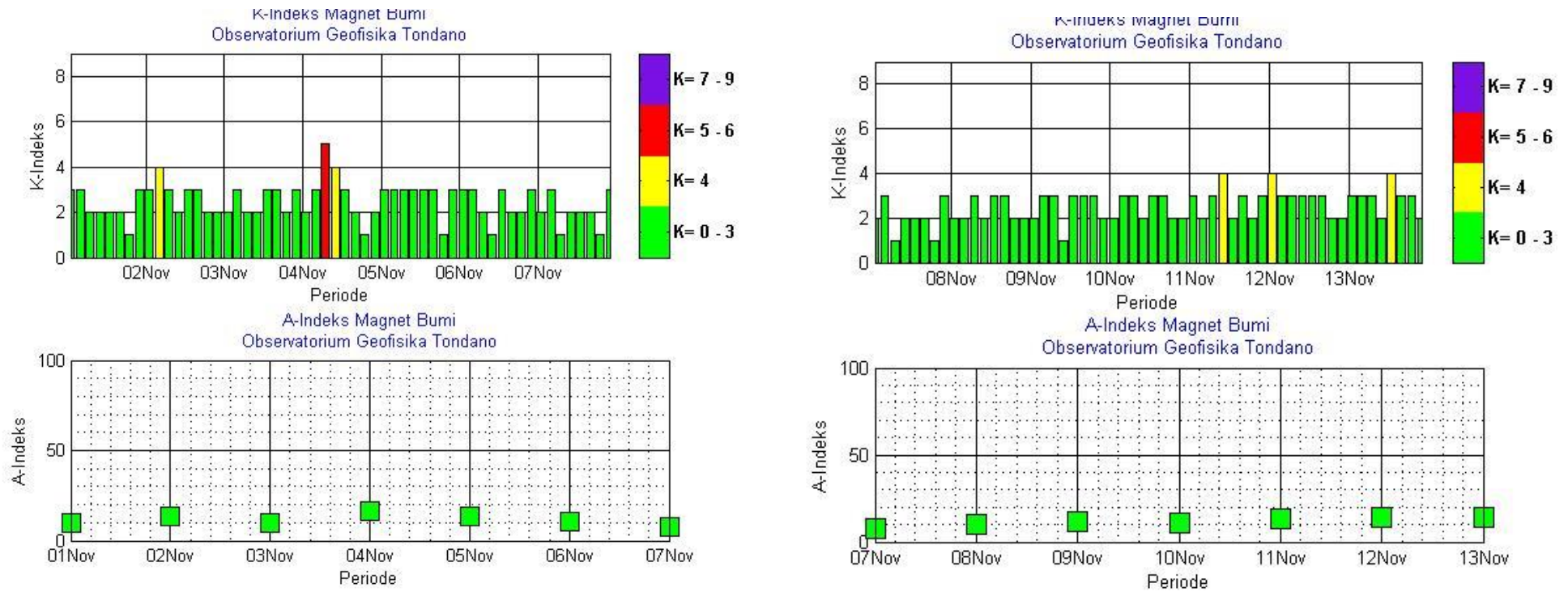
Tabel 101 Monitoring waktu gangguan pada pengamatan magnet bumi November 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	11	2019					
2	2	11	2019					
3	3	11	2019					
4	4	11	2019					
5	5	11	2019					
6	6	11	2019					
7	7	11	2019					
8	8	11	2019					
9	9	11	2019					
10	10	11	2019					
11	11	11	2019					
12	12	11	2019					
13	13	11	2019					renov gedung
14	14	11	2019					renov gedung
15	15	11	2019					renov gedung
16	16	11	2019					renov gedung
17	17	11	2019					renov gedung
18	18	11	2019					renov gedung
19	19	11	2019					renov gedung
20	20	11	2019					renov gedung
21	21	11	2019					renov gedung
22	22	11	2019					renov gedung
23	23	11	2019					renov gedung
24	24	11	2019					renov gedung
25	25	11	2019					renov gedung
26	26	11	2019					renov gedung
27	27	11	2019					renov gedung
28	28	11	2019					renov gedung
29	29	11	2019					renov gedung
30	30	11	2019					renov gedung

Tabel 102 Hasil analisa K-indeks dan A-indeks November 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1	3	3	2	2	2	2	1	3	9.5	Tenang
2	3	4	3	2	3	3	2	2	13.5	Tenang
3	2	3	2	2	3	3	2	3	11	Tenang
4	2	3	5	4	3	2	1	2	16.125	Tenang
5	3	3	3	3	3	3	1	3	13.5	Tenang
6	3	3	2	1	3	2	2	3	10.5	Tenang
7	2	3	1	2	2	2	1	3	8	Tenang
8	2	2	3	2	3	3	2	2	10	Tenang
9	2	3	3	1	3	3	3	2	11.5	Tenang
10	2	3	3	2	3	3	2	2	11	Tenang
11	3	2	3	4	2	3	2	3	13.5	Tenang
12	4	3	3	3	3	3	2	2	14.5	Tenang
13	3	3	3	2	4	3	3	2	14.5	Tenang
14	0	0	0	0	0	0	0	0	0	renov gedung
15	0	0	0	0	0	0	0	0	0	renov gedung
16	0	0	0	0	0	0	0	0	0	renov gedung
17	0	0	0	0	0	0	0	0	0	renov gedung
18	0	0	0	0	0	0	0	0	0	renov gedung
19	0	0	0	0	0	0	0	0	0	renov gedung
20	0	0	0	0	0	0	0	0	0	renov gedung
21	0	0	0	0	0	0	0	0	0	renov gedung
22	0	0	0	0	0	0	0	0	0	renov gedung
23	0	0	0	0	0	0	0	0	0	renov gedung
24	0	0	0	0	0	0	0	0	0	renov gedung
25	0	0	0	0	0	0	0	0	0	renov gedung
26	0	0	0	0	0	0	0	0	0	renov gedung
27	0	0	0	0	0	0	0	0	0	renov gedung
28	0	0	0	0	0	0	0	0	0	renov gedung
29	0	0	0	0	0	0	0	0	0	renov gedung
30	0	0	0	0	0	0	0	0	0	renov gedung

Gambar 32 Plot hasil analisa K-indeks dan A-indeks saat terjadi gangguan magnet bumi di bulan November 2019



L. Desember 2019

1. Nilai variasi harian bulan Desember 2019

Tabel 103 Nilai variasi harian komponen H – horizontal (nT) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Keterangan : Renovasi Gedung Magnet

Tabel 104 Nilai variasi harian komponen Z – vertical (nT) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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HOURLY MEANS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Keterangan : Renovasi Gedung Magnet

Tabel 105 Nilai Variasi harian komponen F – total (nT) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
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Keterangan : Renovasi Gedung Magnet

Tabel 106 Nilai Variasi harian komponen X – north (nT) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
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HOURLY MEANS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Keterangan : Renovasi Gedung Magnet

Tabel 107 Nilai Variasi harian komponen Y – east (nT) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
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Keterangan : Renovasi Gedung Magnet

Tabel 108 Nilai Variasi harian komponen D – declination (menit) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
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Keterangan : Renovasi Gedung Magnet

Tabel 109 Nilai variasi harian komponen I – inclination (derajat) Desember 2019

Tondano Magnetic Observatory																								Desember 2019	
Hour Date	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	DAILY MEANS
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5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOURLY MEANS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Keterangan : Renovasi Gedung Magnet

2. Gangguan badai magnet

Tabel 110 Monitoring waktu gangguan pada pengamatan magnet bumi Desember 2019

Tanggal	K-1	K-2	K-3	K-4	K-5	K-6	K-7	K-8	A Indeks	Keterangan
1										renovasi gedung
2										renovasi gedung
3										renovasi gedung
4										renovasi gedung
5										renovasi gedung
6										renovasi gedung
7										renovasi gedung
8										renovasi gedung
9										renovasi gedung
10										renovasi gedung
11										renovasi gedung
12										renovasi gedung
13										renovasi gedung
14										renovasi gedung
15										renovasi gedung
16										renovasi gedung
17										renovasi gedung
18										renovasi gedung
19										renovasi gedung
20										renovasi gedung
21										renovasi gedung
22										renovasi gedung
23										renovasi gedung
24										renovasi gedung
25										renovasi gedung
26										renovasi gedung
27										renovasi gedung
28										renovasi gedung
29										renovasi gedung
30										renovasi gedung
31										renovasi gedung

Tabel 111 Hasil analisa K-indeks dan A-indeks Desember 2019

Kejadian rekaman magnet bumi							Durasi gangguan	Keterangan
No	Hari			Waktu				
	Tanggal	Bulan	Tahun	Jam	Menit	Detik		
1	1	12	2019					renovasi gedung
2	2	12	2019					renovasi gedung
3	3	12	2019					renovasi gedung
4	4	12	2019					renovasi gedung
5	5	12	2019					renovasi gedung
6	6	12	2019					renovasi gedung
7	7	12	2019					renovasi gedung
8	8	12	2019					renovasi gedung
9	9	12	2019					renovasi gedung
10	10	12	2019					renovasi gedung
11	11	12	2019					renovasi gedung
12	12	12	2019					renovasi gedung
13	13	12	2019					renovasi gedung
14	14	12	2019					renovasi gedung
15	15	12	2019					renovasi gedung
16	16	12	2019					renovasi gedung
17	17	12	2019					renovasi gedung
18	18	12	2019					renovasi gedung
19	19	12	2019					renovasi gedung
20	20	12	2019					renovasi gedung
21	21	12	2019					renovasi gedung
22	22	12	2019					renovasi gedung
23	23	12	2019					renovasi gedung
24	24	12	2019					renovasi gedung
25	25	12	2019					renovasi gedung
26	26	12	2019					renovasi gedung
27	27	12	2019					renovasi gedung
28	28	12	2019					renovasi gedung
29	29	12	2019					renovasi gedung
30	30	12	2019					renovasi gedung
31	31	12	2019					renovasi gedung

