



BMKG

BULETIN GEMPA BUMI 2019

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

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KATA PENGANTAR

Puji dan syukur kehadiran Tuhan Yang Maha Esa, Badan Meteorologi, Klimatologi, dan Geofisika (BMKG), Stasiun Geofisika Klas 1 Manado yang selanjutnya disebut Stasiun Geofisika Manado pada awal tahun 2020 dapat menerbitkan Buletin Gempabumi dan Tsunami tahun 2019 sebagai salah satu produk informasi.

Buletin Gempabumi dan Tsunami Stasiun Geofisika Manado tahun 2019 ini dibuat berdasarkan hasil analisa gempabumi menggunakan perangkat lunak Sesicomp3. Besar harapan kami, agar buletin ini dapat memenuhi kebutuhan masyarakat dalam pelayanan data gempabumi beserta seluruh parameternya.

Ucapan terimakasih ditujukan kepada seluruh pihak yang telah mendukung terbitnya buletin ini.

Manado, Januari 2020
Kepala Stasiun Geofisika Manado

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DAFTAR ISI

DAFTAR ISI	ii
DAFTAR TABEL	iii
DAFTAR GAMBAR	v
DATA STASIUN SEISMIK	ix
DAFTAR ISTILAH	xi
I. PENDAHULUAN	1
II. REKAPITULASI KEJADIAN GEMPABUMI TAHUN 2019.....	2
III. DATA KEJADIAN GEMPABUMI BULANAN TAHUN 2019	11
A. Data Gempabumi Bulan Januari 2019	11
B. Data Gempabumi Bulan Februari 2019	23
C. Data Gempabumi Bulan Maret 2019	30
D. Data Gempabumi Bulan April 2019	37
E. Data Gempabumi Bulan Mei 2019.....	42
F. Data Gempabumi Bulan Juni 2019	49
G. Data Gempabumi Bulan Juli 2019.....	57
H. Data Gempabumi Bulan Agustus 2019	65
I. Data Gempabumi Bulan September 2019	70
J. Data Gempabumi Bulan Oktober 2019.....	78
K. Data Gempabumi Bulan November 2019	86
L. Data Gempabumi Bulan Desember 2019	100
IV. PETA GONCANGAN GEMPABUMI TERASA DI WILAYAH REGIONAL 10 TAHUN 2019 ..	107
A. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Januari 2019.....	108
B. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Februari 2019	115
C. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Maret 2019	126
D. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan April 2019.....	131
E. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Mei 2019	135
F. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Juni 2019.....	148
G. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Juli 2019	151
H. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Agustus 2019.....	155
I. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan September 2019.....	158
J. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Oktober 2019	162
K. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan November 2019	172
L. Peta Goncangan (<i>Shakemap</i>) Gempabumi Bulan Desember 2019.....	185
V. DATA DAN INFORMASI TSUNAMI	193
LAMPIRAN	200

DAFTAR TABEL

Tabel 1 Rekapitulasi kejadian gempabumi tahun 2019	2
Tabel 2 Rekapitulasi kejadian gempabumi dirasakan tahun 2019	5
Tabel 3 Data kejadian gempabumi bulan Januari 2019	11
Tabel 4 Rekapitulasi gempabumi berdasarkan magnitudo bulan Januari 2019.....	21
Tabel 5 Data kejadian gempabumi bulan Februari 2019.....	23
Tabel 6 Rekapitulasi gempabumi berdasarkan magnitudo bulan Februari 2019.....	28
Tabel 7 Data kejadian gempabumi bulan Maret 2019	30
Tabel 8 Rekapitulasi gempabumi berdasarkan magnitudo bulan Maret 2019	35
Tabel 9 Data kejadian gempabumi bulan April 2019	37
Tabel 10 Rekapitulasi gempabumi berdasarkan magnitudo bulan April 2019	40
Tabel 11 Data kejadian gempabumi bulan Mei 2019.....	42
Tabel 12 Rekapitulasi gempabumi berdasarkan magnitudo bulan Mei 2019.....	47
Tabel 13 Data kejadian gempabumi bulan Juni 2019	49
Tabel 14 Rekapitulasi gempabumi berdasarkan magnitudo bulan Juni 2019.....	55
Tabel 15 Data kejadian gempabumi bulan Juli 2019	57
Tabel 16 Rekapitulasi gempabumi berdasarkan magnitudo bulan Juli 2019	63
Tabel 17 Data kejadian gempabumi bulan Agustus 2019.....	65
Tabel 18 Rekapitulasi gempabumi berdasarkan magnitudo bulan Agustus 2019	68
Tabel 19 Data kejadian gempabumi bulan September 2019	70
Tabel 20 Rekapitulasi gempabumi berdasarkan magnitudo bulan September 2019	76
Tabel 21 Data kejadian gempabumi bulan Oktober 2019	78
Tabel 22 Rekapitulasi gempabumi berdasarkan magnitudo bulan Oktober 2019	84
Tabel 23 Data kejadian gempabumi bulan November 2019	86
Tabel 24 Rekapitulasi gempabumi berdasarkan magnitudo bulan November 2019	98
Tabel 25 Data kejadian gempabumi bulan Desember 2019	100
Tabel 26 Rekapitulasi gempabumi berdasarkan magnitudo bulan Desember 2019	105
Tabel 27 Atenuasi intensitas gempa bumi 5 Januari 2019 pukul 08:04:20 WIB	108
Tabel 28 Atenuasi intensitas gempa bumi 9 Januari 2019 pukul 16:59:23 WIB	109
Tabel 29 Atenuasi intensitas gempa bumi 13 Januari 2019 pukul 10:36:19 WIB.....	111
Tabel 30 Atenuasi intensitas gempa bumi 16 Januari 2019 pukul 17:49:30 WIB.....	111
Tabel 31 Atenuasi intensitas gempa bumi 20 Januari 2019 pukul 19:46:44 WIB.....	112
Tabel 32 Atenuasi intensitas gempa bumi 21 Januari 2019 pukul 17:45:56 WIB.....	113
Tabel 33 Atenuasi intensitas gempa bumi 23 Januari 2019 pukul 19:11:09 WIB.....	114
Tabel 34 Atenuasi intensitas gempa bumi 2 Februari 2019 pukul 08:11:02 WIB	115
Tabel 35 Atenuasi intensitas gempa bumi 6 Februari 2019 pukul 06:17:47 WIB	116
Tabel 36 Atenuasi intensitas gempa bumi 6 Februari 2019 pukul 18:55:05 WIB	118
Tabel 37 Atenuasi intensitas gempa bumi 7 Februari 2019 pukul 11:15:29 WIB	118
Tabel 38 Atenuasi intensitas gempa bumi 9 Februari 2019 pukul 11:08:55 WIB	119
Tabel 39 Atenuasi intensitas gempa bumi 16 Februari 2019 pukul 22:46:33 WIB	121
Tabel 40 Atenuasi intensitas gempa bumi 20 Februari 2019 pukul 07:10:41 WIB	122
Tabel 41 Atenuasi intensitas gempa bumi 23 Februari 2019 pukul 18:43:58 WIB	124
Tabel 42 Atenuasi intensitas gempa bumi 24 Februari 2019 pukul 20:29:33 WIB	125
Tabel 43 Atenuasi intensitas gempa bumi 3 Maret 2019 pukul 17:54:44 WIB.....	126
Tabel 44 Atenuasi intensitas gempa bumi 19 Maret 2019 pukul 21:35:22 WIB.....	129
Tabel 45 Atenuasi intensitas gempa bumi 24 Maret 2019 pukul 11:37:37 WIB.....	130
Tabel 46 Atenuasi intensitas gempa bumi 8 April 2019 pukul 02:45:34 WIB.....	131

Tabel 47 Atenuasi intensitas gempa bumi 1 Mei 2019 pukul 12:15:52 WIB.....	135
Tabel 48 Atenuasi intensitas gempa bumi 4 Mei 2019 pukul 05:22:38 WIB.....	136
Tabel 49 Atenuasi intensitas gempa bumi 5 Mei 2019 pukul 04:02:11 WIB.....	137
Tabel 50 Atenuasi intensitas gempa bumi 5 Mei 2019 pukul 20:55:31 WIB.....	139
Tabel 51 Atenuasi intensitas gempa bumi 9 Mei 2019 pukul 11:33:56 WIB.....	140
Tabel 52 Atenuasi intensitas gempa bumi 12 Mei 2019 pukul 06:43:42 WIB	141
Tabel 53 Atenuasi intensitas gempa bumi 16 Mei 2019 pukul 10:56:18 WIB	143
Tabel 54 Atenuasi intensitas gempa bumi 22 Mei 2019 pukul 01:42:48 WIB	145
Tabel 55 Atenuasi intensitas gempa bumi 27 Mei 2019 pukul 00:00:05 WIB	145
Tabel 56 Atenuasi intensitas gempa bumi 30 Mei 2019 pukul 05:13:46 WIB	146
Tabel 57 Atenuasi intensitas gempa bumi 11 Juni 2019 pukul 12:45:58 WIB.....	149
Tabel 58 Atenuasi intensitas gempa bumi 7 Juli 2019 pukul 22:08:42 WIB.....	152
Tabel 59 Atenuasi intensitas gempa bumi 2 Agustus 2019 pukul 03:35:23 WIB.....	155
Tabel 60 Atenuasi intensitas gempa bumi 4 September 2019 pukul 20:37:48 WIB.....	158
Tabel 61 Atenuasi intensitas gempa bumi 4 September 2019 pukul 20:37:48 WIB.....	159
Tabel 62 Atenuasi intensitas gempa bumi 18 September 2019 pukul 14:01:02 WIB.....	161
Tabel 63 Atenuasi intensitas gempa bumi 6 Oktober 2019 pukul 22:50:32 WIB	163
Tabel 64 Atenuasi intensitas gempa bumi 13 Oktober 2019 pukul 00:14:44 WIB.....	163
Tabel 65 Atenuasi intensitas gempa bumi 14 Oktober 2019 pukul 02:35:16 WIB.....	164
Tabel 66 Atenuasi intensitas gempa bumi 24 Oktober 2019 pukul 20:38:18 WIB.....	166
Tabel 67 Atenuasi intensitas gempa bumi 28 Oktober 2019 pukul 11:07:49 WIB.....	167
Tabel 68 Atenuasi intensitas gempa bumi 29 Oktober 2019 pukul 10:36:26 WIB.....	168
Tabel 69 Atenuasi intensitas gempa bumi 29 Oktober 2019 pukul 13:45:32 WIB.....	169
Tabel 70 Atenuasi intensitas gempa bumi 31 Oktober 2019 pukul 00:29:03 WIB.....	171
Tabel 71 Atenuasi intensitas gempa bumi 07 November 2019 pukul 11:35:35 WIB.....	172
Tabel 72 Atenuasi intensitas gempa bumi 16 November 2019 pukul 09:24:43 WIB.....	179
Tabel 73 Atenuasi intensitas gempa bumi 17 November 2019 pukul 23:42:57 WIB.....	181
Tabel 74 Atenuasi intensitas gempa bumi 18 November 2019 pukul 18:24:04 WIB.....	181
Tabel 75 Atenuasi intensitas gempa bumi 20 November 2019 pukul 13:32:13 WIB.....	182
Tabel 76 Atenuasi intensitas gempa bumi 25 November 2019 pukul 08:01:13 WIB.....	183
Tabel 77 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 17:55:29 WIB	186
Tabel 78 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 18:24:25 WIB.....	186
Tabel 79 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 20:21:03 WIB.....	187
Tabel 80 Atenuasi intensitas gempa bumi 15 Desember 2019 pukul 21:09:11 WIB.....	190
Tabel 81 Atenuasi intensitas gempa bumi 25 Desember 2019 pukul 23:56:25 WIB.....	191

DAFTAR GAMBAR

Gambar 1 Regionalisasi sumber gempabumi di Indonesia.....	1
Gambar 2 Kejadian gempabumi menurut kekuatan Magnitudo.....	3
Gambar 3 Prosentase kejadian gempabumi menurut jarak dari Stasiun Geofisika Manado.....	3
Gambar 4 Peta sebaran episenter gempabumi wilayah PGR 10 tahun 2019.....	4
Gambar 5 Sebaran episenter gempabumi bulan Januari 2019	20
Gambar 6 Grafik gempabumi berdasarkan magnitudo bulan Januari 2019	22
Gambar 7 Grafik persentase gempabumi berdasarkan magnitudo bulan Januari 2019.....	22
Gambar 8 Sebaran episenter gempabumi bulan Februari 2019.....	27
Gambar 9 Grafik gempabumi berdasarkan magnitudo bulan Februari 2019	29
Gambar 10 Grafik persentase gempabumi berdasarkan magnitudo bulan Februari 2019	29
Gambar 11 Sebaran episenter gempabumi bulan Maret 2019.....	34
Gambar 12 Grafik gempabumi berdasarkan magnitudo bulan Maret 2019.....	36
Gambar 13 Grafik persentase gempabumi berdasarkan magnitudo bulan Maret 2019.....	36
Gambar 14 Sebaran episenter gempabumi bulan April 2019	39
Gambar 15 Grafik gempabumi berdasarkan magnitudo bulan April 2019.....	41
Gambar 16 Grafik persentase gempabumi berdasarkan magnitudo bulan April 2019.....	41
Gambar 17 Sebaran episenter gempabumi bulan Mei 2019.....	46
Gambar 18 Grafik gempabumi berdasarkan magnitudo bulan Mei 2019	48
Gambar 19 Grafik persentase gempabumi berdasarkan magnitudo bulan Mei 2019	48
Gambar 20 Sebaran episenter gempabumi bulan Juni 2019.....	54
Gambar 21 Grafik gempabumi berdasarkan magnitudo bulan Juni 2019	56
Gambar 22 Grafik persentase gempabumi berdasarkan magnitudo bulan Juni 2019	56
Gambar 23 Sebaran episenter gempabumi bulan Juli 2019	62
Gambar 24 Grafik gempabumi berdasarkan magnitudo bulan Juli 2019.....	64
Gambar 25 Grafik persentase gempabumi berdasarkan magnitudo bulan Juli 2019.....	64
Gambar 26 Sebaran episenter gempabumi bulan Agustus 2019	67
Gambar 27 Grafik gempabumi berdasarkan magnitudo bulan Agustus 2019.....	69
Gambar 28 Grafik persentase gempabumi berdasarkan magnitudo bulan Agustus 2019	69
Gambar 29 Sebaran episenter gempabumi bulan September 2019.....	75
Gambar 30 Grafik gempabumi berdasarkan magnitudo bulan September 2019.....	77
Gambar 31 Grafik persentase gempabumi berdasarkan magnitudo bulan September 2019.....	77
Gambar 32 Sebaran episenter gempabumi bulan Oktober 2019	83
Gambar 33 Grafik gempabumi berdasarkan magnitudo bulan Oktober 2019.....	85
Gambar 34 Grafik persentase gempabumi berdasarkan magnitudo bulan Oktober 2019.....	85
Gambar 35 Sebaran episenter gempabumi bulan November 2019	97
Gambar 36 Grafik gempabumi berdasarkan magnitudo bulan November 2019.....	99
Gambar 37 Grafik persentase gempabumi berdasarkan magnitudo bulan November 2019.....	99
Gambar 38 Sebaran episenter gempabumi bulan Desember 2019	104
Gambar 39 Grafik gempabumi berdasarkan magnitudo bulan Desember 2019.....	106
Gambar 40 Grafik persentase gempabumi berdasarkan magnitudo bulan Desember 2019.....	106
Gambar 41 Perbandingan antara skala MMI dengan percepatan tanah maksimum	107
Gambar 42 Peta Guncangan Gempabumi 5 Januari 2019 pukul 08:04:20 WIB.....	108
Gambar 43 Peta Guncangan Gempabumi 9 Januari 2019 pukul 16:59:23 WIB	109
Gambar 44 Peta Guncangan Gempabumi 7 Januari 2019 pukul 00:27:19 WIB.....	110
Gambar 45 Peta Guncangan Gempabumi 13 Januari 2019 pukul 10:36:19 WIB	110
Gambar 46 Peta Guncangan Gempabumi 16 Januari 2019 pukul 17:49:30 WIB	111

Gambar 47 Peta Guncangan Gempabumi 20 Januari 2019 pukul 19:46:44 WIB	112
Gambar 48 Peta Guncangan Gempabumi 21 Januari 2019 pukul 17:45:56 WIB	113
Gambar 49 Peta Guncangan Gempabumi 23 Januari 2019 pukul 19:11:09 WIB	114
Gambar 50 Peta Guncangan Gempabumi 2 Februari 2019 pukul 08:11:02 WIB.....	115
Gambar 51 Peta Guncangan Gempabumi 6 Februari 2019 pukul 06:17:47 WIB.....	116
Gambar 52 Peta Guncangan Gempabumi 6 Februari 2019 pukul 14:37:45 WIB.....	117
Gambar 53 Peta Guncangan Gempabumi 6 Februari 2019 pukul 18:55:05 WIB.....	117
Gambar 54 Peta Guncangan Gempabumi 7 Februari 2019 pukul 11:15:29 WIB.....	118
Gambar 55 Peta Guncangan Gempabumi 7 Februari 2019 pukul 17:03:06 WIB.....	119
Gambar 56 Peta Guncangan Gempabumi 9 Februari 2019 pukul 11:08:55 WIB.....	119
Gambar 57 Peta Guncangan Gempabumi 14 Februari 2019 pukul 10:42:42 WIB.....	120
Gambar 58 Peta Guncangan Gempabumi 16 Februari 2019 pukul 22:46:33 WIB.....	120
Gambar 59 Peta Guncangan Gempabumi 18 Februari 2019 pukul 08:18:08 WIB.....	121
Gambar 60 Peta Guncangan Gempabumi 20 Februari 2019 pukul 07:10:41 WIB.....	122
Gambar 61 Peta Guncangan Gempabumi 20 Februari 2019 pukul 08:52:22 WIB.....	123
Gambar 62 Peta Guncangan Gempabumi 23 Februari 2019 pukul 18:43:58 WIB.....	123
Gambar 63 Peta Guncangan Gempabumi 24 Februari 2019 pukul 20:29:33 WIB.....	124
Gambar 64 Peta Guncangan Gempabumi 3 Maret 2019 pukul 17:54:44 WIB	126
Gambar 65 Peta Guncangan Gempabumi 8 Maret 2019 pukul 17:28:19 WIB	127
Gambar 66 Peta Guncangan Gempabumi 13 Maret 2019 pukul 08:50:46 WIB	127
Gambar 67 Peta Guncangan Gempabumi 16 Maret 2019 pukul 06:07:57 WIB	128
Gambar 68 Peta Guncangan Gempabumi 19 Maret 2019 pukul 21:35:22 WIB	128
Gambar 69 Peta Guncangan Gempabumi 24 Maret 2019 pukul 11:37:37 WIB	129
Gambar 70 Peta Guncangan Gempabumi 8 April 2019 pukul 02:45:34 WIB	131
Gambar 71 Peta Guncangan Gempabumi 8 April 2019 pukul 23:16:35 WIB	132
Gambar 72 Peta Guncangan Gempabumi 19 April 2019 pukul 14:29:58 WIB	132
Gambar 73 Peta Guncangan Gempabumi 24 April 2019 pukul 09:17:20 WIB	133
Gambar 74 Peta Guncangan Gempabumi 24 April 2019 pukul 10:28:27 WIB	133
Gambar 75 Peta Guncangan Gempabumi 28 April 2019 pukul 23:06:15 WIB	134
Gambar 76 Peta Guncangan Gempabumi 1 Mei 2019 pukul 12:15:52 WIB.....	135
Gambar 77 Peta Guncangan Gempabumi 4 Mei 2019 pukul 05:22:38 WIB.....	136
Gambar 78 Peta Guncangan Gempabumi 5 Mei 2019 pukul 04:02:11 WIB.....	137
Gambar 79 Peta Guncangan Gempabumi 5 Mei 2019 pukul 06:51:01 WIB.....	138
Gambar 80 Peta Guncangan Gempabumi 5 Mei 2019 pukul 07:05:40 WIB.....	138
Gambar 81 Peta Guncangan Gempabumi 5 Mei 2019 pukul 20:55:31 WIB.....	139
Gambar 82 Peta Guncangan Gempabumi 9 Mei 2019 pukul 11:33:56 WIB.....	139
Gambar 83 Peta Guncangan Gempabumi 12 Mei 2019 pukul 01:17:23 WIB.....	140
Gambar 84 Peta Guncangan Gempabumi 12 Mei 2019 pukul 06:43:42 WIB.....	141
Gambar 85 Peta Guncangan Gempabumi 14 Mei 2019 pukul 19:15:56 WIB.....	142
Gambar 86 Peta Guncangan Gempabumi 15 Mei 2019 pukul 20:28:19 WIB.....	142
Gambar 87 Peta Guncangan Gempabumi 16 Mei 2019 pukul 10:56:18 WIB.....	143
Gambar 88 Peta Guncangan Gempabumi 17 Mei 2019 pukul 19:21:00 WIB.....	144
Gambar 89 Peta Guncangan Gempabumi 22 Mei 2019 pukul 01:42:48 WIB.....	144
Gambar 90 Peta Guncangan Gempabumi 27 Mei 2019 pukul 00:00:05 WIB.....	145
Gambar 91 Peta Guncangan Gempabumi 30 Mei 2019 pukul 05:13:46 WIB.....	146
Gambar 92 Peta Guncangan Gempabumi 30 Mei 2019 pukul 11:33:23 WIB.....	147
Gambar 93 Peta Guncangan Gempabumi 31 Mei 2019 pukul 17:12:33 WIB.....	147
Gambar 94 Peta Guncangan Gempabumi 4 Juni 2019 pukul 07:35:30 WIB.....	148
Gambar 95 Peta Guncangan Gempabumi 11 Juni 2019 pukul 12:45:58 WIB.....	148

Gambar 96 Peta Guncangan Gempabumi 12 Juni 2019 pukul 23:41:37 WIB.....	149
Gambar 97 Peta Guncangan Gempabumi 24 Juni 2019 pukul 15:17:07 WIB.....	150
Gambar 98 Peta Guncangan Gempabumi 3 Juli 2019 pukul 21:18:53 WIB	151
Gambar 99 Peta Guncangan Gempabumi 7 Juli 2019 pukul 22:08:42 WIB	151
Gambar 100 Peta Guncangan Gempabumi 8 Juli 2019 pukul 13:20:15 WIB	153
Gambar 101 Peta Guncangan Gempabumi 9 Juli 2019 pukul 01:52:34 WIB	153
Gambar 102 Peta Guncangan Gempabumi 15 Juli 2019 pukul 03:52:25 WIB	154
Gambar 103 Peta Guncangan Gempabumi 2 Agustus 2019 pukul 03:35:23 WIB.....	155
Gambar 104 Peta Guncangan Gempabumi 6 Agustus 2019 pukul 10:51:19 WIB.....	156
Gambar 105 Peta Guncangan Gempabumi 27 Agustus 2019 pukul 11:39:38 WIB.....	156
Gambar 106 Peta Guncangan Gempabumi 27 Agustus 2019 pukul 13:31:21 WIB.....	157
Gambar 107 Peta Guncangan Gempabumi 29 Agustus 2019 pukul 17:53:07 WIB.....	157
Gambar 108 Peta Guncangan Gempabumi 4 September 2019 pukul 20:37:48 WIB	158
Gambar 109 Peta Guncangan Gempabumi 11 September 2019 pukul 06:32:27 WIB.....	159
Gambar 110 Peta Guncangan Gempabumi 17 September 2019 pukul 21:37:59 WIB.....	160
Gambar 111 Peta Guncangan Gempabumi 18 September 2019 pukul 14:01:02 WIB.....	160
Gambar 112 Peta Guncangan Gempabumi 29 September 2019 pukul 09:02:54 WIB.....	161
Gambar 113 Peta Guncangan Gempabumi 4 Oktober 2019 pukul 07:45:55 WIB	162
Gambar 114 Peta Guncangan Gempabumi 6 Oktober 2019 pukul 22:50:32 WIB	162
Gambar 115 Peta Guncangan Gempabumi 13 Oktober 2019 pukul 00:14:44 WIB	163
Gambar 116 Peta Guncangan Gempabumi 14 Oktober 2019 pukul 02:35:16 WIB	164
Gambar 117 Peta Guncangan Gempabumi 20 Oktober 2019 pukul 04:51:31 WIB.....	165
Gambar 118 Peta Guncangan Gempabumi 24 Oktober 2019 pukul 20:38:18 WIB.....	165
Gambar 119 Peta Guncangan Gempabumi 28 Oktober 2019 pukul 11:07:49 WIB	166
Gambar 120 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 09:04:45 WIB.....	167
Gambar 121 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 10:36:26 WIB.....	168
Gambar 122 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 13:45:32 WIB	169
Gambar 123 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 14:29:05 WIB.....	170
Gambar 124 Peta Guncangan Gempabumi 31 Oktober 2019 pukul 00:29:03 WIB.....	170
Gambar 125 Peta Guncangan Gempabumi 07 November 2019 pukul 11:35:35 WIB	172
Gambar 126 Peta Guncangan Gempabumi 11 November 2019 pukul 10:48:48 WIB	173
Gambar 127 Peta Guncangan Gempabumi 12 November 2019 pukul 06:40:59 WIB.....	173
Gambar 128 Peta Guncangan Gempabumi 14 November 2019 pukul 23:17:43 WIB.....	174
Gambar 129 Peta Guncangan Gempabumi 15 November 2019 pukul 01:45:39 WIB	174
Gambar 130 Peta Guncangan Gempabumi 15 November 2019 pukul 03:39:07 WIB.....	175
Gambar 131 Peta Guncangan Gempabumi 15 November 2019 pukul 04:12:56 WIB	175
Gambar 132 Peta Guncangan Gempabumi 15 November 2019 pukul 04:37:26 WIB	176
Gambar 133 Peta Guncangan Gempabumi 15 November 2019 pukul 05:34:20 WIB.....	176
Gambar 134 Peta Guncangan Gempabumi 15 November 2019 pukul 06:17:20 WIB	177
Gambar 135 Peta Guncangan Gempabumi 15 November 2019 pukul 08:17:39 WIB.....	177
Gambar 136 Peta Guncangan Gempabumi 15 November 2019 pukul 12:06:09 WIB.....	178
Gambar 137 Peta Guncangan Gempabumi 15 November 2019 pukul 19:52:22 WIB.....	178
Gambar 138 Peta Guncangan Gempabumi 16 November 2019 pukul 09:24:43 WIB.....	179
Gambar 139 Peta Guncangan Gempabumi 16 November 2019 pukul 17:19:16 WIB.....	180
Gambar 140 Peta Guncangan Gempabumi 17 November 2019 pukul 23:42:57 WIB.....	180
Gambar 141 Peta Guncangan Gempabumi 18 November 2019 pukul 18:24:04 WIB.....	181
Gambar 142 Peta Guncangan Gempabumi 20 November 2019 pukul 13:32:13 WIB.....	182
Gambar 143 Peta Guncangan Gempabumi 24 November 2019 pukul 21:48:06 WIB.....	183
Gambar 144 Peta Guncangan Gempabumi 25 November 2019 pukul 08:01:13 WIB.....	183

Gambar 145 Peta Guncangan Gempabumi 28 November 2019 pukul 12:32:04 WIB	184
Gambar 146 Peta Guncangan Gempabumi 28 November 2019 pukul 23:25:05 WIB	184
Gambar 147 Peta Guncangan Gempabumi 3 Desember 2019 pukul 17:52:24 WIB	185
Gambar 148 Peta Guncangan Gempabumi 3 Desember 2019 pukul 17:55:29 WIB	185
Gambar 149 Peta Guncangan Gempabumi 3 Desember 2019 pukul 18:24:25 WIB	186
Gambar 150 Peta Guncangan Gempabumi 3 Desember 2019 pukul 20:21:03 WIB	187
Gambar 151 Peta Guncangan Gempabumi 5 Desember 2019 pukul 19:24:45 WIB	188
Gambar 152 Peta Guncangan Gempabumi 11 Desember 2019 pukul 09:13:09 WIB	188
Gambar 153 Peta Guncangan Gempabumi 15 Desember 2019 pukul 13:11:54 WIB	189
Gambar 154 Peta Guncangan Gempabumi 15 Desember 2019 pukul 21:09:11 WIB	189
Gambar 155 Peta Guncangan Gempabumi 25 Desember 2019 pukul 23:56:25 WIB	190
Gambar 156 Peta Guncangan Gempabumi 29 Desember 2019 pukul 01:25:45 WIB	191
Gambar 157 Peta Guncangan Gempabumi 29 Desember 2019 pukul 16:12:16 WIB	192
Gambar 158 Peta Guncangan Gempabumi 31 Desember 2019 pukul 12:18:27 WIB	192

DATA STASIUN SEISMIK
DALAM WILAYAH STASIUN GEOFISIKA MANADO

1. Alamat Stasiun : Jl. Harapan No.42 Winangun, Manado, Sulawesi Utara
2. Koordinat Stasiun : 01°26'35" LU dan 124°50'21" BT
3. Kode Stasiun : MNI
4. Batuan : Basalt Peroksin
5. Ketinggian : 128 Meter DPL
6. Sistem Monitoring : Seiscomp3 dan INASEIS (JIS-view)

DAFTAR SENSOR SEISMOMETER DAN AKSELEROMETER TANGGUNG JAWAB
STASIUN GEOFISIKA KLAS 1 MANADO

1. Kode stasiun : MNI
Lokasi : Manado, Sulawesi Utara
Digitizer : Taurus
Sensor : Trilium-120QA (broadband seismometer dan Tokyo Keiki TSM-1) dan Akselerometer
2. Kode stasiun : SLMI
Lokasi : Manado, Sulawesi Utara
Digitizer : Nanometrics Taurus
Sensor : Metrozet TSA-100S (akselerometer)
3. Kode stasiun : TMSI
Lokasi : Tondano, Sulawesi Utara
Digitizer : Trident-305
Sensor : Trilium-120P (broadband seismometer) dan Titan (akselerometer)
4. Kode stasiun : KMSI
Lokasi : Kotamobagu, Sulawesi Utara
Digitizer : Trident-305
Sensor : Trilium-120Q (broadband seismometer) dan TSA-100S (akselerometer)
5. Kode stasiun : SGSI
Lokasi : Sangihe, Sulawesi Utara
Digitizer : Trident-305

- Sensor : Trilium-120Q (broadband seismometer) dan BBAS-2 (akselerometer)
6. Kode stasiun : MGA1
 Lokasi : Melonguane, Sulawesi Utara
 Digitizer : Trident-305
 Sensor : Trilium-120P (broadband seismometer) dan TitanOpen (akselerometer)
7. Kode stasiun : PSSI
 Lokasi : Siau, Sulawesi Utara
 Digitizer : Centaur
 Sensor : Trilium-120Q (broadband seismometer) dan Titan (akselerometer)
8. Kode stasiun : SAMI
 Lokasi : Sam Ratulangi, Sulawesi Utara
 Digitizer : Titan
 Sensor : Titan AG (akselerometer)
9. Kode stasiun : KWSI
 Lokasi : Kayuwatu, Sulawesi Utara
 Digitizer : Titan
 Sensor : Titan AG (akselerometer)
10. Kode stasiun : BTSI
 Lokasi : Bitung, Sulawesi Utara
 Digitizer : Titan
 Sensor : Titan AG (akselerometer)
11. Kode stasiun : (Belum ditentukan)
 Lokasi : Bolaang Mongondow Selatan
 Sensor : broadband seismometer dan akselerometer
 Terpasang Desember 2019

DAFTAR ISTILAH

Daftar istilah yang digunakan dalam memahami hasil analisa dan informasi gempabumi adalah sebagai berikut:

- a. *Date*
Menunjukkan tanggal terjadinya gempabumi.
- b. *OT (Origin Time)*
Menunjukkan waktu terjadinya gempabumi yang terdiri atas HH:MM:SS
HH : Jam terjadinya gempabumi
MM : Menit terjadinya gempabumi
SS : Detik terjadinya gempabumi
- c. *Latitude*
Menunjukkan lokasi lintang sumber gempabumi (episenter).
- d. *Longitude*
Menunjukkan lokasi bujur sumber gempabumi (episenter).
- e. *Depth*
Menunjukkan kedalaman sumber gempabumi, dinyatakan dalam kilometer.
- f. *Magnitudo* atau *mag*
Menunjukkan Magnitudo atau kekuatan gempabumi.
- g. *TypeMag*
Menunjukkan tipe magnitudo yang digunakan dalam perhitungan kekuatan gempabumi.
- h. *Region*
Menunjukkan daerah zona seismik berdasarkan pembagian yang dilakukan oleh Flinn-Engdahl.
- i. *Intensitas*
Menunjukkan dampak gempabumi di permukaan bumi misalnya, di suatu tempat terjadi kerusakan atau hanya dirasakan getarannya.
- j. *MMI*
Modified Mercally Intencity (MMI) merupakan salah satu jenis skala intensitas gempabumi
- k. *SIG*
Skala Intensitas Gempabumi (SIG) merupakan salah satu jenis skala intensitas gempabumi.

l. *Epicenter* atau *epic*

Titik lokasi di permukaan bumi yang merupakan hasil proyeksi dari pusat terjadinya gempa di dalam bumi.

m. PGN

Pusat Gempa Nasional, sebagai pusat informasi gempabumi nasional yang bertempat di Jakarta.

n. PGR

Pusat Gempa Regional, sebagai pusat informasi gempabumi di masing-masing regional.

o. Gempa Tele

Kejadian gempa dengan jarak lebih dari 2° (± 220 km) dari lokasi stasiun.

p. Gempa Lokal

Kejadian gempa dengan jarak kurang dari 2° (± 220 km) dari lokasi stasiun.

q. *Shakemap*

Peta tingkat guncangan akibat kejadian gempabumi.

r. Seismisitas

Katalog yang memuat persebaran lokasi pusat gempabumi

s. *WRS*

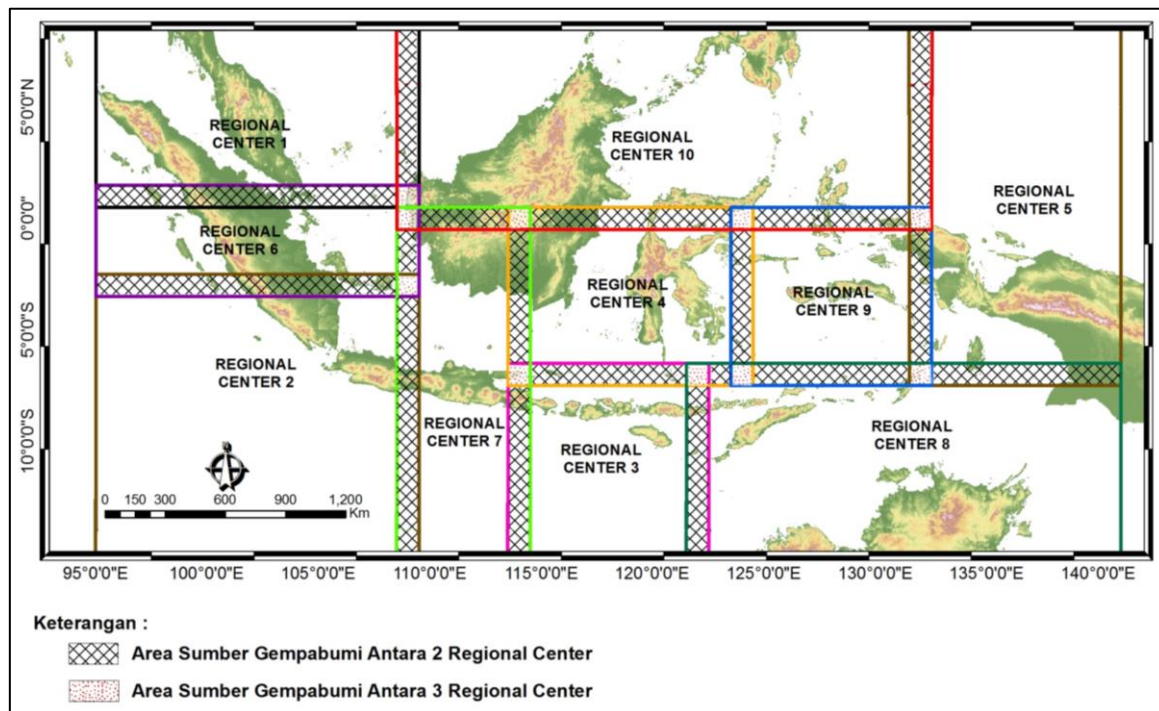
Warning Receiver System, sistem peringatan dini tsunami yang terdiri dari 2 jenis yaitu *WRS2Way* dan *WRS DVB (WRS-Digital Video Broadcast)*.

I. PENDAHULUAN

Gempabumi merupakan fenomena alam yang tidak dapat dihindarkan dan jika terjadi dengan kekuatan signifikan membawa bencana bagi umat manusia. Dampak gempabumi merusak dapat menyebabkan korban jiwa dan kerusakan infrastruktur.

Badan Meteorologi Klimatologi dan Geofisika (BMKG) sebagai instansi pemerintah yang salah satu tugasnya adalah melakukan pengamatan fenomena gempabumi, wajib memberikan informasi yang tepat dan akurat untuk keselamatan masyarakat. Buletin tahunan ini adalah salah satu informasi BMKG untuk masyarakat dan para *stakeholder* yang berisi hasil analisa seismogram berupa kejadian gempabumi yang terjadi di wilayah pemantauan Stasiun Geofisika Kelas 1 Manado yang selanjutnya disebut Stasiun Geofisika Manado sebagai Pusat Gempa Regional (PGR) 10, yang meliputi bagian Utara dari Pulau Kalimantan, sebagian Sulawesi Tengah, Gorontalo, Sulawesi Utara, dan Maluku Utara.

Stasiun Geofisika Manado yang juga sebagai PGR 10, dalam fungsi pemantauan kejadian gempabumi di wilayahnya melakukan koordinasi dengan Stasiun Geofisika Gorontalo dan Stasiun Geofisika Ternate. Parameter gempabumi yang dimasukkan dalam buletin ini dikeluarkan oleh Pusat Gempabumi Regional untuk gempabumi dengan Magnitudo kurang dari 5 ($M < 5$), sementara untuk gempabumi dengan kekuatan $M \geq 5$ dikeluarkan oleh Pusat Gempabumi Nasional (PGN) di kantor pusat BMKG Jakarta. Pembagian wilayah pemantauan kejadian gempabumi dari setiap regional BMKG di Indonesia adalah seperti digambarkan dalam Gambar 1.



Gambar 1 Regionalisasi sumber gempabumi di Indonesia

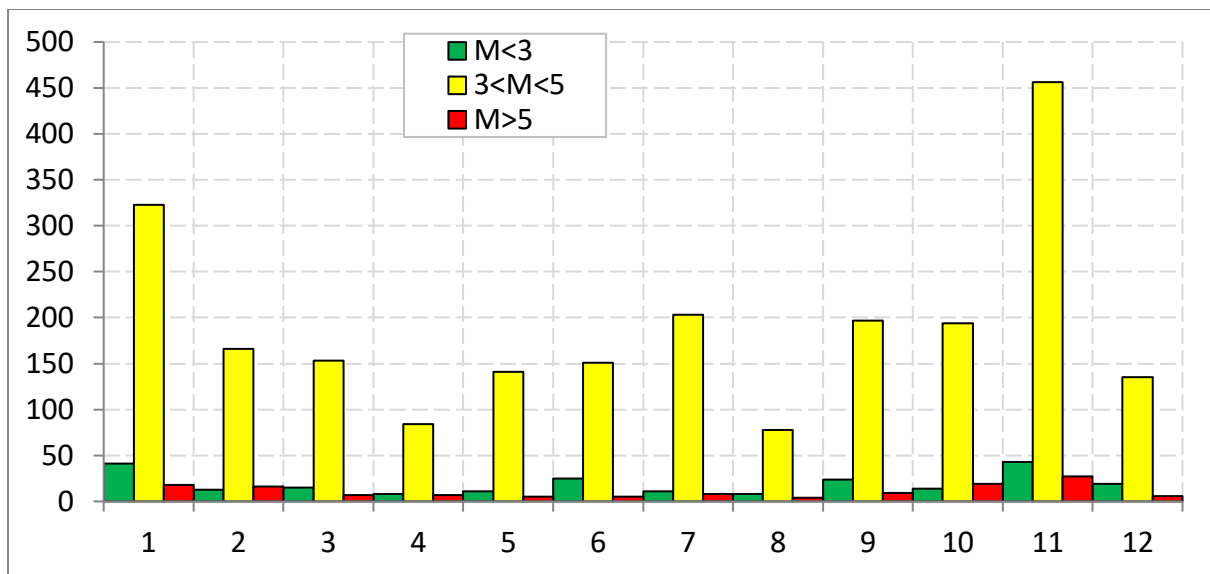
II. REKAPITULASI KEJADIAN GEMPABUMI TAHUN 2019

Jumlah gempabumi yang tercatat di Stasiun Geofisika Manado pada tahun 2019 berjumlah total 2644 kejadian. Dengan bulan November menunjukkan jumlah gempabumi terbanyak sebanyak 526 kejadian dan terendah pada bulan Agustus sebanyak 90 kejadian.

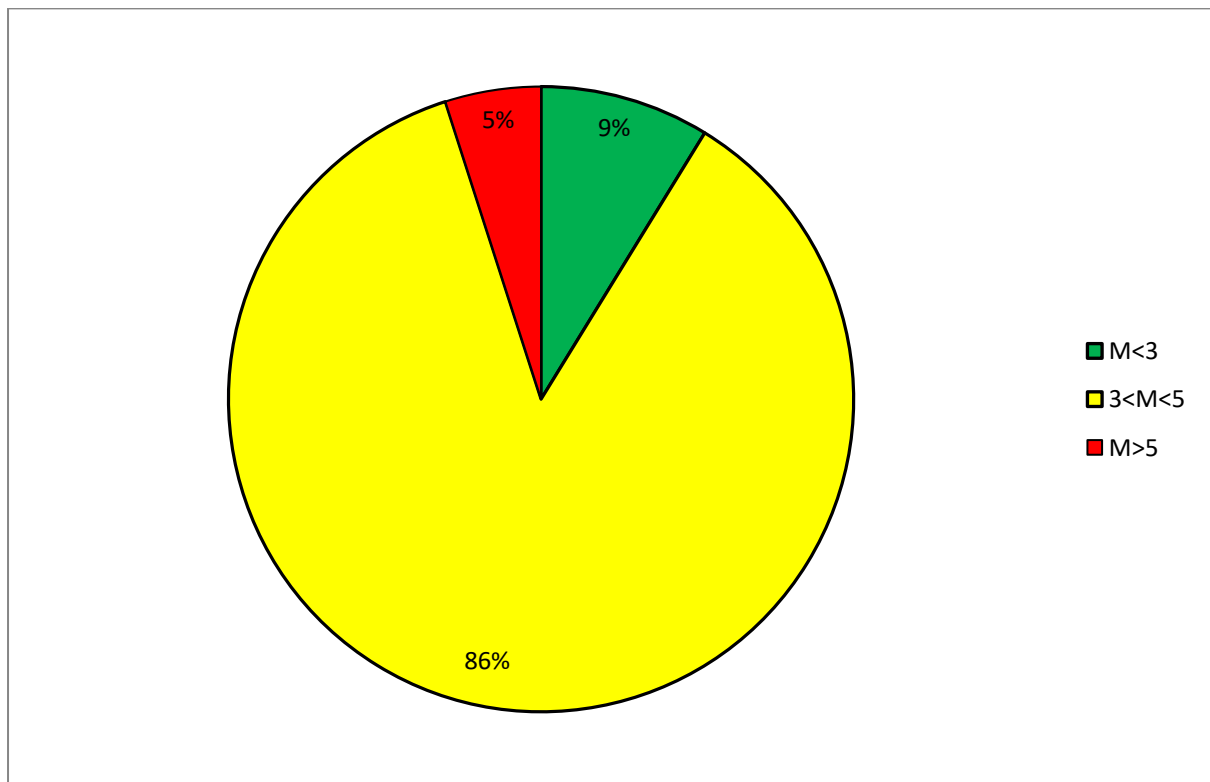
Dari sisi Magnitudo, kejadian gempabumi dengan magnitudo lebih dari sama dengan 3 dan kurang dari 5 terjadi paling sering sebanyak 2281 kejadian. Diikuti oleh gempabumi dengan magnitudo $M < 3$ sebanyak 232 kejadian, dan magnitudo $M \geq 5$ sebanyak 131 kejadian. Pada Tabel 1 ditunjukkan jumlah kejadian total gempabumi setiap bulan serta jumlah gempabumi dirasakan yang parameter rincinya dijelaskan pada Tabel 2. Gambar 2 dan 3 masing-masing menunjukkan grafik kejadian gempabumi berdasarkan klasifikasi magnitudo setiap bulan dan prosentase kejadian gempabumi berdasarkan klasifikasi megnitudo. Peta sebaran episenter gempabumi di wilayah PGR 10 selama tahun 2019 digambarkan pada Gambar 4.

Tabel 1 Rekapitulasi kejadian gempabumi tahun 2019

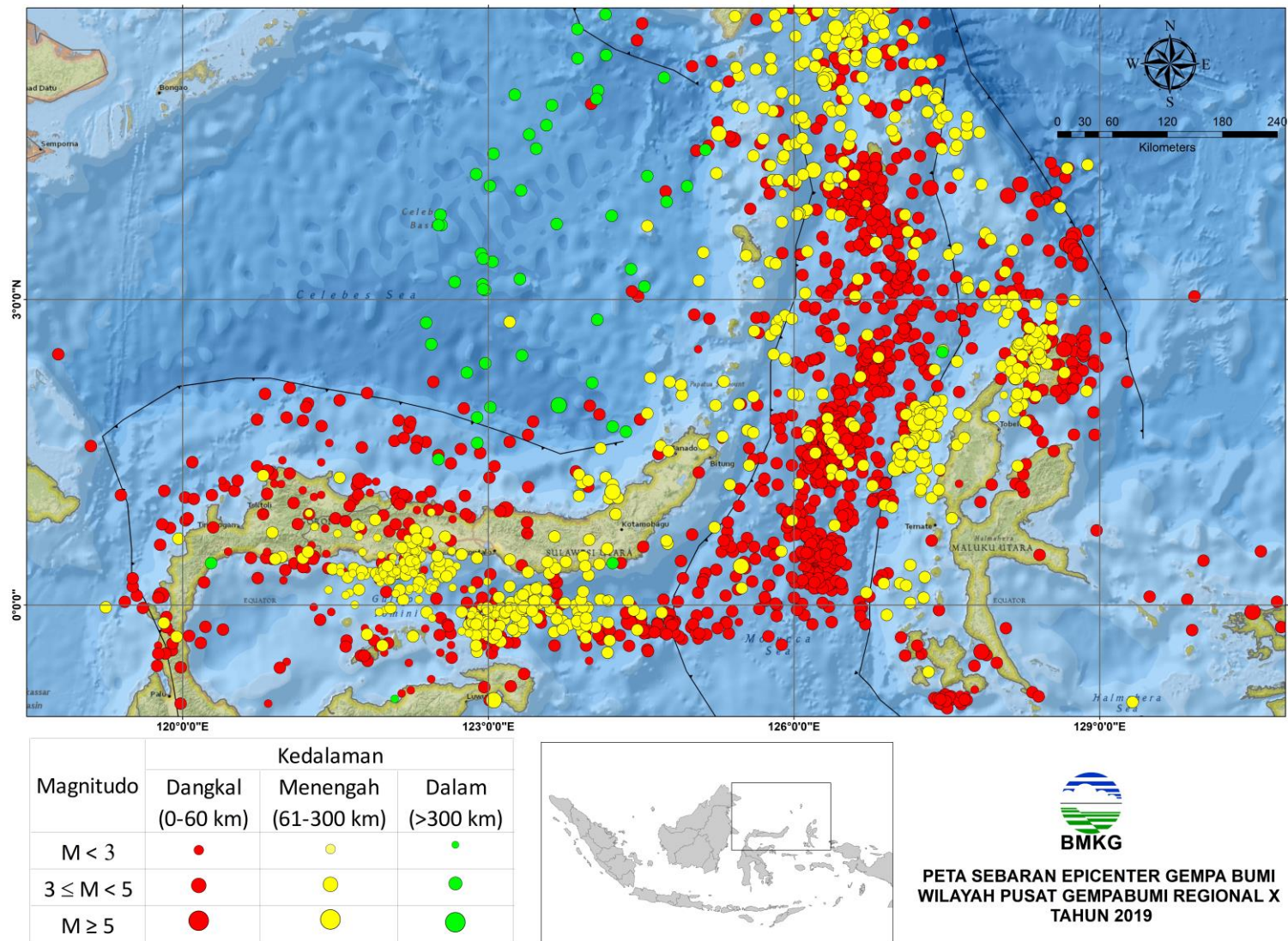
Bulan	Jumlah Gempa	Jumlah Gempa Dirasakan	Menurut magnitudo		
			$M < 3$	$3 \leq M < 5$	$M \geq 5$
Januari	382	8	41	323	18
Februari	195	14	13	166	16
Maret	175	6	15	153	7
April	99	6	8	84	7
Mei	157	18	11	141	5
Juni	181	4	25	151	5
Juli	222	5	11	203	8
Agustus	90	5	8	78	4
September	230	5	24	197	9
Oktober	227	12	14	194	19
Nopember	526	22	43	456	27
Desember	160	12	19	135	6
Total	2644	117	232	2281	131



Gambar 2 Kejadian gempabumi menurut kekuatan Magnitudo



Gambar 3 Prosentase kejadian gempabumi menurut jarak dari Stasiun Geofisika Manado



Gambar 4 Peta sebaran episenter gempabumi wilayah PGR 10 tahun 2019

Tabel 2 Rekapitulasi kejadian gempabumi dirasakan tahun 2019

NO	TANGGAL	WAKTU (WIB)	LINTANG	BUJUR	MAG	KED (Km)	DIRASAKAN (MMI)	KETERANGAN
1	05/01/2019	08:04:20	4.32 LU	126.18 BT	5.3	120	Sangihe (II-III MMI)	Pusat gempa 65 km barat laut Melonguane, talaud, Sulut
2	07/01/2019	00:27:19	2.37 LU	126.75 BT	6.6	47	Manado, Bitung, Siau, Naha, Tobelo, Galela, Bolmong (II-III MMI)	Pusat gempa 154 km barat laut Tobelo, Halmahera Utara, Maluku
3	09/01/2019	16:59:23	1.60 LU	122.39 BT	4.4	6	Sumalata (II MMI), Kwandang (I MMI)	Pusat gempa 68 km utara Bolontio, Gorontalo Utara, Gorontalo
4	13/01/2019	10:36:14	2.27 LU	128.48 BT	4.5	25	Morotai (I-II MMI)	Pusat gempa 40 km timur laut Daruba, Morotai, Maluku
5	16/01/2019	17:49:30	3.47 LU	128.64 BT	5.3	10	Morotai (II-III MMI)	Pusat gempa 161 km utara Daruba, Morotai, Maluku
6	20/01/2019	19:46:44	1.30 LU	120.92 BT	4.0	10	Toli-toli (II MMI)	Pusat gempa 50 km timur laut Toli-toli, Sulawesi Tengah
7	21/01/2019	17:45:56	0.21 LS	123.28 BT	4.8	96	Gorontalo (II MMI)	Pusat gempa 86 km baratdaya Bone Bolango, Gorontalo
8	23/01/2019	19:11:09	1.05 LU	126.99 BT	4.0	17	Ternate (II-III MMI)	Pusat gempa 65 km barat laut Tidore, Maluku Utara
9	02/02/2019	08:11:02	0.35 LU	125.46 BT	5.2	65	Manado, Kotamobagu, Tomohon, Bitung, Minahasa, Minahasa Utara (II MMI)	Pusat gempa 104 km tenggara Kotamobagu, Sulawesi Utara
10	06/02/2019	06:17:47	2.63 LU	128.38 BT	5.0	48	Morotai, Tobelo (II MMI)	Pusat gempa 65 km utara Daruba, Morotai, Maluku
11	06/02/2019	14:37:45	1.15 LU	122.73 BT	3.2	10	Gorontalo Utara (II MMI)	Pusat gempa 34 km barat laut Anggrek, Gorontalo Utara, Gorontalo
12	06/02/2019	18:55:05	2.43 LU	128.96 BT	4.8	10	Daruba (III MMI)	Pusat gempa 62 km timur laut Morotai, Maluku Utara
13	07/02/2019	11:15:28	1.58 LU	126.43 BT	5.7	39	Manado, Minahasa Utara, Minahasa Tenggara, Bitung, Ternate (III-IV MMI)	Pusat gempa 128 km barat laut Jailolo, Halmahera Barat, Maluku
14	07/02/2019	17:03:06	2.27 LU	128.75 BT	5.2	13	Daruba, Tobelo (III MMI)	Pusat gempa 54 km timur laut Daruba, Morotai, Maluku
15	09/02/2019	11:08:55	2.20 LU	128.67 BT	3.9	20	Morotai (III MMI)	Pusat gempa 35 km tenggara Morotai, Maluku Utara
16	14/02/2019	10:42:42	2.20 LU	128.71 BT	4.9	10	Morotai (III MMI), Tobelo, Galela (II-III MMI)	Pusat gempa 38 km tenggara Morotai, Maluku Utara
17	16/02/2019	22:46:33	0.70 LU	123.38 BT	4.0	10	Gorontalo (II MMI)	Pusat gempa 15 km timur laut, Bone Bolango, Gorontalo
18	18/02/2019	08:18:08	1.74 LU	126.38 BT	4.7	4	Bitung (II MMI)	Pusat gempa 126 km tenggara Siau, Sulawesi Utara
19	20/02/2019	07:10:41	0.78 LU	126.20 BT	5.6	62	Ternate (II-III MMI), Manado, Bitung, Kotamobagu (II MMI)	Pusat gempa 131 km barat Ternate, Maluku Utara
20	20/02/2019	08:52:22	0.03 LS	119.81 BT	4.5	10	Sirenja (III MMI), Talise, Donggala (II MMI)	Pusat gempa 8 km barat Tambu, Donggala, Sulteng

21	23/02/2019	18:43:58	1.19 LU	128.22 BT	5.0	10	Subaim (III-IV MMI), Maba, Jailolo, Tobelo (II-III MMI), Ternate (II MMI)	Pusat gempa 57 km utara Maba, Halmahera Timur, Maluku
22	24/02/2019	20:29:33	0.54 LU	122.22 BT	5.1	98	Gorontalo, Boalemo, Pohuwato (III MMI), Kwandang (II MMI)	Pusat gempa 6 km timur laut Tilamuta, Boalemo, Gorontalo
23	03/03/2019	17:54:44	4.46 LU	125.04 BT	4.5	9	Siau (III MMI)	Pusat gempa 105 km barat laut Sangihe, Sulawesi Utara
24	08/03/2019	17:28:19	0.7 LU	121.87 BT	4.1	61	Pohuwato (II MMI)	Pusat gempa 16 km tenggara Pohuwato, Gorontalo
25	13/03/2019	08:50:46	0.02 LU	119.66 BT	5.0	10	Palu, Donggala (II- III MMI)	Pusat gempa 52 km barat laut Donggala, Sulawesi Tengah
26	16/03/2019	06:07:57	6.18 LU	125.45 BT	5.6	92	Sangihe (II-III MMI), Manado (II MMI)	Pusat gempa 275 km barat laut Melonguane, Talaud, Sulut
27	19/03/2019	21:35:22	2.45 LU	128.62 BT	4.7	10	Daruba (II MMI)	Pusat gempa 26 km timur laut Morotai, Maluku Utara
28	24/03/2019	11:37:37	1.71 LU	126.36 BT	6.1	46	Mayu (IV MMI), Manado, Tondano, Bitung (III-IV MMI), Jailolo, Weda, Ternate (III MMI), Tahuna, Siau, Tagulandang, Bolaang Uki (II-III MMI)	Pusat gempa 133 km timur Bitung, Sulawesi Utara
29	08/04/2019	02:45:31	1.01 LU	123.19 BT	5.1	47	Gorontalo Utara (V MMI), Bone Bolango (IV MMI), Gorontalo (III-IV MMI)	Pusat gempa 16 km barat laut Boroko, Bolmut, Sulut
30	08/04/2019	23:16:35	1.24 LU	126.96 BT	5.2	105	Siau (II MMI)	Pusat gempa 60 km barat Jailolo, Halmahera Barat, Maluku
31	19/04/2019	14:29:58	5.36 LU	126.90 BT	5.3	51	Miangas (III MMI)	Pusat gempa 150 km utara Melonguane, Talaud, Sulut
32	24/04/2019	09:17:20	2.22 LU	128.12 BT	5.0	95	Tobelo (III MMI)	Pusat gempa 29 km barat laut Daruba, Morotai, Maluku
33	24/04/2019	10:28:27	2.32 LU	128.15 BT	5.0	81	Tobelo, Morotai (II- III MMI)	Pusat gempa 35 km barat laut Daruba, Morotai, Maluku
34	28/04/2019	23:06:15	0.65 LU	127.47 BT	3.4	5	Tidore (III MMI)	Pusat gempa 4 km tenggara Tidore, Maluku Utara
35	01/05/2019	12:15:52	2.03 LU	128.36 BT	4.4	39	Daruba, Tobelo (II- III MMI)	Pusat gempa 7 km tenggara Daruba, Morotai, Maluku
36	04/05/2019	05:22:33	3.99 LU	126.68 BT	4.9	16	Melonguane (III MMI)	Pusat gempa 34 km timur laut Melonguane, Talaud, Sulut
37	05/05/2019	04:02:13	2.01 LU	123.66 BT	5.7	347	Bitung (II MMI)	Pusat gempa 131 km barat laut Bolaang Mongondow, Sulawesi Utara
38	05/05/2019	06:51:01	4.32 LU	126.80 BT	4.8	9	Melonguane (III MMI)	Pusat gempa 38 km timur laut Melonguane, Talaud, Sulut
39	05/05/2019	07:05:40	4.24 LU	126.68 BT	4.7	17	Melonguane (II MMI)	Pusat gempa 26 km timur laut Melonguane, Talaud, Sulut
40	05/05/2019	20:55:31	4.18 LU	126.71 BT	4.6	20	Melonguane (II MMI)	Pusat gempa 20 km timur laut Melonguane, Talaud, Sulut
41	09/05/2019	11:33:56	0.63 LU	127.35 BT	3.7	10	Tidore (III MMI)	Pusat gempa 12 km baratdaya Tidore, Maluku Utara

42	12/05/2019	01:17:23	0.10 LU	119.50 BT	4.1	10	Donggala (III MMI)	Pusat gempa 21 km barat Malei, Donggala, Sulteng
43	12/05/2019	06:43:42	0.63 LU	122.30 BT	4.6	91	Limboto, Gorontalo (II-III MMI)	Pusat gempa 12 km barat laut Tilamuta, Boalemo, Gorontalo
44	14/05/2019	19:15:56	0.85 LU	120.05 BT	3.6	5	Sojol Utara-Donggala, Dampal Selatan-Toli-toli (III MMI)	Pusat gempa 15 km barat laut Ogoamas, Donggala, Sulteng
45	15/05/2019	20:28:19	4.35 LU	126.77 BT	4.7	15	Melonguane (III-IV MMI)	Pusat gempa 40 km timur laut Melonguane, Talaud, Sulut
46	16/05/2019	10:56:18	1.74 LU	126.25 BT	4.6	10	Bitung (II-III MMI)	Pusat gempa 129 km timur laut Bitung, Sulawesi Utara
47	17/05/2019	19:21:00	0.19 LU	127.10 BT	4.7	113	Ternate (II MMI)	Pusat gempa 65 km baratdaya Tidore, Maluku Utara
48	22/05/2019	01:42:48	0.98 LU	122.17 BT	5.0	64	Gorontalo, Gorontalo Utara (III-IV MMI)	Pusat gempa 53 km utara Tilamuta, Boalemo, Gorontalo
49	27/05/2019	00:00:05	2.10 LU	128.42 BT	4.6	15	Daruba, Tobelo (III MMI)	Pusat gempa 15 km timur laut Daruba, Morotai, Malut
50	30/05/2019	05:13:46	2.15 LU	128.31 BT	4.9	57	Morotai (III MMI), Tobelo (II MMI)	Pusat gempa 11 km timur laut Daruba, Morotai, Malut
51	30/05/2019	11:33:23	0.07 LU	119.76 BT	4.4	10	Tambu (II MMI)	Pusat gempa 55 km barat laut Donggala, Sulawesi Tengah
52	31/05/2019	17:12:33	6.14 LU	126.53 BT	6.1	112	Sangihe, Melonguane (II MMI)	Pusat gempa 235 km utara Melonguane, Talaud, Sulut
53	04/06/2019	07:35:28	0.05 LU	119.68 BT	4.1	10	Malei, Alindau (III MMI)	Pusat gempa 8 km utara Malei, Donggala, Sulteng
54	11/06/2019	12:45:58	2.62 LU	117.22 BT	4.7	14	Tanjung Selor (II-III MMI)	Pusat gempa 40 km tenggara Bulungan, Kalimantan Utara
55	12/06/2019	23:41:37	0.22 LU	119.84 BT	4.0	10	Palu (III MMI), Parigi, Sigi (II-III MMI)	Pusat gempa 22 km timur laut Donggala, Sulawesi Tengah
56	24/06/2019	15:17:07	0.19 LS	124.48 BT	5.1	47	Lolak, Bolsel (II-III MMI)	Pusat gempa 80 km tenggara Bolaang Uki, Bolaang Mongondow Selatan, Sulut
57	03/07/2019	21:18:53	0.94 LU	123.11 BT	4.9	21	Lolak (III-IV MMI), Bone Bolango, Bolmong Utara (III MMI), Gorontalo (II MMI)	Pusat gempa 18 km barat laut Boroko, Bolaang Mongondow Utara, Sulut
58	07/07/2019	22:08:42	0.53 LU	126.18 BT	7.0	49	Bitung, Manado (IV-V MMI), Ternate (III-IV MMI),	Pusat gempa 133 km barat Ternate, Maluku Utara
59	08/07/2019	13:20:13	0.48 LU	126.22 BT	5.5	36	Manado (II MMI)	Pusat gempa 141 km baratdaya Ternate, Maluku Utara
60	09/07/2019	01:52:31	0.41 LU	126.30 BT	5.7	10	Ternate (II-III MMI)	Pusat gempa 125 km baratdaya Ternate, Maluku Utara
61	15/07/2019	03:52:25	0.64 LU	122.40 BT	3.8	76	Paguyaman (II MMI)	Pusat gempa 4 km barat laut Dulupi, Gorontalo
62	02/08/2019	03:35:23	1.16 LU	121.79 BT	5.2	48	Buol (III-IV MMI), Toli-toli (II-III MMI)	Pusat gempa 42 km timur Buol, Sulawesi Tengah
63	06/08/2019	10:51:16	2.20 LU	126.47 BT	5.2	52	Bitung, Siau (II-III MMI), Manado (II MMI)	Pusat gempa 136 km tenggara Ondong Siau, Siau Tagulandang Biaro, Sulut
64	27/08/2019	11:39:38	0.28 LS	119.98 BT	3.1	10	Sirenja (II-III MMI)	Pusat gempa 6 km barat laut Toribulu, Parigi Moutong, Sulteng

65	27/08/2019	13:31:23	1.47 LU	122.51 BT	4.9	39	Buol (II MMI)	Pusat gempa 84 km barat laut Kwandang, Gorontalo Utara, Gorontalo
66	29/08/2019	17:53:07	0.24 LS	123.73 BT	4.8	118	Bolaang Uki (II MMI)	Pusat gempa 74 km baratdaya Bolaang Uki, Bolmong Selatan, Sulawesi Utara
67	04/09/2019	20:37:48	2.34 LU	126.94 BT	4.9	36	Manado (II MMI)	Pusat gempa 131 km barat laut Halmahera Barat, Maluku Utara
68	11/09/2019	06:32:27	4.02 LU	126.74 BT	5.7	56	Melonguane (III-IV MMI), Tahuna (II-III MMI)	Pusat gempa 5 km timur Melonguane, Talaud, Sulut
69	17/09/2019	22:37:59	0.35 LU	122.22 BT	4.4	127	Gorontalo (II MMI)	Pusat gempa 24 km baratdaya Boalemo, Gorontalo
70	18/09/2019	14:01:03	5.44 LU	126.54 BT	5.6	20	Miangas (II-III MMI)	Pusat gempa 160 km barat laut Melonguane, Talaud, Sulut
71	29/09/2019	09:02:54	5.52 LU	126.60 BT	6.3	97	Melonguane (IV MMI), Tahuna, Siau (III MMI), Bitung (II-III MMI), Morotai (II MMI)	Pusat gempa 192 km barat laut Melonguane, Talaud, Sulut
72	04/10/2019	07:45:55	1.44 LU	125.68 BT	4.6	10	Tondano (III MMI), Manado, Bitung (II MMI)	Pusat gempa 55 km timur Bitung, Sulawesi Utara
73	06/10/2019	22:50:32	0.88 LU	126.51 BT	4.5	10	Tidore (II MMI)	Pusat gempa 95 km barat laut Ternate, Maluku Utara
74	13/10/2019	00:14:44	1.48 LU	124.69 BT	3.7	10	Manado (III MMI)	Pusat gempa 24 km barat laut Tomohon, Sulawesi Utara
75	14/10/2019	02:35:16	0.17 LS	124.78 BT	5.0	56	Bolmong, Bolmong Timur, Bolmong Selatan, Minahasa, Minahasa Selatan, Bitung, Tondano, Kotamobagu (III MMI), Gorontalo, Bolmong Utara (II MMI)	Pusat gempa 102 km tenggara Bolaang Uki, Bolmong Selatan, Sulut
76	20/10/2019	04:51:31	2.10 LU	128.57 BT	4.7	13	Morotai (III MMI)	Pusat gempa 31 km timur laut Daruba, Morotai, Maluku
77	24/10/2019	20:38:18	1.11 LU	124.22 BT	5.7	251	Bitung (III MMI), Luwuk, Halmahera Tengah, Halmahera Selatan, Banggai, Taliabu (II-III MMI), Kotamobagu, Tondano, Bolmong Timur, Gorontalo (II MMI)	Pusat gempa 34 km timur laut Lolak, Bolaang Mongondow, Sulut
78	28/10/2019	11:07:49	2.52 LU	128.46 BT	4.8	22	Morotai (III MMI)	Pusat gempa 55 km timur laut Daruba, Morotai, Sulut
79	29/10/2019	08:04:45	6.74 LU	125.18 BT	6.6	15	Sangihe, Talaud (II-III MMI)	Pusat gempa 388 km barat laut Melonguane, Talaud, Sulut
80	29/10/2019	10:36:26	2.41 LU	126.20 BT	4.7	21	Siau (II-III MMI)	Pusat gempa 100 km tenggara Ondong Siau, Siau Tagulandang Biaro, Sulut
81	29/10/2019	13:45:32	0.10 LS	123.03 BT	4.9	144	Gorontalo (II-III MMI), Gorontalo Utara (II MMI)	Pusat gempa 71 km selatan Gorontalo
82	29/10/2019	14:29:05	1.84 LU	122.89 BT	4.5	419	Sumalata (II MMI)	Pusat gempa 111 km barat laut Boroko, Bolmong Utara, Sulut
83	31/10/2019	00:29:00	1.49 LU	126.39 BT	5.2	40	Bitung, Tagulandang, Manado (II MMI)	Pusat gempa 122 km barat laut Jailolo, Halmahera Barat, Maluku

84	07/11/2019	11:35:35	2.01 LU	126.45 BT	4.8	10	Bitung, Manado , Tagulandang (II MMI)	Pusat gempa 146 km barat laut Halmahera Barat, Maluku Utara
85	11/11/2019	10:48:48	0.38 LU	122.88 BT	4.3	48	Luwuk (II-III MMI)	Pusat gempa 104 km barat laut Banggai Kepulauan, Sulawesi Tengah
86	12/11/2019	06:41:00	1.48 LU	127.05 BT	5.7	119	Kotamobagu, Ternate, Tobelo (II- III MMI), Bolmong Timur, Manado, Tondano, Minahasa Utara, Bitung (II MMI)	Pusat gempa 65 km barat laut Jailolo, Halmahera Barat, Maluku
87	14/11/2019	23:17:43	1.67 LU	126.39 BT	7.1	73	Bitung, Manado (IV- V MMI), Gorontalo, Ternate (III-IV MMI), Buol (II MMI)	Pusat gempa 137 km barat laut Jailolo, Halmahera Barat, Maluku
88	15/11/2019	01:45:39	1.49 LU	126.40 BT	5.9	10	Ternate (III MMI), Manado, Tahuna, Bitung (II-III MMI)	Pusat gempa 127 km barat laut Jailolo, Halmahera Barat, Maluku
89	15/11/2019	03:39:07	1.72 LU	126.35 BT	5.4	10	Manado (II MMI)	Pusat gempa 139 km timur laut Bitung, Sulawesi Utara
90	15/11/2019	04:12:56	1.66 LU	126.36 BT	6.1	10	Manado, Ternate (II-III MMI), Tagulandang (II MMI)	Pusat gempa 139 km barat laut Jailolo, Halmahera Barat, Maluku
91	15/11/2019	04:37:26	1.49 LU	126.39 BT	5.3	10	Manado, Tagulandang (II MMI)	Pusat gempa 128 km barat laut Jailolo, Halmahera Barat, Maluku
92	15/11/2019	05:34:20	1.60 LU	126.29 BT	5.5	10	Galela (II-III MMI), Manado, Bitung (II MMI)	Pusat gempa 130 km timur laut Bitung, Sulawesi Utara
93	15/11/2019	06:17:20	1.72 LU	126.36 BT	5.5	10	Manado, Sofifi (II MMI)	Pusat gempa 141 km timur laut Bitung, Sulawesi Utara
94	15/11/2019	08:17:35	1.73 LU	126.39 BT	5.9	10	Manado, Bitung (II- III MMI), Ternate, Minahasa Selatan, Tahuna (II MMI)	Pusat gempa 140 km barat laut Halmahera Barat, Maluku Utara
95	15/11/2019	12:06:09	0.89 LU	122.78 BT	4.4	26	Kwandang, Gorontalo, Bone Bolango (III MMI), Isimu (II MMI)	Pusat gempa 14 km barat laut Gorontalo Utara, Gorontalo
96	15/11/2019	19:52:22	1.75 LU	126.37 BT	5.0	10	Tondano, Tomohon, Minahasa Tenggara (II MMI)	Pusat gempa 136 km timur Bitung, Sulawesi Utara
97	16/11/2019	09:24:43	1.61 LU	126.42 BT	4.4	10	Ternate (II MMI)	Pusat gempa 131 km Jailolo, Halmahera Barat, Maluku
98	16/11/2019	17:19:16	1.67 LU	126.34 BT	5.9	35	Manado, Tomohon, Tondano, Bitung, Tagulandang, Tahuna, Ternate (II MMI)	Pusat gempa 136 km barat laut Jailolo, Halmahera Barat, Maluku
99	17/11/2019	23:42:57	1.45 LU	126.37 BT	4.0	10	Manado (II MMI)	Pusat gempa 129 km barat laut Jailolo, Halmahera Barat, Maluku
100	18/11/2019	18:24:04	1.79 LU	126.48 BT	4.9	10	Tagulandang, Bitung (II MMI)	Pusat gempa 132 km Halmahera Barat, Maluku Utara
101	20/11/2019	13:32:13	1.70 LU	126.48 BT	4.8	10	Manado, Bitung (II MMI)	Pusat gempa 129 km barat laut Halmahera Barat, Maluku Utara
102	24/11/2019	21:48:04	0.17 LS	124.38 BT	5.2	10	Kotamobagu, Minahasa Selatan dan Bolaang Mongondow (II MMI)	Pusat gempa 74 km Tenggara Bolaang, Sulawesi Utara
103	25/11/2019	08:01:13	1.17 LU	126.53 BT	3.7	10	Mayau (II MMI)	Pusat gempa 102 km barat laut Ternate, Maluku utara

104	28/11/2019	12:32:04	1.44 LU	126.38 BT	4.5	10	Mayau (II MMI)	Pusat gempa 127 km barat laut Jailolo, Halmahera Barat, Maluku
105	28/11/2019	23:25:05	0.08 LS	124.35 BT	3.5	26	Kotamobagu (II MMI)	Pusat gempa 64 km tenggara Bolaangki, Sulawesi Utara
106	03/12/2019	17:52:24	1.50 LU	126.14 BT	5.2	10	Manado, Tondano, Siau, Bitung, Tomohon, Minahasa Tenggara, Tagulandang (II MMI), Mayau (III MMI)	Pusat gempa 106 km timur laut Bitung, Sulawesi Utara
107	03/12/2019	17:55:29	1.50 LU	126.20 BT	5.4	10	Mayau (III MMI)	Pusat gempa 113 km timur Bitung, Sulawesi Utara
108	03/12/2019	18:24:25	0.65 LU	122.30 BT	4.9	61	Gorontalo, Bolaang Mongondow Utara (II MMI), Bone Bolango, Kwandang, Gorontalo Utara (III MMI)	Pusat gempa 14 km barat laut Boalemo, Gorontalo
109	03/12/2019	20:21:03	1.41 LU	126.20 BT	4.3	15	Mayau (III MMI)	Pusat gempa 119 km tenggara Bitung, Sulawesi Utara
110	05/12/2019	19:24:43	5.33 LU	126.83 BT	5.7	62	Miangas (II-III MMI)	Pusat gempa 147 km utara Melonguane, Sulawesi Utara
111	11/12/2019	09:13:09	0.25 LS	124.52 BT	4.9	20	Bolaang Mongondow Selatan (II-III MMI)	Pusat gempa 94 km tenggara Molibagu, Sulawesi Utara
112	15/12/2019	13:11:54	6.64 LU	125.24 BT	6.8	37	Sangihe (II-III MMI)	Pusat gempa 334 km Melonguane, Sulawesi Utara
113	15/12/2019	21:09:11	1.81 LU	127.27 BT	5.4	101	Sangihe (II MMI), Manado, Bitung, Minahasa Utara, Siau (II-III MMI), Ternate (III MMI)	Pusat gempa 80 km barat Tobelo, Maluku Utara
114	25/12/2019	23:56:25	3.87 LU	126.78 BT	5.1	21	Melonguane (IV MMI), Tahuna (III MMI)	Pusat gempa 18 km tenggara Melonguane, Sulawesi Utara
115	29/12/2019	01:25:45	1.51 LU	128.55 BT	4.7	43	Tobelo (II-III MMI)	Pusat gempa 23 km timur laut Halmahera Timur, Maluku Utara
116	29/12/2019	16:12:16	4.57 LU	125.40 BT	5.2	10	Tahuna (II MMI)	Pusat gempa 107 km barat laut Tahuna, Sulawesi Utara
117	31/12/2019	12:18:27	1.27 LU	120.79 BT	4.9	66	Toli-toli, Buol (IV MMI), Parigi Moutong (III MMI)	Pusat gempa 43 km timur Toli-toli, Sulawesi Tengah

III. DATA KEJADIAN GEMPABUMI BULANAN TAHUN 2019

A. Data Gempabumi Bulan Januari 2019

Tabel 3 Data kejadian gempabumi bulan Januari 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/01/2019	00:58:45	-0.24	123.13	69	3.8				Minahassa Peninsula, Sulawesi
2	01/01/2019	02:04:03	5.80	127.41	10	4.3				Talaud Island
3	01/01/2019	02:52:01	1.90	121.20	10	2.8				Minahassa Peninsula
4	01/01/2019	03:00:43	5.75	126.93	69	4.7				Mindanao, Philippines
5	01/01/2019	04:18:11	3.10	126.59	10	4.0				Talaud Islands, Indonesia
6	01/01/2019	04:36:25	0.48	122.05	173	1.8				Minahassa Peninsula
7	01/01/2019	06:34:48	5.95	126.87	96	4.6				Mindanao, Philippines
8	01/01/2019	09:49:12	1.25	124.15	261	3.4				Minahassa Peninsula, Sulawesi
9	01/01/2019	10:15:18	0.22	122.44	120	2.5				Minahassa Peninsula, Sulawesi
10	01/01/2019	10:25:01	1.58	126.28	10	3.8				Northern Molucca Sea
11	01/01/2019	12:41:59	5.78	126.83	17	4.1				Mindanao, Philippines
12	01/01/2019	14:26:52	3.10	126.58	46	4.0				Talaud Islands, Indonesia
13	01/01/2019	19:51:24	3.14	126.61	56	3.9				Talaud Islands, Indonesia
14	01/01/2019	20:33:09	0.16	122.47	140	2.7				Minahassa Peninsula, Sulawesi
15	01/01/2019	21:03:50	-0.13	122.99	101	3.0				Minahassa Peninsula, Sulawesi
16	01/01/2019	22:07:35	5.98	126.72	128	4.3				Mindanao, Philippines
17	01/01/2019	22:11:19	5.84	126.82	101	4.3				Mindanao, Philippines
18	01/01/2019	22:33:11	0.19	122.51	129	2.2				Minahassa Peninsula
19	01/01/2019	23:03:50	-0.18	123.00	103	2.8				Minahassa Peninsula
20	02/01/2019	01:21:17	0.34	122.00	158	2.2				Minahassa Peninsula
21	02/01/2019	03:43:47	2.57	127.77	12	3.7				Northern Molucca Sea
22	02/01/2019	09:15:38	0.72	127.04	31	3.2				Halmahera, Indonesia
23	02/01/2019	12:33:52	2.62	127.47	15	3.0				Northern Molucca Sea
24	02/01/2019	12:47:43	3.00	128.02	124	4.6				Halmahera, Indonesia
25	02/01/2019	13:36:01	5.57	126.32	110	4.4				Mindanao, Philippines
26	02/01/2019	16:36:09	2.54	127.77	14	3.9				Northern Molucca Sea
27	02/01/2019	16:53:45	2.09	127.17	23	3.2				Northern Molucca Sea
28	02/01/2019	19:08:48	-0.26	132.05	10	3.9				Irian Jaya Region,
29	02/01/2019	21:26:45	5.70	126.00	133	4.5				Mindanao, Philippines
30	02/01/2019	21:26:53	4.96	126.00	161	4.2				Talaud Islands, Indonesia
31	03/01/2019	02:08:59	2.99	128.75	76	3.9				Halmahera, Indonesia
32	03/01/2019	11:25:54	-0.14	122.15	150	3.0				Minahassa Peninsula, Sulawesi
33	03/01/2019	15:45:08	1.40	125.66	10	2.8				Northern Molucca Sea
34	03/01/2019	15:56:22	6.36	126.81	131	4.2				Mindanao, Philippines
35	03/01/2019	17:39:34	0.53	122.20	85	2.5				Minahassa Peninsula, Sulawesi
36	03/01/2019	17:52:35	1.63	126.56	10	2.7				Northern Molucca Sea
37	03/01/2019	18:00:29	-0.03	122.84	145	3.1				Minahassa Peninsula

38	03/01/2019	18:16:10	1.79	128.74	10	4.3				Halmahera, Indonesia
39	03/01/2019	20:59:03	2.49	127.31	43	5.0				Northern Molucca Sea
40	03/01/2019	23:27:55	-0.33	123.28	65	2.8				Minahassa Peninsula, Sulawesi
41	03/01/2019	23:36:43	0.55	121.13	37	2.9				Minahassa Peninsula, Sulawesi
42	04/01/2019	02:00:30	-0.12	123.38	94	3.3				Minahassa Peninsula, Sulawesi
43	04/01/2019	02:00:31	-0.08	123.33	85	3.3				Minahassa Peninsula, Sulawesi
44	04/01/2019	05:02:21	-0.24	119.92	136	3.3				Minahassa Peninsula, Sulawesi
45	04/01/2019	07:38:37	-0.30	124.07	57	3.3				Southern Molucca Sea
46	04/01/2019	10:19:29	0.40	122.11	164	3.8				Minahassa Peninsula, Sulawesi
47	04/01/2019	10:23:36	-0.15	123.01	7	2.9				Minahassa Peninsula, Sulawesi
48	04/01/2019	16:12:51	5.04	127.21	129	4.1				Philippine Islands Region
49	04/01/2019	18:15:25	1.79	126.33	10	4.0				Northern Molucca Sea
50	04/01/2019	18:28:05	-0.05	123.05	218	3.2				Minahassa Peninsula, Sulawesi
51	04/01/2019	21:45:40	2.59	127.35	10	3.0				Northern Molucca Sea
52	04/01/2019	23:14:25	1.28	127.24	139	4.5				Halmahera, Indonesia
53	05/01/2019	00:10:46	1.78	126.48	97	4.4				Northern Molucca Sea
54	05/01/2019	01:04:20	4.32	126.19	120	5.3	0.1822	0.2678	0.2297	Talaud Islands, Indonesia
55	05/01/2019	05:51:17	0.26	124.05	199	3.3				Minahassa Peninsula, Sulawesi
56	05/01/2019	09:58:46	1.12	121.18	46	2.7				Minahassa Peninsula, Sulawesi
57	05/01/2019	12:37:15	3.71	127.94	158	3.6				Talaud Islands, Indonesia
58	05/01/2019	18:37:29	0.54	122.29	89	4.2				Minahassa Peninsula, Sulawesi
59	05/01/2019	22:43:41	-0.10	124.50	114	3.2				Southern Molucca Sea
60	05/01/2019	23:45:40	-0.18	119.82	162	4.1				Minahassa Peninsula, Sulawesi
61	06/01/2019	11:26:05	0.86	126.09	10	3.9				Northern Molucca Sea
62	06/01/2019	14:34:40	5.88	126.83	138	4.5				Mindanao, Philippines
63	06/01/2019	17:27:21	2.34	126.75	56	6.6	1.7158	2.6967	2.7869	Northern Molucca Sea
64	06/01/2019	17:33:15	2.49	126.76	10	5.4				Northern Molucca Sea
65	06/01/2019	17:35:42	2.36	126.85	10	4.7				Northern Molucca Sea
66	06/01/2019	17:41:08	2.49	126.78	10	3.8				Northern Molucca Sea
67	06/01/2019	17:42:34	2.36	126.77	12	4.4				Northern Molucca Sea
68	06/01/2019	17:46:44	2.30	126.83	10	4.6				Northern Molucca Sea
69	06/01/2019	17:57:21	2.40	126.76	10	4.5				Northern Molucca Sea
70	06/01/2019	18:00:43	2.25	126.74	10	4.5				Northern Molucca Sea
71	06/01/2019	18:01:42	2.42	126.76	14	4.7				Northern Molucca Sea
72	06/01/2019	18:07:15	2.33	126.77	10	3.9				Northern Molucca Sea
73	06/01/2019	18:10:02	2.27	126.86	17	3.7				Northern Molucca Sea
74	06/01/2019	18:12:08	2.34	126.74	10	4.3				Northern Molucca Sea
75	06/01/2019	18:14:32	2.24	126.73	15	4.5				Northern Molucca Sea
76	06/01/2019	18:18:08	2.31	126.75	10	5.0				Northern Molucca Sea
77	06/01/2019	18:20:35	2.18	126.72	28	4.3				Northern Molucca Sea
78	06/01/2019	18:23:48	2.38	126.82	10	4.4				Northern Molucca Sea
79	06/01/2019	18:25:30	2.44	126.82	54	5.0				Northern Molucca Sea
80	06/01/2019	18:35:34	2.28	126.85	15	4.4				Northern Molucca Sea
81	06/01/2019	18:41:39	2.34	126.84	27	3.6				Northern Molucca Sea
82	06/01/2019	18:43:27	2.26	126.78	11	3.8				Northern Molucca Sea
83	06/01/2019	18:44:28	2.44	126.77	10	3.9				Northern Molucca Sea
84	06/01/2019	18:57:01	2.35	126.78	27	4.2				Northern Molucca Sea

85	06/01/2019	19:00:38	2.49	126.80	10	4.1				Northern Molucca Sea
86	06/01/2019	19:08:54	2.34	126.78	15	3.5				Northern Molucca Sea
87	06/01/2019	19:10:11	2.30	126.72	11	3.4				Northern Molucca Sea
88	06/01/2019	19:12:29	2.45	127.03	52	3.8				Northern Molucca Sea
89	06/01/2019	19:16:02	2.41	126.79	16	4.9				Northern Molucca Sea
90	06/01/2019	19:18:26	3.75	123.00	490	4.6				Celebes Sea
91	06/01/2019	19:27:43	2.31	127.19	10	3.3				Northern Molucca Sea
92	06/01/2019	19:35:05	2.71	126.79	10	3.8				Northern Molucca Sea
93	06/01/2019	19:37:23	2.44	126.90	10	3.9				Northern Molucca Sea
94	06/01/2019	19:54:51	2.47	126.76	10	4.0				Northern Molucca Sea
95	06/01/2019	20:06:29	2.56	126.79	55	5.0				Northern Molucca Sea
96	06/01/2019	20:19:50	2.27	126.76	30	3.6				Northern Molucca Sea
97	06/01/2019	20:23:53	2.36	126.82	10	4.4				Northern Molucca Sea
98	06/01/2019	20:31:41	2.47	127.25	10	4.6				Northern Molucca Sea
99	06/01/2019	21:07:31	2.55	126.79	10	4.5				Northern Molucca Sea
100	06/01/2019	21:24:04	2.47	126.79	10	4.7				Northern Molucca Sea
101	06/01/2019	21:26:34	2.44	126.88	10	4.3				Northern Molucca Sea
102	06/01/2019	21:27:37	2.50	126.56	10	4.5				Northern Molucca Sea
103	06/01/2019	21:32:59	2.38	126.66	10	4.9				Northern Molucca Sea
104	06/01/2019	22:30:46	1.74	127.94	37	3.0				Halmahera, Indonesia
105	06/01/2019	22:33:00	2.27	126.74	8	4.8				Northern Molucca Sea
106	06/01/2019	23:02:06	2.31	126.69	19	3.9				Northern Molucca Sea
107	06/01/2019	23:18:40	2.27	126.75	28	3.1				Northern Molucca Sea
108	06/01/2019	23:26:06	2.29	126.75	11	3.2				Northern Molucca Sea
109	06/01/2019	23:55:24	2.29	126.81	20	4.0				Northern Molucca Sea
110	07/01/2019	00:09:07	2.34	126.70	10	4.1				Northern Molucca Sea
111	07/01/2019	01:13:36	2.37	126.81	10	3.5				Northern Molucca Sea
112	07/01/2019	01:37:19	2.36	126.75	10	3.9				Northern Molucca Sea
113	07/01/2019	01:48:02	2.33	126.81	15	3.6				Northern Molucca Sea
114	07/01/2019	02:06:53	2.35	126.74	16	3.7				Northern Molucca Sea
115	07/01/2019	02:09:04	2.47	126.81	12	3.6				Northern Molucca Sea
116	07/01/2019	02:13:48	0.47	121.35	17	3.5				Minahassa Peninsula, Sulawesi
117	07/01/2019	02:45:03	2.26	126.77	28	3.9				Northern Molucca Sea
118	07/01/2019	03:01:46	2.42	126.87	13	3.8				Northern Molucca Sea
119	07/01/2019	03:08:44	2.33	126.72	10	4.0				Northern Molucca Sea
120	07/01/2019	03:22:02	0.38	122.06	6	2.8				Minahassa Peninsula, Sulawesi
121	07/01/2019	03:40:48	0.28	122.02	118	3.8				Minahassa Peninsula, Sulawesi
122	07/01/2019	03:44:26	2.47	126.78	10	3.8				Northern Molucca Sea
123	07/01/2019	03:58:49	2.46	126.80	10	3.6				Northern Molucca Sea
124	07/01/2019	04:03:22	2.36	126.77	30	4.2				Northern Molucca Sea
125	07/01/2019	04:12:13	2.54	126.80	27	4.2				Northern Molucca Sea
126	07/01/2019	04:35:45	2.82	126.86	25	3.4				Northern Molucca Sea
127	07/01/2019	05:29:57	2.16	126.76	44	3.9				Northern Molucca Sea
128	07/01/2019	06:02:51	2.43	126.80	20	3.6				Northern Molucca Sea
129	07/01/2019	06:07:50	1.61	126.51	28	3.4				Northern Molucca Sea
130	07/01/2019	06:26:08	2.41	126.78	12	3.6				Northern Molucca Sea
131	07/01/2019	06:26:58	2.45	127.36	10	3.8				Northern Molucca Sea
132	07/01/2019	06:39:52	2.51	126.79	27	3.5				Northern Molucca Sea
133	07/01/2019	06:44:53	2.36	126.88	26	3.5				Northern Molucca Sea
134	07/01/2019	07:00:20	0.22	121.80	184	2.5				Minahassa Peninsula, Sulawesi

135	07/01/2019	07:20:44	2.23	126.73	10	4.6				Northern Molucca Sea
136	07/01/2019	07:32:44	2.32	126.83	35	3.6				Northern Molucca Sea
137	07/01/2019	07:36:44	2.31	126.84	17	3.9				Northern Molucca Sea
138	07/01/2019	07:48:57	2.32	126.85	24	3.8				Northern Molucca Sea
139	07/01/2019	08:00:35	2.32	126.77	33	3.8				Northern Molucca Sea
140	07/01/2019	08:44:54	2.66	126.79	43	3.7				Northern Molucca Sea
141	07/01/2019	08:58:51	2.21	126.71	27	3.6				Northern Molucca Sea
142	07/01/2019	09:12:44	2.37	126.84	26	3.4				Northern Molucca Sea
143	07/01/2019	09:29:49	2.59	126.85	10	3.4				Northern Molucca Sea
144	07/01/2019	09:45:22	2.31	126.78	26	3.3				Northern Molucca Sea
145	07/01/2019	09:53:01	2.19	126.76	28	3.3				Northern Molucca Sea
146	07/01/2019	10:55:35	2.33	126.83	33	3.3				Northern Molucca Sea
147	07/01/2019	11:10:00	4.15	126.02	134	4.4				Talaud Islands, Indonesia
148	07/01/2019	11:31:03	3.17	125.65	91	4.2				Talaud Islands, Indonesia
149	07/01/2019	11:47:28	2.34	126.72	10	3.5				Northern Molucca Sea
150	07/01/2019	14:11:53	2.50	126.81	60	5.2				Northern Molucca Sea
151	07/01/2019	14:40:00	2.38	126.79	10	4.8				Northern Molucca Sea
152	07/01/2019	17:58:47	2.37	126.76	10	4.0				Northern Molucca Sea
153	07/01/2019	18:11:29	2.32	126.70	10	3.9				Northern Molucca Sea
154	07/01/2019	18:19:03	-0.10	122.96	108	3.6				Minahassa Peninsula, Sulawesi
155	07/01/2019	19:10:37	2.36	126.81	10	3.8				Northern Molucca Sea
156	07/01/2019	19:33:10	2.36	126.84	10	3.7				Northern Molucca Sea
157	07/01/2019	19:46:13	0.67	121.81	83	1.8				Minahassa Peninsula, Sulawesi
158	07/01/2019	20:01:31	-0.19	122.80	124	2.7				Minahassa Peninsula, Sulawesi
159	07/01/2019	20:25:14	2.48	126.86	30	4.0				Northern Molucca Sea
160	07/01/2019	20:34:17	2.29	126.71	29	3.6				Northern Molucca Sea
161	07/01/2019	21:58:10	0.69	122.57	10	2.6				Minahassa Peninsula, Sulawesi
162	07/01/2019	22:19:55	2.33	126.84	10	4.0				Northern Molucca Sea
163	08/01/2019	00:14:42	2.34	126.78	20	4.1				Northern Molucca Sea
164	08/01/2019	00:23:55	2.31	126.74	10	3.6				Northern Molucca Sea
165	08/01/2019	03:42:34	2.33	126.72	6	3.9				Northern Molucca Sea
166	08/01/2019	05:22:38	6.17	126.66	106	4.2				Mindanao, Philippines
167	08/01/2019	07:23:05	2.29	126.77	21	4.2				Northern Molucca Sea
168	08/01/2019	07:24:44	-0.45	119.89	16	3.6				Minahassa Peninsula, Sulawesi
169	08/01/2019	07:55:57	2.26	126.73	12	4.0				Northern Molucca Sea
170	08/01/2019	08:39:02	0.49	122.74	125	3.1				Minahassa Peninsula, Sulawesi
171	08/01/2019	12:34:42	2.17	126.73	14	3.5				Northern Molucca Sea
172	08/01/2019	13:19:26	2.50	127.28	10	2.8				Northern Molucca Sea
173	08/01/2019	13:30:13	2.47	126.91	19	3.0				Northern Molucca Sea
174	08/01/2019	13:38:37	2.40	126.74	12	3.2				Northern Molucca Sea
175	08/01/2019	14:48:12	2.32	126.71	10	3.6				Northern Molucca Sea
176	08/01/2019	16:05:57	2.33	126.83	22	3.8				Northern Molucca Sea
177	08/01/2019	16:37:49	-0.47	120.09	10	3.1				Minahassa Peninsula, Sulawesi
178	08/01/2019	16:53:52	2.36	126.82	33	3.5				Northern Molucca Sea
179	08/01/2019	16:59:46	-0.38	124.13	19	3.4				Southern Molucca Sea
180	08/01/2019	17:13:53	2.44	126.72	14	3.8				Northern Molucca Sea
181	08/01/2019	17:46:15	2.46	126.86	10	3.9				Northern Molucca Sea
182	08/01/2019	18:22:26	-0.30	123.00	68	4.2				Minahassa Peninsula, Sulawesi

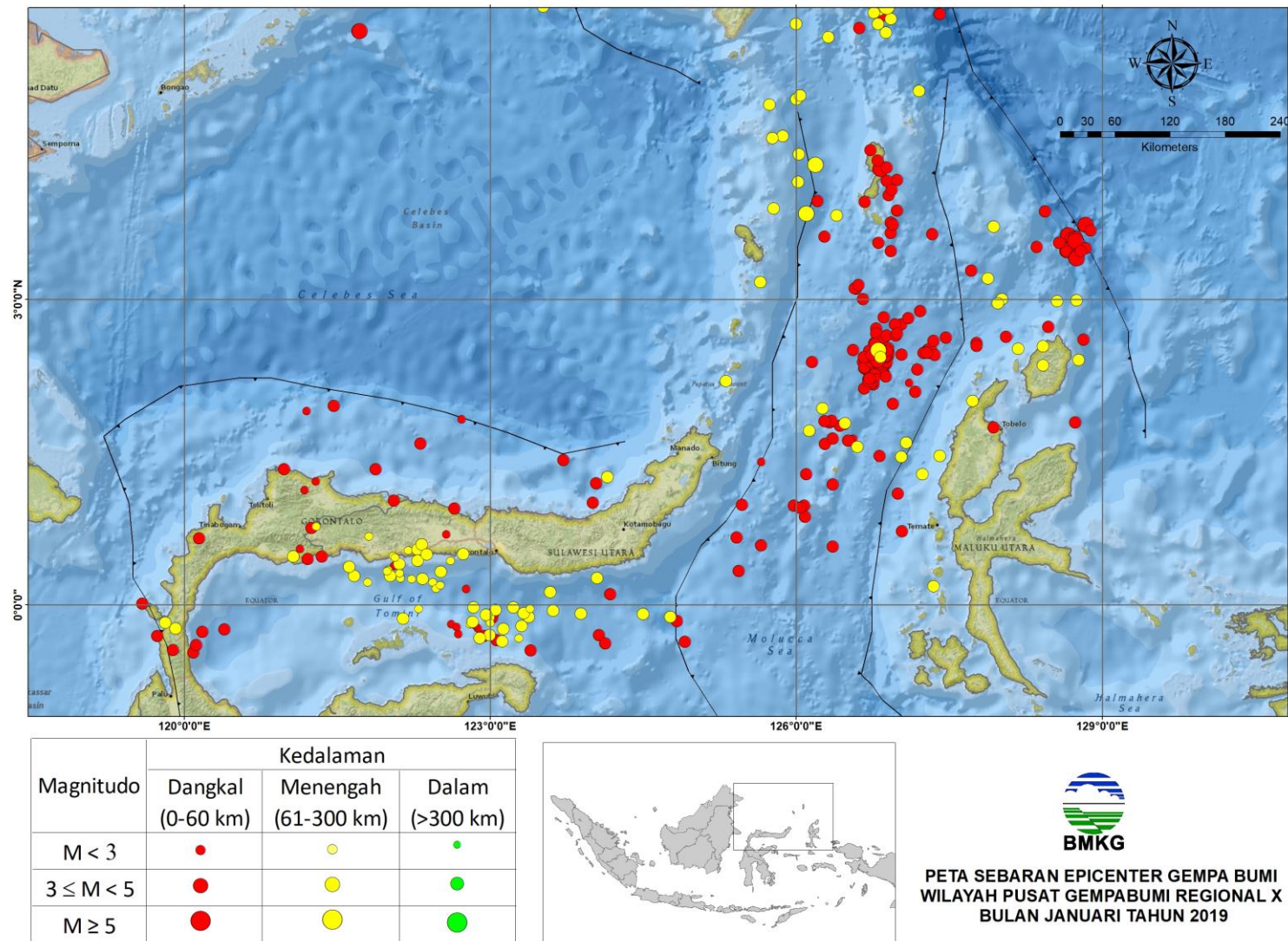
183	08/01/2019	18:38:57	2.43	126.81	10	3.2				Northern Molucca Sea
184	08/01/2019	19:38:03	2.39	126.87	10	3.0				Northern Molucca Sea
185	08/01/2019	21:16:01	2.38	126.89	10	3.7				Northern Molucca Sea
186	08/01/2019	23:18:15	5.44	124.09	466	4.4				Mindanao, Philippines
187	09/01/2019	00:57:43	-0.31	122.94	48	3.1				Minahassa Peninsula, Sulawesi
188	09/01/2019	02:43:54	-0.19	122.62	10	2.9				Minahassa Peninsula, Sulawesi
189	09/01/2019	07:52:57	2.39	126.80	10	4.0				Northern Molucca Sea
190	09/01/2019	08:36:04	3.89	125.78	144	4.2				Talaud Islands, Indonesia
191	09/01/2019	08:43:10	3.20	127.88	133	4.0				Talaud Islands, Indonesia
192	09/01/2019	09:59:24	1.58	122.32	26	4.3	0.1855	0.1144	0.1320	Minahassa Peninsula, Sulawesi
193	09/01/2019	16:15:32	0.46	122.06	178	2.7				Minahassa Peninsula, Sulawesi
194	09/01/2019	17:27:08	-0.35	123.06	57	3.5				Minahassa Peninsula, Sulawesi
195	09/01/2019	19:45:54	2.32	126.67	19	3.5				Northern Molucca Sea
196	09/01/2019	19:59:10	2.49	126.72	10	3.6				Northern Molucca Sea
197	09/01/2019	22:38:04	5.66	126.62	23	4.9				Mindanao, Philippines
198	10/01/2019	01:37:15	4.46	126.73	15	4.2				Talaud Islands, Indonesia
199	10/01/2019	05:47:19	0.59	122.33	75	3.0				Minahassa Peninsula, Sulawesi
200	10/01/2019	07:12:12	2.43	126.88	10	3.2				Northern Molucca Sea
201	10/01/2019	07:51:52	2.60	128.82	10	4.4				Halmahera, Indonesia
202	10/01/2019	16:19:12	2.48	126.78	10	3.9				Northern Molucca Sea
203	10/01/2019	17:36:10	2.51	128.18	196	3.6				Halmahera, Indonesia
204	10/01/2019	20:09:31	1.77	126.47	10	3.9				Northern Molucca Sea
205	11/01/2019	02:49:28	0.26	122.12	143	2.8				Minahassa Peninsula, Sulawesi
206	11/01/2019	03:35:31	2.43	126.87	13	4.2				Northern Molucca Sea
207	11/01/2019	06:27:34	1.70	126.13	102	4.2				Northern Molucca Sea
208	11/01/2019	09:01:25	2.75	127.03	10	4.4				Northern Molucca Sea
209	11/01/2019	11:18:57	2.64	126.89	33	3.1				Northern Molucca Sea
210	11/01/2019	12:01:30	2.24	126.88	36	3.3				Northern Molucca Sea
211	11/01/2019	13:23:04	4.16	126.89	22	3.6				Talaud Islands, Indonesia
212	11/01/2019	15:46:58	2.64	126.98	11	3.8				Northern Molucca Sea
213	11/01/2019	19:11:58	2.49	126.84	13	4.0				Northern Molucca Sea
214	11/01/2019	21:07:27	-0.36	123.12	62	3.2				Minahassa Peninsula, Sulawesi
215	12/01/2019	02:37:47	1.46	126.82	13	3.7				Northern Molucca Sea
216	12/01/2019	03:46:25	2.75	126.97	39	3.2				Northern Molucca Sea
217	12/01/2019	09:59:21	-0.17	122.83	74	3.6				Minahassa Peninsula, Sulawesi
218	12/01/2019	10:42:04	2.81	127.10	10	3.3				Northern Molucca Sea
219	12/01/2019	11:26:20	2.51	126.83	10	3.5				Northern Molucca Sea
220	12/01/2019	20:33:27	-0.24	120.40	10	4.1				Minahassa Peninsula, Sulawesi
221	13/01/2019	01:16:23	3.63	128.67	41	5.1				North of Halmahera, Indonesia
222	13/01/2019	01:20:16	3.73	128.84	24	5.0				North of Halmahera, Indonesia
223	13/01/2019	02:56:00	3.67	128.89	47	4.5				North of Halmahera,
224	13/01/2019	03:36:14	2.72	128.48	25	4.5	-0.0750	-0.0619	-0.0648	Halmahera, Indonesia
225	13/01/2019	05:50:58	3.46	128.66	10	4.4				North of Halmahera, Indonesia
226	13/01/2019	11:29:54	2.50	126.88	10	4.2				Northern Molucca Sea
227	13/01/2019	11:30:56	2.51	126.90	15	4.3				Northern Molucca Sea
228	13/01/2019	12:26:58	2.52	126.90	10	4.5				Northern Molucca Sea

229	13/01/2019	12:58:36	-0.13	123.02	10	3.3				Minahassa Peninsula, Sulawesi
230	13/01/2019	13:15:48	2.49	126.88	10	3.0				Northern Molucca Sea
231	13/01/2019	14:29:28	3.87	126.99	27	4.1				Talaud Islands, Indonesia
232	13/01/2019	14:36:36	3.65	126.93	10	3.8				Talaud Islands, Indonesia
233	13/01/2019	15:59:19	2.39	126.68	10	3.6				Northern Molucca Sea
234	13/01/2019	16:41:42	2.47	127.28	18	3.4				Northern Molucca Sea
235	13/01/2019	18:03:45	1.97	126.95	20	3.5				Northern Molucca Sea
236	13/01/2019	18:10:18	-0.40	120.12	10	3.8				Minahassa Peninsula, Sulawesi
237	13/01/2019	20:51:21	3.51	128.70	10	4.1				North of Halmahera,
238	13/01/2019	21:19:36	0.57	126.36	51	4.7				Northern Molucca Sea
239	13/01/2019	22:54:59	3.28	127.72	10	3.7				Talaud Islands, Indonesia
240	13/01/2019	22:57:44	2.56	126.77	21	4.0				Northern Molucca Sea
241	13/01/2019	23:04:33	2.33	126.67	16	3.6				Northern Molucca Sea
242	13/01/2019	23:54:34	0.43	122.61	79	2.7				Minahassa Peninsula, Sulawesi
243	13/01/2019	23:57:49	2.26	126.77	10	3.6				Northern Molucca Sea
244	14/01/2019	01:09:29	3.60	128.70	10	3.9				North of Halmahera, Indonesia
245	14/01/2019	01:51:45	3.75	126.93	17	3.2				Talaud Islands, Indonesia
246	14/01/2019	01:56:22	3.73	126.95	18	3.4				Talaud Islands, Indonesia
247	14/01/2019	02:01:48	2.38	126.74	10	3.7				Northern Molucca Sea
248	14/01/2019	03:24:18	1.63	126.36	16	4.3				Northern Molucca Sea
249	14/01/2019	04:01:13	3.61	128.73	32	4.3				North of Halmahera,
250	14/01/2019	08:50:52	5.61	126.88	125	4.3				Mindanao, Philippines
251	14/01/2019	11:59:28	1.95	121.47	16	4.3				Minahassa Peninsula, Sulawesi
252	14/01/2019	15:23:00	-0.09	123.89	80	3.7				Minahassa Peninsula, Sulawesi
253	14/01/2019	16:31:25	2.43	126.83	133	3.6				Northern Molucca Sea
254	14/01/2019	17:20:23	0.97	126.08	12	3.9				Northern Molucca Sea
255	14/01/2019	19:03:45	-0.12	124.77	62	3.8				Southern Molucca Sea
256	14/01/2019	21:23:35	2.43	126.73	10	4.0				Northern Molucca Sea
257	15/01/2019	02:39:30	2.66	126.99	10	3.9				Northern Molucca Sea
258	15/01/2019	05:27:15	0.31	122.11	162	2.6				Minahassa Peninsula
259	15/01/2019	12:39:34	2.43	126.78	17	3.5				Northern Molucca Sea
260	15/01/2019	17:21:39	2.38	126.16	20	4.1				Northern Molucca Sea
261	15/01/2019	20:03:23	5.87	126.89	83	5.8				Mindanao, Philippines
262	15/01/2019	20:39:27	0.97	125.98	10	3.4				Northern Molucca Sea
263	16/01/2019	05:41:11	0.33	125.44	10	4.1				Northern Molucca Sea
264	16/01/2019	10:11:28	0.47	121.07	68	4.1				Minahassa Peninsula, Sulawesi
265	16/01/2019	10:30:53	3.61	126.28	48	4.0				Talaud Islands, Indonesia
266	16/01/2019	10:49:32	3.48	128.66	59	5.4	0.2075	0.1266	0.1783	North of Halmahera, Indonesia
267	16/01/2019	10:53:16	3.52	128.75	10	4.9				North of Halmahera, Indonesia
268	16/01/2019	11:00:36	3.61	128.75	10	4.4				North of Halmahera, Indonesia
269	16/01/2019	11:14:55	3.47	128.65	10	4.1				North of Halmahera, Indonesia
270	16/01/2019	11:31:56	3.54	128.76	10	3.8				North of Halmahera, Indonesia
271	16/01/2019	20:37:56	2.00	127.73	210	3.5				Halmahera, Indonesia
272	16/01/2019	21:45:14	0.28	121.67	176	4.3				Minahassa Peninsula, Sulawesi
273	17/01/2019	00:25:25	2.12	126.67	29	3.8				Northern Molucca Sea
274	17/01/2019	01:00:14	3.51	128.36	10	3.5				North of Halmahera, Indonesia

275	17/01/2019	01:06:49	3.55	128.58	10	3.9				North of Halmahera, Indonesia
276	17/01/2019	07:29:05	1.46	127.41	120	3.6				Halmahera, Indonesia
277	17/01/2019	09:37:05	4.91	125.74	103	4.4				Talaud Islands, Indonesia
278	17/01/2019	14:37:08	-0.27	120.18	10	4.1	0.0364	-0.0549	-0.0420	Minahassa Peninsula, Sulawesi
279	17/01/2019	15:14:44	3.84	126.10	118	5.0				Talaud Islands, Indonesia
280	17/01/2019	19:39:44	-0.33	122.90	67	3.4				Minahassa Peninsula, Sulawesi
281	17/01/2019	23:11:34	3.43	128.74	27	4.8				North of Halmahera,
282	18/01/2019	14:03:16	0.45	121.21	19	3.1				Minahassa Peninsula, Sulawesi
283	18/01/2019	15:38:19	3.57	128.74	10	5.0				North of Halmahera, Indonesia
284	18/01/2019	18:52:04	3.40	128.75	37	5.1				North of Halmahera, Indonesia
285	19/01/2019	06:07:02	-0.06	123.62	130	4.3				Minahassa Peninsula, Sulawesi
286	19/01/2019	10:03:23	3.55	126.81	10	3.7				Talaud Islands, Indonesia
287	19/01/2019	11:13:02	3.50	128.84	43	4.6				North of Halmahera, Indonesia
288	19/01/2019	14:03:03	2.40	126.80	42	5.0				Northern Molucca Sea
289	19/01/2019	15:52:52	6.13	125.79	10	4.2				Mindanao, Philippines
290	20/01/2019	03:25:33	1.02	122.06	12	3.5				Minahassa Peninsula, Sulawesi
291	20/01/2019	05:37:48	2.49	126.89	10	3.8				Northern Molucca Sea
292	20/01/2019	05:54:47	3.86	128.44	28	4.2				North of Halmahera, Indonesia
293	20/01/2019	06:13:26	3.47	128.79	10	4.6				North of Halmahera, Indonesia
294	20/01/2019	06:51:54	0.95	126.04	10	3.9				Northern Molucca Sea
295	20/01/2019	07:04:02	0.94	122.65	26	3.0				Minahassa Peninsula, Sulawesi
296	20/01/2019	07:47:55	5.63	121.72	10	5.3				Celebes Sea
297	20/01/2019	07:53:02	0.65	120.15	10	4.1				Minahassa Peninsula, Sulawesi
298	20/01/2019	12:46:43	1.33	120.98	10	3.9	0.0975	0.1629	0.3250	Minahassa Peninsula, Sulawesi
299	20/01/2019	14:24:32	1.28	126.10	24	3.6				Northern Molucca Sea
300	20/01/2019	18:33:33	0.58	125.66	18	3.5				Northern Molucca Sea
301	20/01/2019	19:50:57	0.15	122.76	10	2.7				Minahassa Peninsula, Sulawesi
302	21/01/2019	10:45:57	-0.21	123.31	100	4.8	0.0803	0.1520	0.2201	Minahassa Peninsula, Sulawesi
303	21/01/2019	12:45:03	0.18	127.35	143	3.7				Halmahera, Indonesia
304	21/01/2019	13:27:21	2.88	127.22	38	4.2				Northern Molucca Sea
305	21/01/2019	16:47:51	4.28	126.83	10	5.0				Talaud Islands, Indonesia
306	21/01/2019	17:37:53	4.29	126.89	11	4.1				Talaud Islands, Indonesia
307	22/01/2019	02:32:15	0.66	116.42	77	3.9				Borneo
308	22/01/2019	04:40:21	3.82	126.40	92	4.4				Talaud Islands, Indonesia
309	22/01/2019	14:33:35	3.96	126.21	32	3.3				Talaud Islands, Indonesia
310	22/01/2019	14:42:42	2.18	127.11	21	2.9				Northern Molucca Sea
311	22/01/2019	15:30:17	0.32	122.52	124	3.3				Minahassa Peninsula, Sulawesi
312	22/01/2019	17:41:58	-0.23	122.88	17	2.9				Minahassa Peninsula, Sulawesi
313	23/01/2019	09:40:06	4.60	125.87	162	4.5				Talaud Islands, Indonesia
314	23/01/2019	12:11:09	1.09	127.00	16	4.2				Northern Molucca Sea
315	23/01/2019	15:48:12	2.54	128.42	219	4.1				Halmahera, Indonesia
316	23/01/2019	16:06:24	2.43	126.67	10	3.7				Northern Molucca Sea
317	23/01/2019	17:11:44	2.49	126.82	10	3.6				Northern Molucca Sea
318	23/01/2019	18:10:23	-0.16	124.83	31	4.1				Southern Molucca Sea

319	23/01/2019	19:54:00	0.43	122.29	147	3.7				Minahassa Peninsula, Sulawesi
320	24/01/2019	04:12:44	-0.09	123.05	10	2.9				Minahassa Peninsula, Sulawesi
321	24/01/2019	05:30:30	5.87	123.52	77	4.4				Mindanao, Philippines
322	24/01/2019	06:27:55	1.59	127.08	111	3.6				Halmahera, Indonesia
323	24/01/2019	09:22:12	0.77	121.30	81	2.4				Minahassa Peninsula, Sulawesi
324	24/01/2019	11:15:11	3.47	126.93	28	3.4				Talaud Islands, Indonesia
325	24/01/2019	13:37:59	-0.42	117.22	14	2.8				Borneo
326	24/01/2019	13:38:53	2.19	125.31	82	3.4				Talaud Islands, Indonesia
327	24/01/2019	14:34:00	2.45	126.74	11	3.6				Northern Molucca Sea
328	24/01/2019	17:27:38	-0.31	119.74	11	3.9	0.0705	-0.0378	0.0697	Minahassa Peninsula, Sulawesi
329	24/01/2019	18:07:37	2.96	127.98	119	4.2				Northern Molucca Sea
330	24/01/2019	20:03:29	6.18	126.91	201	4.7				Mindanao, Philippines
331	24/01/2019	20:47:22	-0.04	123.39	98	2.9				Minahassa Peninsula, Sulawesi
332	24/01/2019	21:16:24	5.70	126.81	117	4.2				Mindanao, Philippines
333	24/01/2019	22:50:06	4.02	126.91	10	3.2				Talaud Islands, Indonesia
334	25/01/2019	16:03:44	2.23	126.79	37	2.5				Northern Molucca Sea
335	25/01/2019	16:39:44	0.33	121.99	81	2.7				Minahassa Peninsula, Sulawesi
336	25/01/2019	19:45:16	2.19	126.71	14	4.4				Northern Molucca Sea
337	25/01/2019	21:45:15	2.22	126.72	5	4.5				Northern Molucca Sea
338	26/01/2019	06:35:00	0.25	122.23	141	2.5				Minahassa Peninsula
339	26/01/2019	06:38:33	0.10	124.18	10	3.3				Minahassa Peninsula
340	26/01/2019	10:40:14	-0.20	122.85	10	2.9				Minahassa Peninsula
341	26/01/2019	13:27:41	1.75	126.43	49	3.4				Northern Molucca Sea
342	26/01/2019	13:58:55	-0.03	123.23	142	3.0				Minahassa Peninsula, Sulawesi
343	26/01/2019	19:41:22	1.81	126.35	12	4.0				Northern Molucca Sea
344	26/01/2019	19:52:05	0.49	122.38	79	3.0				Minahassa Peninsula, Sulawesi
345	26/01/2019	23:23:16	1.21	121.29	10	2.8				Minahassa Peninsula, Sulawesi
346	26/01/2019	23:29:51	0.66	125.42	28	3.6				Northern Molucca Sea
347	27/01/2019	04:35:05	1.80	126.28	10	3.6				Northern Molucca Sea
348	27/01/2019	14:20:22	2.40	128.77	79	4.3				Halmahera, Indonesia
349	27/01/2019	16:41:21	1.19	124.04	10	3.4				Minahassa Peninsula, Sulawesi
350	27/01/2019	18:01:18	0.75	121.25	59	3.0				Minahassa Peninsula, Sulawesi
351	27/01/2019	22:38:00	5.58	123.96	459	4.2				Mindanao, Philippines
352	28/01/2019	02:11:06	0.12	123.59	112	3.4				Minahassa Peninsula, Sulawesi
353	28/01/2019	04:06:40	2.35	128.42	210	4.7				Halmahera, Indonesia
354	28/01/2019	04:18:33	0.37	121.62	154	4.2				Minahassa Peninsula, Sulawesi
355	28/01/2019	10:14:36	-0.37	124.91	13	4.0				Southern Molucca Sea
356	28/01/2019	16:46:29	5.81	126.76	124	4.3				Mindanao, Philippines
357	28/01/2019	17:24:18	3.96	126.67	46	4.0				Talaud Islands, Indonesia
358	28/01/2019	18:00:37	4.42	126.03	142	4.6				Talaud Islands, Indonesia
359	28/01/2019	19:44:52	-0.45	123.40	10	3.0				Minahassa Peninsula, Sulawesi
360	28/01/2019	21:41:48	1.93	126.26	79	3.8				Northern Molucca Sea
361	28/01/2019	21:48:41	4.58	125.77	108	4.2				Talaud Islands, Indonesia
362	29/01/2019	05:26:42	5.00	126.04	110	4.9				Mindanao, Philippines
363	29/01/2019	12:58:31	1.33	121.88	10	3.3				Minahassa Peninsula, Sulawesi

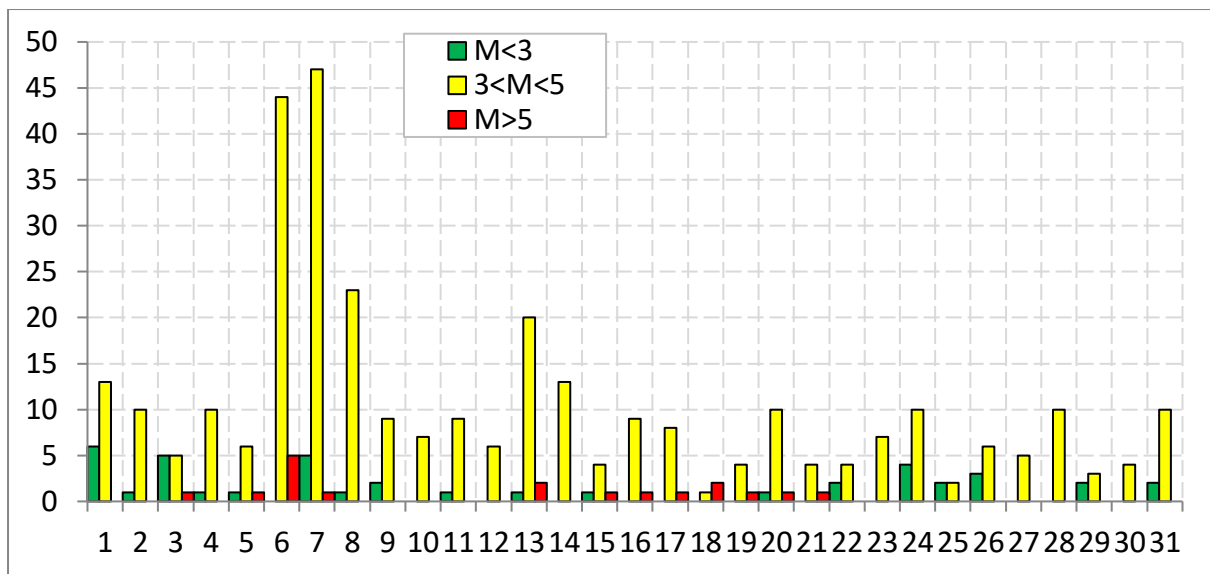
364	29/01/2019	14:43:36	1.82	122.72	10	2.7				Minahassa Peninsula, Sulawesi
365	29/01/2019	22:25:55	-0.29	122.69	10	2.7				Minahassa Peninsula, Sulawesi
366	29/01/2019	23:05:22	3.00	126.66	10	3.4				Talaud Islands, Indonesia
367	30/01/2019	01:51:59	1.55	126.60	108	3.1				Northern Molucca Sea
368	30/01/2019	13:59:32	1.18	126.36	10	3.8				Northern Molucca Sea
369	30/01/2019	18:24:52	3.64	127.34	25	4.0				Talaud Islands, Indonesia
370	30/01/2019	21:13:12	0.25	122.34	131	3.0				Minahassa Peninsula, Sulawesi
371	31/01/2019	02:39:42	1.00	124.01	10	3.8				Minahassa Peninsula, Sulawesi
372	31/01/2019	02:42:57	1.42	123.72	10	3.1				Minahassa Peninsula
373	31/01/2019	03:03:15	4.17	126.99	10	4.1				Talaud Islands, Indonesia
374	31/01/2019	12:54:59	1.45	127.03	76	4.6				Halmahera, Indonesia
375	31/01/2019	10:16:16	-0.04	122.30	91	2.3				Minahassa Peninsula
376	31/01/2019	14:50:55	4.36	126.80	11	4.0				Talaud Islands, Indonesia
377	31/01/2019	18:04:00	-0.22	122.67	26	2.5				Minahassa Peninsula, Sulawesi
378	31/01/2019	18:12:02	2.63	128.06	10	3.5				Halmahera, Indonesia
379	31/01/2019	20:50:35	2.98	128.56	218	4.7				Halmahera, Indonesia
380	31/01/2019	21:09:50	0.98	125.47	32	3.1				Northern Molucca Sea
381	31/01/2019	22:13:27	4.07	126.94	14	3.4				Talaud Islands, Indonesia
382	31/01/2019	23:20:30	0.01	119.59	12	3.7				Minahassa Peninsula



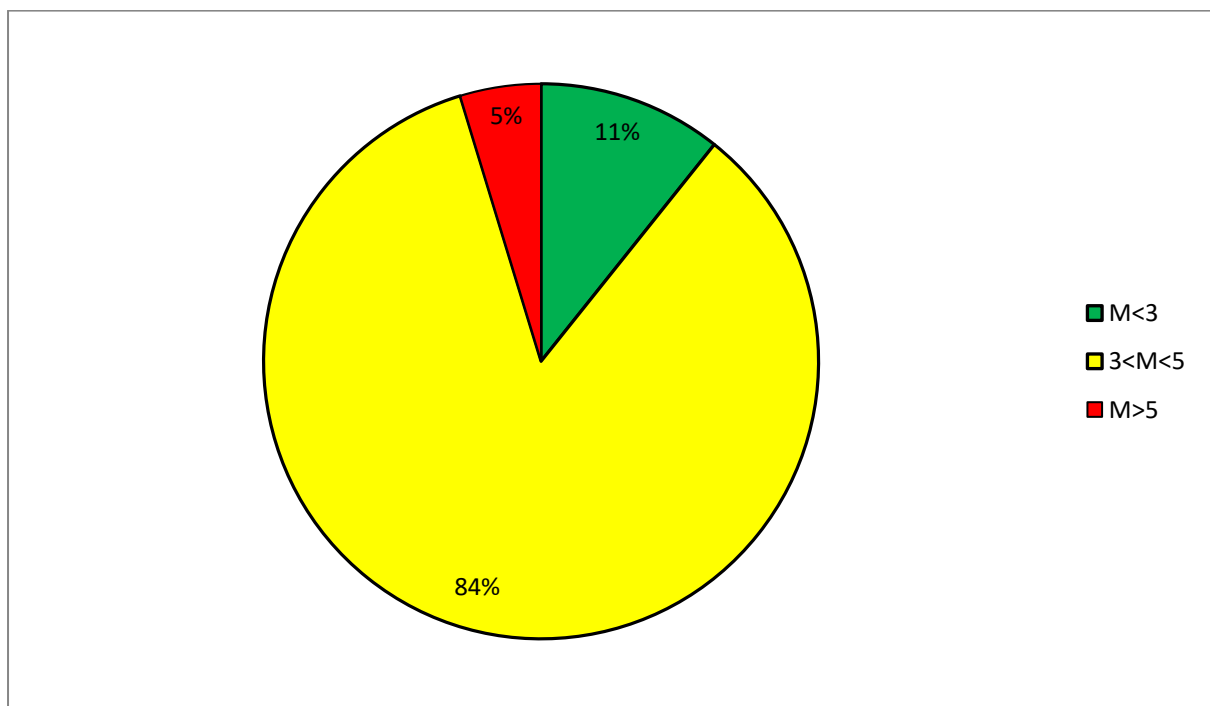
Gambar 5 Sebaran episenter gempabumi bulan Januari 2019

Tabel 4 Rekapitulasi gempabumi berdasarkan magnitudo bulan Januari 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	6	13	0	19	0	0
2	1	10	0	11	0	0
3	5	5	1	11	0	0
4	1	10	0	11	0	0
5	1	6	1	8	1	0
6	0	44	5	49	1	0
7	5	47	1	53	0	0
8	1	23	0	24	0	0
9	2	9	0	11	1	0
10	0	7	0	7	0	0
11	1	9	0	10	0	0
12	0	6	0	6	0	0
13	1	20	2	23	1	0
14	0	13	0	13	0	0
15	1	4	1	6	0	0
16	0	9	1	10	1	0
17	0	8	1	9	0	0
18	0	1	2	3	0	0
19	0	4	1	5	0	0
20	1	10	1	12	1	0
21	0	4	1	5	1	0
22	2	4	0	6	0	0
23	0	7	0	7	1	0
24	4	10	0	14	0	0
25	2	2	0	4	0	0
26	3	6	0	9	0	0
27	0	5	0	5	0	0
28	0	10	0	10	0	0
29	2	3	0	5	0	0
30	0	4	0	4	0	0
31	2	10	0	12	0	0
Jumlah gempa	41	323	18	382	8	0



Gambar 6 Grafik gempa bumi berdasarkan magnitudo bulan Januari 2019



Gambar 7 Grafik persentase gempa bumi berdasarkan magnitudo bulan Januari 2019

B. Data Gempabumi Bulan Februari 2019

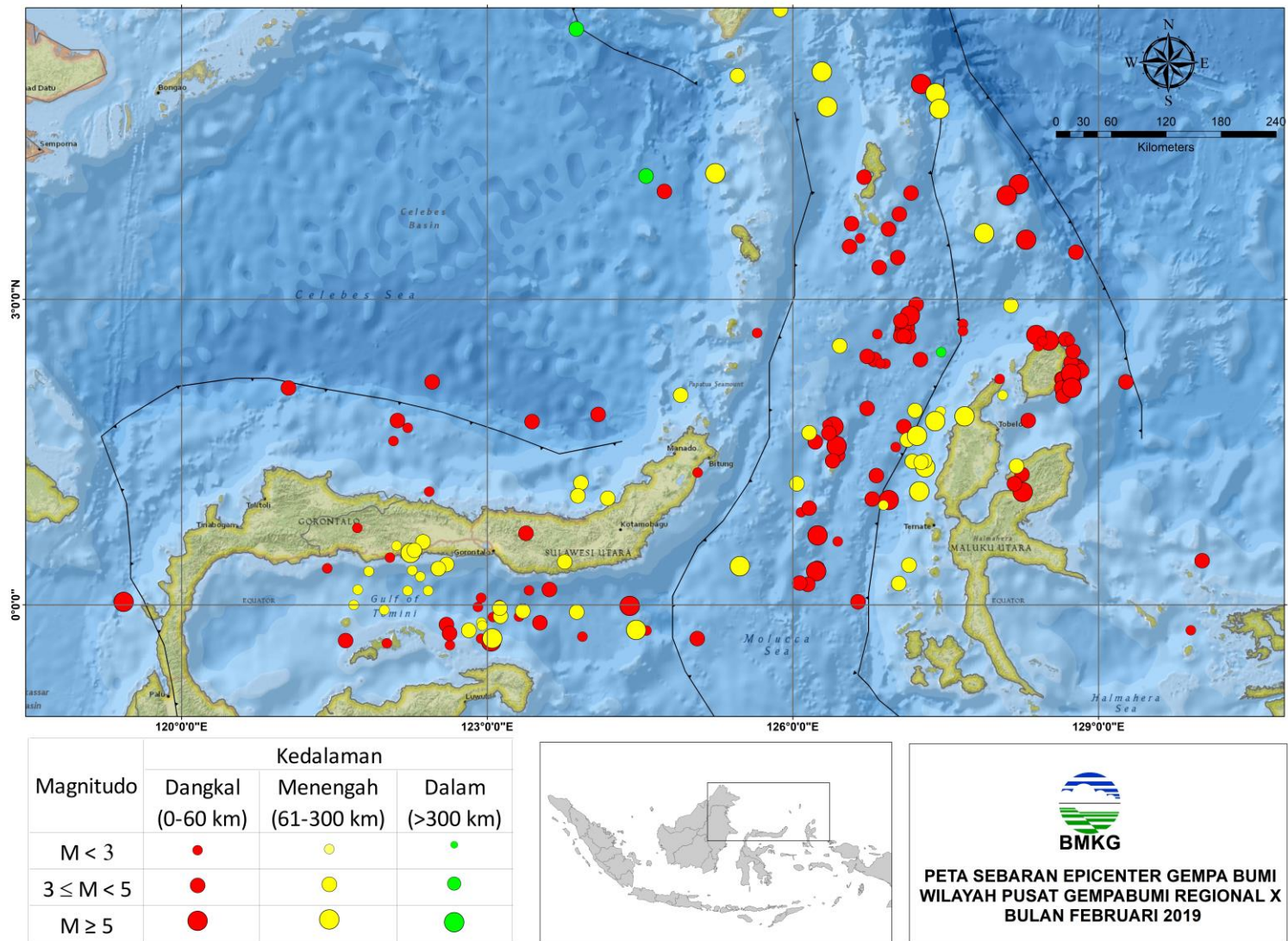
Tabel 5 Data kejadian gempabumi bulan Februari 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/02/2019	01:02:11	0.40	122.60	95	3.6				Minahassa Peninsula, Sulawesi
2	01/02/2019	15:15:54	2.19	122.46	10	3.8				Celebes Sea
3	02/02/2019	01:11:02	0.38	125.48	80	5.3	0.5586	0.6390	0.4880	Northern Molucca Sea
4	02/02/2019	03:10:36	1.03	126.94	22	4.5				Northern Molucca Sea
5	02/02/2019	16:38:50	1.91	127.20	101	4.1				Halmahera, Indonesia
6	02/02/2019	18:01:37	2.66	126.83	10	3.1				Northern Molucca Sea
7	03/02/2019	02:43:16	6.47	125.74	185	4.7				Mindanao, Philippines
8	03/02/2019	09:04:14	-0.01	124.40	38	4.6				Southern Molucca Sea
9	03/02/2019	19:40:30	4.04	127.16	10	4.4				Talaud Islands, Indonesia
10	03/02/2019	21:50:38	2.06	124.90	222	3.5				Celebes Sea
11	03/02/2019	22:44:32	1.93	126.73	10	3.9				Northern Molucca Sea
12	03/02/2019	22:59:23	3.60	126.66	10	3.0				Talaud Islands, Indonesia
13	04/02/2019	01:35:24	5.02	127.40	114	4.7				Philippine Islands Region
14	04/02/2019	08:42:55	-0.38	122.02	10	3.3				Minahassa Peninsula, Sulawesi
15	04/02/2019	09:04:58	3.65	127.88	163	4.7				Talaud Islands, Indonesia
16	04/02/2019	13:48:47	-0.05	121.99	237	2.5				Minahassa Peninsula, Sulawesi
17	04/02/2019	16:26:15	0.14	122.42	154	2.9				Minahassa Peninsula, Sulawesi
18	04/02/2019	19:20:28	2.41	127.25	11	4.1				Northern Molucca Sea
19	04/02/2019	20:54:40	1.81	122.12	28	4.0				Minahassa Peninsula, Sulawesi
20	04/02/2019	21:10:57	2.76	127.67	13	3.0				Northern Molucca Sea
21	04/02/2019	21:43:51	0.00	121.69	146	2.8				Minahassa Peninsula, Sulawesi
22	05/02/2019	02:32:35	1.85	127.69	226	4.2				Halmahera, Indonesia
23	05/02/2019	02:44:45	1.47	126.44	10	3.7				Northern Molucca Sea
24	05/02/2019	04:25:18	4.24	125.24	178	4.5				Talaud Islands, Indonesia
25	05/02/2019	06:22:21	1.20	123.92	69	4.0	0.2073	0.1919	0.1656	Minahassa Peninsula, Sulawesi
26	05/02/2019	10:19:51	0.39	127.14	143	3.8				Halmahera, Indonesia
27	05/02/2019	12:19:54	1.90	127.45	117	3.1				Halmahera, Indonesia
28	05/02/2019	12:58:09	-0.33	125.06	10	3.8				Southern Molucca Sea
29	05/02/2019	13:44:13	1.61	122.08	10	3.1				Minahassa Peninsula, Sulawesi
30	05/02/2019	17:38:22	5.20	125.46	206	4.1				Mindanao, Philippines
31	05/02/2019	20:35:15	-0.36	123.04	45	4.7				Minahassa Peninsula, Sulawesi
32	05/02/2019	23:17:45	2.59	128.51	15	5.1				Halmahera, Indonesia
33	05/02/2019	23:17:48	2.65	128.39	55	5.0				Halmahera, Indonesia
34	06/02/2019	00:04:24	2.54	128.41	27	3.5				Halmahera, Indonesia
35	06/02/2019	05:28:03	0.58	122.11	90	2.6				Minahassa Peninsula, Sulawesi
36	06/02/2019	06:54:00	1.69	126.16	74	3.9				Northern Molucca Sea
37	06/02/2019	07:37:49	1.11	122.43	10	3.1				Minahassa Peninsula, Sulawesi
38	06/02/2019	09:23:35	-0.02	122.91	18	3.1				Minahassa Peninsula, Sulawesi
39	06/02/2019	10:37:29	-0.19	122.60	17	3.8				Minahassa Peninsula, Sulawesi
40	06/02/2019	11:55:08	2.32	128.79	10	5.0				Halmahera, Indonesia
41	06/02/2019	17:33:23	0.91	126.08	27	3.4				Northern Molucca Sea
42	06/02/2019	22:01:36	-0.33	122.94	10	3.2				Minahassa Peninsula, Sulawesi
43	07/02/2019	00:40:55	-0.11	123.31	11	3.0				Minahassa Peninsula, Sulawesi
44	07/02/2019	02:03:53	2.20	128.71	10	4.2				Halmahera, Indonesia
45	07/02/2019	03:35:24	0.15	121.73	85	3.1				Minahassa Peninsula, Sulawesi
46	07/02/2019	04:15:30	1.56	126.43	39	5.7	4.8556	2.2390	4.0399	Northern Molucca Sea

47	07/02/2019	08:32:35	1.42	126.39	10	3.9				Northern Molucca Sea
48	07/02/2019	09:40:25	2.22	128.72	10	4.4				Halmahera, Indonesia
49	07/02/2019	10:03:06	2.32	128.76	19	5.2				Halmahera, Indonesia
50	07/02/2019	10:13:36	2.22	128.03	11	3.4				Halmahera, Indonesia
51	07/02/2019	10:16:15	2.22	128.64	11	3.6				Halmahera, Indonesia
52	07/02/2019	10:36:24	2.32	128.75	10	3.6				Halmahera, Indonesia
53	07/02/2019	10:48:13	2.26	128.77	10	4.0				Halmahera, Indonesia
54	07/02/2019	11:41:49	-0.06	123.35	134	3.5				Minahassa Peninsula, Sulawesi
55	07/02/2019	13:04:12	2.17	128.72	11	3.6				Halmahera, Indonesia
56	07/02/2019	13:16:09	1.07	123.89	269	3.7				Minahassa Peninsula, Sulawesi
57	07/02/2019	14:03:29	0.21	127.04	112	3.6				Halmahera, Indonesia
58	07/02/2019	14:08:15	2.21	128.75	10	3.5				Halmahera, Indonesia
59	07/02/2019	15:22:47	1.62	127.12	141	3.6				Halmahera, Indonesia
60	07/02/2019	17:03:05	0.34	126.19	10	3.2				Northern Molucca Sea
61	07/02/2019	17:06:13	0.36	126.24	10	3.7				Northern Molucca Sea
62	07/02/2019	17:13:52	0.34	126.22	10	4.0				Northern Molucca Sea
63	07/02/2019	18:40:15	2.21	128.70	10	3.6				Halmahera, Indonesia
64	07/02/2019	22:13:42	2.37	126.91	23	3.3				Northern Molucca Sea
65	08/02/2019	00:23:54	3.58	128.29	10	4.6				North of Halmahera,
66	08/02/2019	01:31:44	2.23	128.71	10	4.0				Halmahera, Indonesia
67	08/02/2019	11:07:00	2.22	128.65	10	3.8				Halmahera, Indonesia
68	08/02/2019	13:23:02	2.38	128.73	27	3.7				Halmahera, Indonesia
69	08/02/2019	13:45:15	2.19	129.27	10	3.8				Halmahera, Indonesia
70	08/02/2019	17:50:44	-0.31	123.94	10	3.4				Minahassa Peninsula, Sulawesi
71	08/02/2019	18:40:25	2.28	128.77	10	4.1				Halmahera, Indonesia
72	08/02/2019	19:16:52	2.20	128.74	10	4.2				Halmahera, Indonesia
73	08/02/2019	19:29:41	2.49	128.75	12	3.9				Halmahera, Indonesia
74	08/02/2019	20:32:10	2.95	127.21	10	4.0				Northern Molucca Sea
75	08/02/2019	21:07:46	0.98	126.89	68	3.2				Northern Molucca Sea
76	08/02/2019	21:29:04	2.61	128.68	26	3.9				Halmahera, Indonesia
77	09/02/2019	00:57:55	2.09	128.65	14	3.9				Halmahera, Indonesia
78	09/02/2019	04:08:53	2.29	128.73	10	3.9				Halmahera, Indonesia
79	09/02/2019	04:54:20	2.30	128.83	14	3.7				Halmahera, Indonesia
80	09/02/2019	05:32:27	1.35	127.30	136	4.3				Halmahera, Indonesia
81	09/02/2019	12:23:41	2.69	127.67	10	3.2				Northern Molucca Sea
82	09/02/2019	14:12:24	-0.07	123.88	136	3.3				Minahassa Peninsula, Sulawesi
83	09/02/2019	19:57:07	2.16	128.70	10	4.3				Halmahera, Indonesia
84	09/02/2019	21:38:47	3.46	128.78	10	4.3				North of Halmahera,
85	10/02/2019	01:06:16	2.68	127.07	10	4.2				Northern Molucca Sea
86	10/02/2019	01:08:44	2.72	127.10	10	4.8				Northern Molucca Sea
87	10/02/2019	01:15:33	2.72	127.09	10	3.9				Northern Molucca Sea
88	10/02/2019	01:41:35	2.64	127.14	10	4.2				Northern Molucca Sea
89	10/02/2019	02:05:02	0.33	126.23	60	5.0	0.1425	0.1229	0.1596	Northern Molucca Sea
90	10/02/2019	02:22:38	2.41	126.80	10	4.3				Northern Molucca Sea
91	10/02/2019	05:42:26	2.84	127.15	41	4.6				Northern Molucca Sea
92	10/02/2019	07:37:53	2.79	127.06	10	3.9				Northern Molucca Sea
93	10/02/2019	08:24:06	-0.17	122.94	77	3.1				Minahassa Peninsula, Sulawesi
94	10/02/2019	11:49:28	0.20	126.15	10	3.8				Northern Molucca Sea
95	10/02/2019	16:54:43	0.33	121.84	184	2.0				Minahassa Peninsula, Sulawesi
96	11/02/2019	03:31:49	1.80	123.44	10	3.7				Minahassa Peninsula, Sulawesi
97	11/02/2019	11:33:56	0.36	121.43	29	3.1				Minahassa Peninsula, Sulawesi
98	11/02/2019	11:34:24	1.04	126.78	13	3.8				Northern Molucca Sea
99	11/02/2019	14:09:39	0.22	126.07	10	3.9				Northern Molucca Sea
100	11/02/2019	15:07:13	2.23	128.72	10	3.9				Halmahera, Indonesia
101	11/02/2019	15:25:42	4.06	124.74	11	4.1				Celebes Sea
102	11/02/2019	17:45:05	1.81	128.31	53	4.1				Halmahera, Indonesia
103	11/02/2019	18:22:12	0.00	123.12	13	2.8				Minahassa Peninsula, Sulawesi
104	11/02/2019	18:47:48	3.41	127.03	10	3.9				Talaud Islands, Indonesia
105	11/02/2019	21:59:20	2.13	121.05	10	4.4				Celebes Sea
106	12/02/2019	02:50:40	2.64	127.06	10	4.4				Northern Molucca Sea
107	12/02/2019	03:43:00	2.64	127.09	10	3.6				Northern Molucca Sea
108	12/02/2019	05:49:23	2.94	128.14	129	3.6				Halmahera, Indonesia

109	12/02/2019	07:01:10	-0.35	121.61	10	3.7				Minahassa Peninsula, Sulawesi
110	12/02/2019	08:01:23	4.89	126.34	83	5.0				Talaud Islands, Indonesia
111	12/02/2019	11:38:35	0.07	122.94	22	3.1				Minahassa Peninsula, Sulawesi
112	13/02/2019	07:28:57	0.14	122.22	104	2.8				Minahassa Peninsula, Sulawesi
113	13/02/2019	09:54:53	3.69	126.94	24	3.7				Talaud Islands, Indonesia
114	13/02/2019	11:08:06	-0.33	123.05	67	4.2				Minahassa Peninsula, Sulawesi
115	13/02/2019	12:09:29	0.62	126.44	14	3.5				Northern Molucca Sea
116	13/02/2019	15:23:40	0.42	123.76	235	3.6				Minahassa Peninsula, Sulawesi
117	13/02/2019	15:28:25	5.65	123.87	508	4.4				Mindanao, Philippines
118	13/02/2019	15:35:38	2.59	128.45	14	3.2				Halmahera, Indonesia
119	13/02/2019	16:14:25	1.66	127.22	102	4.7	0.2307	0.1487	0.1831	Halmahera, Indonesia
120	13/02/2019	18:26:47	2.60	128.72	10	3.4				Halmahera, Indonesia
121	13/02/2019	18:30:06	1.36	128.19	71	3.7				Halmahera, Indonesia
122	13/02/2019	18:30:08	1.28	128.25	35	3.9				Halmahera, Indonesia
123	13/02/2019	19:07:50	1.87	124.09	37	3.6				Minahassa Peninsula, Sulawesi
124	13/02/2019	21:27:58	1.60	126.22	27	3.6				Northern Molucca Sea
125	14/02/2019	02:37:28	6.95	123.75	10	4.9				Mindanao, Philippines
126	14/02/2019	03:42:43	2.27	128.73	10	5.0				Halmahera, Indonesia
127	14/02/2019	04:03:16	0.47	122.05	3	2.6				Minahassa Peninsula, Sulawesi
128	14/02/2019	07:47:39	2.48	127.46	367	4.1				Northern Molucca Sea
129	14/02/2019	07:48:04	2.44	126.73	15	4.1				Northern Molucca Sea
130	14/02/2019	10:51:50	2.13	128.64	13	3.6				Halmahera, Indonesia
131	14/02/2019	11:33:37	1.75	127.09	23	4.0				Halmahera, Indonesia
132	14/02/2019	17:03:43	2.06	128.06	72	2.8				Halmahera, Indonesia
133	15/02/2019	00:28:25	1.27	126.82	25	3.8				Northern Molucca Sea
134	15/02/2019	02:05:28	-0.40	122.64	30	2.9				Minahassa Peninsula, Sulawesi
135	15/02/2019	03:10:39	-0.28	122.63	58	4.3				Minahassa Peninsula, Sulawesi
136	15/02/2019	03:26:09	2.37	126.86	10	3.3				Northern Molucca Sea
137	15/02/2019	03:44:17	1.19	126.04	88	3.5				Northern Molucca Sea
138	15/02/2019	08:21:30	0.03	126.64	33	4.4				Northern Molucca Sea
139	15/02/2019	15:29:03	6.27	126.18	132	4.2				Mindanao, Philippines
140	15/02/2019	16:20:55	6.75	126.87	92	5.1				Mindanao, Philippines
141	15/02/2019	22:58:44	4.21	124.56	348	4.3				Celebes Sea
142	16/02/2019	05:56:32	-0.11	123.13	147	3.5				Minahassa Peninsula, Sulawesi
143	16/02/2019	07:54:20	1.74	122.22	10	3.3				Minahassa Peninsula, Sulawesi
144	16/02/2019	09:20:34	-0.12	123.06	17	3.0				Minahassa Peninsula, Sulawesi
145	16/02/2019	15:02:29	3.52	126.56	40	3.9				Talaud Islands, Indonesia
146	16/02/2019	15:46:33	0.70	123.38	10	4.0				Minahassa Peninsula, Sulawesi
147	16/02/2019	15:57:47	1.41	127.17	113	3.4				Halmahera, Indonesia
148	16/02/2019	21:09:04	4.20	126.70	15	4.4				Talaud Islands, Indonesia
149	16/02/2019	22:34:58	-0.25	122.82	127	3.4				Minahassa Peninsula, Sulawesi
150	16/02/2019	23:00:22	2.05	128.65	10	3.9				Halmahera, Indonesia
151	16/02/2019	23:19:54	-0.20	122.95	89	2.7				Minahassa Peninsula, Sulawesi
152	17/02/2019	00:03:21	-0.25	124.56	15	3.3				Southern Molucca Sea
153	17/02/2019	13:18:27	1.11	127.24	152	4.5				Halmahera, Indonesia
154	17/02/2019	13:51:36	0.62	122.37	69	3.5	0.3758	0.1915	0.3502	Minahassa Peninsula, Sulawesi
155	17/02/2019	22:23:37	-0.25	124.46	129	4.9	0.2128	0.3090	0.1516	Southern Molucca Sea
156	18/02/2019	01:18:10	1.75	126.40	10	4.7	0.5967	0.3221	0.3748	Northern Molucca Sea
157	18/02/2019	08:07:35	6.02	124.67	355	4.6				Mindanao, Philippines
158	18/02/2019	17:49:49	2.13	128.74	10	4.6				Halmahera, Indonesia
159	18/02/2019	20:45:29	0.95	126.16	21	4.0	0.2839	0.3416	0.2388	Northern Molucca Sea
160	18/02/2019	21:44:11	1.55	127.01	25	3.4				Halmahera, Indonesia
161	19/02/2019	09:33:28	1.77	126.34	10	3.2				Northern Molucca Sea
162	19/02/2019	12:51:07	4.13	128.22	41	5.2				North of Halmahera, Indonesia

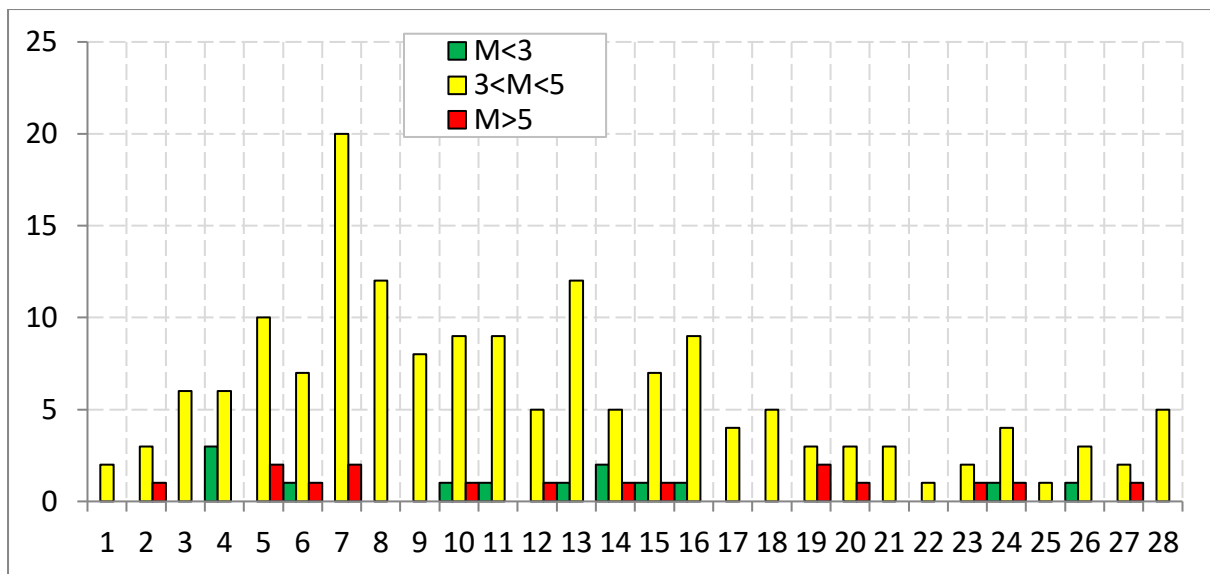
163	19/02/2019	12:57:01	4.02	128.10	57	5.1				North of Halmahera, Indonesia
164	19/02/2019	14:56:44	1.41	127.29	100	3.4				Halmahera, Indonesia
165	19/02/2019	18:14:51	7.38	126.71	117	4.3				Mindanao, Philippines
166	20/02/2019	00:10:39	0.68	126.24	10	5.8	1.2600	1.1051	1.2227	Northern Molucca Sea
167	20/02/2019	01:52:19	0.03	119.43	10	4.6				Minahassa Peninsula, Sulawesi
168	20/02/2019	12:31:12	0.14	123.41	37	3.2				Minahassa Peninsula, Sulawesi
169	20/02/2019	12:53:37	-0.18	123.52	59	4.1				Minahassa Peninsula, Sulawesi
170	21/02/2019	03:03:21	1.30	125.07	0	3.3				Northern Molucca Sea
171	21/02/2019	14:36:46	2.67	125.65	10	3.4				Talaud Islands, Indonesia
172	21/02/2019	19:13:57	2.54	126.46	75	3.7				Northern Molucca Sea
173	22/02/2019	17:48:35	5.85	125.88	158	4.1				Mindanao, Philippines
174	23/02/2019	00:40:15	0.36	122.52	73	3.8				Minahassa Peninsula, Sulawesi
175	23/02/2019	11:43:58	1.11	128.26	5	5.0				Halmahera, Indonesia
176	23/02/2019	21:59:51	4.87	127.44	159	4.4				Talaud Islands, Indonesia
177	24/02/2019	01:46:48	1.80	127.40	98	4.4				Halmahera, Indonesia
178	24/02/2019	11:24:03	0.28	122.34	153	2.4				Minahassa Peninsula, Sulawesi
179	24/02/2019	11:44:02	3.84	127.04	53	4.3				Talaud Islands, Indonesia
180	24/02/2019	13:29:33	0.51	122.25	76	5.4	1.0772	0.4578	0.8099	Minahassa Peninsula, Sulawesi
181	24/02/2019	14:03:51	1.19	128.17	10	3.8				Halmahera, Indonesia
182	24/02/2019	14:15:21	0.54	122.29	65	3.7				Minahassa Peninsula, Sulawesi
183	25/02/2019	16:43:24	1.40	127.26	115	4.1				Halmahera, Indonesia
184	26/02/2019	11:13:38	0.34	122.26	167	3.2				Minahassa Peninsula, Sulawesi
185	26/02/2019	15:02:30	0.76	121.73	48	2.6				Minahassa Peninsula, Sulawesi
186	26/02/2019	17:08:59	0.43	130.02	12	3.7				Irian Jaya Region,
187	26/02/2019	22:33:41	1.69	126.35	10	3.8				Northern Molucca Sea
188	27/02/2019	00:11:25	5.11	127.26	16	5.1				Philippine Islands Region
189	27/02/2019	15:32:30	3.74	126.58	10	4.2				Talaud Islands, Indonesia
190	27/02/2019	20:15:14	1.05	124.18	243	3.4				Minahassa Peninsula, Sulawesi
191	28/02/2019	05:16:36	5.23	126.29	156	4.5				Mindanao, Philippines
192	28/02/2019	11:14:00	-0.03	123.12	142	3.3				Minahassa Peninsula, Sulawesi
193	28/02/2019	13:38:17	0.15	123.61	31	3.6				Minahassa Peninsula, Sulawesi
194	28/02/2019	16:54:48	-0.25	129.91	10	3.3				Halmahera, Indonesia
195	28/02/2019	17:45:54	3.31	126.85	10	4.0				Talaud Islands, Indonesia



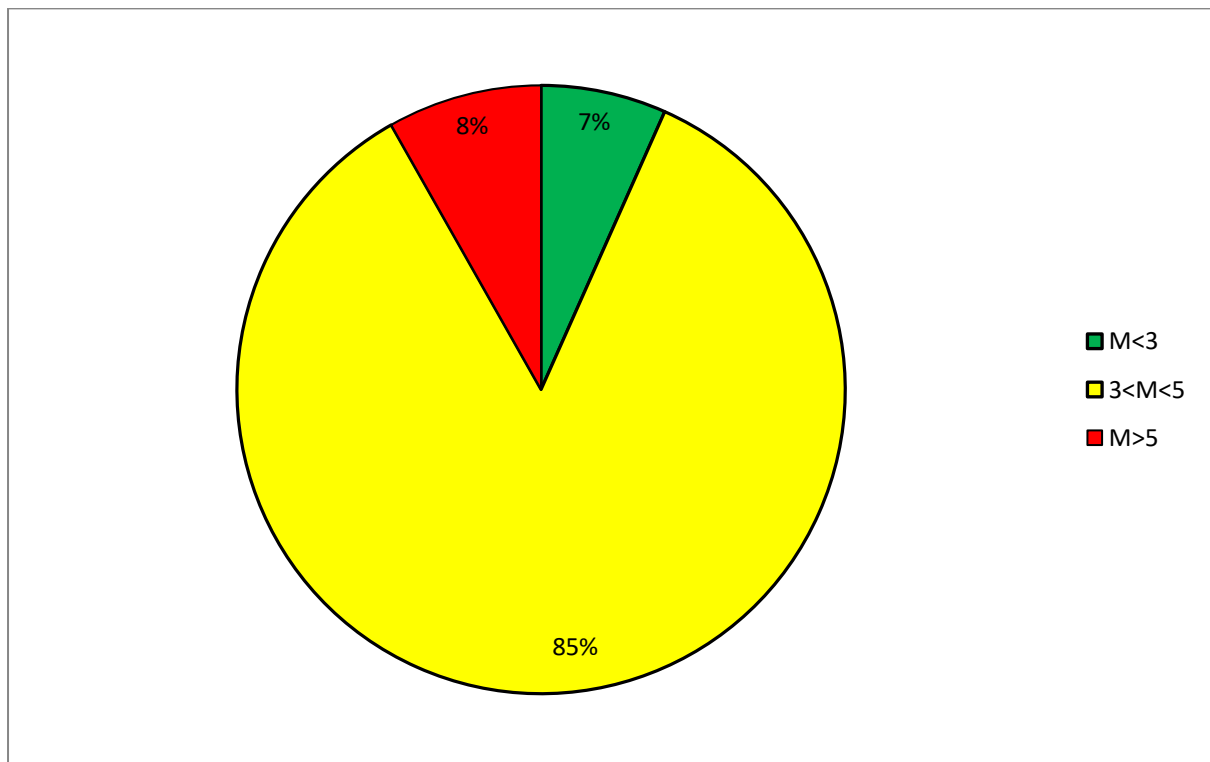
Gambar 8 Sebaran episenter gempabumi bulan Februari 2019

Tabel 6 Rekapitulasi gempabumi berdasarkan magnitudo bulan Februari 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	2	0	2	0	0
2	0	3	1	4	1	0
3	0	6	0	6	0	0
4	3	6	0	9	0	0
5	0	10	2	12	1	0
6	1	7	1	9	2	0
7	0	20	2	22	2	0
8	0	12	0	12	0	0
9	0	8	0	8	1	0
10	1	9	1	11	0	0
11	1	9	0	10	0	0
12	0	5	1	6	0	0
13	1	12	0	13	0	0
14	2	5	1	8	1	0
15	1	7	1	9	0	0
16	1	9	0	10	1	0
17	0	4	0	4	0	0
18	0	5	0	5	1	0
19	0	3	2	5	1	0
20	0	3	1	4	1	0
21	0	3	0	3	0	0
22	0	1	0	1	0	0
23	0	2	1	3	1	0
24	1	4	1	6	1	0
25	0	1	0	1	0	0
26	1	3	0	4	0	0
27	0	2	1	3	0	0
28	0	5	0	5	0	0
Jumlah gempa	13	166	16	195	14	0



Gambar 9 Grafik gempabumi berdasarkan magnitudo bulan Februari 2019



Gambar 10 Grafik persentase gempabumi berdasarkan magnitudo bulan Februari 2019

C. Data Gempabumi Bulan Maret 2019

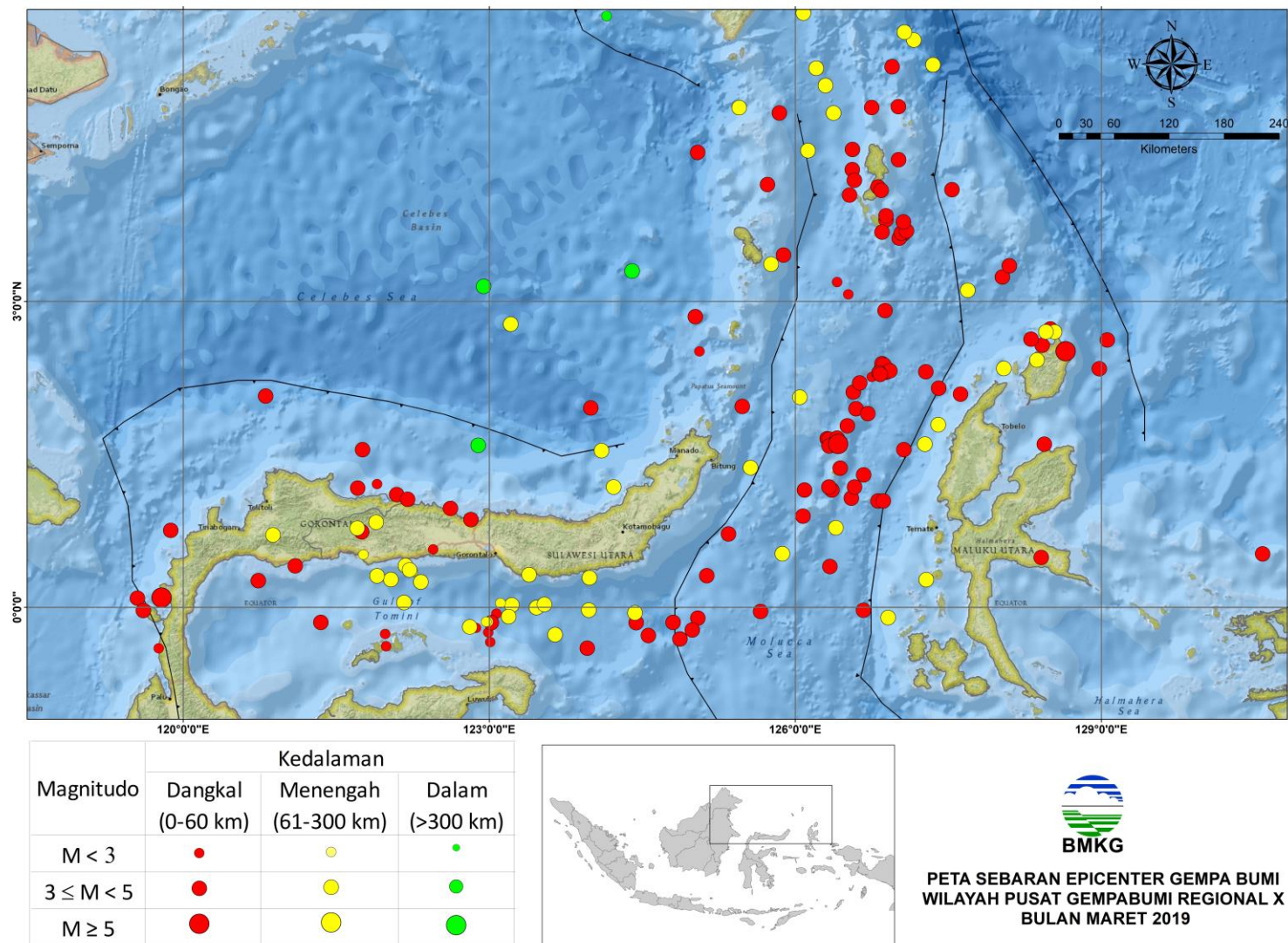
Tabel 7 Data kejadian gempabumi bulan Maret 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/03/2019	01:00:43	4.90	125.45	186	5.0	0.0965	0.0972	0.0972	Talaud Islands, Indonesia
2	01/03/2019	05:35:16	4.85	125.84	10	3.8				Talaud Islands, Indonesia
3	01/03/2019	07:24:47	0.84	121.89	93	3.5				Minahassa Peninsula, Sulawesi
4	01/03/2019	23:23:10	-0.22	124.99	25	4.5	0.2652	0.1503	0.2528	Southern Molucca Sea
5	02/03/2019	01:27:50	0.03	123.54	92	4.2	0.2958	0.1982	0.2257	Minahassa Peninsula, Sulawesi
6	02/03/2019	04:07:25	1.04	126.81	27	3.6				Northern Molucca Sea
7	02/03/2019	09:22:01	0.00	123.46	70	3.6				Minahassa Peninsula, Sulawesi
8	02/03/2019	13:12:01	0.09	119.55	10	3.8				Minahassa Peninsula, Sulawesi
9	02/03/2019	14:29:53	5.80	124.15	433	4.1	0.1176	0.1026	0.1094	Mindanao, Philippines
10	02/03/2019	16:23:20	-0.15	123.02	59	3.6				Minahassa Peninsula, Sulawesi
11	02/03/2019	20:46:31	2.70	128.46	216	4.4	0.0927	0.0518	0.0551	Halmahera, Indonesia
12	02/03/2019	23:11:37	-0.06	123.07	25	2.8				Minahassa Peninsula, Sulawesi
13	03/03/2019	10:54:44	4.46	125.04	9	4.5	0.1220	0.0607	0.0862	Talaud Islands, Indonesia
14	03/03/2019	15:10:48	-0.03	123.98	102	3.4				Minahassa Peninsula, Sulawesi
15	03/03/2019	15:32:37	1.55	121.76	10	3.2				Minahassa Peninsula, Sulawesi
16	03/03/2019	16:36:55	-0.20	122.87	13	3.0				Minahassa Peninsula, Sulawesi
17	03/03/2019	16:40:47	5.64	127.07	143	4.5	0.0923	0.0660	0.0787	Philippine Islands Region
18	03/03/2019	17:27:47	1.18	124.22	272	3.3				Minahassa Peninsula, Sulawesi
19	03/03/2019	18:07:10	2.31	127.28	47	3.5				Northern Molucca Sea
20	04/03/2019	05:40:50	-0.08	123.21	130	2.7				Minahassa Peninsula, Sulawesi
21	04/03/2019	06:39:19	2.30	126.82	28	3.4				Northern Molucca Sea
22	04/03/2019	07:54:52	2.51	125.06	10	3.0				Talaud Islands, Indonesia
23	04/03/2019	10:55:56	-0.10	126.91	65	3.4				Southern Molucca Sea
24	04/03/2019	13:35:22	0.02	123.22	98	3.1				Minahassa Peninsula, Sulawesi
25	04/03/2019	15:44:03	-0.04	125.66	19	3.4				Southern Molucca Sea
26	04/03/2019	18:48:32	2.26	126.75	25	2.8				Northern Molucca Sea
27	05/03/2019	03:19:51	-0.38	121.99	10	2.9				Minahassa Peninsula, Sulawesi
28	05/03/2019	04:33:15	5.83	126.08	122	4.7	0.2155	0.1956	0.2409	Mindanao, Philippines
29	05/03/2019	05:01:20	2.07	120.81	10	3.8				Celebes Sea
30	05/03/2019	16:49:20	-0.05	124.43	137	3.2				Southern Molucca Sea
31	05/03/2019	23:27:06	4.85	126.37	103	4.1				Talaud Islands, Indonesia
32	06/03/2019	07:38:53	-0.14	122.99	63	3.0				Minahassa Peninsula, Sulawesi
33	06/03/2019	08:39:30	2.30	126.89	10	4.6	0.2376	0.1860	0.1826	Northern Molucca Sea
34	06/03/2019	10:12:47	1.11	122.09	11	3.4				Minahassa Peninsula, Sulawesi
35	06/03/2019	11:32:55	1.54	124.10	257	3.6				Minahassa Peninsula, Sulawesi
36	06/03/2019	13:23:31	0.04	123.11	139	3.0				Minahassa Peninsula, Sulawesi
37	06/03/2019	13:57:20	3.78	127.06	50	5.0	0.0923	0.1076	0.1483	Talaud Islands, Indonesia

38	06/03/2019	14:09:16	3.67	127.04	26	4.1	0.1176	0.1430	0.1701	Talaud Islands, Indonesia
39	06/03/2019	15:49:37	0.52	121.77	111	2.9				Minahassa Peninsula, Sulawesi
40	06/03/2019	17:12:33	-0.23	130.93	289	3.5				Irian Jaya Region, Indonesia
41	06/03/2019	19:31:13	0.57	122.45	56	2.9				Minahassa Peninsula, Sulawesi
42	06/03/2019	19:54:12	5.29	126.21	143	4.2				Mindanao, Philippines
43	06/03/2019	20:06:20	0.25	122.33	135	3.1				Minahassa Peninsula, Sulawesi
44	06/03/2019	20:35:22	0.75	119.88	12	3.6				Minahassa Peninsula, Sulawesi
45	06/03/2019	23:56:52	2.20	126.63	50	4.9	0.1429	0.2413	0.2493	Northern Molucca Sea
46	07/03/2019	03:59:39	2.70	128.54	216	3.8				Halmahera, Indonesia
47	07/03/2019	17:17:38	2.11	126.57	10	3.9				Northern Molucca Sea
48	07/03/2019	20:56:53	1.90	126.71	54	4.7	0.0966	0.1933	0.3486	Northern Molucca Sea
49	07/03/2019	22:22:49	1.65	126.33	10	3.6				Northern Molucca Sea
50	08/03/2019	00:04:05	4.12	126.81	10	3.6				Talaud Islands, Indonesia
51	08/03/2019	07:24:27	3.15	122.94	504	4.2				Celebes Sea
52	08/03/2019	10:28:19	0.74	121.75	52	4.1	0.0793	0.0744	0.0906	Minahassa Peninsula, Sulawesi
53	08/03/2019	16:22:29	3.68	126.85	28	4.3	0.0737	0.1105	0.0871	Talaud Islands, Indonesia
54	08/03/2019	18:37:24	0.40	126.34	38	3.3				Northern Molucca Sea
55	08/03/2019	19:56:59	-0.26	121.98	10	2.5				Minahassa Peninsula, Sulawesi
56	08/03/2019	21:52:40	-0.31	124.87	10	4.4	0.1430	0.0775	0.0908	Southern Molucca Sea
57	09/03/2019	03:33:16	0.97	122.62	45	3.9				Minahassa Peninsula, Sulawesi
58	09/03/2019	09:41:04	0.31	121.90	192	3.6				Minahassa Peninsula, Sulawesi
59	09/03/2019	13:22:49	-0.09	123.19	130	4.2	0.2106	0.1126	0.1368	Minahassa Peninsula, Sulawesi
60	09/03/2019	18:12:43	3.66	127.06	10	4.2				Talaud Islands, Indonesia
61	09/03/2019	19:03:34	3.69	127.07	17	4.2	0.1243	0.1040	0.1408	Talaud Islands, Indonesia
62	09/03/2019	19:42:31	2.73	128.50	19	4.2	0.1274	0.1229	0.1372	Halmahera, Indonesia
63	09/03/2019	20:44:24	4.49	126.56	44	3.3				Talaud Islands, Indonesia
64	09/03/2019	20:48:41	3.69	127.09	29	3.8				Talaud Islands, Indonesia
65	09/03/2019	20:55:01	4.91	127.01	10	4.1	0.1403	0.1985	0.2695	Talaud Islands, Indonesia
66	10/03/2019	02:46:43	4.90	126.75	10	3.9				Talaud Islands, Indonesia
67	10/03/2019	03:31:49	5.32	127.35	230	4.2	0.1768	0.1002	0.1333	Philippine Islands Region
68	10/03/2019	07:51:25	3.37	125.76	148	3.7				Talaud Islands, Indonesia
69	10/03/2019	22:19:29	0.53	125.87	64	4.0				Northern Molucca Sea
70	11/03/2019	03:06:21	2.91	126.88	10	3.5				Northern Molucca Sea
71	11/03/2019	03:30:13	1.15	126.09	24	3.7				Northern Molucca Sea
72	11/03/2019	07:00:10	1.95	124.00	10	3.9	0.2079	0.1840	0.3170	Minahassa Peninsula, Sulawesi
73	11/03/2019	15:30:47	2.34	128.04	166	4.4	0.1511	0.1089	0.1251	Halmahera, Indonesia
74	11/03/2019	16:36:44	3.87	115.44	183	5.3				Borneo
75	11/03/2019	18:07:58	3.11	127.69	107	4.0	0.0818	0.0727	0.0696	Talaud Islands, Indonesia
76	11/03/2019	20:02:07	4.09	126.84	22	4.2	0.0508	0.0439	0.0395	Talaud Islands, Indonesia
77	11/03/2019	21:24:03	4.10	127.54	11	4.0	0.1654	0.1369	0.1242	Talaud Islands, Indonesia
78	12/03/2019	08:27:36	3.80	126.89	10	4.0				Talaud Islands, Indonesia
79	12/03/2019	13:22:39	2.78	123.21	206	3.3				Celebes Sea
80	12/03/2019	23:38:17	2.15	127.41	10	4.4				Northern Molucca Sea
81	13/03/2019	01:50:47	0.10	119.79	10	5.3	0.1507	0.0913	0.1163	Minahassa Peninsula, Sulawesi
82	13/03/2019	01:51:16	-0.03	119.61	10	4.9	0.1507	0.0913	0.1163	Minahassa Peninsula, Sulawesi
83	13/03/2019	05:03:03	5.12	126.30	202	4.0				Mindanao, Philippines

84	13/03/2019	07:05:37	-0.15	124.80	10	3.5				Southern Molucca Sea
85	13/03/2019	07:11:22	0.52	130.58	10	3.7				Irian Jaya Region, Indonesia
86	13/03/2019	11:36:10	0.37	122.22	146	4.5	0.0985	0.0740	0.1094	Minahassa Peninsula, Sulawesi
87	13/03/2019	19:18:06	3.84	126.89	24	3.6				Talaud Islands, Indonesia
88	13/03/2019	20:44:53	1.21	121.90	10	2.7				Minahassa Peninsula, Sulawesi
89	13/03/2019	21:25:06	-0.27	123.65	114	3.2				Minahassa Peninsula, Sulawesi
90	13/03/2019	22:02:55	0.05	122.16	159	3.3				Minahassa Peninsula, Sulawesi
91	13/03/2019	23:22:47	1.36	126.44	10	4.6	0.3085	0.3439	0.3783	Northern Molucca Sea
92	13/03/2019	23:45:34	1.17	121.71	10	3.4				Minahassa Peninsula, Sulawesi
93	13/03/2019	23:48:43	3.24	128.03	10	3.1				North of Halmahera, Indonesia
94	14/03/2019	00:55:20	1.37	125.56	63	3.6				Northern Molucca Sea
95	14/03/2019	05:11:31	1.95	126.60	37	4.1	0.1550	0.1060	0.1129	Northern Molucca Sea
96	14/03/2019	21:52:12	1.15	126.36	10	4.3	0.4438	0.6463	0.6143	Northern Molucca Sea
97	15/03/2019	03:12:58	1.18	126.33	25	3.1				Northern Molucca Sea
98	15/03/2019	09:55:31	6.17	125.23	90	4.9	0.1071	0.1106	0.1787	Mindanao, Philippines
99	15/03/2019	13:50:59	0.35	122.25	141	2.5				Minahassa Peninsula, Sulawesi
100	15/03/2019	19:00:16	5.56	127.16	114	4.5	0.0935	0.1038	0.1300	Philippine Islands Region
101	15/03/2019	22:34:00	1.60	127.27	170	3.7				Halmahera, Indonesia
102	15/03/2019	23:07:57	6.21	125.46	93	5.8	0.6513	0.9725	0.6779	Mindanao, Philippines
103	16/03/2019	07:06:16	1.30	126.67	54	4.6				Northern Molucca Sea
104	16/03/2019	10:14:08	1.07	126.55	12	3.6				Northern Molucca Sea
105	16/03/2019	11:44:34	-0.28	124.56	10	3.4				Southern Molucca Sea
106	16/03/2019	13:21:36	3.62	127.02	14	3.5				Talaud Islands, Indonesia
107	16/03/2019	13:30:03	1.78	126.51	16	3.6				Northern Molucca Sea
108	16/03/2019	20:53:12	1.60	128.44	30	3.6				Halmahera, Indonesia
109	17/03/2019	09:31:50	3.45	125.88	21	4.2	0.1557	0.0905	0.1098	Talaud Islands, Indonesia
110	17/03/2019	12:45:35	2.63	128.31	31	4.4	0.1765	0.1351	0.2258	Halmahera, Indonesia
111	18/03/2019	14:46:06	-0.40	123.96	10	3.4				Minahassa Peninsula, Sulawesi
112	18/03/2019	17:37:42	2.57	128.42	16	3.8				Halmahera, Indonesia
113	18/03/2019	19:50:57	-0.03	126.67	10	3.5				Southern Molucca Sea
114	19/03/2019	03:02:12	2.09	127.62	20	3.6				Northern Molucca Sea
115	19/03/2019	14:35:22	2.51	128.65	24	5.1	0.1377	0.0875	0.0776	Halmahera, Indonesia
116	19/03/2019	17:44:00	0.86	122.82	20	4.2	0.1115	0.1745	0.2082	Minahassa Peninsula, Sulawesi
117	19/03/2019	18:45:33	-0.40	119.76	10	2.9				Minahassa Peninsula, Sulawesi
118	19/03/2019	19:30:30	2.85	125.02	18	3.9				Talaud Islands, Indonesia
119	19/03/2019	21:29:59	3.07	126.52	10	2.9				Talaud Islands, Indonesia
120	19/03/2019	21:33:08	3.19	126.41	38	2.8				Talaud Islands, Indonesia
121	19/03/2019	22:12:26	2.62	129.06	27	4.7	0.3261	0.2616	0.2409	Halmahera, Indonesia
122	20/03/2019	03:03:32	6.08	125.98	157	4.3				Mindanao, Philippines
123	20/03/2019	09:21:55	2.32	126.93	23	3.9				Northern Molucca Sea
124	20/03/2019	14:29:50	3.35	128.10	22	4.5				North of Halmahera, Indonesia
125	20/03/2019	17:20:37	0.27	127.28	110	3.7				Halmahera, Indonesia
126	20/03/2019	21:32:27	4.48	126.12	136	4.8				Talaud Islands, Indonesia
127	21/03/2019	02:44:16	-0.15	124.44	21	3.3				Southern Molucca Sea
128	21/03/2019	16:11:04	1.18	126.58	27	3.5				Northern Molucca Sea
129	21/03/2019	18:02:58	0.49	128.41	13	3.7				Halmahera, Indonesia
130	21/03/2019	23:06:42	0.90	126.07	8	3.7				Northern Molucca Sea

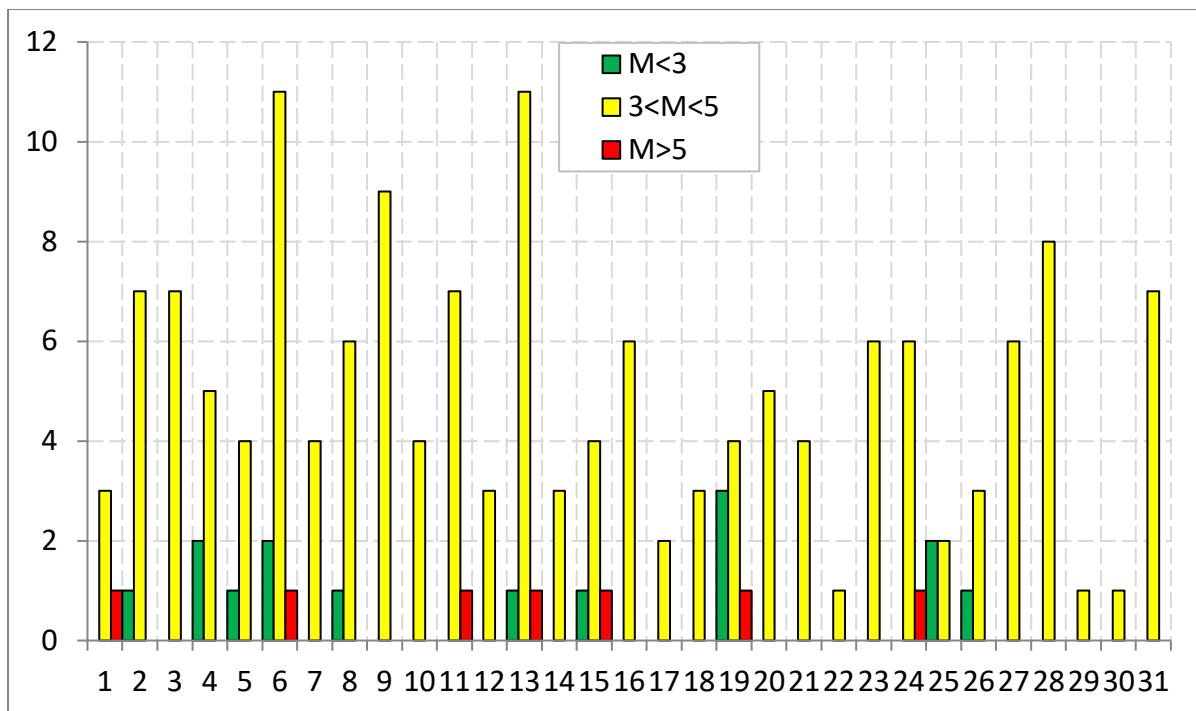
131	22/03/2019	20:44:49	2.28	126.83	59	3.6				Northern Molucca Sea
132	23/03/2019	00:10:35	0.32	123.39	152	3.4				Minahassa Peninsula, Sulawesi
133	23/03/2019	00:47:41	2.34	128.98	31	3.9				Halmahera, Indonesia
134	23/03/2019	13:09:34	2.33	126.84	10	4.3	0.1404	0.0779	0.1088	Northern Molucca Sea
135	23/03/2019	13:14:57	2.35	126.86	10	3.9				Northern Molucca Sea
136	23/03/2019	15:52:43	4.15	125.73	52	4.3	0.0966	0.0828	0.0700	Talaud Islands, Indonesia
137	23/03/2019	22:29:44	1.97	125.48	11	3.3				Northern Molucca Sea
138	24/03/2019	04:37:37	1.60	126.42	48	6.2	4.5083	8.4991	6.7654	Northern Molucca Sea
139	24/03/2019	13:36:57	0.71	120.88	61	3.8				Minahassa Peninsula, Sulawesi
140	24/03/2019	19:35:22	0.78	121.71	81	3.7				Minahassa Peninsula, Sulawesi
141	24/03/2019	19:55:37	0.41	122.18	110	3.4				Minahassa Peninsula, Sulawesi
142	24/03/2019	21:19:03	6.09	126.75	159	4.4				Mindanao, Philippines
143	24/03/2019	22:30:13	1.04	126.86	37	3.9				Northern Molucca Sea
144	24/03/2019	23:32:19	2.39	126.85	10	3.5				Northern Molucca Sea
145	25/03/2019	19:31:42	1.66	126.41	15	3.6				Northern Molucca Sea
146	25/03/2019	19:45:05	-0.34	123.01	17	2.8				Minahassa Peninsula, Sulawesi
147	25/03/2019	20:10:11	1.06	122.20	34	3.2				Minahassa Peninsula, Sulawesi
148	25/03/2019	21:04:20	-0.14	122.97	97	2.8				Minahassa Peninsula, Sulawesi
149	26/03/2019	12:03:30	-0.24	122.99	12	2.6				Minahassa Peninsula, Sulawesi
150	26/03/2019	16:22:09	0.41	121.10	18	3.4				Minahassa Peninsula, Sulawesi
151	26/03/2019	22:05:07	1.59	122.89	410	4.2				Minahassa Peninsula, Sulawesi
152	26/03/2019	22:18:03	1.58	126.33	27	4.0				Northern Molucca Sea
153	27/03/2019	00:33:45	0.29	123.98	189	4.9				Minahassa Peninsula, Sulawesi
154	27/03/2019	02:16:08	0.72	125.34	15	4.2				Northern Molucca Sea
155	27/03/2019	04:17:38	2.33	126.92	10	3.9				Northern Molucca Sea
156	27/03/2019	04:19:29	2.42	128.37	212	4.5				Halmahera, Indonesia
157	27/03/2019	14:48:39	4.29	126.56	14	3.9				Talaud Islands, Indonesia
158	27/03/2019	21:42:03	1.79	127.40	138	4.2				Halmahera, Indonesia
159	28/03/2019	04:01:32	4.39	127.01	17	3.7				Talaud Islands, Indonesia
160	28/03/2019	06:30:34	2.38	126.87	10	4.0				Northern Molucca Sea
161	28/03/2019	11:53:04	-0.15	121.35	10	3.1				Minahassa Peninsula, Sulawesi
162	28/03/2019	12:58:09	0.31	125.13	26	3.3				Northern Molucca Sea
163	28/03/2019	14:25:04	0.26	120.74	20	4.0				Minahassa Peninsula, Sulawesi
164	28/03/2019	15:38:23	2.06	126.04	102	4.7				Northern Molucca Sea
165	28/03/2019	18:02:20	4.04	126.53	31	3.9				Talaud Islands, Indonesia
166	28/03/2019	18:08:10	1.55	127.06	29	3.9				Halmahera, Indonesia
167	29/03/2019	11:45:30	-0.19	122.81	128	3.2				Minahassa Peninsula, Sulawesi
168	30/03/2019	16:29:34	-0.11	125.04	22	3.3				Southern Molucca Sea
169	31/03/2019	03:32:36	4.19	126.58	23	4.0				Talaud Islands, Indonesia
170	31/03/2019	08:07:48	0.78	126.40	71	4.5				Northern Molucca Sea
171	31/03/2019	13:44:08	5.30	126.95	12	4.3				Mindanao, Philippines
172	31/03/2019	14:21:39	0.27	122.04	182	3.3				Minahassa Peninsula, Sulawesi
173	31/03/2019	15:45:04	3.30	124.40	339	4.3				Celebes Sea
174	31/03/2019	16:37:31	1.65	126.31	5	3.9				Northern Molucca Sea
175	31/03/2019	18:39:55	1.63	126.42	10	3.6				Northern Molucca Sea



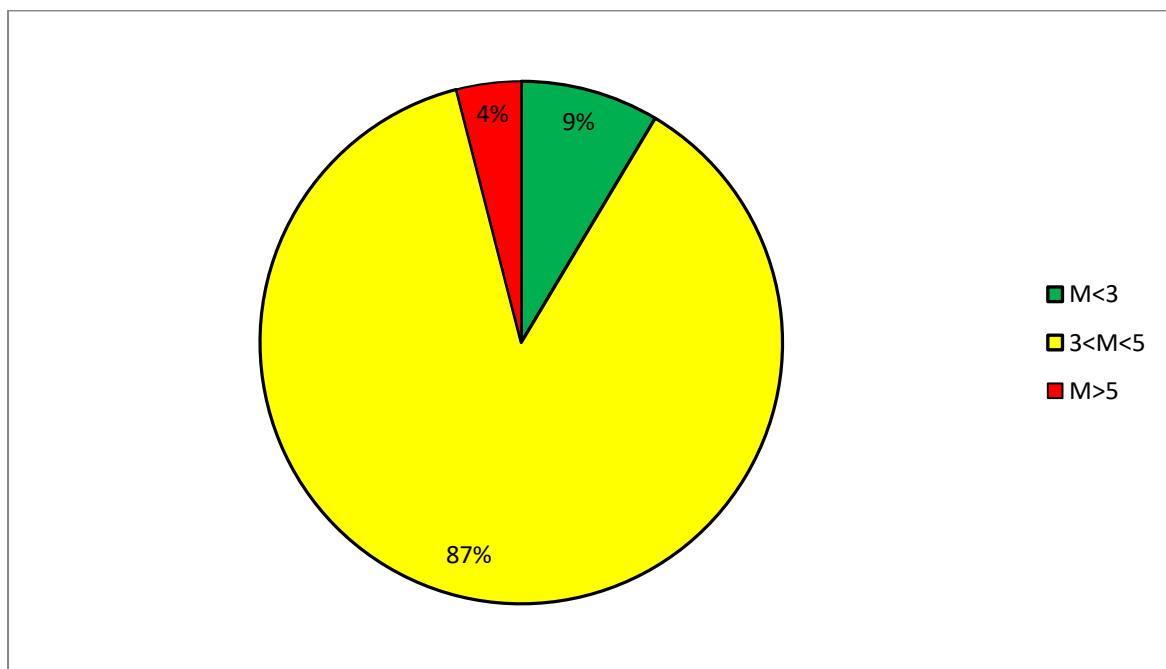
Gambar 11 Sebaran episenter gempabumi bulan Maret 2019

Tabel 8 Rekapitulasi gempabumi berdasarkan magnitudo bulan Maret 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	3	1	4	0	0
2	1	7	0	8	0	0
3	0	7	0	7	1	0
4	2	5	0	7	0	0
5	1	4	0	5	0	0
6	2	11	1	14	0	0
7	0	4	0	4	0	0
8	1	6	0	7	1	0
9	0	9	0	9	0	0
10	0	4	0	4	0	0
11	0	7	1	8	0	0
12	0	3	0	3	0	0
13	1	11	1	13	1	0
14	0	3	0	3	0	0
15	1	4	1	6	1	0
16	0	6	0	6	0	0
17	0	2	0	2	0	0
18	0	3	0	3	0	0
19	3	4	1	8	1	0
20	0	5	0	5	0	0
21	0	4	0	4	0	0
22	0	1	0	1	0	0
23	0	6	0	6	0	0
24	0	6	1	7	1	0
25	2	2	0	4	0	0
26	1	3	0	4	0	0
27	0	6	0	6	0	0
28	0	8	0	8	0	0
29	0	1	0	1	0	0
30	0	1	0	1	0	0
31	0	7	0	7	0	0
Jumlah gempa	15	153	7	175	6	0



Gambar 12 Grafik gempabumi berdasarkan magnitudo bulan Maret 2019



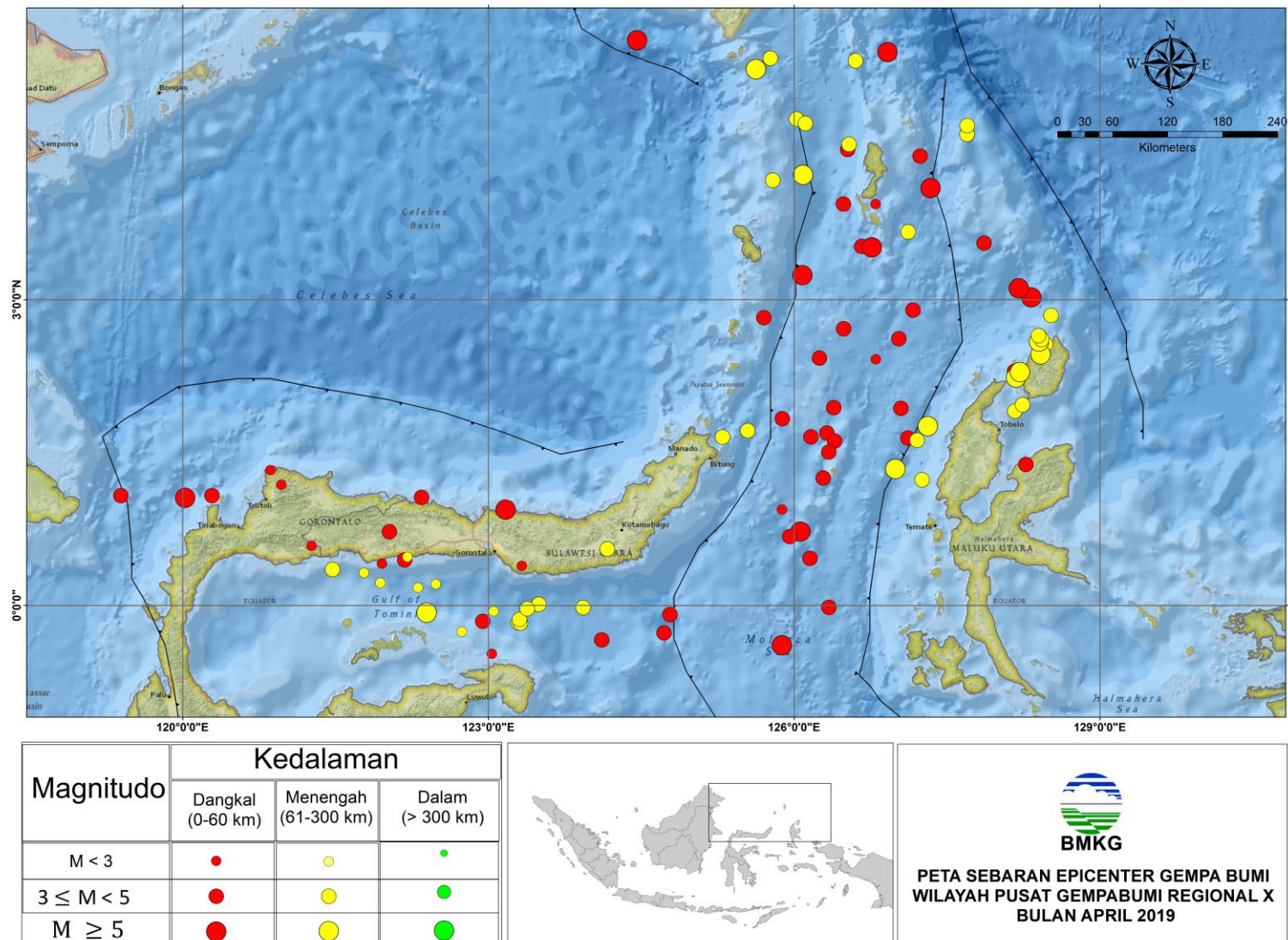
Gambar 13 Grafik persentase gempabumi berdasarkan magnitudo bulan Maret 2019

D. Data Gempabumi Bulan April 2019

Tabel 9 Data kejadian gempabumi bulan April 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/04/2019	22:46:50	-0.02	126.34	10	3.7				Southern Molucca
2	01/04/2019	04:27:10	0.18	122.31	144	2.6				Minahassa Peninsula
3	02/04/2019	12:28:31	1.76	127.31	118	5.3				Halmahera Indonesia
4	02/04/2019	06:03:07	4.47	126.52	5	4.2				Talaud Islands
5	03/04/2019	20:34:09	2.56	128.47	203	4.2				Halmahera Indonesia
6	03/04/2019	11:27:46	0.21	122.48	138	2.5				Minahassa Peninsula
7	03/04/2019	01:19:14	0.22	121.94	169	2.5				Minahassa Peninsula
8	04/04/2019	18:53:47	-0.34	124.11	14	3.9				Southern Molucca
9	04/04/2019	13:07:41	5.34	126.60	119	4.0				Mindanao Philippines
10	04/04/2019	06:36:05	4.09	127.34	10	5.1				Talaud Islands
11	04/04/2019	02:37:03	4.22	126.09	112	4.5				Talaud Islands
12	05/04/2019	12:33:53	1.65	126.16	10	4.0				Northern Molucca
13	05/04/2019	11:32:19	4.52	126.54	67	4.1				Talaud Islands
14	06/04/2019	10:12:19	-0.26	122.74	140	3.0				Minahassa Peninsula
15	06/04/2019	13:57:25	5.26	125.63	198	4.9				Mindanao Philippines
16	06/04/2019	05:30:21	5.37	125.77	186	4.2				Mindanao Philippines
17	06/04/2019	03:18:07	0.55	124.17	141	3.6				Minahassa Peninsula
18	06/04/2019	01:34:22	1.23	127.26	130	4.3				Halmahera Indonesia
19	07/04/2019	22:00:50	1.91	128.17	134	3.8				Halmahera Indonesia
20	07/04/2019	20:13:49	1.62	127.21	76	4.1				Halmahera Indonesia
21	07/04/2019	19:45:33	0.94	123.17	22	5.3				Minahassa Peninsula
22	07/04/2019	13:41:35	2.46	128.42	226	4.6				Halmahera Indonesia
23	07/04/2019	09:20:42	0.39	123.33	10	3.1				Minahassa Peninsula
24	07/04/2019	04:53:23	4.62	127.70	75	4.3				Talaud Islands
25	08/04/2019	21:55:27	2.90	127.17	26	4.0				Northern Molucca
26	08/04/2019	16:23:28	2.30	128.16	32	4.3				Halmahera Indonesia
27	08/04/2019	16:16:34	1.34	126.99	120	5.3	0.2403	0.1706	0.1775	Northern Molucca
28	08/04/2019	11:13:41	0.32	121.78	159	2.6				Minahassa Peninsula
29	08/04/2019	10:39:48	1.69	126.32	10	3.9				Northern Molucca
30	08/04/2019	10:24:09	1.33	120.86	15	2.9				Minahassa Peninsula
31	09/04/2019	20:03:06	0.58	121.27	12	2.9				Minahassa Peninsula
32	09/04/2019	14:35:17	2.42	126.80	10	3.4				Northern Molucca
33	09/04/2019	11:09:19	0.48	122.21	162	2.9				Minahassa Peninsula
34	10/04/2019	22:00:38	2.85	128.52	222	3.8				Halmahera Indonesia
35	10/04/2019	07:28:56	2.59	128.40	208	4.9				Halmahera Indonesia
36	10/04/2019	03:27:09	1.97	128.24	194	3.9				Halmahera Indonesia
37	11/04/2019	22:34:23	0.72	126.06	10	4.5				Northern Molucca
38	11/04/2019	17:43:31	0.01	123.49	130	3.8				Minahassa Peninsula
39	13/04/2019	11:56:22	1.08	119.39	10	4.2				Celebes Sea
40	13/04/2019	01:49:38	1.61	126.40	10	4.0				Northern Molucca
41	14/04/2019	19:02:35	-0.17	123.29	140	3.6				Minahassa Peninsula
42	14/04/2019	15:10:13	3.24	126.08	10	4.5				Talaud Islands
43	15/04/2019	16:26:13	1.08	120.29	10	3.6				Minahassa Peninsula
44	15/04/2019	05:00:26	1.50	126.34	10	3.6				Northern Molucca
45	16/04/2019	15:44:25	-0.07	122.40	237	4.8				Minahassa Peninsula
46	16/04/2019	23:12:44	1.05	120.03	10	4.9				Minahassa Peninsula
47	16/04/2019	08:21:55	2.62	127.03	10	4.2				Northern Molucca
48	16/04/2019	06:07:18	2.74	117.81	318	4.0				Borneo
49	17/04/2019	03:47:22	0.41	121.96	10	3.2				Minahassa Peninsula
50	18/04/2019	00:03:53	-0.27	124.72	10	3.8				Southern Molucca
51	18/04/2019	21:31:45	1.65	125.30	158	4.2				Northern Molucca
52	18/04/2019	14:26:09	1.94	126.39	10	3.7				Northern Molucca
53	18/04/2019	11:00:58	5.55	124.46	10	4.6				Mindanao Philippines
54	18/04/2019	06:51:37	2.72	126.49	10	3.8				Northern Molucca
55	18/04/2019	02:41:27	3.55	127.86	22	3.9				Talaud Islands
56	19/04/2019	14:25:52	-0.17	123.31	131	4.0				Minahassa Peninsula
57	19/04/2019	03:14:15	-0.14	123.31	146	3.6				Minahassa Peninsula
58	19/04/2019	10:31:02	0.67	125.96	10	3.8				Northern Molucca
59	19/04/2019	07:29:58	5.43	126.92	34	5.4	0.1049	0.0569	0.0922	Mindanao Philippines
60	19/04/2019	07:08:11	6.44	126.00	154	4.5				Mindanao Philippines

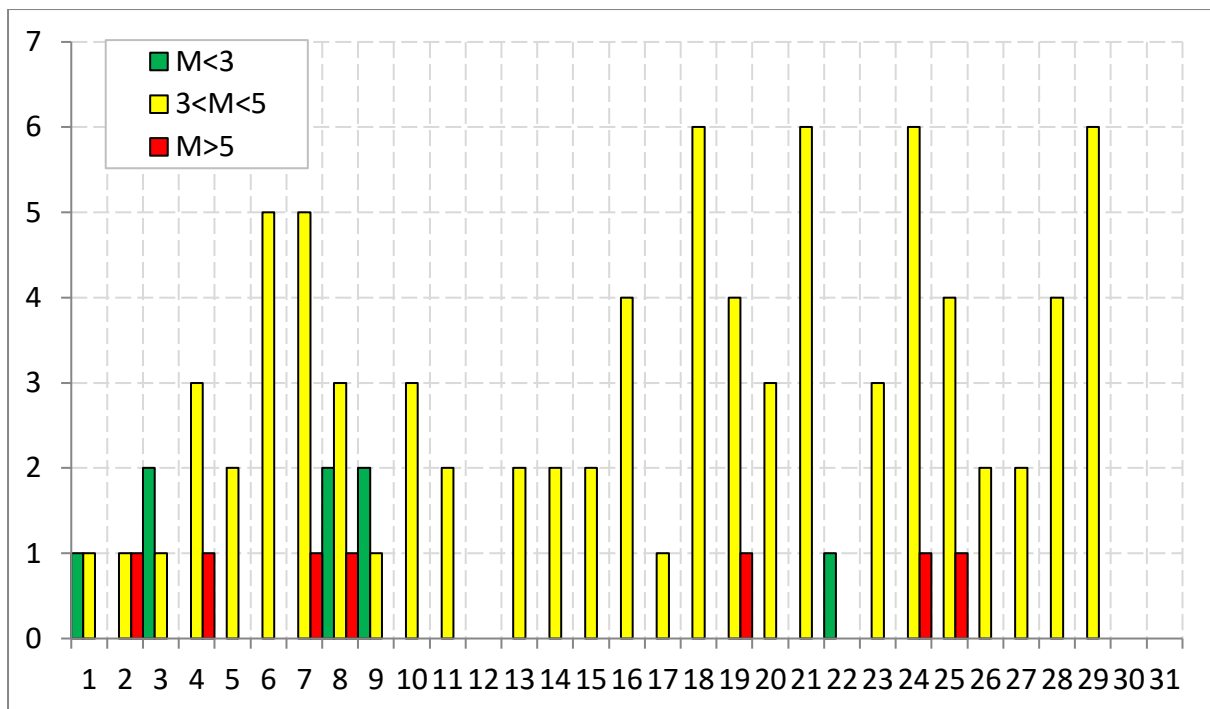
61	20/04/2019	21:40:57	1.38	128.27	26	4.1				Halmahera Indonesia
62	20/04/2019	13:48:17	1.64	127.11	30	4.0				Halmahera Indonesia
63	20/04/2019	03:28:40	1.93	127.05	12	3.5				Halmahera Indonesia
64	21/04/2019	19:37:21	-0.03	123.38	122	4.0				Minahassa Peninsula
65	21/04/2019	16:50:59	0.94	125.88	10	3.2				Northern Molucca
66	21/04/2019	15:45:27	3.52	126.66	10	3.6				Talaud Islands
67	21/04/2019	13:38:20	2.82	125.70	10	3.6				Talaud Islands
68	21/04/2019	09:03:15	0.46	126.16	10	3.7				Northern Molucca
69	21/04/2019	04:49:29	4.77	126.02	99	3.9				Talaud Islands
70	22/04/2019	04:02:44	1.19	120.97	10	2.5				Minahassa Peninsula
71	23/04/2019	00:10:05	-0.09	124.78	10	4.1				Southern Molucca
72	23/04/2019	15:07:22	1.25	126.29	10	3.9				Northern Molucca
73	23/04/2019	14:23:02	3.94	126.80	10	3.1				Talaud Islands
74	24/04/2019	18:42:10	-0.39	125.88	10	4.8	0.1530	0.1177	0.1324	Southern Molucca
75	24/04/2019	16:30:00	4.17	125.79	78	4.3				Talaud Islands
76	24/04/2019	16:24:24	4.41	127.24	14	3.8				Talaud Islands
77	24/04/2019	11:09:27	4.73	126.11	93	4.2				Talaud Islands
78	24/04/2019	06:14:26	3.02	128.33	10	4.4				North of
79	24/04/2019	03:28:26	2.23	128.18	102	5.1				Halmahera Indonesia
80	24/04/2019	02:17:19	2.29	128.21	96	4.7				Halmahera Indonesia
81	25/04/2019	16:25:08	-0.06	123.05	142	3.2				Minahassa Peninsula
82	25/04/2019	10:03:48	-0.02	123.93	73	3.6				Minahassa Peninsula
83	25/04/2019	11:02:07	7.60	126.72	10	5.0				Mindanao Philippines
84	25/04/2019	08:39:13	1.83	125.88	16	4.2				Northern Molucca
85	25/04/2019	01:34:07	3.11	128.20	4	4.7				North of
86	26/04/2019	07:57:44	2.61	128.43	176	3.4				Halmahera Indonesia
87	26/04/2019	01:36:51	3.66	127.12	164	4.0				Talaud Islands
88	27/04/2019	18:40:27	3.94	126.48	4	3.9				Talaud Islands
89	27/04/2019	06:23:48	0.45	122.18	10	3.5				Minahassa Peninsula
90	28/04/2019	22:47:37	-0.48	123.03	21	3.4				Minahassa Peninsula
91	28/04/2019	23:31:24	3.51	126.76	10	4.5	0.5953	0.0951	0.1902	Talaud Islands
92	28/04/2019	03:06:20	1.71	125.54	83	3.9				Northern Molucca
93	28/04/2019	01:23:01	0.35	121.47	178	3.8				Minahassa Peninsula
94	29/04/2019	13:00:25	-0.16	122.94	13	3.6				Minahassa Peninsula
95	29/04/2019	17:19:11	4.71	127.70	92	4.3				Talaud Islands
96	29/04/2019	13:44:20	0.72	122.03	58	4.0				Minahassa Peninsula
97	29/04/2019	12:40:50	2.43	126.25	21	3.9				Northern Molucca
98	29/04/2019	10:44:18	2.65	128.40	204	4.3				Halmahera Indonesia
99	29/04/2019	05:23:46	1.06	122.34	10	3.7				Minahassa Peninsula



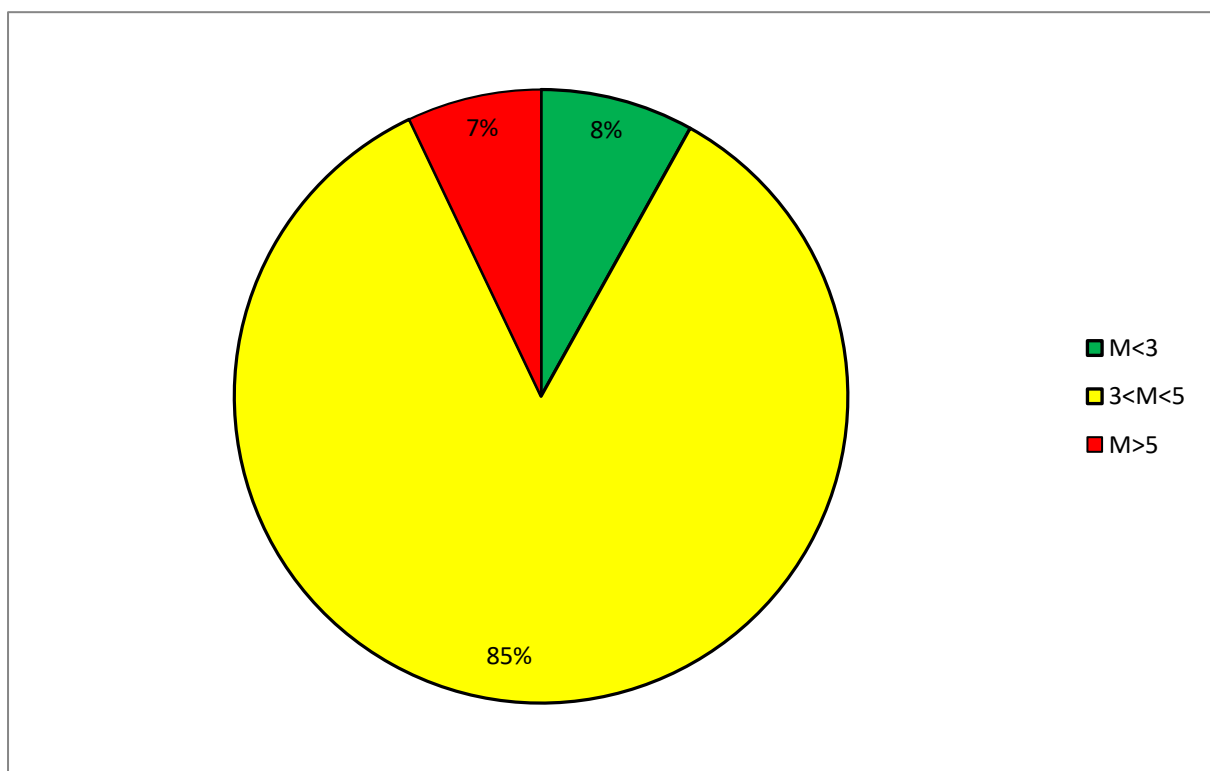
Gambar 14 Sebaran episenter gempabumi bulan April 2019

Tabel 10 Rekapitulasi gempabumi berdasarkan magnitudo bulan April 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	1	1	0	2	0	0
2	0	1	1	2	0	0
3	2	1	0	3	0	0
4	0	3	1	4	0	0
5	0	2	0	2	0	0
6	0	5	0	5	0	0
7	0	5	1	6	1	0
8	2	3	1	6	1	0
9	2	1	0	3	0	0
10	0	3	0	3	0	0
11	0	2	0	2	0	0
12	0	0	0	0	0	0
13	0	2	0	2	0	0
14	0	2	0	2	0	0
15	0	2	0	2	0	0
16	0	4	0	4	0	0
17	0	1	0	1	0	0
18	0	6	0	6	0	0
19	0	4	1	5	1	0
20	0	3	0	3	0	0
21	0	6	0	6	0	0
22	1	0	0	1	0	0
23	0	3	0	3	0	0
24	0	6	1	7	2	0
25	0	4	1	5	0	0
26	0	2	0	2	0	0
27	0	2	0	2	0	0
28	0	4	0	4	1	0
29	0	6	0	6	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
Jumlah gempa	8	84	7	99	6	0



Gambar 15 Grafik gempabumi berdasarkan magnitudo bulan April 2019



Gambar 16 Grafik persentase gempabumi berdasarkan magnitudo bulan April 2019

E. Data Gempabumi Bulan Mei 2019

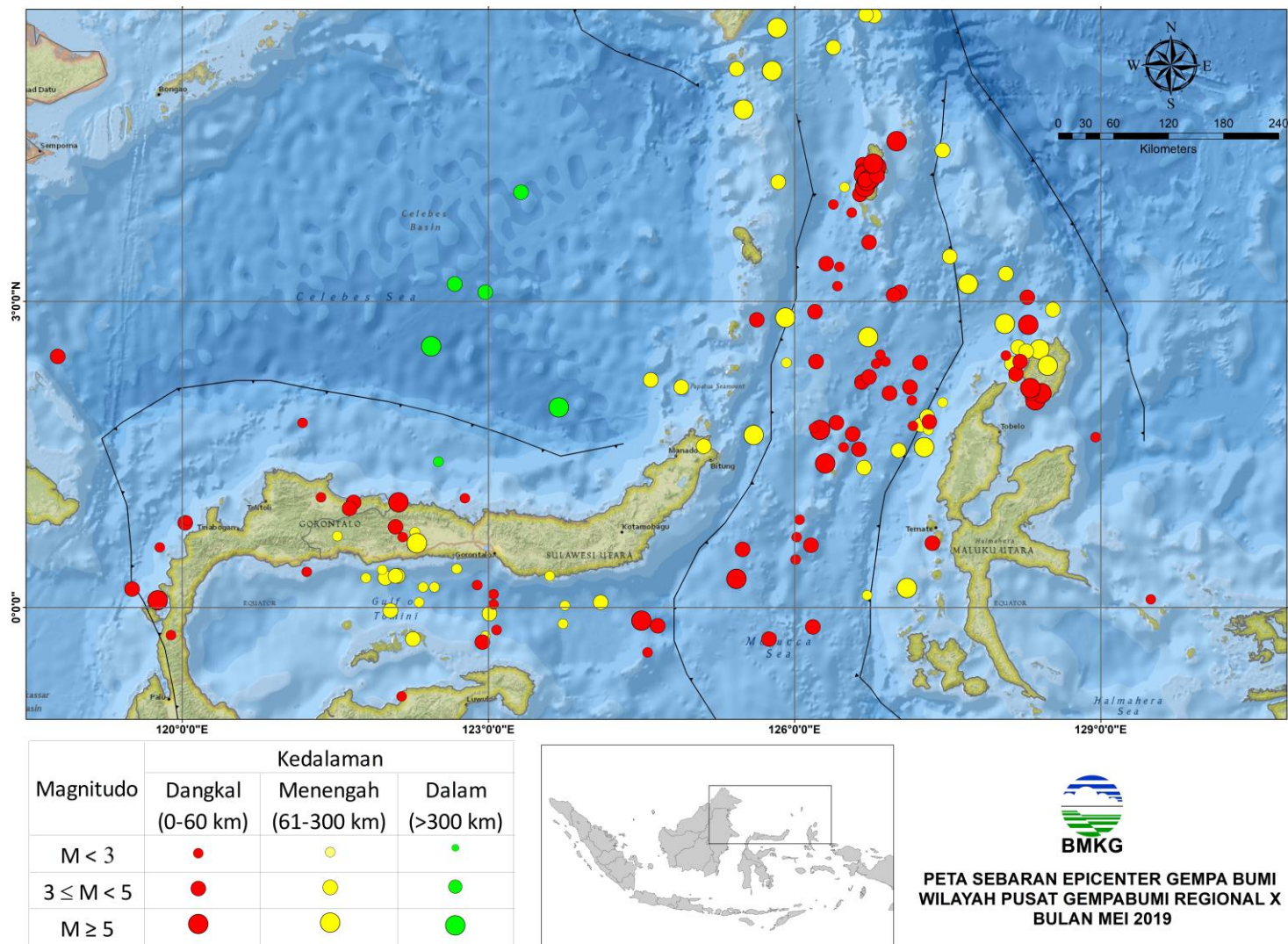
Tabel 11 Data kejadian gempabumi bulan Mei 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/05/2019	04:44:51	2.84	125.91	113	4.3				Talaud Island
2	01/05/2019	05:15:52	2.03	128.36	39	4.4				Halmahera
3	01/05/2019	14:54:41	2.90	126.20	15	3.7				Northern Molucca Sea
4	01/05/2019	16:59:31	-0.34	122.94	58	3.8				Minahassa Peninsula
5	01/05/2019	21:38:46	3.15	126.42	57	3.4				Talaud Island
6	02/05/2019	04:23:55	2.41	126.21	29	4.2	0.1357	-0.1790	0.1431	Northern Molucca Sea
7	02/05/2019	04:32:49	3.09	127.03	10	3.9				Talaud Island
8	02/05/2019	05:31:39	3.06	126.97	10	3.9				Talaud Island
9	02/05/2019	18:24:25	2.16	127.13	33	3.7				Northern Molucca Sea
10	03/05/2019	08:08:34	1.81	121.18	29	3.3				Celebes Sea
11	03/05/2019	13:38:56	2.39	128.13	163	4.0				Halmahera
12	03/05/2019	17:09:17	4.34	126.67	13	3.9				Talaud Island
13	03/05/2019	17:19:25	-0.31	122.26	152	3.7				Minahassa Peninsula
14	03/05/2019	17:28:55	4.28	126.67	20	4.0				Talaud Island
15	03/05/2019	18:23:20	-0.18	124.66	10	4.0				Southern Molucca Sea
16	03/05/2019	19:11:58	4.05	126.64	22	3.8				Talaud Island
17	03/05/2019	22:22:33	4.29	126.79	11	5.1				Talaud Island
18	03/05/2019	22:46:13	4.31	126.77	14	4.7				Talaud Island
19	03/05/2019	23:40:44	-0.22	123.08	10	3.5				Minahassa Peninsula
20	04/05/2019	01:02:39	0.08	129.49	17	3.4				Halmahera
21	04/05/2019	02:24:12	4.24	126.64	16	3.2				Talaud Island
22	04/05/2019	10:50:02	0.74	122.28	67	3.3				Minahassa Peninsula
23	04/05/2019	12:51:04	5.97	125.17	10	3.6				Mindanao
24	04/05/2019	16:06:02	3.87	126.56	10	3.6				Talaud Island
25	04/05/2019	18:34:33	2.51	128.39	206	3.3				Halmahera
26	04/05/2019	19:54:45	3.37	126.31	9	3.9				Talaud Island
27	04/05/2019	21:02:13	1.96	123.69	328	5.5	0.4017	0.4625	0.3271	Minahassa Peninsula
28	04/05/2019	23:51:01	4.32	126.80	9	4.8				Talaud Island
29	05/05/2019	00:05:40	4.24	126.68	17	4.7				Talaud Island
30	05/05/2019	01:39:54	1.07	122.77	49	3.4				Minahassa Peninsula
31	05/05/2019	03:07:14	4.20	126.74	20	4.5				Talaud Island
32	05/05/2019	04:42:01	4.12	126.69	10	4.7				Talaud Island
33	05/05/2019	08:57:19	-0.13	124.50	10	4.4				Southern Molucca Sea
34	05/05/2019	09:30:09	0.38	122.69	106	3.0				Minahassa Peninsula
35	05/05/2019	10:13:51	2.78	128.06	107	4.6				Halmahera
36	05/05/2019	12:33:23	1.69	125.60	74	4.7	0.3387	0.3881	0.3083	Northern Molucca Sea
37	05/05/2019	13:55:31	4.18	126.71	20	4.6				Talaud Island
38	05/05/2019	14:40:04	3.17	122.67	537	4.4				Celebes Sea
39	05/05/2019	19:48:09	5.80	126.78	179	3.8				Mindanao
40	05/05/2019	19:50:27	-0.44	124.56	15	3.1				Southern Molucca Sea
41	05/05/2019	22:13:41	5.28	125.43	208	4.2				Mindanao
42	05/05/2019	23:14:38	1.82	127.32	31	4.2	0.3689	0.3506	0.2783	Halmahera
43	05/05/2019	23:59:54	1.41	126.30	10	4.7				Southern Molucca Sea
44	06/05/2019	03:56:45	4.19	126.69	19	4.3				Talaud Island
45	07/05/2019	07:19:13	2.56	122.44	497	4.9				Celebes Sea

46	07/05/2019	11:45:57	-0.28	122.97	152	2.8				Minahassa Peninsula
47	07/05/2019	13:03:43	4.17	125.84	143	4.0				Talaud Island
48	07/05/2019	13:07:47	5.49	126.38	181	4.1				Mindanao
49	07/05/2019	14:34:19	1.79	127.24	135	3.8				Halmahera
50	07/05/2019	21:28:43	0.57	125.49	14	4.2	0.1475	-0.1784	0.1007	Southern Molluca Sea
51	08/05/2019	10:03:19	1.54	127.02	107	4.0				Halmahera
52	08/05/2019	15:37:30	2.55	128.19	148	3.4				Halmahera
53	08/05/2019	20:04:36	6.25	126.81	105	4.1				Mindanao
54	08/05/2019	21:03:38	3.27	128.07	150	3.8				Halmahera
55	09/05/2019	00:32:37	0.20	122.36	132	2.8				Minahassa Peninsula
56	09/05/2019	04:33:56	0.63	127.35	10	3.7				Halmahera
57	09/05/2019	05:57:45	0.61	126.16	10	3.8				Southern Molluca Sea
58	09/05/2019	14:04:09	3.04	128.28	58	3.8				Halmahera
59	10/05/2019	00:32:26	2.10	126.93	24	4.3	0.1572	0.1699	-0.1228	Northern Molluca Sea
60	10/05/2019	01:42:09	0.79	122.09	28	3.8				Minahassa Peninsula
61	10/05/2019	02:57:51	2.47	128.07	9	3.3				Halmahera
62	10/05/2019	15:12:38	2.46	118.78	29	4.1				Celebes Sea
63	10/05/2019	18:09:24	4.23	126.81	22	3.8				Talaud Island
64	10/05/2019	20:57:59	1.70	126.57	19	3.9	0.0651	-0.0561	0.0600	Northern Molluca Sea
65	11/05/2019	00:23:30	2.29	128.17	10	4.3				Halmahera
66	11/05/2019	00:31:43	1.78	127.16	33	3.3				Halmahera
67	11/05/2019	03:38:46	0.69	122.16	40	3.4				Minahassa Peninsula
68	11/05/2019	14:14:56	0.20	122.47	110	2.5				Minahassa Peninsula
69	11/05/2019	18:17:24	0.18	119.51	10	4.0				Minahassa Peninsula
70	11/05/2019	18:55:43	0.05	124.10	104	3.8				Southern Molluca Sea
71	11/05/2019	21:56:42	4.12	126.49	78	2.9				Talaud Island
72	11/05/2019	22:37:17	5.81	126.70	150	3.8				Mindanao
73	11/05/2019	23:43:42	0.63	122.30	91	4.6	0.3105	0.3921	0.1998	Minahassa Peninsula
74	13/05/2019	03:59:41	5.68	125.83	148	4.7				Mindanao
75	13/05/2019	10:53:21	5.26	125.78	169	4.6				Mindanao
76	13/05/2019	19:11:08	2.39	126.80	10	3.3				Northern Molluca Sea
77	13/05/2019	19:18:05	2.41	126.89	14	3.4				Northern Molluca Sea
78	14/05/2019	00:52:43	0.83	120.03	5	3.7				Minahassa Peninsula
79	14/05/2019	12:15:56	0.85	120.05	5	3.6				Minahassa Peninsula
80	14/05/2019	14:13:01	3.58	126.73	18	4.0				Talaud Island
81	14/05/2019	17:11:28	3.34	126.44	10	3.1				Talaud Island
82	14/05/2019	18:57:32	2.21	126.66	10	4.0				Northern Molluca Sea
83	14/05/2019	19:23:51	2.19	126.64	10	3.4				Northern Molluca Sea
84	15/05/2019	02:02:54	-0.06	123.01	130	3.7				Minahassa Peninsula
85	15/05/2019	09:02:14	2.23	124.59	239	3.8				Celebes Sea
86	15/05/2019	13:28:19	4.35	126.77	15	4.7				Talaud Island
87	15/05/2019	14:36:58	2.92	128.53	215	3.8				Halmahera
88	15/05/2019	22:24:03	-0.87	122.15	30	3.0				Minahassa Peninsula
89	16/05/2019	00:48:13	3.17	127.70	92	4.5				Halmahera
90	16/05/2019	01:07:14	4.88	125.50	184	4.4				Talaud Island
91	16/05/2019	03:56:18	1.74	126.25	10	4.6	0.7098	0.6386	0.5497	Northern Molluca Sea
92	16/05/2019	16:51:44	3.44	127.52	94	3.8				Talaud Island
93	16/05/2019	17:12:56	2.01	127.45	96	3.3				Halmahera
94	17/05/2019	12:03:36	1.55	126.63	10	3.7				Northern Molluca Sea
95	17/05/2019	12:21:00	0.19	127.10	113	4.7	0.3678	0.3386	0.1594	Halmahera
96	17/05/2019	13:03:16	0.22	122.89	51	3.4				Minahassa Peninsula
97	17/05/2019	15:18:22	2.53	128.40	216	4.5				Halmahera

98	17/05/2019	16:58:36	2.51	128.27	178	4.0				Halmahera
99	17/05/2019	17:23:00	1.67	128.95	10	3.3				Halmahera
100	18/05/2019	11:16:17	-0.16	123.73	112	3.2				Minahassa Peninsula
101	18/05/2019	12:28:25	0.69	126.02	10	3.6				Northern Molluca Sea
102	18/05/2019	12:31:50	0.86	126.05	10	3.1				Northern Molluca Sea
103	18/05/2019	12:47:53	1.08	121.36	10	2.9				Minahassa Peninsula
104	18/05/2019	17:17:38	1.81	126.41	20	3.8				Northern Molluca Sea
105	19/05/2019	10:56:03	1.58	125.11	133	3.7				Northern Molluca Sea
106	20/05/2019	04:52:46	2.41	128.21	24	4.2				Halmahera
107	20/05/2019	06:52:43	4.07	123.32	544	4.4				Celebes Sea
108	20/05/2019	14:12:39	3.09	122.97	494	4.1				Celebes Sea
109	20/05/2019	18:22:46	2.26	126.73	10	4.0				Northern Molluca Sea
110	20/05/2019	22:08:49	1.57	126.48	10	3.6				Northern Molluca Sea
111	21/05/2019	12:22:38	0.05	122.32	141	2.5				Minahassa Peninsula
112	21/05/2019	13:55:04	2.16	124.89	215	3.5				Celebes Sea
113	21/05/2019	15:26:45	2.40	125.92	68	3.3				Northern Molluca Sea
114	21/05/2019	18:42:45	1.03	122.12	16	5.2	0.8342	0.9018	0.2969	Minahassa Peninsula
115	22/05/2019	04:40:04	3.95	126.38	21	3.6				Talaud Island
116	22/05/2019	06:58:41	4.48	127.45	82	4.2				Talaud Island
117	22/05/2019	10:52:21	4.57	127.00	36	4.7				Talaud Island
118	23/05/2019	09:18:41	-0.03	122.04	245	3.6				Minahassa Peninsula
119	23/05/2019	11:31:44	1.57	127.27	80	4.5	0.2105	0.1935	0.1582	Halmahera
120	23/05/2019	12:49:21	1.43	122.51	405	3.6				Minahassa Peninsula
121	23/05/2019	13:52:08	2.03	127.15	27	3.4				Halmahera
122	23/05/2019	15:06:47	1.74	127.31	78	3.2				Halmahera
123	23/05/2019	17:10:09	2.65	126.72	67	4.4				Northern Molluca Sea
124	24/05/2019	03:37:03	1.03	121.68	10	4.3				Minahassa Peninsula
125	24/05/2019	13:16:47	1.87	127.30	95	3.7				Halmahera
126	24/05/2019	13:22:27	2.82	125.63	10	4.0	0.0867	0.1031	0.0994	Talaud Island
127	24/05/2019	16:00:30	0.29	121.80	186	2.5				Minahassa Peninsula
128	25/05/2019	02:36:42	0.35	121.22	10	2.6				Minahassa Peninsula
129	25/05/2019	12:10:01	0.47	126.01	10	3.3				Southern Molluca Sea
130	26/05/2019	05:29:30	-0.19	126.18	10	4.1				Southern Molluca Sea
131	26/05/2019	10:33:39	0.28	125.43	10	5.0	0.3194	0.2704	0.2134	Southern Molluca Sea
132	26/05/2019	11:44:32	1.37	126.68	118	3.5				Northern Molluca Sea
133	26/05/2019	17:00:05	2.10	128.42	15	4.6				Halmahera
134	26/05/2019	20:21:12	-0.27	119.89	10	3.0				Minahassa Peninsula
135	27/05/2019	01:45:18	1.76	126.19	8	3.5				Northern Molluca Sea
136	27/05/2019	13:34:01	0.29	121.99	173	3.9				Minahassa Peninsula
137	28/05/2019	03:07:05	2.37	128.48	219	4.3				Halmahera
138	28/05/2019	11:54:51	0.70	121.52	86	2.3				Minahassa Peninsula
139	28/05/2019	16:22:35	0.31	123.60	244	3.2				Minahassa Peninsula
140	28/05/2019	17:08:00	2.25	128.15	148	3.0				Halmahera
141	29/05/2019	02:31:53	0.03	123.05	20	3.0				Minahassa Peninsula
142	29/05/2019	15:40:52	2.40	127.23	58	4.0				Northern Molluca Sea
143	29/05/2019	18:13:18	2.77	128.29	12	4.4				Halmahera
144	29/05/2019	18:26:35	0.59	119.78	10	3.4				Minahassa Peninsula
145	29/05/2019	21:11:14	2.10	128.32	59	4.0				Halmahera
146	29/05/2019	21:23:11	-0.31	125.75	34	3.8				Southern Molluca Sea
147	29/05/2019	22:13:46	2.15	128.31	57	4.9				Halmahera
148	30/05/2019	00:28:11	0.97	121.64	10	4.2				Minahassa Peninsula
149	30/05/2019	04:33:23	0.07	119.76	10	4.4				Minahassa Peninsula

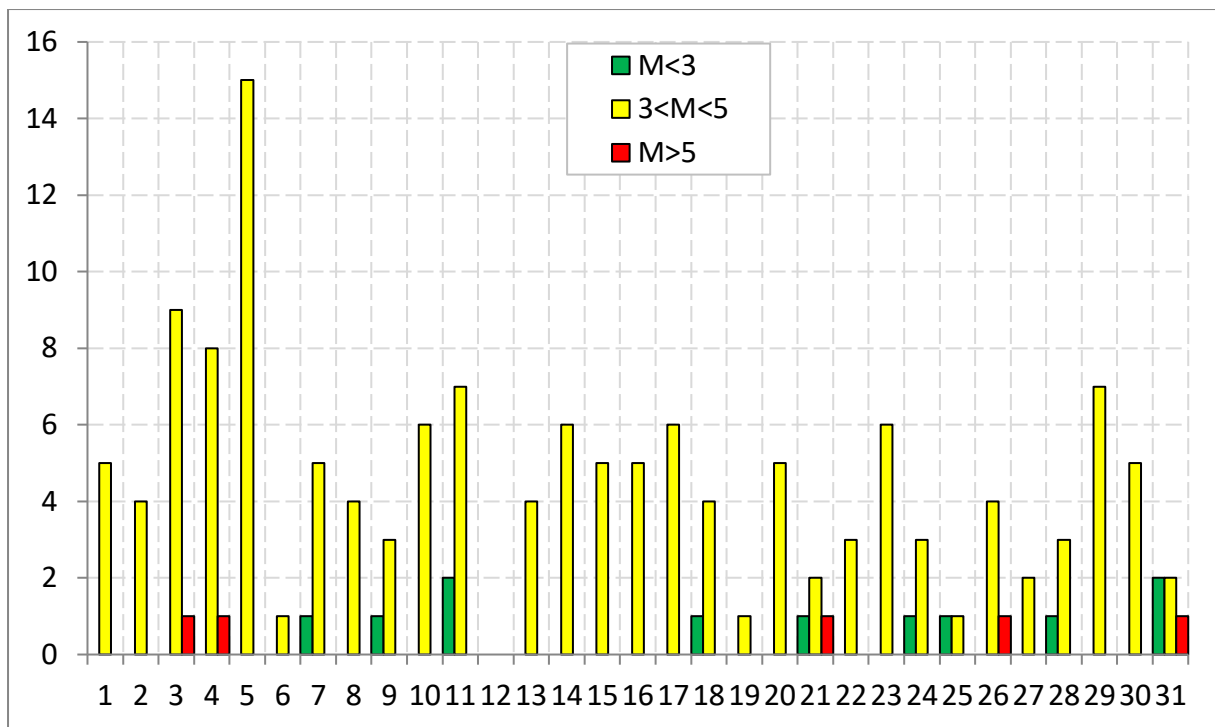
150	30/05/2019	10:30:34	2.48	126.84	3	3.6				Northern Molluca Sea
151	30/05/2019	15:23:36	0.02	123.75	134	3.3				Minahassa Peninsula
152	30/05/2019	18:17:07	0.31	122.11	137	4.0				Minahassa Peninsula
153	31/05/2019	10:12:33	6.14	126.53	112	6.3				Mindanao
154	31/05/2019	10:25:05	0.31	122.09	163	3.6				Minahassa Peninsula
155	31/05/2019	11:27:46	0.13	123.05	21	2.9				Minahassa Peninsula
156	31/05/2019	11:45:48	0.37	121.96	156	2.4				Minahassa Peninsula
157	31/05/2019	20:04:25	0.12	126.71	76	3.3				Southern Molluca Sea



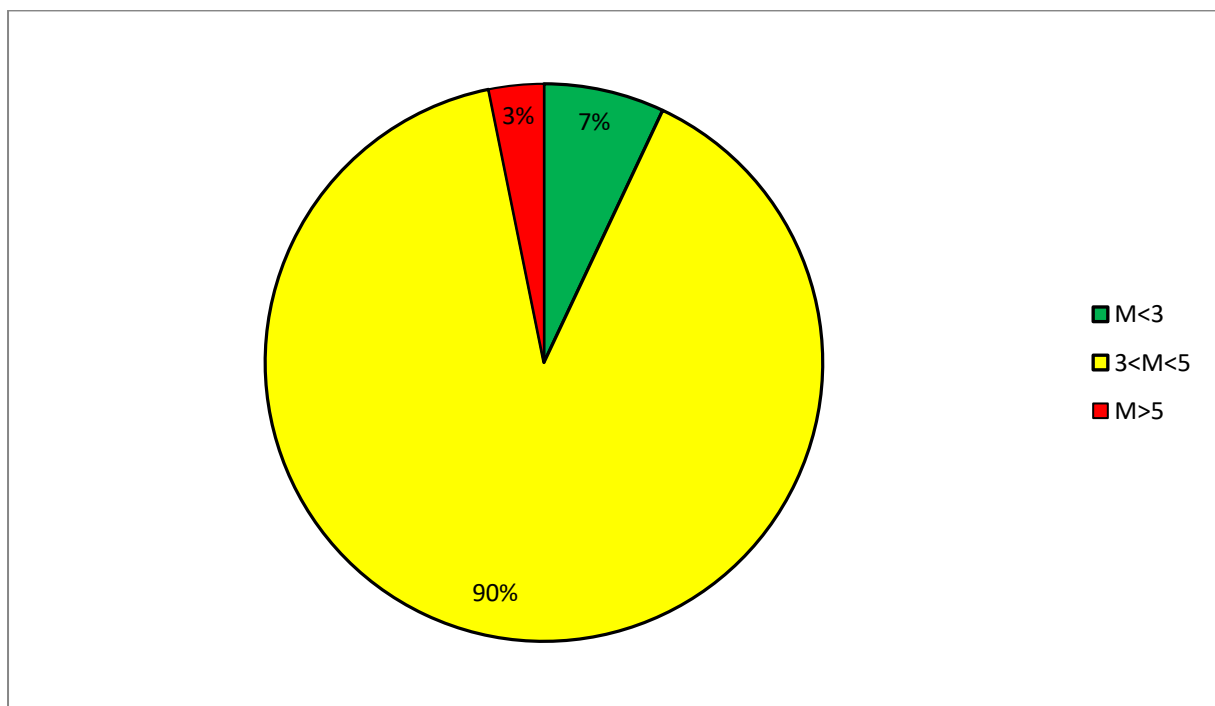
Gambar 17 Sebaran episenter gempabumi bulan Mei 2019

Tabel 12 Rekapitulasi gempabumi berdasarkan magnitudo bulan Mei 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	5	0	5	1	0
2	0	4	0	4	0	0
3	0	9	1	10	1	0
4	0	8	1	9	3	0
5	0	15	0	15	1	0
6	0	1	0	1	0	0
7	1	5	0	6	0	0
8	0	4	0	4	0	0
9	1	3	0	4	1	0
10	0	6	0	6	0	0
11	2	7	0	9	2	0
12	0	0	0	0	0	0
13	0	4	0	4	0	0
14	0	6	0	6	1	0
15	0	5	0	5	1	0
16	0	5	0	5	1	0
17	0	6	0	6	1	0
18	1	4	0	5	0	0
19	0	1	0	1	0	0
20	0	5	0	5	0	0
21	1	2	1	4	1	0
22	0	3	0	3	0	0
23	0	6	0	6	0	0
24	1	3	0	4	0	0
25	1	1	0	2	0	0
26	0	4	1	5	1	0
27	0	2	0	2	0	0
28	1	3	0	4	0	0
29	0	7	0	7	1	0
30	0	5	0	5	1	0
31	2	2	1	5	1	0
Jumlah gempa	11	141	5	157	18	0



Gambar 18 Grafik gempabumi berdasarkan magnitudo bulan Mei 2019



Gambar 19 Grafik persentase gempabumi berdasarkan magnitudo bulan Mei 2019

F. Data Gempabumi Bulan Juni 2019

Tabel 13 Data kejadian gempabumi bulan Juni 2019

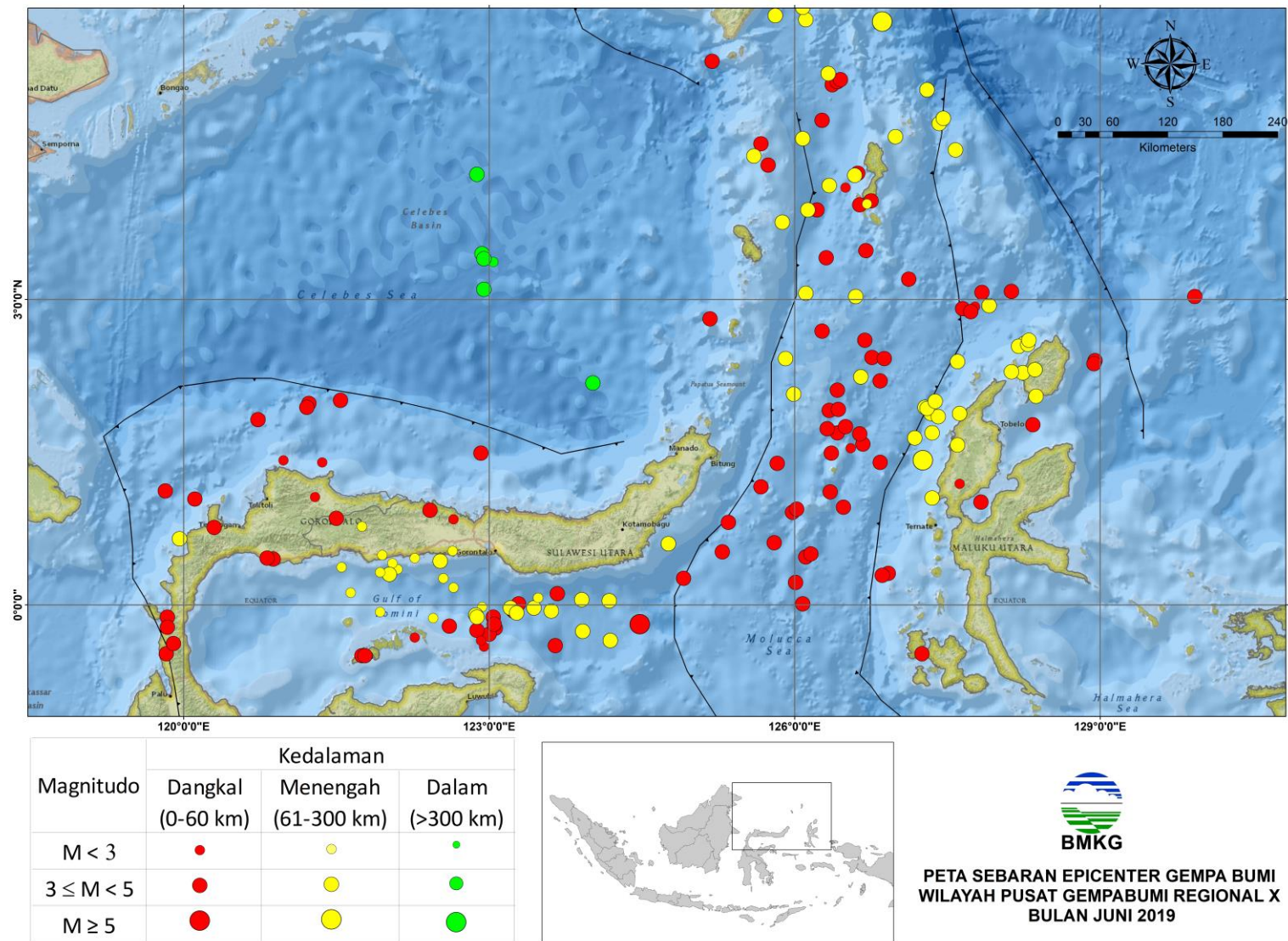
No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/06/2019	05:39:50	1.40	121.36	18	3.0				Minahassa Peninsula, Sulawesi
2	01/06/2019	07:58:19	4.12	126.34	85	4.3	0.0169	0.0116	0.0181	Talaud Islands, Indonesia
3	01/06/2019	09:45:31	6.10	126.53	99	5.4				Mindanao, Philippines
4	01/06/2019	12:51:46	1.39	125.83	10	3.1				Northern Molucca Sea
5	01/06/2019	15:22:35	3.37	123.04	497	3.8				Celebes Sea
6	01/06/2019	17:13:14	2.93	127.77	10	3.0				Northern Molucca Sea
7	01/06/2019	17:15:45	3.03	129.93	10	3.9				North of Halmahera, Indonesia
8	01/06/2019	23:14:44	1.04	120.11	9	4.1				Minahassa Peninsula, Sulawesi
9	02/06/2019	01:13:21	1.58	126.67	10	4.3				Northern Molucca Sea
10	02/06/2019	02:03:19	-0.13	122.45	77	2.9				Minahassa Peninsula, Sulawesi
11	02/06/2019	17:40:45	5.94	126.69	11	4.7				Mindanao, Philippines
12	02/06/2019	18:01:33	5.96	126.52	53	4.5	0.0693	0.0039	0.0066	Mindanao, Philippines
13	02/06/2019	19:04:40	-0.12	123.04	54	3.1				Minahassa Peninsula, Sulawesi
14	02/06/2019	19:13:13	-0.48	119.83	10	3.3				Minahassa Peninsula, Sulawesi
15	02/06/2019	20:29:26	-0.50	121.81	10	2.9				Minahassa Peninsula, Sulawesi
16	03/06/2019	00:42:52	1.06	121.29	10	2.9				Minahassa Peninsula, Sulawesi
17	03/06/2019	02:44:44	1.69	126.42	10	4.5	0.0162	0.0170	0.0250	Northern Molucca Sea
18	03/06/2019	07:28:00	0.76	120.30	10	4.1				Minahassa Peninsula, Sulawesi
19	03/06/2019	08:01:41	2.42	125.91	101	3.4				Talaud Islands, Indonesia
20	03/06/2019	12:21:28	4.23	122.88	526	4.1				Celebes Sea
21	03/06/2019	15:30:49	2.94	127.91	134	4.1				Northern Molucca Sea
22	03/06/2019	20:34:39	4.41	125.60	140	3.8				Talaud Islands, Indonesia
23	03/06/2019	21:51:40	0.84	122.65	10	2.6				Minahassa Peninsula, Sulawesi
24	03/06/2019	22:43:18	2.57	128.26	156	3.3				Halmahera, Indonesia
25	04/06/2019	00:35:29	-0.12	119.84	10	4.1				Minahassa Peninsula, Sulawesi
26	04/06/2019	03:27:37	1.01	127.83	10	4.1				Halmahera, Indonesia
27	04/06/2019	06:32:43	-0.02	122.93	110	2.9				Minahassa Peninsula, Sulawesi
28	04/06/2019	10:25:03	2.05	128.37	122	3.7				Halmahera, Indonesia
29	04/06/2019	13:56:50	1.68	126.64	18	3.3				Northern Molucca Sea
30	04/06/2019	14:52:53	1.49	122.92	10	3.1				Minahassa Peninsula, Sulawesi
31	04/06/2019	16:15:09	0.26	124.91	10	3.6				Minahassa Peninsula, Sulawesi
32	04/06/2019	22:05:50	3.03	126.60	74	3.7				Talaud Islands, Indonesia
33	04/06/2019	23:07:19	2.43	126.76	10	3.7				Northern Molucca Sea
34	05/06/2019	02:16:48	2.40	128.95	10	3.4				Halmahera, Indonesia
35	05/06/2019	02:21:03	2.37	128.94	10	3.4				Halmahera, Indonesia
36	05/06/2019	04:01:20	1.42	120.98	7	2.9				Minahassa Peninsula, Sulawesi
37	05/06/2019	07:38:11	2.54	128.20	113	4.0				Halmahera, Indonesia
38	05/06/2019	10:16:59	-0.22	131.40	14	3.2				Irian Jaya Region, Indonesia
39	05/06/2019	20:41:49	6.48	124.22	446	5.3				Mindanao, Philippines

40	05/06/2019	20:54:08	2.18	124.02	750	3.9				Celebes Sea
41	05/06/2019	21:42:45	1.88	127.34	70	3.7				Halmahera, Indonesia
42	06/06/2019	05:36:51	3.76	125.88	122	3.7				Talaud Islands, Indonesia
43	06/06/2019	08:24:03	4.58	126.08	105	4.6				Talaud Islands, Indonesia
44	06/06/2019	13:19:50	3.08	128.13	7	4.1				North of Halmahera, Indonesia
45	06/06/2019	19:50:18	4.60	126.99	61	4.0				Talaud Islands, Indonesia
46	07/06/2019	01:47:28	2.91	127.65	10	3.2				Northern Molucca Sea
47	07/06/2019	05:47:10	0.31	126.92	12	3.8				Northern Molucca Sea
48	07/06/2019	16:37:51	1.16	125.67	27	3.7				Northern Molucca Sea
49	07/06/2019	18:19:24	5.34	125.19	16	4.4				Mindanao, Philippines
50	07/06/2019	19:47:24	-0.48	127.25	50	3.5				Halmahera, Indonesia
51	07/06/2019	19:55:18	3.45	122.93	497	3.9				Celebes Sea
52	07/06/2019	22:02:09	-0.06	123.61	114	3.7				Minahassa Peninsula, Sulawesi
53	07/06/2019	22:13:32	-0.32	122.27	29	2.8				Minahassa Peninsula, Sulawesi
54	07/06/2019	23:27:55	0.52	125.29	10	3.9				Northern Molucca Sea
55	08/06/2019	03:08:18	1.49	126.36	10	3.6				Northern Molucca Sea
56	08/06/2019	10:50:41	-0.50	121.75	10	3.6				Minahassa Peninsula, Sulawesi
57	08/06/2019	11:06:35	0.22	126.01	19	3.2				Northern Molucca Sea
58	08/06/2019	14:09:38	5.11	126.37	45	4.4				Mindanao, Philippines
59	08/06/2019	15:45:25	0.26	122.55	116	2.8				Minahassa Peninsula, Sulawesi
60	08/06/2019	16:09:44	1.05	127.35	159	3.6				Halmahera, Indonesia
61	08/06/2019	16:49:36	-0.40	123.65	10	3.2				Minahassa Peninsula, Sulawesi
62	08/06/2019	16:59:29	1.69	127.35	102	4.2	0.0160	0.0110	0.0140	Halmahera, Indonesia
63	08/06/2019	18:00:02	1.57	127.60	180	3.7				Halmahera, Indonesia
64	08/06/2019	18:17:33	1.91	126.34	16	3.3				Northern Molucca Sea
65	08/06/2019	20:11:34	1.40	126.84	51	3.4				Northern Molucca Sea
66	08/06/2019	20:34:59	4.76	126.27	11	4.4				Talaud Islands, Indonesia
67	09/06/2019	00:46:51	1.77	128.34	24	3.5				Halmahera, Indonesia
68	09/06/2019	05:33:46	2.69	126.27	25	3.8				Northern Molucca Sea
69	09/06/2019	06:47:53	5.14	126.42	10	4.3				Mindanao, Philippines
70	09/06/2019	09:48:19	2.01	121.54	10	4.2				Celebes Sea
71	09/06/2019	18:44:15	-0.35	124.19	74	4.1				Southern Molucca Sea
72	09/06/2019	22:08:45	5.16	126.45	12	4.0				Mindanao, Philippines
73	10/06/2019	01:09:10	4.10	126.50	10	2.9				Talaud Islands, Indonesia
74	10/06/2019	12:30:33	4.73	127.42	70	4.0				Talaud Islands, Indonesia
75	10/06/2019	18:59:28	0.53	122.64	104	2.5				Minahassa Peninsula, Sulawesi
76	10/06/2019	19:45:34	3.20	127.12	34	3.4				Talaud Islands, Indonesia
77	10/06/2019	22:20:54	3.88	126.13	113	4.2				Talaud Islands, Indonesia
78	10/06/2019	23:02:21	0.45	120.88	11	4.2				Minahassa Peninsula, Sulawesi
79	10/06/2019	23:53:50	0.46	120.82	32	3.5				Minahassa Peninsula, Sulawesi
80	11/06/2019	05:45:56	2.61	117.14	14	4.8				Borneo
81	11/06/2019	16:01:52	0.01	126.08	10	3.1				Northern Molucca Sea
82	11/06/2019	19:27:21	-0.07	121.93	227	2.8				Minahassa Peninsula, Sulawesi
83	12/06/2019	01:18:19	4.24	126.62	15	3.8				Talaud Islands, Indonesia
84	12/06/2019	01:30:34	-0.50	121.78	10	4.2				Minahassa Peninsula, Sulawesi
85	12/06/2019	02:55:40	5.75	126.11	123	4.4				Mindanao, Philippines
86	12/06/2019	10:05:53	0.35	122.10	76	2.5				Minahassa Peninsula, Sulawesi

87	12/06/2019	11:59:17	3.48	126.70	16	3.5				Talaud Islands, Indonesia
88	12/06/2019	13:04:58	3.93	126.64	40	3.1				Talaud Islands, Indonesia
89	12/06/2019	16:41:37	-0.22	119.84	10	4.0				Minahassa Peninsula, Sulawesi
90	12/06/2019	18:39:33	3.94	126.71	61	2.6				Talaud Islands, Indonesia
91	12/06/2019	20:03:07	1.54	126.55	34	2.8				Northern Molucca Sea
92	12/06/2019	21:15:46	2.28	128.24	198	3.5				Halmahera, Indonesia
93	12/06/2019	21:18:57	0.29	126.86	14	3.5				Northern Molucca Sea
94	13/06/2019	00:07:29	0.96	126.48	30	4.4				Northern Molucca Sea
95	13/06/2019	00:40:21	3.07	127.84	20	4.4				Talaud Islands, Indonesia
96	14/06/2019	07:30:35	1.88	127.62	217	3.8				Halmahera, Indonesia
97	14/06/2019	08:08:39	2.60	126.69	22	3.1				Northern Molucca Sea
98	14/06/2019	08:12:18	1.64	127.18	127	3.8				Halmahera, Indonesia
99	14/06/2019	17:57:56	0.61	125.80	16	3.3				Northern Molucca Sea
100	14/06/2019	22:49:08	1.94	127.28	91	3.9				Halmahera, Indonesia
101	15/06/2019	08:54:30	3.06	126.11	101	4.3				Talaud Islands, Indonesia
102	15/06/2019	14:07:38	-0.10	122.87	184	3.3				Minahassa Peninsula, Sulawesi
103	15/06/2019	20:43:17	5.22	126.33	61	4.3				Mindanao, Philippines
104	15/06/2019	23:31:12	4.22	126.59	70	4.0				Talaud Islands, Indonesia
105	16/06/2019	00:35:09	2.20	126.84	13	4.0				Northern Molucca Sea
106	16/06/2019	05:12:46	3.97	126.75	23	4.3				Talaud Islands, Indonesia
107	16/06/2019	09:58:59	-0.23	123.06	12	3.1				Minahassa Peninsula, Sulawesi
108	16/06/2019	10:16:45	-0.03	123.44	118	3.2				Minahassa Peninsula, Sulawesi
109	16/06/2019	20:26:18	2.42	126.88	10	4.1				Northern Molucca Sea
110	17/06/2019	03:47:20	0.65	119.96	61	3.4				Minahassa Peninsula, Sulawesi
111	17/06/2019	22:05:16	-0.21	122.61	28	3.1				Minahassa Peninsula, Sulawesi
112	18/06/2019	04:18:38	0.49	121.95	183	2.7				Minahassa Peninsula, Sulawesi
113	18/06/2019	07:19:51	0.07	123.48	105	3.0				Minahassa Peninsula, Sulawesi
114	18/06/2019	09:55:32	-0.03	123.21	116	3.7				Minahassa Peninsula, Sulawesi
115	18/06/2019	10:49:40	4.78	127.46	164	4.2				Talaud Islands, Indonesia
116	18/06/2019	10:50:54	-0.29	123.00	10	3.1				Minahassa Peninsula, Sulawesi
117	18/06/2019	13:44:54	2.56	128.29	145	3.5				Halmahera, Indonesia
118	18/06/2019	14:43:08	0.47	126.11	10	3.7				Northern Molucca Sea
119	18/06/2019	15:37:58	3.40	122.95	505	4.0				Celebes Sea
120	18/06/2019	16:09:29	0.37	121.55	143	2.4				Minahassa Peninsula, Sulawesi
121	18/06/2019	21:47:09	0.77	121.75	74	2.1				Minahassa Peninsula, Sulawesi
122	19/06/2019	15:37:10	-0.25	122.88	53	3.3				Minahassa Peninsula, Sulawesi
123	19/06/2019	15:47:13	0.05	123.91	102	3.2				Minahassa Peninsula, Sulawesi
124	19/06/2019	16:45:49	2.39	127.60	111	4.2				Northern Molucca Sea
125	19/06/2019	17:51:39	2.11	126.42	21	3.2				Northern Molucca Sea
126	19/06/2019	19:09:43	0.93	122.42	13	3.5				Minahassa Peninsula, Sulawesi
127	19/06/2019	20:50:10	-0.41	122.95	28	2.8				Minahassa Peninsula, Sulawesi
128	20/06/2019	02:04:43	5.73	126.86	78	5.1				Mindanao, Philippines
129	20/06/2019	06:01:07	0.85	121.50	10	3.7				Minahassa Peninsula, Sulawesi
130	20/06/2019	13:48:30	2.29	128.13	109	3.7				Halmahera, Indonesia
131	20/06/2019	15:46:35	3.10	122.95	503	4.0				Celebes Sea

132	20/06/2019	17:47:17	4.32	125.74	54	4.5				Talaud Islands, Indonesia
133	20/06/2019	19:17:58	2.31	128.36	219	3.8				Halmahera, Indonesia
134	20/06/2019	20:31:58	0.81	125.35	26	3.5				Northern Molucca Sea
135	21/06/2019	02:50:35	2.24	126.65	61	3.8				Northern Molucca Sea
136	22/06/2019	03:31:32	-0.35	122.92	59	2.8				Minahassa Peninsula, Sulawesi
137	22/06/2019	03:44:09	1.75	126.50	23	4.2				Northern Molucca Sea
138	22/06/2019	06:31:29	0.01	123.29	59	3.5				Minahassa Peninsula, Sulawesi
139	22/06/2019	15:43:56	4.47	127.58	104	4.6				Talaud Islands, Indonesia
140	23/06/2019	02:45:28	0.60	124.76	116	3.9				Minahassa Peninsula, Sulawesi
141	23/06/2019	09:53:55	2.07	125.99	97	4.1				Talaud Islands, Indonesia
142	23/06/2019	11:58:40	5.87	126.08	101	4.6				Mindanao, Philippines
143	24/06/2019	08:17:08	-0.19	124.48	40	5.1	0.0150	0.0200	0.0100	Southern Molucca Sea
144	24/06/2019	11:41:36	0.91	125.98	15	3.6				Northern Molucca Sea
145	24/06/2019	16:33:50	5.79	125.81	195	4.1				Mindanao, Philippines
146	24/06/2019	18:02:43	1.85	127.41	113	3.5				Halmahera, Indonesia
147	24/06/2019	18:10:09	2.60	128.30	162	3.4				Halmahera, Indonesia
148	24/06/2019	18:45:49	4.53	125.67	13	4.1				Talaud Islands, Indonesia
149	24/06/2019	19:41:52	1.19	127.62	10	2.4				Halmahera, Indonesia
150	24/06/2019	19:45:28	0.94	126.02	10	3.3				Northern Molucca Sea
151	25/06/2019	00:08:10	1.98	121.23	10	3.8				Minahassa Peninsula, Sulawesi
152	25/06/2019	00:59:12	1.73	126.32	10	4.4	0.0159	0.0220	0.0220	Northern Molucca Sea
153	25/06/2019	10:26:20	2.88	127.73	10	3.9				Northern Molucca Sea
154	25/06/2019	16:02:24	0.11	123.67	10	3.4				Minahassa Peninsula, Sulawesi
155	25/06/2019	20:32:18	0.04	124.18	93	4.8	0.0052	0.0090	0.0060	Minahassa Peninsula, Sulawesi
156	26/06/2019	05:09:08	-0.38	119.90	10	3.6				Minahassa Peninsula, Sulawesi
157	26/06/2019	06:30:55	1.94	121.21	26	4.1				Minahassa Peninsula, Sulawesi
158	26/06/2019	14:46:53	1.82	120.73	10	3.5				Minahassa Peninsula, Sulawesi
159	26/06/2019	15:32:57	0.43	122.52	72	3.2				Minahassa Peninsula, Sulawesi
160	27/06/2019	07:29:20	0.41	122.05	97	2.3				Minahassa Peninsula, Sulawesi
161	27/06/2019	08:28:37	0.30	122.02	143	3.1				Minahassa Peninsula, Sulawesi
162	27/06/2019	10:38:59	2.81	125.17	9	3.3				Talaud Islands, Indonesia
163	27/06/2019	15:17:42	1.12	119.82	10	3.6				Celebes Sea
164	27/06/2019	19:35:07	-0.08	123.27	119	4.0				Minahassa Peninsula, Sulawesi
165	27/06/2019	20:16:09	-0.26	123.92	78	4.4				Minahassa Peninsula, Sulawesi
166	27/06/2019	20:24:34	1.42	127.26	142	5.2	0.0700	0.1140	0.1142	Halmahera, Indonesia
167	27/06/2019	22:58:05	-0.06	123.24	3	3.2				Minahassa Peninsula, Sulawesi
168	28/06/2019	00:28:45	1.93	127.30	84	4.6	0.0240	0.0143	0.0195	Halmahera, Indonesia
169	28/06/2019	10:59:46	0.17	122.65	147	2.9				Minahassa Peninsula, Sulawesi
170	28/06/2019	11:14:03	1.11	126.35	18	3.5				Northern Molucca Sea
171	28/06/2019	12:33:54	3.41	126.31	10	4.0				Talaud Islands, Indonesia
172	28/06/2019	23:30:27	1.92	126.43	21	4.0				Northern Molucca Sea
173	29/06/2019	06:14:48	-0.12	122.88	95	3.1				Minahassa Peninsula, Sulawesi
174	29/06/2019	09:10:44	0.46	122.27	125	2.8				Minahassa Peninsula, Sulawesi
175	29/06/2019	10:59:04	0.32	121.93	179	2.7				Minahassa Peninsula, Sulawesi

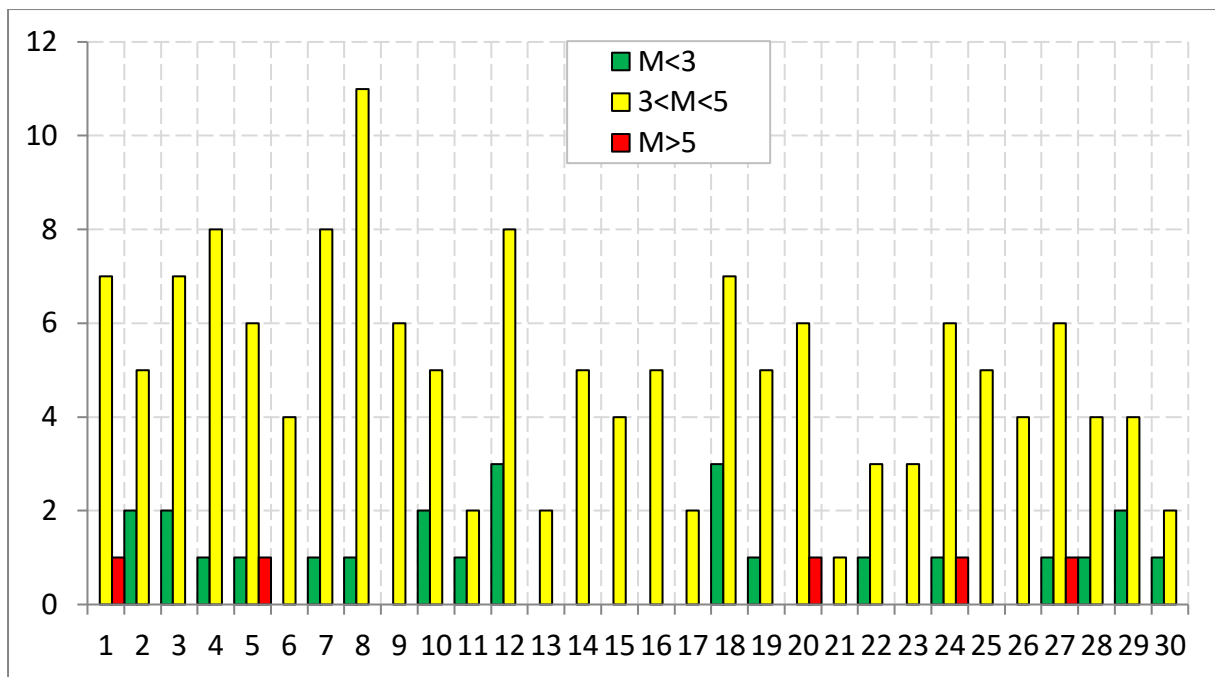
176	29/06/2019	12:37:06	-0.19	123.05	10	3.1				Minahassa Peninsula, Sulawesi
177	29/06/2019	16:20:22	0.50	126.16	10	4.2				Northern Molucca Sea
178	29/06/2019	20:01:53	3.88	126.22	50	3.5				Talaud Islands, Indonesia
179	30/06/2019	11:29:01	5.06	127.30	137	4.0				Philippine Islands Region
180	30/06/2019	14:12:11	0.12	121.64	190	2.3				Minahassa Peninsula, Sulawesi
181	30/06/2019	17:05:08	2.00	127.38	105	3.5				Northern Molucca Sea



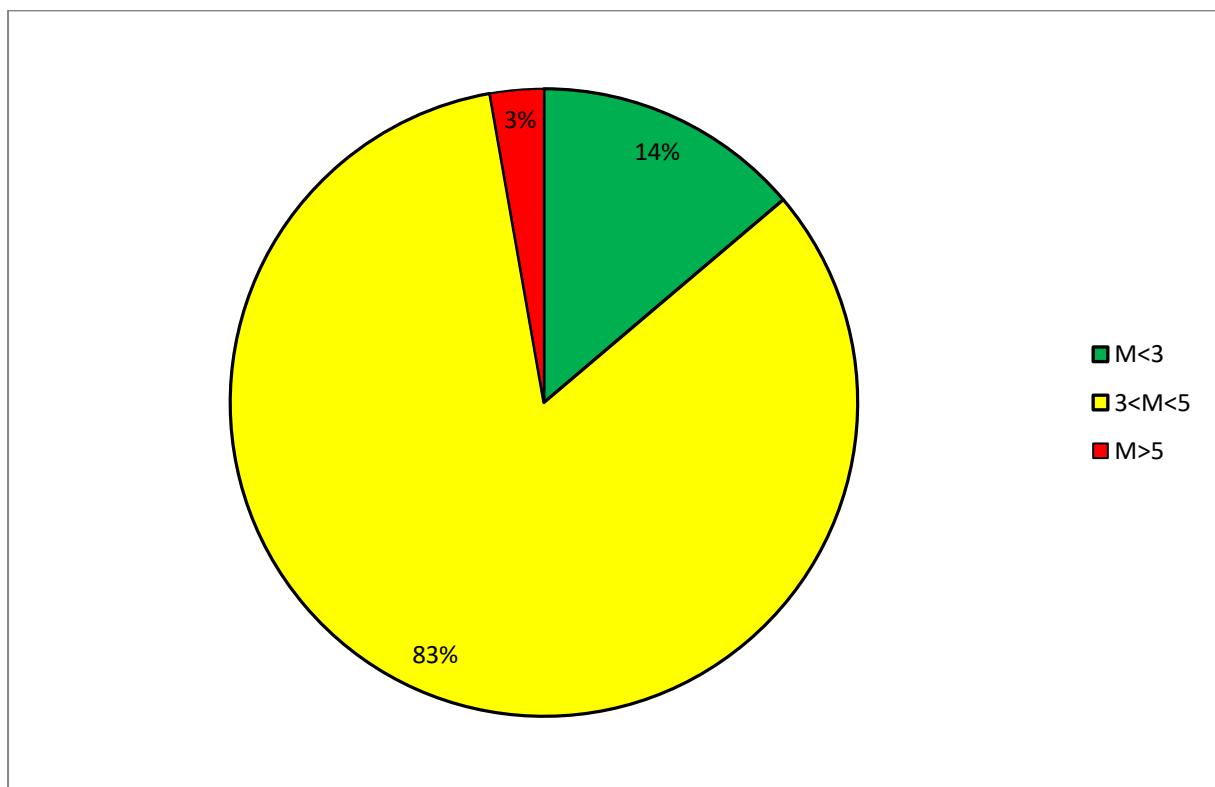
Gambar 20 Sebaran episenter gempabumi bulan Juni 2019

Tabel 14 Rekapitulasi gempabumi berdasarkan magnitudo bulan Juni 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	7	1	8	0	0
2	2	5	0	7	0	0
3	2	7	0	9	1	0
4	1	8	0	9	0	0
5	1	6	1	8	0	0
6	0	4	0	4	0	0
7	1	8	0	9	0	0
8	1	11	0	12	0	0
9	0	6	0	6	0	0
10	2	5	0	7	0	0
11	1	2	0	3	1	0
12	3	8	0	11	1	0
13	0	2	0	2	0	0
14	0	5	0	5	0	0
15	0	4	0	4	0	0
16	0	5	0	5	0	0
17	0	2	0	2	0	0
18	3	7	0	10	0	0
19	1	5	0	6	0	0
20	0	6	1	7	0	0
21	0	1	0	1	0	0
22	1	3	0	4	0	0
23	0	3	0	3	0	0
24	1	6	1	8	1	0
25	0	5	0	5	0	0
26	0	4	0	4	0	0
27	1	6	1	8	0	0
28	1	4	0	5	0	0
29	2	4	0	6	0	0
30	1	2	0	3	0	0
Jumlah gempa	25	151	5	181	4	0



Gambar 21 Grafik gempabumi berdasarkan magnitudo bulan Juni 2019



Gambar 22 Grafik persentase gempabumi berdasarkan magnitudo bulan Juni 2019

G. Data Gempabumi Bulan Juli 2019

Tabel 15 Data kejadian gempabumi bulan Juli 2019

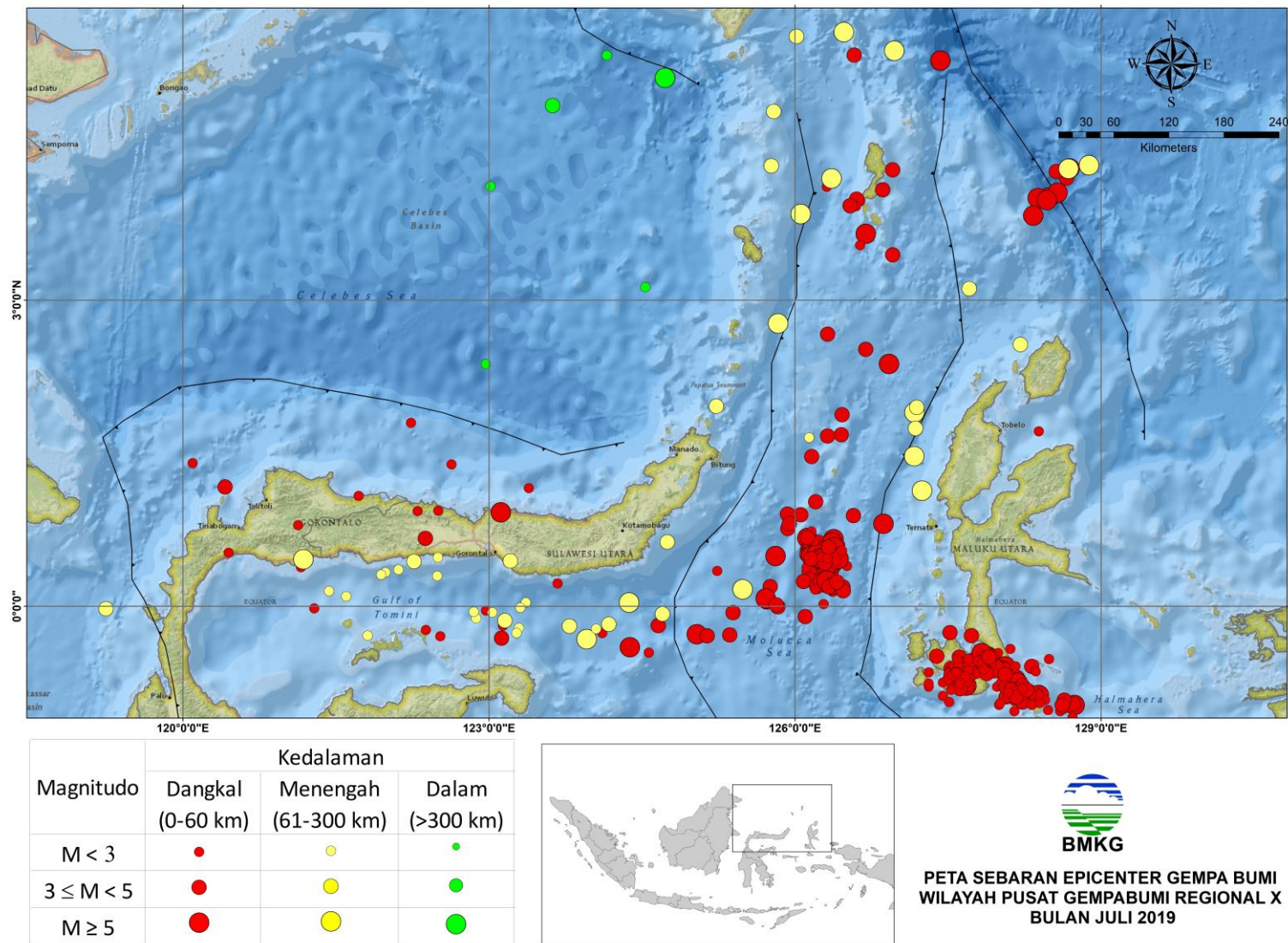
No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLM			Region
			Lat	Long			X	Y	Z	
1	02/07/2019	15:55:38	6.16	126.19	10	4.2				Halmahera Indonesia
2	02/07/2019	16:02:51	-0.04	122.97	10	2.8				Southern Molucca Sea
3	02/07/2019	19:56:03	5.40	124.16	452	4.2				Mindanao Philippines
4	02/07/2019	22:12:40	0.03	124.37	107	4.3				Minahassa Peninsula
5	03/07/2019	02:25:57	4.31	118.35	10	3.8				Minahassa Peninsula
6	03/07/2019	10:46:51	2.52	126.69	10	3.9				Halmahera Indonesia
7	03/07/2019	14:02:23	1.90	127.17	96	4.2				Celebes
8	03/07/2019	14:18:52	0.92	123.12	13	4.9	0.2991	0.3766	0.4396	Minahassa Peninsula
9	03/07/2019	16:28:51	1.71	128.39	47	3.3				Sulawesi Indonesia
10	03/07/2019	21:54:56	4.11	123.02	502	4.2				Mindanao Philippines
11	03/07/2019	22:35:43	0.79	121.13	10	3.1				Minahassa Peninsula
12	04/07/2019	01:25:35	5.58	126.02	192	4.1				Northern Molucca Sea
13	04/07/2019	07:01:34	2.37	126.92	14	4.6				Borneo
14	04/07/2019	15:19:33	-0.22	123.29	143	3.3				Halmahera Indonesia
15	04/07/2019	16:22:02	5.44	126.97	123	4.3				Minahassa Peninsula
16	04/07/2019	16:40:23	0.81	126.87	16	4.7				Northern Molucca Sea
17	04/07/2019	20:04:11	0.45	126.36	10	3.3				Halmahera Indonesia
18	05/07/2019	09:35:09	1.68	126.45	9	4.4				Minahassa Peninsula
19	05/07/2019	15:13:21	-0.02	121.29	10	2.8				Halmahera Indonesia
20	05/07/2019	15:46:31	1.02	126.20	11	4.0				Mindanao Philippines
21	05/07/2019	22:07:29	0.63	124.75	114	3.6				Northern Molucca Sea
22	06/07/2019	08:10:28	1.67	126.32	10	3.8				Sulawesi Indonesia
23	06/07/2019	11:16:49	-0.29	121.81	122	3.3				Halmahera Indonesia
24	07/07/2019	01:59:59	-0.02	119.25	298	4.1				Halmahera Indonesia
25	07/07/2019	07:45:09	0.44	122.27	178	3.6				Northern Molucca Sea
26	07/07/2019	09:14:26	-0.32	123.96	83	4.4				Mindanao Philippines
27	07/07/2019	11:54:01	-0.12	122.87	127	3.4				Halmahera Indonesia
28	07/07/2019	15:08:39	0.45	126.18	10	7.1	7.1314	13.7102	11.2798	Northern Molucca Sea
29	07/07/2019	15:29:15	0.67	126.12	10	4.9				Northern Molucca Sea
30	07/07/2019	15:34:24	0.53	126.14	15	4.2				Northern Molucca Sea
31	07/07/2019	15:43:57	0.55	126.15	10	4.8				Northern Molucca, Sea
32	07/07/2019	15:57:01	0.55	126.14	10	4.0				Northern Molucca Sea
33	07/07/2019	16:00:54	0.51	126.24	10	4.1				Northern Molucca Sea
34	07/07/2019	16:23:48	0.57	126.15	10	3.9				Northern Molucca Sea
35	07/07/2019	16:34:06	0.50	126.17	10	4.0				Minahassa Peninsula
36	07/07/2019	16:39:13	0.60	126.21	10	4.2				Northern Molucca Sea
37	07/07/2019	17:05:14	0.50	126.21	10	4.7				Minahassa Peninsula
38	07/07/2019	17:15:29	0.63	126.23	10	4.3				Sulawesi Indonesia
39	07/07/2019	17:37:08	0.51	126.17	10	3.8				Northern Molucca Sea
40	07/07/2019	18:17:25	0.50	126.12	10	4.4				Northern Molucca Sea
41	07/07/2019	18:35:08	0.51	126.24	10	4.0				Minahassa Peninsula
42	07/07/2019	18:43:29	0.53	126.19	10	3.6				Northern Molucca Sea
43	07/07/2019	20:01:35	0.43	126.22	10	4.2				Minahassa Peninsula
44	07/07/2019	20:35:19	0.50	126.27	10	4.1				Mindanao Philippines
45	07/07/2019	20:43:34	0.50	126.14	10	3.8				Northern Molucca, Sea

46	07/07/2019	23:59:20	-0.20	123.79	108	4.0				Sumbawa Region
47	08/07/2019	00:53:04	0.53	126.18	10	4.0				Northern Molucca Sea
48	08/07/2019	01:59:30	0.57	126.28	10	4.0				Northern Molucca Sea
49	08/07/2019	02:24:37	0.66	126.38	10	4.8				Minahassa Peninsula
50	08/07/2019	02:49:40	0.49	126.16	10	4.8				Northern Molucca Sea
51	08/07/2019	03:23:29	0.32	126.25	8	3.8				Northern Molucca Sea
52	08/07/2019	03:39:17	0.45	126.24	10	4.1				Northern Molucca Sea
53	08/07/2019	04:16:15	0.62	126.36	10	4.9				Northern Molucca Sea
54	08/07/2019	06:08:29	0.43	126.24	10	3.5				North of Halmahera
55	08/07/2019	06:20:12	0.51	126.21	10	5.5	0.5429	0.7925	0.7861	Northern Molucca Sea
56	08/07/2019	09:11:02	0.50	126.36	10	3.7				Northern Molucca Sea
57	08/07/2019	14:00:28	4.11	126.31	31	3.1				Northern Molucca Sea
58	08/07/2019	14:46:07	0.59	126.28	10	3.2				Northern Molucca Sea
59	08/07/2019	15:42:38	0.34	126.14	10	3.8				Northern Molucca Sea
60	08/07/2019	15:48:18	0.60	126.44	10	3.6				Northern Molucca Sea
61	08/07/2019	16:18:36	0.39	126.51	58	3.7				Northern Molucca Sea
62	08/07/2019	16:42:22	0.46	126.38	10	3.7				Northern Molucca Sea
63	08/07/2019	17:52:55	0.46	121.18	85	4.4				Northern Molucca Sea
64	08/07/2019	18:21:38	0.50	126.30	10	4.2				Minahassa Peninsula
65	08/07/2019	18:29:30	0.49	126.31	10	3.9				Northern Molucca Sea
66	08/07/2019	18:52:32	0.41	126.30	10	5.6	0.5133	0.8479	1.3152	Northern Molucca Sea
67	08/07/2019	19:00:39	0.50	126.34	10	4.8				Northern Molucca Sea
68	08/07/2019	19:09:51	4.04	128.55	10	4.4				Minahassa Peninsula
69	08/07/2019	19:28:18	0.46	126.19	10	3.9				Minahassa Peninsula
70	08/07/2019	19:54:11	0.48	126.29	10	4.5				Minahassa Peninsula
71	08/07/2019	20:37:37	0.47	126.27	10	3.9				Northern Molucca Sea
72	08/07/2019	20:57:37	0.51	126.35	8	4.3				Northern Molucca Sea
73	08/07/2019	21:08:38	0.59	126.30	10	3.7				Northern Molucca Sea
74	08/07/2019	21:30:45	0.46	126.25	10	4.7				Northern Molucca Sea
75	08/07/2019	21:41:09	0.44	126.24	10	4.2				Northern Molucca Sea
76	08/07/2019	22:24:37	0.38	126.40	15	3.7				Northern Molucca Sea
77	08/07/2019	23:05:23	0.34	126.36	7	4.2				Northern Molucca Sea
78	08/07/2019	23:32:38	0.36	122.11	144	2.7				Northern Molucca Sea
79	08/07/2019	23:57:55	0.58	126.38	9	4.8				Northern Molucca Sea
80	09/07/2019	00:27:13	-0.28	125.04	10	4.6				Halmahera Indonesia
81	09/07/2019	03:23:11	0.15	121.43	114	3.0				Northern Molucca Sea
82	09/07/2019	04:06:25	0.39	126.36	16	4.2				Northern Molucca Sea
83	09/07/2019	04:59:28	0.53	126.36	10	3.5				Northern Molucca Sea
84	09/07/2019	08:04:49	0.38	126.11	4	3.6				Northern Molucca Sea
85	09/07/2019	11:02:20	0.38	126.33	10	3.9				Northern Molucca Sea
86	09/07/2019	11:29:27	-0.10	126.10	10	3.9				Southern Molucca Sea
87	09/07/2019	14:12:56	6.92	125.11	10	5.4				Northern Molucca Sea
88	09/07/2019	17:01:59	4.20	128.66	10	4.3				Sulawesi Indonesia
89	09/07/2019	17:14:25	4.29	128.68	93	4.5				Talaud islands
90	09/07/2019	18:00:56	0.26	126.15	10	4.1				Northern Molucca Sea
91	09/07/2019	18:21:35	-0.46	124.57	5	3.2				South of Mariana
92	09/07/2019	20:19:06	4.01	128.49	26	4.6				Northern Molucca Sea
93	09/07/2019	22:40:03	0.24	126.08	10	4.0				Northern Molucca Sea
94	10/07/2019	00:23:01	-0.08	124.70	65	4.0				Aru Islands Region
95	10/07/2019	02:13:08	0.22	123.67	32	3.4				North of Halmahera
96	10/07/2019	10:09:42	1.47	126.16	7	4.3				Northern Molucca Sea
97	10/07/2019	14:26:39	1.65	126.14	126	3.3				Southern Molucca Sea

98	10/07/2019	17:11:53	0.14	126.37	10	3.5				North of Halmahera
99	10/07/2019	19:52:24	0.35	125.24	5	3.6				Northern Molucca Sea
100	10/07/2019	19:58:12	0.36	126.34	10	3.4				Northern Molucca Sea
101	10/07/2019	20:15:30	0.48	126.35	12	3.8				Northern Molucca Sea
102	10/07/2019	20:29:59	0.44	126.30	10	3.8				Northern Molucca Sea
103	10/07/2019	21:00:07	4.32	128.88	114	4.2				Northern Molucca Sea
104	11/07/2019	02:55:46	4.85	125.79	127	4.0				Northern Molucca Sea
105	11/07/2019	03:37:06	2.37	122.97	468	4.2				Sulawesi Indonesia
106	11/07/2019	06:04:52	0.17	126.22	13	3.6				Northern Molucca Sea
107	11/07/2019	08:10:49	4.26	128.56	29	4.4				Northern Molucca Sea
108	11/07/2019	10:06:38	0.49	125.81	10	4.9				Northern Molucca Sea
109	11/07/2019	11:10:03	1.39	122.63	0	3.2				Northern Molucca Sea
110	11/07/2019	11:17:31	4.29	128.69	16	4.5				North of Halmahera
111	11/07/2019	13:13:56	0.51	126.35	4	4.0				Southern Molucca Sea
112	11/07/2019	13:23:09	3.44	126.96	35	3.9				Minahassa Peninsula
113	11/07/2019	14:07:52	0.64	126.19	10	3.5				Northern Molucca Sea
114	11/07/2019	16:27:02	0.51	126.41	13	3.9				Northern Molucca Sea
115	11/07/2019	16:31:21	-0.40	124.38	8	4.5				Minahassa Peninsula
116	11/07/2019	17:26:34	0.53	126.41	26	3.6				Northern Molucca Sea
117	11/07/2019	19:12:08	0.30	122.49	120	2.7				Sulawesi Indonesia
118	11/07/2019	20:45:26	4.00	128.38	17	4.6				Northern Molucca Sea
119	11/07/2019	21:24:24	0.23	126.28	12	4.8				Southern Molucca Sea
120	11/07/2019	21:39:46	0.44	126.27	11	3.2				Mindanao Philippines
121	11/07/2019	21:46:38	0.46	126.43	8	5.0				Mindanao Philippines
122	11/07/2019	21:55:51	0.54	126.46	10	3.7				Mindanao Philippines
123	12/07/2019	03:49:38	4.05	128.57	10	4.5				Northern Molucca Sea
124	12/07/2019	11:04:24	5.63	126.48	146	4.6				Talaud islands
125	12/07/2019	17:02:17	2.56	128.21	121	3.6				Northern Molucca Sea
126	13/07/2019	09:03:11	1.40	120.09	10	3.7				Northern Molucca Sea
127	13/07/2019	16:35:37	0.41	126.39	10	3.7				Northern Molucca Sea
128	13/07/2019	17:19:27	0.44	126.40	17	3.6				Northern Molucca Sea
129	13/07/2019	19:26:06	-0.26	123.27	109	3.3				Halmahera Indonesia
130	13/07/2019	20:29:20	3.13	124.53	309	4.2				Southern Molucca Sea
131	13/07/2019	21:58:00	3.83	128.33	6	4.9				Mindanao Philippines
132	13/07/2019	22:23:19	3.98	128.47	31	4.6				Minahassa Peninsula
133	14/07/2019	08:13:02	4.19	126.36	94	4.8				Minahassa Peninsula
134	14/07/2019	08:35:18	-0.01	125.83	27	4.0				Southern Molucca Sea
135	14/07/2019	10:13:50	-0.49	127.89	10	4.6				Celebes Sea
136	14/07/2019	12:48:04	0.19	126.47	10	4.1				North of Halmahera
137	14/07/2019	20:52:27	0.66	122.38	54	3.9	0.0624	0.1245	0.1299	Northern Molucca Sea
138	15/07/2019	00:14:06	6.82	126.10	121	4.8				Northern Molucca Sea
139	15/07/2019	02:57:58	-0.19	124.66	10	4.4				Halmahera Indonesia
140	15/07/2019	04:26:29	6.90	124.96	10	5.2				Halmahera Indonesia
141	15/07/2019	06:31:13	1.47	127.17	110	4.9				Northern Molucca Sea
142	15/07/2019	10:35:25	-0.46	127.84	10	5.2	0.1638	0.1138	0.1921	Halmahera Indonesia
143	15/07/2019	15:58:05	-0.29	125.14	10	3.8				Sulawesi Indonesia
144	15/07/2019	17:13:15	0.17	125.49	159	4.4				Southern Molucca Sea
145	15/07/2019	21:59:31	0.47	126.21	10	4.1				Northern Molucca Sea
146	16/07/2019	18:53:41	0.02	126.28	10	3.7				Northern MoluccaSea
147	16/07/2019	21:07:28	-0.27	124.11	10	3.4				Northern Molucca Sea
148	17/07/2019	01:57:23	0.19	126.21	8	4.2				North of Halmahera
149	17/07/2019	04:40:29	0.25	126.25	10	4.2				Northern Molucca Sea

150	17/07/2019	18:08:02	1.80	122.24	10	3.5				Minahassa Peninsula
151	17/07/2019	20:00:18	0.42	126.29	10	3.9				North of Halmahera
152	18/07/2019	09:55:03	0.19	125.76	10	3.9				North of Halmahera
153	18/07/2019	10:46:08	0.16	126.20	10	3.5				North of Halmahera
154	18/07/2019	11:52:59	5.40	126.58	10	4.1				Mindanao Philippines
155	18/07/2019	12:00:49	1.95	127.19	105	3.8				Halmahera Indonesia
156	18/07/2019	13:41:26	3.97	126.64	41	3.2				Mindanao Philippines
157	18/07/2019	17:08:20	0.21	126.36	10	4.5				Talaud islands
158	18/07/2019	17:17:50	0.25	126.31	10	5.1				Celebes Sea
159	18/07/2019	17:33:05	0.93	122.50	17	3.7				Northern Molucca Sea
160	19/07/2019	04:43:45	0.58	126.33	10	3.8				Minahassa Peninsula
161	19/07/2019	04:59:40	0.33	121.98	166	2.8				Northern Molucca Sea
162	19/07/2019	05:39:55	5.18	124.73	349	4.5				Northern Molucca Sea
163	19/07/2019	06:58:02	0.15	126.47	10	4.2				Sulawesi Indonesia
164	19/07/2019	10:08:23	-0.28	125.36	8	4.0				Minahassa Peninsula
165	19/07/2019	12:48:46	2.67	126.32	10	4.2				Minahassa Peninsula
166	19/07/2019	15:23:46	3.65	126.69	10	4.6				Celebes Sea
167	19/07/2019	18:23:43	2.77	125.83	115	4.3				North of Halmahera
168	19/07/2019	22:39:25	-0.30	122.52	16	3.7				Halmahera Indonesia
169	20/07/2019	04:29:04	3.99	126.60	31	4.3				Halmahera Indonesia
170	20/07/2019	11:09:10	0.21	126.36	5	4.0				Minahassa Peninsula
171	20/07/2019	13:30:26	4.91	123.62	493	4.3				Halmahera Indonesia
172	20/07/2019	16:41:56	0.93	122.30	41	2.9				Halmahera Indonesia
173	20/07/2019	16:42:43	0.73	126.16	10	3.5				Halmahera Indonesia
174	20/07/2019	22:40:18	0.19	126.33	3	4.2				Sulawesi Indonesia
175	21/07/2019	03:33:38	0.48	122.50	63	3.2				Halmahera Indonesia
176	21/07/2019	16:08:15	0.24	126.41	10	3.9				Halmahera Indonesia
177	21/07/2019	17:37:58	0.47	126.16	10	3.8				Halmahera Indonesia
178	22/07/2019	20:28:58	0.89	126.57	43	3.8				Halmahera Indonesia
179	22/07/2019	13:59:38	-0.14	123.16	119	3.8				Philippine Islands Region
180	22/07/2019	17:08:20	-0.23	122.38	15	2.8				Northern Molucca Sea
181	23/07/2019	10:09:32	3.11	127.71	88	4.0				Halmahera Indonesia
182	23/07/2019	21:05:56	0.67	126.12	10	4.3				Halmahera Indonesia
183	24/07/2019	18:54:17	1.88	126.46	10	4.0				Halmahera Indonesia
184	24/07/2019	20:30:56	0.03	123.36	120	3.0				Halmahera Indonesia
185	25/07/2019	00:09:54	-0.31	123.12	17	4.1				Halmahera Indonesia
186	25/07/2019	11:27:59	3.54	126.64	10	3.6				Halmahera Indonesia
187	25/07/2019	15:51:25	0.48	126.26	10	3.7				Halmahera Indonesia
188	26/07/2019	10:01:43	1.13	127.25	87	4.3				Halmahera Indonesia
189	26/07/2019	19:58:04	-0.06	122.85	180	3.0				Halmahera Indonesia
190	27/07/2019	00:50:55	0.76	125.93	10	4.2				Halmahera Indonesia
191	27/07/2019	03:14:02	0.90	126.06	8	4.0				Halmahera Indonesia
192	27/07/2019	04:14:09	0.91	125.96	10	3.7				Halmahera Indonesia
193	27/07/2019	05:17:36	0.04	125.72	10	4.3				Halmahera Indonesia
194	27/07/2019	05:19:47	0.08	125.71	10	4.6				Halmahera Indonesia
195	27/07/2019	11:52:23	0.52	120.45	45	2.9				Halmahera Indonesia
196	27/07/2019	14:53:24	0.31	121.94	165	2.9				Northern MoluccaSea
197	27/07/2019	18:46:56	0.90	125.93	9	4.2				Halmahera Indonesia
198	28/07/2019	09:49:20	1.74	127.18	101	3.7				Halmahera Indonesia
199	28/07/2019	10:31:12	0.81	125.94	11	4.1				Halmahera Indonesia
200	28/07/2019	14:23:51	4.32	125.77	81	3.9				Halmahera Indonesia

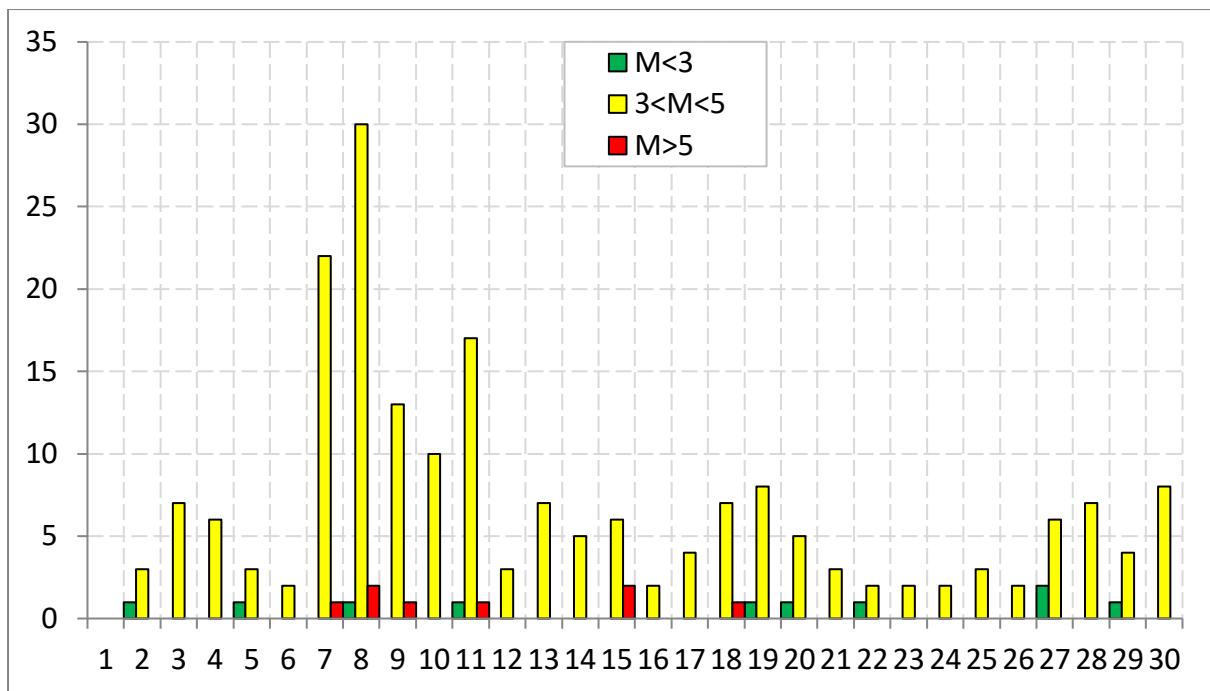
201	28/07/2019	15:00:19	3.84	126.06	67	4.2				Halmahera Indonesia
202	28/07/2019	18:47:17	1.08	121.72	5	3.5				Halmahera Indonesia
203	28/07/2019	20:23:38	0.44	123.21	240	3.7				Halmahera Indonesia
204	28/07/2019	22:49:33	5.35	127.43	10	4.9				Halmahera Indonesia
205	29/07/2019	04:50:42	4.28	126.96	10	4.3				Halmahera Indonesia
206	29/07/2019	06:21:10	4.08	126.86	10	4.4				Halmahera Indonesia
207	29/07/2019	10:21:47	0.47	126.32	10	3.7				Halmahera Indonesia
208	29/07/2019	14:17:53	0.38	121.16	10	2.5				Halmahera Indonesia
209	29/07/2019	18:34:31	1.17	120.41	10	4.2				Halmahera Indonesia
210	30/07/2019	00:33:35	1.16	123.39	1	3.6				Halmahera Indonesia
211	30/07/2019	13:11:26	0.01	125.82	12	4.0				Halmahera Indonesia
212	30/07/2019	13:50:52	-0.22	124.05	88	3.3				Minahassa Peninsula
213	30/07/2019	14:59:13	-0.19	123.14	21	3.0				Northern Molucca Sea
214	30/07/2019	15:34:25	-0.06	123.03	102	3.0				Minahassa Peninsula
215	30/07/2019	18:44:31	3.92	126.54	42	3.9				Talaud islands
216	30/07/2019	18:53:42	3.92	126.60	50	3.4				Southern Molucca Sea
217	30/07/2019	23:50:37	-0.18	124.17	85	3.7				Seram Indonesia
218	31/07/2019	04:10:49	-0.02	123.31	124	3.3				Minahassa Peninsula
219	31/07/2019	13:57:12	-0.06	125.39	10	3.9				Southern Molucca Sea
220	31/07/2019	16:39:16	6.70	126.04	106	4.7				Halmahera Indonesia
221	31/07/2019	22:02:12	0.09	121.60	180	2.8				Halmahera Indonesia
222	31/07/2019	22:42:48	1.96	125.23	153	4.0				Northern Molucca Sea



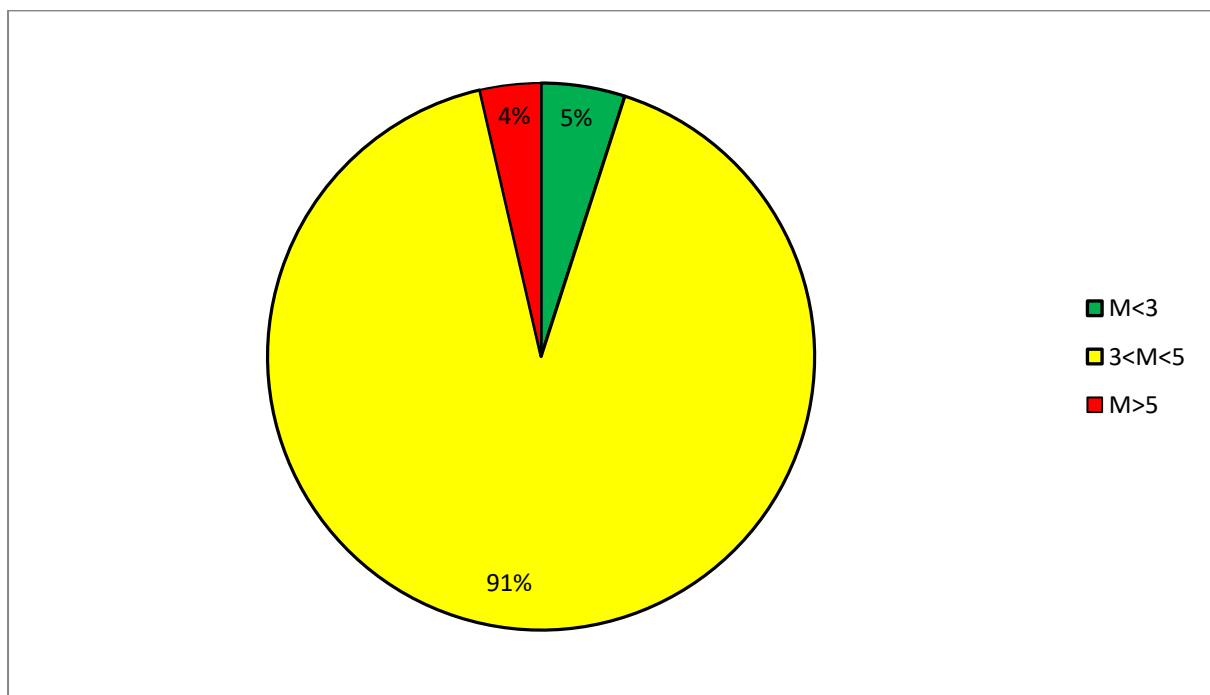
Gambar 23 Sebaran episenter gempabumi bulan Juli 2019

Tabel 16 Rekapitulasi gempabumi berdasarkan magnitudo bulan Juli 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	0	0	0	0	0
2	1	3	0	4	0	0
3	0	7	0	7	1	0
4	0	6	0	6	0	0
5	1	3	0	4	0	0
6	0	2	0	2	0	0
7	0	22	1	23	1	0
8	1	30	2	33	2	0
9	0	13	1	14	0	0
10	0	10	0	10	0	0
11	1	17	1	19	0	0
12	0	3	0	3	0	0
13	0	7	0	7	0	0
14	0	5	0	5	1	0
15	0	6	2	8	0	0
16	0	2	0	2	0	0
17	0	4	0	4	0	0
18	0	7	1	8	0	0
19	1	8	0	9	0	0
20	1	5	0	6	0	0
21	0	3	0	3	0	0
22	1	2	0	3	0	0
23	0	2	0	2	0	0
24	0	2	0	2	0	0
25	0	3	0	3	0	0
26	0	2	0	2	0	0
27	2	6	0	8	0	0
28	0	7	0	7	0	0
29	1	4	0	5	0	0
30	0	8	0	8	0	0
31	1	4	0	5	0	0
Jumlah gempa	11	203	8	222	5	0



Gambar 24 Grafik gempa bumi berdasarkan magnitudo bulan Juli 2019



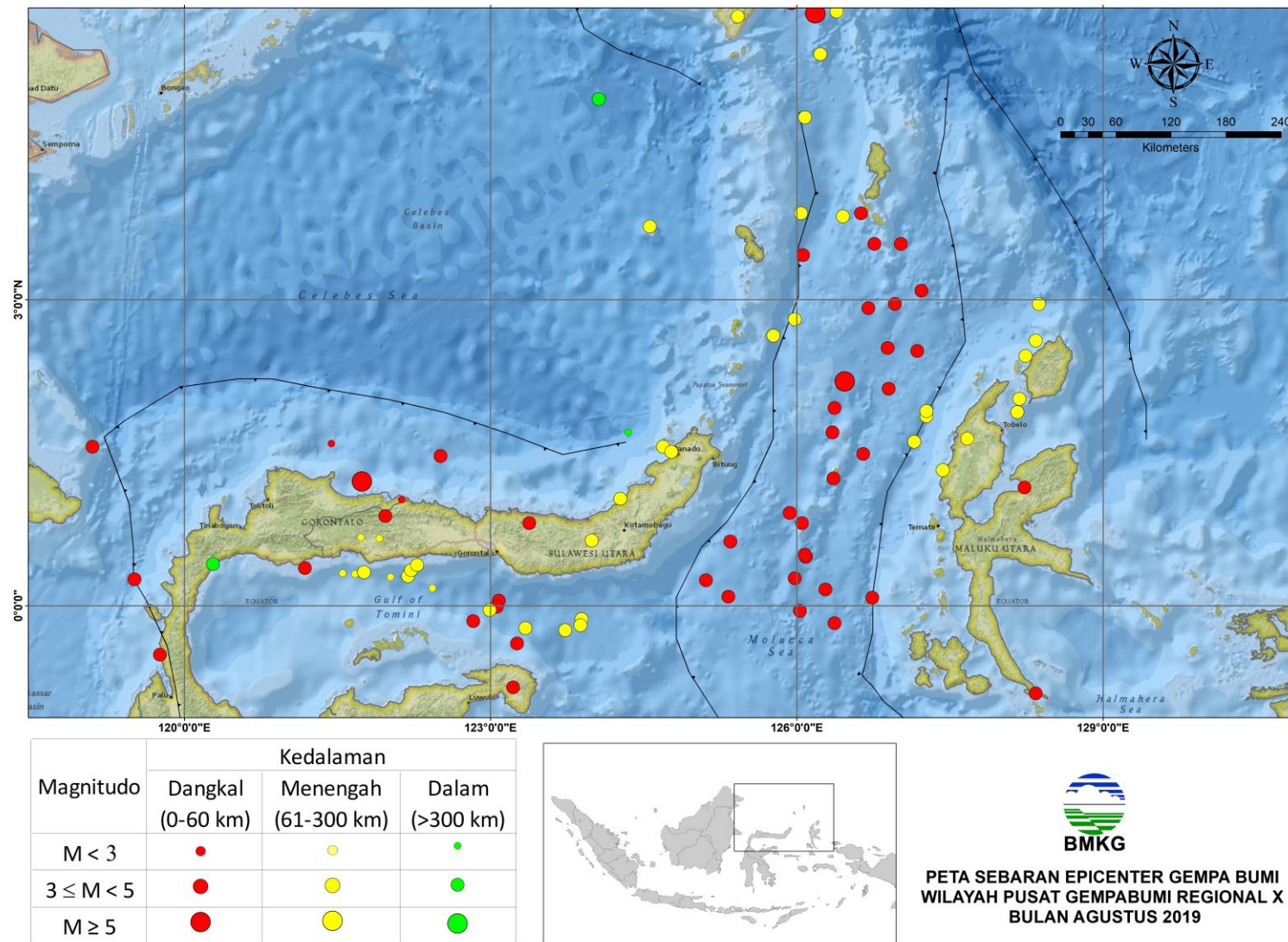
Gambar 25 Grafik persentase gempa bumi berdasarkan magnitudo bulan Juli 2019

H. Data Gempabumi Bulan Agustus 2019

Tabel 17 Data kejadian gempabumi bulan Agustus 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/08/2019	02:16:12	-0.13	123.89	108	3.6				Minahassa Peninsula
2	01/08/2019	06:11:09	-0.15	122.83	8	3.5				Minahassa Peninsula
3	01/08/2019	10:19:48	0.25	125.11	12	3.8				Northern Molucca Sea
4	01/08/2019	12:32:25	2.45	128.24	228	3.9				Halmahera
5	01/08/2019	16:43:14	0.29	122.19	134	3.6				Minahassa Peninsula
6	01/08/2019	20:35:20	1.22	121.74	10	5.4				Celebes Sea
7	02/08/2019	07:22:15	4.79	126.08	89	4.9				Talaud Island
8	02/08/2019	08:14:49	0.35	122.22	164	3.1				Minahassa Peninsula
9	02/08/2019	08:57:24	-0.22	123.34	188	3.1				Minahassa Peninsula
10	02/08/2019	13:02:35	3.55	126.76	22	3.6				Talaud Island
11	02/08/2019	16:10:12	5.88	126.06	113	5.6				Talaud Island
12	03/08/2019	07:19:34	1.33	127.43	157	4.3				Halmahera
13	04/08/2019	13:31:13	0.40	122.28	147	3.7				Minahassa Peninsula
14	04/08/2019	15:07:49	0.32	121.55	153	2.6				Minahassa Peninsula
15	05/08/2019	03:37:50	0.34	121.78	178	2.3				Minahassa Peninsula
16	05/08/2019	03:53:45	1.86	127.27	93	4.9				Halmahera
17	06/08/2019	03:51:16	2.20	126.47	10	5.3				Northern Molucca Sea
18	06/08/2019	12:10:37	0.09	125.33	10	3.9				Northern Molucca Sea
19	06/08/2019	13:56:39	1.59	121.44	15	2.7				Celebes Sea
20	06/08/2019	18:37:11	3.72	124.56	282	4.4				Celebes Sea
21	07/08/2019	05:11:14	4.97	124.06	475	4.7				Celebes Sea
22	07/08/2019	07:45:47	2.13	126.90	14	3.9				Northern Molucca Sea
23	07/08/2019	07:41:39	1.04	122.13	14	3.0				Minahassa Peninsula
24	07/08/2019	10:57:59	0.48	126.09	21	3.5				Northern Molucca Sea
25	07/08/2019	18:15:24	-0.19	123.88	74	4.2				Minahassa Peninsula
26	07/08/2019	19:53:26	5.91	125.95	50	4.9				Mindanao
27	08/08/2019	06:07:52	3.82	126.45	84	4.6				Talaud Island
28	08/08/2019	15:13:24	2.81	125.98	103	3.5				Talaud Island
29	08/08/2019	16:05:31	1.56	119.10	10	4.8				Celebes Sea
30	08/08/2019	20:26:36	1.25	126.36	10	4.7				Northern Molucca Sea
31	09/08/2019	07:30:25	1.56	124.69	217	4.0				Minahassa Peninsula
32	10/08/2019	12:59:16	0.41	120.28	542	4.4				Minahassa Peninsula
33	11/08/2019	06:04:38	0.31	121.67	128	2.3				Minahassa Peninsula
34	11/08/2019	06:30:43	0.91	125.93	10	3.9	0.1753	0.2048	0.2151	Northern Molucca Sea
35	11/08/2019	19:10:48	1.05	124.27	208	3.4				Minahassa Peninsula
36	12/08/2019	10:38:12	5.83	126.39	167	4.7				Talaud Island
37	12/08/2019	20:11:08	0.81	123.38	10	3.3				Minahassa Peninsula
38	13/08/2019	00:12:58	1.49	126.65	10	4.0				Northern Molucca Sea
39	13/08/2019	03:30:30	5.81	126.18	10	5.1				Talaud Island
40	13/08/2019	08:38:11	-0.80	123.22	11	3.6				Minahassa Peninsula
41	13/08/2019	08:47:15	1.16	128.23	41	4.5				Halmahera
42	14/08/2019	13:46:48	-0.48	119.76	12	3.5				Minahassa Peninsula
43	14/08/2019	18:37:25	2.96	126.96	11	3.7				Talaud Island
44	14/08/2019	21:52:32	1.64	127.67	183	4.0				Halmahera
45	14/08/2019	22:43:07	1.90	128.16	97	3.9				Halmahera

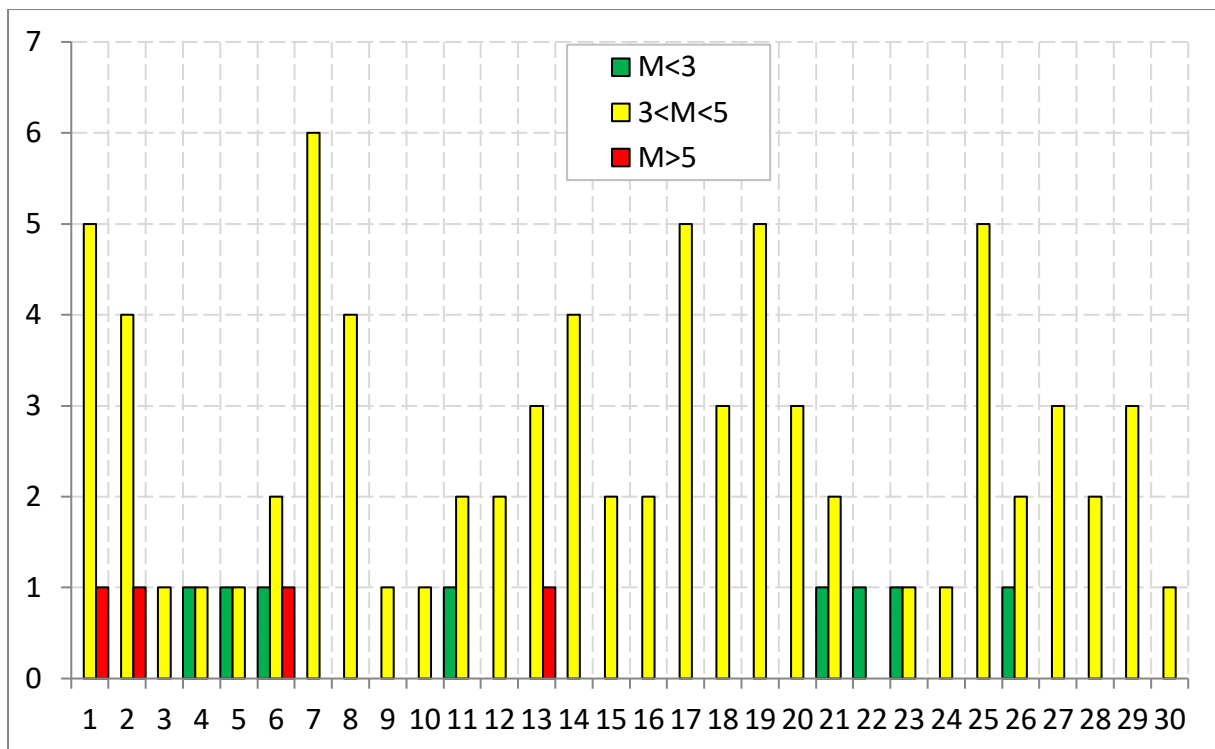
46	15/08/2019	08:17:52	5.41	126.23	130	4.5				Mindanao
47	15/08/2019	17:55:59	3.44	126.06	10	3.5				Talaud Island
48	16/08/2019	12:36:06	5.78	125.42	93	4.1				Mindanao
49	16/08/2019	19:51:38	2.92	126.70	10	4.7				Northern Molucca Sea
50	17/08/2019	04:00:22	1.51	124.77	228	3.7				Minahassa Peninsula
51	17/08/2019	09:12:28	0.08	126.74	9	4.1				Halmahera
52	17/08/2019	12:00:06	3.85	126.63	10	4.1				Talaud Island
53	17/08/2019	12:47:53	0.26	119.51	10	3.8				Minahassa Peninsula
54	17/08/2019	21:45:29	0.63	125.35	27	3.6				Minahassa Peninsula
55	18/08/2019	04:26:10	0.05	123.08	20	3.2				Minahassa Peninsula
56	18/08/2019	09:02:24	1.61	127.15	118	4.2				Halmahera
57	18/08/2019	13:00:43	-0.01	123.06	25	3.1				Minahassa Peninsula
58	19/08/2019	01:57:52	3.85	126.04	120	4.8				Talaud Island
59	19/08/2019	06:54:14	3.09	127.22	10	3.8				Northern Molucca Sea
60	19/08/2019	09:14:56	-0.86	128.34	10	4.0				Irian jaya
61	19/08/2019	16:53:38	1.94	126.37	19	4.1				Northern Molucca Sea
62	19/08/2019	20:05:22	1.70	126.35	16	4.6	0.1558	0.1984	0.2368	Northern Molucca Sea
63	20/08/2019	10:34:57	-0.04	122.99	113	3.8				Minahassa Peninsula
64	20/08/2019	10:53:35	-0.17	126.37	10	3.9				Southern Molucca Sea
65	20/08/2019	11:15:29	0.16	126.28	10	3.8				Southern Molucca Sea
66	21/08/2019	06:34:56	-0.05	126.03	10	4.0				Southern Molucca Sea
67	21/08/2019	20:16:09	0.67	121.73	76	2.9				Minahassa Peninsula
68	21/08/2019	22:11:50	2.60	128.34	196	4.3				Halmahera
69	22/08/2019	19:55:02	0.17	122.43	133	2.9				Minahassa Peninsula
70	23/08/2019	17:36:58	0.28	122.02	159	2.7				Minahassa Peninsula
71	23/08/2019	23:06:35	1.91	127.27	98	4.2				Halmahera
72	24/08/2019	06:26:26	2.03	128.18	105	3.6				Halmahera
73	25/08/2019	04:05:14	2.96	128.37	204	4.0				Halmahera
74	25/08/2019	04:49:18	0.50	126.08	10	4.1				Northern Molucca Sea
75	25/08/2019	07:57:49	2.65	125.77	119	3.5				Northern Molucca Sea
76	25/08/2019	11:52:41	2.53	126.89	10	4.0				Northern Molucca Sea
77	26/08/2019	11:47:06	0.66	121.91	74	2.3				Northern Molucca Sea
78	25/08/2019	18:58:45	2.50	127.18	10	4.2				Minahassa Peninsula
79	26/08/2019	14:31:10	3.55	127.02	10	4.4				Northern Molucca Sea
80	26/08/2019	19:48:10	0.64	123.99	252	3.7				Minahassa Peninsula
81	27/08/2019	02:17:34	0.33	121.76	183	3.1				Minahassa Peninsula
82	27/08/2019	06:31:21	1.47	122.51	39	4.9	0.2239	0.3318	0.4291	Minahassa Peninsula
83	27/08/2019	15:15:34	-0.37	123.26	10	4.2				Minahassa Peninsula
84	28/08/2019	00:08:03	1.70	124.35	302	4.0				Minahassa Peninsula
85	28/08/2019	06:28:26	0.27	125.98	24	4.0				Northern Molucca Sea
86	29/08/2019	10:53:07	-0.24	123.73	118	4.8				Minahassa Peninsula
87	29/08/2019	12:25:09	0.37	121.18	10	3.4				Minahassa Peninsula
88	29/08/2019	19:37:01	0.81	126.05	10	4.4	0.3067	0.6596	0.4509	Minahassa Peninsula
89	30/08/2019	05:28:20	0.88	121.97	33	3.4				Northern Molucca Sea
90	31/08/2019	07:42:33	6.20	126.53	104	4.8				Mindanao



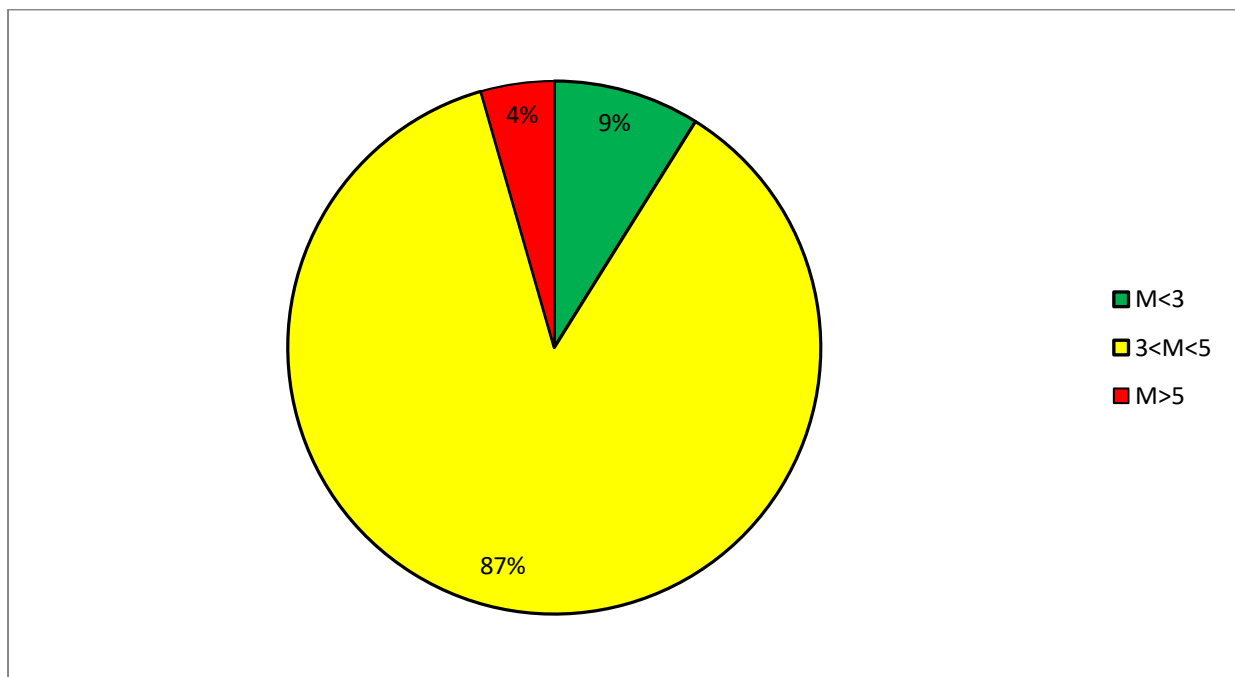
Gambar 26 Sebaran episenter gempabumi bulan Agustus 2019

Tabel 18 Rekapitulasi gempabumi berdasarkan magnitudo bulan Agustus 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	5	1	6	1	0
2	0	4	1	5	0	0
3	0	1	0	1	0	0
4	1	1	0	2	0	0
5	1	1	0	2	0	0
6	1	2	1	4	1	0
7	0	6	0	6	0	0
8	0	4	0	4	0	0
9	0	1	0	1	0	0
10	0	1	0	1	0	0
11	1	2	0	3	0	0
12	0	2	0	2	0	0
13	0	3	1	4	0	0
14	0	4	0	4	0	0
15	0	2	0	2	0	0
16	0	2	0	2	0	0
17	0	5	0	5	0	0
18	0	3	0	3	0	0
19	0	5	0	5	0	0
20	0	3	0	3	0	0
21	1	2	0	3	0	0
22	1	0	0	1	0	0
23	1	1	0	2	0	0
24	0	1	0	1	0	0
25	0	5	0	5	0	0
26	1	2	0	3	0	0
27	0	3	0	3	2	0
28	0	2	0	2	0	0
29	0	3	0	3	1	0
30	0	1	0	1	0	0
31	0	1	0	1	0	0
Jumlah gempa	8	78	4	90	5	0



Gambar 27 Grafik gempabumi berdasarkan magnitudo bulan Agustus 2019



Gambar 28 Grafik persentase gempabumi berdasarkan magnitudo bulan Agustus 2019

I. Data Gempabumi Bulan September 2019

Tabel 19 Data kejadian gempabumi bulan September 2019

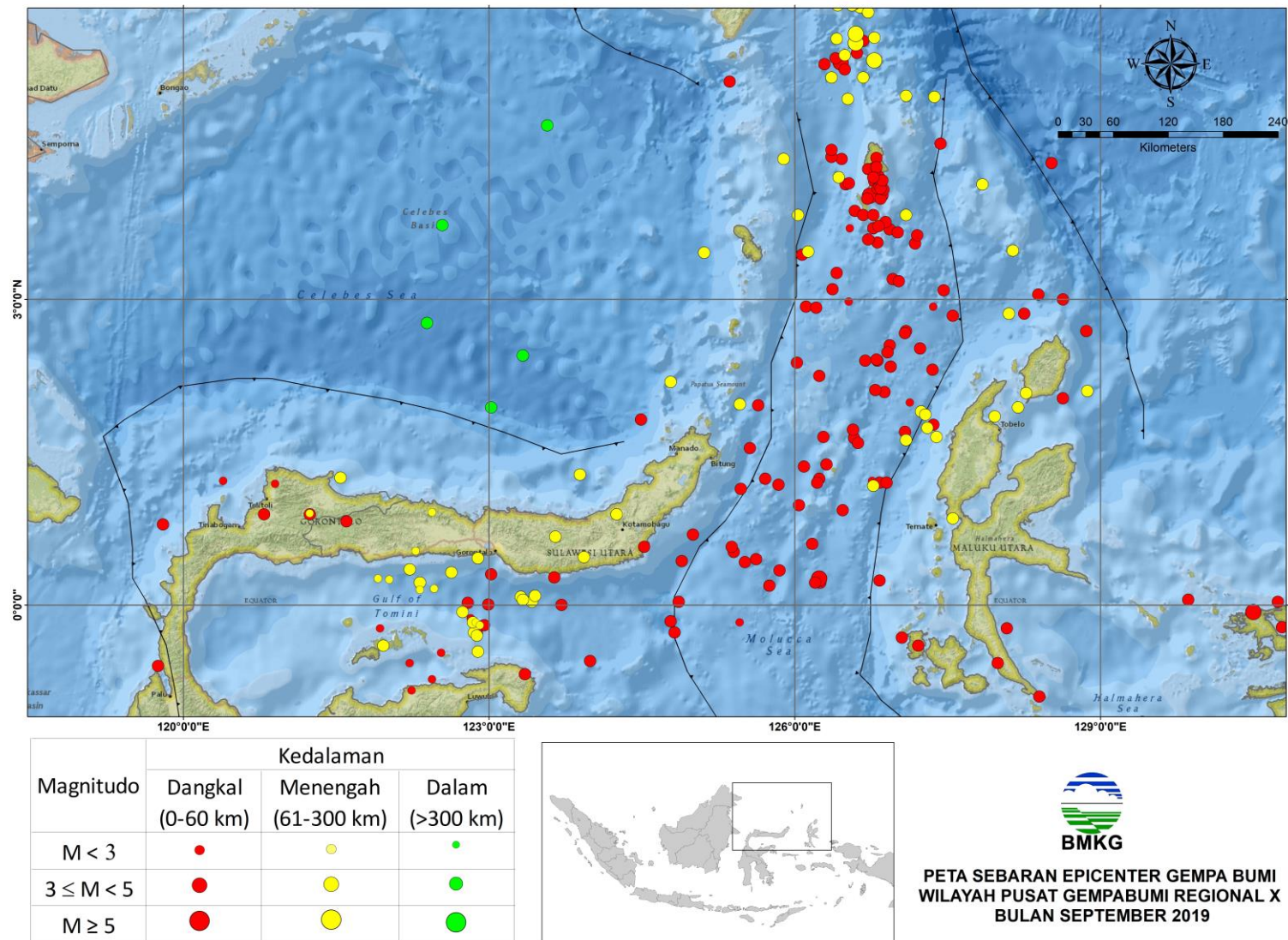
No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/09/2019	06:23:49	5.14	125.36	10	4.9				Mindanao, Philipines
2	01/09/2019	06:33:07	0.47	123.93	202	3.6				Minahassa Peninsula, Sulawesi
3	01/09/2019	11:38:11	2.40	126.69	21	4.2				Northern Molucca Sea
4	01/09/2019	11:57:36	5.35	126.78	103	5.1				Mindanao, Philipines
5	02/09/2019	18:58:24	0.22	126.25	10	4.5	0.0686	0.3138	0.0883	Southern Molucca Sea
6	02/09/2019	03:42:47	1.64	126.58	29	4.2				Northern Molucca Sea
7	02/09/2019	23:49:09	1.82	124.49	10	3.5				Minahassa Peninsula, Sulawesi
8	02/09/2019	11:26:52	-0.27	122.85	74	3.2				Minahassa Peninsula, Sulawesi
9	02/09/2019	10:25:43	3.09	127.46	25	4.1				Talaud Islands, Indonesia
10	02/09/2019	18:54:22	6.18	123.96	520	4.5				Mindanao, Philipines
11	03/09/2019	14:23:29	1.72	126.57	3	4.1				Northern Molucca Sea
12	03/09/2019	16:10:27	4.07	126.82	24	3.3				Talaud Islands, Indonesia
13	03/09/2019	19:17:48	0.24	126.83	12	3.2				Northern Molucca Sea
14	04/09/2019	05:51:50	2.09	126.88	17	3.8				Northern Molucca Sea
15	04/09/2019	05:55:49	2.52	127.23	10	3.9				Northern Molucca Sea
16	04/09/2019	13:21:17	1.22	120.39	15	2.7				Minahassa Peninsula, Sulawesi
17	04/09/2019	13:37:48	2.34	126.94	36	4.9	0.1471	0.1079	0.1079	Northern Molucca Sea
18	04/09/2019	16:27:16	2.31	127.35	21	4.1				Northern Molucca Sea
19	04/09/2019	18:09:44	0.26	126.24	21	5.0	0.1569	0.1177	0.1079	Northern Molucca Sea
20	04/09/2019	18:23:24	0.93	126.47	13	3.0				Northern Molucca Sea
21	04/09/2019	20:07:12	0.22	126.20	10	4.6				Northern Molucca Sea
22	05/09/2019	05:31:47	-0.23	121.93	4	2.9				Minahassa Peninsula, Sulawesi
23	05/09/2019	16:44:10	1.14	125.47	21	3.9				Northern Molucca Sea
24	05/09/2019	18:22:00	-0.47	122.53	10	2.6				Minahassa Peninsula, Sulawesi
25	05/09/2019	18:40:11	-0.23	128.08	10	3.3				Halmahera, Indonesia
26	05/09/2019	19:57:46	3.56	126.81	10	3.9				Talaud Island
27	06/09/2019	07:28:59	3.20	126.96	10	4.2				Talaud Island
28	06/09/2019	07:45:41	2.38	126.02	48	3.2				Northern Molucca Sea
29	06/09/2019	09:58:22	0.22	122.32	235	3.4				Minahassa Peninsula, Sulawesi
30	06/09/2019	10:00:58	2.10	128.87	75	3.4				Halmahera, Indonesia
31	06/09/2019	12:02:25	3.87	126.59	59	4.8				Northern Molucca Sea
32	06/09/2019	15:09:42	1.90	127.24	77	4.2				Halmahera, Indonesia
33	06/09/2019	15:55:44	0.03	130.74	13	3.6				Irian Jaya Region, Indonesia
34	06/09/2019	16:30:24	0.98	126.04	10	3.5				Northern Molucca Sea
35	06/09/2019	18:44:47	2.45	123.33	421	3.8				Celebes Sea
36	06/09/2019	21:12:02	1.87	127.28	92	3.8				Halmahera, Indonesia
37	06/09/2019	21:14:27	-0.07	130.50	10	5.4				West Papua
38	06/09/2019	23:28:29	-0.22	130.78	21	4.3	0.0981	0.0647	0.0102	West Papua
39	07/09/2019	16:45:16	0.03	123.42	126	3.0				Minahassa Peninsula, Sulawesi
40	07/09/2019	19:32:50	1.77	127.36	24	3.7				Halmahera, Indonesia
41	07/09/2019	21:19:29	2.69	128.86	10	3.8				Halmahera, Indonesia
42	08/09/2019	02:01:16	0.57	124.52	10	3.7				Minahassa Peninsula, Sulawesi
43	08/09/2019	05:39:51	1.96	125.64	14	3.4				Northern Molucca Sea

44	08/09/2019	05:56:00	1.20	126.83	37	3.8				Northern Molucca Sea
45	08/09/2019	13:49:17	6.17	125.35	68	5.0				Mindanao, Philipines
46	08/09/2019	22:39:32	1.20	126.90	40	3.5				Northern Molluca Sea
47	09/09/2019	00:17:28	0.16	122.46	128	2.6				Minahassa Peninsula, Sulawesi
48	09/09/2019	06:44:25	0.89	120.79	10	4.3				Minahassa Peninsula, Sulawesi
49	09/09/2019	08:20:00	0.91	122.44	84	2.9				Minahassa Peninsula, Sulawesi
50	09/09/2019	08:25:23	-0.40	121.96	129	3.3				Minahassa Peninsula, Sulawesi
51	09/09/2019	09:36:35	2.40	126.81	10	4.5				Northern Molluca Sea
52	09/09/2019	11:17:43	0.25	122.02	151	2.2				Minahassa Peninsula, Sulawesi
53	09/09/2019	14:22:26	-0.27	124.82	10	3.3				Southern Molucca Sea
54	10/09/2019	23:13:20	3.55	127.18	21	3.7				Talaud Islands, Indonesia
55	10/09/2019	23:58:53	1.85	127.96	92	3.4				Halmahera, Indonesia
56	10/09/2019	05:39:26	6.59	126.35	54	5.9				Mindanao, Philippines
57	10/09/2019	10:33:52	2.11	126.79	13	3.6				Northern Molluca Sea
58	10/09/2019	14:02:39	0.15	122.32	134	2.6				Minahassa Peninsula, Sulawesi
59	10/09/2019	15:20:31	0.67	123.65	246	3.7				Celebes Sea
60	10/09/2019	23:32:27	4.02	126.74	56	5.7	0.0137	0.1275	0.1177	Talaud Island
61	10/09/2019	23:44:50	3.70	126.77	10	3.8				Talaud island
62	10/09/2019	23:46:07	4.16	126.78	17	4.6				Talaud Island
63	10/09/2019	23:52:41	4.11	126.85	23	3.2				Talaud island
64	10/09/2019	23:55:24	3.83	126.67	10	3.2				Talaud island
65	10/09/2019	23:57:41	4.21	126.82	14	3.4				Talaud island
66	11/09/2019	00:00:39	4.09	126.81	23	3.3				Talaud island
67	11/09/2019	00:04:14	4.11	126.83	31	3.4				Talaud island
68	11/09/2019	00:36:05	4.02	126.86	23	4.1				Talaud island
69	11/09/2019	00:51:15	3.99	126.84	19	4.1	0.1961	0.1079	0.2256	Talaud island
70	11/09/2019	03:06:11	4.39	126.80	10	3.5				Talaud island
71	11/09/2019	03:54:23	4.16	126.84	22	3.9				Talaud island
72	11/09/2019	05:10:35	4.08	126.87	24	4.2				Talaud Island
73	11/09/2019	06:26:32	-0.60	119.75	10	3.4				Minahassa Peninsula, Sulawesi
74	11/09/2019	08:46:39	-0.73	122.44	10	2.8				Minahassa Peninsula, Sulawesi
75	11/09/2019	22:12:29	4.23	126.78	17	3.5				Talaud Island
76	11/09/2019	23:33:37	-0.07	122.74	167	3.1				Minahassa Peninsula, Sulawesi
77	12/09/2019	15:28:46	1.94	128.19	119	4.7				Halmahera, Indonesia
78	12/09/2019	17:21:47	3.83	126.77	10	4.2				Talaud Island
79	12/09/2019	22:16:50	1.74	127.30	115	4.5				Halmahera, Indonesia
80	12/09/2019	23:37:57	0.85	127.55	210	4.0				Halmahera, Indonesia
81	13/09/2019	03:02:18	1.94	123.02	435	4.8				Celebes Sea
82	13/09/2019	03:45:31	2.03	128.63	10	4.3				Halmahera, Indonesia
83	13/09/2019	04:12:29	-0.57	122.22	20	2.7				Minahassa Peninsula, Sulawesi
84	13/09/2019	09:16:57	2.41	126.80	10	4.4				Halmahera, Indonesia
85	13/09/2019	14:18:15	1.59	126.62	10	3.9				Halmahera, Indonesia
86	13/09/2019	14:31:10	4.09	126.84	24	3.3				Talaud Islands
87	13/09/2019	19:35:20	0.01	122.99	21	3.0				Minahassa Peninsula, Sulawesi
88	14/09/2019	02:42:18	2.84	127.55	10	4.4				Halmahera, Indonesia
89	14/09/2019	06:12:52	0.30	123.02	17	3.2				Minahassa Peninsula, Sulawesi
90	14/09/2019	08:13:43	3.69	126.93	42	4.3				Talaud Island

91	14/09/2019	11:19:34	1.36	126.09	19	3.0				Northern Molucca Sea
92	14/09/2019	13:43:43	1.19	120.90	15	2.7				Northern Molluca Sea
93	14/09/2019	13:54:18	0.53	122.28	87	2.8				Minahassa Peninsula, Sulawesi
94	14/09/2019	14:28:28	3.00	128.63	10	4.1				Halmahera, Indonesia
95	14/09/2019	14:41:30	1.28	123.89	280	3.9				Celebes Sea
96	14/09/2019	14:56:14	2.86	128.10	105	4.7				Halmahera, Indonesia
97	14/09/2019	16:44:14	4.38	126.46	12	3.8				Talaud Island
98	15/09/2019	00:27:09	1.65	126.28	10	4.3	0.1373	0.1373	0.1177	Northern Molluca Sea
99	15/09/2019	16:26:03	1.22	126.76	24	2.9				Northern Molucca Sea
100	15/09/2019	16:48:20	0.43	124.89	24	3.1	0.1275	0.0843	0.0137	Minahasa Peninsula, Sulawesi
101	15/09/2019	17:12:26	0.52	125.40	11	4.1				Northern Molluca Sea
102	15/09/2019	23:21:13	3.73	122.54	581	4.6				Celebes Sea
103	16/09/2019	18:28:12	1.99	127.13	35	2.8				Halmahera, Indonesia
104	16/09/2019	22:10:57	0.09	123.45	118	3.0				Minahassa Peninsula, Sulawesi
105	16/09/2019	23:14:36	-0.20	122.95	10	3.0				Minahassa Peninsula, Sulawesi
106	17/09/2019	00:36:33	0.20	132.48	24	3.5				Papua
107	17/09/2019	00:36:41	0.27	123.64	28	3.3				Minahassa Peninsula, Sulawesi
108	17/09/2019	00:53:50	-0.30	122.88	68	4.1				Northern Molucca Sea
109	17/09/2019	03:30:03	1.18	125.84	10	3.2				Northern Molucca Sea
110	17/09/2019	05:34:42	-0.68	123.35	10	4.4				Minahassa Peninsula, Sulawesi
111	17/09/2019	10:30:05	0.42	125.51	15	4.7	0.3236	0.2746	0.5492	Northern Molluca Sea
112	17/09/2019	11:44:02	2.55	126.93	10	3.3				Halmahera, Indonesia
113	17/09/2019	12:03:21	4.13	126.50	11	3.3				Talaud Island
114	17/09/2019	12:29:27	2.93	126.11	21	4.2				Talaud Island
115	17/09/2019	13:05:44	3.99	126.71	22	3.2				Talaud Islands
116	17/09/2019	13:49:56	0.89	124.25	251	3.1				Celebes Sea
117	17/09/2019	14:37:59	0.35	122.22	127	4.4				Minahassa Peninsula, Sulawesi
118	17/09/2019	16:30:53	0.02	122.79	29	3.9				Minahassa Peninsula, Sulawesi
119	17/09/2019	18:45:32	3.83	126.03	115	4.8				Northern Molluca Sea
120	17/09/2019	22:37:53	0.00	123.71	23	3.6				Minahassa Peninsula, Sulawesi
121	18/09/2019	03:12:26	0.32	122.63	137	3.5				Minahassa Peninsula, Sulawesi
122	18/09/2019	03:58:53	-0.57	127.99	20	4.8				Halmahera, Indonesia
123	18/09/2019	07:01:03	5.33	126.45	10	5.6				Talaud Island
124	18/09/2019	10:42:11	3.83	127.09	88	4.1				Talaud Island
125	18/09/2019	11:45:17	2.19	124.78	230	3.8				Celebes Sea
126	18/09/2019	12:04:01	5.26	126.49	20	4.9				Talaud Island
127	18/09/2019	16:52:35	5.54	126.67	24	4.2				Talaud Island
128	18/09/2019	21:40:19	-0.17	122.84	175	3.6				Minahassa Peninsula, Sulawesi
129	19/09/2019	06:38:21	2.86	128.25	26	3.6				Halmahera, Indonesia
130	19/09/2019	06:41:54	3.59	126.75	17	2.9				Talaud Islands
131	19/09/2019	06:46:25	1.97	125.46	104	4.8				Northern Molluca Sea
132	19/09/2019	11:47:17	6.93	126.26	111	4.7				Talaud Island
133	19/09/2019	11:59:33	3.18	127.02	21	3.4				Talaud Island
134	19/09/2019	13:18:14	0.57	125.38	9	3.4				Northern Molluca Sea
135	19/09/2019	13:48:00	1.54	125.56	26	3.2				Minahassa Peninsula, Sulawesi
136	19/09/2019	18:58:26	0.82	121.60	35	3.4				Minahassa Peninsula, Sulawesi

137	19/09/2019	19:09:50	3.63	127.20	30	4.9				Talaud Island
138	19/09/2019	20:43:35	5.18	126.36	108	3.5				Talaud Island
139	20/09/2019	01:15:34	0.08	123.31	159	3.5				Minahassa Peninsula, Sulawesi
140	20/09/2019	05:07:11	0.89	121.24	10	3.5				Minahassa Peninsula, Sulawesi
141	20/09/2019	08:06:40	-0.46	122.89	62	3.7				Minahassa Peninsula, Sulawesi
142	20/09/2019	08:17:25	1.24	126.24	10	4.0				Northern Molucca Sea
143	20/09/2019	08:33:28	1.20	126.22	10	3.7				Northern Molucca Sea
144	20/09/2019	09:06:40	0.46	122.89	62	3.7				Minahassa Peninsula, Sulawesi
145	20/09/2019	09:40:43	0.19	125.75	10	3.6				Northern Molucca Sea
146	20/09/2019	11:33:59	-0.32	127.05	10	3.7				Halmahera, Indonesia
147	20/09/2019	11:34:00	-0.40	127.21	10	4.0				Halmahera, Indonesia
148	20/09/2019	15:50:32	1.24	125.71	15	4.2	0.6080	0.6963	0.3825	Northern Molucca Sea
149	20/09/2019	20:32:06	-0.13	122.82	18	2.6				Minahassa Peninsula, Sulawesi
150	20/09/2019	20:34:34	3.46	125.11	232	4.1				Northern Molucca Sea
151	20/09/2019	20:48:22	3.47	126.13	124	3.9				Northern Molucca Sea
152	20/09/2019	20:51:57	-0.17	122.87	122	2.7				Minahassa Peninsula, Sulawesi
153	20/09/2019	21:51:35	3.70	126.54	10	2.9				Talaud Island, Indonesia
154	21/09/2019	08:31:17	3.44	126.07	10	3.5				Northern Molucca Sea
155	21/09/2019	09:00:18	3.26	126.41	10	3.8				Talaud Island
156	21/09/2019	10:29:45	2.48	126.91	27	3.6				Halmahera, Indonesia
157	21/09/2019	12:01:34	4.53	127.43	60	4.1				Talaud Island
158	21/09/2019	17:21:47	3.76	126.89	24	3.9				Talaud Island
159	21/09/2019	20:07:02	3.72	126.82	33	3.3				Talaud Island, Indonesia
160	21/09/2019	21:32:32	5.37	126.40	27	4.9				Talaud Island
161	21/09/2019	21:37:58	2.25	126.24	18	3.9				Northern Molucca Sea
162	22/09/2019	11:31:37	4.29	126.77	35	3.4				Talaud Island
163	22/09/2019	15:21:52	1.65	127.39	88	3.3				Halmahera, Indonesia
164	22/09/2019	16:04:00	0.05	129.86	10	3.1				Papua
165	22/09/2019	20:49:35	3.10	126.37	10	3.5				Talaud Island
166	22/09/2019	22:22:37	2.77	122.39	507	4.6				Minahassa Peninsula, Sulawesi
167	23/09/2019	05:34:43	4.38	125.89	124	3.9				Northern Molucca Sea
168	23/09/2019	13:06:02	4.99	127.37	116	4.1				Talaud Island
169	23/09/2019	20:40:10	-0.84	122.24	3	2.9				Minahassa Peninsula, Sulawesi
170	23/09/2019	23:54:04	0.05	123.33	105	3.1				Minahassa Peninsula, Sulawesi
171	24/09/2019	02:29:19	4.40	126.36	10	3.1				Talaud Island
172	24/09/2019	04:43:10	1.17	126.77	131	3.5				Halmahera, Indonesia
173	24/09/2019	11:30:24	2.92	126.21	13	3.9				Northern Molucca Sea
174	24/09/2019	16:55:22	4.34	128.52	10	4.7				Talaud Island
175	24/09/2019	22:06:49	-1.15	129.41	10	3.1				Halmahera, Indonesia
176	24/09/2019	22:21:21	4.14	126.53	21	3.0				Talaud Island, Indonesia
177	25/09/2019	07:30:48	-0.28	122.88	10	3.8				Minahassa Peninsula, Sulawesi
178	25/09/2019	12:28:54	1.70	127.08	47	3.5				Halmahera, Indonesia
179	25/09/2019	14:31:27	0.60	126.17	10	4.4	0.1177	0.1079	0.0863	Halmahera, Indonesia
180	25/09/2019	17:19:32	0.03	124.86	10	3.6				Minahassa Peninsula, Sulawesi
181	25/09/2019	19:08:43	1.62	127.09	109	3.4				Halmahera, Indonesia
182	25/09/2019	19:32:00	-0.55	123.99	10	3.0				Minahassa Peninsula, Sulawesi
183	25/09/2019	21:41:30	-0.90	128.40	10	3.6				Halmahera, Indonesia

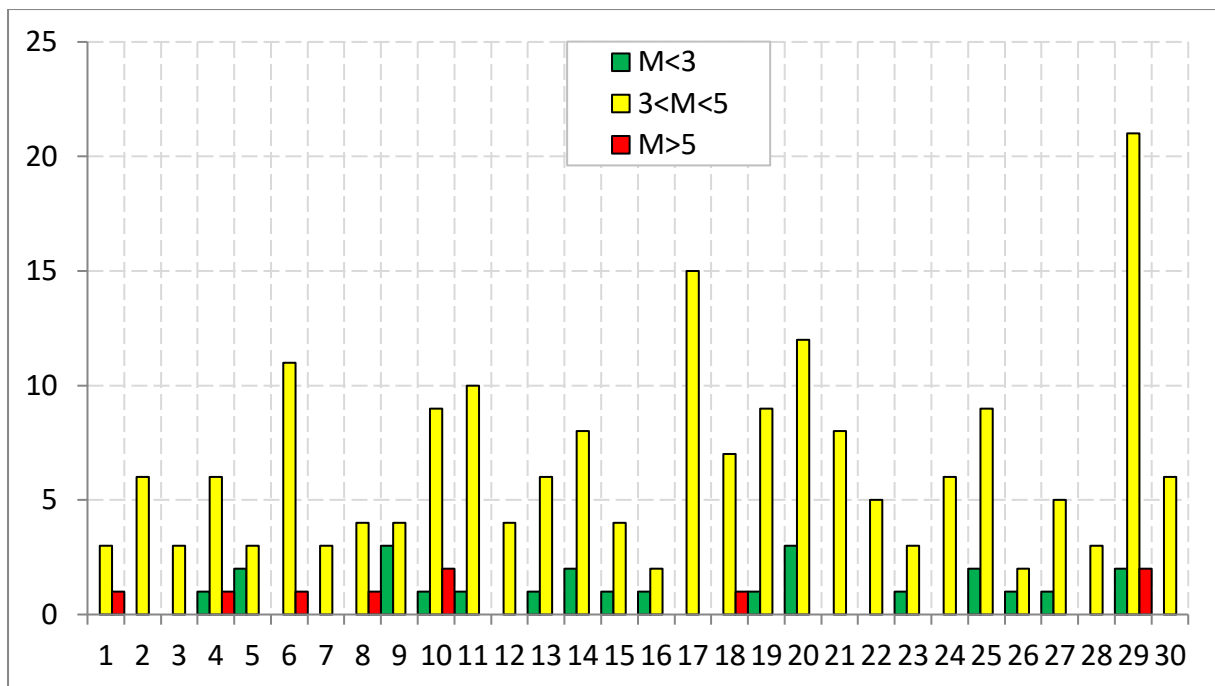
184	25/09/2019	21:46:37	0.90	121.24	68	2.3				Minahasa Peninsula
185	25/09/2019	21:51:04	1.25	121.54	62	3.1				Minahasa Peninsula, Sulawesi
186	25/09/2019	23:17:31	2.93	127.36	36	2.7				Northern Molucca Sea
187	25/09/2019	23:30:32	0.34	125.85	10	3.6				Minahasa Peninsula, Sulawesi
188	26/09/2019	12:14:15	3.66	127.01	35	3.7				Talaud Island
189	26/09/2019	15:53:36	5.00	127.09	108	3.7				Talaud Island
190	26/09/2019	20:56:37	-0.20	122.91	90	2.8				Minahasa Peninsula, Sulawesi
191	27/09/2019	04:31:26	1.38	126.31	10	4.0	0.1863	0.1765	0.1667	Minahasa Peninsula, Sulawesi
192	27/09/2019	12:45:12	5.31	126.29	10	4.5				Talaud Island
193	27/09/2019	15:36:20	0.26	121.91	164	2.8				Minahasa Peninsula, Sulawesi
194	27/09/2019	19:02:16	4.28	126.72	11	4.1				Talaud Island
195	27/09/2019	19:21:14	4.30	126.80	10	4.0				Talaud Island, Indonesia
196	27/09/2019	22:55:07	4.17	126.86	10	3.3				Talaud Island, Indonesia
197	28/09/2019	00:14:47	2.08	128.27	102	3.8				Halmahera, Indonesia
198	28/09/2019	12:06:10	4.71	123.57	501	4.5				Laut Sulawesi
199	28/09/2019	23:11:24	0.69	125.00	38	3.5				Minahasa Peninsula, Sulawesi
200	29/09/2019	02:02:54	5.52	126.60	97	6.3				Talaud Island
201	29/09/2019	02:37:37	0.45	125.62	26	3.8				Minahasa Peninsula, Sulawesi
202	29/09/2019	02:40:36	5.87	126.64	103	4.4				Talaud Island
203	29/09/2019	03:08:54	5.51	126.59	16	4.2				Talaud Island
204	29/09/2019	03:12:08	5.61	126.59	15	4.6				Talaud Island
205	29/09/2019	03:50:40	4.20	126.77	10	3.5				Talaud Island, Indonesia
206	29/09/2019	04:19:19	5.82	126.72	150	4.5				Talaud Island, Indonesia
207	29/09/2019	05:12:58	0.79	119.80	10	3.1				Minahasa Peninsula
208	29/09/2019	05:53:21	5.56	126.41	146	4.5				Talaud Island
209	29/09/2019	07:40:18	5.61	126.60	89	5.4				Mindanao, Philippines
210	29/09/2019	08:22:48	4.97	126.52	116	4.3				Mindanao, Philippines
211	29/09/2019	09:15:49	6.04	126.20	157	4.4				Mindanao, Philippines
212	29/09/2019	10:47:19	5.90	126.58	135	3.6				Mindanao, Philippines
213	29/09/2019	11:09:44	5.42	126.61	20	3.6				Mindanao, Philippines
214	29/09/2019	11:33:45	5.40	126.49	154	3.8				Mindanao, Philippines
215	29/09/2019	12:11:40	5.89	126.56	123	4.0				Mindanao, Philippines
216	29/09/2019	12:54:43	5.57	126.78	151	4.1				Mindanao, Philippines
217	29/09/2019	13:11:12	6.11	126.72	125	4.5				Mindanao, Philippines
218	29/09/2019	14:22:39	5.89	126.42	138	4.2				Mindanao, Philippines
219	29/09/2019	17:41:55	2.69	127.09	10	4.7				Halmahera, Indonesia
220	29/09/2019	18:02:19	2.67	127.08	10	4.3				Halmahera, Indonesia
221	29/09/2019	18:56:01	3.05	128.39	18	3.6				Halmahera, Indonesia
222	29/09/2019	19:04:37	2.98	126.53	12	2.9				Talaud Island
223	29/09/2019	19:13:36	-0.17	125.46	10	2.8				Southern Molucca Sea
224	29/09/2019	21:19:54	5.18	126.67	147	4.2				Mindanao
225	30/09/2019	02:00:29	4.47	126.36	53	4.2				Mindanao
226	30/09/2019	04:18:52	3.48	128.14	67	4.2				Halmahera, Indonesia
227	30/09/2019	06:52:57	-0.16	124.78	10	4.5				Minahasa Peninsula, Sulawesi
228	30/09/2019	18:24:57	4.20	126.43	100	3.7				Talaud Island
229	30/09/2019	21:07:35	4.13	127.84	70	4.0				Talaud Island
230	30/09/2019	22:46:51	3.59	126.72	10	3.0				Talaud Island, Indonesia



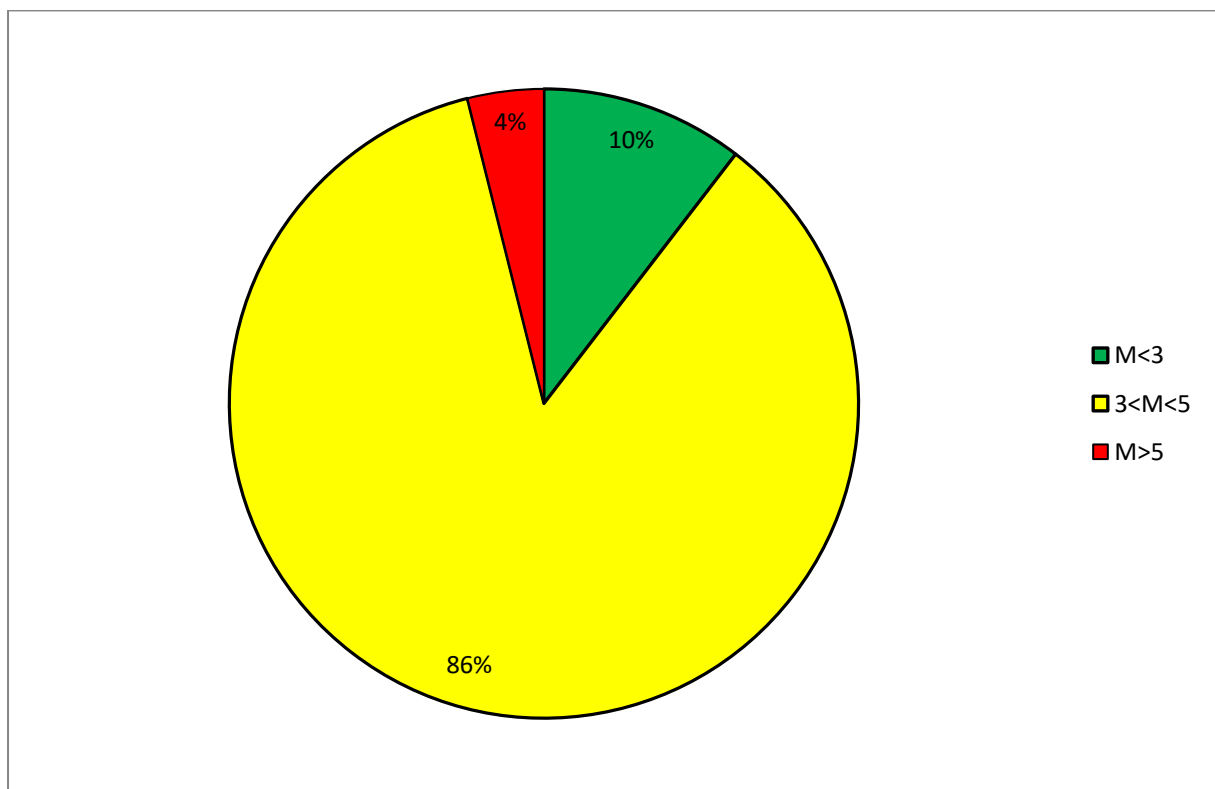
Gambar 29 Sebaran episenter gempabumi bulan September 2019

Tabel 20 Rekapitulasi gempa bumi berdasarkan magnitudo bulan September 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	0	3	1	4	0	0
2	0	6	0	6	0	0
3	0	3	0	3	0	0
4	1	6	1	8	1	0
5	2	3	0	5	0	0
6	0	11	1	12	0	0
7	0	3	0	3	0	0
8	0	4	1	5	0	0
9	3	4	0	7	0	0
10	1	9	2	12	1	0
11	1	10	0	11	0	0
12	0	4	0	4	0	0
13	1	6	0	7	0	0
14	2	8	0	10	0	0
15	1	4	0	5	0	0
16	1	2	0	3	0	0
17	0	15	0	15	1	0
18	0	7	1	8	1	0
19	1	9	0	10	0	0
20	3	12	0	15	0	0
21	0	8	0	8	0	0
22	0	5	0	5	0	0
23	1	3	0	4	0	0
24	0	6	0	6	0	0
25	2	9	0	11	0	0
26	1	2	0	3	0	0
27	1	5	0	6	0	0
28	0	3	0	3	0	0
29	2	21	2	25	1	0
30	0	6	0	6	0	0
Jumlah gempa	24	197	9	230	5	0



Gambar 30 Grafik gempabumi berdasarkan magnitudo bulan September 2019



Gambar 31 Grafik persentase gempabumi berdasarkan magnitudo bulan September 2019

J. Data Gempabumi Bulan Oktober 2019

Tabel 21 Data kejadian gempabumi bulan Oktober 2019

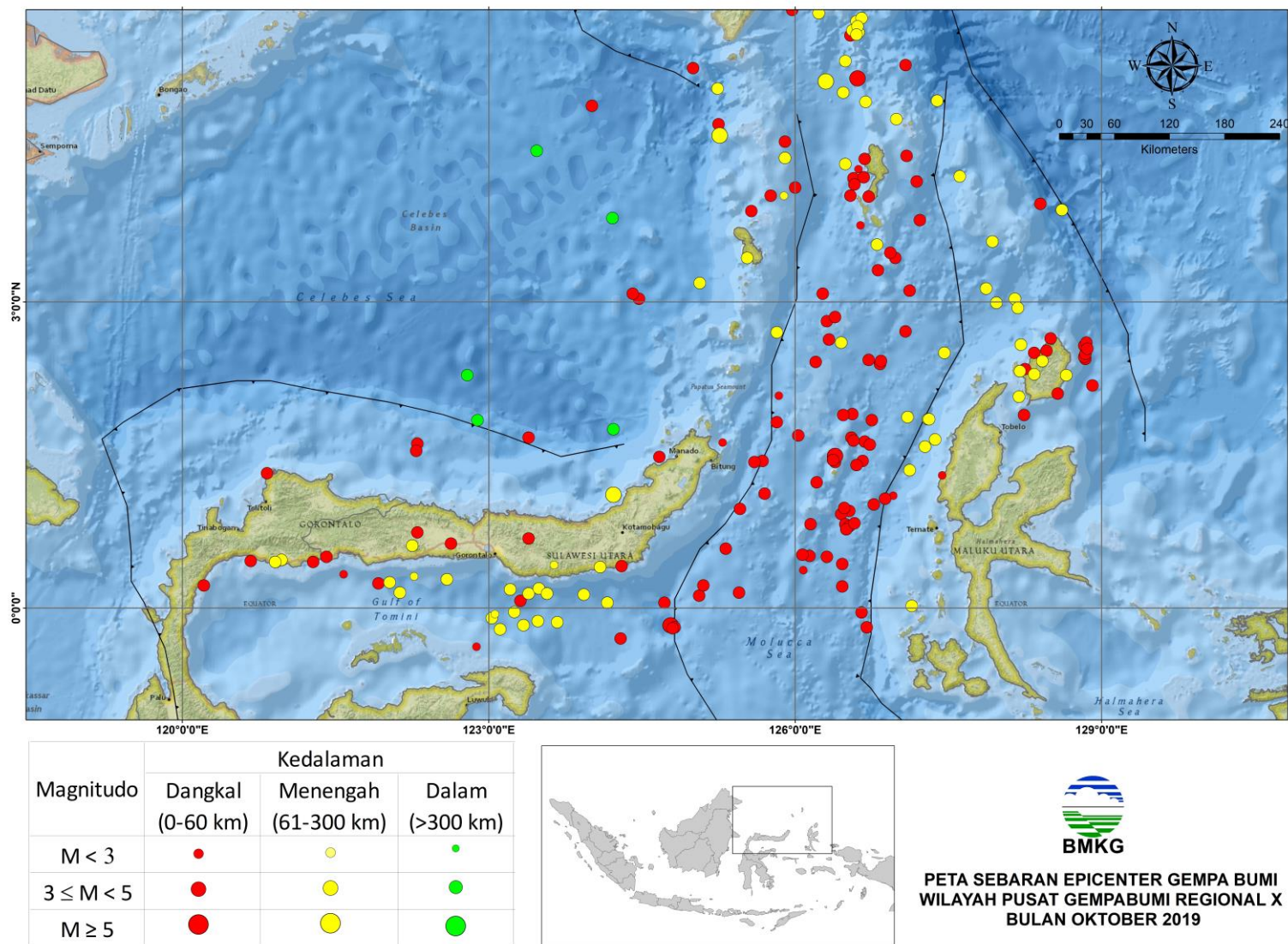
No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLM			Region
			Lat	Long			X	Y	Z	
1	01/10/2019	13:04:16	1.61	122.30	10	3.3				Minahasa Peninsula, Sulawesi
2	01/10/2019	14:45:58	4.04	125.89	89	2.6				Talaud Island, Indonesia
3	01/10/2019	23:26:39	3.03	124.47	20	4.2				Celebes Sea
4	02/10/2019	00:00:02	3.08	124.41	10	3.8				Celebes Sea
5	02/10/2019	02:55:47	2.34	128.25	28	3.8				Halmahera
6	02/10/2019	11:54:39	4.35	126.49	170	3.9				Talaud Island, Indonesia
7	02/10/2019	14:00:42	0.41	124.30	27	3.4				Southern Molucca Sea
8	02/10/2019	16:43:06	0.40	124.09	68	3.2				Southern Molucca Sea
9	02/10/2019	18:40:05	3.08	126.27	14	3.3				Talaud Islands, Indonesia
10	02/10/2019	19:38:22	0.15	125.45	10	3.4				Northern Molucca Sea
11	03/10/2019	01:13:20	0.15	122.13	233	3.4				Minahassa Peninsula, Sulawesi
12	03/10/2019	02:39:00	4.43	127.09	33	3.9				Talaud Islands, Indonesia
13	03/10/2019	15:11:16	1.90	126.56	30	3.8				Northern Molucca Sea
14	03/10/2019	16:59:35	1.35	127.12	81	3.2				Halmahera, Indonesia
15	03/10/2019	17:18:57	1.47	127.30	152	3.0				Halmahera, Indonesia
16	03/10/2019	19:26:04	5.75	126.60	132	3.8				Mindanao, Philippines
17	03/10/2019	21:49:05	5.94	126.14	21	3.7				Mindanao, Philippines
18	04/10/2019	00:45:55	1.44	125.68	10	4.6				Northern Molucca Sea
19	04/10/2019	01:05:58	5.64	126.62	118	4.6				Mindanao, Philippines
20	04/10/2019	01:29:11	2.63	126.33	14	3.5				Northern Molucca Sea
21	04/10/2019	02:13:58	5.32	127.08	10	4.5				Mindanao, Philippines
22	04/10/2019	19:06:00	-0.30	124.29	9	3.8				Southern Molucca Sea
23	04/10/2019	21:15:51	2.50	127.46	204	3.2				Northern Molucca Sea
24	04/10/2019	23:22:51	5.09	125.24	267	4.2				Mindanao, Philippines
25	05/10/2019	03:24:31	0.45	121.28	17	4.0				Minahassa Peninsula, Sulawesi
26	05/10/2019	11:26:48	2.81	126.31	27	3.5				Northern Molucca Sea
27	05/10/2019	11:53:33	1.23	126.21	10	4.0				Northern Molucca Sea
28	05/10/2019	16:24:30	0.25	122.03	161	3.1				Minahassa Peninsula, Sulawesi
29	05/10/2019	17:11:09	5.66	126.56	125	4.7				Mindanao, Philippines
30	05/10/2019	18:00:08	5.78	126.65	120	4.0				Talaud Islands
31	05/10/2019	21:23:39	2.71	127.08	10	3.1				Northern Molucca Sea
32	05/10/2019	23:13:09	0.31	122.27	116	2.6				Minahassa Peninsula, Sulawesi
33	05/10/2019	23:18:08	3.96	128.40	10	3.7				North of Halmahera
34	05/10/2019	23:56:03	4.79	126.99	77	4.4				Talaud Islands
35	06/10/2019	00:00:54	1.44	126.66	15	4.2				Northern Molucca Sea
36	06/10/2019	00:50:59	3.43	125.53	151	3.3				Talaud Islands
37	06/10/2019	06:26:50	1.10	126.96	14	2.9				Northern Molucca Sea
38	06/10/2019	07:48:44	0.68	123.39	6	3.0				Minahassa Peninsula
39	06/10/2019	11:40:23	1.54	122.29	10	3.7				Minahassa Peninsula, Sulawesi
40	06/10/2019	15:30:15	3.82	124.21	382	4.0				Celebes Sea
41	06/10/2019	15:50:32	0.95	126.53	11	4.5				Northern Molucca Sea
42	06/10/2019	19:16:34	2.60	126.45	119	3.4				Northern Molucca Sea
43	06/10/2019	19:56:59	2.28	122.79	515	3.9				Celebes Sea
44	06/10/2019	22:18:20	-0.14	123.67	75	3.4				Minahassa Peninsula
45	07/10/2019	04:20:03	0.92	126.45	10	3.2				Northern Molucca Sea
46	07/10/2019	04:59:25	2.39	126.83	10	3.8				Northern Molucca Sea
47	07/10/2019	09:40:44	2.28	128.65	222	3.8				Halmahera, Indonesia

48	07/10/2019	14:12:49	0.82	126.49	10	3.5				Northern Molucca Sea
49	07/10/2019	17:20:21	4.18	127.19	15	4.0				Talaud Islands, Indonesia
50	07/10/2019	22:37:28	6.01	125.38	21	4.7				Mindanao, Philippines
51	07/10/2019	23:03:20	0.12	125.06	10	4.0				Southern Molucca Sea
52	07/10/2019	23:12:25	6.41	125.97	163	4.5				Mindanao, Philippines
53	08/10/2019	01:49:50	5.29	125.00	18	4.3				Mindanao, Philippines
54	08/10/2019	02:29:10	0.24	121.92	30	3.0				Minahassa Peninsula, Sulawesi
55	08/10/2019	13:10:46	4.97	127.39	152	4.0				Talaud Islands, Indonesia
56	08/10/2019	14:33:15	4.74	125.25	57	4.3				Talaud Islands, Indonesia
57	08/10/2019	16:29:33	4.48	123.47	516	3.8				Celebes Sea
58	08/10/2019	23:49:37	1.07	126.88	35	3.8				Northern Molucca Sea
59	09/10/2019	12:29:05	4.04	126.54	40	3.7				Talaud Islands, Indonesia
60	09/10/2019	15:30:50	2.70	125.82	122	4.1				Talaud Islands, Indonesia
61	09/10/2019	15:53:56	1.67	126.55	12	3.6				Northern Molucca Sea
62	09/10/2019	19:46:27	0.22	120.21	37	3.2				Minahassa Peninsula, Sulawesi
63	10/10/2019	00:54:56	-0.04	123.25	136	3.4				Minahassa Peninsula, Sulawesi
64	10/10/2019	14:35:30	0.33	121.58	18	2.8				Minahassa Peninsula, Sulawesi
65	10/10/2019	15:50:19	1.65	127.37	94	3.5				Halmahera, Indonesia
66	10/10/2019	21:45:29	0.80	126.53	10	3.9				Northern Molucca Sea
67	10/10/2019	21:55:26	2.50	128.34	15	4.2				Halmahera, Indonesia
68	11/10/2019	11:10:26	2.42	126.84	27	3.6				Northern Molucca Sea
69	11/10/2019	16:14:20	1.63	126.68	10	3.4				Northern Molucca Sea
70	11/10/2019	18:22:48	0.14	123.39	214	3.6				Minahassa Peninsula, Sulawesi
71	11/10/2019	19:51:26	5.70	126.61	136	4.1				Mindanao, Philippines
72	11/10/2019	23:34:42	2.07	128.19	134	3.8				Halmahera, Indonesia
73	12/10/2019	15:51:08	5.62	126.60	105	4.7				Mindanao, Philippines
74	12/10/2019	17:14:44	1.48	124.67	10	3.6	0.0627	0.0531	0.0640	Minahassa Peninsula, Sulawesi
75	12/10/2019	17:30:58	2.44	128.84	10	4.6				Halmahera, Indonesia
76	12/10/2019	18:18:53	2.46	128.83	10	4.0				Halmahera, Indonesia
77	12/10/2019	18:24:20	3.80	127.22	30	3.6				Talaud Island
78	12/10/2019	20:19:25	2.49	128.84	10	3.6				Halmahera, Indonesia
79	12/10/2019	20:54:12	1.43	126.39	10	3.4				Northern Molluca Sea
80	12/10/2019	21:54:08	2.08	125.84	10	2.7				Talaud Island
81	13/10/2019	00:20:00	1.30	127.44	20	2.8				Northern Molucca Sea
82	13/10/2019	08:17:02	0.50	121.41	22	3.0				Minahassa Peninsula, Sulawesi
83	13/10/2019	10:37:20	5.05	126.47	191	3.9				Mindanao, Philippines
84	13/10/2019	17:22:30	2.99	127.97	143	3.1				Northern Molluca Sea
85	13/10/2019	17:27:52	0.43	126.46	10	3.2				Northern Molluca Sea
86	13/10/2019	18:40:52	0.58	125.32	28	3.0				Northern Molluca Sea
87	13/10/2019	19:35:16	-0.17	124.78	56	5.0	0.2568	0.2372	0.0120	Southern Molucca Sea
88	13/10/2019	20:05:41	-0.19	124.82	22	4.5				Southern Molucca Sea
89	13/10/2019	20:16:35	2.58	128.21	138	3.0				Halmahera
90	13/10/2019	21:05:19	5.86	125.97	26	4.3				Mindanao, Philippines
91	14/10/2019	04:20:45	1.64	126.57	12	3.4				Northern Molluca Sea
92	14/10/2019	13:38:03	2.64	128.50	10	3.6				Halmahera
93	14/10/2019	15:38:00	0.98	126.48	10	3.1				Northern Molluca Sea
94	14/10/2019	18:39:25	1.67	123.39	24	3.1				Minahassa Peninsula, Sulawesi
95	14/10/2019	23:35:15	0.46	120.67	43	3.3				Minahassa Peninsula, Sulawesi
96	15/10/2019	15:29:00	4.92	124.01	10	3.9				Celebes Sea
97	15/10/2019	15:56:18	0.51	126.14	10	3.6				Northern Molluca Sea
98	15/10/2019	16:00:34	5.36	126.49	149	4.1				Mindanao, Philippines
99	15/10/2019	20:48:47	0.37	126.08	10	2.7				Northern Molluca Sea
100	15/10/2019	21:10:48	-0.38	122.88	55	2.7				Minahassa Peninsula

101	16/10/2019	05:03:56	3.75	126.64	22	2.9				Talaud Island
102	16/10/2019	11:10:55	0.21	126.46	10	3.8				Northern Molucca Sea
103	16/10/2019	12:35:06	4.12	126.00	11	3.6				Talaud Island
104	16/10/2019	13:55:28	1.82	125.82	12	3.8				Northern Molucca Sea
105	17/10/2019	00:35:55	0.13	123.93	199	3.3				Minahassa Peninsula, Sulawesi
106	17/10/2019	01:28:57	5.16	126.30	88	5.6				Mindanao, Philippines
107	17/10/2019	01:56:30	3.56	126.80	84	4.5				Talaud Islands, Indonesia
108	17/10/2019	13:56:38	3.31	126.81	10	3.7				Talaud Islands, Indonesia
109	17/10/2019	16:23:23	0.42	123.64	248	2.8				Minahassa Peninsula, Sulawesi
110	17/10/2019	21:34:44	0.47	120.97	111	3.6				Minahassa Peninsula, Sulawesi
111	18/10/2019	11:48:38	6.09	126.58	88	4.6				Mindanao, Philippines
112	18/10/2019	13:18:45	4.63	125.26	67	5.2				Talaud Islands, Indonesia
113	18/10/2019	21:06:31	0.74	122.30	20	3.0				Minahassa Peninsula
114	19/10/2019	03:42:00	1.85	127.30	81	3.7				Halmahera, Indonesia
115	19/10/2019	04:58:09	3.43	126.98	10	4.0				Talaud Islands, Indonesia
116	19/10/2019	17:11:36	-0.17	123.34	113	4.5				Minahassa Peninsula, Sulawesi
117	19/10/2019	21:51:31	2.10	128.57	13	4.7	0.2131	0.1622	0.1320	Halmahera, Indonesia
118	20/10/2019	05:59:11	2.57	128.83	10	4.1				Halmahera, Indonesia
119	20/10/2019	06:35:37	0.61	122.25	84	3.2				Minahassa Peninsula, Sulawesi
120	20/10/2019	15:47:57	0.52	126.07	10	3.5				Northern Molucca Sea
121	20/10/2019	18:32:50	6.70	125.28	10	4.8				Mindanao, Philippines
122	21/10/2019	02:23:14	1.40	126.60	55	4.5				Northern Molucca Sea
123	21/10/2019	07:01:11	1.32	120.83	16	3.1				Minahassa Peninsula
124	21/10/2019	11:18:04	4.21	126.57	16	4.2				Talaud Islands, Indonesia
125	21/10/2019	11:27:36	4.30	126.62	23	2.9				Talaud Islands, Indonesia
126	21/10/2019	13:07:18	0.50	126.31	10	3.2				Northern Molucca Sea
127	21/10/2019	16:05:49	4.22	126.67	27	3.4				Talaud Islands, Indonesia
128	21/10/2019	17:51:18	2.43	126.72	5	3.9				Northern Molucca Sea
129	21/10/2019	18:29:52	4.40	126.68	17	3.6				Talaud Islands, Indonesia
130	21/10/2019	19:03:52	4.41	125.90	153	3.9				Talaud Islands, Indonesia
131	21/10/2019	21:50:19	1.43	125.60	10	3.6				Northern Molucca Sea
132	22/10/2019	01:35:06	0.63	122.63	36	3.8				Minahassa Peninsula, Sulawesi
133	22/10/2019	07:20:10	0.22	125.10	13	4.0				Southern Molucca Sea
134	22/10/2019	16:23:27	6.91	124.71	10	4.2				Mindanao, Philippines
135	22/10/2019	19:43:44	4.57	125.90	10	3.2				Talaud Islands, Indonesia
136	23/10/2019	01:29:02	2.60	128.85	10	3.8				Halmahera, Indonesia
137	23/10/2019	05:44:20	4.23	127.61	151	4.1				Talaud Islands, Indonesia
138	23/10/2019	11:34:41	2.54	128.86	10	4.7				Halmahera, Indonesia
139	23/10/2019	12:53:26	0.45	120.91	70	4.3				Minahassa Peninsula, Sulawesi
140	23/10/2019	16:39:26	3.89	125.57	37	3.5				Talaud Islands, Indonesia
141	23/10/2019	23:06:09	4.96	126.69	148	3.8				Talaud Islands, Indonesia
142	24/10/2019	13:38:18	1.11	124.22	243	5.6	0.2783	0.2646	0.2710	Minahassa Peninsula, Sulawesi
143	24/10/2019	20:49:22	1.12	125.70	27	4.5				Northern Molucca Sea
144	25/10/2019	11:01:32	0.19	123.49	79	3.0				Minahassa Peninsula, Sulawesi
145	25/10/2019	11:27:54	-0.13	123.48	103	3.5				Minahassa Peninsula, Sulawesi
146	25/10/2019	13:31:50	4.03	126.72	55	3.9				Talaud Islands, Indonesia
147	25/10/2019	17:11:29	-0.20	124.80	10	4.6				Southern Molucca Sea
148	25/10/2019	17:26:32	-0.19	126.70	10	4.1				Southern Molucca Sea
149	25/10/2019	18:51:05	0.82	126.15	10	3.2				Northern Molucca Sea
150	25/10/2019	20:57:01	3.90	128.61	62	4.2				North of Halmahera, Indonesia
151	25/10/2019	21:53:01	2.29	128.34	203	3.7				Halmahera, Indonesia
152	25/10/2019	23:57:36	1.89	126.47	28	4.7				Northern Molucca Sea

153	26/10/2019	02:03:15	0.14	123.57	137	3.6				Minahassa Peninsula, Sulawesi
154	26/10/2019	03:04:27	0.02	127.14	108	4.5				Halmahera, Indonesia
155	26/10/2019	05:07:55	3.03	128.15	136	4.7				Halmahera, Indonesia
156	26/10/2019	13:56:05	1.84	126.75	16	3.1				Northern Molucca Sea
157	27/10/2019	02:05:34	3.11	127.12	10	4.9				Talaud Islands, Indonesia
158	27/10/2019	02:23:21	3.59	127.93	151	3.9				Talaud Islands
159	27/10/2019	16:05:52	6.82	124.99	15	4.8				Mindanao, Philippines
160	27/10/2019	16:41:15	2.85	126.39	15	3.2				Northern Molucca Sea
161	27/10/2019	16:48:46	1.69	126.03	10	3.4				Northern Molucca Sea
162	27/10/2019	16:54:12	0.28	122.59	112	3.6				Minahassa Peninsula, Sulawesi
163	27/10/2019	17:06:33	3.13	127.87	111	3.2				Talaud Islands
164	27/10/2019	17:39:07	2.42	128.42	221	3.3				Halmahera
165	27/10/2019	17:49:37	1.75	124.22	304	3.7				Minahassa Peninsula, Sulawesi
166	27/10/2019	18:26:05	0.07	123.31	7	4.0				Minahassa Peninsula, Sulawesi
167	27/10/2019	18:49:32	0.97	125.46	31	4.0				Northern Molucca Sea
168	27/10/2019	19:26:43	1.87	127.10	69	3.6				Halmahera, Indonesia
169	27/10/2019	21:26:48	0.77	126.50	10	4.3				Northern Molucca Sea
170	27/10/2019	21:33:27	2.18	128.91	10	3.7				Halmahera, Indonesia
171	27/10/2019	21:52:45	1.58	127.27	127	4.2				Northern Molucca Sea
172	28/10/2019	04:07:49	2.52	128.46	22	4.8	0.3121	0.2452	0.3270	Halmahera, Indonesia
173	28/10/2019	07:29:50	2.32	128.20	134	4.0				Halmahera, Indonesia
174	28/10/2019	13:17:38	-0.04	126.65	3	4.0				Southern Molucca Sea
175	28/10/2019	13:42:02	1.01	126.77	27	4.0				Northern Molucca Sea
176	28/10/2019	18:43:32	3.18	125.06	222	4.0				Talaud Islands, Indonesia
177	28/10/2019	19:18:56	1.89	128.24	42	3.0				Halmahera, Indonesia
178	29/10/2019	01:04:45	6.84	125.22	15	6.6	0.1123	0.1165	0.2130	Mindanao, Philippines
179	29/10/2019	01:28:06	6.83	125.04	19	5.4				Mindanao, Philippines
180	29/10/2019	02:20:32	6.59	125.18	10	5.2				Mindanao, Philippines
181	29/10/2019	02:22:41	6.71	125.06	45	4.8				Mindanao, Philippines
182	29/10/2019	02:34:28	6.86	125.03	10	5.1				Mindanao, Philippines
183	29/10/2019	02:42:40	6.82	125.12	10	5.9				Mindanao, Philippines
184	29/10/2019	03:36:26	2.41	126.20	21	4.7	0.1156	0.1196	0.0930	Northern Molucca Sea
185	29/10/2019	03:56:30	7.08	124.89	13	4.9				Mindanao, Philippines
186	29/10/2019	04:15:47	5.61	126.54	10	4.9				Mindanao, Philippines
187	29/10/2019	06:45:32	-0.10	123.03	71	4.9	0.2871	0.3361	0.2170	Minahassa Peninsula, Sulawesi
188	29/10/2019	07:02:14	7.28	124.99	45	4.8				Mindanao, Philippines
189	29/10/2019	07:29:05	1.84	122.89	419	4.5				Minahassa Peninsula, Sulawesi
190	29/10/2019	08:05:09	6.94	124.95	10	4.7				Mindanao, Philippines
191	29/10/2019	08:33:12	6.97	12.01	10	5.4				Mindanao, Philippines
192	29/10/2019	08:46:03	6.76	125.38	10	5.4				Mindanao, Philippines
193	29/10/2019	12:03:01	-0.06	123.06	132	2.9				Minahassa Peninsula, Sulawesi
194	29/10/2019	19:14:33	0.18	123.21	181	3.5				Minahassa Peninsula, Sulawesi
195	30/10/2019	02:23:13	1.60	126.73	14	3.7				Northern Molucca Sea
196	30/10/2019	03:16:33	5.19	126.61	10	5.0				Mindanao, Philippines
197	30/10/2019	06:28:47	0.05	124.72	10	3.9				Minahassa Peninsula, Sulawesi
198	30/10/2019	12:26:05	3.48	126.93	26	4.0				Talaud Islands, Indonesia
199	30/10/2019	17:29:00	1.49	126.39	10	5.4	0.0736	0.0893	0.0530	Northern Molucca Sea
200	30/10/2019	18:36:32	1.85	127.31	106	3.9				Halmahera, Indonesia
201	30/10/2019	19:20:19	1.45	126.37	10	3.9				Northern Molucca Sea
202	30/10/2019	21:16:35	0.05	124.16	81	3.0				Minahassa Peninsula, Sulawesi
203	30/10/2019	21:31:41	1.45	126.37	10	3.8				Northern Molucca Sea
204	31/10/2019	00:59:08	7.19	125.02	10	4.8				Mindanao, Philippines
205	31/10/2019	01:11:21	6.97	125.23	28	6.5				Mindanao, Philippines

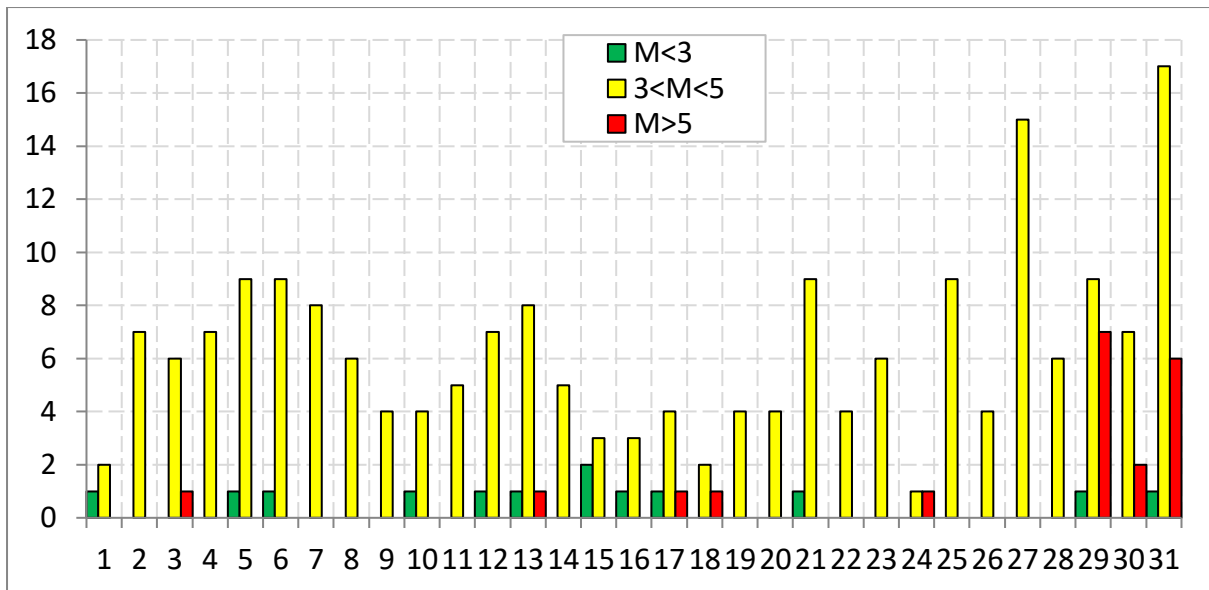
206	31/10/2019	01:27:31	7.14	125.03	18	5.6				Mindanao, Philippines
207	31/10/2019	01:51:37	6.91	124.92	10	4.6				Mindanao, Philippines
208	31/10/2019	03:12:16	4.15	126.58	36	4.0				Talaud Islands
209	31/10/2019	03:51:35	0.83	126.58	10	3.4				Northern Molluca Sea
210	31/10/2019	04:50:09	1.62	125.29	10	2.9				Northern Molluca Sea
211	31/10/2019	05:12:56	6.78	125.43	10	4.4				Mindanao, Philippines
212	31/10/2019	05:34:21	7.06	125.02	13	5.0				Mindanao, Philippines
213	31/10/2019	05:59:06	6.89	125.26	10	4.6				Mindanao, Philippines
214	31/10/2019	06:53:52	-0.21	123.11	72	4.2				Minahassa Peninsula, Sulawesi
215	31/10/2019	07:02:02	7.24	125.07	10	4.7				Mindanao, Philippines
216	31/10/2019	07:45:49	4.04	125.76	40	3.8				Mindanao, Philippines
217	31/10/2019	07:54:50	7.35	125.10	13	4.9				Mindanao, Philippines
218	31/10/2019	08:08:56	7.88	125.12	10	4.7				Mindanao, Philippines
219	31/10/2019	08:56:39	6.97	124.91	11	5.2				Mindanao, Philippines
220	31/10/2019	10:41:20	6.99	125.10	10	5.0				Mindanao, Philippines
221	31/10/2019	10:55:58	7.31	125.82	31	4.6				Mindanao, Philippines
222	31/10/2019	11:56:05	5.92	126.29	133	4.7				Mindanao, Philippines
223	31/10/2019	11:56:07	5.83	126.23	120	4.7				Mindanao, Philippines
224	31/10/2019	12:42:22	6.96	125.22	10	4.7				Mindanao, Philippines
225	31/10/2019	16:59:32	6.71	125.37	10	4.4				Mindanao, Philippines
226	31/10/2019	17:35:32	6.77	125.17	10	5.0				Mindanao, Philippines
227	31/10/2019	22:17:55	2.94	128.18	146	4.0				Halimahera, Indonesia



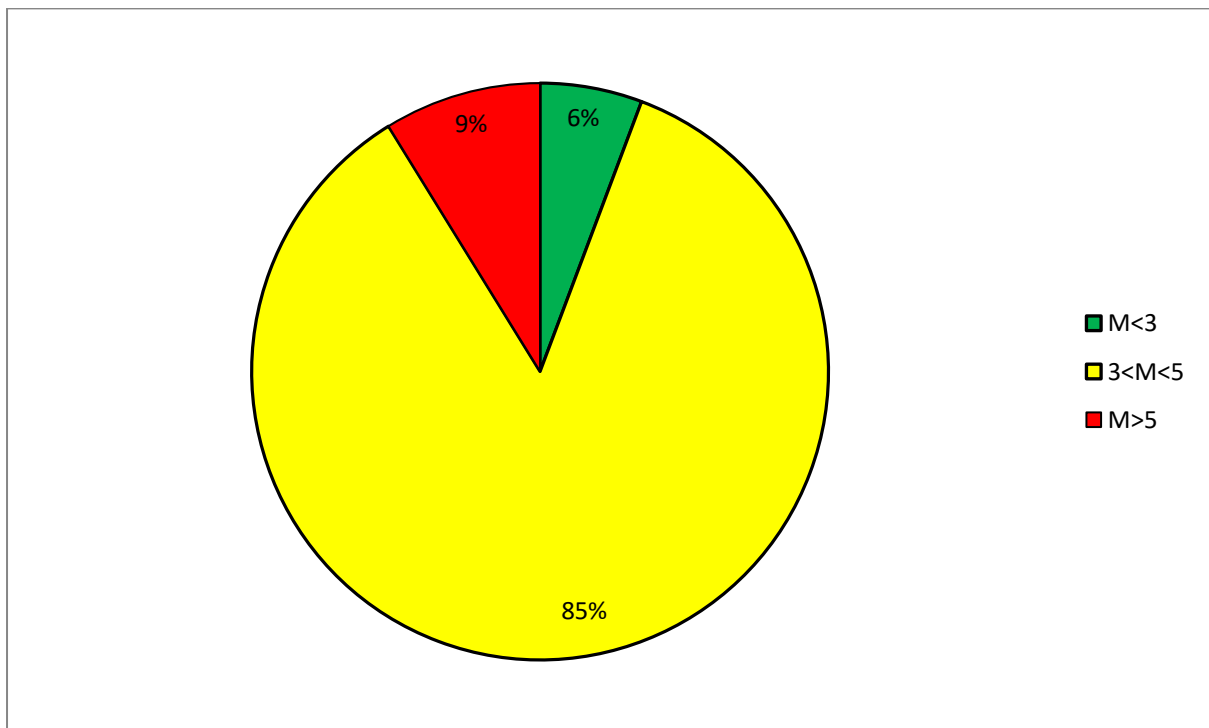
Gambar 32 Sebaran episenter gempabumi bulan Oktober 2019

Tabel 22 Rekapitulasi gempabumi berdasarkan magnitudo bulan Oktober 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	1	2	0	3	0	0
2	0	7	0	7	0	0
3	0	6	1	7	1	0
4	0	7	0	7	0	0
5	1	9	0	10	0	0
6	1	9	0	10	1	0
7	0	8	0	8	0	0
8	0	6	0	6	0	0
9	0	4	0	4	0	0
10	1	4	0	5	0	0
11	0	5	0	5	0	0
12	1	7	0	8	1	0
13	1	8	1	10	1	0
14	0	5	0	5	0	0
15	2	3	0	5	0	0
16	1	3	0	4	0	0
17	1	4	1	6	0	0
18	0	2	1	3	0	0
19	0	4	0	4	1	0
20	0	4	0	4	0	0
21	1	9	0	10	0	0
22	0	4	0	4	0	0
23	0	6	0	6	0	0
24	0	1	1	2	1	0
25	0	9	0	9	0	0
26	0	4	0	4	0	0
27	0	15	0	15	0	0
28	0	6	0	6	1	0
29	1	9	7	17	4	0
30	0	7	2	9	1	0
31	1	17	6	24	0	0
Jumlah gempa	13	194	20	227	12	0



Gambar 33 Grafik gempabumi berdasarkan magnitudo bulan Oktober 2019



Gambar 34 Grafik persentase gempabumi berdasarkan magnitudo bulan Oktober 2019

K. Data Gempabumi Bulan November 2019

Tabel 23 Data kejadian gempabumi bulan November 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLM			Region
			Lat	Long			X	Y	Z	
1	01/11/2019	02:20:27	3.34	127.14	37	3.6				Talaud Islands, Indonesia
2	01/11/2019	02:33:57	3.25	127.07	10	5.3				Talaud Islands, Indonesia
3	01/11/2019	02:47:52	3.10	126.93	15	3.4				Talaud Islands, Indonesia
4	01/11/2019	02:51:52	3.17	127.04	10	4.6				Talaud Islands, Indonesia
5	01/11/2019	04:14:05	3.60	127.27	28	4.1				Talaud Islands, Indonesia
6	01/11/2019	06:07:55	6.99	125.02	12	5.2				Mindanao, Philipines
7	01/11/2019	07:14:48	3.44	127.17	64	3.9				Talaud Islands, Indonesia
8	01/11/2019	09:21:40	3.02	126.83	10	3.2				Talaud Islands, Indonesia
9	01/11/2019	09:31:36	2.36	128.60	30	3.7				Halmahera, Indonesia
10	01/11/2019	09:36:47	-0.08	125.15	10	3.5				Southern Molucca Sea
11	01/11/2019	09:48:19	4.97	126.47	10	3.5				Talaud Islands, Indonesia
12	01/11/2019	10:46:49	2.73	128.29	14	4.3				Halmahera, Indonesia
13	01/11/2019	14:20:19	3.33	127.06	30	3.1				Talaud Islands, Indonesia
14	01/11/2019	14:31:40	-0.30	124.08	10	3.2				Southern Molucca Sea
15	01/11/2019	16:00:16	3.15	127.00	10	3.6				Talaud Islands, Indonesia
16	01/11/2019	16:58:16	3.50	127.60	140	3.8				Talaud Islands, Indonesia
17	01/11/2019	17:23:28	3.15	127.01	10	3.5				Talaud Islands, Indonesia
18	01/11/2019	18:17:03	-0.10	122.83	124	2.6				Minahassa Peninsula
19	01/11/2019	18:21:45	3.20	127.02	10	3.9				Talaud Islands, Indonesia
20	01/11/2019	18:38:39	6.88	125.21	15	4.9				Mindanao, Philipines
21	01/11/2019	23:14:48	-0.47	124.17	110	3.4				Minahassa Peninsula
22	02/11/2019	05:03:43	3.96	124.75	311	4.3				Talaud Islands, Indonesia
23	02/11/2019	14:59:14	4.01	126.85	22	2.9				Talaud Islands, Indonesia
24	02/11/2019	23:23:22	1.80	128.27	79	3.7				Halmahera, Indonesia
25	03/11/2019	00:25:17	1.42	126.38	20	3.9				Halmahera, Indonesia
26	03/11/2019	05:59:24	1.43	126.35	21	3.9				Halmahera, Indonesia
27	03/11/2019	14:42:20	5.69	127.11	23	4.7				Talaud Islands, Indonesia
28	03/11/2019	16:28:03	-0.11	123.51	18	3.4				Minahassa Peninsula
29	03/11/2019	16:40:29	1.88	124.56	239	3.7				Celebes Sea
30	03/11/2019	19:28:37	-0.23	121.79	10	2.1				Minahassa Peninsula, Indonesia
31	03/11/2019	22:25:30	3.28	127.10	26	3.7				Talaud Islands, Indonesia
32	03/11/2019	23:55:52	1.22	123.98	260	3.3				Celebes Sea
33	04/11/2019	01:52:01	1.29	126.38	10	3.6				Halmahera, Indonesia
34	04/11/2019	11:15:54	1.18	125.37	66	4.0				Northern Molucca Sea
35	04/11/2019	11:19:35	-0.19	125.01	10	4.2				Southern Molucca Sea
36	04/11/2019	18:03:40	5.52	126.55	113	3.9				Talaud Islands, Indonesia
37	04/11/2019	18:15:33	0.01	123.29	10	2.9				Minahassa Peninsula
38	04/11/2019	20:09:27	0.30	122.04	153	3.0				Minahassa Peninsula, Indonesia
39	04/11/2019	23:14:30	0.24	120.99	10	2.8				Minahassa Peninsula, Indonesia
40	05/11/2019	07:52:33	2.05	125.60	90	4.3				Talaud Islands, Indonesia
41	05/11/2019	11:11:24	2.09	128.39	23	3.3				Halmahera, Indonesia
42	05/11/2019	14:42:15	3.24	127.27	10	3.4				Talaud Islands, Indonesia
43	06/11/2019	00:00:51	-0.47	121.98	10	3.0				Minahassa Peninsula
44	06/11/2019	01:25:09	1.87	127.31	77	3.6				Halmahera, Indonesia

45	06/11/2019	02:16:17	1.08	122.17	14	4.5				Minahassa Peninsula
46	06/11/2019	03:43:58	4.88	125.70	202	4.0				Talaud Islands, Indonesia
47	06/11/2019	08:23:52	3.78	126.76	41	3.9				Talaud Islands, Indonesia
48	06/11/2019	09:56:53	1.41	127.04	103	4.1				Halmahera, Indonesia
49	06/11/2019	15:59:12	0.06	123.31	178	3.1				Minahassa Peninsula, Indonesia
50	06/11/2019	20:00:56	0.07	127.27	132	4.3				Halmahera, Indonesia
51	06/11/2019	22:23:27	1.00	121.09	4	3.3				Minahassa Peninsula
52	07/11/2019	03:36:19	3.28	127.09	26	3.3				Talaud Islands, Indonesia
53	07/11/2019	04:35:35	2.01	126.45	10	4.8	0.3435	0.3805	0.2105	Halmahera, Indonesia
54	07/11/2019	08:23:04	-0.03	123.61	71	3.3				Minahassa Peninsula, Indonesia
55	07/11/2019	08:30:11	0.57	125.61	28	3.6				Northern Molucca Sea
56	07/11/2019	13:28:13	0.11	122.09	239	2.6				Minahassa Peninsula
57	07/11/2019	14:09:41	2.47	128.40	210	3.9				Halmahera, Indonesia
58	07/11/2019	20:29:25	0.23	122.99	117	2.9				Minahassa Peninsula
59	07/11/2019	21:11:37	4.63	127.58	107	4.4				Talaud Islands, Indonesia
60	07/11/2019	22:41:29	5.67	126.41	108	5.4				Talaud Islands, Indonesia
61	07/11/2019	22:51:01	3.31	127.08	10	4.1				Talaud Islands, Indonesia
62	07/11/2019	23:41:16	1.55	126.49	17	4.0				Halmahera, Indonesia
63	07/11/2019	23:58:28	0.34	122.37	10	2.7				Minahassa Peninsula
64	08/11/2019	01:22:39	1.64	122.17	10	3.1				Minahassa Peninsula, Indonesia
65	08/11/2019	04:48:11	1.02	126.89	60	4.1				Halmahera, Indonesia
66	08/11/2019	04:52:25	2.49	126.84	10	3.5				Halmahera, Indonesia
67	08/11/2019	10:15:52	7.81	124.66	10	4.8				Mindanao, Philippines
68	08/11/2019	18:57:24	4.57	127.37	24	5.1				Talaud Islands, Indonesia
69	08/11/2019	22:35:02	3.20	123.31	450	3.9				Talaud Islands, Indonesia
70	08/11/2019	01:22:39	1.64	122.17	10	3.1				Minahassa Peninsula, Indonesia
71	08/11/2019	04:48:11	1.02	126.89	60	4.1				Halmahera, Indonesia
72	08/11/2019	04:52:25	2.49	126.84	10	3.5				Halmahera, Indonesia
73	08/11/2019	10:15:52	7.81	124.66	10	4.8				Mindanao, Philippines
74	08/11/2019	18:57:24	4.57	127.37	24	5.1				Talaud Islands, Indonesia
75	08/11/2019	22:35:02	3.20	123.31	450	3.9				Talaud Islands, Indonesia
76	08/11/2019	23:14:48	0.25	0.25	95	4.8	0.5726	0.5534	0.4254	Halmahera, Indonesia
77	08/11/2019	23:31:39	1.14	126.10	37	3.3				Northern Molucca Sea
78	08/11/2019	23:43:56	4.14	125.92	60	2.9				Talaud Islands, Indonesia
79	09/11/2019	00:08:30	2.72	128.34	18	3.5				Halmahera, Indonesia
80	09/11/2019	05:37:40	-0.16	123.87	91	4.5				Minahassa Peninsula, Indonesia
81	09/11/2019	06:37:41	-0.25	124.19	11	4.4				Minahassa Peninsula
82	09/11/2019	09:13:13	0.28	121.75	185	2.6				Minahassa Peninsula
83	09/11/2019	11:23:44	2.23	128.35	206	3.9				Halmahera, Indonesia
84	09/11/2019	13:38:03	-0.42	121.92	10	2.4				Minahassa Peninsula, Indonesia
85	09/11/2019	16:08:07	0.80	126.07	10	3.3				Northern Molucca Sea
86	09/11/2019	20:02:49	1.93	122.76	10	3.6				Minahassa Peninsula
87	09/11/2019	21:40:49	1.88	127.34	87	3.6				Halmahera, Indonesia
88	10/11/2019	01:14:18	0.56	122.15	62	3.1				Minahassa Peninsula
89	10/11/2019	04:19:45	4.61	126.56	105	4.2				Talaud Islands, Indonesia
90	10/11/2019	05:26:26	-0.24	123.28	10	2.8				Minahassa Peninsula, Indonesia
91	10/11/2019	11:48:38	4.84	127.31	139	4.1				Talaud Islands, Indonesia
92	10/11/2019	15:00:12	3.24	126.90	10	3.5				Talaud Islands, Indonesia
93	10/11/2019	18:47:18	2.08	121.81	10	3.7				Celebes Sea

94	10/11/2019	20:09:48	0.83	125.98	76	3.6				Northern Molucca Sea
95	11/11/2019	03:48:46	-0.40	122.88	82	4.2				Minahassa Peninsula
96	11/11/2019	05:11:00	5.76	126.68	130	4.8				Talaud Islands, Indonesia
97	11/11/2019	06:46:19	-0.07	123.18	74	3.4				Minahassa Peninsula
98	11/11/2019	12:14:46	3.57	126.30	10	3.0				Talaud Islands, Indonesia
99	11/11/2019	21:57:46	2.83	127.44	10	3.5				Halmahera, Indonesia
100	11/11/2019	23:41:00	1.48	127.05	119	4.7	2.5618	2.9782	1.7080	Halmahera, Indonesia
101	12/11/2019	02:46:53	1.25	123.01	10	4.6				Minahassa Peninsula
102	12/11/2019	02:48:24	1.36	123.06	10	4.9	0.6721	0.5737	0.3818	Minahassa Peninsula
103	12/11/2019	14:33:47	1.60	123.21	10	4.0				Minahassa Peninsula
104	12/11/2019	15:11:30	1.43	126.40	10	4.5	0.2164	0.2633	0.1892	Halmahera, Indonesia
105	12/11/2019	16:26:08	-0.04	123.11	145	2.9				Minahassa Peninsula
106	13/11/2019	02:20:07	0.99	122.13	19	4.6				Minahassa Peninsula
107	13/11/2019	06:50:14	0.80	122.22	54	3.1				Minahassa Peninsula
108	13/11/2019	18:18:47	0.23	125.59	10	3.4				Northern Molucca Sea
109	13/11/2019	22:13:58	1.36	120.73	39	3.4				Minahassa Peninsula
110	14/11/2019	00:14:37	-0.08	123.16	114	3.7				Minahassa Peninsula
111	14/11/2019	01:45:49	0.35	122.18	112	3.0				Minahassa Peninsula
112	14/11/2019	05:37:30	0.17	122.28	140	2.7				Minahassa Peninsula
113	14/11/2019	13:34:00	0.65	122.21	82	2.9				Minahassa Peninsula
114	14/11/2019	16:17:43	1.64	126.37	73	7.1	35.8718	32.0409	20.6745	Northern Molucca Sea
115	14/11/2019	16:30:56	1.45	126.33	59	4.5				Northern Molucca Sea
116	14/11/2019	16:38:54	1.60	126.29	10	4.9	0.6556	-0.5497	0.4266	Northern Molucca Sea
117	14/11/2019	16:43:50	1.60	126.38	10	4.3				Northern Molucca Sea
118	14/11/2019	16:52:05	1.65	126.49	10	4.4	-0.1682	-0.1912	0.1265	Northern Molucca Sea
119	14/11/2019	17:01:01	1.72	126.47	10	4.1				Northern Molucca Sea
120	14/11/2019	17:10:26	1.57	126.50	10	4.6				Northern Molucca Sea
121	14/11/2019	17:11:38	1.70	126.42	32	4.8	0.4224	-0.3960	-0.2260	Northern Molucca Sea
122	14/11/2019	17:16:24	1.58	126.32	10	4.4	-0.2483	0.2866	0.1534	Northern Molucca Sea
123	14/11/2019	17:16:45	1.53	126.28	10	4.3				Northern Molucca Sea
124	14/11/2019	17:23:04	1.63	126.42	10	3.9				Northern Molucca Sea
125	14/11/2019	17:29:54	1.59	126.44	10	4.1				Northern Molucca Sea
126	14/11/2019	17:33:48	1.56	126.39	10	3.2				Northern Molucca Sea
127	14/11/2019	17:35:33	1.55	126.48	10	3.9				Northern Molucca Sea
128	14/11/2019	17:40:39	1.62	126.34	10	4.4	0.2335	0.2274	-0.1533	Northern Molucca Sea
129	14/11/2019	17:44:41	1.64	126.45	10	4.4	0.2600	0.3418	-0.1828	Northern Molucca Sea
130	14/11/2019	17:46:50	1.60	126.42	10	3.6				Northern Molucca Sea
131	14/11/2019	17:48:36	1.52	126.39	10	4.0				Northern Molucca Sea
132	14/11/2019	17:55:20	1.58	126.43	10	5.0	0.5023	0.4624	0.2730	Northern Molucca Sea
133	14/11/2019	18:14:57	1.88	126.35	10	4.1				Northern Molucca Sea
134	14/11/2019	18:17:16	1.54	126.46	10	3.7				Northern Molucca Sea
135	14/11/2019	18:19:03	1.68	126.51	10	3.7				Northern Molucca Sea
136	14/11/2019	18:23:02	1.40	126.53	104	3.8				Northern Molucca Sea
137	14/11/2019	18:25:25	1.58	126.43	10	3.8				Northern Molucca Sea
138	14/11/2019	18:27:00	1.43	126.41	10	3.6				Northern Molucca Sea
139	14/11/2019	18:29:53	1.69	126.46	10	3.5				Northern Molucca Sea
140	14/11/2019	18:32:49	1.44	126.46	10	3.6				Northern Molucca Sea
141	14/11/2019	18:40:44	1.59	126.42	10	4.1	0.1154	0.1076	-0.0958	Northern Molucca Sea
142	14/11/2019	18:45:39	1.49	126.40	10	5.9	3.6441	3.4585	-1.7116	Northern Molucca Sea
143	14/11/2019	18:51:58	1.56	126.52	10	3.9				Northern Molucca Sea
144	14/11/2019	19:00:00	1.60	126.45	10	3.4				Northern Molucca Sea
145	14/11/2019	19:03:31	1.50	126.41	11	4.1	0.1229	0.1434	-0.1190	Northern Molucca Sea

146	14/11/2019	19:06:02	1.74	126.46	10	4.3	0.1382	-0.1485	0.1047	Northern Molucca Sea
147	14/11/2019	19:09:54	1.66	126.13	10	3.5				Northern Molucca Sea
148	14/11/2019	19:11:26	1.47	126.39	10	3.5				Northern Molucca Sea
149	14/11/2019	19:22:37	1.58	126.41	10	4.3	-0.1182	-0.1398	0.0920	Northern Molucca Sea
150	14/11/2019	19:38:32	1.33	126.37	106	3.7				Northern Molucca Sea
151	14/11/2019	19:42:49	1.43	126.47	10	3.7				Northern Molucca Sea
152	14/11/2019	19:49:43	1.59	126.52	10	3.1				Northern Molucca Sea
153	14/11/2019	19:54:29	1.56	126.40	10	3.5				Northern Molucca Sea
154	14/11/2019	19:59:03	1.63	126.49	10	3.4				Northern Molucca Sea
155	14/11/2019	20:00:35	0.10	123.34	74	3.5				Minahassa Peninsula
156	14/11/2019	20:03:10	1.61	126.49	14	3.3				Northern Molucca Sea
157	14/11/2019	20:07:06	1.61	126.43	10	4.5	0.3696	0.2424	0.1918	Northern Molucca Sea
158	14/11/2019	20:10:49	1.79	126.35	10	4.8	0.5867	-0.5167	0.2913	Northern Molucca Sea
159	14/11/2019	20:17:37	1.61	126.37	10	4.3	-0.1678	0.2369	-0.1771	Northern Molucca Sea
160	14/11/2019	20:19:41	1.83	126.42	10	5.4	-1.5556	1.3639	-0.7846	Northern Molucca Sea
161	14/11/2019	20:34:07	1.60	126.43	10	4.3	-0.1244	0.1121	-0.0795	Northern Molucca Sea
162	14/11/2019	20:36:21	1.60	126.47	10	4.4	0.1309	-0.1645	0.1223	Northern Molucca Sea
163	14/11/2019	20:39:08	1.77	126.35	10	5.3	-1.4178	1.5492	0.7385	Northern Molucca Sea
164	14/11/2019	20:48:13	1.53	126.47	10	4.1	0.1240	0.1564	0.1116	Northern Molucca Sea
165	14/11/2019	20:54:03	1.66	126.39	10	5.3	1.5547	-1.6232	-0.9509	Northern Molucca Sea
166	14/11/2019	21:07:28	1.68	126.31	10	5.2	1.2664	1.2605	0.7473	Northern Molucca Sea
167	14/11/2019	21:12:56	1.64	126.38	10	6.1	-4.9970	-4.9826	2.5609	Northern Molucca Sea
168	14/11/2019	21:31:54	1.55	126.46	10	4.2				Northern Molucca Sea
169	14/11/2019	21:33:48	1.62	126.55	10	4.9	0.3934	-0.4070	0.2882	Northern Molucca Sea
170	14/11/2019	21:37:26	1.49	126.39	10	5.3	-1.6000	-1.6759	-1.0333	Northern Molucca Sea
171	14/11/2019	21:43:40	1.49	126.43	10	4.8	-0.3210	0.3687	0.5772	Northern Molucca Sea
172	14/11/2019	21:49:22	1.32	126.36	10	3.8				Northern Molucca Sea
173	14/11/2019	21:56:04	1.52	126.35	10	4.3				Northern Molucca Sea
174	14/11/2019	22:00:34	1.52	126.35	10	4.8	-0.5012	-0.6334	-0.4585	Northern Molucca Sea
175	14/11/2019	22:10:42	1.64	126.50	12	3.8				Northern Molucca Sea
176	14/11/2019	22:11:50	1.64	126.38	10	4.2	-0.2044	-0.2758	-0.2039	Northern Molucca Sea
177	14/11/2019	22:15:10	1.75	126.50	10	5.2	0.7049	-1.0345	0.3819	Northern Molucca Sea
178	14/11/2019	22:25:50	1.53	126.41	10	4.6	0.5085	-0.6110	0.2880	Northern Molucca Sea
179	14/11/2019	22:28:20	1.50	126.37	10	4.8	-0.3755	-0.3354	0.2572	Northern Molucca Sea
180	14/11/2019	22:32:53	1.61	126.36	10	4.7	-0.3829	-0.3045	0.2475	Northern Molucca Sea
181	14/11/2019	22:34:26	1.72	126.42	47	5.1	-1.9505	1.8185	-0.8291	Northern Molucca Sea
182	14/11/2019	22:42:22	1.61	126.36	10	5.3	-1.0139	-1.1665	0.6860	Northern Molucca Sea
183	14/11/2019	22:50:43	1.45	126.81	29	4.0				Northern Molucca Sea
184	14/11/2019	23:06:03	1.64	126.29	10	3.3				Northern Molucca Sea
185	14/11/2019	23:11:56	1.70	126.33	10	3.8				Northern Molucca Sea
186	14/11/2019	23:17:19	1.65	126.35	10	5.5	2.7872	2.5992	-1.4560	Northern Molucca Sea
187	14/11/2019	23:27:03	1.54	126.46	10	4.6	-0.3054	-0.2364	-0.2322	Northern Molucca Sea
188	14/11/2019	23:33:56	1.89	126.33	10	3.7				Northern Molucca Sea
189	14/11/2019	23:59:43	1.69	126.32	10	4.9	0.7919	0.7411	0.4814	Northern Molucca Sea
190	15/11/2019	00:20:32	1.41	126.34	3	4.2				Northern Molucca Sea
191	15/11/2019	00:32:50	1.63	126.32	21	3.8				Northern Molucca Sea
192	15/11/2019	00:39:12	1.73	126.39	10	5.1	-1.0969	0.8169	0.4371	Northern Molucca Sea
193	15/11/2019	00:47:34	1.83	126.33	96	3.8				Northern Molucca Sea
194	15/11/2019	00:51:36	1.64	126.41	10	4.0				Northern Molucca Sea
195	15/11/2019	01:03:21	1.71	126.40	10	4.3				Northern Molucca Sea
196	15/11/2019	01:17:35	1.73	126.39	10	5.9				Northern Molucca Sea
197	15/11/2019	01:58:13	1.62	126.31	11	4.2				Northern Molucca Sea

198	15/11/2019	02:06:07	1.55	126.47	5	4.5				Northern Molucca Sea
199	15/11/2019	02:15:13	1.74	126.33	10	3.8				Northern Molucca Sea
200	15/11/2019	02:49:23	1.56	126.33	10	4.1				Northern Molucca Sea
201	15/11/2019	02:51:59	1.66	126.33	10	3.7				Northern Molucca Sea
202	15/11/2019	02:54:21	1.69	126.26	5	3.6				Northern Molucca Sea
203	15/11/2019	03:02:29	1.54	126.43	10	3.8				Northern Molucca Sea
204	15/11/2019	03:07:39	0.96	126.96	197	4.1				Northern Molucca Sea
205	15/11/2019	03:13:03	1.77	126.52	44	4.9	0.6580	0.4943	0.3505	Northern Molucca Sea
206	15/11/2019	03:21:02	1.79	126.48	38	4.1				Northern Molucca Sea
207	15/11/2019	03:31:35	1.68	126.44	10	3.2				Northern Molucca Sea
208	15/11/2019	03:55:36	1.59	126.38	87	3.5				Northern Molucca Sea
209	15/11/2019	03:58:50	1.74	126.31	10	4.5				Northern Molucca Sea
210	15/11/2019	04:07:07	2.07	126.28	202	3.5				Northern Molucca Sea
211	15/11/2019	04:14:45	1.71	126.36	10	3.6				Northern Molucca Sea
212	15/11/2019	04:24:14	2.10	126.44	10	3.9				Northern Molucca Sea
213	15/11/2019	04:42:09	1.51	126.26	10	4.5	-0.2487	-0.3334	0.1894	Northern Molucca Sea
214	15/11/2019	04:58:02	1.48	126.47	97	4.1				Northern Molucca Sea
215	15/11/2019	05:56:09	0.89	122.78	26	4.4				Minahassa Peninsula
216	15/11/2019	05:16:47	1.42	126.47	44	3.3				Northern Molucca Sea
217	15/11/2019	05:27:51	1.71	126.36	10	5.0	-0.3543	0.3275	0.2287	Northern Molucca Sea
218	15/11/2019	05:34:48	1.72	126.32	10	4.8	0.4514	0.6424	0.3614	Northern Molucca Sea
219	15/11/2019	05:47:17	1.74	126.32	10	4.8	0.3436	-0.4840	-0.2665	Northern Molucca Sea
220	15/11/2019	06:08:34	1.51	126.27	10	4.1				Northern Molucca Sea
221	15/11/2019	06:10:12	1.56	126.28	10	4.4				Northern Molucca Sea
222	15/11/2019	06:18:44	1.50	126.44	10	3.8				Northern Molucca Sea
223	15/11/2019	06:20:52	1.68	126.40	10	3.8				Northern Molucca Sea
224	15/11/2019	06:27:53	1.48	126.41	10	4.2				Northern Molucca Sea
225	15/11/2019	06:48:41	1.65	126.29	10	4.2				Northern Molucca Sea
226	15/11/2019	06:58:21	1.60	126.29	10	3.9				Northern Molucca Sea
227	15/11/2019	07:50:31	1.55	126.45	10	3.7				Northern Molucca Sea
228	15/11/2019	08:08:48	1.57	126.52	10	4.8	-0.5371	0.4041	0.3131	Northern Molucca Sea
229	15/11/2019	08:45:17	1.56	126.28	12	3.9				Northern Molucca Sea
230	15/11/2019	09:36:22	1.53	126.44	10	5.0	1.3333	1.2670	0.7238	Northern Molucca Sea
231	15/11/2019	09:48:48	1.67	126.42	10	4.3				Northern Molucca Sea
232	15/11/2019	10:04:12	1.51	126.43	10	4.3				Northern Molucca Sea
233	15/11/2019	10:43:34	1.69	126.39	13	4.0				Northern Molucca Sea
234	15/11/2019	10:49:00	1.30	126.21	10	3.9				Northern Molucca Sea
235	15/11/2019	11:14:45	1.54	126.48	11	3.8				Northern Molucca Sea
236	15/11/2019	11:21:14	1.46	126.43	10	3.6				Northern Molucca Sea
237	15/11/2019	11:30:48	1.69	126.35	10	3.9				Northern Molucca Sea
238	15/11/2019	11:34:08	1.49	126.37	18	3.3				Northern Molucca Sea
239	15/11/2019	12:08:28	1.69	126.50	10	4.3				Northern Molucca Sea
240	15/11/2019	12:21:08	1.67	126.46	10	4.2				Northern Molucca Sea
241	15/11/2019	12:36:24	1.20	126.27	10	3.6				Northern Molucca Sea
242	15/11/2019	12:41:33	1.54	126.35	10	4.5	0.2114	-0.2175	0.1301	Northern Molucca Sea
243	15/11/2019	12:52:22	1.74	126.38	10	5.1				Northern Molucca Sea
244	15/11/2019	13:03:57	1.63	126.53	10	3.0				Northern Molucca Sea
245	15/11/2019	13:16:14	1.67	126.36	10	3.2				Northern Molucca Sea
246	15/11/2019	13:30:46	1.39	126.36	10	3.3				Northern Molucca Sea
247	15/11/2019	13:36:29	1.65	126.51	15	2.8				Northern Molucca Sea
248	15/11/2019	13:46:00	1.51	126.37	10	3.7				Northern Molucca Sea
249	15/11/2019	13:56:50	1.44	126.30	10	3.0				Northern Molucca Sea

250	15/11/2019	14:16:11	1.60	126.50	10	3.2				Northern Molucca Sea
251	15/11/2019	14:23:51	1.69	126.40	10	4.4				Northern Molucca Sea
252	15/11/2019	14:35:38	1.58	126.51	10	3.0				Northern Molucca Sea
253	15/11/2019	14:42:39	1.57	126.45	10	2.9				Northern Molucca Sea
254	15/11/2019	14:45:30	1.69	126.39	10	4.0				Northern Molucca Sea
255	15/11/2019	15:01:26	1.51	126.27	10	4.0				Northern Molucca Sea
256	15/11/2019	15:19:35	1.56	126.45	10	4.1				Northern Molucca Sea
257	15/11/2019	15:37:48	1.60	126.35	10	3.5				Northern Molucca Sea
258	15/11/2019	15:52:25	1.59	126.34	17	3.7				Northern Molucca Sea
259	15/11/2019	16:22:45	1.48	126.38	10	4.1				Northern Molucca Sea
260	15/11/2019	16:43:49	1.53	126.46	10	4.2				Northern Molucca Sea
261	15/11/2019	17:02:53	1.46	126.10	11	3.4				Northern Molucca Sea
262	15/11/2019	17:16:52	1.73	126.49	9	3.4				Northern Molucca Sea
263	15/11/2019	17:19:49	1.71	126.49	10	3.8				Northern Molucca Sea
264	15/11/2019	17:27:27	1.59	126.43	11	3.5				Northern Molucca Sea
265	15/11/2019	17:42:15	1.81	126.26	10	2.9				Northern Molucca Sea
266	15/11/2019	17:45:54	1.69	126.56	10	2.8				Northern Molucca Sea
267	15/11/2019	17:55:45	1.70	126.38	10	3.8				Northern Molucca Sea
268	15/11/2019	18:29:15	1.70	126.40	10	4.1				Northern Molucca Sea
269	15/11/2019	19:20:02	1.51	126.43	22	2.9				Northern Molucca Sea
270	15/11/2019	19:24:48	1.72	126.39	10	4.0				Northern Molucca Sea
271	15/11/2019	19:32:13	1.68	126.48	22	3.4				Northern Molucca Sea
272	15/11/2019	19:36:45	0.52	121.23	76	4.4				Minahassa Peninsula
273	15/11/2019	19:58:45	1.57	126.50	10	3.1				Northern Molucca Sea
274	15/11/2019	20:09:11	1.73	126.50	10	4.0				Northern Molucca Sea
275	15/11/2019	20:17:39	1.61	126.85	10	2.8				Northern Molucca Sea
276	15/11/2019	20:19:03	1.61	126.49	10	2.8				Northern Molucca Sea
277	15/11/2019	20:22:01	1.74	126.47	10	2.6				Northern Molucca Sea
278	15/11/2019	20:24:42	1.78	126.53	10	3.2				Northern Molucca Sea
279	15/11/2019	20:34:46	1.50	126.42	10	2.8				Northern Molucca Sea
280	15/11/2019	20:48:39	1.77	126.50	10	3.1				Northern Molucca Sea
281	15/11/2019	20:51:20	1.76	126.17	10	3.7				Northern Molucca Sea
282	15/11/2019	21:05:52	1.58	126.40	10	3.6				Northern Molucca Sea
283	15/11/2019	21:13:49	1.57	126.36	31	3.0				Northern Molucca Sea
284	15/11/2019	21:45:38	1.64	125.88	10	3.7				Northern Molucca Sea
285	15/11/2019	21:55:43	1.52	126.40	37	2.9				Northern Molucca Sea
286	15/11/2019	21:59:42	1.63	126.35	10	3.4				Northern Molucca Sea
287	15/11/2019	22:02:01	1.56	126.37	10	4.9				Northern Molucca Sea
288	15/11/2019	22:10:34	1.84	126.32	10	3.2				Northern Molucca Sea
289	15/11/2019	22:17:21	1.72	126.46	31	2.7				Northern Molucca Sea
290	15/11/2019	22:37:50	1.64	126.42	12	2.9				Northern Molucca Sea
291	15/11/2019	22:44:33	1.46	126.39	29	3.0				Northern Molucca Sea
292	15/11/2019	22:46:45	1.39	126.40	10	3.4				Northern Molucca Sea
293	15/11/2019	22:51:36	1.41	126.23	10	3.5				Northern Molucca Sea
294	15/11/2019	22:52:37	1.52	126.38	10	3.5				Northern Molucca Sea
295	15/11/2019	22:56:00	2.62	127.32	10	3.6				Halmahera
296	15/11/2019	22:59:50	1.47	126.40	11	3.2				Northern Molucca Sea
297	15/11/2019	23:03:56	1.46	126.40	10	4.3				Northern Molucca Sea
298	15/11/2019	23:23:44	1.49	126.41	10	3.2				Northern Molucca Sea
299	15/11/2019	23:33:32	1.43	126.44	10	3.7				Northern Molucca Sea
300	15/11/2019	23:35:00	1.67	126.41	10	4.2				Northern Molucca Sea
301	15/11/2019	23:44:32	1.59	126.45	10	5.0				Northern Molucca Sea

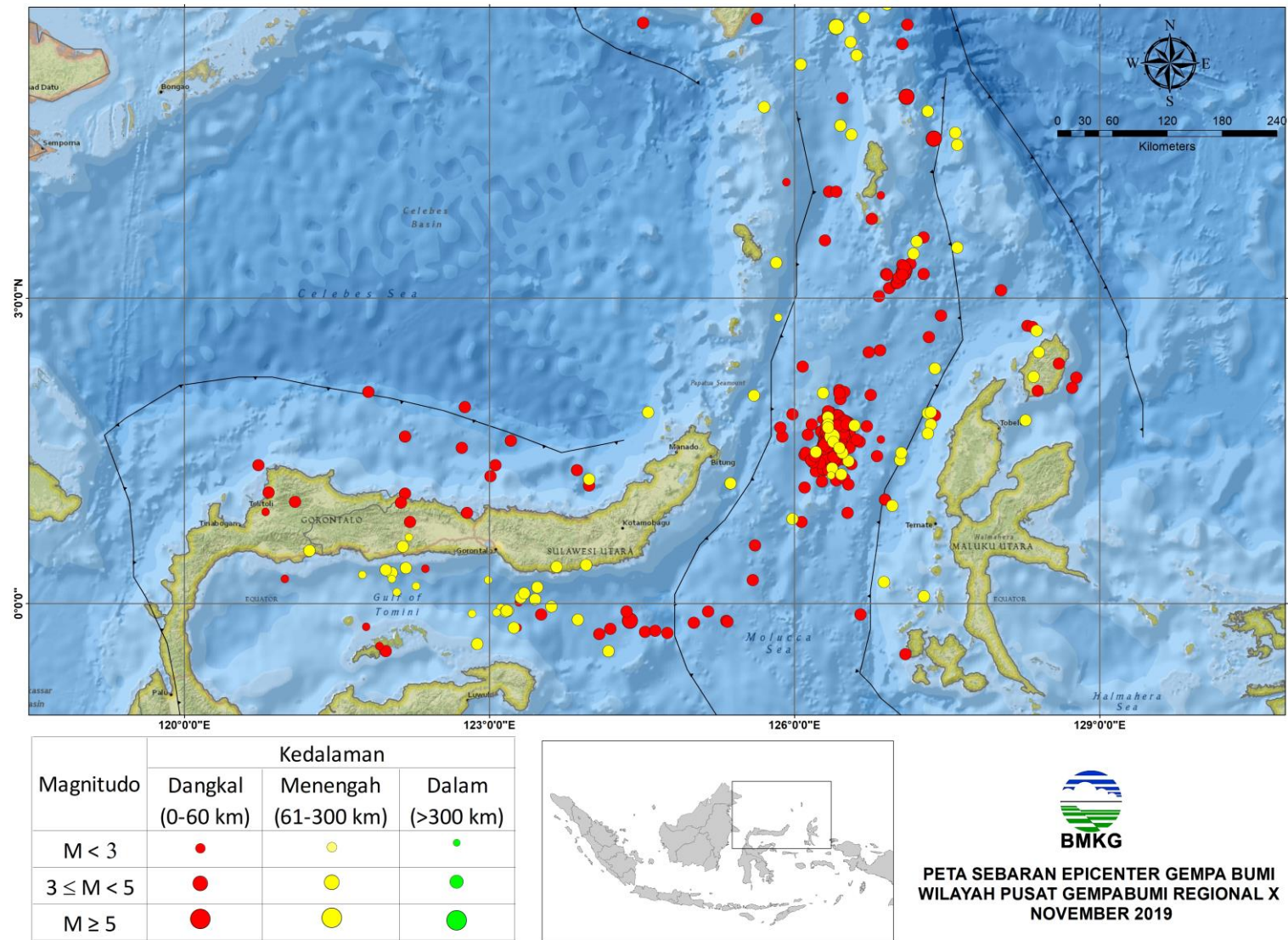
302	15/11/2019	23:57:57	1.53	126.41	10	4.0				Northern Molucca Sea
303	16/11/2019	00:22:53	1.49	126.40	10	3.8				Northern Molucca Sea
304	16/11/2019	01:16:32	1.66	126.45	10	4.1				Northern Molucca Sea
305	16/11/2019	01:27:06	1.65	126.44	10	3.3				Northern Molucca Sea
306	16/11/2019	02:06:08	1.60	126.40	26	3.3				Northern Molucca Sea
307	16/11/2019	02:08:32	1.64	126.48	10	3.8				Northern Molucca Sea
308	16/11/2019	02:16:42	1.51	126.45	23	3.2				Northern Molucca Sea
309	16/11/2019	02:24:42	1.69	126.49	10	4.5				Northern Molucca Sea
310	16/11/2019	02:49:09	1.64	126.46	10	3.7				Northern Molucca Sea
311	16/11/2019	02:56:16	1.66	126.44	10	3.4				Northern Molucca Sea
312	16/11/2019	03:01:59	1.47	126.41	10	4.0				Northern Molucca Sea
313	16/11/2019	03:11:00	1.27	126.46	162	4.0				Northern Molucca Sea
314	16/11/2019	03:12:34	1.60	126.48	10	4.7				Northern Molucca Sea
315	16/11/2019	03:27:30	1.64	126.52	10	3.0				Northern Molucca Sea
316	16/11/2019	03:29:31	1.63	126.45	10	4.2				Northern Molucca Sea
317	16/11/2019	03:40:54	1.66	126.54	10	4.5				Northern Molucca Sea
318	16/11/2019	04:04:37	1.69	126.31	11	3.3				Northern Molucca Sea
319	16/11/2019	04:12:54	1.63	126.46	10	3.4				Northern Molucca Sea
320	16/11/2019	04:20:45	1.76	127.34	78	3.6				Northern Molucca Sea
321	16/11/2019	04:54:04	1.69	126.36	10	3.6				Northern Molucca Sea
322	16/11/2019	05:49:13	1.37	126.56	10	3.4				Northern Molucca Sea
323	16/11/2019	05:51:31	1.53	126.44	67	3.5				Northern Molucca Sea
324	16/11/2019	06:02:33	1.27	126.42	10	3.2				Northern Molucca Sea
325	16/11/2019	06:11:50	1.76	126.40	19	2.8				Northern Molucca Sea
326	16/11/2019	06:21:31	1.44	126.33	10	4.1				Northern Molucca Sea
327	16/11/2019	06:45:44	2.33	126.08	22	3.1				Northern Molucca Sea
328	16/11/2019	06:54:10	1.31	126.29	15	3.6				Northern Molucca Sea
329	16/11/2019	06:59:38	1.51	126.41	22	3.1				Northern Molucca Sea
330	16/11/2019	07:31:26	1.60	126.46	10	3.4				Northern Molucca Sea
331	16/11/2019	08:28:02	1.70	126.49	10	4.2				Northern Molucca Sea
332	16/11/2019	08:40:27	1.44	126.43	10	3.9				Northern Molucca Sea
333	16/11/2019	08:52:40	1.75	126.59	130	3.3				Northern Molucca Sea
334	16/11/2019	09:34:38	0.24	122.04	166	2.9				Minahassa Peninsula
335	16/11/2019	09:56:51	1.46	126.43	10	3.8				Northern Molucca Sea
336	16/11/2019	10:19:16	1.65	126.40	42	5.7				Northern Molucca Sea
337	16/11/2019	10:31:46	1.75	126.35	19	4.3				Northern Molucca Sea
338	16/11/2019	10:39:41	1.53	126.51	10	3.3				Northern Molucca Sea
339	16/11/2019	10:48:18	1.68	126.33	10	3.6				Northern Molucca Sea
340	16/11/2019	10:53:00	1.58	126.34	10	3.6				Northern Molucca Sea
341	16/11/2019	11:12:32	1.62	126.35	10	4.3				Northern Molucca Sea
342	16/11/2019	11:26:07	1.53	126.47	23	3.1				Northern Molucca Sea
343	16/11/2019	11:43:32	2.05	126.75	14	3.3				Northern Molucca Sea
344	16/11/2019	12:43:07	1.49	126.21	170	3.2				Northern Molucca Sea
345	16/11/2019	13:35:46	1.65	126.34	10	3.1				Northern Molucca Sea
346	16/11/2019	13:42:47	1.32	126.28	10	3.1				Northern Molucca Sea
347	16/11/2019	13:59:16	1.63	126.31	10	3.1				Northern Molucca Sea
348	16/11/2019	14:03:49	1.67	126.31	16	3.2				Northern Molucca Sea
349	16/11/2019	14:41:12	1.60	126.35	10	3.3				Northern Molucca Sea
350	16/11/2019	14:56:51	1.69	126.34	10	3.6				Northern Molucca Sea
351	16/11/2019	16:25:36	1.55	126.38	10	3.0				Northern Molucca Sea
352	16/11/2019	16:30:36	1.85	127.38	20	3.0				Halmahera
353	16/11/2019	16:50:00	1.72	126.37	10	3.0				Northern Molucca Sea

354	16/11/2019	16:51:53	1.71	126.43	10	3.8				Northern Molucca Sea
355	16/11/2019	18:34:52	0.38	123.95	161	4.8				Minahassa Peninsula
356	16/11/2019	18:58:55	1.72	126.35	12	2.7				Northern Molucca Sea
357	16/11/2019	19:04:38	1.63	126.48	10	3.0				Northern Molucca Sea
358	16/11/2019	19:19:15	1.70	126.48	10	2.8				Northern Molucca Sea
359	16/11/2019	19:23:59	1.47	126.41	10	3.8				Northern Molucca Sea
360	16/11/2019	19:43:19	1.63	126.42	35	2.6				Northern Molucca Sea
361	16/11/2019	20:26:17	1.73	126.50	18	3.3				Northern Molucca Sea
362	16/11/2019	20:29:26	1.66	126.54	10	3.3				Northern Molucca Sea
363	16/11/2019	20:36:37	1.69	126.47	10	3.0				Northern Molucca Sea
364	16/11/2019	20:42:27	1.67	126.39	10	2.9				Northern Molucca Sea
365	16/11/2019	21:48:47	1.76	126.33	91	3.0				Northern Molucca Sea
366	16/11/2019	21:55:22	1.70	126.42	22	2.6				Northern Molucca Sea
367	16/11/2019	21:57:27	1.42	126.43	36	2.9				Northern Molucca Sea
368	16/11/2019	22:48:15	1.52	126.40	3	3.2				Northern Molucca Sea
369	16/11/2019	22:50:50	1.68	126.32	10	3.7				Northern Molucca Sea
370	16/11/2019	23:10:28	1.65	126.49	10	3.1				Northern Molucca Sea
371	16/11/2019	23:22:19	1.69	126.43	10	3.6				Northern Molucca Sea
372	16/11/2019	23:50:21	1.74	126.31	4	4.1				Northern Molucca Sea
373	17/11/2019	00:04:27	1.54	126.38	19	4.1				Northern Molucca Sea
374	17/11/2019	00:26:55	1.44	126.41	10	3.7				Northern Molucca Sea
375	17/11/2019	00:32:43	1.74	126.45	10	4.7				Northern Molucca Sea
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377	17/11/2019	00:51:25	1.72	126.45	22	3.9				Northern Molucca Sea
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380	17/11/2019	02:07:52	1.47	126.36	31	3.5				Northern Molucca Sea
381	17/11/2019	02:36:59	1.39	126.30	10	3.2				Northern Molucca Sea
382	17/11/2019	03:20:07	0.89	126.52	12	3.4				Northern Molucca Sea
383	17/11/2019	03:36:36	1.65	126.44	10	3.3				Northern Molucca Sea
384	17/11/2019	04:03:41	1.21	126.41	10	4.4				Northern Molucca Sea
385	17/11/2019	04:21:02	1.73	125.86	10	3.4				Northern Molucca Sea
386	17/11/2019	05:00:12	1.69	126.48	10	3.5				Northern Molucca Sea
387	17/11/2019	05:38:12	1.65	126.33	10	3.5				Northern Molucca Sea
388	17/11/2019	06:39:37	1.43	126.41	22	3.2				Northern Molucca Sea
389	17/11/2019	07:02:14	1.48	126.38	23	3.3				Northern Molucca Sea
390	17/11/2019	07:04:01	1.73	126.37	10	3.4				Northern Molucca Sea
391	17/11/2019	08:21:14	1.42	126.31	10	3.9				Northern Molucca Sea
392	17/11/2019	10:55:18	1.23	126.49	10	3.0				Northern Molucca Sea
393	17/11/2019	11:08:01	1.44	126.37	10	4.8				Northern Molucca Sea
394	17/11/2019	11:28:53	1.45	126.36	10	3.5				Northern Molucca Sea
395	17/11/2019	12:51:31	1.82	126.44	36	3.6				Northern Molucca Sea
396	17/11/2019	13:43:03	1.52	126.40	10	3.4				Northern Molucca Sea
397	17/11/2019	15:19:07	1.26	126.36	84	2.8				Northern Molucca Sea
398	17/11/2019	16:26:08	3.08	128.03	10	3.5				Halmahera
399	17/11/2019	16:42:09	1.67	126.32	10	4.0				Northern Molucca Sea
400	17/11/2019	16:42:57	1.45	126.37	10	4.0				Northern Molucca Sea
401	17/11/2019	16:47:38	3.23	127.06	10	3.9				Talaud Islands
402	17/11/2019	17:25:00	1.47	126.44	10	3.0				Northern Molucca Sea
403	17/11/2019	17:51:01	1.79	126.48	10	2.8				Northern Molucca Sea
404	17/11/2019	18:02:21	1.61	126.33	10	2.6				Northern Molucca Sea
405	17/11/2019	18:08:12	1.62	126.31	10	2.7				Northern Molucca Sea

406	17/11/2019	18:41:27	1.42	126.47	10	3.5				Northern Molucca Sea
407	17/11/2019	18:52:02	1.54	126.47	10	3.8				Northern Molucca Sea
408	17/11/2019	20:28:11	1.78	126.35	20	3.1				Northern Molucca Sea
409	17/11/2019	20:43:12	1.58	126.56	10	3.5				Northern Molucca Sea
410	17/11/2019	20:51:11	1.53	126.54	10	3.3				Northern Molucca Sea
411	18/11/2019	00:03:01	1.31	126.33	12	3.6				Northern Molucca Sea
412	18/11/2019	00:32:15	1.09	120.83	10	4.2				Minahassa Peninsula
413	18/11/2019	05:31:10	3.56	127.20	76	3.5				Talaud Islands
414	18/11/2019	08:25:22	1.54	126.38	8	3.8				Northern Molucca Sea
415	18/11/2019	10:58:22	1.74	126.50	10	4.6				Northern Molucca Sea
416	18/11/2019	11:22:42	1.43	126.30	10	4.6				Northern Molucca Sea
417	18/11/2019	11:24:04	1.79	126.48	10	4.9				Northern Molucca Sea
418	18/11/2019	11:34:01	1.78	126.50	10	4.8				Northern Molucca Sea
419	18/11/2019	12:37:37	1.71	126.46	10	3.5				Northern Molucca Sea
420	18/11/2019	12:25:46	1.80	126.49	16	3.3				Northern Molucca Sea
421	18/11/2019	12:42:09	2.31	127.38	88	3.3				Halmahera
422	18/11/2019	12:48:01	1.80	126.49	10	4.1				Northern Molucca Sea
423	18/11/2019	12:52:06	1.78	126.46	10	3.5				Northern Molucca Sea
424	18/11/2019	12:56:42	1.77	126.49	10	3.3				Northern Molucca Sea
425	18/11/2019	13:13:59	0.33	121.98	176	4.6				Minahassa Peninsula
426	18/11/2019	13:49:47	1.78	126.48	10	3.6				Northern Molucca Sea
427	18/11/2019	15:12:49	1.75	126.46	12	3.4				Northern Molucca Sea
428	18/11/2019	16:01:48	1.68	126.31	10	3.1				Northern Molucca Sea
429	18/11/2019	17:17:37	1.79	126.51	10	3.4				Northern Molucca Sea
430	18/11/2019	17:21:11	1.55	126.43	10	3.0				Northern Molucca Sea
431	18/11/2019	17:40:14	1.72	126.35	32	3.1				Northern Molucca Sea
432	18/11/2019	19:26:45	1.71	126.37	39	3.5				Northern Molucca Sea
433	18/11/2019	19:56:00	1.51	126.45	10	3.7				Northern Molucca Sea
434	18/11/2019	19:57:32	1.38	126.25	10	3.5				Northern Molucca Sea
435	19/11/2019	01:29:52	1.80	126.49	10	4.5				Northern Molucca Sea
436	19/11/2019	01:46:26	1.61	126.61	10	3.6				Northern Molucca Sea
437	19/11/2019	03:48:10	0.16	123.47	109	3.2				Minahassa Peninsula
438	19/11/2019	07:30:11	1.59	126.43	10	3.2				Northern Molucca Sea
439	19/11/2019	10:41:11	1.64	126.49	10	3.9				Northern Molucca Sea
440	19/11/2019	10:47:53	1.73	126.33	65	3.5				Northern Molucca Sea
441	19/11/2019	11:53:09	1.43	126.39	27	3.1				Northern Molucca Sea
442	19/11/2019	11:59:10	1.61	126.41	10	4.0				Northern Molucca Sea
443	19/11/2019	12:54:08	1.61	126.44	12	4.2				Northern Molucca Sea
444	19/11/2019	13:31:25	5.30	126.06	160	4.3				Talaud Islands
445	19/11/2019	15:11:22	2.08	126.49	10	3.6				Northern Molucca Sea
446	19/11/2019	17:57:07	1.72	126.45	14	2.6				Northern Molucca Sea
447	19/11/2019	19:54:33	-0.24	123.24	100	3.7				Minahassa Peninsula
448	19/11/2019	20:22:27	4.62	123.40	492	3.9				Talaud Islands
449	19/11/2019	20:53:52	4.51	127.60	109	3.9				Talaud Islands
450	20/11/2019	00:05:05	1.69	126.45	10	4.8				Northern Molucca Sea
451	20/11/2019	01:29:41	4.11	124.95	305	4.1				Talaud Islands
452	20/11/2019	03:31:19	1.53	122.73	10	3.5				Minahassa Peninsula
453	20/11/2019	04:37:26	-0.29	124.75	6	4.1				Minahassa Peninsula
454	20/11/2019	05:30:08	1.57	126.49	10	3.7				Northern Molucca Sea
455	20/11/2019	06:32:15	1.70	126.48	10	4.9				Northern Molucca Sea
456	20/11/2019	07:38:32	1.69	126.38	10	4.1				Northern Molucca Sea
457	20/11/2019	08:11:52	1.75	126.48	10	3.9				Northern Molucca Sea

458	20/11/2019	08:28:12	1.74	126.71	10	4.1				Northern Molucca Sea
459	20/11/2019	13:50:24	3.35	125.82	75	3.4				Talaud Islands
460	20/11/2019	15:46:53	3.74	123.67	327	3.8				Talaud Islands
461	20/11/2019	15:59:37	1.51	126.25	10	3.5				Northern Molucca Sea
462	20/11/2019	16:57:24	1.42	126.41	25	3.1				Northern Molucca Sea
463	20/11/2019	17:04:19	1.52	126.29	10	3.9				Northern Molucca Sea
464	20/11/2019	18:35:14	1.67	126.44	10	3.6				Northern Molucca Sea
465	20/11/2019	18:53:54	2.07	126.44	10	3.5				Northern Molucca Sea
466	20/11/2019	21:59:16	1.60	126.46	10	3.8				Northern Molucca Sea
467	20/11/2019	22:08:21	1.67	126.48	25	3.5				Northern Molucca Sea
468	20/11/2019	22:31:36	6.88	124.97	10	4.9				Talaud Islands
469	21/11/2019	05:14:33	4.98	127.10	15	5.0				Talaud Islands, Indonesia
470	21/11/2019	11:52:32	1.67	127.31	123	4.6				Halmahera
471	21/11/2019	14:45:07	0.41	124.22	371	3.7				Minahassa Peninsula
472	21/11/2019	15:35:50	1.79	126.50	10	3.8				Northern Molucca Sea
473	22/11/2019	16:55:09	2.81	125.84	113	2.8				Talaud Islands, Indonesia
474	22/11/2019	18:21:44	-0.17	125.33	10	4.2				Minahassa Peninsula
475	22/11/2019	17:02:44	1.74	126.48	10	3.5				Northern Molucca Sea
476	22/11/2019	17:10:34	1.57	126.39	10	3.0				Northern Molucca Sea
477	22/11/2019	17:21:47	-0.11	126.65	10	4.0				Southern Molluca Sea
478	22/11/2019	18:21:44	-0.18	125.34	10	4.2				Southern Molluca Sea
479	22/11/2019	18:39:22	0.90	120.80	20	2.3				Minahassa Peninsula
480	22/11/2019	19:06:42	1.62	126.38	10	4.4				Northern Molucca Sea
481	22/11/2019	20:24:41	1.52	126.42	10	3.1				Halmahera
482	22/11/2019	22:33:04	1.55	126.45	10	3.4				Southern Molluca Sea
483	22/11/2019	23:18:00	5.89	126.91	124	4.8				Mindanao, Philippines
484	22/11/2019	20:33:32	1.41	126.18	10	4.0				Northern Molluca sea
485	23/11/2019	04:57:26	3.23	126.91	10	3.4				Talaud island
486	23/11/2019	06:34:20	0.36	123.66	247	3.7				Minahassa Peninsula
487	23/11/2019	08:51:36	0.04	123.45	143	4.1				Minahassa Peninsula
488	23/11/2019	09:11:14	5.39	126.61	161	4.6				Talaud Islands
489	23/11/2019	10:53:26	1.66	126.33	10	3.5				Northern Molluca Sea
490	23/11/2019	16:23:02	1.86	125.98	10	4.2				Northern Molluca sea
491	24/11/2019	08:23:04	1.59	126.31	10	3.9				Northern Molluca sea
492	24/11/2019	10:29:46	1.54	126.32	10	4.5				Northern Molluca sea
493	24/11/2019	13:10:58	1.57	126.29	10	3.9				Northern Molluca sea
494	24/11/2019	13:48:04	-0.17	124.38	10	5.2				Minahassa Peninsula
495	24/11/2019	17:15:57	4.70	126.45	137	4.0				Talaud Islands
496	24/11/2019	22:13:32	0.21	126.88	63	4.5				Halmahera
497	25/11/2019	01:01:13	1.17	126.53	10	3.7				Halmahera
498	25/11/2019	17:06:48	1.75	126.42	10	4.1				Halmahera
499	25/11/2019	21:05:22	-0.28	124.53	16	3.6				Southern Molluca Sea
500	25/11/2019	23:44:42	2.47	126.73	29	4.0				Talaud Islands
501	26/11/2019	01:18:40	2.68	128.38	188	4.0				Halmahera
502	26/11/2019	06:55:14	-0.07	123.17	126	3.1				Minahassa Peninsula
503	26/11/2019	12:17:58	1.56	126.29	20	3.2				Northern Molluca sea
504	26/11/2019	13:25:13	1.48	126.11	5	3.5				Northern Molluca sea
505	26/11/2019	14:56:38	5.75	125.63	10	4.2				Talaud Islands
506	26/11/2019	16:22:54	1.39	126.18	10	3.6				Minahassa Peninsula
507	26/11/2019	22:32:27	2.22	128.77	10	3.8				Halmahera
508	27/11/2019	09:58:39	-0.09	123.07	123	2.9				Minahassa Peninsula
509	27/11/2019	10:16:28	5.71	124.51	14	4.5				Talaud Islands

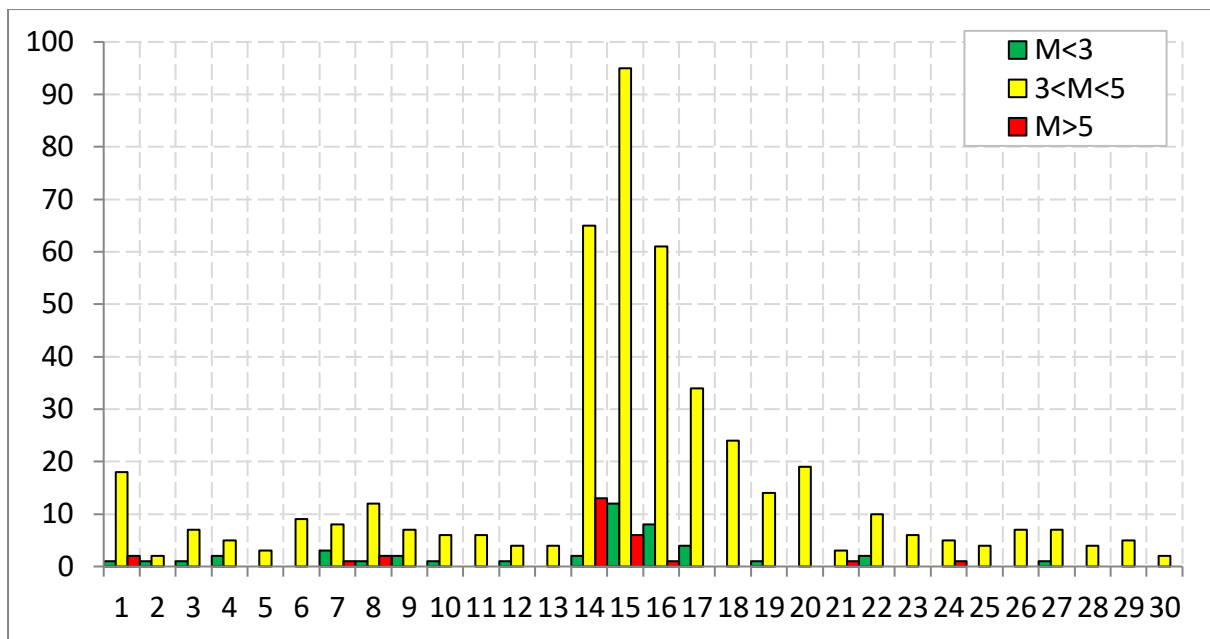
510	27/11/2019	11:23:24	1.41	126.16	10	3.9				Minahassa Peninsula
511	27/11/2019	11:53:59	1.45	126.20	10	4.1				Minahassa Peninsula
512	27/11/2019	13:18:28	2.12	128.73	10	4.2				Halmahera, Indonesia
513	27/11/2019	19:26:51	1.31	123.86	10	3.5				Minahassa Peninsula, Sulawesi
514	27/11/2019	23:25:27	1.16	123.98	10	4.2				Minahassa Peninsula, Sulawesi
515	27/11/2019	21:32:03	1.42	126.40	10	4.3				Northern Molucca sea
516	28/11/2019	07:32:04	1.44	126.38	10	4.5				Halmahera
517	28/11/2019	10:30:56	1.52	126.44	10	3.6				Halmahera
518	28/11/2019	16:13:38	-0.27	124.63	17	4.8				Southern Molucca Sea
519	28/11/2019	16:25:05	-0.08	124.35	26	3.5				Southern Molucca Sea
520	29/11/2019	07:08:29	1.76	126.51	22	3.2				Southern Molucca Sea
521	29/11/2019	12:29:14	5.50	127.06	10	4.4				Mindanao
522	29/11/2019	16:09:47	-0.50	127.09	10	3.8				Halmahera
523	29/11/2019	16:33:40	4.05	126.34	30	4.3				Talaud Islands
524	29/11/2019	22:01:47	1.66	126.37	10	4.0				Northern Molucca Sea
525	30/11/2019	13:58:19	4.05	126.41	24	4.0				Talaud Islands
526	30/11/2019	23:43:34	5.31	127.18	169	4.7				Philippines Island



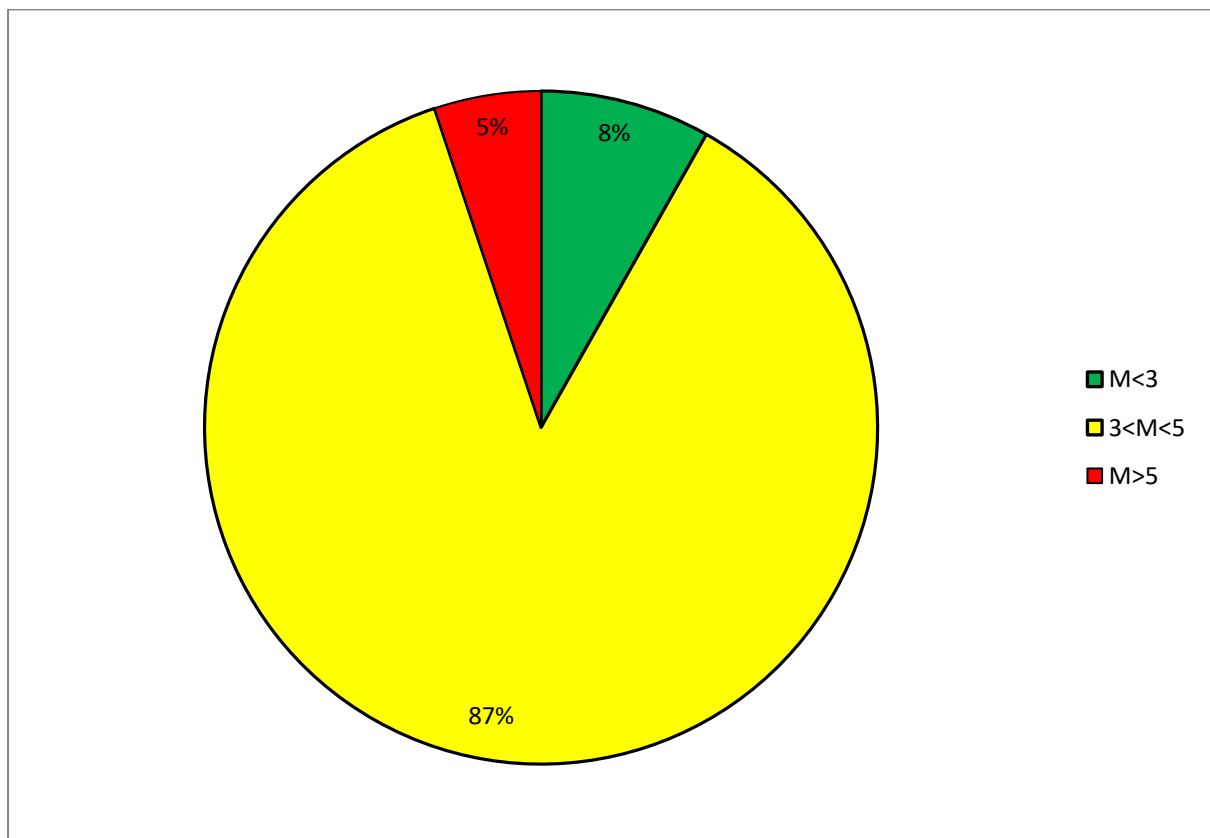
Gambar 35 Sebaran episenter gempabumi bulan November 2019

Tabel 24 Rekapitulasi gempabumi berdasarkan magnitudo bulan November 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	1	18	2	21	0	0
2	1	2	0	3	0	0
3	1	7	0	8	0	0
4	2	5	0	7	0	0
5	0	3	0	3	0	0
6	0	9	0	9	0	0
7	3	8	1	12	1	0
8	1	12	2	15	0	0
9	2	7	0	9	0	0
10	1	6	0	7	0	0
11	0	6	0	6	2	0
12	1	4	0	5	0	0
13	0	4	0	4	0	0
14	2	65	13	80	7	1
15	12	95	6	113	3	0
16	8	61	1	70	2	0
17	4	34	0	38	1	0
18	0	24	0	24	1	0
19	1	14	0	15	0	0
20	0	19	0	19	1	0
21	0	3	1	4	0	0
22	2	10	0	12	0	0
23	0	6	0	6	0	0
24	0	5	1	6	1	0
25	0	4	0	4	1	0
26	0	7	0	7	0	0
27	1	7	0	8	0	0
28	0	4	0	4	2	0
29	0	5	0	5	0	0
30	0	2	0	2	0	0
Jumlah gempa	43	456	27	526	22	1



Gambar 36 Grafik gempabumi berdasarkan magnitudo bulan November 2019



Gambar 37 Grafik persentase gempabumi berdasarkan magnitudo bulan November 2019

L. Data Gempabumi Bulan Desember 2019

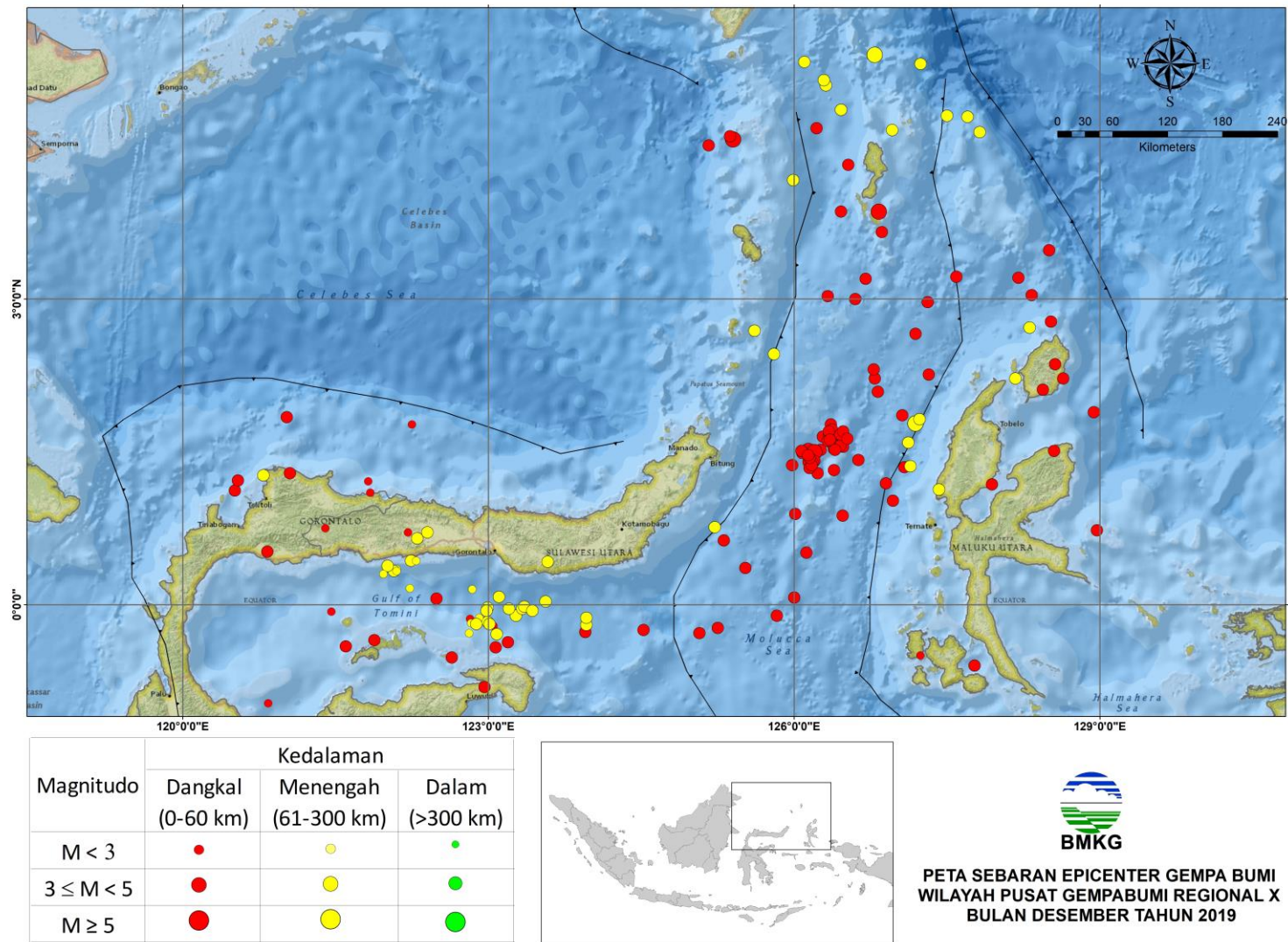
Tabel 25 Data kejadian gempabumi bulan Desember 2019

No	Date	OT (UTC)	Epicenter		Depth (km)	Mag	PGA (gals) / SLMI			Region
			Lat	Long			X	Y	Z	
1	01/12/2019	03:26:19	0.51	126.12	10	3.6				Northern Molluca Sea
2	01/12/2019	04:42:00	-0.07	121.46	19	2.5				Minahassa Peninsula
3	01/12/2019	05:26:29	0.43	122.24	180	3.5				Minahassa Peninsula
4	01/12/2019	05:26:32	0.35	122.10	154	2.7				Minahassa Peninsula
5	01/12/2019	17:24:07	2.22	128.64	17	4.4				Halmahera
6	01/12/2019	20:17:33	1.77	122.25	10	2.8				Minahassa Peninsula
7	02/12/2019	00:35:11	2.11	128.44	52	4.3				Halmahera
8	02/12/2019	03:05:22	1.52	126.26	10	4.0	1.3729	0.0981	0.0981	Northern Molluca Sea
9	02/12/2019	05:06:30	-0.11	123.27	90	3.6				Minahassa Peninsula
10	02/12/2019	03:32:56	2.69	125.61	100	3.8				Talaud Islands
11	02/12/2019	06:42:21	1.77	126.36	10	4.3	0.1961	0.1961	0.0981	Northern Molluca Sea
12	02/12/2019	11:36:59	1.65	126.28	10	4.1	0.0981	0.0981	0.0981	Northern Molluca Sea
13	02/12/2019	11:47:46	1.68	126.34	10	3.9				Northern Molluca Sea
14	02/12/2019	12:15:32	1.55	126.48	10	3.6				Northern Molluca Sea
15	02/12/2019	13:41:17	0.42	123.58	226	3.7				Minahassa Peninsula
16	02/12/2019	16:40:45	4.17	125.99	175	4.3				Talaud Islands
17	02/12/2019	20:06:31	-0.21	123.05	56	2.9				Minahassa Peninsula
18	02/12/2019	23:11:59	0.43	122.29	91	2.5				Minahassa Peninsula
19	03/12/2019	05:29:26	3.86	126.46	10	3.7				Talaud Islands
20	03/12/2019	08:23:05	1.29	126.23	10	4.1	1.1768	0.0981	1.0787	Northern Molluca Sea
21	03/12/2019	08:47:57	1.40	126.14	21	3.5				Northern Molluca Sea
22	03/12/2019	10:24:20	1.45	126.17	10	4.1	0.0981	0.0981	0.1961	Northern Molluca Sea
23	03/12/2019	10:52:24	1.51	126.14	10	5.2	1.0787	1.0787	0.8826	Northern Molluca Sea
24	03/12/2019	10:55:29	1.50	126.20	10	5.4	1.0787	0.8826	0.9807	Northern Molluca Sea
25	03/12/2019	11:10:52	1.49	126.08	10	3.7				Northern Molluca Sea
26	03/12/2019	11:16:04	1.51	126.07	10	3.5				Northern Molluca Sea
27	03/12/2019	11:24:25	0.65	122.30	61	4.9	0.2942	0.1961	0.3923	Minahassa Peninsula
28	03/12/2019	11:40:29	1.34	126.15	12	3.2				Northern Molluca Sea
29	03/12/2019	13:21:03	1.41	126.20	15	4.3	0.1961	0.1961	0.1961	Northern Molluca Sea
30	03/12/2019	13:24:26	1.39	126.18	10	3.9				Northern Molluca Sea
31	03/12/2019	13:30:47	0.15	122.84	105	2.8				Minahassa Peninsula
32	03/12/2019	16:15:02	-0.14	122.82	10	2.5				Minahassa Peninsula
33	03/12/2019	16:18:37	1.37	126.17	10	3.8				Northern Molluca Sea
34	03/12/2019	16:31:41	1.44	126.15	10	3.7				Northern Molluca Sea
35	03/12/2019	19:39:17	0.89	126.01	10	3.2				Northern Molluca Sea
36	03/12/2019	20:34:00	-0.20	123.96	83	3.8				Minahassa Peninsula
37	03/12/2019	20:26:26	1.37	125.98	10	3.4				Northern Molluca Sea
38	05/12/2019	08:39:56	1.47	126.14	10	3.9				Northern Molluca Sea
39	05/12/2019	12:08:06	0.87	126.48	10	3.5				Northern Molluca Sea
40	05/12/2019	12:21:45	1.13	127.42	122	4.6				Halmahera, Indonesia
41	05/12/2019	12:24:46	5.40	126.79	62	5.7				Miargas, Indonesia
42	05/12/2019	13:34:04	1.12	120.51	10	3.5				Minahassa Peninsula
43	05/12/2019	14:20:19	-0.97	120.84	14	2.5				Minahassa Peninsula
44	05/12/2019	16:47:52	1.22	120.54	10	3.2				Minahassa Peninsula

45	05/12/2019	19:51:23	1.53	126.39	10	3.8				Northern Molucca Sea
46	06/12/2019	07:05:44	0.76	125.22	87	4.3				Northern Molucca Sea
47	06/12/2019	08:03:57	0.63	125.31	21	4.2	0.2942	0.1961	0.0981	Northern Molucca Sea
48	06/12/2019	11:05:28	-0.04	123.33	135	3.5				Minahassa Peninsula
49	06/12/2019	13:37:47	-0.27	123.95	10	3.4				Minahassa Peninsula
50	06/12/2019	14:37:09	1.66	126.37	10	4.0	0.1961	0.0981	0.7845	Northern Molucca Sea
51	06/12/2019	23:07:17	1.56	126.41	10	3.8				Northern Molucca Sea
52	07/12/2019	09:53:38	0.07	126.00	21	4.0	0.1961	0.7845	0.0981	Northern Molucca Sea
53	07/12/2019	11:12:11	-0.18	122.83	84	2.9				Minahassa Peninsula
54	07/12/2019	20:21:38	-0.17	122.99	87	3.1				Minahassa Peninsula
55	07/12/2019	23:06:02	1.84	121.02	10	3.9				Celebes Sea
56	08/12/2019	06:03:15	1.89	128.94	10	4.4				Halmahera
57	08/12/2019	06:51:49	1.59	126.36	10	3.4				Northern Molucca Sea
58	08/12/2019	11:13:52	1.72	126.37	21	3.3				Northern Molucca Sea
59	08/12/2019	13:20:54	-0.28	122.81	75	2.8				Minahassa Peninsula
60	08/12/2019	19:50:57	3.00	126.60	10	3.8				Talaud Islands
61	08/12/2019	23:27:14	-0.04	123.20	139	3.0				Minahassa Peninsula
62	08/12/2019	23:53:18	1.10	121.84	10	2.7				Celebes Sea
63	09/12/2019	00:39:05	0.33	122.07	155	4.1				Minahassa Peninsula
64	09/12/2019	11:12:46	5.01	123.26	565	4.4				Mindanao
65	09/12/2019	14:16:05	1.53	126.39	15	3.1				Northern Molucca Sea
66	09/12/2019	14:21:20	2.09	126.82	10	4.5	0.0981	0.0000	0.0981	Northern Molucca Sea
67	09/12/2019	19:50:19	-0.13	122.91	95	2.7				Minahassa Peninsula
68	10/12/2019	00:16:51	0.38	122.01	160	3.5				Minahassa Peninsula
69	10/12/2019	08:32:13	-0.28	125.07	12	4.2	0.0981	0.0981	0.0981	Southern Molucca Sea
70	10/12/2019	10:37:03	1.02	126.97	49	3.4				Halmahera
71	10/12/2019	12:43:58	5.10	126.31	117	4.8				Talaud Islands
72	10/12/2019	15:02:58	1.18	127.94	13	3.5				Halmahera
73	11/12/2019	02:13:09	-0.25	124.52	20	4.9	0.2942	0.2942	0.3923	Southern Molucca Sea
74	11/12/2019	17:48:29	-0.23	125.25	10	4.8	0.0981	0.0981	0.0981	Southern Molucca Sea
75	11/12/2019	20:28:27	3.21	128.20	34	4.8	0.0981	0.0981	0.0981	Halmahera
76	12/12/2019	05:49:16	1.70	126.34	10	4.0				Northern Molucca Sea
77	12/12/2019	12:30:57	1.42	126.63	53	3.9				Halmahera
78	12/12/2019	15:40:31	-0.50	127.24	10	2.9				Halmahera
79	13/12/2019	03:13:36	1.32	126.39	10	4.0	0.1961	0.1961	0.1961	Northern Molucca Sea
80	13/12/2019	05:05:30	2.36	128.56	56	4.1				Halmahera
81	13/12/2019	10:14:29	0.36	125.52	10	4.0	0.0981	0.0981	0.0981	Southern Molucca Sea
82	13/12/2019	12:50:43	-0.42	123.07	58	3.0				Minahassa Peninsula
83	13/12/2019	20:41:38	3.20	126.70	10	3.8				Talaud Islands
84	13/12/2019	21:05:10	1.86	127.06	10	4.0	0.0981	0.0981	0.0981	Halmahera
85	13/12/2019	21:45:14	1.29	121.05	10	4.2	0.0981	0.0981	0.0981	Minahassa Peninsula
86	14/12/2019	06:52:53	1.56	126.45	10	4.1	0.0981	0.0981	0.0981	Northern Molucca Sea
87	14/12/2019	08:41:33	-0.02	123.35	161	3.4				Minahassa Peninsula
88	14/12/2019	16:50:06	4.66	126.96	70	4.3				Talaud Islands
89	14/12/2019	20:26:32	2.78	128.52	10	3.9				Halmahera
90	14/12/2019	22:09:42	3.83	122.53	551	4.1				Celebes Sea
91	14/12/2019	22:34:45	3.73	122.51	553	4.5				Celebes Sea
92	15/12/2019	04:11:52	-0.06	123.43	134	3.7				Minahassa Peninsula
93	15/12/2019	10:16:18	-0.19	122.88	88	4.3				Minahassa Peninsula
94	15/12/2019	12:04:52	0.73	128.97	10	3.4				Halmahera
95	15/12/2019	13:09:11	1.78	127.19	86	5.5				Halmahera
96	15/12/2019	20:38:03	3.04	128.33	31	4.4				Halmahera

97	16/12/2019	04:13:24	-0.13	123.96	108	4.5				Minahassa Peninsula
98	16/12/2019	07:41:51	4.43	123.05	561	4.6				Celebes Sea
99	16/12/2019	09:39:16	1.35	127.08	17	3.6				Halmahera
100	16/12/2019	12:56:54	0.75	121.40	55	2.3				Minahassa Peninsula
101	16/12/2019	17:25:52	1.67	126.45	10	4.5	0.2942	0.3923	0.1961	Northern Molucca Sea
102	16/12/2019	18:31:37	3.22	127.59	10	4.0				Talaud Islands
103	16/12/2019	18:57:44	1.70	126.48	10	4.5	0.3923	0.4903	0.1961	Northern Molucca Sea
104	16/12/2019	23:35:23	1.21	121.82	10	2.8				Minahassa Peninsula
105	17/12/2019	15:56:27	4.79	127.70	112	4.2				Talaud Islands
106	17/12/2019	22:01:49	-0.29	123.08	63	3.8				Minahassa Peninsula
107	17/12/2019	22:29:15	-0.37	123.19	59	3.5				Minahassa Peninsula
108	18/12/2019	03:26:29	1.63	126.52	10	3.3				Northern Molucca Sea
109	18/12/2019	04:01:20	1.82	127.23	89	4.5				Halmahera
110	18/12/2019	05:30:32	0.16	122.23	122	2.6				Minahassa Peninsula
111	18/12/2019	16:46:13	4.86	126.46	66	4.6				Talaud Islands
112	19/12/2019	15:46:40	4.64	127.82	123	4.1				Talaud Islands
113	19/12/2019	17:18:44	0.33	122.10	162	2.9				Minahassa Peninsula
114	19/12/2019	23:47:01	-0.41	121.60	10	3.3				Minahassa Peninsula
115	20/12/2019	05:42:09	0.71	122.40	77	3.2				Minahassa Peninsula
116	20/12/2019	06:37:07	0.30	121.97	143	2.4				Minahassa Peninsula
117	20/12/2019	11:11:54	0.71	122.21	58	2.5				Minahassa Peninsula
118	20/12/2019	13:32:52	4.32	126.53	31	4.7	0.1961	0.0981	0.1961	Talaud Island
119	20/12/2019	16:04:28	-0.81	122.96	56	3.8				Minahassa Peninsula
120	21/12/2019	05:42:10	1.59	127.12	85	4.1				Halmahera
121	21/12/2019	12:46:38	-0.52	122.64	10	4.4	0.0981	0.0981	0.0981	Minahassa Peninsula
122	22/12/2019	12:37:00	-0.19	123.01	96	3.1				Minahassa Peninsula
123	23/12/2019	06:24:42	2.22	126.79	13	4.0	0.3923	0.2942	0.3923	Northern Molucca Sea
124	23/12/2019	07:03:48	2.31	126.78	10	3.6				Northern Molucca Sea
125	23/12/2019	08:49:44	1.52	126.40	10	4.0				Northern Molucca Sea
126	23/12/2019	15:36:18	-0.03	122.99	149	4.3				Minahassa Peninsula
127	23/12/2019	21:42:45	1.19	126.90	40	4.3				Halmahera
128	24/12/2019	06:05:41	2.66	127.19	10	3.5				Northern Molucca Sea
129	24/12/2019	08:35:30	2.46	125.80	121	4.0				Talaud Island
130	24/12/2019	09:14:20	5.15	126.29	169	4.1				Talaud Island
131	24/12/2019	18:08:11	-0.35	121.88	10	3.2				Minahassa Peninsula
132	24/12/2019	21:57:13	1.61	126.33	19	3.1				Northern Molucca Sea
133	25/12/2019	04:00:35	3.03	126.33	16	3.6				Northern Molucca Sea
134	25/12/2019	16:56:25	3.86	126.83	10	5.3				Talaud Islands, Indonesia
135	25/12/2019	21:24:05	-0.60	127.77	10	3.8				Halmahera
136	27/12/2019	00:19:48	2.26	127.32	18	3.6				Northern Molucca Sea
137	27/12/2019	00:52:06	0.06	122.49	30	3.1				Minahassa Peninsula
138	27/12/2019	03:21:16	3.66	126.86	33	4.0	0.0981	0.0981	0.0981	Talaud Island
139	27/12/2019	04:40:40	0.52	120.83	17	3.0				Minahassa Peninsula
140	27/12/2019	08:33:59	2.97	127.31	27	4.5				Talaud Island
141	27/12/2019	10:27:28	4.80	127.50	112	4.6				Talaud Island
142	27/12/2019	17:25:02	-0.06	122.98	148	3.0	0.0981	0.0981	0.0981	Minahassa Peninsula
143	28/12/2019	01:59:36	5.33	126.10	103	4.8				Talaud Island

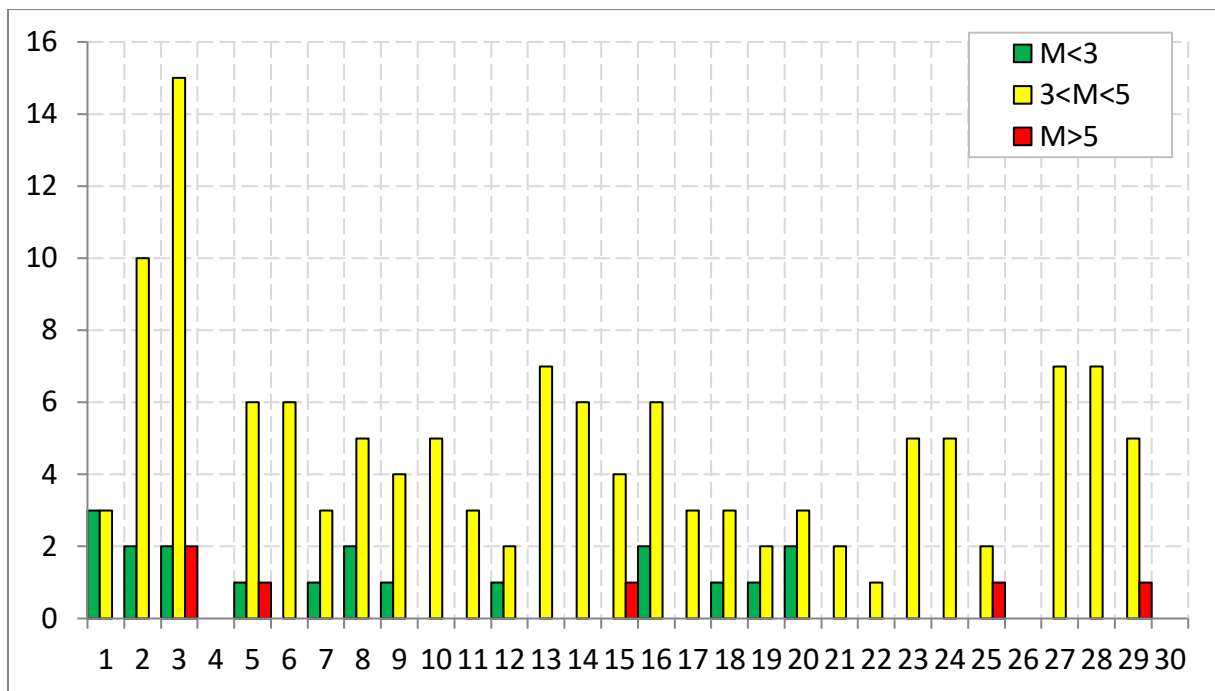
144	28/12/2019	02:33:02	4.68	126.22	56	4.9				Talaud Island
145	28/12/2019	08:13:36	2.22	128.17	153	3.6				Halmahera
146	28/12/2019	08:38:13	5.31	127.24	68	4.8				Talaud Island
147	28/12/2019	11:10:35	2.72	128.31	192	4.3				Halmahera
148	28/12/2019	16:29:58	1.36	127.14	154	3.9				Halmahera
149	28/12/2019	18:25:45	1.51	128.55	43	4.7				Halmahera
150	29/12/2019	04:55:04	0.07	123.10	97	4.8				Minahassa Peninsula
151	29/12/2019	06:34:33	2.80	124.07	307	4.8				Celebes Sea
152	29/12/2019	09:12:16	4.57	125.40	10	5.2				Talaud Island
153	29/12/2019	12:03:53	4.60	125.37	10	4.9				Talaud Island
154	29/12/2019	13:18:01	4.51	125.16	10	4.7				Talaud Island
155	29/12/2019	13:48:16	3.48	128.50	11	4.0				Halmahera
156	31/12/2019	04:18:27	1.27	120.79	66	4.9				Minahassa Peninsula
157	31/12/2019	09:35:13	4.47	125.13	315	4.1				Celebes Sea
158	31/12/2019	09:50:43	0.03	123.56	105	4.5				Minahassa Peninsula
159	31/12/2019	19:14:11	-0.11	125.83	10	3.8				Southern Molluca Sea
160	31/12/2019	22:13:21	1.62	126.35	10	3.8				Northern Molluca Sea



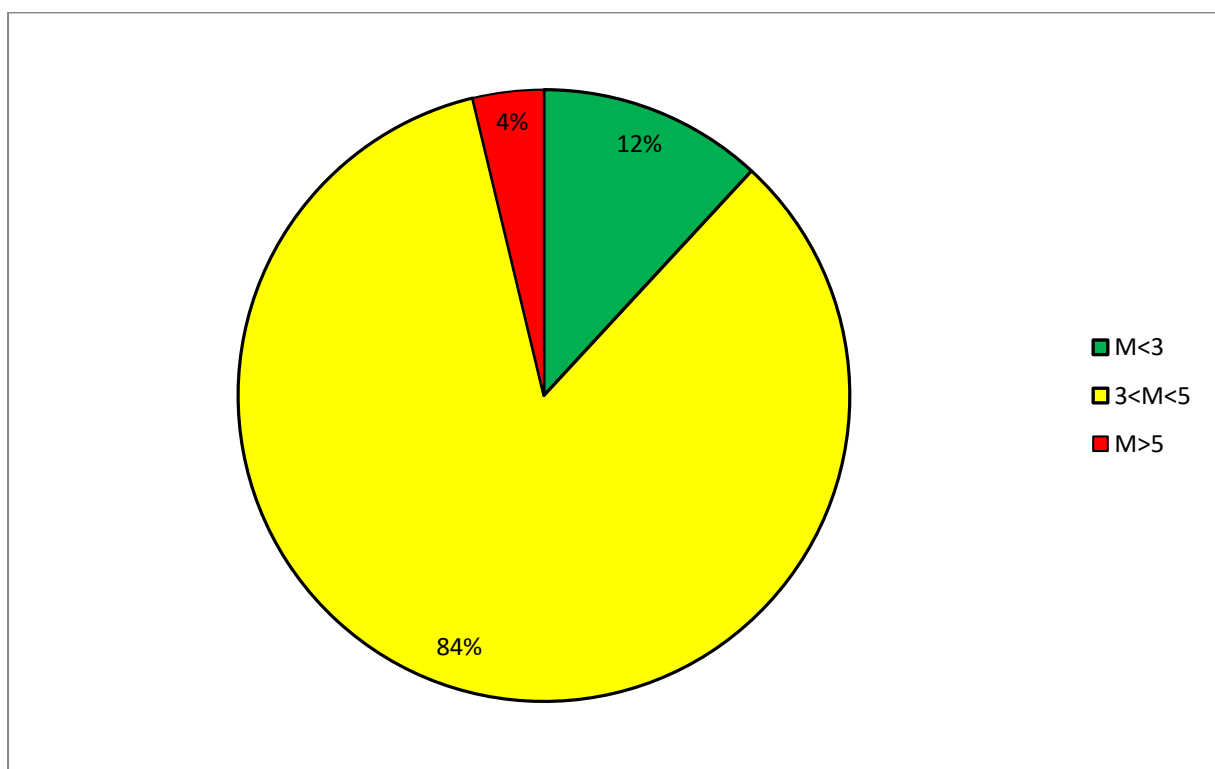
Gambar 38 Sebaran episenter gempabumi bulan Desember 2019

Tabel 26 Rekapitulasi gempabumi berdasarkan magnitudo bulan Desember 2019

Tanggal (UTC)	Magnitudo			Jumlah Total	Jumlah Gempa Signifikan	
	M<3	3≤M<5	M≥5		Dirasakan	Merusak
1	3	3	0	6	0	0
2	2	10	0	12	0	0
3	2	15	2	19	4	0
4	0	0	0	0	0	0
5	1	6	1	8	1	0
6	0	6	0	6	0	0
7	1	3	0	4	0	0
8	2	5	0	7	0	0
9	1	4	0	5	0	0
10	0	5	0	5	0	0
11	0	3	0	3	1	0
12	1	2	0	3	0	0
13	0	7	0	7	0	0
14	0	6	0	6	0	0
15	0	4	1	5	2	0
16	2	6	0	8	0	0
17	0	3	0	3	0	0
18	1	3	0	4	0	0
19	1	2	0	3	0	0
20	2	3	0	5	0	0
21	0	2	0	2	0	0
22	0	1	0	1	0	0
23	0	5	0	5	0	0
24	0	5	0	5	0	0
25	0	2	1	3	1	0
26	0	0	0	0	0	0
27	0	7	0	7	0	0
28	0	7	0	7	1	0
29	0	5	1	6	1	0
30	0	0	0	0	0	0
31	0	5	0	5	1	0
Jumlah gempa	19	135	6	160	12	0



Gambar 39 Grafik gempabumi berdasarkan magnitudo bulan Desember 2019



Gambar 40 Grafik persentase gempabumi berdasarkan magnitudo bulan Desember 2019

IV. PETA GONCANGAN GEMPABUMI TERASA DI WILAYAH REGIONAL 10 TAHUN 2019

Peta Goncangan (*Shakemap*) merupakan Peta yang menggambarkan getaran/guncangan tanah yang diakibatkan oleh gempa. Melalui shakemap, daerah yang merasakan getaran akibat gempabumi dapat diketahui secara cepat dan tepat. Untuk gempa dengan kekuatan yang besar hingga menimbulkan korban yang cukup besar, shakemap dapat digunakan untuk mengetahui lokasi yang terkena dampak signifikan, sehingga bantuan dapat diberikan secara tepat.

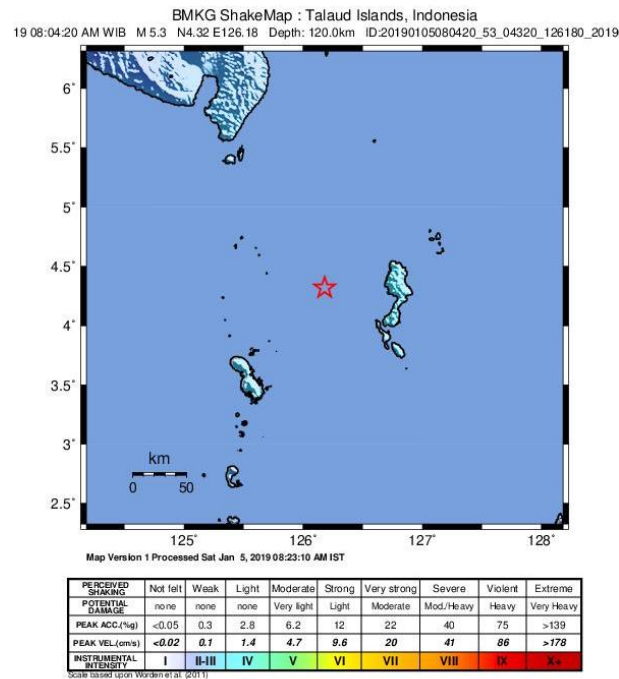
Peta goncangan yang dikeluarkan BMKG memiliki 2 jenis satuan, yaitu MMI (*Modified Mercalli Intensity*) dan SIG BMKG (Skala Intensitas Gempabumi BMKG). Di dalam Buletin Gempabumi Stasiun Geofisika Manado ini, Peta Guncangan disajikan dengan menggunakan skala MMI. Skala MMI adalah satuan yang dibuat oleh Giuseppe Mercalli pada tahun 1902. Skala MMI dibagi menjadi 12 bagian berdasarkan informasi dari orang-orang yang selamat dari gempa tersebut dan juga dengan melihat serta membandingkan tingkat kerusakan akibat gempa tersebut. Oleh karena itu, Skala MMI bersifat sangat subjektif karena didasarkan pada penilaian manusia. Pada gambar berikut ditunjukkan pembagian skala MMI berdasarkan nilai percepatan tanah dan getaran yang dirasakan.

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL. (cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)

Gambar 41 Perbandingan antara skala MMI dengan percepatan tanah maksimum

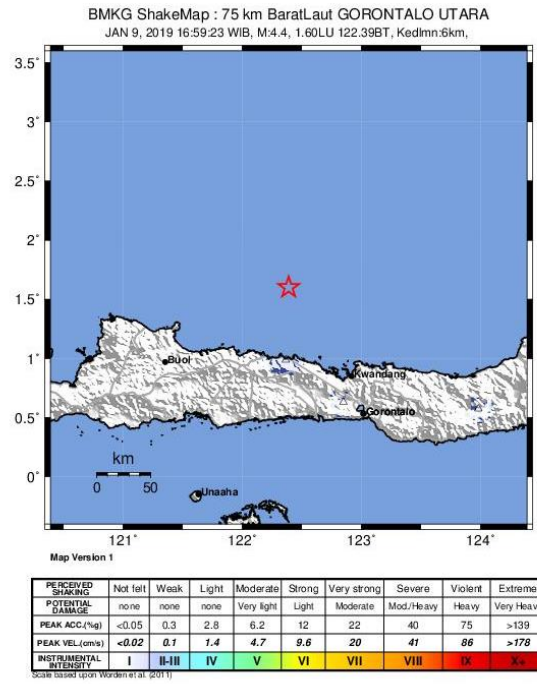
A. Peta Guncangan (*Shakemap*) Gempabumi Bulan Januari 2019



Gambar 42 Peta Guncangan Gempabumi 5 Januari 2019 pukul 08:04:20 WIB

Tabel 27 Atenuasi intensitas gempa bumi 5 Januari 2019 pukul 08:04:20 WIB

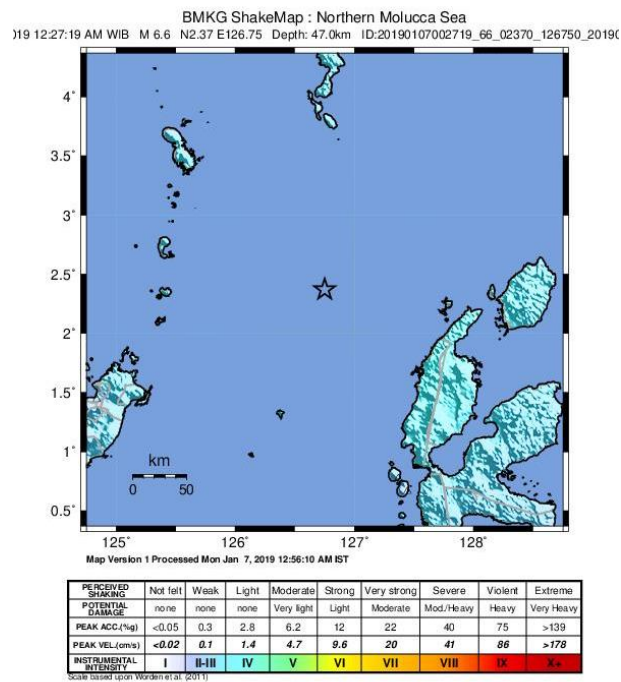
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SLMI	STA GEOF MANADO	1.44	124.84	371.68		1
2	TNTI	TERNATE	0.77	127.37	431.90		1
3	TMUN	TIDORE	0.66	127.45	445.51		1
4	KMSI	KOTA MUBAGO	0.57	123.98	496.49		1
5	SMSI	SUMALATA	0.99	122.36	574.44		1
6	LBMI	LABUHA	-0.64	127.50	581.97		1
7	SANI	SANANA	-2.05	125.99	717.49		1
8	NLAI	NAMLEA	-3.24	127.10	854.18		1
9	MSAI	MASOHI	-3.35	128.93	912.43		1



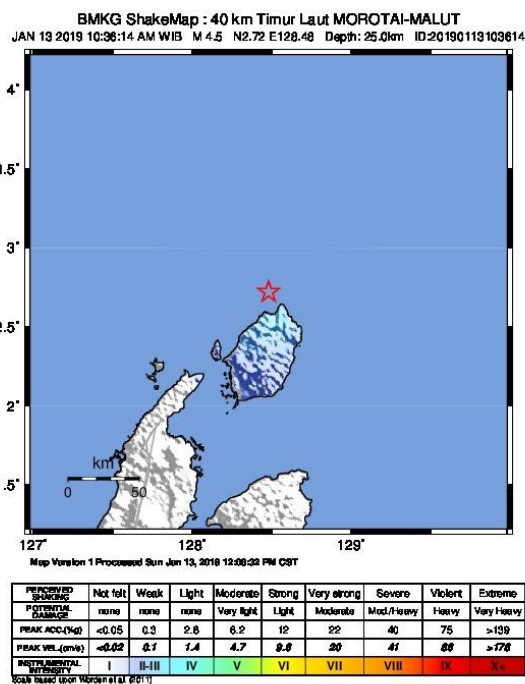
Gambar 43 Peta Guncangan Gempabumi 9 Januari 2019 pukul 16:59:23 WIB

Tabel 28 Atenuasi intensitas gempa bumi 9 Januari 2019 pukul 16:59:23 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SMSI	SUMALATA	0.99	122.36	68.05	2	1
2	GMCI	STA MET GORONTALO	0.63	122.85	119.37		1
3	KMSI	KOTA MUBAGO	0.57	123.98	210.45		1



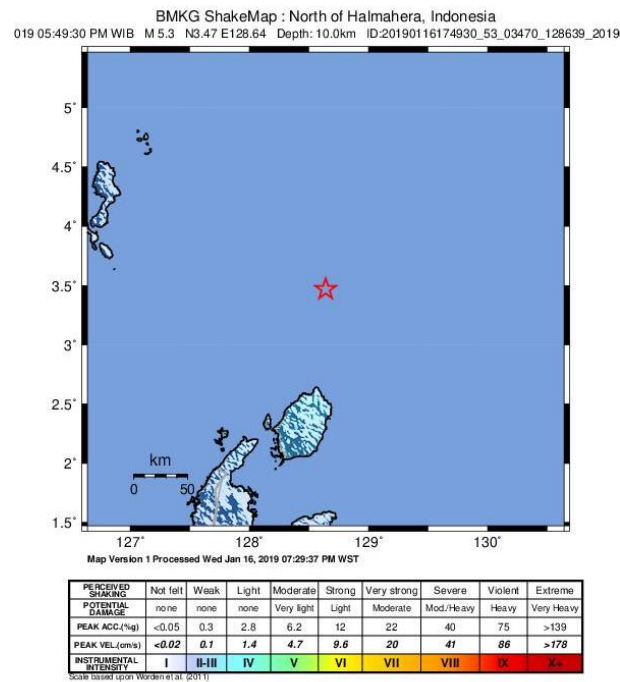
Gambar 44 Peta Guncangan Gempabumi 7 Januari 2019 pukul 00:27:19 WIB



Gambar 45 Peta Guncangan Gempabumi 13 Januari 2019 pukul 10:36:19 WIB

Tabel 29 Atenuasi intensitas gempa bumi 13 Januari 2019 pukul 10:36:19 WIB

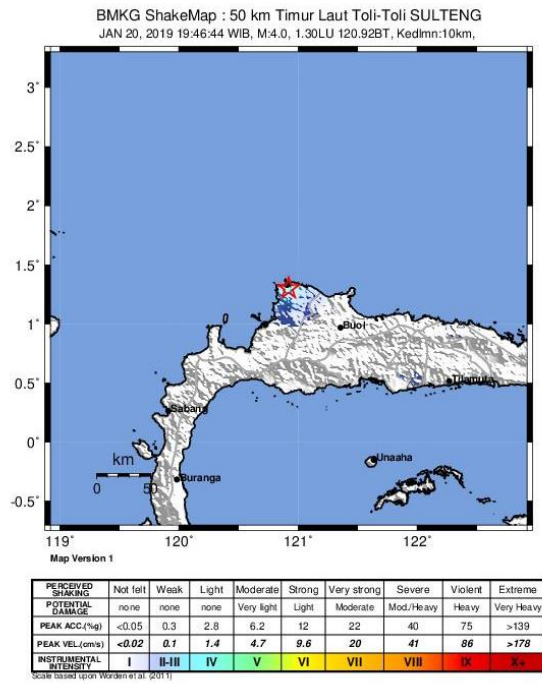
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	249.46		1



Gambar 46 Peta Guncangan Gempabumi 16 Januari 2019 pukul 17:49:30 WIB

Tabel 30 Atenuasi intensitas gempa bumi 16 Januari 2019 pukul 17:49:30 WIB

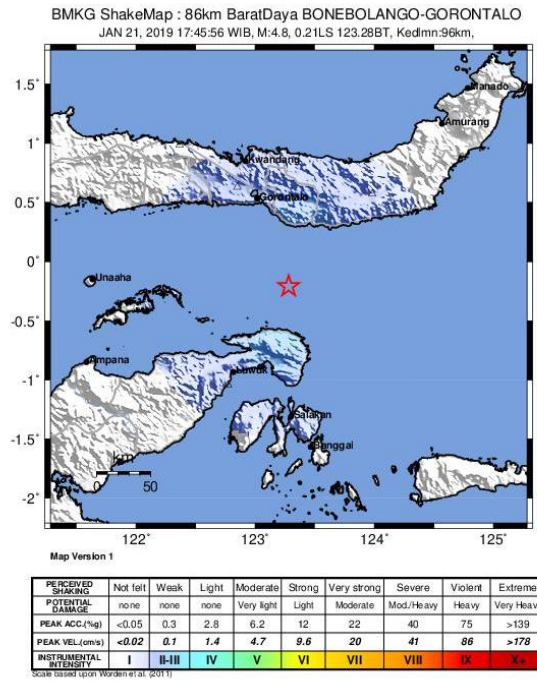
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SANI	SANANA	-2.05	125.99	679.76		1



Gambar 47 Peta Guncangan Gempabumi 20 Januari 2019 pukul 19:46:44 WIB

Tabel 31 Atenuasi intensitas gempa bumi 20 Januari 2019 pukul 19:46:44 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	145.80		1
2	SMSI	SUMALATA	0.99	122.36	164.34		1
3	KMRS	STA KLIM MAROS	-5.00	119.57	716.35		1

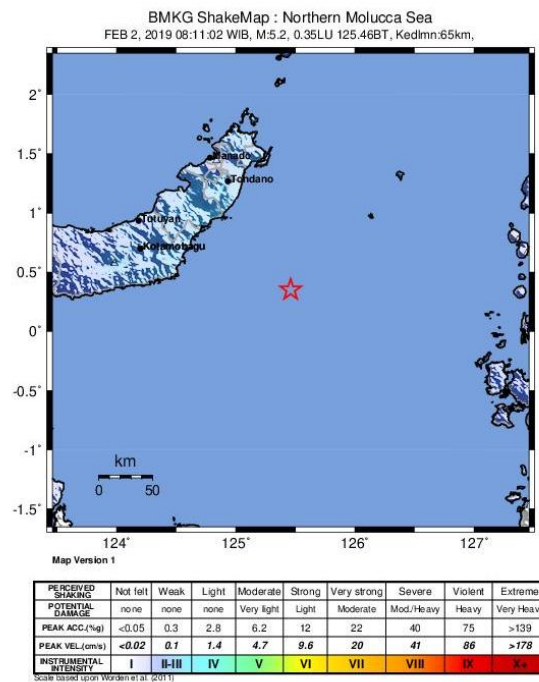


Gambar 48 Peta Guncangan Gempabumi 21 Januari 2019 pukul 17:45:56 WIB

Tabel 32 Atenuasi intensitas gempa bumi 21 Januari 2019 pukul 17:45:56 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	GMCI	STA MET GORONTALO	0.63	122.85	104.93	2	3
2	LUWI	LUWUK	-1.04	122.77	108.38		2
3	KMSI	KOTA MUBAGO	0.57	123.98	116.98		1
4	SMSI	SUMALATA	0.99	122.36	167.66		1
5	LBMI	LABUHA	-0.64	127.50	471.75		1
6	TTSI	TANATORAJA	-3.05	119.82	497.33		1
7	NLAI	NAMLEA MALUKU	-3.24	127.10	541.90		1
8	EDFI	ENDE	-8.75	121.69	965.76		1

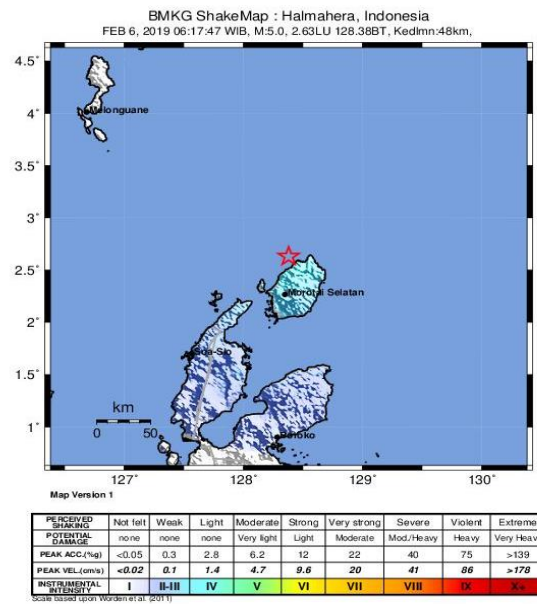
B. Peta Guncangan (*Shakemap*) Gempabumi Bulan Februari 2019



Gambar 50 Peta Guncangan Gempabumi 2 Februari 2019 pukul 08:11:02 WIB

Tabel 34 Atenuasi intensitas gempa bumi 2 Februari 2019 pukul 08:11:02 WIB

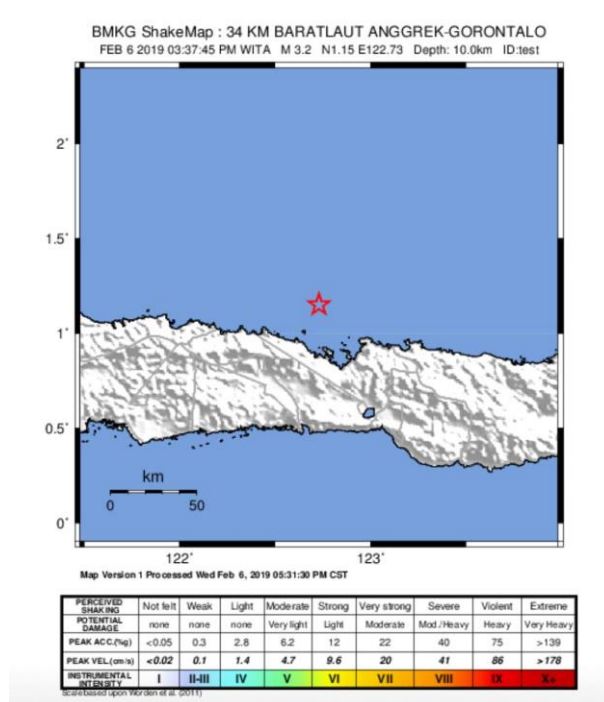
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SLMI	STA GEOF MANADO	1.44	124.84	138.79	2	1
2	KMSI	KOTA MUBAGO	0.57	123.98	165.35	2	3
3	TNTI	TERNATE	0.77	127.37	216.18		1
4	TMUN	TIDORE	0.66	127.45	222.59		1
5	LBMI	LABUHA	-0.64	127.50	251.14		1
6	SANI	SANANA	-2.05	125.99	272.03		1
7	GMCI	STA MET GORONTALO	0.63	122.85	290.88		3
8	LUWI	LUWUK	-1.04	122.77	335.58		2
9	SMSI	SUMALATA	0.99	122.36	350.38		1
10	MRSI	MARISA GORONTALO	0.48	121.94	390.55		1
11	NLAI	NAMLEA MALUKU	-3.24	127.10	437.74		1
12	KRAI	KAIRATU	-3.32	128.40	521.30		1
13	MSAI	MASOHI	-3.35	128.93	562.52		1
14	TTSI	TANATORAJA	-3.05	119.82	730.87		1



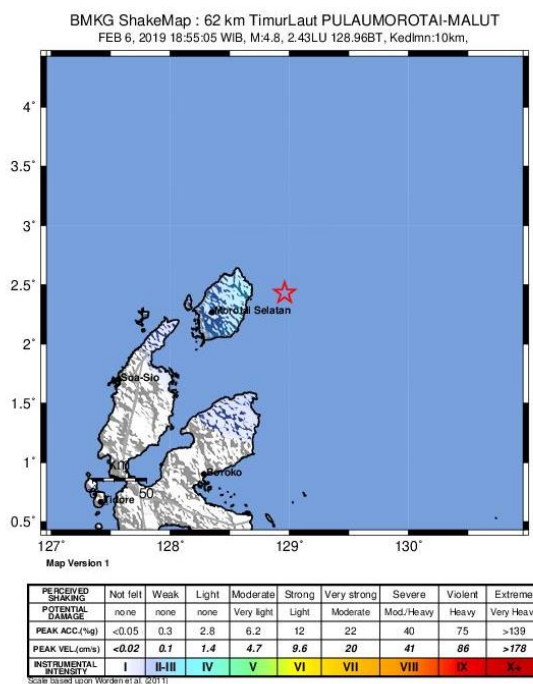
Gambar 51 Peta Guncangan Gempabumi 6 Februari 2019 pukul 06:17:47 WIB

Tabel 35 Atenuasi intensitas gempa bumi 6 Februari 2019 pukul 06:17:47 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	234.53		1
2	TMUN	TIDORE	0.66	127.45	241.20		1
3	RAPI	RAJA AMPAT	-0.41	130.82	432.74		1
4	SWI	SORONG	-0.86	131.26	502.51		1
5	SANI	SANANA	-2.05	125.99	583.43		1
6	FAKI	FAK-FAK	-2.92	132.26	752.39		1
7	RKPI	RANSIKI	-1.51	134.18	791.26		1



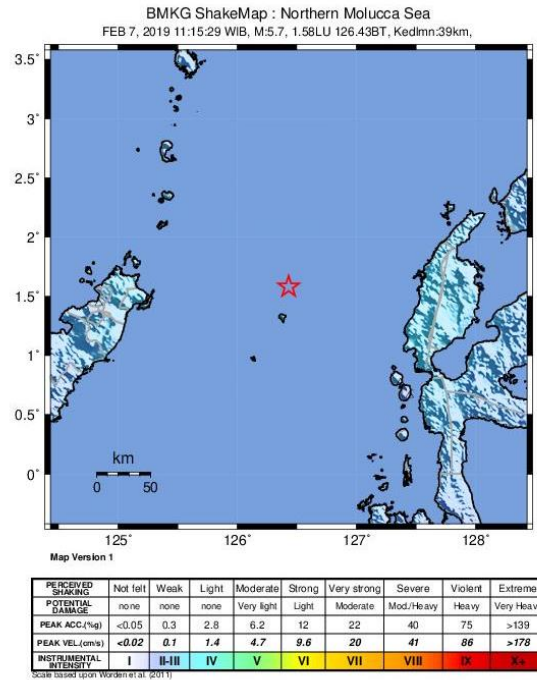
Gambar 52 Peta Guncangan Gempabumi 6 Februari 2019 pukul 14:37:45 WIB



Gambar 53 Peta Guncangan Gempabumi 6 Februari 2019 pukul 18:55:05 WIB

Tabel 36 Atenuasi intensitas gempa bumi 6 Februari 2019 pukul 18:55:05 WIB

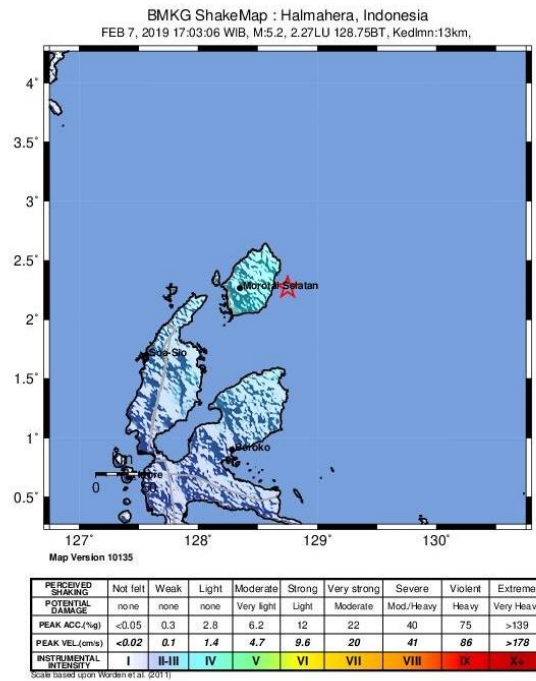
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	255.61		1
2	TMUN	TIDORE	0.66	127.45	258.56		1
3	LBMI	LABUHA	-0.64	127.50	377.73		1
4	RKPI	RANSIKI	-1.51	134.18	726.89		1



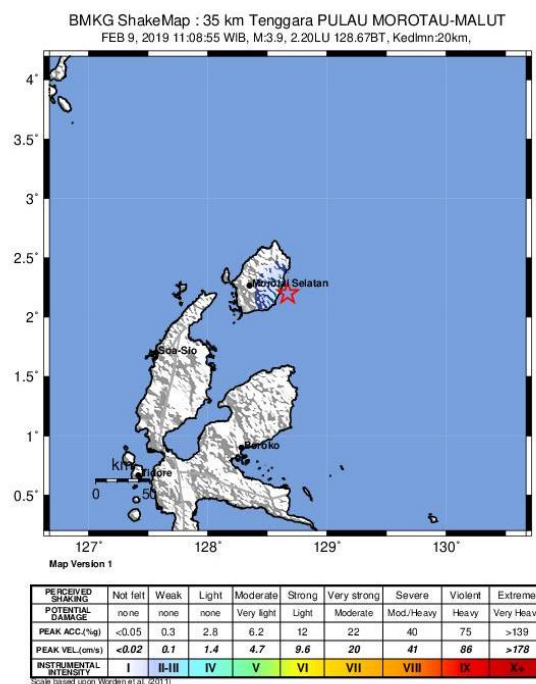
Gambar 54 Peta Guncangan Gempabumi 7 Februari 2019 pukul 11:15:29 WIB

Tabel 37 Atenuasi intensitas gempa bumi 7 Februari 2019 pukul 11:15:29 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	141.05	4	2
2	TMUN	TIDORE	0.66	127.45	155.05		2
3	SLMI	STA GEOF MANADO	1.44	124.84	179.82	4	2
4	LBMI	LABUHA	-0.64	127.50	274.74		2
5	KMSI	KOTA MUBAGO	0.57	123.98	295.02		3
6	SANI	SANANA	-2.05	125.99	406.39		1
7	SMSI	SUMALATA	0.99	122.36	456.47		1
8	LUWI	LUWUK	-1.04	122.77	500.08		1
9	MRSI	MARISA GORONTALO	0.48	121.94	513.55		1
10	NLAI	NAMLEA MALUKU	-3.24	127.10	818.27		1
11	TTSI	TANATORAJA	-3.05	119.82	896.00		1
12	SPSI	SIDRAP	-3.96	119.77	962.36		1

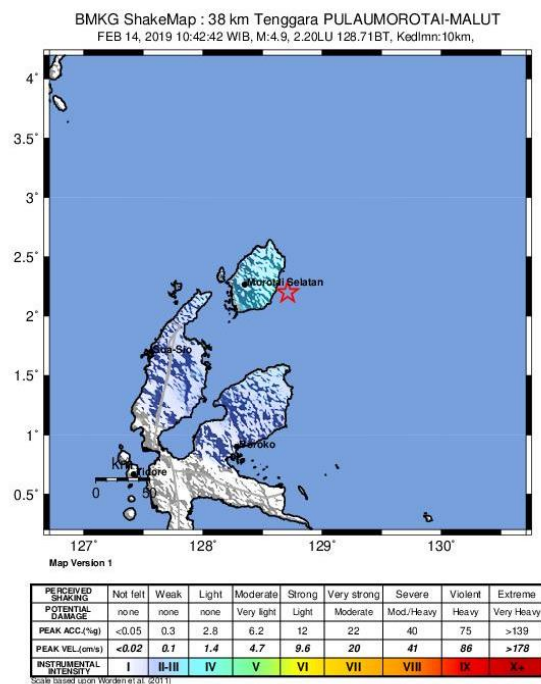


Gambar 55 Peta Guncangan Gempabumi 7 Februari 2019 pukul 17:03:06 WIB

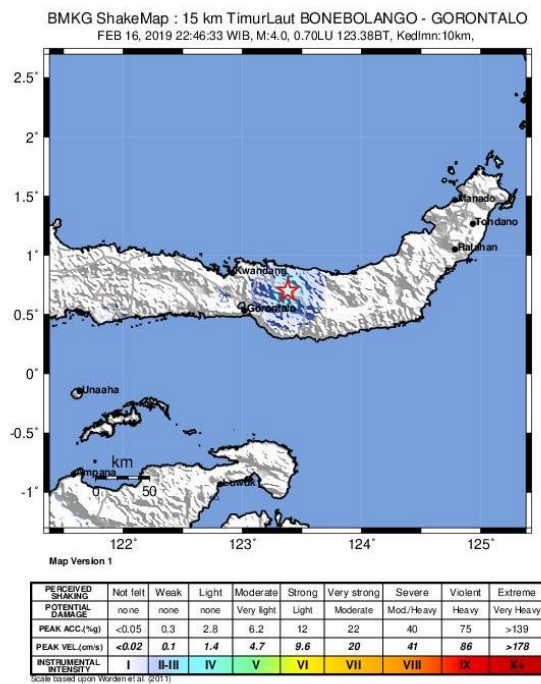


Gambar 56 Peta Guncangan Gempabumi 9 Februari 2019 pukul 11:08:55 WIB
Tabel 38 Atenuasi intensitas gempa bumi 9 Februari 2019 pukul 11:08:55 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KMPI	KAIMANA	-3.66	133.7	858.97		1



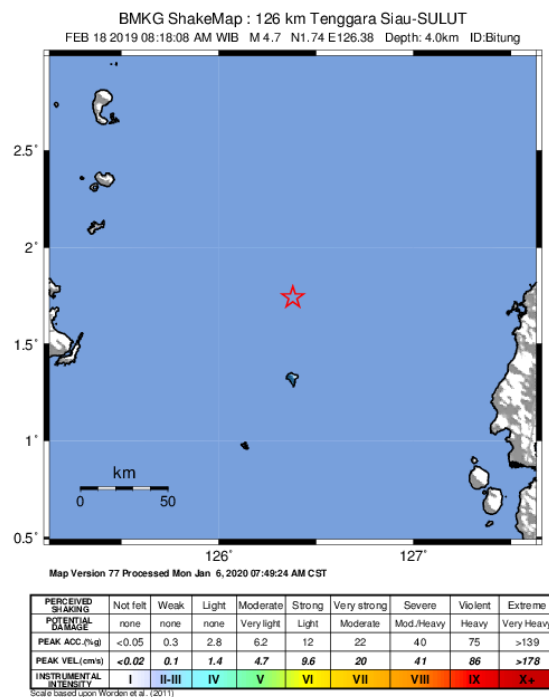
Gambar 57 Peta Guncangan Gempabumi 14 Februari 2019 pukul 10:42:42 WIB



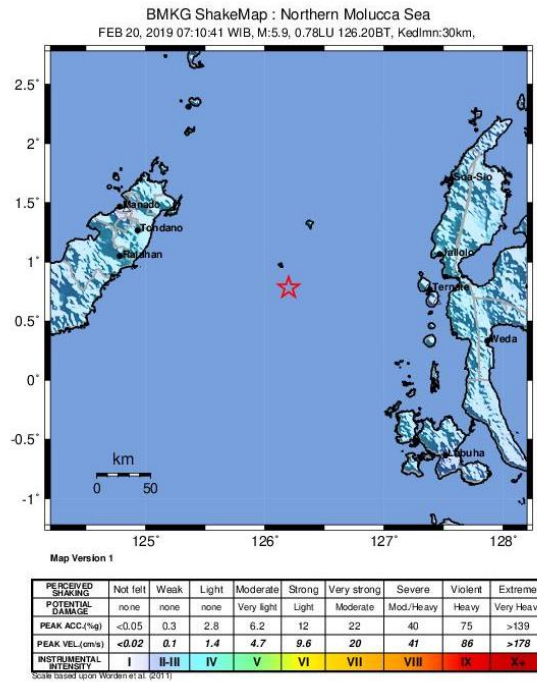
Gambar 58 Peta Guncangan Gempabumi 16 Februari 2019 pukul 22:46:33 WIB

Tabel 39 Atenuasi intensitas gempa bumi 16 Februari 2019 pukul 22:46:33 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	GMCI	STA MET GORONTALO	0.63	122.85	59.44	2	2
2	MRSI	MARISA GORONTALO	0.48	121.94	161.91		1
3	LUWI	LUWUK	-1.04	122.77	205.14		1
4	KMRS	STA KLIM MAROS	-5.00	119.57	761.98		1



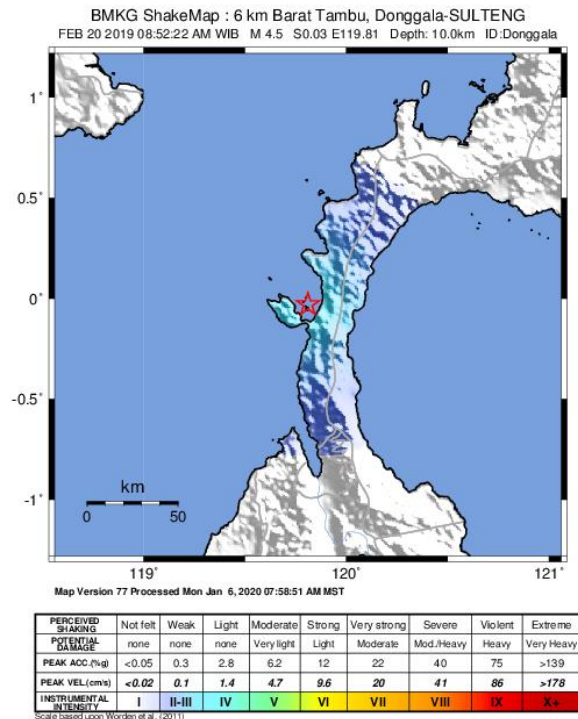
Gambar 59 Peta Guncangan Gempabumi 18 Februari 2019 pukul 08:18:08 WIB



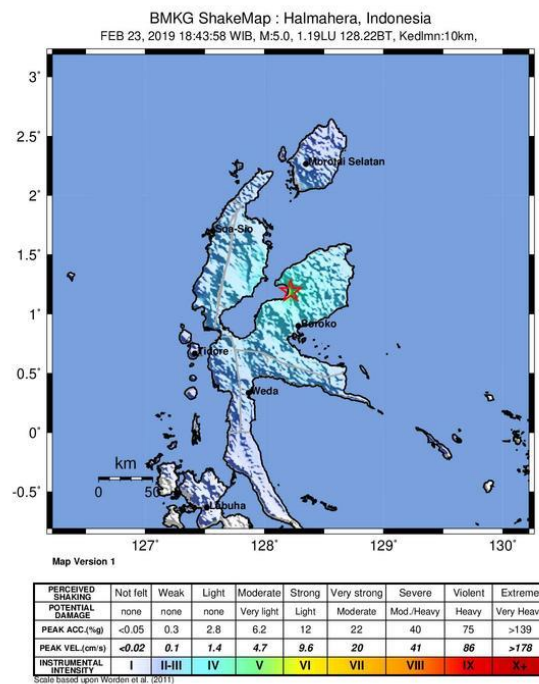
Gambar 60 Peta Guncangan Gempabumi 20 Februari 2019 pukul 07:10:41 WIB

Tabel 40 Atenuasi intensitas gempa bumi 20 Februari 2019 pukul 07:10:41 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	130.57	3	3
2	TMUN	TIDORE	0.66	127.45	139.73		2
3	SLMI	STA GEOF MANADO	1.44	124.84	168.38	2	2
4	LBMI	LABUHA	-0.64	127.50	213.50		2
5	KMSI	KOTA MUBAGO	0.57	123.98	247.04	2	3
6	SANI	SANANA	-2.05	125.99	314.23		1
7	LUWI	LUWUK	-1.04	122.77	430.20		1
8	NLAI	NAMLEA MALUKU	-3.24	127.10	456.45		1
9	KRAI	KAIRATU	-3.32	128.40	515.32		1
10	RAPI	RAJA AMPAT	-0.41	130.82	528.98		1
11	MSAI	MASOHI	-3.35	128.93	548.36		1
12	KDRI	STA MET KENDARI	-3.97	122.59	661.49		1
13	KKSI	KOLAKA	-4.17	121.56	745.62		1
14	FAKI	FAK-FAK	-2.92	132.26	787.91		1
15	TTSI	TANATORAJA	-3.05	119.82	825.16		1
16	BKSI	BULUKUMBA	-5.32	120.12	955.16		1



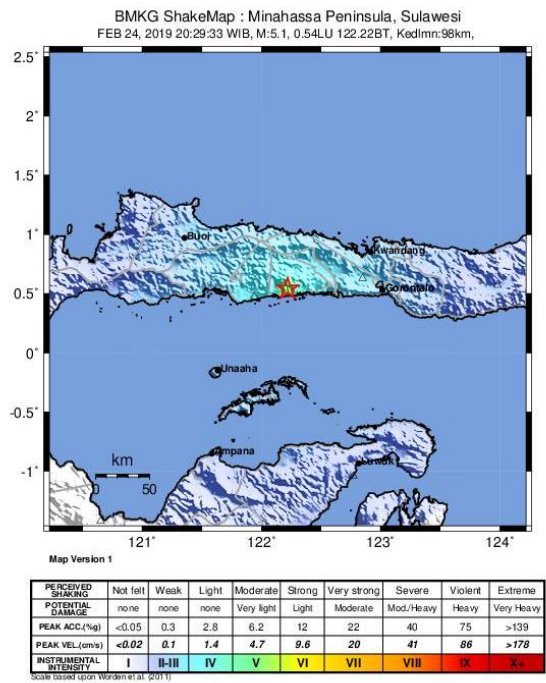
Gambar 61 Peta Guncangan Gempabumi 20 Februari 2019 pukul 08:52:22 WIB



Gambar 62 Peta Guncangan Gempabumi 23 Februari 2019 pukul 18:43:58 WIB

Tabel 41 Atenuasi intensitas gempa bumi 23 Februari 2019 pukul 18:43:58 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TMUN	TIDORE	0.66	127.45	103.27		1
2	TNTI	TERNATE	0.77	127.37	104.87	2	2
3	LBMI	LABUHA	-0.64	127.50	217.66		2
4	RAPI	RAJA AMPAT	-0.41	130.82	338.81		1
5	SWI	SORONG	-0.86	131.26	407.03		1
6	NLAI	NAMLEA MALUKU	-3.24	127.10	507.22		1
7	FAKI	FAK-FAK	-2.92	132.26	640.31		1

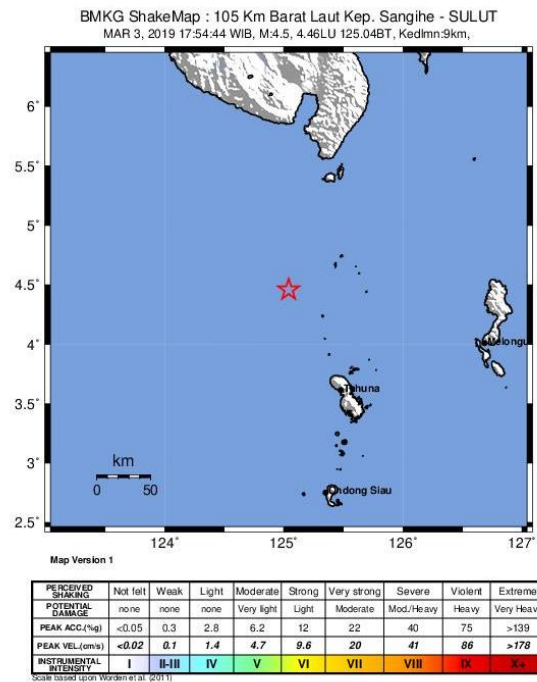


Gambar 63 Peta Guncangan Gempabumi 24 Februari 2019 pukul 20:29:33 WIB

Tabel 42 Atenuasi intensitas gempa bumi 24 Februari 2019 pukul 20:29:33 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	30.95		4
2	GMCI	STA MET GORONTALO	0.63	122.85	69.9	3	4
3	LUWI	LUWUK	-1.04	122.77	185.43		3
4	KMSI	KOTA MUBAGO	0.57	123.98	194.98		3
5	PMCI	STA MET POSO	-1.42	120.65	278.37		4
6	SLMI	STA GEOF MANADO	1.44	124.84	307.14		1
7	MSBA	STA MET MASAMBA	-2.56	120.32	402.7		1
8	TTSI	TANATORAJA	-3.05	119.82	478.86		1
9	KDRI	STA MET KENDARI	-3.97	122.59	502.31		1
10	SANI	SANANA	-2.05	125.99	507.36		1
11	KKSI	KOLAKA	-4.17	121.56	526.87		1
12	SPSI	SIDRAP	-3.96	119.77	569.28		1
13	LBMI	LABUHA	-0.64	127.50	600.78		1
14	BKB	BALIKPAPAN	-1.11	116.91	617.85		1
15	NLAI	NAMLEA MALUKU	-3.24	127.10	685.25		1
16	BKSI	BULUKUMBA	-5.32	120.12	691.34		1
17	MKS	GOWA	-5.22	119.47	708.53		1

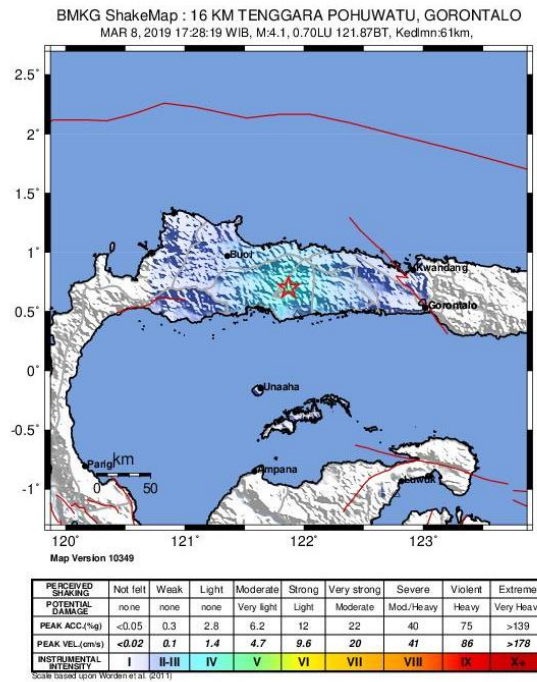
C. Peta Guncangan (*Shakemap*) Gempabumi Bulan Maret 2019



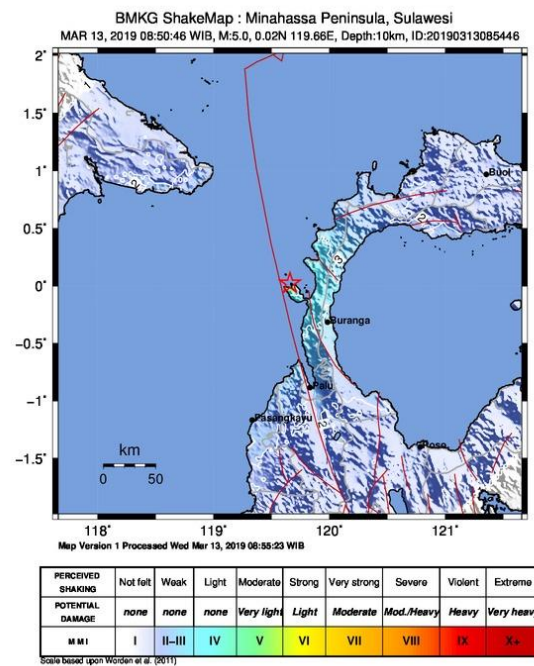
Gambar 64 Peta Guncangan Gempabumi 3 Maret 2019 pukul 17:54:44 WIB

Tabel 43 Atenuasi intensitas gempa bumi 3 Maret 2019 pukul 17:54:44 WIB

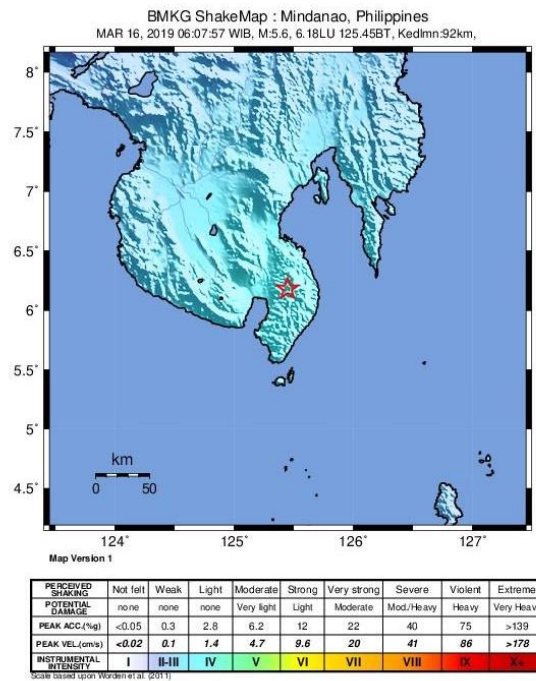
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	NLAI	NAMLEA MALUKU	-3.24	127.10	886.16		1



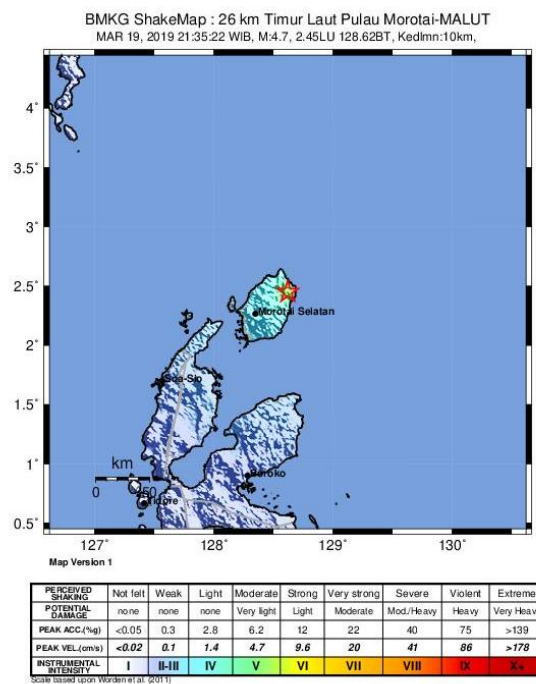
Gambar 65 Peta Guncangan Gempabumi 8 Maret 2019 pukul 17:28:19 WIB



Gambar 66 Peta Guncangan Gempabumi 13 Maret 2019 pukul 08:50:46 WIB



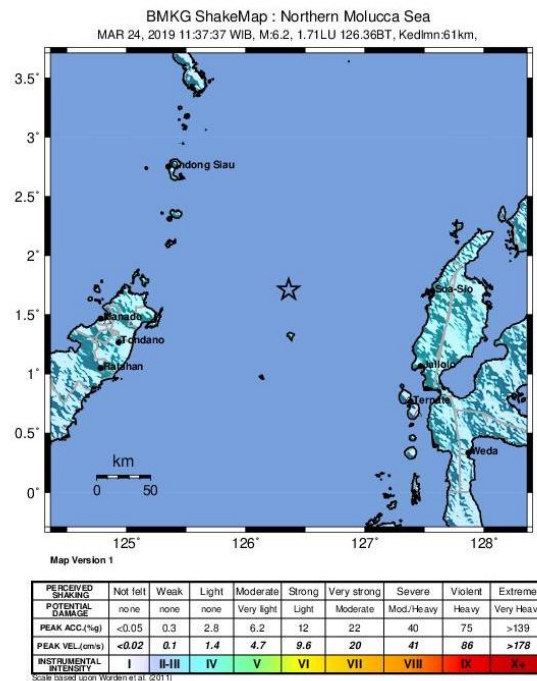
Gambar 67 Peta Guncangan Gempabumi 16 Maret 2019 pukul 06:07:57 WIB



Gambar 68 Peta Guncangan Gempabumi 19 Maret 2019 pukul 21:35:22 WIB

Tabel 44 Atenuasi intensitas gempa bumi 19 Maret 2019 pukul 21:35:22 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	232.82		1
2	TMUN	TIDORE	0.66	127.45	237.58		1
3	RAPI	RAJA AMPAT	-0.41	130.82	401.27		1
4	SWI	SORONG	-0.86	131.26	470.92		1

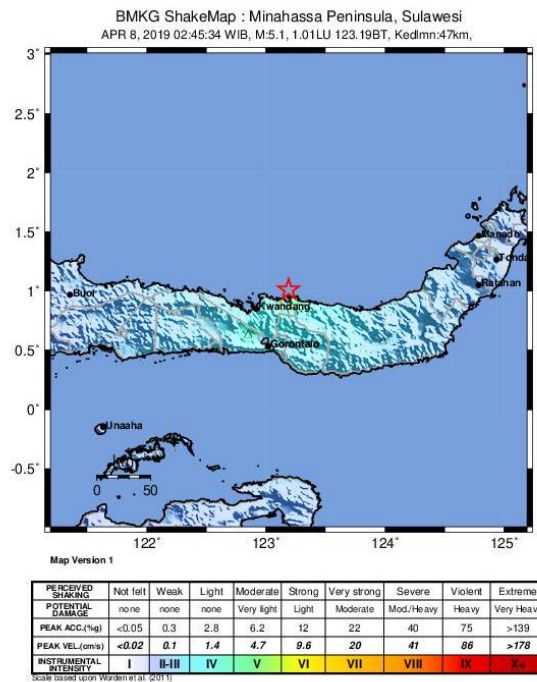


Gambar 69 Peta Guncangan Gempabumi 24 Maret 2019 pukul 11:37:37 WIB

Tabel 45 Atenuasi intensitas gempa bumi 24 Maret 2019 pukul 11:37:37 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	160.67	3	3
2	TMUN	TIDORE	0.66	127.45	174.33		2
3	SLMI	STA GEOF MANADO	1.44	124.84	178.14	4	3
4	LBMI	LABUHA	-0.64	127.50	292.66		2
5	KMSI	KOTA MUBAGO	0.57	123.98	295.41		4
6	SANI	SANANA	-2.05	125.99	420.44		1
7	LUWI	LUWUK	-1.04	122.77	502.62		2
8	MRSI	MARISA GORONTALO	0.48	121.94	509.85		1
9	RAPI	RAJA AMPAT	-0.41	130.82	548.73		1
10	NLAI	NAMLEA MALUKU	-3.24	127.10	555.95		1
11	SWI	SORONG	-0.86	131.26	614.48		1
12	PMCI	STA MET POSO	-1.42	120.65	722.8		3
13	KDRI	STA MET KENDARI	-3.97	122.59	756.62		1
14	FAKI	FAK-FAK	-2.92	132.26	832.67		1
15	SPSI	SIDRAP	-3.96	119.77	965		9

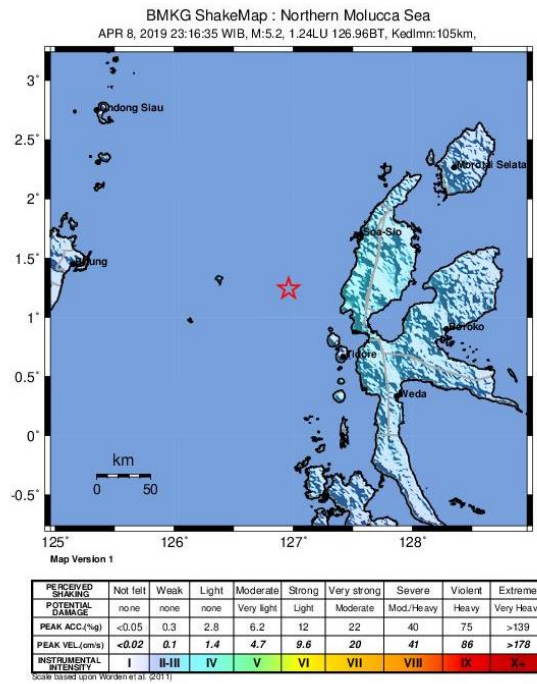
D. Peta Guncangan (*Shakemap*) Gempabumi Bulan April 2019



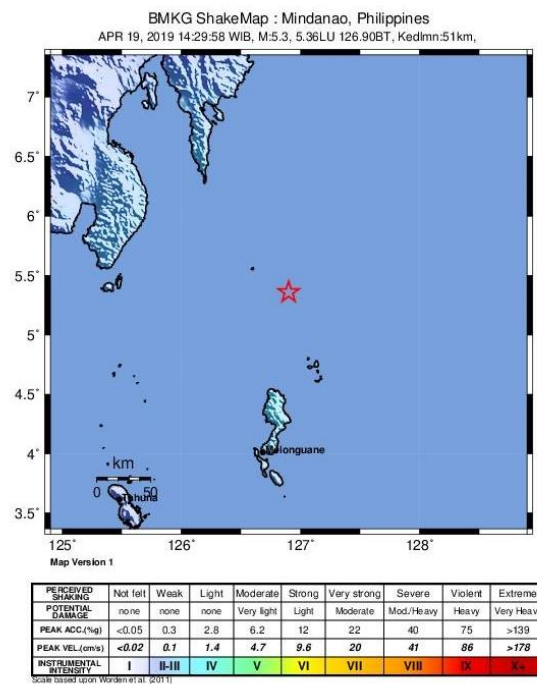
Gambar 70 Peta Guncangan Gempabumi 8 April 2019 pukul 02:45:34 WIB

Tabel 46 Atenuasi intensitas gempa bumi 8 April 2019 pukul 02:45:34 WIB

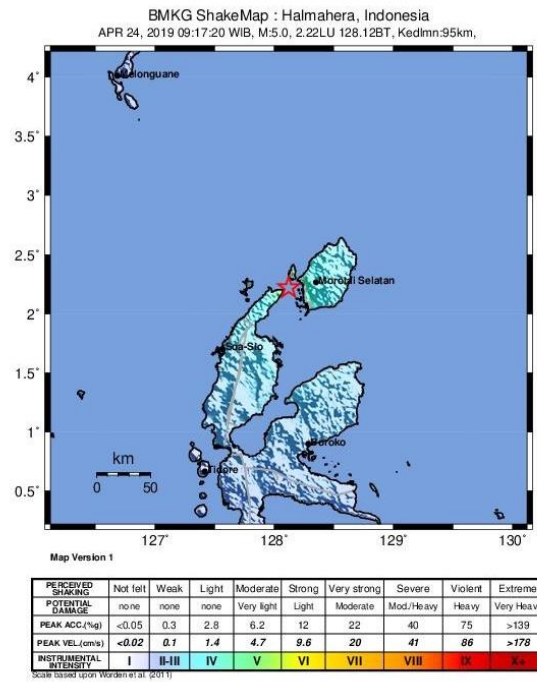
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	GMCI	STA MET GORONTALO	0.63	122.85	55.84	5	6
2	KMSI	KOTA MUBAGO	0.57	123.98	99.54		3
3	MRSI	MARISA GORONTALO	0.48	121.94	150.13	4	3
4	LUWI	LUWUK	-1.04	122.77	231.98		1
5	MPSI	MAPAGA SABANG PALU	0.34	119.9	372.73		2
6	PMCI	STA MET POSO	-1.42	120.65	389.99		1
7	SANI	SANANA	-2.05	125.99	459.99		1
8	KDRI	STA MET KENDARI	-3.97	122.59	556.89		1
9	TTSI	TANATORAJA	-3.05	119.82	585.41		1
10	NLAI	NAMLEA MALUKU	-3.24	127.1	641.08		1
11	SPSI	SIDRAP	-3.96	119.77	670.32		1
12	BKB	BALIKPAPAN	-1.11	116.91	736.55		1
13	MKS	GOWA	-5.22	119.47	805.58		1



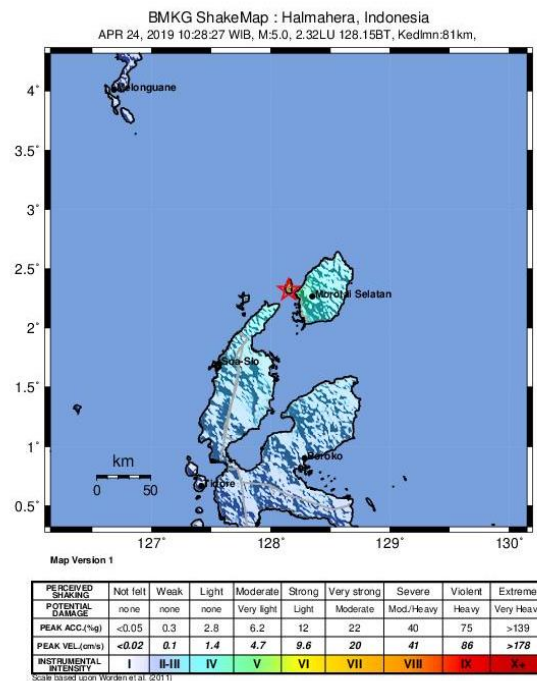
Gambar 71 Peta Guncangan Gempabumi 8 April 2019 pukul 23:16:35 WIB



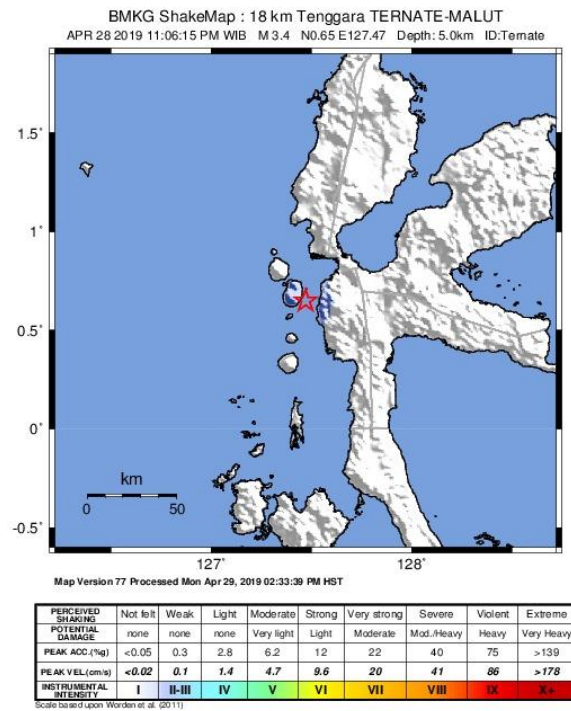
Gambar 72 Peta Guncangan Gempabumi 19 April 2019 pukul 14:29:58 WIB



Gambar 73 Peta Guncangan Gempabumi 24 April 2019 pukul 09:17:20 WIB

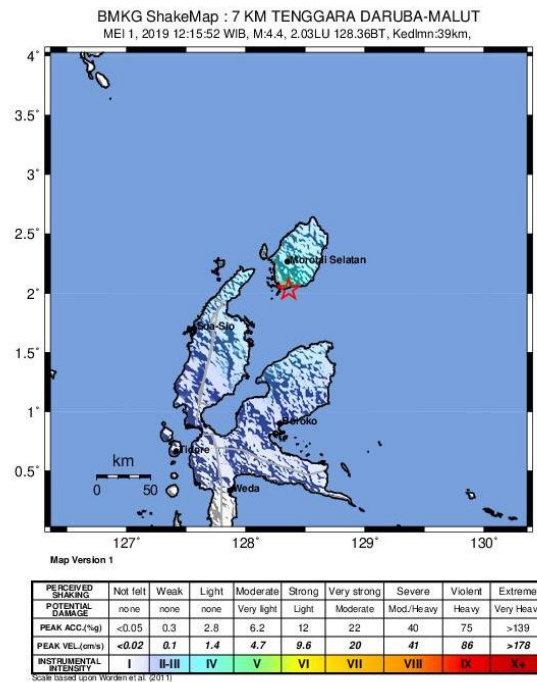


Gambar 74 Peta Guncangan Gempabumi 24 April 2019 pukul 10:28:27 WIB



Gambar 75 Peta Guncangan Gempabumi 28 April 2019 pukul 23:06:15 WIB

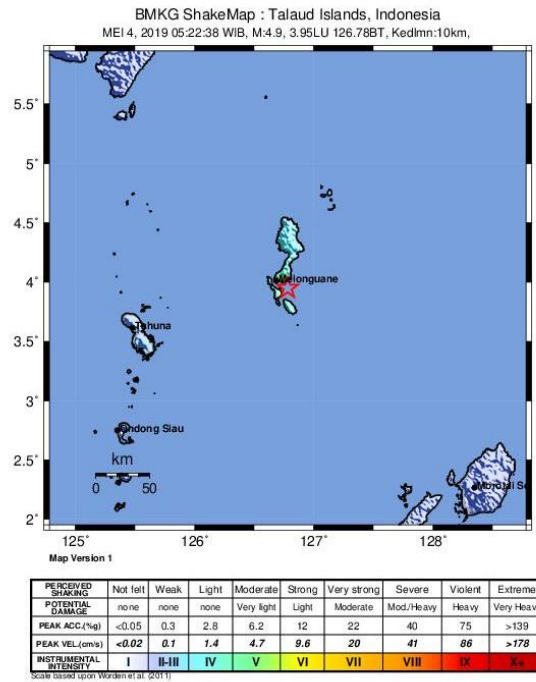
E. Peta Guncangan (*Shakemap*) Gempabumi Bulan Mei 2019



Gambar 76 Peta Guncangan Gempabumi 1 Mei 2019 pukul 12:15:52 WIB

Tabel 47 Atenuasi intensitas gempa bumi 1 Mei 2019 pukul 12:15:52 WIB

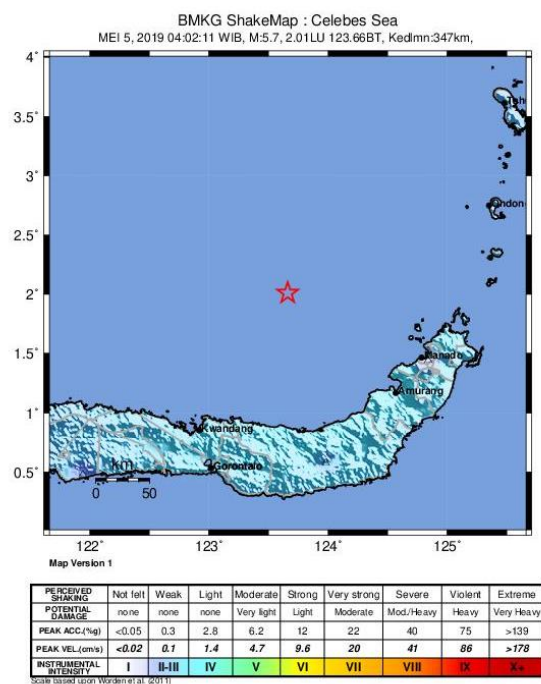
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	178.18		1
2	LUWI	LUWUK	-1.04	122.77	708.97		1



Gambar 77 Peta Guncangan Gempabumi 4 Mei 2019 pukul 05:22:38 WIB

Tabel 48 Atenuasi intensitas gempa bumi 4 Mei 2019 pukul 05:22:38 WIB

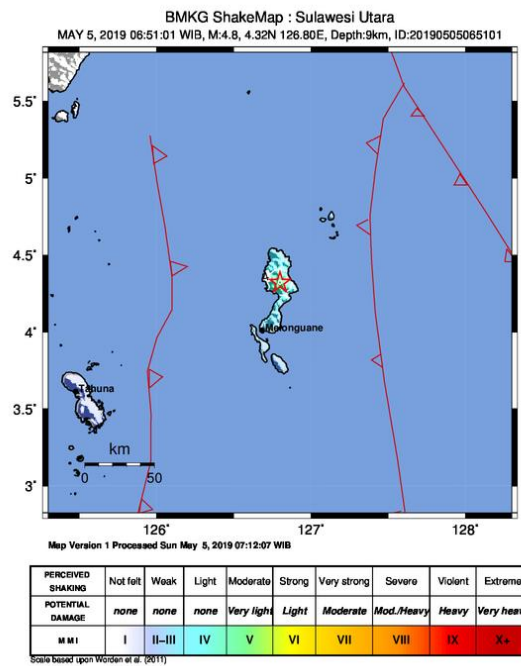
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	661.9		1
2	NLAI	NAMLEA MALUKU	-3.24	127.1	800.2		1
3	SANI	SANANA	-2.05	125.99	672.7		1



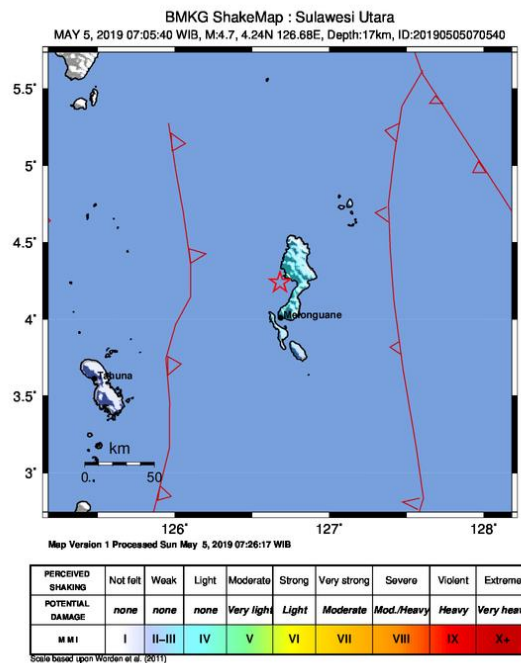
Gambar 78 Peta Guncangan Gempabumi 5 Mei 2019 pukul 04:02:11 WIB

Tabel 49 Atenuasi intensitas gempa bumi 5 Mei 2019 pukul 04:02:11 WIB

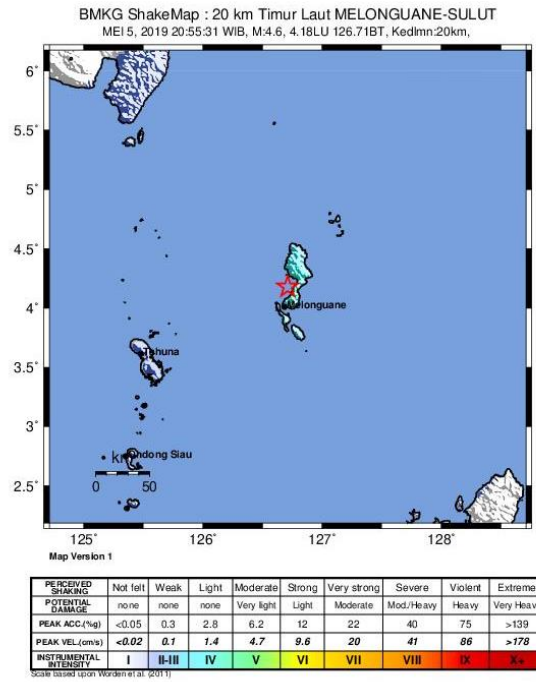
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SLMI	STA GEOF MANADO	1.44	124.84	189.84		1
2	KMSI	KOTA MUBAGO	0.57	123.98	203.95		3
3	MRSI	MARISA GORONTALO	0.48	121.94	283.06		1
4	LUWI	LUWUK	-1.04	122.77	373		2
5	TNTI	TERNATE	0.77	127.37	450.23		2
6	TMUN	TIDORE	0.66	127.45	461.97		2
7	MPSI	MAPAGA SABANG PALU	0.34	119.9	472.62		1
8	PMCI	STA MET POSO	-1.42	120.65	520.73		2
9	LBMI	LABUHA	-0.64	127.5	531.71		2
10	SANI	SANANA	-2.05	125.99	533.15		2
11	KDRI	STA MET KENDARI	-3.97	122.59	685.15		1
12	NLAI	NAMLEA MALUKU	-3.24	127.1	707.05		2
13	TTSI	TANATORAJA	-3.05	119.82	715.04		1
14	KKSI	KOLAKA	-4.17	121.65	731.65		1
15	KRAI	KAIRATU	-3.32	128.4	800.48		1
16	SPSI	SIDRAP	-3.96	119.77	800.67		1
17	BKB	BALIKPAPAN	-1.11	116.91	834.74		1
18	MSAI	MASOHI	-3.35	128.93	842.78		2
19	RAPI	RAJA AMPAT	-0.41	130.82	847.84		1
20	SWI	SORONG	-0.86	131.26	910.04		1
21	BKSI	BULUKUMBA	-5.32	120.12	911.85		1
22	MKS	GOWA	-5.22	119.47	935.38		1
23	BSSI	BENTENG SELAYAR	-6.14	120.49	978.7		1



Gambar 79 Peta Guncangan Gempabumi 5 Mei 2019 pukul 06:51:01 WIB

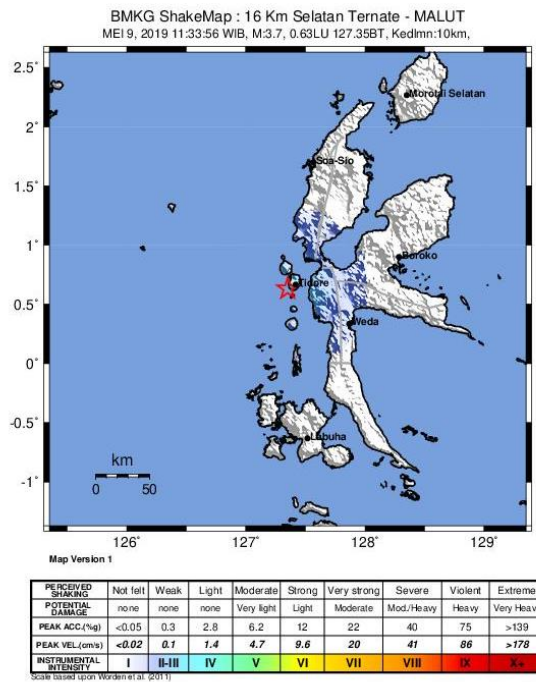


Gambar 80 Peta Guncangan Gempabumi 5 Mei 2019 pukul 07:05:40 WIB



Gambar 81 Peta Guncangan Gempabumi 5 Mei 2019 pukul 20:55:31 WIB
Tabel 50 Atenuasi intensitas gempa bumi 5 Mei 2019 pukul 20:55:31 WIB

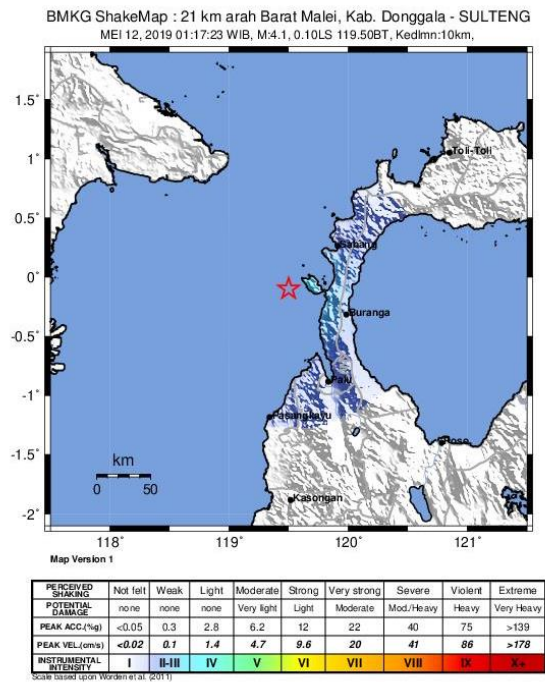
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SANI	SANANA	-2.05	125.99	697.14		1



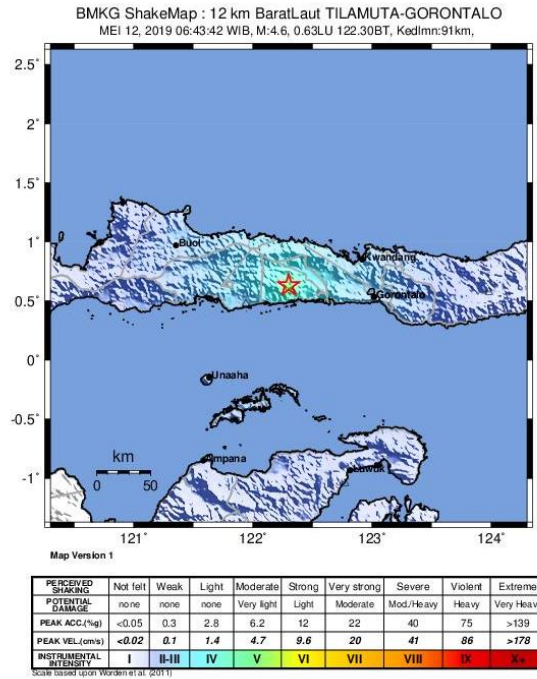
Gambar 82 Peta Guncangan Gempabumi 9 Mei 2019 pukul 11:33:56 WIB

Tabel 51 Atenuasi intensitas gempa bumi 9 Mei 2019 pukul 11:33:56 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TMUN	TIDORE	0.66	127.45	11.34	3	3
2	TNTI	TERNATE	0.77	127.37	15.91		3
3	SNDI	BANDANEIRA	-4.31	129.54	601.27		1
4	SPSI	SIDRAP	-3.96	119.77	985.21		1



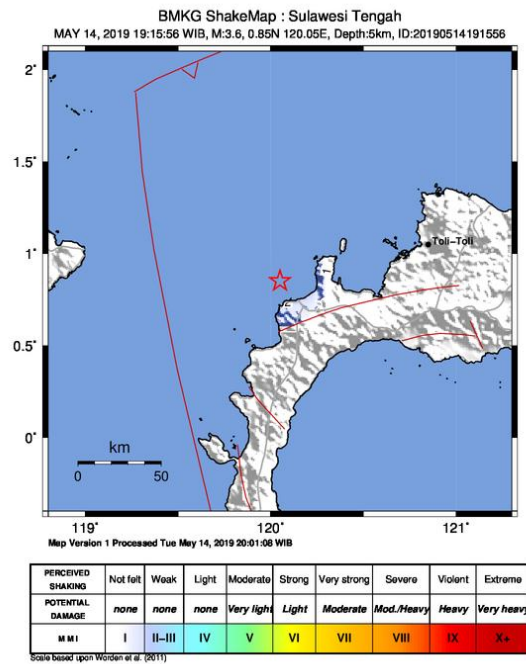
Gambar 83 Peta Guncangan Gempabumi 12 Mei 2019 pukul 01:17:23 WIB



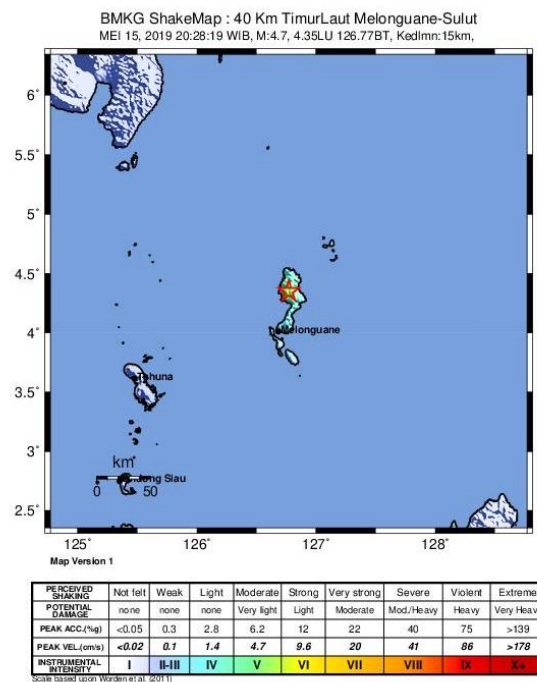
Gambar 84 Peta Guncangan Gempabumi 12 Mei 2019 pukul 06:43:42 WIB

Tabel 52 Atenuasi intensitas gempa bumi 12 Mei 2019 pukul 06:43:42 WIB

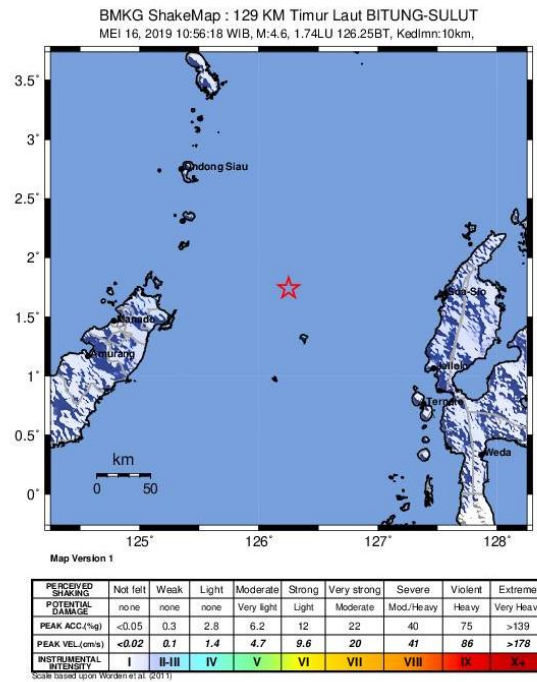
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	43.39		1
2	GMCI	STA MET GORONTALO	0.63	122.85	61.15	3	1
3	KMSI	KOTA MUBAGO	0.57	123.98	187.01		1
4	LUWI	LUWUK	-1.04	122.77	193.16		1
5	MPSI	MAPAGA SABANG PALU	0.34	119.9	269.06		1
6	SLMI	STA GEOF MANADO	1.44	124.84	296.4		1
7	SANI	SANANA	-2.05	125.99	506.74		1



Gambar 85 Peta Guncangan Gempabumi 14 Mei 2019 pukul 19:15:56 WIB



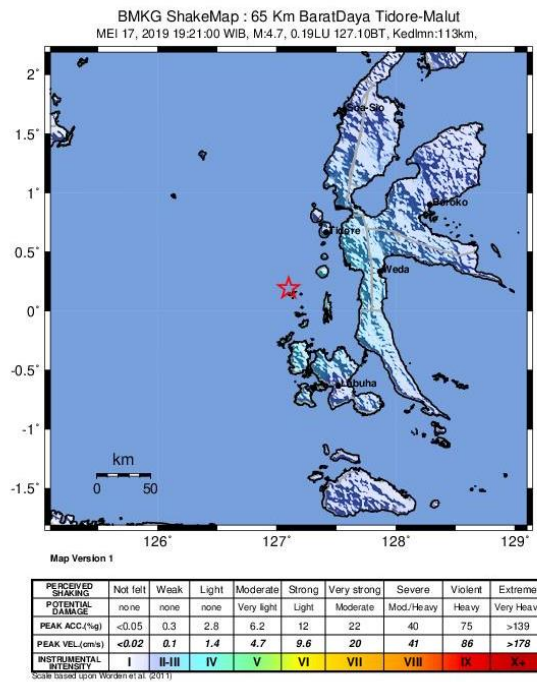
Gambar 86 Peta Guncangan Gempabumi 15 Mei 2019 pukul 20:28:19 WIB



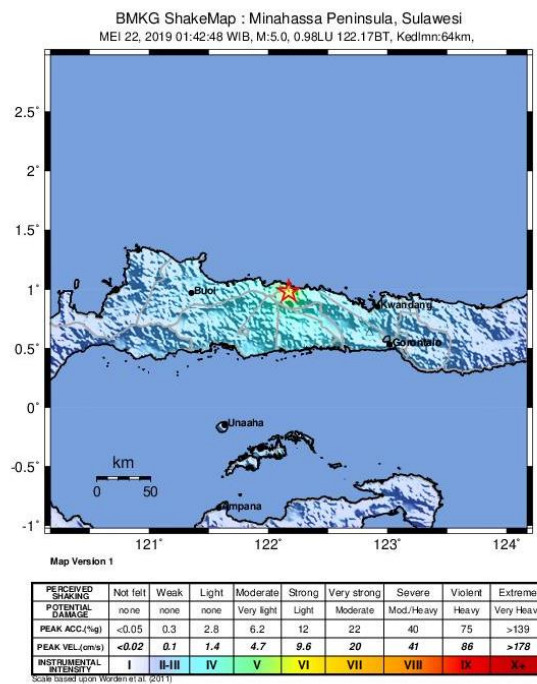
Gambar 87 Peta Guncangan Gempabumi 16 Mei 2019 pukul 10:56:18 WIB

Tabel 53 Atenuasi intensitas gempa bumi 16 Mei 2019 pukul 10:56:18 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SLMI	STA GEOF MANADO	1.44	124.84	160.27		1
2	TNTI	TERNATE	0.77	127.37	164.33		1
3	TMUN	TIDORE	0.66	127.45	178.82		1
4	KMSI	KOTA MUBAGO	0.57	123.98	283.59		1
5	LBMI	LABUHA	-0.64	127.5	298.76		1
6	SANI	SANANA	-2.05	125.99	422.2		1
7	BNDI	BANDANEIRA	-4.31	129.54	766.14		1



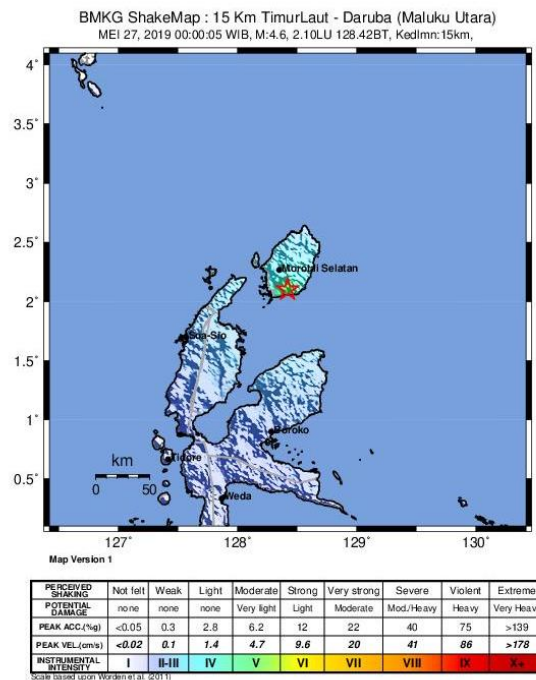
Gambar 88 Peta Guncangan Gempabumi 17 Mei 2019 pukul 19:21:00 WIB



Gambar 89 Peta Guncangan Gempabumi 22 Mei 2019 pukul 01:42:48 WIB

Tabel 54 Atenuasi intensitas gempa bumi 22 Mei 2019 pukul 01:42:48 WIB

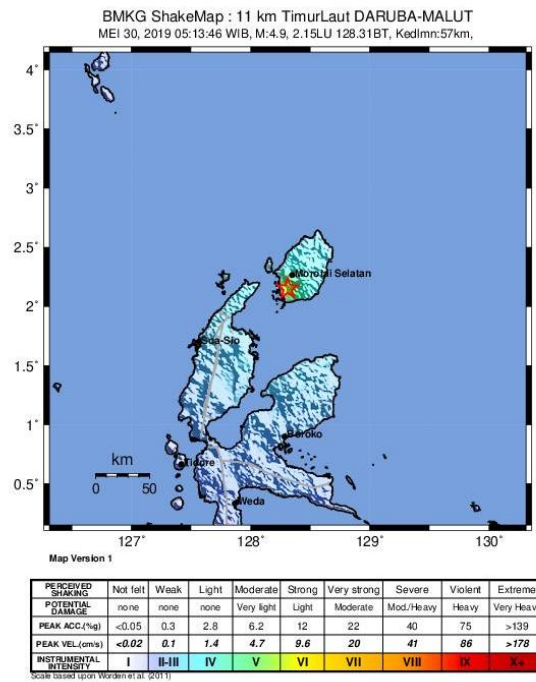
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	GMCI	STA MET GORONTALO	0.63	122.85	84.29	4	4
2	LUWI	LUWUK	-1.04	122.77	233.82		2
3	PMCI	STA MET POSO	-1.42	120.65	315.13		2
4	SANI	SANANA	-2.05	125.99	541.04		1
5	KDRI	STA MET KENDARI	-3.97	122.59	551.64		1
6	BKB	BALIKPAPAN	-1.11	116.91	628.99		1



Gambar 90 Peta Guncangan Gempabumi 27 Mei 2019 pukul 00:00:05 WIB

Tabel 55 Atenuasi intensitas gempa bumi 27 Mei 2019 pukul 00:00:05 WIB

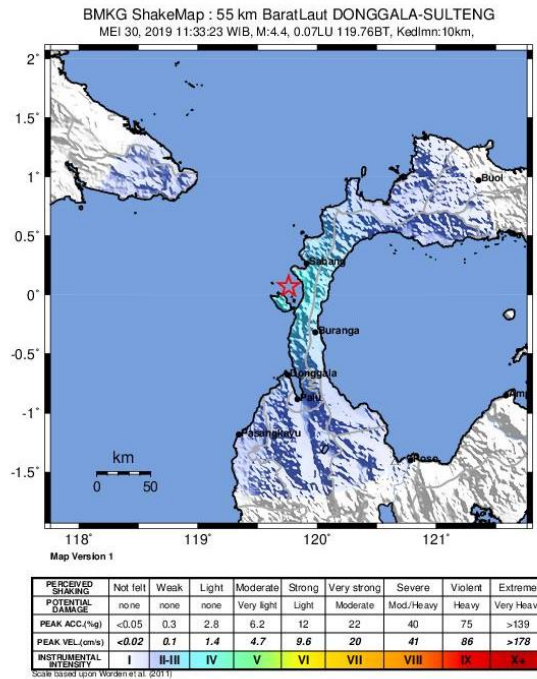
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	188.43		1
2	TMUN	TIDORE	0.66	127.45	192.87		1
3	LBMI	LABUHA	-0.64	127.5	321.13		1
4	RAPI	RAJA AMPAT	-0.41	130.82	386.21		1
5	SWI	SORONG	-0.86	131.26	456.24		1
6	FAKI	FAK-FAK	-2.92	132.26	702.96		1
7	LUWI	LUWUK	-1.04	122.77	718.57		1



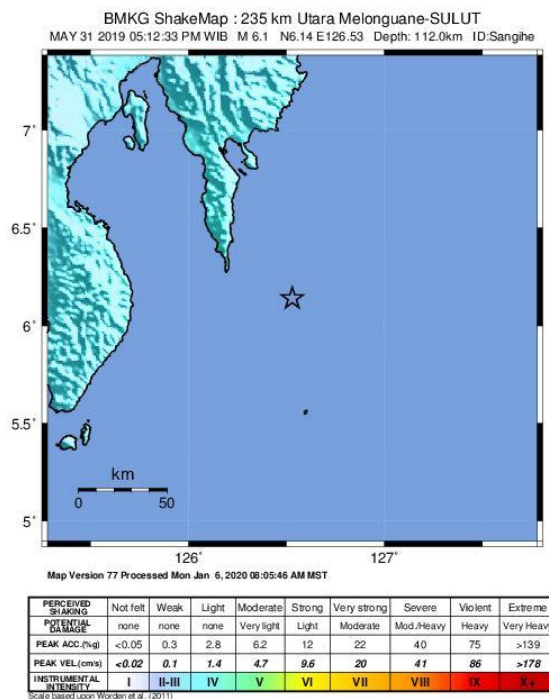
Gambar 91 Peta Guncangan Gempabumi 30 Mei 2019 pukul 05:13:46 WIB

Tabel 56 Atenuasi intensitas gempa bumi 30 Mei 2019 pukul 05:13:46 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	185.64		1
2	TMUN	TIDORE	0.66	127.45	191.07		1
3	LBMI	LABUHA	-0.64	127.5	322.78		1
4	SLMI	STA GEOF MANADO	1.44	124.84	393.69		1
5	RAPI	RAJA AMPAT	-0.41	130.82	398.71		1
6	SWI	SORONG	-0.86	131.26	468.74		1
7	SANI	SANANA	-2.05	125.99	533.41		1
8	FAKI	FAK-FAK	-2.92	132.26	714.84		1
9	RKPI	RANSIKI	-1.51	134.18	768.85		1
10	PMCI	STA MET POSO	-1.42	120.65	939.58		1

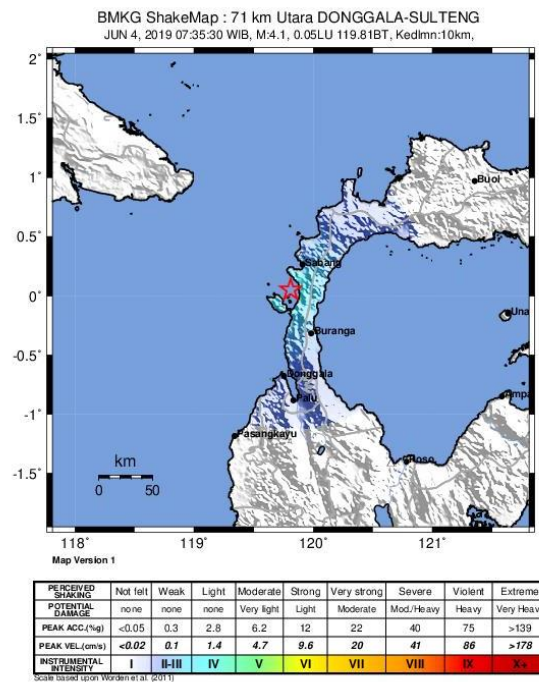


Gambar 92 Peta Guncangan Gempabumi 30 Mei 2019 pukul 11:33:23 WIB

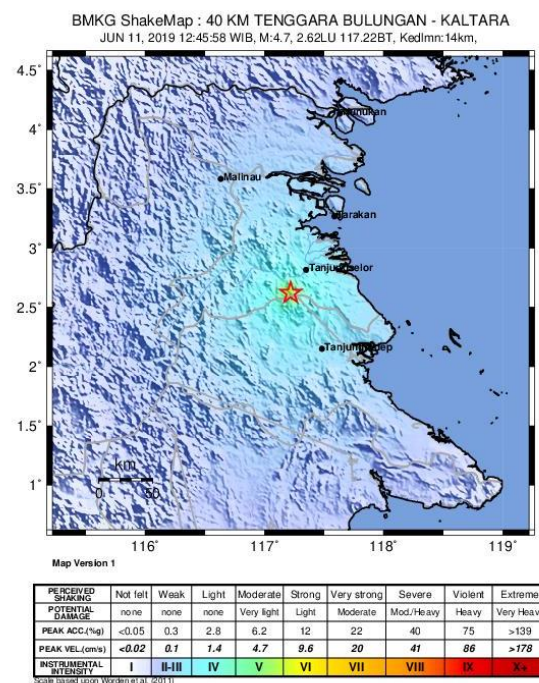


Gambar 93 Peta Guncangan Gempabumi 31 Mei 2019 pukul 17:12:33 WIB

F. Peta Guncangan (*Shakemap*) Gempabumi Bulan Juni 2019



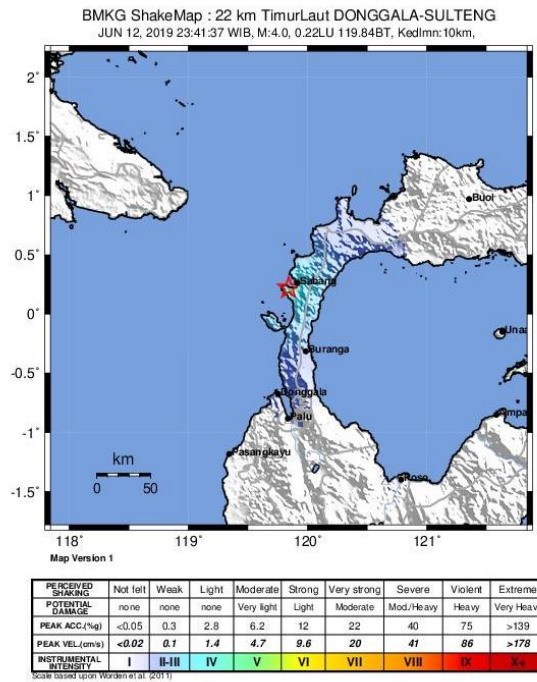
Gambar 94 Peta Guncangan Gempabumi 4 Juni 2019 pukul 07:35:30 WIB



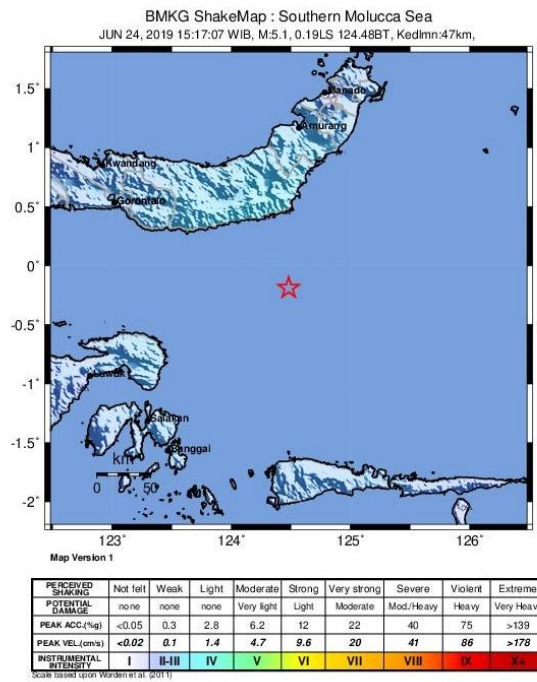
Gambar 95 Peta Guncangan Gempabumi 11 Juni 2019 pukul 12:45:58 WIB

Tabel 57 Atenuasi intensitas gempa bumi 11 Juni 2019 pukul 12:45:58 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TKUN		3.31	117.58	86.89		2
2	MPSI	MAPAGA SABANG PALU	0.34	119.9	391.18		1

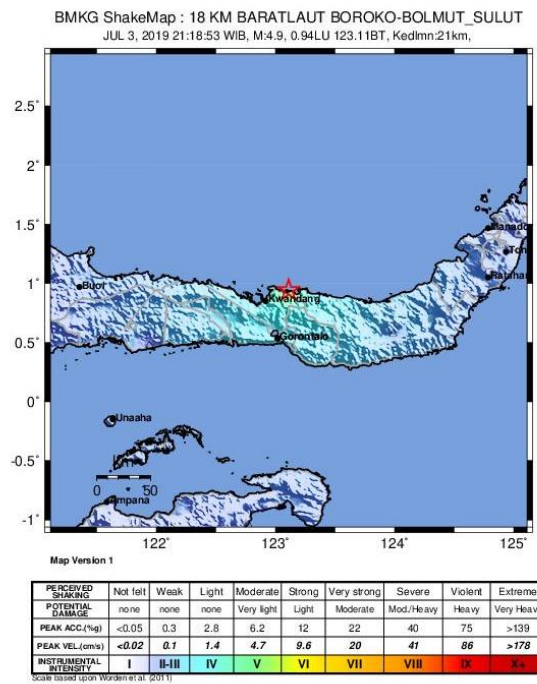


Gambar 96 Peta Guncangan Gempabumi 12 Juni 2019 pukul 23:41:37 WIB

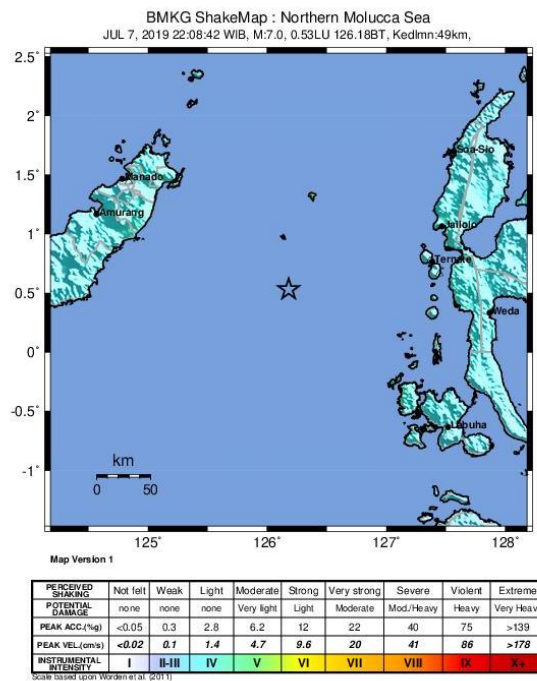


Gambar 97 Peta Guncangan Gempabumi 24 Juni 2019 pukul 15:17:07 WIB

G. Peta Guncangan (*Shakemap*) Gempabumi Bulan Juli 2019



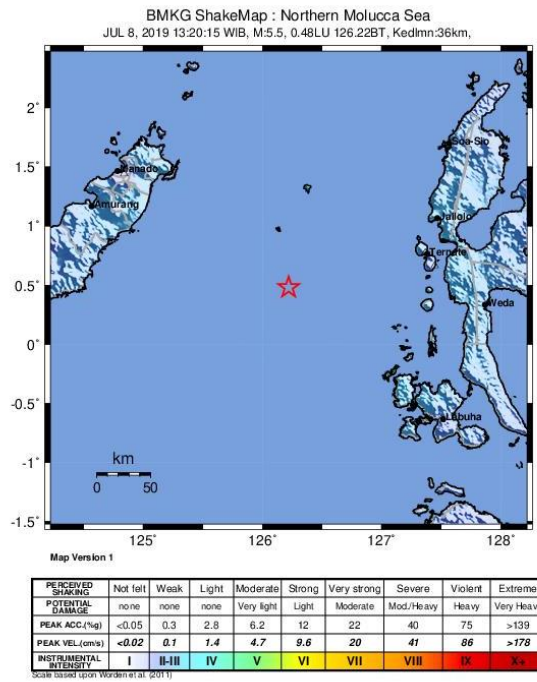
Gambar 98 Peta Guncangan Gempabumi 3 Juli 2019 pukul 21:18:53 WIB



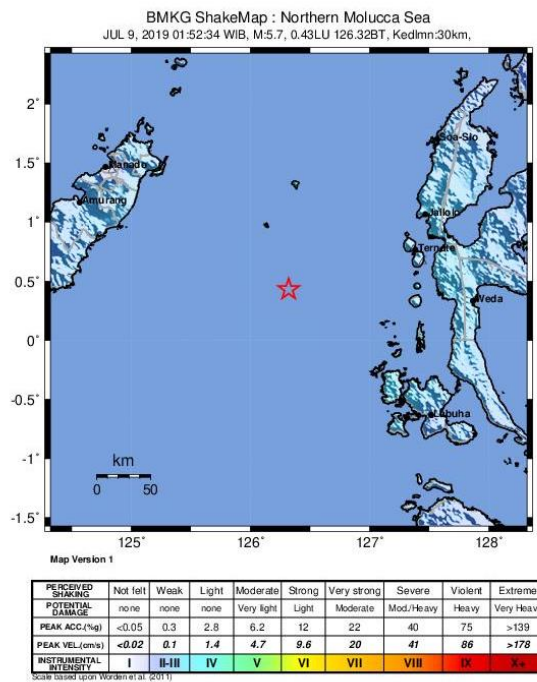
Gambar 99 Peta Guncangan Gempabumi 7 Juli 2019 pukul 22:08:42 WIB

Tabel 58 Atenuasi intensitas gempa bumi 7 Juli 2019 pukul 22:08:42 WIB

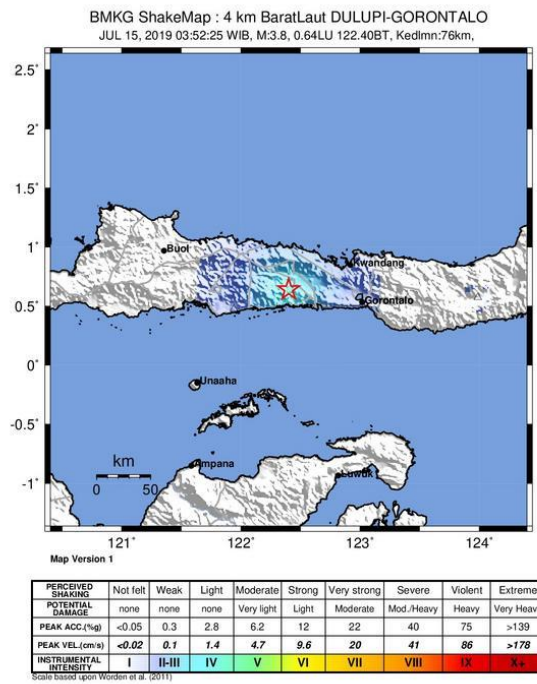
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	130.6	4	4
2	TMUN	TIDORE	0.66	127.45	137.06		3
3	SLMI	STA GEOF MANADO	1.44	124.84	174.19	5	3
4	LBMI	LABUHA	-0.64	127.5	189.36		4
5	KMSI	KOTA MUBAGO	0.57	123.98	235.99		5
6	SANI	SANANA	-2.05	125.99	279.2		3
7	LUWI	LUWUK	-1.04	122.77	407.8		3
8	NLAI	NAMLEA MALUKU	-3.24	127.1	421.81		3
9	MRSI	MARISA GORONTALO	0.48	121.94	461.62		2
10	KRAI	KAIRATU	-3.32	128.4	483.84		2
11	PAMI	STA MET PATTIMURA AMBON	-3.71	128.1	507.54		4
12	RAPI	RAJA AMPAT	-0.41	130.82	516.59		2
13	MSAI	MASOHI	-3.35	128.93	518.3		3
14	SWI	SORONG	-0.86	131.26	575.5		2
15	KDRI	STA MET KENDARI	-3.97	122.59	629.74		1
16	PMCI	STA MET POSO	-1.42	120.65	641.02		3
17	BDMI	STA MET BANDANEIRA	-4.52	129.21	687.46		2
18	BNDI	BANDANEIRA	-4.52	129.21	687.46		2
19	MPSI	MAPAGA SABANG PALU	0.34	119.9	688.53		2
20	KKSI	KOLAKA	-4.17	121.65	715.3		2
21	FAKI	FAK-FAK	-2.92	132.26	767.15		1
22	TTSI	TANATORAJA	-3.05	119.82	800.69		2
23	SPSI	SIDRAP	-3.96	119.77	859.72		1
24	RKPI	RANSIKI	-1.51	134.18	907.13		2
25	BASO	BARU SULAWESI	-4.53	119.63	909.29		2
26	BKSI	BULUKUMBA	-5.32	120.12	925.41		1
27	KMPI	KAIMANA	-3.66	133.7	946.73		1
28	BSSI	BENTENG SELAYAR	-6.14	120.49	963.84		1
29	ALKI	ALOR	-8.14	124.59	969.97		1



Gambar 100 Peta Guncangan Gempabumi 8 Juli 2019 pukul 13:20:15 WIB

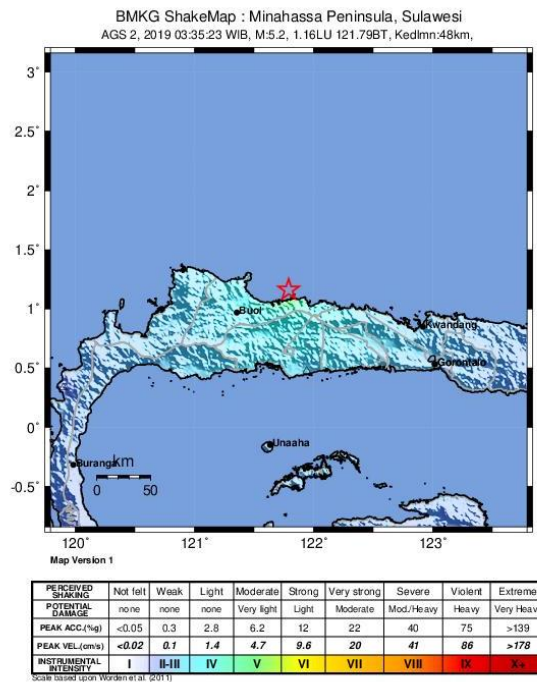


Gambar 101 Peta Guncangan Gempabumi 9 Juli 2019 pukul 01:52:34 WIB



Gambar 102 Peta Guncangan Gempabumi 15 Juli 2019 pukul 03:52:25 WIB

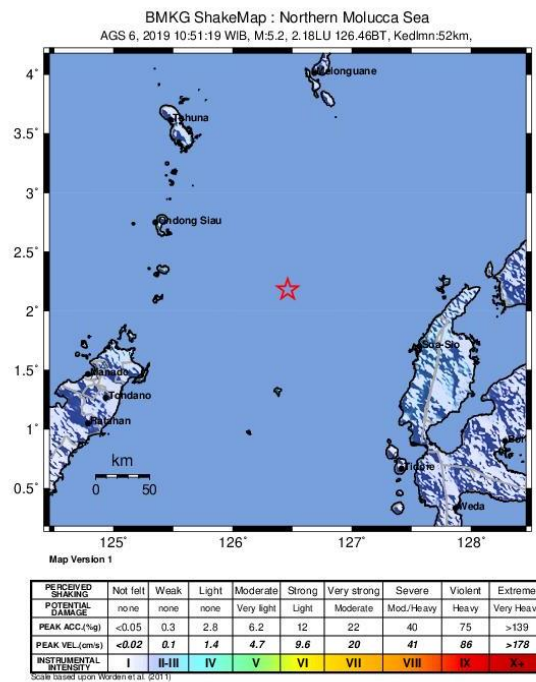
H. Peta Guncangan (*Shakemap*) Gempabumi Bulan Agustus 2019



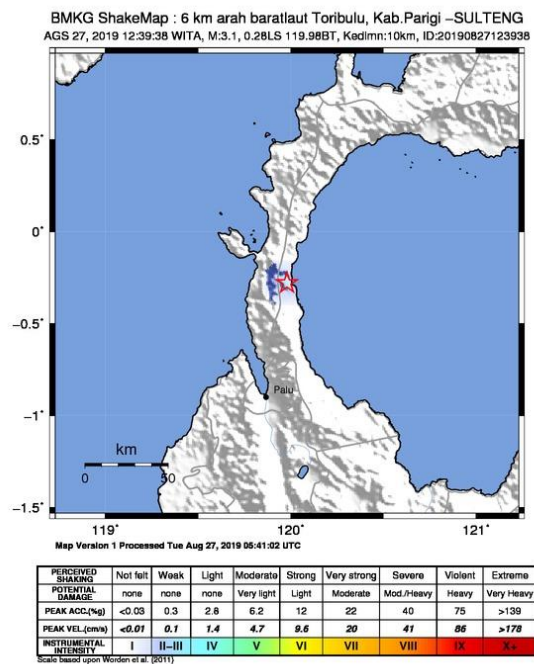
Gambar 103 Peta Guncangan Gempabumi 2 Agustus 2019 pukul 03:35:23 WIB

Tabel 59 Atenuasi intensitas gempa bumi 2 Agustus 2019 pukul 03:35:23 WIB

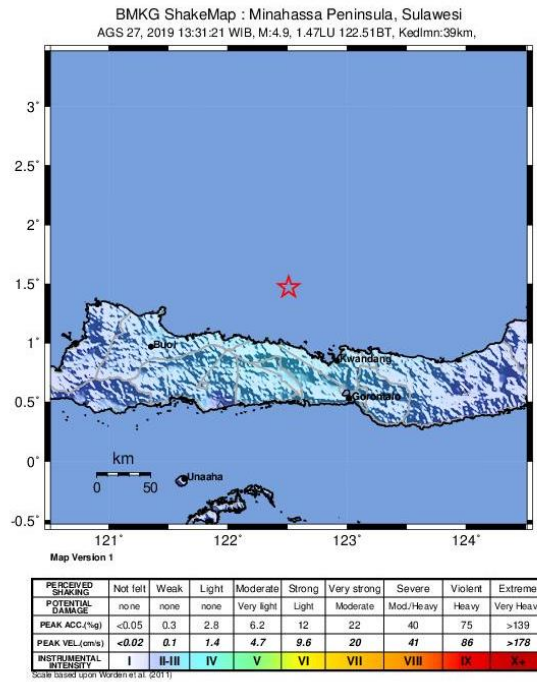
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	76.79		3
2	MPSI	MAPAGA SABANG PALU	0.34	119.9	228.4		2
3	PMCI	STA MET POSO	-1.42	120.65	312.34		2
4	MSBA	STA MET MASAMBA	-2.55	120.32	443.04		1
5	TTSI	TANATORAJA	-3.05	119.82	515.37		1
6	KDRI	STA MET KENDARI	-3.97	122.59	576.35		1
7	SANI	SANANA	-2.05	125.99	586.55		1
8	KKSI	KOLAKA	-4.17	121.65	592.08		1
9	BKB	BALIKPAPAN	-1.11	116.91	597.82		1
10	NLAI	NAMLEA MALUKU	-3.24	127.1	765.56		1



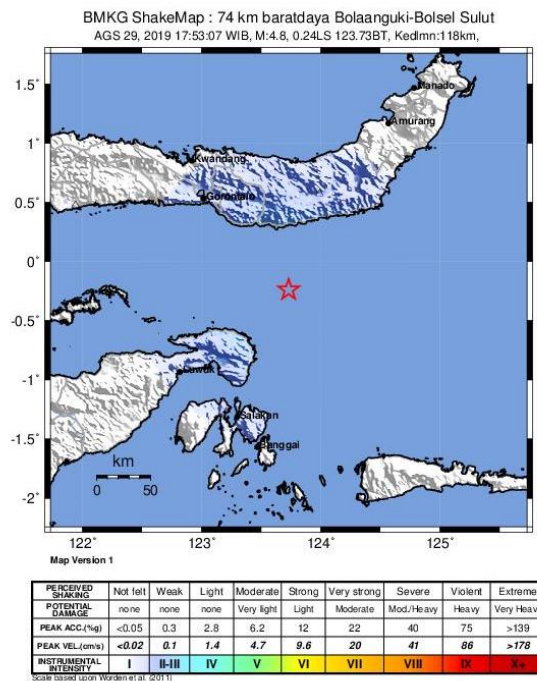
Gambar 104 Peta Guncangan Gempabumi 6 Agustus 2019 pukul 10:51:19 WIB



Gambar 105 Peta Guncangan Gempabumi 27 Agustus 2019 pukul 11:39:38 WIB

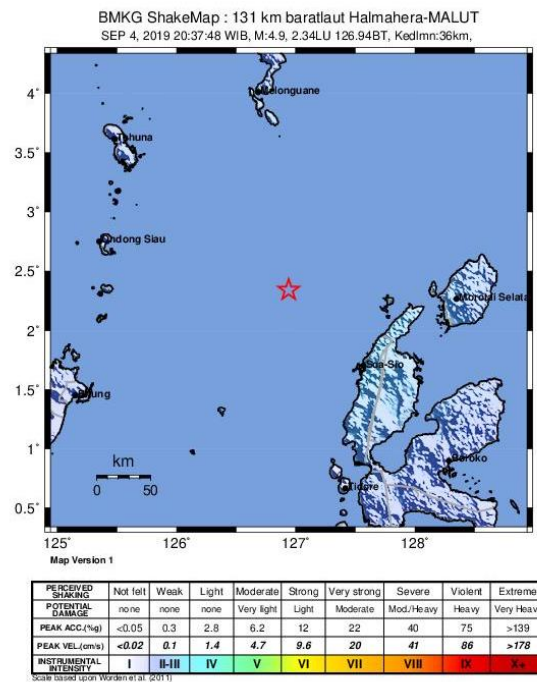


Gambar 106 Peta Guncangan Gempabumi 27 Agustus 2019 pukul 13:31:21 WIB



Gambar 107 Peta Guncangan Gempabumi 29 Agustus 2019 pukul 17:53:07 WIB

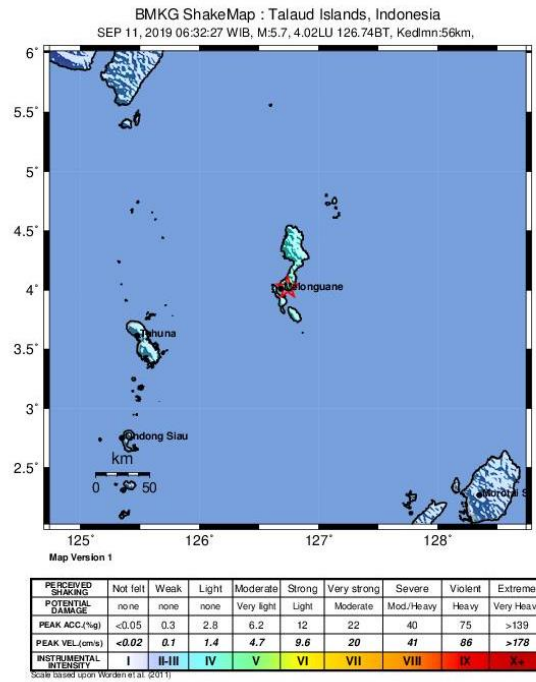
I. Peta Guncangan (*Shakemap*) Gempabumi Bulan September 2019



Gambar 108 Peta Guncangan Gempabumi 4 September 2019 pukul 20:37:48 WIB

Tabel 60 Atenuasi intensitas gempa bumi 4 September 2019 pukul 20:37:48 WIB

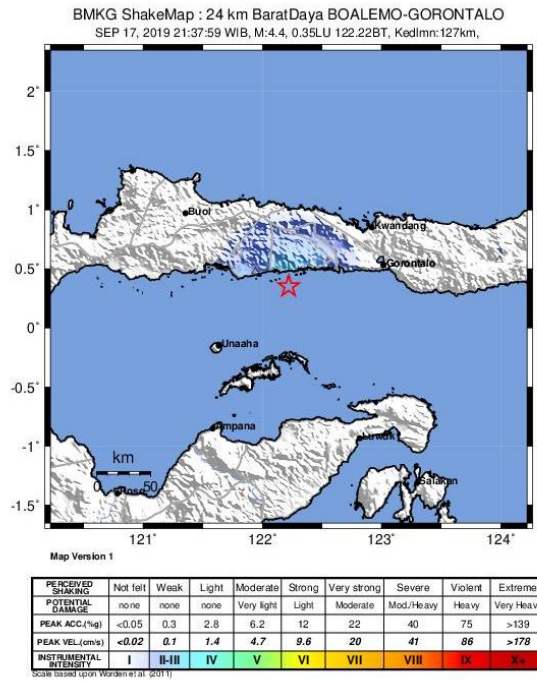
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	180.69		1
2	TMUN	TIDORE	0.66	127.45	194.61		1
3	SAMI	STA MET SAMRATULANGI					
		MANADO	1.54	124.92	241.38	2	1
4	LBMI	LABUHA	-0.64	127.5	336.95		1
5	KMSI	KOTA MUBAGO	0.57	123.98	382.36		1
6	SANI	SANANA	-2.05	125.99	499.45		1
7	MPSI	MAPAGA SABANG PALU	0.34	119.9	813.84		1



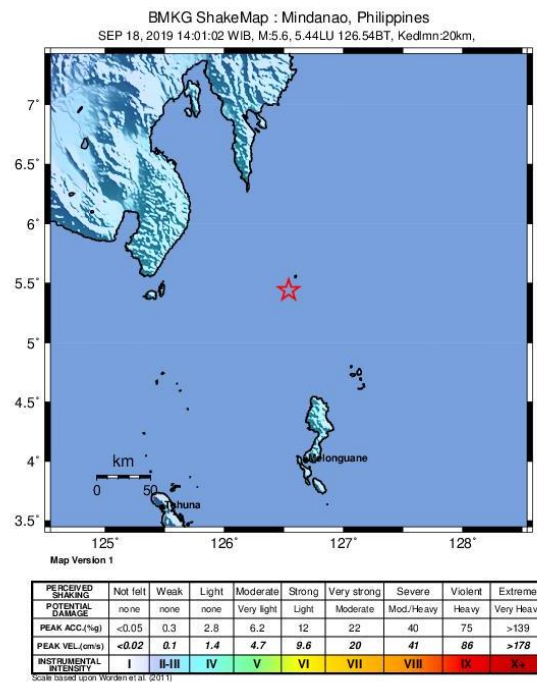
Gambar 109 Peta Guncangan Gempabumi 11 September 2019 pukul 06:32:27 WIB

Tabel 61 Atenuasi intensitas gempa bumi 4 September 2019 pukul 20:37:48 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	344.72		1
2	TNTI	TERNATE	0.77	127.37	370.18		1
3	MRSI	MARISA GORONTALO	0.48	121.94	663.44		1
4	RAPI	RAJA AMPAT	-0.41	130.82	670.07		1
5	SANI	SANANA	-2.05	125.99	680.57		1
6	SWI	SORONG	-0.86	131.26	739.87		1
7	NLAI	NAMLEA MALUKU	-3.24	127.1	808.3		1



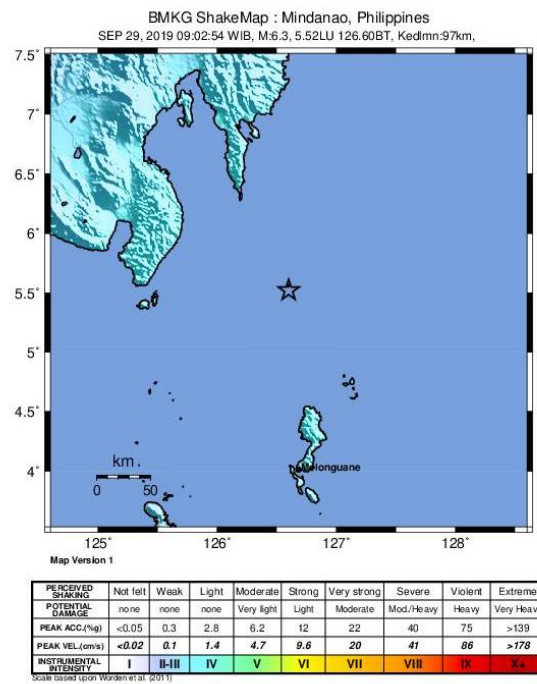
Gambar 110 Peta Guncangan Gempabumi 17 September 2019 pukul 21:37:59 WIB



Gambar 111 Peta Guncangan Gempabumi 18 September 2019 pukul 14:01:02 WIB

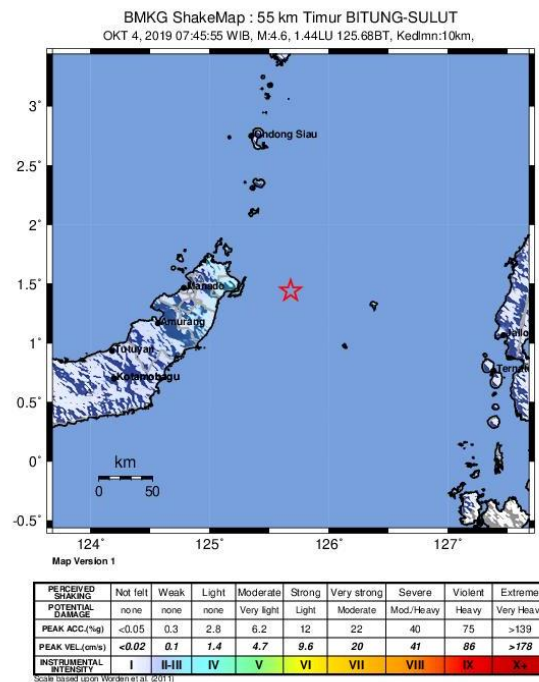
Tabel 62 Atenuasi intensitas gempa bumi 18 September 2019 pukul 14:01:02 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	MRSI	MARISA GORONTALO	0.48	121.94	750.51		1
2	SANI	SANANA	-2.05	125.99	833.76		1
3	NLAI	NAMLEA MALUKU	-3.24	127.1	965.73		1

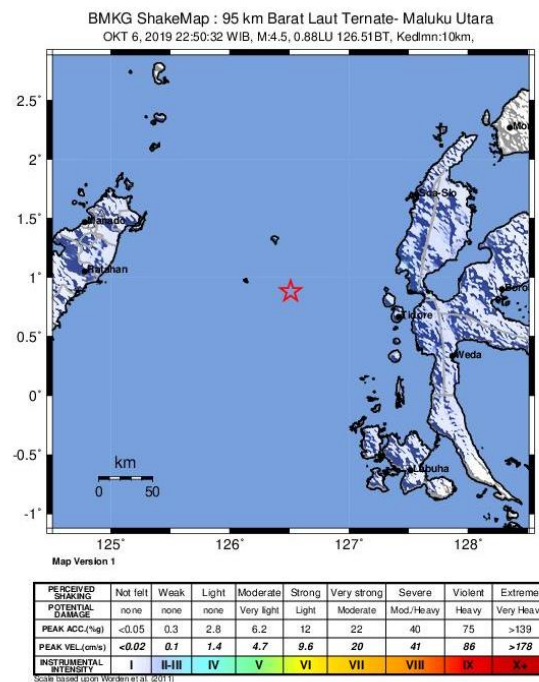


Gambar 112 Peta Guncangan Gempabumi 29 September 2019 pukul 09:02:54 WIB

J. Peta Guncangan (*Shakemap*) Gempabumi Bulan Oktober 2019



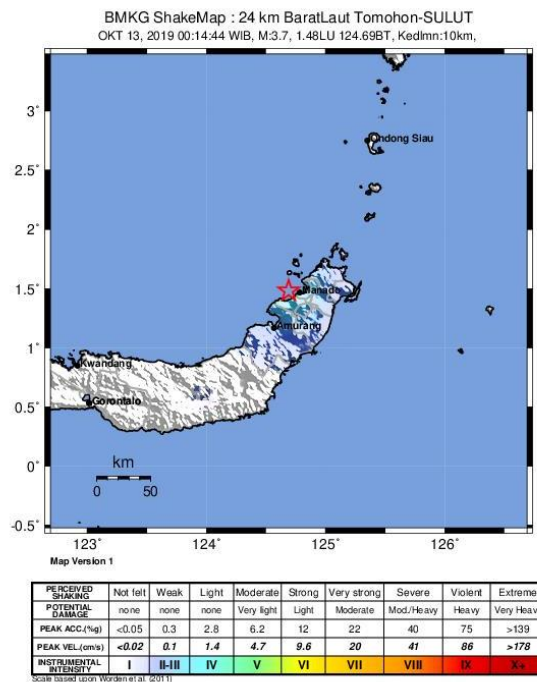
Gambar 113 Peta Guncangan Gempabumi 4 Oktober 2019 pukul 07:45:55 WIB



Gambar 114 Peta Guncangan Gempabumi 6 Oktober 2019 pukul 22:50:32 WIB

Tabel 63 Atenuasi intensitas gempa bumi 6 Oktober 2019 pukul 22:50:32 WIB

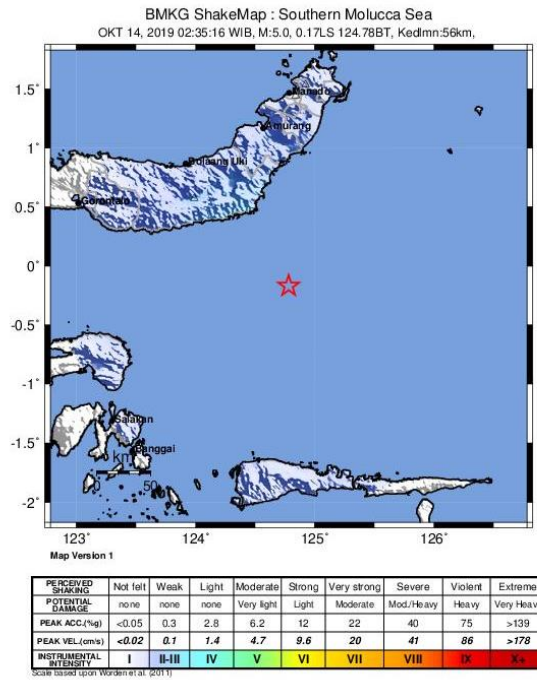
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TMUN	TIDORE	0.66	127.45	106.79	2	1
2	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	191.06		1
3	SLMI	STA GEOF MANADO	1.44	124.84	196.05		1
4	LBMI	LABUHA	-0.64	127.5	201.57		1
5	NLAI	NAMLEA MALUKU	-3.24	127.1	462.68		1



Gambar 115 Peta Guncangan Gempabumi 13 Oktober 2019 pukul 00:14:44 WIB

Tabel 64 Atenuasi intensitas gempa bumi 13 Oktober 2019 pukul 00:14:44 WIB

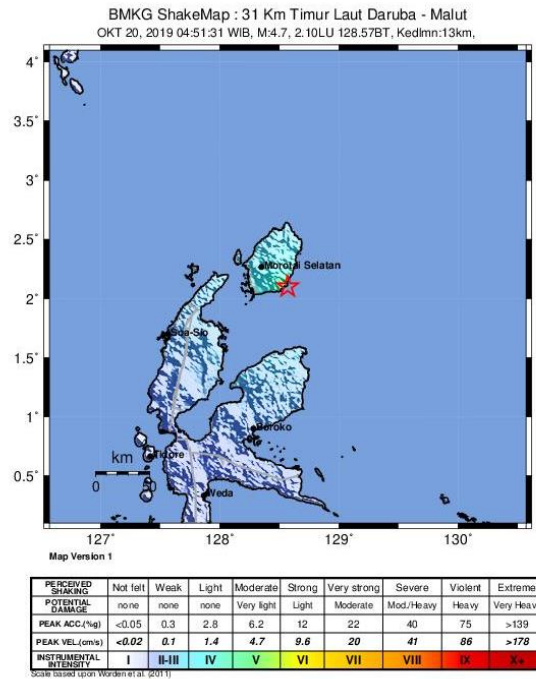
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KMSI	KOTA MUBAGO	0.57	123.98	127.38		1



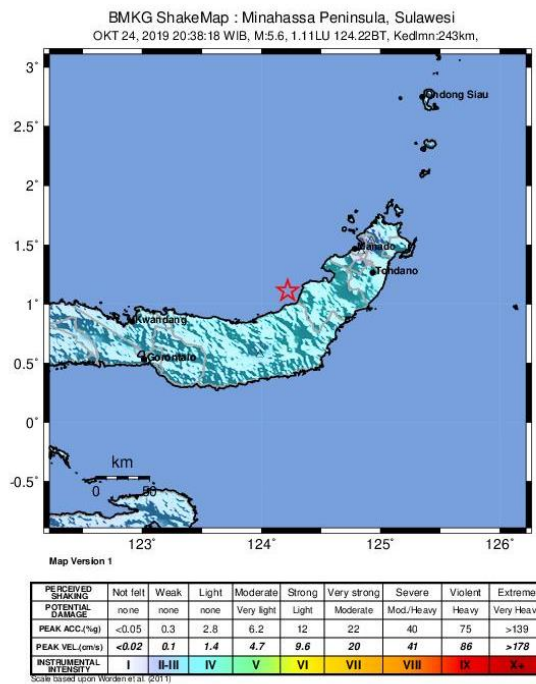
Gambar 116 Peta Guncangan Gempabumi 14 Oktober 2019 pukul 02:35:16 WIB

Tabel 65 Atenuasi intensitas gempa bumi 14 Oktober 2019 pukul 02:35:16 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KMSI	KOTA MUBAGO	0.57	123.98	120.14	3	3
2	SLMI	STA GEOF MANADO	1.44	124.84	178.78		1
3	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	189.72		2
4	LBMI	LABUHA	-0.64	127.5	306.25		1
5	TMUN	TIDORE	0.66	127.45	309.88		1
6	MRSI	MARISA GORONTALO	0.48	121.94	323.03	2	1
7	NLAI	NAMLEA MALUKU	-3.24	127.1	426.95		1
8	PMCI	STA MET POSO	-1.42	120.65	478.27		2
9	KDRI	STA MET KENDARI	-3.97	122.59	486.86		1
10	KRAI	KAIRATU	-3.32	128.4	532.12		1
11	MPSI	MAPAGA SABANG PALU	0.34	119.9	545.03		1
12	MSAI	MASOHI	-3.35	128.93	579.95		1
13	SPSI	SIDRAP	-3.96	119.77	697.81		1
14	BKSI	BULUKUMBA	-5.32	120.12	771.03		1
15	SUHA	STA MET HASANUDIN MAKASAR	-5.06	119.55	795.15		1
15	BSSI	BENTENG SELAYAR	-6.14	120.49	816.41		1



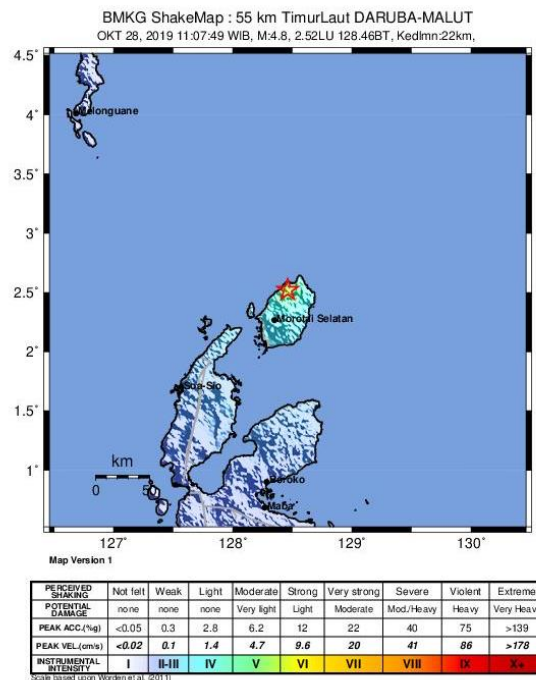
Gambar 117 Peta Guncangan Gempabumi 20 Oktober 2019 pukul 04:51:31 WIB



Gambar 118 Peta Guncangan Gempabumi 24 Oktober 2019 pukul 20:38:18 WIB

Tabel 66 Atenuasi intensitas gempa bumi 24 Oktober 2019 pukul 20:38:18 WIB

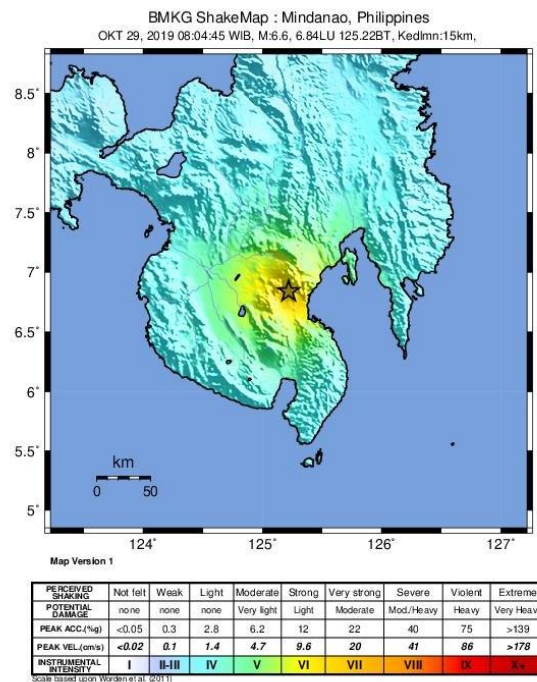
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KMSI	KOTA MUBAGO	0.57	123.98	141.34	2	3
2	SLMI	STA GEOF MANADO	1.44	124.84	144.2		2
3	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	151.28		2
4	MRSI	MARISA GORONTALO	0.48	121.94	290.68	2	2
5	TNTI	TERNATE	0.77	127.37	372.17		2
6	TMUN	TIDORE	0.66	127.45	381.94		1
7	SANI	SANANA	-2.05	125.99	424.34		2
8	LBMI	LABUHA	-0.64	127.5	432.52		2
9	PMCI	STA MET POSO	-1.42	120.65	503.01		3
10	MPSI	MAPAGA SABANG PALU	0.34	119.9	503.05		1
11	NLAI	NAMLEA MALUKU	-3.24	127.1	595.97		2
12	MSBA	STA MET MASAMBA	-2.55	120.32	609.58		1
13	KDRI	STA MET KENDARI	-3.97	122.59	609.62		1
14	KKSI	KOLAKA	-4.17	121.65	667.97		1
15	KRAI	KAIRATU	-3.32	128.4	690.24		1
16	SPSI	SIDRAP	-3.96	119.77	763.04		1
17	MJNE	STA MET MAJENE	-3.55	118.98	791.38		1
18	BKSI	BULUKUMBA	-5.32	120.12	859.75		1
19	BNDI	BANDANEIRA	-4.52	129.91	900.33		1
20	BSSI	BENTENG SELAYAR	-6.14	120.49	918.27		1



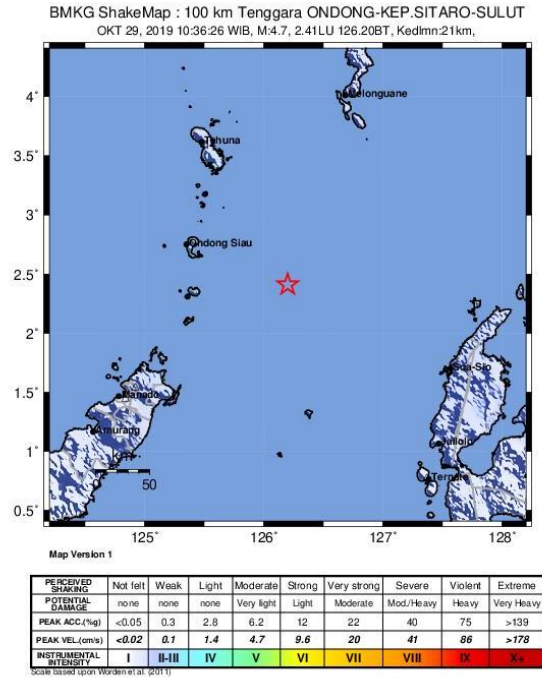
Gambar 119 Peta Guncangan Gempabumi 28 Oktober 2019 pukul 11:07:49 WIB

Tabel 67 Atenuasi intensitas gempa bumi 28 Oktober 2019 pukul 11:07:49 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	RAPI	RAJA AMPAT	-0.41	130.82	418.38		1
2	RKPI	RANSIKI	-1.51	134.18	777.69		1
3	BNDI	BANDANEIRA	-4.52	129.91	799.37		1



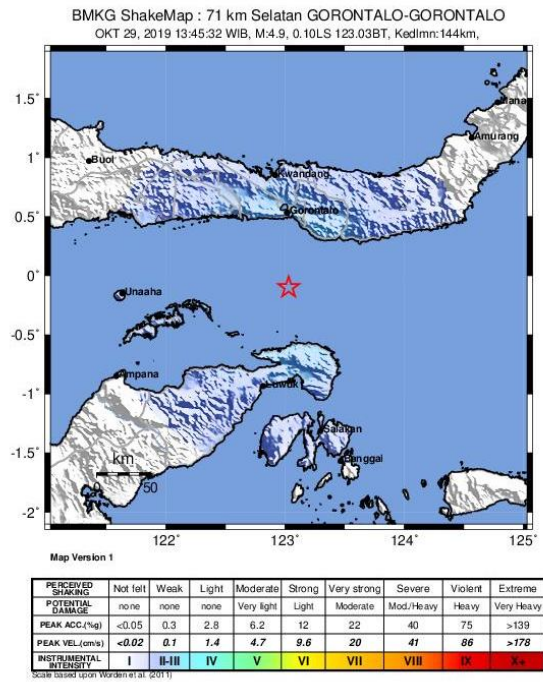
Gambar 120 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 09:04:45 WIB



Gambar 121 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 10:36:26 WIB

Tabel 68 Atenuasi intensitas gempa bumi 29 Oktober 2019 pukul 10:36:26 WIB

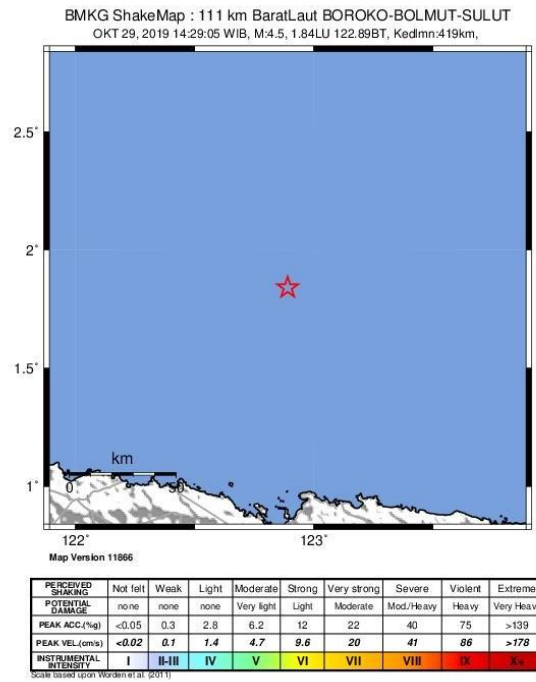
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	172.03		1
2	SLMI	STA GEOF MANADO	1.44	124.84	185.55		1
3	TNTI	TERNATE	0.77	127.37	223.6		1
4	LBMI	LABUHA	-0.64	127.5	368.48		1
5	SANI	SANANA	-2.05	125.99	496.46		1
6	MRSI	MARISA GORONTALO	0.48	121.94	519.91		1
7	NLAI	NAMLEA MALUKU	-3.24	127.1	636.05		1
8	MSAI	MASOHI	-3.35	128.93	708.24		1



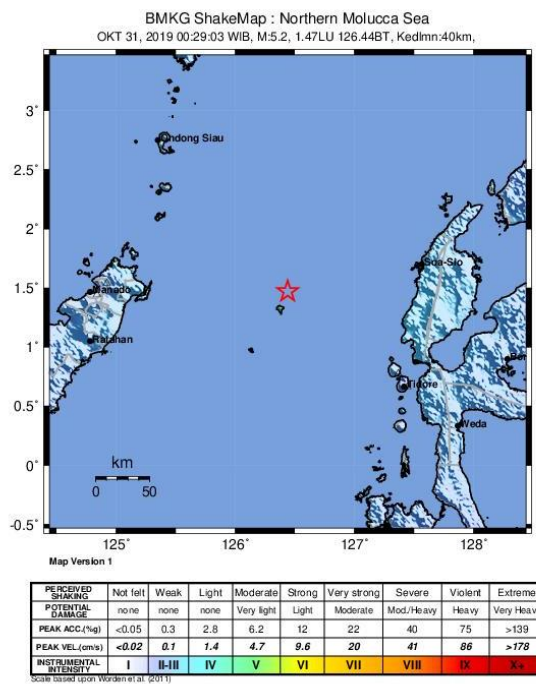
Gambar 122 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 13:45:32 WIB

Tabel 69 Atenuasi intensitas gempa bumi 29 Oktober 2019 pukul 13:45:32 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KMSI	KOTA MUBAGO	0.57	123.98	130.29		1
2	MRSI	MARISA GORONTALO	0.48	121.94	137.04	2	2
3	MPSI	MAPAGA SABANG PALU	0.34	119.9	351.64		1
4	SANI	SANANA	-2.05	125.99	393.88		1
5	NLAI	NAMLEA MALUKU	-3.24	127.1	571.33		1
6	BSSI	BENTENG SELAYAR	-6.14	120.49	728.66		1



Gambar 123 Peta Guncangan Gempabumi 29 Oktober 2019 pukul 14:29:05 WIB

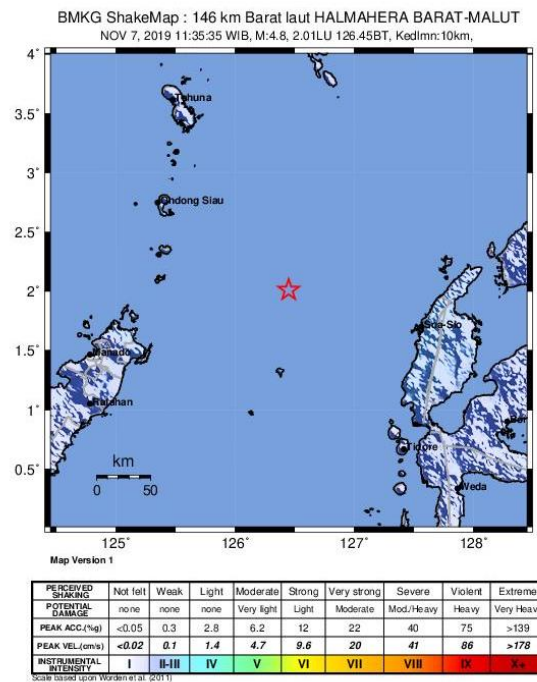


Gambar 124 Peta Guncangan Gempabumi 31 Oktober 2019 pukul 00:29:03 WIB

Tabel 70 Atenuasi intensitas gempa bumi 31 Oktober 2019 pukul 00:29:03 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	128.02		2
2	TMUN	TIDORE	0.66	127.45	142.29		1
3	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	167.91		2
4	SLMI	STA GEOG MANADO	1.44	124.84	177	2	2
5	LBMI	LABUHA	-0.64	127.5	261.41		1
6	KMSI	KOTA MUBAGO	0.57	123.98	289.22		3
7	SANI	SANANA	-2.05	125.99	393.59		1
8	MRSI	MARISA GORONTALO	0.48	121.94	511.23		1
9	NLAI	NAMLEA MALUKU	-3.24	127.1	527.73		1
10	MPSI	MAPAGA SABANG PALU	0.34	119.9	737.16		1
11	KDRI	STA MET KENDARI	-3.97	122.59	739.94		1
12	FAKI	FAK-FAK	-2.92	132.26	809.84		1
13	KKSI	KOLAKA	-4.17	121.65	821.65		1
14	SPSI	SIDRAP	-3.96	119.77	955.43		1
15	MJNE	STA MET MAJENE	-3.55	118.98	998.54		1

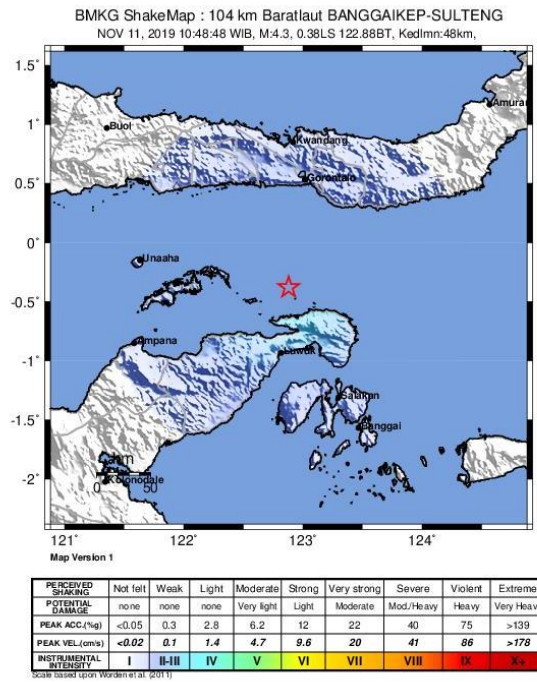
K. Peta Guncangan (*Shakemap*) Gempabumi Bulan November 2019



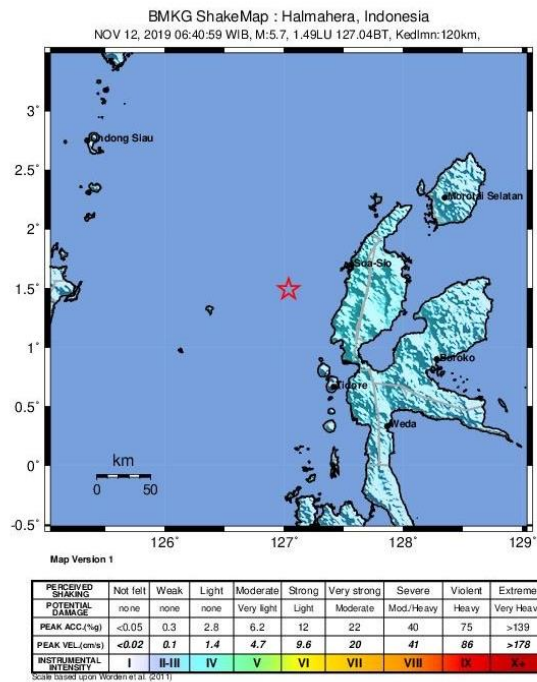
Gambar 125 Peta Guncangan Gempabumi 07 November 2019 pukul 11:35:35 WIB

Tabel 71 Atenuasi intensitas gempa bumi 07 November 2019 pukul 11:35:35 WIB

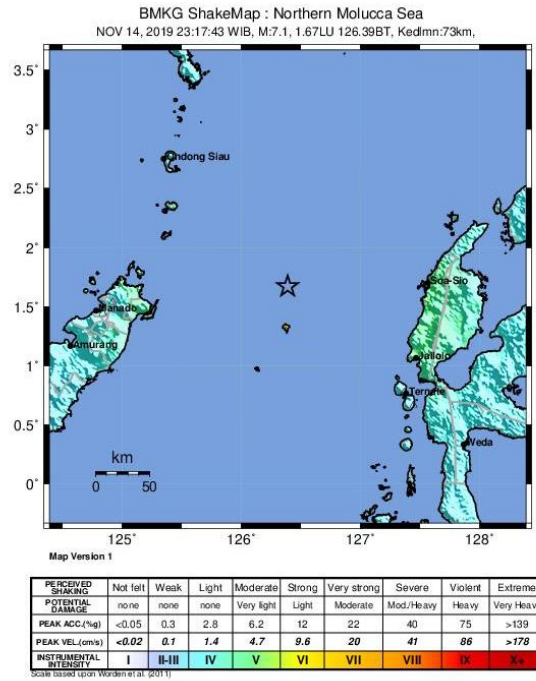
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	171.29		1
2	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	177.78		1
3	SLMI	STA GEOF MANADO	1.44	124.84	189.81	2	1
4	SANI	SANANA	-2.05	125.99	454.33		1



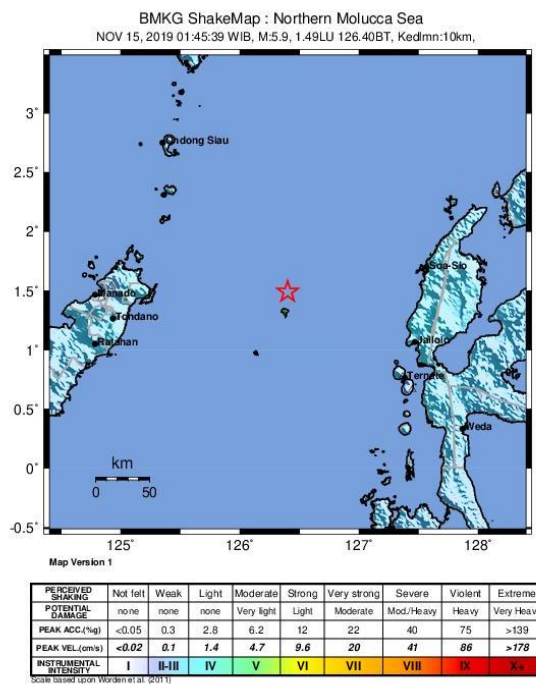
Gambar 126 Peta Guncangan Gempabumi 11 November 2019 pukul 10:48:48 WIB



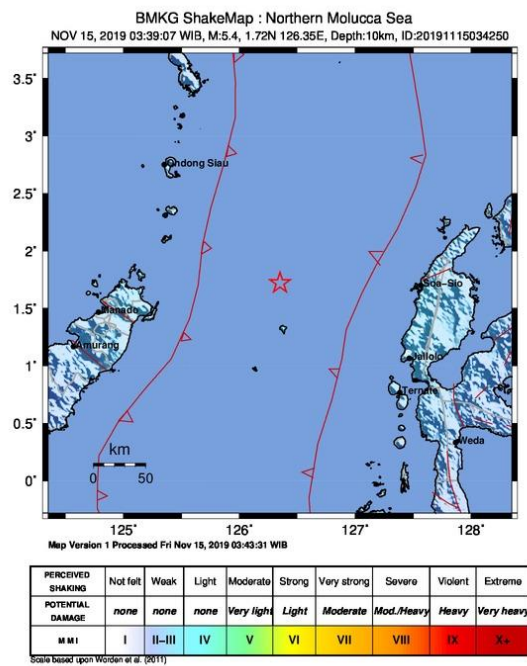
Gambar 127 Peta Guncangan Gempabumi 12 November 2019 pukul 06:40:59 WIB



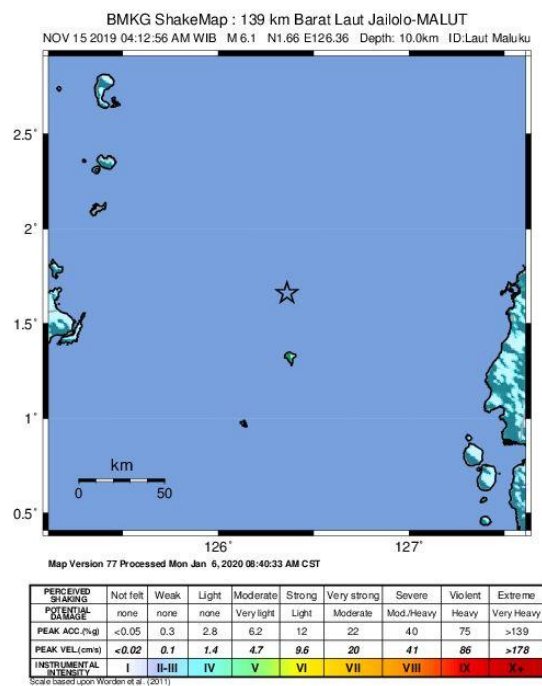
Gambar 128 Peta Guncangan Gempabumi 14 November 2019 pukul 23:17:43 WIB



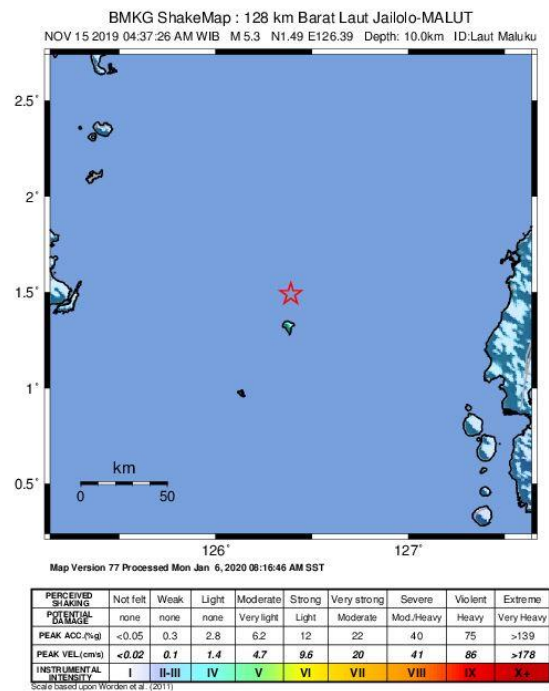
Gambar 129 Peta Guncangan Gempabumi 15 November 2019 pukul 01:45:39 WIB



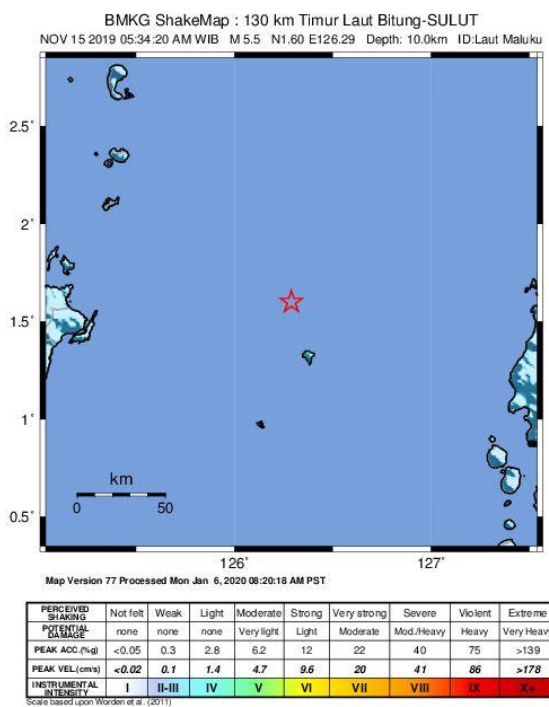
Gambar 130 Peta Guncangan Gempabumi 15 November 2019 pukul 03:39:07 WIB



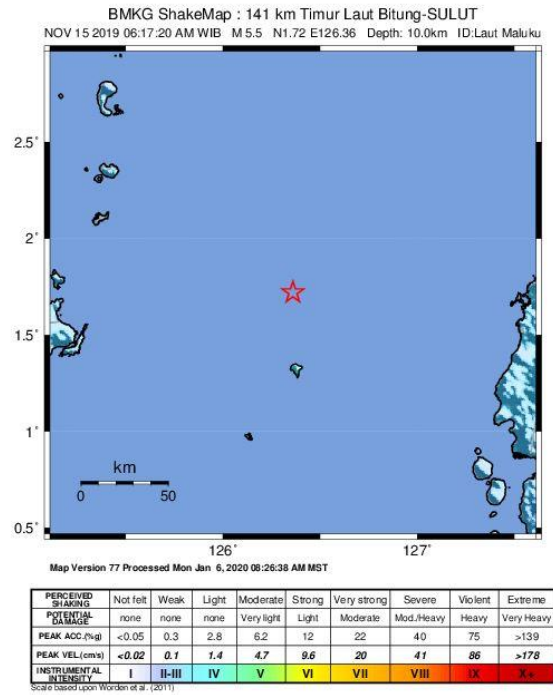
Gambar 131 Peta Guncangan Gempabumi 15 November 2019 pukul 04:12:56 WIB



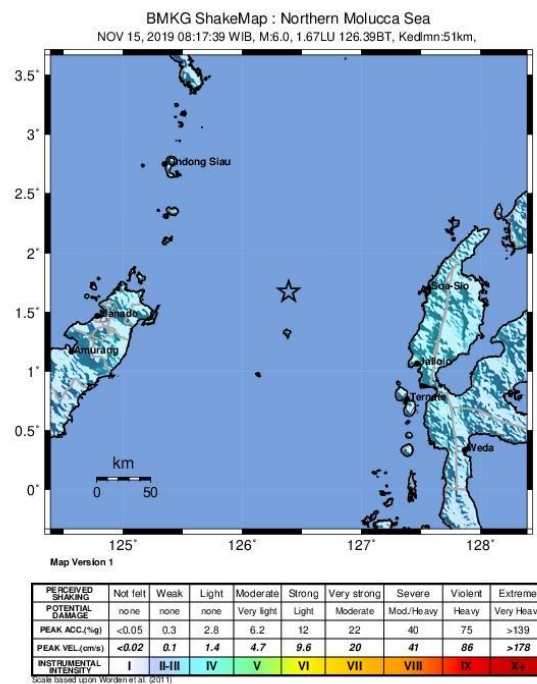
Gambar 132 Peta Guncangan Gempabumi 15 November 2019 pukul 04:37:26 WIB



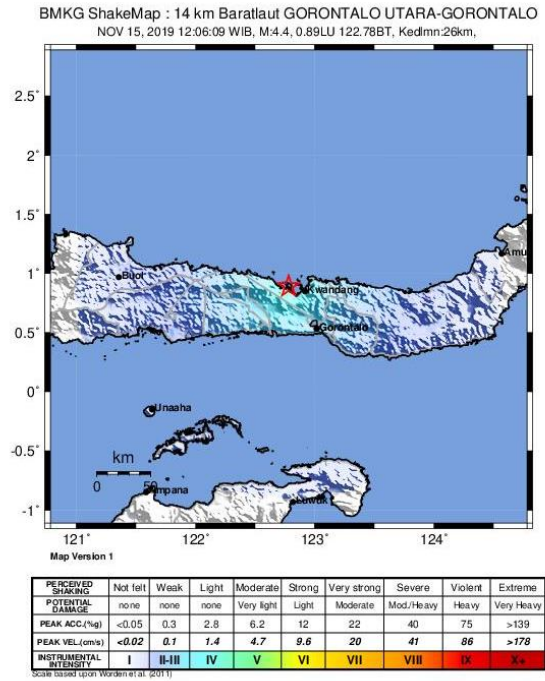
Gambar 133 Peta Guncangan Gempabumi 15 November 2019 pukul 05:34:20 WIB



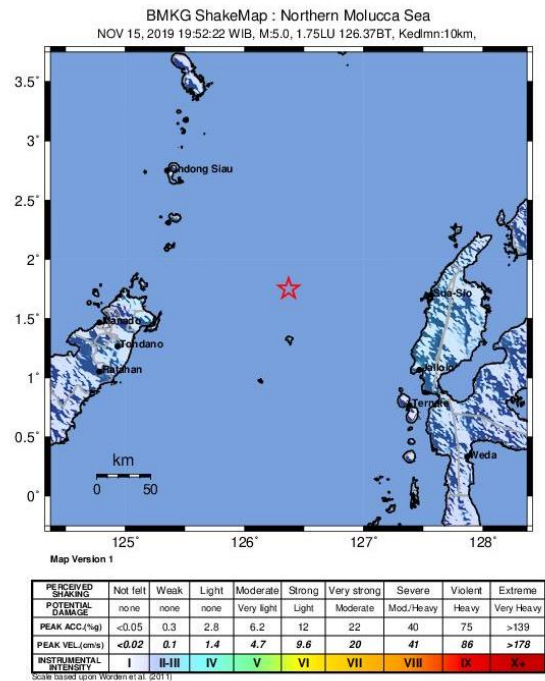
Gambar 134 Peta Guncangan Gempabumi 15 November 2019 pukul 06:17:20 WIB



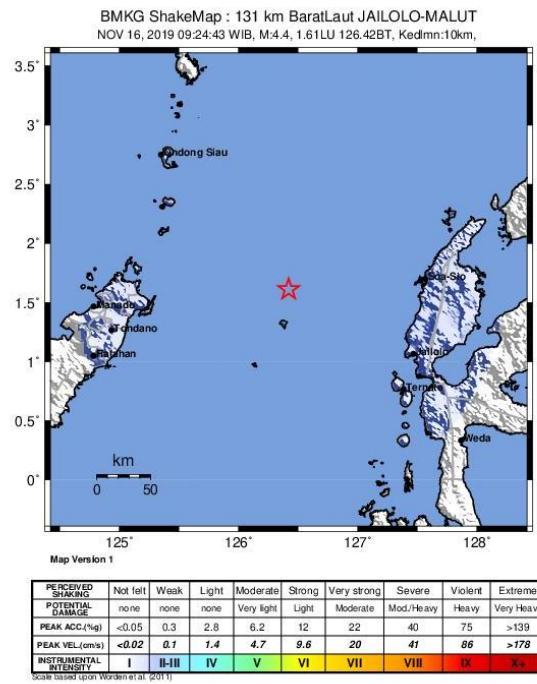
Gambar 135 Peta Guncangan Gempabumi 15 November 2019 pukul 08:17:39 WIB



Gambar 136 Peta Guncangan Gempabumi 15 November 2019 pukul 12:06:09 WIB



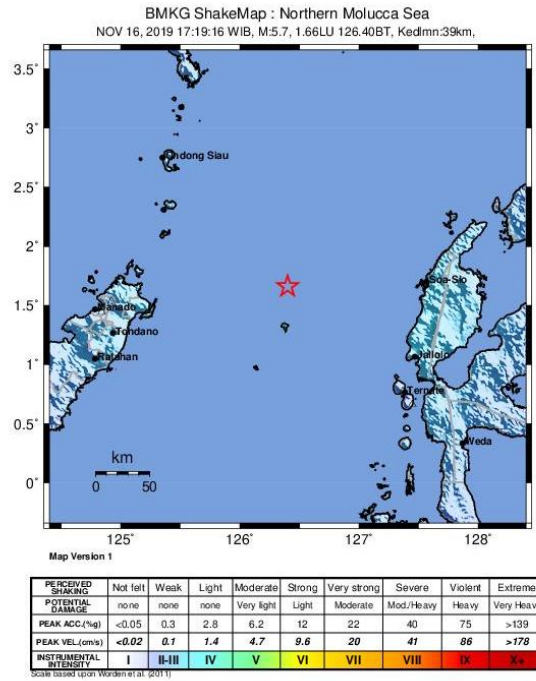
Gambar 137 Peta Guncangan Gempabumi 15 November 2019 pukul 19:52:22 WIB



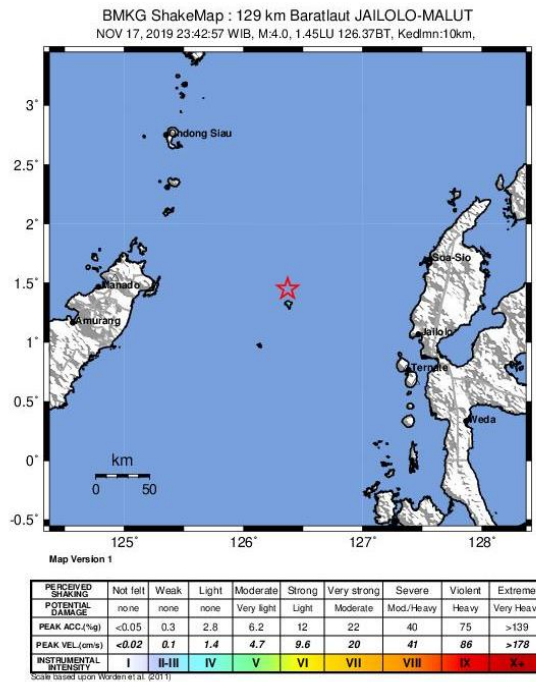
Gambar 138 Peta Guncangan Gempabumi 16 November 2019 pukul 09:24:43 WIB

Tabel 72 Atenuasi intensitas gempa bumi 16 November 2019 pukul 09:24:43 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	140.59	2	1



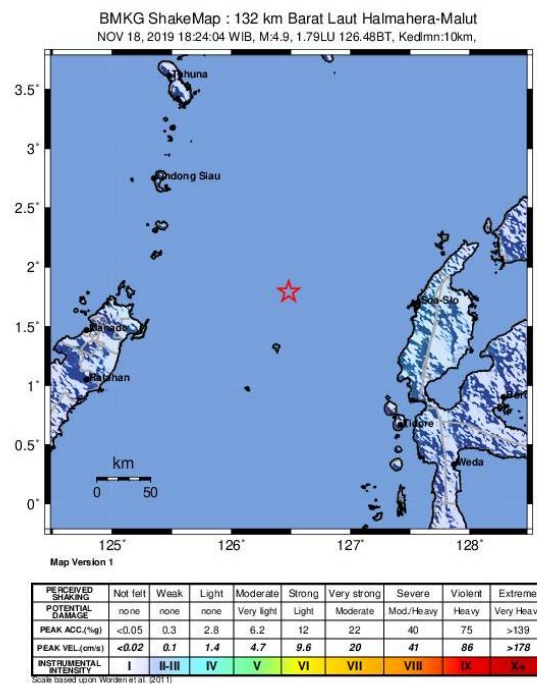
Gambar 139 Peta Guncangan Gempabumi 16 November 2019 pukul 17:19:16 WIB



Gambar 140 Peta Guncangan Gempabumi 17 November 2019 pukul 23:42:57 WIB

Tabel 73 Atenuasi intensitas gempa bumi 17 November 2019 pukul 23:42:57 WIB

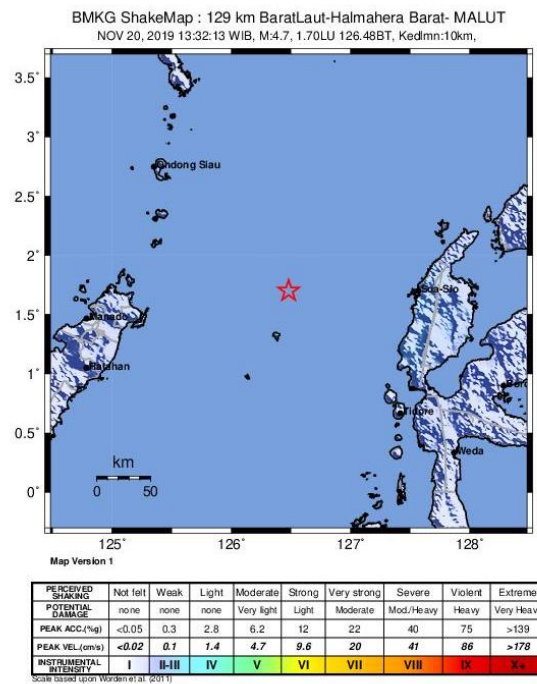
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	134.05		1
2	TMUN	TIDORE	0.66	127.45	148.11		1
3	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	161.25	2	1
4	LBMI	LABUHA	-0.64	127.5	264.03		1
5	TKUN		3.31	117.58	998.14		1



Gambar 141 Peta Guncangan Gempabumi 18 November 2019 pukul 18:24:04 WIB

Tabel 74 Atenuasi intensitas gempa bumi 18 November 2019 pukul 18:24:04 WIB

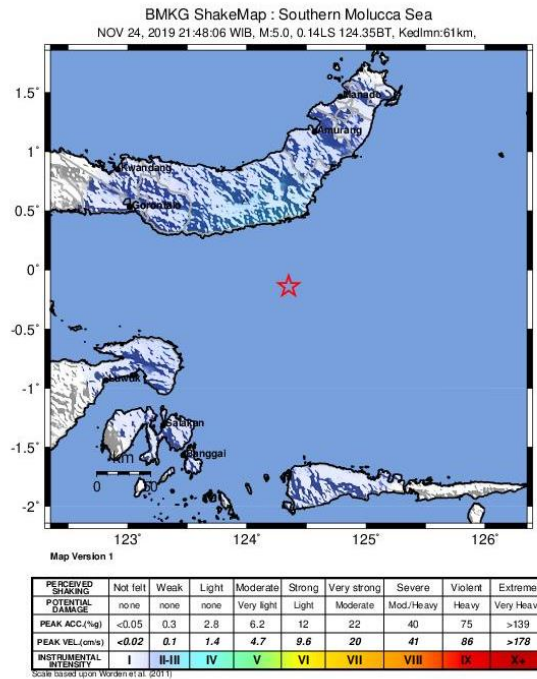
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	150.12		1
2	TMUN	TIDORE	0.66	127.45	164.9		1
3	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	175.44		1
4	SLMI	STA GEOF MANADO	1.44	124.84	186.43		1
5	LBMI	LABUHA	-0.64	127.5	292.87		1
6	KMSI	KOTA MUBAGO	0.57	123.98	308.24		1
7	SANI	SANANA	-2.05	125.99	430.45		1
8	TTSI	TANATORAJA	-3.05	119.82	915.02		1



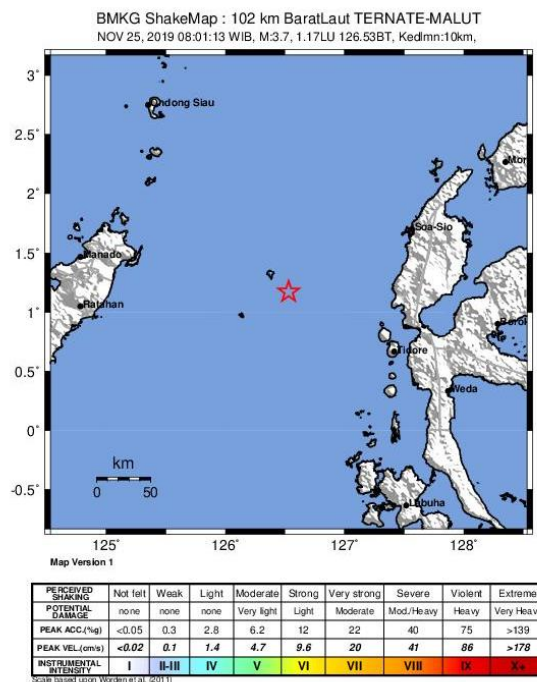
Gambar 142 Peta Guncangan Gempabumi 20 November 2019 pukul 13:32:13 WIB

Tabel 75 Atenuasi intensitas gempa bumi 20 November 2019 pukul 13:32:13 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TNTI	TERNATE	0.77	127.37	142.72		1
2	LBMI	LABUHA	-0.64	127.5	283.67		1
3	SANI	SANANA	-2.05	125.99	420.52		1
4	NLAI	NAMLEA MALUKU	-3.24	127.1	553.5		1



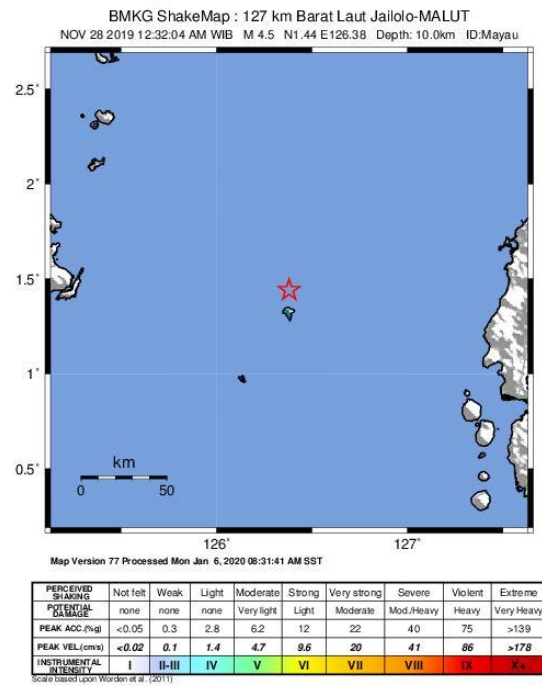
Gambar 143 Peta Guncangan Gempabumi 24 November 2019 pukul 21:48:06 WIB



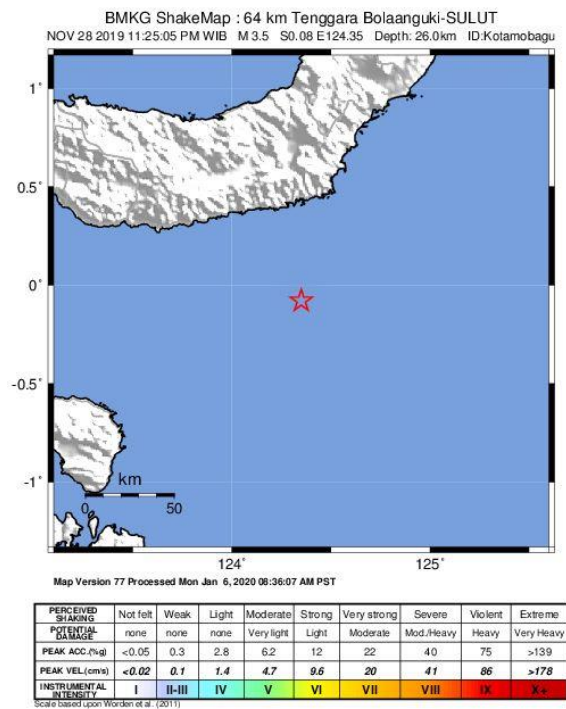
Gambar 144 Peta Guncangan Gempabumi 25 November 2019 pukul 08:01:13 WIB

Tabel 76 Atenuasi intensitas gempa bumi 25 November 2019 pukul 08:01:13 WIB

No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	KDRI	STA MET KENDARI	-3.97	122.59	719.99		1

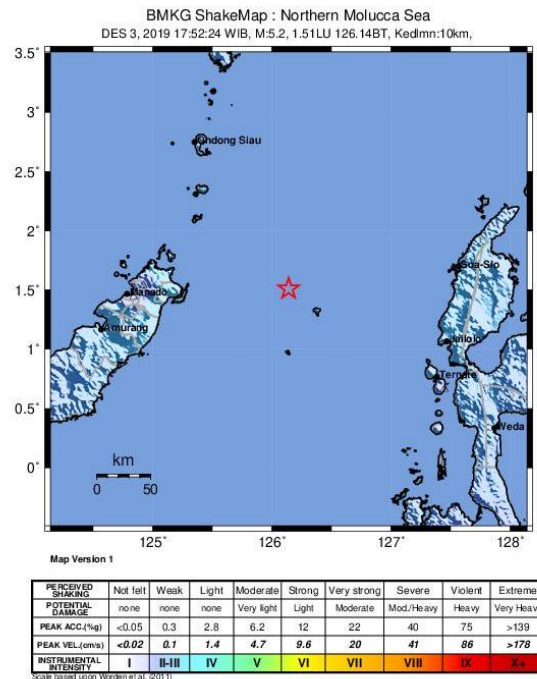


Gambar 145 Peta Guncangan Gempabumi 28 November 2019 pukul 12:32:04 WIB

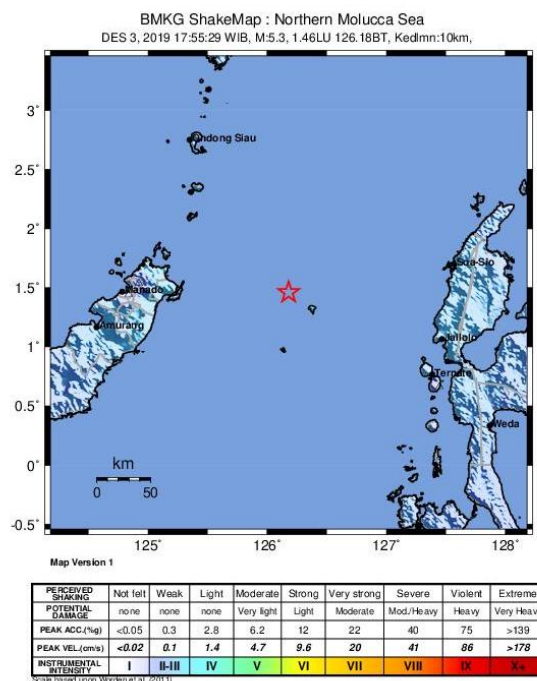


Gambar 146 Peta Guncangan Gempabumi 28 November 2019 pukul 23:25:05 WIB

L. Peta Guncangan (*Shakemap*) Gempabumi Bulan Desember 2019



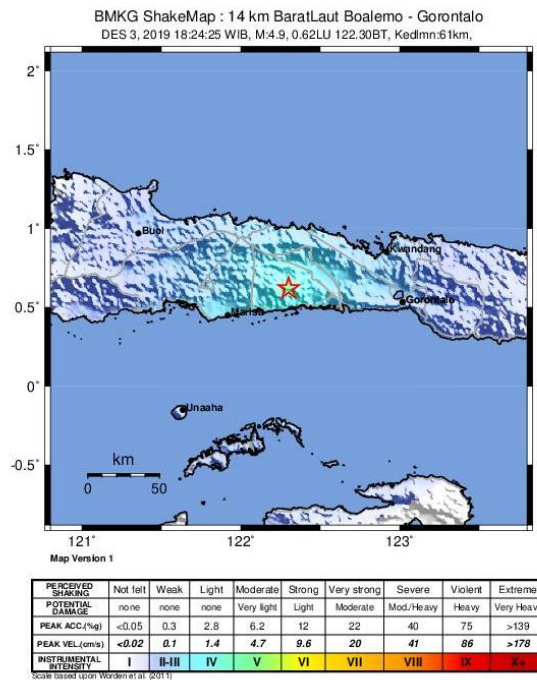
Gambar 147 Peta Guncangan Gempabumi 3 Desember 2019 pukul 17:52:24 WIB



Gambar 148 Peta Guncangan Gempabumi 3 Desember 2019 pukul 17:55:29 WIB

Tabel 77 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 17:55:29 WIB

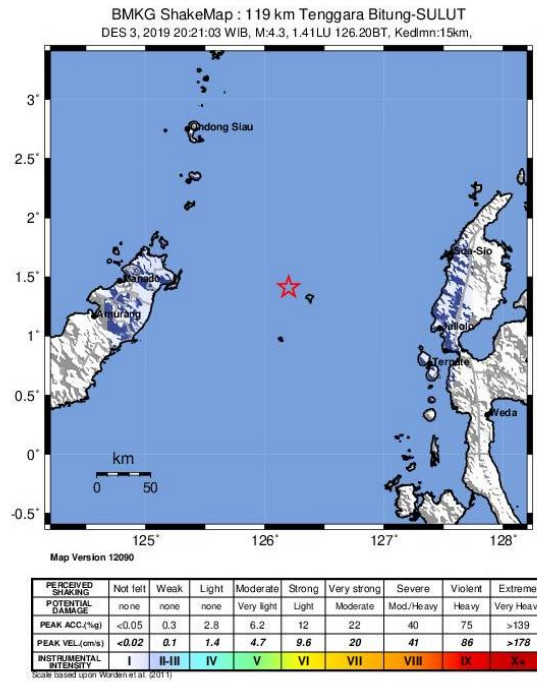
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	139.42		2
2	SLMI	STA GEOF MANADO	1.44	124.84	148.37		2
3	TMUN	TIDORE	0.66	127.45	165.49		1
4	LBMI	LABUHA	-0.64	127.5	274.81		1
5	KKSI	KOLAKA	-4.17	121.65	802.45		1



Gambar 149 Peta Guncangan Gempabumi 3 Desember 2019 pukul 18:24:25 WIB

Tabel 78 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 18:24:25 WIB

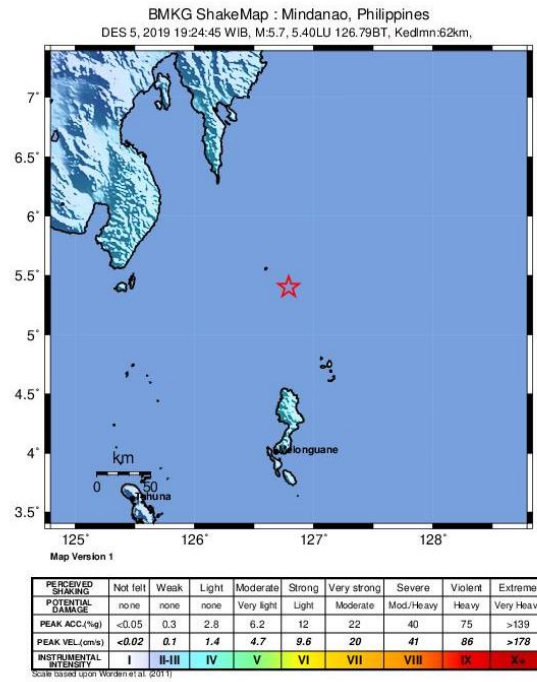
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SLMI	STA GEOF MANADO	1.44	124.84	296.75		2
2	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	308.82		2
3	KKSI	KOLAKA	-4.17	121.65	537.68		1
4	TMUN	TIDORE	0.66	127.45	572.2		1
5	LBMI	LABUHA	-0.64	127.5	594.99		1



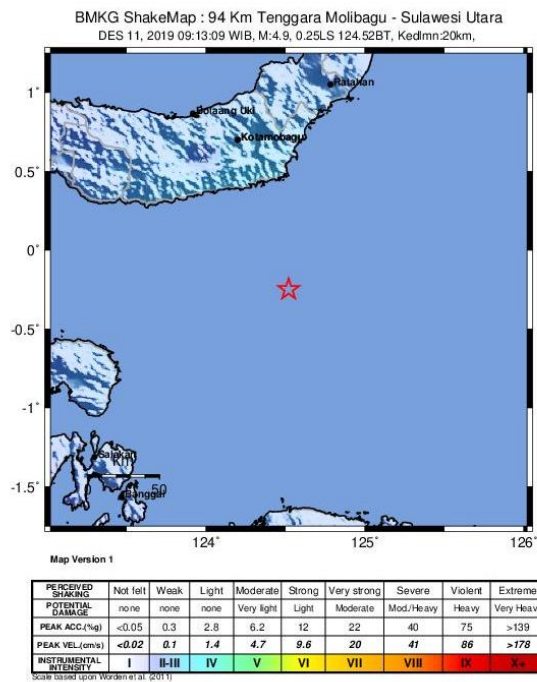
Gambar 150 Peta Guncangan Gempabumi 3 Desember 2019 pukul 20:21:03 WIB

Tabel 79 Atenuasi intensitas gempa bumi 3 Desember 2019 pukul 20:21:03 WIB

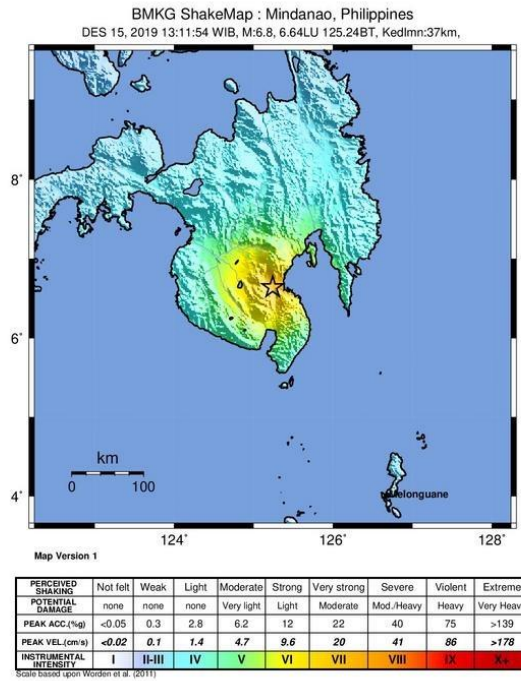
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	142.76		1
2	SLMI	STA GEOF MANADO	1.44	124.84	151.34		1
3	TMUN	TIDORE	0.66	127.45	161.43		1
4	KDRI	STA MET KENDARI	-3.97	122.59	720.31		1



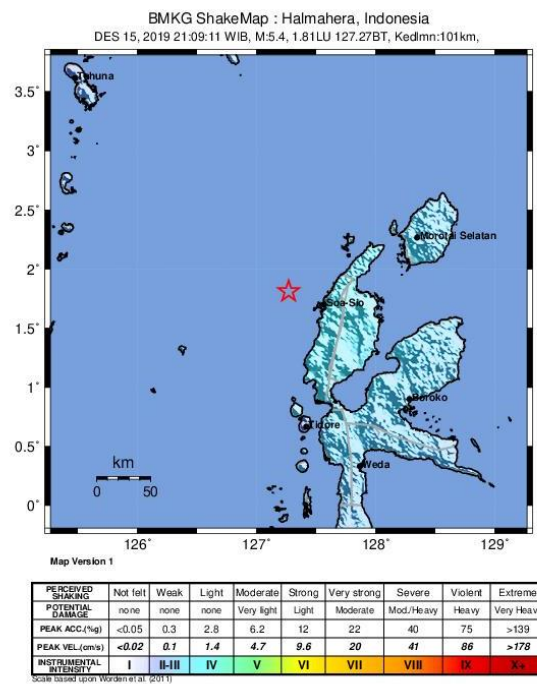
Gambar 151 Peta Guncangan Gempabumi 5 Desember 2019 pukul 19:24:45 WIB



Gambar 152 Peta Guncangan Gempabumi 11 Desember 2019 pukul 09:13:09 WIB



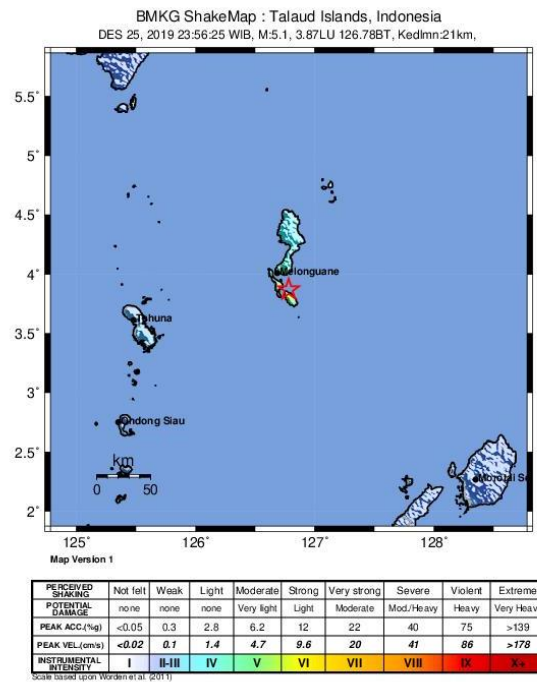
Gambar 153 Peta Guncangan Gempabumi 15 Desember 2019 pukul 13:11:54 WIB



Gambar 154 Peta Guncangan Gempabumi 15 Desember 2019 pukul 21:09:11 WIB

Tabel 80 Atenuasi intensitas gempa bumi 15 Desember 2019 pukul 21:09:11 WIB

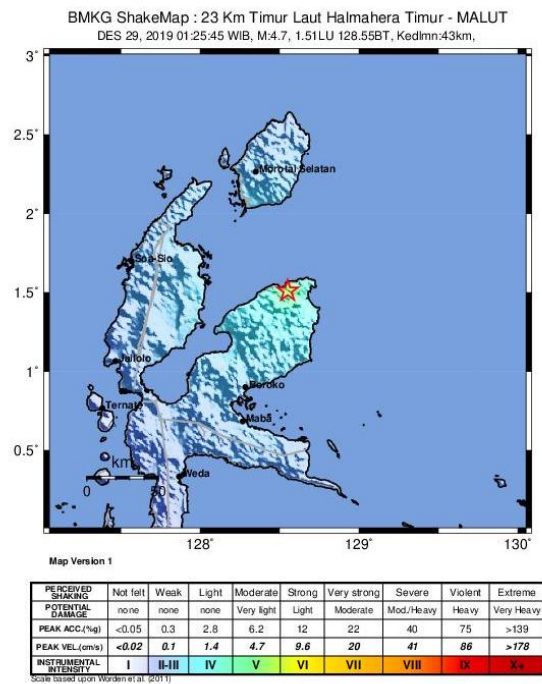
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	TMUN	TIDORE	0.66	127.45	162.51		1
2	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	280.27		2
3	SLMI	STA GEOF MANADO	1.44	124.84	290.13	3	2
4	LBMI	LABUHA	-0.64	127.5	290.26		2
5	RAPI	RAJA AMPAT	-0.41	130.82	475.28		1
6	SWI	SORONG	-0.86	131.26	542.17		1
7	NLAI	NAMLEA MALUKU	-3.24	127.1	569.57		1
8	KRAI	KAIRATU	-3.32	128.4	591.3		1
9	MRSI	MARISA GORONTALO	0.48	121.94	617.81		1
10	PMCI	STA MET POSO	-1.42	120.65	823.33		2
11	MPSI	MAPAGA SABANG PALU	0.34	119.9	840.69		1
12	TTSI	TANATORAJA	-3.05	119.82	992.64		1



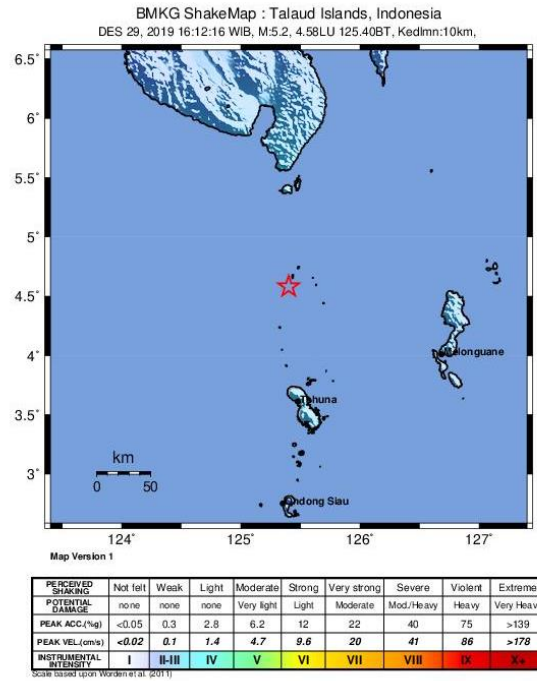
Gambar 155 Peta Guncangan Gempabumi 25 Desember 2019 pukul 23:56:25 WIB

Tabel 81 Atenuasi intensitas gempa bumi 25 Desember 2019 pukul 23:56:25 WIB

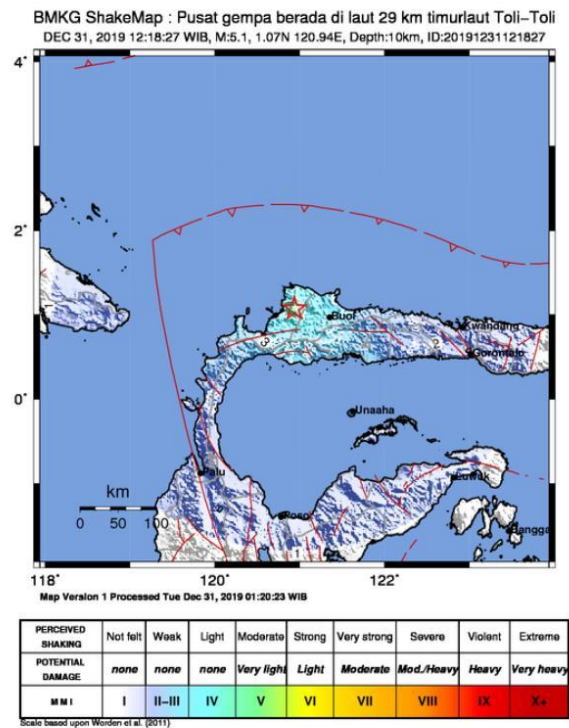
No	ID Sta	Stasiun	Koordinat Stasiun		Jarak Ke Hiposenter	Intensitas	
			Lat	Long		Obs	Alat
1	SAMI	STA MET SAMRATULANGI MANADO	1.54	124.92	330.62		1
2	SLMI	STA GEOF MANADO	1.44	124.84	344.51	.	1
3	TMUN	TIDORE	0.66	127.45	363.17		1
4	LBMI	LABUHA	-0.64	127.5	506.76		1
5	MRSI	MARISA GORONTALO	0.48	121.94	655.91		1
6	SWI	SORONG	-0.86	131.26	723.49		1
7	NLAI	NAMLEA MALUKU	-3.24	127.1	790.42		1
8	KRAI	KAIRATU	-3.32	128.4	818.34		1
9	MSAI	MASOHI	-3.35	128.93	836.28		1



Gambar 156 Peta Guncangan Gempabumi 29 Desember 2019 pukul 01:25:45 WIB



Gambar 157 Peta Guncangan Gempabumi 29 Desember 2019 pukul 16:12:16 WIB



Gambar 158 Peta Guncangan Gempabumi 31 Desember 2019 pukul 12:18:27 WIB

V. DATA DAN INFORMASI TSUNAMI

1. Gempabumi Laut Maluku 7 Juli 2019

Gempabumi tektonik telah terjadi di Laut Maluku dengan parameter sebagai berikut :

Hari, Tanggal : Minggu, 7 Juli 2019

OT : 22:08:42 WIB

Lokasi : 0.53 LU dan 126.18 BT (133 km Barat Daya Ternate, Maluku Utara)

Kedalaman : 49 km

Magnitudo : 7.0

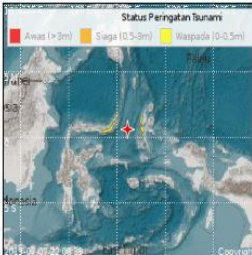
Berdasarkan hasil pemodelan, gempabumi ini diperkirakan menyebabkan tsunami dengan level tertinggi waspada (<0.5m) di Minahasa Bagian Selatan dengan estimasi waktu tiba pukul 22:15 WIB dan di Minahasa Utara Bagian Selatan dengan estimasi waktu tiba pukul 22:16 WIB, sehingga BMKG mengeluarkan peringatan dini tsunami. Setelah dilakukan pengecekan terhadap hasil observasi tide gauge 6 stasiun (Bitung, Tobelo, Ternate, Taliabu, Jailolodan Sanana) tidak terdapat kenaikan gelombang signifikan. Berdasarkan hasil update mekanisme sumber gempa yang bertipe sesar naik (*thrust fault*) dan hasil observasi ketinggian gelombang tsunami, serta telah terlewatnya perkiraan waktu kedatangan tsunami maka Peringatan Dini Tsunami (PDT) ini diakhiri pada pukul 00:19 WIB tanggal 8 Juli 2019.

a. Peringatan Dini lewat WRS DVB:

Berita 1:
Waktu kirim: 7 Juli 2019,22:14:12 WIB

**PERINGATAN DINI TSUNAMI**
BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA





Status Peringatan tsunami
■ Area 1 (>3m) ■ Sisa (0.5-3m) ■ Waspada (0-0.5m)

Magnitude
 **7.1**

Waktu : 07-Jul-19 22:08:39 WIB
Lokasi : 0.51 LU - 126.18 BT
Kedalaman: 10 Km
Keterangan lokasi gempabumi :
135 km BaratDaya TERNATE-MALUT
136 km BaratDaya TERNATE-MALUT
141 km BaratDaya TIDORE-MALUT
155 km BaratDaya JAILOLO-MALUT
2275 km TimurLaut JAKARTA-INDONESIA

**Berpotensi TSUNAMI untuk diteruskan
pada Masyarakat**

BERPOTENSI TERJADI TSUNAMI DI WILAYAH	
Propinsi	Lokasi
	Status

Perkiraan wilayah terpapar, tingkat ancaman tsunami, dan perkiraan waktu tiba gelombang tsunami.

Daerah yang Berpotensi Tsunami Berdasarkan Pemodelan:

KOTA/KAB	STATUS PERINGATAN
KOTA-BITUNG (SULUT)	SIAGA
HALMAHERA (MALUT)	WASPADA
KOTA-TERNATE (MALUT)	WASPADA
KOTA-TIDORE (MALUT)	WASPADA
MINAHASA BAGIAN SELATAN (SULUT)	WASPADA
MINAHASA-UTARA BAGIAN SELATAN (SULUT)	WASPADA
MINAHASA-SELATAN BAGIAN SELATAN (SULUT)	WASPADA
BOLAANGMONGONDOW BAGIAN SELATAN (SULUT)	WASPADA

Saran dan Arahan Status Peringatan

AWAS Pemerintah Propinsi/Kab/Kota yang berada pada status "Awat" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi menyeluruh

SIAGA Pemerintah Propinsi/Kab/Kota yang berada pada status "Siaga" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi

WASPADA Pemerintah Propinsi/Kab/Kota yang berada pada status "Waspada" diharap memperhatikan dan segera mengarahkan masyarakat untuk menjauhi pantai dan tepian sungai

Berita 2 : (Pemutakhiran)

Waktu kirim : 7 Juli 2019, 22:21:59 WIB

Peringatan Dini Tsunami Ke-2

Waktu Isu: 07/07/2019 22:21:59 WIB

Pemutakhiran Peringatan Dini Tsunami untuk wilayah: SULUT, Gempa Mag:7.0, 07-Jul-19 22:08:42 WIB, Lok:0.54 LU, 126.19 BT (133 km BaratDaya TERNATE-MALUT), Kedlmn:36 Km ::BMKG

Merupakan informasi lanjutan dari informasi sebelumnya yang diisu dalam waktu kurang lebih 15 menit setelah kejadian gempa melalui moda penyebaran informasi SMS, E-mail, Fax, Website, WRS, dan Sosial Media. Informasi ini merupakan pemutakhiran dari informasi yang telah dikeluarkan sebelumnya dan akan diikuti oleh pemutakhiran berikutnya sampai Peringatan Dini Tsunami-4 dikeluarkan.

[Lihat Peta Guncangan](#)

[Penjelasan BMKG](#)

Waktu Gempa 07-07-19 22:08:42 WIB	Kekuatan Gempa M 7.0	Kedalaman Gempa 36 Km
Potensi Gempa Potensi TSUNAMI untuk diteruskan pada masyarakat	Saran dari BMKG Ikuti arahan peringatan dini TSUNAMI dari BPBD, BNPB dan BMKG	

Daerah yang Berpotensi Tsunami Berdasarkan Pemodelan:

KOTA/KAB	STATUS PERINGATAN	ESTIMASI TIBA
MINAHASA BAGIAN SELATAN (SULUT)	WASPADA	07-07-2019 22:15:58 WIB
MINAHASA-UTARA BAGIAN SELATAN (SULUT)	WASPADA	07-07-2019 22:16:43 WIB

Saran dan Arahan Status Peringatan

AWAS Pemerintah Propinsi/Kab/Kota yang berada pada status "Awat" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi menyeluruh

SIAGA Pemerintah Propinsi/Kab/Kota yang berada pada status "Siaga" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi

WASPADA Pemerintah Propinsi/Kab/Kota yang berada pada status "Waspada" diharap memperhatikan dan segera mengarahkan masyarakat untuk menjauhi pantai dan tepian sungai

Berita 4 : (Pengakhiran)

Waktu kirim: 7 Juli 2019,00:09:27 WIB



b. Peringatan Dini lewat SMS:

Berita 1

Peringatan Dini Tsunami untuk wilayah: MALUT, SULUT, Gempa Mag:7.1, 07-Jul-19 22:08:39 WIB, Lok:0.51 LU, 126.18 BT (135 km BaratDaya TERNATE-MALUT), Kedlmn:10 Km ::BMKG

Berita 2

Pemutakhiran Peringatan Dini Tsunami untuk wilayah: SULUT, Gempa Mag:7.0, 07-Jul-19 22:08:42 WIB, Lok:0.54 LU, 126.19 BT (133 km BaratDaya TERNATE-MALUT), Kedlmn:36 Km ::BMKG

Berita 4

Peringatan Dini TSUNAMI yang disebabkan oleh gempa Mag:7.0, 07-Jul-19 22:08:42 WIB, dinyatakan telah berakhir::BMKG

2. Gempabumi Laut Maluku 14 November 2019

Gempabumi tektonik telah terjadi di Laut Maluku dengan parameter sebagai berikut :

Hari, Tanggal : Kamis, 14 November 2019
OT : 23:17:41 WIB
Lokasi : 1.67°LU dan 126.39°BT (134 km arah Barat Laut Kota Jailolo, Kab. Halmahera Barat, Maluku Utara)
Kedalaman : 73 km
Magnitudo : 7.1

Berdasarkan hasil pemodelan, gempabumi ini diperkirakan menyebabkan tsunami dengan level tertinggi waspada (<0.5m) di Minahasa Utara Bagian Selatan dengan estimasi waktu tiba pukul 23:17 WIB dan di Minahasa Utara Bagian Selatan dengan estimasi waktu tiba pukul 23:17 WIB, sehingga BMKG mengeluarkan peringatan dini tsunami. Setelah dilakukan pengecekan terhadap hasil observasi tide gauge 6 stasiun (Bitung, Tobelo, Ternate, Taliabu, Jailolodan Sanana) terdapat kenaikan gelombang di daerah Ternate pukul 23:43 WIB setinggi 0.06m, di Jailolo 23:43 WIB setinggi 0.09m dan Bitung pukul 00:08 WIB setinggi 0.10m. Berdasarkan hasil update mekanisme sumber gempa yang bertipe sesar naik (*thrust fault*) dan hasil observasi ketinggian gelombang tsunami, serta telah terlewatnya perkiraan waktu kedatangan tsunami maka Peringatan Dini Tsunami (PDT) ini diakhiri pada pukul 01:45 WIB pada tanggal 15 November 2019.

a. Peringatan Dini lewat WRS DVB:

Berita 1:

Waktu kirim: 14 November 2019, 23:23:42 WIB



Berita 2 : (Pemutakhiran)

Waktu kirim : 14 November 2019, 23:33:30 WIB

Peringatan Dini Tsunami-2

Waktu Isu: 14/11/2019 23:33:30 WIB

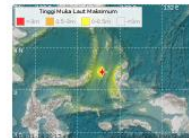
Pemutakhiran Peringatan Dini Tsunami untuk wilayah: SULUT, Gempa Mag 7.1, 14-Nov-19 23:17:43 WIB, Lok:1.67 LU, 126.39 BT (137 km BaratLaut JAILOLO-MALUT), Kedlm:73 Km ::BMKG

Merupakan informasi lanjutan dari informasi sebelumnya yang diisu dalam waktu kurang lebih 15 menit setelah kejadian gempa melalui mode penyediaan informasi SMS, E-mail, Fax, Website, WRB, dan Sosial Media. Informasi ini merupakan pemutakhiran dari informasi yang telah dikeluarkan sebelumnya dan akan diikuti oleh pemutakhiran berikutnya sampai Peringatan Dini Tsunami-4 dikeluarkan.

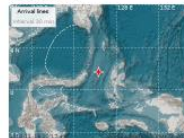
[Lihat Peta Guncangan](#)

[Penjelasan BMKG](#)

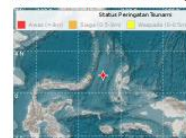
Peta Perkiraan Tinggi Muka Laut Maksimum



Peta Perkiraan Penjalaran Gelombang



Peta Perkiraan Zona Warning



Waktu Gempa

14-11-19 23:17:43 WIB



Kekuatan Gempa

M 7.1



Kedalaman Gempa

73 Km



Potensi Gempa

Potensi TSUNAMI untuk diterbitkan pada masyarakat



Saran dari BMKG

Ikuti arahan peringatan dini TSUNAMI dari BPBC, BNPS dan BMKG

Daerah yang Berpotensi Tsunami Berdasarkan Pemodelan:

KOTA/KAB	STATUS PERINGATAN	ESTIMASI TIBA
MINAHASA-UTARA BAGIAN SELATAN (SULUT)	WA BPADA	14-11-2019 23:17:43 WIB

Berita 3.1 : (Verifikasi)

Waktu kirim : 15 November 2019, 01:18:11 WIB

Peringatan Dini Tsunami-3.1

Waktu Isu: 15/11/2019 01:18:11 WIB

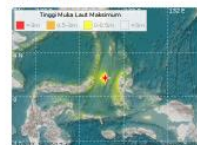
Pemutakhiran Peringatan Dini, Tsunami akibat gempa Mag 7.1 (137 km BaratLaut JAILOLO-MALUT), telah terdeteksi di Bitung(00.08WIB)0.10m, Ternate(23.43WIB)0.06m: BMKG

Merupakan informasi lanjutan dari informasi sebelumnya yang dilengkapi dengan data observasi tinggi muka air laut. Informasi ini juga merupakan pemutakhiran informasi sebelumnya dan akan diikuti oleh pemutakhiran berikutnya sampai pengakhiran Peringatan Dini Tsunami-4 dikeluarkan.

[Lihat Peta Guncangan](#)

[Penjelasan BMKG](#)

Peta Perkiraan Tinggi Muka Laut Maksimum



Peta Perkiraan Penjalaran Gelombang



Peta Perkiraan Zona Warning



Waktu Gempa

14-11-19 23:17:43 WIB



Kekuatan Gempa

M 7.1



Kedalaman Gempa

73 Km



Potensi Gempa

Potensi TSUNAMI untuk diterbitkan pada masyarakat



Saran dari BMKG

Ikuti arahan peringatan dini TSUNAMI dari BPBC, BNPS dan BMKG

Berdasarkan pengamatan muka air laut, tsunami telah terdeteksi di:

LOKASI (KOORDINAT)	WAKTU	KETINGGIAN (m)
Bitung (1.4390,125.190)	00.08 WIB 15-11-2019	0.10
Temate (0.762,127.388)	23.43 WIB 14-11-2019	0.06

Daerah yang Berpotensi Tsunami Berdasarkan Pemodelan:

KOTA/KAB	STATUS PERINGATAN	ESTIMASI TIBA
MINAHABA-UTARA BAGIAN SELATAN (BULUT)	WA SPADA	14-11-2019 23:17:43 WIB

Saran dan Arahan Status Peringatan

ARAS Pemerintah Propinsi/Kab/Kota yang berada pada status "Aras" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi menyeluruh
SIAGA Pemerintah Propinsi/Kab/Kota yang berada pada status "Siaga" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi
WASPADA Pemerintah Propinsi/Kab/Kota yang berada pada status "Waspada" diharap memperhatikan dan segera mengarahkan masyarakat untuk menjauhi pantai dan tepian sungai

Berita 3.2 (Verifikasi)

Waktu kirim : 15 November 2019, 01:33:09 WIB

Peringatan Dini Tsunami-3.2

Waktu Iku: 15/11/2019 01:33:09 WIB

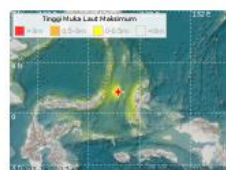
Pemutakhiran Peringatan Dini, Tsunami akibat gempa Mag:7.1 (137 km BaratLaut JAILOLO-MALUT), telah terdeteksi di Bitung(00.08WIB)0.10m, Jailolo(23.43WIB)0.09m, Temate(23.43WIB)0.06m:BMKG

Merupakan informasi lanjutan dari informasi sebelumnya yang dilengkapi dengan data observasi tinggi muka air laut, informasi ini juga merupakan pemutakhiran informasi sebelumnya dan akan diikuti oleh pemutakhiran berikutnya sampai pengakhiran Peringatan Dini Tsunami-4 dikeluarkan.

 Lihat Peta Goncangan

 Penjelasan BMKG

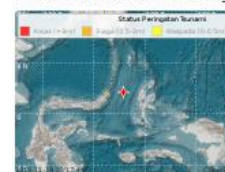
Peta Perkiraan Tinggi Muka Laut Maksimum



Peta Perkiraan Penjalaran Gelombang



Peta Perkiraan Zona Warning



Waktu Gempa

14-11-19 23:17:43 WIB

Kekuatan Gempa

M 7.1

Kedalaman Gempa

73 Km

Potensi Gempa

Potensi TSUNAMI untuk diteruskan pada masyarakat

Saran dari BMKG

Ikuti arahan peringatan dini TSUNAMI dari BPBD, BNPB dan BMKG

Berdasarkan pengamatan muka air laut, tsunami telah terdeteksi di:

LOKASI (KOORDINAT)	WAKTU	KETINGGIAN (m)
Bitung (1.4390,125.190)	00.08 WIB 15-11-2019	0.10
Jailolo (1.0570,127.470)	23.43 WIB 14-11-2019	0.09
Temate (0.762,127.388)	23.43 WIB 14-11-2019	0.06

Daerah yang Berpotensi Tsunami Berdasarkan Pemodelan:

KOTA/KAB	STATUS PERINGATAN	ESTIMASI TIBA
MINAHABA-UTARA BAGIAN SELATAN (BULUT)	WA SPADA	14-11-2019 23:17:43 WIB

Saran dan Arahan Status Peringatan

ARAS Pemerintah Propinsi/Kab/Kota yang berada pada status "Aras" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi menyeluruh
SIAGA Pemerintah Propinsi/Kab/Kota yang berada pada status "Siaga" diharap memperhatikan dan segera mengarahkan masyarakat untuk melakukan evakuasi
WASPADA Pemerintah Propinsi/Kab/Kota yang berada pada status "Waspada" diharap memperhatikan dan segera mengarahkan masyarakat untuk menjauhi pantai dan tepian sungai

Berita 4 : (Pengakhiran)

Waktu kirim: 15 November 2019, 01:45:05 WIB

**PERINGATAN DINI TSUNAMI**

BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA



Peringatan dini TSUNAMI yang disebabkan gempa
kekuatan : 7.1 SR
tanggal : 14-Nov-19 23:17:43 WIB
dinyatakan TELAH BERAKHIR berdasarkan
pertimbangan data observasi muka air laut

Waktu kirim: 15 November 2019, 01:45:05 WIB

b. Peringatan Dini lewat SMS:**Berita 1**

Peringatan Dini Tsunami untuk wilayah: MALUT, SULUT, Gempa Mag:7.4, 14-Nov-19 23:17:41 WIB, Lok:1.63 LU, 126.40 BT (134 km BaratLaut JAILOLO-MALUT), Kedlmn:10 Km ::BMKG

Berita 2

Pemutakhiran Peringatan Dini Tsunami untuk wilayah: SULUT, Gempa Mag:7.1, 14-Nov-19 23:17:43 WIB, Lok:1.67 LU, 126.39 BT (137 km BaratLaut JAILOLO-MALUT), Kedlmn:73 Km ::BMKG

Berita 3.1

Pemutakhiran Peringatan Dini, Tsunami akibat gempa Mag:7.1 (137 km BaratLaut JAILOLO-MALUT), telah terdeteksi di Bitung(00:08WIB)0.10m, Ternate(23:43WIB)0.06m::BMKG

Berita 3.2

Pemutakhiran Peringatan Dini, Tsunami akibat gempa Mag:7.1 (137 km BaratLaut JAILOLO-MALUT), telah terdeteksi di Bitung(00:08WIB)0.10m, Jailolo(23.43WIB)0.09m, Ternate(23:43WIB)0.06m::BMKG

Berita 4

Peringatan Dini TSUNAMI yang disebabkan oleh gempa Mag:7.1, 14-Nov-19 23:17:43 WIB, dinyatakan telah berakhir::BMKG

LAMPIRAN

1. Skala Modified Mercally Intensity (MMI)



BADAN METEOROLOGI KLIMATOLOGI DAN GEOFISIKA
Jalan Angkasa I No. 2, Kemayoran, Jakarta 10720 Telp. : (021) 4246321 Fax. : (021) 4246703
 website : <http://www.bmkg.go.id>

MODIFIED MERCALLY INTENSITY

(MMI)



1 MMI

Getaran tidak dirasakan kecuali dalam keadaan luar biasa oleh beberapa orang



2 MMI

Getaran dirasakan oleh beberapa orang, benda-benda ringan yang digantung bergoyang



3 MMI

Getaran dirasakan nyata dalam rumah. Terasa getaran seakan-akan ada truk berlalu.



4 MMI

Pada siang hari dirasakan oleh orang banyak dalam rumah, di luar oleh beberapa orang, gerabah pecah, jendela/pintu gemerincing dan dinding berbunyi



5 MMI

Getaran dirasakan oleh hampir semua penduduk, orang banyak terbangun, gerabah pecah, jendela dan sebagainya pecah, barang-barang terpelanting, tiang-tiang dan barang besar tampak bergoyang, bandul lonceng dapat berhenti.



6 MMI

Getaran dirasakan oleh semua penduduk. Kebanyakan semua terkejut dan lari keluar, plester dinding jatuh dan cerobong asap pada pabrik rusak, kerusakan ringan



7 MMI

Tiap-tiap orang keluar rumah. Kerusakan ringan pada rumah-rumah dengan bangunan dan konstruksi yang baik. Sedangkan pada bangunan dengan konstruksi kurang baik terjadi retak-retak bahkan hancur, cerobong asap pecah. Terasa oleh orang yang naik kendaraan.



8 MMI

Kerusakan ringan pada bangunan dengan konstruksi yang kuat. Retak-retak pada bangunan dengan konstruksi kurang baik, dinding dapat lepas dari rangka rumah, cerobong asap pabrik dan monumen-monumen roboh, air menjadi keruh



9 MMI

Kerusakan pada bangunan yang kuat, rangka-rangka rumah menjadi tidak lurus, banyak retak-retak. Rumah tampak agak berpindah dari pondamennya. Pipa-pipa dalam rumah putus.



10 MMI

Bangunan dari kayu yang kuat rusak, rangka rumah lepas dari pondamennya, tanah terbelah, rel melengkung, tanah longsor di tiap-tiap sungai dan di tanah-tanah yang curam.



11 MMI

Bangunan-bangunan hanya sedikit yang tetap berdiri. Jembatan rusak, terjadi lembah. Pipa dalam tanah tidak dapat dipakai sama sekali, tanah terbelah, rel melengkung sekali.



12 MMI

Hancur sama sekali. Gelombang tampak pada permukaan tanah. Pemandangan menjadi gelap. Benda-benda terlempar ke udara.

2. Skala Intensitas Gempabumi BMKG (SIG-BMKG)

Skala SIG BMKG	Warna	Deskripsi Sederhana	Deskripsi Rinci	Skala MMI	PGA (gal)
I	Putih	TIDAK DIRASAKAN (Not Felt)	Tidak dirasakan atau dirasakan hanya oleh beberapa orang tetapi terekam oleh alat.	I-II	< 2.9
II	Hijau	DIRASAKAN (Felt)	Dirasakan oleh orang banyak tetapi tidak menimbulkan kerusakan. Benda-benda ringan yang digantung bergoyang dan jendela kaca bergetar.	III-V	2.9-88
III	Kuning	KERUSAKAN RINGAN (Slight Damage)	Bagian non struktur bangunan mengalami kerusakan ringan, seperti retak rambut pada dinding, genteng bergeser ke bawah dan sebagian berjatuhan.	VI	89-167
IV	Jingga	KERUSAKAN SEDANG (Moderate Damage)	Banyak Retakan terjadi pada dinding bangunan sederhana, sebagian roboh, kaca pecah. Sebagian plester dinding lepas. Hampir sebagian besar genteng bergeser ke bawah atau jatuh. Struktur bangunan mengalami kerusakan ringan sampai sedang.	VII-VIII	168-564
V	Merah	KERUSAKAN BERAT (Heavy Damage)	Sebagian besar dinding bangunan permanen roboh. Struktur bangunan mengalami kerusakan berat. Rel kereta api melengkung.	IX-XII	> 564