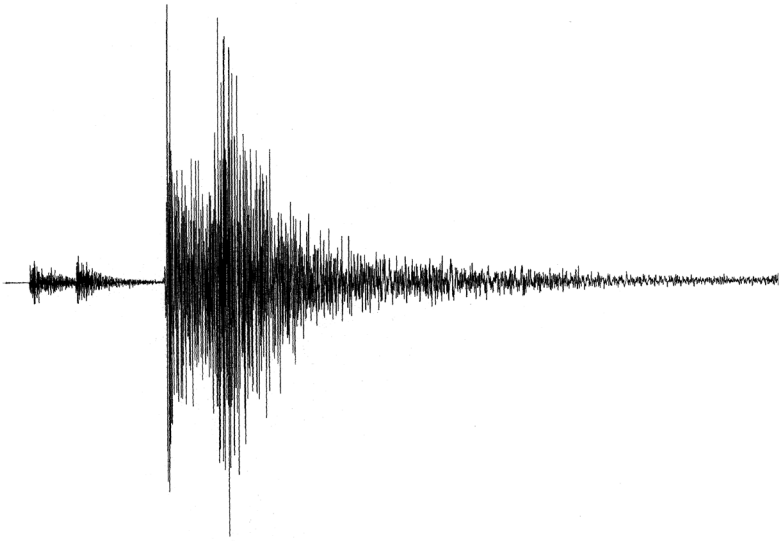
Arab Republic of Egypt
Ministry of Higher Education And Scientific Research
National Research Institute of Astronomy and Geophysics
(NRIAG)
EGYPTIAN NATIONAL SEISMIC NETWORK
(ENSN)

Egyptian Earthquake Bulletin (2019)



January
2020

PREFACE

Instrumental recording of earthquakes was started in Egypt as early as 1899, where Helwan seismological station was one of the little stations that recorded San Francesco earthquake in 1906. Analog equipment was eventually modernized from the Milnshow to Galitzen to Sprengnether seismographs. In 1962, a seismic station was installed at Helwan as a station on the Worldwide Standardized Seismograph Network (WWSSN). This station is still in operation till now. By the beginning of 1972, four analog stations were installed at Helwan, Aswan, Abu Simbel and Matrouh, one of them is Japanese short period and the rest are intermediate Russian Seismographs consequences.

After the occurrence of the October, 12, 1992 earthquake in Dahshour area, 35 km to the southwest of Cairo, the Egyptian Government financed the National Research Institute of Astronomy and Geophysics (NRIAG) to construct and deploy the Egyptian National Seismic Network (ENSN), which covers the whole Egypt. NRIAG upgraded the data communication system from telephone lines to satellite to increase the efficiency of the ENSN.

By the mid-2003, the installation of the whole seismic field stations has been completed covering the whole country of Egypt and five sub-centers have been constructed and equipped. Besides, an earthquake Disaster Reduction Data center (EDRDC) was established and supported by GIS technology.

The Egyptian earthquake bulletin is one of the products of the ENSN reports and lists the recorded earthquakes in Egypt and the adjacent area. The Current version represent data for the year 2019.

Prof. Dr. Gad El Qady

ELQad

President of NRIAG

CONTENTS

PREFACE	**I**
CONTENTS	**II**
List of Tables	**III**
List of Figures	**IV**
Seismological Staff	**V**
Introduction	**1**
Configuration of the Egyptian National Seismic Network	**2**
Data processing	**7**
ENSN station performance	**11**
Strong motion observation units	**15**
Summary of 2019 Seismicity	**17**
The magnitude of completeness	**17**

List of Tables

Table (1) 5
Stations code and location of ENSN velocity-meter units
Table (2) 7
Strong motion unit's location.
Table (3) 12
The maximum and minimum percentage for each sub-network in 2019
Table (4) 12
The average percentage for each sub-network in 2019
Table (5) 13
Maximum and minimum percentage for each month in 2019
Table (6) 15
Health of strong motion stations 2019
Table (7) 26
Hypo-central parameters of local earthquakes recorded by ENSN in 2019
Table (8) 45
Hypo-central parameters of regional earthquakes recorded by ENSN in 2019

List of Figures

Figure (1) 3
Distribution of Egyptian National Seismological Network (ENSN) station
Figure (2) 4
Distribution of Strong motion Instruments in Egypt
Figure (3) 8
Locations of seismic stations that have been used when it is available for the Mediterranean Sea earthquakes
Figure (4) 10
Multiple velocity model used by ENSN for earthquake location
Figure (5) 14
The Percentage for ENSN and each sub-network in ENSN during each month in 2019
Figure (6) 16
Strong motion data efficiency (2019).
Figure (7) 16
Strong motion events recorded during 2019
Figure (8) 18
All recorded seismic activity in and around Egypt as recorded by ENSN in 2019.
Figure (9) 19
The Egyptian Local seismic activity as recorded by ENSN in 2019
Figure (10) 20
The Egyptian Local seismic activity as recorded by ENSN in 2019 zoomed in Gulf of Suez, Gulf of Aqaba (lower figures) and their entrance (upper figure)
Figure (11) 21
The Egyptian Local seismic activity as recorded by ENSN in 2019 zoomed in Cairo-Suez district (upper figure) and Aswan region (lower figure)
Figure (12) 22
The regional earthquake activity around Egypt as recorded by ENSN in 2019
Figure (13) 23
Magnitude of completeness deduced from the cumulative plot of local earthquakes 2019
Figure (14) 23
Distribution of earthquake size of local and regional earthquakes 2019
Figure (15) 24
Earthquake count along the year 2019
Figure (16) 24
Histograms showing the distribution of earthquake magnitudes recorded in 2019
Figure (17) 25
Depth distribution of recorded earthquakes in 2019

Seismological Staff

Personnel staff of the ENSN Lab.

No.	Name	
1	Prof. Ahmed Aly Badwy	Head of Seismology Dept.
2	Prof. Sherif Mohamed El-Hady El-Nashar	Head of ENSN Lab.
3	Prof. Rashad Kebeasy	
4	Prof. Rafat Fath El-Bary	
5	Prof. Abuo El-Ela Amin Mohammed	
6	Prof. Awad Hassoup	
7	Prof. Hagag Hamed	Head of Aswan Seismological Center
8	Prof. Gaber Hasseb	
9	Prof. Sayed Dahy	
10	Prof. Sayed Shaban Refai	
11	Prof. Ahmed Hosny Ali	
12	Dr. Hamed Abd El Monem Nofel	
13	Dr. Mahmoud Abd El Halem Mohana	
14	Ass. Prof. Hesham Eid Abd EL Hafeez	
15	Ass. Prof. Gad El Kareem Abd Rabou Mohammed	
16	Ass. Prof. Khaled Abed Allah Moahmoud	Director of EDRDC
17	Ass. Prof. Abd El Naser Mohammed Abd El Motal	
18	Ass. Prof. Mahmoud Salah El Hadidy	
19	Dr. Sameh Mousa	
20	Dr. Emad Kamal	
21	Dr. Mohammed Abd El Hay Ez Al Arab	
22	Dr. Ashraf Abd El Rahman Adly	
23	Dr. Ezat Al Amin	
24	Dr. Mohammed Abd Rabou	
25	Ass. Prof. Ali Gamal Rabei	
26	Dr. Mahamoud Samy	
27	Dr. Lotfy Samy	
28	Dr. Mohammed Salah	
29	Dr. Omar Mohammed El Saied	
30	Dr. Ahmed Farid	
31	Dr. Mohammed Yassien Husseen	
32	Mr. Walid Farid Ahmed	
33	Mr. Abotalib Ali Abotalib	
34	Mr. Mohamed Taha	
35	Eng. Ahmed Tawfek	
36	Eng. Ibrahim Gamal Ibrahim	

No.	Name
37	Eng. Hager Saad El Deen El sayed
38	Eng. Ghada Husssien Mohammed
39	Eng. Rahma Reda Moawad Abd-ElAzim
40	Eng. Fatma Ismail Abdel-Latif Salah
41	Mr. Reda Ibrahim El Sayed
42	Mr. Hosam Ibrahim El Desoky
43	Mr. Ahmed Abd El Mawla
44	Eng. Ahmed Abd El Azeem
45	Eng. Ramadan Mady ALi
46	Eng. Ramadan Desoky
47	Eng. Tarek Mohammed Mahmoud
48	Eng. Mohammed Hasablla
49	Mr. Hazem Yousef Bader El Deen
50	Miss. Samer Ahmed Ali
51	Mr. Hany Abu El Naga
52	Mr. Hussein Sabry
53	Mr. Hosam El Deen Mostafa
54	Mr Hamada saadelah
55	Mr Ahmed Hamed
56	Mr. Sayed Mohammed Ali
57	Mr. Khaled Kebeasy
58	Mrs. Saher Abd Rabou
59	Mrs. Zeinab Ibrahim Mohammed
60	Mrs. Salwa Ibrahim Mohammed
61	Mr. Ashraf Farouk
62	Mr. Hesham Fathy Mohammed
63	Mr. Mohammed Hasaneen Ali
64	Mr. Mohammed Abd El Monem Farag
65	Mr. Mohammed Saad El Deen
66	Mr. Ahmed Mohammed Yousef
67	Mr. Sameh Abbas Ahmed
68	Mr. Ahmed Barakat Mefrah
69	Mr. Mohammed Hussein Koryem
70	Mr. Ahmed Mahmoud Hanafy
71	Mr. Ahmed Hegazy
72	Mr. Sameh Ismail
Personnel Staff of General Seismology Lab.	
73	Prof. Hesham Hussein Mousa — Vice-President of NRIAG
74	Ass. Prof. Eman Farag Hassan — Head of General Seismology Lab.

No.	Name
75	Prof. Mamdouh Abbas Morsy
76	Ass. Prof. Ali Ahmed Ghareeb
77	Dr. Soud Abd El Hady
78	Dr. Medhat El Rayes
79	Dr. Assem Mostafa Taha
80	Dr. Shaima Ali Maamon
81	Mr. Mohamed El Sayed
82	Mr. Ibrahim Yousef Ibrahim
83	Mrs. Hend Lotfy
84	Mr. Mohamed Abd El Aal
85	Eng. Emad Badreldeen Abdelaziz Helal
Prepare and Design by Drawing and GIS unit	
86	Dr. Fatma Mohammed Ali
87	Mr. Walid Ahmed Mohmoud
88	Mr. Mohammed Said Abd El Sadek

Editing and preparing the final report of ENSN

89	Prof. Dr. Ahmed Aly Badawy
90	Prof. Dr. Sherif Mohmed El-Hady El-Nashar
91	Associate prof. Dr. Khaled Abd Ellah Mahmoud
92	Dr. Ashraf Abd El Rahman Adly
93	Dr. Shaima Ali Maamon
94	Mrs. Hend Lotfy
95	Eng. Ramadan Desoky

Introduction:

Earthquakes are the most typical phenomenon of natural hazard. They have effects on nature, human life and man-made structures. Assessment of earthquake occurrence sequences for any area plays an important role in proposing measures to minimize earthquake damage.

An earthquake is a geodynamic phenomenon. The present seismic activity and the other geodynamic phenomena related to it (e.g. deformation and ruptures of the crust, volcanoes, geothermal manifestation, topographic features, etc.) are results of relatively recent geologic process, which is usually, called active tectonics.

The causes of earthquakes are in the earth's crust and the upper mantle. The intensity and the form of active tectonics are not the same in all regions of the earth. There are regions where the active tectonics are high today and other regions where this activity is presently weak but was higher in the geologic past. The present active tectonics are the results of active tectonics that take place in certain zones on the earth's surface. These zones define the boundaries of the major lithospheric plates. These systems are the continental fracture and the mid-oceanic ridge systems.

Egypt is located close to one of the continental fracture system (Hellenic arc) at the convergence boundary of two big lithospheric plates (Eurasia and Africa). Also, Egypt is affected by the opening of the Red Sea (Mid Oceanic System) and its two branches (the Gulf of Suez and the Gulf of Aqaba-Dead Sea transform system). Thus, the seismicity is due to the interaction between the three plates of Eurasia, Africa and Arabian plates. Thus, it could be concluded that although the damaging earthquakes occurred infrequently, its risky consequences could not be ignored.

On 12 October 1992, an earthquake with magnitude (5.9 Mb) caught the Egyptian people. This earthquake caused 561 deaths, 9832 injured and left a damage of more than 35 million US$. As a result of this damage, the Egyptian Government supports the National Research Institute of Astronomy and Geophysics (NRIAG) to install the Egyptian National Seismic Network ENSN comprising from both velocity meters and accelerometers instruments (strong motion).

Configuration of the Egyptian National Seismic Network:

The Egyptian National Seismic Network (ENSN) consists of the main center at Helwan and five sub-centers at Hurghada, Burg El-Arab, Mersa Alam, Aswan and Kharga. The main center receives the seismic data from the near distance stations through a telemetry communication and from the remote stations and the sub-centers via the satellite communications. The received data are analyzed for determining the earthquake parameters.

The distribution of the seismic stations (Fig. 1) and the strong motion units (Fig. 2) are chosen to cover the known seismic sources as can as possible. Also, this distribution covers some regions with known historical earthquakes without any evidence of instrumental activity (e.g. Siwa seismic stations). Table 1 and 2 contains the stations full name and code together with the geographic locations of ENSN velocity stations and strong motion units respectively. During our location analysis, online available waveforms of some international stations (Fig.3) were used to extract any available phases for the earthquake of interest for enhancing our detectability and earthquake location accuracy.

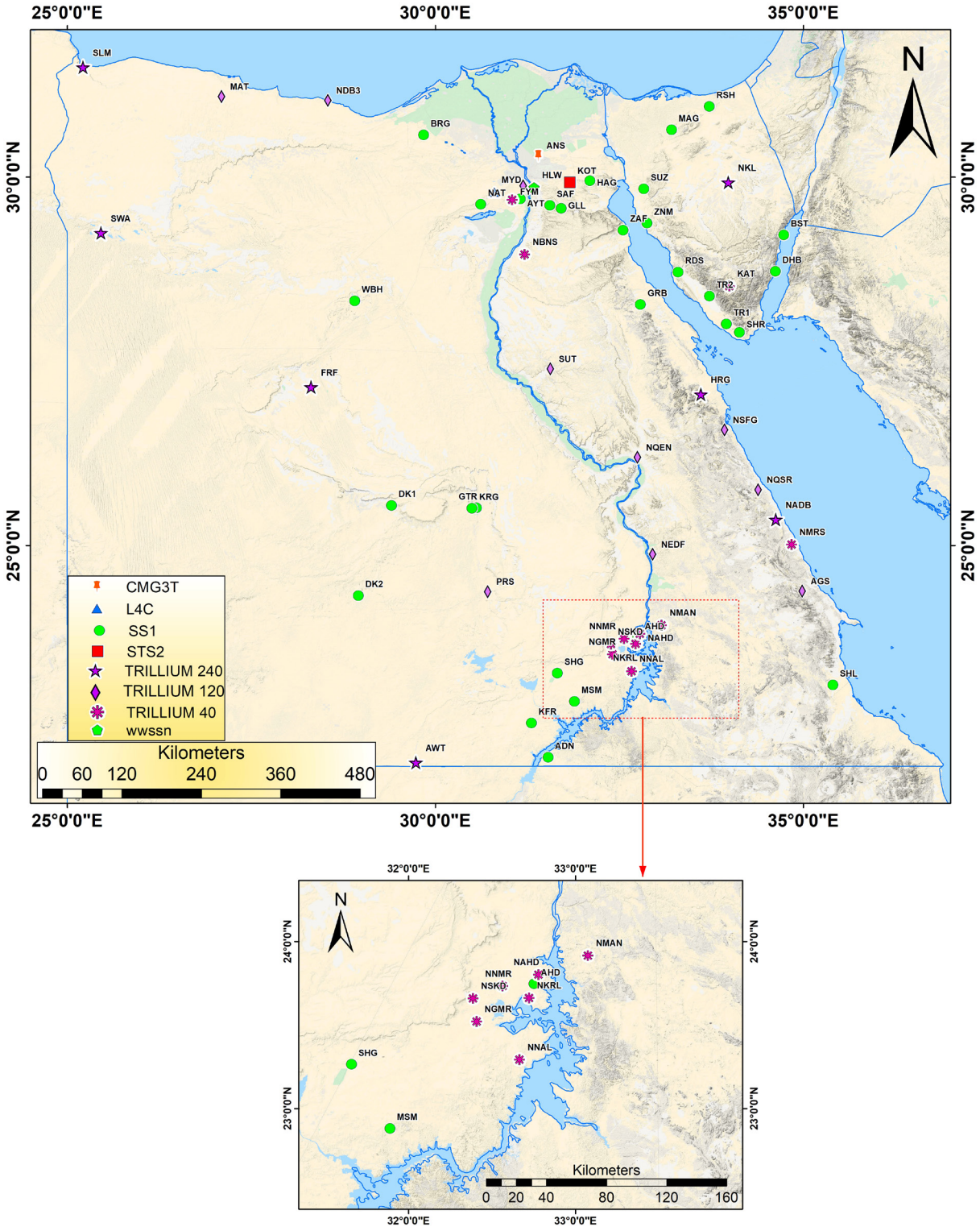


Figure (1): Distribution of Egyptian National Seismological Network (ENSN) stations

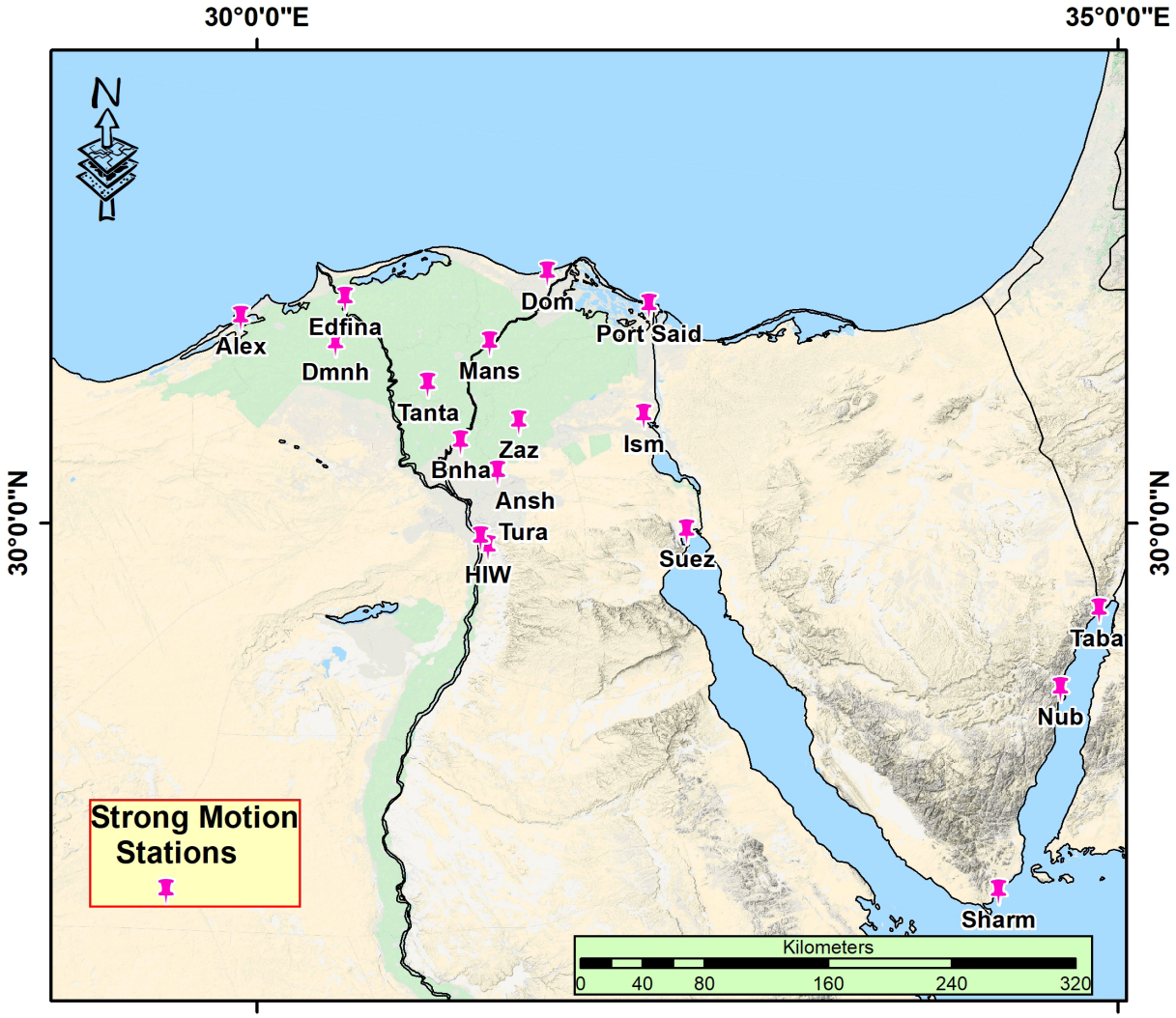


Figure (2): Distribution of strong motion instruments in Egypt.

Table 1: Stations code and location of ENSN velocity-meter units.

Station full name	Station code	Lat. N	Long. E
Abu-Dabbab	ADB	25.351	34.6238
Adendan	ADN	22.1224	31.5307
Abu-Gasoun	AGS	24.3794	34.9866
Ayyat	AYT	29.7044	31.1529
Burg El-Arab	BRG	30.5743	29.8393
Barnees	BRNS	23.8559	34.1143
Basata	BST	29.2166	34.7327
Dabaa	DB2	31.047	28.5039
Dahab	DHB	28.7221	34.6188
Dakhla1	DK1	25.5432	29.4028
Dakhla2	DK2	24.3195	28.9546
Edfou	EDF	25.0945	33.1818
Frafra	FRF	27.1484	28.3105
Fayyoum	FYM	29.6923	31.043
Galala	GLL	29.5772	31.7081
Gareib	GRB	28.2705	32.7859
Gabel Elteer	GTR	25.5096	30.5595
Hagoul	HAG	29.953	32.099
Helwan	HLW	29.8585	31.3432
Hurghada	HRG	27.0517	33.6081
Katren	KAT	28.5229	33.9928
Khafra	KFR	22.5891	31.3047
Kottamia	KOT	29.9276	31.8292
Kharga	KRG	25.5032	30.4985
Kasr	KSR	23.6105	33.0872
Mabd	MABD	22.9726	32.3258
Maghara	MAG	30.643	33.2082
Matrouh	MAT	31.094	27.0964
Matrouh Center	MATC	31.3457	27.2305
MersaAlam	NMRS	25.063	34.868
Masmus	MSM	22.8814	31.889
Mayadein	MYD	29.7958	30.8009
New Abu Dabbab	NADB	25.3405	34.5021
New Abu Hadid	NAHD	23.8022	32.778
Natroun	NAT	29.6329	30.6172
New BaniSuef	NBNS	28.6226	31.2945
New Gabel Aliza	NGAL	23.4192	32.7324
New Gabel Marawa	NGMR	23.52169	32.40756
New Gabel Dorwa	NGRW	23.6684	32.7912
Nekhel	NKL	29.9293	33.9804
New Khour El Ramla	NKRL	23.6634	32.7211

Station full name	Station code	Lat. N	Long. E
New Kurkur	NKUR	24.0042	32.6514
New Manam	NMAN	23.9169	33.0749
New New Aliza	NNAL	23.2931	32.6647
New northern Marawa	NNMR	23.7376	32.5618
New Sen El Kddab	NSKD	23.661	32.386
Nueiba	NUB	28.9893	34.6396
New west Aliza	NWAL	23.38301	32.57781
New west kalabsha	NWKL	23.41309	32.44888
Paris	PRS	24.3718	30.7126
Quseer	NQSR	26.11	34.264
New Qena	NQEN	29.862	32.738
New Edfu	NEDF	24.888	32.947
Roudaes	RDS	28.712	33.2975
Areish	RSH	30.9601	33.7219
Rayyan	RYAN	29.08251	30.27754
Saf	SAF	29.6187	31.5538
Safaga	NSFG	26.723	33.938
Sharm	SH2	27.8817	34.0833
Shagher	SHG	23.2655	31.6576
Shalateen	SHL	23.1067	35.3999
Salloum	SLM	31.4916	25.2123
Saqqara	NSQR	29.8813	31.1959
Assuit	SUT	27.3967	31.5626
Suez	SUZ	29.8406	32.8322
Siwa	SWA	29.2432	25.4556
Tal El Amarna	TAMR	27.6821	30.9175
Tour1	TR1	28.0068	33.9521
Tour2	TR2	28.3853	33.7227
WahatBaharya	WBH	28.3208	28.9038
Zaafarana	ZAF	29.2819	32.5487
Zeneima	ZNM	29.3761	32.8752

Table 2: Strong motion units location.

St. Name	Lat	Long
HlW	29.858532	31.343222
Mans	31.041850	31.352813
Tanta	30.800702	30.993091
Port Said	31.257932	32.276153
Edfina	31.297339	30.514054
Zaz - Old 2016	30.587260	31.482568
Zaz - New	30.583595	31.521063
Dmnh	31.03638889	30.45722222
Alex	31.1886	29.908
Tura	29.91	31.30
Ansh	30.290856	31.39976
Bnha	30.466508	31.181863
Dom	31.446537	31.688605
Suez	29.950409	32.496496
Ism- Old 2016	30.60378	32.305126
Ism - New	30.618582	32.245399
Sharm	27.859129	34.306004
Nub	29.034660	34.665797
Taba	29.490564	34.889563

DATA PROCESSING:

A friendly user interface program with powerful tools for routine work is used to extract the digital data of remote stations online from the ring buffer. This software named “Atlas- ver. 2.0.8” provided by Nanometrics Inc. (Canada) and is able to load, view, manipulate, locate and save digital data from many sources like, Earthworm databases, SEED files and Nanometrics data servers. With Atlas software we can view and pick events using the intuitive interface, sort traces by first phase time or by channel name, view multiple events simultaneously from several data sources and we can edit event and solution. Using Atlas enables editing events, create phase, duration and amplitude picks which are important for magnitude estimations. With Atlas we can use simple and robust methods to create digital filters and apply them individually or as a group to trace data. Atlas works with fully interactive maps that combine a geographical display of stations and epicenters. Spectral analysis has also done using Atlas for any trace and easily creates HTML bulletins to view and distribute summaries of events.

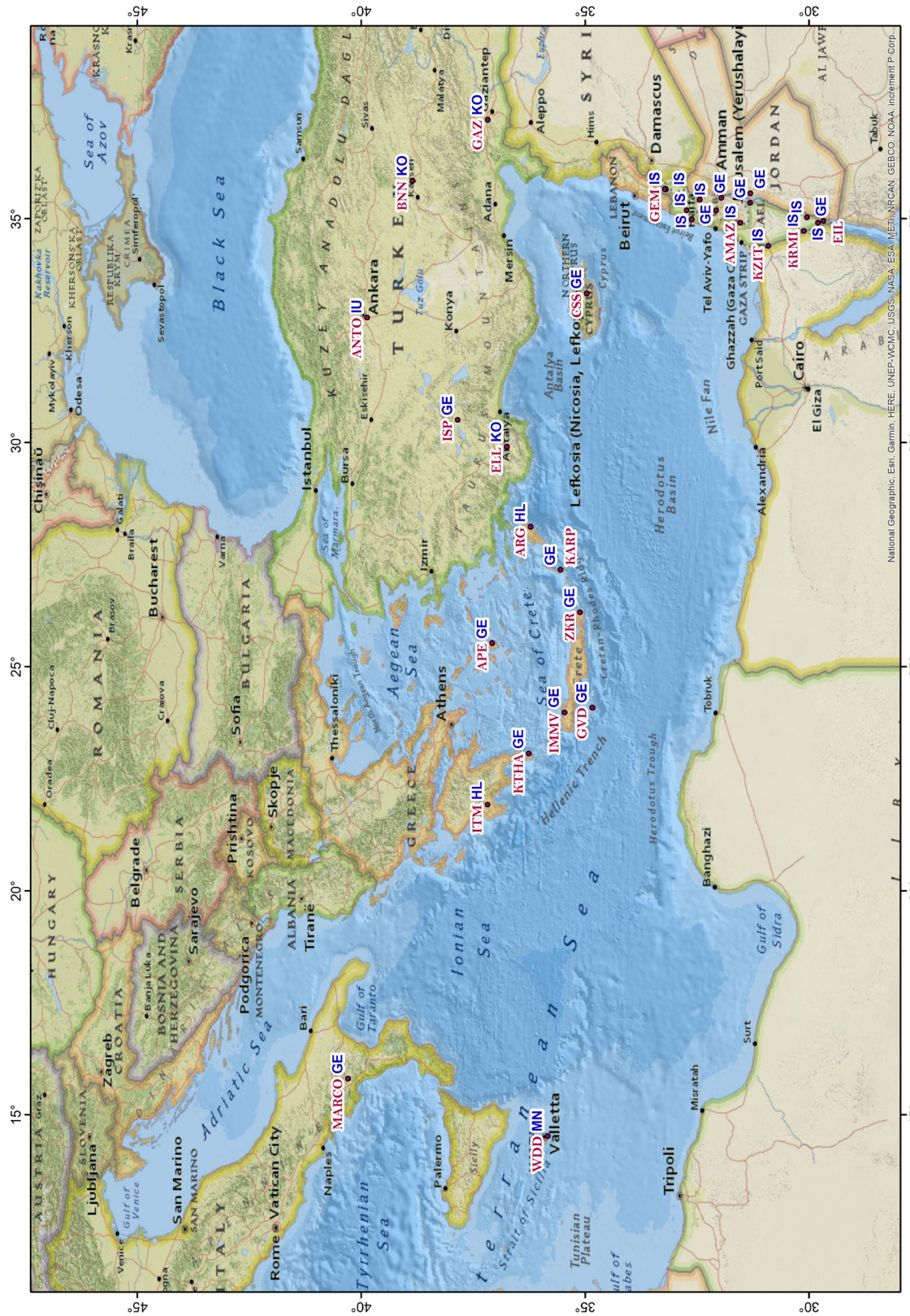


Figure (3): location of seismic stations that have been used when it is available for the Mediterranean Sea earthquakes.

Atlas uses Hypo-inverse, a location program written and used by the United States Geological Survey (USGS), to locate earthquakes and calculate magnitudes. This is done by creating an input file listing phases and any magnitude information.

For the location: after creating the input file that lists phases, Hypo-inverse operates with a set of files that give instructions for which stations to use in calculations as well as any weights, delays, or corrections to apply, and an important input which is the crustal model that is suitable for the area of interest. In our case, ENSN, different crustal models are used which covers many parts of the Egyptian territory, for example a model to the northern part and the Mediterranean is applied to events confined to that part, while another one in the northeastern part of Eastern Desert is used, a third one in central and southern part of Eastern Desert. In southern Egypt, Aswan area, a local crustal model of Aswan is applied. For Dahshour seismogenic zone a local model deduced for a tomographic study is used. A specific model for the northern part of Red Sea is used as well as another one to Abo-Dabbab region is applied. Egypt is therefore including different crustal unites and types acts for a very complex lithospheric structure. The simplest case Hypoinverse handles is one crustal model and one set of station delays used for all epicenters and all stations. Hypoinverse also allows considerable complexity by using multiple velocity models. In any model, velocity varies only with depth. Multiple crustal velocity model give more reliable earthquake location which have been combined with different velocity models to reach a more accurate phase picking and precise location for earthquake solution. Due to this ENSN use a multiple crustal velocity models option of Hypoinverse -2000 program (Fig.4).

For magnitude calculations: duration and amplitude magnitude are two types of magnitudes can be determined using Atlas. *The primary traditional duration or coda magnitude* (F-P), M_D is considered by Atlas (Lee et al., 1972) taking into consideration the phase weight and Eaton's distance correction (BSSA, 1992). The complete form of the duration magnitude expression is:

$$M_D(f\text{-}P) = FMA + FMB*\log(f\text{-}P) + FMF*(f\text{-}P) + FMD*D + FMZ*Z + STACOR + FMGN*G$$

The FM coefficients are set by the DUR and DUB commands.

f-P is the end of the coda (F) minus P-time, or duration.

D is the epicentral distance.

Z is the (positive) depth.

STACOR is the duration magnitude correction for the station.

G is the gain correction.

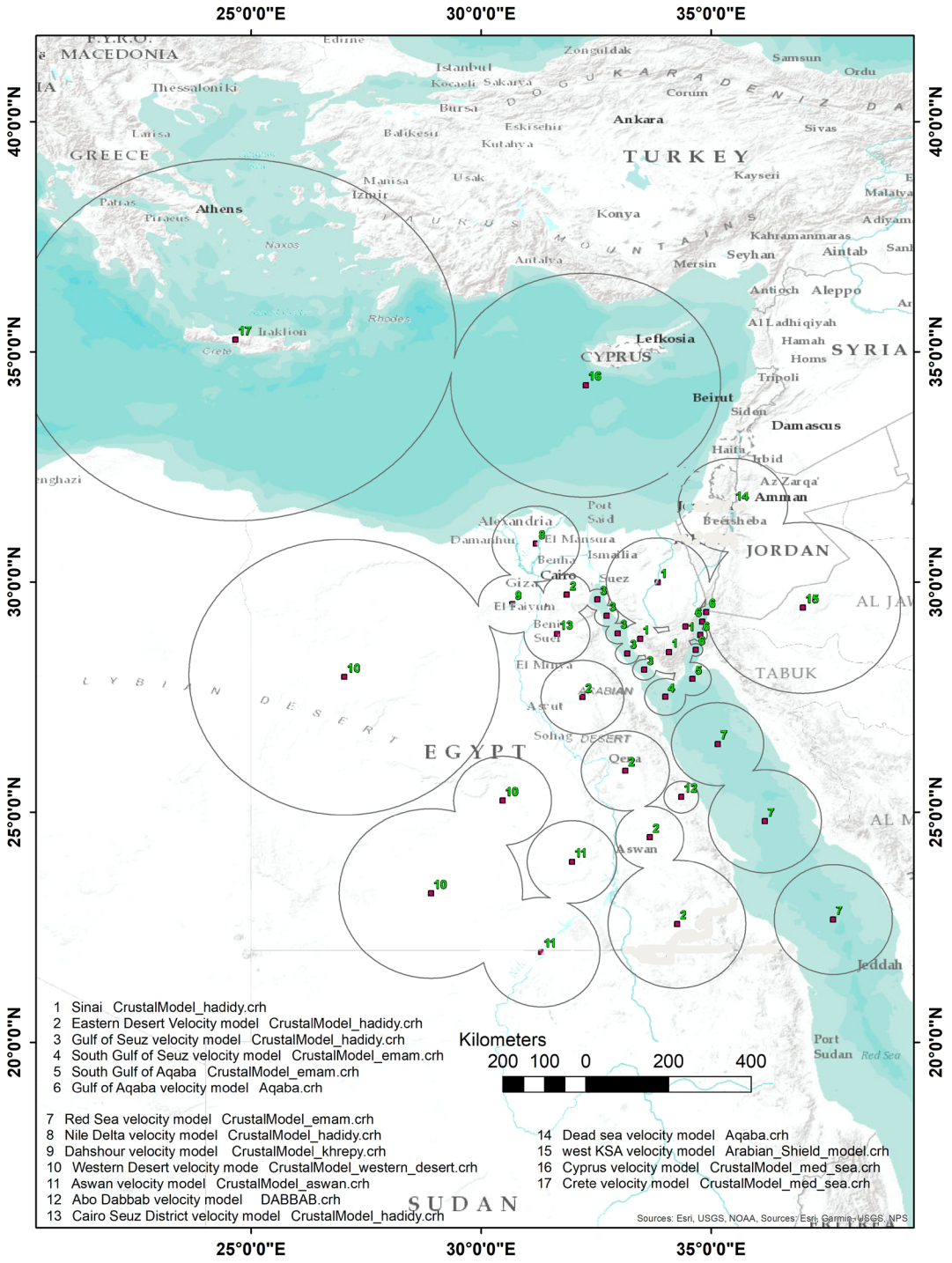


Figure (4): Multiple velocity model used by ENSN for earthquake location.

S is the slant distance $S^2 = D^2 + Z^2$.
The form of duration magnitude proposed by Lee et. al. (1972):

$$\mathbf{M_D(f\text{-}P) = -0.87 + 2.0*\log (f\text{-}P) + 0.0035*D + STACOR}$$

The second type of magnitude determined by Atlas is the *amplitude (Local) magnitude*. The method for calculating the local magnitude is modeled after the reading of maximum peak-to-peak amplitudes from the standard Wood-Anderson torsion seismograph. If the amplitude is read from an electromagnetic seismometer with velocity output, it is correct to an equivalent Wood-Anderson response using Jerry Eaton's XMAG formulation (1970, 1992), the seismometer motor constant and the response curve of the seismometer and recording system. Digital amplitudes are handled also by using the appreciate system gain. Richter's original formula is:

$$\mathbf{M_L = \log (A_{WA}/2) - \log (A_o)}$$

Where A_{WA} is the maximum peak-to-peak amplitude in mm on the paper record, and log (A_o) is an attenuation term and is a tabulated function of distance. The division by 2 is because of the peak-to-peak reading.
The "X" magnitude formula developed by Jerry Eaton (1992), for velocity seismometers is used in hypoinverse-2000. Before the magnitude is calculated, the amplitude is converted to effective Wood-Anderson amplitude using the period at which the amplitude is measured and the response curve for the seismograph type. The M_X relation is:

$$\mathbf{M_X = \log (A_D / 2 \times CAL \times R(f) \times S)) + F_1(s) + F_2(d) + XCOR_{COMP} + XCOR_{STA}}$$

Where A_D is the peak-to-peak amplitude, CAL is the dimensionless calibration factor depending on the system gain, R(f) is the frequency dependent response curve of the USGS system relative to the Wood-Anderson seismometer, S is the seismometer motor constant in volt/cm/sec, $F_1(s)$ and $F_2(d)$ are the log (A_o) distance correction, $XCOR_{COMP}$ is the correction made globally to all components with a given component code and finally, $XCOR_{STA}$ is the individual station correction.

ENSN Stations Performance (2019)

Egyptian National Seismic Network (ENSN) consists of six sub-networks. These sub-networks are Cairo, Sinai, Aswan, Red Sea, N-coast and N-valley which having 8, 9, 15, 8, 4 and 6 stations respectively. The total numbers of in-operation stations are fifty three.

According to Table 3, month-2019 achieved maximum percentage (100%) for all sub-networks except Aswan (92%). The minimum percentage in Cairo sub-network was in August 2019. While in April 2019 the minimum was for Sinai and in October 2019 in Red Sea sub-networks. For Aswan sub-network the

minimum was in October 2019. The N-coast sub-network reached a minimum in October and November 2019. The N-valley sub-network has achieved a minimum in in November 2019. According to Table 4, in 2019, the best operational sub-network was N-Valley with 99.80 % in average, while the worst sub-network was in Aswan with 81 % in average. According to Figure 4, Table 5 is created to illustrate the maximum and the minimum percentage for each month in 2019.

Table 3: The maximum and minimum percentage for each sub-network in 2019

	Cairo	Sinai	Aswan	Red Sea	N-Coast	N-Valley
MAX. Percentage	100%	100%	92%	100%	100%	100%
Month-2019	From (1:5)+9&10	6&7& 10& 12	may	1&2&3 &12	From1:9 +12	4&9&12
Min. Percentage	93%	53%	72%	84%	99%	80%
Month-2019	8	4	10	10	10&11	11

Table 4: The average percentage for each sub-network in 2019.

	Cairo	Sinai	Aswan	Red Sea	N-Coast	N-Valley
Average Percent in 2019	93.50%	85.80%	81%	97.05.%	99.80%	94.00%
Best sub network						
Worst sub network						

Table 5: the maximum and minimum percentage for each Month in 2019

month-2019	Maximum percentage (%)	sub-network name	Minimum percentage(%)	sub-network name
January	100%	Cairo-red sea-N_coast	76.5%	Aswan
February	100%	Cairo-red sea-N_coast	55%	Sinai
March	100%	Cairo-red sea-N_coast	55%	Sinai
April	100%	Cairo-Nvalley-N_coast	53%	Sinai
May	100%	Cairo-N_coast	92%	Aswan
June	100%	Sinai-N_coast	82.5%	Aswan
July	100%	Sinai-N_coast	84%	Aswan
August	100%	N_coast	83%	Aswan
September	100%	Cairo-Nvalley-N_coast	77%	Aswan
October	100%	Sinai	72%	Aswan
November	99.5%	Red sea	73%	Aswan
December	100%	Cairo-Nvalley-N_coast - Red sea - Sinai	73%	Aswan

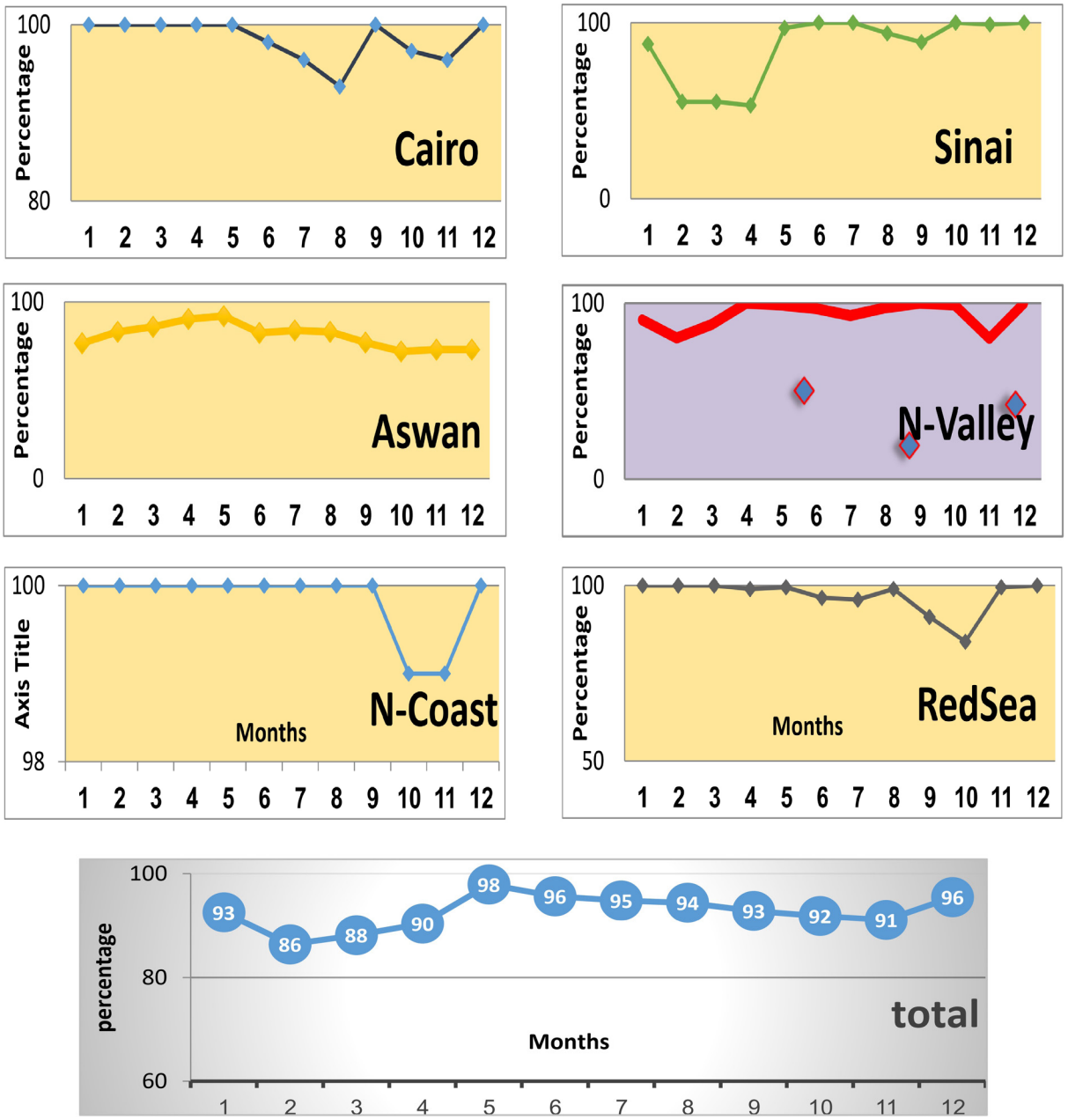


Figure (5) The Percentage for ENSN and each sub-network in ENSN during each month in 2019

Strong motion observation units

Strong motion network has started working since 2008 were five stations was first established that cover the Nile Delta region. The main goal is to monitor and record the acceleration produced from the active surrounding seismic zones, especially the Mediterranean Sea due to the fact that, the opposite region is Nile Delta, which is characterized by the thick sedimentary cover gaining a bad impact because of the severe amplification of any seismic waves that produced during any earthquake.

Since 2008 until now, the total number of accelerographs was increased to 17 stations in and around the Nile Delta as shown in Figure (6). Table (6) contains station's health information of strong motion stations from 1/1/2019 to 31/12/2019. The strong motion network mainly involves three types of sensors **IDS-3602A,** TERRA Technology CORP, **130-SMA** (REFTEK Company) and **TITAN SMA** (Nanometrics company). Stations send data to the main centre at NRIAG through TCP/IP connection using 3G-router.

A Master server computer at the main center receives data from both Reftek and Nanometrics stations using RTPD and Apollo Server acquisition programs while Compass software has been used by ENSN users strong motion data for analysis of the recorded events. A copy of data is manually stored in the mass storage for backup. Fig.7 shows the distribution of the seismic events already recorded by the Egyptian strong motion network that have been occurring during 2019.

Table 6: Health of strong motion stations 2019

Stn. Name	KADF	TADF	KHLW	THLW	RANS	RASW	RQTB	RSUZ	TALX
Stn. Health	75%	70%	95%	95%	90%	92%	85%	82%	90%
Stn. Name	TBNH	TISM	TKOT	TMAN	TNUB	TPOR	TSHR	TTBA	TZAG
Stn. Health	98%	95%	98%	97%	75%	70%	95%	30%	85%

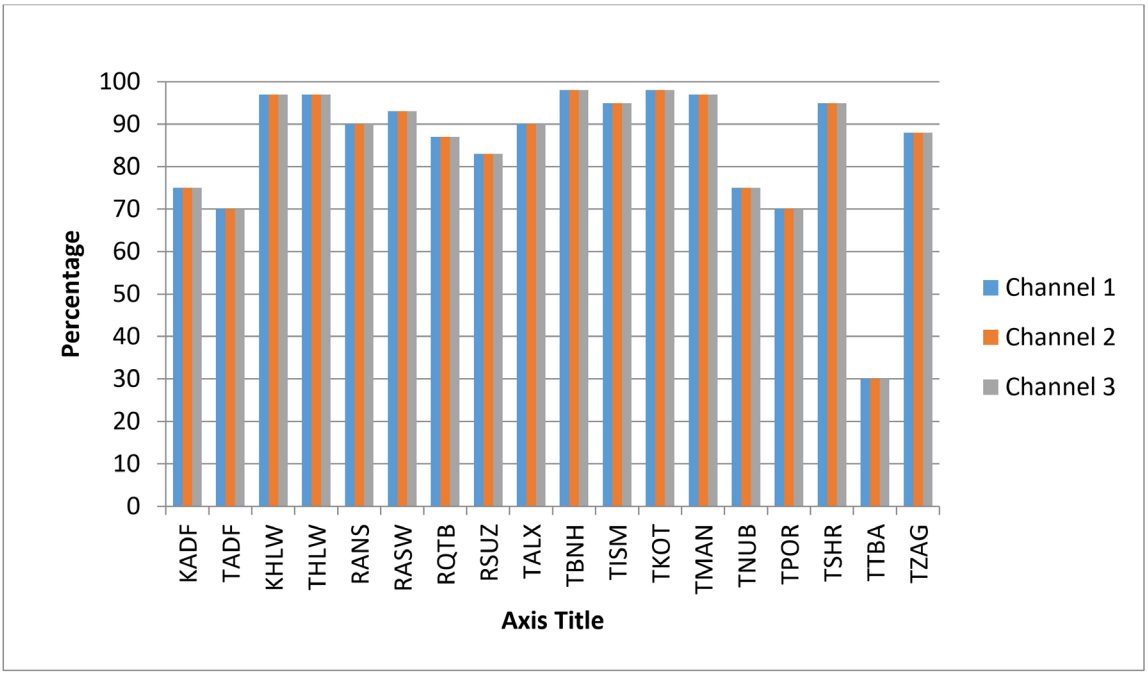


Figure (6): Strong motion data efficiency (2019).

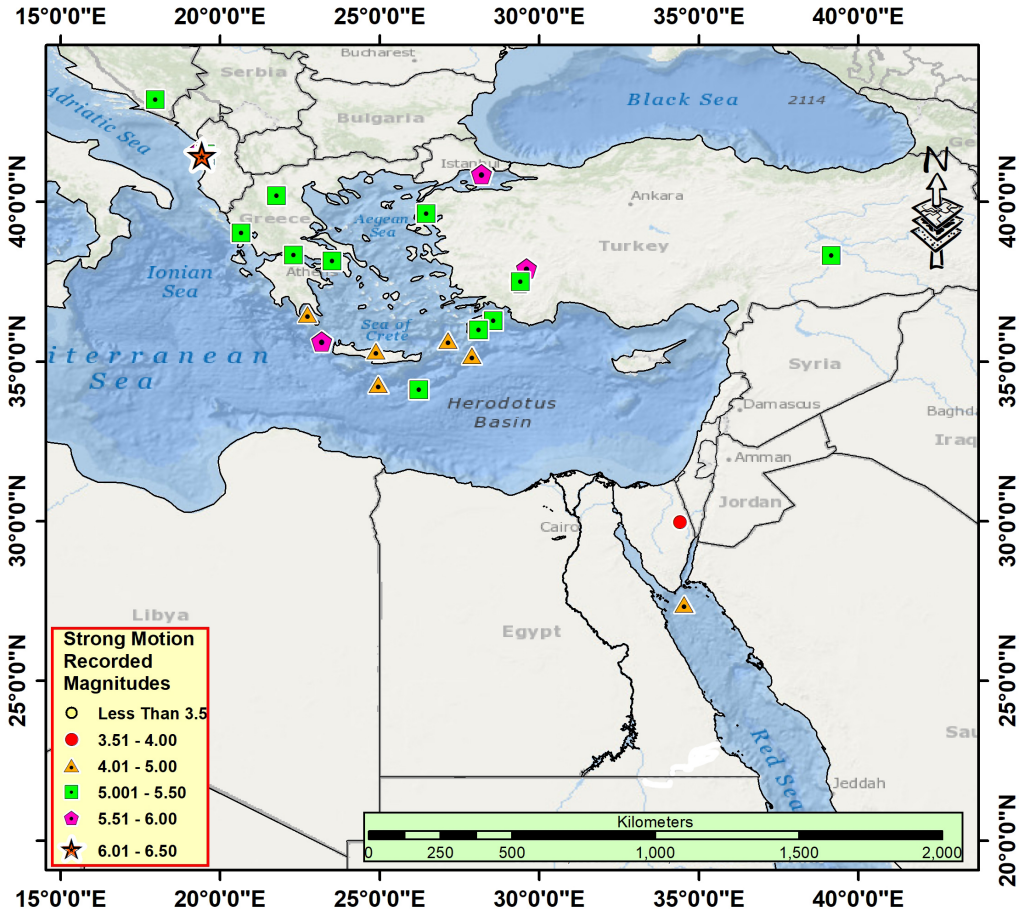


Figure (7): Strong motion events recorded during 2019.

Summary of 2019 Seismicity

The all recorded seismic activity within the year **2019** in and around Egypt (Fig. 8) reflects the incredible increase in the number of smaller earthquakes. This large number of events could be attributed to the seismic station's delectability of ENSN.

These **local seismic activities** (Fig. 9) are fit along the previously defined seismic zones during previous years. Figs. 10 and 11 show zoom in for some selected seismic zone in Egypt.

The **regional seismic activities** (Fig. 12) show a cluster of the seismic activity to the southern part of Hellenic and Cyprian arcs. The seismic activity extends to north to the southern part of Greece and Turkey. Few events are located along Southern Jordan, Northern Sudan, Central Red Sea, and along the Dead Sea Transform Fault System.

The magnitude of completeness

One important issue related to the catalogues is that the recorded earthquakes are never complete in time and space. Completeness can be defined as the extent to which all earthquakes in each magnitude range and time period are reported in the dataset. The magnitude of completeness (Mc) is the minimum magnitude that is always recorded in a specified zone within a given time period. Mc can be estimated by fitting a Gutenberg-Richter model to the magnitude-frequency distributions, the minimum magnitude at which the magnitude-frequency distribution deviates from the Gutenberg-Richter model is taken as the magnitude of completeness. Using just the earthquakes in 2019, the Mc is around 1.8, as shown in figures from 13 to 16. The last fig. 17 presents the depth distribution of recorded earthquakes in 2019.

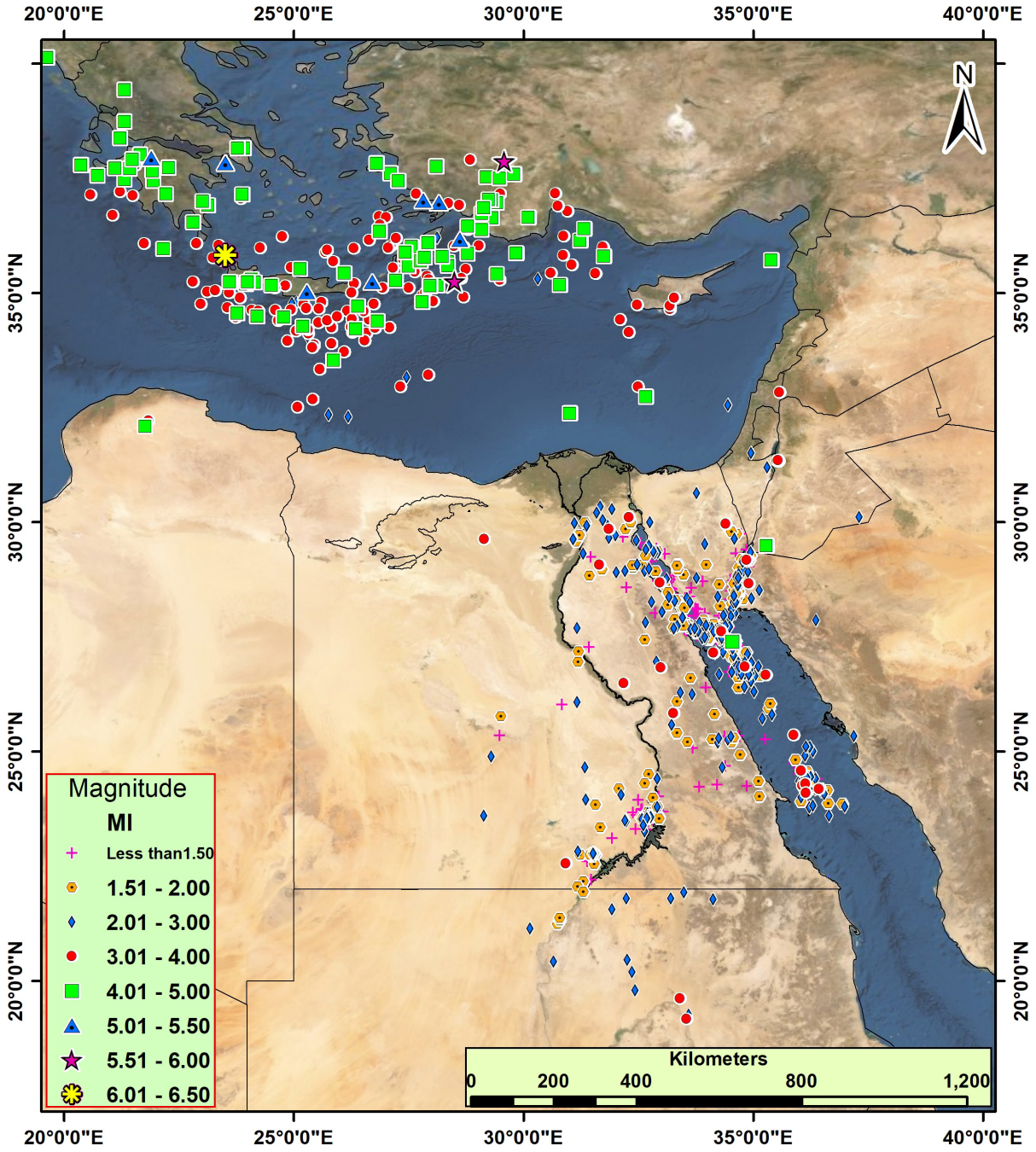


Figure (8): All recorded seismic activity in and around Egypt as recorded by ENSN in 2019.

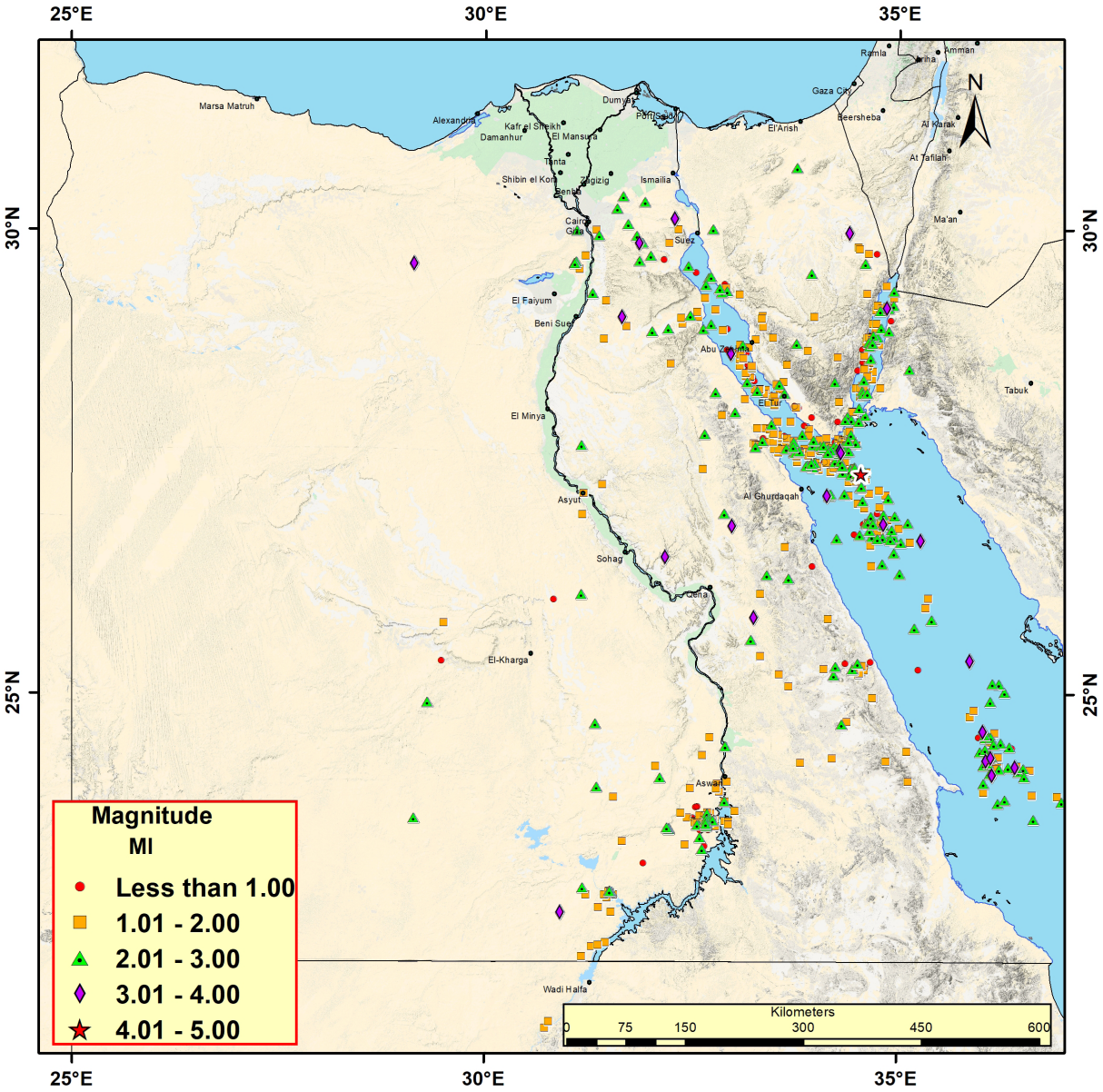


Figure (9): The Egyptian Local seismic activity as recorded by ENSN in 2019.

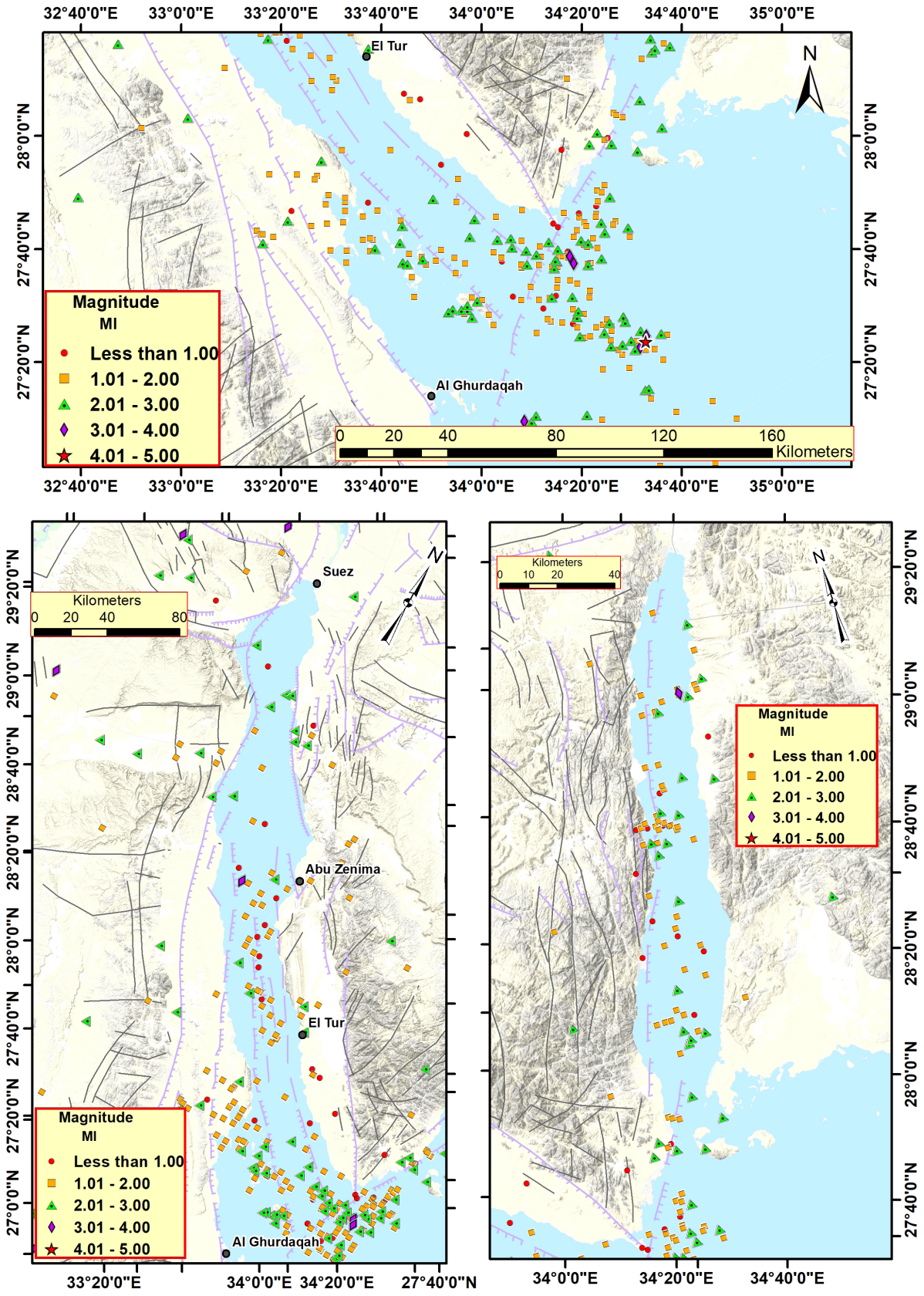


Figure (10): The Egyptian Local seismic activity as recorded by ENSN in 2019 zoomed in Gulf of Suez, Gulf of Aqaba (lower figures) and their entrance (upper figure).

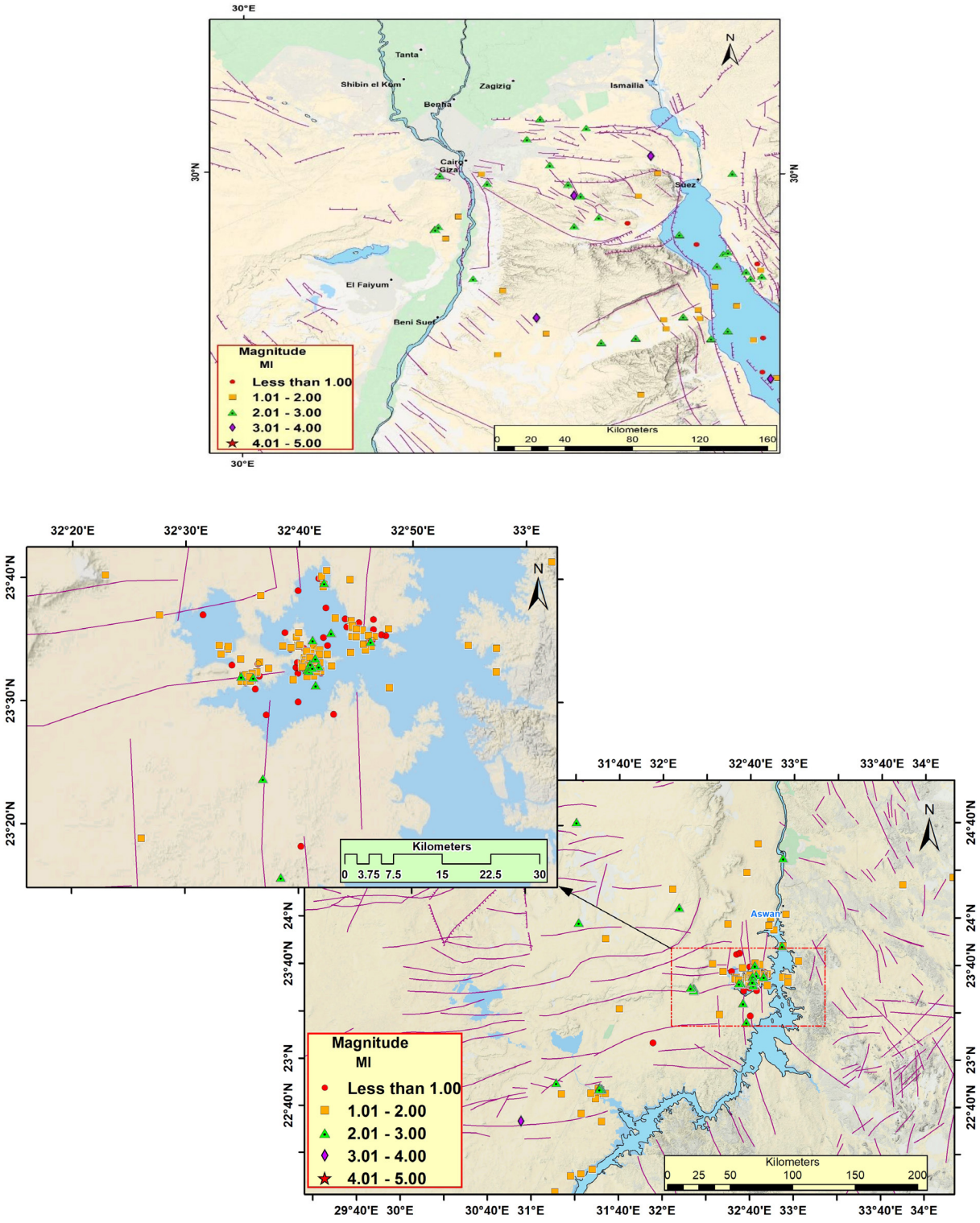


Figure (11): The Egyptian Local seismic activity as recorded by ENSN in 2019 zoomed in Cairo- Suez district (upper figure) and Aswan region (lower figure).

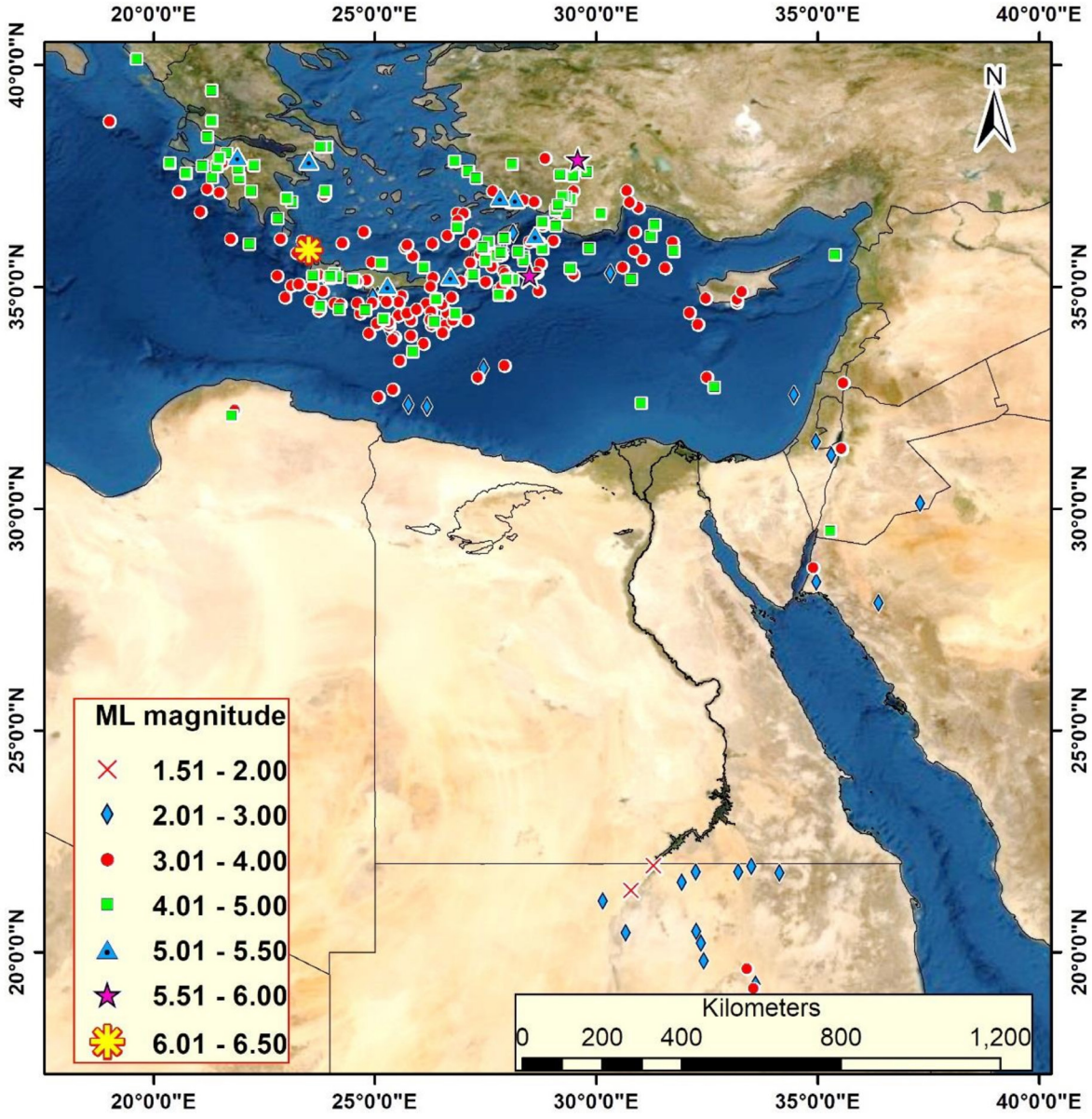


Figure (12) The regional earthquake activity around Egypt as recorded by ENSN in 2019.

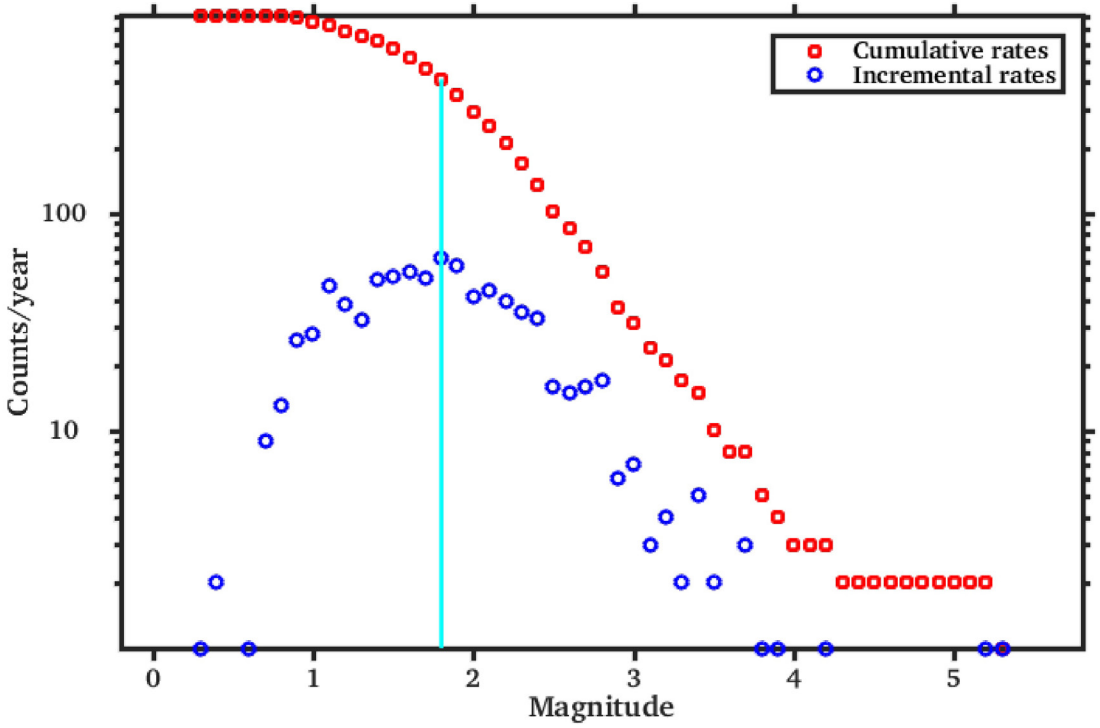


Figure (13): Magnitude of completeness deduced from the cumulative plot of local earthquakes 2019

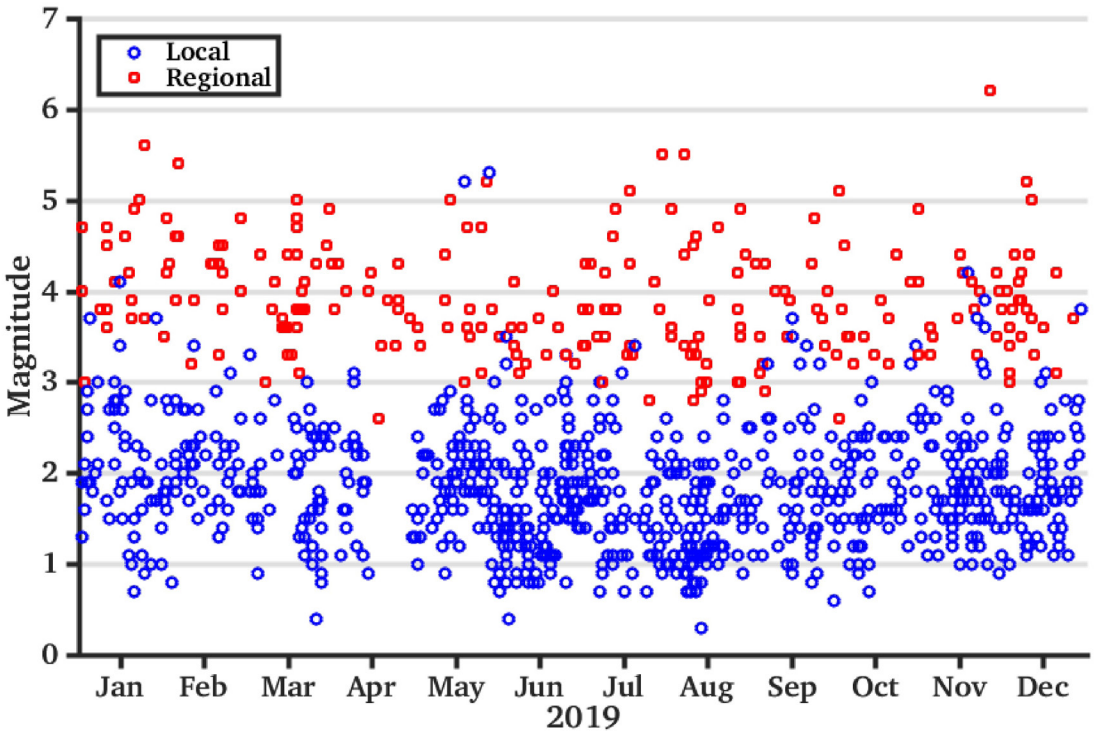


Figure (14): Distribution of earthquake size of local and regional earthquakes 2019

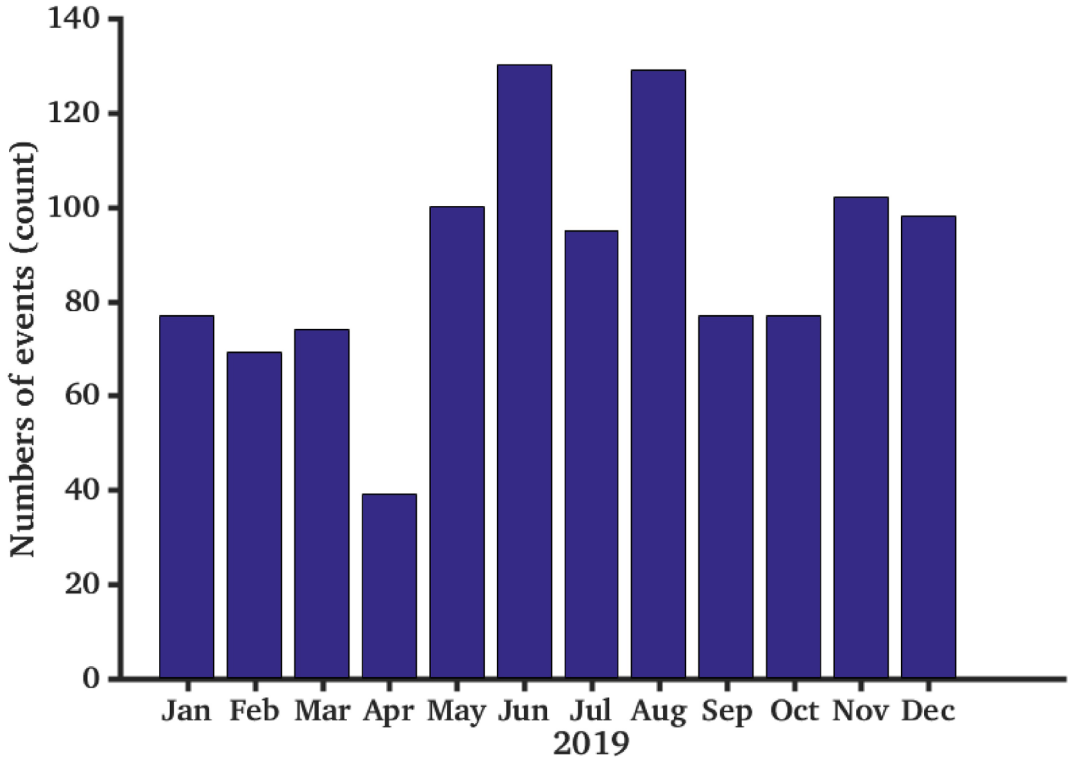


Figure (15) Earthquake count along the year 2019

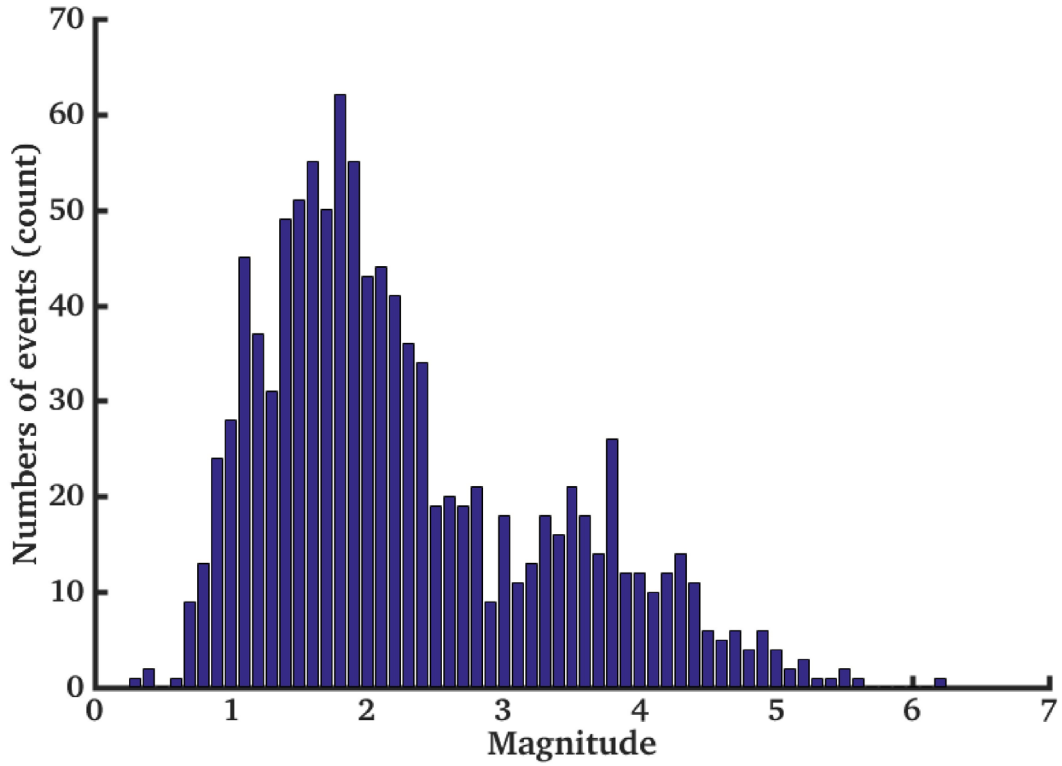


Figure (16) Histograms showing the distribution of earthquake magnitudes recorded in 2019

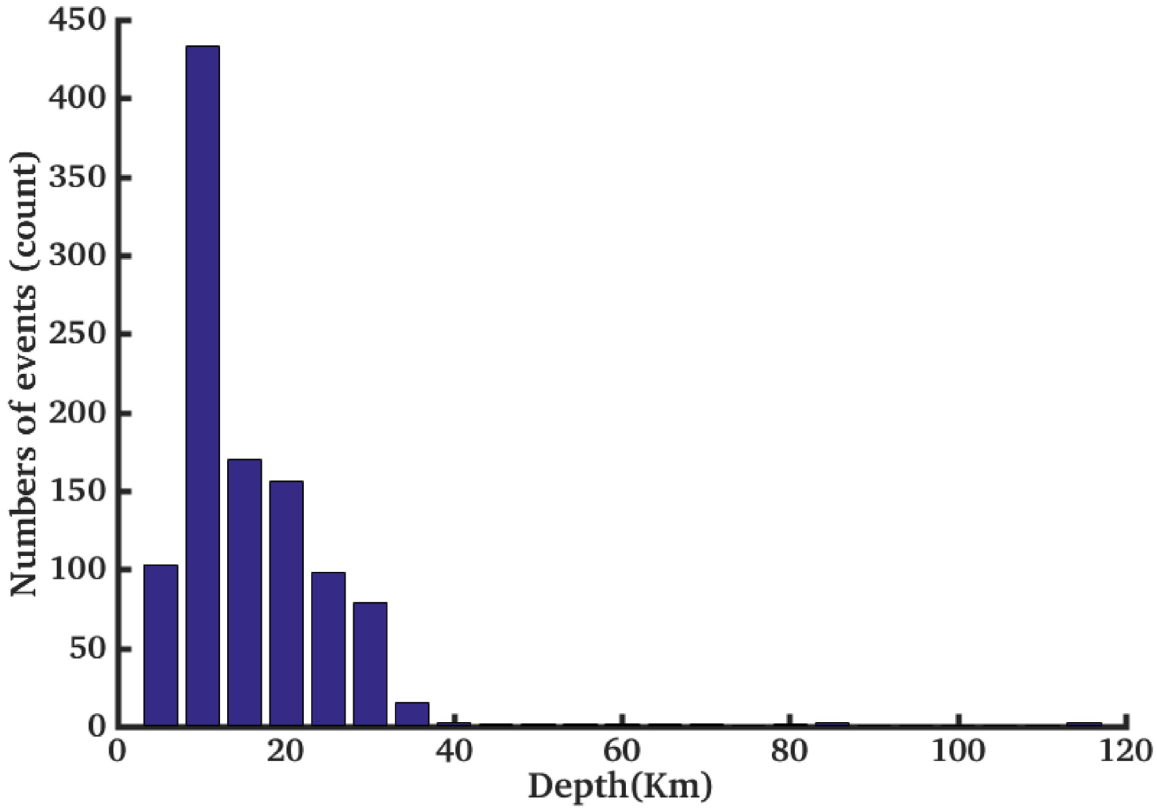


Figure (17) Depth distribution of recorded earthquakes in 2019.

Table (7) Hypo-central parameters of local earthquakes recorded by ENSN in 2019

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	1	1	5	22	56.13	23.6668	32.6949	4.01		1.26	1.26
2019	1	1	10	38	59.18	28.9478	32.9305	26.75		1.86	1.86
2019	1	2	4	47	35.73	28.8583	34.7457	15.91	2.09	1.65	2.09
2019	1	3	13	3	36.9	27.7342	33.7366	18.42	2.37	1.91	2.37
2019	1	3	15	41	24.87	24.1896	36.2372	17.1	1.95	2.66	1.95
2019	1	4	11	9	6.58	27.8738	33.9232	18.82	1.87	1.79	1.87
2019	1	5	1	2	57.43	23.5705	32.5611	20	1.83	2.64	1.83
2019	1	6	18	16	41.7	28.3786	34.2324	13.98	2.03	1.94	2.03
2019	1	7	19	23	51.63	28.9538	34.7902	23.25	2.08	1.9	2.08
2019	1	7	23	55	6.12	30.1101	32.2943	1.95	3.02	2.78	3.02
2019	1	10	9	11	49.02	28.8449	34.6404	11.96		1.7	107
2019	1	11	0	15	0.47	27.6489	34.2591	19.08	1.52	1.93	1.52
2019	1	11	21	32	25.21	24.8975	29.3017	19.21	2.71	2.81	2.71
2019	1	13	4	8	7.04	23.2616	32.6406	5.26	2.66	2.8	2.66
2019	1	13	21	41	32.56	27.6191	34.355	23.44	2.82	2.6	2.82
2019	1	13	22	47	32.31	29.1977	34.9398	20.6	2.45	2.56	2.45
2019	1	14	4	52	6.69	26.8645	35.1173	21.82	2.81	3.13	2.81
2019	1	15	0	45	38.53	29.0742	31.6545	17.99	3.39	3.22	3.39
2019	1	16	16	25	35.13	23.5266	32.5957	12.63	1.92	1.84	1.92
2019	1	16	16	33	21.32	27.1833	31.1972	11.59	1.86	2.56	1.86
2019	1	16	18	34	40.08	28.5967	34.5705	29.14		1.53	1.53
2019	1	16	23	32	14.09	26.7358	34.9183	24.03	2.71	2.99	2.71
2019	1	17	6	1	14.17	28.2842	33.2895	13.13	2.94	2.71	2.94
2019	1	17	13	53	50.47	23.6607	32.7029	8.64	2.4	2.26	2.4
2019	1	17	22	11	44.31	23.5325	32.5993	9.71	2.31	2.1	2.31
2019	1	18	5	0	49.35	23.6587	32.7027	10.82	1.13		1.13
2019	1	19	6	17	11.87	27.8067	33.917	18.86	1.95	2.25	1.95
2019	1	19	6	31	21.93	23.5265	32.5977	7.22	0.96		0.96
2019	1	20	6	48	18.54	23.5248	32.5882	4.98	0.65		0.65
2019	1	20	6	50	43.05	27.9159	33.8669	10.91		1.31	1.31
2019	1	20	12	55	20.87	23.5349	32.5838	9.12	1.51	1.4	1.51
2019	1	21	22	45	24.64	27.3839	34.4692	18.71	2.32	2.12	2.32
2019	1	22	18	46	45.41	27.6303	34.2514	17.38	2.05	2.42	2.05
2019	1	23	4	32	38.53	23.6556	32.7013	5.8	1.09	1.08	1.09
2019	1	23	21	51	18.39	28.3227	34.7807	6.28	1.63	1.93	1.63
2019	1	24	12	40	50.2	23.6625	32.701	13.19	0.93		0.93
2019	1	24	20	28	38.43	23.6101	32.7429	6.45	1.94	1.85	1.94
2019	1	24	21	14	52.56	28.727	32.927	14.96		2.16	
2019	1	25	22	4	1.59	27.518	34.1916	17.05	1.86	2.33	1.86
2019	1	26	9	5	35.24	28.9426	32.639	2.93	2.83	2.42	2.83
2019	1	26	9	23	40.2	23.5451	32.6826	11.91	1.01		1.01

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	1	26	12	47	37.44	26.9552	31.1823	0.02	1.74	2.29	1.74
2019	1	28	9	8	44.19	27.5246	33.9686	19.84	1.7	2.07	1.7
2019	1	28	18	44	28.93	28.6844	32.9749	23.39	3.7	3.16	3.7
2019	1	30	6	25	51.9	23.6013	32.7364	7.61	0.96	0.79	0.96
2019	1	30	10	47	14.73	23.5431	32.6789	12.26	2.09	1.53	2.09
2019	1	30	11	12	51.15	23.5459	32.6826	14.15	1.44	1.8	1.44
2019	1	30	21	40	10.74	23.5454	32.6786	14.38	1.43	1.57	1.43
2019	1	31	10	50	22.67	29.546	32.5536	6.74		1.66	1.66
2019	1	31	13	5	44.36	29.0041	32.3859	22.93	1.78	1.67	1.78
2019	2	1	6	37	47.35	27.8838	33.4534	16.03	1.91	1.93	1.91
2019	2	1	18	0	40.39	29.7172	32.0019	18.1	2.77	2.79	2.77
2019	2	1	18	3	58.7	27.8053	33.547	10	1.76	1.81	1.76
2019	2	1	22	17	20.9	23.5885	32.7439	3.95	1.6	2.15	1.6
2019	2	2	6	8	44.79	27.6269	33.7378	3.5	2.72	2.57	2.72
2019	2	3	21	26	2.81	23.5705	32.6538	19.76		0.77	0.77
2019	2	4	2	46	11.83	26.7408	34.4738	16.82		1.84	1.84
2019	2	4	3	9	52.98	26.8558	34.582	16.71		2.18	2.18
2019	2	4	5	45	48.87	26.3942	33.9665	9.99		1.92	1.92
2019	2	4	7	24	37.07	26.293	33.413	31.27	2.18	2.29	2.18
2019	2	4	7	36	8.44	27.1757	34.3515	3.55	2.08	1.64	2.08
2019	2	4	20	18	15.45	28.9715	31.7091	15.79	1.8	1.43	1.8
2019	2	4	21	2	55.83	26.8599	34.6168	25.45	2.83	2.86	2.83
2019	2	7	10	31	18.78	29.68	32.1647	0.1		1.99	1.99
2019	2	7	22	39	22.72	30.2855	31.9291	2.73	2.67	2.69	2.67
2019	2	8	3	44	4.03	27.5238	34.234	20.23	2.32	2.86	2.32
2019	2	8	20	34	10.38	25.719	35.2042	21	2.73	2.48	2.73
2019	2	9	4	56	26.96	27.8131	33.8385	21.94	2.19	1.98	2.19
2019	2	9	20	16	30.95	29.854	32.2257	6.34	1.74	1.97	1.74
2019	2	10	1	36	52.47	28.9932	32.7315	14.64	2.27	2.38	2.27
2019	2	10	4	16	10.99	28.3525	33.5574	7.17	2.06	2.33	2.06
2019	2	10	5	15	48.77	27.0778	34.5157	18.08	1.86	1.95	1.86
2019	2	11	2	11	17.58	28.4765	34.6964	18.86		2.14	2.14
2019	2	11	8	15	11.57	26.4955	32.1831	16.74	3.36	3.25	3.36
2019	2	11	17	34	11.51	28.7687	33.1168	17.21	2.26	1.8	2.26
2019	2	12	10	42	27.6	30.3436	31.6695	16.02	2.72	2.37	2.72
2019	2	12	17	50	16.41	27.7493	34.4468	12.26	1.46	1.66	1.46
2019	2	13	15	23	7.92	27.4482	34.4259	17.2	2.42	2.71	2.42
2019	2	14	18	50	29.77	28.3003	33.2655	8.19	1.83	1.74	1.83
2019	2	15	9	8	38.52	28.269	32.7898	18.77	2.18	2.28	2.18
2019	2	17	2	35	25.14	27.6121	34.1346	24.98	1.65	2.07	1.65
2019	2	19	19	20	14.2	24.2057	36.0471	17.08	2.88	3.06	2.88
2019	2	19	19	23	11.42	24.3553	36.0043	2.94	2.4	2.74	2.4
2019	2	20	8	45	22.8	29.0843	33.3566	11.64	1.73	1.62	1.73

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	2	20	9	29	43.33	29.4221	32.8963	3.92		2.09	2.09
2019	2	20	15	6	42.56	24.9325	34.695	3.57		1.27	1.27
2019	2	20	23	30	47.17	32.3361	26.1463	6.43	3.26	3.04	3.26
2019	2	21	20	5	59.85	28.0243	32.8695	6.93	1.36	1.83	1.36
2019	2	22	7	37	46.36	27.1565	34.1668	5.85	2.28	2.67	2.28
2019	2	22	7	41	24.08	27.1416	34.1551	8.38		2.18	2.18
2019	2	23	11	31	58.82	27.7626	34.0494	16.06	1.92	1.83	1.92
2019	2	23	17	34	52.27	23.6697	32.6993	5.05	1.56	1.37	1.56
2019	2	23	22	7	53.13	22.751	31.511	6.46	1.88	2.57	1.88
2019	2	24	5	9	30.04	26.2577	33.6772	13.32	2.01	2.59	2.01
2019	2	24	17	45	1.84	25.3634	35.8817	7.99	3.06	2.84	3.06
2019	2	25	3	38	54.71	24.0631	32.1259	19.93	2.29	2.24	2.29
2019	2	25	6	32	21.21	29.6539	31.0988	15.38	2.29	2.54	2.29
2019	2	27	2	41	11.75	26.6043	33.6358	1.76	1.81	1.74	1.81
2019	2	27	20	41	25.98	23.5933	32.7135	3.4	2.08	1.96	2.08
2019	2	28	5	54	28.75	23.8445	31.5652	15.46	1.82	2.02	1.82
2019	2	28	19	57	24.85	27.1305	34.8797	30.78	2.64	2.46	2.64
2019	3	3	23	21	52.47	25.772	29.5026	15.53	1.83	2.12	1.83
2019	3	4	4	46	30.44	24.3586	35.1173	10.61	1.88	1.86	1.88
2019	3	4	10	10	26.5	27.6149	34.2361	17.29	1.96	1.95	1.96
2019	3	4	20	49	21.67	24.2827	34.2127	16.88	1.47	1.95	1.47
2019	3	5	0	8	30.75	23.3517	31.671	15.53	1.8	2.21	1.8
2019	3	6	6	14	38.46	23.5267	32.5816	4.08	1.48	1.36	1.48
2019	3	6	13	19	36.31	23.6166	32.4611	19.72	1.37	1.39	1.37
2019	3	6	18	10	25.9	28.5671	33.1819	18.97	0.95	1.28	0.95
2019	3	7	7	51	37.78	28.5085	34.5076	10		1.77	1.77
2019	3	7	8	22	43.5	28.284	34.563	33.1	2.07	2.02	2.07
2019	3	7	13	26	57.32	27.8193	32.6579	22.2	2.56	2.3	2.56
2019	3	10	20	11	32.14	28.0545	34.4712	4.98	1.61	1.68	1.61
2019	3	13	8	12	51.89	28.3755	33.1685	6.64	2.25	2.36	2.25
2019	3	19	23	37	17.5	26.3106	35.0223	10.89	2.05	2.53	2.05
2019	3	20	3	58	44.93	23.5818	32.7715	5.62	2.03		2.03
2019	3	20	20	52	37.39	27.6314	34.0691	24.63		2.19	2.19
2019	3	20	23	16	43.01	27.4594	34.3127	30.4		2.53	2.53
2019	3	21	0	13	32.74	27.5118	33.986	1.18	2.06	2.42	2.06
2019	3	21	2	55	55.81	27.5559	34.1642	13.78	1.34		1.34
2019	3	22	7	25	35.69	24.2287	33.8286	18.89	1.43		1.43
2019	3	23	0	35	42.16	23.5349	32.688	6.04	1.48	1.35	1.48
2019	3	23	5	46	15.38	23.5772	32.9151	3.54	1.29		1.29
2019	3	23	22	12	3.61	27.42	34.1837	30.14	1.1	2.23	1.1
2019	3	24	11	59	55.78	27.4666	34.4722	19.28	2.95		2.95
2019	3	25	12	45	50.81	27.4187	34.4084	24.96	2.53	2.29	2.53
2019	3	25	16	15	34.71	27.7021	33.9612	12.99	2.69	2.1	2.69

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	3	25	17	11	51.2	22.1676	31.3009	11.2	1.51		1.51
2019	3	25	17	20	2.05	25.3565	29.4789	5.69		2.22	2.22
2019	3	26	19	15	30.97	28.5786	32.2449	1.53	1.19	1.97	1.19
2019	3	26	20	31	11.02	24.2488	34.8644	3.37	1.01	1.86	1.01
2019	3	26	21	43	21.82	24.183	36.3492	7.2	2.39		2.39
2019	3	26	22	4	28.36	25.2019	34.5287	3.6	1.61		1.61
2019	3	27	17	59	31.86	23.6271	32.7056	6.37		0.41	0.41
2019	3	27	21	45	46.9	24.2904	36.1492	3.81	2.37		2.37
2019	3	28	4	8	6.38	25.9423	35.3428	12.95	1.77		1.77
2019	3	28	14	0	1.28	27.7637	33.6065	11.67	1.69	1.42	1.69
2019	3	28	15	8	57.21	26.9335	34.6755	14.42	2.28	2.07	2.28
2019	3	28	16	37	59.41	23.9934	32.822	5.36	1.65	1.13	1.65
2019	3	29	2	18	7.3	27.5229	34.2271	4.83	1.13	1.85	1.13
2019	3	29	4	20	31.38	27.6413	33.9111	29.73	1.71	2.55	1.71
2019	3	29	5	38	40.45	25.3474	34.6767	29		2.37	2.37
2019	3	29	9	26	31.97	25.2638	35.2567	27.32		1.4	1.4
2019	3	29	21	26	46.22	23.5423	32.6818	9.04	0.85		0.85
2019	3	29	21	29	19.66	23.5459	32.6619	11.89	0.86		0.86
2019	3	30	18	38	10.54	24.3806	36.067	3.16	2.53		2.53
2019	3	30	22	37	57.6	27.1004	34.5748	23.1	2.44	2.27	2.44
2019	4	1	9	37	38.36	27.4085	34.3278	16.71	2.26	1.83	2.26
2019	4	3	23	1	32.23	26.0915	33.3378	3.46	1.92	2.5	1.92
2019	4	3	23	1	34.71	26.7143	34.6825	22.04	2.52	2.53	2.52
2019	4	5	21	45	22.08	23.5632	32.6776	5.8	0.87	1.45	0.87
2019	4	5	21	45	22	23.5552	32.6734	4	1.14	1.69	1.14
2019	4	6	4	13	10.54	23.6001	32.745	5.78	1.3	1.64	1.3
2019	4	6	4	13	10.49	23.6029	32.7446	4	1.63	1.64	1.63
2019	4	7	6	3	30.72	27.61	34.2419	21.8	2.03	2.36	2.03
2019	4	7	9	24	12.2	27.6665	33.6457	16.29	2.33	2.44	2.33
2019	4	7	9	52	18.73	27.6948	33.6056	5.72	1.95	2.54	1.95
2019	4	7	9	52	18.36	27.6216	33.7539	16.86	2.3	2.18	2.3
2019	4	7	17	36	12.87	23.5756	32.7725	11.99	1.14	1.62	1.14
2019	4	7	17	36	12.6	23.5703	32.7641	6.18	1.65	1.76	1.65
2019	4	7	17	38	21.45	23.5909	32.7871	5.79	0.95	1.39	0.95
2019	4	7	17	38	20.81	23.5988	32.7976	6.39	1.37	1.1	1.37
2019	4	8	16	57	7.63	26.0311	30.8337	14.17		1.9	1.9
2019	4	10	8	29	17.88	24.261	36.0801	10.28	3.11	3.25	3.11
2019	4	10	19	2	47.73	24.3119	36.1099	8.18	2.41	2.68	2.41
2019	4	10	22	45	10.88	24.2959	36.1386	2.37	3.05	3.23	3.05
2019	4	10	22	55	46.81	24.3092	36.1325	10.11	2.31	2.37	2.31
2019	4	11	1	40	42.32	24.3053	36.1481	15.53	2.23	2.45	2.23
2019	4	11	2	30	22.61	24.2861	36.117	8.95	2.22	2.35	2.22
2019	4	11	11	16	34.36	24.232	36.1089	5.12	2.31	2.04	2.31

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	4	11	21	30	52.23	28.3217	34.5169	4.1	1.24	1.94	1.24
2019	4	11	21	30	52.63	28.3207	34.4893	4.27	1.22	1.92	1.22
2019	4	13	13	20	14.67	27.4656	34.319	14.56	2.19	1.9	2.19
2019	4	13	17	12	6	27.7229	34.3188	28.71	1.12	1.5	1.12
2019	4	13	18	18	55.28	26.6901	34.7093	17.53	1.75	1.98	1.75
2019	4	13	19	58	13.14	27.7819	34.1353	30.8	1.92	2.46	1.92
2019	4	14	2	23	38.76	24.2287	36.1438	1.92		1.9	1.9
2019	4	15	1	20	2.87	23.5978	32.7757	5.8		1.87	1.87
2019	4	15	1	20	2.69	23.5898	32.7936	4.99	0.91	1.13	0.91
2019	5	1	17	15	35.76	27.6949	33.6385	15.19	1.32		1.32
2019	5	1	18	11	20.63	24.1425	36.1521	5.37	1.57		1.57
2019	5	2	4	43	12.92	24.2969	36.1381	20.85	1.31	1.72	1.31
2019	5	3	2	3	31.58	26.0857	31.1696	1.95	2.43	2.92	2.43
2019	5	3	3	44	51.59	27.6271	33.5511	12.92	1.03	1.37	1.03
2019	5	4	17	15	54.33	23.5758	32.5491	13.82	1.34	1.14	1.34
2019	5	5	5	30	48.94	27.7701	34.3828	25.49	1.6		1.6
2019	5	5	16	20	40.22	25.3972	33.3326	0.08	1.99	1.89	1.99
2019	5	6	9	22	56.59	26.7031	34.8184	25.61	2.19		2.19
2019	5	7	22	3	15.4	26.9648	32.8977	4.13	2.24		2.24
2019	5	8	9	5	5.53	27.6999	33.6295	9.46	1.36	1.61	1.36
2019	5	9	1	38	58.5	22.7983	31.5217	3.69	2.66	3	2.66
2019	5	10	2	11	0.11	28.9161	32.0188	5.63	2.11	2.54	2.11
2019	5	10	2	56	10.64	27.7736	34.2744	27.09	1.46		1.46
2019	5	11	5	36	54.12	27.4898	34.3049	23.38	1.73		1.73
2019	5	12	6	4	57.42	29.1414	34.7769	12.73	2.8	2.12	2.8
2019	5	12	6	52	39.25	27.7362	33.4335	6.15	1.64	1.54	1.64
2019	5	12	10	43	33.84	27.8403	34.386	17.17	1.16		1.16
2019	5	13	1	1	31.63	28.4136	34.6818	8.15	1.81		1.81
2019	5	13	20	31	21.1	27.7462	33.54	19.05	1.87	1.67	1.87
2019	5	13	21	7	2.78	27.7327	34.2548	10.12	0.91		0.91
2019	5	13	21	27	29.53	37.7902	21.564	19.93	3.85	4.62	3.85
2019	5	15	2	54	21.44	28.6312	34.6667	22.4	2.92		2.92
2019	5	15	18	16	24.32	29.1466	34.7283	9.78	1.33	1.35	1.33
2019	5	15	20	39	4.09	23.5731	32.9566	5.88	1.75	2.18	1.75
2019	5	16	3	3	5.86	29.64	31.0786	15.98	2.26	2.39	2.26
2019	5	16	5	13	24.59	27.658	34.0414	14.81	1.57	1.68	1.57
2019	5	16	6	57	7.52	25.8183	34.1573	6.53	1.98	2.26	1.98
2019	5	16	11	18	45.84	26.6583	34.9504	19.4	1.68	1.81	1.68
2019	5	16	14	5	55.21	22.0544	31.1815	5.1	1.58	1.49	1.58
2019	5	16	18	50	58.79	24.4668	36.1287	10.12	1.57		1.57
2019	5	16	18	51	4.31	24.4122	32.9164	13.89	2.21	2.35	2.21
2019	5	16	23	10	39.07	24.197	36.4522	9.49	1.69	1.78	1.69
2019	5	17	10	53	55.26	28.0239	34.6009	0.02	2.02		2.02

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	5	17	19	21	38.48	23.5758	32.708	12.16		1.91	1.94
2019	5	18	9	13	0.87	23.6655	32.7409	3.99	1.23	1.25	1.23
2019	5	18	10	7	32.59	23.534	32.5815	18.74	2.06	2.28	2.06
2019	5	18	11	18	17.54	29.6097	32.4564	3.46	2.38	2.04	2.38
2019	5	18	21	16	31.4	28.0524	33.0228	26.2	2.3	2.32	2.3
2019	5	19	16	36	41.52	28.836	34.7143	15.53	1.56	1.56	1.56
2019	5	20	7	57	38.62	22.7538	31.5274	18.63		1.78	1.78
2019	5	20	18	54	13.42	23.574	32.6876	12.02	1.75	1.72	1.75
2019	5	20	23	51	40.64	27.7151	34.4097	23.93	5.19	2.06	5.19
2019	5	21	14	3	41.82	27.4868	33.9527	11.11	2.71		2.71
2019	5	21	14	40	30.68	22.7861	31.539	3.11	2.26	2.72	2.26
2019	5	21	15	5	44.55	27.4869	33.9337	10.97	2.81	2.46	2.81
2019	5	21	23	10	29.82	23.5481	32.6953	4.26	2.11	1.87	2.11
2019	5	22	0	25	34.06	23.5513	32.683	4.39	2.22	1.91	2.22
2019	5	22	4	51	5.07	28.8534	33.4805	4.46	1.93	1.82	1.93
2019	5	22	7	21	15.75	27.4873	33.905	12.99	2.21	2.32	2.21
2019	5	22	7	40	35.54	27.4764	33.9442	9.57	1.76	1.86	1.76
2019	5	22	8	1	32.91	27.465	33.9692	13.61	2.49	2.46	2.49
2019	5	22	8	23	1.49	27.4791	33.8903	18.49	2.54	2.79	2.54
2019	5	23	9	7	33.79	28.1089	33.797	21.61		1.99	1.99
2019	5	24	8	26	14.69	28.1617	33.4354	10.82	1.77	1.54	1.77
2019	5	24	12	29	46.29	28.0085	34.3851	1.42	2.15	1.92	2.15
2019	5	24	13	50	48.57	27.9745	34.4332	3.59	2.65	2.35	2.65
2019	5	24	20	53	4.13	24.1705	36.5326	9.27	2.28	2.14	2.28
2019	5	25	9	39	22.19	28.2456	34.5661	10	2.09	1.95	2.09
2019	5	25	20	46	55.46	27.6838	34.3549	23.77	2.06	2.01	2.06
2019	5	25	21	19	53.43	27.9885	34.4108	10.01	1.36	1.46	1.36
2019	5	26	9	4	2.2	21.2437	30.7359	12.45	1.84	2.41	1.84
2019	5	27	0	28	51.26	27.6423	34.0677	25.25	1.7	2	1.7
2019	5	27	3	11	9.43	29.5331	33.9481	20.64	2.01	2.46	2.01
2019	5	27	5	41	39.82	25.1967	34.2311	13.37	2.18	2.51	2.18
2019	5	27	9	47	2.48	27.2501	34.5461	16.98	2.27	2.01	2.27
2019	5	28	1	13	44.31	27.5293	34.2487	33.29		2.09	2.09
2019	5	28	1	30	10.61	23.5537	32.6816	19.55		1.83	1.83
2019	5	28	4	39	51.27	23.5449	32.6859	11.05	1.42	1.62	1.42
2019	5	28	10	58	21.2	27.454	34.2318	2.83	1.38	1.4	1.38
2019	5	29	13	47	5.47	25.342	37.2006	10	2.56		2.56
2019	5	29	18	50	23.59	27.8189	34.4274	24.81	5.32	2.66	5.32
2019	5	30	0	55	5.84	26.6507	35.039	27.32	2.71		2.71
2019	5	30	5	26	43.01	24.5662	36.1842	12.22	1.93	2.51	1.93
2019	5	30	17	36	13.9	23.5767	32.6621	7.53	1	1.22	1
2019	5	30	23	49	12.03	27.3985	34.4307	23.31	1.51	1.69	1.51
2019	5	31	1	8	2.22	27.5765	34.2545	25.04	1.56	1.73	1.56

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	5	31	3	19	6.79	28.8335	34.7074	11.58	0.84	1.23	0.84
2019	5	31	6	36	14.02	23.6042	36.657	9.84	3	2.88	3
2019	5	31	12	35	16.38	24.5103	32.7262	3.48	1.74	2.21	1.74
2019	5	31	17	59	43.37	23.5754	32.6422	7.93	1.37	2.25	1.37
2019	6	1	1	1	30.56	24.6588	31.3397	1.67	2.06	2.4	2.06
2019	6	1	11	34	13.82	24.0052	36.0476	1.2	2.12	2.09	2.12
2019	6	1	18	36	22.84	27.5261	33.7773	9.76	1.29	1.59	1.29
2019	6	2	13	54	58.34	23.3038	32.6701	8.58	0.92	2	0.92
2019	6	2	14	34	16.31	24.9473	34.6942	3.47	0.89	0.96	0.89
2019	6	2	21	15	15.69	23.5712	32.692	13.61	0.69	0.92	0.69
2019	6	3	4	37	29.1	23.5479	32.6867	11.36	1.38	1.5	1.38
2019	6	3	4	36	12.97	23.5342	32.6782	17.64	1.34	1.1	1.34
2019	6	3	6	16	31.56	23.557	32.6828	16.17	1.23	0.92	1.23
2019	6	3	6	18	31.84	23.5494	32.689	3.91	1.6	1.41	1.6
2019	6	3	10	5	24.75	26.5354	34.9561	25.81	2.13	2.33	2.13
2019	6	3	16	27	12.78	22.7922	31.5149	7.98	1.19	1.54	1.19
2019	6	4	2	45	49.15	25.2642	34.4533	5.19	2.04	1.82	2.04
2019	6	4	3	55	7.38	22.79	31.5218	5.63	0.81	1.8	0.81
2019	6	4	4	27	10.69	27.4756	34.3416	20.02	1.58	1.58	1.58
2019	6	4	5	50	0.63	28.7512	33.1907	19.17	1.15	1.67	1.15
2019	6	4	6	54	22.8	28.5675	33.6505	27.97	1.46	1.72	1.46
2019	6	4	9	34	6.44	26.8309	32.9946	19.94	3.51	3.47	3.51
2019	6	4	15	53	12.2	25.3319	34.3727	10.01		1.61	1.61
2019	6	4	20	16	54.51	27.7617	34.326	10	1.52	1.83	1.52
2019	6	4	21	35	22.21	23.5705	32.6968	9.53	1.45	2	1.45
2019	6	4	22	20	13.08	23.5542	32.6935	14.56	1	1.79	1
2019	6	5	0	21	37.65	23.5507	32.6865	10.18	0.42	1.29	0.42
2019	6	5	8	52	1.68	27.6919	34.1349	10.74	1.2	1.73	1.2
2019	6	5	11	33	57.24	27.6808	34.3402	26.17	1.36	1.68	1.36
2019	6	7	2	22	51.4	29.2762	34.9445	8.37	1.54	1.89	1.54
2019	6	7	9	45	21.53	27.4364	34.3197	20.77	1.99	2.02	1.99
2019	6	8	4	18	46.16	23.5487	32.6919	16.43	0.9	1.22	0.9
2019	6	8	9	12	25.8	28.8331	33.2719	24.41	1.27	1.91	1.27
2019	6	8	10	26	12.79	24.9361	34.7158	3.28	1.79	1.88	1.79
2019	6	8	12	56	32.28	24.1885	36.2218	3.45	1.59	2.3	1.59
2019	6	8	13	35	54.21	27.6534	34.2935	25.15	1.52	1.89	1.52
2019	6	8	15	49	50.57	28.8399	34.6891	15.62	0.83	1.37	0.83
2019	6	9	20	20	26.62	27.4393	34.4339	3.28	1.21	1.57	1.21
2019	6	9	20	21	6.43	27.4248	34.5294	18.2	2.34	2.53	2.34
2019	6	10	7	6	56.13	28.2552	33.6229	16.42	2.75	2.37	2.75
2019	6	10	9	45	35.25	27.6222	34.1335	16.06	1.88	1.77	1.88
2019	6	10	19	26	27.45	24.1139	36.1269	6.97	2.57	2.69	2.57
2019	6	10	19	51	10.47	27.4999	33.953	19.94	2.01	2.43	2.01

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	6	11	3	10	25.41	27.9943	34.4214	21.93		1.45	1.45
2019	6	11	7	3	58.12	27.7944	34.3825	9.97	0.9	1.16	0.9
2019	6	11	8	18	42.3	23.597	32.7594	16.1	1.25	1.35	1.25
2019	6	11	9	11	30.28	24.5209	35.9881	9.95		1.63	1.63
2019	6	11	17	18	45.02	23.5745	32.5624	16.96	1.23	1.45	1.23
2019	6	11	18	44	45.3	26.8595	34.6379	25.62	2.23	2.05	2.23
2019	6	12	4	50	16.24	24.1679	36.2106	0.76	1.29	1.58	1.29
2019	6	12	4	51	50.73	24.1617	36.2385	10	2.11	2.36	2.11
2019	6	12	8	22	30.23	23.6901	33.0371	36.99	1.38	1.51	1.38
2019	6	12	9	8	51.46	23.5191	32.7993	17.15	1.04	1.79	1.04
2019	6	12	20	23	29.06	23.5596	32.6876	19.49	0.75	0.92	0.75
2019	6	12	22	23	13.89	23.5549	32.6839	18.3	1.06	1.17	1.06
2019	6	13	17	54	44.88	23.3138	32.4355	18.56	1.17	1.03	1.17
2019	6	14	3	22	29.47	23.5437	32.6758	7.68	0.81	0.88	0.81
2019	6	15	6	31	56.81	23.5385	32.6986	15.49	0.91	1	0.91
2019	6	15	23	6	51.63	28.5192	35.1323	7.74	2.74	2.27	2.74
2019	6	16	17	23	30.05	23.549	32.5676	10.87	0.8	1.01	0.8
2019	6	17	4	17	2.51	23.4952	32.2388	8.86	2.26	1.88	2.26
2019	6	17	7	32	43.43	28.3573	33.5254	16.56	1.28	1.2	1.28
2019	6	17	7	45	50.56	28.8475	34.6968	19.64	1.77	1.38	1.77
2019	6	17	10	3	44.34	23.5557	32.6778	14.78	1.05	1.17	1.05
2019	6	17	18	4	40.08	23.5563	32.6875	9.91	1.14	1.11	1.14
2019	6	18	9	21	31.13	28.4967	34.6933	3.53	1.99	1.92	1.99
2019	6	18	10	39	36.94	22.7936	31.5247	7.79		1.93	1.93
2019	6	18	11	27	20.46	28.4462	33.1519	15.31	1.51	1.63	1.51
2019	6	18	12	1	29.44	23.552	32.6759	12.26	1.2	1.35	1.2
2019	6	18	12	24	35.84	23.5596	32.6743	4.19	1.12	1.29	1.12
2019	6	18	19	13	15.37	23.5465	32.6866	8.67	1.37	1.56	1.37
2019	6	19	12	54	51.78	23.5539	32.6847	14.44	1.68	1.55	1.68
2019	6	19	14	21	45.33	23.5528	32.6819	13.96	1.08	1.28	1.08
2019	6	19	19	53	56.21	28.5612	34.6343	13.89	1.25		1.25
2019	6	20	1	12	3.02	23.551	32.6918	8.55	1.07	1.29	1.07
2019	6	20	7	13	41.99	27.6916	34.3314	19.82	2.76	2.67	2.76
2019	6	20	15	8	31.22	27.6709	34.3867	18.13	1.96	1.98	1.96
2019	6	20	18	16	58.87	23.5541	32.6933	8.82	1.1	1.04	1.1
2019	6	20	23	8	36.26	23.5505	32.6892	9.14	0.96		0.96
2019	6	20	23	24	22.1	23.5553	32.6874	11.39	0.9		0.9
2019	6	21	4	9	53.55	23.5502	32.6827	11.67	1.56	1.5	1.56
2019	6	21	19	58	47.81	23.5774	32.6643	14.34	1.09	1.01	1.09
2019	6	22	4	19	34.26	23.5489	32.6793	10.38	1.05	1.12	1.05
2019	6	22	20	17	14.17	23.536	32.5878	11.69	1.46	1.19	1.46
2019	6	23	0	5	23.15	23.5536	32.6935	10.22	1.48	1.54	1.48
2019	6	24	8	40	20.97	23.5778	32.7612	5.44	1.78	2.23	1.78

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	6	24	19	13	29.78	22.7527	31.566	1.34	1.85	2.38	1.85
2019	6	25	10	45	36.96	28.1995	33.1463	8.7	1.75	1.88	1.75
2019	6	25	12	4	23.1	28.7998	34.6574	16.41	1.87	1.81	1.87
2019	6	25	13	2	2.54	26.3998	34.6793	30.87	1.7	2.38	1.7
2019	6	25	16	21	24	29.3428	32.9226	7.33	2.88	2.6	2.88
2019	6	26	0	10	32.84	24.5815	36.0427	13.39	3.27	3.26	3.27
2019	6	26	0	47	4.91	27.6616	34.1487	16.21	2.29	2.45	2.29
2019	6	26	4	22	3.97	27.6935	34.0532	28.48	2.17	2.2	2.17
2019	6	26	7	9	48.6	27.6464	34.2943	15.82	3.01		3.01
2019	6	26	7	11	11.36	27.6708	34.1016	10.98	2.75	2.58	2.75
2019	6	26	8	9	38.19	27.6452	34.1989	16.27	1.68	1.53	1.68
2019	6	26	9	11	28.5	29.329	32.8603	9.35	2.3	2.01	2.3
2019	6	26	10	37	41.03	28.1036	34.5273	5.08	2.06	1.84	2.06
2019	6	26	11	14	13.84	23.5534	32.6858	13.11	0.85	0.93	0.85
2019	6	26	21	50	59.6	27.7005	31.1672	13.77	2.3	2.47	2.3
2019	6	27	3	51	31.7	28.9244	34.8857	12.19	2.58	2.3	2.58
2019	6	27	8	21	21.09	29.3713	32.8335	5.35	2.49	2.1	2.49
2019	6	27	13	1	21.57	29.0834	32.4801	19.47	2.28	2.55	2.28
2019	6	27	20	28	6.98	27.5546	34.2528	16.59	1.53	1.8	1.53
2019	6	28	5	11	59.47	27.7491	33.355	3.23	2.24	2.22	2.24
2019	6	28	6	41	52.55	28.8716	34.6801	12.11	1.47	1.51	1.47
2019	6	28	12	51	32.09	27.7624	34.3817	26.94	1.81	2.03	1.81
2019	6	28	16	59	1.48	24.2977	36.2294	8	1.91	2.18	1.91
2019	6	28	18	11	45.79	28.6886	33.0082	25.22	1.57	1.94	1.57
2019	6	28	19	19	9.43	28.8772	34.6931	12.17	2.11	2.35	2.11
2019	6	29	8	41	36.46	29.6369	31.0814	15.93	2.3	2.13	2.3
2019	6	29	10	17	51.65	29.382	32.9161	2.04	1.56	1.46	1.56
2019	6	29	15	6	15.73	28.5915	34.6484	19.02	1.68	1.69	1.68
2019	6	30	2	36	1.64	22.5556	31.5383	15.63	1.66	1.85	1.66
2019	6	30	5	25	41.04	23.5883	32.7768	3.31	1.94	2.07	1.94
2019	6	30	6	15	26.6	28.9674	33.3619	10.62	1.56	1.69	1.56
2019	6	30	22	30	30.89	28.0681	34.44	23.26	1.43	1.51	1.43
2019	7	1	0	10	3.77	23.5543	32.6898	6.11	1.41	1.58	1.41
2019	7	1	23	30	30.42	23.5533	32.6839	7.52	1.37	1.61	1.37
2019	7	2	19	13	38.35	27.7458	34.3437	5.28	1.88	1.81	1.88
2019	7	2	20	54	54.76	30.0003	32.7539	22.01	2.26		2.26
2019	7	3	23	52	13.66	23.5479	32.6923	8.79	1.39	1.43	1.39
2019	7	4	4	11	46.81	29.3493	34.9461	10.11	2.37		2.37
2019	7	4	12	35	31.21	28.7895	33.7676	5	2.2	2.09	2.2
2019	7	4	21	46	0.05	27.6151	34.2534	3.91	1.69	1.78	1.69
2019	7	4	23	28	11.27	27.6379	34.3998	3.73	2.07	2.08	2.07
2019	7	5	0	18	21.58	26.0457	35.3705	6.18	1.9	2.18	1.9
2019	7	5	15	33	7.19	27.4262	34.4346	24.28	1.97	2.16	1.97

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	7	5	21	24	45.08	28.2269	34.5335	9.99	1.66	1.57	1.66
2019	7	6	6	57	44.09	28.7813	34.7707	20.71	1.7	1.7	1.7
2019	7	6	8	58	26.02	29.0705	32.5739	8.65	1.8	2	1.8
2019	7	6	11	36	55.46	29.7454	34.7378	32.19		2.83	2.83
2019	7	6	22	0	13.52	29.9917	31.3407	3.56	1.82		1.82
2019	7	7	20	21	48.28	26.9014	34.8739	30.26	1.81	2.21	1.81
2019	7	8	3	6	23.84	23.5866	32.7022	4	0.71	0.89	0.71
2019	7	8	23	17	57	28.0619	34.4503	16.69	1.34	1.57	1.34
2019	7	9	0	21	14.6	23.5469	32.6844	1.51	1.74	1.88	1.74
2019	7	9	0	28	6.75	23.5421	32.6811	7.57	2.19	2.26	2.19
2019	7	9	0	39	37.53	23.5451	32.6825	11.42	0.86	1.13	0.86
2019	7	9	2	6	5.68	23.548	32.6808	13.63		2.01	2.01
2019	7	9	23	5	8.79	28.0068	33.952	7	0.97		0.97
2019	7	10	7	27	41.35	30.6446	33.7674	9.32	2.22	2.36	2.22
2019	7	10	9	38	22.54	28.2363	33.4327	12.62	1.81	1.71	1.81
2019	7	11	7	59	40.62	23.5383	32.6027	10	1.07	1.15	1.07
2019	7	12	0	14	13.42	27.7217	33.2527	10.02	1.46	1.44	1.46
2019	7	12	9	11	18.77	27.6642	33.8666	1.96	1.37	1.16	1.37
2019	7	12	21	37	18.28	29.9277	31.8292	7	2.64		2.64
2019	7	13	5	10	43.87	24.0197	32.939	3.46	1.43	1.37	1.43
2019	7	13	14	27	43.29	27.6458	34.2707	8.54	1.44	1.55	1.44
2019	7	13	16	32	47.77	23.7378	32.5622	7	0.96		0.96
2019	7	13	20	28	38.5	23.5666	32.7423	5	1.14		1.14
2019	7	13	20	46	50.17	26.9363	34.9642	12.8	2.8		2.8
2019	7	13	21	43	35.91	27.5749	34.2961	21.58	1.97		1.97
2019	7	14	7	4	44.07	28.2546	34.5768	7.41	2.51	2.21	2.51
2019	7	15	3	35	17.26	23.8756	36.64	9.54	1.75		1.75
2019	7	16	12	26	46.65	27.8866	33.3872	10.07	1.37	1.24	1.37
2019	7	16	14	22	31.59	22.611	31.3817	3.48	1.43	1.95	1.43
2019	7	16	18	46	47.19	22.7494	31.2313	19.79	1.52	1.89	1.52
2019	7	16	19	53	58.22	23.5448	32.6219	9.39	1.1	0.91	1.1
2019	7	17	19	53	34.97	28.3444	34.5619	4.03	1.63	1.41	1.63
2019	7	17	22	22	9.31	23.5485	32.6796	10.56	0.67	0.53	0.67
2019	7	18	22	34	46.21	27.664	33.4986	6.92	1.05	0.91	1.05
2019	7	20	6	24	20.95	23.5721	32.6735	2.52	0.87		0.87
2019	7	21	20	1	17.09	22.5574	30.9217	10.56	3.37	2.99	3.37
2019	7	21	20	34	43.7	29.0076	34.6897	8.12	1.53	1.66	1.53
2019	7	24	18	5	6.69	28.558	33.0793	23.89	1.41	1.42	1.41
2019	7	24	23	47	16.22	23.9089	32.8474	4.87	1.49	1.32	1.49
2019	7	25	12	21	19.46	27.6433	33.8025	15.86	1.76	1.75	1.76
2019	7	25	12	44	17.59	27.6333	33.8491	22.26	1.65	1.53	1.65
2019	7	25	13	2	1.51	27.6526	33.7603	3.32	1.83		1.83
2019	7	25	19	4	31.38	23.5442	32.6734	8.52	0.74	0.57	0.74

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	7	26	0	46	33.97	29.1469	34.7707	17.88	1.12		1.12
2019	7	26	6	5	43.36	27.4502	34.2696	21.19	1.32	1.29	1.32
2019	7	27	0	29	45.72	28.8453	34.6691	13.92	1.1	1.04	1.1
2019	7	27	10	27	29.32	27.697	34.0972	28.53	2.19		2.19
2019	7	27	22	42	1.28	27.5173	34.0025	21.23	1.94	2.22	1.94
2019	7	28	22	47	7.81	27.4437	32.6404	3.56	1.86	1.77	1.86
2019	7	29	2	29	37.25	23.5474	32.6726	11.71	1.14	1.04	1.14
2019	7	29	3	8	57.24	23.5562	32.6761	13.37	1.35	1.15	1.35
2019	7	29	18	29	17.3	24.5194	36.1143	36.72	2.37	2.36	2.37
2019	7	30	7	12	40.02	22.7904	31.5224	6.19	2.12	2.39	2.12
2019	7	30	8	22	35.68	23.5897	32.7684	8.06	1.22	1.23	1.22
2019	7	30	18	5	55.63	23.552	32.6737	5	0.97	1.12	0.97
2019	7	31	22	29	33.78	23.5492	32.6769	11.39	0.93	0.82	0.93
2019	8	1	3	36	33.64	27.3127	34.4051	24.33	1.31	1.43	1.31
2019	8	1	3	52	9.64	27.7994	33.4834	12.25	1.04	1.19	1.04
2019	8	1	5	4	4.04	27.3161	34.4925	19.65	1.61	1.57	1.61
2019	8	1	5	49	28.76	27.5965	33.9146	24.87	1.7	1.6	1.7
2019	8	1	5	56	52.19	27.6215	33.8159	16.25	1.74	1.83	1.74
2019	8	1	22	22	52.34	29.486	32.7055	23.1	2.62	2.75	2.62
2019	8	2	3	16	47.87	27.4167	34.5985	5.52	2.04	2.42	2.04
2019	8	2	22	28	51.06	23.5489	32.6825	12.79	1.02	1.15	1.02
2019	8	3	0	24	8.34	23.5475	32.6736	14.28	1.54	1.64	1.54
2019	8	3	1	16	9.01	27.4432	34.0414	13.09	1.51	1.72	1.51
2019	8	3	1	43	40.4	27.4739	34.0259	13.88	2	2.14	2
2019	8	3	16	21	42.04	29.496	32.7315	14.28	2.17	2.05	2.17
2019	8	4	4	31	58.03	27.7039	34.4945	4	1.13	1.34	1.13
2019	8	4	5	20	43.54	27.5165	34.1325	9.33	1.13	1.35	1.13
2019	8	5	5	21	22.96	23.499	32.2377	14.74	2.05	2.27	2.05
2019	8	5	5	35	28.64	23.4838	32.2379	5.04	2.08	2.16	2.08
2019	8	5	5	39	2.9	25.0143	36.3015	30.17	2.41	2.68	2.41
2019	8	5	7	19	28.3	28.6941	33.1645	9.26		1.41	1.41
2019	8	5	19	28	11.43	28.9276	34.7082	17.93	0.87	0.97	0.87
2019	8	6	3	15	12.91	23.5447	32.6665	10.44	0.97	1.09	0.97
2019	8	7	22	59	15.21	27.461	34.2214	21.33	1.14	1.63	1.14
2019	8	8	8	4	2.14	21.3188	30.7844	29.81	1.74		1.74
2019	8	8	8	15	32.46	28.624	33.0801	2.39	1.73		1.73
2019	8	8	8	44	40.43	29.3227	31.2962	25.39	2.04		2.04
2019	8	8	12	3	17.95	23.5586	32.6906	11.83	2.08	2.01	2.08
2019	8	8	20	30	2.51	23.5483	32.6788	10.86	0.93	1.18	0.93
2019	8	9	2	3	47.67	23.5382	32.6647	6.96	0.65	0.65	0.65
2019	8	9	2	7	59.03	23.5831	32.7735	6.34	0.87	1.05	0.87
2019	8	9	20	41	20.84	23.5533	32.6085	4.98	1.16	1.06	1.16
2019	8	9	21	29	42.47	22.2141	31.4675	0.1	1.32	1.31	1.32

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	8	9	22	7	43.23	23.5313	32.5992	5.4	0.91	1.05	0.91
2019	8	10	1	44	25.66	23.5524	32.6835	8.11	1.18	1.12	1.18
2019	8	10	2	10	29.83	23.5639	32.7078	22.47	1.64	1.63	1.64
2019	8	10	2	20	54.26	27.7362	34.3494	29.49	1.55	1.58	1.55
2019	8	10	4	37	58.71	23.564	32.552	20.15	1.22	1.22	1.22
2019	8	10	11	2	48.33	23.5515	32.6706	16.05	1.11	0.45	1.11
2019	8	10	12	27	29.6	28.3805	33.6128	13.39	1.44	1.36	1.44
2019	8	10	14	25	31.24	23.5524	32.6748	12.21	1.39	1.35	1.39
2019	8	10	14	28	8.15	23.5505	32.6778	10.47	0.69	0.37	0.69
2019	8	10	16	28	1.21	23.5496	32.6801	3.22	1.35	1.28	1.35
2019	8	10	18	47	46.64	23.5479	32.6768	9.86	0.99	0.62	0.99
2019	8	11	0	47	30.75	23.5529	32.6639	13.09	0.99	1.09	0.99
2019	8	11	6	22	9.03	28.3945	33.2589	5.15	0.8	1.21	0.8
2019	8	11	20	17	37.67	27.6263	34.3639	17.75	1.71	1.42	1.71
2019	8	11	22	32	55.65	23.5467	32.671	10.76	1.05	0.92	1.05
2019	8	12	0	13	20.49	23.5343	32.608	3.42	0.82	0.93	0.82
2019	8	12	0	49	42.75	24.6835	34.3923	21.94	1.33		1.33
2019	8	12	5	18	33.68	27.8076	34.3884	3.58	1.93		1.93
2019	8	12	16	2	46.59	29.2459	31.4628	11.56	1.15	1.47	1.15
2019	8	12	16	11	43.33	28.537	34.632	10.87	0.74	0.92	0.74
2019	8	12	18	38	48.96	27.187	34.6499	2.67	1.78	1.98	1.78
2019	8	13	9	54	59.9	28.7147	33.9051	17.66	1.12	1.23	1.12
2019	8	13	10	57	59.28	26.7343	34.7916	12.88	1.05	1.46	1.05
2019	8	13	19	1	17.01	26.8378	34.8244	18.3	2.15	1.95	2.15
2019	8	13	19	12	7.91	26.868	34.7258	11.49	1.38	1.71	1.38
2019	8	14	0	55	10.15	29.3149	33.0777	23.64	1.1	1.28	1.1
2019	8	14	0	59	34.2	28.8498	34.6059	9.92	0.79	0.98	0.79
2019	8	14	3	47	39.34	23.9067	36.052	20.63	1.68		1.68
2019	8	14	11	5	44.56	29.58	31.1406	3.46	1.73	1.51	1.73
2019	8	14	21	30	11.88	23.5346	32.5939	4.59	0.35	0.22	0.35
2019	8	14	23	15	30.48	28.5244	34.5851	17.35	1.6	1.55	1.6
2019	8	15	12	23	58.38	24.5119	36.075	16.56	2.38	2.05	2.38
2019	8	15	13	49	15.77	24.5158	36.1372	3.66	2.06	2.09	2.06
2019	8	15	19	24	42.26	24.4691	36.1367	7.09	1.81	1.86	1.81
2019	8	15	21	38	50.32	24.467	36.1474	9.5	1.85	2.05	1.85
2019	8	15	23	43	32.8	27.2803	31.423	18.75	1.15	1.06	1.15
2019	8	16	10	22	19.99	29.0379	34.9071	5.26	0.98	1.01	0.98
2019	8	16	12	52	13.66	27.8341	34.4008	14.04	1.16	1.29	1.16
2019	8	16	14	41	32.52	24.9488	34.6971	4.96	1.1	1.2	1.1
2019	8	16	18	32	14.55	29.9985	32.3336	20.72	1.89		1.89
2019	8	16	20	43	56.72	27.0358	34.78	14.88	1.51	1.52	1.51
2019	8	17	0	11	48.46	28.9358	34.7259	20.9	1.16	0.93	1.16
2019	8	17	0	23	44.97	29.0765	33.9802	10.24	1.91	1.69	1.91

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	8	18	1	32	36.52	23.55	32.6872	4		1.3	1.3
2019	8	18	7	10	59.6	22.1833	31.3809	8.36	1.2	1.47	1.2
2019	8	18	17	48	4.89	26.7792	34.6564	4.07	2.15	2.06	2.15
2019	8	20	3	45	50.22	23.5478	32.6959	4.74	1.52	1.13	1.52
2019	8	20	23	6	4.05	25.234	34.6021	3.24	0.96	1.13	0.96
2019	8	21	21	36	31.81	28.4376	33.2056	10.11	1.21	1.64	1.21
2019	8	22	1	23	45.36	23.5873	32.6626	10.21	1.65	1.78	1.65
2019	8	22	5	22	30.9	23.5295	32.6579	12.21	1.22	1.22	1.22
2019	8	22	11	56	24.15	24.9117	36.131	17.7	2.63		2.63
2019	8	22	21	28	18.17	27.7428	34.2398	9.49		1.47	1.47
2019	8	22	23	50	55.7	28.3211	34.5359	5.93	1.14	1.81	1.14
2019	8	23	4	6	19.37	27.773	34.3249	17.74		1.58	1.58
2019	8	24	1	50	11.9	27.0264	34.5961	15.78	1.78	2	1.78
2019	8	25	5	29	46.24	24.4099	36.365	6.74	2.19		2.19
2019	8	26	8	6	5.66	27.4521	34.4785	17.5	2.01	2.03	2.01
2019	8	26	17	8	17.03	27.4441	34.4048	12.52	1.62	1.87	1.62
2019	8	27	4	59	17.79	28.3033	33.5655	9.75	1.11	1.93	1.11
2019	8	28	23	25	39.93	28.6669	34.5836	15.59	1.73		1.73
2019	8	29	5	40	36.34	27.8723	33.4459	7.02	1.44		1.44
2019	8	29	21	53	44.69	27.4363	34.3823	21.39	1.46	1.73	1.46
2019	8	29	21	53	7.94	27.4475	34.3046	20.15	0.87	1.44	0.87
2019	8	30	3	18	17.55	27.4922	34.2063	22.49		1.67	1.67
2019	8	30	22	43	12.89	27.9594	34.2665	30.2		2.07	2.07
2019	8	31	9	1	50.55	26.7077	34.9519	23.14	2.47		2.47
2019	9	1	8	8	9.57	28.6772	33.0883	16.2	1.46	1.71	1.46
2019	9	1	13	0	14.11	23.1119	31.9276	5		1.62	1.62
2019	9	1	23	58	45.39	27.6601	34.2888	27.28		2.51	2.51
2019	9	2	19	17	53.01	23.9405	32.8093	12.06	1.14	1.06	1.14
2019	9	3	16	49	14.3	27.5848	33.7698	22.28	1.7	1.87	1.7
2019	9	5	1	28	40.78	28.8042	34.6371	12.89	2.18	2.16	2.18
2019	9	5	4	15	16.15	28.8193	34.7274	18.7	1.13	0.93	1.13
2019	9	5	5	10	21.87	29.4097	32.6688	4.79	2.23	2.52	2.23
2019	9	5	9	21	4.91	28.8055	34.6131	7.37	1.45	1.16	1.45
2019	9	7	2	1	30.1	29.1742	34.8599	5.53	3.2	3.14	3.2
2019	9	7	3	39	56.29	29.2002	34.7429	11.71	1.89	1.9	1.89
2019	9	7	11	34	59.15	26.6951	34.2589	31.05	2.58	2.71	2.58
2019	9	8	11	36	42.6	24.4521	36.2582	21.41	2.38	2.34	2.38
2019	9	8	23	49	30.2	27.6863	34.2242	25.37	2.03	2.04	2.03
2019	9	11	6	48	37.29	23.5989	32.7506	5.43	1.18	0.93	1.18
2019	9	11	22	30	47.39	27.7813	33.6544	21.72	1.25		1.25
2019	9	12	14	7	40.67	27.7002	34.3721	26.11	1.9		1.9
2019	9	12	20	38	2.04	27.4594	34.4177	22.92	1.91		1.91
2019	9	13	0	18	3.88	26.7381	34.7593	29.6	1.61		1.61

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	9	14	11	52	42.8	23.4817	32.6183	5.51	0.98		0.98
2019	9	15	15	35	17.74	25.5863	33.2235	3.62	2.46		2.46
2019	9	15	23	20	11.17	28.8522	34.6234	6.19	1.4		1.4
2019	9	15	23	23	43.92	28.861	34.6377	11.54	1.31		1.31
2019	9	16	3	47	47.87	27.662	33.5525	21.62	1.03		1.03
2019	9	16	10	35	32.09	29.9638	34.4056	15.9	3.73	3.23	3.73
2019	9	16	19	23	1.64	23.6123	32.7338	15.84	0.93		0.93
2019	9	16	20	59	42.32	26.6759	35.2804	9.59	3.47		3.47
2019	9	16	23	33	4.01	23.5506	32.6061	9.05	0.91		0.91
2019	9	17	1	14	44.89	28.8566	34.6802	15.15	1.53		1.53
2019	9	17	4	51	5.28	28.8339	34.6733	6.51	1.77		1.77
2019	9	17	7	35	1.22	27.6741	34.3525	24.48	1.89	1.89	1.89
2019	9	18	2	12	24.31	22.7171	31.4897	3.75	1.86	2.12	1.86
2019	9	18	7	40	43.39	28.169	34.2859	4.81	1.61		1.61
2019	9	19	15	33	23.19	27.1741	34.1813	7.96	2.22		2.22
2019	9	19	18	1	38.36	27.1586	34.1437	10.54	3.16		3.16
2019	9	19	23	4	14.47	27.9583	33.5366	6.88	1.38	1.95	1.38
2019	9	20	15	35	25.75	29.9317	31.3726	2.37	2.65	2.32	2.65
2019	9	20	19	48	46.9	28.8359	31.436	12.08	1.97	1.88	1.97
2019	9	21	19	9	3.35	29.8567	31.8628	23.44	3.43		3.43
2019	9	23	9	56	32.09	22.7541	31.4545	3.56	1.76	2.17	1.76
2019	9	23	17	39	53.3	23.5463	32.6864	12.52	1.26	1.41	1.26
2019	9	23	18	20	23.78	23.5436	32.6869	10.91	0.85	0.95	0.85
2019	9	23	19	41	33.53	23.5464	32.6973	12.62	1.16	1.14	1.16
2019	9	23	19	48	29.63	23.5412	32.6981	9.46	1.08	1.04	1.08
2019	9	24	6	50	39.39	28.7668	34.6493	14.27	2.69		2.69
2019	9	24	23	38	53.34	27.7801	33.5467	10.15	1.3	1.72	1.3
2019	9	24	23	50	47.91	22.7876	31.5123	3.37	1.38	2.07	1.38
2019	9	25	0	50	23.2	22.7882	31.5114	3.48	1.64	2.26	1.64
2019	9	25	2	49	42.19	23.5809	32.7689	3.3	0.92	0.72	0.92
2019	9	25	8	20	30.32	22.7819	31.5333	2.77	2.01	2.41	2.01
2019	9	25	8	52	25.7	27.6332	34.2458	15.37	2.19	2.17	2.19
2019	9	25	23	22	52.64	23.555	32.6955	5		1.43	1.43
2019	9	26	14	18	41.07	26.8423	34.6322	26.89	1.82	2.29	1.82
2019	9	26	20	42	58.97	27.6253	34.3077	16.18	3.25	3.09	3.25
2019	9	27	16	11	26.46	22.7778	31.5306	3.04	1.93	2.22	1.93
2019	9	29	20	58	59.97	28.2961	33.3964	21.16	1.69	1.65	1.69
2019	9	30	0	44	54.17	27.7429	33.4866	8.57	1.51	1.55	1.51
2019	9	30	20	47	55.53	28.2719	34.6079	10.92	1.81	1.82	1.81
2019	9	30	23	46	17	27.5255	34.3032	21.63	2.35	2.34	2.35
2019	10	1	14	0	35.22	25.2547	34.5991	3.49	1.2		1.2
2019	10	1	18	0	36.38	23.5934	32.6454	2.05	0.63		0.63
2019	10	2	20	54	42.56	23.607	29.1402	31.32	2.12	2.81	2.12

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	10	3	1	45	31.25	26.866	34.7967	26.12	1.71	1.66	1.71
2019	10	3	7	42	3.63	24.745	35.8842	6.89	1.39		1.39
2019	10	4	17	53	59.99	26.8052	35.0088	29.58	1.78		1.78
2019	10	5	3	32	30.1	26.9706	34.7494	30.12		2.3	2.3
2019	10	5	6	55	49.39	27.7796	33.3678	3.78		1.91	1.91
2019	10	5	7	34	13.67	28.9463	34.7243	21.28	1.46		1.46
2019	10	7	7	24	26.44	26.6204	34.6716	11.01	1.81	2.35	1.81
2019	10	7	7	48	54.52	23.7839	36.2246	9.47	2.07	2.5	2.07
2019	10	7	15	39	4.94	29.7442	34.6376	19.29	1.97	1.58	1.97
2019	10	7	18	47	2.52	23.6069	32.7542	8.7	0.98	0.59	0.98
2019	10	7	22	28	10.21	23.9572	31.3589	5.45	2.12		2.12
2019	10	8	12	11	2.55	23.6776	32.7066	3.29	1.51	1.53	1.51
2019	10	8	14	26	44.09	25.1079	36.2346	22.58	2.21	2.53	2.21
2019	10	8	18	13	50.61	27.9589	33.698	3.65	1.23	1.57	1.23
2019	10	9	19	48	22.59	27.6643	34.2535	14.31	2.21	2.21	2.21
2019	10	10	7	30	8.19	23.5757	32.6647	6.12	1.02		1.02
2019	10	10	11	29	41.13	23.6115	32.7756	8.67	0.92		0.92
2019	10	10	23	26	32.24	27.818	33.5468	4.98	1.18	1.74	1.18
2019	10	11	1	11	15.52	29.8549	31.9004	24.14	2.79	2.58	2.79
2019	10	11	11	50	44.84	25.1127	36.1555	15.66	2.41	2.49	2.41
2019	10	11	20	39	40.37	23.9482	32.4966	3.49	1.17	1.18	1.17
2019	10	11	22	47	26.12	23.54	32.6046	4.82	1.54		1.54
2019	10	12	5	43	15.81	23.5755	32.6663	8.54	1.45	1.6	1.45
2019	10	13	5	18	8.99	25.2113	33.5675	9.96	1.87		1.87
2019	10	13	13	15	19.44	28.2623	34.6265	3.46	2.36		2.36
2019	10	13	15	29	48	25.4072	33.3395	4.09	1.54		1.54
2019	10	14	0	22	2.94	27.7512	33.7324	4.95	1.01	1.38	1.01
2019	10	14	19	44	40.54	24.5453	36.0652	2.86	2.22	2.49	2.22
2019	10	14	20	34	39.62	23.7444	32.5849	8.07		0.67	0.67
2019	10	14	22	8	10.29	23.8022	36.9977	9.89	2.53	2.72	2.53
2019	10	14	23	56	53.46	28.4449	34.6232	6.45	1.57	1.8	1.57
2019	10	15	4	16	50.61	23.864	36.9465	9.63	1.97	2.36	1.97
2019	10	15	22	53	26.18	24.0991	36.1557	44.72	3.05	3.17	3.05
2019	10	17	20	38	27.88	25.2221	34.5386	9.11	1.46	1.74	1.46
2019	10	18	6	16	3.2	27.8551	34.41	10.09	1.61	1.55	1.61
2019	10	19	4	26	34.31	27.4815	34.3221	24.45	2.41	2.5	2.41
2019	10	20	4	32	32.77	27.5276	34.1056	22.78		2.41	2.41
2019	10	20	9	56	31.92	23.5529	32.6971	4.11	1.65	1.78	1.65
2019	10	21	17	7	4.94	29.1519	32.7819	7.1	1.42	1.84	1.42
2019	10	22	7	31	12.85	28.229	33.4964	21.33	1.61	1.78	1.61
2019	10	23	2	16	58.12	28.9328	32.8758	29.47	1.95	2.09	1.95
2019	10	24	2	18	6.17	26.6918	34.7509	11.44	2.4	2.45	2.4
2019	10	24	3	22	8.76	29.2752	32.6593	16.17	1.57	1.46	1.57

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	10	24	16	3	19.64	28.2793	33.3528	5.79		2.22	2.22
2019	10	25	4	38	30.06	23.5378	32.5975	4.56	1.68	2.01	1.68
2019	10	25	22	55	44.01	26.7776	34.7509	22.48	1.82	1.78	1.82
2019	10	25	23	2	7.37	27.5657	34.32	24.48	1.53	1.58	1.53
2019	10	26	13	3	31.18	28.9452	32.2137	18.13	2.35		2.35
2019	10	28	5	31	2.64	24.1374	36.4771	9.64	2.02		2.02
2019	10	28	22	43	30.22	25.2452	34.4813	3.45	1.18		1.18
2019	10	29	17	8	11.06	25.8346	33.2609	3.05	3.19	3.14	3.19
2019	10	30	4	37	4.25	26.735	34.5362	28.06	2.12	2.49	2.12
2019	10	30	12	1	47.75	27.9558	34.52	10.23	2.62		2.62
2019	10	31	11	0	4.57	29.6386	29.1436	7.43	3.38		3.38
2019	10	31	16	42	26.39	23.5167	32.602	11.39		1.8	1.8
2019	10	31	23	30	53.64	26.8663	34.6379	28.31	1.78	1.82	1.78
2019	11	2	0	13	39.14	27.62	34.1922	14.38	1.32		1.32
2019	11	2	2	9	44.68	27.7542	33.977	18.08	2.48		2.48
2019	11	2	3	54	49.86	27.7028	34.3076	15.75	1.53		1.53
2019	11	2	22	13	2.37	30.0506	31.7256	18.95	2.67		2.67
2019	11	4	1	6	5.41	23.588	32.7503	4	1.05		1.05
2019	11	4	10	33	20.91	23.5834	32.6864	3.5	2.65		2.65
2019	11	5	4	28	22.99	26.787	34.9275	17.04	2.32	2.92	2.32
2019	11	6	13	40	50.25	29.815	34.5137	9.76	1.81	1.9	1.81
2019	11	6	16	2	42.62	24.6563	34.3282	4.22	2.26		2.26
2019	11	7	10	10	3.04	28.2554	33.373	31.92	1.56		1.56
2019	11	7	13	53	42.22	23.5221	32.6911	10.36	2.6		2.6
2019	11	7	16	50	57.33	23.5485	32.7142	18.18	1.28		1.28
2019	11	7	22	21	45.27	27.7289	34.4878	14.08	2.85	2.97	2.85
2019	11	8	9	56	18.29	29.1736	34.8564	16.25	1.7		1.7
2019	11	8	17	54	17.85	23.5654	32.6835	10	1.05	1.15	1.05
2019	11	10	5	45	7.53	29.1663	34.8006	17.03	1.71	1.66	1.71
2019	11	10	23	25	26.66	27.6752	34.1955	14.89	1.51		1.51
2019	11	11	1	3	19.58	29.1609	34.8828	22.84	2.87		2.87
2019	11	11	13	43	5.13	25.8105	35.4158	41.5	2.77		2.77
2019	11	11	20	29	58.38	28.3163	34.6097	3.93		2.16	2.16
2019	11	12	22	15	3.09	29.1875	34.8593	21.75	1.46	1.58	1.46
2019	11	12	22	43	35.75	27.5448	34.3613	22.64	1.47	1.62	1.47
2019	11	13	0	8	28.5	27.8267	33.4915	9.98	1.47	1.57	1.47
2019	11	13	2	57	54.63	29.1859	34.914	23.16	1.31	1.52	1.31
2019	11	13	8	25	36.14	29.1724	34.9171	20.78	1.92		1.92
2019	11	13	11	15	53.83	23.5459	32.6862	12.2	2.09	2.14	2.09
2019	11	13	13	51	55.55	26.8535	34.7015	23.12	2.4		2.4
2019	11	13	16	34	55.49	23.6434	32.6097	19.57	1.18	1.4	1.18
2019	11	13	21	27	0.59	28.7348	34.5637	12.42		1.85	1.85
2019	11	13	23	15	2.99	28.4778	33.1522	15.6	1.71	2.16	1.71

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	11	13	23	58	53.91	29.3234	34.6191	5.26	1.43	1.47	1.43
2019	11	14	11	43	11.6	27.6238	34.3555	27.91	1.83	1.91	1.83
2019	11	15	0	13	29.41	29.0631	32.3714	20.97	1.97	2.1	1.97
2019	11	16	0	0	42.38	27.8877	33.2953	8.05	1.82	2.04	1.82
2019	11	16	17	37	24.8	23.4829	32.7176	10.02	0.98		0.98
2019	11	16	17	55	18.76	27.4066	34.3445	20.51	1.5		1.5
2019	11	17	2	13	9.82	29.7202	31.2111	3.57	1.84		1.84
2019	11	17	8	4	1.77	30.2138	31.5959	9.54	2.28		2.28
2019	11	17	20	24	53.27	23.5418	32.6911	12.63	1.72	1.7	1.72
2019	11	18	10	37	52.02	22.8279	31.1904	11.89	2.38		2.38
2019	11	18	16	27	32.36	28.4379	33.2357	18.19		2.31	2.31
2019	11	18	18	38	0.24	24.1564	36.6128	8.64	1.91	2.05	1.91
2019	11	19	6	16	13.3	25.2961	34.6154	5.23		2	2
2019	11	19	10	15	40.09	23.5408	32.6919	10.73	1.86		1.86
2019	11	19	16	54	2.33	23.5496	32.686	14.96	1.69	1.78	1.69
2019	11	19	23	4	26.13	27.3944	34.5474	14.28	4.18		4.18
2019	11	19	23	10	36.89	27.389	34.5464	14.79	2.61	2.79	2.61
2019	11	20	0	17	4.43	27.7104	33.2679	4.35	1.79	1.8	1.79
2019	11	20	1	54	32.42	27.3795	34.4308	22.45	2.33	2.58	2.33
2019	11	20	3	24	0.3	23.4995	32.6653	5		1.01	1.01
2019	11	20	3	38	18.92	27.41	34.3627	21.31	1.26	1.6	1.26
2019	11	20	4	50	52.63	27.7116	33.2726	4.99	1.21	1.41	1.21
2019	11	20	13	15	28.58	27.3952	34.4982	20.3	2.15		2.15
2019	11	20	15	4	49.4	27.3859	34.5319	19.85	1.53		1.53
2019	11	21	22	25	7.63	27.3695	34.5477	18.21	1.86		1.86
2019	11	22	3	7	7.77	27.6249	33.9464	21.73	1.26		1.26
2019	11	22	6	16	30.7	27.4139	34.6192	22.14	1.89		1.89
2019	11	22	8	11	57.79	27.3413	34.6067	11.04	1.73		1.73
2019	11	22	10	3	13.35	26.8537	34.8253	27.52	3.67		3.67
2019	11	22	12	35	35.7	23.5268	32.5894	3.51	1.74		1.74
2019	11	23	5	34	53.27	24.3117	32.6395	26.7	1.77	1.76	1.77
2019	11	23	19	22	20.93	23.6704	32.3814	4.17	1.18		1.18
2019	11	23	22	1	56.97	29.4068	34.8544	16.85	1.5		1.5
2019	11	24	8	21	28.98	27.9261	33.4668	27.77	2.35		2.35
2019	11	24	10	53	41.93	28.7929	34.6842	15.41	2.37		2.37
2019	11	24	12	40	37.03	27.3683	34.5117	22.18	2.12		2.12
2019	11	25	0	43	6.02	27.3558	34.47	30.08	1.53		1.53
2019	11	25	13	18	6.03	23.6133	32.7193	4.69	1.7		1.7
2019	11	26	2	51	37.44	23.617	32.5249	19.08	0.96		0.96
2019	11	26	7	41	57.14	23.7987	32.9164	5.14	1.62	1.77	1.62
2019	11	26	14	33	39.35	22.7846	31.52	3.32	2.01	2.21	2.01
2019	11	27	4	8	31.67	27.7034	33.3082	4.56	1.48	1.6	1.48
2019	11	28	21	36	57.2	23.8231	36.3084	6.28	2.02	2.04	2.02

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	11	29	2	13	32.76	25.2678	34.1079	17.53	1.82	1.93	1.82
2019	11	29	3	48	24.71	25.2949	34.2486	22.64	2.07	2.16	2.07
2019	11	29	6	15	34.1	27.1631	34.4028	16.3	1.41	1.7	1.41
2019	11	30	18	33	49.1	23.6503	32.6645	10.91	0.92		0.92
2019	12	1	0	30	6.03	23.5729	32.6544	8.66	1.12		1.12
2019	12	1	10	5	33.12	27.6836	33.2725	25.62	2.08	1.89	2.08
2019	12	1	12	50	56.15	23.3954	32.614	9.6	2.2		2.2
2019	12	1	20	3	26.84	28.6487	34.267	7.51	1.78	1.63	1.78
2019	12	1	20	46	4.75	26.9492	34.827	22.99	2.01	1.91	2.01
2019	12	2	12	4	17.03	29.983	31.1066	1.11	2.35		2.35
2019	12	2	19	32	49	29.0041	34.7313	18.63	1.42	1.45	1.42
2019	12	3	17	39	28.61	23.5411	32.9563	7.66	1.67	1.84	1.67
2019	12	4	0	43	46.81	28.1065	33.7626	14.66	1.03	1.15	1.03
2019	12	5	3	40	4.64	27.6428	34.2891	24.97	1.52		1.52
2019	12	6	11	26	47.01	23.5768	32.6676	8.69	1.73	1.85	1.73
2019	12	6	18	39	48.12	23.5933	32.6657	3.6	1.8	1.87	1.8
2019	12	6	23	19	22.75	28.1624	33.518	5.32	1.59	1.72	1.59
2019	12	8	8	30	17.32	28.6344	33.1236	19.31	1.36		1.36
2019	12	9	19	46	25.51	28.8266	34.7326	15.24	1.63	1.65	1.63
2019	12	10	3	38	16.98	29.1249	32.564	20.2	1.31	1.8	1.31
2019	12	10	8	50	29.05	27.6617	33.6298	16.2	1.22	1.4	1.22
2019	12	10	17	54	19.57	28.3258	34.5795	15.96	1.15	1.29	1.15
2019	12	11	2	8	7.6	27.6358	33.8043	17.14	2.01	2.21	2.01
2019	12	11	2	11	50.09	28.5309	33.2246	19.89	1.22		1.22
2019	12	11	8	36	24.43	23.799	32.9101	5.09	2.05	2	2.05
2019	12	11	12	22	19.01	27.7391	34.4395	26.41	1.67	1.72	1.67
2019	12	11	13	1	50.46	27.6156	33.7566	11.74	2	2.06	2
2019	12	11	22	35	47.46	23.527	32.595	2.69	1.55		1.55
2019	12	12	2	12	4.13	23.5332	32.594	11.94	1.55		1.55
2019	12	12	13	34	39.8	28.135	33.5033	9.46	1.58	1.54	1.58
2019	12	13	4	51	49.68	27.2536	34.5578	20.46	2.39	2.3	2.39
2019	12	13	6	24	27.26	27.6491	34.1829	16.66	2.29	2.23	2.29
2019	12	14	4	13	23.96	24.1924	32.0745	4.73	1.67	1.67	1.67
2019	12	14	17	49	50.95	27.2267	34.565	6.45	1.61		1.61
2019	12	14	21	13	24.78	28.1738	33.5063	9.57	1.29		1.29
2019	12	15	1	55	44.64	26.6569	35.1455	3.12	1.94		1.94
2019	12	15	6	35	41.91	23.5022	32.2141	2.47	2.25		2.25
2019	12	15	8	28	49.75	25.0762	33.6858	15.11	1.2	1.37	1.2
2019	12	15	19	46	35.07	27.3781	34.53	19.05	3.05	2.95	3.05
2019	12	15	23	12	0.32	25.3027	34.5733	10.51	1.77	1.91	1.77
2019	12	16	6	52	38.42	23.5641	32.6959	15.02	1.62	1.83	1.62
2019	12	16	9	30	33.27	24.3994	36.3957	9.13		2.31	2.31
2019	12	16	9	41	6.62	28.3975	34.581	7.68	2.06		2.06

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	12	16	14	12	41.77	27.8044	33.6232	9.95		2.01	2.01
2019	12	16	20	7	48.38	24.4371	36.1739	3.33	2.41		2.41
2019	12	17	1	33	12.24	27.4103	34.5499	8.85	3.08		3.08
2019	12	18	2	18	42.73	27.974	34.3593	21.7	2.4	2.55	2.4
2019	12	19	7	41	23.91	29.6604	31.8642	6.85	2.67		2.67
2019	12	19	13	34	23.36	27.6851	33.7289	18.81	2.1		2.1
2019	12	19	16	16	32.68	27.3951	34.5175	17.42	1.94		1.94
2019	12	19	18	31	17.6	27.3722	34.5768	16.46	1.75	1.88	1.75
2019	12	19	23	38	50.24	27.3703	34.4564	19.01	1.82		1.82
2019	12	20	17	24	8.55	29.7933	34.5256	9.4	1.82		1.82
2019	12	20	18	32	23.11	23.5571	32.5808	15.14	1.45		1.45
2019	12	20	22	7	33.23	28.304	33.3291	4.55	1.09		1.09
2019	12	20	22	8	32.88	28.3038	33.3155	15.03	1.69		1.69
2019	12	21	2	9	21.69	27.1662	34.8503	30.4	1.74		1.74
2019	12	22	0	13	46.15	27.2183	34.7705	21.5	1.48		1.48
2019	12	22	7	0	35.24	23.5679	32.6775	8.22	1.34		1.34
2019	12	22	15	33	46.6	28.7787	33.0857	19.82	1.2	1.28	1.2
2019	12	22	16	28	37.31	24.1793	36.4519	7.25	2.44	2.64	2.44
2019	12	23	7	31	0.26	23.5598	32.6822	3.44	1.44		1.44
2019	12	23	7	36	2.68	23.5445	32.6926	11.37	1.84	1.88	1.84
2019	12	23	20	3	58.01	28.1248	33.7433	25.75		1.82	1.82
2019	12	24	22	31	0.06	29.6395	34.5956	23.39	2.84	2.66	2.84
2019	12	25	10	4	47.05	29.0538	33.3439	6.31	1.87		1.87
2019	12	25	17	33	43.27	28.5533	33.225	3.52	1.09		1.09
2019	12	26	2	20	28.7	24.0255	35.136	8.24	1.66		1.66
2019	12	26	15	6	49.83	27.7443	34.3982	13.15	2.06		2.06
2019	12	28	9	19	21.44	27.6203	34.1519	16.41	2.7		2.7
2019	12	28	14	42	0.92	24.0801	36.5459	9.47	2.46		2.46
2019	12	28	17	27	54.99	24.8186	35.9276	3.86	1.82		1.82
2019	12	28	21	27	35.05	27.5256	34.36	9.74	1.87		1.87
2019	12	29	3	21	20.54	25.33	34.5178	10.35	2.41		2.41
2019	12	29	9	24	55.34	26.6832	34.9111	24.9	2.83		2.83
2019	12	29	17	5	41.26	26.4182	34.813	24.2	2.19		2.19
2019	12	30	0	27	52.78	24.1877	36.4339	18.39	3.81		3.81

Table (8) Hypo-central parameters of regional earthquakes recorded by ENSN in 2019

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	1	1	11	39	55.7	35.2473	23.604	9.65	4.71	4.75	4.71
2019	1	2	6	8	25.52	32.6819	25.41	32.83	3.03	3.76	3.03
2019	1	3	8	44	32.86	31.5104	34.9597	9.96	2.87	2.54	2.87
2019	1	3	12	30	18.22	21.8008	33.2084	31.69	2.69	2.53	2.69
2019	1	4	1	30	52.44	25.595	27.3825	12.12	3.69	4.08	3.69
2019	1	8	7	6	9.27	35.9762	26.3051	10		3.84	3.84
2019	1	10	15	4	20.25	34.4157	26.635	10.04	3.63	3.77	3.63
2019	1	10	17	30	16.32	37.477	21.3174	21	4.67	4.78	4.67
2019	1	10	18	24	38.86	34.3904	26.8179	7	4.52	4.32	4.52
2019	1	10	23	3	44.3	34.6026	26.5252	19.08	3.8	3.65	3.8
2019	1	13	14	15	22.19	31.2017	35.3023	9.87		2.99	2.99
2019	1	13	22	27	8.31	35.8602	28.784	11.21	4.08	4.14	4.08
2019	1	15	15	59	50.59	29.4935	35.2844	12.46	4.14	3.75	4.14
2019	1	17	21	46	40.84	38.0139	21.6527	12.94	4.59	4.56	4.59
2019	1	18	9	48	1.42	37.7877	20.3601	33	4.25	4.97	4.25
2019	1	18	17	14	11.62	37.562	20.7273	32	4.25	5.02	4.25
2019	1	19	11	45	50.63	34.2473	25.8209	25.49	3.74	3.65	3.74
2019	1	19	14	57	50.27	34.1464	32.2998	12.22	3.9	3.69	3.9
2019	1	20	15	49	52.08	35.6809	28.3503	31.8	4.89	4.69	4.89
2019	1	22	20	12	0.46	36.9752	28.1579	14.5	5.02	4.73	5.02
2019	1	24	14	31	2.42	35.2571	28.4989	13.13	5.62	5.19	5.62
2019	1	24	23	25	42.14	34.7614	22.9777	9.89	3.74	3.69	3.74
2019	1	31	2	53	3.76	35.9899	24.2701	29.91	3.51	4.01	3.51
2019	2	1	5	2	7.39	37.4502	21.9372	10.01	4.16	4.54	4.16
2019	2	1	10	29	51.75	35.5871	27.4927	28.73	4.8	4.62	4.8
2019	2	2	14	9	29.64	34.4995	24.1962	9.98	4.31	4.02	4.31
2019	2	4	16	51	4.55	35.7653	23.2404	33	3.92	4.35	3.92
2019	2	4	17	41	20.16	37.1618	22.2112	33	4.59	4.6	4.59
2019	2	5	2	26	23.7	37.9432	21.895	10.04	5.39	5.23	5.39
2019	2	5	15	12	4.61	35.8726	29.841	33	4.6	4.12	4.6
2019	2	10	23	8	48.2	33.3398	25.5683	9.98	3.21	3.54	3.21
2019	2	11	16	38	9.63	36.0354	29.0338	33	3.93	4.54	3.93
2019	2	17	19	7	37.58	36.9188	23.1274	15.55	4.34	4.45	4.34
2019	2	18	3	46	45.16	34.5616	23.7597	33	4.34	4.23	4.34
2019	2	20	5	35	29	35.7193	35.3936	24.83	4.34	4.66	4.34
2019	2	20	10	43	31.39	34.4736	24.7822	25.11	4.46	4.62	4.46
2019	2	20	23	30	48.33	32.3014	26.1792	15.02	2.68	3.11	2.68
2019	2	21	1	6	53.27	35.4131	29.4186	26.79	4.21	4.46	4.21
2019	2	21	2	19	34.26	32.0964	21.7606	15.86	4.55	4.4	4.55
2019	2	21	6	25	49.26	32.2194	21.8361	11.8	3.79	3.72	3.79
2019	2	28	1	22	43.01	34.1427	26.2797	9.98	3.97	3.91	3.97

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	2	28	20	9	24.65	37.7164	21.4234	8.56		4.77	4.77
2019	3	3	9	46	51.65	19.618	33.4096	9.93		3.28	3.28
2019	3	7	16	25	42.79	35.175	30.7841	7.59	4.36		4.36
2019	3	9	11	37	33.93	32.5144	25.079	15.18	3.01	3.23	3.01
2019	3	11	6	24	26.46	34.6119	26.1627	12.72	3.79	3.83	3.79
2019	3	12	5	3	36.31	33.5374	25.8615	23.63	4.08	4.28	4.08
2019	3	12	17	29	49.77	21.1451	30.1445	10	2.77	2.73	2.77
2019	3	15	0	7	13.85	35.1586	24.5577	14.6	3.7		3.7
2019	3	15	18	3	16.07	34.4304	26.2691	12.6	3.63		3.63
2019	3	16	8	50	14.3	34.1296	26.5851	9.55	3.6		3.6
2019	3	17	11	49	41.87	37.6653	21.916	8.84	4.38		4.38
2019	3	17	14	38	38.7	34.6373	24.9407	9.81	3.26		3.26
2019	3	17	17	41	26.63	35.1555	24.8116	29.93	3.6	3.92	3.6
2019	3	18	21	18	30.74	34.741	32.4745	30.51	3.26		3.26
2019	3	19	23	48	5.59	26.3781	35.4369	26.78	2.6		2.6
2019	3	20	6	34	28.15	37.5295	29.1886	29.25	4.99		4.99
2019	3	20	6	38	24.73	36.973	29.4216	10.27	4.71	4.35	4.71
2019	3	20	8	0	32.41	37.1621	29.4947	26.94	3.58		3.58
2019	3	20	17	4	17.93	37.5239	29.2888	23.48	3.81	4.77	3.81
2019	3	20	17	42	55.03	37.5069	29.4784	26.8		4.75	4.75
2019	3	20	17	43	7.32	36.6443	29.3158	10	4.43	4.47	4.43
2019	3	21	16	41	7.24	37.9014	28.844	30	3.77		3.77
2019	3	21	16	46	14.83	34.2559	26.2471	29.77	3.08		3.08
2019	3	22	15	32	48.82	37.5947	29.79	27.61	4.01		4.01
2019	3	22	18	24	30.82	35.2196	27.9961	8.1	3.78		3.78
2019	3	23	8	46	57.76	36.018	27.5593	29.73	4.14		4.14
2019	3	23	8	47	4.59	35.4638	27.638	10.52	3.78	4.1	3.78
2019	3	27	11	27	10.74	37.0324	29.3101	28.16	4.28		4.28
2019	3	31	11	30	24.31	37.0443	29.2406	28.33	4.54		4.54
2019	4	1	1	49	38.29	36.735	29.0928	3.35	4.02	4.56	4.02
2019	4	1	1	49	44.78	36.3819	29.0902	33.25	4.88	4.78	4.88
2019	4	2	8	0	23.58	35.3051	24.0769	9.83	4.28	4.35	4.28
2019	4	3	18	53	8.91	33.8696	25.4435	22.99	3.82	4.21	3.82
2019	4	4	15	1	28.8	36.8568	29.1392	10.05	4.29	3.97	4.29
2019	4	7	15	6	37.29	36.7847	30.958	33	3.99	4.5	3.99
2019	4	16	1	4	54.24	37.7232	21.1051	9.83	4.18	4.53	4.18
2019	4	19	13	52	32.78	33.1698	27.4558	27.76	2.58	3.3	2.58
2019	4	22	19	36	41.57	36.9535	28.3625	24.09	3.85		3.85
2019	4	25	2	51	45.4	35.6929	25.8632	21.37	3.37		3.37
2019	4	26	9	16	8.19	36.0985	27.9172	24.88	4.33		4.33
2019	4	26	21	53	41.37	35.3672	27.9038	29.27	3.88		3.88
2019	4	30	19	10	3.15	35.8905	25.6864	6.18	3.7		3.7
2019	5	3	4	33	20.71	33.7213	26.097	9.39	3.6		3.6

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	5	4	13	39	41.21	34.7584	26.7398	16.39	3.4		3.4
2019	5	5	13	27	28.29	28.348	34.9692	9.88	2.16		2.16
2019	5	10	4	21	21.46	22.775	31.4928	4.19	1.89	2.36	1.89
2019	5	11	2	6	9.69	21.9323	33.4976	24.57	2.66		2.66
2019	5	13	16	57	16.99	37.7333	22.2698	7.93	4.38		4.38
2019	5	13	21	27	29.53	37.7902	21.564	19.93	3.85	4.62	3.85
2019	5	14	6	10	58.38	34.1198	25.3215	11.29	3.58	3.85	3.58
2019	5	15	16	53	50.49	32.7377	32.6694	31.14	4.98		4.98
2019	5	20	15	28	9.79	33.218	27.9298	25.35	3.02	2.87	3.02
2019	5	21	8	58	18.84	37.91	21.4833	21.92	4.65	4.41	4.65
2019	5	21	22	26	0.97	35.554	24.935	5.81	3.61	3.16	3.61
2019	5	22	16	43	35.13	34.6895	23.5523	24.98	3.49	3.75	3.49
2019	5	22	17	13	47.53	34.4655	23.7374	10.15	3.76	3.61	3.76
2019	5	26	10	50	27.5	35.5229	28.7452	6.18	3.57	4	3.57
2019	5	26	11	0	29.67	34.9106	28.7034	23.87	3.11		3.11
2019	5	26	12	7	4.38	37.7653	28.1005	10.43	4.7	4.53	4.7
2019	5	28	5	27	46.56	37.0168	27.8203	27.01	5.23	5.24	5.23
2019	5	30	21	43	44.56	37.1603	27.6656	31.23	3.84	4.39	3.84
2019	6	2	23	8	8.14	36.0316	27.1128	29.26	3.53	3.39	3.53
2019	6	4	1	49	49.11	22.1325	23.5506	27.95	3.25	4.36	3.25
2019	6	6	2	39	45.08	36.1914	27.23	29.82	3.59	3.73	3.59
2019	6	7	8	14	4.19	37.17	30.6925	30	3.39	4.55	3.39
2019	6	7	12	21	37.66	35.592	28.3595	10.59	4.12	4.14	4.12
2019	6	8	23	12	28.13	34.2425	26.7688	17.65	3.32	4.01	3.32
2019	6	9	13	44	17.96	32.957	27.3248	31.12	3.12	3.35	3.12
2019	6	10	4	46	37.61	36.2346	24.7509	26.93	3.57	3.52	3.57
2019	6	11	9	13	47.09	35.4381	30.6017	31.49	3.22	3.81	3.22
2019	6	11	18	44	44.84	26.8599	34.6312	31.59	2.23	2.13	2.23
2019	6	16	10	29	0.22	35.0291	23.1146	29.65	3.67	3.55	3.67
2019	6	19	5	8	7.92	33.9611	26.5396	29.94	3.28	3.5	3.28
2019	6	21	19	4	3.46	36.2421	30.876	22.61	3.96	4.13	3.96
2019	6	23	10	19	19.68	36.6661	26.8599	26.93	3.56	3.91	3.56
2019	6	26	5	16	43.75	33.8117	25.406	29.38	3.34	3.81	3.34
2019	6	29	23	50	41.83	35.9412	25.7279	29.92	3.23	3.87	3.23
2019	7	2	14	21	45.91	34.4033	24.6637	17.99	3.4	3.59	3.4
2019	7	2	18	55	13.48	35.9813	27.0557	6.53	3.75	4.04	3.75
2019	7	3	1	2	10.76	35.1654	28.1158	22.93	4.29	4.2	4.29
2019	7	3	1	29	2.56	34.8205	28.0372	23.46	3.4		3.4
2019	7	4	4	1	42.99	35.5472	27.161	7	3.84		3.84
2019	7	5	14	19	0.9	32.3818	31.0068	6.71	4.31	4.15	4.31
2019	7	7	22	22	24.21	37.2139	21.2188	33	3.53	4.98	3.53
2019	7	8	10	48	43.16	20.4292	30.657	9.78	2.6	2.67	2.6
2019	7	8	11	3	32.23	30.1196	37.3081	9.99	2.99	2.99	2.99

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	7	8	18	26	2.53	20.4593	32.2574	9.89	2.46	2.47	2.46
2019	7	9	18	25	23.44	36.2135	28.1212	7	2.96		2.96
2019	7	10	2	54	2.04	36.0029	28.7092	30.3	3.82	4.32	3.82
2019	7	10	18	58	43.52	36.421	29.0998	15	3.55		3.55
2019	7	10	22	57	11.72	35.1669	24.511	19.88	4.22	4.1	4.22
2019	7	11	12	10	17.83	34.3517	25.5373	31.43	3.76		3.76
2019	7	13	15	8	43.78	38.7402	21.3092	31.85	4.64		4.64
2019	7	14	10	50	18.18	39.4298	21.3111	11.83	4.86		4.86
2019	7	14	13	12	26.06	34.7956	25.6014	86.44	3.84		3.84
2019	7	16	13	4	14.65	19.172	33.5536	9.66	3.14	3.4	3.14
2019	7	18	21	56	11.73	32.9613	32.4988	23.56	3.33	3.07	3.33
2019	7	19	1	33	44.52	35.8219	30.8623	6.53	3.43	3.65	3.43
2019	7	19	11	13	16.95	37.8406	23.5096	31.06	5.13		5.13
2019	7	19	12	11	53.65	38.1641	23.9059	21.67	4.35		4.35
2019	7	20	8	10	21.67	36.6541	27.0128	114.69	3.26		3.26
2019	7	26	5	8	7.96	32.3468	25.7581	6.56	2.77	2.68	2.77
2019	7	28	16	9	7.55	38.1572	23.77	9.79	4.13		4.13
2019	7	30	10	36	29.97	37.1271	21.4915	26.34	3.76	4.72	3.76
2019	7	31	4	40	3.85	35.0278	25.2802	117.79	5.45	5.98	5.45
2019	8	3	1	9	40.82	36.0053	31.7245	29.09	3.46	3.74	3.46
2019	8	3	9	3	17.24	21.3767	30.7844	20.04	1.96	2.25	1.96
2019	8	3	9	51	24.91	35.1537	27.9612	10.06	4.91		4.91
2019	8	3	13	18	9.98	33.9518	24.8636	25.55	3.6		3.6
2019	8	3	18	14	58.72	35.1156	27.9647	6.56	3.52		3.52
2019	8	8	8	39	13.74	37.6106	27.1008	26.32	4.38	4.88	4.38
2019	8	8	11	25	29.09	37.8716	29.5808	11.88	5.51		5.51
2019	8	8	15	43	40.22	34.8984	23.824	24.23	3.39		3.39
2019	8	10	7	29	2.4	34.7574	25.2126	31.65	3.29	4.17	3.29
2019	8	11	7	2	50.57	34.2803	25.1955	17.09	4.48	4.55	4.48
2019	8	11	8	18	43.24	34.041	25.308	7.9	2.83	3.15	2.83
2019	8	11	12	35	7.73	35.2971	27.9427	29.63	3.43	3.68	3.43
2019	8	11	19	46	50.18	35.2275	27.9641	18.96	2.84	2.91	2.84
2019	8	12	7	57	7.12	35.4365	26.1022	4.53	4.57	4.45	4.57
2019	8	12	23	38	54.07	35.1598	27.9902	15.53	3.28	3.83	3.28
2019	8	13	21	11	19.24	35.7102	23.4328	21.72	3.48	3.7	3.48
2019	8	14	13	54	16.22	38.7289	19.0114	22	3.05	3.25	3.05
2019	8	14	23	35	43.16	34.801	25.0559	4.26	2.89	2.99	2.89
2019	8	16	10	20	20.17	36.0435	23.3656	21.31	3.17	2.95	3.17
2019	8	16	13	52	29.15	35.3097	30.3112	28.53	2.96	3.48	2.96
2019	8	17	2	22	11.67	37.1441	20.5708	32.49	3.89		3.89
2019	8	20	9	34	53.19	36.1481	31.2305	27.88	4.7	4.56	4.7
2019	8	27	1	58	9.54	35.7174	27.8604	31.92	3.75	3.75	3.75
2019	8	27	4	31	23.44	35.7039	27.7638	11.24	4.25		4.25

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	8	27	15	21	28.61	35.8266	27.9117	25.8	2.99	2.78	2.99
2019	8	28	0	6	35.24	35.7407	27.3794	11.68	3.54	3.33	3.54
2019	8	28	4	31	10.38	34.6599	25.545	26.63	3.04	3.44	3.04
2019	8	28	11	58	21.15	35.7759	27.8438	30.35	4.94		4.94
2019	8	28	12	28	45.46	36.0225	28.4864	62.23	3.65		3.65
2019	8	30	15	38	11.45	37.8301	26.8018	20.82	4.39		4.39
2019	8	30	17	21	5.98	37.4523	27.2794	2.07	4.41		4.41
2019	9	4	1	10	24.71	35.209	28.0583	2.57	3.13	3.23	3.13
2019	9	4	17	35	39.59	35.2093	26.315	32.56	3.46		3.46
2019	9	5	18	13	20.53	35.2712	23.7412	18.26	3.19	2.99	3.19
2019	9	6	0	15	10.23	32.5632	34.4552	15.52	2.87	3.3	2.87
2019	9	6	8	59	54.4	35.8058	31.7427	18.15	4.29		4.29
2019	9	8	2	5	1.48	21.7828	34.1329	1.55	2.6	2.89	2.6
2019	9	10	7	6	45.88	35.1609	27.9657	4.02	4.01		4.01
2019	9	13	12	31	17.49	35.9628	22.1619	80.88	4.03		4.03
2019	9	14	15	2	39.32	34.9384	27.7966	11.52	3.54		3.54
2019	9	15	2	6	52.32	35.0527	23.2885	27.9	3.91	3.7	3.91
2019	9	23	7	9	5.12	35.8907	27.4316	10.54	4.27	3.63	4.27
2019	9	24	7	48	59.01	34.2187	26.3438	22.22	4.83		4.83
2019	9	25	17	42	5.44	36.3857	28.7931	9.79	3.81	3.98	3.81
2019	9	27	5	22	21.99	35.1971	27.9763	3.99	3.71		3.71
2019	9	28	9	23	43.01	34.1685	25.0504	21.31	3.36	3.47	3.36
2019	9	29	7	50	50.98	35.1127	27.5037	2.39	3.99		3.99
2019	10	2	23	47	14.22	36.0797	22.8753	52.15	3.26		3.26
2019	10	3	4	44	55.15	36.1683	28.6134	1.34	5.07		5.07
2019	10	3	7	30	19.51	34.7847	24.9554	27.7	2.65	3.06	2.65
2019	10	4	20	20	19.51	35.8939	27.573	5.93	3.83		3.83
2019	10	5	11	52	29.3	20.1956	32.3635	4.4	2.3		2.3
2019	10	5	14	51	39.09	35.793	28.2363	55.69	4.53		4.53
2019	10	6	5	57	9	36.4882	26.877	0.02	3.48		3.48
2019	10	7	1	18	38.32	35.9154	27.4715	7.95	3.55		3.55
2019	10	7	22	2	25.62	35.0099	26.2561	4.87	3.46		3.46
2019	10	8	14	55	41.23	34.6507	33.1861	7.68	3.21		3.21
2019	10	8	15	31	38.51	21.8048	32.2417	1.44	2.42	2.78	2.42
2019	10	12	22	11	51.01	35.0042	27.8648	4.92	3.52		3.52
2019	10	16	7	28	6.19	36.9016	30.7513	12.43	3.3		3.3
2019	10	18	10	46	7.13	34.7247	33.1874	39.89	3.9		3.9
2019	10	21	0	42	27.7	34.204	25.3107	4.41	3.2		3.2
2019	10	21	10	30	43.55	35.282	29.4877	27.9	3.69		3.69
2019	10	24	21	6	45.3	36.4643	28.7861	9.25	4.38		4.38
2019	10	29	13	1	52.85	35.5305	25.1368	29.78	4.07		4.07
2019	11	1	5	25	38.53	40.131	19.6182	6.67	4.91		4.91
2019	11	1	10	17	4.11	36.4016	31.3184	25.4	4.07		4.07

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	11	1	18	40	43.07	32.8295	35.5771	5.51	3.26		3.26
2019	11	5	3	50	25.36	36.9134	28.6065	10.31	3.58		3.58
2019	11	5	21	1	24.36	35.4255	31.5616	29.96	3.3		3.3
2019	11	6	3	19	35.1	36.6976	21.0546	83.95	3.46		3.46
2019	11	15	6	12	12.01	21.568	31.9267	3.42	2.2	2.3	2.2
2019	11	15	18	15	16.6	37.062	23.8513	27.45	3.74	3.81	3.74
2019	11	16	16	43	36.89	21.9444	31.2983	13.91	1.6		1.6
2019	11	16	18	14	10.6	36.6506	30.1064	69.24	4.38		4.38
2019	11	17	17	14	24.81	36.9996	23.0111	18.9	4.18		4.18
2019	11	20	14	0	32.86	36.3491	26.865	21.83	4.11		4.11
2019	11	21	3	25	10.96	36.158	26.6354	12.35	3.81		3.81
2019	11	22	22	50	27.49	34.6698	25.2704	9.61	3.31	3.53	3.31
2019	11	23	3	43	32.22	36.5501	22.8056	8.6	4.03	4.17	4.03
2019	11	24	4	42	1.24	28.6667	34.9069	6.5	3.25		3.25
2019	11	25	8	7	44.24	31.3439	35.5144	13.57	3.08		3.08
2019	11	25	11	39	31.55	31.3359	35.5499	14.43	3.6		3.6
2019	11	25	11	48	46.98	31.3506	35.5412	13.1	3.87		3.87
2019	11	27	7	23	36.52	35.8278	23.5041	29.92	6.25		6.25
2019	11	29	0	45	10.15	27.8694	36.3728	2.5	2.01	2.23	2.01
2019	11	29	6	51	8.74	34.4042	25.7307	9.28	3.47	3.81	3.47
2019	11	29	15	3	48.59	19.803	32.4255	9.71	2.71		2.71
2019	11	29	20	46	29.38	38.3818	21.2191	10	4.19		4.19
2019	11	30	3	24	30.85	34.4853	25.9438	14.96	3.99		3.99
2019	12	1	18	13	22.36	34.2488	27.087	12.07	3.82	4.01	3.82
2019	12	3	9	46	0.43	35.2731	27.217	5.92	4.03		4.03
2019	12	3	12	38	1.15	19.2714	33.5971	10	2.54		2.54
2019	12	4	2	20	24.6	34.6324	24.6023	16.94	3.41		3.41
2019	12	4	2	36	33.87	34.6242	24.0858	1.33	3.01		3.01
2019	12	4	8	18	14.45	35.2683	27.1763	4.07	3.56		3.56
2019	12	4	10	45	0.45	34.4159	32.1053	28.56	3.09		3.09
2019	12	5	7	22	41.88	36.0846	21.7446	19.25	3.81		3.81
2019	12	6	8	45	41.12	35.2001	23.9556	15.69	4.4	4.34	4.4
2019	12	7	14	34	59.08	35.1159	24.5917	0.1	3.92	4.19	3.92
2019	12	7	14	46	58.92	35.2314	24.1446	21.61	4.06	4.46	4.06
2019	12	8	3	41	50.95	35.2458	22.8013	13.97	3.88	3.93	3.88
2019	12	8	21	9	7.53	35.6201	31.0531	20.77	3.49		3.49
2019	12	8	22	27	23.17	35.0121	23.5919	16.58	3.48		3.48
2019	12	8	22	41	14.38	35.2406	23.9913	16.65	4.19		4.19
2019	12	10	0	55	29.87	35.3223	28.6551	19.94	3.8		3.8
2019	12	10	21	58	26.24	35.242	26.7052	62.98	5.24		5.24
2019	12	11	2	29	24.38	37.1583	23.8792	7.18	4.44		4.44
2019	12	12	3	5	43.12	34.7178	26.3917	19.92	4.96		4.96
2019	12	12	9	53	0.22	34.7438	26.3995	6.89	3.68	3.67	3.68

Year	Mon.	D	H	M	S	lat.	Long.	Depth	ML	MD	ML else MD
2019	12	13	22	22	48.2	34.6069	24.2271	11.33	3.3		3.3
2019	12	16	11	46	22.92	35.1158	26.9321	16.46	3.63		3.63
2019	12	21	18	21	38.05	33.8975	25.8199	19.94	3.12		3.12
2019	12	21	23	51	34.84	34.8119	27.7974	22.49	4.15		4.15
2019	12	27	7	19	30.69	34.8903	33.2856	8.65	3.73		3.73

Prepare and Design by Drawing and GIS unit
2020