

SEISMOLOGICAL BULLETIN OF SYOWA STATION, ANTARCTICA, 1990

KATSUTADA KAMINUMA

National Institute of Polar Research,
9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173

and

KEN-ICHI NAGASAKA

Faculty of Science, Ibaraki University,
1-1, Bunkyo 2-chome, Mito 310

1. Introduction

The seismic observation system at Syowa Station is schematically illustrated in Fig. 1. There are two types of seismometers, the one called SP (short-period) or HES with the natural period of 1.0 s of the pendulum and the other called LP (long-period) or PELS with the natural period of 12.0 s. SP and LP have been operated since 1961 and 1967, respectively (Kaminuma *et al.*, 1968). A new vault for seismometers was built in March 1970 (Kaminuma and Chiba, 1973). The old LP was replaced by PELS at Syowa Station in 1982. The coordinates of the seismographic vault are $69^{\circ}00'31.7''$ S in latitude and $39^{\circ}35'31.6''$ E in longitude. The elevation is 20 m above the mean sea level.

The system was maintained by K. Nagasaka throughout the wintering season of JARE-31 (February 1990 - January 1991).

2. Data

The overall frequency response and the magnification of the short-period and long-period seismometers (Z, N-S and E-W components) are shown in Fig. 2. The system clock has been

connected to the recovered UTC from NNSS satellites since February 1987 (see Fig. 1). The accuracy of the read-out data can be estimated as 0.2 S.

Considering the delay time of 1-2 years between the publication of this report and the observing wintering period, which is inevitable due to the restriction of transport ability between Tokyo and Syowa Station, the PDE (Preliminary Determination of Epicenters) reports by NEIC (National Earthquake Information Center) are referred to and only the seismograms of teleseismic events are edited.

2.1. Read-out data

The onset of the all events detected on the monitoring seismograms of the short- and long-periods was picked out from the pen-monitor records. The onset times of P-arrivals are listed in Table 1. Symbols E and I in the phase column denote weak and sharp onsets, respectively. The direction of the initial ground motion is denoted by + for the upward direction and - for the downward direction. Arrival time is in UTC.

Some earthquakes were determined as the local events using the data of the tripartite array network which was installed around Syowa Station in 1987 (Akamatsu *et al.*, 1988). The local events are denoted with the symbol of the single asterisk in Table 1. The teleseismic events reported in the PDE of NEIC are shown with the serial numbers (#-xxx) in the table. The serial numbers are corresponded to the numbers in Table 2 which are listed the big events detected at Syowa Station and reported in the PDE. The events detected on the only long-period seismograms are shown with the double asterisks.

2.2. Teleseismic events

Figure 3 shows the location of 181 teleseismic events of which initial phases were detected at Syowa Station. The list of hypocenters of the teleseisms is shown in Table 2 with the same serial numbers as given in remarks of Table 1. The seismograms of these events are available from National Institute of Polar Research.

Pen-monitor examples of short- and long-period seismograms of 23 teleseismic events are given in the appendix. Body wave magnitude of the events in the appendix is larger than 6.5. One block of long-period seismogram is shown for one hour record and that of short-period is for 30 minutes. Both long- and short-period are given for three component seismograms at Syowa

Station. The long-period seismograms of #-34, -42, -49 and -83 are not shown in the appendix because 1) the initial phase could not be identified for large-tremor (#-34 and -42), 2) no records (#-49) and 3) small amplitude of the event (#-83).

It is regrettable that the phase readings of the events recorded at Syowa Station have been reported to NEIS at least once a week. However we could not find the reports of SYO on the Earthquake Data Report. This might be a result of the difficulty of telecommunications through the mother station from Syowa Station by the present system in Antarctica.

3. Staffs of Data Process

The seismic observations at Syowa Station are organized by one of the authors, K. Kaminuma, and Dr. K. Shibuya of National Institute of Polar Research. Information on the seismic observation at Syowa Station is available from them. Ms. Y. Shudo of National Institute of Polar Research has scaled and edited all events, and has prepared this manuscript. The authors express their thanks for her cooperation.

References

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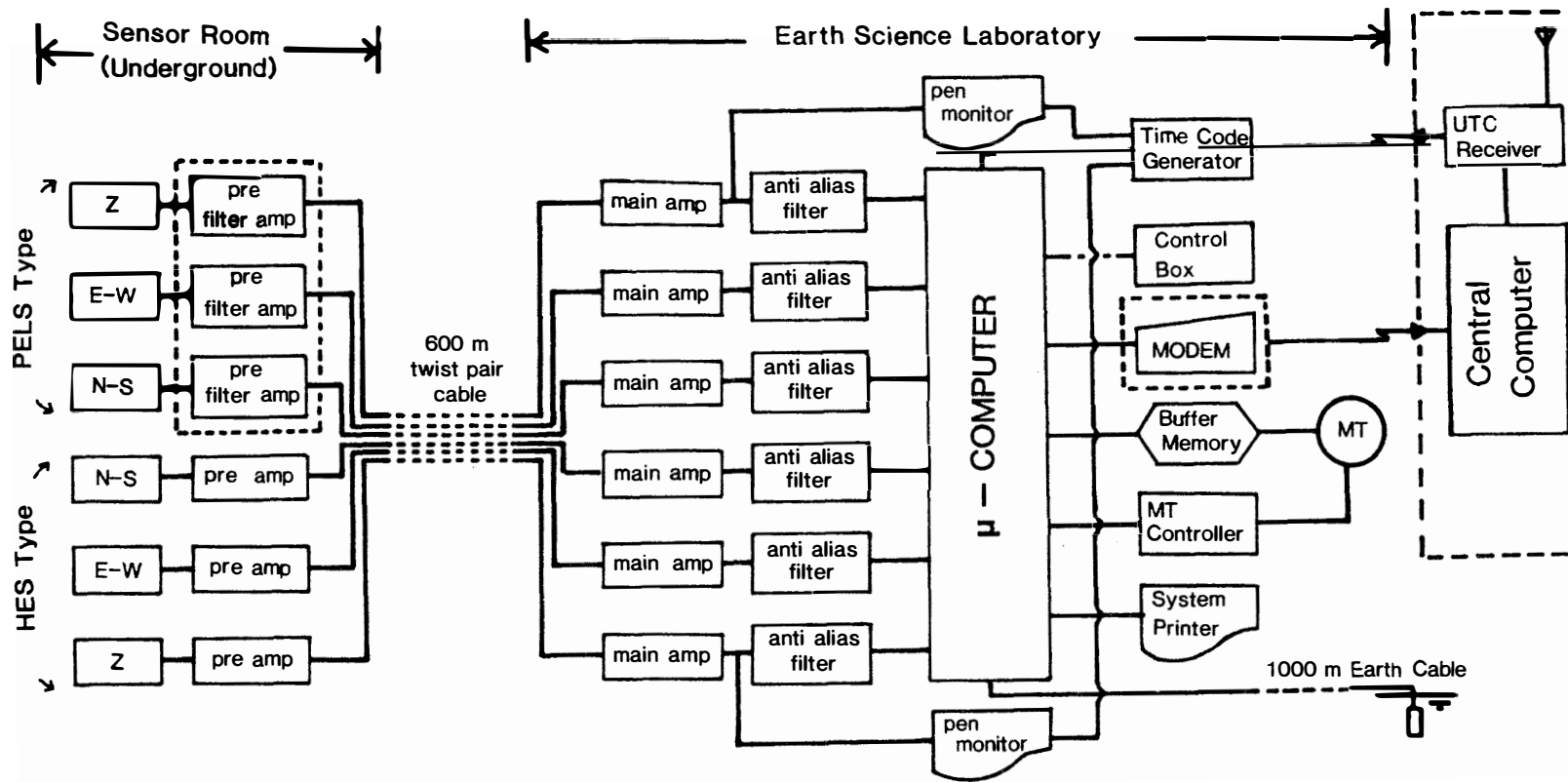


Fig. 1. The seismic observation system at Syowa Station.

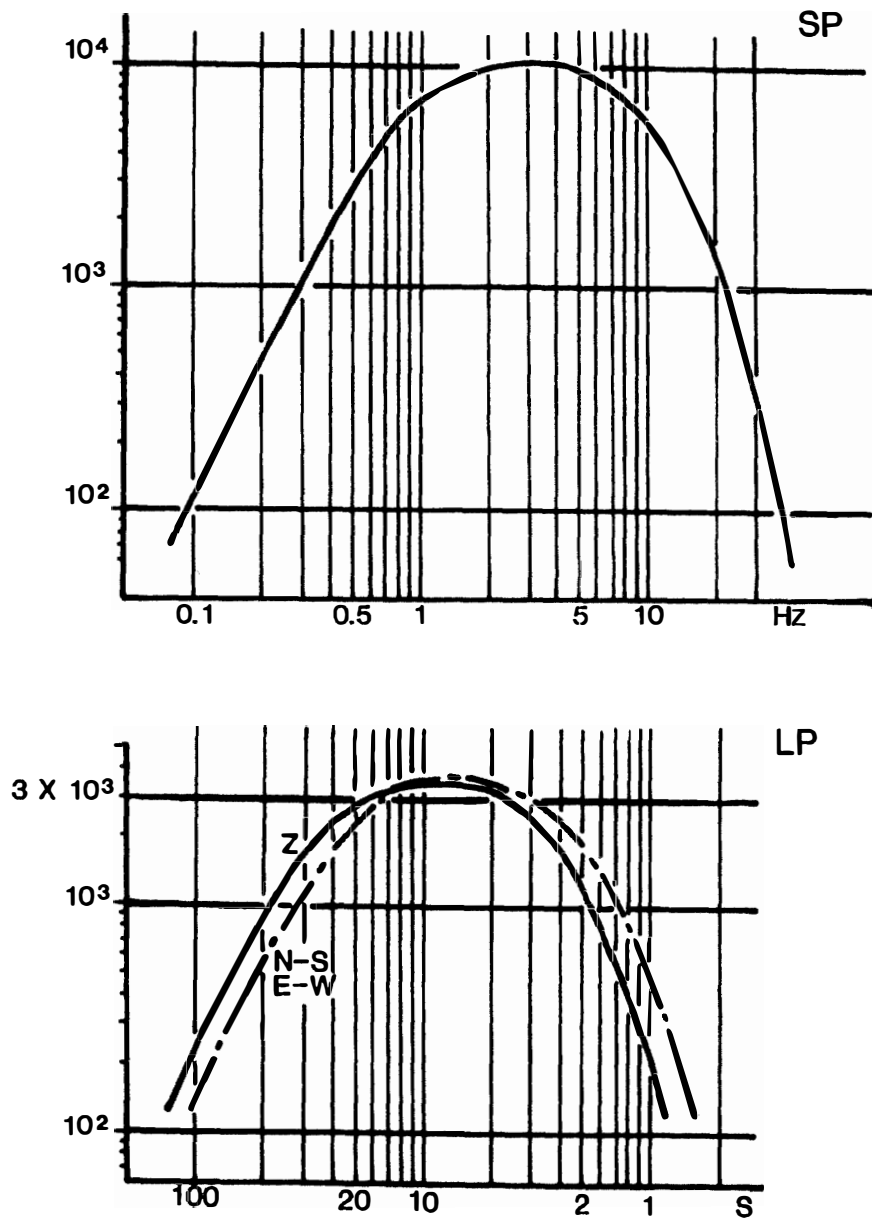


Fig. 2. Over-all frequency responses of the short-period and the long-period seismographs.

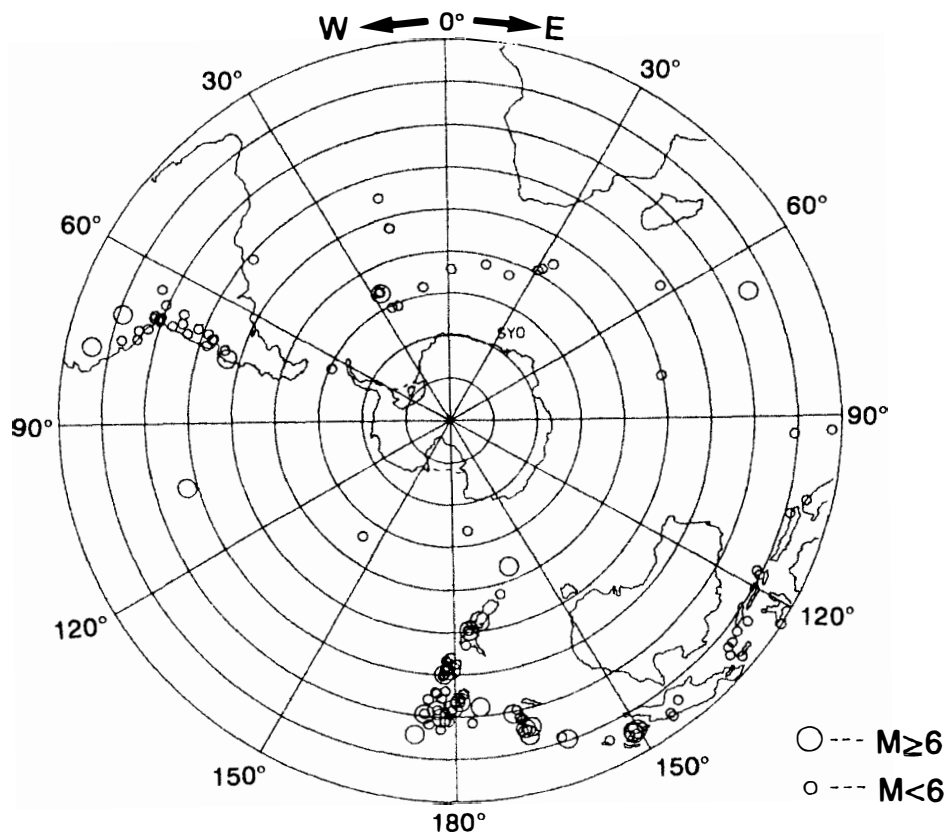
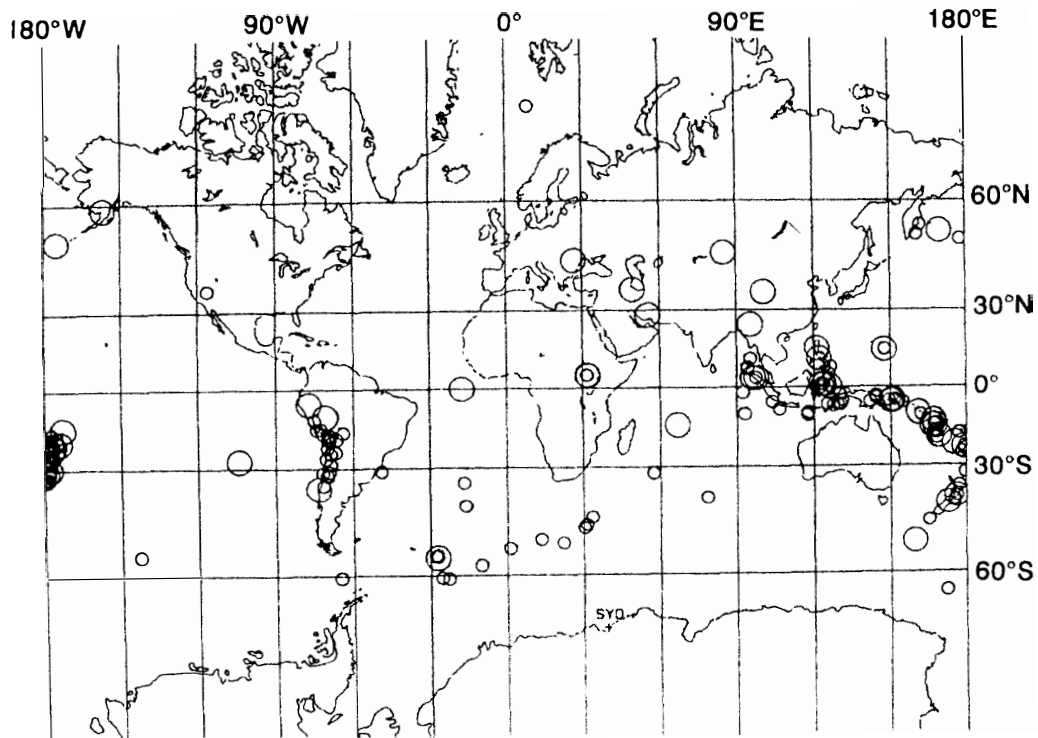


Fig. 3. Epicenters of the 181 events.

Table 1. Read-out data.

| Date | Phase | Arrival time | Remarks | Date | Phase | Arrival time | Remarks |
|---------|--------|--------------|---------|---------|--------|--------------|---------|
| | | h m s | | | | h m s | |
| Jan. 01 | +IPZ | 08 01 11.1 | #-1 | Jan. 16 | -EPZ | 08 08 15.8 | #-16 |
| 04 | -IPZ | 05 45 25.4 | #-2 | | LP EPZ | 08 08 16.0 | |
| 05 | -IPZ | 10 21 52.9 | #-3 | | +IPZ | 11 03 51.3 | #-17 |
| | EPZ | 13 15 33.0 | #-4 | | LP+IPZ | 11 03 51.5 | |
| 06 | +IPZ | 21 55 52.1 | #-5 | 18 | EPZ | 05 54 29.5 | #-18 |
| | LP+IPZ | 21 55 52.1 | | | LP+IPZ | 05 54 30.2 | |
| 07 | +IPZ | 09 19 05.9 | #-6 | | -IPZ | 12 05 13.5 | |
| | LP+IPZ | 09 19 06.2 | | | +IPZ | 12 57 19.7 | #-19 |
| | +IPZ | 21 00 50.1 | #-7 | | LP+IPZ | 12 57 20.0 | |
| 08 | -IPZ | 11 17 13.8 | #-8 | | +IPZ | 21 09 30.7 | |
| | ISH | 11 26 44.5 | | 20 | -IPZ | 09 24 52.2 | |
| 09 | +IPZ | 14 54 32.3 | | 22 | EPZ | 08 37 13.5 | #-20 |
| | -IPZ | 15 48 43.5 | #-9 | | EPZ | 17 38 29.2 | #-21 |
| | EPZ | 19 05 08.0 | #-10 | | LP EPZ | 17 38 30.5 | |
| 10 | EPZ | 10 10 43.1 | #-11 | 23 | -IPZ | 07 59 44.3 | #-22 |
| | LP+IPZ | 10 10 44.0 | | 29 | EPZ | 09 42 45.5 | * |
| | +IPZ | 12 06 17.0 | #-12 | 30 | -IPZ | 18 25 42.2 | #-23 |
| | +IPZ | 16 23 44.4 | | Feb. 02 | -IPZ | 15 01 58.3 | #-24 |
| 11 | -IPZ | 16 15 40.0 | | | LP EPZ | 15 01 59.2 | |
| 12 | -IPZ | 15 41 26.4 | | | EPZ | 18 46 41.0 | |
| | -IPZ | 19 02 40.8 | | | EPZ | 19 06 50.3 | |
| 13 | +IPZ | 20 15 28.9 | #-13 | 04 | EPZ | 08 09 42.6 | |
| 14 | EPZ | 21 15 53.2 | #-14 | | +IPZ | 17 07 16.8 | |
| | LP EPZ | 21 15 54.2 | | 07 | EPZ | 18 30 24.3 | * |
| 16 | EPZ | 07 48 15.0 | #-15 | 10 | EPZ | 03 38 12.6 | #-25 |
| | LP EPZ | 07 48 15.2 | | | LP-IPZ | 03 38 14.5 | |

#-No. --- corresponds to that in Table 2.

* --- corresponds to local event.

** --- has no arrival time record on the short-period seismographs.

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Feb. 10 | -EPZ | 04 | 05 | 18.8 | |
| 11 | EPZ | 22 | 10 | 31.2 | |
| 12 | -IPZ | 05 | 59 | 31.6 | |
| 13 | +IPZ | 00 | 06 | 45.2 | #-26 |
| | +IPZ | 13 | 42 | 11.1 | |
| 16 | +IPZ | 21 | 15 | 52.8 | |
| 17 | EPZ | 02 | 46 | 40.3 | |
| 18 | -IPZ | 12 | 34 | 50.3 | #-27 |
| 19 | -IPZ | 05 | 45 | 23.4 | #-28 |
| | LP-IPZ | 05 | 45 | 23.7 | |
| | -IPZ | 07 | 01 | 00.0 | #-29 |
| | ESH | 07 | 11 | 42.6 | |
| | LP-IPZ | 07 | 01 | 01.6 | |
| | LP ISH | 07 | 11 | 42.6 | |
| 20 | -IPZ | 07 | 12 | 40.6 | |
| 22 | -IPZ | 16 | 55 | 54.8 | #-30 |
| 25 | -IPZ | 15 | 09 | 27.5 | |
| | EPZ | 23 | 02 | 57.3 | #-31 |
| 26 | EPZ | 19 | 19 | 00.0 | |
| 27 | -EPZ | 09 | 39 | 56.6 | #-32 |
| Mar. 01 | -IPZ | 02 | 43 | 07.5 | |
| | +IPZ | 16 | 18 | 05.3 | |
| 03 | -IPZ | 12 | 28 | 52.2 | #-33 |
| | LP-IPZ | 12 | 28 | 52.8 | |
| | +IPZ | 12 | 56 | 44.3 | |
| | EPZ | 18 | 45 | 18.2 | |
| | +IPZ | 19 | 41 | 28.9 | |
| 04 | +IPZ | 17 | 34 | 34.6 | |
| 05 | +IPZ | 16 | 50 | 49.3 | #-34 |
| 06 | -IPZ | 13 | 42 | 40.6 | #-35 |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Mar. 10 | +IPZ | 03 | 43 | 40.5 | |
| | +IPZ | 16 | 19 | 38.9 | |
| 11 | -IPZ | 03 | 26 | 24.2 | |
| | EPZ | 22 | 33 | 14.6 | |
| 12 | EPZ | 13 | 09 | 34.2 | |
| | -IPZ | 13 | 45 | 38.7 | |
| | EPZ | 15 | 01 | 13.4 | #-36 |
| | LP EPZ | 15 | 01 | 08.0 | |
| | +EPZ | 23 | 30 | 56.7 | |
| 13 | -EPZ | 00 | 52 | 58.0 | |
| | +IPZ | 13 | 40 | 25.6 | |
| 15 | -IPZ | 05 | 09 | 12.3 | #-37 |
| | LP-EPZ | 05 | 09 | 12.4 | |
| 16 | +EPZ | 14 | 28 | 52.5 | |
| 17 | EPZ | 01 | 44 | 48.7 | |
| 20 | +IPZ | 19 | 02 | 31.2 | |
| 21 | +IPZ | 16 | 57 | 37.3 | #-38 |
| | LP+IPZ | 16 | 57 | 37.0 | |
| 22 | +IPZ | 00 | 11 | 04.3 | #-39 |
| 23 | +IPZ | 14 | 46 | 12.3 | |
| 24 | -IPZ | 07 | 15 | 33.3 | #-40 |
| | LP-EPZ | 07 | 15 | 33.4 | |
| 25 | +EPZ | 01 | 22 | 18.8 | #-41 |
| 26 | +IPZ | 05 | 35 | 53.9 | |
| | +IPZ | 06 | 09 | 44.8 | |
| 27 | -IPZ | 20 | 17 | 11.9 | |
| Apr. 02 | +IPZ | 06 | 07 | 59.8 | |
| | -IPZ | 14 | 07 | 25.6 | |
| | LP-EPZ | 14 | 07 | 25.6 | |
| 03 | -IPZ | 07 | 46 | 21.4 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Apr. 04 | +EPZ | 13 | 54 | 34.6 | |
| 05 | EPZ | 21 | 31 | 48.2 | #-42 |
| | EPZ | 21 | 41 | 53.8 | #-43 |
| 06 | +EPZ | 07 | 57 | 46.2 | #-44 |
| | EPZ | 16 | 43 | 54.2 | |
| 07 | -IPZ | 18 | 38 | 32.7 | |
| 08 | -IPZ | 05 | 55 | 00.0 | |
| 09 | -IPZ | 09 | 43 | 30.1 | #-45 |
| 10 | EPZ | 19 | 33 | 22.8 | |
| | EPZ | 22 | 56 | 10.0 | |
| 11 | +IPZ | 13 | 22 | 09.0 | #-46 |
| | LP+IPZ | 13 | 22 | 09.0 | |
| 13 | -IPZ | 08 | 27 | 56.3 | |
| 16 | -IPZ | 22 | 49 | 51.6 | #-47 |
| | LP-IPZ | 22 | 49 | 52.2 | |
| 18 | -EPZ | 10 | 39 | 04.8 | #-48 |
| | +IPZ | 13 | 52 | 10.3 | #-49 |
| | +IPZ | 14 | 36 | 52.3 | |
| | +IPZ | 17 | 19 | 10.3 | #-50 |
| | +EPZ | 18 | 37 | 43.5 | |
| | +IPZ | 18 | 45 | 54.2 | |
| | +EPZ | 19 | 35 | 32.6 | |
| 19 | -EPZ | 01 | 18 | 00.5 | #-51 |
| | LP-EPZ | 01 | 18 | 00.9 | |
| | +IPZ | 12 | 53 | 31.5 | #-52 |
| | LP+EPZ | 12 | 53 | 31.2 | |
| | LP ISH | 13 | 04 | 17.0 | |
| 20 | -IPZ | 09 | 03 | 09.1 | |
| 21 | +IPZ | 19 | 05 | 22.6 | #-53 |
| | LP+EPZ | 19 | 05 | 23.0 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Apr. 22 | +IPZ | 20 | 35 | 47.0 | |
| 23 | +IPZ | 16 | 46 | 38.8 | |
| 26 | EPZ | 09 | 55 | 51.5 | #-54 |
| | LP-EPZ | 09 | 55 | 52.6 | |
| | +IPZ | 15 | 53 | 26.1 | #-55 |
| 28 | -IPZ | 11 | 54 | 36.6 | #-56 |
| | LP-EPZ | 11 | 54 | 37.0 | |
| 30 | -IPZ | 05 | 59 | 45.6 | #-57 |
| May 01 | -IPZ | 16 | 32 | 47.2 | #-58 |
| | ISH | 16 | 43 | 19.9 | |
| | LP EPZ | 16 | 32 | 54.5 | |
| | LP ISH | 16 | 43 | 19.5 | |
| 02 | -IPZ | 23 | 03 | 30.7 | #-59 |
| | ISH | 23 | 13 | 53.3 | |
| | LP-IPZ | 23 | 03 | 30.9 | |
| | LP ISH | 23 | 13 | 53.5 | |
| 04 | -IPZ | 23 | 56 | 26.2 | |
| 08 | +IPZ | 01 | 52 | 24.0 | |
| 09 | +EPZ | 04 | 27 | 28.4 | #-60 |
| | ISH | 04 | 32 | 27.0 | |
| | LP+IPZ | 04 | 27 | 29.7 | |
| | LP ISH | 04 | 32 | 29.0 | |
| 10 | +IPZ | 01 | 07 | 07.8 | |
| | +IPZ | 08 | 27 | 26.2 | |
| 11 | EPZ | 13 | 30 | 37.5 | |
| | LP+EPZ | 13 | 30 | 43.0 | |
| | -IPZ | 19 | 55 | 18.3 | |
| 13 | +IPZ | 04 | 33 | 56.9 | #-61 |
| | LP+IPZ | 04 | 33 | 57.8 | |
| 14 | +IPZ | 12 | 05 | 59.0 | |

| Date | Phase | Arrival time | | | Remarks |
|--------|--------|--------------|----|------|---------|
| | | h | m | s | |
| May 14 | +IPZ | 21 | 44 | 29.7 | #-62 |
| | LP+IPZ | 21 | 44 | 29.8 | |
| 15 | EPZ | 15 | 32 | 14.2 | |
| | +IPZ | 16 | 35 | 09.9 | |
| | +IPZ | 18 | 44 | 32.4 | #-63 |
| | LP+IPZ | 21 | 45 | 11.6 | |
| 17 | -IPZ | 11 | 15 | 22.8 | #-64 |
| | -IPZ | 12 | 03 | 50.6 | |
| | +IPZ | 16 | 11 | 08.8 | #-65 |
| | ISH | 16 | 20 | 25.5 | |
| 20 | +IPZ | 02 | 33 | 39.4 | #-66 |
| | LP+IPZ | 02 | 33 | 39.4 | |
| | -IPZ | 07 | 45 | 09.1 | #-67 |
| | ISH | 07 | 55 | 15.9 | |
| | LP-IPZ | 07 | 45 | 09.1 | |
| | +IPZ | 10 | 04 | 48.5 | #-68 |
| | LP+IPZ | 10 | 04 | 48.5 | |
| 21 | -IPZ | 13 | 36 | 16.9 | |
| | EPZ | 14 | 35 | 43.6 | * |
| 23 | +IPZ | 19 | 47 | 27.2 | |
| 24 | -IPZ | 19 | 46 | 23.5 | #-69 |
| | LP-IPZ | 19 | 46 | 24.0 | |
| | -IPZ | 20 | 11 | 47.2 | #-70 |
| | LP-IPZ | 20 | 11 | 47.3 | |
| | -IPZ | 20 | 20 | 32.2 | #-71 |
| | LP-IPZ | 20 | 20 | 32.4 | |
| 25 | +IPZ | 02 | 16 | 15.9 | #-72 |
| | LP+IPZ | 02 | 16 | 16.0 | |
| 26 | -EPZ | 03 | 10 | 27.5 | |
| 27 | +IPZ | 22 | 09 | 07.2 | #-73 |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| May 27 | LP+IPZ | 22 | 09 | 07.2 | |
| 28 | -IPZ | 11 | 40 | 37.5 | #-74 |
| 29 | -EPZ | 07 | 36 | 33.4 | * |
| 30 | +IPZ | 02 | 47 | 21.2 | #-75 |
| | LP+IPZ | 02 | 47 | 21.0 | |
| | +IPZ | 04 | 13 | 46.1 | |
| | +IPZ | 10 | 58 | 35.6 | #-76 |
| | LP+IPZ | 10 | 58 | 35.6 | |
| | EPZ | 17 | 02 | 42.1 | |
| 31 | +IPZ | 00 | 36 | 17.8 | #-77 |
| | LP EPZ | 00 | 36 | 18.0 | |
| June 01 | EPZ | 01 | 41 | 06.0 | |
| | +IPZ | 11 | 20 | 49.4 | |
| | +IPZ | 18 | 27 | 44.0 | |
| 02 | +IPZ | 05 | 10 | 46.7 | |
| 07 | -IPZ | 09 | 38 | 26.9 | #-78 |
| | LP EPZ | 09 | 38 | 27.0 | |
| 08 | -EPZ | 03 | 52 | 54.8 | |
| | -IPZ | 14 | 01 | 36.1 | #-79 |
| | LP-IPZ | 14 | 01 | 37.1 | |
| | -IPZ | 15 | 17 | 07.5 | #-80 |
| | EPZ | 21 | 49 | 37.1 | |
| 10 | -IPZ | 03 | 29 | 00.6 | |
| 13 | +IPZ | 16 | 19 | 39.4 | #-81 |
| | LP+IPZ | 16 | 19 | 39.4 | |
| | -EPZ | 16 | 55 | 07.3 | |
| 14 | EPZ | 07 | 54 | 37.0 | #-82 |
| | LP EPZ | 07 | 54 | 38.0 | |
| | -IPZ | 13 | 06 | 15.4 | #-83 |
| 15 | EPZ | 08 | 25 | 34.0 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| June 16 | +EPZ | 01 | 46 | 31.0 | |
| | -IPZ | 08 | 58 | 36.2 | |
| 17 | EPZ | 05 | 05 | 25.1 | |
| 18 | -IPZ | 19 | 14 | 34.3 | |
| 19 | EPZ | 19 | 19 | 26.8 | |
| 20 | -EPZ | 15 | 30 | 17.5 | |
| | +EPZ | 21 | 18 | 08.6 | #-84 |
| | LP+IPZ | 21 | 18 | 04.2 | |
| 22 | EPZ | 12 | 00 | 34.2 | #-85 |
| | +IPZ | 21 | 33 | 37.2 | |
| | +IPZ | 22 | 02 | 02.1 | |
| 23 | +IPZ | 05 | 15 | 08.1 | |
| | +IPZ | 21 | 50 | 40.0 | #-86 |
| | ISH | 22 | 00 | 55.2 | |
| | LP+IPZ | 21 | 50 | 40.0 | |
| | LP ISH | 22 | 00 | 58.0 | |
| 24 | -IPZ | 08 | 47 | 45.2 | #-87 |
| | LP-IPZ | 08 | 47 | 45.2 | |
| 25 | +IPZ | 20 | 06 | 25.4 | |
| 26 | +IPZ | 12 | 20 | 04.2 | #-88 |
| | ISH | 12 | 29 | 29.0 | |
| | LP+IPZ | 12 | 20 | 04.2 | |
| | LP ISH | 12 | 29 | 41.0 | |
| 27 | -EPZ | 05 | 22 | 33.5 | |
| 29 | +IPZ | 04 | 05 | 03.6 | #-89 |
| | LP+IPZ | 04 | 05 | 03.5 | |
| | EPZ | 06 | 42 | 23.7 | #-90 |
| July 03 | EPZ | 02 | 19 | 36.0 | |
| 05 | +IPZ | 22 | 54 | 04.6 | |
| 06 | EPZ | 00 | 28 | 08.8 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| July 06 | LP+IPZ | 00 | 28 | 08.8 | |
| | EPZ | 11 | 55 | 09.0 | |
| 09 | -IPZ | 15 | 23 | 00.4 | #-91 |
| | LP-EPZ | 15 | 23 | 00.5 | |
| 10 | +EPZ | 03 | 30 | 56.3 | #-92 |
| | LP+IPZ | 03 | 30 | 56.3 | |
| | EPZ | 18 | 36 | 00.4 | |
| 11 | +IPZ | 19 | 59 | 24.2 | #-93 |
| | LP EPZ | 19 | 59 | 23.5 | |
| | LP ISH | 20 | 08 | 48.3 | |
| 13 | +EPZ | 08 | 24 | 44.7 | |
| 14 | +EPZ | 06 | 06 | 29.2 | #-94 |
| | LP+IPZ | 06 | 06 | 29.4 | |
| 15 | EPZ | 10 | 13 | 37.6 | |
| 16 | EPZ | 07 | 40 | 25.8 | #-95 |
| | LP+EPZ | 07 | 40 | 25.8 | |
| | -IPZ | 15 | 02 | 15.4 | #-96 |
| | LP-IPZ | 15 | 02 | 15.4 | |
| | LP ISH | 15 | 10 | 57.2 | |
| 18 | +IPZ | 17 | 34 | 08.1 | #-97 |
| | ISH | 17 | 46 | 22.5 | |
| | LP+IPZ | 17 | 34 | 08.4 | |
| 20 | +EPZ | 15 | 15 | 10.8 | |
| 21 | +IPZ | 00 | 51 | 30.7 | |
| 22 | +IPZ | 09 | 37 | 46.5 | #-98 |
| | ISH | 09 | 47 | 22.9 | |
| | LP+IPZ | 09 | 37 | 46.4 | |
| | LP ISH | 09 | 47 | 20.0 | |
| 24 | -IPZ | 05 | 46 | 25.5 | |
| 25 | -IPZ | 13 | 49 | 55.0 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| July 26 | -EPZ | 04 | 30 | 37.8 | #-99 |
| 27 | +IPZ | 12 | 50 | 36.6 | #-100 |
| | ISH | 13 | 00 | 54.2 | |
| | LP+IPZ | 12 | 50 | 37.2 | |
| 28 | +IPZ | 08 | 55 | 29.5 | |
| | LP+IPZ | 08 | 55 | 29.5 | |
| | +IPZ | 19 | 20 | 36.5 | |
| 29 | +EPZ | 21 | 16 | 55.3 | |
| 31 | EPZ | 03 | 39 | 42.5 | |
| | LP-IPZ | 03 | 39 | 41.0 | |
| Aug. 02 | +IPZ | 05 | 35 | 04.2 | #-101 |
| | LP+IPZ | 05 | 35 | 04.2 | |
| | -IPZ | 15 | 15 | 06.5 | |
| 03 | -IPZ | 09 | 33 | 55.5 | |
| 05 | LP EPZ | 01 | 54 | 05.0 | ** |
| | +EPZ | 17 | 54 | 27.8 | |
| | LP EPZ | 17 | 54 | 28.0 | |
| 06 | -IPZ | 08 | 51 | 15.6 | |
| | +IPZ | 20 | 36 | 58.8 | #-102 |
| 10 | +IPZ | 02 | 03 | 49.3 | #-103 |
| | -IPZ | 05 | 50 | 16.7 | #-104 |
| | LP-IPZ | 05 | 50 | 16.5 | |
| | EPZ | 09 | 48 | 12.7 | * |
| | +IPZ | 15 | 57 | 22.0 | #-105 |
| | LP+IPZ | 15 | 57 | 22.1 | |
| | -IPZ | 17 | 59 | 43.6 | #-106 |
| | ISH | 18 | 09 | 31.8 | |
| | LP-IPZ | 17 | 59 | 44.0 | |
| 12 | EPZ | 21 | 37 | 40.3 | #-107 |
| | LP+IPZ | 21 | 37 | 40.6 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Aug. 13 | +IPZ | 22 | 47 | 37.3 | |
| 15 | -IPZ | 13 | 35 | 29.4 | |
| | -IPZ | 16 | 05 | 29.0 | #-108 |
| 16 | -IPZ | 04 | 54 | 25.6 | |
| | +EPZ | 05 | 18 | 42.8 | |
| 17 | -EPZ | 13 | 20 | 17.5 | #-109 |
| | LP+EPZ | 13 | 20 | 18.7 | |
| | LP ISH | 13 | 30 | 50.5 | |
| | -IPZ | 21 | 59 | 11.0 | |
| 18 | EPZ | 14 | 02 | 03.4 | #-110 |
| | LP-IPZ | 14 | 02 | 04.0 | |
| | EPZ | 15 | 52 | 49.2 | * |
| | EPZ | 19 | 05 | 12.3 | #-111 |
| | LP EPZ | 19 | 05 | 14.5 | |
| 21 | -IPZ | 01 | 09 | 03.5 | #-112 |
| | LP-IPZ | 01 | 09 | 03.6 | |
| | -IPZ | 14 | 25 | 15.0 | #-113 |
| | LP-IPZ | 14 | 25 | 15.3 | |
| | EPZ | 17 | 56 | 42.2 | |
| 22 | -IPZ | 17 | 31 | 20.5 | |
| | +IPZ | 22 | 24 | 40.9 | |
| 24 | +IPZ | 16 | 37 | 20.6 | #-114 |
| | LP+IPZ | 16 | 37 | 20.9 | |
| 25 | -EPZ | 03 | 38 | 18.1 | |
| | +IPZ | 16 | 00 | 51.3 | #-115 |
| | LP+IPZ | 16 | 00 | 51.3 | |
| 26 | -IPZ | 05 | 28 | 17.2 | |
| | -EPZ | 13 | 56 | 34.9 | #-116 |
| 27 | EPZ | 04 | 24 | 11.4 | |
| | LP EPZ | 04 | 24 | 13.5 | |

| Date | Phase | Arrival time | | | Remarks |
|----------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Aug. 27 | EPZ | 15 | 28 | 39.4 | #-117 |
| 28 | -EPZ | 03 | 29 | 17.4 | |
| | -EPZ | 09 | 10 | 00.9 | #-118 |
| 30 | +IPZ | 07 | 30 | 27.7 | |
| Sept. 02 | -IPZ | 10 | 17 | 25.9 | |
| | LP-IPZ | 10 | 17 | 26.1 | |
| 04 | EPZ | 01 | 59 | 07.0 | |
| | -EPZ | 16 | 08 | 02.0 | |
| | -IPZ | 23 | 25 | 55.8 | #-119 |
| | LP-IPZ | 23 | 25 | 55.9 | |
| 07 | +IPZ | 11 | 46 | 25.5 | #-120 |
| | LP+IPZ | 11 | 46 | 25.5 | |
| | -IPZ | 16 | 20 | 34.5 | #-121 |
| | ISH | 16 | 29 | 55.5 | |
| | LP-IPZ | 16 | 20 | 34.3 | |
| | LP ISH | 16 | 29 | 55.5 | |
| 08 | EPZ | 19 | 03 | 57.0 | #-122 |
| | LP-IPZ | 19 | 03 | 57.9 | |
| | EPZ | 20 | 44 | 43.8 | #-123 |
| | LP+IPZ | 20 | 44 | 43.8 | |
| | LP ISH | 20 | 55 | 23.3 | |
| 09 | EPZ | 02 | 54 | 03.0 | |
| | EPZ | 05 | 48 | 52.0 | #-124 |
| | LP+IPZ | 05 | 48 | 52.8 | |
| 12 | -IPZ | 02 | 46 | 28.5 | |
| | +IPZ | 10 | 35 | 01.8 | |
| | +IPZ | 20 | 23 | 56.3 | #-125 |
| | LP+IPZ | 20 | 23 | 56.4 | |
| 14 | -IPZ | 09 | 25 | 54.5 | #-126 |
| | LP EPZ | 09 | 25 | 53.2 | |

| Date | Phase | Arrival time | | | Remarks |
|----------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Sept. 14 | -IPZ | 16 | 20 | 05.4 | |
| 16 | +IPZ | 05 | 25 | 44.1 | |
| 17 | -IPZ | 12 | 09 | 02.0 | #-127 |
| | LP-IPZ | 12 | 09 | 01.9 | |
| | -IPZ | 13 | 56 | 24.0 | #-128 |
| | LP-IPZ | 13 | 56 | 24.1 | |
| 18 | +IPZ | 03 | 38 | 25.6 | #-129 |
| 19 | +IPZ | 04 | 23 | 40.6 | |
| 23 | +IPZ | 17 | 52 | 04.8 | #-130 |
| | EPZ | 18 | 06 | 43.2 | #-131 |
| | LP-EPZ | 18 | 06 | 45.0 | |
| | LP ISH | 18 | 17 | 20.0 | |
| | EPZ | 21 | 32 | 05.5 | |
| | LP EPZ | 21 | 32 | 08.6 | |
| 24 | +IPZ | 02 | 10 | 41.4 | #-132 |
| | LP+IPZ | 02 | 10 | 41.2 | |
| 28 | +IPZ | 19 | 57 | 25.9 | #-133 |
| | LP+IPZ | 19 | 57 | 26.0 | |
| | LP ISH | 20 | 07 | 59.2 | |
| 29 | -IPZ | 12 | 09 | 44.6 | |
| Oct. 02 | +IPZ | 08 | 01 | 07.7 | |
| | EPZ | 08 | 21 | 06.2 | |
| | LP EPZ | 08 | 21 | 06.5 | |
| | -IPZ | 15 | 19 | 16.2 | #-134 |
| | LP-IPZ | 15 | 19 | 16.8 | |
| 04 | EPZ | 23 | 59 | 06.7 | |
| | LP EPZ | 23 | 59 | 07.3 | |
| 05 | -IPZ | 23 | 55 | 15.7 | |
| 06 | +IPZ | 02 | 51 | 51.8 | #-135 |
| 07 | EPZ | 04 | 57 | 50.2 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Oct. 07 | EPZ | 05 | 41 | 32.6 | |
| | +IPZ | 11 | 38 | 25.8 | #-136 |
| | -IPZ | 22 | 47 | 43.3 | |
| 10 | -IPZ | 01 | 11 | 33.3 | #-137 |
| | ISH | 01 | 21 | 04.1 | |
| | LP-IPZ | 01 | 11 | 33.4 | |
| | LP ISH | 01 | 21 | 04.1 | |
| | -IPZ | 06 | 06 | 23.0 | #-138 |
| | ISH | 06 | 15 | 49.0 | |
| | LP EPZ | 06 | 06 | 20.0 | |
| | LP ISH | 06 | 15 | 49.0 | |
| 11 | +IPZ | 04 | 36 | 09.5 | |
| 12 | +IPZ | 17 | 49 | 39.4 | #-139 |
| | LP+IPZ | 17 | 49 | 39.5 | |
| | +EPZ | 19 | 29 | 47.0 | |
| 13 | -IPZ | 23 | 05 | 00.8 | #-140 |
| 14 | +IPZ | 19 | 53 | 19.9 | #-141 |
| | LP EPZ | 19 | 53 | 19.5 | |
| 15 | +IPZ | 01 | 47 | 25.6 | #-142 |
| | LP+IPZ | 01 | 47 | 25.6 | |
| 16 | +IPZ | 23 | 50 | 44.7 | |
| 17 | +EPZ | 12 | 28 | 45.0 | #-143 |
| | LP+EPZ | 12 | 28 | 45.0 | |
| | -IPZ | 14 | 41 | 55.3 | #-144 |
| | LP-IPZ | 14 | 41 | 55.3 | |
| 23 | +IPZ | 20 | 26 | 48.1 | |
| 24 | -IPZ | 15 | 17 | 28.5 | |
| 25 | EPZ | 11 | 15 | 03.5 | #-145 |
| | LP+IPZ | 11 | 15 | 04.6 | |
| | +IPZ | 16 | 46 | 30.8 | #-146 |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Oct. 26 | -IPZ | 05 | 57 | 58.2 | #-147 |
| | LP+IPZ | 05 | 57 | 57.6 | |
| | +IPZ | 06 | 12 | 35.7 | |
| 28 | +IPZ | 07 | 12 | 30.2 | |
| | +IPZ | 16 | 09 | 32.3 | |
| 29 | EPZ | 05 | 55 | 30.8 | |
| | LP-EPZ | 05 | 55 | 31.1 | |
| | +EPZ | 06 | 27 | 14.3 | #-148 |
| | LP+EPZ | 06 | 27 | 14.6 | |
| | -IPZ | 06 | 52 | 13.5 | #-149 |
| | LP EPZ | 06 | 52 | 15.0 | |
| 31 | -IPZ | 14 | 50 | 46.5 | #-150 |
| | LP-IPZ | 14 | 50 | 46.6 | |
| Nov. 01 | EPZ | 02 | 06 | 17.1 | |
| | +IPZ | 04 | 14 | 46.9 | |
| 02 | -IPZ | 21 | 09 | 41.0 | |
| 04 | +IPZ | 18 | 25 | 55.6 | #-151 |
| | LP+IPZ | 18 | 25 | 55.9 | |
| 06 | EPZ | 00 | 52 | 14.0 | |
| | +IPZ | 15 | 01 | 22.0 | |
| | EPZ | 18 | 59 | 29.1 | #-152 |
| | LP-EPZ | 18 | 59 | 29.5 | |
| | LP ISH | 19 | 10 | 08.0 | |
| | EPZ | 20 | 34 | 16.0 | #-153 |
| | LP EPZ | 20 | 34 | 15.0 | |
| 07 | +EPZ | 14 | 49 | 36.6 | |
| | +IPZ | 19 | 11 | 49.1 | #-154 |
| | LP+IPZ | 19 | 11 | 49.1 | |
| 10 | -EPZ | 11 | 43 | 24.2 | |
| 11 | +EPZ | 07 | 26 | 04.5 | |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Nov. 14 | +IPZ | 19 | 36 | 39.2 | #-155 |
| 15 | +IPZ | 02 | 46 | 53.7 | #-156 |
| | LP EPZ | 02 | 46 | 53.0 | |
| | +IPZ | 05 | 00 | 35.6 | #-157 |
| | LP+EPZ | 05 | 00 | 35.6 | |
| | +IPZ | 05 | 31 | 06.5 | |
| 16 | +IPZ | 07 | 26 | 02.3 | |
| | +IPZ | 14 | 55 | 30.7 | |
| 18 | +IPZ | 16 | 35 | 26.2 | #-158 |
| | LP+IPZ | 16 | 35 | 26.2 | |
| 20 | +IPZ | 09 | 16 | 21.2 | |
| 22 | EPZ | 13 | 23 | 02.0 | |
| | +IPZ | 21 | 02 | 14.8 | #-159 |
| | LP+EPZ | 21 | 02 | 14.9 | |
| 23 | +EPZ | 01 | 09 | 07.3 | |
| | +IPZ | 07 | 55 | 02.3 | #-160 |
| 25 | -IPZ | 04 | 31 | 40.6 | |
| 26 | +IPZ | 20 | 20 | 53.8 | |
| 30 | -EPZ | 13 | 32 | 21.2 | |
| Dec. 02 | EPZ | 14 | 49 | 03.8 | |
| 03 | -EPZ | 06 | 00 | 31.4 | |
| 05 | -IPZ | 16 | 21 | 24.2 | #-161 |
| | LP-IPZ | 16 | 21 | 24.2 | |
| | LP ISH | 16 | 31 | 50.6 | |
| 07 | -IPZ | 02 | 35 | 25.4 | |
| | -IPZ | 08 | 37 | 19.7 | #-162 |
| | LP-IPZ | 08 | 37 | 19.7 | |
| | -IPZ | 12 | 29 | 05.7 | |
| 08 | -IPZ | 04 | 56 | 54.9 | |
| 09 | +IPZ | 11 | 12 | 18.6 | #-163 |

| Date | Phase | Arrival time | | | Remarks |
|---------|--------|--------------|----|------|---------|
| | | h | m | s | |
| Dec. 09 | LP+IPZ | 11 | 12 | 18.5 | |
| | +IPZ | 15 | 56 | 16.9 | #-164 |
| | LP+IPZ | 15 | 56 | 16.9 | |
| 10 | +IPZ | 09 | 47 | 25.7 | #-165 |
| 11 | +EPZ | 14 | 54 | 55.2 | |
| 13 | +EPZ | 12 | 39 | 32.6 | #-166 |
| | LP+IPZ | 12 | 39 | 32.0 | |
| 18 | +IPZ | 02 | 40 | 37.0 | #-167 |
| | LP EPZ | 02 | 40 | 36.9 | |
| | +EPZ | 02 | 56 | 46.6 | #-168 |
| | LP EPZ | 02 | 56 | 46.0 | |
| | +IPZ | 15 | 12 | 05.2 | |
| 19 | +EPZ | 14 | 08 | 04.2 | #-169 |
| | LP+EPZ | 14 | 08 | 04.0 | |
| | -IPZ | 22 | 12 | 15.8 | |
| 21 | EPZ | 05 | 42 | 16.5 | #-170 |
| | LP+EPZ | 05 | 42 | 17.1 | |
| | LP ISH | 05 | 52 | 56.8 | |
| | +IPZ | 13 | 07 | 48.0 | #-171 |
| | LP+IPZ | 13 | 07 | 48.0 | |
| | +IPZ | 18 | 42 | 20.4 | #-172 |
| | LP+IPZ | 18 | 42 | 20.5 | |
| 22 | +IPZ | 19 | 14 | 33.4 | #-173 |
| | LP+IPZ | 19 | 14 | 33.2 | |
| 23 | +IPZ | 16 | 43 | 53.8 | #-174 |
| | LP+IPZ | 16 | 43 | 53.8 | |
| | +IPZ | 18 | 01 | 16.7 | #-175 |
| | LP+IPZ | 18 | 01 | 16.8 | |
| 24 | +IPZ | 04 | 27 | 41.8 | |
| | +IPZ | 10 | 25 | 20.0 | |

| Date | Phase | Arrival time | | | Remarks | |
|---------|--------|--------------|----|------|---------|-------|
| | | h | m | s | | |
| Dec. 24 | EPZ | 16 | 03 | 48.5 | #-176 | |
| | +IPZ | 19 | 28 | 43.8 | | |
| | -EPZ | 22 | 28 | 59.1 | | |
| 27 | +IPZ | 13 | 47 | 19.4 | #-177 | |
| | ISH | 13 | 57 | 20.9 | | |
| | LP+IPZ | 13 | 49 | 19.2 | | |
| | LP ISH | 13 | 57 | 20.2 | | |
| | -EPZ | 16 | 20 | 14.3 | | #-178 |
| | +IPZ | 16 | 30 | 10.6 | | |
| 28 | +EPZ | 22 | 42 | 01.2 | #-179 | |
| | LP-IPZ | 22 | 42 | 01.6 | | |
| 29 | EPZ | 13 | 36 | 34.5 | #-180 | |
| | LP EPZ | 13 | 36 | 34.0 | | |
| 30 | -IPZ | 19 | 27 | 12.1 | #-181 | |
| | LP-IPZ | 19 | 27 | 12.1 | | |

Table 2. List of 181 earthquakes.

| Data No. | Origin time | | | Geographic Coordinates | | Region | Depth (km) | Magnitude | | Epicentral distance (degree) | Azimuth (degree) |
|----------|-------------|------------|--|------------------------|--------------------|-------------------------|------------|-----------|------|------------------------------|------------------|
| | Date | U T C | | Latitude (degree) | Longitude (degree) | | | (Mb) | (Ms) | | |
| 1 | 01/01 | 07 49 35.5 | | 21.772 S | 179.361 W | Fiji Islands Region | 600 D | 5.2 | | 85.079 | 35.873 SE |
| 2 | 01/04 | 05 32 21.0 | | 15.397 S | 172.850 W | Samoa Islands Region | 54 G | 6.4 | 6.4 | 92.608 | 31.180 SE |
| 3 | 01/05 | 10 10 21.8 | | 8.800 S | 106.442 E | South of Java | 29 D | 5.3 | 5.8 | 73.579 | 108.685 SE |
| 4 | 01/05 | 13 03 44.3 | | 19.258 S | 69.529 W | Northern Chile | 109 | 5.0 | | 78.683 | 65.456 SW |
| 5 | 01/06 | 21 44 56.2 | | 10.681 S | 92.987 E | South Indian Ocean | 15 G | 5.7 | 5.5 | 67.417 | 121.310 SE |
| 6 | 01/07 | 09 06 43.4 | | 15.947 S | 74.245 W | Near Coast of Peru | 48 D | 5.9 | 5.3 | 83.323 | 62.313 SW |
| 7 | 01/07 | 20 53 29.2 | | 32.159 S | 57.447 E | Atlantic-Indian Rise | 10 G | 5.3 | 4.8 | 38.107 | 155.127 SE |
| 8 | 01/08 | 11 05 47.1 | | 24.368 S | 179.105 E | South of Fiji Islands | 518 | 5.0 | | 82.227 | 36.650 SE |
| 9 | 01/09 | 15 35 49.0 | | 11.591 N | 95.017 E | Andaman Islands Region | 33 N | 5.2 | 5.3 | 89.262 | 126.229 SE |
| 10 | 01/09 | 18 51 29.2 | | 24.753 N | 95.241 E | Burma | 119 G | 6.1 | | 101.885 | 129.989 SE |
| 11 | 01/10 | 10 06 01.5 | | 52.192 S | 13.514 E | Southwest of Africa | 10 G | 5.5 | 5.0 | 20.708 | 130.351 SW |
| 12 | 01/10 | 11 53 21.6 | | 11.654 N | 95.143 E | Andaman Islands Region | 33 N | 5.3 | 5.4 | 89.359 | 126.130 SE |
| 13 | 01/13 | 20 03 41.9 | | 10.171 S | 117.826 E | South of Sumbawa Island | 36 D | 5.2 | 4.8 | 76.288 | 97.309 SE |

| | | | | | | | | | | |
|----|-------|------------|----------|-----------|---------------------------|-------|-----|-----|--------|------------|
| 14 | 01/14 | 21 04 03.2 | 29.709 S | 177.467 W | Kermadec Islands | 58 * | 5.5 | 6.0 | 77.727 | 32.389 SE |
| 15 | 01/16 | 07 36 31.6 | 31.664 S | 178.085 W | Kermadec Islands Region | 23 D | 5.4 | 5.5 | 75.703 | 32.470 SE |
| 16 | 01/16 | 07 56 33.4 | 31.725 S | 177.996 W | Kermadec Islands Region | 33 N | 5.4 | 5.5 | 75.661 | 32.379 SE |
| 17 | 01/16 | 10 52 08.2 | 31.587 S | 178.046 W | Kermadec Islands Region | 33 N | 5.5 | 5.4 | 75.786 | 32.454 SE |
| 18 | 01/18 | 05 42 35.9 | 30.108 S | 177.665 W | Kermadec Islands | 25 D | 5.5 | 5.3 | 77.300 | 32.469 SE |
| 19 | 01/18 | 12 45 23.6 | 30.141 S | 177.688 W | Kermadec Islands | 13 D | 6.0 | 5.8 | 77.264 | 32.482 SE |
| 20 | 01/22 | 08 25 34.0 | 31.612 S | 178.083 W | Kermadec Islands Region | 33 N | 5.2 | | 75.754 | 32.480 SE |
| 21 | 01/22 | 17 26 11.4 | 3.885 N | 96.100 E | Northern Sumatera | 46 G | 6.0 | 5.8 | 82.231 | 122.886 SE |
| 22 | 01/23 | 07 47 09.5 | 12.451 S | 75.069 W | Peru | 104 D | 5.5 | | 86.886 | 62.714 SW |
| 23 | 01/30 | 18 14 12.8 | 23.398 S | 179.094 E | South of Fiji Islands | 548 | 5.3 | | 83.167 | 36.890 SE |
| 24 | 02/02 | 14 49 09.4 | 18.407 S | 176.924 E | Fiji Islands Region | 10 G | 5.6 | 5.7 | 87.526 | 40.066 SE |
| 25 | 02/10 | 03 27 41.2 | 42.343 S | 172.798 E | South Island, New Zealand | 10 | 6.0 | 6.0 | 63.513 | 37.008 SE |
| 26 | 02/12 | 23 56 38.0 | 31.193 S | 48.919 W | South Atlantic Ocean | 30 D | 5.5 | 4.4 | 60.584 | 79.022 SW |
| 27 | 02/18 | 12 21 58.0 | 5.516 S | 149.432 E | New Britain Region | 142 G | 5.9 | | 91.837 | 69.516 SE |
| 28 | 02/19 | 05 34 37.0 | 40.347 S | 176.102 E | North Island, New Zealand | 24 G | 5.9 | 6.3 | 66.128 | 35.001 SE |
| 29 | 02/19 | 06 48 10.1 | 15.465 S | 166.385 E | Vanuatu Islands | 12 G | 6.4 | 6.7 | 87.665 | 50.575 SE |

| | | | | | | | | | | |
|----|-------|------------|----------|-----------|---|-------|-----|-----|---------|-----------|
| 30 | 02/22 | 16 44 32.1 | 24.764 S | 68.860 W | Chile-Argentina Border Region | 103 D | 5.2 | | 73.310 | 64.058 SW |
| 31 | 02/25 | 22 51 09.1 | 18.042 S | 69.135 W | Northern Chile | 141 D | 5.5 | | 79.693 | 66.242 SW |
| 32 | 02/27 | 09 28 54.1 | 17.159 S | 64.141 W | Bolivia | 601 | 5.4 | | 78.844 | 71.094 SW |
| 33 | 03/03 | 12 16 27.9 | 22.122 S | 175.163 E | South of Fiji Islnds | 33 G | 6.3 | 7.4 | 83.516 | 40.743 SE |
| 34 | 03/05 | 16 38 12.5 | 18.318 S | 168.063 E | Vanuatu Islands | 21 G | 5.6 | 7.0 | 85.390 | 48.216 SE |
| 35 | 03/06 | 13 30 58.4 | 11.147 S | 117.440 E | South of Sumbawa Island | 22 D | 5.6 | 4.8 | 75.241 | 97.308 SE |
| 36 | 03/12 | 14 41 19.4 | 51.484 N | 175.032 W | Andreanof Islands, Aleutian Islnds | 14 G | 6.0 | 6.2 | 156.138 | 61.004 SE |
| 37 | 03/15 | 04 56 34.5 | 15.130 S | 167.238 E | Vanuatu Islands | 132 D | 5.6 | | 88.222 | 49.882 SE |
| 38 | 03/21 | 16 46 05.4 | 31.092 S | 179.093 W | Kermadec Islands Region | 145 G | 6.2 | | 76.062 | 33.469 SE |
| 39 | 03/22 | 00 00 16.4 | 36.919 S | 177.197 E | Off East Coast of Northern Island, New Zealand | 225 | 5.8 | | 69.660 | 35.092 SE |
| 40 | 03/24 | 07 05 52.1 | 47.624 S | 165.261 E | Off West Coast of Southern Island, New Zealand | 33 N | 5.4 | 5.1 | 56.804 | 40.870 SE |
| 41 | 03/25 | 01 10 42.8 | 32.958 S | 178.447 W | South of Kermadec Islnds | 33 N | 5.1 | 5.1 | 74.373 | 32.471 SE |
| 42 | 04/05 | 21 12 35.5 | 15.125 N | 147.596 E | Mariana Islands Region | 11 G | 6.5 | 7.5 | 110.543 | 78.648 SE |
| 43 | 04/05 | 21 22 31.3 | 15.331 N | 147.553 E | Mariana Islands Region | 33 N | 5.7 | | 110.719 | 78.770 SE |
| 44 | 04/06 | 07 52 02.0 | 60.527 S | 25.482 W | South Sandwich Islands Region | 33 N | 5.6 | 5.6 | 27.523 | 74.916 SW |

| | | | | | | | | | | | |
|----|-------|-------|------|----------|-----------|---------------------------------|-------|-----|-----|---------|------------|
| 45 | 04/09 | 09 31 | 09.6 | 25.806 S | 176.058 W | South of Fiji Islands | 17 G | 5.7 | 5.9 | 81.808 | 32.013 SE |
| 46 | 04/11 | 13 10 | 16.8 | 30.991 S | 177.806 W | Kermadec Islands | 33 N | 5.4 | 5.4 | 76.413 | 32.387 SE |
| 47 | 04/16 | 22 37 | 11.2 | 14.858 S | 167.278 E | Vanuatu Islands | 119 D | 5.5 | | 88.493 | 49.923 SE |
| 48 | 04/18 | 10 33 | 48.9 | 57.968 S | 10.316 W | Southwestern Atlantic Ocean | 10 G | 5.2 | 5.2 | 23.952 | 91.860 SW |
| 49 | 04/18 | 13 39 | 19.0 | 1.186 N | 122.857 E | Minahassa Peninsula | 26 G | 6.2 | 7.4 | 88.685 | 96.711 SE |
| 50 | 04/18 | 17 06 | 18.4 | 1.263 N | 122.984 E | Minahassa Peninsula | 35 D | 5.7 | | 88.803 | 96.620 SE |
| 51 | 04/19 | 01 05 | 08.7 | 1.300 N | 123.021 E | Minahassa Peninsula | 33 N | 5.7 | 5.7 | 88.851 | 96.599 SE |
| 52 | 04/19 | 12 40 | 38.6 | 1.108 N | 123.429 E | Minahassa Peninsula | 24 G | 5.8 | 6.2 | 88.817 | 96.149 SE |
| 53 | 04/21 | 18 54 | 52.4 | 36.985 S | 73.303 W | Near Coast of Central Chile | 12 G | 6.0 | 5.7 | 63.306 | 55.451 SW |
| 54 | 04/26 | 09 37 | 15.0 | 35.986 N | 100.245 E | Qinghai Province, China | 8 G | 6.5 | 6.9 | 113.905 | 129.511 SE |
| 55 | 04/26 | 15 40 | 34.4 | 1.059 N | 122.825 E | Minahassa Peninsula | 24 G | 5.8 | 5.8 | 88.555 | 96.696 SE |
| 56 | 04/28 | 11 42 | 23.8 | 26.113 S | 178.021 W | South of Fiji Islands | 17 D | 5.6 | 5.4 | 81.125 | 33.688 SE |
| 57 | 04/30 | 05 54 | 41.4 | 54.279 S | 1.271 E | Bouvet Island Region | 10 G | 5.9 | 5.4 | 22.723 | 110.416 SW |
| 58 | 05/01 | 16 12 | 21.4 | 58.840 N | 156.858 W | Alaska Peninsula | 211 G | 6.1 | | 167.702 | 43.467 SE |
| 59 | 05/02 | 22 50 | 29.5 | 5.604 S | 150.164 E | New Britain Region | 82 G | 6.2 | | 92.001 | 68.800 SE |
| 60 | 05/09 | 04 21 | 10.1 | 56.381 S | 27.058 W | South Sandwich Islnds Region | 33 N | 6.0 | 5.4 | 31.144 | 79.376 SW |

| | | | | | | | | | | |
|----|-------|------------|----------|-----------|---------------------------|-------|-----|-----|---------|------------|
| 61 | 05/13 | 04 23 09.6 | 40.296 S | 176.064 E | North Island, New Zealand | 21 G | 6.0 | 6.3 | 66.169 | 35.047 SE |
| 62 | 05/14 | 21 34 04.2 | 35.925 S | 71.415 W | Central Chile | 76 G | 5.8 | | 63.723 | 57.467 SW |
| 63 | 05/15 | 18 31 39.6 | 1.158 N | 123.869 E | Minahassa Peninsula | 30 D | 5.6 | 5.6 | 89.022 | 95.756 SE |
| 64 | 05/17 | 11 03 24.7 | 18.080 S | 69.626 W | Northern Chile | 106 D | 5.6 | | 79.819 | 65.784 SW |
| 65 | 05/17 | 15 59 56.5 | 25.398 S | 178.101 E | South of Fiji Islands | 614 D | 5.8 | | 81.009 | 37.295 SE |
| 66 | 05/20 | 02 22 01.6 | 5.121 N | 32.145 E | Sudan | 15 G | 6.7 | 7.1 | 74.182 | 172.289 SW |
| 67 | 05/20 | 07 32 37.2 | 18.102 S | 175.130 W | Tonga Islands | 232 G | 5.9 | | 89.522 | 32.780 SE |
| 68 | 05/20 | 09 53 47.4 | 32.500 S | 179.624 E | South of Kermadec Islands | 346 D | 5.6 | | 74.436 | 34.221 SE |
| 69 | 05/24 | 19 34 44.2 | 5.277 N | 31.829 E | Sudan | 17 G | 5.9 | 6.6 | 74.353 | 171.970 SW |
| 70 | 05/24 | 20 00 08.1 | 5.358 N | 31.848 E | Sudan | 16 G | 6.5 | 7.0 | 74.433 | 171.994 SW |
| 71 | 05/24 | 20 09 23.2 | 7.363 S | 120.363 E | Flores Sea | 589 D | 6.4 | | 79.813 | 95.960 SE |
| 72 | 05/25 | 02 03 27.5 | 2.871 S | 130.338 E | Ceram | 15 G | 5.8 | 5.4 | 87.591 | 88.269 SE |
| 73 | 05/27 | 21 49 35.4 | 74.225 N | 8.828 E | Greenland Sea | 29 D | 5.5 | 5.7 | 144.442 | 166.165 SW |
| 74 | 05/28 | 11 28 47.6 | 20.874 S | 177.987 W | Fiji Islands Region | 486 G | 5.9 | | 86.241 | 34.824 SE |
| 75 | 05/30 | 02 34 05.8 | 6.016 S | 77.229 W | Northern Peru | 24 G | 6.1 | 6.5 | 93.665 | 62.788 SW |
| 76 | 05/30 | 10 40 06.1 | 45.841 N | 26.668 E | Romania | 89 G | 6.7 | | 115.123 | 170.090 SW |
| 77 | 05/31 | 00 17 47.8 | 45.811 N | 26.769 E | Romania | 88 G | 6.1 | | 115.087 | 170.165 SW |

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|----|-------|------------|----------|-----------|---|-------|-----|-----|---------|------------|
| 78 | 06/07 | 09 25 19.1 | 3.563 S | 144.432 E | Near North Coast of Papua New Guinea | 29 D | 5.9 | 6.5 | 91.956 | 74.871 SE |
| 79 | 06/08 | 13 49 22.9 | 17.573 S | 71.824 W | Near Coast of Peru | 27 D | 5.6 | 5.4 | 81.013 | 63.967 SW |
| 80 | 06/08 | 15 05 09.5 | 18.874 S | 178.789 W | Fiji Islands Region | 499 D | 5.6 | | 88.023 | 36.005 SE |
| 81 | 06/13 | 16 00 00.0 | 37.262 N | 116.420 W | Southern Nevada | 0 | 5.7 | 4.5 | 145.771 | 35.114 SW |
| 82 | 06/14 | 07 40 56.2 | 11.760 N | 121.899 E | Panay, Philippine Islands | 18 G | 6.0 | 7.1 | 98.216 | 101.404 SE |
| 83 | 06/14 | 12 47 28.8 | 47.869 N | 85.076 E | Kazakh-Xinjiang Border Region | 58 G | 6.1 | 6.8 | 121.489 | 145.879 SE |
| 84 | 06/20 | 21 00 09.9 | 36.957 N | 49.409 E | Western Iran | 19 D | 6.4 | 7.7 | 106.089 | 171.848 SE |
| 85 | 06/22 | 11 48 45.5 | 19.648 S | 69.128 W | Northern Chile | 103 D | 5.3 | | 78.185 | 65.680 SW |
| 86 | 06/23 | 21 38 18.7 | 21.568 S | 176.483 W | Fiji Islands Region | 181 G | 6.4 | | 85.867 | 33.301 SE |
| 87 | 06/24 | 08 35 24.9 | 21.610 S | 176.502 W | Fiji Islands Region | 193 D | 5.6 | | 85.822 | 33.310 SE |
| 88 | 06/26 | 12 08 29.3 | 22.015 S | 179.473 W | South of Fiji Islands | 587 G | 6.0 | | 84.819 | 35.919 SE |
| 89 | 06/29 | 03 53 28.7 | 21.552 S | 179.332 W | Fiji Islands Region | 616 D | 5.7 | | 85.299 | 35.897 SE |
| 90 | 06/29 | 06 31 25.8 | 28.578 S | 68.746 W | La Rioja Province, Argentina | 123 D | 5.2 | | 69.716 | 62.708 SW |
| 91 | 07/09 | 15 11 20.3 | 5.395 N | 31.654 E | Sudan | 13 G | 5.9 | 6.4 | 74.480 | 171.796 SW |
| 92 | 07/10 | 03 17 59.2 | 10.353 S | 161.119 E | Solomon Islands | 66 G | 6.0 | | 91.014 | 56.998 SE |
| 93 | 07/11 | 19 48 08.1 | 25.355 S | 178.342 E | South of Fiji Islands | 585 D | 5.6 | | 81.103 | 37.091 SE |

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|-----|-------|-------|------|----------|-----------|----------------------------------|-------|-----|-----|---------|------------|
| 94 | 07/14 | 05 54 | 25.4 | 0.003 N | 17.376 W | North of Ascension Island | 11 G | 6.2 | 6.4 | 78.676 | 121.238 SW |
| 95 | 07/16 | 07 26 | 34.6 | 15.679 N | 121.172 E | Luzon, Philippine Islands | 25 D | 6.5 | 7.8 | 101.613 | 103.513 SE |
| 96 | 07/16 | 14 51 | 35.7 | 32.460 S | 69.958 W | Mendoza Province, Argentina | 102 D | 5.7 | | 66.489 | 60.124 SW |
| 97 | 07/18 | 17 21 | 47.0 | 6.820 S | 130.601 E | Banda Sea | 97 | 5.7 | | 84.003 | 86.593 SE |
| 98 | 07/22 | 09 26 | 14.6 | 23.622 S | 179.893 W | South of Fiji Islands | 531 G | 5.9 | | 83.166 | 35.928 SE |
| 99 | 07/26 | 04 18 | 28.9 | 7.504 S | 127.760 E | Banda Sea | 131 D | 5.2 | | 82.343 | 88.989 SE |
| 100 | 07/27 | 12 37 | 59.5 | 15.355 S | 167.464 E | Vanuatu Islands | 126 G | 6.4 | | 88.068 | 49.609 SE |
| 101 | 08/02 | 05 24 | 08.5 | 31.620 S | 71.695 W | Near Coast of Central Chile | 36 | 5.5 | 5.9 | 67.810 | 58.971 SW |
| 102 | 08/06 | 20 30 | 44.9 | 56.104 S | 27.700 W | South Sandwich Islands Region | 112 D | 5.6 | | 31.585 | 79.187 SW |
| 103 | 08/10 | 01 51 | 19.4 | 0.076 S | 122.954 E | Minahassa Peninsula | 172 | 5.4 | | 87.542 | 96.169 SE |
| 104 | 08/10 | 05 37 | 52.1 | 20.199 S | 168.328 E | Loyalty Islands | 47 D | 5.8 | 5.6 | 83.656 | 47.440 SE |
| 105 | 08/10 | 15 44 | 31.3 | 0.333 N | 126.175 E | Molucca Passage | 53 | 5.8 | | 89.080 | 93.308 SE |
| 106 | 08/10 | 17 47 | 36.7 | 19.805 S | 177.385 W | Fiji Islands Region | 373 D | 6.0 | | 87.407 | 34.506 SE |
| 107 | 08/12 | 21 25 | 21.9 | 19.435 S | 169.132 E | Vanuatu Islands | 140 G | 6.3 | | 84.602 | 46.927 SE |
| 108 | 08/15 | 15 54 | 41.9 | 40.382 S | 176.394 E | North Island, New Zealand | 31 D | 5.4 | 5.0 | 66.154 | 34.757 SE |
| 109 | 08/17 | 13 07 | 17.4 | 11.164 S | 161.997 E | Solomon Islands | 29 G | 5.9 | 6.8 | 90.506 | 55.928 SE |

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|-----|------------------|----------|-----------|---|-------|-----|-----|--------|---------|----|
| 110 | 08/18 13 55 07.5 | 40.229 S | 78.308 E | Mid-Indian Rise | 10 G | 5.6 | 6.0 | 35.204 | 124.073 | SE |
| 111 | 08/18 18 52 36.8 | 7.507 N | 93.975 E | Nicobar Islands Region | 21 D | 5.5 | 6.0 | 85.057 | 126.005 | SE |
| 112 | 08/21 00 57 28.5 | 33.373 S | 178.046 W | South of Kermadec Islands | 33 N | 5.7 | 5.5 | 74.047 | 32.033 | SE |
| 113 | 08/21 14 13 04.8 | 27.487 S | 104.266 W | Easter Islnad Region | 11 G | 6.0 | 5.3 | 80.072 | 32.084 | SW |
| 114 | 08/24 16 24 38.6 | 4.455 S | 144.508 E | Near North Coast of Papua New Guinea | 214 D | 5.4 | | 91.146 | 74.489 | SE |
| 115 | 08/25 15 47 53.8 | 0.525 N | 126.084 E | Molucca Passage | 11 G | 6.0 | 6.1 | 89.227 | 93.462 | SE |
| 116 | 08/26 13 45 02.2 | 34.067 S | 178.930 W | South of Kermadec Islnads | 13 * | 5.4 | 4.9 | 73.201 | 32.611 | SE |
| 117 | 08/27 15 17 12.0 | 6.870 S | 125.452 E | Banda Sea | 506 G | 5.8 | | 82.102 | 91.375 | SE |
| 118 | 08/28 08 58 05.8 | 19.645 S | 69.876 W | Northern Chile | 64 D | 5.2 | | 78.433 | 65.006 | SW |
| 119 | 09/04 23 15 11.3 | 31.262 S | 69.063 W | San Juan Province, Argentina | 112 D | 5.5 | | 67.321 | 61.374 | SW |
| 120 | 09/07 11 34 35.5 | 31.071 S | 178.397 W | Kermadec Islands Region | 10 G | 5.5 | 5.3 | 76.220 | 32.876 | SE |
| 121 | 09/07 16 09 19.6 | 24.260 S | 66.957 W | Salta Province, Argentina | 161 | 5.5 | | 73.159 | 65.935 | SW |
| 122 | 09/08 18 51 45.2 | 24.449 S | 177.227 W | South of Fiji Islnads | 132 D | 5.4 | | 82.906 | 33.350 | SE |
| 123 | 09/08 20 31 57.7 | 20.548 S | 174.173 W | Tonga Islnads | 33 N | 5.6 | 5.7 | 87.310 | 31.399 | SE |
| 124 | 09/09 05 35 45.9 | 5.178 S | 151.729 E | New Britain Region | 74 | 5.8 | | 92.925 | 67.475 | SE |
| 125 | 09/12 20 16 18.9 | 60.447 S | 65.029 W | Drake Passage | 10 G | 5.5 | 5.2 | 39.950 | 48.009 | SW |

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|-----|-------|-------|------|----------|-----------|----------------------------------|-------|-----|-----|---------|------------|
| 126 | 09/14 | 09 20 | 18.9 | 60.689 S | 22.794 W | South Sandwich Islands Region | 33 N | 5.9 | 5.5 | 26.470 | 76.703 SW |
| 127 | 09/17 | 11 57 | 24.1 | 5.917 S | 103.796 E | Southern Sumatera | 59 D | 5.7 | | 75.397 | 112.264 SE |
| 128 | 09/17 | 13 47 | 26.6 | 53.155 S | 159.632 E | Macquarie Islands Region | 10 G | 6.0 | 6.0 | 50.332 | 42.406 SE |
| 129 | 09/18 | 03 18 | 39.7 | 51.453 N | 177.899 E | Rat Islands, Aleutian Islands | 41 D | 5.6 | 5.4 | 153.796 | 69.829 SE |
| 130 | 09/23 | 17 45 | 43.5 | 55.945 S | 27.068 W | South Sandwich Islands Region | 33 N | 5.4 | | 31.484 | 79.902 SW |
| 131 | 09/23 | 17 54 | 02.9 | 17.732 S | 167.612 E | Vanuatu Islands | 10 G | 5.4 | 6.2 | 85.830 | 48.795 SE |
| 132 | 09/24 | 01 58 | 01.9 | 17.590 S | 167.833 E | Vanuatu Islands | 26 * | 5.2 | 5.5 | 86.026 | 48.633 SE |
| 133 | 09/28 | 19 44 | 47.1 | 13.559 S | 167.079 E | Vanuatu Islands | 176 G | 6.0 | | 89.683 | 50.479 SE |
| 134 | 10/02 | 15 06 | 44.6 | 24.036 S | 174.646 W | South of Tonga Islands | 9 G | 5.8 | 5.5 | 83.806 | 31.122 SE |
| 135 | 10/06 | 02 41 | 15.4 | 41.589 S | 175.344 E | North Island, New Zealand | 39 * | 5.7 | 5.1 | 64.776 | 35.232 SE |
| 136 | 10/07 | 11 32 | 13.7 | 56.167 S | 27.008 W | South Sandwich Islnads Region | 100 D | 5.4 | | 31.291 | 79.681 SW |
| 137 | 10/10 | 01 00 | 05.5 | 19.503 S | 66.618 W | Southern Bolivia | 266 G | 5.8 | | 77.490 | 67.997 SW |
| 138 | 10/10 | 05 54 | 53.5 | 23.497 S | 179.029 E | South of Fiji Islands | 549 G | 6.0 | | 83.057 | 36.925 SE |
| 139 | 10/12 | 17 30 | 00.0 | 37.248 N | 116.494 W | Southern Nevada | 0 | 5.6 | 4.2 | 145.772 | 35.006 SW |
| 140 | 10/13 | 22 53 | 32.8 | 23.493 S | 179.135 E | South of Fiji Islands | 572 D | 5.3 | | 83.083 | 36.831 SE |

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|-----|-------|------------|----------|-----------|----------------------------------|-------|-----|-----|---------|------------|
| 141 | 10/14 | 19 48 12.6 | 46.121 S | 33.554 E | Prince Edward Islands Region | 10 G | 4.9 | | 22.964 | 169.229 SW |
| 142 | 10/15 | 01 35 44.5 | 2.211 S | 92.249 E | Southwest of Sumatera | 32 D | 5.9 | 6.5 | 75.263 | 124.770 SE |
| 143 | 10/17 | 12 16 29.1 | 25.557 S | 176.311 W | South of Fiji Islands | 44 D | 5.6 | 5.5 | 82.003 | 32.292 SE |
| 144 | 10/17 | 14 30 13.1 | 10.970 S | 70.776 W | Peru-Brazil Border Region | 599 G | 6.7 | | 86.882 | 67.177 SW |
| 145 | 10/25 | 11 01 38.7 | 8.307 N | 126.462 E | Mindanao, Philippine Islands | 44 G | 5.9 | 6.1 | 96.621 | 95.920 SE |
| 146 | 10/25 | 16 33 33.4 | 6.189 S | 154.960 E | Solomon Islands | 142 G | 5.8 | | 93.033 | 64.101 SE |
| 147 | 10/26 | 05 49 37.9 | 35.143 S | 16.426 W | South Atlantic Ridge | 10 G | 5.1 | 5.6 | 45.441 | 107.895 SW |
| 148 | 10/29 | 06 19 11.2 | 63.490 S | 172.361 E | Balleny Islnds Region | 10 G | 5.2 | 5.4 | 43.486 | 28.433 SE |
| 149 | 10/29 | 06 42 41.7 | 55.981 S | 143.243 W | South Pacific Cordillera | 10 G | 5.3 | 5.2 | 55.121 | 1.933 SE |
| 150 | 10/31 | 14 39 27.2 | 26.634 S | 70.481 W | Near Coast of Northern Chile | 60 D | 5.5 | | 72.083 | 61.931 SW |
| 151 | 11/04 | 18 13 43.0 | 15.721 S | 72.619 W | Southern Peru | 121 | 5.4 | | 83.013 | 63.875 SW |
| 152 | 11/06 | 18 45 52.2 | 28.251 N | 55.462 E | Southern Iran | 11 G | 6.2 | 6.7 | 97.830 | 165.928 SE |
| 153 | 11/06 | 20 14 29.7 | 53.452 N | 169.871 E | Komandorsky Islands Region | 25 G | 6.3 | 7.0 | 152.638 | 81.281 SE |
| 154 | 11/07 | 19 05 27.9 | 55.974 S | 27.538 W | South Sandwich Islands Region | 48 G | 5.9 | 5.3 | 31.628 | 79.478 SW |
| 155 | 11/14 | 19 17 00.7 | 37.227 N | 116.371 W | Southern Nevada | 0 | 5.4 | | 145.727 | 35.165 SW |
| 156 | 11/15 | 02 34 32.4 | 3.908 N | 97.457 E | Northern Sumatera | 48 D | 6.0 | 6.8 | 82.667 | 121.593 SE |

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|-----|-------|------------|----------|-----------|------------------------------|-------|-----|-----|---------|------------|
| 157 | 11/15 | 04 48 12.2 | 3.982 N | 97.324 E | Northern Sumatera | 30 * | 5.8 | 5.6 | 82.697 | 121.743 SE |
| 158 | 11/18 | 16 23 06.9 | 3.942 N | 97.343 E | Northern Sumatera | 67 D | 5.7 | | 82.664 | 121.712 SE |
| 159 | 11/22 | 20 49 06.7 | 5.575 S | 150.993 E | New Britain Region | 29 G | 6.0 | 6.0 | 92.306 | 68.033 SE |
| 160 | 11/23 | 07 41 57.9 | 5.538 N | 125.851 E | Mindanao, Philippine Islands | 125 | 5.7 | | 93.820 | 95.484 SE |
| 161 | 12/05 | 16 08 51.4 | 5.264 S | 131.370 E | Banda Sea | 75 G | 5.9 | | 85.730 | 86.443 SE |
| 162 | 12/07 | 08 25 03.3 | 16.993 S | 177.268 W | Fiji Islands Region | 414 D | 5.6 | | 90.177 | 35.007 SE |
| 163 | 12/09 | 11 07 34.1 | 48.300 S | 31.392 E | South of Africa | 10 G | 5.3 | 4.0 | 20.976 | 164.630 SW |
| 164 | 12/09 | 15 36 26.9 | 54.881 N | 162.109 E | Near East Coast of Kamchatka | 26 D | 5.7 | 5.0 | 150.979 | 90.739 SE |
| 165 | 12/10 | 09 34 33.0 | 5.940 S | 142.282 E | Papua New Guinea | 32 | 5.8 | 5.7 | 88.980 | 76.046 SE |
| 166 | 12/13 | 12 26 40.7 | 1.116 N | 124.034 E | Minahassa Peninsula | 33 N | 6.0 | 5.7 | 89.042 | 95.587 SE |
| 167 | 12/18 | 02 33 12.3 | 42.553 S | 16.140 W | South Atlantic Ridge | 10 G | 5.4 | 5.4 | 38.712 | 103.241 SW |
| 168 | 12/18 | 02 49 22.8 | 42.667 S | 15.948 W | Tristan Da Cunha Region | 12 D | 5.6 | 5.4 | 38.544 | 103.353 SW |
| 169 | 12/19 | 13 48 22.6 | 52.618 N | 160.716 E | Off East Coast of Kamchatka | 22 G | 5.9 | 5.6 | 148.683 | 89.291 SE |
| 170 | 12/21 | 05 29 28.7 | 20.467 S | 174.161 W | Tonga Islands | 13 G | 6.1 | 6.2 | 87.392 | 31.405 SE |
| 171 | 12/21 | 12 55 45.5 | 18.891 S | 177.971 W | Fiji Islands Region | 457 D | 5.3 | | 88.178 | 35.246 SE |
| 172 | 12/21 | 18 31 43.8 | 32.696 S | 69.647 W | Mendoza Province, Argentina | 116 | 5.3 | | 66.173 | 60.294 SW |

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|-----|-------|-------|------|----------|-----------|------------------------------|-------|-----|-----|--------|------------|
| 173 | 12/22 | 19 01 | 41.8 | 14.948 S | 168.036 E | Vanuatu Islands | 27 G | 5.8 | 5.4 | 88.615 | 49.195 SE |
| 174 | 12/23 | 16 39 | 16.5 | 49.231 S | 30.493 E | South of Africa | 10 G | 5.1 | 4.4 | 20.148 | 162.553 SW |
| 175 | 12/23 | 17 48 | 40.4 | 15.182 S | 167.386 E | Vanuatu Islands | 143 | 5.6 | | 88.213 | 49.730 SE |
| 176 | 12/24 | 15 59 | 40.9 | 53.07 S | 22.24 E | South of Africa | 10 G | 4.9 | | 17.765 | 144.033 SW |
| 177 | 12/27 | 13 35 | 10.0 | 6.873 S | 129.542 E | Banda Sea | 181 G | 5.6 | | 83.573 | 87.560 SE |
| 178 | 12/27 | 16 08 | 34.6 | 22.725 S | 70.006 W | Near Coast of Northern Chile | 64 D | 5.1 | | 75.588 | 63.788 SW |
| 179 | 12/28 | 22 32 | 17.2 | 14.875 S | 66.777 E | Mid-Indian Rise | 17 G | 6.0 | 5.8 | 56.685 | 148.103 SE |
| 180 | 12/29 | 13 23 | 54.3 | 8.257 N | 94.061 E | Nicobar Islands Region | 18 D | 5.6 | 6.0 | 85.799 | 126.144 SE |
| 181 | 12/30 | 19 14 | 18.9 | 5.097 S | 150.967 E | New Britain Region | 179 G | 6.6 | | 92.747 | 68.218 SE |

APPENDIX

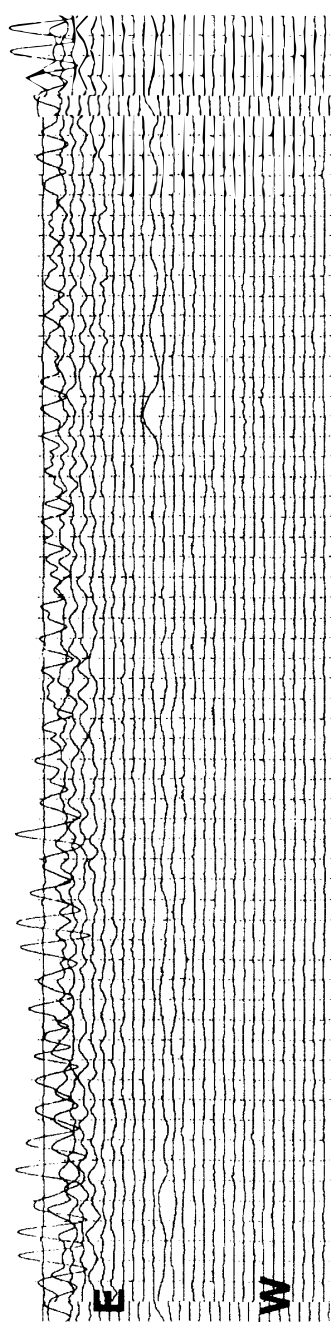
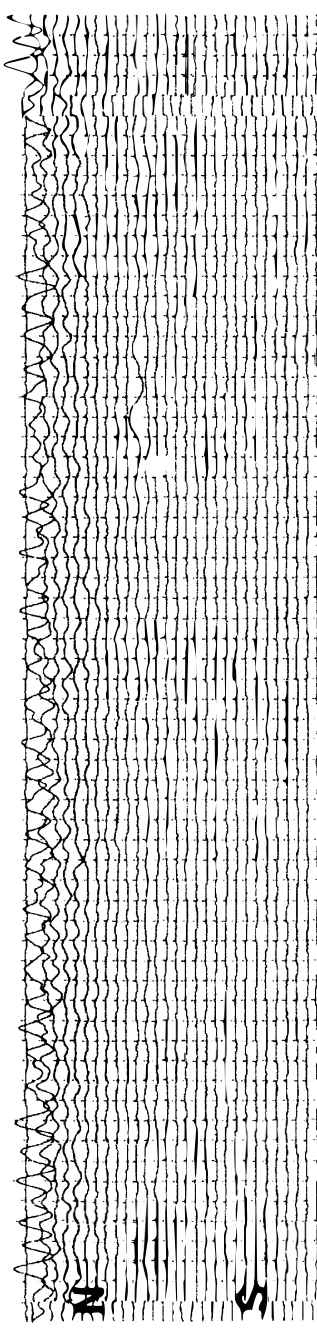
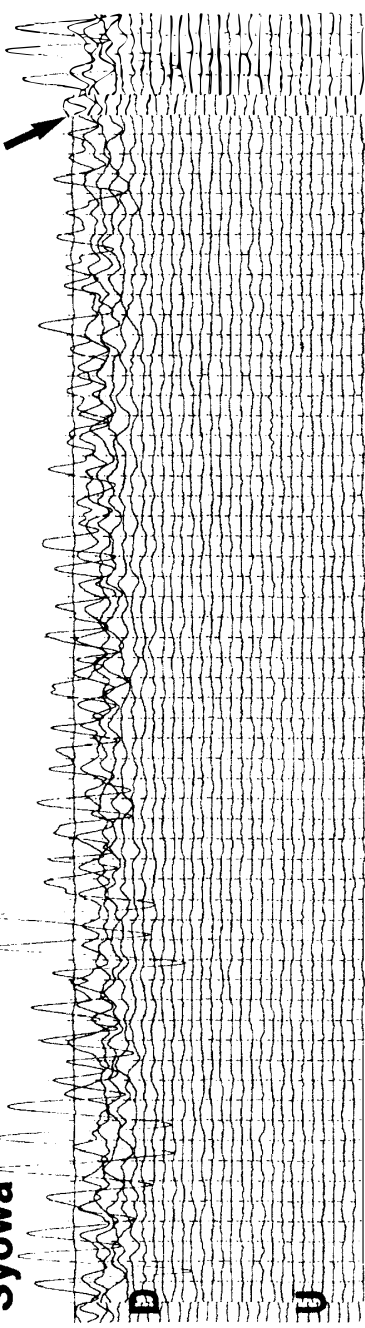
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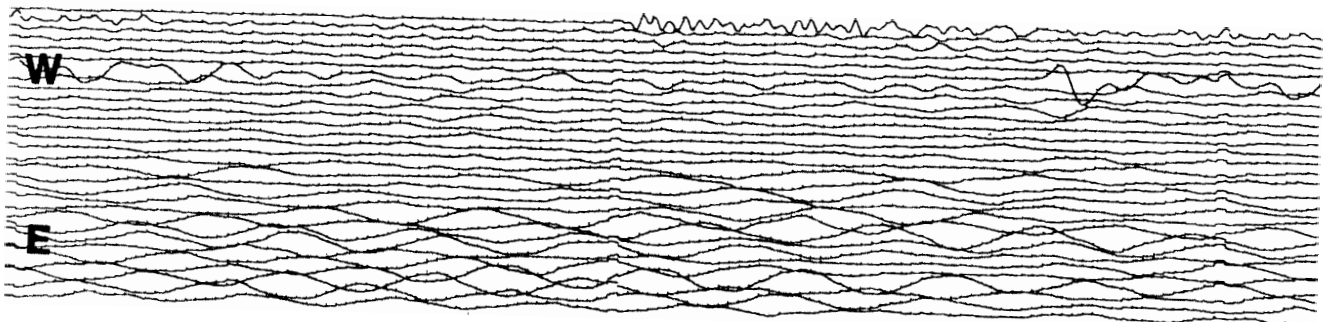
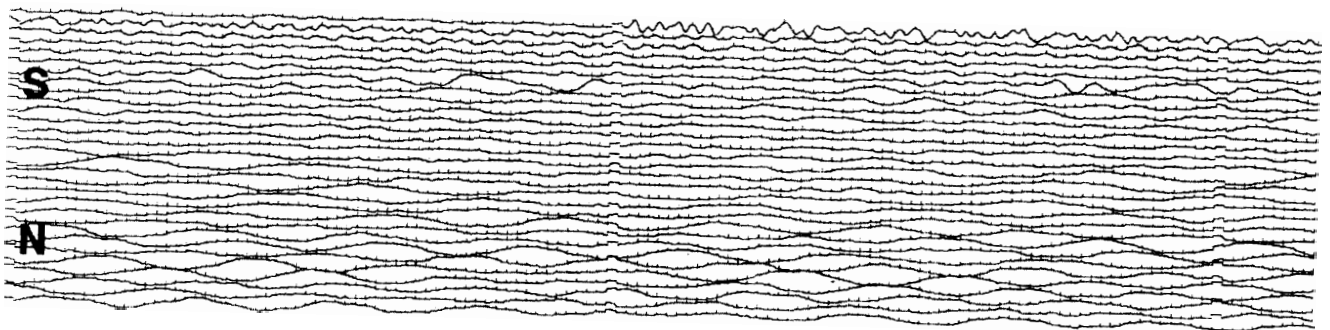
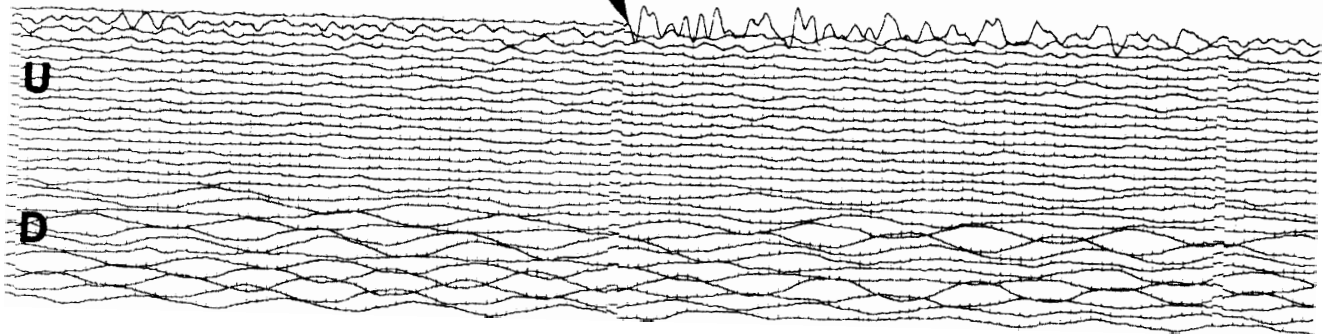
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Vanuatu Islands

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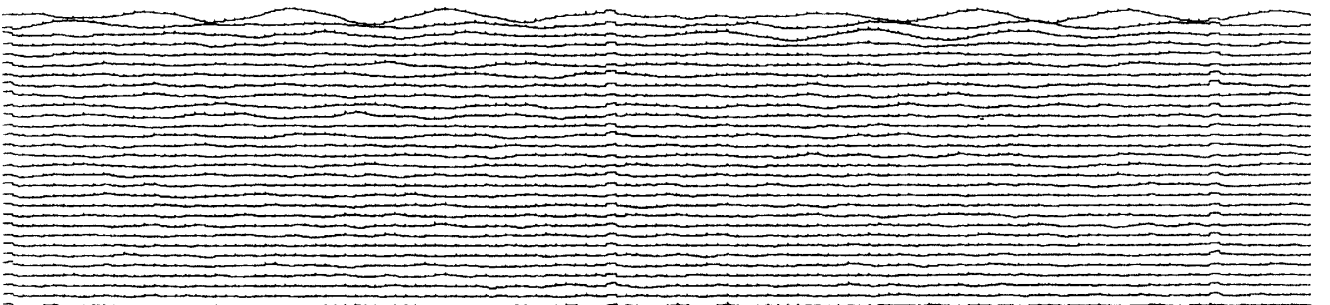
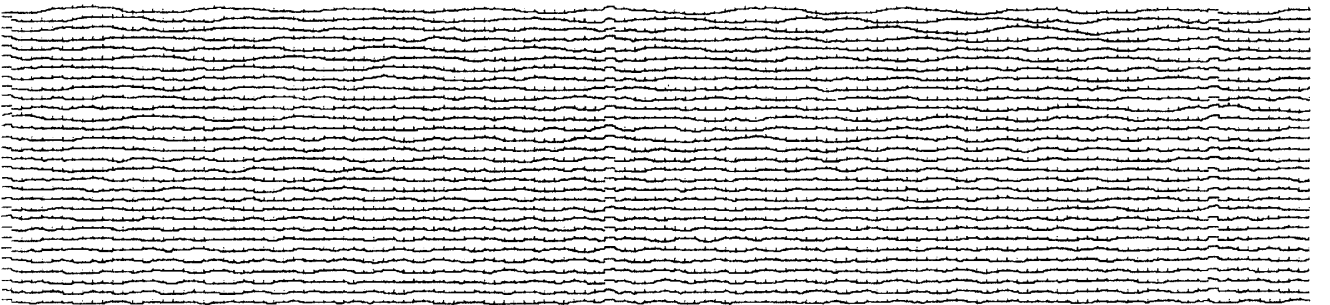
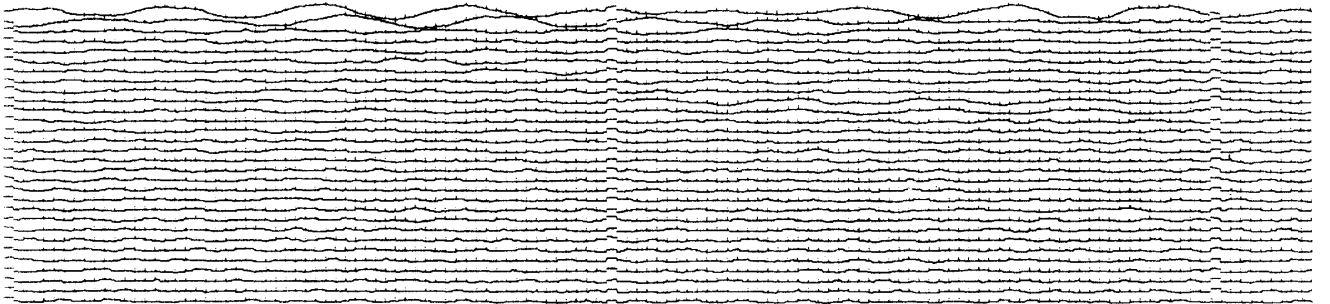
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LP-2



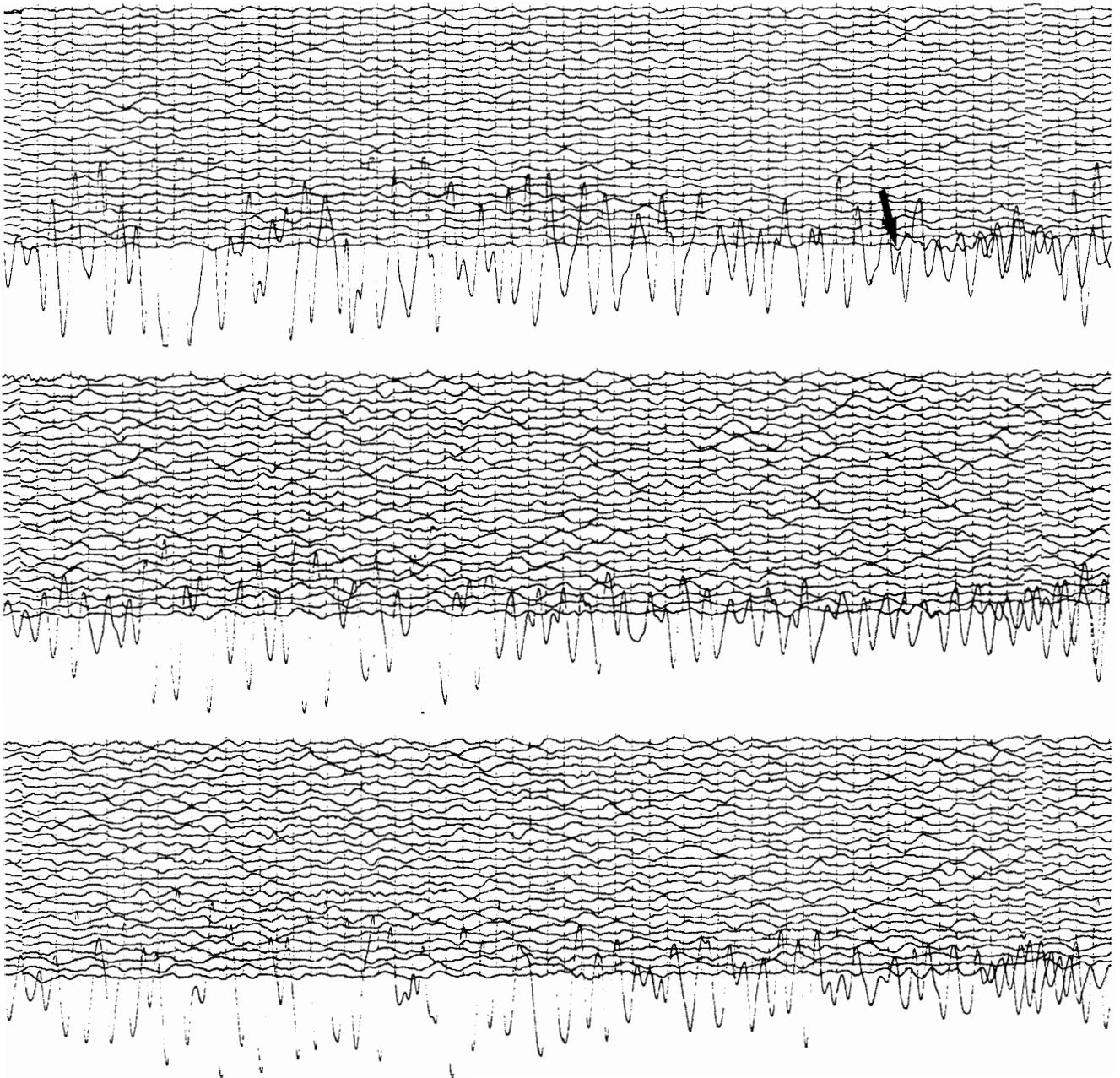
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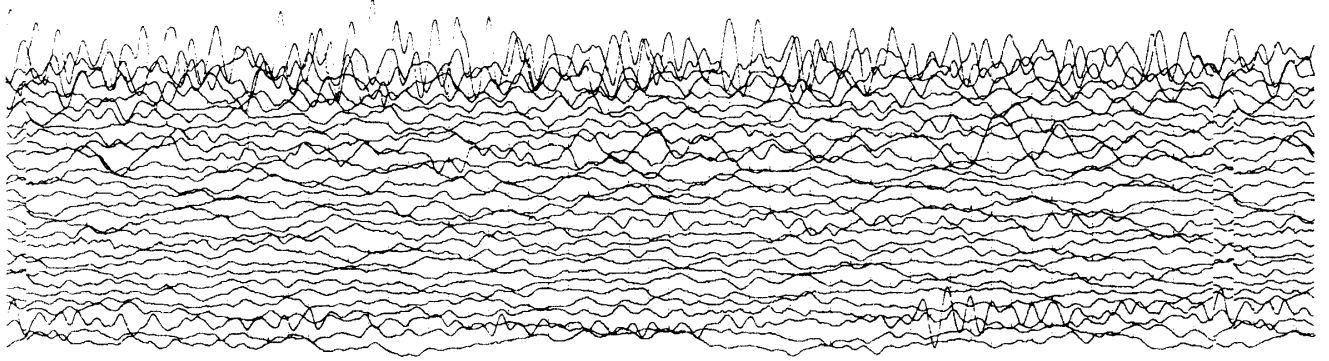
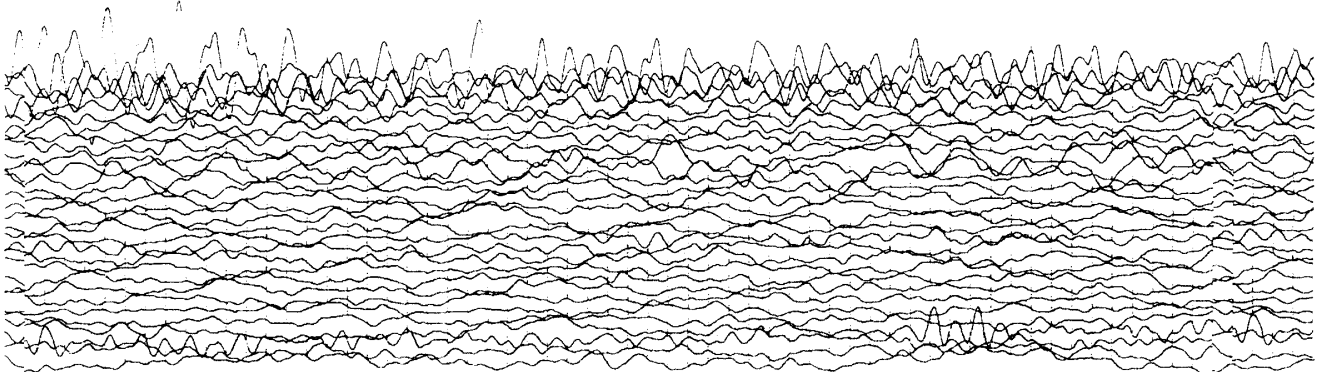
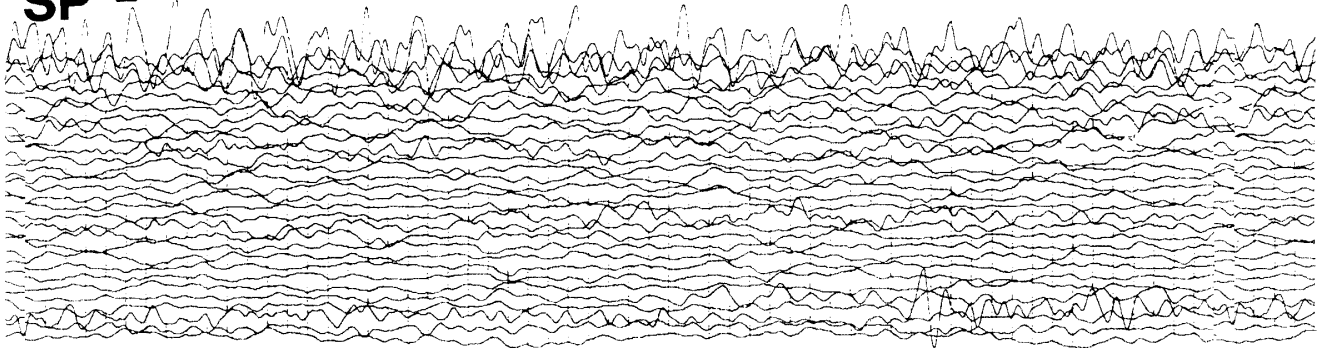
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South of Fiji Islands

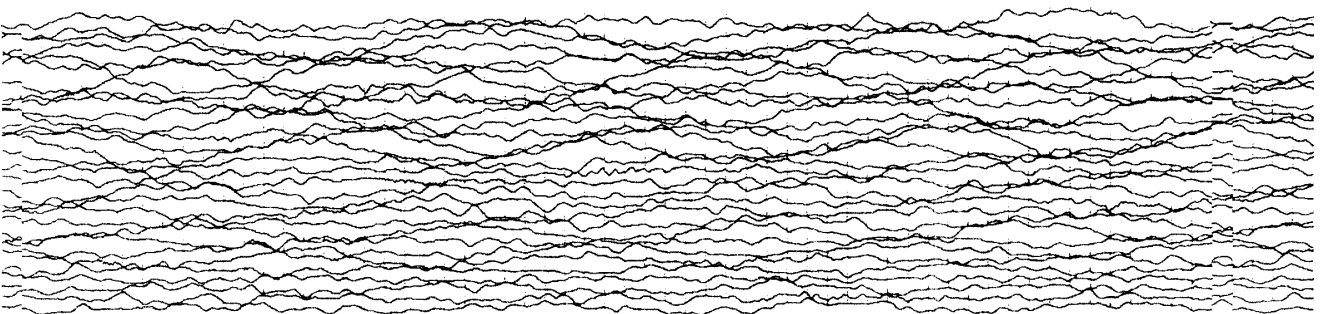
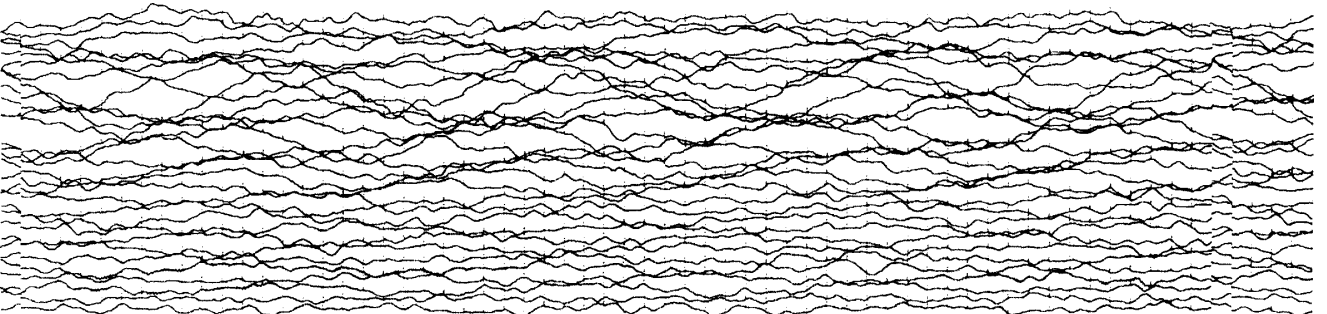
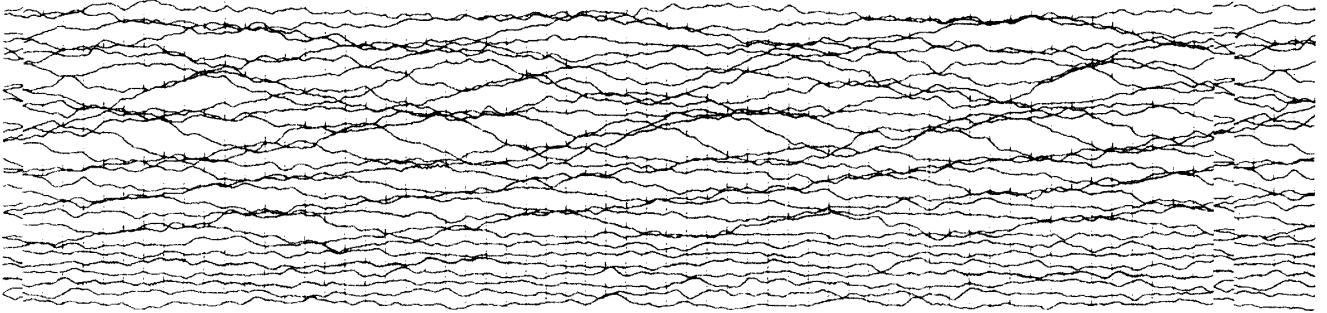
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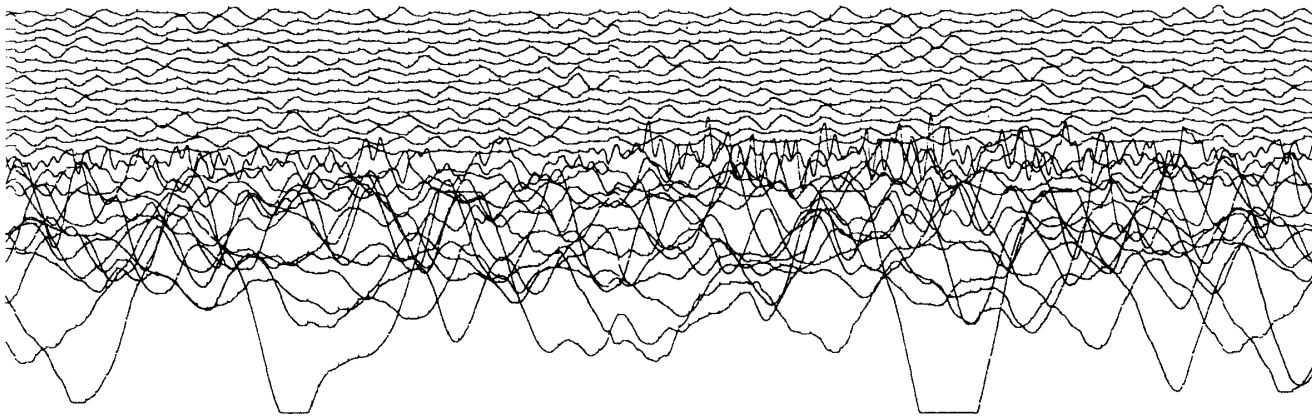
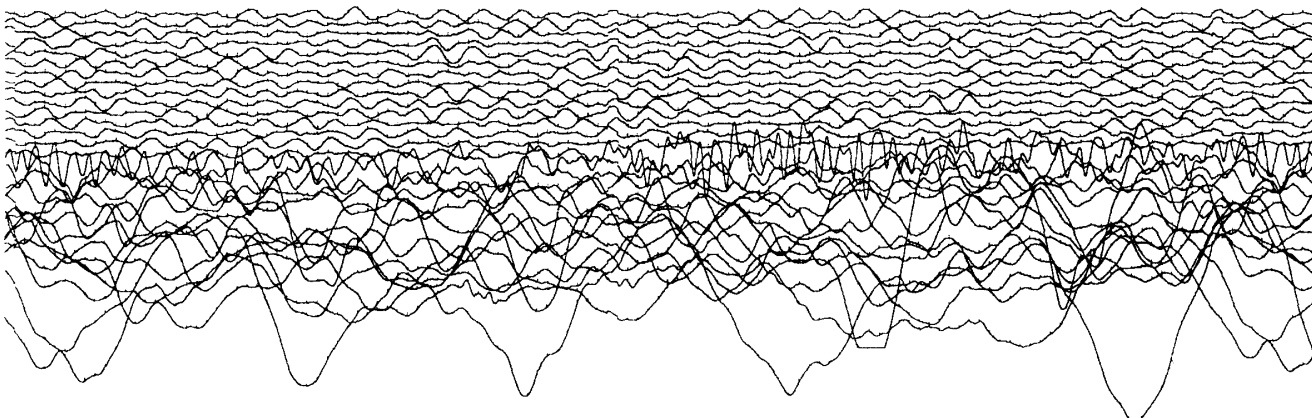
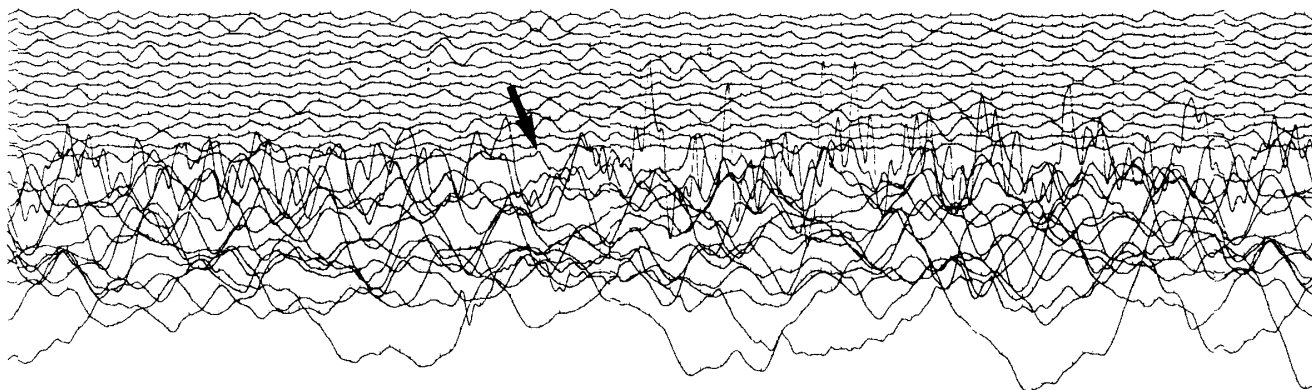
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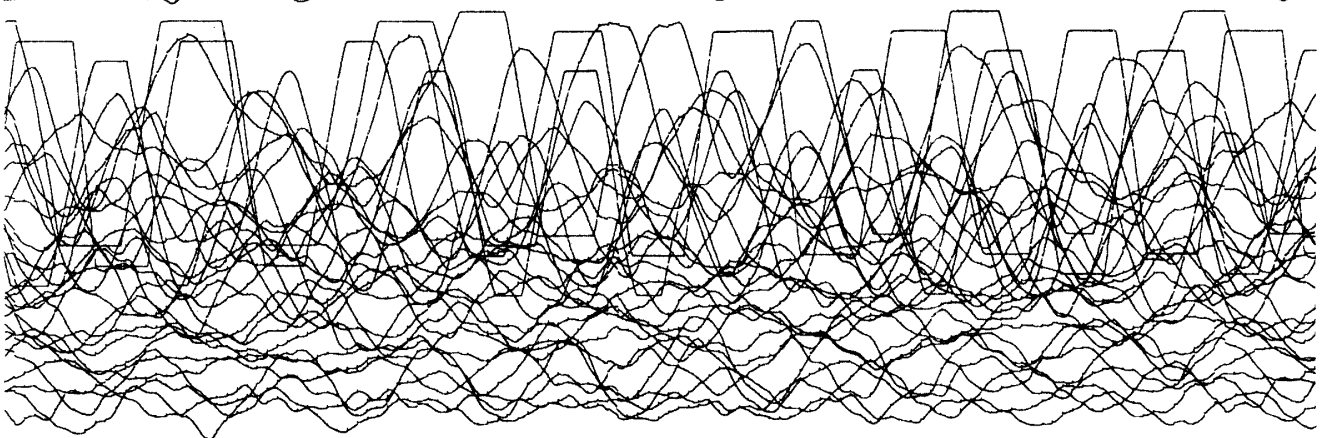
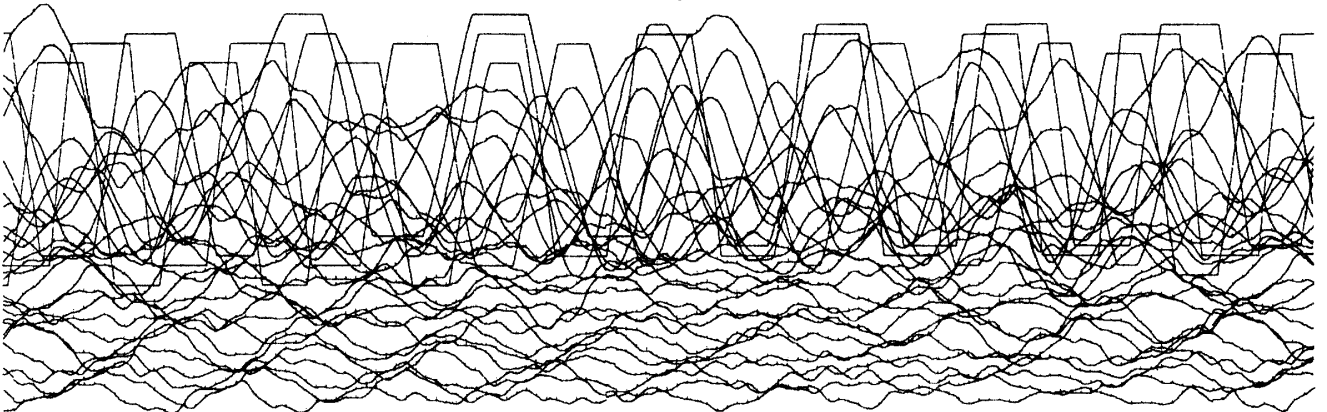
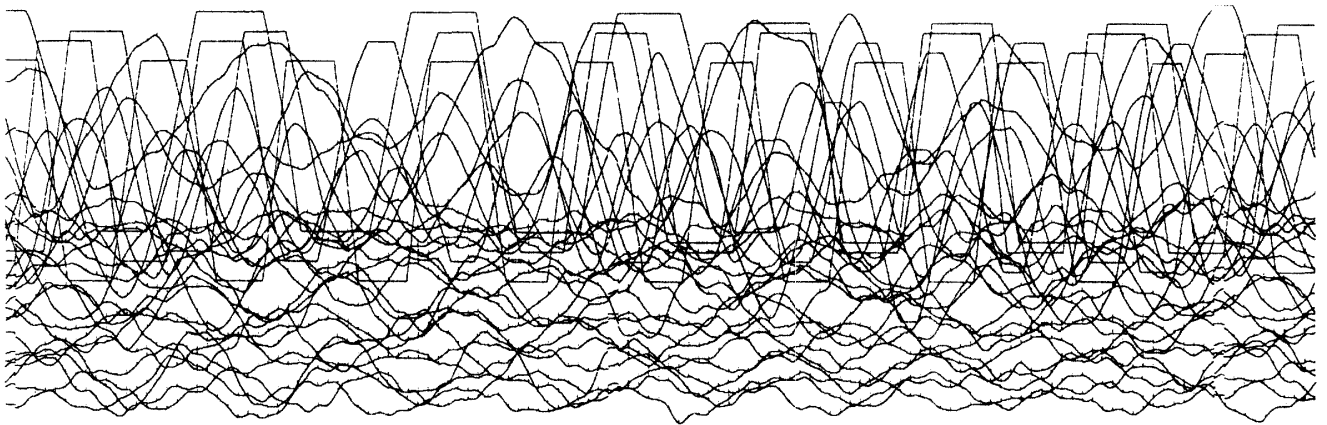
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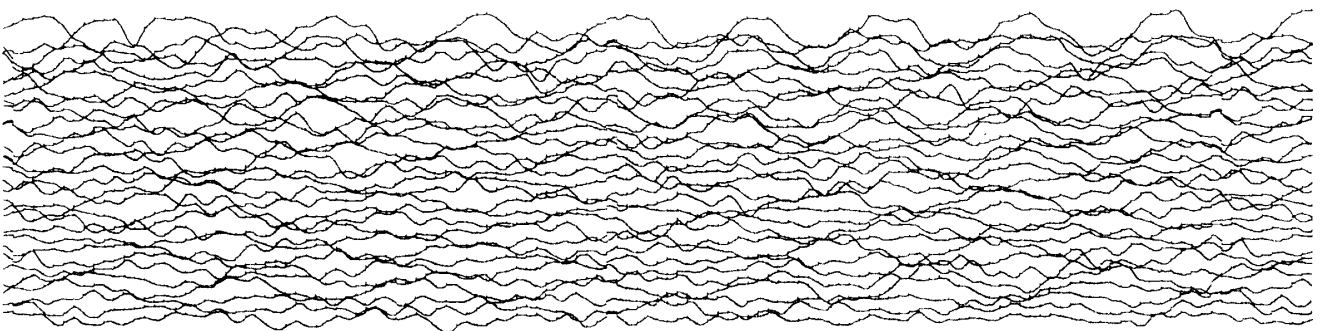
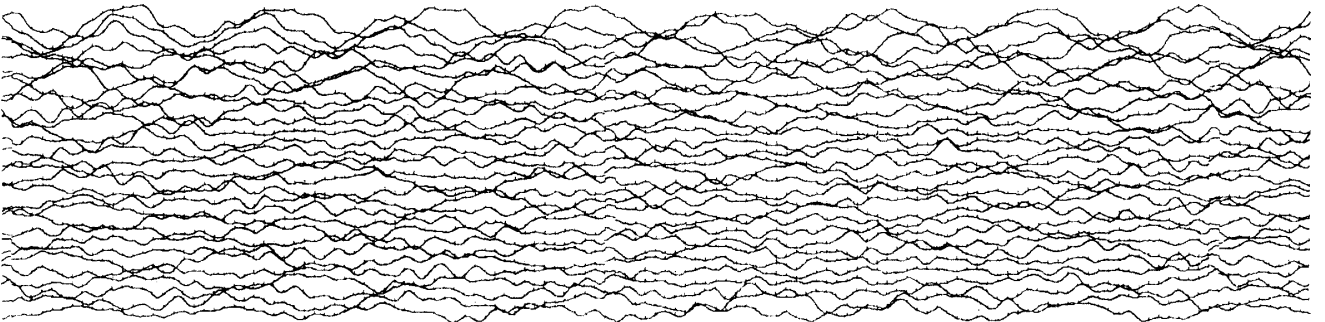
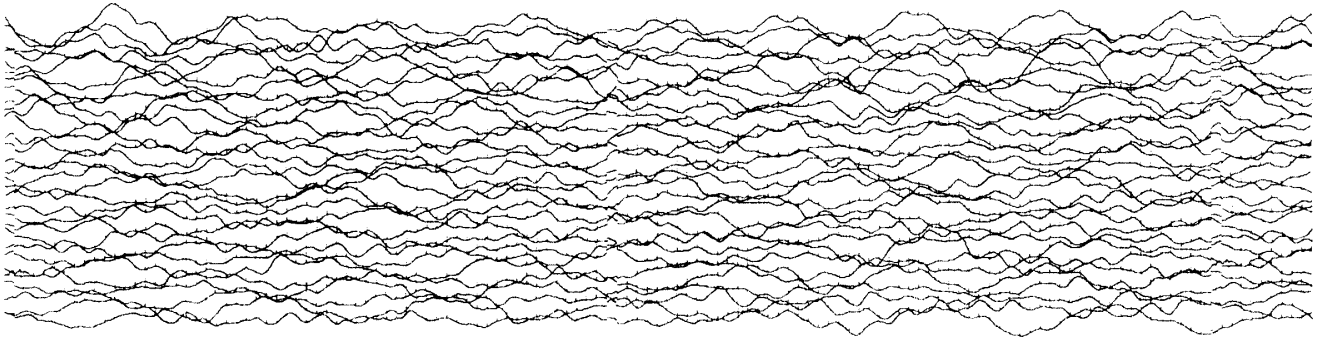
LP-1



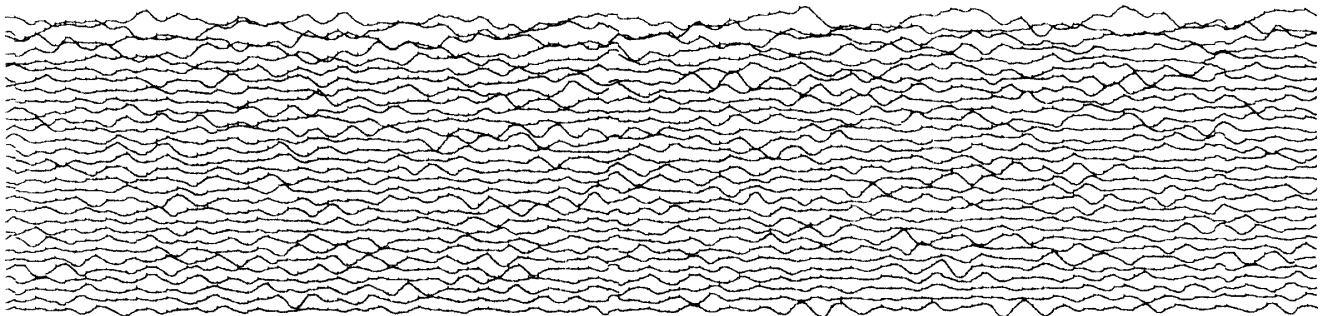
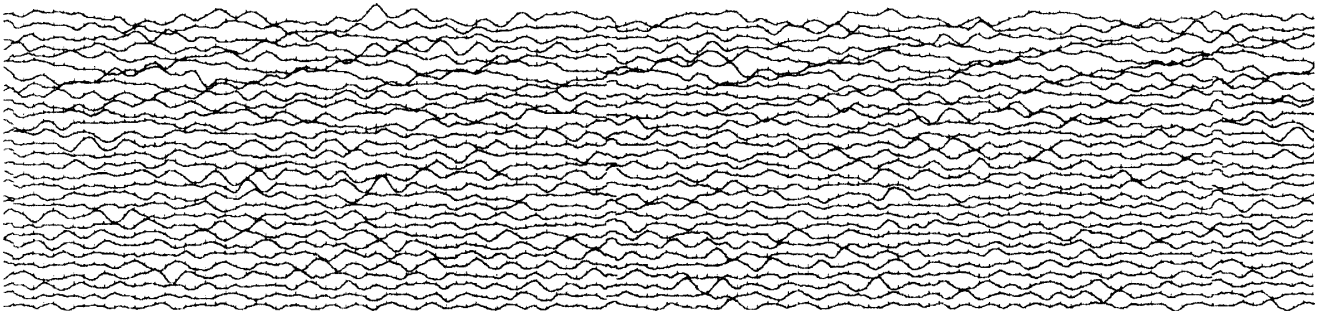
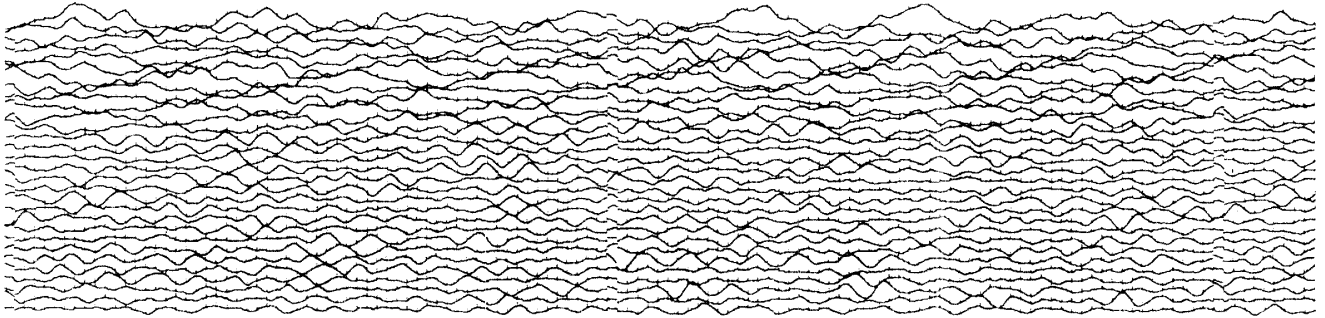
LP-2



LP-3



LP-4



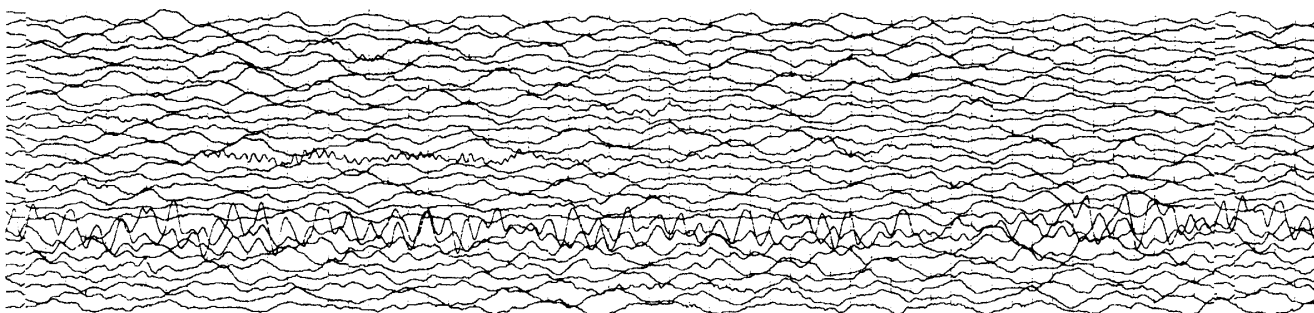
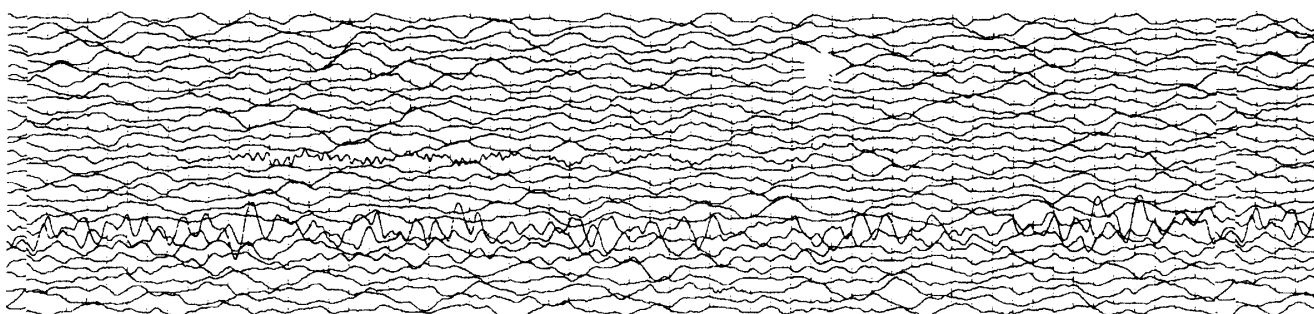
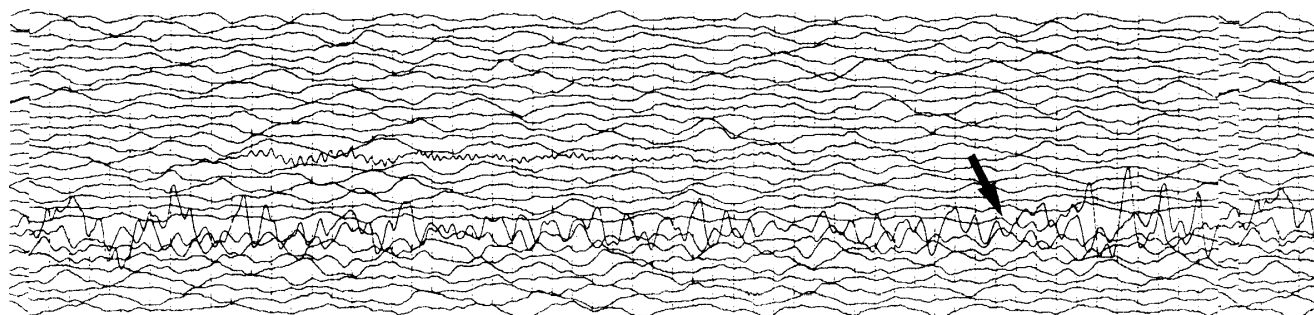
#-34

MAR. 05 16h38m12.5s

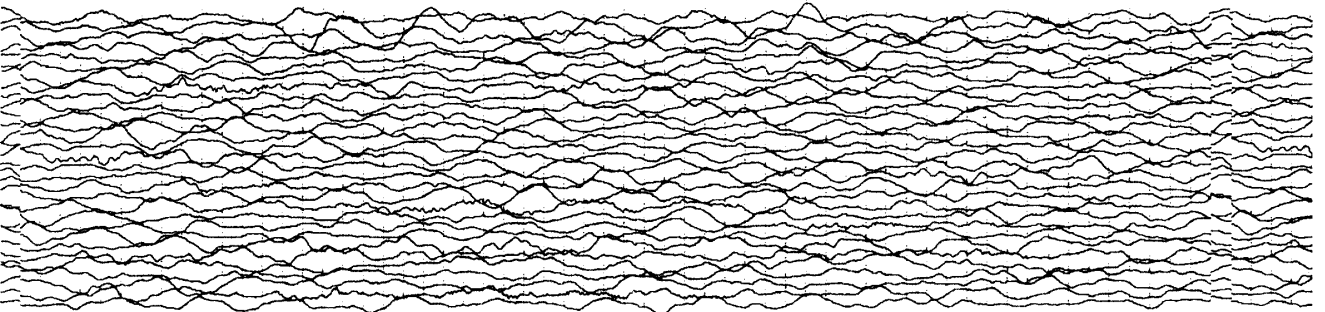
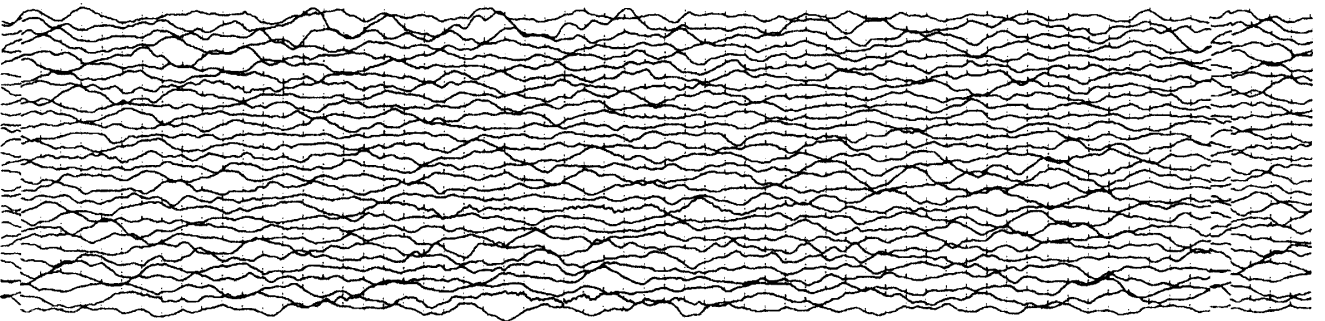
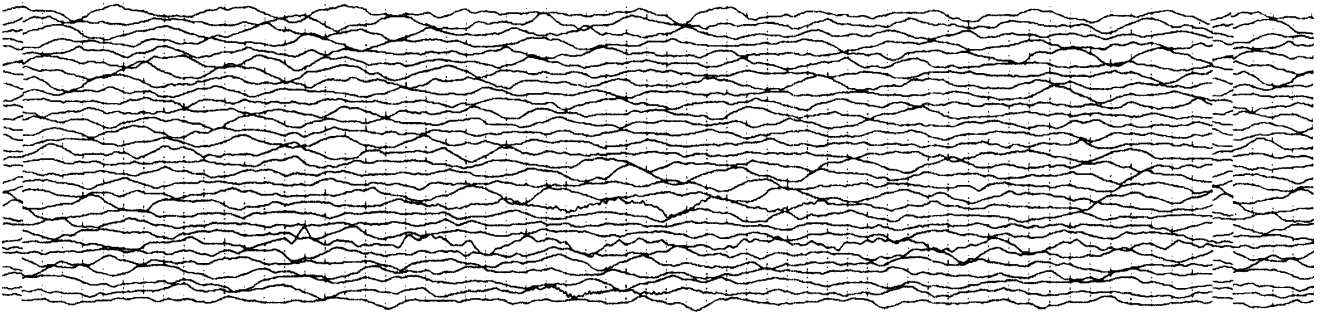
18.318 S 168.063 E 21km Mb 5.6 Ms 7.0

Vanuatu Islands

SP-1



SP-2



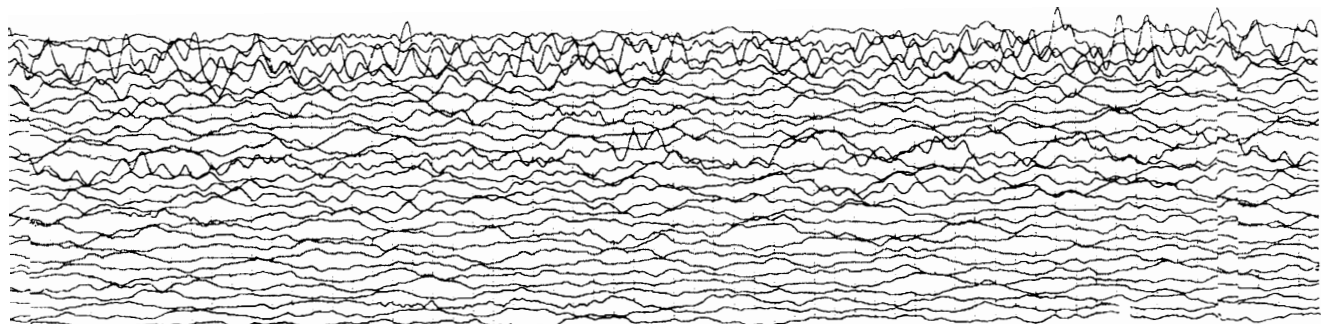
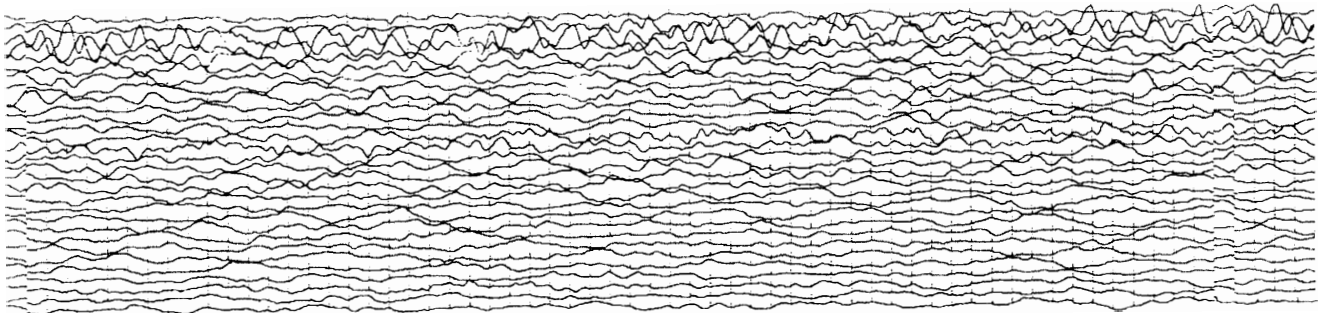
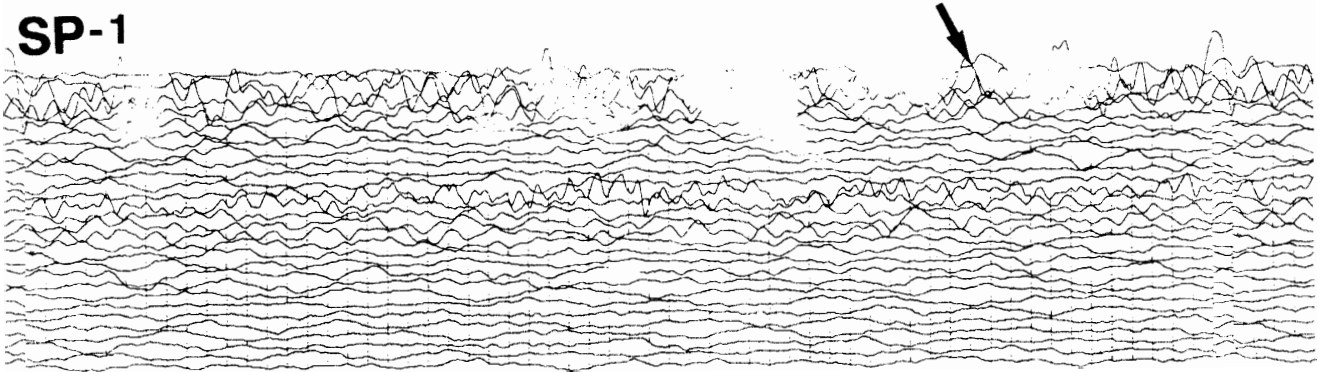
#-42

APR. 05 21h12m35.5s

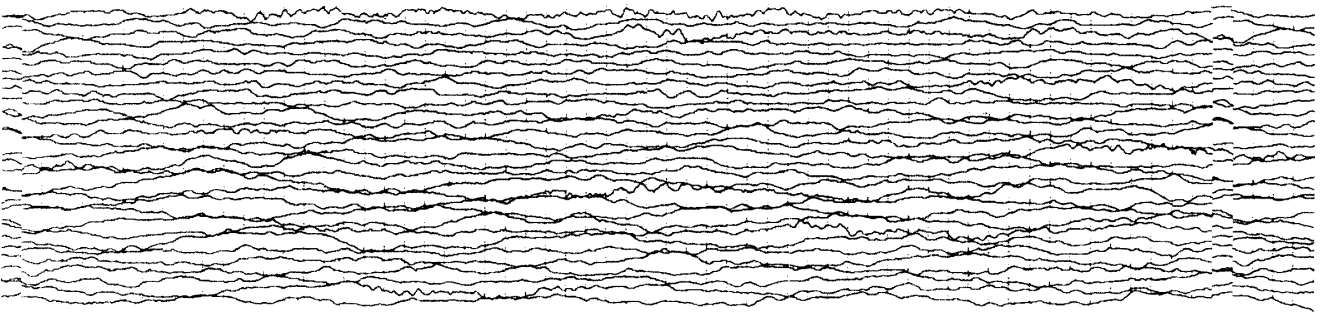
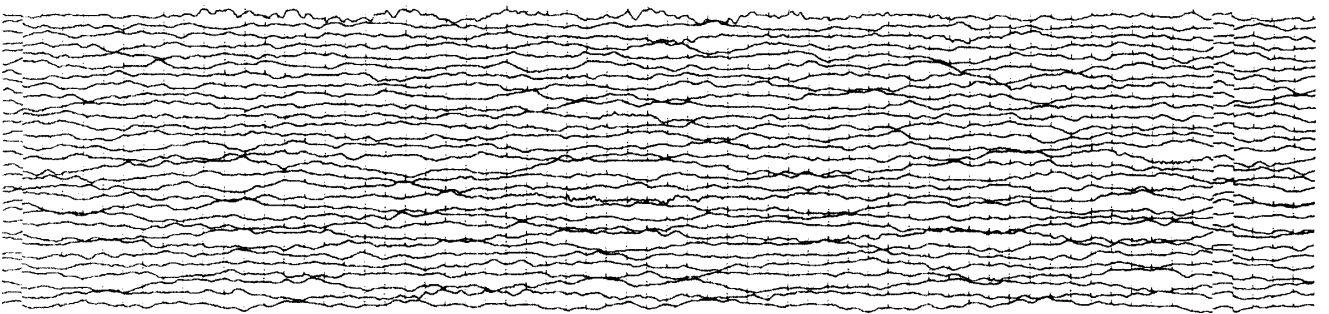
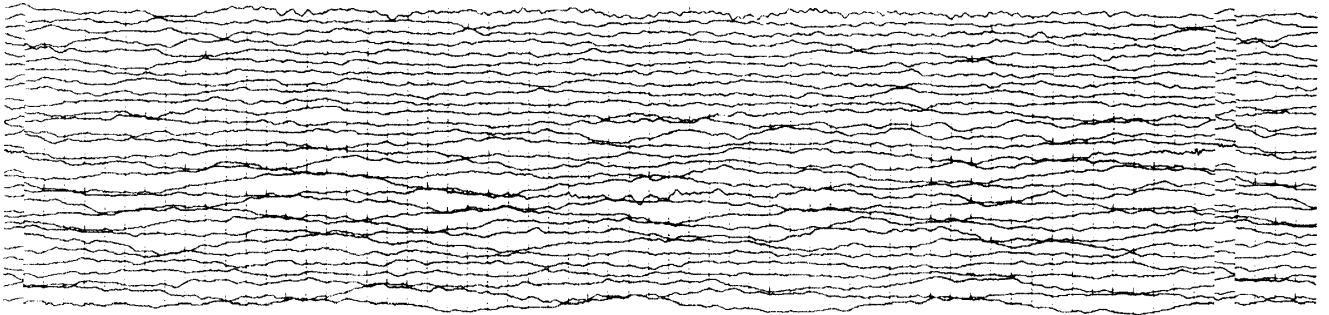
15.125 N 147.596 E 11km Mb 6.5 Ms 7.5

Mariana Islands Region

SP-1



SP-2



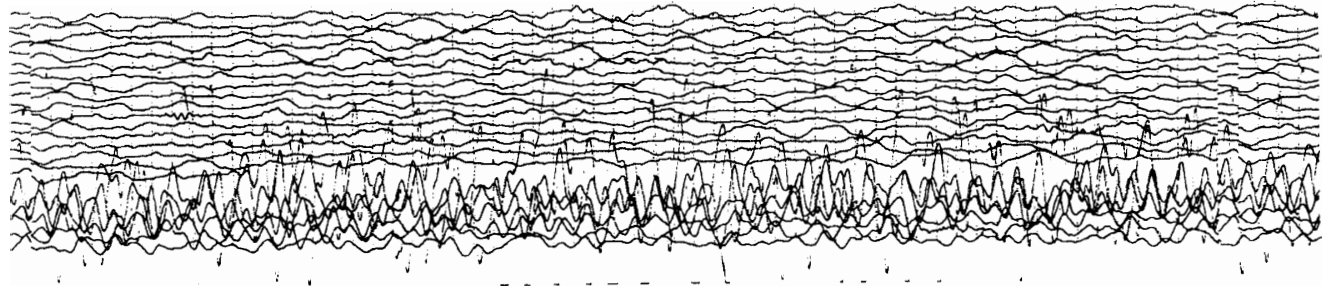
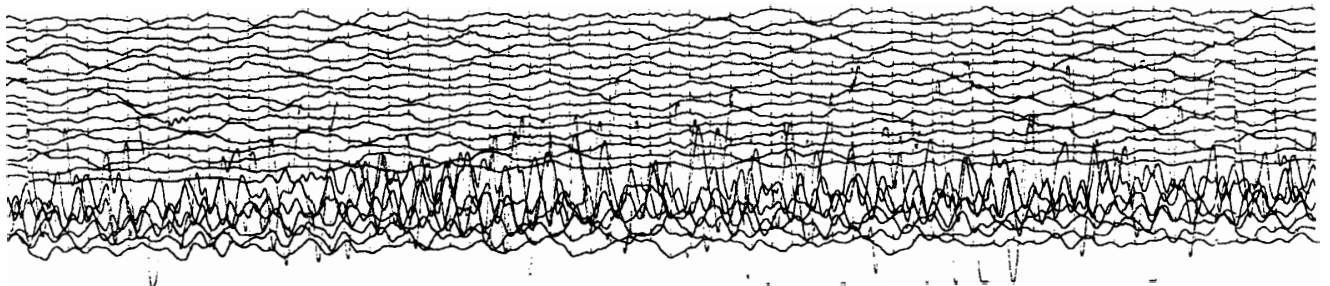
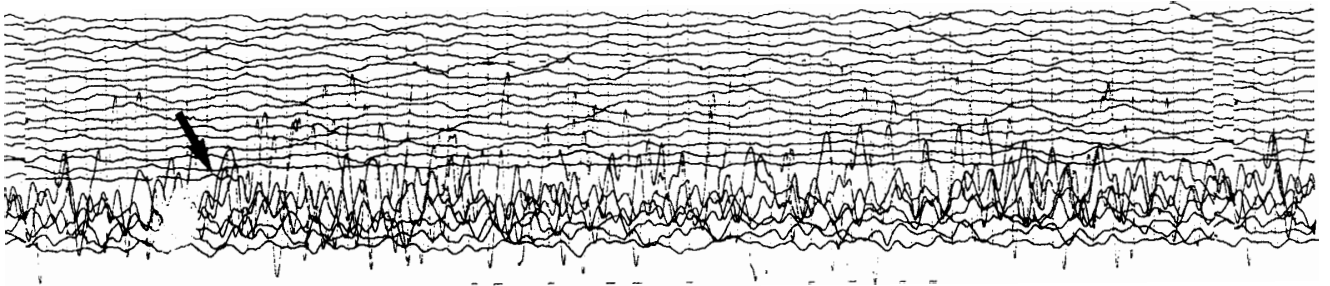
#-49

APR. 18 13h39m19.0s

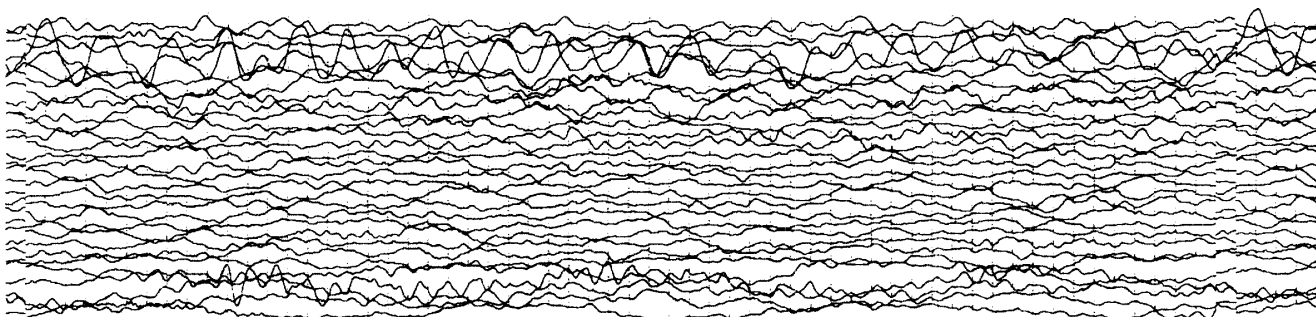
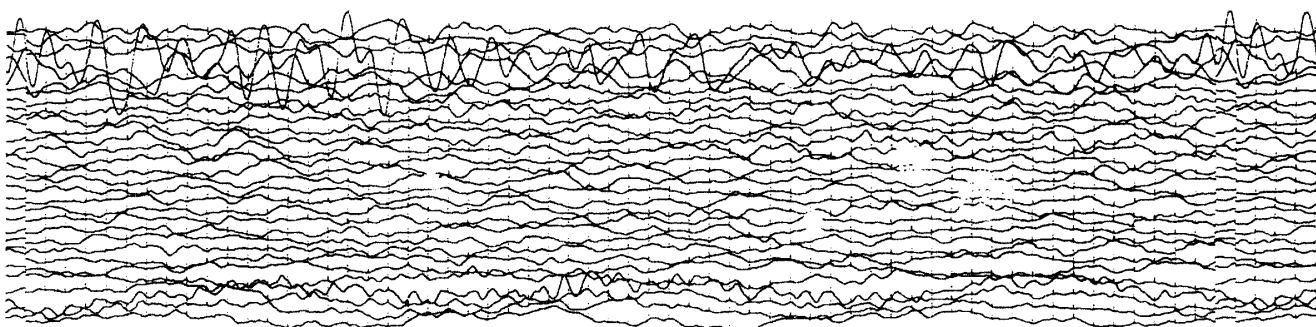
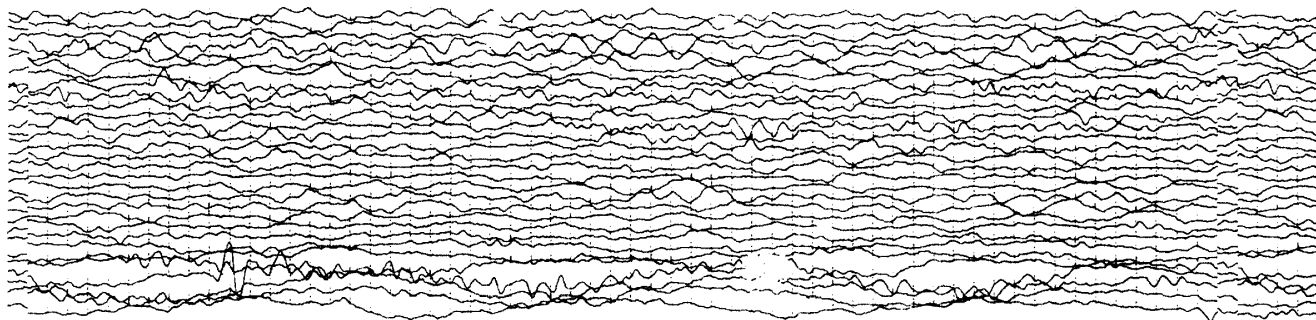
1.186 N 122.857 E 26km Mb 6.2 Ms 7.4

Minahassa Peninsula

SP-1



SP-2



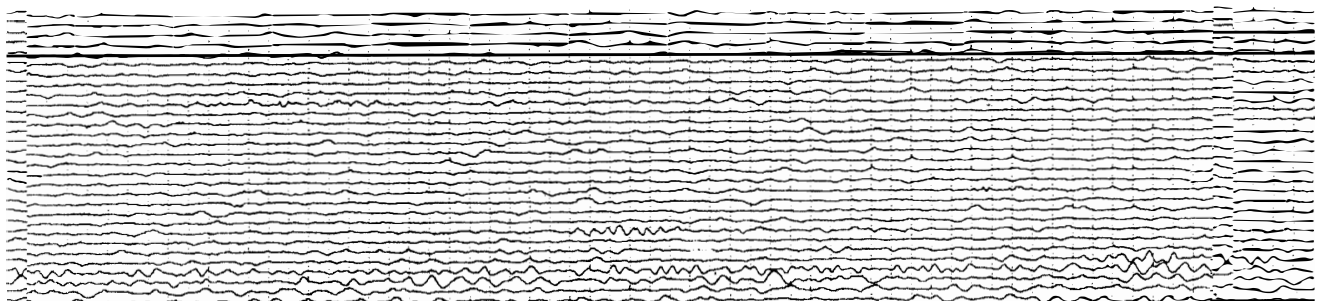
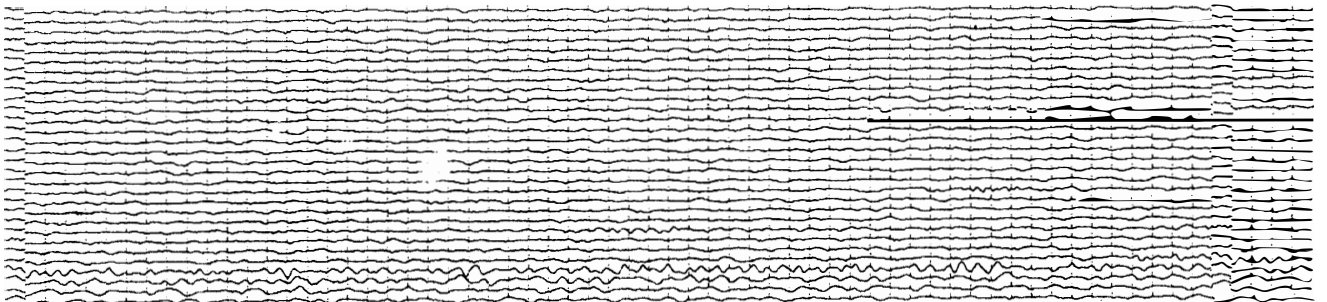
#-54

APR. 26 09h37m15.0s

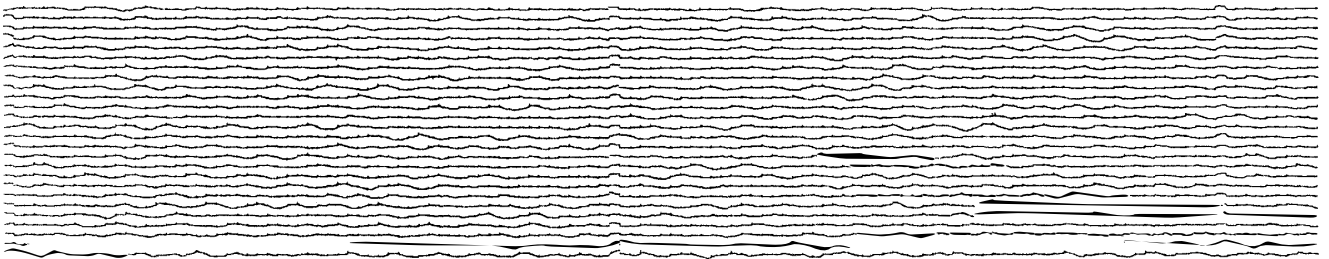
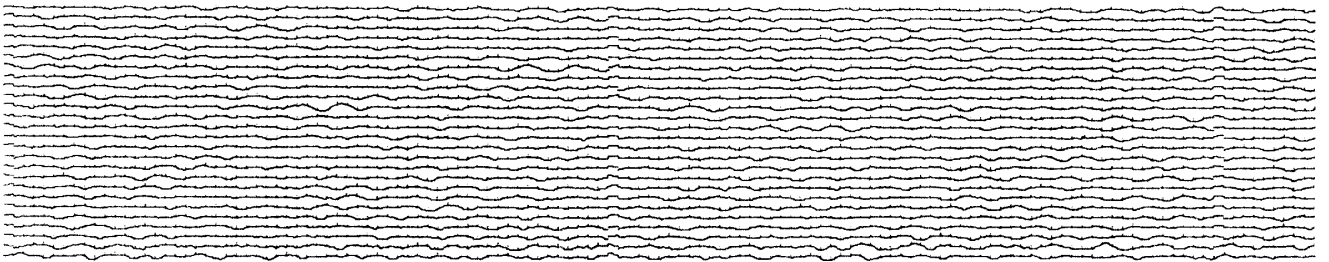
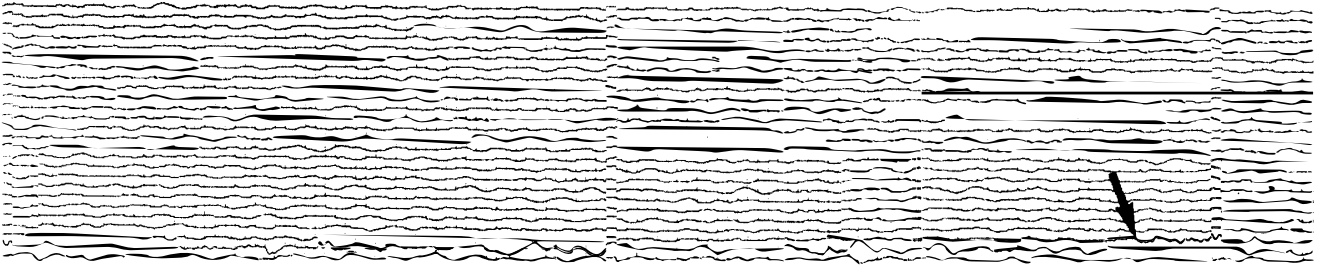
35.986 N 100.245 E 8km Mb 6.5 Ms 6.9

Qinghai Province, China

SP



LP



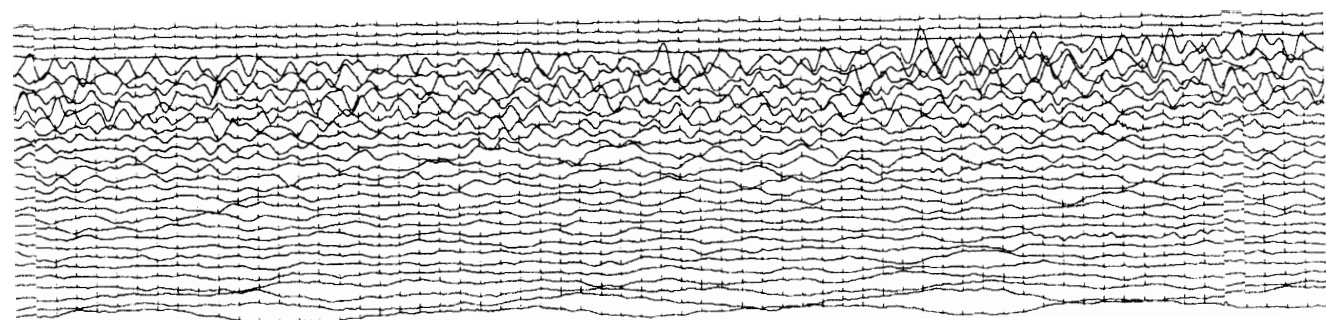
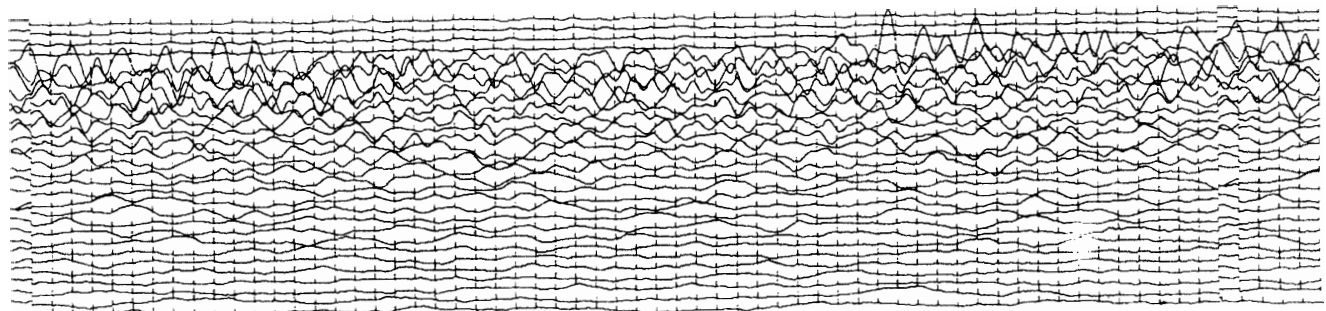
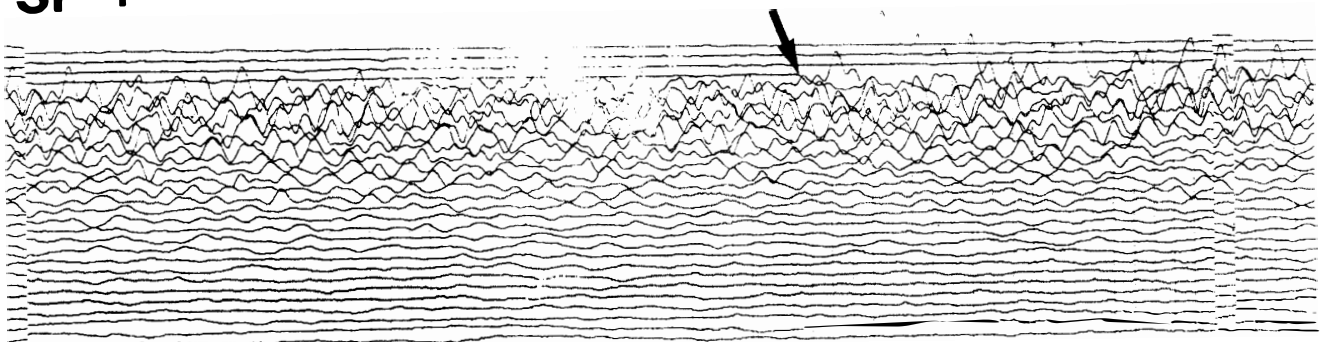
#-66

MAY 20 02h22m01.6s

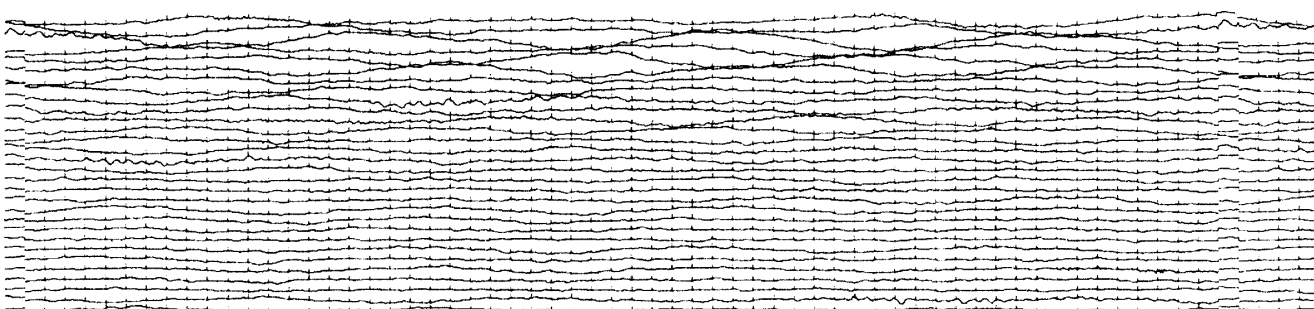
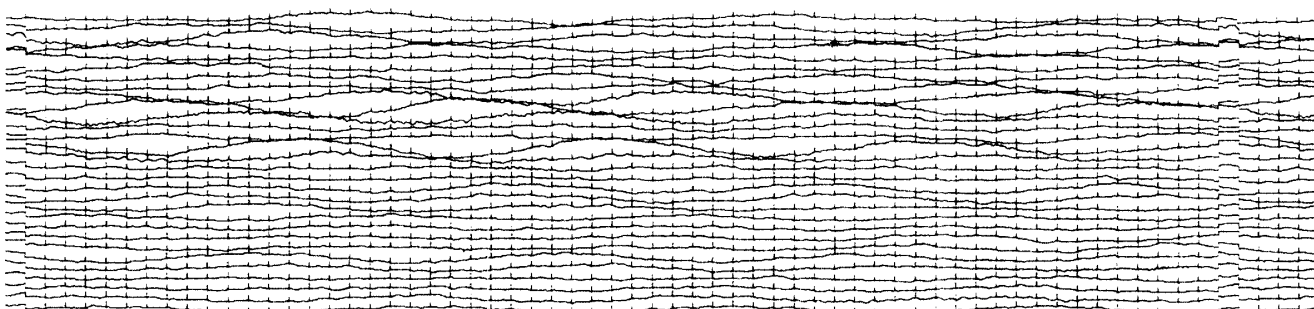
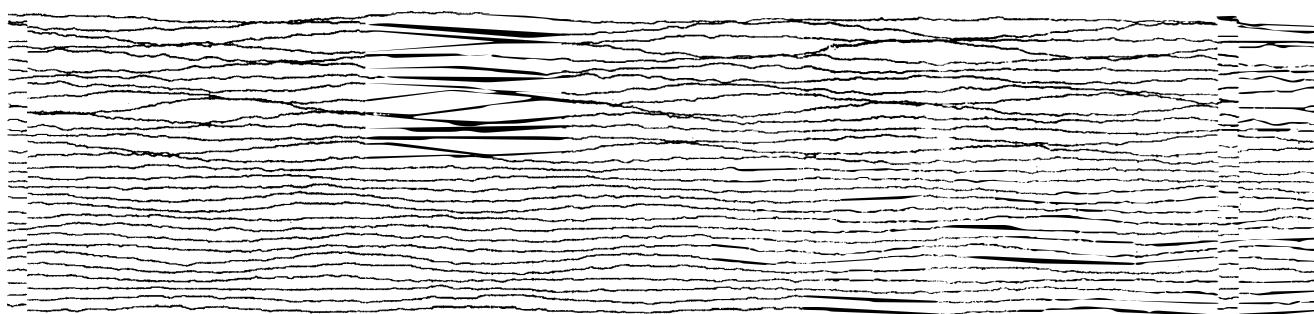
5.121 N 32.145 E 15km Mb 6.7 Ms 7.1

Sudan

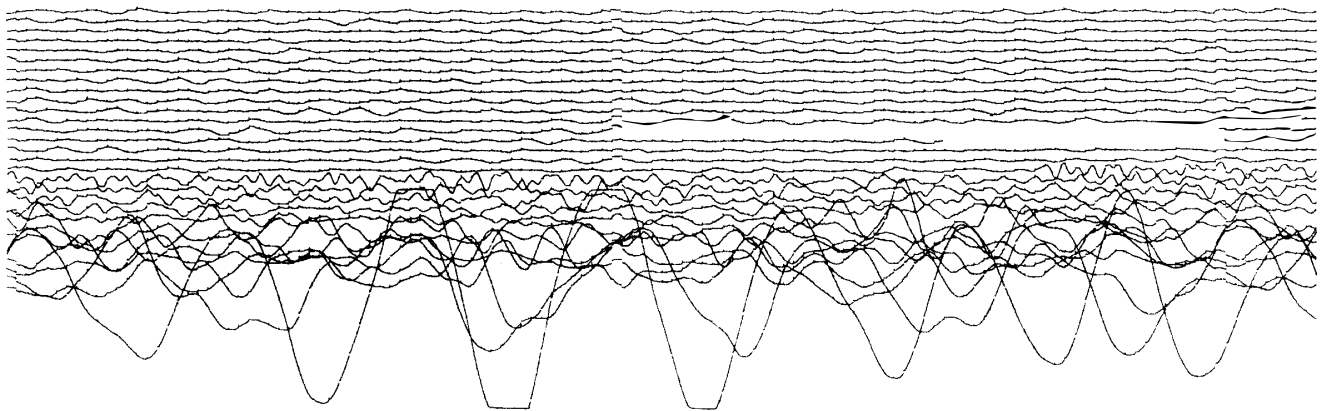
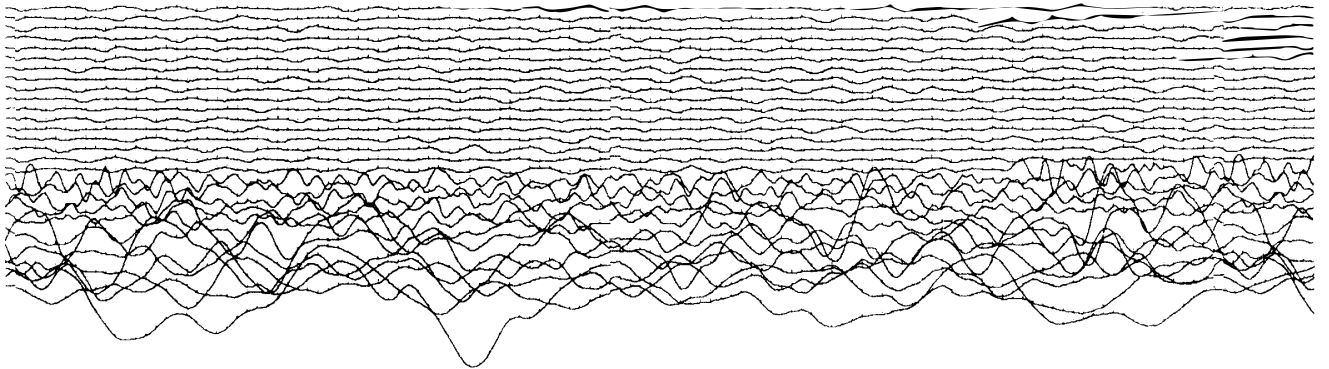
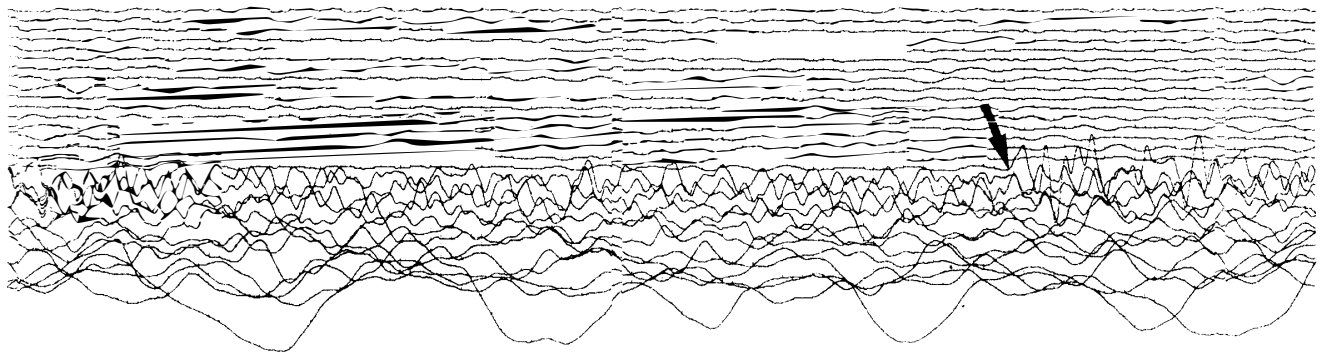
SP-1



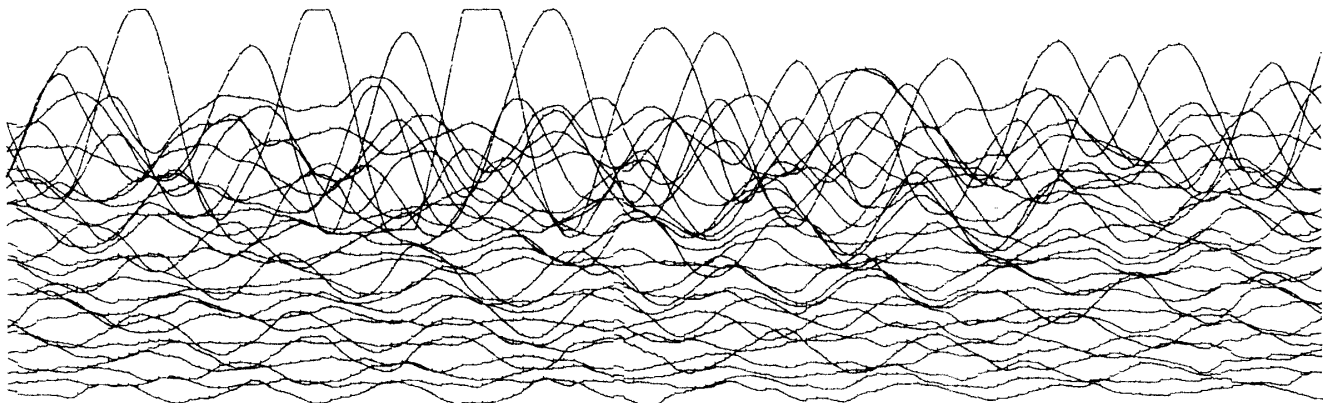
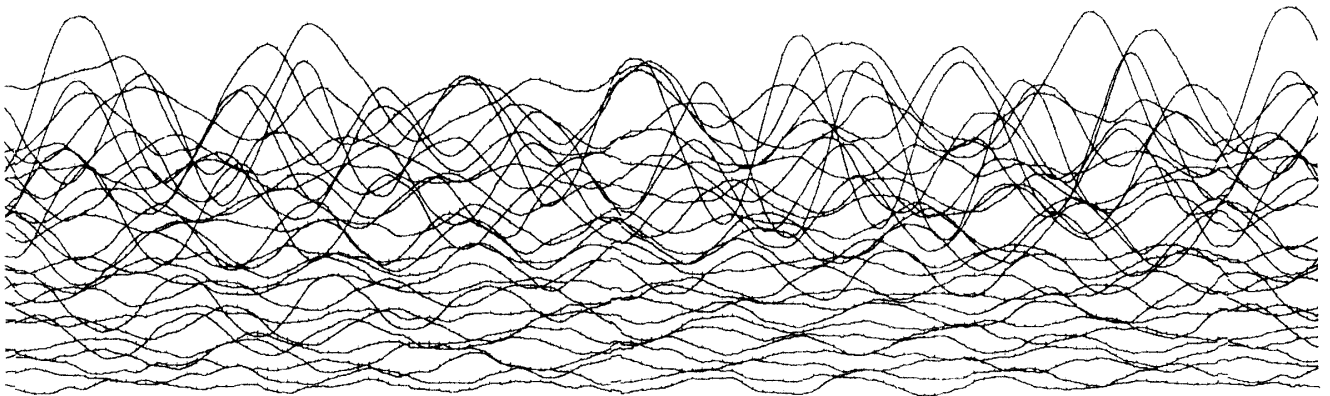
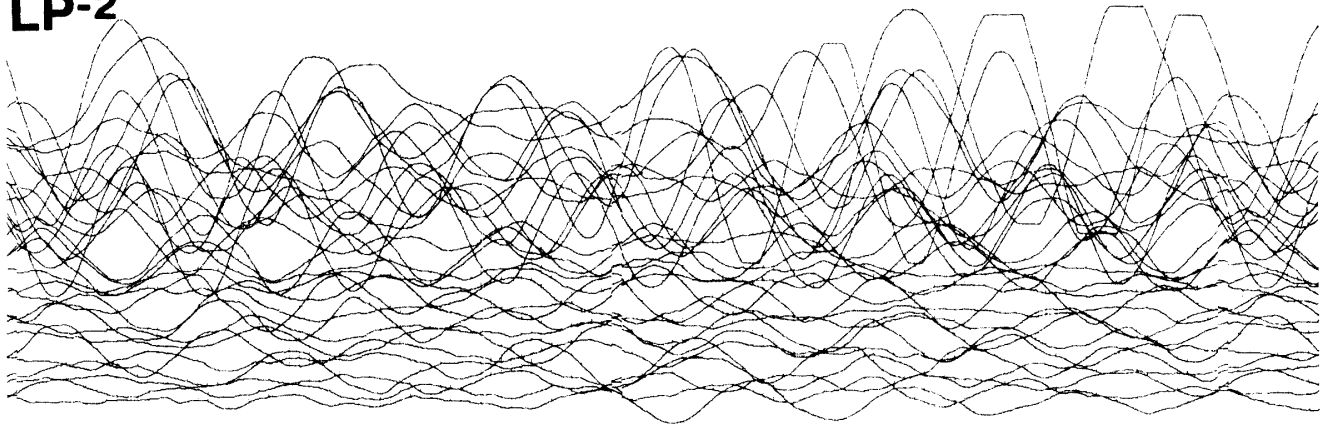
SP-2



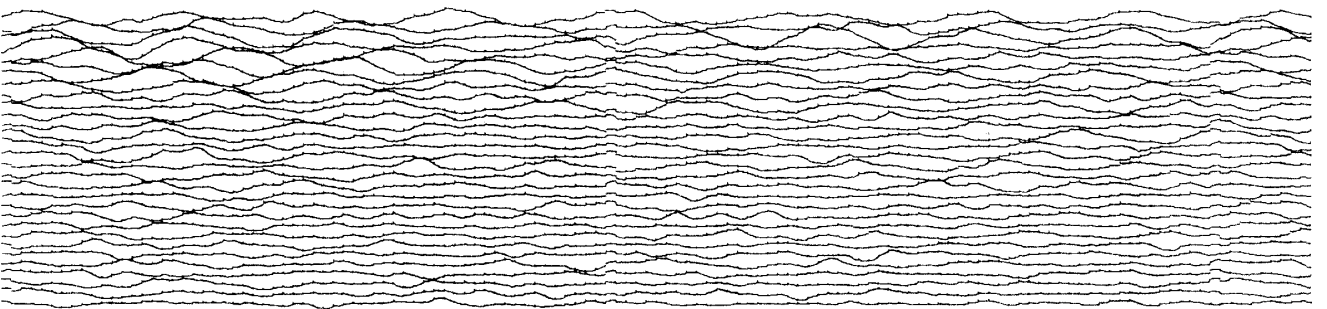
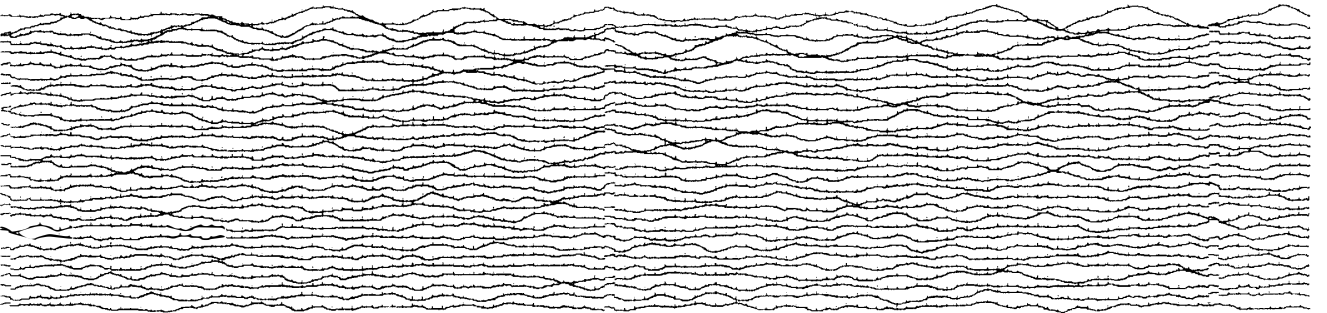
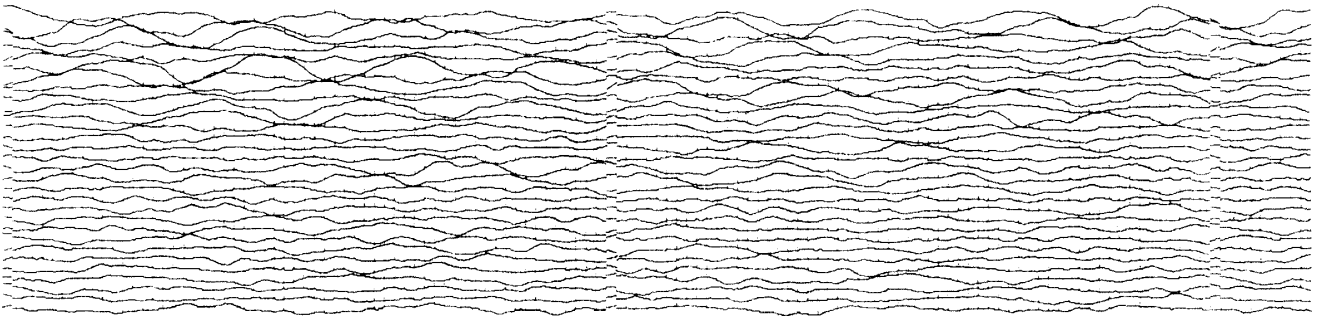
LP-1



LP-2



LP-3

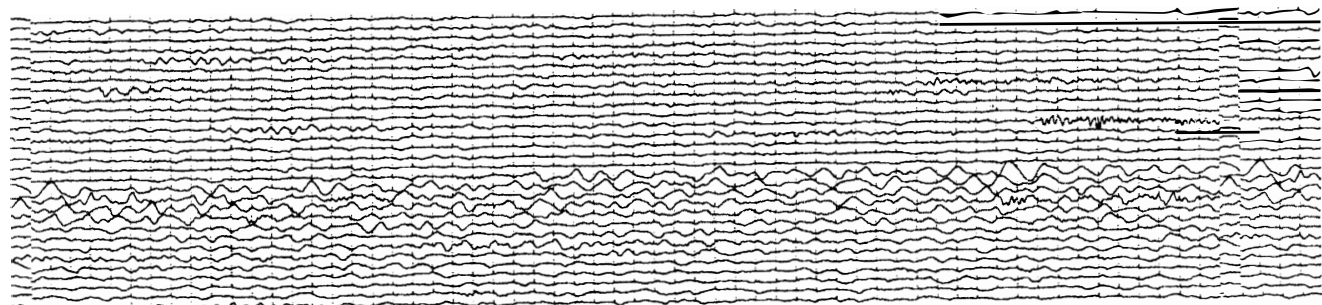
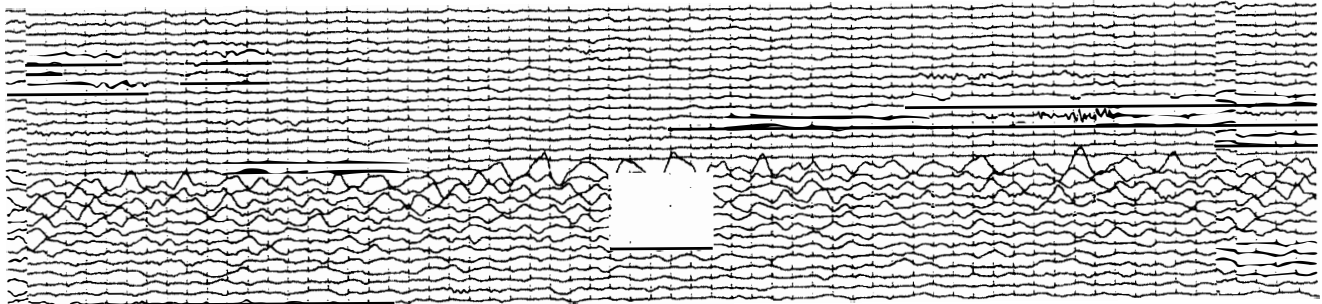
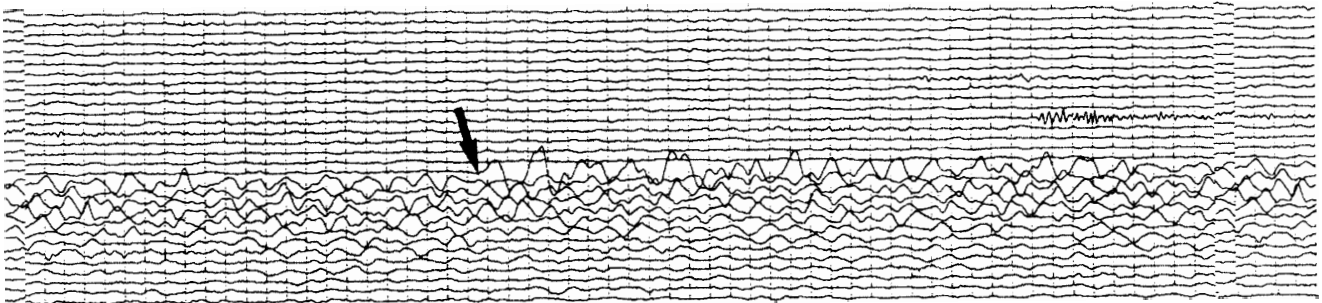


#-69

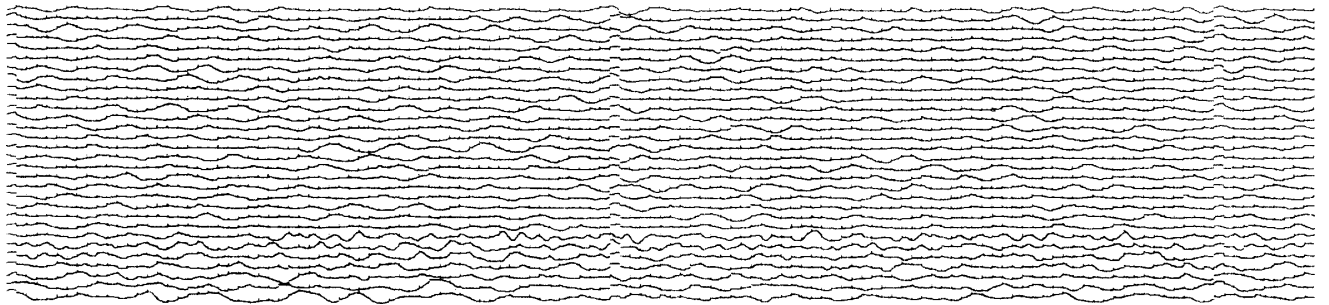
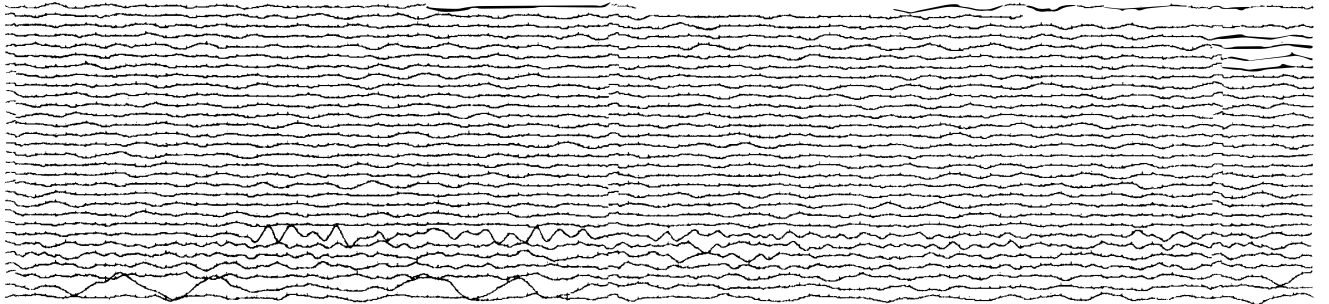
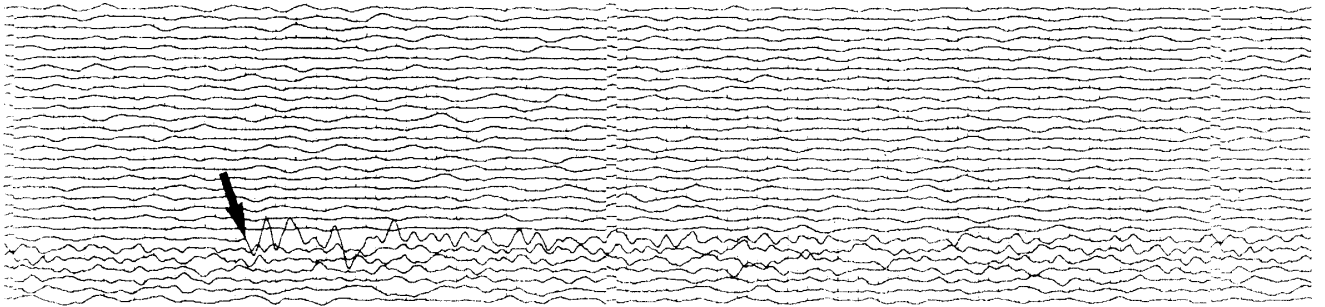
MAY 24 19h34m44.2s

5.277 N 31.829 E 17km Mb 5.9 Ms 6.6
Sudan

SP



LP



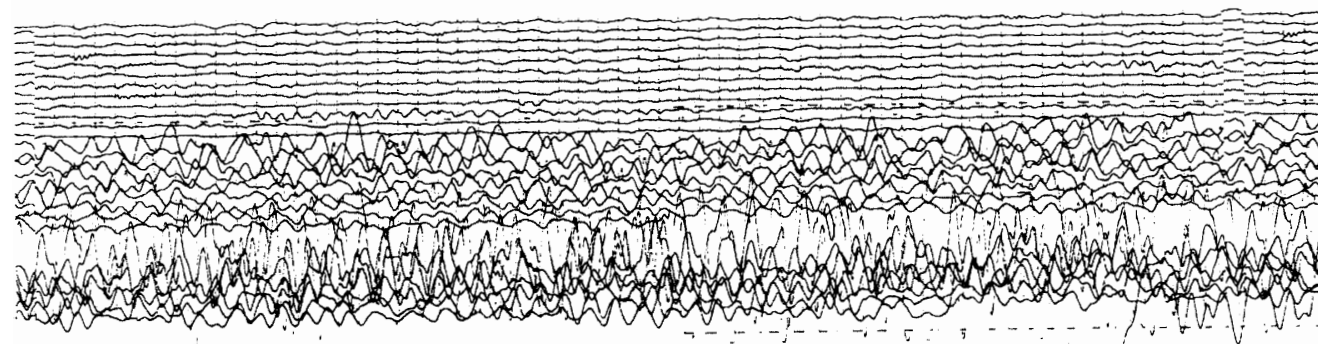
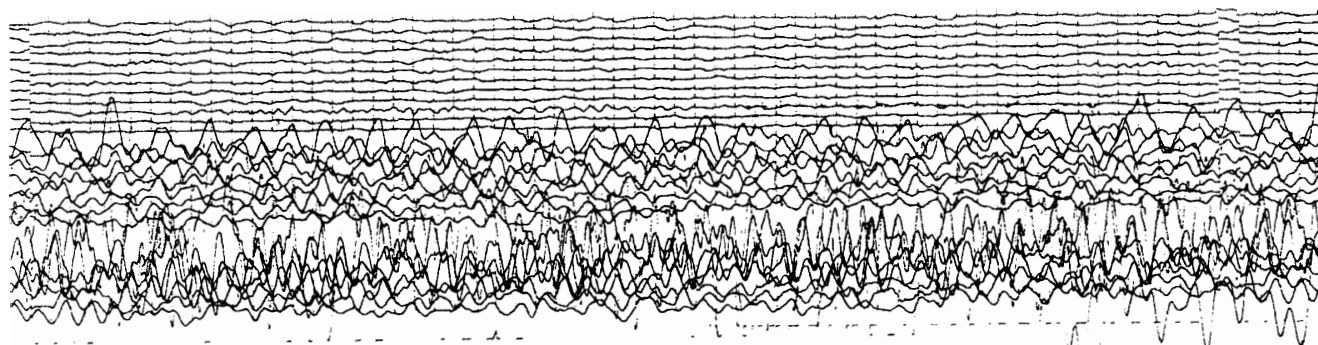
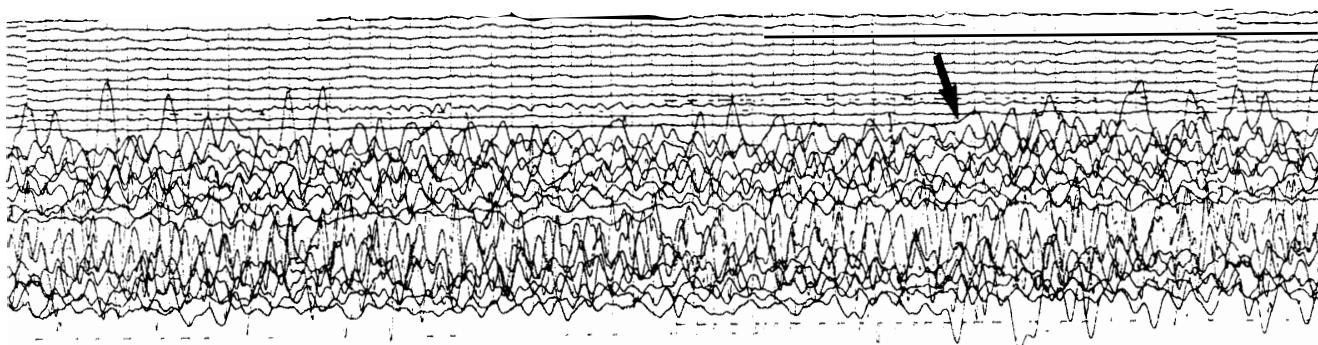
#-70

MAY 24 20h00m08.1s

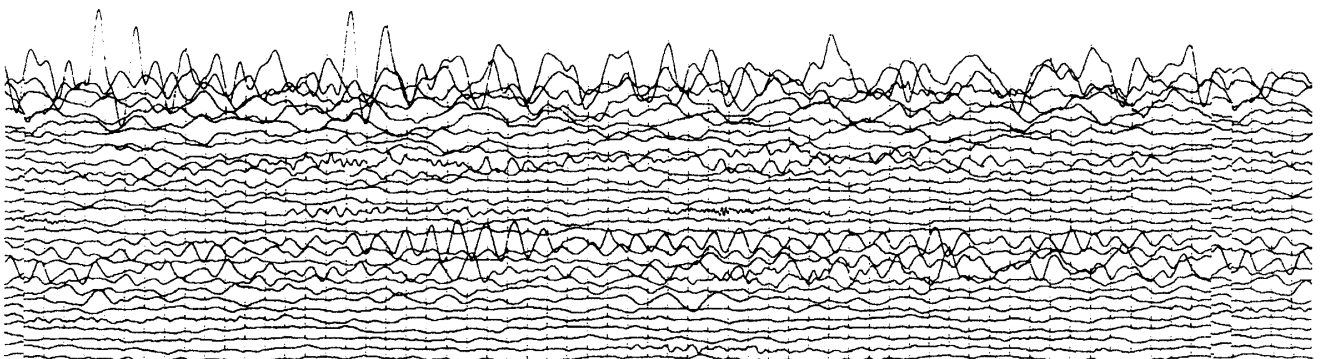
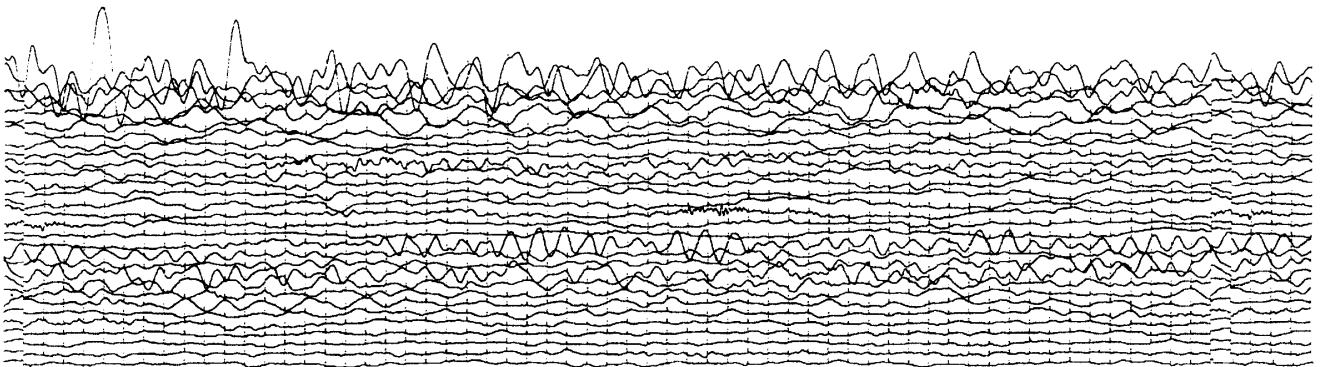
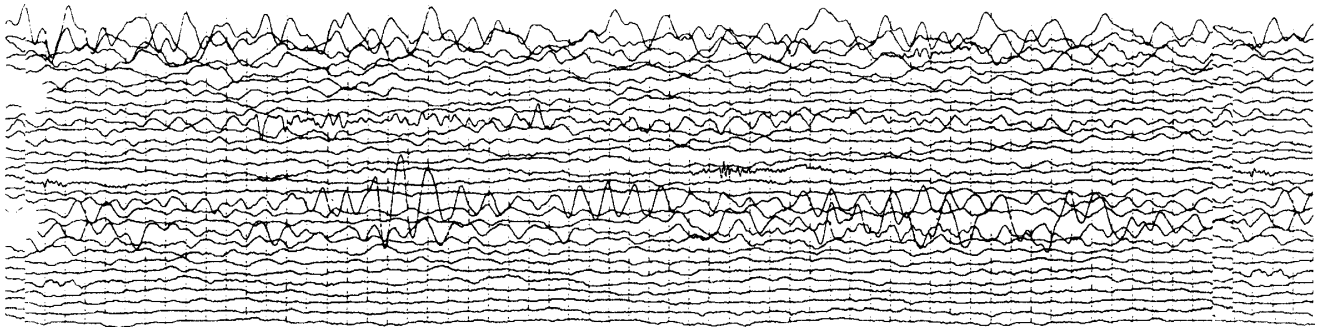
5.358 N 31.848 E 16km Mb 6.5 Ms 7.0

Sudan

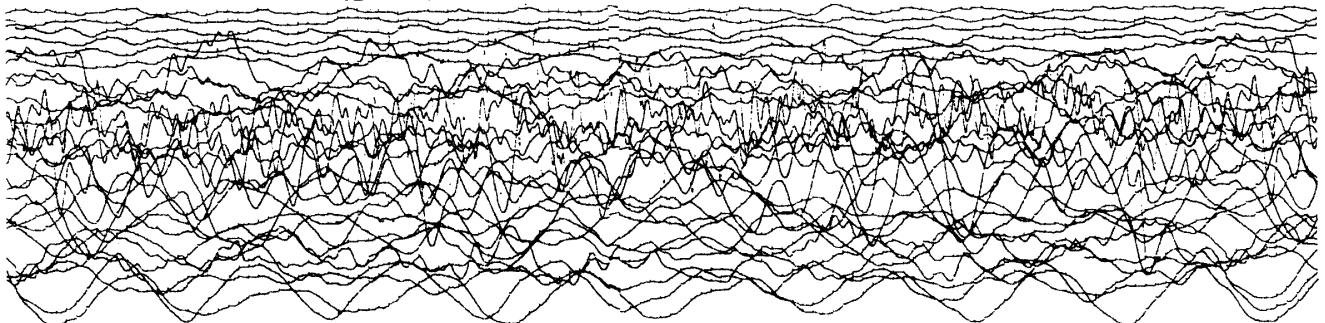
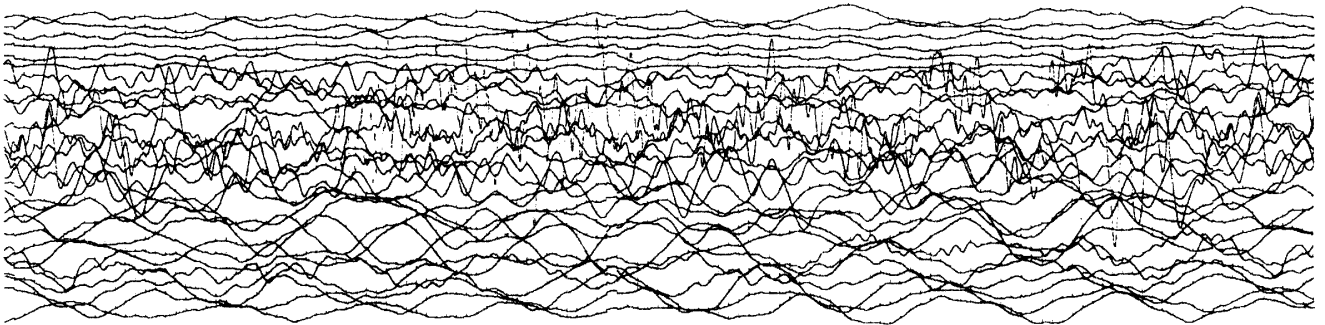
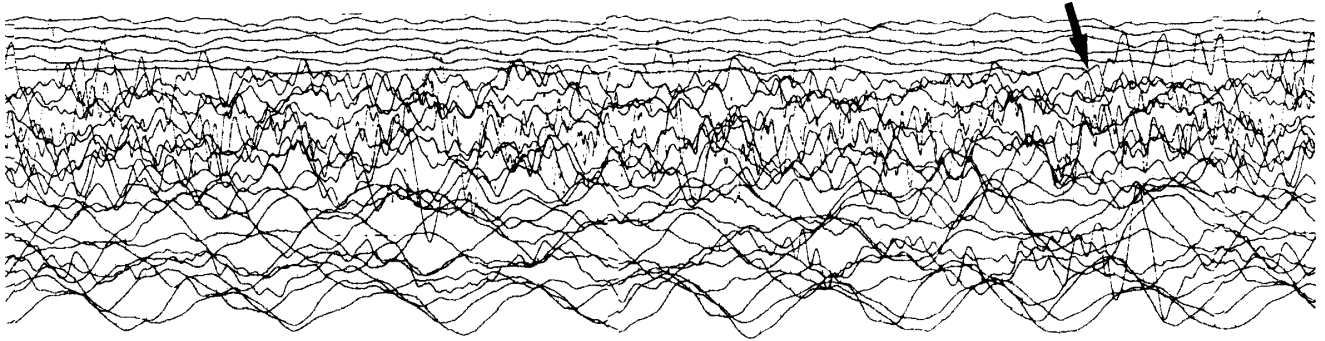
SP-1



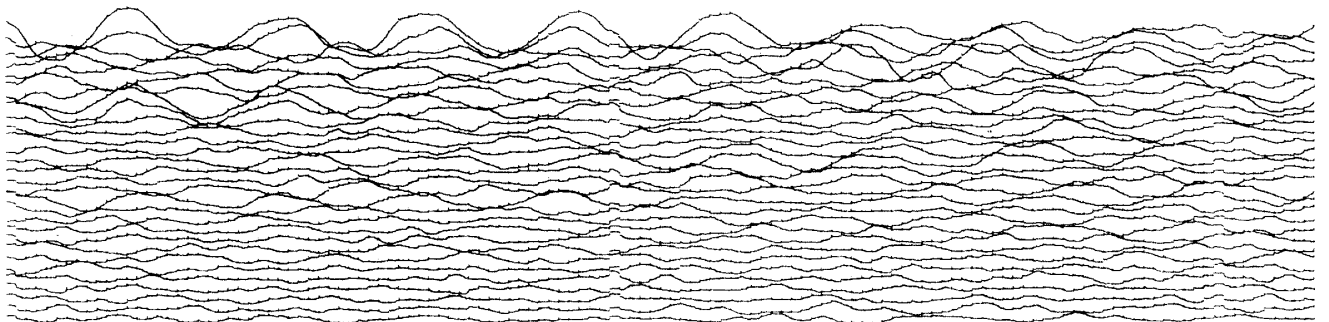
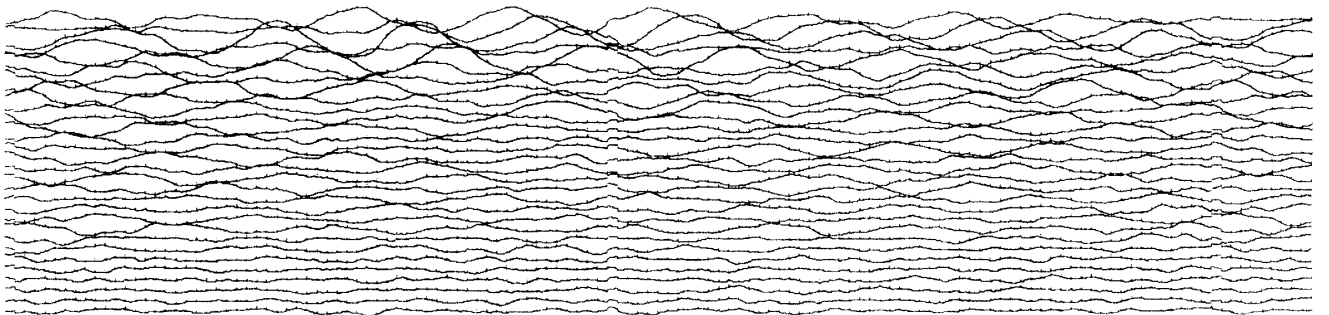
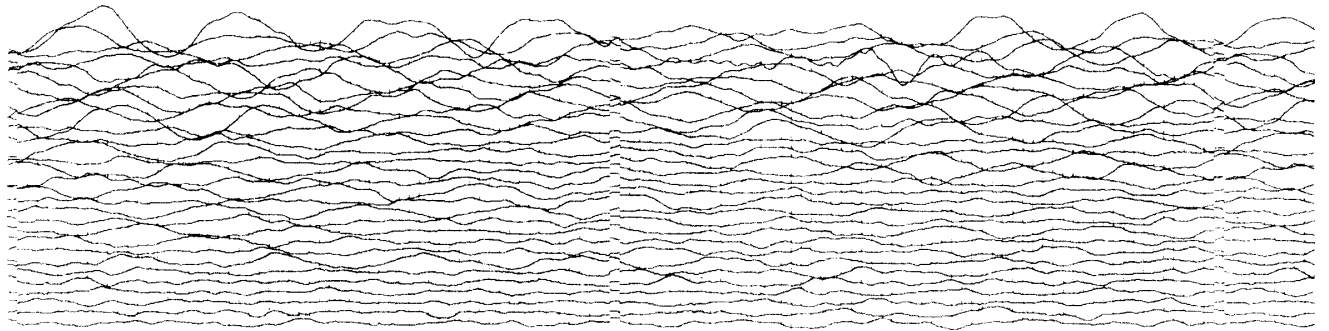
SP-2



LP-1



LP-2

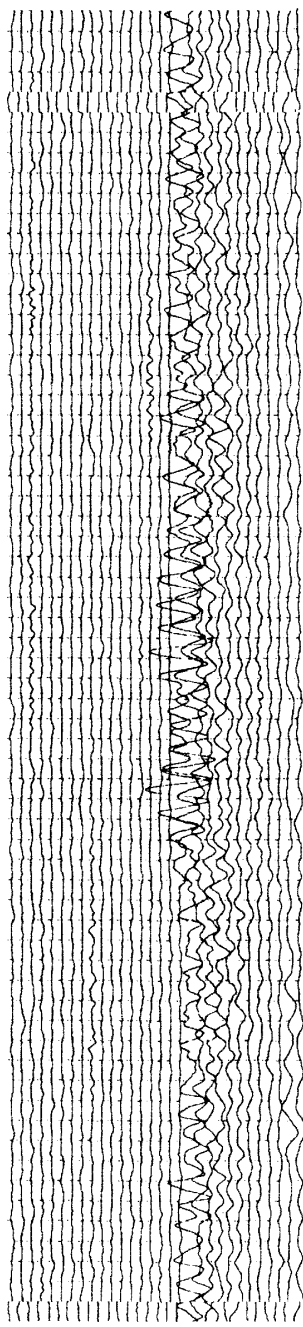
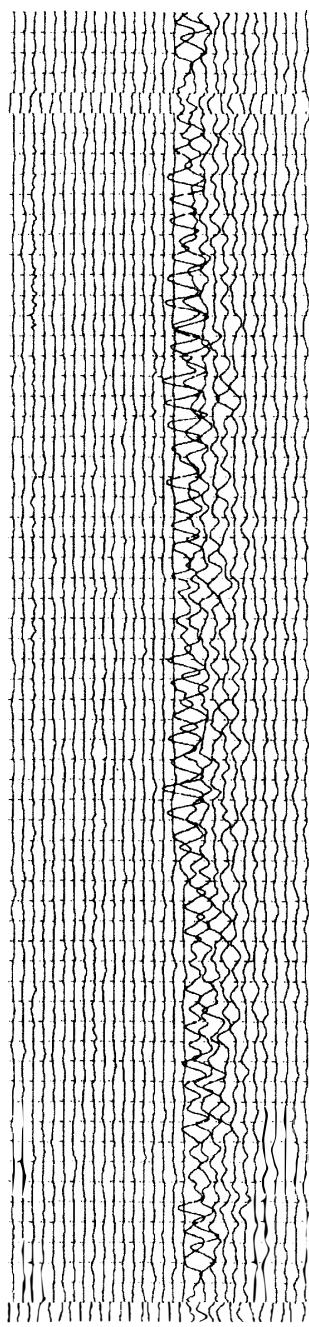
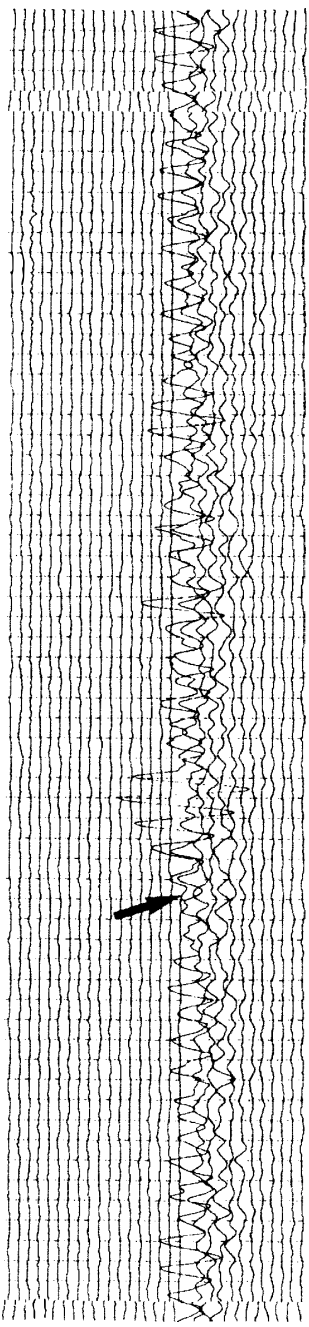


#-75

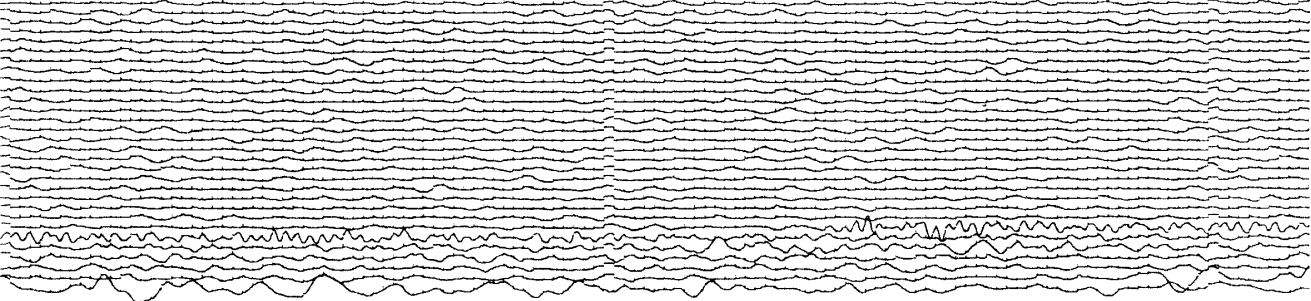
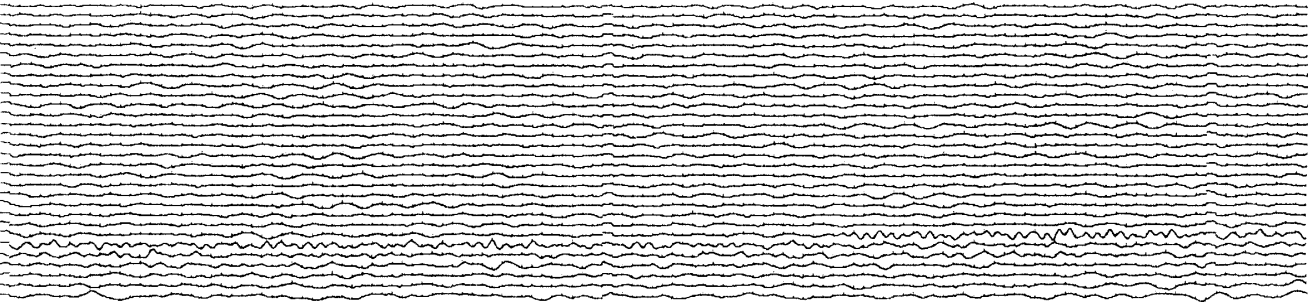
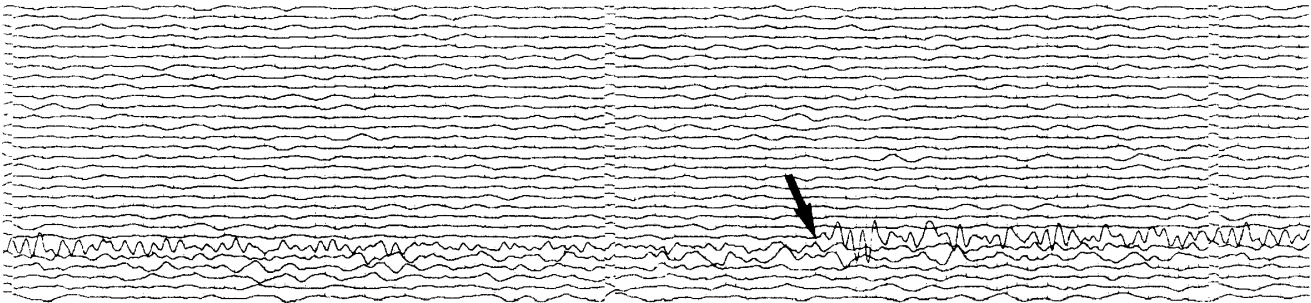
MAY 30 02h34m05.8s

**6.016 S 77.229 W 24km Mb 6.1 Ms 6.5
Northern Peru**

SP



LP

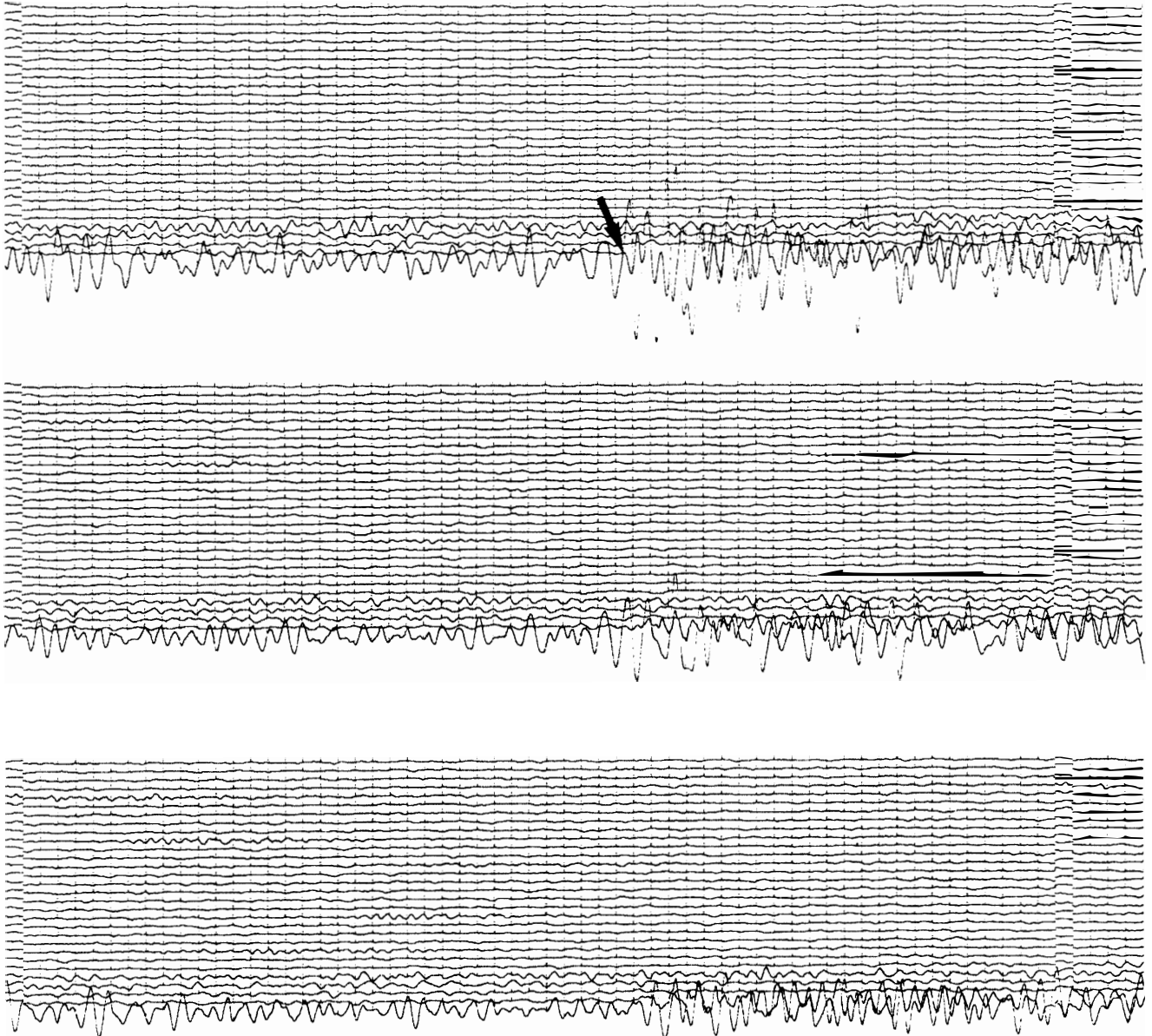


#-76

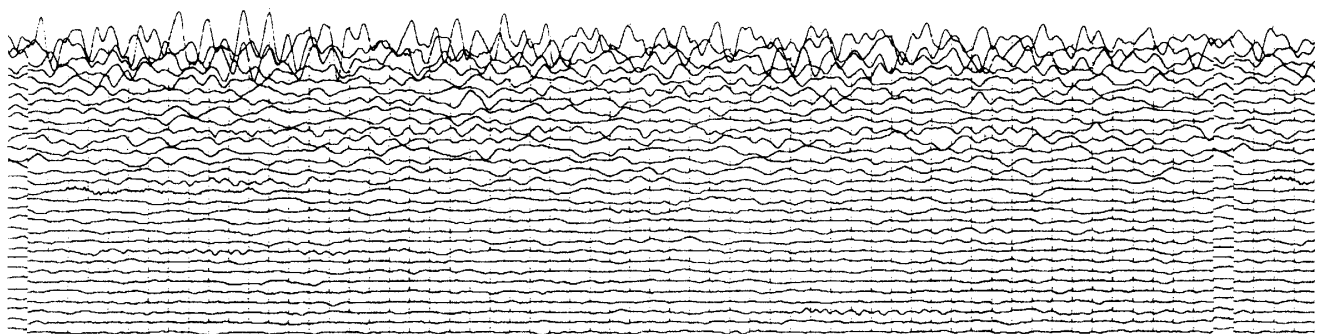
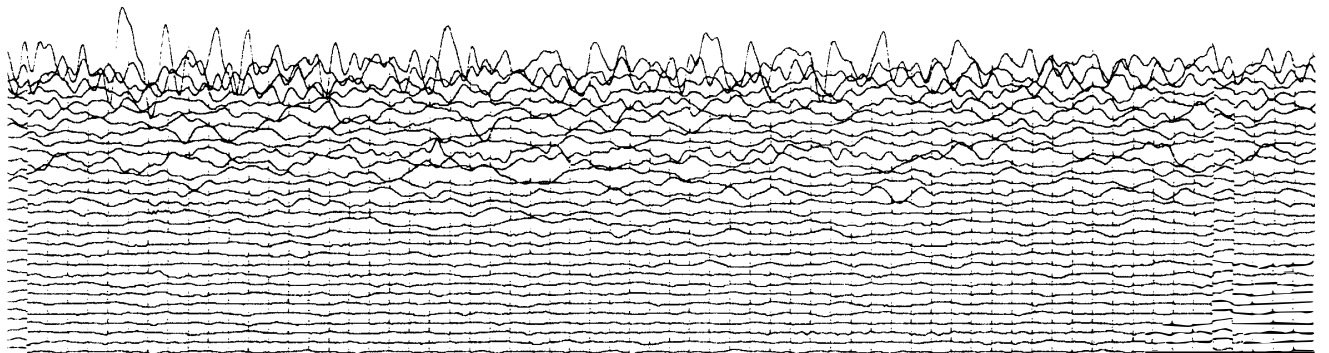
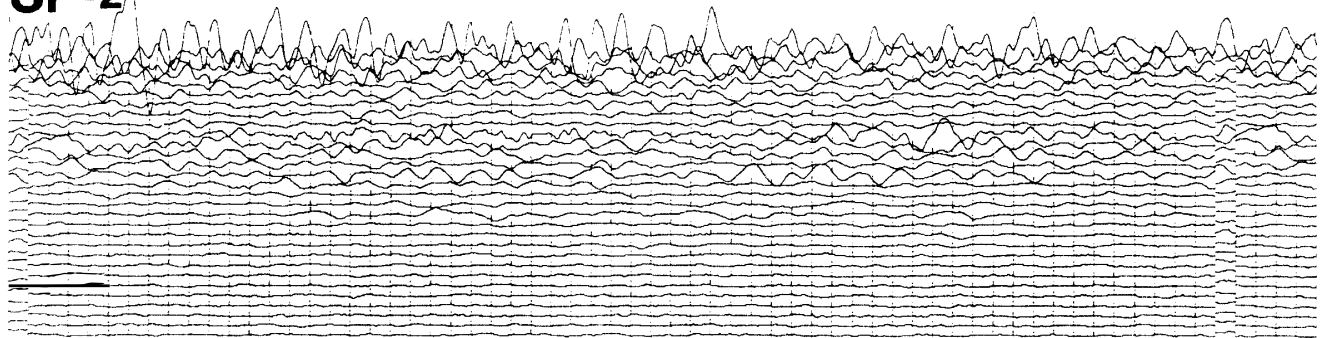
MAY 30 10h40m06.1s

45.841 N 26.668 E 89km Mb 6.7
Romania

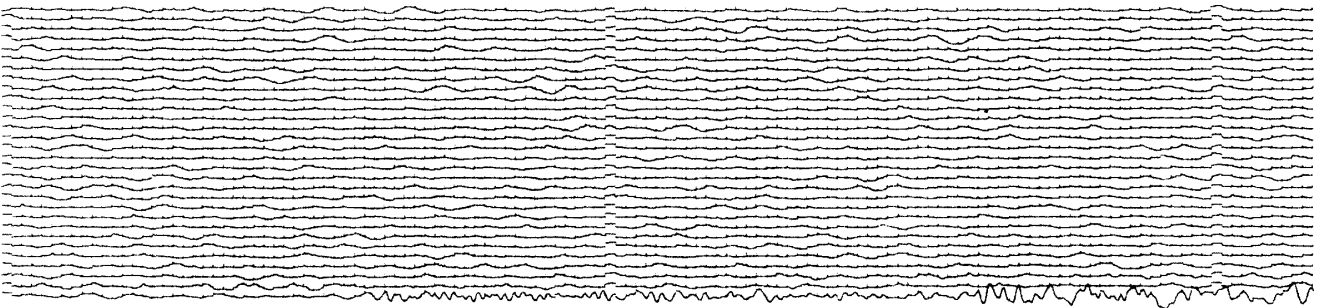
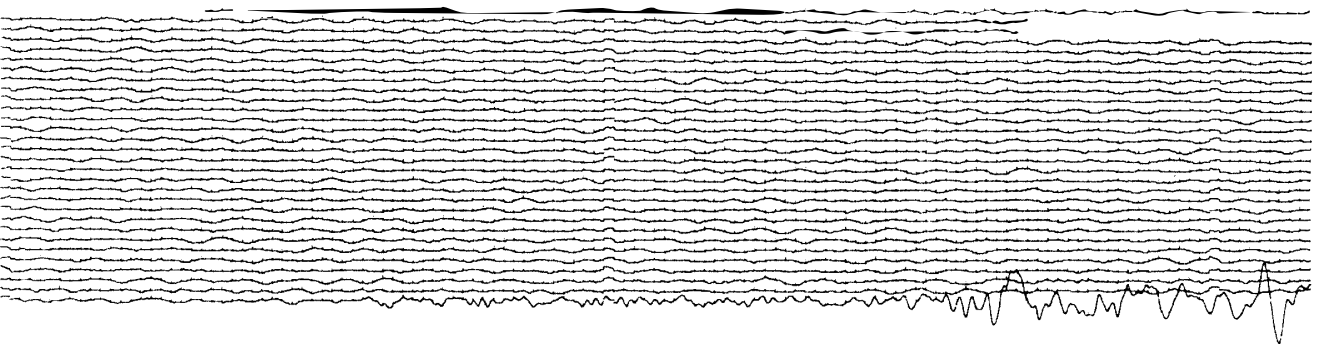
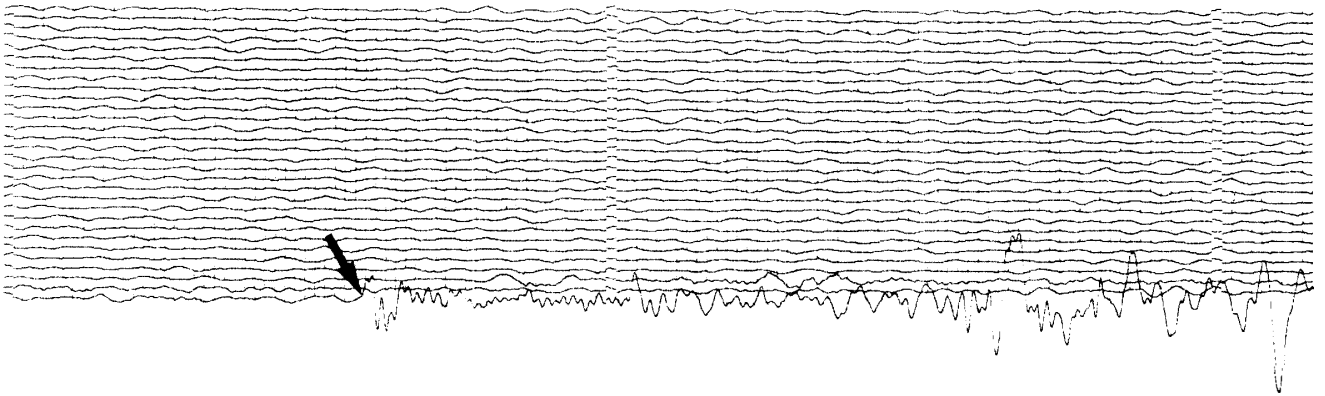
SP-1



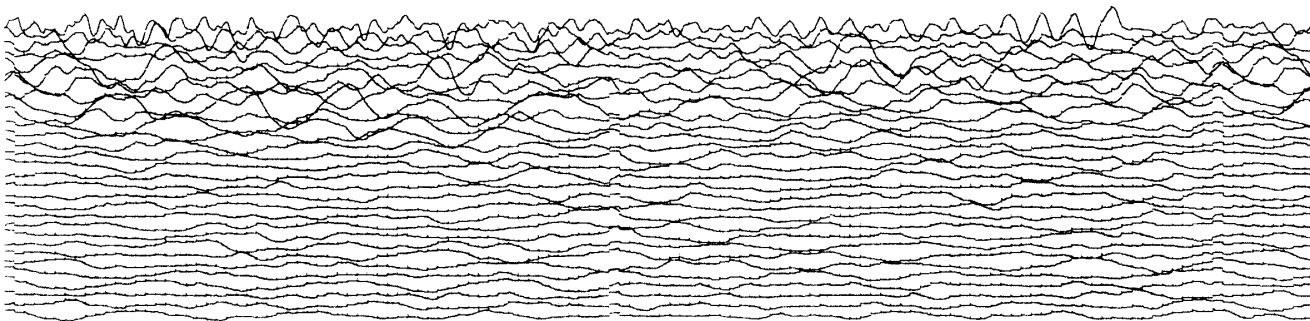
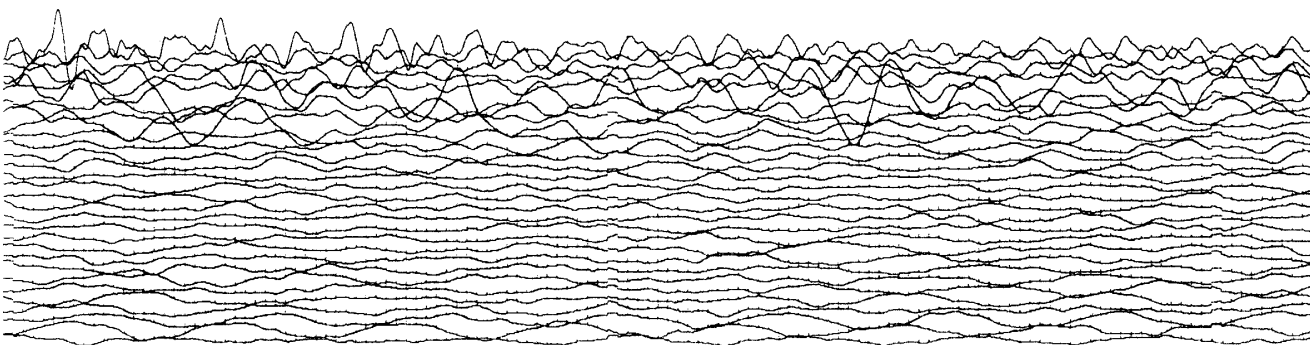
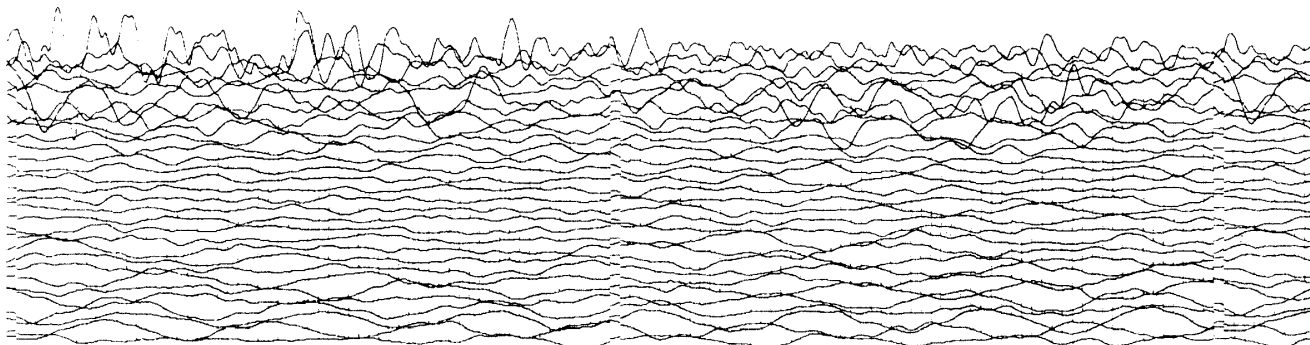
SP-2



LP-1



LP-2

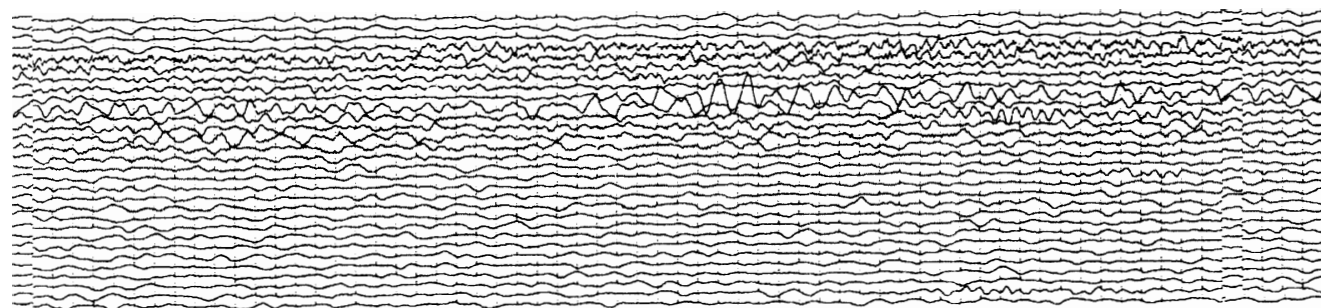
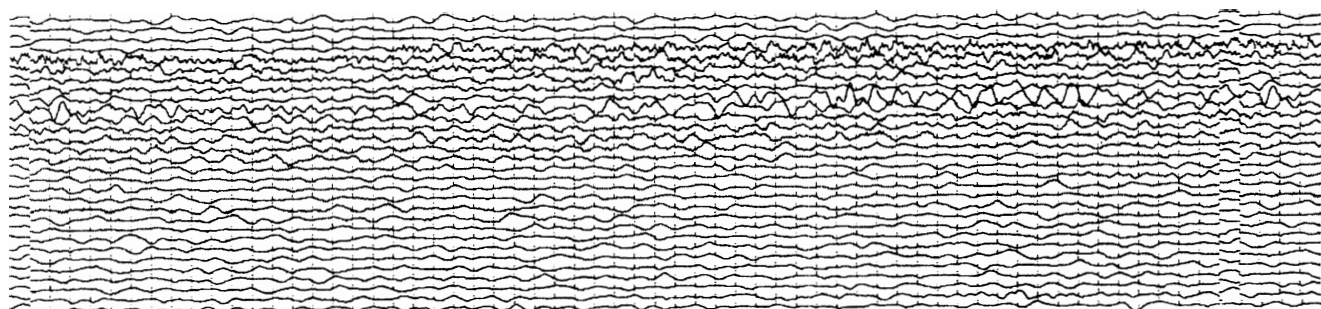
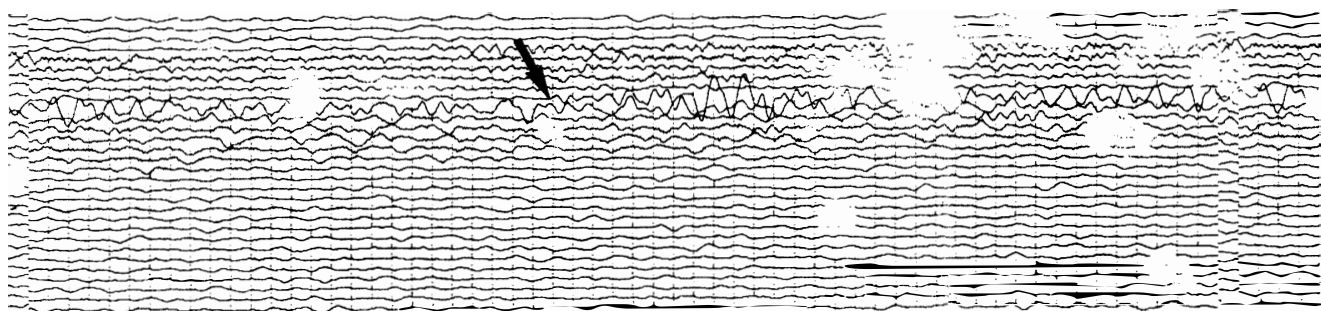


#-78

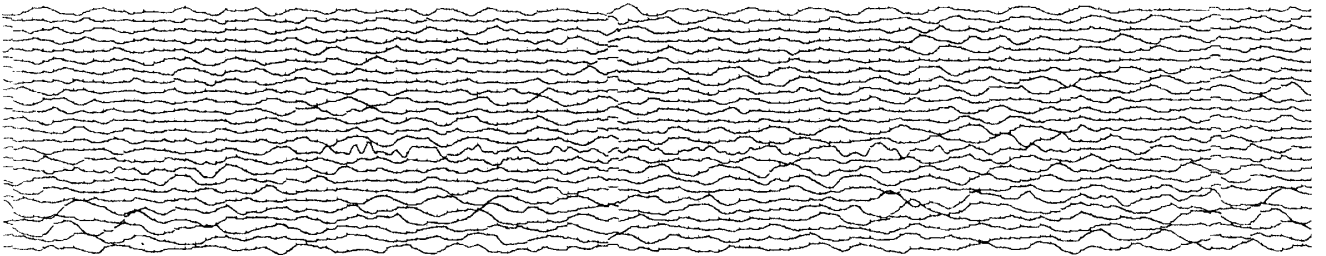
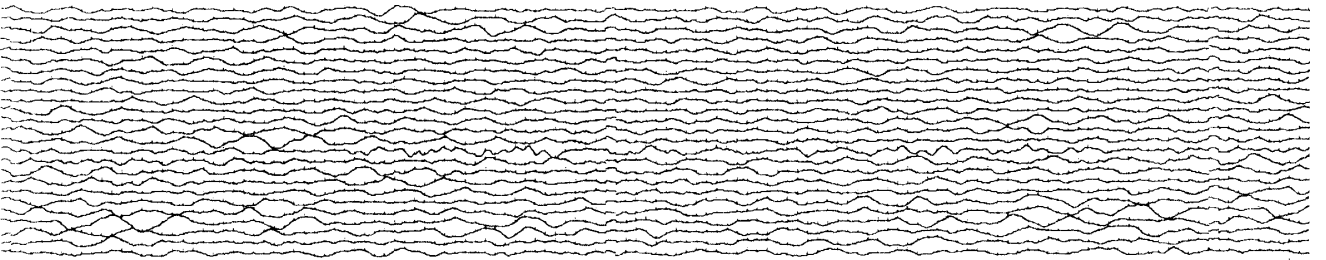
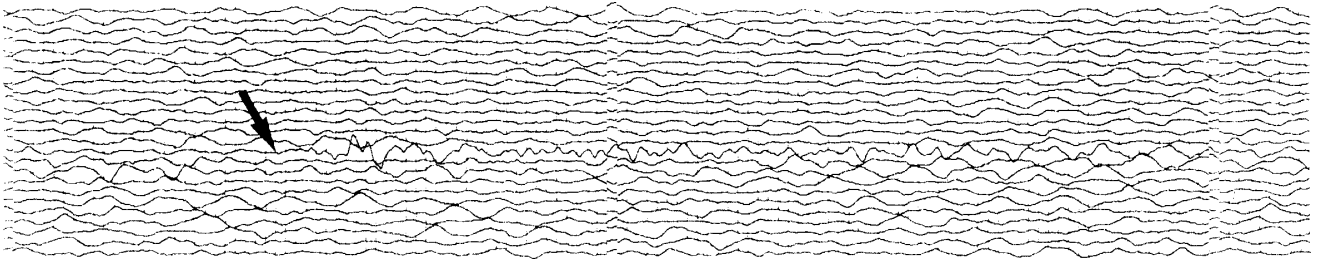
JUNE 07 09h25m19.1s

3.563 S 144.432 E 29km Mb 5.9 Ms 6.5
Near North Coast of Papua New Guinea

SP



LP

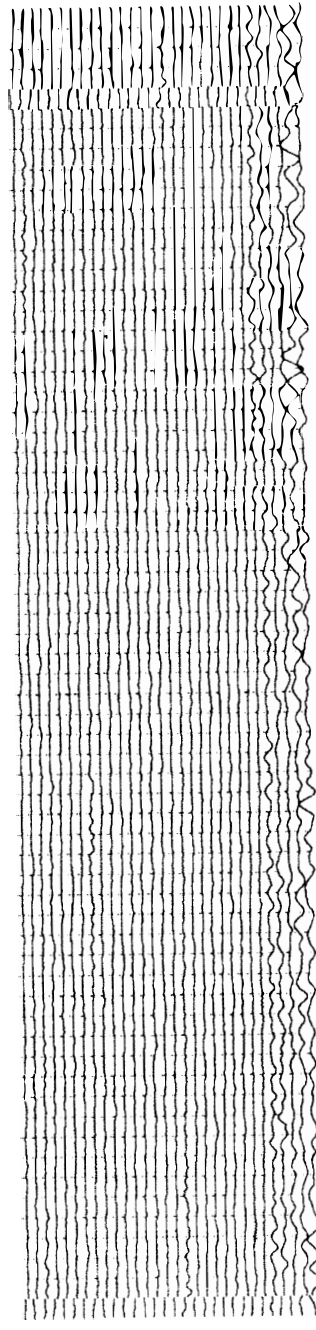
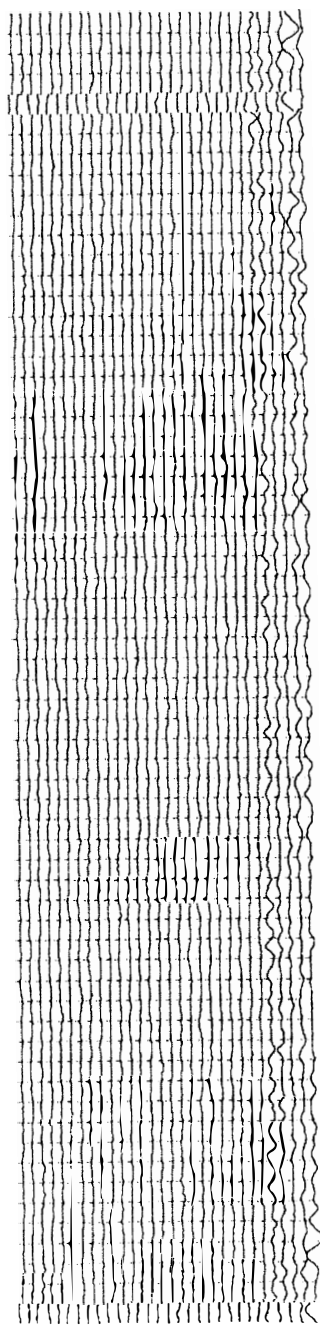
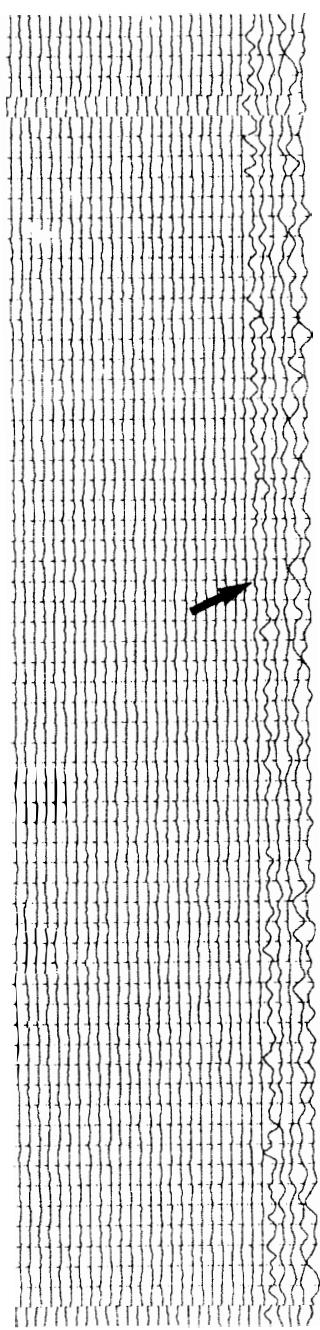


#-82

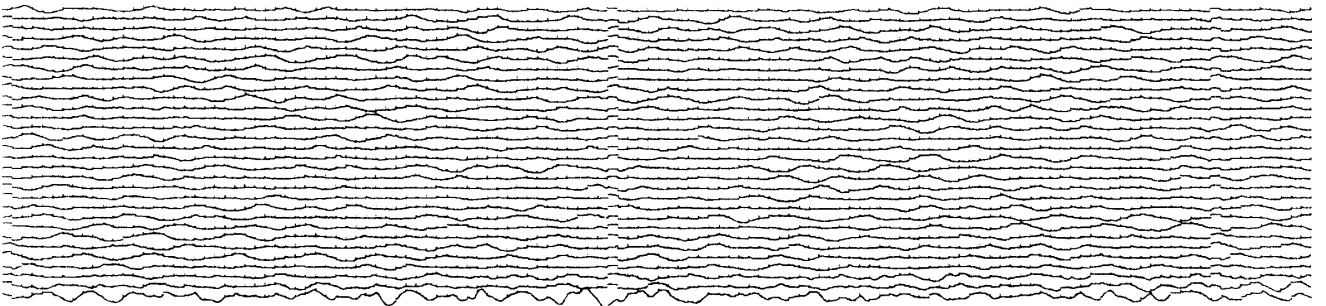
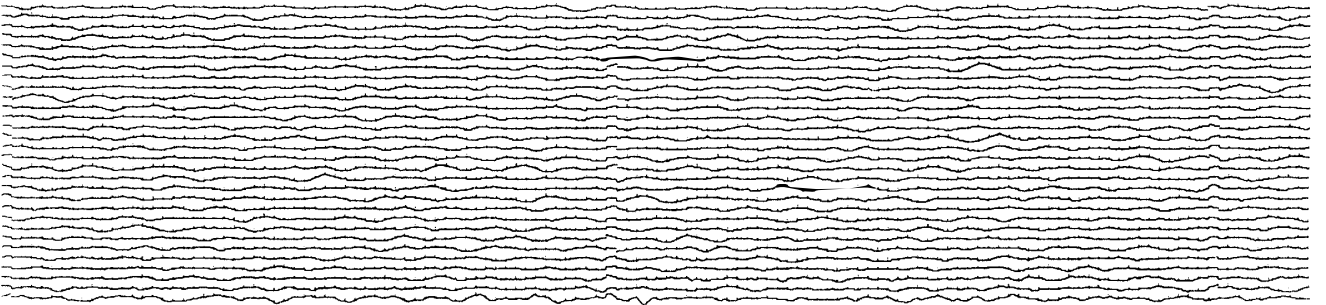
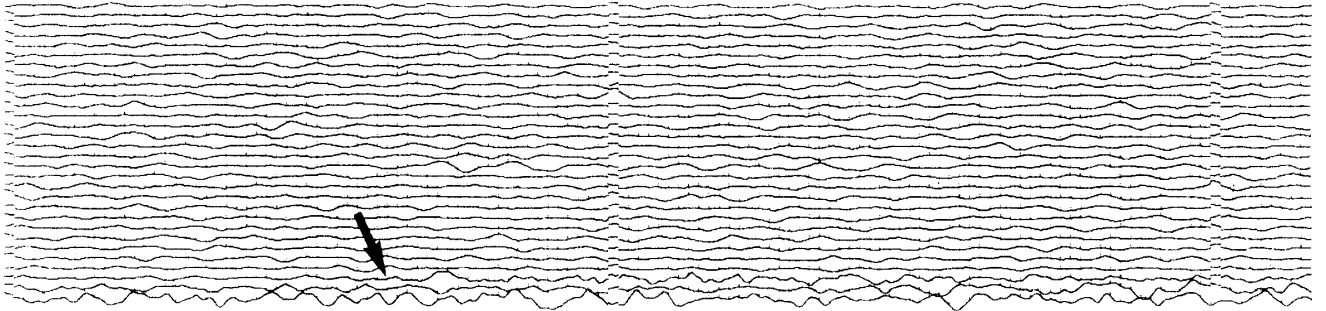
JUNE 14 07h40m56.2s

11.760 N 121.899 E 18 km Mb 6.0 Ms 7.1
Panay, Philippine Islands

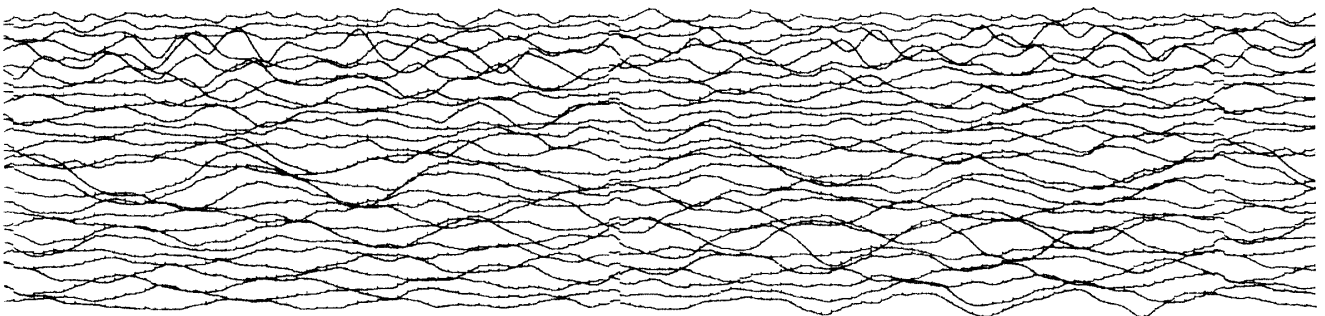
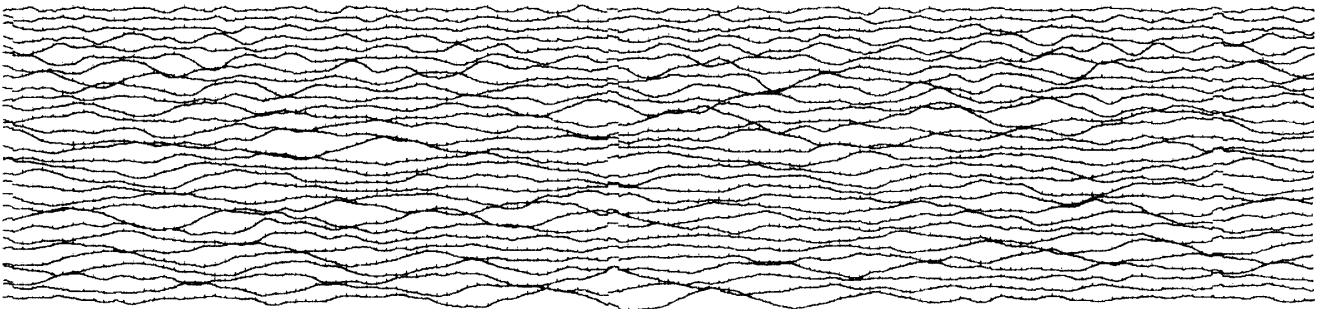
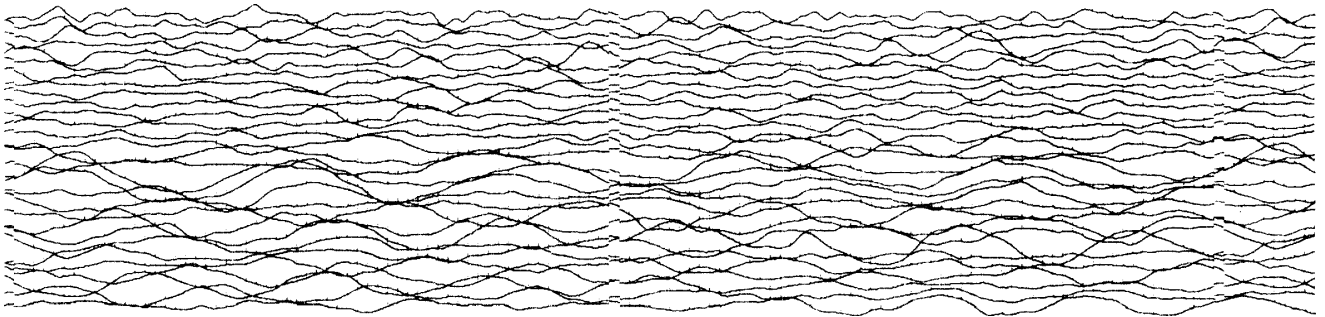
SP



LP-1



LP-2



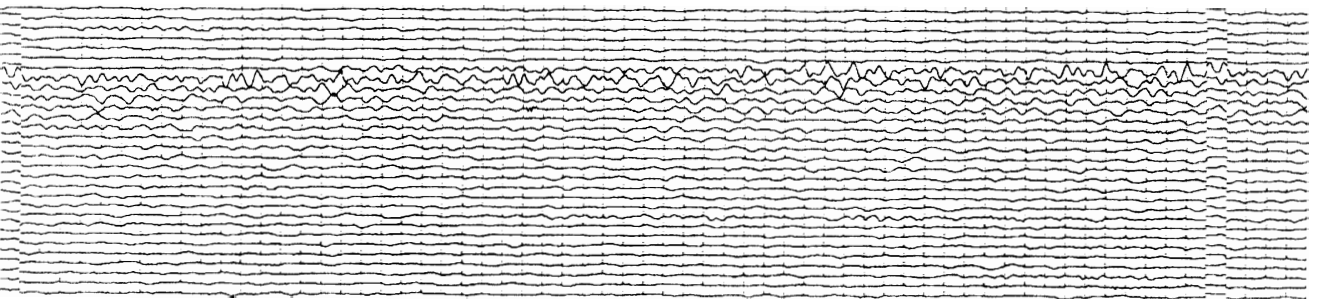
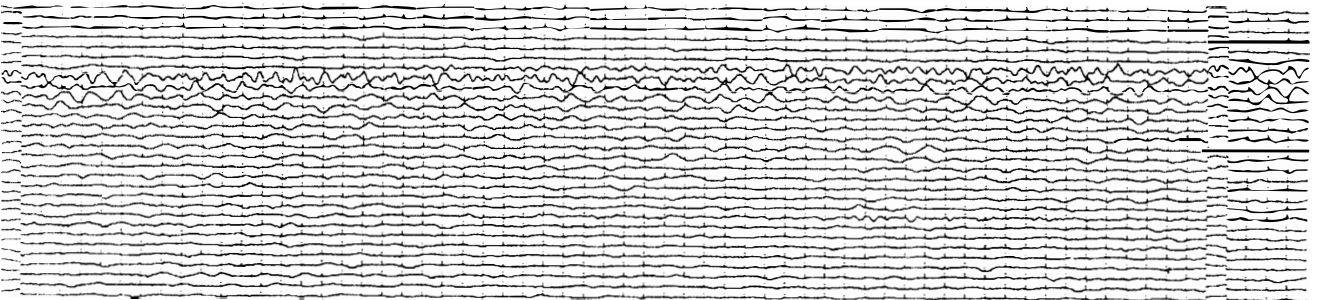
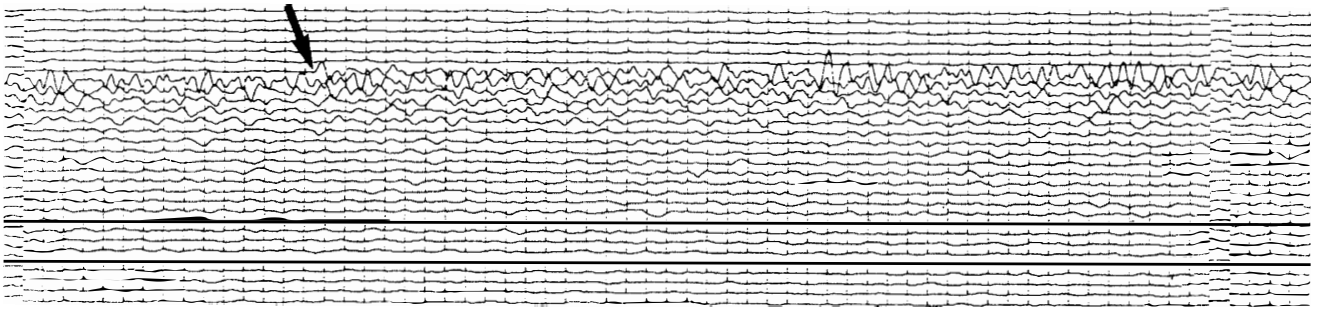
#-83

JUNE 14 12h47m28.8s

47.869 N 85.076 E 58km Mb 6.1 Ms 6.8

Kazakh-Xinjiang Border Region

SP



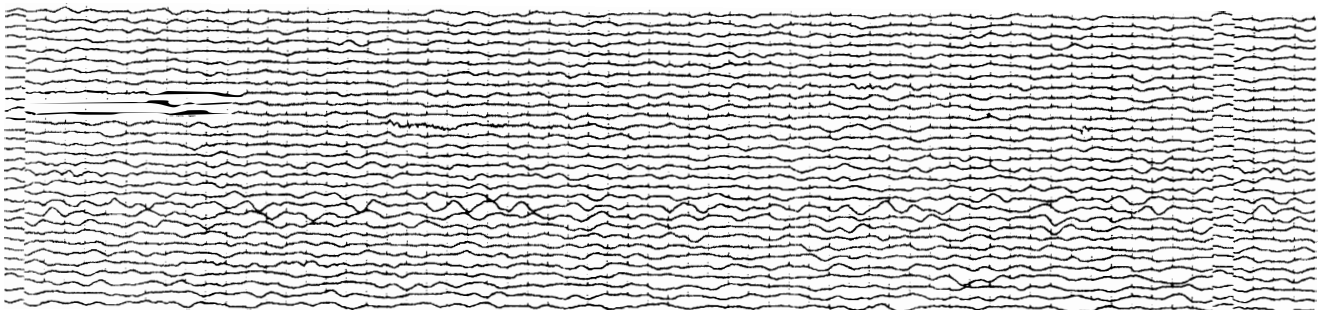
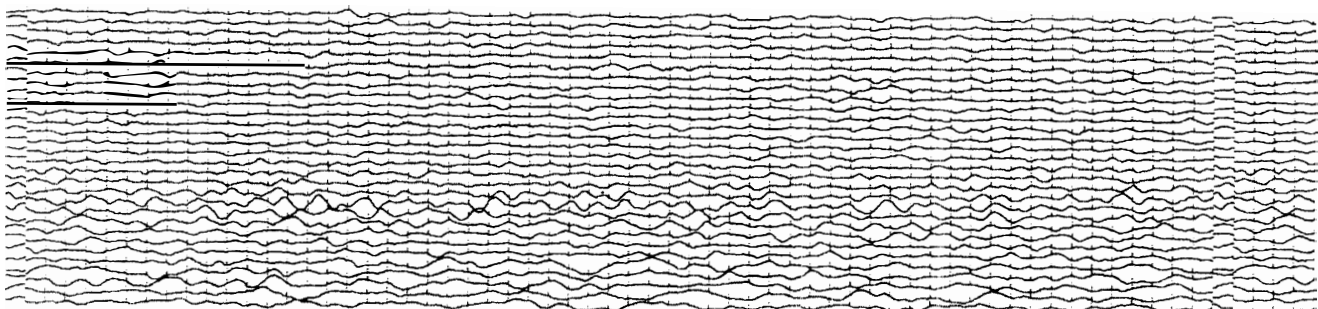
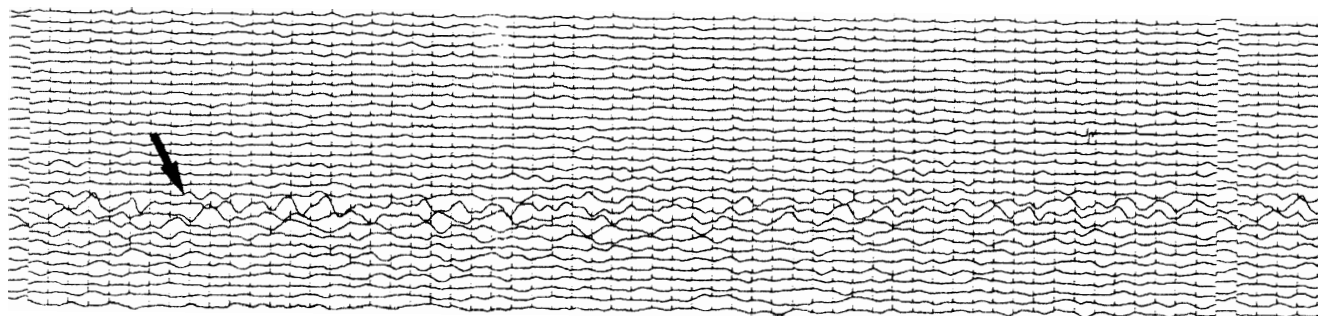
#-84

JUNE 20 21h00m09.9s

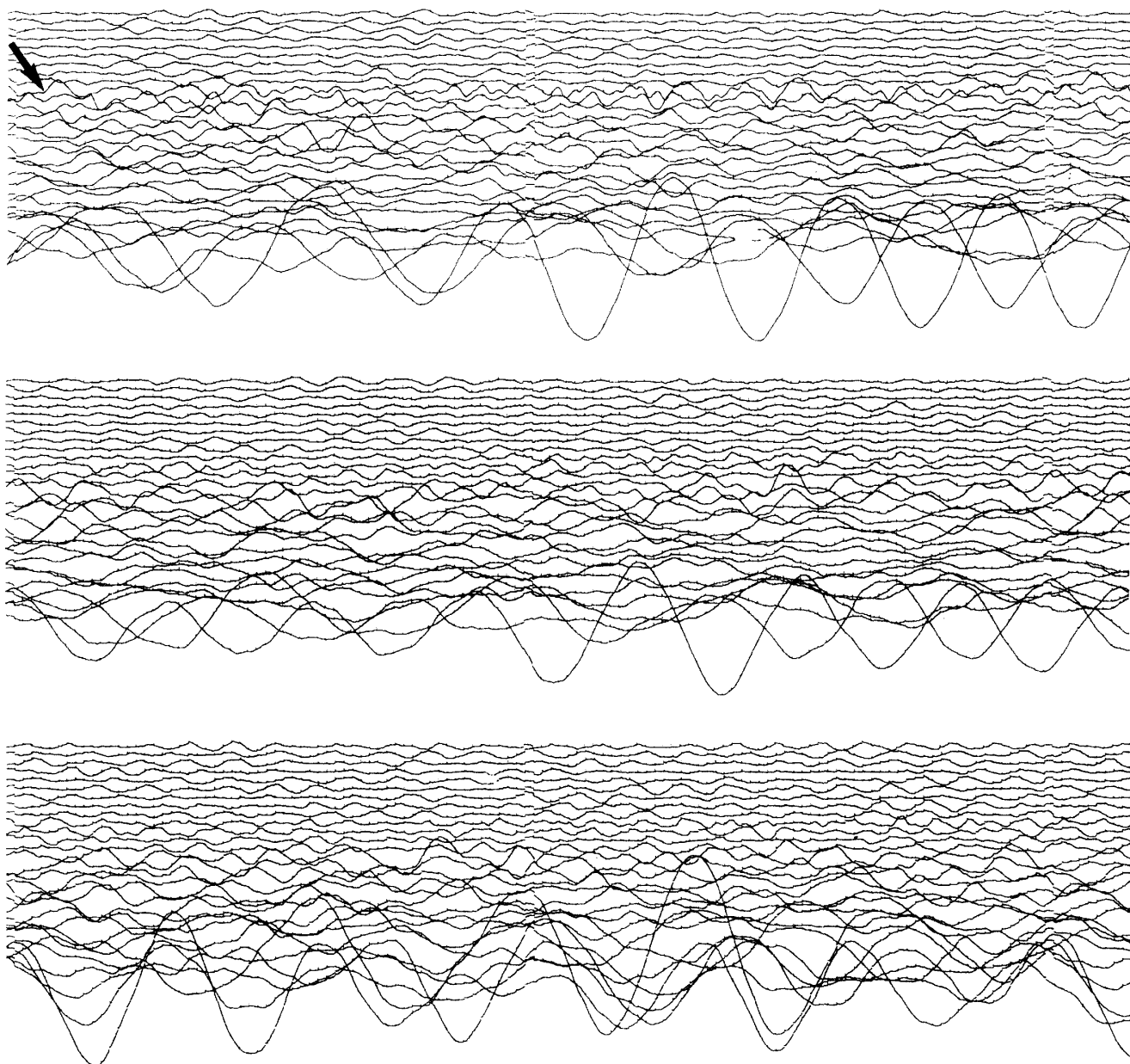
36.957 N 49.409 E 19km Mb 6.4 Ms 7.7

Western Iran

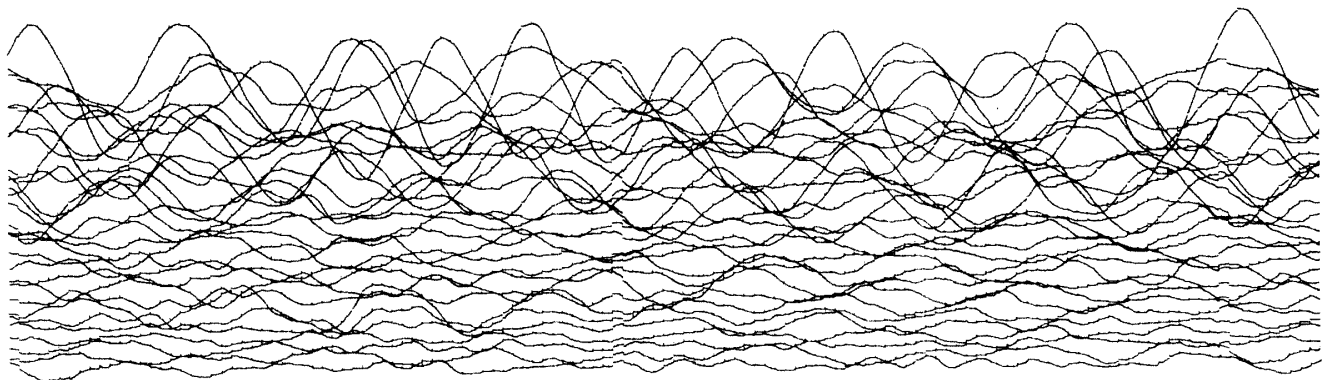
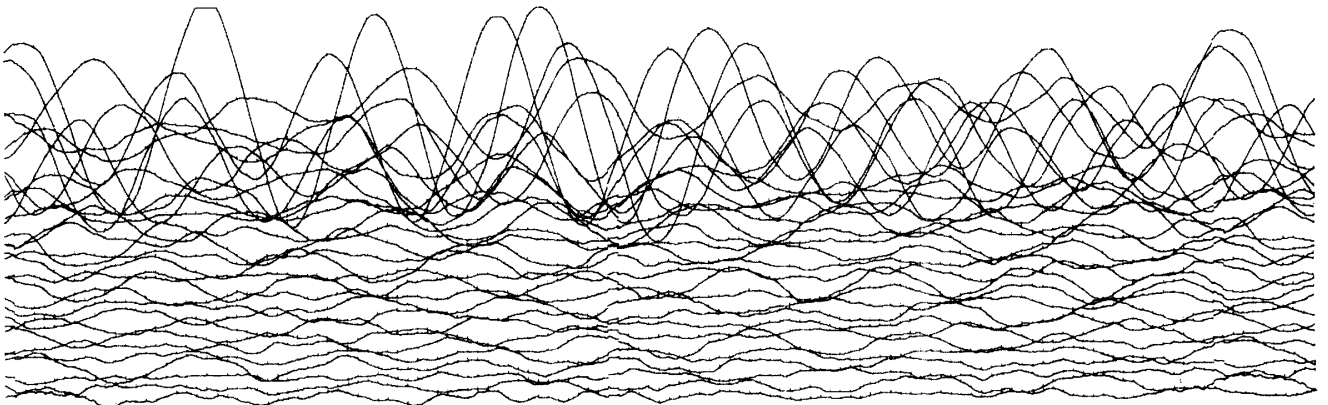
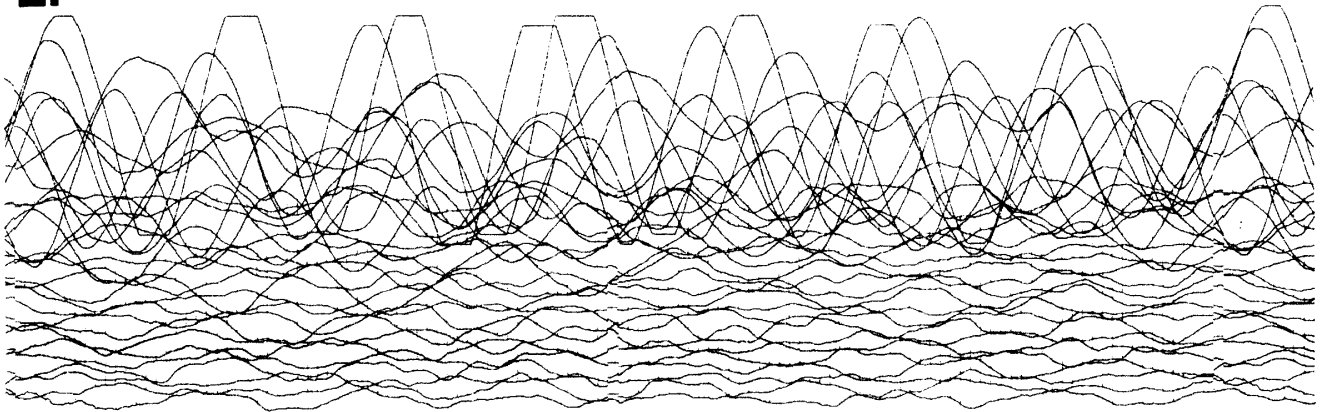
SP



LP-1



LP-2



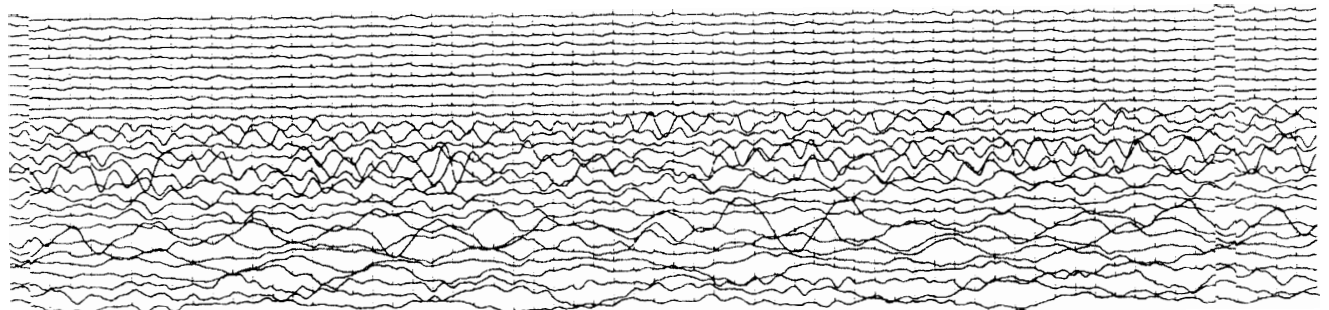
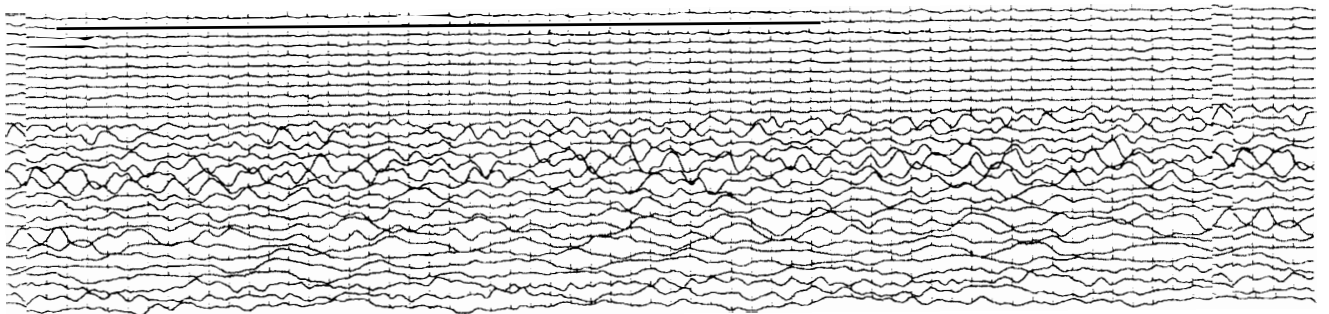
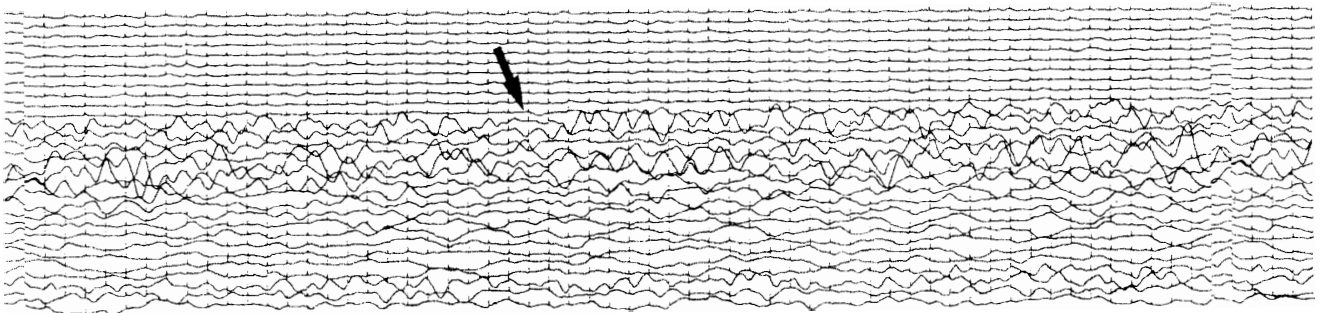
#-95

JULY 16 07h26m34.6s

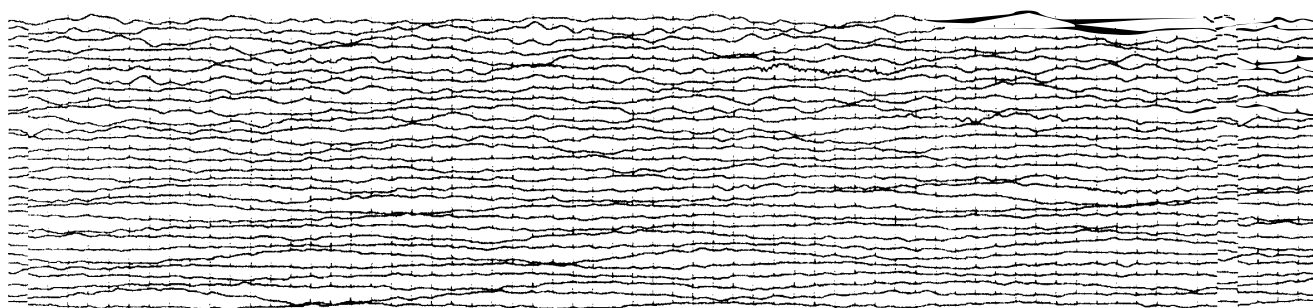
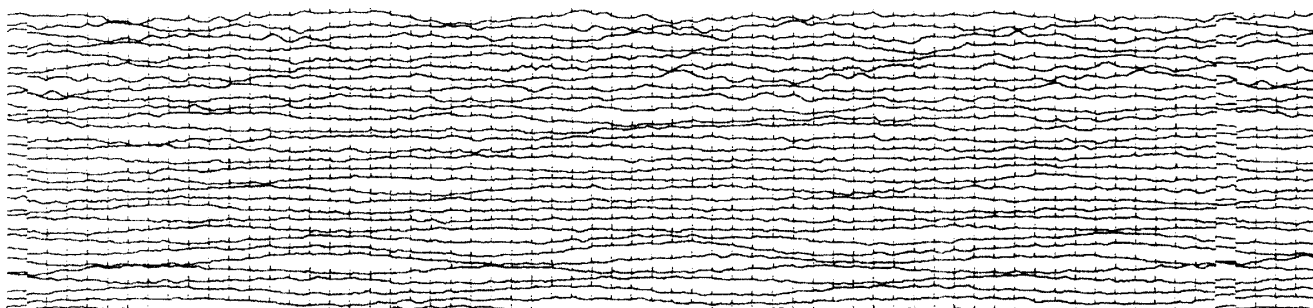
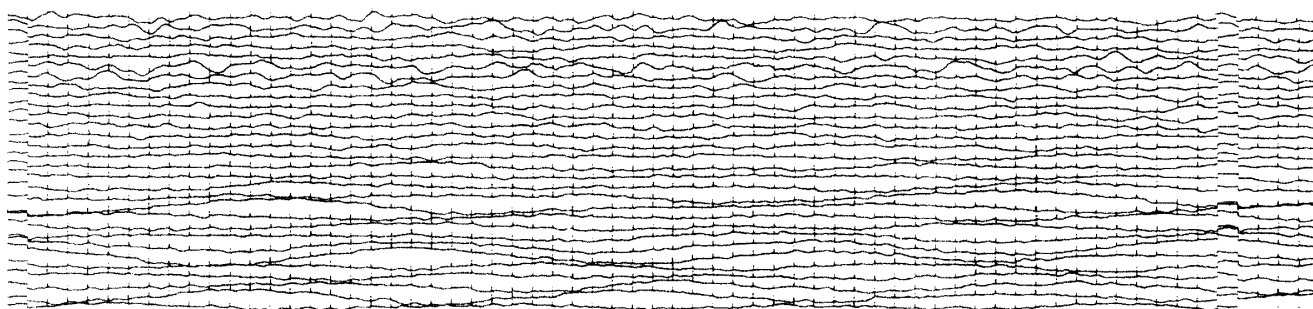
15.679 N 121.172 E 25km Mb 6.5 Ms 7.8

Luzon, Philippine Islands

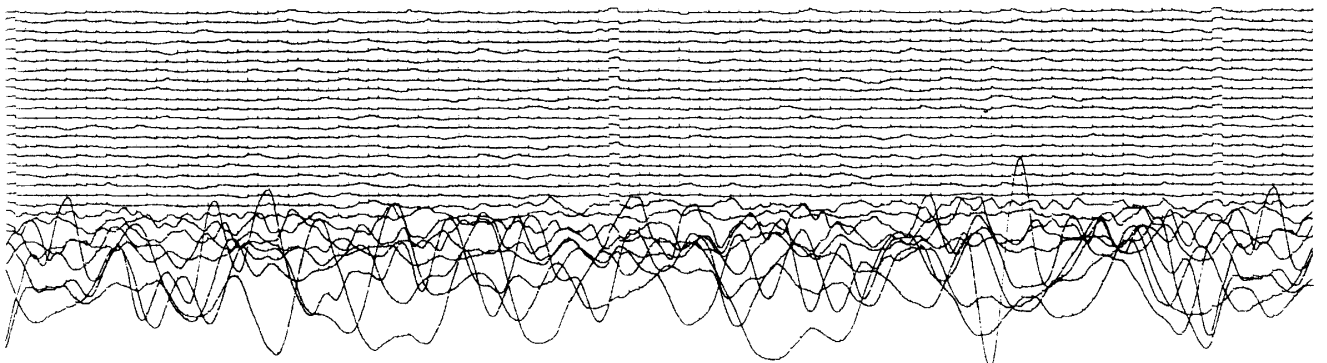
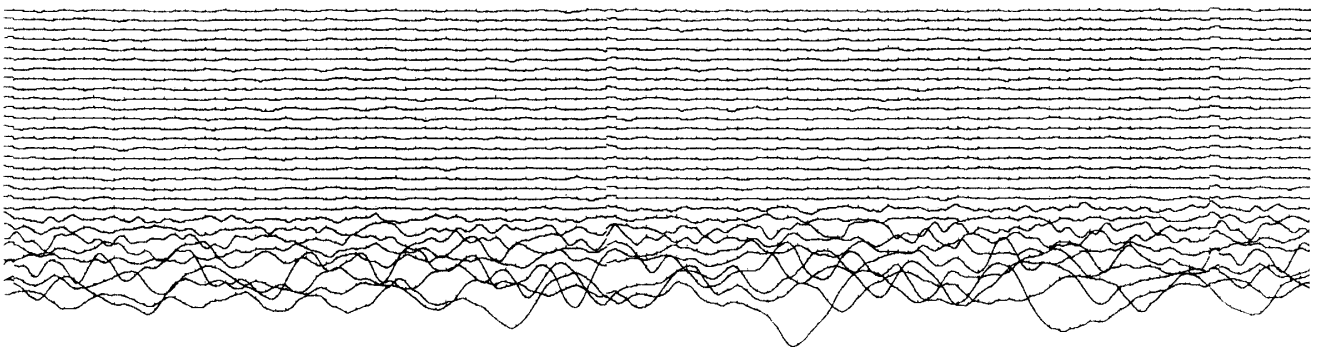
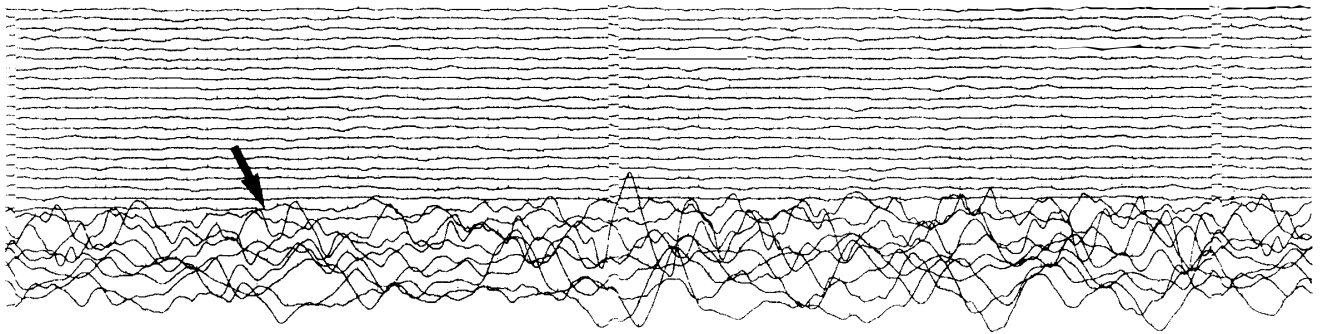
SP-1



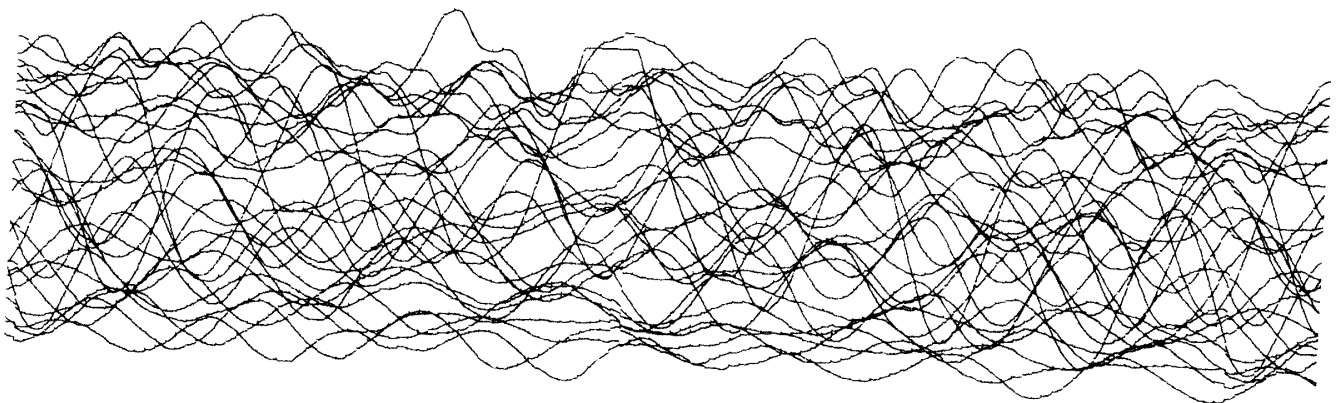
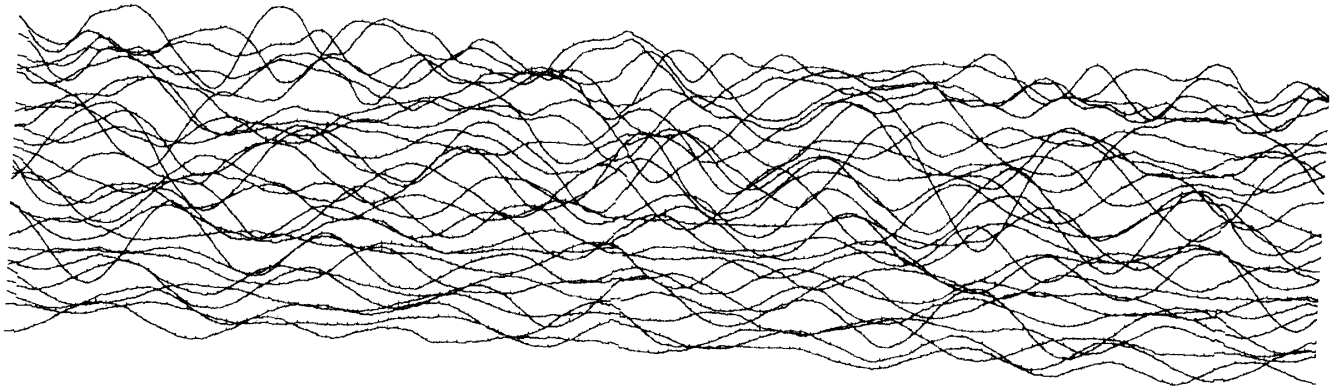
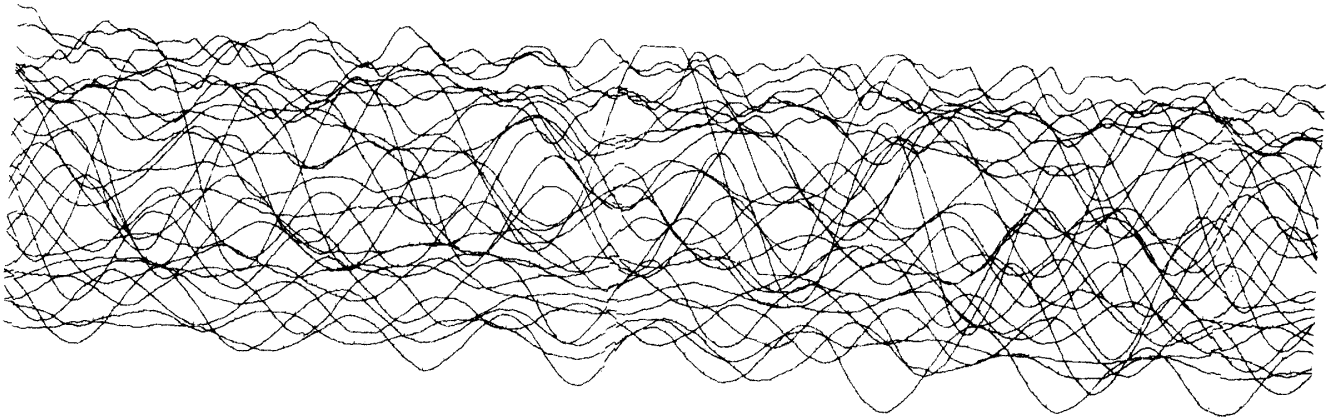
SP-2



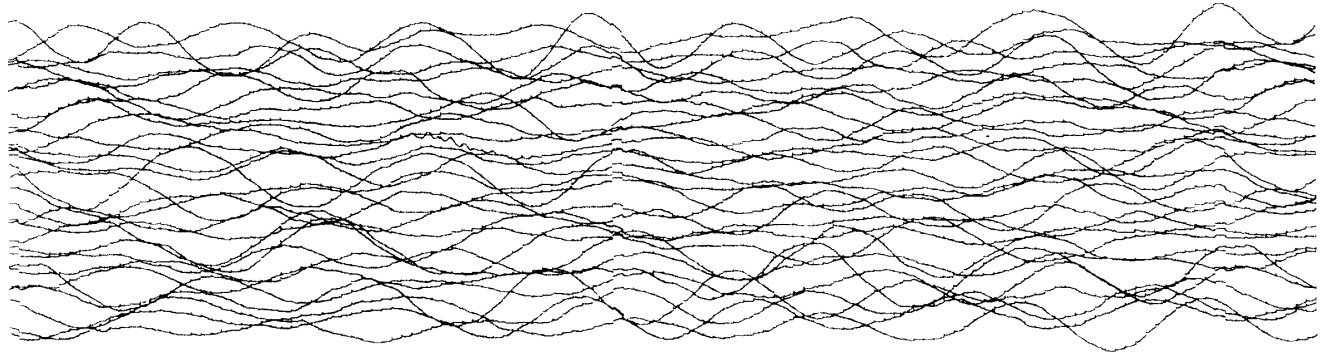
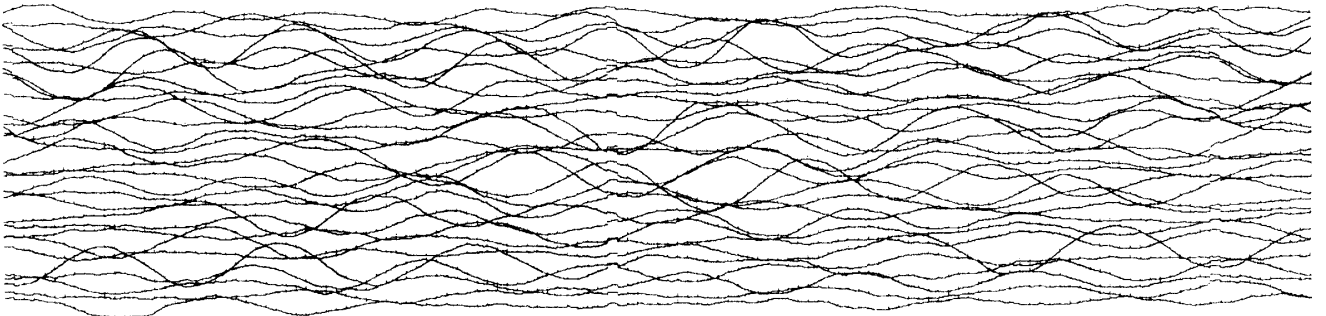
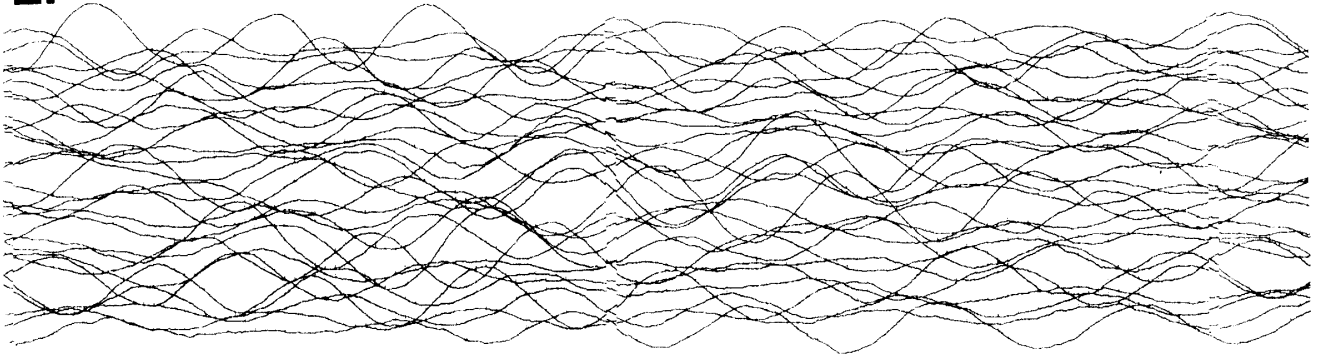
LP-1



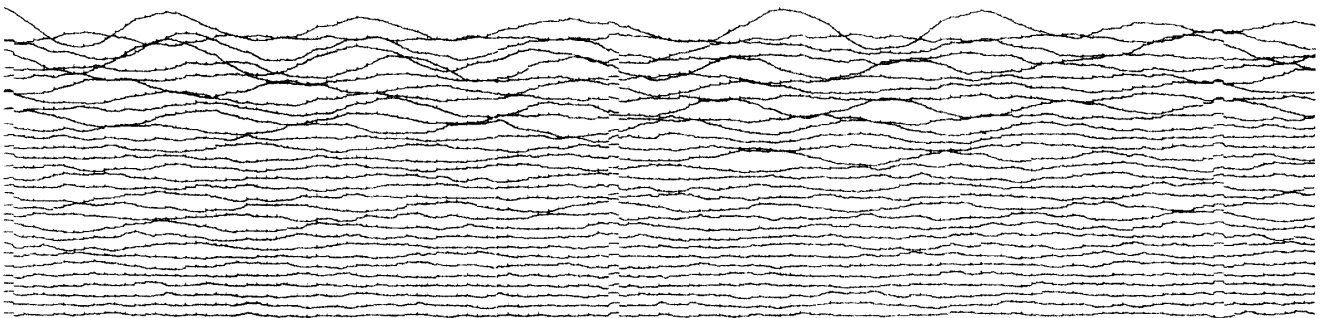
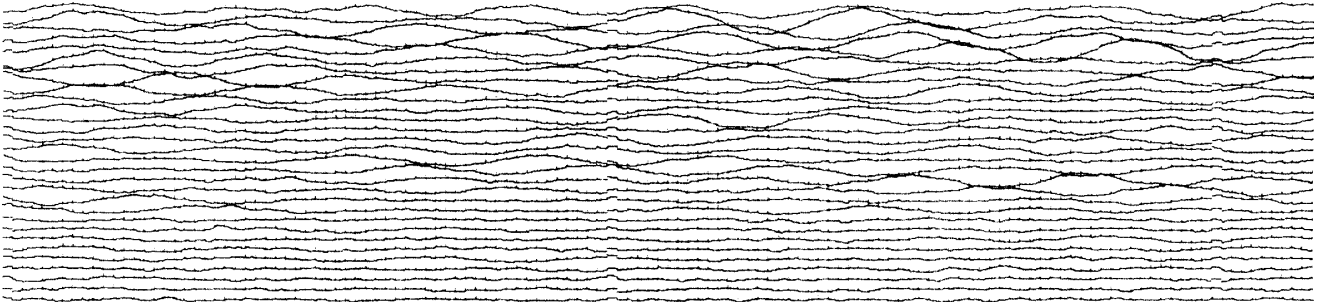
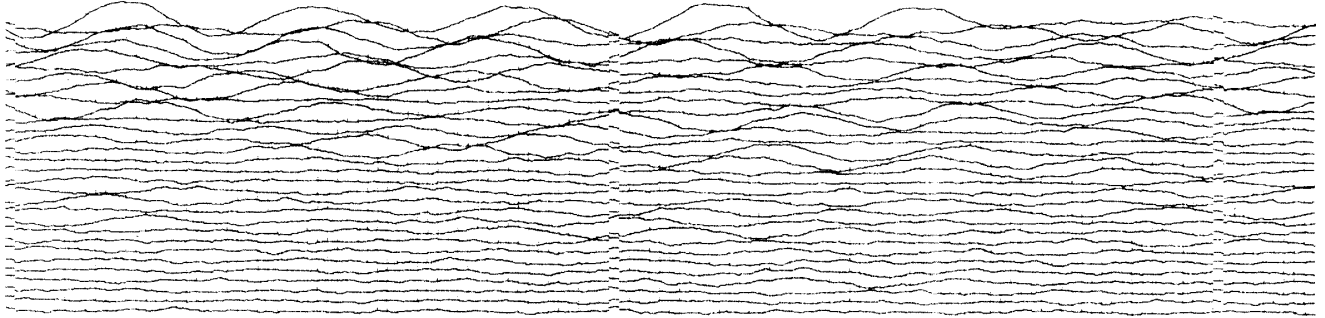
LP-2



LP-3



LP-4

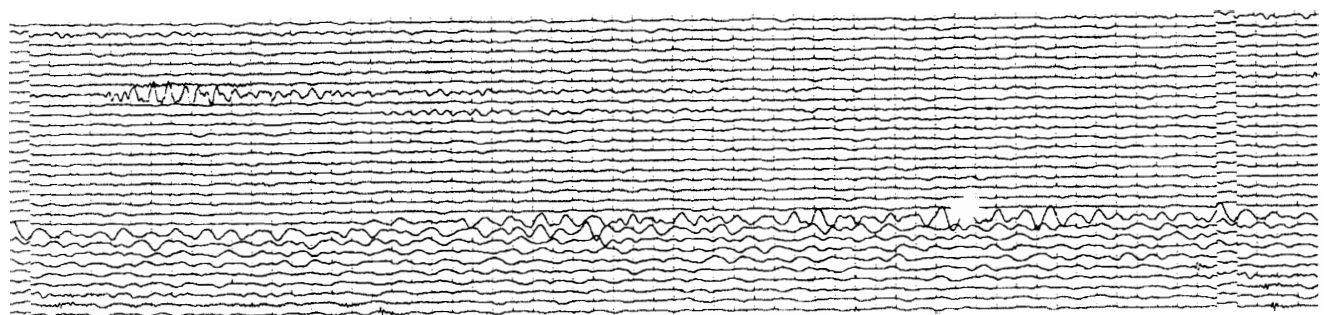
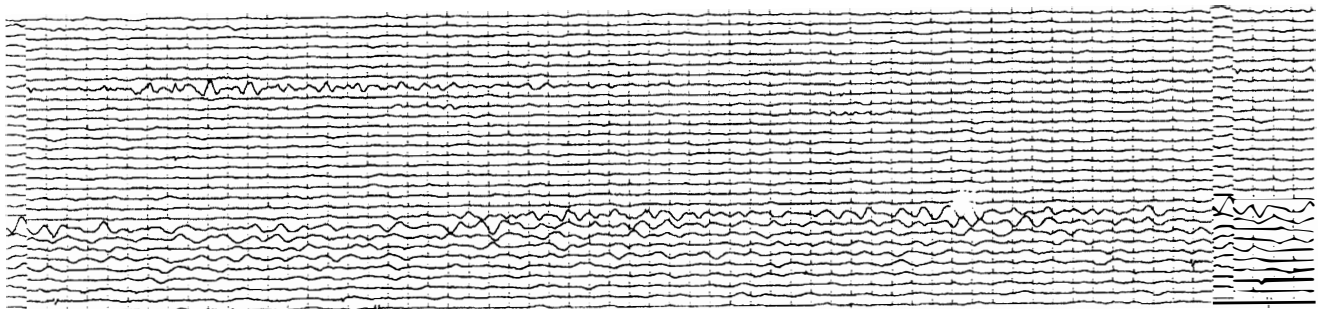
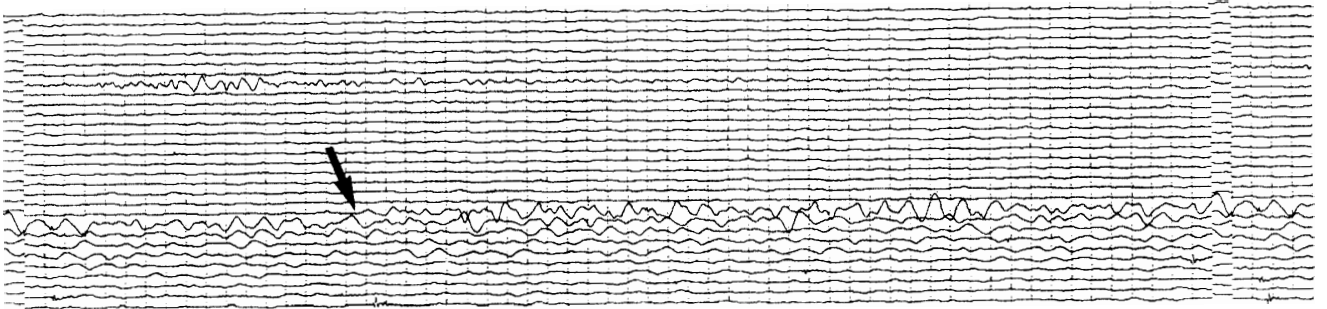


#-109

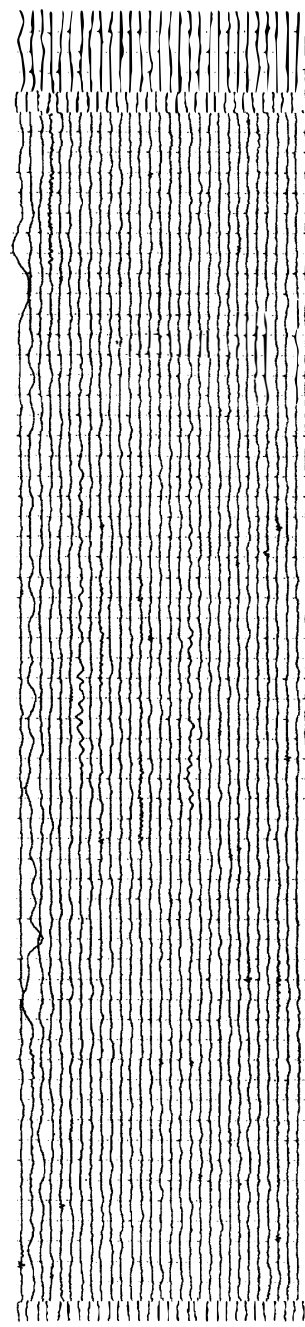
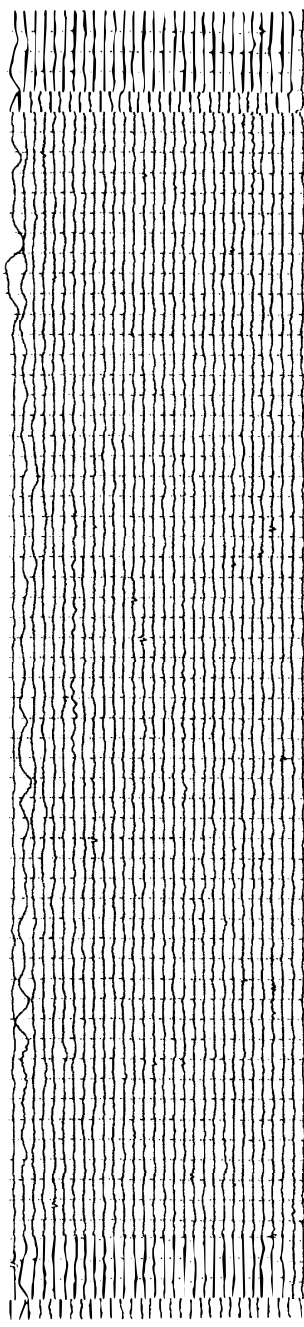
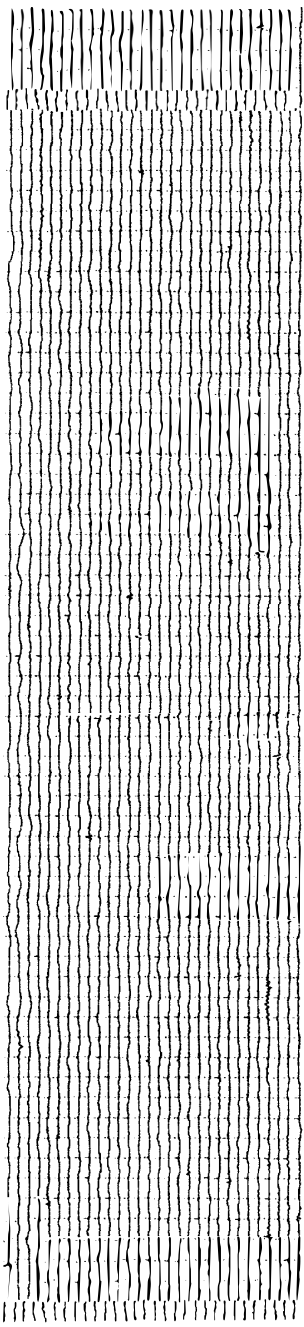
AUG. 17 13h07m17.4s

11.164 S 161.997 E 29km Mb 5.9 Ms 6.8
Solomon Islands

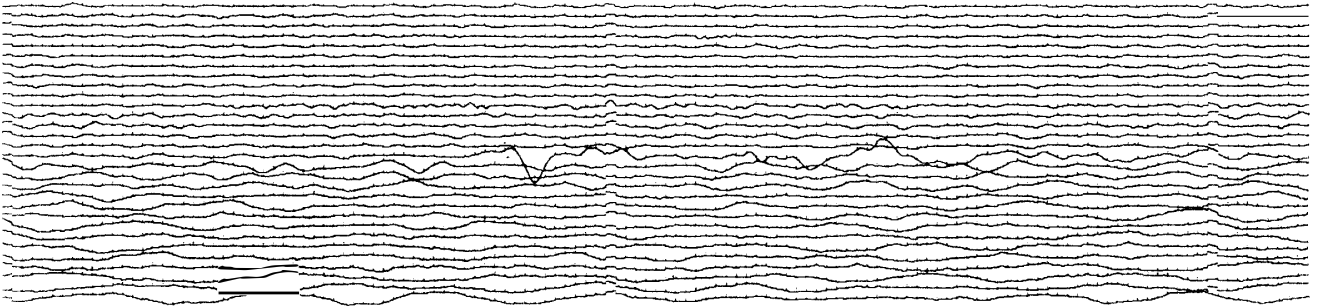
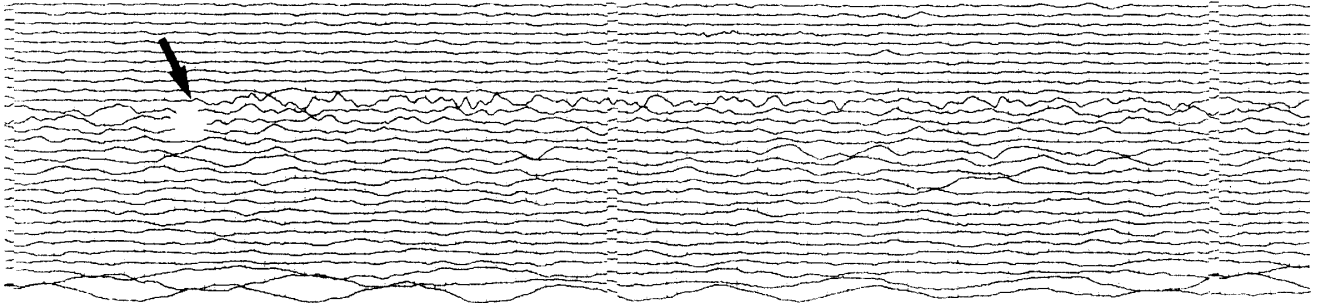
SP-1



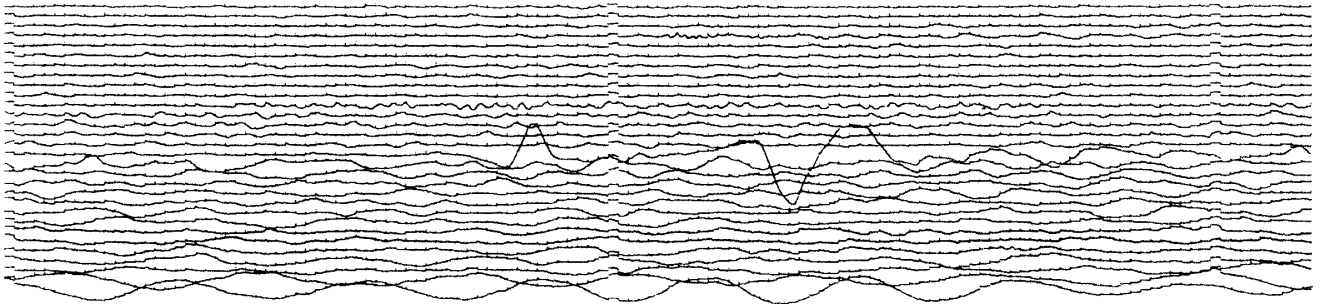
SP-2



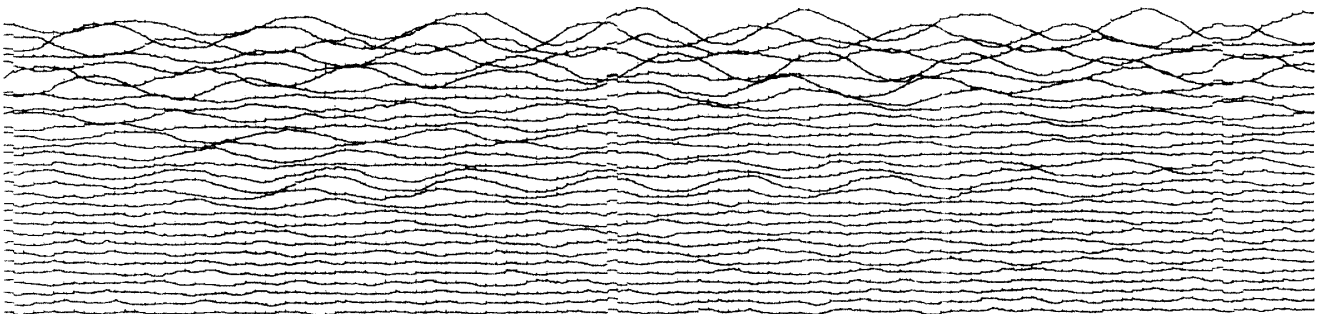
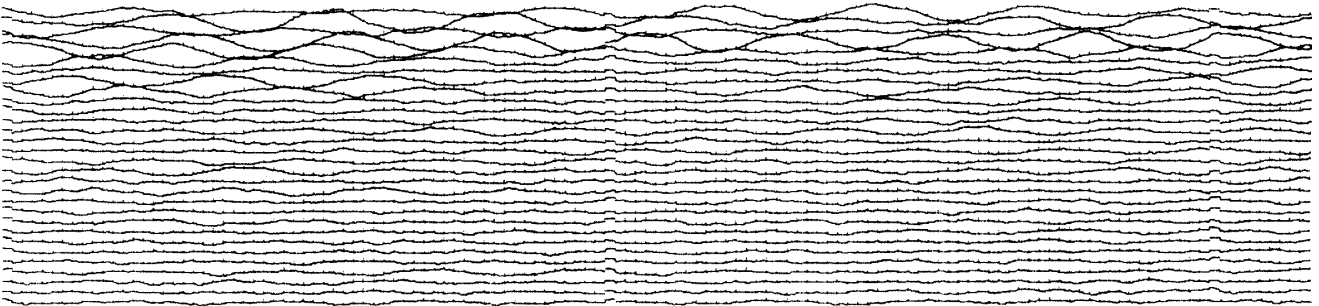
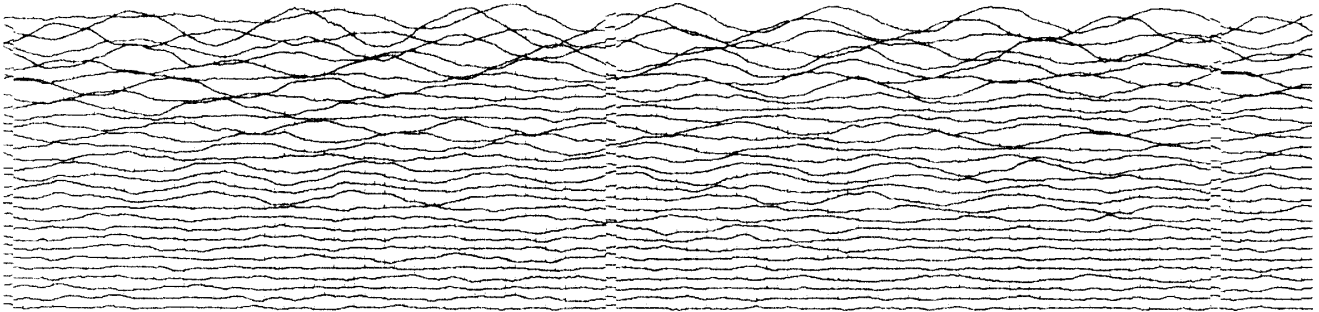
LP-1



V6



LP-2

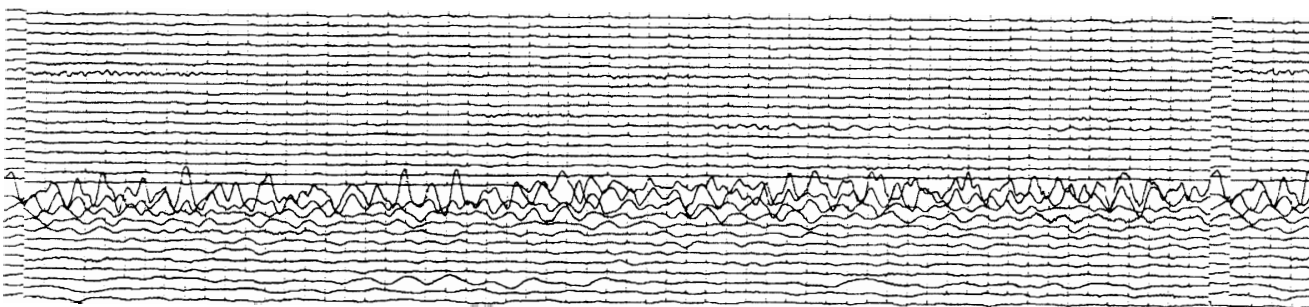
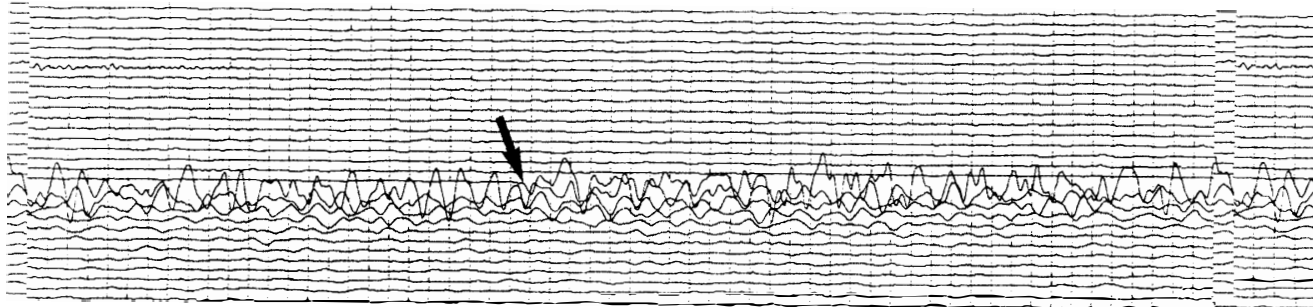


#-142

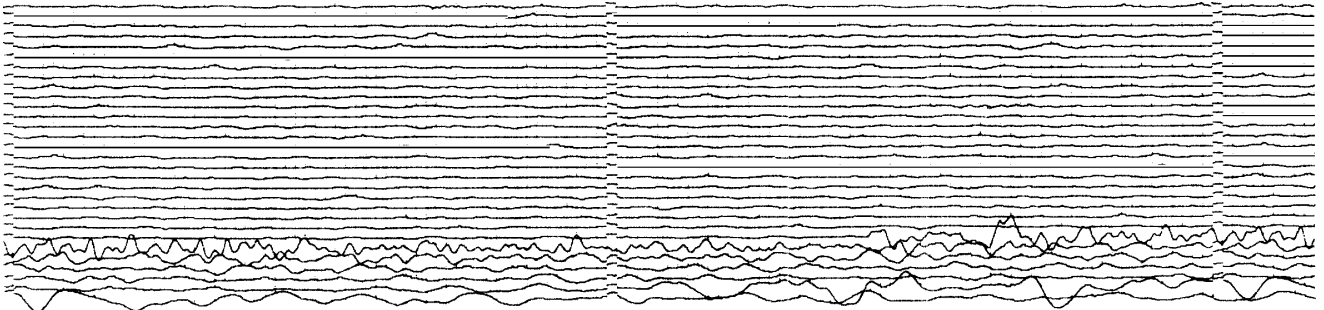
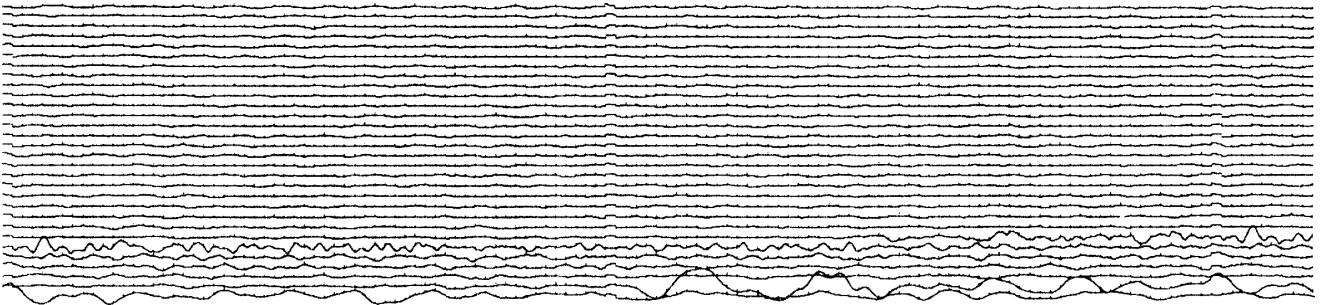
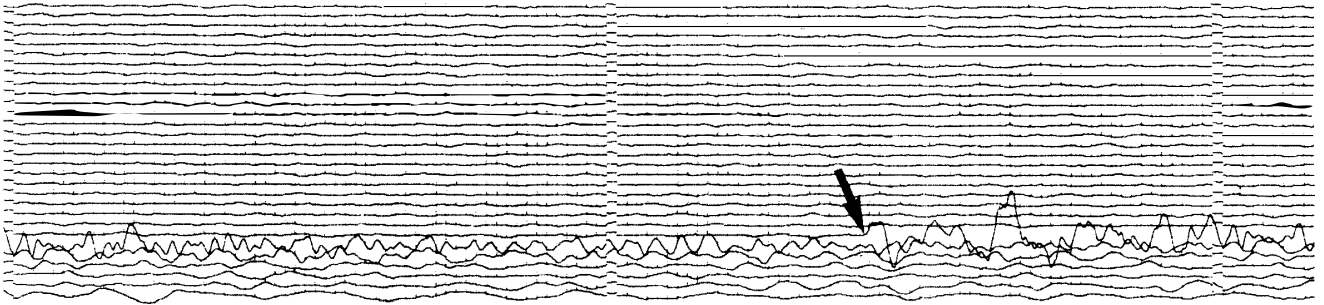
OCT. 15 01h35m44.5s

2.211 S 92.249 E 32km Mb 5.9 Ms 6.5
Southwest of Sumatera

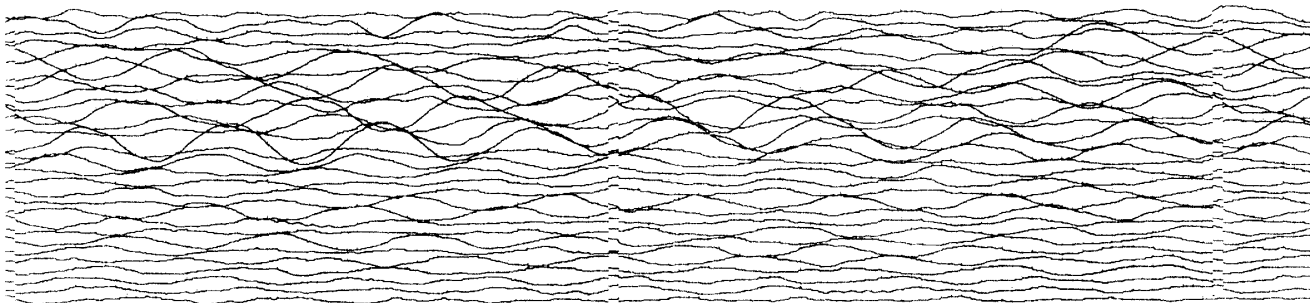
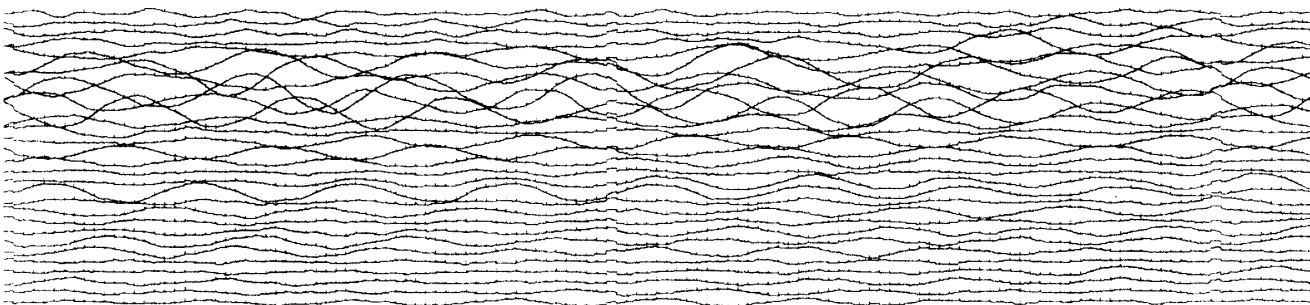
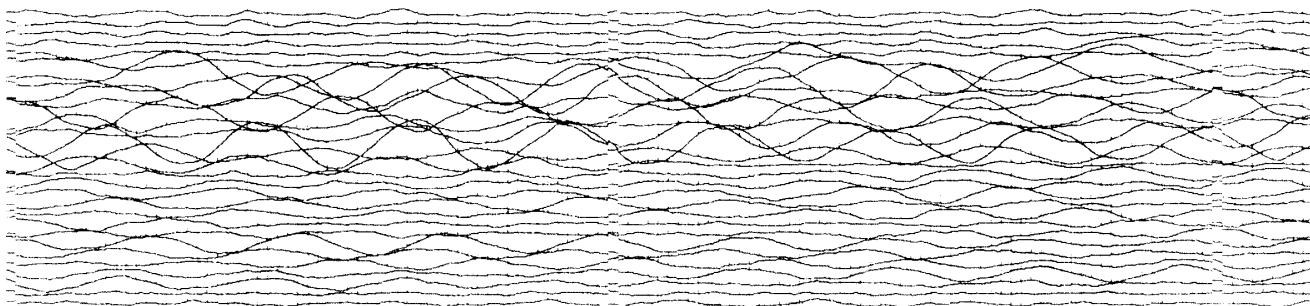
SP



LP-1



LP-2

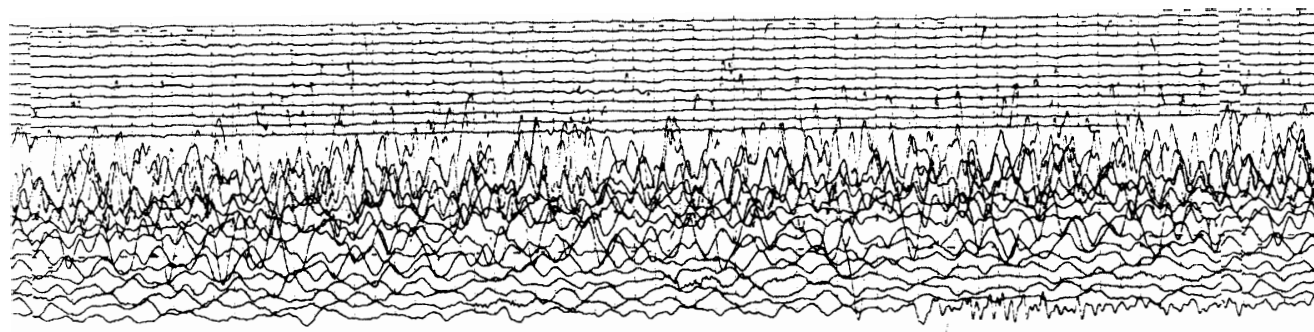
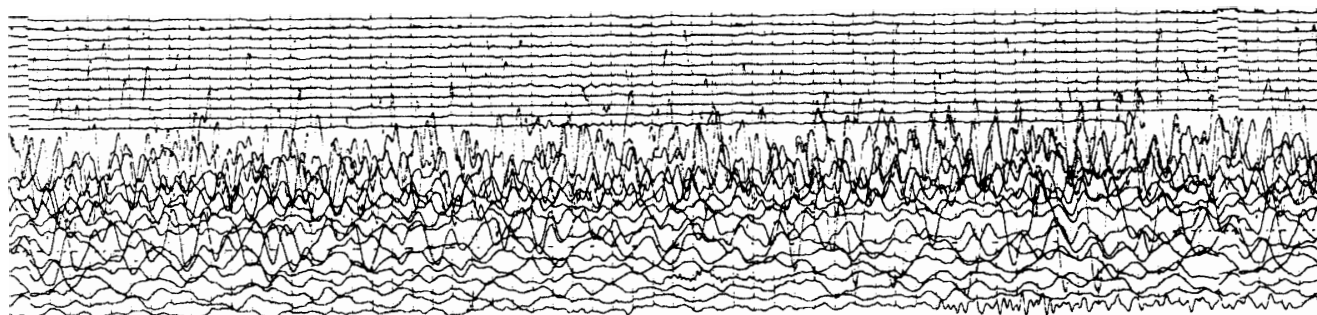
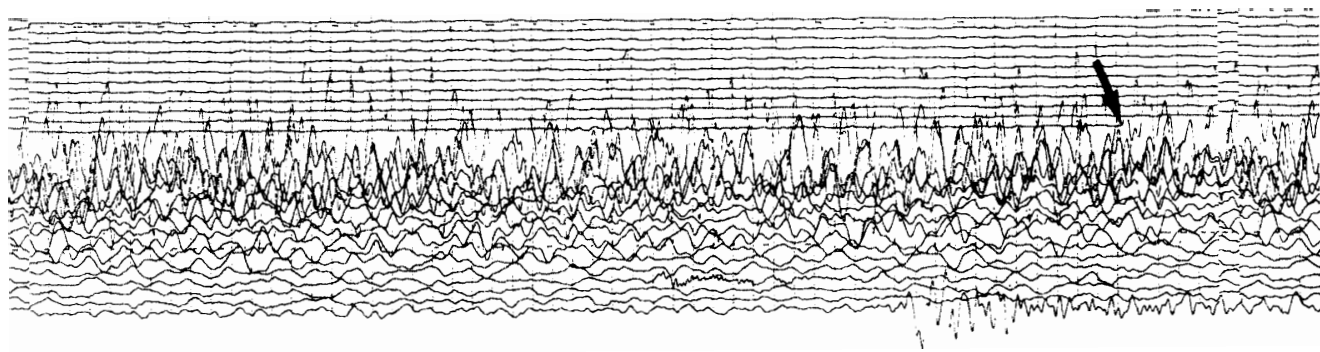


#-144

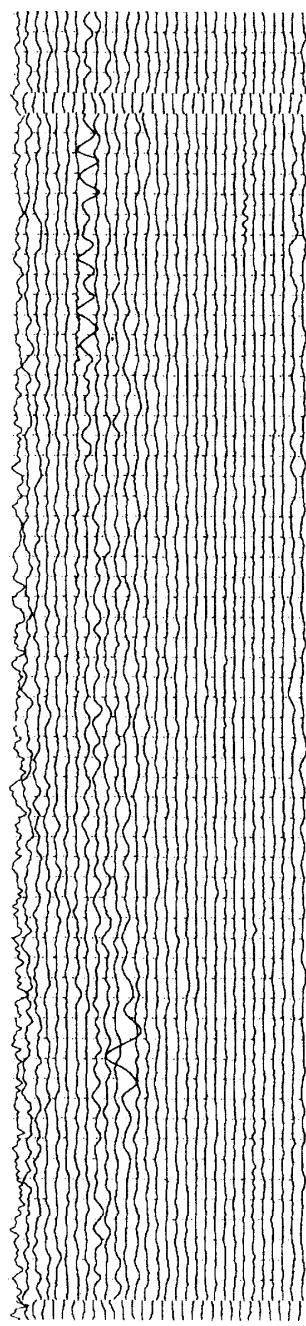
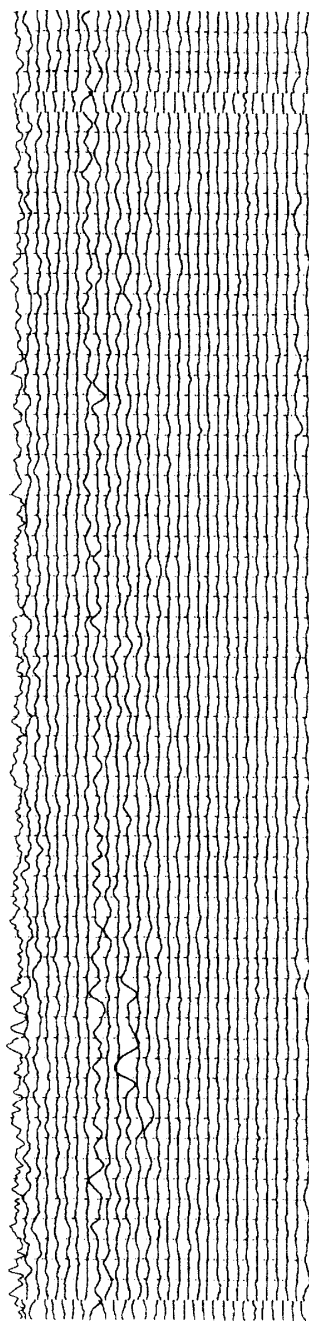
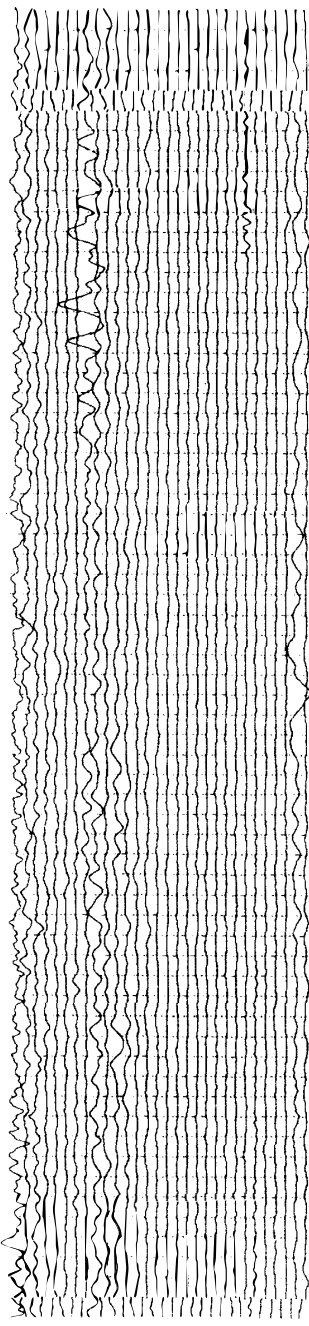
OCT. 17 14h30m13.1s

10.970 S 70.776 W 599km Mb 6.7
Peru-Brazil Border Region

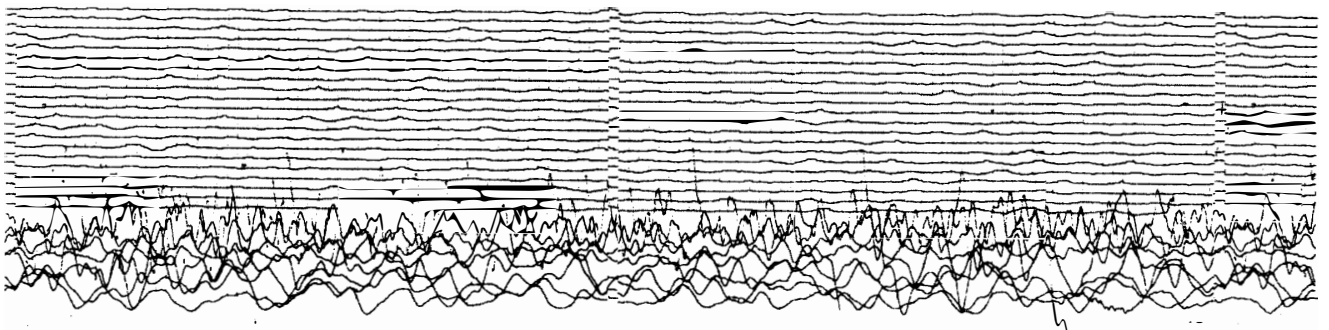
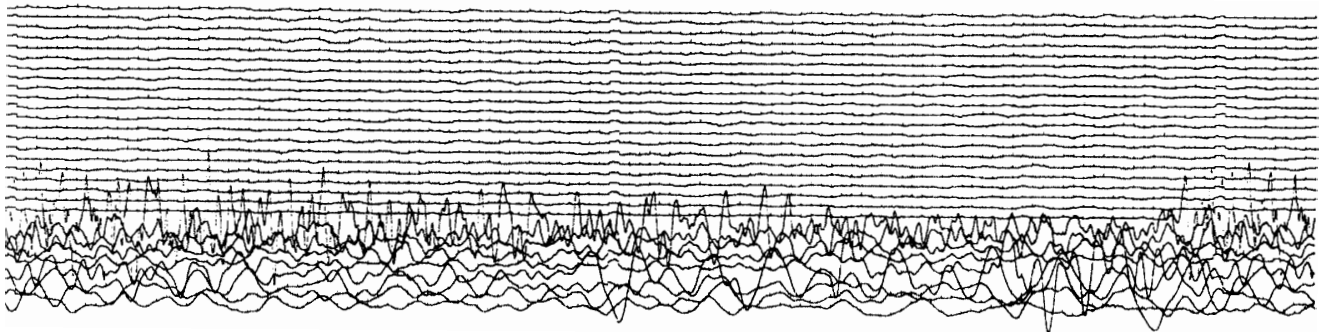
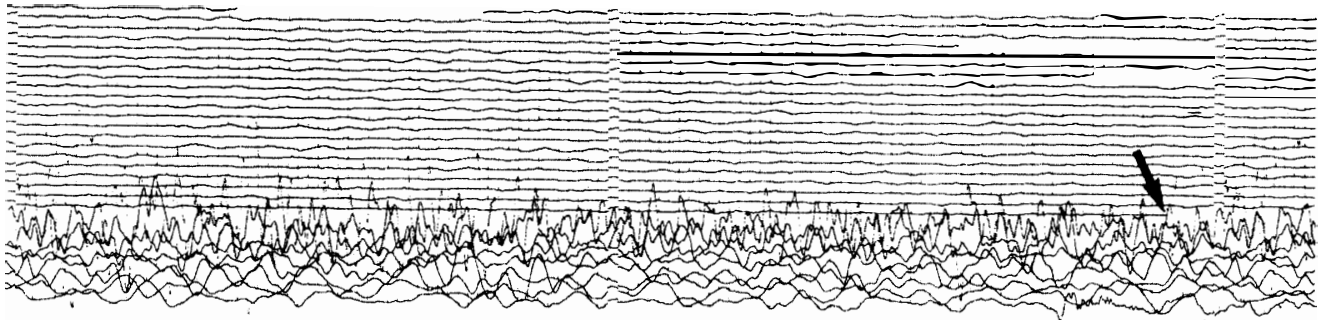
SP-1



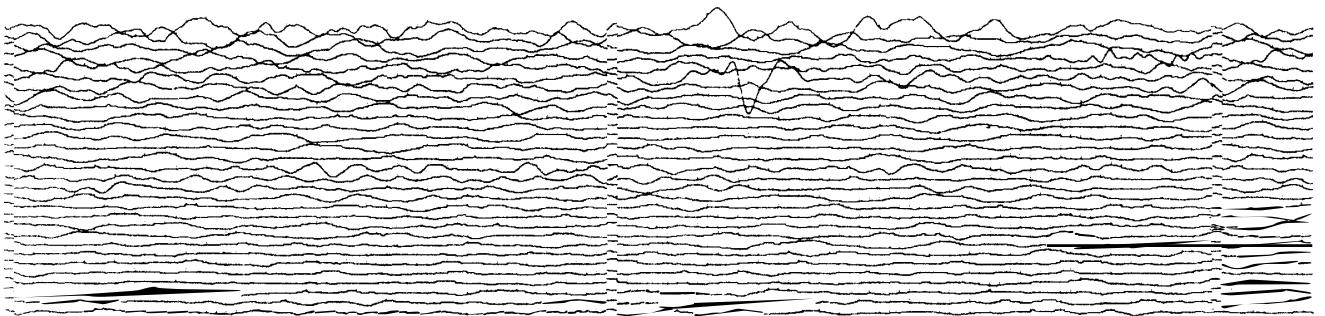
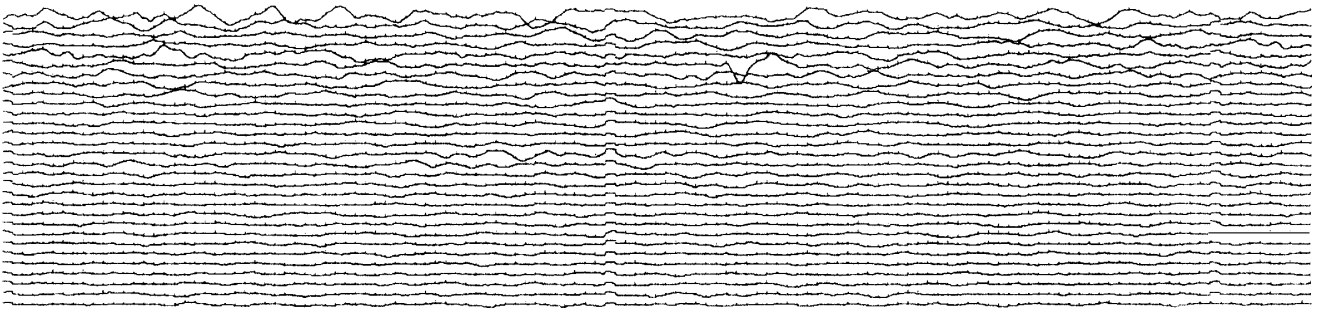
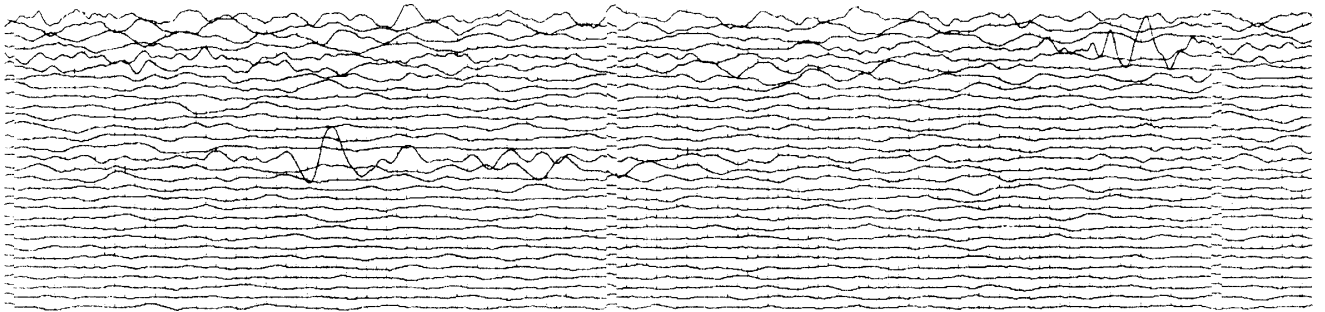
SP-2



LP-1



LP-2



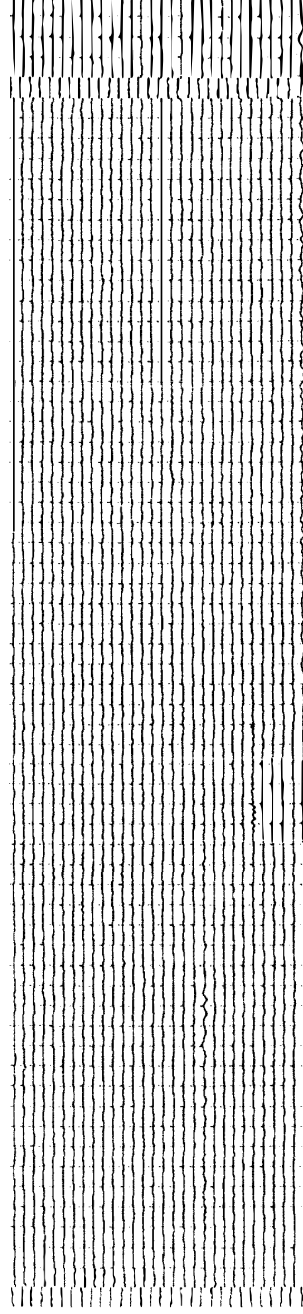
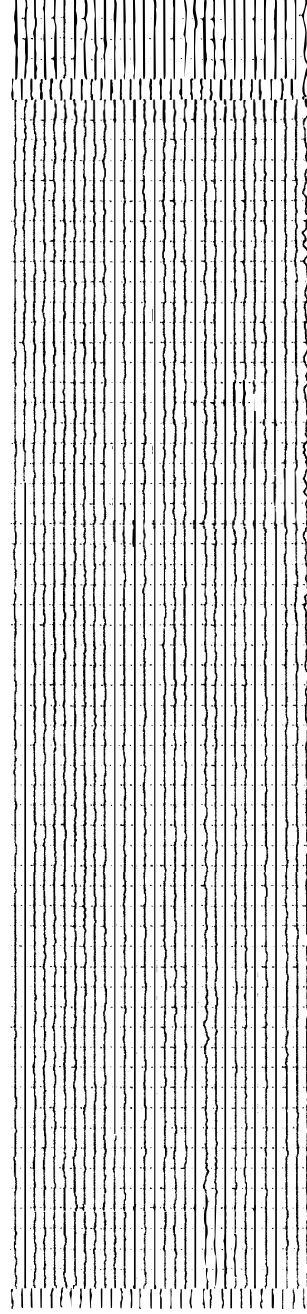
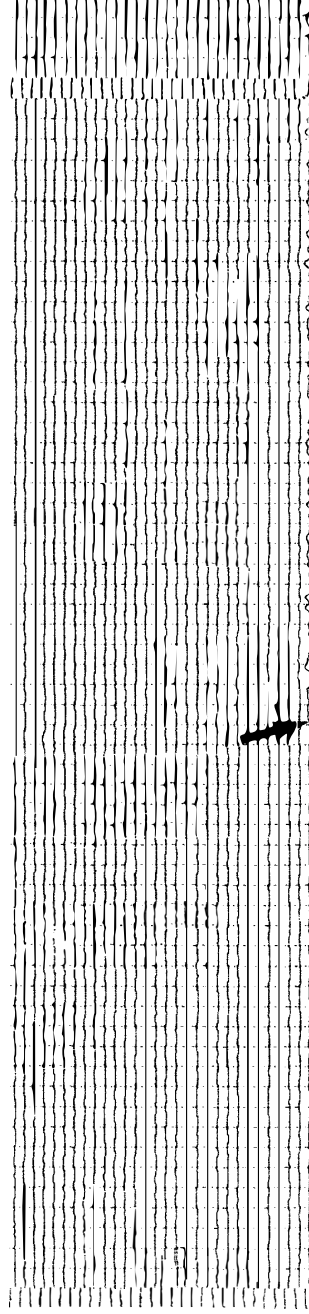
#-152

NOV. 06 18h45m52.2s

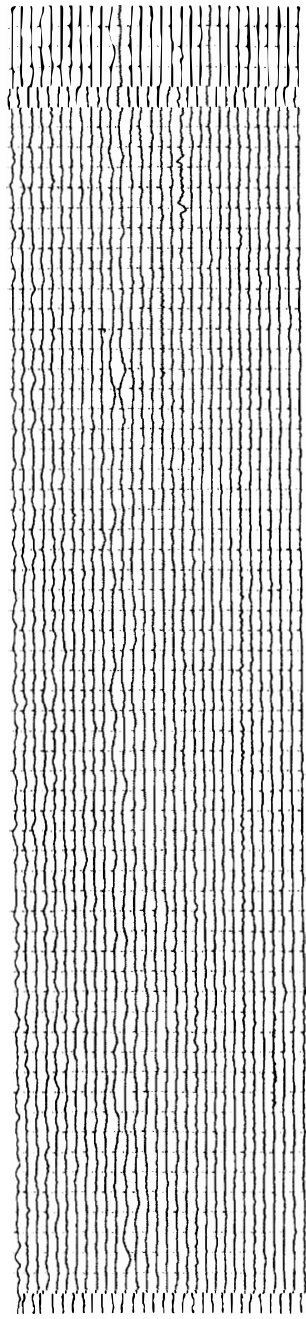
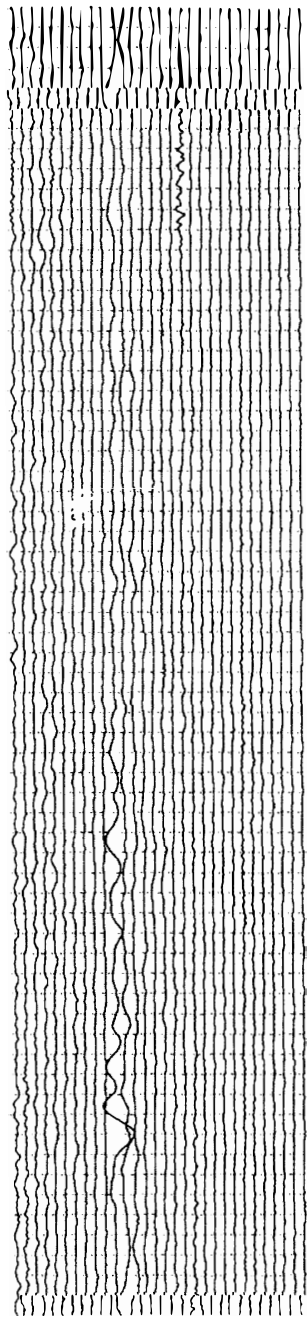
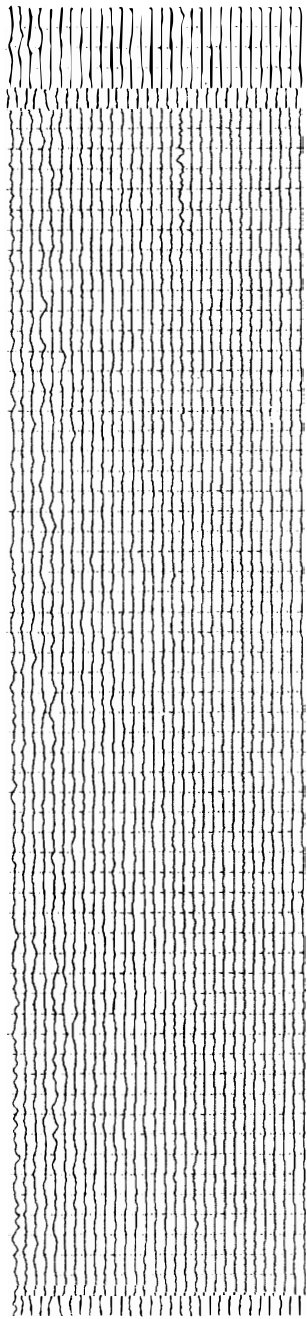
28.251 N 55.462 E 11km Mb 6.2 Ms 6.7

Southern Iran

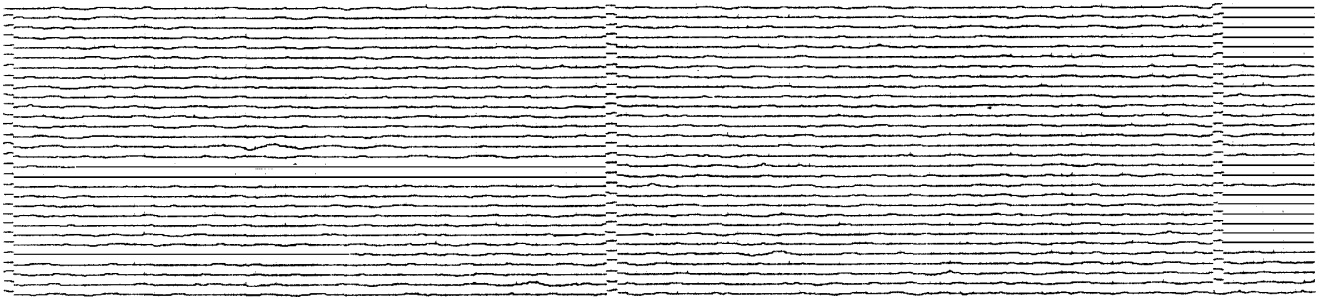
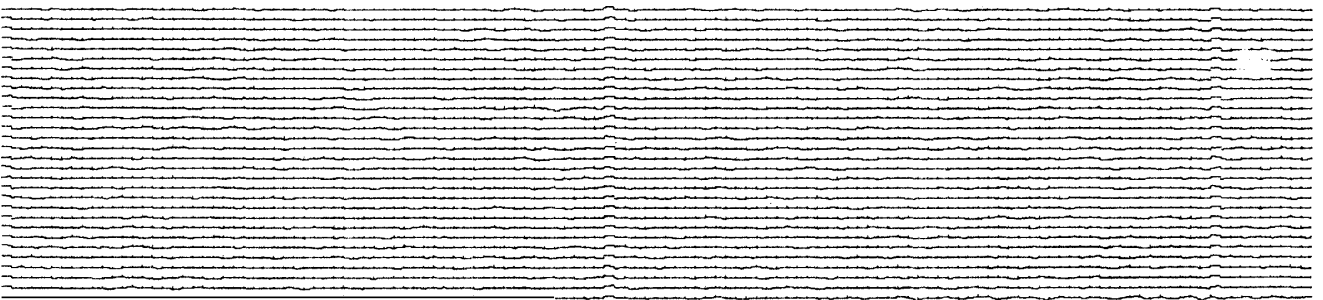
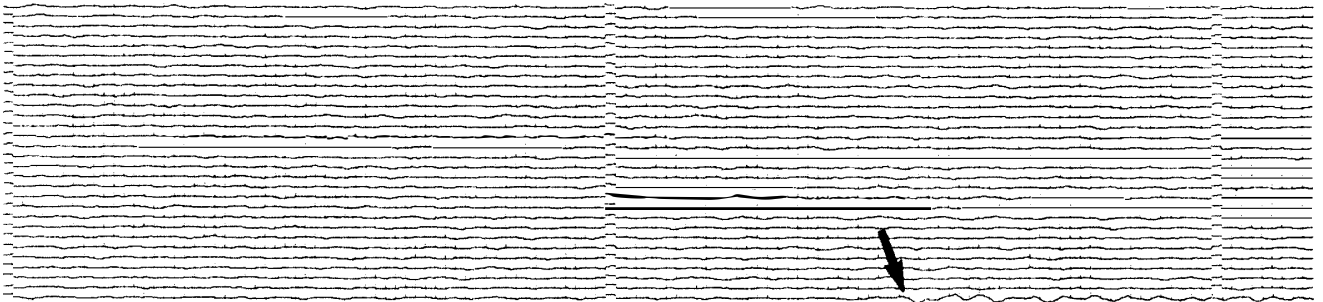
SP-1



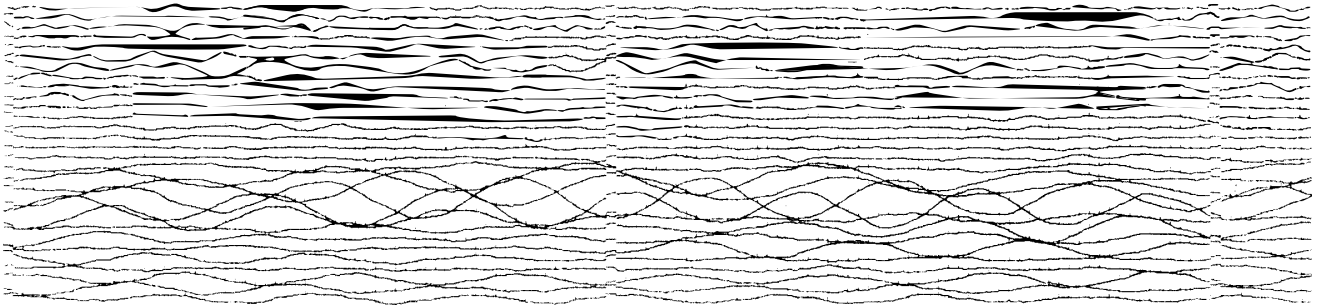
SP-2



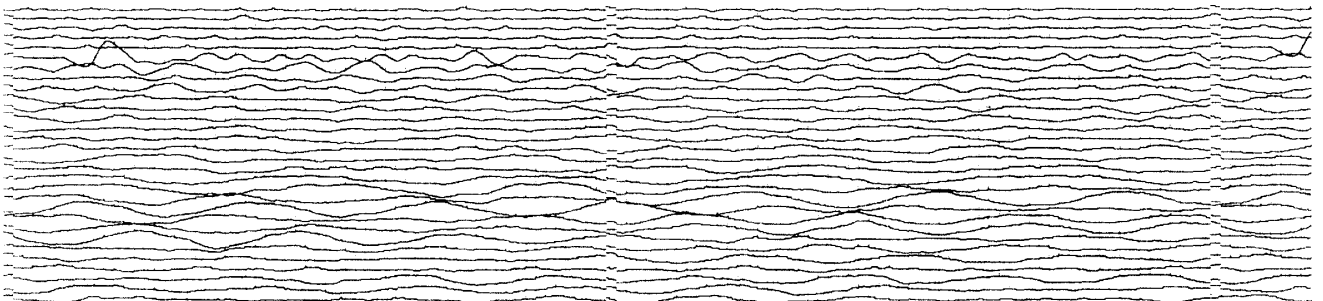
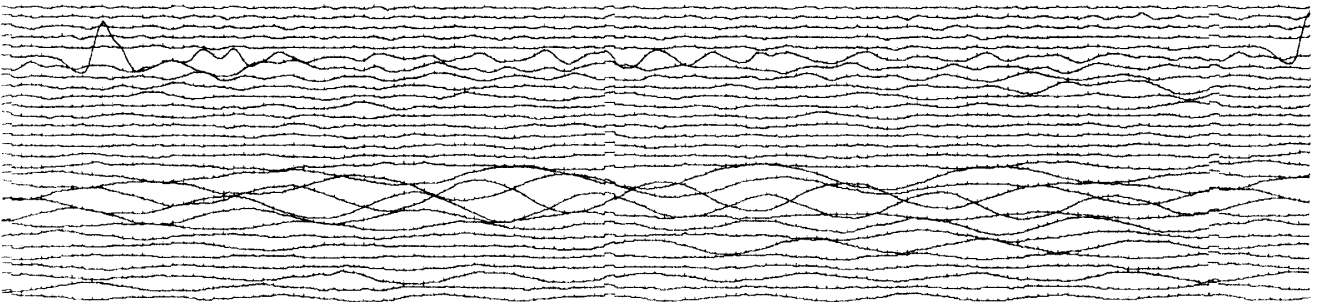
LP-1



LP-2



2.941



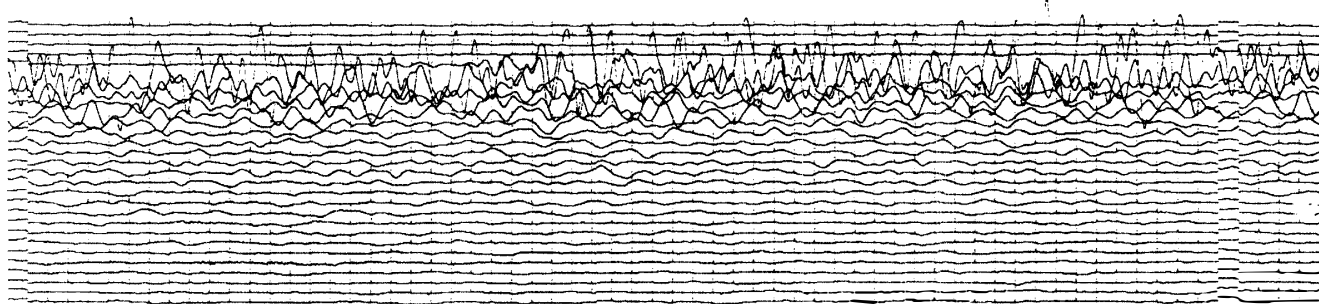
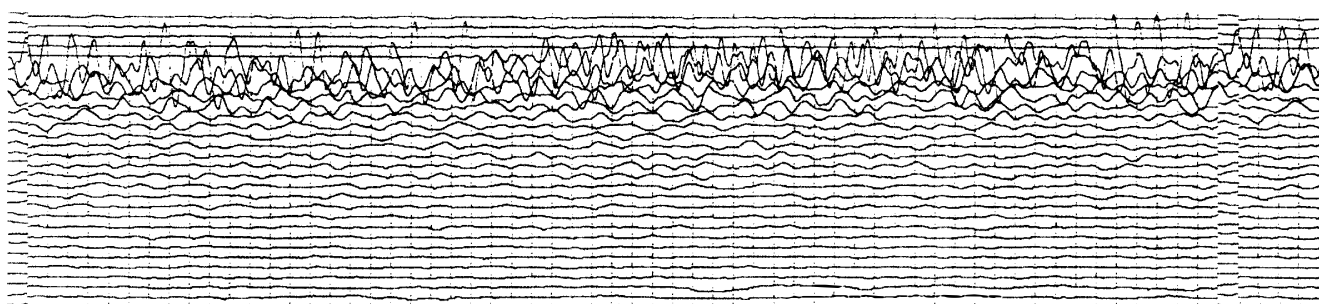
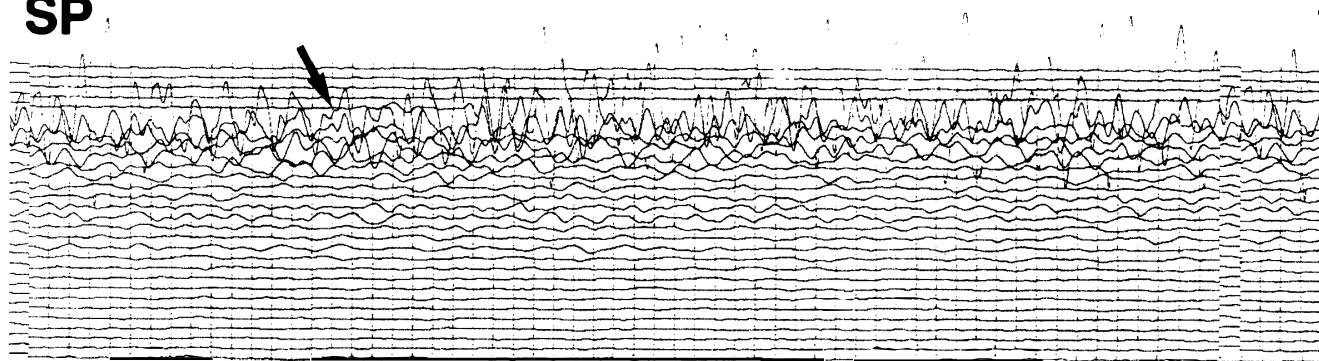
#-153

NOV. 06 20h14m29.7s

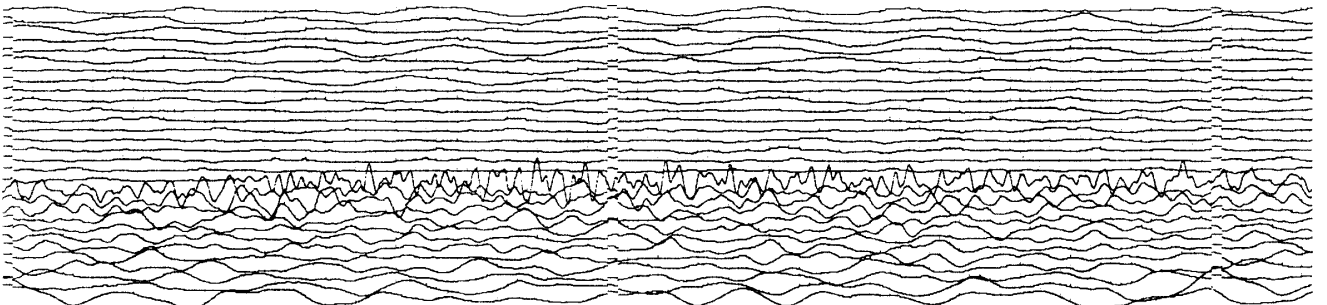
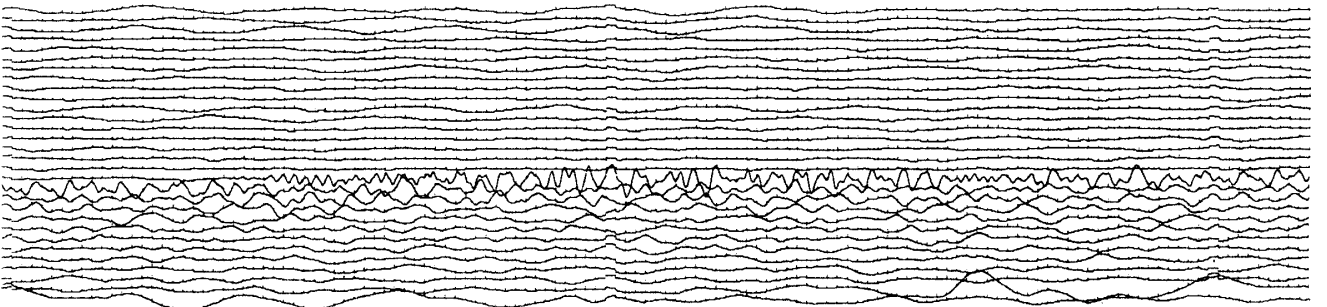
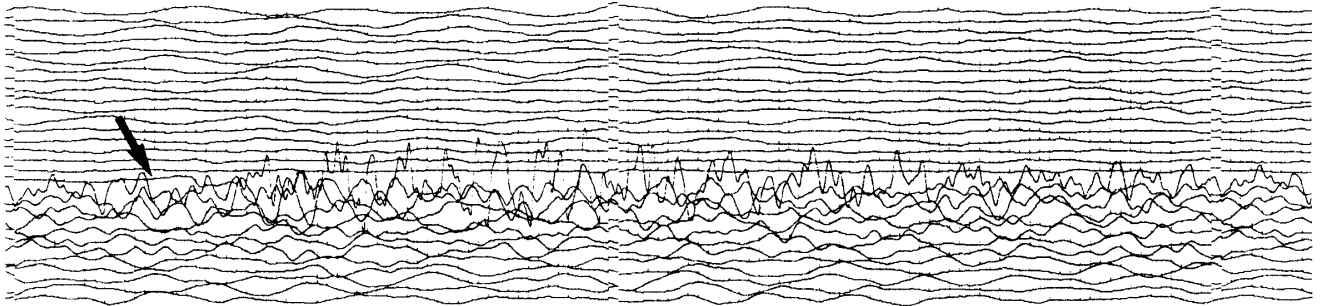
53.452 N 169.871 E 25km Mb 6.3 Ms 7.0

Komandorsky Islands Region

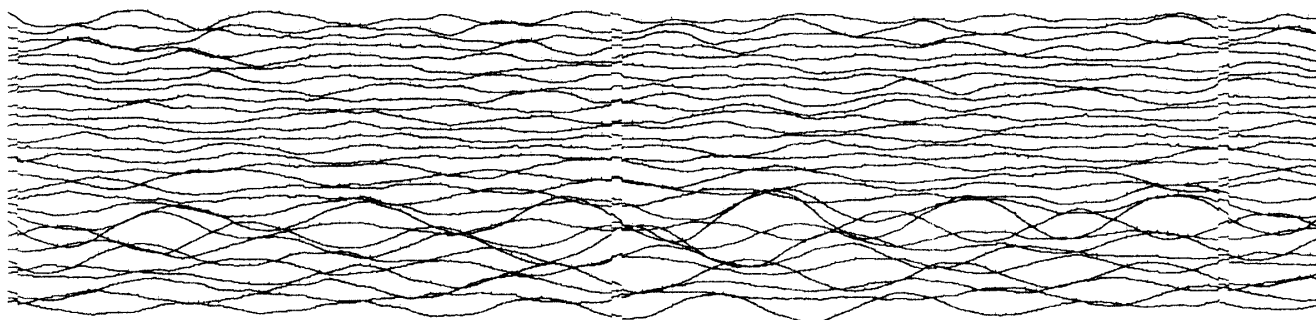
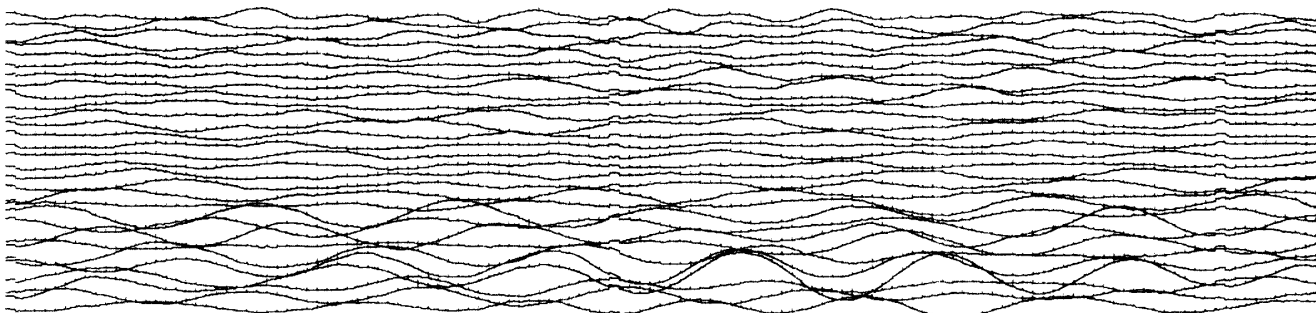
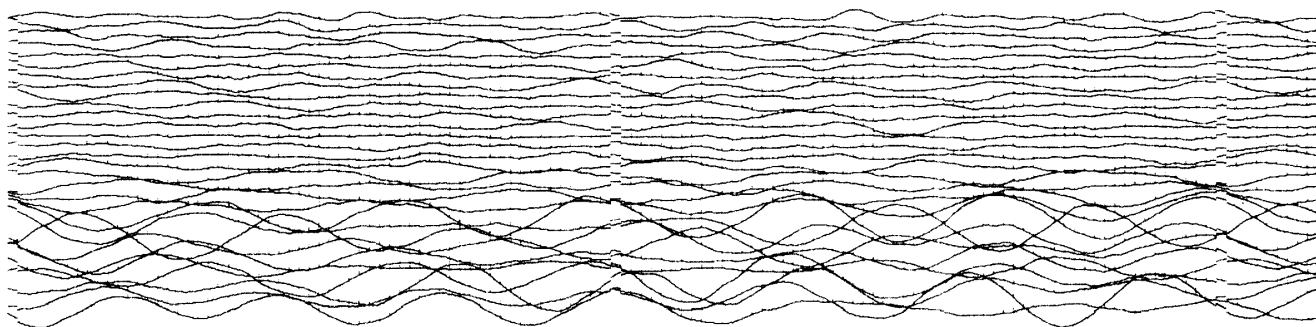
SP



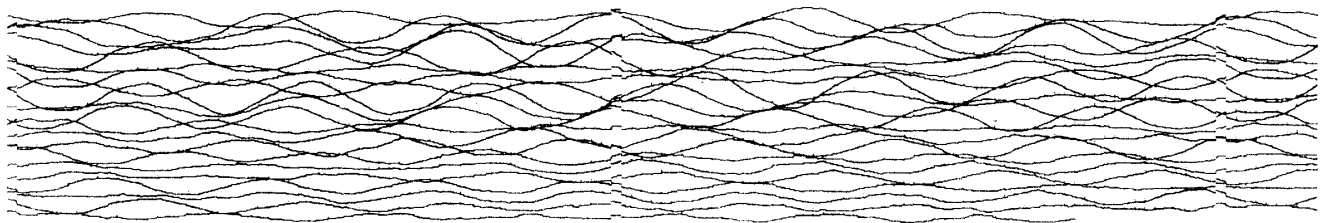
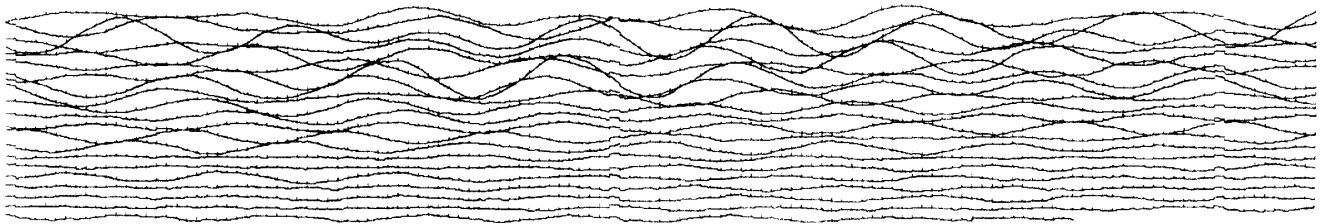
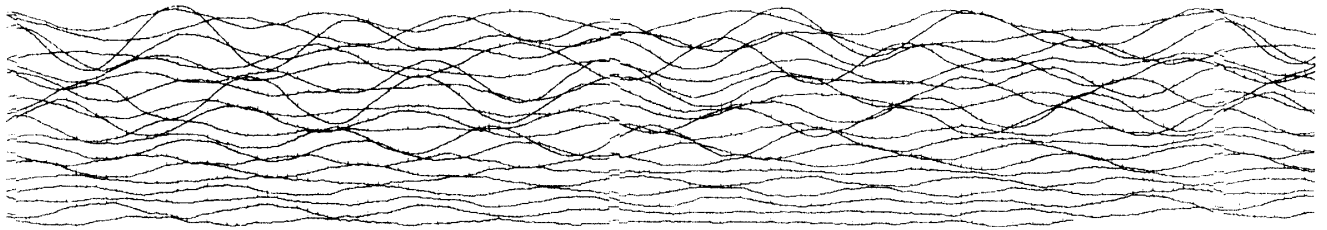
LP-1



LP-2



LP-3



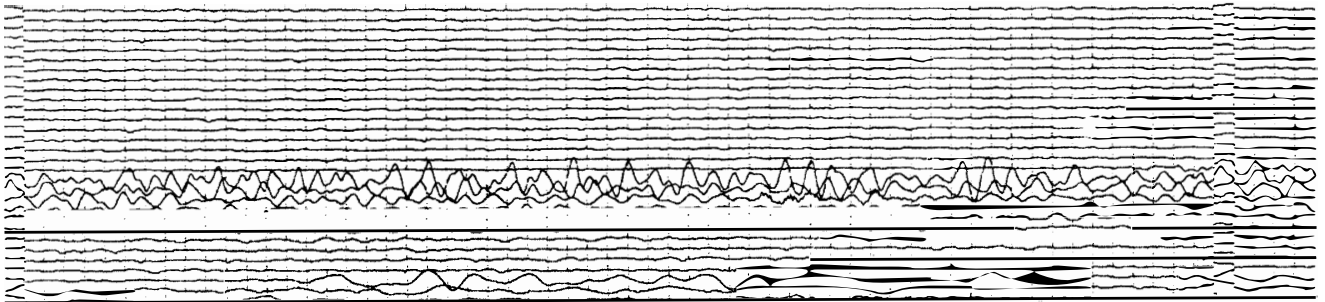
#-156

NOV. 15 02h34m32.4s

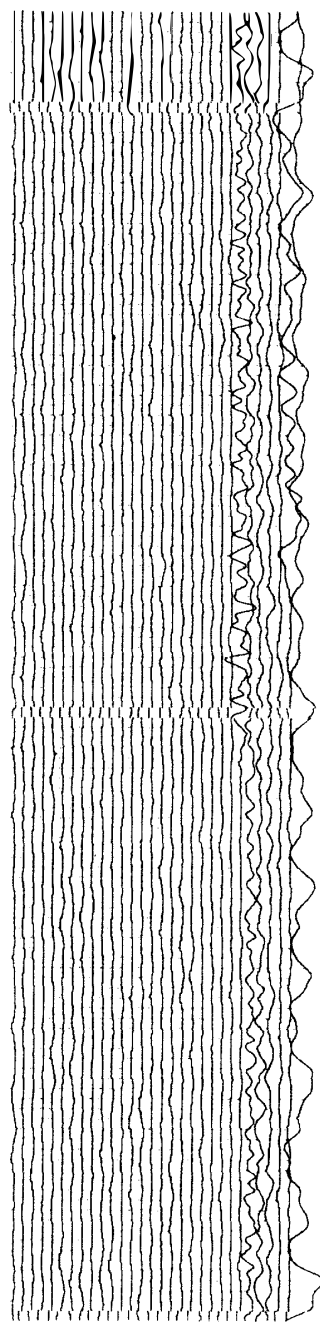
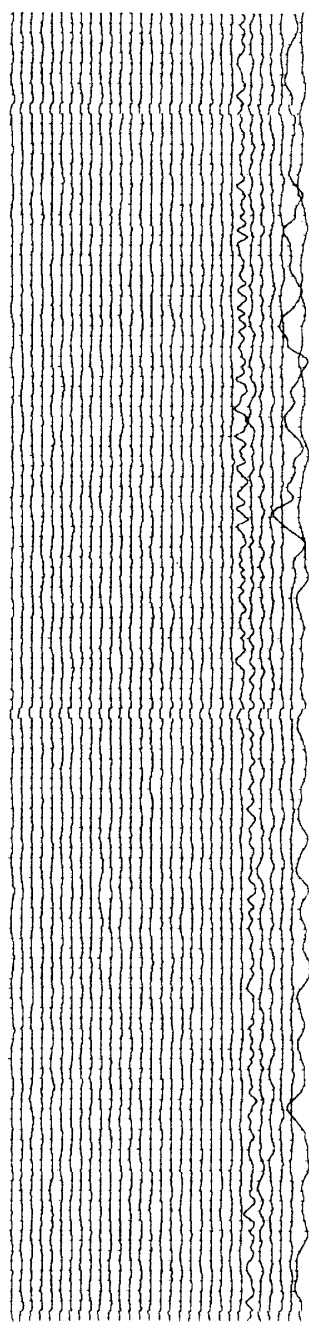
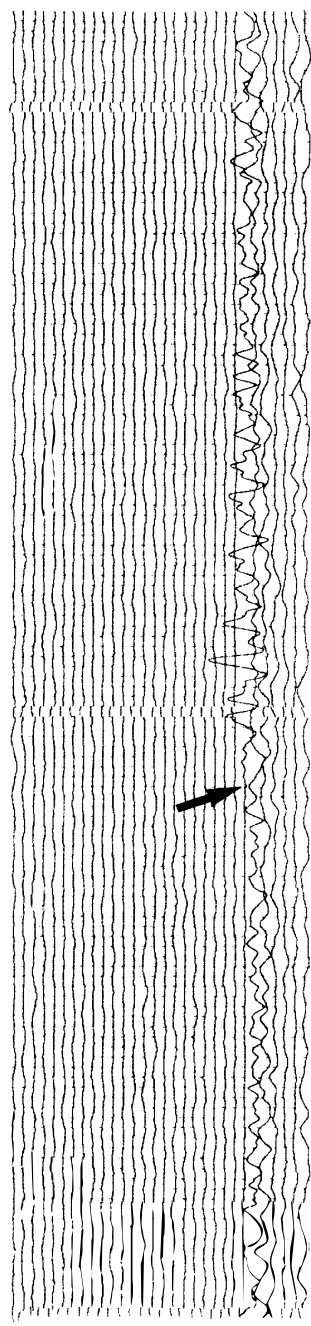
3.908 N 97.457 E 48km Mb 6.0 Ms 6.8

Northern Sumatera

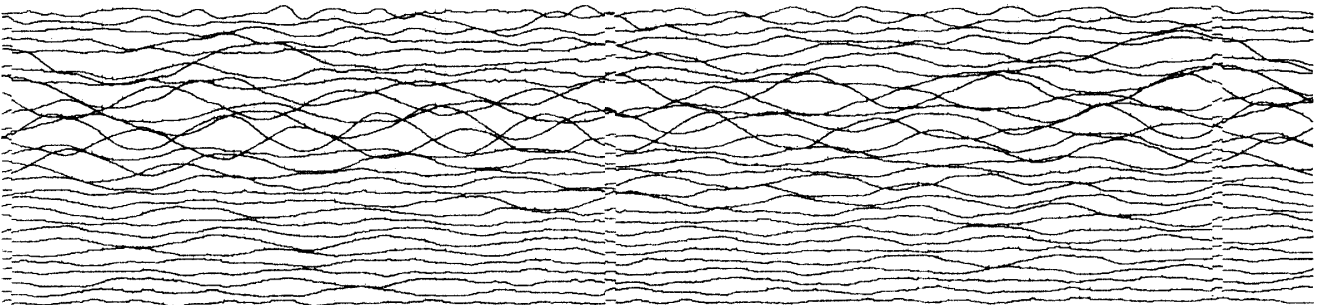
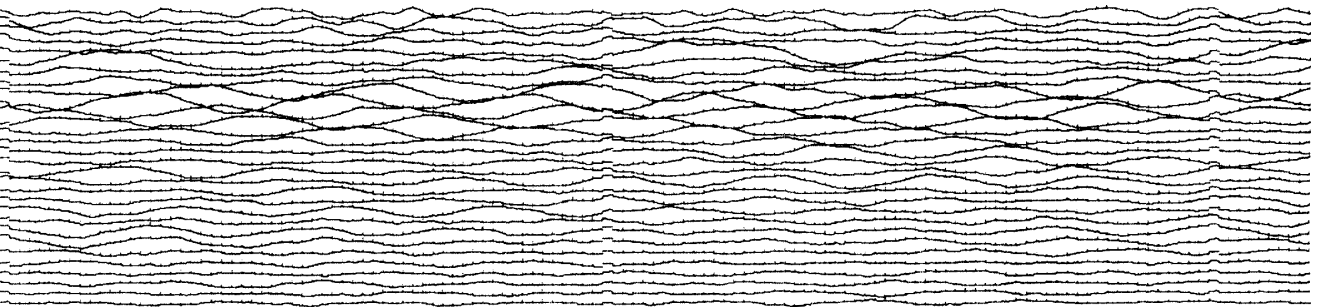
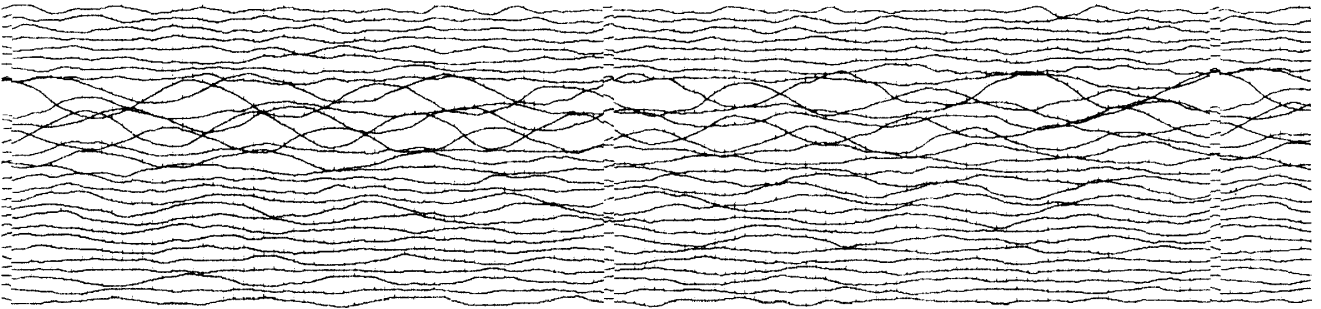
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LP-1



LP-2



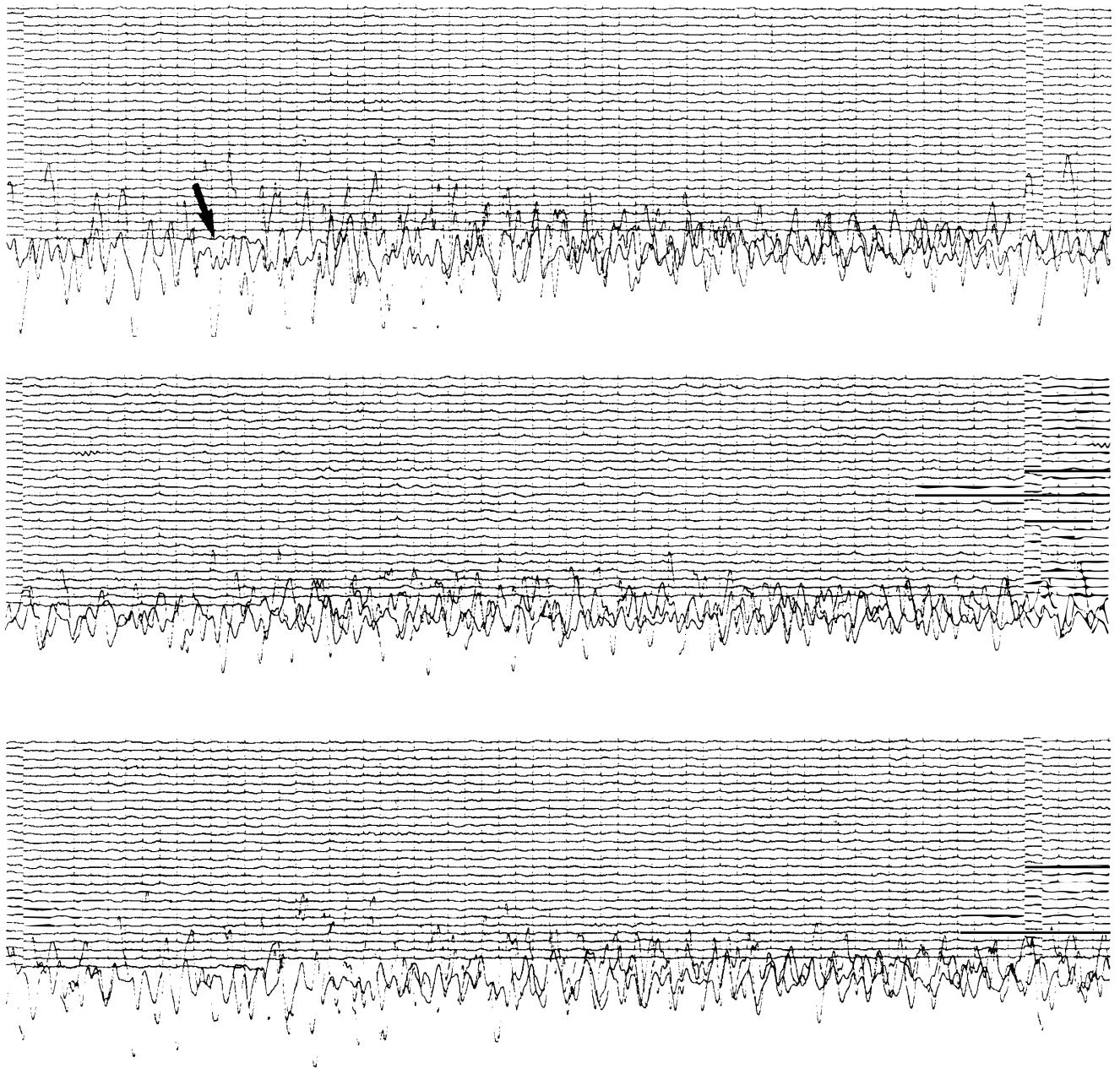
#-181

DEC. 30 19h14m18.9s

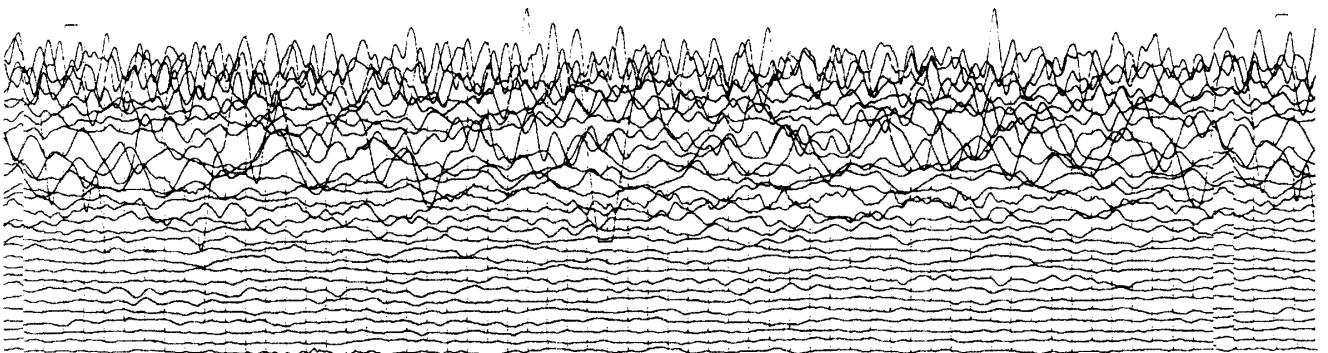
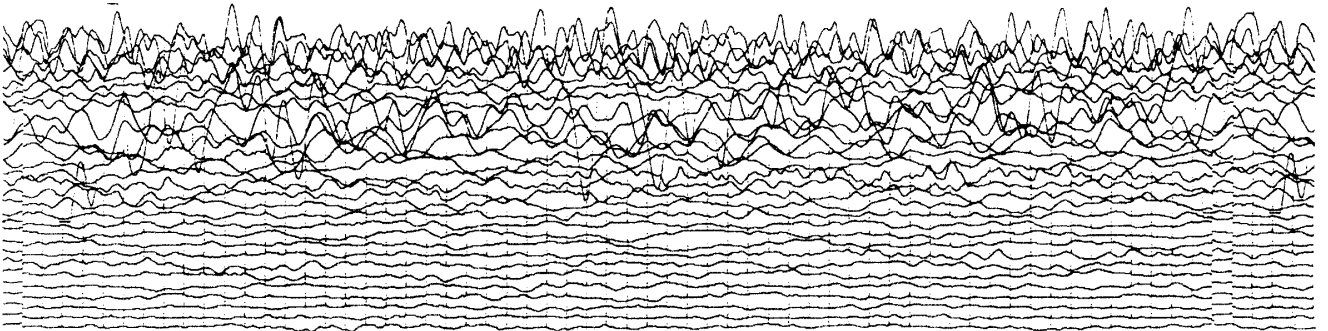
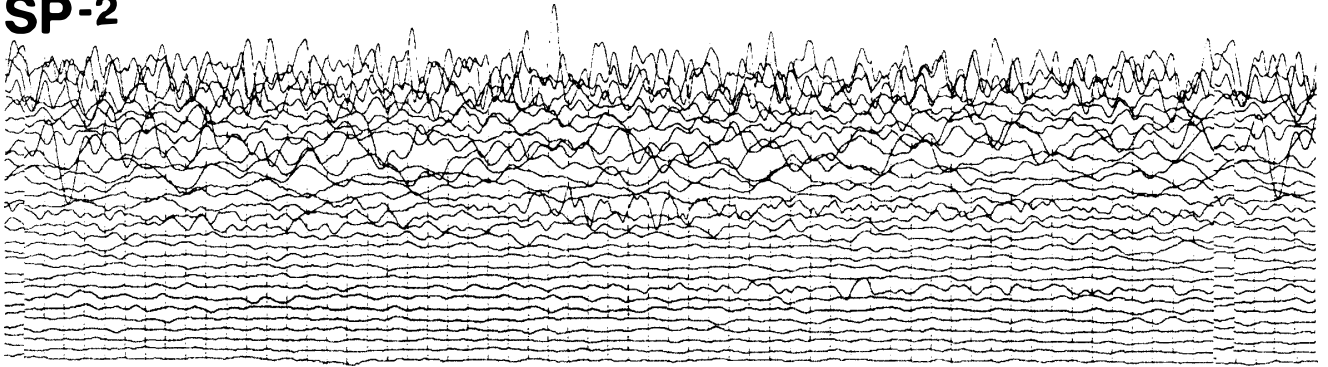
5.097 S 150.967 E 179km Mb 6.6

New Britain Region

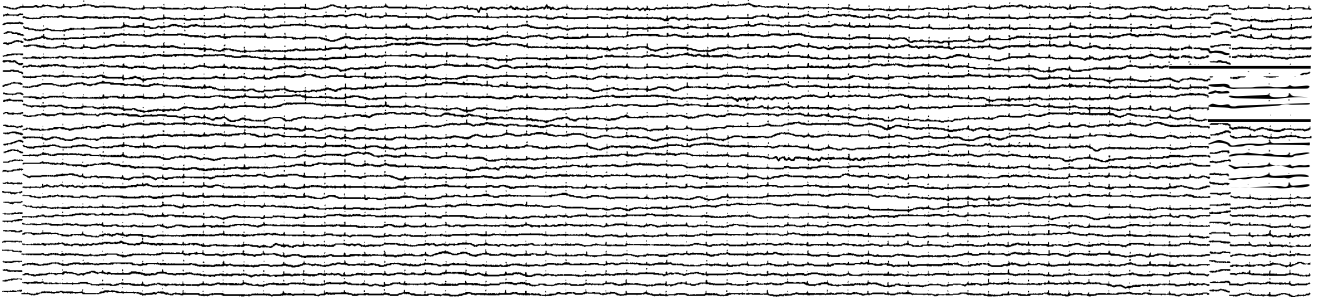
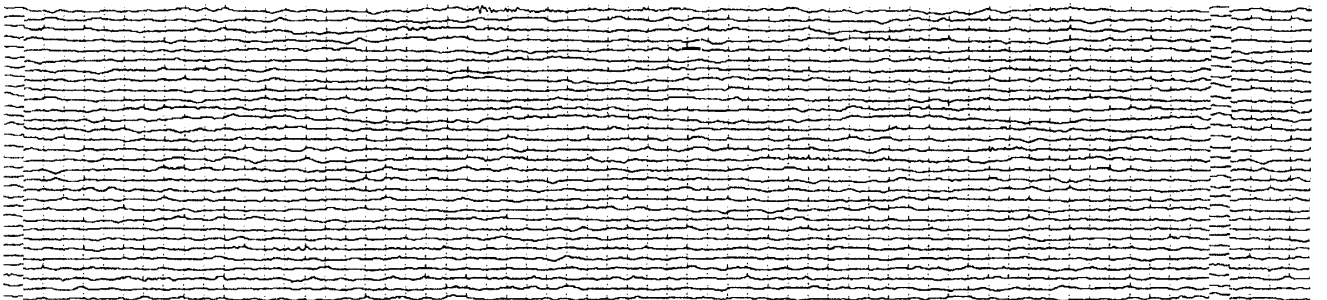
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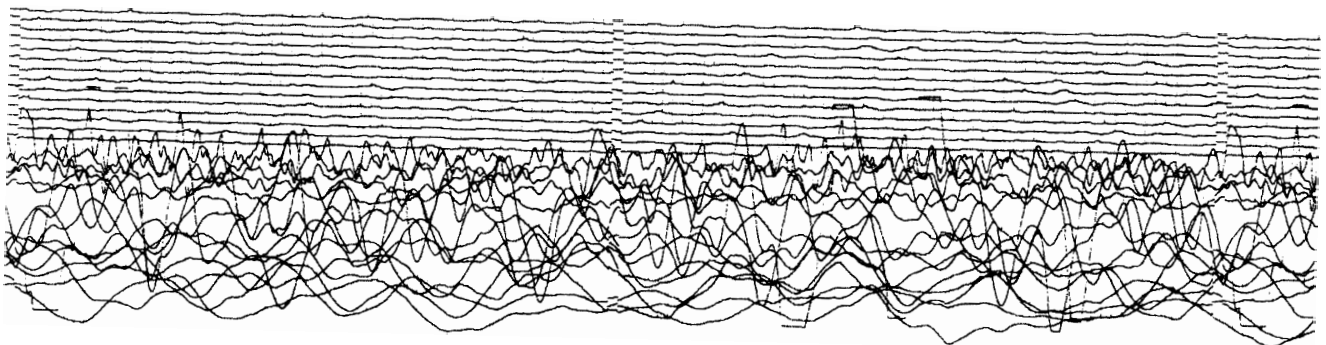
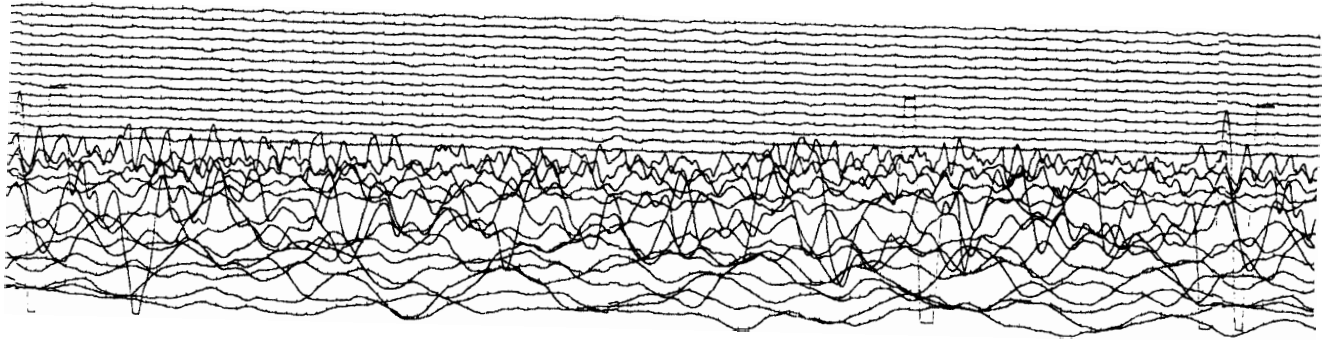
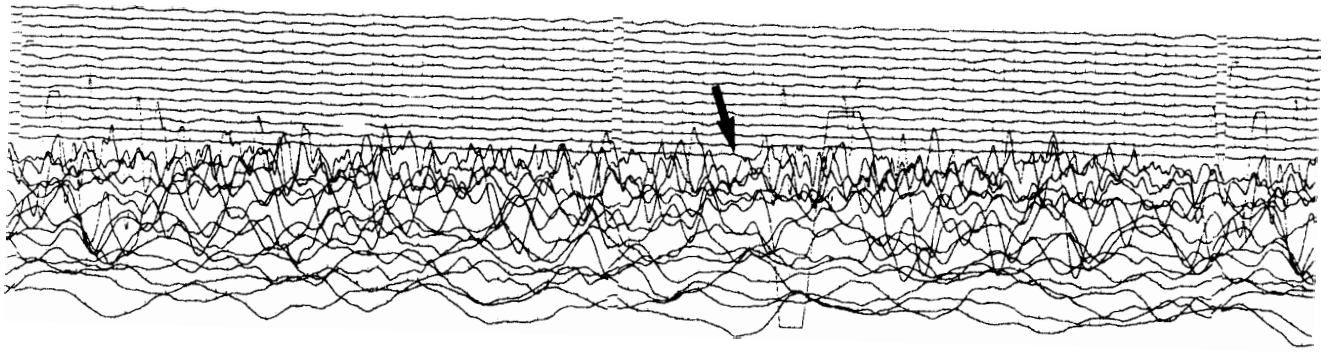
SP-2



SP-3



LP-1



LP-2

