



Magnetic base station data for 1985 marine
geophysical surveys

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MAGNETIC BASE STATION DATA FOR 1985 MARINE GEOPHYSICAL SURVEYS.

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This report accompanies digital magnetic base station data to be used as reference for two 1985 geophysical surveys, for which Orkustofnun (National Energy Authority) has responsibility. These are a cruise off the north coast of Iceland, and another in the Jan Mayen Ridge area in cooperation with Oljedirektoratet (The Norwegian Petroleum Directorate). The survey data are being processed by the Norwegian geophysical company Geco, and the base station data will be given to them to be included in the magnetic processing.

The magnetic observatory is at the tip of Tjörnes, a peninsula on the north coast of Iceland. Coordinates are 66.0 deg. N and 17.4 deg. W (see fig. 1). This is a temporary installation operated by the National Institute of Polar Research of Japan, in cooperation with Dr. Þorsteinn Sæmundsson at the University of Iceland, who kindly provided the data. The station is just east of the Icelandic survey area, and could possibly be used for direct corrections of ship-board magnetic data. The distance to the Jan Mayen area is on the other hand some 500 km, which is too far for such processing. However, as no other observatory is closer, it was decided to use this station for indications of magnetic disturbances.

Observations and data treatment

The data delivered with this report cover a period of 38 days, from July 25 to August 31, 1985. I obtained the data as a sequence of variations in horizontal component, declination and vertical component (dH, dD, dZ); d meaning "delta". The sample intervals were 2 s. As the ship's meter measures total field, I judge it appropriate to present also the total field variations for the base station data.

I have resampled the data at 20 s intervals (every tenth point), and calculated the variations in total field from the horizontal and vertical components, after applying appropriate calibration. The declination is not relevant. The variations in the two perpendicular components are referred to an arbitrary reference. As they are small numbers compared to the Earth's total field, one can assume that the

inclination of the total field vector is near constant and apply the following approximation:

$$dZ = dH \cdot \cos(I) + dZ \cdot \sin(I) ,$$

where I is the inclination, some 76 degrees in N-Iceland.

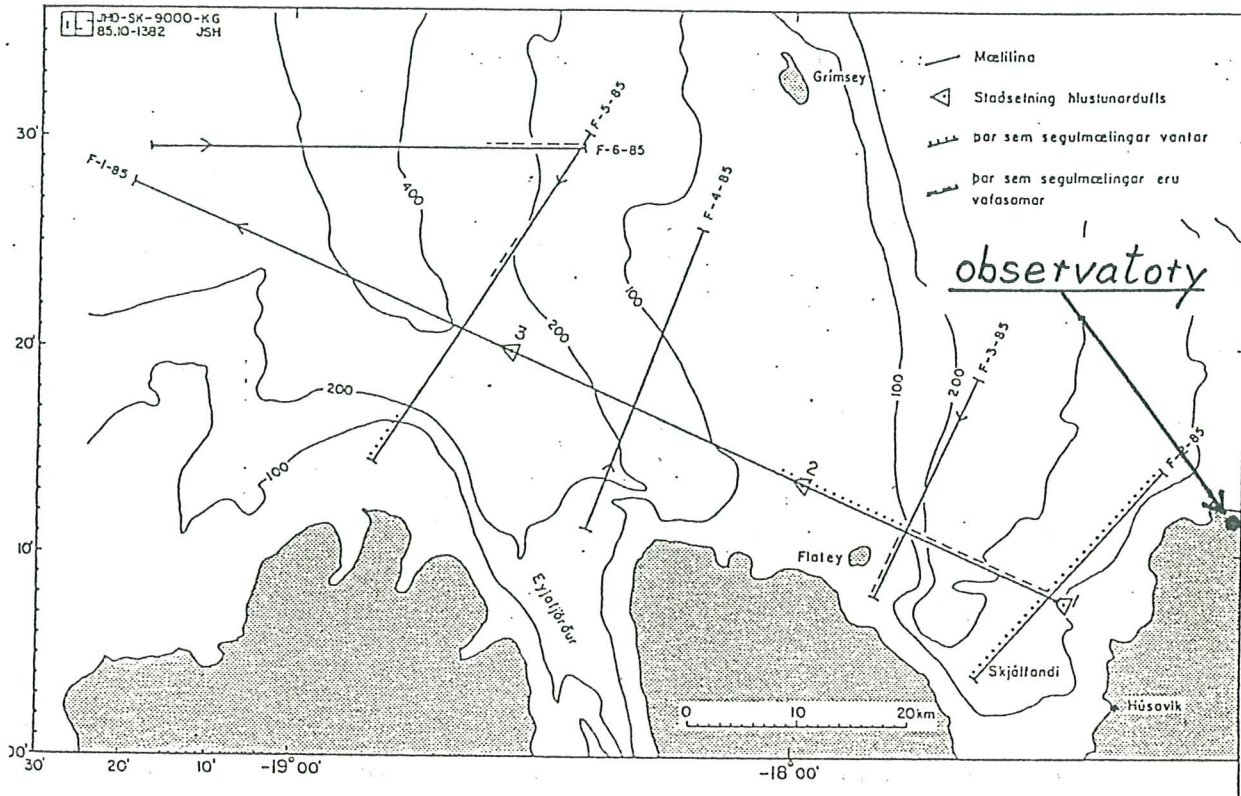


Fig 1. The North-Iceland survey lines, and location of the Tjörnes observatory.

Figure 2 shows a plot of all the various parameters recorded in the observatory. Figures 3 a) to 3 d) show my plot of the calculated total field variations of the 38 days. Note that the data corresponding to gaps in the graphs are defined as 9999 in the files. These were either missing or had very abnormal values (about -32000). On days 219 and 243, there are also patches of high values that are certainly wrong, and maximum value is 2850. Some suspicious spikes have also been indicated by arrows.

It should be mentioned here that a previous batch of similar data were delivered to Geco in early December 1985, for the period 15-17 of August 1985, the duration of the Iceland cruise. These data are from the same station, but differ in the way that they are resampled at 1 minute intervals and a 3-day average has been subtracted. These data can now be considered obsolete.

Data tape

The tape is EBCDIC-formatted, 1600 bpi, record length is 80 and block length 100; 103 blocks and 10298 records were written to tape.

The data are contained in 1 file, covering the period June 25 to August 31. These 38 days are numbered 206 to 243. Each day is represented by 271 records. Record length is 80, and each record contains 16 values ($5 \times 16 = 80$). The first record of each 271 rec. group contains the year and day no. (e.g.: 85 206) in the first two places, and is then followed by 14 0-values. Then follow 270 records containing 4320 values of the total field data, corresponding to times 0-hours to 20 seconds before midnight.

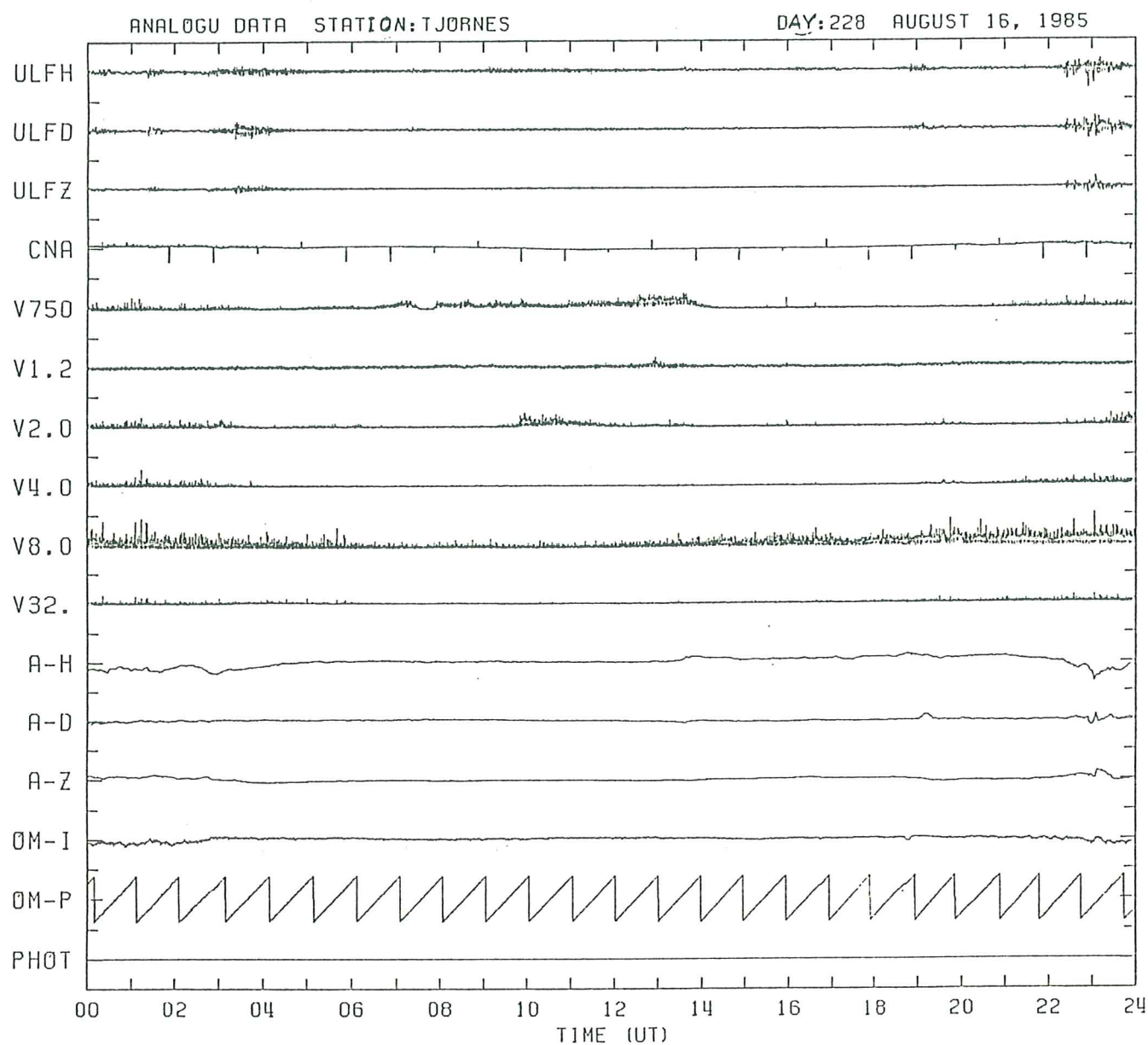


Fig. 2. Plot of one day observatory data. Only A-H and A-Z, the horizontal and vertical magnetic components, were used in the processing.

Fig. 3 a). Total magnetic field variations
at Tjörnes observatory.

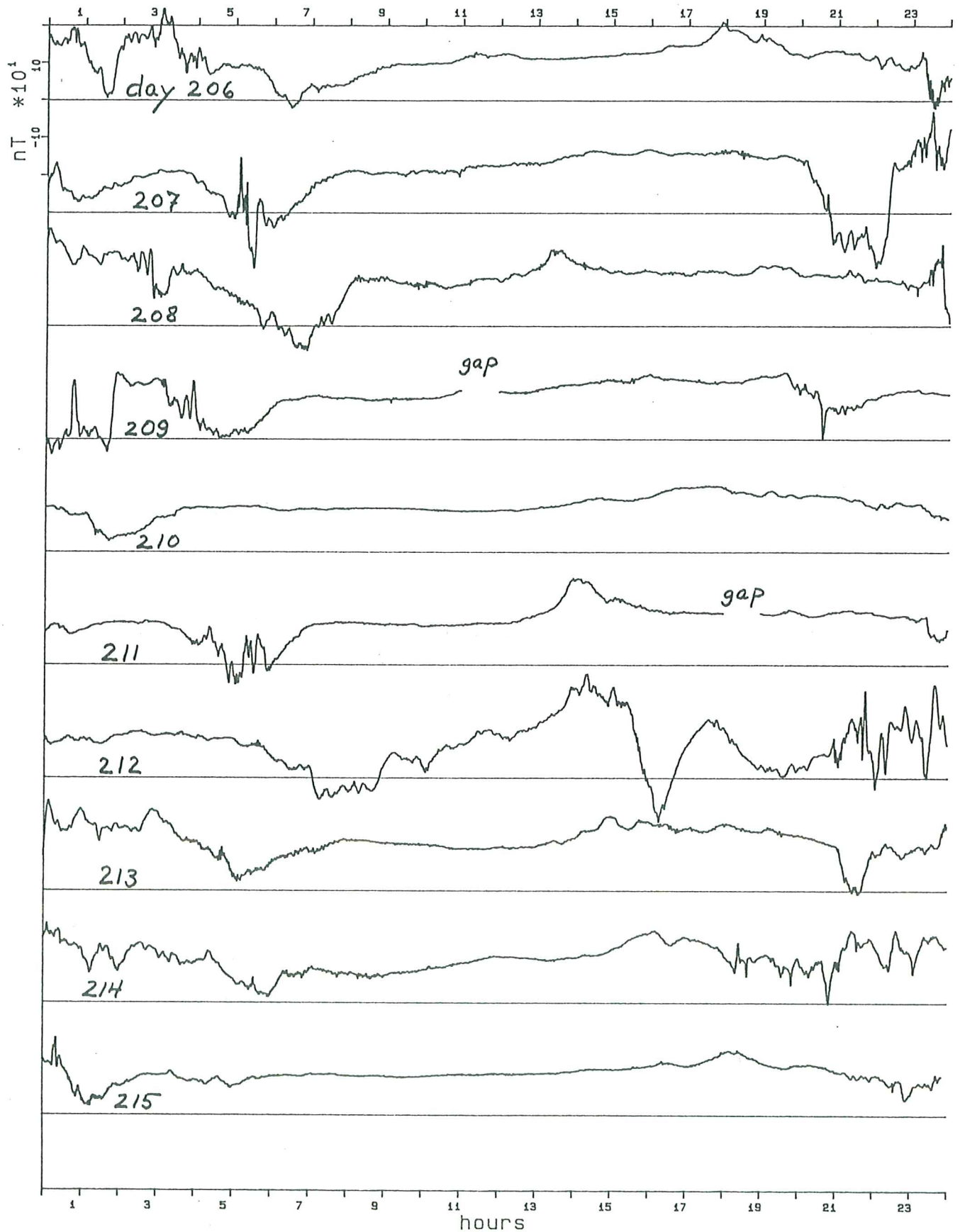


Fig. 3 b)

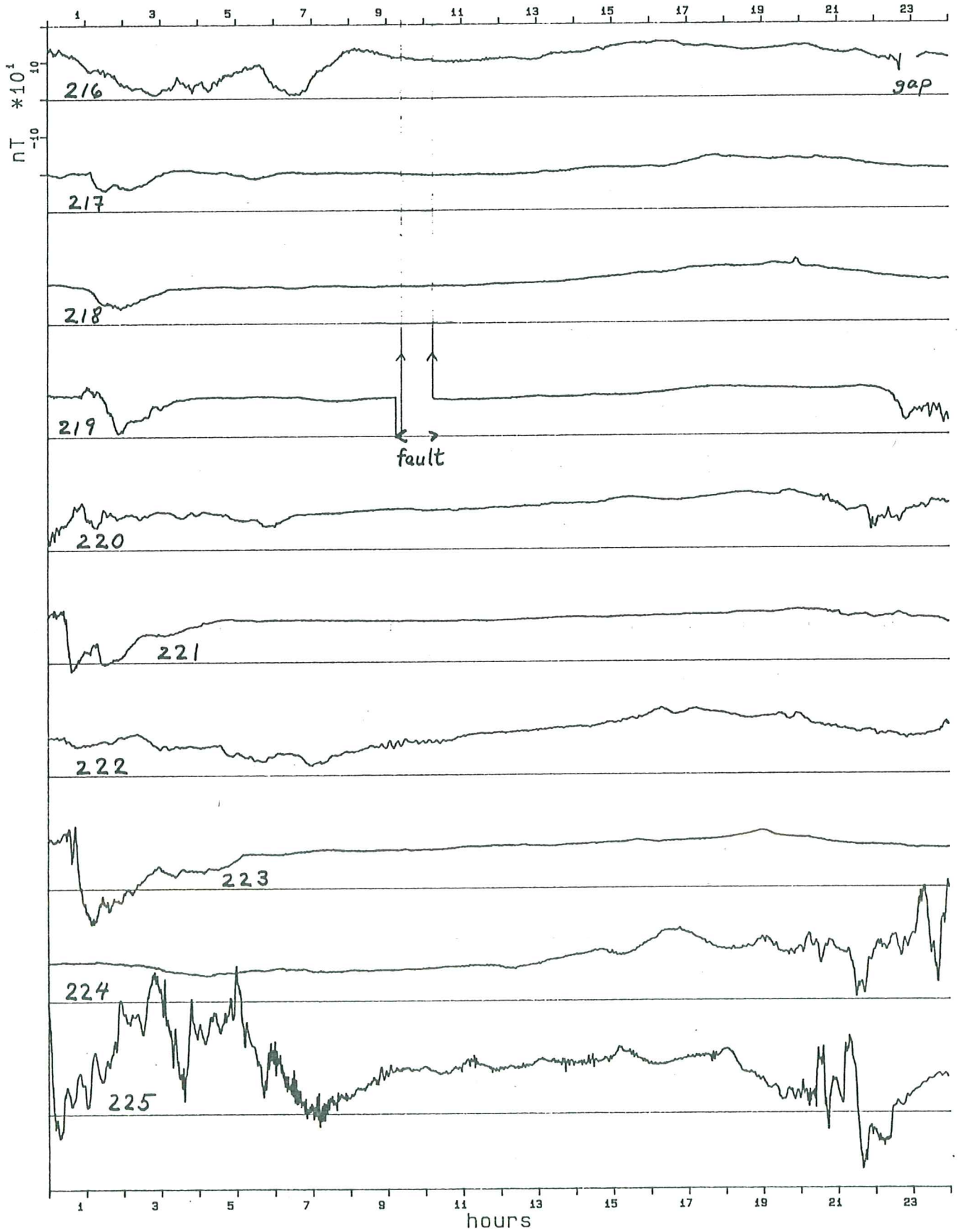


Fig. 3c)

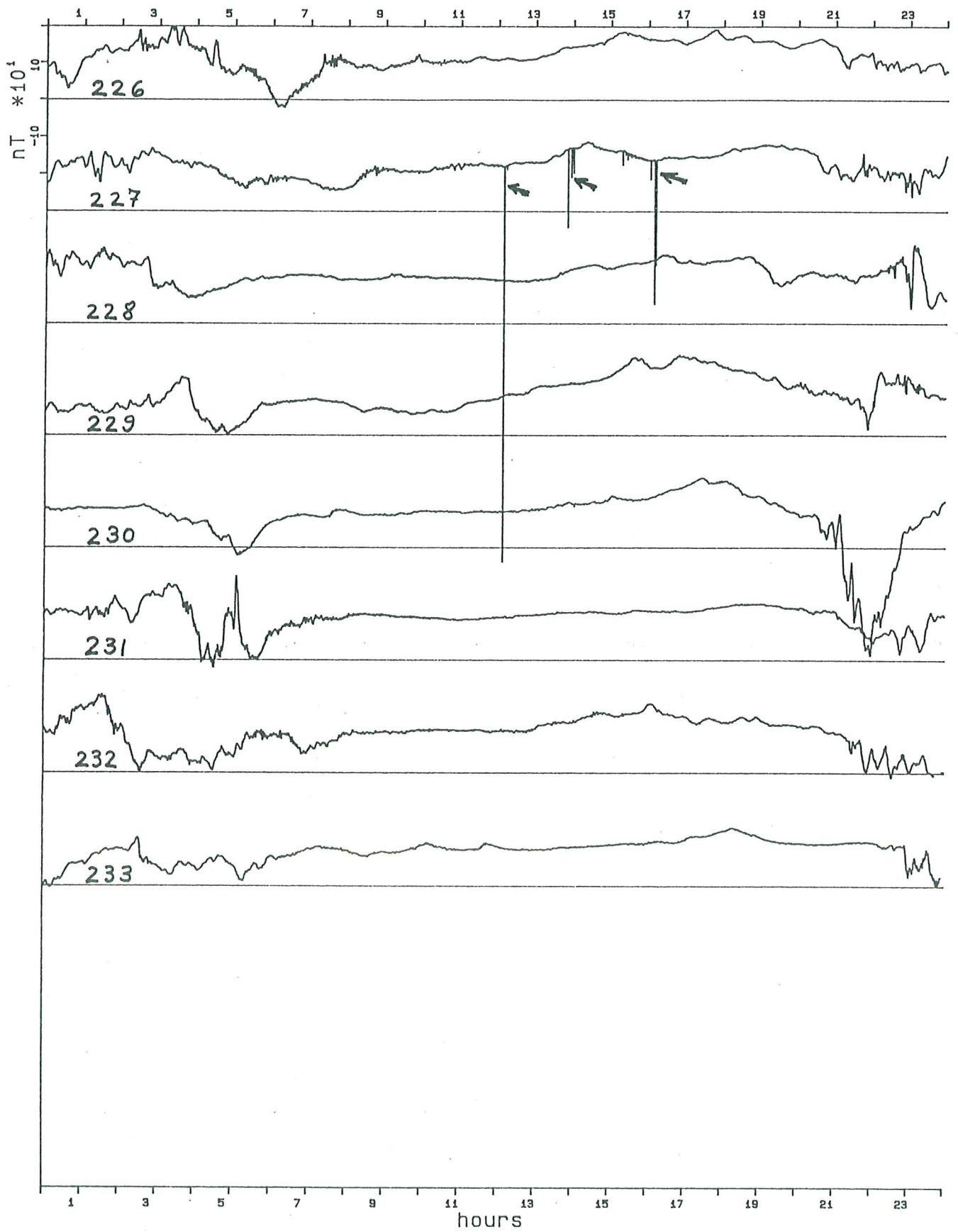


Fig. 3 d)

