Werk

Jahr: 1976
Kollektion: fid.geo
Signatur: 8 Z NAT 2148:42
Digitalisiert: Niedersächsische Staats- und Universitätsbibliothek Göttingen
Werk Id: PPN1015067948_0042
PURL: http://resolver.sub.uni-goettingen.de/purl?PPN1015067948_0042

LOG Id: LOG_0023
LOG Titel: Note on the reliability of subjective processing of geomagnetic pulsation-records in the range Pc 2 - Pc 5
LOG Typ: article

Übergeordnetes Werk

Werk Id: PPN1015067948
PURL: http://resolver.sub.uni-goettingen.de/purl?PPN1015067948
OPAC: http://opac.sub.uni-goettingen.de/DB=1/PPN?PPN=1015067948

Contact

Niedersächsische Staats- und Universitätsbibliothek Göttingen
Georg-August-Universität Göttingen
Platz der Göttinger Sieben 1
37073 Göttingen
Germany
Email: gdz@sub.uni-goettingen.de

J. Geophys. 42, 89–91, 1976

Journal of Geophysics

Note on the Reliability of Subjective Processing of Geomagnetic Pulsation-Records in the Range Pc 2–Pc 5

A. Korschunow

Geophysikalisches Observatorium Fürstenfeldbruck
der Ludwig-Maximilians-Universität München,
D-8080 Fürstenfeldbruck, Ludwigshöhe 8, Federal Republic of Germany

Key words: Geomagnetic pulsations – Processing of data.

At the observatory Fürstenfeldbruck (IAGA-code: Fu) an extended statistical evaluation of records of geomagnetic pulsations for the years 1960–1971 (covering the 4,401 days of the sun-rotations: No. 1731–1893) is in progress (Korschunow, 1969; Hollò and Korschunow, 1974). Daily records of GRENET-type variometers are continuously examined with the aid of a glass-scale (subjective method of reading and estimating). Quarter-hourly activity-figures (Schätz-Zahlen) S in grades between 0 and 9 are derived from the records, using components of the geomagnetic field in the horizontal plane: H and D. Thus the photo-optical records are transformed into collections of figures, finally leading to the preparation of punched cards.

Taking into consideration that subjective methods of evaluation often are regarded with suspicion, because of individual errors incorporated into the processing, checks with three independent processors previously had been carried through, leading to promising results. Recently, however, another check was made unvoluntarily: Mistakebly records from five consecutive days were passed two times through routine-work. Thus there had been no planned performance, and a psychologically non-objectionable check had been completed with one and the same processor. A detailed report of the results had been published (Korschunow, 1974). Here one aspect will be demonstrated.

For the days in question (covering a general activity-range between Ap 11 up to Ap 30) the quarter-hourly mean figures of activity S (cf. above) have been derived. In order to simulate the effect of extended processing over a longer set of days, smoothing of the figures S according to the formula $(a+2b+c)/4$ was carried through.

Fig. 1 gives the smoothed curves of daily variation of S in the components H and D, likewise the difference curves ΔH and ΔD (original investigation minus repeated investigation). According to a IAGA-resolution, Berkeley 1963 (published in 1964), the statistical treatment of the Fürstenfeldbruck-records

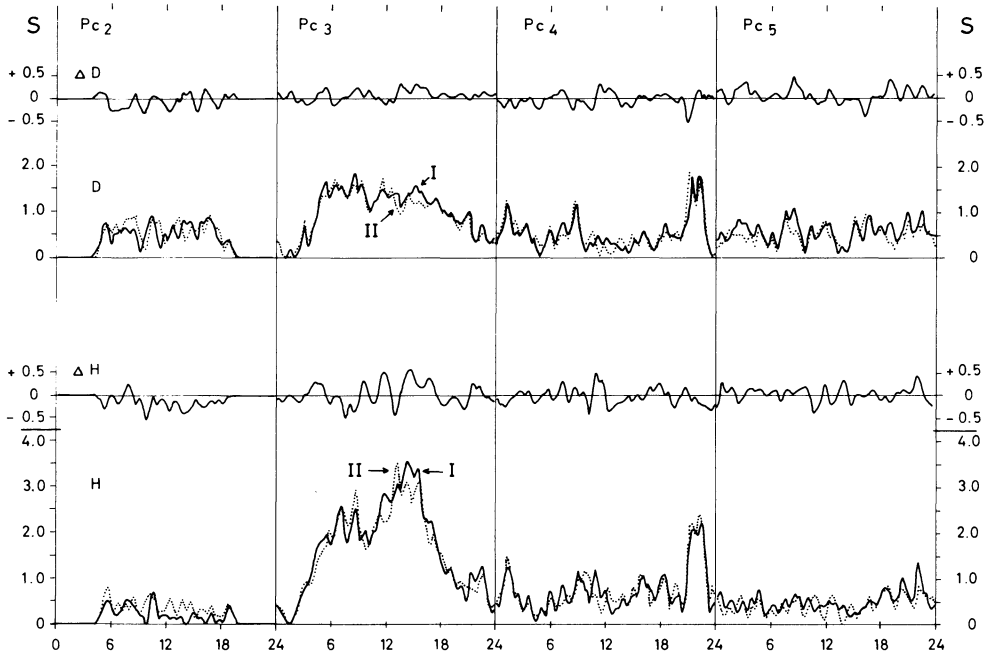

Fig. 1. Smoothed mean daily variation of pulsation activity figures *S* for the five days Feb. 4–9, 1964. I (full lines) results from first evaluation, II (broken lines) results from second evaluation. *Δ D*, *Δ H* differences between the two results. Reference-time: UT or GMT

Table 1. Correlation coefficients between the time-series as resulting from the original, first evaluation and the time-series as resulting from the repeated, second evaluation

	Pc 2	Pc 3	Pc 4	Pc 5
Component H				
Derived from mean daily variation	0,629	0,923	0,776	0,509
Derived from smoothed mean daily variation	0,727	0,949	0,895	0,629
Component D				
Derived from mean daily variation	0,841	0,932	0,822	0,483
Derived from smoothed mean daily variation	0,914	0,943	0,900	0,627

goes on in the four period-ranges of pulsations: Pc 2 5–10 s, Pc 3 10–45 s, Pc 4 45–150 s, and Pc 5 150–450 s, which are denoted correspondingly in Fig. 1.

In Table 1 the effect of smoothing the time-series, leading to better correlation-coefficients, is evident. The good correlation of the ranges Pc 3 and Pc 4, however, is not attained by the ranges Pc 2 and Pc 5. In the case of Pc 2's, being riders on Pc 3's and Pc 4's, obviously there could not be discerned properly the Pc 2's. whenever amplitudes of Pc 3's and Pc 4's had been larger. In the case of Pc 5 (belonging to the longer period-range 150–450 s) the processor seemed to be uncertain in his decision with respect to the borders of the time-base

(quarter-hourly-code!). These two sources of errors are widely known and common in subjective processing.

The results of this check and preliminary results of the statistics in progress (ultimately covering a solar-cycle) of the three consecutive years 1960–1962, not yet being published, demonstrate that sufficient reliability is achieved, provided that one individual processor is permanently taking care of the records. Taking moreover in view that thousands of consecutive days are involved into the complete system of evaluation, rough "quickly-going-schemes", adopted to extended analogue time-series, seem to be promising. Taking further into consideration that up to now in most observatories daily records are produced by means of galvanometric-photo-optical techniques or with pencil-recorders, such rough schemes of subjective evaluation seem to be the only means to get results out of the abundance of data on the long run.

References

Hollò, L., Korschunow, A.: A comparison of activity character figures of geomagnetic pulsations at the observatories Fürstenfeldbruck and Nagycenk. Acta Geodet., Geophys. et Montanist. Acad. Sci. Hung. **9**, (1–2), 51–66, 1974

Korschunow, A.: Erdmagnetische Pulsationen und Erdstrom an der Station Fürstenfeldbruck im Jahre 1968. In: Veröffentlichungen des Geophysikalischen Observatoriums Fürstenfeldbruck, Serie A, Nr. 11, 13–30, 1969

Korschunow, A.: Pulsationen des erdmagnetischen Feldes an der Station Fürstenfeldbruck im Jahre 1973. In: Veröffentlichungen des Geophysikalischen Observatoriums Fürstenfeldbruck, Serie A, Nr. 16, 9–16, 1974

Received August 14, 1975; Revised Version November 6, 1975