

## Scanning historical magnetograms kept in the archives of the Institute of Geophysics Polish Ac. of Sc.

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The archival resources in the Institute of Geophysics PAS comprehend a large amount of analog magnetograms recorded in the geomagnetic observatories Świder (SWI), Hel (HLP), Belsk (BEL), Hornsund (HRN, Spitsbergen), and Arctowski (ARC, Antarctica). The oldest magnetograms are from Świder observatory which started its work in 1920. The last Polish observatories to stop analog recordings were Hornsund and Arctowski in 1995. Analog recordings were conducted in different ways. In most cases, recordings were made on photographic paper. However, there were also used chart recorders equipped with a pen. For about two years we have been performing a systematic scanning of historical magnetograms now.

All the Polish geomagnetic observatories started their work with analog recordings. The Swider Observatory was the first one; it started its activity in 1920. Geomagnetic observations conducted by Swider were taken over in 1965 by the Central Geophysical Observatory at Belsk, which has been working until today. The table below summarises the historical analog recordings conducted by Polish observatories associated in IAGA.

| Observatory     | Location        | Period of analog recordings |
|-----------------|-----------------|-----------------------------|
| Świder (SWI)    | Central Poland  | 1920-1975                   |
| Belsk (BEL)     | Central Poland  | 1966-1987                   |
| Hel (HLP)       | Northern Poland | 1957-1996                   |
| Hornsund (HRN)  | Spitsbergen     | 1978-1996                   |
| Arctowski (ARC) | Antarctica      | 1978-1996                   |

In most cases, analog recordings were conducted on photographic paper. Different variometers were used for recordings, such as La Cour, Mating Wiesenberg, Schulze, but most of all with Bobrov quartz torsion variometers.



Figure 1. The working place for scanning in Belsk Observatory.

Moreover, on the basis of the Bobrov variometer, a PSM magnetometer was developed in Belsk Observatory in 1978. It produced voltage analog signals proportional to the changes of the geomagnetic field. Hornsund and Arctowski observatories recorded analog signals using pen recorders.

In 2016, a laboratory for scanning historical geophysical recordings was established in Belsk. It is equipped with a few nice scanners. For scanning archival magnetograms, we are using a MAP MASTER type flatbed A0 scanner made in Germany. The working place for scanning is shown in Fig. 1.

After many tests and analyses, it was decided to carry out scanning at the resolution of 600 pixels/inch. This corresponds to the horizontal resolution of 1 pixel/7.5sec and the vertical resolution of 1 pixel/85pT for most of the scanned magnetograms. The scans are saved in TIF format which supports lossless compression.

So far, ca. 12 000 magnetograms have been scanned, among them all magnetograms of Set No 1 from Belsk for the period 1966-1987. In a longer time horizon we plan a conversion of scanned bitmaps to digital time series.

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