MAGNETIC IDENTIFICATION OF THE MAGNETIC MINERAL GREIGITE IN FINE-GRAINED SEDIMENTS OF LAKE PANNON

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The Lake Pannon was a large, long-lived, brackish lake that occupied the Pannonian Basin during the Late Miocene. Magnetite was believed to be the typical magnetic mineral in the sediments of Lake Pannon, including its fine-grained beds. We observed, however, that the intensity of the magnetisation was very varied in the fine-grained sediments, which raised the question whether these sediments contain magnetite in different quantities or the difference is due to different magnetic minerals.

The first investigation indicated, that in some of the strongly magnetic sediments of Lake Pannon the carrier of the magnetic remanence was probably greigite. Since greigite is of diagenetic origin, i.e. definitely not coeval with the deposition of the sediment, its identification in a sediment is important from the viewpoint of palaeomagnetic or even more of magnetostratigraphic interpretation of the palaeomagnetic signal. Greigite can be identified by mineralogical methods. These methods need material separated from the sediment. However, separation is difficult, due to the small grain size, low quantity and the instability of the greigite. An alternative method is the magnetic. There is a series of magnetic mineralogical experiments which eventually lead to the identification of greigite. The methods are not destructive and although the process is time-consuming, the result is reliable, even if greigite is less than 0.01% of the mass.

With the magnetic method we were able to show that greigite is more common in the fine-grained sediments of Lake Pannon that magnetite. Surprisingly, the palaeomagnetic signal connected to greigite more often yielded statistically well defined mean direction than the one connected to magnetite. One possible explanation of this phenomenon is that magnetite, contrary to general opinion, can be of secondary origin in some sediments.

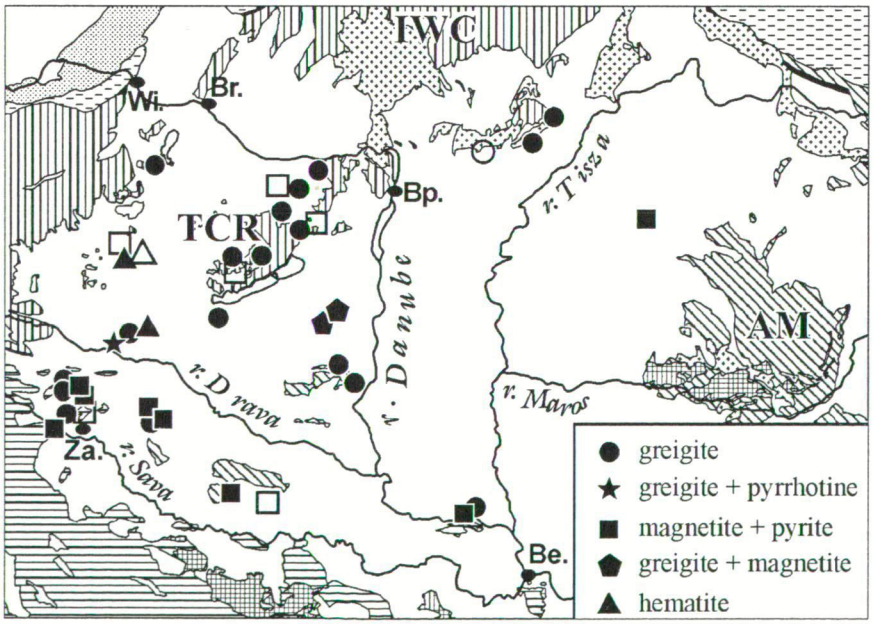

Fig. 1: Magnetic minerals occurrences in the Pannonian Basin. The full symbols show places where the palaeomagnetic signal is good, the hollow symbols show places where it is bad.