

Paleomagnetically Constrained Geodynamic Events and the Formation of the Ipolytarnóc – Lipovany Ignimbrites

Emő MÁRTON¹, Péter MÁRTON², Dionyz VASS³ and Igor TÚNYI⁴

¹ Eötvös Loránd Geophysical Institute of Hungary, Palaeomagnetic Laboratory, Columbus 17-23, H-1145 Budapest, Hungary

² Geophysics Department, Eötvös Loránd University, Pázmány Péter sétány 1/c, H-1117 Budapest, Hungary

³ Technical University, Department of Environmental Studies, T.G. Masaryka 24, 960 53 Zvolen, Slovak Republic

⁴ Geophysical Institute, Slovak Academy of Sciences, Dúbravská cesta 9, 842 28 Bratislava, Slovak Republic

In the area of the Paleogene Basin of N Hungary and S Slovakia two phases of CCW rotation were recognized during the Miocene, through paleomagnetic studies of ignimbrites and sediments (Márton and Márton, 1996, Márton et al., 1996): the first, about 50°, after the emplacement of the lower, the second, about 30°, after the formation of the middle tuff horizon. By combining paleomagnetic and radiometric age data from the Bükk Foreland, the two phases were dated as occurring between 18.5–17.5 Ma and 16.0–14.5 Ma, respectively (Márton and Pécskay, 1998).

An important feature of the paleomagnetic data set is that the three Miocene tuff horizons or tuff complexes (Szakács et al., 1998) are clearly distinguishable by their declinations. In the Ipolytarnóc area, however, some outcrops of the ignimbrite, overlying the “footprint” sandstone, and known as belonging to the lower tuff horizon, exhibited also 30° CCW rotation (Márton and Márton, 1996). This implied younger age than 17.5 Ma. We have followed up the above indication and now present a summary of the paleomagnetic studies so far carried out. There are two localities, one in Ipolytarnóc, (the glauconitic sandstone underlying the “footprint” sandstone), one at Lipovany (ignimbrite), where the angle of the CCW rotation corresponds to that of the lower tuff complex. On the contrary, about 2 km of Lipovany (close to the Hungarian boundary) and at all the sampled points (8 points and/or levels, deposited in water and on dry land) in Ipolytarnóc show only 30° CCW rotation. A limited number of samples drilled from the “footprint” sandstone also seems to belong to the second group. Thus, our data suggest that the first Miocene paleomagnetic marker horizon is older than the ignimbrite eruption producing the material deposited in the vicinity of Ipolytarnóc, i.e. the ignimbrite here must belong to the middle tuff complex of 17.5–16.0 Ma.

Though the age of the ignimbrite in the vicinity of Ipolytarnóc in strictly not controlled stratigraphically, the paleomagnetically indicated age seems to be problematic for the following reason.

The ignimbrite body covering the „footprint“ sandstone at Ipolytarnóc is in similar geological position as the ignimbrite at Čakanovce and at Lipovany. If the Ipolytarnóc ignimbrite is younger than the other ignimbrites in the wider vicinity, we have to assume that the whole Ottnangian and Karpatian was removed by erosion locally at Ipolytarnóc.

References

- MÁRTON E. and MÁRTON P., 1996. Large scale rotations in North Hungary during the Neogene as indicated by palaeomagnetic data. In: A. MORRIS and D.H. TARLING (Editors) Palaeomagnetism and Tectonics of the Mediterranean Region. *Geological Society Special Publication*, 105: 153-173.
- MÁRTON E. and PÉCSKAY Z., 1998. Correlation and dating of the Miocene ignimbritic volcanics in the Bükk foreland, Hungary: complex evaluation of paleomagnetic and K/Ar isotope data. *Acta Geologica Hungarica*, 41: 467-476.
- MÁRTON E., VASS D. and TÚNYI I., 1996. Rotation of the South Slovak Paleogene and Lower Miocene rocks indicated by paleomagnetic data. *Geologica Carpathica*, 47: 31-41.
- SZAKÁCS A., SEGHEDI I., ZELENKA T., MÁRTON E., PÉCSKAY Z. and PÓKA T., 1998. Miocene acidic explosive volcanism in the Bükk Foreland, Hungary: identifying eruptive sequences and searching for search location. *Acta Geologica Hungarica*, 41: 413-435.

Geodynamic Application of Paleomagnetism in the ALCAPA Region

Emő MÁRTON¹

¹ Eötvös Loránd Geophysical Institute of Hungary, Palaeomagnetic Laboratory, Columbus 17-23, H-1145 Budapest, Hungary

Paleomagnetists, prior to 1990, applied their method mostly to Mesozoic and Paleozoic tectonic problems in the Alpine–Mediterranean belt of Europe, and within it, the ALCAPA region. Around this date, the importance of Tertiary displacements was realized (Márton and Mauritsch, 1990), and interest became shifted accordingly. Today, a large number of new paleomagnetic results are available for the Tertiary. The present paper will

attempt to evaluate them from the viewpoint of post-Cretaceous geodynamic processes. It has to be emphasized, however, that the same data are also important for the correct interpretation of pre-Tertiary paleomagnetic declinations in terms of tectonic rotations, since any measured declination is the resultant of all rotations which involved the area in question, after the acquisition of a paleomagnetic signal.