Field-reversal versus self-reversal hypothesis: Paleomagnetic properties, magnetic mineralogy and an origin of the reversed RM of the Neogene rhyolites from central and eastern parts of Slovakia (Part VIII)

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A b s t r a c t : Paleomagnetic properties, magnetic mineralogy and an origin of the reversed remanent magnetization (RM) of the rhyolites from central and eastern Slovakia's volcanic fields were studied. Values of magnetic susceptibility (κ) and natural remanent magnetization (NRM) of the rhyolites are very low, compared to andesitic rocks. The rhyolites of the reversed RM contain mostly the Ilm-Hem phase in their natural state and these phases were renewed also after temperature annealing of the respective rocks. In spite of this, the self-reversed partial thermoremanent magnetization (PTRM) was not induced during the laboratory magnetization of rocks. The dominant share of the rhyolites having normal RM contains ordered phases with the $T_C \geq 580°C$, which were renewed also after their annealing, during heating of samples to 700°C and successive cooling. Such samples have possessed only normal RM. Only rocks with the ilmenite-hematite (Ilm-Hem) phases of $T'_{C1} \approx 540 - 570°C$ (within the compositional range of Ilm_{15} to Ilm_{25}) with the metastable phase, including the disordered phase, were self-reversally magnetized. The mineralogical differences in the rhyolites (presence of the annealed Ilm-Hem phases) have indicated that the reversed RM of these rocks is of the self-reversal origin. The results indicate at the same time that the geomagnetic field was not reversing its polarity during the Middle-Late Badenian to the Late Pannonian time, when these rocks were acquiring their original thermoremanent magnetizations (TRM). No excursions of the field from one polarity to the other one, or the change of polarity of the geomagnetic field from positive to reversed polarity existed in the above delineated geological past.

Key words: rhyolites, in-situ magnetic phases, annealed magnetic phases, Ilm-Hem - a carrier of the self-reversed RM

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