Field-reversal versus self-reversal hypothesis: Paleomagnetic properties, magnetic mineralogy and the reproducible self-reversal PTRM of the Neogene andesites of the Vihorlat Mts. (Part VII)

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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 andesitic rocks from the Vihorlat Mts., were studied. Values of magnetic susceptibility (κ) and natural remanent magnetization (NRM) of andesitic rocks of the Vihorlat Mts. are in average lower than those from other volcanic fields from central or eastern parts of Slovakia. Ordered phases with the $T_C \geq 580°C$ are frequently present in andesitic rocks of the Vihorlat Mts. after heating of samples to 700°C and successive cooling. Such samples have acquired only normal partial thermoremanent magnetization (PTRM) during laboratory magnetization. Only rocks with the ilmenite-hematite (Ilm-Hem) phase 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, are able to be self-reversally magnetized during the magnetizing process in the laboratory field of normal polarity. This is the most convincing proof of the self-reversed origin of the reversed RM of andesitic rocks under study. The rocks having only completely ordered or disordered magnetic phases are not able to acquire the self-reversed PTRM in the laboratory field of normal polarity. Andesitic rocks of the Vihorlat Mts. originated in the Upper Sarmatian to the Late Pannonian time. The mineralogical differences in andesitic rocks, but particularly the reproducible laboratory induced self-reversed PTRM of large number of rocks, indicate the self-reversal origin of the reversed remanent magnetization of rocks. The results indicate, at the same time that the geomagnetic field was not reversing its polarity during the delineated time interval.

Key words: andesites of the Vihorlat Mts., in-situ magnetic phases, annealed magnetic phases, Ilm-Hem - a carrier of the self-reversed RM, the reproducible self-reversed PTRM of andesites

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