A multicomponent magnetization in welded tuffs: a case study of Upper Cretaceous welded tuffs of eastern Russia

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Multiple components of remanent magnetization are often identified in a single sample. Numerous studies have shown that a primary magnetization is generally observed at high unblocking temperatures during thermal demagnetization and often appears only after removal of secondary magnetization components. Alternatively all components of remanent magnetization may be of secondary origin; however, it may occur that a primary magnetization is removed prior to a secondary magnetization during thermal demagnetization.

Four distinct components of natural remanent magnetization (NRM) were isolated from a single site in welded tuffs in the Upper Cretaceous Kisin Group of the Sikhote Alin mountain range, Russia. In order to contribute toward a basis for an interpretation of multicomponent magnetization, rock magnetic experiments were performed on the welded tuffs. All four magnetization components essentially reside in magnetite. The lowest-temperature component up to 300C (component A: D=349.3, I=60.9, a95=7.3, N=7) is a present day viscous magnetization. The third-removed component (component C: D=41.4, I=51.8, a95=3.5, N=8), isolated over the temperature range of 450-560C, is a primary remanence. The second- and fourth-demagnetized components (component B: D=174.7, I=-53.1, a95=21.2, N=3 and component D: D=188.1, I=-64.5, a95=4.0, N=8, respectively) are secondary magnetizations related to a thermal event in Sikhote Alin between 66 and 51 Ma. Components B and D were acquired through different remagnetization processes. Component B is ascribed to a thermoviscous remanent magnetization carried by single-domain magnetite, and component D is a chemical remanent magnetization.