Anisotropy of magnetic susceptibility in alkaline-ultramafic dikes of the Kotuy river valley: Reconstruction of magma transport during the Siberian Traps emplacement

Anton Latyshev1,2, Victor Chmerev2, and Victor Zaitsev3
1Institute of Physics of the Earth RAS, Moscow, Moscow, Russian Federation (anton.latyshev@gmail.com)
2Lomonosov Moscow State University, Moscow, Russia
3Vernadsky Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, Moscow, Russia

Products of the Permian-Triassic magmatic activity in the Kotuy river valley consist of two contrasting in composition groups: 1) tholeiitic basalts, similar to the main volume of the Siberian Traps; 2) alkaline-ultramafic rocks which are extremely rare in other regions of the Siberian platform. Alkaline lavas and tuffs in the Kotuy river valley are exposed only in limited area (Arydzhangsky and Khardakhsky formations), however, multiphase circular plutons (Kugda, Odikhincha) and swarms of radial and parallel dikes marks the essentially wider territory of the manifestation of alkaline magmatic activity.

Here we present the preliminary results of the investigation of AMS in the dike complex of alkaline lamprophyres from the Kotuy river valley. The majority of dikes demonstrate I-type of the magnetic fabric, when the medium axes $K_2$ of AMS ellipsoid is orthogonal to the contact of intrusion. In dikes where the minimal axis $K_3$ is subvertical and maximal axis $K_1$ is flat, we interpret this magnetic fabric as a result of cooling of the static magma column after the emplacement in the setting of horizontal extension (Park et al., 1988; Raposo and Ernesto, 1995). Also, N-type and R-type of magnetic fabric were identified as well. In some intrusions, the orientation of the axes of AMS ellipsoid changes from the contact zones to the inner part if intrusion. In this case, we used data from the contact zones for the magma flow reconstruction.

Analysis of the maximal axis $K_1$ orientation in different dikes showed that in majority of bodies it shallowly plunges to the west. This corresponds to the lateral magma flow from west to east during the emplacement. Consequently, formation of the studied dikes is not directly related to Kugda pluton, which is located 8 km eastward. The emplacement of dikes occurred from the magmatic center located westward from the Kotuy river valley and is not associated with any known large massifs. Petrographic similarity of the studied dikes to the lavas of Arydzhangsky formation allows us to suggest that they are coeval. This implies the wider area of manifestation of the Arydzhangsky magmatic stage.

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