VOLCANIC ACTIVITY AT SEDANKINSKY DOL LAVA FIELD, SREDINNY RIDGE DURING THE HOLOCENE (KAMCHATKA, RUSSIA)

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Kamchatka hosts more than 30 Holocene stratovolcanoes and a large number of monogenetic vents. The recent volcanism is restricted to three main zones: the Eastern Volcanic Belt and South Kamchatka, the Central Kamchatka Depression, and the Sredinny Ridge. While the first two zones are relatively well investigated, few data is currently available on the Sredinny Ridge magmatism.

Here we report the preliminary results on chronology and composition of volcanism from the Sedankinsky Dol lava field, which is the area of the most voluminous volcanism in the northern Sredinny Ridge during the Holocene. This area is situated 100 km NW from Shiveluch, the northernmost active volcano in Kamchatka, and is comprise of several small shield- and stratovolcanoes and more than 100 monogenetic cones. The area is situated to the north of the edge of the subducting Pacifc plate [Gorbatov et al., 1997, Levin et al., 2002, Park et al., 2003], and the origin of magmatism in the area is of broad scientific interest. The recent magmatism in the Sredinny Ridge has been assigned (1) to fluids from the subducting Pacific plate triggering mantle melting, (2) to the melting of the Pacific plate edge and [Avdeiko et al., 2001, Yogodzinski et al., 2001] (3) to mantle plume activity [Portnyagin et al., 2003].

Detailed geological and tephrochronological investigations revealed three main stages of volcanic activity within the Sedankinsky Dol: (1) Late Pleistocene, (2) Early Holocene and (3) Late Holocene. Most of the shield- and stratovolcanoes appeared during the Second stage of Late Pleistocene glaciation and erupted about 4-5 km3 of basaltic, basaltic andesite magmas. The Early and Late Holocene stages are marked by abundant monogenic volcanism and several eruptions of Titila volcano, which is probably the only known potentially active Iceland-type shield volcano in Kamchatka. The total volume of erupted products of the 2nd and 3rd stages is about 0.5 km3.

All the erupted lavas are predominantly Ol-basalts. The total amount of phenocrysts, Ol (Fo_{78-85}) and Pl (An_{65-82}), ranges from 8 to 20%. The determined sequence of crystalization (Ol_{85-83}->Ol_{80-83}->Pl_{71-73}->Ol-Mt-Pl->Cpx-Pl) is consistent with fracturing at the upper crust level. Complex studies of the magmatic paragenesis and melt inclusions in Ol revealed the parent melts composition (SiO_2- 47.46, TiO_2- 1.44, Al_2O_3- 18.18, FeO- 9.73, MnO- 0.18, MgO-8.21, CaO-9.91, Na_2O-3.44, K_2O- 0.67) wich existed at T~ 1210^{0}C, P~1.5 Kbar, and H_2O~ 0.3 %. Oxygen fugacity, determined according to [Ballhause et al., 1991], corresponds to NNO buffer. The close resemblance of melt composition and the similar condition of fracturing of these melts suggest a common mechanism of formation of areal basalts for this area.

The geochemical results indicated that Sedanka basalts have larger amounts of K2O, Na2O, TiO2 and P2O5, compared with basalts of the Eastern volcanic belt, possibly indicating some admixture with intraplate basalts. The investigation of melt inclusions in Ol phenocrysts revealed the existence of two types of parent melts in some samples: low-K tholeite and medium-K high-Ti basalts. The presence of these heterogeneous melts suggests the mixing of different parent melts during magma generation.

Our results confirm the existence of Holocene volcanism in the Sedanskinsky Dol area, as was previously reported by [Ogorodov et al., 1972]. The established periods of volcanic activity within the northern part of the Sredinny Ridge correspond well to those in the Central

Kamchatka Depression and in the Eastern Volcanic Belt and South Kamchatka. The observation implies a common trigger mechanism of volcanism in the entire Kamchatka arc.

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