

# IAVCEI 2017

## Scientific Assembly

August 14-18

Portland, Oregon, U.S.A

**ABSTRACTS**

***Fostering Integrative  
Studies of Volcanoes***



*Stepan Krasheninnikov, Lilya Bazanova, Maxim Portnyagin, Maarten Blaauw*

Submission 770

### **Record of the Holocene magmatism of Avachinsky and Koryaksky volcanoes: geochemical and tephrochronological approach**

Avachinsky (AV) and Koryaksky (KOR) volcanoes are the largest in the Avachinsky volcanic group situated 30 km to the north from Petropavlovsk-Kamchatsky city. Proximal composite tephra sequences for these volcanoes comprise 156 units (eruptions) of AV and 54 units for KOR. In order to date the eruptions, more than 189 radiocarbon dates as well as 53 dates for marker tephra layers [Braitseva et al., 1993, 1995; Bazanova and Pevzner 2001] from 50 localities from the studied sections and across all Kamchatka were compiled and run through the OxCal calibration procedure [Bronk Ramsey, 2009], using the terrestrial northern hemisphere IntCal13 model [Reimer et al., 2013]. The erupted tephra volumes were estimated for 40 Holocene eruptions.

Pyroclastic rocks from AV and KOR volcanoes were studied geochemically to reconstruct their temporal compositional variations. The dataset comprises the major and trace element composition of bulk tephra samples and matrix glasses for 63 samples representing 38 eruptions of AV volcano and 12 eruptions of KOR volcano. AV compositions have low- to medium-K<sub>2</sub>O compositions while KOR tephra are medium- to high- K<sub>2</sub>O, correlating with increasing distance to the trench and the depth to the Benioff zone from AV to KOR volcano [Kuno 1966]. Chemically contrasting glass shards were found in the samples of different ages and often in single lapilli samples. The data testify an important role of magma mixing in the origin of AV rocks that occurred along with fractional crystallization. Compositions of bulk tephra span a much narrower range compared to matrix glasses and represent magmas formed by effective mixing of compositionally contrasting melts, crystallization and accumulation of phenocrysts. Tephra samples from KOR eruptions have more homogeneous compositions.

Whereas magmatic system of KOR appears to have been in quasi-steady state during the Holocene, AV is characterized by a change in tephra compositions from low-K andesites to medium-K basaltic andesites started more than 5000 cal BP. The processes of fractional crystallization associated with periodic injections of mafic middle-K magmas into the shallow low-K silicic magma chamber formed in the early Holocene are thought to control the compositional variability of the Holocene tephra compositions.

Research supported by RSF grant 16-17-10035.