

# **Marine Science and Technology for Sustainable Development**

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## **Abstracts**

## **Evidences of submarine environment in formation the Miocene basaltic andesite ignimbrites at Eastern volcanic belt, Kamchatka**

**O. Bergal-Kuvikas<sup>1,2\*</sup>, A. Rogozin<sup>1</sup>, E. Kliapitskiy<sup>1</sup>**

<sup>1</sup> *Institute of Volcanology and Seismology, Petropavlovsk-Kamchatsky FED RAS, Piip Avenue 6, Petropavlovsk-Kamchatsky, Russia, 684009*

<sup>2</sup> *Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry RAS, Staromonetny str. 35 buil. 2, Moscow, Russia, 119077*

\*e-mail: [kuvikas@mail.ru](mailto:kuvikas@mail.ru)

Basaltic andesite ignimbrites are rare pyroclastic rocks on Earth. Their genesis is interesting and still discussed. During the last decades in Kamchatka Institute of Volcanology and seismology works on field mapping ignimbrites and rocks of caldera-forming eruptions were done. The Miocene (5.78-5.58 Ma) basaltic andesite ignimbrites were founded on Verhnevachinskaya caldera, Mt. Stol and numerous outcrops in basement of Eastern volcanic belt, Kamchatka.

In order to understand origin of such types unusual rocks, such as basaltic andesite ignimbrites we analyzed global database of Smithsonian Institute (USA). We used follows criteria for comparing and finding mafic calderas with basaltic andesite ignimbrites: (1) caldera, as a type of volcano, (2) silica contents, as basaltic andesites, (3) ignimbrite, as a type of the rocks. In results of works only 5 calderas with basaltic andesite ignimbrites were founded: Coli Albaniin Italy, Lican ignimbrite of Villarica volcano in Chile, Massaya in Nicaragua and caldera complexes in New Hebrides, e.g. Ambrym, Tanna, Santa Maria, Kuwai. The uniform features for all listed above volcanoes are genesis of basaltic andesite ignimbrites are related with eruptions hot pyroclastic flows in the external water basin (e.g. lagoon/sea/ lake) or under the water. In order to estimate possibilities of existence marine environment in Miocene at Eastern Volcanic belt we made paleoreconstruction of environment based on stratigraphic and paleontological methods. Combination various types of the data clearly show that all area of Eastern volcanic belt was under the water. Moreover, numerous mollusks on Mt. Stol obviously identify submarine environment in the Miocene. In the basement of studied outcrops observed tuffs with pebbles, boulders. Upper part of the outcrops represented by interbeded layers of ignimbrites, sandstones and lava flows. Columnar joints of ignimbrites, their locations in the outcrops, interbeded layers of ignimbrites and layers of volcanogenetic sediments with rounded clasts of ignimbrites, pumices and hyaloclastites confirmed our hypothesis about external water interactions in formation the basaltic andesite ignimbrites. Irrefutable evidences of formation ignimbrites in submarine environments and hydrothermal activities are finds of palagonites, which formed due to alteration process between basaltic glass and external water.

Results of our research are important to understand origin of unusual basaltic andesite ignimbrites and show significant role of the external water in formation magmatic suites in early stage of Kurile-Kamchatka arc in Northwest Pacific.

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### **Key words**

*Submarine volcanism, basaltic andesitic ignimbrites, Kamchatka*