

## Statistical analysis of the distribution of phreatic eruption products in the caldera of the Golovnin volcano (Kunashir Island, Kuril Islands)

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**Abstract.** The paper presents the results of statistical processing of data on the thickness and size of the tephra fragments of andesitic composition erupted as a result of a phreatic explosion in the caldera of Golovnin volcano about 1000 years ago. A petrochemical description of the products of volcanic activity of the crustal Golovnin volcano and its evolution process is presented based on geological and geophysical data. The relationship between the thickness of the tephra, the size of its fragments, and the distance to the eruption center was studied using the polynomial regressions of varying degrees and exponential distribution. The adequacy of the constructed models to the initial data is illustrated by determination coefficients. Tephra distribution models were constructed on the basis of a three-dimensional trend analysis. For the first time, a logarithmic model was used to describe the size of tephra fragments. The accuracy of the model used was estimated. A method for estimating the potential dispersion range of tephra fragments of a certain size was obtained. The work demonstrates the potential of mathematical statistics for describing the distribution of products of volcanic eruptions of a certain type. The results of this study are suitable for creating an information database of pyroclastite distribution across the Kuril-Kamchatka volcanic region.

**Keywords:**

**Golovnin caldera, tephra, trend analysis, logarithmic model**

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