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Recording of whistlers during Bezymyanniy and Shiveluch volcano eruptions

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Continuous monitoring of natural electromagnetic radiation in VLF range (3-30 kHz) by a VLF direction finder, which records signals of electric and magnetic components of the electromagnetic field and determines the direction of radiation arrival in real time, made it possible to create a long-term data base of lightning activity on Kamchatka peninsular [1]. Statistical analysis of the obtained data base [2] was carried out to detect whistler generation sources using the data of the Automatic Whistler Detector and Analyzer Network and the World Wide Lightning Location Network [3-7]. Different electromagnetic signals were recorded during the analysis of the strongest three eruptions of Bezymyanniy (20.12.2017, 7.04.2023) and Shiveluch (10.04.2023) volcanoes from the corresponding azimuths along the direction to the active volcanoes. The time range, selected for the analysis, is determined by a large number of recorded pulses. For example, the total number of strokes during Shiveluch volcano eruption reached 26101 pulses [8]. In the general data flow, signals of whistler type were detected. Analysis of their disperse characteristics showed the presence of initiating atmospherics that, in its turn, indicates so called long whistlers. It is also illustrated that the initiating atmospheric is one from the pair of positive strokes in more than 90% of all recorded cases.

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