

## Kamchatka and North Kurile Volcano Explosive Eruptions in 2016 and Danger to Aviation

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There are 36 active volcanoes in the Kamchatka and North Kurile, and several of them are continuously active. In 2016, five of the Kamchatkan volcanoes (Sheveluch, Klyuchevskoy, Bezymianny, Karymsky and Zhupanovsky) and three volcanoes of North Kurile (Alaid, Ebeko and Chikurachki) had strong and moderate explosive eruptions. Moderate gas-steam activity was observing of Kizimen, Avachinsky, Koryaksky, Gorely, Mutnovsky and other volcanoes.

Strong explosive eruptions of volcanoes are the most dangerous for aircraft because they can produce in a few hours or days to the atmosphere and the stratosphere till several cubic kilometers of volcanic ash and aerosols. Ash plumes and the clouds, depending on the power of the eruption, the strength and wind speed, can travel thousands of kilometers from the volcano for several days, remaining hazardous to aircraft, as the melting temperature of small particles of ash below the operating temperature of jet engines.

The eruptive activity of Sheveluch volcano began since 1980 (growth of the lava dome) and is continuing at present. Strong explosive events of the volcano occurred in 2016: on 10, and 29 January, 18, and 27 February, 23 March, 02 April, 02 May, 18 September, 09 and 19 December: ash plumes rose up to 10-12 km a.s.l. and extended more 2000 km to the different directions of the volcano. Strong and moderate hot avalanches from the lava dome were observing all year. Activity of the volcano was dangerous to international and local aviation.

Explosive-effusive eruption of Klyuchevskoy volcano lasted from 03 April till 06 November. Strombolian explosive volcanic activity began from 03 April, and on 23-24 April a lava flow began to effusing along the Apakhonchich chute on the southeastern flank of the volcano. Vulcanian activity of the volcano began from 02 May. Ash plumes rose up to 7-8 km a.s.l. and extended more 600 km to the different directions of the volcano. Activity of the volcano was dangerous to international and local aviation.

Extrusive-explosive-effusive eruption of Bezymianny volcano began from 05 December (extrusive phase) and probably continues (effusive phase). A moderate explosive phase probably occurred on 15 December –gas-steam plume containing some amount of ash drifted for about 118 km to the west of the volcano. Activity of the volcano was dangerous to local aviation.

Karymsky volcano has been in a state of explosive eruption since 1996, and this eruption finished on 10 October 2016. Ash plumes rose up to 4-5 km a.s.l. and extended more 300 km mainly to the eastern directions of the volcano in January-February. Activity of the volcano was dangerous to local aviation.

Explosive eruption of Zhupanovsky volcano began on 06 June, 2014, and finished 20 November, 2016. Explosions sent ash up to 8-10 km a.s.l. on 19, 21, and 24 January; 05, 07, 09, and 12 February; 24 March, and 20 November. Ash plumes extended for about 550 km mainly to the eastern directions of the volcano. Activity of the volcano was dangerous to international and local aviation.

Explosive-effusive eruption of Alaid volcano occurred from 01 October, 2015, till 10 August 2016. Ash plumes extended for about 260 km from the volcano in February-April. Lava flow effused on the south-western flank of the volcano (for about 400 m). Activity of the volcano was dangerous to local aviation.

The moderate explosive events at the Ebeko volcano with burst of ash up to 2.6 km a.s.l. occurred on 19-20 October, 08, 11-17, 19-20 and 28-30 November, 8-10, and 12-14, 17, 19-27 and 31 December.

Activity of the volcano was dangerous to local aviation.

The eruptive activity of Chikurachki volcano occurred on 28-31 March; 27 July; 17-19, and 30 August.

Explosions sent ash up to 4 km a.s.l., and ash plumes drifted to the different directions from the volcano.

Activity of the volcano was dangerous to local aviation.

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