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THE 2018 ERUPTION OF PEAK SARYCHEV VOLCANO

Holocene Sarychev Peak Stratovolcano with the ~ 250 m diameter of the crater (48°05' N, 153°12' E; absolute height 1496 m) is located in the northwestern part of Matua Island (Fig. 1) in the Central Kuril Islands (Gorshkov, 1967). The cone of the volcano is composed of andesites and andesite basalts, it grew in the caldera of the Late Pleistocene Matua Volcano. Very strong explosive eruptions were observed in 1760, 1930, 1946 and 2009; the relatively quiet lava outflow on the north-eastern slopes of the volcano occurred in 1878–1879 and 1976. (Andreev et al., 1978; Gorshkov, 1967; Grishin et al., 2010). Besides, singular explosive events such as rare weak ash emissions and sometimes glowing over the crater were observed in the late summer and autumn 1954. The scientists recorded singular ash emission up to 4.5 km above the crater in August 30, 1960 (Gorshkov, 1967).

In autumn 2018, satellite data allow the scientists from the Kamchatkan Volcanic Eruption Response Team (KVERT) to record the volcano activity increase and its explosive eruption (http://www.kscnet.ru/ivs/kvert/van/?n=2018-83).

The May 7, 2018 satellite images, analyzed using the information system (IS) «Remote monitoring of activity of the volcanoes of Kamchatka and the Kuril Islands» (VolSatView, http://volcanoes.smislab.ru) (Girina et al., 2018; Gordeev et al., 2016) for the first time revealed thermal anomaly in the area of the volcano, then it was observed in June-September and the last time on October 15, 2018 (Fig. 2).

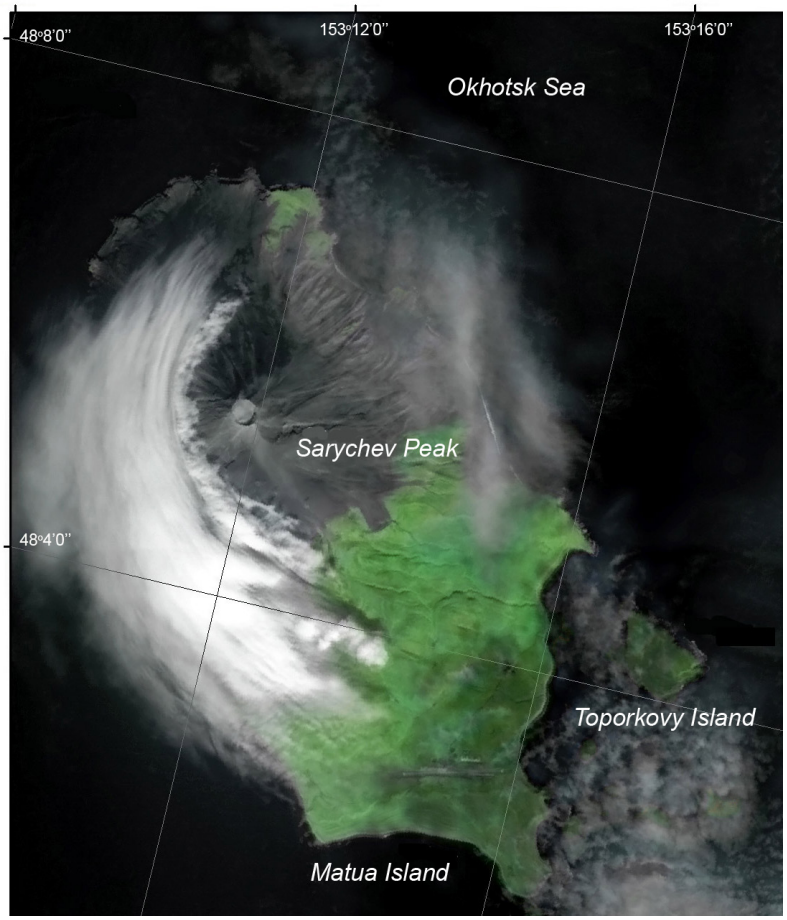

Fig. 1. Peak Sarychev Volcano at Matua Island on the Kanopus-B No. 4/MSS satellite image at 00:38 UTC on September 14, 2018. Data by the Far-Eastern Center of State Research Center Planeta.

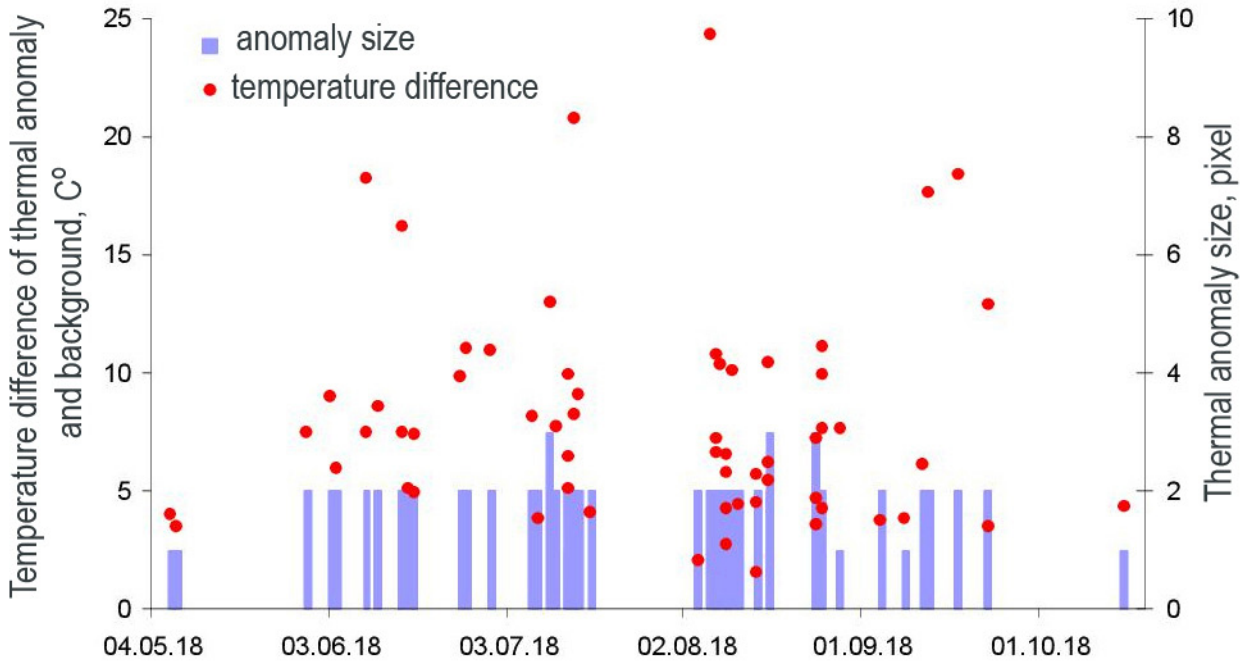

Fig. 2. Temperature difference between thermal anomaly and background, and anomalies size in the crater area of Sarychev Peak Volcano in May–October 2018. Data by the KVERT.

On September, 12 meteorologists from Matua Island recorded the first explosive eruption with ash explosions raised up to 3–4 km above sea level. On the same day, the Aviation Color Code (http://www.kscnet.ru/ivs/kvert/color) of the volcano was changed from «Green» to «Yellow» (http://www.kscnet.ru/ivs/kvert/van/?n=2018-83). On September, 12 from 19:20 to 21:00 UTC the Himawari-8 satellite images allow the KVERT scientists to trace the ash cloud up to 5.5 × 6 km in size at a distance of 121 km southeast of the volcano.

On September, 14 occurred the next explosive episode with up to 3–4 km asl explosion of ash, moving north-northeast of the volcano. The volcano became intensively active, so the Aviation Color Code was changed from «Yellow» to «Orange» (http://www.kscnet.ru/ivs/kvert/van/?n=2018-87).

The September, 17 visual data from the Matua Island meteorologists evidenced of ash explosions up to 4.5 km asl. (http://www.kscnet.ru/ivs/kvert/van/?n=2018-90). Using the September, 17 NOAA-18 satellite image (22:19 UTC) the KVERT scientists identified the thermal anomaly in the area of the volcano (Fig. 2) and the 3 × 5 km ash cloud at a distance of 14 km to the east of the volcano. The September 17–18 Himawari-8 satellite data from the VolSatView IS allow us to trace the 7 × 24 km ash cloud at a distance of 265 km to the east of the volcano. It was the largest explosive eruption of the volcano in 2018.

On October 10, 2018 the last episode of explosive activity of Sarychev Peak Volcano was observed. Visual data from the Matua Island meteorologists evidenced of the ash explosions up to 2–3 km asl. The October, 10 KVERT data based on the Himawari-8 satellite images revealed the ash cloud at a distance of 95 km to the east of the volcano.

On October 15, 2018 we identified weak thermal anomaly in the area of the volcano for the last time (Fig. 2), then only moderate gas and steam activity was observed, therefore on November, 1 the Aviation Color Code of the volcano was changed from «Orange» to «Yellow» (http://www.kscnet.ru/ivs/kvert/van/? n = 2018-108) and on November, 22 from «Yellow» to «Green» (http://www.kscnet.ru/ivs/kvert/van/?n=2018-112).

CONCLUSIONS

After the large 2009 eruption we recorded the first Sarychev Peak Volcano explosive eruption only in 2018.

Moderate eruptive events of 2018, recorded using the visual data from the Matua Island meteorologists and the satellite data from the VolSatView IS, are probably the buildup of a large explosive or explosive-effusive volcanic eruption that could occur in in the next few years.

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References

Andreev V.N., Shantser A.E., Khrenov A.P. et al. Izverzhenie vulkana Pik Sarycheva v 1976 g. // Bulletin vulkanologicheskoi stantsii. 1978. № 55. P. 35–40 (in Russian).

Girina O.A., Loupian E.A., Sorokin A.A. et al. Kompleksnyi monitoring eksplozivnykh izverzhenii vulkanov Kamchatki (Comprehensive monitoring of explosive volcanic eruptions of Kamchatka) / Otv. red. O.A. Girina Petropavlovsk-Kamchatskii: IViS DVO RAN. 2018. 192 p. (in Russian)].

Gordeev E.I., Girina O.A., Loupian E.A. et al. The VolSatView information system for Monitoring the Volcanic Activity in Kamchatka and on the Kuril Islands // Journal of Volcanology and Seismology. 2016. V. 10. № 6. P. 382–394. https://doi.org/10.1134/S074204631606004X.

Gorshkov G.S. Volcanism and the Upper Mantle: Investigations in the Kurile Island Arc. Plenum Press, 1970. 385 p.

Grishin S.Yu., Girina O.A., Vereshchaga E.M., Viter I.V. Powerful eruption of Sarychev Peak volcano (Kuril Islands, 2009) and its impact on the plant cover // Vestnik DVO RAN. 2010. № 3. P. 40–50 (in Russian).

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