

Remote video surveillance of the eruption of Main Pugachev mud volcano (Sakhalin Island) on January 15, 2025

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Abstract. For the first time in the history of mud volcano research on Sakhalin Island, remote video surveillance methods were used to monitor the activity of Main Pugachev mud volcano (central part of Sakhalin Island) and record its eruption process in the winter. As a result, a unique video footage of the eruption of the Western field of Main Pugachev mud volcano was obtained, allowing to trace the stages of its next activation. The eruption of the mud volcano, recorded on January 15, 2025, began rapidly at 6:15 p.m. (local time), without any noticeable precursors. The main explosions occurred during the first 30 minutes, the intensity of explosions in the first minutes of the eruption was 1–3 seconds, and the height of the mud mass ejections reached 10–12 m. At 6:17 p.m., an explosion in the form of a directed blast was observed; the mud mass was ejected at an angle of approximately 45° to a distance of about 20 m. According to preliminary visual data, this eruption is characterized as typical of Main Pugachev mud volcano. With a mud field diameter of more than 50 m and an average thickness of 0.5–0.7 m, the volume of the mud mass was at least 1000 m³. During the eruption, no activation was observed on other fields of the Pugachev group of mud volcanoes.

Keywords:

Sakhalin Island, mud volcano, eruption, explosion, remote video surveillance

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References

1. Chenna R., Prakash V.J., Shubham S. **2025**. Seismological features and preliminary damage assessment of the devastating March 28, 2025 Myanmar earthquake: a comprehensive overview: Posted article. *SSRN*. 24 p. <http://dx.doi.org/10.2139/ssrn.5219429>
2. Inoue N., Yamaguchi R., Yagi Yu., Okuwaki R., Bogdan E., Tadapansawut T. **2025**. A multiple asymmetric bilateral rupture sequence derived from the peculiar tele-seismic P-waves of the 2025 Myanmar earthquake. Preprint. *Seismica*. <https://doi.org/10.31223/X5MX56>
3. Mel'nikov O.A. **2011**. On the dynamics and origin of the Pugachevo group of gas-water-lithoclast («mud») volcanoes on Sakhalin Island: Visual observations and orohydrography. *Journal of Volcanology and Seismology*, 5: 409–420. <https://doi.org/10.1134/s0742046311060054>
4. Siryk I.M. **1962**. Mud cones of southern part of Sakhalin as probable accessories of oil and natural gas deposits. *Geologiya i geofizika*, 7: 66–75. (In Russ.).
5. Ueda M. **1938**. *Mud volcano Maguntan*. Ed. M.M. Shukevich. Novosibirsk: Funds of IMGG FEB RAS. 31 p. (In Russ.).
6. Smekhov E.M. **1947**. [Mud volcanoes of Sakhalin Island]. *Izvestiya Vsesoyuznogo geograficheskogo obshchestva*, 79(4): 493–495. (In Russ.).
7. Chernyshevskaya Z.A. **1958**. [On mud volcanoes of the southern part of Sakhalin]. *Trudy SakhKNII SO AN SSSR*, 6: 118–130. (In Russ.).
8. Siryk I.M., Fedorchenko V.I. **1962**. [Eruption of Pugachevo volcano on Sakhalin, Autumn, 1961]. *Trudy SakhKNII SO AN SSSR*, 12: 103–113. (In Russ.).
9. Siryk I.M. **1970**. Mud volcanoes. In: *Geology of USSR. Sakhalin Island*. Moscow: Nedra, vol. 33, pt 7, p. 355–368. (In Russ.).

10. Il'yev A.Ya., Saprygin S.M., Siryk I.M. **1970**. [1967 eruption of Pugachev mud volcano in 1967]. *Izvestiya Sakhalinskogo otdela Geograficheskogo obshchestva SSSR [Bulletin of the Sakhalin Department of USSR Geographical society]*, 1: 92–99. (In Russ.).
11. Ershov V.V., Mel'nikov O.A. **2007**. Unusual eruption of the Main Pugachevo gas-water-lithoclastic (mud) volcano in Sakhalin during the winter of 2005. *Tikhookeanskaya geologiya = Pacific Geology*, 1(4): 366–370.
12. Mishurinskij D.V., Ershov V.V., Zharkov R.V., Kopanina A.V., Kozlov D.N., Lebedeva E.V., Abdullaeva I.V., Vlasova I.I., Mikhalev D.V. **2018**. Geological-geomorphological and landscape ecological features of the Pugachev mud volcano as a basis for organization and information support of the tourist route (Sakhalin Island). *Geosistemy perekhodnykh zon = Geosystems of Transition Zones*, 2(4): 398–408. (In Russ.).
13. Zharkov R.V., Kozlov D.N. **2021**. [Activity of Pugachevskiye mud volcanoes (Sakhalin Island) in 2019–2021]. In: *Geodynamical processes and natural hazards: Abstracts of the IV National scientific conf., Yuzhno-Sakhalinsk, 6–10 September 2021*. Yuzhno-Sakhalinsk: IMGGE FEB RAS, p. 100. (In Russ.).