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Gas-emission crater in Central Yamal, West Siberia, Russia, a new permafrost feature

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The Yamal crater is a hole funnel-shaped on top and cylinder-shaped down to the bottom, surrounded by a parapet. Field study of the crater included size measurements, photo- video-documentation of the feature and the surrounding environment, and geochemical sampling.
The upper part of the geological section within the crater consisted of stratified icy sediments, underlain by almost pure stratified ice of nearly vertical orientation of the layers.
The volume of discharged material (volume of the void of the crater) was 6 times larger than the volume of material in the parapet. The difference was due to a significant amount of ice exposed in the walls of the crater, emitted to the surface and melted there.
Remote sensing data was processes and validated by field observations to reveal the date of crater formation, previous state of the surface, evolution of the crater and environmental conditions of the surrounding area. Crater formed between 9 October and 1 November 2013.
The initial size derived from Digital Elevation Model (DEM) had diameter of the vegetated rim 25-29 m. It turned through a sharp bend into a cylinder with close to vertical sides and diameter 15-16 m. Depth of the hole was impossible to estimate from DEM because of no light reaching walls in the narrow hole. By the time of initial observation in July 2014, water was found at the depth exceeding 50 m below the rim. In November 2014 this depth was 26 m. By September 2015 almost all the crater was flooded, with water surface about 5 m below the rim. The plan dimensions of the crater increased dramatically from initial 25-29 to 47-54 m in 2015. Thus, it took two warm seasons to almost entirely fill in the crater. We suppose that during the next 1-2 years parapet will be entirely destroyed, and as a result the crater will look like an ordinary tundra lake.
Excluding impossible and improbable versions of the crater's development, the authors conclude that the origin of this crater can be attributed to the air temperature warming trend along with the extreme of 2012. The increased ground temperature and amount of unfrozen water in the permafrost, expanding of cryopegs, formation of a pingo-like mound and its outburst due to high pressure produced by gas hydrate decomposition within permafrost are the main controls. Similar temperature anomalies may increase in number in the future decades, presenting risks for human activities in the region. This conclusion is supported by recent studies of gas-hydrate behavior in the upper permafrost as well as by subsea processes in gas-bearing provinces where analogue mechanism is known to produce pockmarks – subsea depressions. As the crater is surrounded by the parapet, thus is resulting from expulsion of ice and rocks from beneath to the surface and should not be treated as a "sinkhole", "thermokarst" or "collapse".