Estimate of mass flow in gas plumes from the 2010-2012 eruptions of Gorely Volcano, Kamchatka

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Since early June 2010 to present days Gorely has been erupting gas emissions.

Previous eruptions of Gorely in 1961-1964, 1981-1982 and 1984-1986 were phreato-magmatic.

Thermal infrared studies were performed by AGA-Thermovision 680 in 1981, 1982 and 1986 and in 1993 by TIMS (NASA, USA) and since 2008 we have been used high-resolution thermovision ThermaCam P 640.

Thermal anomalies called "hot ground" and "steaming ground" are mainly located on inner slopes of the central crater. The hot-ground thermal anomalies are observed on the outer part of the edifice.

The 2010 eruption occurred from the vent with a diameter of 25 m located at the bottom of the crater. The eruption produced a jet of hot steam at more than 870 degree converting to a steam plume at the altitude.

The steam and gas plume is considered to be a mixture of produced water steam and air. We suggest that the plume contains saturated steam therefore one can analytically reveal physical properties in the plume through the temperature. The temperature was measured by the thermovision and the velocity in the plume was determined by the video record.

The paper presents examples of determination of mass flux at Gorely volcano using ThermaCam P640 data and meteorological observations.