

The 2001 eruptions of Mount Cleveland, Alaska: further analysis of remote sensing and field observation data

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Though the hazard posed by Mount Cleveland in the central Aleutian Islands of Alaska is limited to the interaction between erupted ash clouds and aircraft, the ability to understand other potential hazards produced by the volcano can be applied to other more threatening volcanoes in the Aleutian Islands. Remote sensing satellites (Landsat 7 ETM+, ASTER, ERS-2, RADARSAT-1, AVHRR, and MODIS) have been useful for improving the chronology of activity for the 2001 eruptions. The activity, primarily from thermal infrared data, was analyzed for calculation estimates on thermal flux and eruptive rate in order to determine the possible type of eruptive activity for each image. Estimates in eruptive activity have been compared to all known field observations of the deposits for better classification of the eruption sequence. Post-eruption analysis of satellite data has provided a useful view into the erosion of a pyroclastic debris flow fan deposit from the eruption. Area analysis of this fan deposit in radar imagery between March 31, 2001 until December 21, 2003 indicates an overall trend of a decrease of 20 m² of material per day, though in most cases the decrease was more rapid at certain times and not constant. This unique chance to determine the erosion rate of this deposit may be applied to similar eruption deposits at other island volcanoes. The final use of the satellite data along with the field observation data is to determine if any further deformation of the volcano is taking place since the main eruptions in 2001.