



Tephra dispersal monitoring by satellite images

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Various satellite images were used to monitor the eruption plume from Eyjafjallajökull central volcano in real time from April 14 and throughout the eruption, which stopped, at least temporarily, on May 22. The main object was to study the dispersion of the ash; its extent and direction, for scientific purposes as well as for public safety. The work included a detailed examination of the characteristics of the plume; its content, height and density. Some effort was made to distinguish the plume from dust storms of remobilized ash that prevailed during part of the period.

MODIS and MERIS images, with a number of channels and geometric resolution in the optical channel of 250m and 1km in thermal bands, along with NOAA images with 1km resolution, provided over 15 observations from space daily, although not with equal intervals. ASTER, EO-1 and ENVISAT ASAR images were used when available for comparison and additional information.

A number of analyses were performed on the data, to enhance the images, classify the plume into different severity categories and to estimate the amount of ash in the atmosphere. Other methods included calculations of plume height and data merging in Geographical Information Systems.

Other independent sources of information were used for comparison of the satellite data, such as observations of the eruptions plume from the Icelandic Coast Guard reconnaissance flights, surveying from the ground, web cameras and measurements of the ash distribution, qualities and thickness on the ground.

The results are daily maps of the eruption plume, indicating the extent and severity of the plume at all orbit times. Satellite images, though not a continuous observation method, did record significant changes in the eruption behavior.

In conjunction with in situ investigations, the remote-sensing dataset from the Spring 2010 eruption is a valuable resource which is being used to refine image interpretation techniques and to improve the use of future satellite data of volcanic activity to assess volcanic risk and hazard.