



Development of the atmospheric volcanic monitoring system in Iceland

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The development of the atmospheric volcanic plume monitoring system has escalated since the eruption of Eyjafjallajökull in 2010.

Radars provide a near-real time capability to observe volcanic eruptions both day and night. At high latitudes this is important, over the darkest periods of winter when radar and satellite images are the only means of measurements. Also weather conditions can be such at any time of the year that they obscure observations from survey flights and even from satellites.

Prior to and during the 39 days eruption in 2010 only one operational radar was installed in Iceland, the fixed C-band radar at Keflavík International Airport. The main purpose of this radar is weather monitoring but it can simultaneously be used for volcanic plume monitoring within a radius of 480 km. The radar has been used for plume monitoring since 1991 when an eruption started in Hekla, only a few days after the installation of the radar. Since November 2010 a X-band dual polarization radar has been on loan from the Italian Civil Protection Agency to the Icelandic Meteorological Office (IMO) and during the eruption in Grímsvötn in 2011 the combined system, together with visual observations, gave a good picture of the eruption. Also, in cooperation with the UK National Centre for Atmospheric Science (NCAS) a Lidar has been operating in South-Iceland since May 2011. The Lidar was moved to Keflavík airport during the Grímsvötn eruption to monitor the atmosphere above the airport and assist in decision making regarding openings and closures of the airport.

In 2012 a second fixed position C-band weather radar will be installed in East-Iceland. This means that the geophysically active region in both south and northeast of Iceland will be covered. In addition, the International Civil Aviation Organization (ICAO) has financed two X-band mobile radars to be installed and used in Iceland, solely for volcanic plume monitoring, with the first one becoming operational in summer of 2012.

It has become clear that information on the state of the ambient atmosphere is important for the near-field monitoring of the eruption plume. Due to there only being two sounding stations in Iceland, a mobile radiosonde stations would be a very useful addition to the atmospheric volcanic plume monitoring system. A few ceilometers are currently installed in Iceland for cloud cover monitoring. They could also be used for monitoring suspended and re-suspended ash and this is being discussed. In addition, the aviation authorities are discussing if a Lidar system should be installed at Keflavík airport.