Geophysical Research Abstracts, Vol. 8, 09900, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09900

Observation of active volcanoes from space: the role of remote sensing in monitoring Augustine volcano

J. Bailey (1,2), J. Dehn (1), K. Dean (1), P. Webley (1,2)

(1) Arctic Region Supercomputing Center, 909 Koyukuk Drive, University of Alaska, Fairbanks, AK 99775, USA (2) Alaska Volcano Observatory, 903 Koyukuk Drive, University of Alaska, Fairbanks, AK 99775, USA (jbailey@gi.alaska.edu/ fax: +1-907-474-7290)

Across the North Pacific there are over 40 volcanoes that have been historically active. These constitute almost 10% of the sub-aerial active volcanoes on earth. Over the same region pass multiple air traffic corridors that carry 100,000s of passengers and millions of dollars of freight. This high density of air traffic, along with several past instances of aircraft experiencing mechanical problems after encountering volcanic clouds, make real-time monitoring of the North Pacific volcanoes a necessity. This task is undertaken by the Alaska Volcano Observatory (AVO). The problem for AVO is that the volcanoes are spread over 3000 km, with many lying in remote areas that have sparse populations and generally poor weather conditions. These factors make direct observations, from the ground or aircraft, a sporadic and ineffective basis for monitoring. In addition, approximately half of the historically active volcanoes are not monitored by seismic networks. Thus, satellite remote sensing provides the only viable means to regularly observe activity at the many of these sites. This method is aided by the high latitude of the region, as satellite orbits converge near the pole, producing more frequent passes over the region than occur at most locations. The main datasets used are from three groups of satellites: GOES, AVHRR (on the NOAA satellites) and MODIS (on Terra and Aqua EOS satellites). These data are primarily collected on site at the Geophysical Institute (GI) in Fairbanks. Currently methods to analysis the data require the use of a proprietary image analysis software package. However, currently under development are several web-based interfaces, with simple GUIs that perform the same functions. These have the advantage of being simple to use and available on AVO's internal webpage via any computer with an internet connection. Testing and performance analysis of these tools is being done using a 14 year archive of the col-

lected datasets, currently held by the Arctic Region Supercomputing center (ARSC) in cooperation AVO/GI. These analyses will also have the by-product of providing information on a decade-long pattern of volcanic thermal flux in the North Pacific region. Automated systems divide the datasets into 10 sectors, which are then checked individually, using all new data since the previous monitoring session. These checks involve visual observations and automated algorithms that detect thermal anomalies in band 3 (AVHRR) and bands 20b, b22b (MODIS). The split window technique using band 4 minus 5 (AVHRR) and band 31 minus 32 (MODIS) is employed for ash plume detection. Interpretation of the observations is further aided by modeling programs such as PUFF (a volcanic ash tracking model). An example of the information and data provided by these tools and methods will be shown for currently occurring events (13/1/06) at Augustine Volcano.