

Present and **Future** Remote Sensing Methods for Observing and Monitoring Volcanoes

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Presently, global observation and monitoring of volcanoes makes use of three satellite systems: 1) SPOT provides high spatial resolution (10m) panchromatic data, once every five days; it can be used to map landscapes and changes such as lava flows; 2) Landsat Thematic Mapper provides 30m multispectral data once every 16 days; it can also be used for mapping, but additionally allows calculation of temperatures and energy fluxes for small to extended volcanic phenomena, such as fumaroles, lava flows, domes, etc.; 3) AVHRR provides low spatial resolution data (1km) several times per day in several spectral bands; it can be used to monitor plume evolution, and detect and estimate temperatures of large volcanic features.

Future satellites will allow improved capabilities. The EOS ASTER instrument, due to be launched in 1998, will combine a high spatial panchromatic band, several multispectral VIS-VNIR-SWIR bands, and add multispectral thermal capability. The thermal bands will allow direct measurement of SO₂ in volcanic emissions, and measurement of low temperature volcanic phenomena. Pointability will permit revisiting sites with a frequency of a few days. Planned improvements to the Landsat instruments may also include multispectral thermal bands, stereo capability, and possibly imaging spectrometry capability (date unknown). Dedicated volcanological observatories are being planned for possible launch as Earth Probe Missions. One concept would allow continuous monitoring of northern latitude volcanoes (+35degrees), with SO₂, temperature, and particulate measuring capabilities. All of the above described instruments would be of benefit for monitoring Mauna Loa; some similar capabilities have already been demonstrated there using aircraft scanners in the last 8 years.

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4. **V**

5a. V07 Mauna Loa Decade.
Volcano

5b. 8419 eruption monitoring
8494 Instruments
8409 Atmospheric effects

6. N/A

7. 50%, various

8. \$50 check enclosed

9. I (by chair J. Lockwood)

10. None

11. No