

# 100 years of volcano monitoring in the United States

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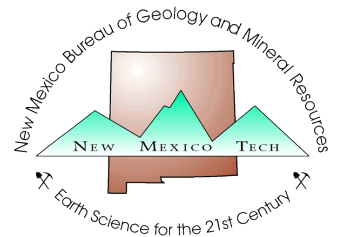
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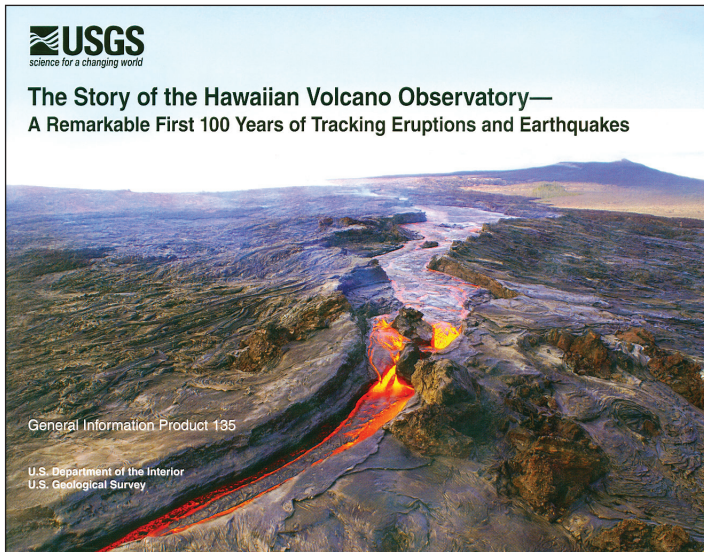
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# 100 years of volcano monitoring in the United States



This year the U.S. Geological Survey (USGS) celebrates 100 years of continuous volcano monitoring in the United States. Monitoring began in 1912, when geologist Thomas A. Jaggar, Jr. (1871–1953) of the Massachusetts Institute of Technology founded America's first volcano observatory, the Hawaiian Volcano Observatory (HVO) in the U.S. Territory of Hawai'i. He served as its first director from 1912 until his retirement in 1940. To celebrate HVO's 100th anniversary, the USGS has published the commemorative book *The Story of the Hawaiian Volcano Observatory—A Remarkable First 100 Years of Tracking Eruptions and Earthquakes* (Babb et al. 2011). Photographs from 1865 to the present and 60 pages of text document the recent eruptions of Hawai'i's volcanoes and scientists' attempts to understand them.

Thomas Jaggar had witnessed the deadly aftermath of volcanic and seismic activity during a decade-long exploration of volcanoes around the world, which included the devastation caused by the 1902 eruptions of Pelée and Soufrière St. Vincent in the Caribbean. These observations led Jaggar to his vision and lifelong work to "protect life and property on the basis of sound scientific achievement." In 1909 he stopped in Hawai'i while on his way to Japan. Noting Kilauea's persistent and relatively benign eruptions, accessibility, and frequent earthquakes, Jaggar concluded that Kilauea was the ideal site for the careful and systematic study of volcano and seismic activity.

While Jaggar set about raising funds to build the observatory, he convinced Frank A. Perret, a world-famous American volcanologist to travel to Hawai'i in early 1911 to begin the observations of Kilauea's volcanic activity and to oversee construction of a scientific station on the eastern edge of Halema'uma'u crater. That summer Perret successfully obtained a temperature measurement of molten lava—the first in the world. Jaggar received the support of MIT, the Carnegie Geophysical Laboratory, the Hawaiian Volcano Research Association, a group of Honolulu businessmen, the College of Hawaii (now the University of Hawai'i), and many others. Jaggar was finally able to achieve his goal and move permanently to the Kilauea station in January 1912.

The Hawaiian Volcano Observatory became a permanent part of the USGS in 1947. Today, the USGS operates five regional facilities throughout the United States: Alaska Volcano Observatory, Cascades Volcano Observatory, Long Valley Observatory, Yellowstone Volcano Observatory, and Hawaiian Volcano Observatory. Each observatory provides regular updates of volcanic activity within its area of responsibility with updates becoming more frequent as activity escalates. In addition, the USGS provides long-term volcano hazard assessments for a growing number of volcanoes, provides public education materials about volcano hazards, and



An HVO geologist takes a sample of active lava within a lava tube. The fluid lava sticks to the heavy hammer head at the end of the cable when it is lowered into the swiftly moving lava stream. These samples are analyzed routinely to track changes in lava chemistry. Photo available at [http://gallery.usgs.gov/photos/06\\_18\\_2010\\_im15GtrFFA\\_06\\_18\\_2010\\_55](http://gallery.usgs.gov/photos/06_18_2010_im15GtrFFA_06_18_2010_55).

participates in emergency management exercises meant to assure public safety during times of volcanic crises.

The Yellowstone Volcano Observatory monitors three areas in New Mexico: the Zuni-Bandera volcanic field, last known eruption, the McCartys flow, about 3,800 years ago; the Carrizozo lava flow, last known eruption about 5,200 years ago; and Valles caldera, last known eruption, the Banco Bonito lava flow, as recent as 34,000 years ago. Roughly 25 eruptions have occurred since the Valles caldera formed 1.25 million years ago. Although most volcanologists would probably classify the caldera as dormant, an eruption sometime in the future is likely.

Valles caldera, one of the three largest young volcanoes in the U.S., is the subject of a new publication from the New Mexico Bureau of Geology and Mineral Resources (Goff et al. 2011). The 30-page text, 50,000-scale geologic map, and three cross sections consolidate the past 40 years of research with 8 years of recent mapping, new geochronologic data, and recent refinements to the geologic nomenclature.

## Selected reading

Additional information about HVO can be found on their Web site ([hvo.wr.usgs.gov/](http://hvo.wr.usgs.gov/)) and on the Web site of the USGS Volcano Hazards Program ([volcanoes.usgs.gov/](http://volcanoes.usgs.gov/)). The preceding brief description was taken, in part, from these USGS Web sites and the following publications.

Babb, J. L., Kauahikaua, J. P., and Tilling, R. I., 2011, *The story of the Hawaiian Volcano Observatory—A remarkable first 100 years of tracking eruptions and earthquakes*: U.S. Geological Survey, General Information Product 135, 60 pp., available at <http://pubs.usgs.gov/gip/135/>.

Dunbar, N. W., 2006, *Volcanoes of New Mexico*: New Mexico Bureau of Geology and Mineral Resources, New Mexico Earth Matters, v. 6, no. 1, pp. 1–3, 5.

Goff, F., 2010, *The Valles caldera: New Mexico's supervolcano*: New Mexico Bureau of Geology and Mineral Resources, New Mexico Earth Matters, v. 10, no. 1, pp. 1–4.

Goff, F., Gardner, J. N., Reneau, S. L., Kelley, S. A., Kempton, K. A., and Lawrence, J. R., 2011, *Geologic map of the Valles caldera, Jemez Mountains, New Mexico*: New Mexico Bureau of Geology and Mineral Resources, Geologic Map 79, 30 pp., 1 sheet, scale 1:50,000.

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New Mexico Bureau of Geology and Mineral Resources