

U.S. West: New life for old volcanoes?

Indonesia dominates the volcano domain, with 76 volcanoes active since record-keeping began, but the United States is no slouch when it comes to eruptions. With 53 historically active volcanoes, it ranks third (Japan is number two) among nations in terms of volcanic activity. In past millenia, some U.S. volcanoes have dwarfed even Krakatau (see p. 138) in their eruptive fury. As for the future, scientists are not so sure. In a recent report, the United States Geological Survey (USGS) identifies more than 35 volcanoes in the western states, Hawaii and Alaska, where eruptions are likely.

The most immediate concern, of course, is Mt. St. Helens in Washington. Scientists expect it to remain active, at least intermittently, for 20 to 30 years. While its spectacular eruption in 1980 (SN: 5/24/80, p. 324; 6/7/80, p. 355) reminded Americans that eruptions are possible in their own backyard, the fact that the event occurred in an otherwise quiet period for volcanoes in the United States made it seem exotic and isolated in time. In fact, Mt. St. Helens had been active between 1832 and 1857 and, according to the geologic record, was simply adhering to its own timetable for periodic eruptions.

In the last decade, Mt. St. Helens' fellow volcanoes in the Cascade Range also have shown signs of life. Mt. Baker, Wash., Mt. Rainier, Wash., Mt. Hood, Ore., Mt. Shasta, Calif., and Lassen Peak, Calif., all were unusually active between 1832 and 1880, with at times two or three erupting in the same year. Now some of these volcanoes, as well as the Mono-Inyo craters on the eastern front of the Sierra Nevada and other volcanoes in the Cascades, "have reached or are approaching a state of chemical evolution similar to that attained by Mt. Mazama just before the cataclysmic eruptions that formed Crater Lake about 6,600 years ago," the authors write. They add that any similar eruption from any of these volcanoes would be a worse disaster than the United States has ever experienced.

Volcanoes in Alaska and Hawaii also are on a high-priority list because, like those in the Cascades, they have periods of 100 to 200 years or less between eruptions, or have erupted in the last 200 to 300 years, or both.

The Mono-Inyo craters follow Mt. St. Helens as the most frequently active volcanoes in the western United States. The chain of lava domes and craters trends along a 15-mile-long line, and eruptions occur there every 200 to 300 years. The latest one was about 250 years ago, give or take 50 years. The USGS report notes that the most recent eruptions from the Mono-Inyo craters expelled material that was "hot enough to incinerate entire forests." An eruption there could destroy the town

U.S. Forest Service



The most recent major eruption at Mt. Hood, Ore., was 300 years ago. After the 1980 eruption at Mt. St. Helens, earthquakes shuddered through Mt. Hood's slopes.

of Mammoth Lakes, four miles to the south, and could disrupt the area's water resources, much of which are channeled to slake Los Angeles' prodigious thirst.

A handful of volcanoes that have not erupted for at least 10,000 years also has attracted the watchful eyes of scientists involved in the USGS Volcano Hazards Program. In Long Valley, Calif., a vast sunken crater, or caldera, marks the site of a tremendous eruption 700,000 years ago. In the past few years ground swelling and earthquakes have suggested that magma has been replenished in the chamber underlying the area (SN: 6/12/82, p. 390; 7/16/83, p. 40).

Other sites of concern include the volcano in Yellowstone National Park, Wyo. Though it has not erupted for 630,000 years, the area is earthquake-prone, and the caldera floor has been rising at a rate of 0.7 inches per year for the past 50 years or more. The Rio Grande rift near Socorro, N.M., also has experienced unusual earth-

quake activity in the last 20 years, and studies have revealed a "sheet-like" body, 15 miles below the surface, which is believed to be a layer of magma moving up from the mantle.

The scientists may know where eruptions are probable, but they don't know when. Spates of eruptions are not uncommon, and the authors note abundant reasons for concern. The restlessness in the Pacific Northwest and along the eastern edge of the Sierra Nevada, increased earthquake activity and likelihood of large-magnitude quakes on the fault on the Sierran front and along the San Andreas, all suggest that grinding of the Pacific and North American crustal plates may be at work in stirring the volcanic systems to life. This has prompted some scientists to conclude that "the Cascades, and possibly other western U.S. volcanoes, are on the threshold of another episode of increased eruptive activity similar to that of the mid-1800s." —C. Simon

Agreement on toxic waste clean-up

A memorandum of understanding signed this past week by the Environmental Protection Agency (EPA) and the Department of Defense (DOD) eliminates some of the existing uncertainties over who is responsible for what when it comes to cleaning up toxic waste in and around military facilities. The uncertainties were created back in August 1981, when President Reagan gave DOD sole jurisdiction to enforce the Comprehensive Environmental Response, Compensation and Liability Act (Superfund) on DOD properties; EPA was given jurisdiction to enforce the act on private property, as well as all non-DOD federal facilities. With the authority split this way, it was left unspecified until now just how the responsibility would be delegated in situations where it appeared that toxic wastes from a DOD facility might be spilling over onto private lands.

The main principle agreed to in the memorandum just signed is that "DOD is generally responsible for financing actions taken in response to releases from DOD facilities, or assuring that another

party finances such actions." Also, the agreement makes it clear that EPA is responsible for initiating and financing the cost of any investigation that may be needed to determine whether a DOD facility is responsible for contaminating non-DOD property.

According to the agreement, a review of such an investigation is always to be carried out jointly and cooperatively by the EPA and DOD. If it is ever determined that a DOD facility is the "sole source of contamination," then DOD is obligated not only to pay for the clean-up on and off the DOD premises, but also to reimburse the EPA for the cost of its investigation. If it is determined that a DOD facility is but one of two or more sources of contamination, then, "EPA and DOD will jointly determine the most appropriate response and financing methods."

"It's a step in the right direction," one Congressional spokesperson told SCIENCE NEWS, though it remains to be seen how well the two agencies actually do cooperate. □