

Preparing for The Next Eruption in the Cascades

ACTIVE volcanoes dominate the skyline in many parts of the Pacific Northwest. These familiar snow-clad peaks are part of a 1,000 mile-long chain of volcanoes, the Cascade Range, which extends from northern California to southern British Colombia. Many of these volcanoes have erupted in the recent past and will erupt again in the foreseeable future. The time between eruptions is usually measured in decades or centuries, so eruptions are not a part of our everyday experience. However, in 1980 Mount St. Helens vividly

demonstrated the power that Cascade volcanoes can unleash when they **do erupt**.

The U. S. Geological Survey (USGS) is responsible for assessing volcano hazards, monitoring the activity of US volcanoes, and issuing warnings of impending eruptions. To help prevent loss of life and property from the next eruption in the Cascades, scientists at the USGS Cascades Volcano Observatory (CVO) in Vancouver, Washington, are working to determine the type and extent of hazards posed by the active Cascade volcanoes.

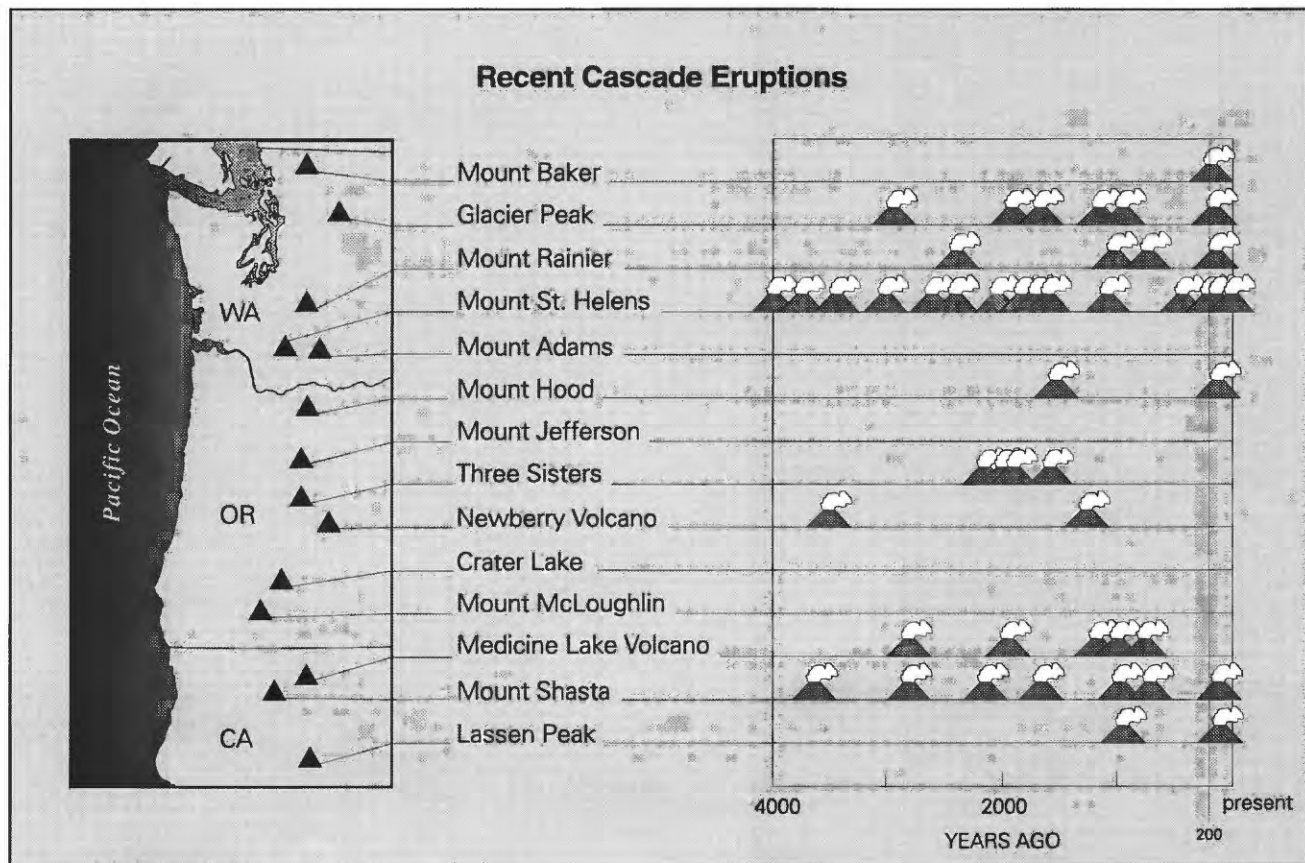


U.S. Department of the Interior - U.S. Geological Survey
Cascades Volcano Observatory



ACTIVE CASCADE VOLCANOES

Eruptions in the Cascades have occurred at an average rate of 1-2 per century for the last 4000 years, and future eruptions are virtually certain. Seven volcanoes in the Cascades have erupted since the first U.S. Independence Day a little more than 200 years ago. Four of these eruptions would have caused considerable property damage and loss of life if they had occurred today without warning. As more people move to the Pacific Northwest, areas near the volcanoes are being developed and recreational usage is expanding. As a result, more and more people are at risk from volcanic activity. The next eruption in the Cascades could affect tens of thousands of people.



Mount Shasta and Weed, California

Volcanoes and Water: A Dangerous Combination

Large portions of most Cascade volcanoes are covered with permanent snow and ice that pose a special hazard during periods of volcanic unrest. Even small eruptions can melt a large quantity of snow or ice, triggering debris flows that can travel tens of miles beyond the flanks of the volcano into populated valleys. Years after volcanic unrest has stopped, erosion of deposits can cause increased sediment that blocks waterways, disrupts aquatic ecosystems, and worsens flooding. Debris flows are the most costly effects of eruptions at snow-clad volcanoes.

USGS CASCADES VOLCANO OBSERVATORY

Preparing for the Next Eruption

EVALUATING Volcano Hazards

To identify the areas that can be affected by future eruptions, rock deposits from pre-historic eruptions are mapped, studied, and dated to learn about the types and frequency of past eruptions at each volcano. This information helps scientists to better anticipate future activity at a volcano, and provides a basis for mitigating the effects of future eruptions through land-use and emergency planning.

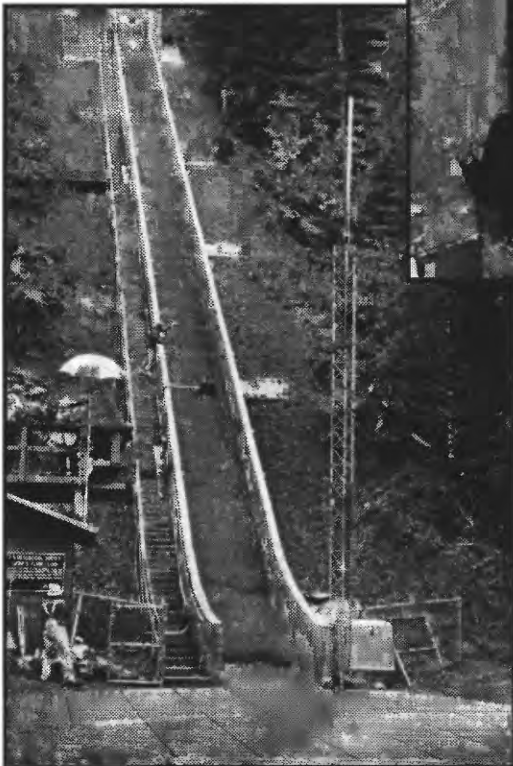


MONITORING Restless Volcanoes

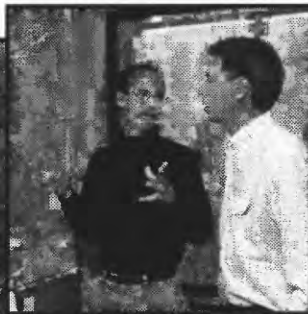
Volcanoes often show signs that they are getting ready to erupt days to months ahead of time. Seismic activity in the Cascades is continuously monitored under the auspices of the USGS Volcano Hazards and Geothermal Studies Program through CVO, the USGS in Menlo Park, California, and the University of Washington Geophysics Program in Seattle, Washington. CVO also monitors ground movements and gas emissions at Cascade volcanoes in order to detect subtle changes that may herald the next eruption.



Monitoring at Three Sisters



Debris-flow experiment at USGS flume

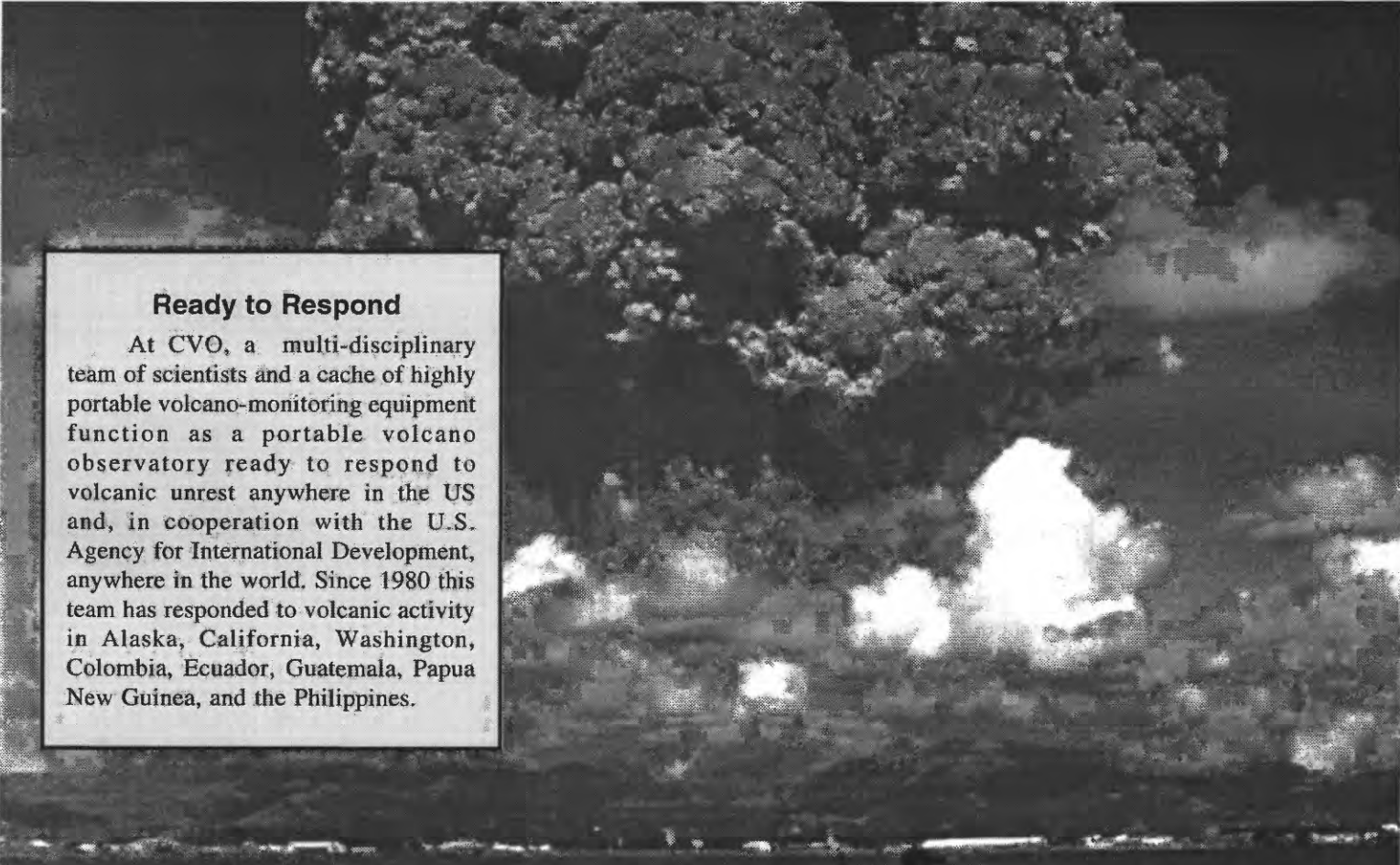


COMMUNICATING Hazards Information

CVO provides information on volcanoes and volcano hazards to public officials, land-use planners, emergency response organizations, the Federal Aviation Administration and other federal agencies, the news media, schools, and the general public. When volcanic activity increases, CVO issues advisories, warnings, and whenever possible, specific predictions concerning eruptions and their potential impacts.

DEVELOPING New Tools, Testing New Ideas

Frequent eruptions of Mount St. Helens and other volcanoes since 1980 have allowed new ideas about how volcanoes work to be tested and eruption-prediction methods to be improved. Research topics also include dynamics of debris flows, effects of volcanic gases on weather and climate, and effects of increased sediment transport on streams. New instrumentation and computer software and hardware developed by the USGS enable scientists at CVO to acquire, process, and interpret monitoring data more quickly and effectively than ever before.



Ready to Respond

At CVO, a multi-disciplinary team of scientists and a cache of highly portable volcano-monitoring equipment function as a portable volcano observatory ready to respond to volcanic unrest anywhere in the US and, in cooperation with the U.S. Agency for International Development, anywhere in the world. Since 1980 this team has responded to volcanic activity in Alaska, California, Washington, Colombia, Ecuador, Guatemala, Papua New Guinea, and the Philippines.

Eruption of Mount Pinatubo, Philippines

The Cascades Volcano Observatory strives to serve the public interest by helping people to live knowledgeably and safely with volcanoes and other natural hazards including earthquakes, landslides, and debris flows, in the western United States and elsewhere in the world. We assess hazards *before* they occur by identifying and studying past hazardous events, their products, ages, and areas that would be affected by similar events in the future. We provide warnings *during* volcanic crises by intensively monitoring restless volcanoes and interpreting results in the context of current hazards assessments. We investigate and report on hazardous events *after* they occur to improve our assessment and prediction skills, and to help develop new concepts of how volcanoes work. We provide information for use in land-use management, emergency response plans, and public education.

Our goal is to keep natural processes from becoming natural disasters.

How to Contact Us for More Information

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