Enhanced monitoring and rapid response plans for OBS

SUMMARY:

Several potential sources of earthquake and volcano hazards are located near shore, offshore, or on islands, and their assessment and monitoring and require the emplacement of monitoring equipment on the sea floor. However, the sea floor environment poses significant technological challenges in terms of the accessibility to power and communications, the ease of installation, and the effects on the installation by waves, currents, and bottom sediments.

OBS image

INVESTIGATORS:

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DESCRIPTION:

The USGS Earthquake Hazards and Volcano Hazards programs are responsible for characterization and evaluation of earthquake hazards and for monitoring of volcanic unrest. However, these programs are not set to deal with the technological challenges posed by the marine environment. The purpose of this project is to chart a plan to use the available technical expertise of the USGS Coastal and Marine Program to help the EH and VH programs address near shore and offshore earthquake and volcanic hazards.

START DATE OF PROJECT:

October 1, 2002

END DATE OF PROJECT:

September 30, 2007

TOPIC:

Earthquake Hazard Assessments

APPROACH:

The study will investigate the potential of Ocean Bottom Seismometers to contribute to the objectives of the Earthquake Hazards and Volcano Hazards Programs by to enhancing monitoring or for post-event response studies. A one-year effort was aimed at producing a white paper describing the technology and potential applications. Criteria and protocols for OBS deployment would be developed as a coordinated effort among the Earthquake Hazards, Volcano Hazards, and Coastal and

Marine Geology programs. Following a positive assessment of feasibility and usefulness, we propose a 5-year plan to coordinate and support the deployment of real-time Ocean Bottom Seismometers with internal and external funds.

IMPACT/RESULTS:

Many of the potential sources of earthquake and volcano hazards are located along the shore, offshore, or on islands. For example, seismic activity on the Newport-Inglewood-Rose Canyon fault systems, the San Andreas fault north of San Francisco, the San Gregorio fault off central California, the Mendocino Triple Junction, or the Cascadia subduction zone can have significant effects on human life and economic infrastructure along the west coast of the U.S. The effects include tsunamis due to earthquake-induced submarine slides, damage to offshore installations such as outfall pipes, cables, and oil rigs, and damage to coastal facilities and beach communities. Volcanic activity in the Alaska Peninsula and the Aleutian Islands can have severe effects on air traffic to East Asia and economic effects on southern Alaska. Large volcanic eruptions have worldwide effects on climate and air quality. The development of a coordinated plan for use of ocean bottom seismometers between the Earthquake Hazards, Volcano Hazards, and coastal and Marine Geology programs will facilitate the monitoring and post-event studies in those regions that were until now poorly covered.

RELATED:

- ten brink, Power, Given, Jones, Hauksson, and Oppenheimer, 2004, Protocol for rapid ocean bottom seismometer mobilization (ROM), USGS, Methods and Techniques