

Solid Earth Physics Seminar, Harvard University

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Faculty Lounge, Hoffman Laboratory, 20 Oxford Street

Watching a Volcano as It Stirs

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Abstract:

Elevated or anomalous seismicity is often at least among the earliest, if not the earliest of, indicators of imminent volcanic eruption, and seismic monitoring is one of the core practices at volcano observatories worldwide. While Kilauea Volcano on the Island of Hawai`i continues to erupt from its East Rift Zone and at its summit caldera, Mauna Loa Volcano has been showing seismic as well as geodetic signs of re-awakening after its longest repose period in nearly two centuries. It has been 33 years since Mauna Loa's most recent eruption that began in March 1984.

What has been referred to as Mauna Loa's most spectacular recorded eruption occurred in June 1950. Lava erupted from a nearly continuous 20km-long fissure along its southwest rift zone. Three separate lava flows originating from this fissure eventually entered the ocean. One flow reached the water within four hours after the eruption's outbreak, traveling a downslope distance of 24km in less than three hours.

Marking a notable departure from prior observed behaviors, the 1950 eruption was followed by 25 years of repose. During that interval, seismographic monitoring at the Hawaiian Volcano Observatory underwent significant expansion and modernizing. Although their published report did not appear until after the July 1975 eruption, Observatory staff were able to recognize and document a clear and suggestive increase in microearthquakes beneath Mauna Loa that began over a year before the eruption's onset. With further improvements to seismic and geodetic monitoring, it is possible to track current activity in much greater detail. Improved analyses and modeling capabilities have also enhanced our interpretative discussions. Comparisons between current activity and earlier eruption sequences, accounting for monitoring and analytical improvements, are equally important to assessments of the build-up toward Mauna Loa's anticipated eruption and possible eruption forecasts.