

Broadband Recording of the First Historical Eruption of Anatahan Volcano, Mariana Islands

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On May 10, 2003, the first historical eruption of Anatahan volcano in the western Pacific Mariana Islands was recorded by an IRIS/PASSCAL broadband seismograph installed seven kilometers from the crater only four days earlier. The fortuitous timing of the deployment offered the opportunity to study the initial eruption of a dormant volcano with a broadband seismograph. Almost no precursory events were recorded until about 5 hrs before the eruption onset. Approximately one hour before the eruption, the number of volcano-tectonic (VT) earthquakes dramatically increased and a large tilt signal commenced. The tilt signal was constructed from the horizontal components of the seismograph, and indicates substantial inflation of the volcanic center. The magnitude of the tilt is consistent with the inflation of a magmatic chamber at depth of somewhat smaller size than the total volume of material output by the eruption. Subsequent deflation coincided with a reduction in the number of VT events and the onset of volcanic tremor as well as long-period and very long-period volcanic events. After about 36 hours of intense earthquake activity, the number of VT events declined and was replaced by nearly continuous volcanic tremor for the next six weeks. The Anatahan records show that portable broadband seismographs can accurately record a wide variety of volcanic signals including very long-period earthquakes and tilt, even when the instruments are deployed in typical temporary field settings. Such records may contribute considerable additional information about eruption mechanics.

Pozgay, S.H., R.A. White, D.A. Wiens, P.J. Shore, A.W. Sauter, and J.L. Kaipat, Seismicity and Tilt Associated with the 2003 Anatahan Eruption Sequence, *J. Vol. Geothermal Res.*, in press, 2005.

Wiens, D.A., P.J. Shore, S.H. Pozgay, A.W. Sauter, and R.A. White, Tilt Recorded by a Portable Broadband Seismograph: The 2003 Eruption of Anatahan Volcano, Mariana Islands, *Geophys. Res. Lett.*, subm. 2005.



Figure 1. The eruption of Anatahan as observed at dawn on May 10, 2003, from a small ship installing PASSCAL seismographs in the Northern Mariana Islands (photo by A. Sauter).

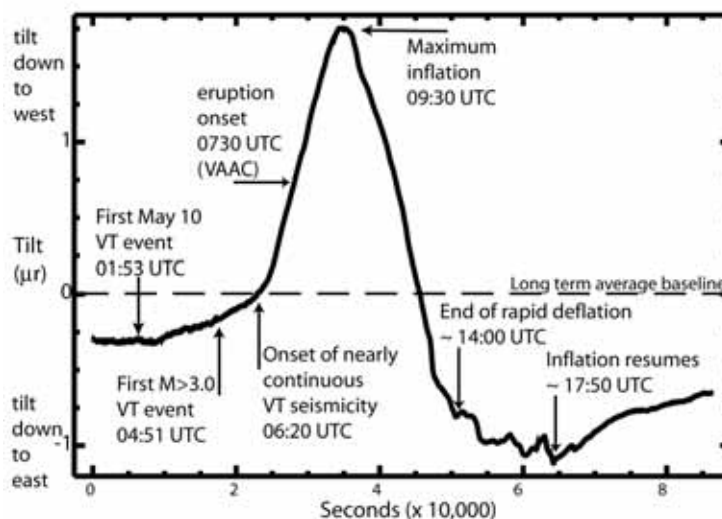


Figure 2. Ground tilt record for May 10, 2003, reconstructed from the horizontal component of the PASSCAL broadband seismograph on Anatahan Island.