

1999 Fall Meeting

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HR: 1330h

AN: **V32A-05**

TI: [Monitoring and analysis of volcanic tremor reduced displacement and spectra associated with eruptions of Shishaldin Volcano, April 1999](#)

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AB: Tremor signals associated with Strombolian eruptions of Shishaldin Volcano on April 19 and April 23, 1999, were the strongest recorded anywhere in the Aleutian Islands by the Alaska Volcano Observatory (AVO) in its 10 year history. Throughout the 1998-1999 seismic unrest at Shishaldin, spectrograms (with a frequency resolution of 0.1 Hz) and reduced displacement (Dr) plots were computed in near-real-time (10 mins) and displayed on the World Wide Web. The tools often gave the first warning of changes in activity, and being able to check these data remotely at any time (over the Web) was invaluable. They also provided an excellent database for further analysis. Analyses of Dr and spectra reveal that the eruption sequences on April 19 and April 23 followed similar patterns. Both were preceded by ~ 2 days of tremor which gradually intensified. A rapid increase commenced ~ 2 hours prior to the maximum observed Dr in both cases (30 cm^2 and 37 cm^2 respectively). Several further pulses of strong tremor ($\text{Dr} > 20 \text{ cm}^2$) then occurred before an abrupt reduction in tremor ($\text{Dr} < 2 \text{ cm}^2$). Strong tremor lasted about 16 hours for April 19 and 6 hours for April 23. However, the main phase of the April 19 eruption was characterised by a very wide-band signal associated with ash ejection to an altitude of ~ 50000 feet; no corresponding signal was observed in the April 23 sequence and relatively little ash was observed although a large thermal anomaly was seen in satellite data. This suggests that the main phase on April 19 corresponded to a vent clearing eruption. The dominant tremor frequency immediately after this eruption was lower than that immediately before. A significant increase in the characteristic scale length (for an exponential relation between duration and amplitude) also occurred suggesting that the vent clearing eruption modified the source geometry. Strong tremor on April 23 had a higher frequency, which was likely the result of lower gas content. Tremor was a key diagnostic for evaluating the activity of Shishaldin during its 1999 eruptions.

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