

**2009 Fall Meeting
Search Results**Cite abstracts as **Author(s) (2009), Title, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract xxxxx-xx**

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volcanology thompson

HR: 1340h

AN: **V43A-2215**TI: [Alarm systems detect volcanic tremor and earthquake swarms during Redoubt eruption, 2009](#)AU: **Thompson, G**EM: glenn@gi.alaska.eduAF: *Alaska Volcano Observatory, Fairbanks, AK, United States*AU: **West, M E**EM: west@gi.alaska.eduAF: *Alaska Volcano Observatory, Fairbanks, AK, United States*

AB: We ran two alarm algorithms on real-time data from Redoubt volcano during the 2009 crisis. The first algorithm was designed to detect escalations in continuous seismicity (tremor). This is implemented within an application called IceWeb which computes reduced displacement, and produces plots of reduced displacement and spectrograms linked to the Alaska Volcano Observatory internal webpage every 10 minutes. Reduced displacement is a measure of the amplitude of volcanic tremor, and is computed by applying a geometrical spreading correction to a displacement seismogram. When the reduced displacement at multiple stations exceeds pre-defined thresholds and there has been a factor of 3 increase in reduced displacement over the previous hour, a tremor alarm is declared. The second algorithm was designed to detect earthquake swarms. The mean and median event rates are computed every 5 minutes based on the last hour of data from a real-time event catalog. By comparing these with thresholds, three swarm alarm conditions can be declared: a new swarm, an escalation in a swarm, and the end of a swarm. The end of swarm alarm is important as it may mark a transition from swarm to continuous tremor. Alarms from both systems were dispatched using a generic alarm management system which implements a call-down list, allowing observatory scientists to be called in sequence until someone acknowledged the alarm via a confirmation web page. The results of this simple approach are encouraging. The tremor alarm algorithm detected 26 of the 27 explosive eruptions that occurred from 23 March - 4 April. The swarm alarm algorithm detected all five of the main volcanic earthquake swarm episodes which occurred during the Redoubt crisis on 26-27 February, 21-23 March, 26 March, 2-4 April and 3-7 May. The end-of-swarm alarms on 23 March and 4 April were particularly helpful as they were caused by transitions from swarm to tremor shortly preceding explosive eruptions; transitions which were detected much earlier by the swarm algorithm than they were by the tremor algorithm.

DE: [7280] SEISMOLOGY / Volcano seismology

DE: [7294] SEISMOLOGY / Seismic instruments and networks

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SC: Volcanology, Geochemistry and Petrology (V)

MN: 2009 Fall Meeting

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