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*'Understanding volcanoes and society: the key for risk mitigation'*



## Evaluating alert effectiveness and forecasting at the Alaska Volcano Observatory

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The Alaska Volcano Observatory (AVO) has been monitoring Alaska volcanoes and issuing volcanic unrest and activity notifications since the organization's inception in 1988. From April, 1988 through June, 2016, there have been at least 63 eruptions from 20 volcanoes. We evaluate the effectiveness of AVO's notifications throughout our history, taking into account what level of functional, telemetered monitoring data existed at the volcano in the period prior-to and during the activity, as well as volcano- and eruption-specific factors (e.g., open or closed vent, bulk chemical composition). We propose that effective notifications are those that correctly forecast or describe events, and are delivered with enough time to protect lives and property. Time frame of effective notification is variable for different volcanoes and eruptive styles, but is generally very short (minutes) in the case of Alaska eruptions where the primary hazard is to aviation. Because AVO's formal notification systems have evolved through time, including years where notifications were issued for ongoing eruptions without assigning a color code, this analysis must evaluate all of AVO's notification products, and is not limited to color code assignments. In 2007, AVO adopted the ICAO Aviation Color Code and USGS Volcano Alert Level system that is now standard at all US Observatories. Although AVO's notification styles and thresholds are a work in progress, we can evaluate the effectiveness within the parameters of each notification system. Extending the analysis period back to 1988, during the time when color code assignments were used less frequently, permits the inclusion of more eruptions, including those with greater explosivity, hazardous potential, and repose periods. A preliminary analysis of AVO's notifications indicates high success of effective alerts for closed, viscous, VEI 3+ eruptions at seismically monitored volcanoes, demonstrating the necessity of geophysical instrumentation at volcanoes that erupt less frequently.