



The 7 – 8 August 2008 Eruption of Kasatochi Volcano Central Aleutian Islands, Alaska

Chris Waythomas and Stephanie Prejean
US Geological Survey, Alaska Volcano Observatory
Anchorage, AK

*Note: AGS meetings will be at the BP Energy Center for 2010-2011.
Please check the website (www.alaskageology.org) and issues of the AGS newsletter for updates.
This newsletter promotes the January luncheon talk of the Alaska Geological Society,
to be held Thursday, January 20th, at the BP Energy Center.*

Kasatochi volcano in the central Aleutian Islands erupted unexpectedly on 7–8 August 2008. Prior to the eruption, the volcano had received little study by volcanologists and has had no confirmed historical eruptions. The island is an important nesting area for seabirds and a long-term biological study site of the U.S. Fish and Wildlife Service. After a notably energetic pre-eruptive earthquake swarm, the volcano erupted violently in a series of explosive events beginning in the early afternoon of 7 August. The first earthquakes of the swarm were detected about one month prior to the eruption onset, but at the time, the origin and significance of these earthquakes was not known. Within about 48 hours of the initial explosion, the swarm intensified and attracted the attention of AVO and AEIC scientists. The largest earthquake of the swarm had a moment magnitude 5.8, and many of the earthquakes were larger than magnitude 4. The earthquake swarm highlights the complex interaction of tectonic and magmatic processes in this region and although intrusion of magma initiated the swarm, the earthquakes clearly developed in a regional tectonic context.

Each of the four main explosive events produced ash-gas plumes that reached 14–18 km above sea level. The main volcanic plume contained a large amount of SO₂ and was tracked around the northern hemisphere by satellite observations. The cumulative volcanic cloud interfered with air travel across the North Pacific, causing many flight cancellations that affected

AGS Luncheon

Date & Time: January 20th, 11:30 am – 1:00 pm

Program: Eruption of Kasatochi Volcano

Speaker: Chris Waythomas & Stephanie Prejean

Place: BP Energy Center

Reservations: Please make your reservation before noon Tuesday Jan. 18th, 2010.

Cost: Seminar only, no meal: Free

Reserve a box lunch: \$15

Reserve a hot lunch: \$20

Lunch with no reservation:
On an "as-available" basis only

E-mail reservations: vp@alaskageology.org
Or phone (907) 269-8673
(Ken Helmold, AGS VP)

For more information: visit the AGS website:

www.alaskageology.org

thousands of travelers. Visits to the volcano in 2008–2010 indicated that the eruption generated pyroclastic flows and surges that swept all flanks of the island, accumulated several tens of meters of pyroclastic debris, and increased the diameter of the island by about 800 m. Pyroclastic-flow deposits emplaced on the island contain mostly accidental lithic debris derived from the inner walls of the Kasatochi crater. Juvenile material in the pyroclastic deposits is less abundant and consists of crystal-rich silicic andesite (59% SiO₂) that ranges from slightly pumiceous to frothy pumice. Fine-grained pyroclastic surge and fall deposits with accretionary lapilli cover the lithic-rich pyroclastic flow deposits and mark a change in eruptive style from episodic explosive activity to more continuous ash emission with smaller intermittent

explosions. The pyroclastic deposits completely cover the island and extend offshore several hundred meters. Wave erosion along the coast and gully development on the flanks has begun to modify the surface mantle of volcanic deposits, and this has important implications for the reestablishment of biotic habitat on the island.

The entire eruption lasted roughly 24 hours and radically transformed the morphology and habitat of the island. Ongoing studies are focused on monitoring the recovery of the island and investigating the ecological effects of severe volcanic disturbances. The Kasatochi eruption has motivated research on how to better monitor activity at unmonitored volcanoes using regional seismic data.

About the Authors

Chris Waythomas is a geologist with USGS-Alaska Volcano Observatory. He has a Ph.D. from the University of Colorado (1990) and has worked for USGS for 24 years and has 34 years experience in Alaska. His main areas of research are volcanic mass flows and the hazards they pose, volcano-ice interactions, and volcano geomorphology.

Stephanie Prejean is a geophysicist at the USGS Alaska Volcano Observatory in Anchorage, Alaska. Her research focuses on studying the physical processes that trigger earthquakes and using earthquakes to track the movement of magma and high-pressure fluids in the crust. She obtained her Ph.D. from Stanford University in 2002 and joined the Alaska Volcano Observatory in 2003.
