

Explosive Summer Sets Scientists Scrambling

After a relative lull in volcanic eruptions in Alaska, three volcanoes in the mid-Aleutians simultaneously erupted in the summer of 2008. On July 12th, Okmok Volcano on Umnak Island erupted, sending an ash plume to an altitude of 50,000 feet. On July 21st, the restless Mt. Cleveland, which had been on yellow “advisory” alert status for almost two years, began erupting explosively. Then Kasatochi, a small island in the central Aleutians, went from quiet to explosive on August 7th, sending an ash cloud southeast that disrupted air traffic.

“This is the most activity that (the Alaska Volcano Observatory) has seen at once,” said Geophysical Institute Research Associate Professor Jon Dehn. “It’s more activity than Alaska has seen in about a century, since Katmai.”

During and after the concurrent eruptions (a coincidence researchers call “chaotic clustering”), members of the Alaska Volcano Observatory (AVO) responded. AVO is a joint program between the Geophysical Institute, the United States Geological Survey, and the Alaska Division of Geological and Geophysical Surveys.

“Okmok had a shorter precursor time than any other eruption I have seen here in 17 years,” said Geophysical Institute Research Professor and AVO Coordinating Scientist Steve McNutt. “Before we knew it, the eruption was upon us and it was bang!-- hit the deck running.”

The observatory switched to 24-hour monitoring for several weeks, which proved fortunate when Kasatochi erupted suddenly August 7th.

“The good news is that we were on 24-hour coverage,” McNutt said. “The bad news is that we didn’t have a network on the island (Kasatochi). But we managed to make the right call (updating Kasatochi to an orange “watch” alert status before it erupted).

Several other Alaska and Kamchatka volcanoes that AVO monitors also were active at the time, adding to the busyness that forced researchers to put aside their normal daily work.

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photo by Jessica Larsen - AVO/UAF-GI

ASH PLUME: An erupting Okmok Volcano is shown above on August 3, 2008. The photo was taken from Fort Glenn, Bering Pacific Ranch, on the eastern flanks of the volcano, and shows the view looking west. The background photo shows the same plume from an aerial view.

photo by Guy Tytgat, AVO/UAF-GI

EXPLOSIVE SUMMER: At left, Mt. Cleveland is shown steaming in 2007. Cleveland began explosively erupting on July 21, 2008. The photo at right shows Kasatochi Volcano as seen from an altitude of 17,000 feet on October 23, 2008. Kasatochi went from being quiet to explosive on August 7, 2008.

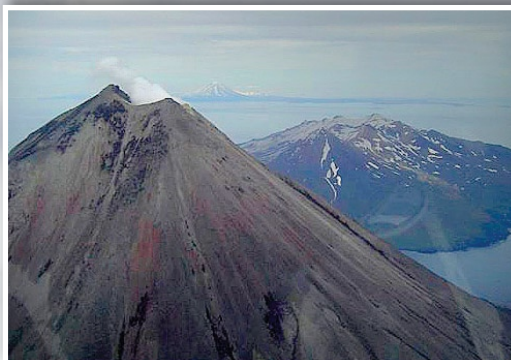


photo by Andrew Rose, Maritime Helicopters



photo by Jerry Morris

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"It was a wild ride to have that level of activity at once," McNutt said. "The tempo at which we worked was like nothing we had ever seen."

The American Geophysical Union (AGU) added a special session dedicated to Okmok and Kasatochi at its fall meeting. Not only were the eruptions dramatic, but both were dangerous. Cattle ranchers at Fort Glenn near Okmok evacuated when the ashfall became extremely thick, and two biologists on Kasatochi caught a ride from a fishing boat shortly before the volcano erupted and wiped out the cabin in which they were living.

"If the weather had been bad, we could have been looking at the first fatalities in a long time," McNutt said.

Weeks after the eruptions volcanologists were still learning about them, such as the fact that infrasound sensors on Shishaldin Volcano recorded Kasatochi erupting from 500 miles away. McNutt and his colleagues were busy not only with their own research, but in writing abstracts for presentations on the eruptions they would give at the AGU conference.

"We'll learn a lot from the eruptions," McNutt said.

"This is a goldmine for students," Dehn added. "It provides research opportunities for students forever."

VISITING NEW TERRAIN

Research Associate Professor Jessica Larsen traveled to Okmok to see the eruption of a volcano she knew better than any other, as she had worked on Okmok since 1998, spending an accumulative six months on the island in tents or in rooms at the cattle ranch at Fort Glenn.

"It's a changed place," she said. "It was a beautiful grassland with songbirds all over. Now it's covered in ash."

Larsen talked with fishermen who said that mud flows known as lahars had destroyed some of their black cod pots on the sea floor. She also saw an ash plume coming from the caldera that still generated lightning even though it was relatively small, reaching up to an altitude of 10,000 feet. She could feel the heat of the volcano through the helicopter when she flew over the caldera.

"I've been on this island so much, and you get your favorite places," she said. "Now it's totally different. That's kind of sad in a way, but the scientific opportunity is once in a lifetime. Now we have this new data that will allow us to monitor it better in the future."

SURPRISE EXPLOSION

The explosive eruption of Kasatochi, a tiny island in the mid-Aleutians with no modern history of eruptions, came as a "complete and utter surprise," according to Dehn. At the time of the eruption, Geophysical Institute researchers pulled long hours, many of them in a room with 12 monitors showing the latest satellite images of Alaska volcanoes and a screen showing the location of all the airborne planes in Alaska.

"Planes have scattered to the wind, reacting to get out of the way," Dehn said. "It's very reassuring."

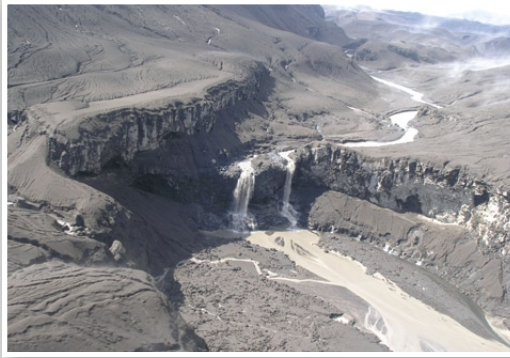
Nearby, Associate Professor Cathy Cahill was helping to monitor the volcanoes and issued a report on what she saw. "It still exists," she wrote of tiny Kasatochi, which she viewed on a satellite image for the first time since the massive eruption.

Kasatochi's unexpected eruption—monitored using a seismic network on Great Sitkin, 20 miles away—was the most disruptive of the summer, with its ash cloud drifting over southern Alaska and canceling 44 flights into and out of Alaska shortly after its eruption.

FORECASTING ASH CLOUD MOVEMENT

The eruptions of Okmok, Cleveland and Kasatochi have spurred increased traffic on the Puff website, found online at <http://puff.images.alaska.edu>. Puff is a volcanic ash-tracking model developed by Geophysical Institute scientists that offers automated runs of simulated ash plumes for elevated status volcanoes, meaning that users can at any time check out predictions of where ash clouds might drift were an eruption to occur.

Post-doctoral fellow Peter Webley, who has an appointment with the Arctic Region Supercomputing



photos courtesy of Janet Schaefer AVO/ADGGS.

BEFORE AND AFTER: Shown here are two photographs of the falls on Crater Creek, the outflow stream from Okmok caldera. The photo on the left was taken in September 2004. The comparative photo on the right is approximately the same view taken August 2, 2008, three weeks after the onset of the eruption.

Center and works daily with AVO and the Geophysical Institute, generates automated predictions on the Puff website so people can watch the paths of simulated ash clouds. He uses meteorological wind-field data and other eruption inputs to provide models of ash cloud movement that are updated every six hours.

“Automated predictions can give an answer straightaway without going out to run the model,” Webley said.

As the need arises, Webley adds volcanoes to the group of automated-prediction volcanoes. When Okmok erupted on July 12th, McNutt called Webley to inform him of the eruption. Webley quickly set up automated predictions for that volcano. By the end of the day, the Okmok predictions were getting hundreds of hits and the

Puff website was getting thousands of hits. After learning of its sudden eruption, Webley added Kasatochi from afar while he was visiting England in early August.

Former Geophysical Institute Associate Professor Hiroshi Tanaka conceived of Puff in response to the eruption of Mt. Redoubt in 1989. Since the early 1990s, Research Professor Ken Dean has led the development of Puff at the Geophysical Institute with major contributions from former Research Assistant Craig Searcy, who now is with the National Weather Service, and more recently, from University of Alaska Fairbanks Assistant Professor Rorik Peterson.

NEW TERRAIN: Research Assistant Professor Jessica Larsen is shown taking measurements on the shore of a new lake that formed inside Okmok Caldera during the 2008 eruption. A new tephra cone 200 meters high and 800 meters across grew entirely during the eruption, and can be seen steaming in the distance.



photo by Christina Neal - AVO/USGS



Crevensten's Legacy: GI Associates' Endowment Fund

When former Geophysical Institute Executive Officer Dan Crevensten passed away on February 18, 2008, in Bellevue, Washington, his three sons asked that people donate in his memory to the Geophysical Institute Associates' Endowment Fund.

Crevensten's son Doug, who lives in Fairbanks, said his dad's years at the institute left an impression on the former Army lieutenant colonel, who was director Keith Mather's right-hand man from 1963 to 1975.

"Once he understood the reach of the Geophysical Institute and the importance of what they did, he was hooked," Doug Crevensten said.

Dan Crevensten and others set up the endowment fund as a method to pay for things not covered by research grants and contracts, such as travel expenses for visiting scholars, installation of a gravity monument at the College International Geophysical Observatory, help for new graduate students (including books and cold-weather gear), and resurrection of the directional signpost outside the institute's Elvey Building.

Dan Crevensten gave the fund a jump-start with a donation when he and others created it in 1992. Today, the fund exceeds \$250,000. A seven-member board, which includes Doug Crevensten, decides the direction of the fund, and the University of Alaska Foundation manages it.

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