A New Kind Of Lightning Discovered

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Lightning in the ash cloud atop Mount Redoubt from the March 28 eruption. Credit: Bretwood Higman

When volcano seismologist Stephen McNutt at the University of Alaska Fairbanks's Geophysical Institute saw strange spikes in the seismic data from the Mount Spurr eruption in 1992, he had no idea that his research was about to take an electrifying turn.

"The seismometers were actually picking up lightning strikes," said McNutt. "I knew that I had to reach out to the physicists studying lightning."

With McNutt's curiosity about volcanic lightning sparked, he teamed up

with physicist and electrical engineer Ronald Thomas and Sonja Behnke, a graduate student in atmospheric physics at the New Mexico Institute of Mining and Technology in Socorro, N.M. for a unique collaboration in order to learn more about volcanic lighting.

When the Mount Redoubt volcano started making seismic noise in January 2009, McNutt alerted Thomas and Behnke that this would be a great opportunity to capture some new volcanic lightning data. By the time the volcano erupted in March, the team had four Lightning Mapping Arrays set up to monitor the lightning from the eruption.

"The LMA is basically an old TV antenna set to pick up channel 3 -- the same frequency that lightning radiates from," said Behnke.

Setting up LMAs about 50 miles away from the volcano across a body of water called Cook Inlet in south central Alaska may not seem like an ideal location, but the team explained that there are obstacles to setting up LMAs near the volcano.

"We can't put the LMAs on the volcano because the volcano is basically in a wilderness area and the stations need power and internet to function," said Thomas.

As the data started coming in from the eruption, the team found something unexpected.

"We saw lots of lightning -- 20 to 30 minutes of lighting," said Thomas. "We saw even more lightning than we would typically see during a major thunderstorm."

Not only was the amount of lightning unusual, but so was the kind of lightning coming from the volcano.

"At the moment the eruption started, there were these sparks of lightning coming from the vent of Redoubt that only lasted 1 to 2 milliseconds," said McNutt, " This was a different kind of lighting that we have never seen before."

The residents and scientists who witnessed Mount Redoubt's explosive eruptions described the events as a breathtaking display.

"They all said that it was the most spectacular lightning display that they have ever seen," said Thomas.

The team has also been studying how the newly-discovered volcanic lighting compares to familiar thunderstorm lightning.

"It's fascinating as we learn how volcanic lighting is the same and yet different form thunderstorm lightning," said Behnke.