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Article Review

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The 2010 eruption of the Eyjafjallajokull in Iceland had huge economic effects. On April 14, the volcano had an explosive eruption from 300 meters under a glacier, sending 750 tons of ash and ice over 30,000 feet into the air every second. From April 15 through April 22, more than 100,000 flights were cancelled across Western Europe, stranding 7 million passengers and slowing international trade. Global losses in GDP were estimated at $4.7 billion U.S. dollars.

Two articles examine the eruption of Eyjafjallajokull in 2010. In “Eyjafjallajökull and the 2010 Closure of European Airspace: Crisismanagement, Economic Impact, and Tackling Future Risks,” Elin Thora Ellertsdotter examines disaster planning around the eruption, concluding that it was solely reactive, and that we need more proactive protocols for handling future eruptions (Student Economic Review, v. 28). In “Characterization of Eyjafjallajökull volcanic ash particles and a protocol for rapid risk assessment,” Gislason, Hassenkam, Nedel, et al examine a method for quickly determining the nature of volcanic ash to determine its danger to travel and toxicity to people and animals (PNAS, 2011). Together the two articles provide insight into how to handle a natural disaster as large as a major volcanic eruption in the modern era of international trade.

Ellertsdotter points out several shortfalls in the disaster planning leading up to the eruption of Eyjafjallajokull in April 2010. Chiefly, she wonders why authorities were not more prepared, as in 1982 a British Airways jet lost power to its engines after flying into a cloud of volcanic ash from Galunggung in Indonesia. Although pilots were able to regain control of the plane and landed safely, the close call led to formation of the International Airways Volcano Watch by the International Civil Aviation Organization. The purpose of the group is to collect information about volcanic ash clouds that may endanger aircraft and issue warnings of possible problems.

Gislason et al may have an answer to this question. They point out that the eruption of Eyjafjallajokull was preceded by almost a month of intense seismic activity, including lava flow from one of its fissures. Had the geologists measuring the seismic activity under the volcano been in conversation with those monitoring ash that volcanos put into the air, perhaps the Volcano Watch organization would have had earlier indication of the impending eruption of Eyjafjallajokull and could have warned the affected disaster planning agencies sooner.

Another issue with the eruption of Eyjafjallajokull is that people did not know what the effects of the ash and ice particles would be. As Gislason et al point out:

The general population felt insecure about health risks. Was it dangerous to inhale the ash particles? Should nursery schools be closed? Were water supplies at risk? Had correct decisions been made about airport closures? Considering the economic costs, will correct decisions be made in the future? (p. 7307)

While previous studies of volcanic ash have been done using material collected far from the source, Gislason et al got dry samples of fresh ash collected immediately after the eruption, then compared them to samples collected from farther away. This allowed them to compare samples and determine the effect of long-range travel on the ash. Using nanotechniques, researchers found that the ash particles were extremely small and fine but also extremely sharp and abrasive, and that even miles of travel did not change this composition. This meant that the ash does pose a hazard to airlines as it can melt in jet engines and cause abrasions on pilot windows. The particles were also extremely salty and carried other toxic chemicals. This meant that inhalation of the ash near the source was very dangerous; however, as the ash dispersed across a long distance, its toxicity diminished.

While Gislason et al provide a method for quickly analyzing volcanic ash that could be deployed in the case of future eruptions, the real problem lies not with the science to determine the composition of the ash, but with the disorganized and uncoordinated response by governments and businesses. Ellertsdotter shows how each country coordinated its own response, with Britain most affected followed by Ireland and Finland. International corporations of all types also had to respond, from manufacturers looking for “just in time” parts to suppliers of flowers, fruits and vegetables trying to cut the losses of their perishable stocks. Ellertsdotter says the response to a volcanic disaster needs to be more coordinated but does not say how. I would think that the organizations we already have would be a good start.

First, the authority of the International Airways Volcano Watch should be increased so that they can make recommendations to encompass multiple governments and industries. They should also be coordinating with agencies that measure and provide earlier warning of impending eruptions, such as geologists that measure seismic activity. Together, governments, scientists, and industry need to develop protocols for responding to volcanic disasters, whether that is quickly rerouting airline traffic or finding alternative sources of necessary supplies. Airlines, too, need to have clear rules for what costs they are responsible for and what they are not. The European Commission said they needed to compensate stranded passengers, but low-cost airlines did not want to. If airlines will be responsible for this, they need to have some type of re-insurance available so that one volcanic eruption does not put them out of business.

One thing is for sure: There will be another eruption. Historically Katya erupts a few years after Eyjafjallajokull, so we are due – and an eruption of Katya is likely to be much larger, according to Ellertsdorfer. It would behoove government and industry to start the planning process now so they are not left scrambling in the middle of a disaster as they were in 2010.