

Natural Hazards: Part 3 of 4

September 2011

☀ She blew her top



Mount St. Helen, the day before, then after, the eruption



On a beautiful, peaceful spring day – Mount St. Helen, State of Washington CATAclysmic ERUPTION May 18, 1980

Within 15 to 20 seconds of a magnitude 5.1 earthquake at 8:32 a.m., the volcano's bulge and summit slid away in the largest landslide ever recorded on Earth. Over the following six-year period, 17 "eruptive episodes" would occur (generating steam as shown in photo), building a lava dome, which partially covers the crater created in 1980. Although St. Helen, the most active volcano in the Cascade Range, appears to be in a state of tranquility, [US geologists and geophysicists](#) continue to monitor for signs of renewed activity.

☀ Clouds without a Silver Lining

On 24 June 1982, the aviation community and much of the world learned of the drama involving a British Airways B747 aircraft which lost power on all four engines while flying at 11 300 m (37 000 ft) from Kuala Lumpur, Malaysia to Perth, Australia. During the ensuing sixteen minutes, the aircraft descended without power from 11 300 m to 3 650 m (37 000 ft to 12 000 ft), at which point the pilot was able to restart three of the engines and make a successful emergency landing at Jakarta, Indonesia.

Piecing together the available evidence and knowing that a large Indonesian volcano, Mt. Galunggung, had been erupting at the time of the incident, suspicion quickly focused on a volcanic ash cloud as being the likely culprit. This suspicion gained further support some three weeks later when another aircraft, a B747 of Singapore Airways bound for Melbourne, Australia, reported a similar incident. This time power was lost on two engines and the aircraft also diverted successfully to Jakarta.

Quoted from the [Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds](#) (2007), published by the International Civil Aviation Organization. Directives were applied following two Icelandic volcano eruptions - Eyjafjallajökull in April 2010 and Grimsvotn in May 2011.

☀ Window of Opportunity and Learning

Over the 25+-year period since Mount St. Helen and Mount Galunggung erupted (an Indonesian colleague described the experience of "walking to school in the dark"), scientists have taken their curiosity, investigative protocols and modern tools of technology to the skies and sites, furthering our understanding of the effects of this force of nature.

☀ Effect on Food and Agriculture

Grounding of air flight is the most widely-known risk-mitigation strategy associated with volcanic ashfall. Farm and agriculture-related damages do not attract equal headline attention, yet, the effects are real, pervasive and costly. While farmers have employed damage-control and recovery tactics for millennia, documentation of longitudinal baseline data is non-existent. Moreover, one cannot predict exact consequences and costs as ash type, contaminants and thickness vary amongst eruptions. As well, crops and livestock differ geographically.

☀ Ongoing Research; General Facts

Research continues (and spikes following each eruption), resulting in some generalizations of ashfall damage to farms and agriculture: clogging of machinery; permanent damage to fragile crops (lettuce, strawberries, apricots) – Mount St. Helen dropped up to 30 kg ash /sq metre; livestock and handler respiratory problems, or suffocation if close to the site; lethal to some insects such as bees and grasshoppers; while ash-contaminated hay is assumed non-toxic to livestock, a concern in Iceland (an example of regional-specific effects) was risk of fluoride poisoning which can lead to internal bleeding, and long term damage to bones and teeth; on soil, reduced water runoff and evaporation, and, increased erosion and temperature, even after tilling; caking of ash on the wings of birds inhibiting flight; blockage of hydro-generated power; and, wet ash is conductive to electricity, requiring particular safety procedures during the restoration of hydro-power.

☀ Effects of Ashfall on Human Health

The most common are skin and eye irritation, respiratory problems, and worker safety during rescue and recovery operations. Both the American and Canadian governments have published fact sheets and guidelines on this topic: [Health Effects of Volcanic Ash](#); [Health Hazards of Volcanic Ash](#); [Potential Health Effects of Volcanic Ash](#) **FF**

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