



Frequency and Characteristics of Volcanic Ash and Dust Suspension Events in Iceland

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Much of the research regarding particulate matter (PM) in dust storms has focused on large global source areas such as in the subtropics. However, the high latitudes have been found to be a major source area for PM. Iceland's PM is unique in that it is mostly produced by volcanic eruptions and basaltic in nature. New particles produced by an eruption get deposited on the surface and are later resuspended. These new particles along with the pre-existing surface material undergo multiple erosion processes; i.e. glacial, fluvial and aeolian.

The frequency of volcanic ash and dust resuspension events, hereafter PM events, occurring in Iceland is dependent on weather conditions, proximity to a source area, and the time since the last ash rich eruption. Due to the frequently windy conditions and the fineness of volcanic ash, loose ash is frequently suspended into the atmosphere and affects the annual frequency of PM events. Within one year of the Grímsvötn eruption (2011) and two years since the Eyjafjallajökull eruption (2010) the frequency of PM events decreased below the 40-year average of 135 events per year by 45%. Volcanic ash is also worked into the surface, buried in snow packs on glaciers, or deposited outside of Iceland after resuspension; which results in lower than average PM events in the years following 2011.

Due to the basaltic nature of PM in Iceland, the physical characteristics are quite different from other major source areas. One of the major differences is the greater surface area compared to other natural dusts and minerals, as would be found in major source areas such as: The Sahara, Asia, and North America. The surface area is a key component in studying PM, as it can affect nucleation of water vapor, and can have greater health impacts. In addition, volcanic ash physical characteristics can pose a greater risk to human health compared to other natural dusts because it can be needle like in shape. Knowing the physical characteristics of PM is beneficial to understanding the hazards that Icelandic PM events pose.