



Long-term variability of dust-storms in Iceland

Pavla Dagsson-Waldhauserová (1,2), Haraldur Ólafsson (2,3,4), and Ólafur Arnalds (1)

(1) Landbúnaðarháskólinn (Agricultural University), Hvanneyri, Iceland, (2) Háskóli Íslands (University of Iceland), (3) Veðurstofa Íslands (Icelandic Meteorological Office), (4) Bergen School of Meteorology, Geophysical Institute, University of Bergen

Iceland is a volcanic island in the North Atlantic Ocean with maritime climate. In spite of moist climate, large areas are with limited vegetation cover where >40% of Iceland is classified with considerable to very severe erosion and 21% of Iceland are volcanic sandy deserts. Natural emissions from these sources influenced by strong winds affect not only regional air quality in Iceland (“Reykjavik haze”) but dust particles are transported over the Atlantic ocean and Arctic Ocean > 1000 km at times. The study places Icelandic dust production area into international perspective, present long term frequency of dust storm events in NE Iceland, and estimate dust aerosol concentrations during reported dust events.

Meteorological observations with dust presence codes and related visibility were used to identify the frequency and the long-term changes in dust production in NE Iceland. There were annually 16.4 days on average with reported dust observations on weather stations within the NE erosion area, indicating extreme dust plume activity and erosion within the NE deserts, even though the area is covered with snow during the major part of winter. During the 2000s the highest occurrence of dust events in six decades was reported. We have measured saltation and aeolian transport during dust/volcanic ash storms in Iceland which give some of the most intense wind erosion events ever measured.

Icelandic dust affects the ecosystems over much of Iceland and causes regional haze. It is likely to affect the ecosystems of the oceans around Iceland, and it brings dust that lowers the albedo of the Icelandic glaciers, increasing melt-off due to global warming. The study indicates that Icelandic dust is not only a substantial source for regional air pollution, but may be considered to contribute to the Arctic haze phenomena and Arctic air pollution.