



## High latitude dust over the North Atlantic: inputs from Icelandic proglacial dust storms

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Mineral aerosols are important in the atmosphere-ocean climate system. Research has almost exclusively focused on visibly active sources located in low-latitude arid regions. Here we show that there may be significant sources in higher latitudes. A six-year record of daily measurements made on Heimaey, an island off the south coast of Iceland, reveals frequent dust events with concentrations often exceeding  $20 \mu\text{g m}^{-3}$ . These events are associated with intense dust storms, some clearly visible in satellite images. Activity is greatest in spring and spatially and temporally associated with active glacial outwash plains. The largest dust events appear to be associated with catastrophic glacial outburst floods (jökulhlaups). HYSPLIT trajectory and aerosol dispersion modeling indicate that over the first 120 hours, 40% of air masses associated with dust events remain over the North Atlantic Ocean whereas 36% make landfall on the west coast of Ireland and the United Kingdom. Glaciers and ice caps on Iceland are predicted to recede in response to climate change; during initial phases of retreat suspended sediment loads are expected to increase which may increase the magnitude and frequency of dust transport to the North Atlantic and to Europe.