



Assessment of Iceland as a dust source

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Iceland has extremely active dust sources that result in large-scale emissions and deposition on land and at sea. The dust has a volcanogenic origin of basaltic composition with about 10% Fe content. We used two independent methods to quantify dust emission from Iceland and dust deposition at sea. Firstly, the aerial extent (map) of deposition on land was extended to ocean areas around Iceland. Secondly, surveys of the number of dust events over the past decades and calculations of emissions and sea deposition for the dust storms were made. The results show that total emissions range from 30.5 (dust-event-based calculation) to 40.1 million t yr⁻¹ (map calculation), which places Iceland among the most active dust sources on Earth. Ocean deposition ranges between 5.5 (dust event calculations) and 13.8 million tons (map calculation). Calculated iron deposition from Icelandic dust ranges between 0.567 and 1.4 million tons, which are distributed over wide areas (>370 000 km²) and consist of fine reactive volcanic materials. The paper provides the first quantitative estimate of total dust emissions and oceanic deposition from Iceland. Iron is a limiting nutrient for primary production in the oceans around Iceland, and the dust is likely to affect Fe levels in Icelandic ocean waters.