Geophysical Research Abstracts
Vol. 20, EGU2018-10193-1, 2018
EGU General Assembly 2018

Total grain size distribution of the Askja 1875 C tephra

Alma Gytha Huntingdon-Williams (1,2), Ármann Höskuldsson (1,2,3), Maria Janebo (2), Thorvaldur Thordarson (1,3), and Constanza Bonadonna (4)

(1) University of Iceland, Reykjavik, Iceland, (2) Institute of Earth Sciences, University of Iceland, Reykjavik, Iceland, (3) Faculty of Earth Sciences, University of Iceland, Reykjavik, Iceland, (4) Section of Earth and Environmental Sciences, University of Geneva, Geneva, Switzerland

Recent explosive eruptions, such as the 2010 Eyjafjallajökull eruption, have highlighted the need for a larger, more detailed, global dataset of volcanic parameters, especially including total grain size distribution (TGSD). TGSD is a critical input parameter or source term for many volcanic ash dispersal and transport models and crucial for volcanic hazard assessments. The 1875 Askja eruption was rhyolitic in composition, and one of the largest explosive historical eruptions in Iceland. It consisted of three main phases: the subplinian unit B, the phreatoplinian unit C, and the Plinian unit D. This study focuses on unit C, which is characterized by fine material which, along with unit D, was distributed far off Iceland to Scandinavia and is therefore of special interest when studying TGSD. Grain size of individual samples were determined by sieving -6.0 to 4.0 φ. Two methods were used to analyse the finest tephra. Firstly, a MassSizer at the University of Geneva was used to analyse the fraction finer than 0.5 mm (1φ) and secondly, a SedigraphIII at the University of Iceland was used to analyse the fraction finer than 125 μm (3 φ). The TGSD was reconstructed using the Voronoi Tessellation technique. The grain size measurements reveal systematic decrease in modal grain size away from the vent. The grain size distribution of individual tephra samples ranges from unimodal to polymodal, where unimodal distribution is dominating. The reconstructed TGSD is unimodal, with a peak at 3.0 φ, median of 3.6 φ and sorting of 2.4.