



Dust events on Vatnajökull, Iceland: comparison between model results and measurements

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Dust events in Iceland considerably influence the surface albedo and subsequently the energy balance of glaciers such as Vatnajökull. Here we study dust events on Vatnajökull based on model simulations and ground-based measurements. Possible sources of dust origin are proglacial areas and sandy deserts which cover more than 22% of Iceland. A newly developed scheme for dust mobilization is used to estimate dust emission from these sandy deserts. Driven with these emissions, a Lagrangian dispersion model, FLEXPART, is used to calculate dust concentration and deposition. The model simulations facilitate to distinguish main source areas of dust transported to the glacier. Meteorological conditions at the source locations as well as flows induced by topography will affect the spatial distribution of dust on the glacier, and not all are resolved by the meteorological data from ECMWF used to run FLEXPART (resolution 0.2 degrees or about 22 km). We aim to determine how important local effects are. Ground based data such as distributed snow samples from Vatnajökull with impurities were collected in October 2013 and 2015. Additionally, firn cores of about 8 meters depth from Brúarjökull (NE Vatnajökull), were taken in 2014 and 2015. The firn cores show pronounced dust layers in the years 2012, 2011, 2010 and 2008. These dust concentrations from firn cores and snow samples as well as time series of albedo measurements from automatic weather stations, were compared to model results. For this comparison we chose ablation seasons which are not influenced by volcanic eruptions. For these periods we explain variations in dust amounts and their spatial patterns.