



## **Contribution of orography to precipitation distribution in Iceland**

Ó. Rögnvaldsson (1,2,4) and H. Ólafsson (1,2,3,4)

(1) Reiknistofa í veðurfræði (Institute for Meteorological Research), (2) Háskóli Íslands (University of Iceland), (3) Veðurstofa Íslands (Icelandic Meteorological Office), (4) Bergen School of Meteorology, Geophysical Institute, University of Bergen, Norway

A numerical experiment of one typical water-year reveals that the mountains constitute to a total increase in precipitation over Iceland by about 40%. The differences in monthly values range from 25% to 55%. The mountains cause a drying in the highlands north of the Vatnajökull ice shelf and north of the two large glaciers in central Iceland. The valley areas in the central and southeast part of the NW quadrant and the two largest fjords in the northwesternmost part of Iceland are also drier when the mountains are present. In the south of Iceland, there are large areas where more than 50% of the total precipitation is due to the impact of the mountains. In reality, this proportion may be greater, because at the current 8 km resolution, the mountains are not fully resolved. The Icelandic mountains cause a substantial increase in precipitation that reaches far south of Iceland while a decrease in precipitation is evident far to the north and northeast of Iceland, indicating that orographic lifting starts far upstream of Iceland and that it takes several hundreds of kilometres for the precipitation systems to recover after the flow has passed a mountain range of the size of Iceland.

Large parts of the areas that are drier when mountains are present than if the ground is flat are deserts, but that may be even more a consequence of low summer temperatures, strong winds, transport of sand by wind and the volcanic nature of the soil than to lack of precipitation.