P3.34 SNEX - The SNæfellsnes EXperiment

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1 Introduction

The SNæfellsnes EXperiment (SNEX) is an atmospheric field experiment in the Snæfellsnes peninsula in W-Iceland. SNEX started in 1999 and data is still being collected.

Figure 1: A map of Iceland showing 3 weather stations

The purpose of SNEX is to gather data on local winds, with emphasis on downslope windstorms: their characteristics in time and space and how they connect to to the synoptic flow field. The goal is to establish a link between real weather and theories of simplified flow over mountains that have flourished in recent decades.

Downslope windstorms are exceptionally frequent in Snæfellsnes, and unlike most mountain ridges, Snæfellsnes is almost surrounded by water and exceptionally well defined in space (Figs. 1-3). This makes the area very well suitable for studies of the impact of mountains on the weather.

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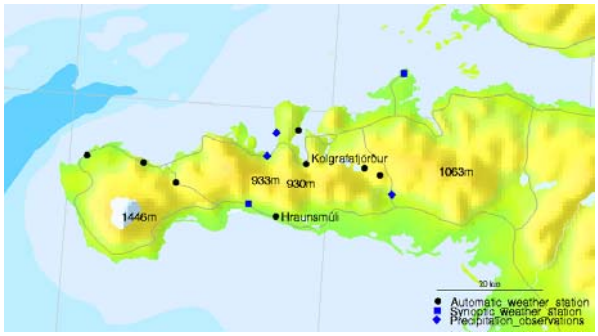

Figure 2: The weather stations in the Snæfellsnes peninsula

SNEX is a low budget experiment and unlike major atmospheric field experiments like MAP or FASTEX, there are no very costly instruments involved and no flights, apart from one-time observations from a helicopter that flew into unexpected weather in 2001 and lost some of its rotating parts. (Ólafsson and Rögnvaldsson, 2001). However, the strength of SNEX is that the experiment spans a period of several years and there is already a substantial collection of violent windstorms and other interesting cases that have been observed by the SNEX network, including the Keflavik soundings.

The SNEX data will soon be available for the meteorological community and it will undoubtedly serve for research of various aspects of mountain flow in the future.

2 Observations

The field observations are mainly based on eight automatic weather stations in Snæfellsnes, radiosoundings from a site about a 100 km south of the mountain ridge (Keflavik airport - WMO 0418). Apart from this, there are 2 conventional synoptic weather stations in the area and 3 precipitation observing stations. The automatic weather stations measure atmospheric pres-

Figure 3: Aerial view of the Snæfellsnes peninsula. The view is to the west with Snæfellsjökull (1446 m.a.s.) in the background.

sure, temperature, humidity and winds. During events of strong windstorms data is collected with very high temporal resolution.

3 Two windstorms

Two examples of typical downslope windstorms are shown in Figs. 4 and 5.

During the southerly storm on 4 March 2000 (Fig.4), Kolgrafafjörður (in the north) had mean wind that was only a little greater than at the weather stations in the mountains. However, the gusts reached up to 52 m/s, giving a gust factor of more than 2. During this storm, there was a stable layer upstream at about 700 hPa.

In the northerly storm (Fig.5), both the mean wind and the gusts are much greater on the south side (Hraunsmúli) than anywhere else in the peninsula. Gusts reach up to 63 m/s and the mean wind speed is 30-35 m/s which is about three times the upstream wind speed. During this storm there was a stable layer and a reverse wind shear at low levels.

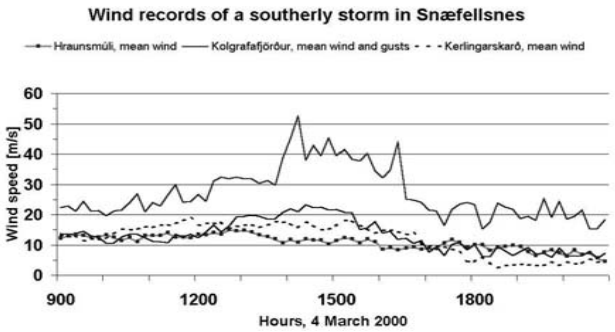

Figure 4: Time series showing a southerly storm, recorded by automatic weather stations.

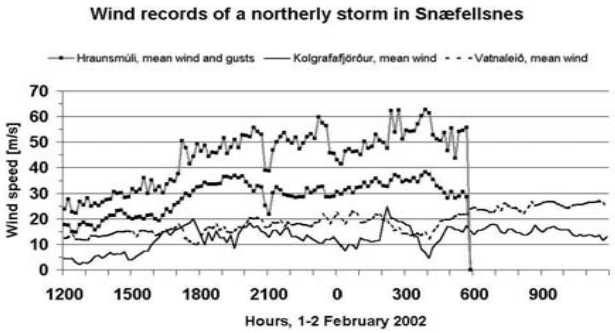

Figure 5: Time series showing a northerly storm, recorded by automatic weather stations.

REFERENCE

Olafsson, H. and O. Rognvaldsson, 2001: Applications of high-resolution numerical simulations in complex terrain. Tech. Rep., Institute for Meteorol. Res., Reykjavik, Iceland.