



WRF Model Experiments on Local Wind Patterns in Petuniabukta, Svalbard

Zuzana Chladova (1), Kamil Laska (2), and Jiri Hosek (1)

(1) Institute of Atmospheric Physics CAS, Prague, Czech Republic (chladova@ufa.cas.cz), (2) Department of Geography, Faculty of Science, Masaryk University, Brno, Czech Republic

This contribution presents the measurement and Weather Research and Forecasting (WRF) model simulations of the wind characteristics in Petuniabukta, northward oriented bay connected with Billefjorden and Isfjorden (Svalbard Arctic archipelago). The 30-min mean values of surface wind speed and prevailing wind direction obtained from four automatic weather stations (hereafter AWS) in the period 7–25 July 2013 were analysed. The AWS were located on the western coast of the Petuniabukta at altitude from 15 to 770 m a. s. l. (coastal zone, foreland of two glaciers, mountain ridge). Pattern of atmospheric circulation was identified using 850 hPa geopotential heights. The model was initialised by the European Centre for Medium-Range Weather Forecasts (ECMWF) operational analysis with 0.5° resolution at 6-hour intervals during the simulation. The WRF model overestimated surface wind speeds, especially during transformation and re-development of the pressure field and frontal systems over Svalbard. Therefore, correlation coefficients between observed and modelled data ranged 0.18 to 0.78 at the coastal site and -0.07 to 0.65 at the mountain ridge depending on surface weather conditions and WRF parametrization. The differences between real and modelled wind roses were larger on mountain ridge and forelands than on the coastal site during study period.