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# The turbulent structure of katabatic winds in the Spitsbergen coastal zone and energy exchange parameterizations

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A particularity of the glacier areas is the quasi persistence of strong offshore winds near the surface. The so-called katabatic winds are generated by the negative buoyant force that develops in the stable cooled layer along the ice sheet slopes. Katabatic winds exist in many parts of the world and are winds that flow from the high elevations of mountains, plateaus, and hills down their slopes to the valleys or planes below. They provide the major ventilation mechanism in mountainous regions at night when synoptic pressure gradients are weak. Katabatic winds are the main components of the climate at glaciers and surrounding areas, in particular, at the Antarctica, Greenland, and Arctic islands.

Our experiments were carried out near the Kongsvegen glacier in Svalbard during the spring time. Some preliminary observational results from the ground-based measurements during the field experiment in Ny-Alesund at spring time are presented. The predominant flow at Ny-Alesund is from the east-southeast due to katabatic flow from the Kongsvegen glacier 10 km to the east of Ny-Alesund. Neutral conditions were observed from the two predominant wind directions centered in the 120° and 250° sectors. A minor peak with the 20% of unstable cases was observed at 245° while stable conditions were mainly distributed around the sector at 120°. The highest values of the sensible heat fluxes were observed during the day time under forced convection because of the transfer of warmer upper layer air into the surface layer.

The dependence of incoming longwave and shortware radiation on cloud amount has been parameterized using relationships reported in the literature. Generally good agreement exists between the measured values and the parameterized those, except the cases of wind blowing from neighboring mountains. For the latent and sensible heat fluxes a new parameterization has been chosen for introducing into the model. The parameterization has been tested for measurement values.

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