



Summertime shallow katabatic flows in Dronning Maud Land, Antarctica

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The vertical structure of the atmospheric boundary layer had been observed near the Finnish Antarctic station Aboa in Dronning Maud Land ($73^{\circ}03'S$, $13^{\circ}25'W$) in austral summer 2010-2011 by means of the three-axes Doppler sodar Latan-3 and a 10-m meteorological mast. The measuring site is located at practically flat slightly sloped (about 1%) surface of the glacier. The sodar was operated with 20–800 meters sounding range, 20 m vertical and 10 s temporal resolution. The mast was equipped with wind and temperature measurements at 5 levels and two sonic anemometers at 2 and 10 meters.

During the measurements the atmospheric boundary layer was most of the time within the sounding range of the sodar. A large variety of sodar echo patterns and wind speed profiles have been observed, however, several cases of clear steady katabatic flows were observed. Practically all of them were Easterly, whereas the uphill direction is Southern. The thickness of the katabatic flow varied from few tens to several hundreds of meters, the wind speed maximum could be as low as 5 meters. Thin katabatic flows had lower wind speed and much stronger temperature gradient (up to 1 K/m), but smaller surface heat flux than the thicker ones.

Such situations pose a major challenge for meteorological models, since the surface layer in these cases appears just within the lowest meters.