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Katabatic flow; the great Large-Eddy Simulation challenge

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Glaciers are sensitive to climate changes. For instance, an increase in atmospheric temperature can result in increased melt. During the winter period in high latitudes the net radiation above glaciers and ice caps is mostly negative, causing a stably stratified boundary layer (SBL). The cooling surface will extract heat from the adjacent air, which in turn becomes heavier. Similarly, air is cooled above a melting glacier surface in summer. Close to the surface, air will become negatively buoyant with respect to air further downslope, causing relatively cold air to flow down the slope. These winds, called katabatic winds or glacier winds, do to a large extent determine the sensible and latent heat fluxes, which in turn play an important role in the energy balance of glaciers. Numerical large-scale models use resolutions that are too coarse to capture the shallow katabatic layer. By aid of a Large-Eddy Simulation model we focus on the energy exchange in the SBL. Results will be used to learn more about mean characteristics and help improving parameterization of heat fluxes in the SBL used in large-scale models.