



Influence of local wind distributions on Blue Ice Area at Scharffenberbotten, East Antarctica

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Blue ice areas (BIAs) cover about 1% of the coastal slow ice flow regions of the Antarctic ice sheet. They are ablation zones that frequently are cleared from surface snow, which most likely is caused by repeated meteorological events. In our investigations, we focus on the valley of Scharffenberbotnen (74.56 deg S, 11.05 deg W), Dronning Maud Land, East Antarctic ice sheet (EAAIS).

Using the open source Finite Element code Elmer, we apply a local micro-meteorological, CFD (Computational Fluid Dynamics) based model to two scenarios: 1. a representative wind field obtained from averaging ECMWF ERA Interim data in the vicinity of Scharffenberbotnen; 2. an assumed near surface wind profile that should resemble approaching katabatic wind fronts. From our results we can conclude that the averaged wind conditions are not sufficient to clear the ice from an existing snow cover. On the other hand, the assumed katabatic event revealed near-ground wind velocities that by their intensity as well as their spatial distribution are able to explain the existence of the large blue ice area inside the valley. To our knowledge this study is the first one that by modelling the local turbulent flow conditions is able to link wind distributions to the location of blue ice areas.