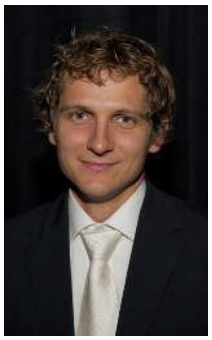

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Reinhard Drews

The Buttressing Effect: Why ice shelves are essential (Be:Wise)

Almost three-quarters of the Antarctic ice-sheet boundary is in contact with the ocean. Floating ice shelves extend the continental ice seawards and provide an interface for the interaction of ice and ocean.

The projects focuses on the Roi Baudouin ice shelf. The aim of the project is to examine the ice-dynamical role of grounded features, which are enclosed by the ice shelf, and which buttress the ice flow from the East-Antarctic ice sheet.

The Roi Baudouin ice shelf is confined by two ice rises with a local flow regime, and two pinning-points with a width of only a few kilometers. Notwithstanding, the latter seem to define the seaward edge of the ice shelf and impact ice-flow in the hinterland. The aim is to investigate the connection between the flow-dynamics of ice shelf with the locally grounded counterparts. This will be done in a combined approach of satellite remotesensing with on-site ground-penetrating radar and GPS measurements. The envisaged geophysical parameters are strain-rates, internal ice properties, surface velocities and characteristics of the bedrock interface. Preliminary studies indicate that the pinning-points of the Roi Baudouin ice shelf become partially afloat during high-tide. Therefore, time-series can be collected, which directly measure the effect of a de- and re-attachment from an ice shelf to a pinning point. This makes the Roi Baudouin ice shelf a unique field site for a case study, which delivers important insight into the operation of the buttressing effect. Larger-scale effect of ice-shelf buttressing, in terms of grounding-line migration and/or in terms of controlling the mass flux from the grounded ice sheet, are not fully understood. However, since the contact area between ice shelf and local highs in bedrock elevation is susceptible to changing ocean characteristics, it is important to quantify this buttressing effect, in order to evaluate whether or not it is a key to understand rapid variations in ice-sheet geometry.