



A look at the basal mass balance of the Fimbul Ice shelf using ice penetrating radar and oceanographic borehole data

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The Fimbul ice shelf is fed by the fast flowing Jutulstraumen, one of the largest outlet glaciers of Dronning Maud Land, East Antarctica. Ice shelves along this coast are notable because they extend over large portions of the continental shelf. Beyond the continental shelf break Warm Deep Water circulates, and oceanographic models indicate that some of this warm water penetrates below the ice shelf resulting in basal melt of the ice.

We present the first series of repeat glaciological investigations of this ice shelf using phase sensitive FMCW radar and GPS. The radar allows us to determine local changes in ice thickness, whilst the GPS measurement of stake nets gives ice flow vectors and strain rates. Combined, we are able to assess the local thinning and thickening of the ice shelf attributed to melting or refreezing at the basal interface.

The melt estimates based on radar data are compared to melt estimates based on vertical profiles of salinity and temperature from the three boreholes in the ice shelf. Most of the water properties indicate that there is mainly one water mass ($T \sim -1.8$ °C and $S \sim 34.3$) in contact with the ice. Slightly warmer water ($T \sim -1.6$ °C) is found in the bottom layer.