The Fimbul Ice Shelf in the Weddell Sea is the sixth largest Antarctic ice shelf. The ice shelf is fed by drainage from a large area in Dronning Maud Land, and overhangs the Antarctic Continental slope. New data gathered between November 2009 and January 2011 reveals detailed ice shelf topography, surface accumulation, snow properties, ice shelf flow speed, bottom melting, as well as ocean currents and temperature and salinity. Three main sites were established. The water column below the ice shelf is warmer than the in situ freezing point in the bottom layer, but has also proper ice shelf water in the layer directly below the ice, indicating basal freezing on one site.

The one year time-series from the six current meters give insight into the seasonal exchange of water below the ice shelf. Most of the water properties remain along one single line in TS space, indicating that inflow of one water mass (T~1.8 °C and S~34.3), but warming episodes are also observed. Shallow core snow samples, radar measurements, and surface stake nets compliment the current meter and thermistor string data from the three main sites, and provide excellent evaluation for melting estimates from numerical models.

Most ice-shelf and ocean models allow direct access of some Warm Deep Water below the ice-shelf, contradicting our observations. Inflow of warmer water seems limited by eddy-driven mixing on the continental shelf, and pathways of inflow are being investigated using a high resolution ice-shelf and ocean model.