# Evidence for (modified) CDW intrusions underneath an East Antarctic ice shelf, grounding line melting and fast inland ice flow

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We present the first comprehensive survey of ocean properties at the calving front of the Roi Baudoin Ice Shelf on the Princess Ragnhild Coast of East Antarctica. These new bathymetric and hydrographic results were collected by lowering acoustic depth sounding and conductivity-temperature-depth (ctd) instruments through leads and holes drilled through fast ice along the ice shelf front and ice mélange in rifts within the ice shelf. Ice thickness measurements were also carried out by both overland and airborne radio-echo sounding near the upstream grounding zone.

Our new findings show important contrasts with International Geophysical Year-era bathymetry and with oceanographic measurements collected in the region during JARE expeditions in the 1980s. Useful context is provided by these earlier studies, as they demonstrate that the continental shelf is unusually narrow in this region, and that the Antarctic Circumpolar Current is in close proximity to this region's ice shelves.

The CTD measurements show the presence of (modified) Circumpolar Deep Water onto the continental shelf in a trough underneath the fast-flowing part of the Roi Baudouin Ice Shelf. This observation is rather unique for the East Antarctic ice sheet as such intrusions have not been reported elsewhere. Furthermore, the large ice streams (Ragnhild glaciers) that discharge in the ice shelf have their grounding line at approximately the same depth as the occurrence of CDW further downstream on the continental shelf. This may potentially lead to a penetration of CDW up to the grounding line with consequences for grounding line melt, hence ice flow acceleration as observed on their West-Antarctic counterparts.