Changes of CDW on the Amundsen Sea Shelf as a major cause for Ice Sheet melt

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From February to March 2010 a joint geophysical and oceanographic German expedition with RV Polarstern into the Amundsen Sea will provide an important contribution to the long-term monitoring of CDW characteristics on the Amundsen Sea continental shelf, continuously conducted by colleagues in the US (LDEO) and UK (BAS), as part of the international ASEP (Amundsen Sea Embayment Project). For the Amundsen Sea it is entirely plausible that ocean influence on the WAIS (West-Antarctic Ice Sheet) could increase from changes in ocean temperature, heat transport and vertical thermohaline structure, in response to altered atmospheric forcing, sea ice production, and ice shelf morphology. Previous work has revealed that the 'warm,' salty CDW gains access to the continental shelf near the sea floor, particularly in the eastern sector, and ponds in glacially scoured troughs that extend deep beneath the ice shelves. The oceanic heat drives basal ice shelf melting rates orders of magnitude faster than beneath the largest ice shelves. Substantial thermohaline variability is apparent in some of the repeated late summer observations, but little is yet known about the seasonal cycle or interannual variability. Heat transport from the continental shelf break to the ice shelf caverns may be influenced by mixing over the rough bottom topography, tidal currents, winds, sea ice production, icebergs, and meltwater impacts on the pycnocline. The talk will focus on first results form CTD measurements conducted during the just finished cruise and the comparison with previous hydrographic data.