Numerical modeling of ocean circulation over the continental shelf and beneath the ice shelves in the Amundsen Sea, Antarctica

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Using a 3-D numerical model, we investigate the hydrography and circulation of ocean waters overlying the continental shelf in the Amundsen Sea. The goal of this study is to better understand processes which govern the temporal and spatial distribution of 'warm' circumpolar deep water (CDW) on the continental shelf, and its derivatives. That deep water, abundant off-shelf, migrates onto the continental shelf and subsequently beneath the floating ice shelves that drape most of the coastline in this sector. This leads to extensive basal melting, which may be negatively impacting the mass balance of the West Antarctic Ice Sheet. We employ a coupled isopycnic ocean, dynamic-thermodynamic sea ice, and thermodynamic ice-shelf model, along with daily varying atmospheric forcing and available bathymetry, to simulate the pathways and properties of waters on the continental shelf. We compare model simulations to ocean observations taken in the area since
1993.