Comparisons of Circumpolar Deep Water variability in the Amundsen Sea between simulations and observations

Taewook Park, Tae-Wan Kim, Kyoung-Ho Cho, SangHoon Lee Korea Polar Research Institute, Incheon 406-840, South Korea

Yoshihiro Nakayama, Dimitris Menemenlis Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, USA

Pierre Dutrieux

Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, USA

Outlet glaciers of the Amundsen Sea Embayment (ASE), West Antarctica, have thinned over recent decades. Circumpolar Deep Water (CDW) originated from Antarctic Circumpolar Current is responsible for the thinning due to basal melting beneath ice shelves in the ASE. Observations based on mooring stations as well as hydrographic survey during the past decade have revealed that CDW intrusion into the ASE shows large year-to-year variations. In this preliminary study on cross-shelf and on-shelf processes, we validate a simulation (2001-2016) of a high-resolution MITgcm ocean model that allows ice shelf-ocean interaction, by comparing with observational data including a recent Araon expedition. Also, we find that zonal wind at the shelf edge can contribute to CDW intrusion from analysis of Mercator-Ocean re-analysis data (1993–2015), thereby delivering more heat into the ASE; however, oceanic responses to local forcing could be underestimated because of a low horizontal resolution and no ice shelf-ocean interaction in the cavity.