Geophysical Research Abstracts
Vol. 20, EGU2018-12404, 2018
EGU General Assembly 2018

Eddy properties and dynamics in the Fram Strait

Claudia Wekerle (1), Tore Hattermann (1,2), Laura Crews (3), Qiang Wang (1), Sergey Danilov (1,4)

(1) Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Climate Dynamics, Bremerhaven, Germany (claudia.wekerle@awi.de), (2) Akvaplan-Niva, Tromsø, Norway, (3) Norwegian Polar Institute, Tromsø, Norway, (4) Jacobs University Bremen, Bremen, Germany

The Fram Strait is the deepest and widest gateway connecting the Arctic Ocean with the Nordic Seas and thereby the North Atlantic. The exchange of water masses through this gateway, via the West Spitsbergen Current (WSC) and the East Greenland Current (EGC), is impacted by eddies. They are shed from the WSC, and thus contribute to the recirculation of Atlantic Water (AW) carried by the WSC. Advection of warm AW by eddies underneath sea ice contributes to ice melting.

The Rossby radius of deformation (which scales with the size of eddies) in the Fram Strait is small (around 4-6 km), requiring high mesh resolution in ocean models. Recently, two ocean model configurations at eddy-resolving scale, ROMS S800 and FESOM_1km, were shown to well represent the observed mean state and variability in the Fram Strait. In this study, we apply an eddy tracking algorithm to the output of the two models in order to identify eddies and investigate their properties. In particular, slightly more cyclones than anti-cyclones are identified in both models in the Fram Strait. Furthermore, we analyze their size, generation sites, lifetime, vertical extent and drift patterns. Generation mechanisms of eddies and their effect on the mean state in both models are investigated as well.

Our approach is particularly valuable since small deformation radii and the presence of sea ice hamper the investigation of eddy properties from satellite altimetry in this region. Despite their different architecture, both models show similar eddy statistics, providing valuable tools to gain insight into eddy properties and dynamics in the Fram Strait.