

A deeper look into the Lofoten basin and its importance to Atlantic Meridional Overturning Circulation

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Lofoten Basin, the largest heat reservoir in the Nordic Seas, plays an important role in the Atlantic Meridional Overturning Circulation (AMOC) primarily due to large winter heat loss and water mass transformation. The present study using a suite of satellite derived and long term (1948-2008) hydrographic data shows signatures of a branch of Norwegian Atlantic Current (NwAC) entering the central Lofoten Basin. This branch (referred here as Central branch of NwAC) plays an important role in the eddy activity and biological productivity of the basin. This current and its associated front appears to act as a barrier between the eastern and western parts of the Lofoten Basin and is likely to prevent the warm Atlantic waters of the slope current and the fresh coastal waters from entering the western Lofoten Basin, thereby influencing dense water formation and thus plays an important role in the AMOC. Further, we show that the large anticyclonic vortex of the western Lofoten basin is one of the major winter convection sites in the Nordic seas and is contributed mainly by the mesoscale eddies generated from the central branch of NwAC. A three dimensional, time-split, σ - coordinate Bergen Ocean Model (BOM) is also used to study the large anticyclonic vortex of the Lofoten basin along with the MICOM model results.