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Deep convection in the Lofoten Basin: ARGO vs MITgcm

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The Lofoten basin (the LB) contains relatively warm and salty waters regarding border basins such as Greenland and Barents Seas. Variability of the processes inside occurring in the basin reflects on the climate as on the mesoscales as on the interannual scales. We use a term mixed layer depth (MLD) as a border of the pycnocline in the water column, this parameter lets us evaluate the intensity of the convection in the region. Several methods of MLD calculations are tested in the current study: Kara, Montegut, and Dukhovskoy. The convection in the basin destructs stratification and forms massive intermediate water mass. The MITgcm data for 1993-2012 and over 5000 in-situ Argo T, S profiles for 2001-2017 were used in the calculations of the MLD.

We consider the maximum MLD (mMLD) in the region and its spatial distribution. The mMLD is higher in the central part of the LB and corresponds to the location of the Lofoten basin eddy (the LBE). Here the mMLD reaches 1000 meters, the medium maximum is 400 meters based both on the in-situ and model data. The maximum mixed layer depth varies in the range of 400-1000 meters according to both datasets were used. The MLD over 400 meters is observed from January to May every year.

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