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What can we learn about deep convection in the Labrador Sea using increments of an ocean reanalysis ?

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Labrador Sea Water is formed by deep convection caused by strong surface cooling (Yashayaev et al., 2009). The convection patch reaches as deep as 2000∼m, but is limited to areas where adequat preconditionning can occur. Indeed, baroclinic eddies that form along the West Greenland boundary current enable the restratification throughout the column (Chanut et al., 2008).

We use the global eddy permitting reanalysis GLORYS1v1 (Ferry et al., 2010), and free regional simulations of NEMO (Madec, 2008) nested in the ocean reanalysis. It is shown that data assimilation enables to better represent the seasonal and interannual variability of deep convection. We use temperature increments from the data assimilation to describe how the ocean model is corrected in the reanalysis. It is shown that data assimilation has the same effects as the expected effects of heat transport by baroclinic eddies that form along the West Greenland boundary current. The effect of data assimilation is compared to existing eddy parametrizations used in coarse ocean models.