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Annual and interannual variability of the Barents Sea water masses and polar front: 1980-2011

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The Barents Sea (BS) is a transition area between the warm and saline Atlantic Waters (AW) and the cold and fresh Arctic Waters (ArW). The BS is characterized by a polar front structure separating AW from ArW. The mixing and cooling of these two water mass generates dense waters in winter. Dense waters are of prior importance because they cascade into the Arctic Ocean to form the Artic Intermediate Waters. This study will use a new hydrographic data set fulfilled by recent stations in the Russian area and a 3D model coupled with atmosphere and ice as a back up to investigate the link between fronts and water masses, as well as their variability over the last 30 years. This study suggests that the polar front structure is composed of two branches and that the dense waters are found in between. The BS, especially in the East, is experiencing an “Atlantification” accompanied with a drastic sea ice decline. These changes, amplified during the last decade, shift the southern branch of the polar front structure in the Norh-East direction and affect negatively the dense water formation. This could have major impacts on the Arctic Ocean ventilation and primary production.