



## **Transformation of Atlantic Water in the Nansen Basin of the Arctic Ocean**

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The joint analysis of recent hydrographic observations and high resolution numerical modelling is presented for the segment of the boundary current between Fram Strait and the Lomonosov Ridge in the Nansen Basin of the Arctic Ocean. The process of the Fram Strait branch of Atlantic Water (FAW) transformation on this route is in the focus of this study. Two specific regions are distinguished, where fast transformation of FAW occurs. The first region is located between northern Svalbard and Franz Joseph Land. This is the place where eastward flow of warm and salty FAW encounters pack ice, which moves towards Fram Strait. Intensive ocean-ice-air interaction leads to rapid heat and salt loss from the upper part of FAW, resulting in formation of surface mixed layer and isolation of the warm FAW core from further direct contact with atmosphere. The second crucial region of FAW transformation is located around Severnaya Zemlya Archipelago. In this region deep warm core of FAW rapidly loses heat and salt as a result of intensive vertical and lateral mixing with the Barents Sea AW branch (BAW), which enters the Nansen Basin through St. Anna Trough, submerges the warm core of FAW and pushes it seaward. Dense water, originating on the north-western shelf of the Laptev Sea, cascades down continental slope and also contributes to cooling and freshening of FAW on its way along the Laptev Sea continental margin. The end product of the transformation process in the Laptev Sea is a new water mass, which includes FAW, BAW and shelf water fractions. This water occupies the depth range 200-1000 m. It is characterised by the positive temperature and by the absence of local maxima on salinity vertical profile. Sitting on the continental slope makes this water mass quite mobile and therefore – the major candidate to reach Canadian Basin. This perspective is less likely for the original FAW. In the Laptev Sea this water is detached off the continental margin and is likely to recirculate towards Fram Strait along the Lomonosov Ridge without entering Canada Basin.