

## Peculiarities of the Atlantic Water distribution within the northern parts of the Barents and Kara Seas.

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The Barents Sea (BS) is a key region for modification of water masses in the Arctic. Something like 50 % of the Arctic Ocean winter heat loss occurs in the BS (Serreze et al., 2007). Waters of the Atlantic origin spreading within the BS represents main source of ocean heat of the region. The characteristics of the Atlantic water (AW) penetrating into the BS from the west were investigated from 1900-th (Knipowitsch, 1905). Modern knowledge regarding this matter is essential. This AW undergoes deep transformation, while spread through BS, and inject into the Arctic Basin (AB) just after leaving of the northern-eastern part of BS and passing through northern Kara Sea (KS). There were several estimations after 1993 (Loeng et al., 1993) of AW characteristics close to enter into the AB. The characteristics of the Atlantic derived intermediate water that spreads into the BS and KS from the north (northern Atlantic derived water - NADW) out of the AB are practically unknown though, while the fact of such spreading was known from 1930-th (Mosby, 1938). The main reason of un-investigation is the year round heavy ice conditions within the northern margin of the BS and KS that prevent to ship or drifting camps measurements.

The comprehensive data base of the observed oceanographic stations was used to determine the characteristics of NADW in the vicinity of the northern margins of BS and KS. Routine oceanographic methods were used – T,S analyses, mapping of parameters, and T,S sections constructions. Assumption regarding the movement of Atlantic Derived Waters rather along the right slope of bottom relief was applied in case such waters having close characteristics but flowing in opposite directions through the same section have to be distinguished.

The minimum, middle, and maximum margins of NADW penetration from the AB to the BS as well as the main peculiarities of large-scale circulation of such water were determined for the 1926-2007 after expert analyses of 160 sections (Fig. 1). The area of spreading and possible heat influence of NADW within the BS was found essentially larger that supposed previously. It was determined, in contradictions with previously published opinions, that NADW newer spread so far to the east to observe close Barents-Kara Seas margin situated between

the Franz-Joseph Land archipelago and Novaya Zemlia island.

It was determined that NADW flow generally along the right slope of the St. Anna Trough while enter into the KS from AB. NADW here can reach, but in case very warm year only, the Barents-Kara Seas margin between northernmost point of Novaya Zemlia and Franz-Joseph Land. NADW flowing to the west from the KS newer cross 200 m isobath and have not an influence of BS hydrology thereby.

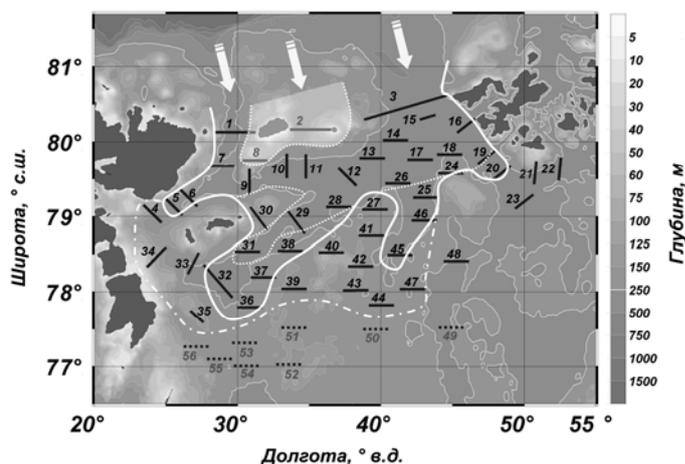


Fig.1 Map of minimum (white dots), middle (solid white line), and maximum (white dot-dashed line) area of NADW within the northern Barents Sea during 1926 -2007. Arrows indicate directions of NADW spreading from the Arctic Basin. Black lines with black numbers as well as black dots with grey numbers – positions of oceanographic sections where NADW were looked for. Dotes with grey number represent the sections where Atlantic water from south-west was observed. Every section on the map were carried out from 1 to tens times during the period of observations. Bottom relief present as shadows of grey, while 250-m isobatic curve represent as white line.

### Reference:

- Knipowitsch, *Transactions on Hydrography and Marine Meteorology*, 33, pp.289-308, 1905.
- Loeng et al., *ICES Statutory Meeting*, 22p, 1993.
- Mosby, *Geofysiske Publikasjoner*, 12(4), pp 1-85, 1938.
- Serreze et al., *J. Geophys. Res.*, 112, D11122, 2007.