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The distinctive features of the North Atlantic Deep Water components origin, structure and propagation in the Atlantic Ocean

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The main task of the research is to determine the origin and the pathways of the North Atlantic Deep Water (NADW) components in the Atlantic Ocean. There are some conceptions about the NADW structure. Classical concept [Wust, 1935] proposed that the NADW consists of 3 components: upper, middle and lower waters. From another point of view, which is based on CFC's distribution [Rhein et al., 1995], the NADW should be divided into 4 parts: the shallow upper water (SUNADW), the layer from the Labrador Sea and two lower layers - the old and the overflowing (LNADW-old, OLNADW).
During this work the structure of NADW including 4 layers was redefined and described more accurately with the use of detecting T,S maximal vertical gradients, in a counterbalance to both aforesaid conceptions. Each component has a strong MIW (Mediterranean Intermediate Water) influence. It was marked out that UNADW1 (upper) and UNADW2 had the similar structure but consisted of various AAIW (Antarctic Intermediate water), Mediterranean and Labrador water mass contribution. MNADW (middle part) is mostly occupied by ISOW (Island-Scotland Overflow Water), MIW and propagates to the South Atlantic from Cabo Verde and Sierra-Leone Basins. LNADW (lower) corresponds to DSOW (Denmark Strait Overflow Water) and also to MIW and AABW (Antarctic Bottom Water).
The use of optimal multiparameter water mass analysis [Tomczak, 2003] in common with the classical methods improves the evidence and gives additional conclusions of the deep water mass origin in Atlantic Ocean. Schemes of propagation of each component in South Atlantic are demonstrated in the work. The research was made under supporting by President of Russian Federation grant № MK-980.2011.5 and Russian Ministry of education and science (GK №P1147).