



Structure of the shelf and slope waters of the Antarctic Seas

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The main objective of present work is to consider characteristics of shelf and slope waters in the Commonwealth, Ross, Amundson and Bellingshausen Seas. Data of Russian surveys led during the Antarctic summer of 2006 – 2014 on RV “Academic Fedorov” and “Academic Treshnikov” was analyzed. Distribution of temperature, salinity, dissolved oxygen, silicate, phosphates and nitrates in the water masses of the Commonwealth and Amundsen seas was shown. Significant differences in the structures of the shelf and slope waters of the seas were observed.

A water structure at the oceanological sections of the Commonwealth Sea was constituted by the Antarctic Surface Water (AASW) with enough high concentration of silicate, nitrate nitrogen and phosphates compare with other areas of the World Ocean; the Upper Circumpolar Deep Water (UCDW) characterized by a minimum of the oxygen content, and a maximum of nutrient concentrations; The Lower Circumpolar Deep Water (LCDW) primary characterized by a salinity maximum and a minimum of nutritive salts as well; and the Antarctic Bottom water (AABW). It was shown that the local cold, salt and dense Antarctic Shelf water (ASW) formed in the shelf area of the Commonwealth Sea. The characteristics of ASW were defined. The ASW mixed with the CDW and their mixture (The Bottom Water of the Prydz Bay (BWPB)) moved down along the slope, and reached the bottom. The characteristics of the BWPB were analyzed. The BWPB was defined by higher content of dissolved oxygen (more 5.5 ml/l) and lower contents of biogenic elements (silicon - low 120 μ , phosphates – low 2.35 μ and nitrates – low 29 μ) in the bottom layer at the slope compared with the Circumpolar Deep Water (CDW) characteristics. Interannual variability of characteristics of the water masses was observed on the repeated oceanological section along 70° E in the Commonwealth Sea. It was shown that characteristics and structure of the BWPB undergo appreciable changes year by year. The coldest ($-1,5^{\circ}$) and less salted (34,54‰ BWPB was observed in 2005, and in 2006 the temperature and salinity of this water were increased ($-0,6^{\circ}$; 34,60‰ – 34,63‰, and the thickness of a layer was much less. In 2007 as capacity of the BWPB layer, and its thermohaline characteristics ($-1,2^{\circ}\text{C}$, 34,56‰ have shown again active moving down near to a bottom of the Antarctic continental slope.

A water structure at the oceanological sections in the eastern Ross, Amundson and Bellingshausen Seas was constituted by the two basic water masses – the AASW and the CDW. The CDW was presented by the UCDW and LCDW. The characteristics of the UCDW and the LCDW were defined. A significant difference of the structures of these seas from the Commonwealth Sea is a free entrance to the shelf area of the CDW therefore formation of the Antarctic Shelf Water here was represented impossible.