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Antarctic Bottom Water in the Scotia Sea

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Quantity properties and circulation of Antarctic Bottom Water (AABW) in the Scotia Sea are investigated using the climate data (Gouretski, Koltermann, 2004), the historical hydrographic data (database WODB2005), and the data of the modern expeditions which were carried out onboard Russian research vessels «Akademik Sergey Vavilov» and «Akademik Ioffe» in December 2003, November 2005, and November 2007. The investigation is based on the original procedure for determination of boundaries between water masses. It is shown that AABW are effectively transferred across the Antarctic Circumpolar Current (ACC) from the regions on the south flank of this current where AABW penetrates into the Scotia Sea. This transfer results in the abyssal water cooling and freshening in the Yaghan Basin, north Scotia Sea. Some rises and depressions in the bottom topography of the western and northern Scotia Sea are important features which impact the AABW transfer. It is shown that additional pathway exists for AABW transport to the north passing through the western Scotia Sea. The existence of the quasi-isolated cyclonic abyssal water circulation in the South Shetland Trench and the westward transport of Atlantic AABW along the Antarctic slope foot into the Pacific are proved.