Atlas of the Arctic Ocean for 2007-2010: the new legacy of the IPY initiative

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The development of a hydrophysical database of temperature and salinity in the Arctic Ocean measured during 2007-2009 and the development of a hydrophysical atlas of the Arctic Ocean based on this dataset is funded and realized in the frame of the Sustaining Arctic Observing Networks program.

More than 36,000 CTD and XBT/XCTD stations carried out in the Arctic region in 2007-2010 were acquired, processed, and assembled into an integrated data base. These data include temperature and salinity profiles delivered by different organizations in US, Russia, Germany, Norway and other contributors. The integrated data base has been used to produce mean temperature and salinity fields for summer and winter periods, and to estimate some substantial recent quantities of the Arctic Ocean thermohaline state (the freshwater and heat content, Atlantic water thickness and temperatures, properties of Pacific water layer etc.) and their anomalies related to the mean climatic values. All data were carefully examined to skip unreliable salinity and temperature records.

The DIVA (Data-Interpolating Variational Analysis) method is chosen as an optimal interpolation method to generate the maps of spatial distribution of temperature and salinity taking into account the coastlines. With the modification of the Optimal Interpolation method, DIVA also calculates the error fields which are an essential part of the product quality in case there is sparse data coverage in the high latitudes of the Arctic Ocean. All quantities are estimated and presented in the spatial grid of 50x50 km.