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Circulation and thermohaline structure of the Aral Sea in the last three years

A.S. Izhitskiy and P.O. Zavialov
Shirshov Institute of Oceanology, Moscow, Russian Federation (gil-gelad@mail.ru)

The results of the 3 latest expeditions (2009 - 2011) of the Shirshov Institute to the Aral Sea are reported. We analyze the interannual variability of the basin circulation together with the thermohaline structure in order to identify the underlying mechanisms.
The study is based on the results of the field surveys of August, 2009, September, 2010, and November, 2011. The vertical profiles of temperature and salinity were obtained using a CTD profiler at 6 stations across the deepest part of the western basin in 2009 and 2010, and 3 stations in 2011. Additionally, during each of the surveys, mooring stations equipped with current meters and pressure gauges were deployed for 3-5 days in the deepest portion of the western basin. A portable automatic meteorological station, continuously recording the wind stress and the principal meteorological parameters, was installed near the mooring sites.
The vertical stratification exhibited a 3-layered pattern, with local salinity maxima in the upper mixed layer and near the bottom, while the intermediate layer was characterized by a core of minimum salinity and temperature. Such a pattern persisted throughout the 3 years of observations.
Analysis of the current measurements data along with the meteorological data records demonstrated that the mean basin-scale surface circulation of the Large Aral Sea is likely to have remained anticyclonic, whilst the near-bottom circulation appears to be cyclonic. The current velocity and level anomalies responded energetically to winds. Correlation analysis of the velocity and surface level series versus the wind stress allowed to quantify the response of the system to the wind forcing as well as to formulate a conceptual scheme of the lake's response to wind forcing at synoptic temporal scales.