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The continuing tale of the dying Aral Sea: Recent developments

P.Zavialov and V.Zhurbas
Shirshov Institute of Oceanology, Moscow, Russia, peter@ocean.ru

A new, 8th field survey of the Aral Sea was conducted by Shirshov Institute in November, 2007. This time, the spatial coverage of the measurements was confined to the central part of the western basin, i.e., the deepest portion. A continuing salinity build-up was documented. At the surface, the salinity increased by 8 g/kg over the last 14 months, and 35 g/kg (or 43%) over the last 5 years since the beginning of instrumental observations in 2002. At the present time, the surface salinity spans around 117 g/kg. Below the depth 30 m, a sharp halocline was observed. In the halocline, the salinity increased downwards by over 1 g/kg per meter. In the bottom layer, hydrogen sulfide was once again detected, but only at low concentrations. The persisting salinity stratification in the bottom layer suggests that the advection of the eastern basin water into the western basin is still underway and continues playing an important role, despite the narrowing of the strait connecting the two basins accompanying the continuing lake level drop. Direct geodesic leveling yielded the following lake level standing: 29.18 m above the ocean level. This implies a drop by 42 cm over the last 14 months, and 129 cm over the last 5 years. Numerical simulations of the Aral Sea's circulation under a variety of wind forcing conditions were continued in 2007. The numerical model used was based on the well-known Princeton Ocean Model (POM). The model simulated rather reasonably the advection of saltier waters from the eastern basin into the western basin and the propagation of dense water in the bottom layer. Under easterly winds, a weak westward zonal transport develops, while in the western basin, especially near its southern shores, local jet currents of upwelling origin develop at relatively high velocities. Under the conditions of northern wind, the eastern basin is dominated by southward transport. A well-developed southward upwelling-related

jet forms above the eastern slope of the west basin. A noteworthy mesoscale feature is a quasi-stationary anticyclonic eddy in the northern part of the western basin. It is interesting that the southern winds generate a similar, but cyclonic eddy at the same location. The short-period variability of the currents and the lake level was investigated based on the data from a mooring station deployed during the preceding, 7th expedition (initial stages of this work were partly addressed in the last year's report, but in 2007, we finalized more detailed analysis). We demonstrate that the internal waves play an important role in the dynamics of the western basin. An oscillation with a period of about 48 hrs was identified and we showed that this oscillation may correspond to an internal seiches at the interface between the subsurface and the bottom layers.