



Modeling the drying of the Aral Sea basin

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The Aral Sea is located in Central Asia on the territories of the republics of Kazakhstan and Uzbekistan. In the 60s of the XX century the Aral Sea was the fourth out of the biggest lakes all over the world. At that time its area amounted to 68478 km², and water capacity in the sea came to 1093 km³ (in 1960th year). Since then the sea level lowered dramatically from its maximum point of 53.5 absolute meter. The lowering occurred with rates between 0.12-0.45 – 1.17 m/year. At present the sea water surface (Big sea) shrank down to 19000 km² what is approximately only 28 % of the initial sea water surface area.

Within the international EU-INTAS project ‘Study of the Groundwater Contribution to the Aral Sea Region Water Supply and Water Quality: Strategies for Reversibility and Pollution Control’, a 3-d hydrodynamic model of the Aral Sea lake has been developed to provide a tool for management groundwater resources in the Aral Sea region. An interactive wetting and drying scheme has been implemented in the model to simulate the dramatic volume and surface area changes and their consequences for the Aral Sea water budget. The model was successfully used to hindcast observed sea level decrease and surface area changes on a multi-year to decadal time scale. Simulated evaporation from the regional Aral Sea model were compared to evaporation estimated from ECMWF re-analysis. The simulated evaporation was found to result in significantly improved volume budgets for the Aral Sea and in realistic predictions of the shrinking of the Aral Sea basin.