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The article presents the results of hydrodynamic modeling of sea level fluctuations in the Caspian Sea using the ADCIRC model for the period from 1979 to 2017. Surges are simulated using an irregular triangulation computational grid with a changing cell size, that easily adapts to changes in shoreline and depth and, therefore, more accurately describes coastal zones.

It is found that the seasonal variability of surges is characterized by a maximum in winter and spring and by a minimum in summer. On the western coast of the North Caspian Sea, the maximum sea-level fluctuations are observed in December-February, and on the northern and eastern coasts – in February and March. The areas of inundation of the coastal territory of the Russian sector of the sea are identified. For the surge on March 12–16, 1995, that was one of the most catastrophic ones in terms of its consequences, the inundation area made up 53% of the possible flooded area, and the inundation area for the surge registered on March 27–April 1, 2015 made up 71 %. The more severe consequences of the surge in 1995 are associated with the fact that the mean annual sea level, that determines the possible flooded area, in 1995 was much higher than in 2015.

Keywords: ADCIRC, Caspian Sea, unstructured grid, storm surge, sea level, numerical modeling

Fig. 11. Ref. 15.