



Modeling the Caspian Sea and its catchment area using a coupled regional atmosphere-ocean model (RegCM-ROMS): model design and preliminary results

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We describe the development of a coupled regional atmosphere-ocean model (RegCM-ROMS) and its implementation over the Caspian Sea basin. The coupled model is run for the period 1999–2008 (after a spin up of 4 yr) and it is compared to corresponding stand alone model simulations and a simulation in which a distributed 1d lake model is run for the Caspian Sea. All model versions show a good performance in reproducing the climatology of the Caspian Sea basin, with relatively minor differences across them. The coupled ROMS produces realistic, although somewhat overestimated, lake surface temperatures (LSTs), with a considerable improvement compared to the use of the simpler coupled lake model. Simulated near surface salinity and sea currents are also realistic, although the upwelling over the eastern coastal regions is underestimated. The distribution of sea ice over the shallow northern shelf of the Caspian Sea and its seasonal evolution are well reproduced. ROMS also calculates the Caspian Sea Level (CSL), showing that for the present experiment excessive evaporation over the lake area leads to a drift in estimated CSL. Despite this problem which requires further analysis due to many uncertainties in the estimation of CSL, overall the coupled RegCM-ROMS system shows encouraging results in reproducing both the climatology of the region and the basic characteristics of the Caspian Sea.