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Evaluation of air-sea exchange over Black Sea from a regional climate simulation

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Studies on the quality of the atmospheric input forcing fields used in oceanic models which are currently available for Black Sea area, showed that local observational datasets are too sparse in time and space to form any realistic climatologies. The reanalysis datasets (e.g. ERA produced by ECMWF) provide promising validation estimates of climatic characteristics against the ones in available climatic data (Schrum et al, 2001), while cannot reproduce some local features due to relatively coarse horizontal resolution. One viable alternative may be provided by numerical simulations embedded in regional climate models. Nevertheless, the performance of the model employed over the selected area, with respect to variables used as input for ocean circulation models, has to be evaluated first.

The aim of the paper is to assess the potential of regional climate model RegCM to be used for providing atmospheric forcing for ocean models applied on Black Sea, as well as to explore the added value of the model compared to the input (reanalysis) data.

To this end, we perform a climate simulation experiment at a horizontal resolution of 20 km using ERA-INTERIM fields as the initial and lateral boundaries conditions, encompassing the period 2000-2009. The results are analysed and seasonal and annual scales with respect to several parameters related to air-sea interaction processes: precipitation, evaporation, sensible heat flux, air temperature and humidity, wind speed at the surface. The model is evaluated against available climatological estimates found in literature, as well using satellite data (e.g. QuikScat, ATOVS) for the period considered. A good agreement is found for surface wind speed, where the basin mean values agree well with reference data employed. The air temperature is generally overestimated; precipitation is quantitatively underestimated, but the spatial pattern is well reproduced, with higher values in the eastern basin.

Reference:
Schrum, C., Staneva, J., Stanev, E. and Ozsoy, E., 2001: Air-sea exchange in the Black Sea estimated from atmospheric analysis for the period 1979-1993, J. Marine Systems, 31, 3-19