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Atmospheric forcing and Sea Surface Temperature response in the Gulf of Cadiz-Alboran Sea system in a 20 years simulation

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In the frame of MedEX ("Inter-basin exchange in the changing Mediterranean Sea") Project a 20 years (1989-2008) simulation at 2km resolution covering Gulf of Cadiz and Alboran Sea, forced by 9 km winds (WRF downscaling of ERA-Interim reanalysis), is analyzed and compared with observations.

Statistical methods, EOF techniques and two harmonic (including annual and semi-annual frequencies) data fit were performed for the analysis. Modeled SST fields are also compared with long-term (1996-2008) in-situ buoy observations provided by Puertos del Estado (Spain) and satellite derived Pathfinder SST database.

Model SSTs generally follow observations data at annual and inter-annual scales with a global error not exceeding 0.17°C (model warmer than SST).

No significant warming tendency was observed in both basins during the 20 years and the Interanual variability dominates, with the series showing a cooling period from 1991 to 1993 followed by a warming period started from 1994. In particular we show that SST cooling observed in the early 1990's in the Gulf of Cadiz – Alboran system is associated with the 1991 catastrophic eruption of Pinatubo volcano (Philippines).