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Climate influence on the North West African fisheries: a large-scale perspective

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There are still many questions about the environmental forcings on marine biological ecosystems that need to be addressed. Of special relevance are those associated with the so-called Eastern Boundary Upwelling Systems (EBUS) due to their great climatic and socio-economic importance, being the latter specially crucial for some regions along the globe such as the North West African region (hereinafter NW Africa). In this study, some possible teleconnections involving large-scale climatic phenomena and the small pelagic fishes dynamics in the NW Africa, have been addressed. These possible teleconnections would be interesting on its own, but those associated with the Sea Surface Temperature (SST) processes are of special importance, since they could noticeably contribute to the development of a seasonal prediction system of fisheries.

To this aim, we have used data provided by the couple model compounded by the Regional Oceanic Modeling System ROMS configured for the NW African upwelling system and by the biogeochemical model PISCES, which simulates plankton productivity and carbon biomass based upon the main nutrients. This coupled model has been run over the period 1980-2009 using interannual atmospheric forcings and consistent oceanic boundary conditions (from NCEP Climate Forecast System Reanalysis). Finally, an evolutionary individual-based Lagrangian model has been used to simulate the spatio-temporal behavior of the small pelagic fishes, at different stages, according to the environmental constraints obtained from ROMS.

The results obtained, though preliminary, point out that the well known El Niño-Southern Oscillation variability mode (ENSO) could act as a possible large-scale climatic forcing of the NW African fishes, which could open a window of opportunity for the development of an effective seasonal prediction system in the aforementioned region.