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Tracking eddy properties within a regional model of the Southern Africa basin

A. M. Doglioli, B. Blanke, S. Speich

Laboratoire de Physique des Océans, Université de Bretagne Occidentale, 6 avenue Le Gorgeu - C.S. 93837, 29238 Brest Cedex 3, France.
(doglioli@univ-brest.fr, blanke@univ-brest.fr, speich@univ-brest.fr)

Eulerian and Lagrangian observations, satellite data and numerical model have already shown the complexity of the regime of turbulent interocean exchange between the Indian and the Atlantic, upstream and within the Cape Basin. Rings and eddies pinch off from the Agulhas retroflection, before they penetrate the Atlantic after interaction with the Agulhas Current and its retroflection, and with neighboring mesoscale structures. They are thought to impact the dynamics and variability of the South Benguela upwelling system, which represents one of the richest ecosystems and a major fishing area in the world.
Satellite measurements allow rough transport estimates achieved by the eddy field, but gaps in knowledge of the full 3D identity of these structures are handicaps that prevent more accurate diagnostics being derived. On the other hand, the Lagrangian analysis of eddies simulated by regional ocean models offers promising bases for the development of more robust estimates of the propagation or conservation of eddy properties.
The analyzed numerical simulations have been performed with the ROMS model (for the regional RIBA configuration developed by P. Penven and S. Speich with a 1/10° horizontal resolution), that is able to represent the crucial properties of the Southern Africa Basin eddy field. Calculations based on a Wavelet Analysis (G. Lapeyre) and on the application of the Okubo-Weiss criterion were used to identify coherent eddies structures and to follow water mass properties along their tracks. The results are here discussed mostly in terms of temperature and salinity temporal evolution, and are compared, where possible, with relevant observations.