Geophysical Research Abstracts
Vol. 20, EGU2018-15307, 2018
EGU General Assembly 2018

Structure and Dynamics of Surface eddies in the Arabian Sea

Adam Ayouche (1), Xavier Carton (1), Mathieu Morvan (1), Alexandre Stegner (2), and Briac Le Vu (2)

(1) UBO, Ifremer, CNRS, IRD, UMR6523 Laboratoire d'Oce´anographie Physique et Spatiale (LOPS), IUEM, F-29280, Plouzane´, France (adam.ayouche@ensta-bretagne.org), (2) Ecole Polytechnique, Palaiseau 91128, France. Laboratoire de Météorologie Dynamique (LMD / CNRS)

The Arabian Sea and Marginal Seas (AMS), the northern part of the Indian Ocean, show a strong eddy activity as revealed by satellite observations and by high-resolution HYCOM (primitive equation) model simulations. The 3D structures of the AMS mesoscale eddies and their lifecycles, including the generation and decaying processes, have been studied over the years, but still require further investigation.
Using a vortex identification and tracking algorithm, AMEDA, based on angular momentum and using also Okubo Weiss calculations, applied to high-resolution altimetric data (1/8th degree resolution), we identify all vortices in the Arabian Sea, Sea of Oman and Gulf of Aden, which live longer than a month. We compute their characteristics (amplitude, radius) and compare them with historical data. Moreover, we identify their formation region and propose a mechanism for this formation.
Then, we analyze their evolution, strengthening or dissipation by (i) their interactions with the wind curl or (ii) the vortex-vortex interactions. We apply the same method to high-resolution primitive equation model output (5 km resolution over the whole area where Rd=55km), and particularly the SSH. We compare statistically our results with those obtained with AVISO altimetry.
Furthermore, we use the information over the whole fluid column to study the origin of Rossby waves in the entrance of the Gulf of Aden, the East Arabian Current. Finally, we study the Ras Al Hadd dipole characteristics using AMEDA outputs and its vertical structure using HYCOM outputs.