Mesoscale and Submesoscale Structures in the Arabian Sea

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The Arabian Sea experiences strong eddy activity from June to September as a response to the strong low-level winds associated with the southwest monsoon season. To better understand the characteristics, development, and propagation of eddies in the Arabian Sea, we spatially and temporally analyze satellite-derived sea surface height (SSH) in conjunction with sea surface salinity (SSS), sea surface temperature (SST), and mixed layer depth. Improved understanding of the mesoscale and submesocale dynamics of the Arabian Sea region paves the way for the application of high-resolution (~100 m) data such as that collected by the jointly developed NASA-CNES (in partnership with CSA and UKSA) Surface Water and Ocean Topography (SWOT) mission, particularly in coastal regions where currently available merged multi-mission altimetric measurements suffer from biases due to coastal processes. Particular emphasis is given to notable annual features such as the Great Whirl (GW) and Lakshadweep Low (LL) in terms of radius, amplitude, eddy kinetic energy (EKE), propagation, and dissipation. The additional value provided by SST and SSS filaments is insight into the local influence of horizontal advection on the physical characteristics of the Arabian Sea and dynamics of coastal eddy development in upwelling regions.