Recipe for synergetic analyses of satellite data of the greater Agulhas Current regime

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Satellite based observations of sea surface temperature (SST), ocean color (OC) and surface roughness often unveil very rich expressions of signatures at scales ranging from 1 to 50 km. These include surface flow pattern and characteristics associated with meandering frontal zones, jets, eddies, upwelling zones, filaments and internal waves. Hitherto the challenge has been to transform these abundant signatures into consistent oceanographic quantities and dynamic processes.

As revealed from a recent set of nearly contemporaneous IR/optical and high resolution synthetic aperture radar (SAR) images of the greater Agulhas Current regime striking complementary manifestation of fronts and eddies are found. Distinct sea surface temperature frontal patterns coincide with localized intense sea surface roughness variations manifested in both the radar backscatter and the sun-glitter. Supported by simulations it is apparent that these surface roughness anomalies correspond to zones predominantly influenced by divergence and convergence.

In this presentation we will demonstrate how such satellite based synergetic approach potentially may open up the ability to transform 2-D maps of mesoscale and sub-mesoscale surface features into 3-D quantitative characterization of the upper ocean dynamics.