



## **Comparison of remotely sensed chlorophyll and Lagrangian Coherent Structures for velocity field validation**

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We present a tool for daily validation of modeled or satellite derived velocity fields in the southeastern region of the Mediterranean. Within this tool, spatial patterns of Lagrangian Coherent Structures (LCS) derived from the velocity field are compared to distribution patterns of satellite derived surface chlorophyll. This comparison is advantageous to pollution spread predictions since it compares the location of fronts in passive tracer spread. The suggested methodology is based on Lagrangian tools that were shown to be very effective in reconstructing the specific effect of horizontal stirring on individual oceanic patterns. Lagrangian techniques are based, in general, on the identification of the velocity field characteristics along particle trajectories. They are well suited for diagnosing properties of tracers like chlorophyll, since they allow to quantify the dynamical properties experienced by a parcel of water during its motion. The Lagrangian diagnostics performed in this tool are based on analyzing the spatial structure of LCS from calculation of finite size Lyapunov exponents (FSLE). These LCS induce in advected tracer fields filament patterns with typical length in the range of 10 - 100 km and lifetime in the range of days/weeks (though it can be much longer if the patterns are associated to long-lived and energetic mesoscale features with low temporal variability). Since LCS represent transport barriers and tracer boundaries, they separate between water bodies with possibly different physical - biogeochemical properties. Daily analyses ( available online at <http://isramar.ocean.org.il/isramar2009/cosem/fsle.aspx> ) of LCS is performed on AVISO altimetry derived velocity fields and on operational numerical circulation forecasts, which are produced as part of the South Eastern Levantine Israeli Prediction System (SELIPS). The LCS analyses are then placed atop maps of surface Chlorophyll concentrations, which is provided within the MyOcean project. A subjective scoring criteria for the fit quality is formulated and implemented for a year of validating circulation estimates in the southeastern Levantine.