

The Lagrangian description of aperiodic flows: applications in geophysical flows

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Abstract

We use several recently developed Lagrangian tools for describing transport in general aperiodic flows. In our approach the first step is based in a Lagrangian descriptor (the so called function M , introduced in Refs. [1,2]). It measures the length of particle trajectories on the ocean surface over a given interval of time. We describe its output over satellite altimetry data on the Kuroshio current. The technique is combined with the direct computation of manifolds of Distinguished Hyperbolic trajectories and a very detailed description of transport is achieved across an eddy and a jet on the Kuroshio current [3,4].

A second velocity data set is examined with the M function tool. The data is obtained from the HYCOM project on the Gulf of Mexico during the time of the oil-spill. We have identified underlying Lagrangian structures and dynamics.

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