



Geodesic Detection of Lagrangian Transport Barriers

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Lagrangian transport barriers can be viewed as optimal material skeletons for observed tracer patterns.

This idea leads to a variational problem whose solution forms the basis of the recent theory of geodesic transport barriers. This geodesic theory enables the computation of hyperbolic barriers (stable and unstable manifolds), elliptic barriers (Lagrangian eddy boundaries), and parabolic barriers (Lagrangian jet cores) as parametrized curves in two-dimensional, finite-time velocity data sets. We show applications to numerical and observational geophysical flow data.