

Lagrangian Coherent Structures in three-dimensional flows

Joao B. Bettencourt, Cristóbal López, Emilio Hernández-García*
IFISC, Instituto de Física Interdisciplinar y Sistemas Complejos
CSIC-Universidad de las Islas Baleares 07122-Palma (Mallorca)

Coherent Structures are known to drive biological dynamics, from plankton to top predators, thus it is very important to be able to characterize them in realistic three dimensional flows. The FSLE is a measure of particle dispersion in fluid flows and the ridges of this scalar field locate regions of the velocity field where strong exponential separation between particles occur. These regions are referred to as Lagrangian Coherent Structures (LCS). We have identified LCS in two different 3d flows: a canonical turbulent velocity field that is the turbulent

flow between two parallel stationary plates driven by a pressure gradient in the mean flow direction and a primitive equation model (ROMS) simulation of the oceanic flow in the Benguela region¹.

* clopez@ifisc.uib-csic.es

¹ J. Bettencourt, C. López, E. Hernández-García, *Ocean Modelling* **51**, 73-83 (2012).