Geophysical Research Abstracts
Vol. 19, EGU2017-19023, 2017
EGU General Assembly 2017

Lagrangian Observations and Modeling of Marine Larvae

Claire B. Paris (1) and Jean-Olivier Irisson (2,3)

(1) Rosenstiel School of Marine and Atmospheric Science, Miami, FL 33149, United States (cparis@rsmas.miami.edu), (2) Sorbonne Universités, UPMC Univ Paris 06, CNRS, France, (3) Laboratoire d'Océanographie de Villefranche (LOV), 06230 Villefranche-sur-Mer, France (irisson@normalesup.org)

Just within the past two decades, studies on the early-life history stages of marine organisms have led to new paradigms in population dynamics. Unlike passive plant seeds that are transported by the wind or by animals, marine larvae have motor and sensory capabilities. As a result, marine larvae have a tremendous capacity to actively influence their dispersal. This is continuously revealed as we develop new techniques to observe larvae in their natural environment and begin to understand their ability to detect cues throughout ontogeny, process the information, and use it to ride ocean currents and navigate their way back home, or to a place like home.

We present innovative in situ and numerical modeling approaches developed to understand the underlying mechanisms of larval transport in the ocean. We describe a novel concept of a Lagrangian platform, the Drifting In Situ Chamber (DISC), designed to observe and quantify complex larval behaviors and their interactions with the pelagic environment. We give a brief history of larval ecology research with the DISC, showing that swimming is directional in most species, guided by cues as diverse as the position of the sun or the underwater soundscape, and even that (unlike humans!) larvae orient better and swim faster when moving as a group. The observed Lagrangian behavior of individual larvae are directly implemented in the Connectivity Modeling System (CMS), an open source Lagrangian tracking application. Simulations help demonstrate the impact that larval behavior has compared to passive Lagrangian trajectories. These methodologies are already the base of exciting findings and are promising tools for documenting and simulating the behavior of other small pelagic organisms, forecasting their migration in a changing ocean.