

Conference Title:

Plankton and hydrographic boundaries: from small-scale density stratification to frontal systems.

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Abstract:

Boundaries can be considered as real or ideal surfaces across which there is an active exchange of matter, energy, and information. The gradient of properties across the boundary allows a dynamic flow (in both directions, but of asymmetric nature) that occurs at multiple spatial and temporal scales, from single cells to ecosystems and from fractions of second to years. At sea, examples of boundaries as places where the gradient of hydrographic properties allow the development of a surface of tension, a place where the components of two systems join and exchange matter, energy (and information) generally coincide with physical singularities like vertical pycnoclines and fronts.

Vertical pycnoclines, while preventing the upward transport of nutrients to illuminated layers, allow the development of deep phytoplankton biomass maxima where there is a compromise between light intensity and nutrient concentration, and they lead to the formation of discrete zooplankton maxima. At larger scales, estuarine systems and fronts maintained by density gradients are boundaries that can keep in contact ecosystems of different characteristics, and where an active exchange not only of matter but of energy and information takes place.

During this talk the role of the hydrographic boundaries as privileged structures for matter and energy flow and for determining the structural characteristics of pelagic ecosystems as well as their functioning and dynamics will be discussed.