

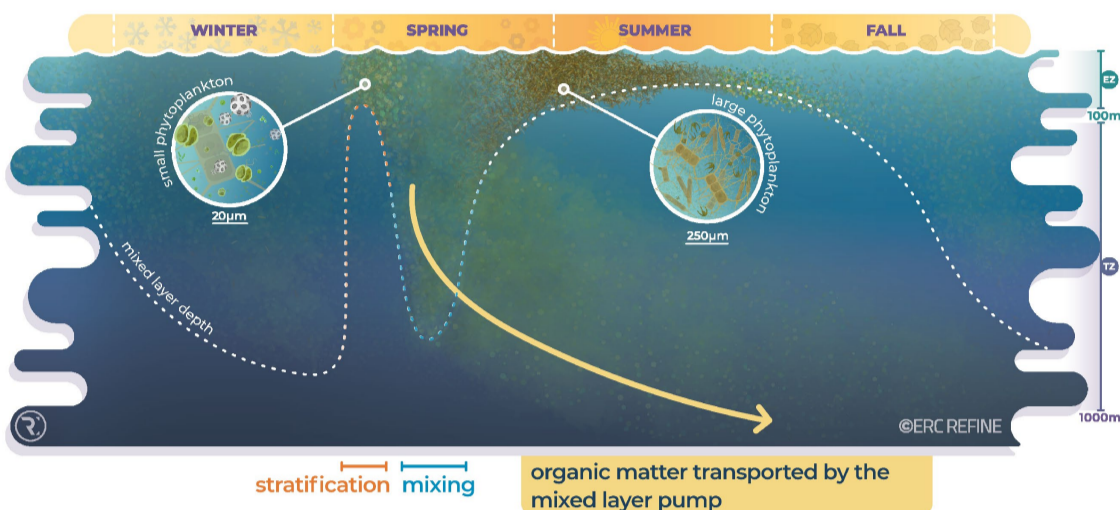
THE BIOLOGICAL CARBON PUMP



... and by physical processes

Several biological and physical phenomena contribute to carbon capture in the deep Ocean. In the following cases, physical phenomena transport carbon through...

... through mixing "the mixed-layer pump"



Variations in the depth of the mixed layer enable phytoplankton and its organic carbon to be transported from the Ocean's surface to the depths. This pump results from the alternation of periods when the waters are stratified (a small mixed layer due to calm, sunny weather) and others when the same waters are mixed up (a deep mixed layer due to mixing from storms).

In stratified conditions, phytoplankton develops. In mixed conditions, phytoplankton is mixed up throughout the mixed layer. Stratification-mixing successions thus inject phytoplankton and its organic carbon into the Twilight Zone.

What does the profiling float measure?

salinity, temperature and density sensor

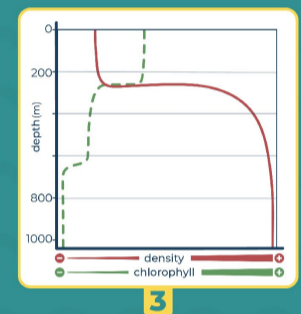
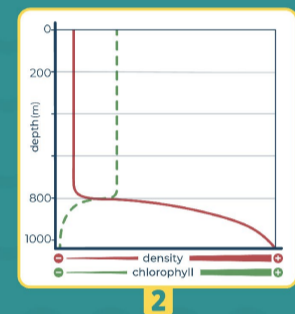
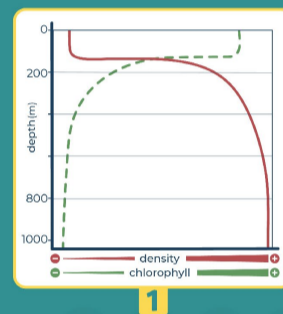
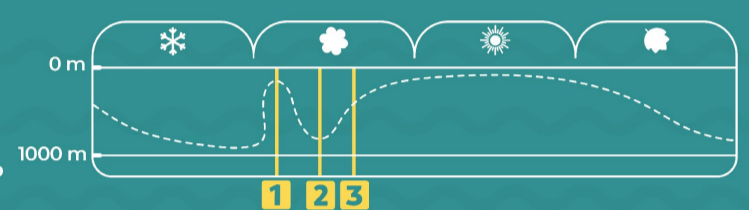
biogeochemical sensor

The profiling float's resurfacing journey, during which its sensor has measured a property. It produces a profile.

The biogeochemical sensor also measures the concentration of chlorophyll in the water column.

profile

Examples of results obtained, thanks to the profiling float, for studying the mixed-layer pump phenomenon.



To obtain a global view, scientists combine profiles from different sensors during their research.

What does the profiling float measure?

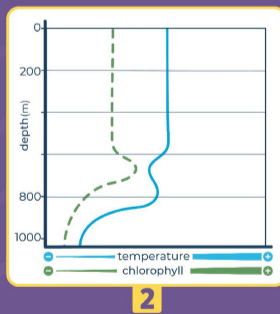
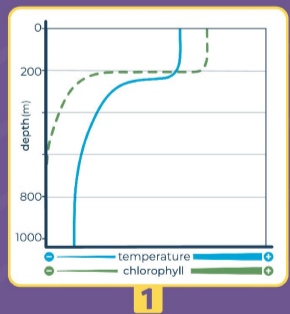
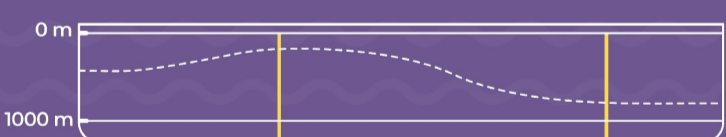
salinity, temperature and density sensor

biogeochemical sensor

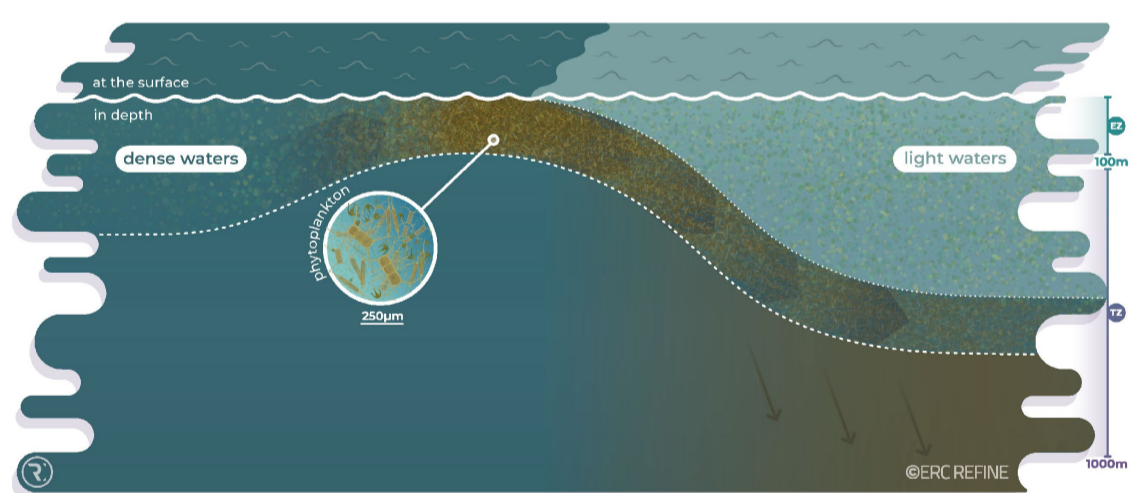
profile

Examples of results obtained, thanks to the profiling float, for studying the subduction pump phenomenon.

The profiles established by the profiling float reveal biogeochemical and physical anomalies at depth, an indication that the waters were previously at the surface.



... through downwelling "the subduction pump"



In the Ocean, when light waters meet denser waters, a barrier (or front) is formed where a bloom can develop. From this meeting, it results in a dive of the dense waters under the light waters, a phenomenon called subduction. This subduction carries the phytoplankton and particles produced at the surface into the Twilight Zone. These will then continue to sink, contributing to the gravitational pump and carbon sequestration.

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Thanks to profiling float technology, scientists are able to gather information on the different processes involved in the biological carbon pump.