



## **Biological activity in the wake of an island close to a coastal upwelling**

M. Sandulescu (1), C. López (2), E. Hernández-García (2), **U. Feudel** (1)

(1) Institute for Chemistry and Biology of the Marine Environment, Carl-von-Ossietzky University Oldenburg, D-26111 Oldenburg, Germany, (2) Instituto Mediterráneo de Estudios Avanzados, IMEDEA (CSIC - Universitat de les Illes Balears), E-07122 Palma de Mallorca, Spain

We study the biological activity in the wake of an island which is close to an upwelling region. Our research is based on numerical analysis of a kinematic flow mimicking the hydrodynamics in the wake, coupled to a three component plankton model. Depending on model parameters different phenomena are described: a) The behavior of the wake as a barrier to transport of nutrients and plankton across it, blocking the influence of upwelling on primary production in the area. b) Its contrasting role facilitating this transport and leading to an enhancement of primary production. Finally c) we show that under certain conditions the interplay between wake structures and biological growth leads to plankton blooms inside mesoscale hydrodynamic vortices that act as incubators of primary production. The mechanism of this localized enhancement of plankton growth is based on the long residence times of nutrients and plankton in the vicinity of the island and the confinement of plankton within vortices.