

Courses L. Denis:

Course 1: Benthic-pelagic coupling in coastal systems: a benthic view

In this course, the lecture focuses on the coupling between pelagic and benthic ecosystems via organic matter transfer. In a first part, an historical review of the concept of benthic-pelagic coupling is given. The basement of the 'old' theory of a constant rain of particles settling to the surficial sediments is described, and the major studies that have lead to the concept of a benthic-pelagic coupling are described. Further methodological developments have allowed a better description of the benthic-pelagic coupling, both in the temporal and the spatial scales. Then the major factors of the benthic-pelagic coupling are given. But close to the coast, and more especially close to the mouth of large rivers, other factors may widely interact with such a functioning scheme. The benthic-pelagic coupling is then scarcely evidenced, while hydrological and hydrodynamic constrains are of major importance. This last part is illustrated by the comparison between two of the major rivers in France: the Seine river flowing to the macrotidal English Channel and the Rhône river flowing to the microtidal Mediterranean Sea.

- 1: Historical review
- 2: Main forcings
 - o Organic matter input in surficial sediments
 - o Resuspension processes
 - o Nutrient recycling
 - o Contaminant sequestration
- 3: Close to the coast ...the history changes

Course 2: Dynamics of bio-sedimentation, production and mineralization processes in intertidal areas.

In this part, we will focus on the main processes in soft (cohesive and permeable) intertidal sediments. First of all, primary production and mineralization processes will be described in cohesive muddy sediments. A special focus on microphytobenthic production, and its variability with time and space will be discussed, on the base of a novel 'high-frequency and high-resolution' autonomous system measuring oxygen microprofiles in surficial sediments. Then the paradigm of processes in permeable sediments will be described: Permeable sediments have been considered as 'non reactive' for the past decades because there is no accumulation in the interstitial waters, but recent studies have evidenced the major role of those sediments in carbon and nitrogen cycling in surficial sediments. Examples of the variability of production and mineralization processes in cohesive sediments, as well as an illustration of the major role of permeable sediments in intertidal systems will be given.

- 1: The intertidal area: a dangerous area to play for scientists?
- 2: Mineralization and production processes in cohesive sediments
- 3: The paradigm of permeable sediments
- 4: Towards a survey of coastal benthic systems?