

ECOLOGY OF COASTAL COMMUNITIES (5MU13)

Ecosystems are complex systems composed of the biotic communities and its abiotic environment with numerous interactions. In order to understand how ecosystems function and persist it is necessary to know how ecological communities are distributed and vary. Understanding the mechanisms that generate and maintain biodiversity, and more particularly the spatial distributions of taxa, is a key objective in ecology. This is also essential to predicting ecosystem responses to future environmental change.

The complexity associated with communities is due in part, to the diverse interactions between many species at various trophic levels and their connections with their abiotic environment, making ecosystem –based studies difficult. In marine environment, coastal ecosystems are characterized by a high biodiversity within a high complexity of the environmental factors interactions. They also are ecosystems strongly under the human impacts by pollution or alien species invasion constituting good models for communities' successions. Understanding how system function, requires a broad approach examining the distributions of communities and how species composition changes over time in relation to the biotic and abiotic environment.

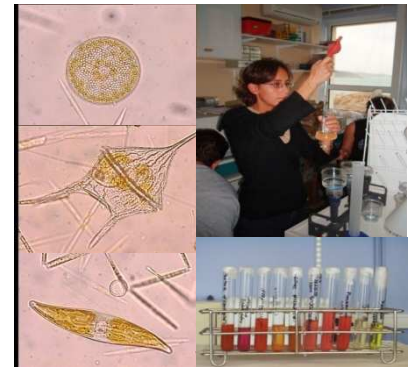
Course objectives

The main goal of the course is to introduce students to the theory and characterization of the processes that regulate, control and affect coastal communities.

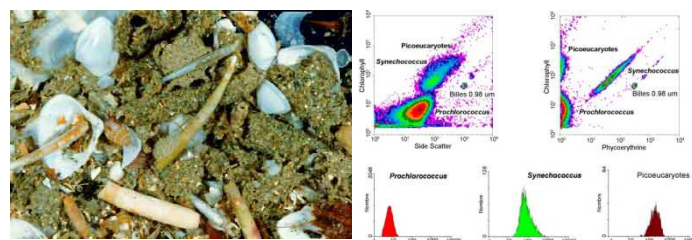
This course will emphasis on both theoretical and practical approaches. After a general and theoretical reminder of marines' communities, and specificities of the coastal ecosystem, we'll try to define and illustrate the main factors which control the establishment, evolutions and succession of communities.

These will be applied on benthic and pelagic communities. In connection with the theoretical approaches, four main practical works (PW) will permit to illustrate and conceptualize some factors controlling the communities.

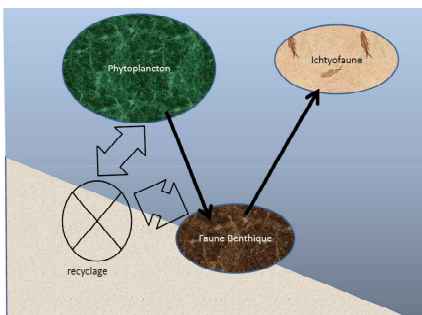
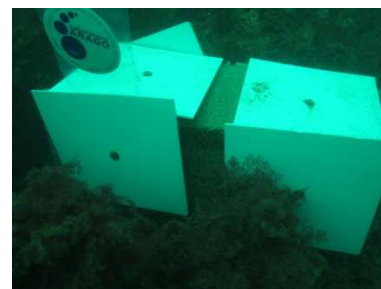
PW1: Effects of abiotic constraints on communities structure. We will test environmental factors controlling the phytoplankton community structure and seasonal variations though photo-acclimation and -adaptation processes. This will allow us to illustrate bottom up structuring factors with emphasis on individualistic traits (abiotic tolerance) of species and their interactions with the environment (niche requirements).



PW2 : Effects of biological interactions on communities structure : Experiment of filtering feeder on natural phytoplankton communities. This will allow us to show the direct and selective control of phytoplankton communities by benthic organisms. This predation process will illustrate a top down effect on community selection and the importance of benthic-pelagic coupling in coastal environment.



PW3 : Spatio-temporal variability of communities. Experiment of colonization of benthic meiofauna on new rocky substrate will illustrate the primary successional changes in benthic communities, interactions and competition processes in colonization of space



PW4: Interaction modeling.

The design and construction of a simple model combining the different factors controlling communities dynamic, will allow student to visualize the communities interactions with external environmental factor and internal dynamic (predation/competition) processes on different spatial and temporal scales.

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