UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biofacies

2425-1-F7502Q014

Aims

Benthic facies and applied marine paleoecology

To provide technical skills to plan, analyse and interpret the results of the paleontological and paleoecological investigation. To provide the rationale and the methods for the use of palaeoecology in the reconstruction of recent environmental changes in transitional and marine coastal areas, on the basis of the interplay between natural change and history of the anthropogenic impact. Ability to identify and interpret some common macrobenthic facies, and taphofacies. Ability to manage the commonest multivariate methods of statistical analyses for the interpretation of benthic associations.

Microfacies; the Pelagic Environment

To provide knowledge of the microfossil groups which are useful to define a paleoenvironmental and biostratigraphic framework from different oceanographic settings. To provide the taxonomic bases for the identification of the main planktonic species. Application of microfossil assemblage for paleoecological reconstructions. Environmental Micropaleontology.

Contents

Benthic facies and applied marine paleoecology

Identifying biofacies as a tool for paleoenvironmental definition. Applications and examples. Introduction to applied marine paleoecology: rationale, sampling strategies, case histories. Multivariate statistics applied to paleoecological analysis. Observations, laboratory analyses and techniques.

Microfacies; the Pelagic Environment

Recognition of biofacies for the definition of the pelagic paleoenvironment in different oceanographic settings. Bases of plankton taxonomy. Applications and examples from present-day and past environments.

Detailed program

Benthic facies and applied marine paleoecology - Lessons

Marine and transitional benthic associations, death and fossil assemblages. Taphonomic processes and their effects on macrobenthos. Applied marine paleoecology and Conservation paleobiology: rationale, case histories. Multivariate statistics for benthic paleoecology.

Microfacies; the Pelagic Environment - Lessons

Microfossils and oceanic (paleo)environments. Taxonomic bases for the identification of the main plankton groups. Plankton paleoecology and biogeography. Biofacies in the pelagic environment: sedimentary environment and diagenesis. Bases for the definition of a biostratigraphic framework for pelagic sedimentary successions. Examples from the present-day environment and from the geological record.

Practical classes

- Recognition under binocular microscope of benthic biofacies and identification of their original environment and depth, in the context of different climates (Mediterranean Sea and Tropics; Atlantic cold-water corals);
- Identification, through polarized light microscope, of key species within the main extant microfossil groups (calcareous nannofossils, diatoms, silicoflagellates) at different latitudes;
- Recognition of microfacies and identification of paleoenvironments in different settings (mid-ocean oligotrophic gyre, upwelling zones, areas with strong continental input, polar zones);
- analysis of data from case studies on the distribution of extant and fossil plankton, synthesis of the ecological/paleoecological interpretation and critical reading of selected scientific publications;
- Identification of biozones through the recognition of biostratigraphic markers for selected time frames and exercise on literature data for the creation of an age model.

Prerequisites

Paleontology, Geobiology are recommended

Teaching form

All classes will be in English

- 14 two-hour Lectures in person, Delivered Didactics (4 ETCS, 28 hours)
- 8 three-hour Practical classes, in person, Interactive Teaching (2 ETCS, 24 hours)

Textbook and teaching resource

Slides and scientific papers provided by the Lecturers on the e-learning page

Semester

Second semester

Assessment method

- 2 self-assessment tests, to be done through the e-learning platform, with multiple choice or true/false questions, related to the themes explained during the lessons in the 2 different modules. The 2 tests must be done and successfully completed with a grade of minimum 24/30 at least one day before the oral examination (the tests are set as to save the best grade obtained, so they can be repeated several times, also to rehearse). The tests are aimed at assessing the theoretical knowledge acquired by the students and also suggest the questions that will come out in the oral exam.

- Written report on the lab activities. The report must contain a synthesis of what has been observed under the microscope, a report on the exercises done during the practicals and, where necessary, an interpretation of the obtained data, in terms of paleoenvironment or reconstructed processes. Object of the evaluation are: the completeness of the report in relation to the proposed activities, the capacity to synthesise and discuss the analysed data and the ability to use an appropriate language. The report must be submitted 3 days before the oral exam.
  The report will count for 1/3 of the final grade.

- Oral examination: two open questions on the themes explained in classes (one on benthic facies, one on planktonic facies). During the oral exam, the teachers will evaluate the acquired knowledge and the acquired capacities in terms of appropriate language and mastery of the themes.
  The oral exam will count for 2/3 of the final grade.

Grading: in /30.

Office hours

Upon appointment by e-mail to the professors

Sustainable Development Goals

QUALITY EDUCATION | LIFE BELOW WATER