



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Biofacies

2122-1-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

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

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. Taphonomy. Applications and examples from present-day and past environments.

Detailed program

Benthic facies and applied marine paleoecology

Lessons: Sampling strategies and techniques for the study of marine and transitional benthic associations, death and fossil assemblages. Taphonomic processes and their effects on macrobenthos. Applied marine paleoecology: rationale, case histories. Multivariate statistics for benthic paleoecology.

Laboratory: Identification of key species within the main macrobenthic groups (mollusks, brachiopods, corals, calcareous algae, bryozoans). Quantification of the sedimentary contribution of the components of the benthic association. Macrobenthic facies analysis and identification of the paleoenvironment. Laboratory techniques and analyses for the study of marine and transitional benthic associations, death and fossil assemblages. Observations of the effects of the biostratigraphic processes on shelled macrobenthos. Preparation, elaboration, and interpretation of multivariate paleobiological data.

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.

Laboratory: Identification, through binocular and polarized light microscope, of key species within the main microfossil groups (calcareous nannofossils, diatoms, silicoflagellates, foraminifera). The laboratory classes will be devoted to: a) the recognition of biofacies and the identification of paleoenvironments (coastal zone, continental shelf, continental slope, abyssal plain) in different settings (mid-ocean oligotrophic gyre, upwelling zones, areas with strong continental input, polar zones); b) the identification of biozones through the recognition of biostratigraphic markers for selected time frames.

Prerequisites

Paleontology, Geobiology

Teaching form

Lessons

Laboratories

Textbook and teaching resource

Slides and scientific papers provided by the Lecturers

Semester

Second semester

Assessment method

2 self-assessment tests, to be done through the e-learning platform, with multiple choice or true/false questions, to be successfully completed before the oral examination

Written reports on the lab activities

Oral examination: two open questions on the themes explained in classes (one on benthic facies, one on planktonic facies)

Grading: weighted average of all grades, in /30.

During the Covid-19 restrictions the oral exams will be exclusively through the WebEx platform. A public link will be posted on the e-learning page of the course for the access of virtual public.

Office hours

Upon appointment by e-mail to the professors
