

COURSE SYLLABUS

Paleoceanography and Paleoclimatology

2324-2-F7401Q095

Aims

Knowledge of climatic variations and their causes at different time scales, through the study of proxies in different archives; knowledge of the main oceanographic processes in the present and in the past.

Contents

Bases of Paleoceanography and Paleoclimatology: climate system, chronology, proxies. Climatic variability and climate variations: timescales of changes. Paleoceanographic variations, as reconstructed through proxy data at different time scales. The paleoclimatic and paleoceanographic history of the Earth, from its origins to the present day.

Detailed program

Lessons:

The climate system, time scales of change (climatic variability vs. variation), dating methods in paleoclimatology and paleoceanography.

Paleoclimatic proxies: examples and applications in the marine, ice and terrestrial record.

Paleoclimatic evolution in the geological past: early Earth climate states and climate evolution; greenhouse and icehouse states; the Cenozoic mid-house; climate variations and Milankovitch cycles; millennial, centennial and decadal-scale variability in the recent past.

Paleoceanographic applications; climate and sea level; paleocirculation and paleoproductivity; global (OAE) and Mediterranean (sapropel) anoxic events; ocean acidification in the present-day and in the paleo-record.

Laboratory:

Case study: eastern Mediterranean sapropels. Description and analysis of a sediment core in the lab; processing and interpretation of paleoclimatic and paleoceanographic data; analysis and discussion of literature data.

Campus:

Two day excursion on the following paleoceanographic themes: a) the Messinian salinity crisis as preserved in the Appennines; b) the oceanic anoxic events in sedimentary successions

Prerequisites

Course of Security on the Field

Teaching form

All the activities will be in English

- Lessons (4 CFU)
- Laboratory (1 CFU)
- Campus (1 CFU)

Textbook and teaching resource

Bradley - Quaternary Paleoclimatology

Slides provided by the professor through the e-learning page

Semester

First semester

Assessment method

- Group oral presentation at the end of the lab activities, to assess the acquired knowledge, the ability to chose the most important data related to the case study and the ability to communicate with a specific scientific language, proper for the course.
- Personal written report on the activities done during the lab, in order to assess the acquired knowledge, the capacity to analyse the considered dataset and the ability to interpret, synthetise and communicate in a written text the results of the case study. The report must be submitted at least 3 days before the oral examination.

The evaluation of the presentation and of the report will count for 1/6 of the final grade

- Written personal report on the activities done during the field work, in order to assess the understanding of the considered themes

The evaluation of the report will account for 1/6 of the final grade

- Oral examination: 3 questions related to the themes addressed in class, of which: a) one proxy selected by the student; b) one question to assess the knowledge on proxies, mechanisms and time scales of changes; c) one question related to the changes occurred within one specific time frame, among those shown in class and in the slides: approximate drawing of a graph if required.
During the exam, the teacher will evaluate the knowledge of the relevant information related to the course, the ability to correlate the information obtained from different archives and the capacity to explain clearly and with an appropriate terminology the themes of the course.

The evaluation of the oral examination will count for 4/6 of the final grade

The final grade will be in /30.

Office hours

Upon appointment by e-mail

Sustainable Development Goals

QUALITY EDUCATION | CLIMATE ACTION | LIFE BELOW WATER
