Universidad Zaragoza

Academic Year/course: 2023/24

60382 - Climatic changes, associated events and geologic record

Syllabus Information

Academic year: 2023/24
Subject: 60382 - Climatic changes, associated events and geologic record
Faculty / School: 100 - Facultad de Ciencias
Degree: 624 - Master's in Geology: Techniques and Applications
ECTS: 6.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

The objectives of this subject are (1) knowledge of the main causes of climatic changes and their consequences; (2) identification of the climatic indicators contained in the geological record; (3) knowledge and application of specific techniques for the study of these climatic indicators; (4) analysis and paleoclimatic interpretation of data obtained from different disciplines; and (5) knowledge of the most relevant climatic changes in the history of earth.

The subject brings together methodologies, techniques and multidisciplinary knowledge that are necessary for:

1- the analysis and interpretation of geological records (from physical, chemical and biological indicators).

2-the discernment of the causes of climatic changes that act on the different natural systems on our planet.

3- the interpretation of the evolution of climate at different spatial and temporal scales.

Sustainable Development Goals: SDG 4 (Quality Education), SDG 13 (Climate Action), SDG 14 (Underwater Life), SDG 15 (Life of Terrestrial Ecosystems).

2. Learning results

Upon completion of the subject, the student will be able to:

- Know the main causes that control climate, at a global level, the consequences on the different natural environments and life in the past, and their reflection in the sedimentary record.

-Understand the interactions between different earth systems.

-Identify characters with climatic significance that are preserved in the geological record, based on physical, chemical and biological indicators.

-Apply specific sampling and study techniques to obtain results with climatic significance.

-Relate and interpret data and results from different techniques or modes of study to obtain contrasted paleoclimatic interpretations.

-Know some of the most relevant climate change phenomena in the Earth's history, understanding their causes and consequences.

3. Syllabus

Theory:

1. Introduction. Causes and indicators of paleoclimatic changes. Factors and scales of action.

2. Climate indicators. 2.1- Sedimentary facies. 2.2- Geomorphological indicators. 2.3- Fossil fauna and flora. 2.4- Geochemical indicators.

3. Multiproxy analysis of sedimentary records.

4. Climatic changes and the paleontological record 4.1. Bioclimatology. 4.2- Analysis of paleontological records. 4.3- Climate change and evolution as well as extinction events.

5. Analysis of climate changes and their effects on biota.

Cabinet and laboratory practices:

1. Processing and interpretation of sedimentological, paleogeographical, geochemical (isotopic) and paleontological data.

2. Multidisciplinary evidence for meteoritic impact from the Cretaceous/Paleogene boundary.

3. Multiproxy analysis of the Paleocene-Eocene transit.

Field practices:

Miocene lacustrine and fluvio-lacustrine systems. Quaternary and present fluvial and lacustrine records.

4. Academic activities

1. Master class (24 h)

2. Laboratory practices and problem solving and case studies (22 h)

3. Special practices (Field practices) (14 h)

4. Personal work: Includes the elaboration of data, some practices, consultations and study of the theoretical and practical knowledge to pass the tests: 87 h.

5. Written test (exam): 3 h.

5. Assessment system

The student must demonstrate achievement of the intended learning results through the following assessment activities. They will be able to choose between continuous evaluation or global evaluation.

Continuous assessment

-Written tests: solving of several questionnaires and completion of practical exercises and reports on different theoretical and practical aspects (100%).

Global assessment.

For students who do not opt for continuous assessment or have not passed it, a written test will be offered. It will account for 100% of the grade.