



UE Marine Geophysics

 **ECTS**
3 credits

 **Component**
UFR PhITEM
(physique,
ingénierie, terre,
environnement,
mécanique)

 **Semester**
Automne

- > **Teaching language(s):** French
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX8GEAD

Presentation

Description

The field course offers a practical teaching in which they implement geophysical and geological methods classically used in Marine Geosciences. In particular, during the internship, students will participate in a seismic reflection acquisition campaign aboard the Thetys II, a coastal vessel of the French Oceanic Fleet, chartered by INSU and managed by IFREMER.

The object studied is the northern Ligurian continental margin, off Nice, which is a remarkable example of passive margin. The internship program includes (under the supervision of a teacher, and with the help of a technician) the implementation by the students of the main data acquisition techniques used in Earth Sciences

- principles of navigation and positioning (GPS, keeping a logbook);
- bathymetry (canyons, sedimentary surveys, continental slope, plateaus,...);
- the implementation of seismic-reflection multitracing, along large profiles cutting the entire Ligurian margin.

These profiles are completed by cross-sectional profiles at the top or bottom of the slope, in order to initiate the students to the study and the reconstruction in three dimensions of sedimentary bodies. Back in the classroom, the students process and interpret the data acquired at sea, in the context of regional geology and global tectonics.

The internship is organized differently for students in the Geophysics track and those in the GeoResources/Geodynamics track, with a different weight for the 3 parts of the internship:

- (1) acquisition campaign at sea
- (2) processing of seismic profiles with Seismic Unix
- (3) interpretation of seismic reflection profiles

For geophysics students, the focus is on acquisition and processing. For example, an offshore session is planned to evaluate the importance of acquisition parameters on the resolution and penetration of the profiles obtained.

For the other students, the interpretation of the profiles is more developed and completed by a course on the tectonic-sedimentary history of the margin. Students will be able to recognize on the profiles the Messinian erosion surface, the unconformity of the acoustic basement and post-rift sediments, the transgression of the upper evaporites, the mode of deposition of the Quaternary turbidic series (canyons and deep Var cone), the tectonic deformation of the foot of the margin (sometimes salt diapirs, active faults of the foot of the margin and of the basin), the subsident zone of the foot of the margin, and finally sometimes, the syn-rift series and the Oligocene tilted blocks (ante-rift series).

The number of students is limited to 16, divided into 2 groups according to their course within the STPE master.

The evaluation is done on the basis of :

a summary sheet to be handed in right after the course. These sheets are corrected by the teachers and can be used as revision sheets afterwards

an oral exam on the 3 themes covered during the course:

Acquisition

Processing

Interpretation

Recommended prerequisites

The student is expected to have a good knowledge of seismic wave propagation and notions of sedimentology.

The processing of seismic profiles is done with the software suite " Seismic Unix ", already presented in the module PAX8GPAB " Exploration Geophysics ".

All students participating in the internship will be required to attend two sessions of module PAX8GRAC "Basin Analysis".

Targeted skills

At the end of the internship, students will have seen the complete work chain carried out during a marine geoscience campaign, from geophysical measurements in the field to the geological interpretation of profiles. In particular, they will know how to:

- Identify the key parameters needed to acquire a seismic profile, identifying the appropriate equipment and choosing the relevant parameters to obtain data with the resolution and penetration needed to characterize the target being studied.
- Process raw data to obtain a quality, debruised and migrated seismic profile.
- Identify artifacts and avoid gross errors when interpreting a seismic profile
- Recognize sedimentary structures in a series of seismic profiles on a 3D volume and place them in the tectonic-sedimentary history of the region studied.

Course parts

UE Marine Geophysics - terrain

Terrain

30h

Useful info

Campus

› Grenoble - University campus