



UE Geophysical Fluid Dynamics

 ECTS
6 credits

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

 Semester
Automne

- > **Teaching language(s):** English, French
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** PAX9ACAE

Presentation

Description

The flows in the atmosphere, in the oceans, in the atmospheres of the giant planets, in the liquid core of the Earth, and even in stars are specific essentially by two aspects: (1) the global rotation to which they are subjected, which is reflected in the Coriolis force; and (2) the stratification of the fluid into layers of varying density, subject to a gravity field. These two characteristics radically change the behavior of fluids. The objective of this course is to define the key concepts, to give the necessary tools to study these systems, and to give a physical meaning to these flows which often defy intuition.

After an introduction to fluid dynamics, a first part focuses on the effect of rotation, in a general way and then in the particular case of thin layers, relevant for the modeling of oceanic and atmospheric flows. An important part of the course is dedicated to the study of waves encountered in geophysical flows (inertial and gravity waves, Rossby waves). A second part focuses on the effect of density variations: thermal convection, viscous density currents (glaciers, volcanic flows) or turbulent currents (atmospheric density currents, turbidity currents, pyroclastic flows). For each phenomenon, specific examples are given and the theory is detailed.

Teaching language: French or english

Course parts

UE Geophysical Fluid Dynamics - CM/TD

Lectures (CM) & Teaching Unit (UE)

42h

Useful info

Campus

> [Grenoble - University campus](#)