Remote sensing of the hydrosphere and cryosphere

Niveau d'étude
Master 2

ECTS
3 crédits

Volume horaire
26h

Période de l'année
Semestre 3

Présentation

DESCRIPTION

This course introduces the fundamentals of the Earth's water cycle, with a special focus on the hydrosphere and cryosphere, and their observation using remote sensing techniques, particularly geodesy and gravimetry methods.

The course is organized around general lectures and practical sessions covering the following topics:

* The Earth's water cycle: stores, fluxes, and their quantification
* Remote sensing of atmospheric water vapor using GNSS
* Remote sensing of the hydrosphere and cryosphere with geodesy and gravimetry
* Monitoring surface and underground water resources
* Past and recent changes in global ice mass budget, sea level height, and atmospheric water vapor

The course includes an individual research project, which can involve:

* A study of a scientific paper
* Thematic data analysis
* The development or testing of a remote sensing algorithm

OBJECTIFS

* Understand basics of the global hydrological cycle
* Understand the principles of geodesy and gravimetry techniques for monitoring water on Earth (vapor, liquid, and ice).
* Analyze and interpret remote sensing data for environmental research and water resources management.
* Develop practical skills in using remote sensing software and

HEURES D'ENSEIGNEMENT

Remote sensing of the hydrosphere and cryosphere	Cours Magistral	12h
Remote sensing of the hydrosphere and cryosphere	Travaux Dirigés	4h
Remote sensing of the hydrosphere and cryosphere	Travaux Pratiques	6h
Remote sensing of the hydrosphere and cryosphere		2h

PRÉ-REQUIS NÉCESSAIRES

Basic knowledge in :

* geophysics, physics and mechanics (satellite orbits, gravity field)
* data analysis skills (statistics and modeling)

* programming skills (proficiency in one or more programming languages: Python, R, MATLAB)