Seismic imaging and full waveform inversion

Niveau d'étude
Master 2

ECTS
3 crédits

Volume horaire
26h

Période de l'année
Semestre 3

Présentation

DESCRIPTION

- Seismic imaging part:
What for: build an image of the subsurface, in 2D or 3D, using waves reflected at interfaces
Topics covered: Reflection and transmission coefficients, overview of basic data analysis procedure (including velocity analysis, stacking, multiple removal), seismic migration and different kinds of migration methods, resolution considerations, amplitude versus offset theory
Computer lab using commercial package Echos
- Seismic full waveform inversion part:
What for: retrieve the fine-scale seismic velocity structure of the subsurface by matching complete recorded waveforms with synthetics computed using the full physics of wave propagation
Topics covered: Elasto-dynamic wave equation, formulation of the inverse problem, motivation for a waveform approach, local optimization approach (making use of the gradient of the least squares function), formulation with Green function, study of sensitivity kernels.

OBJECTIFS

The student will learn about active source seismic methods used for imaging and quantifying subsurface properties with targets such as magma bodies or fault zones as well as industrial applications.

HEURES D'ENSEIGNEMENT

Seismic imaging and full waveform inversion	Cours Magistral	20h
Seismic imaging and full waveform inversion	Travaux Dirigés	6h

PRÉ-REQUIS OBLIGATOIRES

Elasticity, seismic wave propagation, signal processing (Fourier transform, filters), inverse problems.

Pour en savoir plus, rendez-vous sur > u-paris.fr/choisir-sa-formation

Informations non contractuelles. Les formations sont proposées sous réserve d'accréditation ministérielle délivrée tous les 5 ans.
Dernière mise à jour le 02 juin 2025