PHYS3233 Special questions in internal geophysics

[22.5h] 2 credits

Teacher(s): Thierry Camelbeeck, Véronique Dehant, Bernard Ducarme
Language: French
Level: Third cycle

Aims

The course is destined to students having already followed courses in internal geophysics to allow them to deepen their knowledge in certain fields depending on their needs.

Main themes

The course contains a certain numbers of modules among which a total of 22,5hrs will be chosen, in agreement with the students. The modules available are: - determination of terrestrial potential by satellite methods (6h); - determination of the geoid by astronomical, gravimetric and altimetric methods (4h); - seismic waves (6h): reflections and refractions, speed profiles and determination of elastic parameters; - rotation of the Earth and tides (6h): response of the Earth to the luni-solar attraction, motion equations, deformation calculations, gravimetric effects, polar motion, length-of-day variations, nutation and precession; - internal structure of the Earth and normal modes (4h): calculation of free oscillations of the Earth for an elliptic Earth, in rotation, containing a elastic solid inner core, liquid outer core, and an elastic mantle; - comparison of models of the interior of the Earth with those of other planets (4h); - convection inside the mantle (4h): calculation of convective flux, anomalies in associated masses (observed by tomography), internal deformation, in particular deformations at mantle interfaces between the lower mantle and upper mantle, core-mantle boundary, calculation of topography (mountains and hills of these interfaces); - geophysics of the other terrestrial planets (4h); - seismic sources (6h): earthquake location, source parameters evaluation, focal mechanisms and tectonic stress inversion.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites: The following courses must have been previously attended or in cours: PHYS 2140- Introduction to internal geophysics (V. DEHANT) or PHYS 2500-Introduction to earth physics (B. DUCARME).
Support: References, course notes and bibliography are given during the course.
Organization mode: the course is teached in 2 hours sessions. The exam consists in the presentation of two questions chosen among the subjects approached during the course.