

# Global geochemical cycles



Niveau d'étude  
Master 2



ECTS  
3 crédits



Volume horaire  
24h



Période de  
l'année  
Semestre 3

## Présentation

### DESCRIPTION

This course is opened to international master students and will be entirely taught in English. It will address the global geochemical cycles of volatile elements, with a focus on carbon, hydrogen, sulfur and nitrogen cycles.

The distribution of these volatile elements in the main Earth's reservoirs (i.e. mantle, crust, ocean, atmosphere and biosphere) and the fluxes exchanged between these reservoirs will be presented and discussed.

The state-of-the-art methods used by geochemists to determine budgets and fluxes will also be presented. Specifically, students will be trained to use stable isotope compositions coupled with various geochemical and geophysical parameters. Students will then discover the laboratories, analytical techniques and mass spectrometers used to perform these kinds of study.

The determination of fluxes exchanged between mantle and surface reservoirs at mid-ocean ridges and subduction zones will be explored for all selected elements. Students will be trained to solve questions about the extent of degassing associated to volcanism, or devolatilization related to subduction metamorphism, as well as the isotope effects associated to these processes.

The geochemical budgets and fluxes will finally be used to (i) decipher the long-term evolution of the surface and mantle compositions, (ii) predict the future of the Earth's reservoirs, and (iii) extrapolate previous distribution, including the initial state of the Earth. This last part has strong implications for understanding the formation and early differentiation of our planet.

### OBJECTIFS

Master the tools of elemental and isotopic geochemistry. Discover several techniques for measuring precise isotopic compositions (C, S, N, H) in natural materials. Learn the modelling of various geochemical processes (melting, crystallization, degassing, devolatilization).

### HEURES D'ENSEIGNEMENT

Global geochemical cycles	Cours Magistral	12h
Global geochemical cycles	Travaux Dirigés	12h

### PRÉ-REQUIS OBLIGATOIRES

**Pour en savoir plus, rendez-vous sur > [u-paris.fr/choisir-sa-formation](https://u-paris.fr/choisir-sa-formation)**

Knowledge in geochemistry, chemistry and geosciences is useful but not mandatory

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