UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Isotopes as Environmental Tracers

2627-1-124R-ISO

Title

Isotopes as environmental tracers

Teacher(s)

Barbara Leoni ; Marco Rotiroti

Language

English

Short description

This course aims to provide basic general concepts on environmental isotopes and, at the same time, specific applications to different environmental problems. The main expected outcome is that students, at the end of the course, could be able to evaluate and propose an application of isotopic methods in their own PhD projects. Suggested year of attendance: I or II.

Part 1 – General Principles: stable isotopes, radioisotopes, chart of nuclides, isotope ratio, fractionation, general applications.

Part 2 – Water Isotope: water cycle and water isotopes, precipitation and water isotopes, global and local meteoric water lines, global and local effects, deuterium excess, surface water and water isotopes, groundwater and water isotopes, groundwater dating.

Part 3 – Stable isotope ratios and food webs, applications of stable isotopes in a food-web context, the trophic position of an organism in a food web, species-specific baselines, long-lived consumers as baselines, which resource pools support consumers?, quantitative approaches for analyzing stable isotope, what additional information does relative position of consumers in isotopic space reveal about food-web structure?

Part 4 – Environmental Isotopes: tracing the carbon cycle, tracing contaminants sources and processes, nitrogen isotopes, boron isotopes, sulfur isotopes, field applications, case studies and numerical elaborations in computer labs.

Final evaluation: oral presentation of possible application of isotope techniques within the PhD project of participants

CFU / Hours

2 CFU - 20 Hours (8h lecture - 12h laboratory training)

Teaching period

II semester

Sustainable Development Goals