

Isotopic tracers of geological processes

Prof. Massimo D'Antonio

12 hours – 3 CFU

Short Program of the Course:

Introduction on isotopes - Hints on analytical techniques - Radiogenic isotopes - Radioactivity and mechanisms of radioactive decay - Hints on absolute geochronology - Rb-Sr systematics - Sm-Nd systematics - Method of isochron - Stable isotopes - Isotopic geothermometry - Mixing and dilution processes - Isotopic mixtures with 1 and 2 components.

Radiogenic and stable isotopes in petrology as tracers of closed- and open-system magmatic processes: Isotopic variations in MORB, OIB and SZ - Effects of seawater alteration on isotope systematics - Isotopic variations of oceanic sediments - Contribution of isotopes to the understanding of the genesis of granites - Isotopic chemostratigraphies.

Radiogenic isotopes as tracers of metamorphic events: Internal-external Rb-Sr isochron - K-Ar systematics - Thermometamorphism - U-Th-Pb systematics - Concordia-discordia method.

Stable isotopes as tracers of low T processes: Hydrologic cycle - Hydrothermal systems - Ore Geology - Palaeoclimatology - Radon as tracer of environmental radioactivity and seismic activity.