# Title: Integrated approaches for evaluating groundwater resources and hydrogeological risks by remote sensing techniques and hydrogeological modelling

**Tutor:** Silvio Coda

**Co-tutor(s):** Vincenzo Allocca

# Proposal

Usage of remote sensing techniques in hydrogeology has represented an explored frontier over the last decades. These methodologies, integrated with ground-based measurements and monitoring, enhance the capability to investigate many aspects of aquifer systems. The application of combined approaches is widely reported in the scientific literature for hydrogeological purposes and for dealing with natural and anthropogenic risks related to groundwater.

The proposed project aims to develop of a multi-approach methodology for evaluating groundwater resources and the hydrological variables that regulate the water balance, as well as for assessing geo-risks associated with groundwater dynamics (e.g., drought, ground deformation, and groundwater flooding).

# Research Program

The methodology will be implemented in different hydrogeological settings of southern Italy, integrating traditional and advanced hydrogeological techniques with remote sensing ones. Specifically, it will include:

* geological and hydrogeological modelling of aquifers;
* monitoring of hydrological parameters of groundwater, unsaturated zone and atmosphere, in ad-hoc selected experimental fields;
* processing of satellite hydrological datasets (e.g. MODIS, SWI, etc.);
* coupled analysis of variations in groundwater volume and levels with aquifer deformations detected by remote sensing techniques (e.g., GNSS, terrestrial and satellite SAR);
* processing of satellite images for mapping groundwater flooding prone areas.

# =================