



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

EARTH OBSERVATION APPLICATIONS

*Applications of optical and radar
Remote Sensing, and other EO data,
exploited for a broad spectrum of topics.*

The University of Bologna has been involved in several studies concerning Earth Observation applications covering the areas of Agriculture, Geology, Hydrology, Land Cover and Use, Mapping and Risk Management.



The research of the University of Bologna covers a wide range of topics:

- Risk management for disasters (earthquakes, floods, fires, landslides, etc.), quick mapping in emergency phases, crowdmapping solutions
- Land Use/Land Cover changes detection. Characterization and interpretation of landscapes and evolutionary trajectories; fragmentation analysis; environmental monitoring, GIS Multi-Criteria Spatial Decision Support Systems
- Precision agriculture and farming, support to rural development policies. Optical and microwave remote sensing for soil moisture measurement
- Water resources management, water quality, glaciology
- Mapping of impervious, urban sprawl monitoring, EO/GIS for urban planning. Thermal remote sensing, Urban Heat Island
- Coastal zone protection and management, subsidence monitoring
- Archaeological applications of Remote Sensing
- EO for extreme environments and polar regions
- Climate change. Arid environments and desertification
- EO for humanitarian crisis management
- Spectroscopic measurements of the atmosphere from space, modeling of the atmospheric measurement chain
- Sea level from altimetry, surface winds from scatterometers, sea surface temperature and ocean color from radiometers, marine pollution from Synthetic Aperture Radar
- Use of ESA Sentinel-1, S-2 imagery for the assessment of forest disturbance
- Reflectance/albedo data for the assessment of vegetation productivity. Assessment of vegetation biochemical contents by hyperspectral imagery
- Aerial and terrestrial LiDAR and photogrammetry for 3D city models, DTM/DSM generation for environmental monitoring, geomorphology, landslides, etc.
- Processing of historical aerial images
- Applications in the framework of Copernicus program

HIGHLIGHTS

The University of Bologna participates in the **Copernicus Academy**.

Over the years the University of Bologna has been involved in national and international **projects** funded by ESA and the EU, among them: [Atlantos](#), [Subcoast](#), [EnergyCity](#), [EblaChora](#), [Spartacus](#).

Different research groups have established an **extensive network of collaborations** with several institutions and research centers at national and international level, such as: ASI (Italian Space Agency), ESA, NEREUS (Network of European Regions Using Space Technologies), CNR (National Research Council – Italy), INGV (National Institute for Geophysics and Volcanology), INAF (National Institute for Astrophysics), PNRA (National Program for Antarctic Research).