

**PetroLab. In-situ stone studies for heritage science**

**Description**



XRF spectrometer



Magnetometer (metal detector)



Contact angle (water-substrate) meter

PetroLab is a mobile laboratory for the in-situ study of the characteristics, decay degree and behavior of the stone materials of heritage assets, including both natural (rocks) and artificial (mortars, ceramics), alteration or salt crusts (e.g. black crusts) and historical patinas (*scialbatura*), by means of portable and non-destructive/non-invasive techniques (NDT). Several conventional or advanced analytical techniques are available in PetroLab for the petrological and chemical characterization of the stone material, their surface properties and some other bulk characteristics. This information can be complementary to that obtained by techniques offered by other MOLABs. The uniqueness of the access offer is based on the number of portable and NDT at the same time to be used in situ on stone heritage assets/objects; and the expertise of the group in the study of stone heritage, assuring the respect for the object and a meaningful interpretation of the data in this specific field.

**Fields of application**

**Cultural heritage**

architecture, buildings, archaeology, sculpture, cultural objects, natural/geological heritage

**Materials**

**inorganic**

stone/rocks, mortars, ceramics, by-products (salts)

**organic**

organic coatings, historical patinas

**Equipment**

The available portable and non-destructive equipments are following listed:

- Optical digital microscopy. Edge Digital Microscope DinoLite
- X ray fluorescence spectrometer. Niton, ThermoFischer Scientific
- Spectrophotometer (color measurements). Minolta Cm 700d
- Gloss/brightness meter. Multigloss 268; BYK Gardner
- Optical roughness-meter. TRACEiT; Innowep
- Micro-hardness-meter. Equotip 3D
- Micro contact angle tester (able to measure, besides horizontal surfaces, vertical and ceilings). MSA, Krüss
- Ultrasound velocity analyzer. Pundit LAB+ CNS Electronics (with subaquatic transducers)
- Drilling resistance measuring system (DRMS). Sint Technology (moderately destructive technique)
- Magnetometer (metal detector). Profotometer 4
- Air-permeameter. Tiny-Perm-II; Vindum Engineering

- Infrared camera. Thermacam B4 Flir system.
- Moisture/damp meter. Protimeter Surveymaster; General Electric
- Electrical Resistivity Tomography. Geoelectrical survey device. Geotom; Geolog2000

PetroLab uses the resources of the Petrophysics Laboratory, with its quality management system certified by AENOR (Spanish Association for Standardisation and Certification) according to the UNE EN ISO 9001:2015 standard.

## Potential Results

By means of the results obtained with these techniques, we are able to characterize the material, analyze the causes and degree of decay, as well as to recommend the most adequate conservation techniques. Among these last ones, we also can assess different conservation techniques (e.g. cleaning, consolidation, waterproofing, salt removal, etc.), indicating the best properties/behavior for the decayed stone and/or to prevent further deterioration. We also perform surveys on damp areas, locating the active ones, on surface and in depth. Some of the techniques (e.g. ultrasound velocity) are ready to measure in subaquatic conditions.

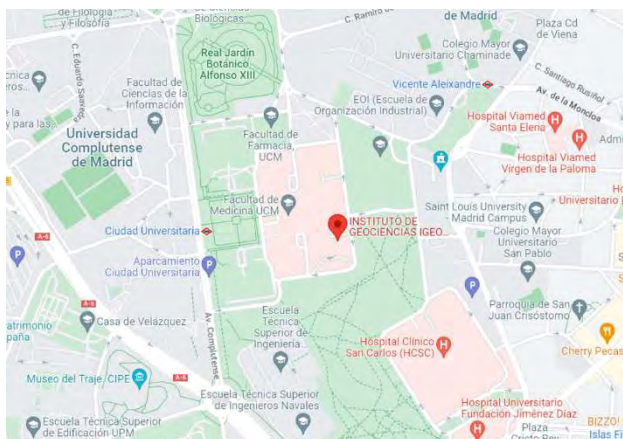
## References

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## Requisites/needs for the service

- Electricity Supply (preferably)
- Safe equipments storage
- Scaffolding (if necessary)

## Provider



Instituto de Geociencias IGEO.  
 Consejo Superior de Investigaciones Científicas y  
 Universidad Complutense de Madrid  
 Calle del Doctor Severo Ochoa 7 - 28040 Madrid

Contact:  
 Monica Alvarez de Buergo, monica.alvarez@csic.es  
 +34 91 394 7878 - +34 91 394 7879

