

Geoenvironmental analysis in hypogeous environments (GAHE)

Geochemical and environmental monitoring of subsurface environments applied to heritage conservation.

Need or problems that solves

The Geoenvironmental analysis in hypogeous environments group focuses, among other scientific fields, on the conservation of natural and cultural heritage in subsurface environments (caves, catacombs, tunnels, etc.) and the integrated study of the deterioration processes of the heritage they contain, especially Rock Art.

To respond to different issues, the Geochemical and Geoenvironmental Monitoring Lab of the National Museum of Natural Sciences (MNCN-CSIC), offers technological solutions, which provide answers to questions including:

- Environmental characterization of host heritage ecosystems.
- Mineralogical, geochemical and petrophysical characterization of the substrates and seepage water.
- Geomicrobiological aspects, such as the interaction between microorganisms and the different existing substrates: rocks, construction materials, speleothems, etc.

Innovative aspects

- Environmental monitoring with multiparameter stations (temperature, humidity, wind, pressure, suspended particulate matter, concentration of trace gases, such as CO₂, CH₄ and Rn) and portable gas and water sensors and analyzers.
- Models for early detection of microbiological proliferation.
- Visitor impact assessment and management to minimize tourism negative impacts.



Equipment

The [Geochemical and Geoenvironmental Monitoring Lab](#) of the MNCN has the infrastructure for the processing and analysis of water, soil, rock and sediment samples, as well as microbiological samples. On the other hand, it has specialized equipment for continuous measurement of environmental parameters, highlighting the portable gas analyzers such as Picarro and Gasmeter.

Contact

Análisis Geoambiental en medios hipogeos (AGMH).
Museo Nacional de Ciencias Naturales (MNCN-CSIC)
Sergio Sánchez Moral
ssmilk@mncn.csic.es
<https://www.mncn.csic.es/en/investigacion/geologia>

KEYWORDS

- Subsurface environments (caves, catacombs, tunnels, etc)
- Rock Art.
- Climate and environmental monitoring.
- Geomicrobiology.

POTENTIAL END USERS

Public or private institutions interested in the adaptation and tourist use of hypogeous environments and conservation of the natural and cultural heritage they host.

TECHNIQUES

- Climate and environmental monitoring.
- Material analysis.
- Air and water quality determination.