

KARSTIC CAVES OF CENTRAL PORTUGAL AS PALAEOENVIRONMENTAL ARCHIVES (CAVE)

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Abstract: Karst systems record changes in several parameters (such as rainfall, temperature, CO₂ partial pressure, sea level, regional hydrologic baseline, origin of water, human activity, etc.) and preserve this valuable information over time. Because of their natural conditions and their isolation from the exterior environment, caves represent a “living” archive of extreme importance to understand the evolution of karst systems and the environmental changes to which cave environments have been exposed.

In Portugal, the work of local speleological teams consists mostly on the inventory and topographic analysis of caves. The resulting observations are rarely scientifically published.

Because of their genetic and evolutionary specificity, national value and environmental fragility, most of the Portuguese karst systems are within protected areas. Nevertheless, particular land use and management problems persist, threatening the integrity of karst resources for future generations. So, the scientific data resulting from the CAVE project will be directly applicable to the management and conservation of karstic environments at a regional scale.

The CAVE project proposes an integrated approach based on an analysis of the various palaeoclimatic archives from caves and karst deposits. Of these, the most important are the stable isotope analyses and absolute dating in speleothems and property analyses of fluvial, lacustrine and other cave sediments. Most of the above deposits contain information relevant to the palaeoclimate evolution at a regional scale and sometimes show evidence of archaeological materials correlated with human occupation. The combination of data from various features (speleothems, clastic cave sediments, cave animals remains and archaeological evidence) within the same karstic environment allow for the ability to overcome the limitations of some absolute dating methods, to combine different climate records into a composite record, to carry on time-series analyses taking into account regional or global climate records and to identify the regional constraints of climate oscillations.

The proposed research will focus on the main karstic massifs of Central Portugal (Outil/Cantanhede Massif, Sicó Massif and Estremadura Massif) and has the following aims:

i) creation of an evolutionary model of caves based on structural, morphological, sedimentological and geoarchaeological analyses; this model will further be integrated with known geological and geomorphological regional evolutionary models; ii) understanding of contemporary cave activity and groundwater dynamics as well as their vulnerability to human activities; iii) transfer of the project results and conclusions to public and private institutions with territorial planning and conservation responsibilities in karstic areas.

In this communication we will present the preliminary results obtained for some caves in the Central Portugal area.

Keywords: Cave sediments; Geoarchaeology; Isotopic analysis; Climate global change.