



Multi-proxy, multi-archive, climate records in the caves of Romania - a review

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The KARSTHIVES Project was recently launched as an integrated approach of paleoclimate reconstructions during the last 500 ka based upon a multi-proxy analysis of the various paleoclimate archives from caves and karst deposits of Romania.

Owing to its geographical location and geological settings, Romania has the potential of excellent paleoclimate archives from cave deposits because: (i) include extensive karst regions, with numerous caves that are usually well-documented; (ii) caves in Romania usually host abundant speleothems, suitable for high-resolution paleoclimate records; (iii) located at middle latitudes (44-45°N) speleothems from Romania are likely to preserve the longest speleothem records even during extreme climatic events; (iv) the regions located in the inner and outer parts of the Carpathian range experience slightly different climate conditions being influenced differently by the North Atlantic Oscillation (NAO); (v) numerous Romanian caves host simultaneously several types of deposits that may provide independent and coeval paleoclimate records.

This review presents the state of the art on various proxies and archives from the caves of Romania that are relevant for paleoclimatic reconstructions and the perspectives for future work under the KARSTHIVES Project. Such records include speleothem stable isotopes records but also mineralogical variations in speleothems, magnetic properties of fluvial or lacustrine sediments, fossil and sub-fossil species and faunal associations, stable isotopes and composition of the underground ice. The combination of the data measured from various proxies from the same cave environment (speleothems, sediments, fossil, ice) allow: (i) to overcome the limitations of the some of the dating methods; (ii) to combine different climatic profiles into a composite one; (iii) to calibrate a record taking into account the coeval and/or marker-data obtained from other proxies in the same cave. Several famous Romanian caves that bear the potential for multiple proxy analyses, such as Ursilor, Scarisoara, Oase and Cioclovina are presented and different strategies for the multi-proxy approach are discussed.