



The area of Hungary is dominated by Cenozoic sedimentary formations. However, karst regions built up by Mesozoic limestones are also important, containing extensive cave systems (like the Aggtelek Caves listed as a World Heritage). Hungary also has the biggest lake of Central Europe, Lake Balaton, which started to form in the late Pleistocene. Thus, paleoclimate research has been conducted in Hungary in various fields, ranging from major mass extinctions (Permian-Triassic and Triassic-Jurassic) to sedimentological and paleobotanic studies on Quaternary deposits and to paleohydrology. Classical investigations on sedimentary features and paleontology-paleobotany have mainly been done by individual researchers and small research groups at the Hungarian Geological Institute, the Hungarian Natural History Museum, the Eötvös Loránd University of Budapest (hosting also the Geological Research Group of the Hungarian Academy of Sciences and a new tree-ring laboratory) and the University of Szeged. Meteorologist researchers of the Eötvös Loránd University and the Hungarian Meteorological Service deal with climate modelling with special emphasis on future climate scenarios. A large interdisciplinary project summarizing state-of-art knowledge of local effects of climate change and possible future scenarios was conducted in recent years.



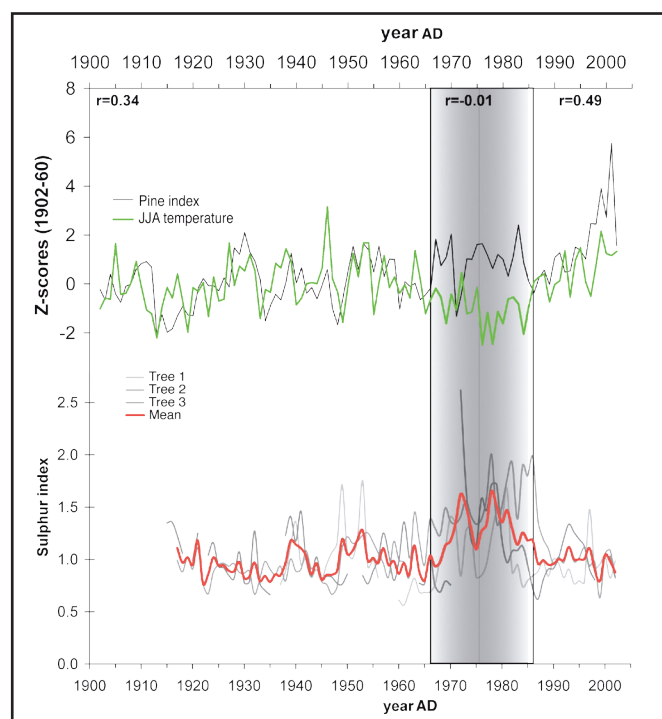
Recent analytical developments at the Institute for Geochemical Research (IGCR), Hungarian Academy of Sciences, has enabled Hungary to launch high-resolution geochemical studies on travertines, speleothems, molluscs, soils, tree rings and cave ice deposits. In order to co-ordinate paleoclimate-related geochemical research both within the Institute and in Hungary, the GEOCHEMISTRY and PALEOCLIMATE Research Group was established at the IGCR in 2006.

### Funding

The research projects are mainly subsidized by the Hungarian National Research Fund, however, financial support has also been provided by the Ministry of Environment and Water.

### National PAGES Contact

- Attila Demeny (Speleothems, sediments)



Tree rings not only reflect temperature and precipitation amount, but can also be used to detect changes in environmental chemistry. Tree ring samples studied in the course of the MILLENNIUM project show changes in sulphur content due to local mine activities in Romania (Kern et al., 2009, *Dendrochronologia* 27, 121-128).



The Spanish PAGES Committee was created in 1996, and co-ordinated by the Spanish IGBP Committee, which is endorsed by the Ministry of Innovation and Science. Spanish PAGES-related science is undertaken by over 40 research groups working on paleoenvironmental studies, located at Universities (70%), CSIC, the Spanish Council for Research (20%), and other public and private research institutions (10%). PAGES-Spain has also strong links with the Spanish Committee for Research in Global Change (CEICAG), created in 2004. Over the last decades, PAGES Spanish-funded research has focused on the reconstruction of climatic and hydrological records, using a wide range of techniques and archives from terrestrial (fluvial, limnological, dendro, speleothems), coastal and marine sites, and from documentary sources (historical records). PAGES-Spain has also promoted links with research groups developing climate and paleohydrological models to allow further quantitative and mechanistical understanding of past global changes.

### Internationally funded projects

PAGES-Spain scientists are involved in several multinational projects funded by the European Union, and other international programs.

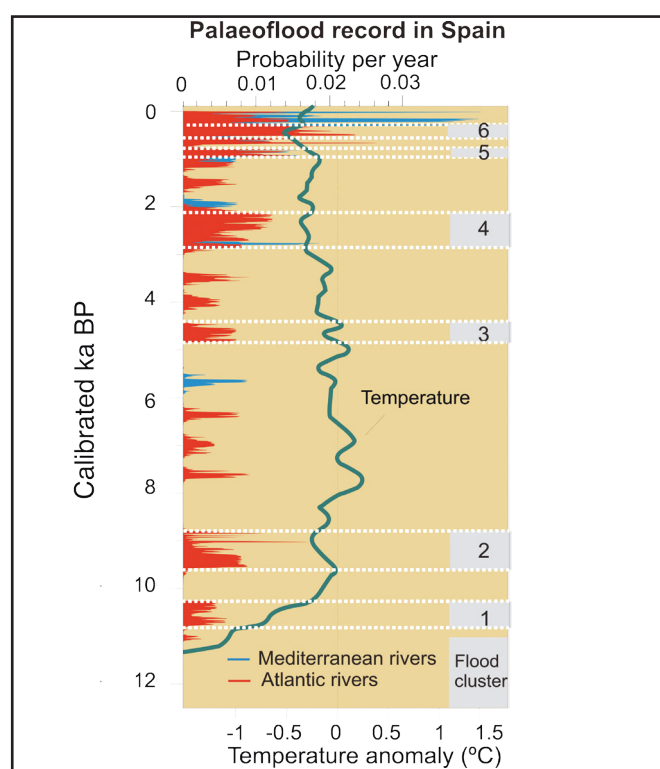
Examples of key projects are:

- GEOCLINMAR - Geomorphological evolution of coastal environments
- MILLENNIUM - European climate of the last millennium
- Past4Future - towards reconstructing abrupt climate changes during interglacials

### Spanish-funded projects

In Spain, research funding is provided by the Ministry of Innovation and Science, as well as by research programs of Regional Autonomous Governments. Examples of key projects are:

- FLOOD-MED - Flood hazards in Mediterranean rivers
- CALIBRE - Rapid climate changes in the Iberian Peninsula based on proxy calibration
- CIMERA - Linking Iberian Climates with the Atlantic Meridional Overturning Circulation
- GEOCLIMED - Geomorphological analysis of marine and terrestrial quaternary sequences from the Mediterranean Spanish littoral
- FluVALps - Fluvial variability in the Alps during the last 3,000 years



Summed probability for the radiocarbon dating from slackwater flood deposits in Spanish rivers, and periods of main dating clusters (FLOOD-MED Project).

### Spanish PAGES National Committee

- Gerardo Benito (Fluvial records)
- Cari Zazo (Coastal records)
- Antoni Rosell (Marine records)
- Blas Valero Garcés (Paleolimnological records)
- Mariano Barriendos (Documentary records)