

Reconstruction of Palaeoclimatic Changes in Europe for the Last 200 kyr Basing on U-Series dating of Speleothems

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Speleothems provide a sensitive tool for studies of past climatic changes as the periods of their growth coincide with relatively warm and humid episodes, while breaks in calcite deposition correspond to cool and dry phases. The growth of individual speleothems may be affected by local factors but the collective properties of speleothems growth may cancel out local effects.

Probability density functions (pdf) for speleothems growth are calculated from the skewed "pdf" for each date, using the original $^{230}\text{Th}/^{234}\text{U}$ and $^{234}\text{U}/^{238}\text{U}$ ratios with the corresponding analytical errors. Filters may be used to screen out dates with low precision. As a result we obtain continuous record which approximate speleothems growth frequencies.

442 results of U-Series dating of speleothems from Poland, Slovakia and Czech Republic were collected in U-Series Laboratory in Warsaw. Except of our data, 34 dating results published by other authors have been used for pdf construction. Results outside range of U-Series method, results of analysis with low efficiency of chemical extractions of Uranium and Thorium and results for the samples about essential contents of nonradiogenic Thorium have been rejected. Received set of dates has been used to construction of speleothems growth frequencies (pdf) in selected regions.

Final decision about regional division have been done undertaking took under attention two requirements. Minimum 150 dating results must be used for pdf construction and selected region should, in period of time embraced with analysis, to pass similar "climatical history".

In all regional age frequency distributions of speleothem datas the Holocene signal is the dominant, with decreasing frequency with time. This is due to two effects. First, Holocene speleothems dominate the available surfaces in caves. Second, speleothems tend to be destroyed over time, and therefore, older specimens are rarer than younger ones. Comparison of pdf from different regions (Carpatian Mts., European Uplands, England and Norway) confirms the conclusion that there is a significant latitudinal variation in time-dependent speleothems growth frequencies (strong climatical gradient N-S). Comparison of periods of intensive speleothems deposition in different regions of Europe by different authors does not show of essential temporary differences among them. It means that climatical changes, between 10 and 200 kyrs, in the Europe seem to be rather synchronic.