

ABSTRACT
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**Quantitative Annual Speleothem Records of Temperature,
Precipitation and Solar Insolation in the past – A Key for
Characterisation of past climatic systems**

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We studied luminescence of speleothems from Cold Water cave, Iowa, US and Rats Nest cave, Alberta, Canada. A reconstruction of the past annual precipitation rates for the last 280 years for Kananaskis country, Alberta, Canada has been obtained from speleothem annual growth rates.

In dependence on the soil surface exposition we measure either solar sensitive or temperature sensitive paleoluminescence speleothem records:

- In case of Cold Water cave, Iowa, US we obtained high correlation coefficient of 0.9 between the luminescence record and Solar Luminosity Sunspot index and reconstructed sunspot numbers since 1000 AD with a precision within the experimental error of their measurements;

- in case of Rats Nest cave, Alberta, Canada we measured correlation coefficient of 0.67 between luminescence intensity and air temperature record for the last 100 years and reconstructed annual air temperatures for last 280 years at the cave site with estimated error of 0.35 0C, while the error of the direct measurements is 0.1 0C.