

Impact of External Temperature on the Speleothem Growth in the Moravian Karst

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Abstract : Based on the data from the Moravian Karst, the influence of the calcite speleothem growth by selected meteorological factors was evaluated. External temperature was determined as one of the main factors influencing speleothem growth in Moravian Karst. This factor significantly influences the CO₂ concentration in soil/epikarst, and cave atmosphere in the Moravian Karst and significantly contributes to the changes in the CO₂ partial pressure differences between soil/epikarst and cave atmosphere in Moravian Karst, which determines the drip water supersaturation with respect to the calcite and quantity of precipitated calcite in the Moravian Karst cave environment. External air temperatures and cave air temperatures were measured using a COMET S3120 data logger, which can measure temperatures in the range from -30 to +80 °C with an accuracy of ± 0.4 °C. CO₂ concentrations in the cave and soils were measured with a FT A600 CO₂H Ahlborn probe (value range 0 ppmv to 10,000 ppmv, accuracy 1 ppmv), which was connected to the data logger ALMEMO 2290-4, V5 Ahlborn. The soil temperature was measured with a FHA646E1 Ahlborn probe (temperature range -20 to 70 °C, accuracy ± 0.4 °C) connected to an ALMEMO 2290-4 V5 Ahlborn data logger. The airflow velocities into and out of the cave were monitored by a FVA395 TH4 Thermo anemometer (speed range from 0.05 to 2 m s⁻¹, accuracy ± 0.04 m s⁻¹), which was connected to the ALMEMO 2590-4 V5 Ahlborn data logger for recording. The flow was measured in the lower and upper entrance of the Imperial Cave. The data were analyzed in MS Office Excel 2019 and PHREEQC.

Keywords : speleothem growth, carbon dioxide partial pressure, Moravian Karst, external temperature

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