Секция «Гидрогеология»

Hydrological control on present-day calcareous tufas formation – a case study from Buzgó stream in Slovak Karst (southern Slovakia)

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Calcareous tufas are freshwater deposits forming near the springs of karst origin. Over three years seasonal studies conducted in Buzgó hardwater stream in Slovak Karst (southern Slovakia) let to determine hydrological control on present-day calcareous tufa formation.

Seasonal observations (incl. hydrochemistry, growth rate) conducted between 2010 and 2012 revealed that stream waters are predominantly supersaturated in respect to calcite during a year and showed positive values of $SI_{calc.}$ (mean = 0.47). The highest values of $SI_{calc.}$ along the stream (0.88) were noted in the winter-spring season of 2012, while the lowest (0.37) in the winter season at the turn of the year 2010 and 2011. Seasonal observations proved that formation of calcareous tufas were almost continuous all year round and showed similar tendency to waters supersaturation. The most effective formation of calcareous tufas along the stream (growth rate = 0.8 mg/cm^2/day) were noted in the winter-spring season of 2012, while the least at the turn of the year 2010 and 2011 (growth rate = 0.18 mg/cm^2/day). The highest values of $SI_{calc.}$ and calcareous tufas growth rate were noted during periods of low spring discharges. It shows that formation of calcareous tufas significantly depends on local hydrological conditions, particularly groundwater level fluctuations.

Negative correlation between $SI_{calc.}$, and spring discharges suggests that increases of water turbulence, which theoretically should stimulate more vigorous precipitation seems to be negligible.

Acknowledgements: The study was financed by the Polish Ministry of Science and Higher Education grant N N307 600640