

## Summary

The geochemical information preserved in mollusc's shells is an exciting new tool to study rapid climatic and environmental changes. The seasonal variation is recorded in the isotopic composition of molluscan shells (Jones & Quitmeyer, 1996; Veinott & Cornett, 1998; Dettman et al., 1999; Wurster & Patterson, 2001).

The specimens of species *Unio pictorum* used in this investigation were collected from three different area of Lake Balaton – Balatonlelle, Balatonberény, Balatonszéplak. The shells were drilled and the carbonate samples were analyzed using Finnigan MAT 252 and Finnigan delta S mass spectrometer.

During the investigation several kind of technique were tested for sampling. One of the goals of this study was to find an appropriate technique for taking representative samples. Micro-drilling of the prismatic layer – at the same time avoiding the nacreous layer – proved to be the best method in this regard.

The water of Lake Balaton is essentially replenished by the Zala River and Nyugati-canal. Comparing the  $\delta^{18}\text{O}_{\text{aragonite}}$  values of shells from each sampling site (Balatonberény, Balatonlelle, Balatonszéplak) differences in  $\delta^{18}\text{O}_{\text{aragonite}}$  values were observed. These differences can be mainly explained by the influence of the Zala River and Nyugati-canal. As the  $^{18}\text{O}$ -depleted water flows from the inlet to the Eastern part of the Lake, the evaporation let the water gradually enriched in  $^{18}\text{O}$  and it is well recorded in the  $\delta^{18}\text{O}$  values of mollusc's shells.

If the time series of both temperature and  $\delta^{18}\text{O}_{\text{water}}$  are known,  $\delta^{18}\text{O}_{\text{aragonite}}$  can be calculated using the relationship:  $T(^{\circ}\text{C})=21,8-4,69(\delta^{18}\text{O}_{\text{aragonite}}-\delta^{18}\text{O}_{\text{water}})$  (Grossman & Ku, 1986). Temperature and  $\delta^{18}\text{O}$  data of water taken at Balatonszéplak (1 km offshore) have been used for calculating  $\delta^{18}\text{O}_{\text{aragonite}}$  and these latter data were compared to the measured  $\delta^{18}\text{O}_{\text{aragonite}}$  data of the shell (50 m offshore). Significant differences were observed during the growing period of 2002-2003, no difference was found for the year 2004. This difference observed can be explained by the probable difference in temperature and  $\delta^{18}\text{O}_{\text{water}}$  values between the sampling sites of water and shell, since the water level was extremely low during the period 2002-2003.

Secondary trends were identified using geostatistical methods in both  $\delta^{18}\text{O}_{\text{aragonite}}$  and  $\delta^{18}\text{O}_{\text{water}}$  time series. In case of  $\delta^{18}\text{O}_{\text{water}}$  time series a periodicity of approximately one-year (26 week, April-October) was observed.