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**Stable Isotopes of gastropoda shells from the Middle Holocene terraces in Lake Sünnet, Göynük, NW Anatolia**

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**Abstract**

We studied two detailed sections (each about 10 m thick) of Middle Holocene lake margin terraces (calibrated radiocarbon ages ranging from 8000 BP to 5000 BP) in Lake Sünnet (Göynük, NW Anatolia) in terms of mollusk palaeo-ecology and stable isotopes of selected gastropoda shells. Bulk sediment stable isotopes were also used where the mollusk shells were absent. The results are interpreted in order to explain the Middle Holocene climate variations and lacustrine conditions.

Five mollusk zones are distinguished in the studied record. The first 4 zones cover the time span of cal. 8000 BP- 6000 BP. They are typical with dominance of *Valvata cristata and Gyralus crista* in varying proportions, and represent generally shallow freshwater lake environment. The fifth zone is characterized by limited individuals of *Vallonia sp.* that mostly appeared in relatively dry period between cal. 6000-5000 BP in very shallow ponds.

*Valvata cristata* shell oxygen isotope ratio (δ18O*val*) display a gradual shift from -9.5‰ to -8.0‰ between cal. 8000 BP-6900 BP. At cal. 6900 BP an abrupt 2 permil positive shift occurred in only 15 years, which makes the first pervasive drought event in Middle Holocene. Following several high magnitude (2 permil), century-long climate fluctuations between cal. 6900 BP and 6400 BP, the δ18O*val* record gradually shifts to more negative values (2 permil) indicating a climatic recovery until cal. 6000 BP.

Subsequently, bulk sediment isotope ratio of oxygen (δ18O*sed*) exhibits a gradual but strong shift between cal. 6000 BP and 5500 BP from -9.0‰ to -5.0‰. This enabled proliferation of *Vallonia sp.* in mollusk Zone 5. Following a 3 permil recovery (negative shift) at about cal. 5500 BP, positive shift started again at cal. 5200 BP and continued until cal. 5000 BP when lake record ceased due to ongoing lake level drop in the studied terrace location.

***Keywords: Stable isotopes, Middle Holocene, Mollusk shell, Palaeo-ecology, Lake Sünnet***