Geophysical Research Abstracts
Vol. 15, EGU2013-9623, 2013
EGU General Assembly 2013

A 4500-year ostracod record from Lake Shkodra (Albania): palaeoenvironmental and palaeoclimatic reconstruction using a multi proxy approach.

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During September 2003 several cores were retrieved from the Albanian side of Lake Shkodra. Among them, a 7,8 m long composite core (SK13) has been selected for multidisciplinary analysis: ostracods, characeae, pollen, $CaCO_3$ content and stable isotopes. The chronological framework of SK13 was established through the recognition of four well-dated tephra layers and four 14C accelerator mass spectrometry measurements; the sedimentation rate has been calculated as an average of 0.2 cm a -1(Sulpizio et al 2010, Van Welden et al. 2008).
Ostracods have been recovered from 337 samples of 2cm3 in volume, collected almost continuously along the cores. Each sample corresponds to ca. 10 years. Ostracods are abundant and well preserved in all samples, represented by adults and juveniles. On the whole, 13 species have been recovered with different frequencies. Among them, some are endemic of the lake (Candona montenigrina, and Limnocythere scutariense), others are known from other Balcanic lakes and are recorded for the first time in Shkodra (Paralimnocythere georgevitschi in Lake Ohrid, Candona paionica and Candona “angulata” meridionalis in Lake Dorjan). The remaining taxa (Darwinula stevensoni, Pseudocandona marchica, Cypria ophtalmica, Ilyocypris gibba, Cypridopsis vidua, and Metacypris cordata, Cyclocypris sp. and Zonocypris sp.) are widely distributed in central and southern Europe, but signalled for the first time in Albania.
The faunal composition is quite homogeneous, with the percentages of the different species varying along the sediment core. The main change occurs at about 1200 cal a BP, where 8 ostracod species disappear and the frequency of the remaining 5 species dramatically increases. This major change reflects the $CaCO_3$ trend with its major peak around 1200 cal a BP. On the contrary, the Characeae display an opposite behaviour, occurring continuously from the base of the core until about 1200 cal a BP, when they as well disappear. The δ18Oc record shows values between ca. -8.7‰ and - 6.4‰ with frequent and large fluctuations from 4500 to ca 1200 cal a BP; such fluctuations decrease after ca 1200 cal a BP and at ca 800 cal a BP the values attain close to ca. -7.2 ‰Ṫhe δ13Cc record display value ranges between between ca. -5.1‰ and -3.1‰ the highest values are recorded between 4500 and 3000 cal a BP and the lowest peak is reached at about 1200 cal a BP following which there is an increasing trend reaching stability around -3.7‰ from 700 cal a BP. The pollen record is quite homogeneous, however since ca 1100 cal a BP the percentage of arboreal pollen decreases together with the pollen concentrations. Surprisingly most of the ostracod and charophyte species occur in recent material, sampled between 2010 and 2011 in the Albanian side of the lake. The drastic change recorded by all proxies at around 1200 cal a BP could be related to favourable climatic conditions linked to the Medieval Warm Period as recorded in other Mediterranean lakes. But a more local signal could have been the trigger for the sudden increase in ostracod frequencies, the disappearance of charophytes and the progressive magnitude reduction of the δ18Oc excursions recorded after 1200 cal a BP. could be also linked to a change in land use due to human activities.
Because of its high sedimentation rate, the high authigenic carbonate component, the abundant and well preserved microfossils and the possibility to study the modern analogue, the Shkodra lake and the SK13 composite core represent a perfect opportunity to study the Holocene evolution of an area at the transition between the Mediterranean Basin and the Balkans.

References

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