

the Earth's climatic system. For a long period, paleoceanographic studies have considered that Marine Isotope Stage (MIS) 11 (400,000 yr ago) is a better analogue of our current status than any other more recent interglacial due to the similar orbital situation.

Following this idea, we reconstruct Sea Surface Temperature (SST) conditions for the MIS 11 and for the Holocene in the Iberian Margin. For this study we use core MD03-2699 retrieved from the Estremadura Spur north of Lisbon at 1850m water depth for the MIS 11, while the Holocene reconstruction is based on two sediment sequences: 1) core MD03-2699 in conjunction with box core PO287-44B; and 2) core D13882, D13902 and box core PO287-26B from the Tagus prodelta off Lisbon, collected at 90m water. SST was estimated from the relative composition of C37 unsaturated alkenones ( $UK'37=0.033*SST+0.044$ ;  $r^2=0.96$ ;  $n=370$  (Müller et al., 1998).

The results show the Holocene maximum SST was close to 19°C and occurred between 10.5 and 9.7 ka while MIS 11 record reveals two warm phases: the first with maximum SST close to 18°C (427 to 412 ka) and a second with temperatures close to 19°C (407 to 395 ka). Both periods display a SST decrease following the maximum. However, in the case of MIS 11, that decrease was interrupted by the second SST increase along with the sea level high stand at 407ka. This observed parallelism was a pre-condition for further comparison of these two periods in the assessment of MIS 11 as a possible model for the future Holocene evolution. However, the forthcoming climate conditions of the Holocene remain an open question.

#### **CLIMATE CHANGES IN THE WESTERN IBERIAN MARGIN DURING MARINE ISOTOPE STAGES 15-9 (580 TO 300 KA): SUBORBITAL GLACIAL VARIABILITY**

Teresa Rodrigues. *LNEG, Portugal*  
E-mail address: [teresa.rodrigues@lneg.pt](mailto:teresa.rodrigues@lneg.pt)

Past sea surface water conditions of the western Iberian margin were reconstructed based on biomarker analyses of a marine deep sea core MD03-2699 from the Estremadura Spur north off Lisbon, providing new insights into orbital and suborbital-scale climate variability between Marine Isotope Stage (MIS) 15 to MIS 9 (580 to 300 ka). We use biomarker based proxy records such as the alkenone unsaturated index to estimate sea surface temperature (SST), the total alkenone concentration to reconstruct phytoplankton productivity and terrestrial biomarkers to evaluate the continental input. The results extend the existing biomarker record namely the SST for the Iberian Margin back to the 6th climatic cycle (580 ka). A general trend of stable interglacials contrasts with glacial periods and glacial inceptions which are marked by high-frequency variability. Thus, several short-lived climatic coolings were identified by large SST decreases, the occurrence of ice-rafted detritus (IRD) and high percentages of the tetra-unsaturated alkenone C37:4. Some of these events were extremely cold and similar in their general trends to the well known Heinrich events of the last glaciation. We identified 8 Heinrich-type events between 580 and 300 ka. The general deglaciation pattern detected between MIS 15 and MIS 9 is similar in their general trends to that characterizing the more recent climatic cycles, i.e. marked by two coolings separated by a short warming episode which may reflect the southward, north- and southward migration of the Polar front.

#### **EVALUATING THE ROLE OF CLIMATE CHANGES AND BIOTIC FACTORS ON MAMMALIAN COMMUNITY STRUCTURE DURING THE PLEISTOCENE**

Jesús Rodríguez. *CENIEH, Spain*  
E-mail address: [jesus.rodriguez@cenieh.es](mailto:jesus.rodriguez@cenieh.es)

Climate and biological interactions are currently recognized as key factors influencing community structure and composition. Functional group composition of either Local Faunal Assemblages (LFAs) or Faunal Complexes (FC) is frequently considered a good proxy to community structure. We consider that FC are not comparable to recent communities but to regional species pools and thus, LFAs should be used to represent paleocommunities. Climate has been often considered to be the main determinant of community composition and, consequently, community evolution and faunal turnover have been traditionally related to climate

changes. Although strong evidence supports the influence of climate oscillations on the evolution of FC during the European Pleistocene, their effects on community structure and composition are still poorly understood. Analysis of recent Holarctic local faunas reveals a complex influence of climate and regional species pool composition on community structure, measured as functional group composition of local assemblages. In addition, mammalian communities from southern Europe exhibited a marked structural continuity along several middle Pleistocene climatic oscillations. The Pleistocene fossil record provides a good opportunity to better understand the influence of climate changes and biotic interactions in shaping community structure in the long term, although the contribution of several disciplines is required. On the one hand, the concurrence of paleontologists and geochronologists is essential to obtain taxonomically consistent LFAs databases including reliable numerical age estimations. On the other hand, paleoclimatologists, palynologists and geochemistries should provide independent climate and environmental proxies. The results of such a research program would not only shed light on the evolution of Pleistocene paleocommunities, but it would also provide keys to predict the effects of current climatic change on living communities.

#### **FOREARC UPLIFT IN NORTH-CENTRAL CHILE RECORDED BY COASTAL AND CONTINENTAL RECORDS**

María Pía Rodríguez. *Departamento de Geología, Universidad de Chile, Chile*  
E-mail address: [mariaod@ing.uchile.cl](mailto:mariaod@ing.uchile.cl)

The Central Andes forearc has long been recognized as undergoing uplift. At the coast two kinds of geomorphic features, marine terraces and wave-cut low dipping features known as 'rasa', provide evidence this uplift. Many attempts to date them have been published. A synthesis of these data leads to the conclusion the uplift is quite recent, and probably begun ~400ky ago. In parallel, the main continental catchments display terraces, the main one being associated with both the marine terraces and rasas and a pediment. Cosmogenic nuclide dating show they formed at ~400-500 ky, fully consistent with the coastal estimate.

#### **TESTATE AMOEBAE (THECAMOEBIANS) AS WATER QUALITY INDICATORS IN LAKES: DEVELOPMENT OF A MODERN DISTRIBUTIONAL DATASET FROM THE GREATER TORONTO AREA**

Helen M. Roe. *School of Geography, Archaeology and Palaeoecology, United Kingdom*  
E-mail address: [h.roe@qub.ac.uk](mailto:h.roe@qub.ac.uk)

Thecamoebians were examined from 123 surface sediment samples collected from 45 lakes in the Greater Toronto Area (GTA) and the surrounding region to i) elucidate the controls on faunal distribution in modern lake environments; and ii) to consider the utility of thecamoebians in quantitative studies of water quality change. This area was chosen because it includes a high density of lakes that are threatened by urban development and where water quality has deteriorated locally as a result of contaminant inputs, particularly nutrients. Canonical Correspondence analysis (CCA) and a series of partial CCAs were used to examine species-environment relationships. Twenty-four environmental variables were considered, including water properties (e.g. pH, DO, conductivity), substrate characteristics, nutrient loading, and environmentally available metals. The thecamoebian assemblages showed a strong association with Olsen's Phosphorus, reflecting the eutrophic status of many of the lakes, and locally to elevated conductivity measurements, which appear to reflect road salt inputs associated with winter de-icing operations. A transfer function was developed for Olsen P using this training set based on weighted averaging with inverse deshrinking (WA Inv). The model was applied to infer past changes in Phosphorus enrichment in core samples from several lakes, including eutrophic Haynes Lake within the GTA. Thecamoebian-inferred changes in sedimentary Phosphorus from a 210Pb dated core from Haynes Lake are related to i) widespread introduction of chemical fertilizers to agricultural land in the post WWII era; ii) a steep decline in Phosphorus with a change in agricultural practices in the late 1970s; and iii) the construction of a golf