



A Palaeoenvironmental framework for the Epipalaeolithic to Neolithic occupation of Northeast Morocco based on land snail stable isotope analysis

Amy Prendergast (1), Jörg Linstädter (2), Monika Gdak (1), Bernd Schöne (3), and Rainer Hutterer (4)

(1) University of Melbourne, School of Geography, Melbourne, Australia (amy.prendergast@unimelb.edu.au), (2) German Archaeological Institute, (3) Institute of Geosciences, University of Mainz, (4) Zoologisches Forschungsmuseum Alexander Koenig

The Epipalaeolithic to Neolithic archaeological record in Morocco is key to understanding the shift from hunter-gatherer to pastoral-agricultural lifeways in North Africa. Some contend that these developments were modulated by shifts in climate and environment and connected to rapid climate change events during the Holocene. Evaluation of this hypothesis requires the linkage of local and regional climate records with well-dated archaeological sequences. The rock shelter of Ifri n'Etsedda, occupied between 10.0 and 6.0 ka cal BP, allows this hypothesis to be tested as the site contains both Epipalaeolithic and Neolithic deposits along with abundant material for palaeoenvironmental reconstruction. This study uses stable isotope analyses ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) land snail shells (*Alabastrina solute*) from the archaeological sequence to construct a palaeoenvironmental framework for interpreting human-environment interactions in northeastern Morocco. This offers the opportunity to study the Neolithic transition in the context of local palaeoenvironmental records.

Analysis of live-collected modern land snail shells from the study area show that the stable isotope compositions this species can be used for quantitative rainfall reconstructions ($\delta^{18}\text{O}$) and vegetation composition reconstructions ($\delta^{13}\text{C}$). The land snail stable isotope records from Ifri n'Etsedda suggests that while the early Holocene was characterised by a fluctuating but generally more humid climate, conditions became progressively more arid towards the mid Holocene. This shift to arid conditions coincided with the beginning of the Neolithic at the site around 7.2 ka cal BP. These local palaeoenvironmental records mirror shifts in the pollen record from the site and regional trends seen in other palaeoenvironmental records and suggest that environmental changes may have played a role in the transition to food production in the region.