



The relative timing of human occupation and palaeoenvironmental changes in the high-resolution sequence of Umm El Tlel: a Palaeolithic site in the Syrian desert

M.-A. Courty (1), E. Boëda (2), A. Emery-Barbier (3), C. Griggo (4), N. Mercier (5), I. Théry-Parisot (6) and H. Valladas (7)

(1) CNRS-IPH, CERP. Tautavel, France (courty@tautavel.univ-perp.fr / Tel. : 33468291995)

(2) Université de Nanterre – MAE, UMR 7041, Nanterre, France (eric.boeda@wanadoo.fr)

(3) Université de Nanterre – MAE, UMR 7041, Nanterre, France
(aline.emery-barbier@tele2.fr)

(4) Université Joseph Fourier, Institut Dolomieu, UMR 6636, Grenoble, France
(christophe.griggo@uifg-grenoble.fr)

(5) LSCE CNRS-CEA, UMR 1572, Gif,-sur-Yvette, France (norbert.mercier@lsce.cnrs-gif.fr)

(6) LSCE CNRS-CEA, UMR 1572, Gif,-sur-Yvette, France (helene.valladas@lsce.cnrs-gif.fr)

The integration of palaeoenvironmental studies and archaeological data has now well established the major role played by the rapid climate variability of the last glacial cycle on the behaviour of hunter-gatherer groups. The investigation of the causative linkages between sudden modification of natural resources and cultural changes, e.g. human migration, or changes of hunting strategies, is often limited by the fragmentary record of most archaeological sequences. Nearly continuous records can however be obtained from the sites in which human occupation and sedimentation have been in played at the smallest timescales, relevant both to cultural and environmental issues. The comprehensive understanding of these high resolution archives is constrained by our ability to determine the exact duration of occupation phases and natural events that were nearly instantaneous at geological scales (days to decades). The research strategy that can be developed to solve this limitation is illustrated here using the site

Umm el Tlel in the El Kowm basin (Syrian desert). This benchmark sequence for the Near East displays more than ten meters of well stratified deposits of aeolian, lacustrine and palustrine origin that were deposited in an endoreic basin. The natural deposits are interlayered with well preserved 70 occupation stratum that range from the late Upper Palaeolithic to the Middle Palaeolithic. C^{14} radiometric dating and TL ages of burnt flints frame the sequence between ca. 14 kyr BP and 70 kyr BP. The thick archaeological strata (in units VI 3 & 4) were interpreted to result from long-term occupation periods in contrast to the thin living floors (e.g. VIII2 α a, VI2 α a, V2 π a) that were assigned to short occupation phases on the basis of fauna and lithic assemblages. The micromorphological study of the different archaeological units allows to identify distinctive assemblage of pedo-sedimentary characteristics that are relevant in terms of duration and conditions of occupation. Their palaeoenvironmental significance is calibrated with the help of palynological data. The results emphasize the synchrony throughout the middle Palaeolithic of human occupation with erosional episodes of different magnitude and duration. The thin living floors (i.e. VI2 α a, V2 π a) often coincide with short (ca. a few decades) events of soil erosion by wind and runoff in response to a stronger Mediterranean influence. These swings interrupted long (ca. a few centuries) lacustrine episodes of bio-chemical sedimentation that were controlled by maintenance of cold aridity. The short events would possibly express the millennial-scale climate variability during isotopic stage 3. The series of rich archaeological layers that are interstratified in the lower sedimentary complex VI (VI 3 & 4) showing thick lacustrine strata formed under extreme aridity, relates to cyclical episodes of low energy hydric erosion. These long humid periods (ca. a few centuries) that slowly liquefied the formerly developed soils would correlate to the interstadial phases of the last glacial cycle. In contrast the thin archaeological layers within the unit VII coincide with pulses of high energy hydric erosion that induced profound transformation of the surrounding soil-landscapes. This unusual episode of torrential rainfall that is dated at ca. 70 kyr BP would represent the abrupt establishment of exceptional conditions at the transition from stage 5 to 4, possibly in response to an Heinrich event. The different timescales of human occupation in the site of Umm el Tlel appear to match the diverse patterns of climate variability encountered during the late Quaternary period.