Geophysical Research Abstracts
Vol. 14, EGU2012-6659, 2012
EGU General Assembly 2012

Palaeolithic use of fossil combustible linked to singular environmental conditions : the long term el Kowm record (Syria).

M.-A. Courty (1), J.-M. Le Tensorer (2), E. Boëda (3), S. Muhesen (4), E. Alsakhel (5), and F. Wegmüller (6)

(1) CNRS-MNHN UMR 7194, 1 rue René Panhard, 75013 Paris, FR (macourty@wanadoo.fr), (2) Institute for Prehistory and Archaeological Science (IPAS), University of Basel, Spalenring 145, CH-4055 Basel, Switzerland (jean-marie.letensorer@unibas.ch), (3) Université Paris X – Nanterre. UMR 7041. Maison de l'Archéologie et de l'Ethnologie. 21 allée de l'Université, 92023 Nanterre Cedex. FR (eric.boeda@gmail.com), (4) Damascus University, Syria (smuhesen@hotmail.com), (5) Musée des Antiquités Nationales. Damas. Syrie (alsakhel@mail.com), (6) Institute for Prehistory and Archaeological Science (IPAS), University of Basel, Spalenring 145, CH-4055 Basel, Switzerland (fabio.wegmueller@unibas.ch)

Identifying the adaptation of hunter-gatherer communities to particular situations that provided natural resources is a major concern for multidisciplinary team studying archaeological contexts. This challenge is illustrated in the desertic El Kowm basin in central Syria by data from Hummal and El Kowm Paleolithic sites. The sites form prominent mounds at artesian springs resulting from recurrent episodes of lacustrine, limnic and aeolian sedimentation in pseudo-karstic depressions. The few meter sequences provide semi-continuous succession of archaeological levels from the Oldest Palaeolithic (Oldowan) to the early Neolithic period. This long term continuity of occupation is partly due to attracting conditions due to the profusion of water from epithermal artesian wells during periods of high water recharge. In addition, we document here the unique potential of this endoreic basin to have accumulated singular fossil combustible of high energy value during particular environmental episodes. The latter are represented by the recurrence of distinctive black organogenic facies showing a contrasting micro stratification formed of interlayered grey calcareous silty clay, dark brown organic rich clay and dull orange clay. Spatial excavation has shown the unique preservation of Palaeolithic occupation surfaces in association to the microstratified facies. High resolution sampling and multi-proxy analysis have allowed explaining the formation of the microstratified facies from rapid changes of environmental conditions in response to contrasting fluctuations of atmospheric dust loading, precipitation events, rainwater quality and evapotranspiration. Organogenic microfacies formed at different time periods share common compositional assemblage and structural behaviour: occurrence of exotic fine sand-sized debris formed of metal-rich carbonaceous components with polymer, fine charcoal, vitrous carbon, carbon fibres, and exotic rock clasts with a metal-rich carbonaceous coating; highly stable microstructure and low wettability. Based on their analytical properties, the carbonaceous polymorphs and the associated mineral components are shown to deriving from fossil combustible of stratospheric origin. The comparison with modern analogues (cf. Courty et al., 2012) has provided keys to explaining the organogenic microfacies from accumulation episodes of exotic stratospheric aerosols in response to serial meteor explosion at high altitude. Geogenic markers and microfacies pattern show four situations: (1) nearly intact ancient surfaces with pulverized carbonaceous composite debris that trace the local effects of meteor explosion ; (2) secondary concentrations expressing accumulation of stratospheric aerosols from the heavy rainfall events subsequent to the meteor explosions; (3) relictual concentrations resulting from selective accumulation of the most resistant components by chemical and physical erosion along to the fossilization; (4) human-controlled concentrations of the unusual debris indicating intentional collect, use and transformation of the singular fossil combustible and related materials. Ancient humans are thus suggested to have regularly exploited the local sources of the singular fossil combustible that formed during episodes of serial cosmic explosions. The direct effect of increased atmospheric dust loading on precipitation regime explains the apparent synchrony between occupation phases and local climate changes. These are simply two distinctive responses to a common cause.

Courty, Benoît and Vaillant (2012). Possible interaction of meteor explosion with stratospheric aerosols on cloud nucleation based on 2011 observations. Geophysical Research Abstracts Vol. 14, EGU2012.