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Tufa and travertine of the Lesser Caucasus: a light on the Quaternary palaeoenvironment of the Circumcaspian regions

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In the course of the International Associated Laboratory HEMHA (Humans and Environment in Mountainous Habitats : the case of Armenia), the French Foreign Affair Ministry Caucasus Mission (CNRS-UMR 5133 Archéorient, Lyon University) and the French-German research program Ancient Kura (CNRS-UMR 7192 PrOCauLAC, Paris, France, Deutsches Archäologisches Institut, Eurasien-Abteilung, Berlin, Germany with ANR-CNRS and DFG funding) numerous sites of the Lesser Caucasus territory are under geomorphological, palaeoenvironmental and archaeological investigations. Through comparisons between the tufa/travertine system and the detrital formation morphosedimentary evolution, one of our research interests is to define the Late Quaternary landscape mutations as well as the origin and rhythmicity of the major morphogenic trends reversals. The impacts of the environmental changes highlighted on the human occupation modes are also debated. A total of 14 travertine and tufa formations were studied (8 Pleistocene and 6 Postglacial formations) on a Northwest-Southeast transect of more than 300 km across the Lesser Caucasus. Each of these carbonated system development are correlated with high global relative sea levels and interstadial climates on a range between the Marine Isotopic Stage 11 and 1 (ca. 335 to 1.5 Ky BP). The absolute chronology is constrained by a series of U/Th and 14C dating. A total of 24 dating was performed (6 radiocarbon and 18 U/Th datings), allowing a high quality overview of the travertinization process over the time at a regional scale. Jointly with the measurement of the late Quaternary interglacial series impact on the tufas development in the Caucasus, the geomorphological position of some travertinous formations and their absolute dating gives some clues about the neotectonic evolution of the studied valleys. In some area, the uplift rate has been determined (ca. 8 mm/year) and discretized from the alluvial incision signal. The analysis of the carbonated deposits (faciological determinations, palaeobotanical and palynological identifications of leave imprints and pollens), which are the expression of specific climatic conditions, and the comparative approach with the general morphosedimentary evolution, give a complete reading grid of the regional landscape mutation expressions and origins (Caspian Sea eustatism or exclusive climatic impact), necessary to understand the magnitude of the changes and their influence on the Circumcaspian societies.