



Shamb travertine, southern Armenia : evidence of rapid climatic and morphogenic changes around 9500 cal. BP in the Lesser Caucasus

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Aim : Through analysis of the morphosedimentary travertine system development in Lesser Caucasus valleys, define and identify the rapid Postglacial climate changes and their impact on the landscape mutations and societies of this bioclimatic and cultural crossroad area between Africa, Asia and Europe.

Location and specificity : Postglacial alluvial travertine system in the Vorotan valley near the Shamb locality, Syunik region, southern Armenia. The formations are developed in a former glacial valley connected to the Vorotan river. This major river in Armenia rises in the Syunik mountains and is confluent with the Arax near the Iranian border. They consist of various facies from alluvial thin detrital sedimentary units to chalky carbonated layers and sharp travertine deposits with grass imprints, gastropods, pollens and charcoal.

Methods : The geomorphological methodology used is a high-resolution morphosedimentary sequential analysis. Thanks to the cutting of the Shamb travertine formation by different unsustainable torrential rivers the morphostratigraphical studies can be conducted both longitudinally and laterally relative to the axis of the thalweg. Pollen sampling and analysis were carried out in the limnic, argillaceous detrital alluvial deposits and on chalky travertine facies in order to define precisely the bioclimatic conditions. The chronology is constrained by U/Th and ¹⁴C dating.

Results : In terms of sedimentary facies, our results clearly show the progression of temperate and humid conditions since the Last Glacial Maximum with an optimum ranked around 9500 cal. BP. These conditions are expressed through the progressive development of various travertine facies, from chalky units to sharp carbonated deposits that underline the growth of hydrodynamic conditions in the valley. A major phase of accumulation is also highlighted at this time. The pollen analysis almost completed will define more precisely these results. The presence of fire levels in some travertine facies as well as the use of formations studied as indicators of local tectonic evolution increments the morphogenic evolution pattern proposed.

Main conclusions :

During the Lateglacial humid conditions begin to rise in the southern Armenia valleys. Around 9500 cal. BP temperatures and humidity seems to increase at the same time and causes the filling of the valleys by the travertine formations development. This climatic event is generally recorded between Caucasus, Iran and Anatolia. Then, the steppic and dry conditions occurs before a new reversal of morphogenic tendencies oriented towards the thalweg linear incision. This study can be considered as the first step to the knowledge of landscape mutations in connection with climate changes and human occupations since the end of the last climatic cycle in this region.