Geophysical Research Abstracts
Vol. 18, EGU2016-11807, 2016
EGU General Assembly 2016

Towards a better understanding of ephemeral stream morphodynamics during the last 100 ka in the vicinity of the prehistoric site of Ifri n'Ammar (Morocco)

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This research focuses on the ephemeral stream deposits of Wadi Selloum to reconstruct the palaeoenvironmental evolution in the direct vicinity of the rock shelter Ifri n'Ammar (NE Morocco). As one of the oldest settlement sites of anatomically modern humans (AMH) in North Africa, Ifri n'Ammar documents periodic occupation phases since ∼170 ka. These discontinuous settlement dynamics may have been related to or influenced by landscape changes and climate forcing. Therefore, our study aims at identifying phases of morphodynamic activity and stability, respectively, in the deposits of Wadi Selloum by using micromorphological, sedimentological (laser diffractometry), geochemical (LOI, magnetic susceptibility, Scheibler method) and mineralogical (XRD) methods. A robust chronology for the ephemeral stream deposits was built by applying different luminescence dating techniques (OSL dating of quartz and pIRIR290 dating of potassium feldspar). An internal cross-check is provided by the TL-age of a pottery shard.

The application of luminescence dating techniques to Wadi Selloum deposits yield burial ages between 1.3 ± 0.2 and 102 ± 8 ka, with enhanced aggradation occurring during three time spans: between ∼100 and 60 ka, ∼21 and 14 ka and during the Holocene.

The development of a major palaeosol (2B-2C-sequence) points to a stability phase during the OIS 3. Pedogenesis is evident in thin sections by well-developed subangular blocky microstructures. The main soil forming process is the precipitation of secondary carbonate in subsoil horizons, indicated by pedofeatures such as calcite infillings and hypocoatings. Holocene deposits (6.4 ± 4 to 1.3 ± 0.2 ka) seem to be affected by short-term changes between a relative stability of the landscape and hydromorphic activity, evidenced by the strong variations in the mineralogical and geochemical characteristics. This is supported by an insignificant differentiation in soil horizons with only weakly developed pedofeatures. The uppermost part of the profiles shows a weak Ap-C-sequence of a calcaric Fluvisol.

Our study provides first insights in the palaeoenvironment around Ifri n'Ammar during the last glacial interglacial cycle and may allow for assumptions about climatic conditions during the time of human occupation in Ifri n'Ammar.