

KlimaCampus Colloquium

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At the invitation of the Center for Earth System Research and Sustainability CEN

The Nile River during the Holocene: Environment, climate and the humans

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Abstract

As been one of the longest rivers on Earth, and having nurtured the development of highly complex human societies, the Nile River is a key location to study the environment-human interactions, and the response of the geosystem to climatic changes. In this regard, the Holocene period is a particularly relevant time interval as it encompasses large-scale environmental changes, such as the waxing and waning of the so-called Green Sahara as well as crucial evolutions in human populations. In this presentation, we will focus on the response of the Nile River system to climatic changes and the relationships to human population dynamics. Fluvial sediments deposited on the submarine delta can be seen as a "time machine" that allows to reconstruct the environmental changes in the catchment area. Among other methods, we used molecular fossils stored in the sediments to reconstitute the changes in vegetation cover, and radiogenic isotope ratios as tracers of sediment provenance, which provide crucial information on erosion dynamics and river runoff. Two main results were derived from our study: 1) although the overall Nile River runoff decreased steadily throughout the Holocene, the contribution from the two main sources (the Blue and White Niles) varied greatly and rapidly; 2) the vegetation cover and erosion pattern changed abruptly during the early Holocene, whereas the Nile Runoff remained high. In order to characterize the climatic mechanisms controlling the changes observed, we compared our results to other regional records and to the output from a high resolution atmospheric model (LMDZ4). Finally, the comparison of our reconstructions with published archeological reconstructions suggests that important steps of human evolution, such as the beginning of pastoralism, were probably triggered by rapid changes in the environment.