

Late Quaternary Climates of the Eastern Sahara

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The Eastern Sahara of Western Egypt, Northwest Sudan and Northeast Chad presently is the largest hyperarid area on earth but underwent severe climatic changes in the past.

During several episodes of the last interglacial (Eemian or Isotopic stage 5; 130-75 ka before present), high groundwater levels caused considerable lake, calcrete and speleothem formation unparalleled in the Quaternary geological record.

For the early and mid-glacial times between 75 and 20 ka bp, the question of uninterrupted aridity is still a matter of controversy though there are some indications of minor humid intervals. During the last glacial maximum at 18 ka bp as well as during the terminal Pleistocene, Northeast Africa undisputedly witnessed extremely dry conditions leading to almost complete deflation of earlier water-borne sediments.

Following the abrupt onset of humid conditions at 9,300 bp (uncal.) all over the Eastern Sahara, the early and mid-Holocene wet phase resulted in extensive and well-preserved fluvial (e.g. Wadi Howar), playa (e.g. Gilf Kebir plateau) and lake deposits (e.g. West Nubian basin and Ounianga Serir). Prograding aridity terminated aquatic sedimentation around the latitude of the Tropic of Cancer (23°N) at 4,800 bp, and in the southeastern periphery of the Sahara (17°N) at about 2,000 bp.

Environmental change during the early-Holocene climatic optimum was dominated by southerly rains driven by a paleo-monsoon system which reached some 700 km further north than today subjecting a major part of the African continent to essentially different living conditions and triggering various cultural and socio-economic processes.