

Understanding past hydrological changes in Africa since the Last Glacial Maximum

Ilham Bouimetarhan¹ and Rachid Cheddadi²

Session OSM19 at the PAGES 6th Open Science Meeting, online, 16 May 2022



PAGES AGADIR 2022
6th Open Science Meeting
Learning from the past for a sustainable future

About two-thirds of Africa is arid or semi-arid, and water availability is a critical factor for the wellbeing of ecosystems and anthropogenic activities. Studies of regional hydrologic fluctuations in Africa since the Last Glacial Maximum (LGM) reveal profound implications and impacts on ecosystems and human societies. Reconstructions of paleoenvironmental changes in such critical environments are often hindered by the lack of suitable archives under arid conditions. The 6th Open Science Meeting (OSM) session OSM19, "Understanding past hydrological changes in Africa since the Last Glacial Maximum", was proposed in an attempt to build African research synergies, and provide an overview of the recent research on past climate change since the LGM from different regions in Africa. In this context, the session aimed to provide a better understanding of the spatio-temporal variability of hydrologic changes over Africa since the LGM. This session was dedicated to identifying new hydrological records from Africa, including terrestrial and marine

records, with a time span that covered the last 20 millennia. Although the conference was completely online, the session successfully attracted diverse contributions that provided an overview of the ongoing science inland and offshore of the African continent. This session provided a scientific platform to share new records from different areas and time periods based on very interesting proxy records and model simulations to identify long-term climate variabilities, explore mechanisms and dynamics underlying the observed climate changes, and address the impact that hydrological change has had on the evolution of ecosystems and human activities. The session was attended by more than 90 participants, with eight oral contributions and eight posters that presented and discussed the state-of-the-art research of the African hydrological changes since the LGM.

The session was built around three key research foci: (1) paleohydrological and paleoenvironmental changes during the

LGM, (2) anthropogenic vs climate effects on African environments during the LGM, and (3) data-model synthesis of spatiotemporal variations in African hydroclimate since the LGM. Panelists (over 60% were early-career researchers) presented their latest research from different parts of Africa and provided a few recommendations. This session highlighted the increasing need of new data for both past climate reconstructions and model simulations/improvement in order to fill existing gaps and obtain a more complete overview of the LGM African hydroclimate. This task can only be fulfilled in a collaborative framework between the marine and terrestrial research communities, and between data and modeling communities. We therefore all agreed to put further efforts into: (1) comparing and integrating, simultaneously and independently, terrestrial and marine records in paleoclimate interpretations; (2) investigating tropical influence on hydroclimate variation in the hyper-arid central Sahara; (3) generating more Late Quaternary Aeolian-fluvial paleoenvironmental archives in Africa; (4) reconstructing high-resolution hydroclimatic and vegetation changes using historical archives and multi-proxy sediment records and (5) providing data-model synthesis of hydroclimatic proxies over Africa. Possibilities are presently being explored to collaborate on these research foci.

The session conveners were satisfied with the quality and the diversity of oral and poster presentations, as well as with the gender balance and the geographical representation. However, we strongly felt that the session was dominated mainly by research from North Africa and the central and eastern Sahara desert. Additionally, the session conveners would like to emphasize that although African climate mechanisms and impacts on regional and local ecosystems can be partially studied by the international community, an increased international scientific effort toward involving institutional cooperation with locally based African scientists, especially West and East Africa, is necessary to make significant progress in this field.

AFFILIATIONS

¹Faculty of Applied Sciences, Ibn Zohr University of Agadir, Morocco

²ISEM, University of Montpellier, CNRS, IRD, France

CONTACT

Ilham Bouimetarhan: i.bouimetarhan@uiz.ac.ma



Figure 1: Ecosystem-climate-human interaction in Lake Afourgah (Middle Atlas at 1420 m above sea level, Morocco).