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Paleofire activity in North Africa during the last 21 ka inferred from a charcoal record from lake Ifrah (Middle atlas – Morocco): climatic implications.

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While the paleofire activity of the Late Glacial Maximum is well defined in different records from most part of the both hemispheres, paleofire activity in North Africa and its connections with past climatic changes still remains poorly documented. A multiproxy analysis using organic and inorganic matter, geochemistry, magnetic susceptibility, microcharcoal and pollen data from Lake Ifrah (Middle Atlas – Morocco) provides new insights for better understanding paleofire occurrence during the Late Glacial Maximum and Holocene periods. The comparison between microcharcoal distribution and lacustrine multiproxy data highlights the variability of paleofire activity that is interpreted in term of long-term climate-driven changes. The early- to mid-Holocene (between 10.2 and 5.0 k yr BP) marked a significant increase in microcharcoal abundance which likely testifies regional emissions from forest fires. Such biomass burning events were associated to prolonged periods of drought, as inferred by synchronous abrupt decrease in surface runoff input records (e.g. organic matter, trace elements and magnetic susceptibility) and increase in carbonate content, calcite and Mg-calcite concentration. At a long-time scale, orbitally induced changes in summer solar radiation at the northern Hemisphere atmosphere and ocean circulation account for large part of hydrological and climatical changes in the Northwestern Africa. The reconstructed fire activity strikingly synchronizes with the climatic variability that occurred during the LGM and Holocene at a regionally scale.