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A multi-proxy record of Holocene environmental change from Lake Chamo, southern Ethiopia

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The structure and evolution of East Africa Rift Valley has made the region sensitive to climate change, with alternating wet and arid periods that may have influenced human evolution. Understanding environmental change and its impact on human societies for the last few millennia may provide insights that can be applied to longer records from the region. Geophysical and geochemical data together with ostracods and sedimentary charcoal were used to reconstruct Holocene environments at Lake Chamo, a rift lake in southern Ethiopia. Humid conditions in the early to mid Holocene are inferred from high Si count and high diatom abundance. Poor calcite preservation along with relatively lowered lightness (L*) value also confirm this humid period. Abundant charcoal suggests more stable woody savanna vegetation during this time. A major change to aridity occurred at 5200 cal yr BP, as indicated by high amounts of calcite in the sediments and high ostracod abundance. The dramatic decline of charcoal concentration after this time clearly shows the vegetation response to aridity. Fluctuating value of Ca and Sr in conjunction with high colour changes during 2400 – 800 cal yr BP, reflecting the changing conditions of reducing/oxidizing reaction that might indicate the occurrence of both humid and dry periods. High catchment inwash and deposition of terrigenious material at 1500 – 800 cal yr BP indicate periods of intensive erosion. This intensive erosion might favor as a function of both anthropogenic impact and climatic variability. Moderate values of all the geochemical data along with higher values of "L*–a*–b*" colour data from 800 cal yr BP to the present indicated generally dry conditions. Overall, the record from Lake Chamo shows major environmental changes, in agreement with other studies from the region.