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Geochemistry of sediment in south part of Urmia Lake and responses to climate change during 20,000 years ago

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Sediments deposited on the beach and 10km surroundings of Urmia Lake have contributed to the understanding of a long-term environmental history of this area. Clay mineralogy along with major elements and loss on ignition (LOI) of Urmia sediments were determined with the aim of evaluating their suitability with climate changes. These climate records are concerned with changes in precipitation or effective moisture. This lake is brackish or saline and often very shallow. Depositional units of contrasting lithological and geochemical composition have been distinguished, reflecting past environmental conditions associated with relatively warm, peak warm, cold and dry, and cold but moister climate modes. Calcium and strontium was found to have a negative relationship with aluminum through a cluster analysis. Sodium and magnesium were influenced by the underwater lake environment. Aluminum, potassium, iron, magnesium, beryllium were predominantly terrigenous. The amount of $CaCO_3$ that is ultimately incorporated into the sediments is a function of how much is produced in the epilimnion and how much is consumed in the hypolimnion and the sediments. Iron, manganese, and phosphate accumulate in the anoxic hypolimnion throughout the summer. Detrital clastic material in the sediments of Urmia Lake deposited over the last 20000 years is a major component that is mostly river-borne (fluvial). The clastic component is responding to external forcing (river) whereas the authigenic components are responding to internal forcing (productivity), although both may ultimately be forced by climate change. The enrichment factors for heavy metals suggested that the influence of human activities on heavy-metal enrichment in Urmia Lake region was not severe over the past century. High agricultural water demand and dam making resulted in rapid declines in lake water level, with subsequent increases of lake water salinity, as evidenced by enhanced sodium and evaporate minerals concentration in Lake Core sediments. During this period, anthropogenic activity also enhanced the intensity of weathering and the denudation of the Urmia watershed.