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Clay mineralogy and sediment grain-size variations as climatic signals in southern part of Urmia Lake cores, North West of Iran

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ABSTRACT:

Generally, the reconstitution of palaeo-geography and related environments is based on the study of sediment markers such as grain size and clay mineralogy. In this research, 90 surface and subsurface sediment samples from eight cores were analyzed for grain size and clay mineralogy in southern part of Urmia lake coast and adjacent areas. Abundant minerals are quartz, feldspars, calcite and dolomite. Heavy minerals identified were epidote, hornblende and zircon. Clay minerals are Kaolinite and Smectite mainly. Clay mineralogy and mean grain size of sediments in eight cores of Urmia Lake; reflect climatic conditions in this region. Relatively coarse sediments usually deposited during Urmia Lake low stands and relatively fine sediments deposited during high stands. The mineralogy of the clay-size fraction was determined by X-ray diffraction (XRD). Mineral assemblages display two climate conditions: Those having large Kaolinite, quartz, and feldspar peaks but a small smectite peak (interpreted to be cold times), and those with small Kaolinite, quartz and feldspar peaks and a large smectite peak-(warm sediments). In addition, smectite content correlate well with high mean grain size in Urmia Lake sediments, whereas sediments rich in Kaolinite, quartz, and feldspar correlate well with finer mean grain size. Chemical elements of the total sample are mainly of terrigenous origin, supplied by "Discharge Rivers", which discharges in Urmia Lake. Variations in clay mineralogy and grain size didn't indicate that the lake-level variations and nature of sediments delivered to the lake vary in concert with global climate changes, recently. Human activities such as Dams' constructions and agriculture have probably induced variations in the mobilization of chemical elements.

Keywords:
Sediment, Grain size, Clay mineral, Climate, Urmia lake.

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