



Evidence of ENSO and IOD Interplay in Continental Climatic Records from Southern Himalaya (Renuka Lake), India

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Abstract

We studied the ²¹⁰Pb and ¹³⁷Cs isotope dated shallow sediment core taken from the Renuka Lake (India), using the multiproxy approach, e.g. clay minerals (illite, chlorite and kaolinite), Chemical Index of Alteration (CIA), Chemical Index of Weathering (CIW). In overall distribution, illite (65%) dominates throughout the sequence, followed by chlorite (19%) and kaolinite (16%). The average value of CIA and CIW in the Renuka Lake was estimated 76 and 93, respectively. Based on these proxies, two major wet and warm (ca. 1839-1890 AD and ca. 1929-1959) and two arid (ca. 1890-1929 AD and ca. 1959-2003 AD) phases of the climate were observed in the Renuka Lake. The climatic phases of the Renuka Lake area seem to be influenced significantly by the sea surface temperature (SST) anomalies e.g. Indian Ocean Dipole (IOD) and El Nino Southern Oscillation (ENSO). The more positive value of the Dipole Mode Index (DMI) since 1920 AD and onward affected the monsoon-dominated climate in the foothill region of the Himalaya. It has also been observed that the relationship between ENSO-ISM was weakened and the influence of Indian Ocean Dipole (IOD) increased on ISMR despite the strong El-Nino year (1997), the ISMR remained above the normal. The present study gives strong evidences of the multiple factors that have been controlling the monsoon in the region.

Keywords: Monsoon, ENSO, IOD, Clay Minerals, Sediment Core, Renuka Lake, Southern Himalaya, India