

## **A geochemical record of the link between chemical weathering and the Indian summer monsoon during the Late Holocene recorded in lacustrine sediments**

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Geochemical data obtained from lake sediments can not only provide valuable insights into chemical weathering intensity (CWI) within lake catchment, but also information on past climatic and environmental conditions of a region [1, 2]. We studied sediments of Pookot Lake, a closed, natural lake located in the *Sahyadri*, southern India, to investigate variations in CWI and Indian Summer Monsoon variability during the past 2500 years. Major (Na, K, Ca, Fe, Mg, Al, Ti), minor (Mn, Cu, Zn, Ti, P, Rb, Sr, Ba, Pb) and rare-earth elements were analysed in an AMS <sup>14</sup>C-dated sediment core. The elemental data and various chemical weathering indices [Rb/Sr, K/Al, Na/Al, Chemical Index of Alteration (CIA) and Chemical Index of Weathering (CIW)] indicate significant changes in the intensity of chemical weathering:

1. ~ **2500 cal. years B.P.**: Enhanced rate of chemical weathering which points to high rainfall conditions.
2. **2500-1300 cal. years B.P.**: Decreased rate of chemical weathering, indicating a weak monsoon.
3. **1300-600 cal. years B.P.**: Increased rate of chemical weathering due to a strong monsoon. This period corresponds to the Medieval Warm Period (MWP).
4. **600-300 cal. years B.P.**: Decreased rate of chemical weathering due to a weak monsoon. This period corresponds to the Little Ice Age (LIA).
5. **300 cal. year B.P. to the Present**: Slightly increasing rate of chemical weathering resulting from strengthening of the monsoon.

These data indicate that the rate of chemical weathering has varied in concert with the intensity of the Indian summer monsoon during the Late Holocene in southern India.

[1] Zhang et al. (2016) PLOS One <https://doi.org/10.1371/journal.pone.0168928>.

[2] Park et al. (2014) QSR 105, 112-125.