Title:	Contrasting pattern of hydrological changes during the past two millennia from central and northern India: Regional climate difference or anthropogenic impact?
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Abstract:	High resolution reconstructions of the India Summer Monsoon (ISM) are essential to identify regionally different patterns of climate change and refine predictive models. We find opposing trends of hydrological proxies between northern (Sahiya cave stalagmite) and central India (Lonar Lake) between 100 and 1300 CE with the strongest anti-correlation between 810 and 1300 CE. The apparently contradictory data raise the question if these are related to widely different regional precipitation patterns or reflect human influence in/around the Lonar Lake. By comparing multiproxy data with historical records, we demonstrate that only the organic proxies in the Lonar Lake show evidence of anthropogenic impact. However, evaporite data (mineralogy and δ18O) are indicative of precipitation/evaporation (P/E) into the Lonar Lake. Back-trajectories of air-mass circulation over northern and central India show that the relative contribution of the Bay of Bengal (BoB) branch of the ISM is crucial for determining the δ18O of carbonate proxies only in north India, whereas central India is affected significantly by the Arabian Sea (AS) branch of the ISM. We conclude that the δ18O of evaporative carbonates in the Lonar Lake reflects P/E and, in the interval under consideration, is not influenced by source water changes. The opposing trend between central and northern India can be explained by (i) persistent multidecadal droughts over central India between 810 and 1300 CE that provided an effective mechanism for strengthening sub-tropical westerly winds resulting in enhancement of wintertime (non-monsoonal) rainfall over northern parts of the Indian subcontinent, and/or (ii) increased moisture influx to northern India from the depleted BoB source waters.
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