



## **Groundwater-Climate variability link in the transboundary aquifer system of south Asia**

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Fresh water resource of South Asia is becoming extremely stressed due to the rapid rate of groundwater depletion in recent times, particularly in the agriculture-heavy regions of India and Bangladesh. Among other factors, the relationship between climate variability and groundwater levels is critical for the security and sustainability of the water-food nexus. Thus, it is worthwhile to comprehend the poorly understood groundwater-climate continuum at basinal and sub-basinal scale. With the wavelet coherence analysis, we demonstrated the influence of global climate cycles on groundwater levels in the parts of the transboundary aquifer system of South Asia. Our findings suggest rapid groundwater response to the global climate patterns in shallow levels and relatively delayed groundwater response with increasing depth. However, this intuitive response is not visible in places with pervasive groundwater exploitation. Our findings also indicate that climate oscillations from the Pacific Ocean have a major influence on groundwater levels in the region. The findings would help in constructing resilience scenarios of groundwater impacted by climate variability and to take countermeasures, especially during climate-driven dry periods.