



## Tropical Indian Ocean hydroclimate and its relation to the Hadley and Walker circulations since the last glacial

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*Climate models predict a slowdown of the zonal and meridional atmospheric overturning circulation over the tropics (the Walker and Hadley circulations) for the twenty-first century with severe consequences for tropical and global climate. However, debate exists on the appropriate interpretation of historical records and observations over the twentieth century and necessitates longer records of past changes in tropical circulation to test the model results. Several records of continental rainfall, sea surface and thermocline temperatures from the eastern Indian Ocean extending back to the last glacial period suggest a stronger-than-today glacial Indian Walker circulation. Changes in the Hadley circulation occurred at different timescales and through a number of forcings. Climate model simulations underscore the sensitivity of tropical circulation to temperature change, among other forcings, but remain equivocal and in part, inconsistent with paleo-reconstructions. Untangling the (competing) impacts of meridional and zonal circulation changes on tropical hydroclimate, and whether and how these changes are reflected by different proxies at different sites, remains a critical task for both paleoclimate reconstructions and simulations.*