

## **Local Hadley and Walker circulations**

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*Abstract:*

It is widely accepted that the Hadley circulation is widening and that the Walker circulation is weakening. Here, we investigate changes in the local Hadley and Walker circulations by decomposing the vertical mass flux into a zonal and meridional component, then computing their linear trends between 1979 and 2009. This study emphasizes the regional differences in changes in the local Hadley and Walker circulations over a 31-year period. Additionally, the impact of the Madden-Julian Oscillation on the local Hadley and Walker circulations is investigated.