

## **Sensitivity of deep convection to free-tropospheric humidity in a hierarchy of models**

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Results from a general circulation model suggest that some systematic biases of the simulated tropical climatology, such as the double Intertropical Convergence Zone, can be alleviated by an increase of the entrainment into convective plumes, but to the expense of an overestimation of precipitation in the center of tropical convergence zones. This sensitivity results from a decrease of precipitation at the margins of the convergence zones and from changes in the variability at the intraseasonal scale. Single-column models with parameterized vertical large-scale motion confirm that increasing the sensitivity of deep convection to free-tropospheric humidity generally increases the capacity of the model to sustain either non-precipitating equilibria or oscillatory stationary states over warm waters.