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Sensitivity of deep tropical convection to changes in the thermodynamic environment[1] SHARON SESSIONS, DAVID RAYMOND, SASKA GJORGJIEVSKA, New Mexico Institute of Mining and Technology — Accurately modeling the effects of climate change using global models relies heavily on the representation of unresolved convection. This is because a major uncertainty in models is due to the effect of clouds and water vapor. Reducing this uncertainty requires a better understanding of convective processes. Deep tropical convection is especially important since it simultaneously drives global circulation and evolves as a result in changes to the convective environment induced by the general circulation. We investigate how changes to the thermodynamic environment–specifically changes in temperature and moisture–modify tropical convection. Unsurprisingly, increases in environmental moisture result in convection with higher precipitation rates. However, a counter-intuitive result is that increases atmospheric stability associated with a cooling in the lower troposphere and a warming aloft also produce higher precipitation rates. Understanding this result has provided significant insight to tropical cyclogenesis, and may be important for understanding other types of large scale organization of tropical convection.

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