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Atmospheric circulation and energy transport changes in warm climates

Hamza Kunhu Bangalth (1) and Olivier M Pauluis (1,2)

(1) Center for Prototype Climate Modeling, NYU Abu Dhabi, Abu Dhabi, U.A.E, (2) Center for Atmosphere Ocean Science, Courant Institute of Mathematical Sciences, New York University, 251 Mercer Street New York, NY

The equator-to-pole differential heating is the primary driver of the large-scale atmospheric circulation. Any change in the Earth's energy budget, for example, due to changes in atmospheric composition, surface albedo or solar activity, also alter the atmospheric dynamics and vice-versa. The energy transport can be due to a transport of sensible, latent or geopotential energy, and can occur through a large-scale overturning circulation or synoptic-scale eddies.Identifying the relative importance of each transport mechanisms at this location is crucial in explaining the mechanics and energetics of an altered climate.

The current study investigates the changes in the atmospheric circulation and energy transport under different climates. A series of aqua-planet simulations with varying CO_2 concentration and solar forcing in the HIgh Resolution Atmospheric Model (HiRAM) The dynamic responses have been analyzed by averaging circulations on isentropic surfaces which better represent the eddy transport than the Eulerian mean approach. The response of energy transport has been estimated separately for their mean, and eddy components.