



Tropopause Structure and Stratospheric Circulation

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We consider the role of baroclinic eddies on stratospheric circulation and their role in shaping the tropopause. We present a series of dynamical states using an idealized three-dimensional general circulation model with gray radiation and latent heat release. Beginning with the case of radiative-convective equilibrium, we develop an eddy-free two-dimensional state with zonally symmetric flow, followed by a three-dimensional state that includes baroclinic eddy fluxes. In both dry and moist cases, we find that the deepening of the tropical tropospheric layer and the shape of the extratropical tropopause can be understood through eddy-driven processes such as the stratospheric Brewer-Dobson circulation. These results suggest that eddies alone can generate a realistic tropopause profile in the absence of moist convection and that stratospheric circulation is an important contributor to tropopause structure.