

# 國立中央大學大氣物理研究所書報討論

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## Is Tropical Atmosphere in Convective Quasi-Equilibrium?

### Abstract

The convective quasi-equilibrium (CQE) is an important assumption for theoretical study of the large-scale phenomenon within tropics, which states that the time series of instability is in statistical equilibrium so that the temperature profile will tie to the moist adiabat with neutral stability. Because of this property, the free tropospheric saturation moist static energy (MSE) will tie to boundary layer MSE, which will predict unity correlation and regression coefficient between these two quantities.

By examine the vertical profile of the correlation and regression coefficient between saturation MSE and boundary layer MSE from the long-term sounding data within tropical convection center, this study finds that tropical region is far from CQE due to weaker warming of shallow convection and stratiform precipitation which leading to the sign reversal of heating from lower to upper troposphere. By this evaluation, the possible mechanism may be due to the oversimplifications for convection life cycles.

### Keywords

Convective Quasi-Equilibrium (對流準平衡)

### Reference

Lin, J., T. Qian, T. Shinoda, and S. Li, 2015: Is the Tropical Atmosphere in Convective Quasi-Equilibrium?. *J. Climate*, 28, 4357–4372, <https://doi.org/10.1175/JCLI-D-14-00681.1>.