Introduction
Thermal characteristics of the tropical cold-point tropopause (CPT) play a crucial role in stratosphere-troposphere coupling and exchange (Holton et al. 1995). For example, temperature of the CPT controls transport of water vapor from the troposphere to the stratosphere (Brewer 1949; Mote et al. 1996) and affects global radiation budget (Holton et al. 1995; Forster and Shine 1999). Thus, the thermal variabilities are of importance in climate studies.

In this study, we examine the thermal variabilities of the CPT in seasonal and intraseasonal time scales using high-resolution global temperature profiles from COSMIC GPS RO measurements.

Data
COSMIC GPS RO mission was jointly launched by Taiwan and US for weather, climate, space weather and geodetic studies. It provides a large number of high-resolution temperature profiles over the globe (~2000 profiles/day) since its operation at April 2006.

This study uses recent 4 years of COSMIC data (Sep. 2006 - Aug. 2010)

What drive the thermal variability of the CPT?

1. Convection
2. Tropospheric circulation
3. Stratospheric processes
4. TTL upwelling
5. Equatorial waves

Conclusion
- Geographical distribution of T-CPT minima and maxima is controlled by localized deep convection and large-scale circulation in the tropical troposphere.
- However, its seasonal cycle is largely driven by stratospheric circulation and upwelling in the TTL.
- Intraseasonal variability of T-CPT is dominated by Kelvin waves (free and convectively-coupled waves) with non-negligible contribution by MJO convection.

Further work
1. Seasonal cycle of T-CPT : Compare the contribution of 3 and 4 using idealized GCM
2. Locality of T-CPT, Water vapor transport in the TTL

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