

R005-43

Zoom meeting C : 11/2 PM1 (13:45-15:30)

15:00~15:15

Impacts of CO2 doubling on momentum balance in the thermosphere.

#Masaru Kogure¹, Huixin Liu¹, Chihiro Tao²)

⁽¹Kyushu University, ⁽²NICT

A CO2 increase causes global cooling in the thermosphere. Numerical models predict that a doubling of the CO2 mixing ratio leads to ~50 K neutral temperature cooling and ~50 % neutral density drop in the thermosphere (e.g., Dickinson, 1989; Solomon et al., 2018). Also, observation studies support this cooling thermosphere due to the CO2 increase (Ogawa et al., 2014). While the CO2 increase impact on the neutral temperature is understood well, its impact on the thermospheric dynamics is poorly understood. Liu et al. (2020) investigated the impacts of CO2 doubling on the dynamics of thermosphere using the whole atmosphere model Ground-to-topside Atmosphere Ionosphere model for Aeronomy (GAIA). The zonal mean zonal wind in the lower thermosphere is accelerated eastward in June except for middle latitudes. The meridional circulation in June, the summer to winter circulation (southward) in an altitude range of 120-300 km is strengthened. However, the dynamic mechanisms for these changes in the thermospheric circulation are still unclear.

This presentation will show the change in the momentum balance and discuss the mechanism responsible for the dynamical response to the CO2 doubling by investigating changes in the momentum balances in June between the 350 ppm CO2 and 700 ppm CO2 run data, which are the same data as Liu et al. (2020).