



Intra-seasonal Scale Variability of Asian Summer Monsoon Anticyclone from Satellite Data

Jiali Luo (1), Laura Pan (2), Shawn Honomichl (2), John Bergman (3,1), William Randel (2), Gene Francis (2), Maya George (4), Cathy Clerbaux (4), and Xiong Liu (5)

(1) Lanzhou University, Lanzhou, China (luojl@lzu.edu.cn), (2) National Center for Atmospheric Research, Boulder, USA, (3) Bay Area Environmental Research Institute, Sonoma, USA, (4) CNRS/INSU, LATMOS-IPSL, Paris, France, (5) Harvard-Smithsonian Center for Astrophysics, Cambridge, USA

Intra-seasonal variability of chemical species in the Upper Troposphere Lower Stratosphere (UTLS) associated with the Asian Summer Monsoon (ASM) is investigated using satellite observations. Day-to-day behavior of CO (a tropospheric tracer) and O₃ (a stratospheric tracer) in the UTLS from both nadir viewing (IASI and OMI) and limb viewing (MLS) instruments are analyzed to: determine whether the intra-seasonal scale variability that is evident in dynamical fields is also evident in chemical species, analyze the response of chemical distributions to dynamical processes, and assess the capability of satellite data to resolve the characteristics of the ASM anticyclone in the UTLS. Both nadir and limb viewing instruments agree on the location of a CO maximum and an O₃ minimum within the anticyclone, indicating the presence of tropospheric air. According to MLS, sub-seasonal anomalies of CO at 150 hPa and 100 hPa, as well as O₃ at 100 hPa migrate westward from the eastern mode of the anticyclone, mimicking similar behavior found in anomalies of geopotential height. The enhanced CO within ASM anticyclone and eastern shedding of CO in UTLS is well captured in IASI data while the westward migration is weak. Both O₃ data sets exhibit westward propagating anomalies at 100 hPa and neither exhibits the eastern shedding. Vertical profiles of CO from IASI indicate that the relatively high CO in the ASM anticyclone is associated with the upward transport in troposphere.