



Characterization of Asian Summer Monsoon Transport from the Boundary Layer to Lower Stratosphere: Recent Progress from Model Studies and New Observations

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The Asian Summer Monsoon (ASM) system is a significant driver for transport between the boundary layer and the upper troposphere/lower stratosphere (UT/LS). Satellite observations, although provide clear evidence of its global impact on seasonal scales, are unable to resolve the details of the transport process. This work summarizes recent progress in characterizing the transport behavior using global chemistry-climate models (CCMs) and in situ observations. NCAR Whole Atmosphere Community Climate Model run in specified dynamics mode (WACCM-SD) is used to characterize the sub-seasonal scale dynamical variability of the monsoon system and the impact on transport of boundary layer tracers into lower stratosphere. The analysis focuses on three elements of the transport: uplifting from the boundary layer, transport to the regions outside of ASM at the UTLS level, and transport into stratosphere in association with the Brewer-Dobson circulation. In situ measurements from six years of sounding studies over the Tibetan plateau are analyzed to complement the model analyses. The profiles of ozone, water vapor, cirrus clouds, together with temperature from the soundings provide important insight into the ASM transport behaviors.