LONGITUDINAL DIFFERENCE OF THE MESOSPHERE/LOWER THERMOSPHERE STRUCTURES OBSERVED WITH GOUND-BASED LIDAR, AIRGLOW AND RADAR MEASUREMENTS BETWEEN JAPAN (~135E) AND COLORADO (~105W)

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Ground and satellite observations, as well as modeling studies, have indicated that there is a significant longitudinal variability in the mesosphere and the upper atmosphere. One of the sources of such zonal variability, especially at the equatorial and low/mid- latitude region, is the tropospheric convection or latent heat release and non-migrating tides generated by these conditions. The outstanding structure of non-migrating tides in the low/mid latitudes is an eastward propagating diurnal tide with zonal wave number 3 (DE3), which causes a wave-4 structure in zonal direction, when sampled at the same local time. This would suggest that when we compare the dynamical (and chemical) structures, such as atmospheric instability/stability, wave ducts, and critical layers at the same local time, significant zonal variability could exist. In order to study such longitudinal variability, we have compared ground-based observations at two locations; Shigaraki, Japan (135E) and Fort Collins, CO (~105W). The former is the site of the MU radar, where OMTI (Optical Mesosphere Thermosphere Imagers) is collocated. A sodium temperature lidar is also operated at Uji, within 30 km distance. The latter is the site of CSU sodium temperature and wind lidar, with an airglow imager operated nearby. Seasonal and height cross-section of lidar temperature in the MLT region were different between the two sites. At Ft. Collins, annual variation was dominant, but at Shigaraki, semiannual variation seems to be more significant, which suggests stronger effect of low latitude SAO. The airglow imaging data at the two sites are also being compared in detail, for both gravity waves and ripple structures (the latter indicating existence of instability).

Na lidar, airglow imaging, longitudinal variability

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