



Intercomparison of Dynamical Fields in the Middle Atmosphere Revealed in Global Reanalyses

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Nowadays, various global atmospheric reanalysis data are frequently used for studies of large-scale atmospheric phenomena. In this study, we compare dynamical fields in the middle atmosphere revealed in various global reanalyses, i.e. ERA-Interim, JRA-55, MERRA, MERRA-2, along with JRA-55c which is a reanalysis assimilating conventional meteorological observations only. Here, we use monthly averaged zonal-mean zonal wind and temperature data up to 0.1 hPa for all the reanalyses. We also use Aura Microwave Limb Sounder (MLS) observations for comparison. It is found that differences of the zonal wind among the reanalyses increase with height. The differences are the largest in the tropical region and meridionally symmetric with respect to the equator. It is noteworthy that westerlies of MERRA-2 are apparently stronger than those of other reanalyses in the equatorial upper stratosphere and lower mesosphere. On the other hand, the temperature field is also found to show a feature of increasing differences with height; their latitudinal dependence is rather weak, though the differences are somewhat small in the equatorial region. The discrepancy of the latitudinal dependence between the two is mainly due to relatively small constrains of the thermal wind balance near the equator. Temporal variations of the differences are generally affected by the change of the observing system. In particular, the change of the satellite observing system from TOVS to ATOVS in 1998 is found to be largely influenced in the middle atmosphere. In the presentation, differences seen in the equatorial semiannual oscillation (SAO) around the stratopause will be also discussed.