RESIDUAL MEAN CIRCULATION DURING THE EVOLUTION OF SUDDEN STRATOSPHERIC WARMING

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Zonal mean flow changes during the evolution of sudden stratospheric warming are investigated by composite analyses of 76 warming events identified in the present day simulation from 299 winters. Their dynamical signatures are compared with the 17 SSW events using EraInterim data from 34 years (1979-2013). The main difference is that monthly distribution of the model SSW events are relatively less than re- analysis. The SSW events are classified as displacement or split events based on the geopotential field values at 10 hPa. The streographic projection of geopotential field values identifies 10 and 3 split events in model and observation respectively. The model quite accurately simulates some dynamical features associated with the major SSW. Residual mean circulation induced by EP-flux divergence, sum of advection and residual forcing are stronger in split events than displacement type SSW has been confirmed by both simulation and observation. Composite analysis of warming events from Era-Interim (1979-2013) record a cooling of the tropical lower strato- sphere with corresponding changes in the mean meridional stratospheric circulation. A cooling of the upper troposphere induces enhanced convective activity near the equatorial region of the Southern Hemisphere and suppressed convective activity in the off-equatorial Northern Hemisphere. After selecting vortex splits, the sea-saw pattern of convective activity in the troposphere grows prominent and robust but the signal evolves somewhat earlier in model.

Keywords: Sudden stratospheric warming, residual mean circulation, split events