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Enhanced residual mean circulation during the evolution of split type sudden stratospheric warming

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Residual mean circulation changes during the evolution of sudden stratospheric warming (SSW) are investigated by composite analyses of 76 major warming events identified in a present day simulation performed with a coupled ocean-troposphere-stratosphere model from 299 winters. Their dynamical signatures are compared with the 17 SSW events identified from 35 years of Era-Interim data. The main difference is that, relative frequency of simulated SSW events is smaller than obtained from reanalysis. SSW events are classified as displacement or split events based on the geopotential field values at 10 hPa. The geopotential field values identifies 10 and 3 split events in simulation and observation respectively. The model quite accurately simulates some of the 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. Moreover, the contribution of EP-flux divergence or planetary wave forcing is larger than contribution of other types of forcing.