EGU22-11510
https://doi.org/10.5194/egusphere-egu22-11510
EGU General Assembly 2022

Response of the traveling planetary waves at low latitude middle atmosphere during September 2019 minor sudden stratospheric warming

Gourav Mitra[1,2], Amitava Guharay[1], Paulo Batista[3], and Ricardo Buriti[4]

[1]Physical Research Laboratory, Ahmedabad, India (gourav@prl.res.in, guharay@prl.res.in)
[2]Indian Institute of Technology, Gandhinagar, India (gourav@prl.res.in)
[3]Heliophysics, Planetary Sciences and Aeronomy Division, National Institute for Space Research, INPE, São José Dos Campos, Brazil (paulo.batista@inpe.br)
[4]Department of Physics, Federal University of Campina Grande, Campina Grande, Brazil (rburiti.ufcg@gmail.com)

Planetary wave (PW) associated dynamical variability in the equatorial and extratropical middle atmosphere during the September 2019 Southern hemisphere minor sudden stratospheric warming (SSW) is investigated utilizing meteor radar wind observations from São João do Cariri (7.4°S, 36.5°W) and Cachoeira Paulista (22.7°S, 45°W) and reanalysis data. Signature of the mesospheric warming in conjunction with the stratospheric cooling is found at low latitudes. The strong westerly wind at low latitudes decelerates notably near 65 km at the onset of the warming episode, although no wind reversal is observed. The wind spectra reveal a prevalent quasi-16-day wave (Q16DW) prior to the SSW and existence of a quasi-6-day wave (Q6DW) after the warming event. Possible existence of barotropic/baroclinic instability in the low and mid latitude middle atmosphere may be responsible for exciting the Q6DW. The traveling PW is primarily found to travel westward corresponding to zonal wavenumber 1 and 2. Furthermore, significant latitudinal mixing of airmass between the tropics and high latitudes is evident in the potential vorticity map. The Eliassen-Palm flux diagnosis shows the propagation of the Q6DW and Q16DW from mid to low latitudes during the warming event.