Session: C9 Poster: M155B

Tropical tropopause and PDO regime shift

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Recent studies have shown that the Tropical Belt (TB) has progressively expanded since at least the late 70s. This trend has been largely attributed to the radiative forcing due to GHG increase and stratospheric ozone depletion, even if an influence of Sea Surface Temperature (SST) anomalies has been also suggested. In this work we investigate the impact of the Pacific Decadal Oscillation (PDO) on the TB width. The study is performed by using both AMIP (Atmospheric Model Intercomparison Project) and idealized simulations, produced by NCAR/CAM3 GCM, and ECMWF reanalyses. The analysis of ECMWF data shows that a switch of the PDO from a positive to a negative phase can lead to a main TB expansion during the equinoxes. This effect, indicating a possible PDO contribution to the jump that characterized the TB width at the end of 90s, is not correctly reproduced by model simulations. Deficiencies in the model sensitivity of convective processes to SST anomalies is suggested as a possible cause of the TB widening underestimation.