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Multidecadal variability in intraseasonal Sudden Stratospheric Warming Occurrence

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Stratospheric Sudden Warmings (SSWs) are the main source of intraseasonal variability in the Northern Hemisphere polar stratosphere. A discussion on the characterization of SSWs is presented here, with a focus on the evolution of stratospheric temperatures. We present results based on different zonal mean temperature climatologies, and deviations thereof during SSW events.

Results from the European Centre for Medium-range Weather Forecast project ERA-40 and NCEP-NCAR reanalysis in winter show differences up to +4K in February at 60N and 10hPa level, between the presatellite period (1958-1979) and postsatellite period (1979-2001). This is the region typically used to calculate some of the diagnostics that characterize SSWs. Our analysis shows that the difference in climatologies between periods is related to changes in the distribution of SSWs throughout the winter, since most of the events peak in January during the presatellite period and at the end of February for the postsatellite period.

We also discuss the disadvantages of using the 10hPa level to study the evolution of SSW, because it shows changes that seem to be an artifact of the assimilation processes employed in reanalysis data. Our study indicates that using the 20hPa level, instead of 10hpa, and taking into account the period selected to compute anomalies can improve the characterization of SSWs.