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## **Changes in the stratosphere before and after Stratospheric Sudden Warming Events in the different Phases of the Equatorial QBO**

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The quasi-biennial oscillation (QBO) is one of the most important oscillation in the atmosphere, in particular, in the stratosphere, it modulates the Brewer-Dobson circulation. With a period of 28 months, the QBO affects the equator and high latitudes due to the coupling wave-mean circulation. During the westerly phase of the QBO the propagation of the gravity wave are amplified. This leads a weakness in the polar vortex, facilitating the occurrence of sudden stratospheric warmings (SSW). In order to study the stratospheric variability before and after the SSW events in the East and West phase of QBO, we use the daily data sets of the three reanalysis (Era-Interim, MERRA and JRA55) from 1979 to 2014 .

Composites were formed for each QBO phase., e.g. Easterly and westerly. This decomposition analysis shows important anomalies of the stratosphere belonging on the considered QBO phase. These variabilities are significant at 90% in the Monte-Carlo test of 1000 resamples.