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**Plain Language Summary:** Analyses of Singapore radiosonde and reanalysis data from 1950s show that the quasi-biennial oscillation (QBO) in the equatorial stratosphere is decadal modulated in the amplitude as well as in the period. These two decadal variations are positively correlated with each other after 1980s, while they show approximately negative correlation before 1980s. The decadal amplitude variations of the QBO are not correlated with the solar cycle, but closely and positively correlated with the decadal components of Niño 3.4 sea surface temperature anomalies (SSTa), Pacific decadal oscillation (PDO) index, and North Pacific gyre oscillation (NPGO) index, suggesting that the tropical SSTa in the central Pacific substantially influences the QBO in the decadal time-scales.

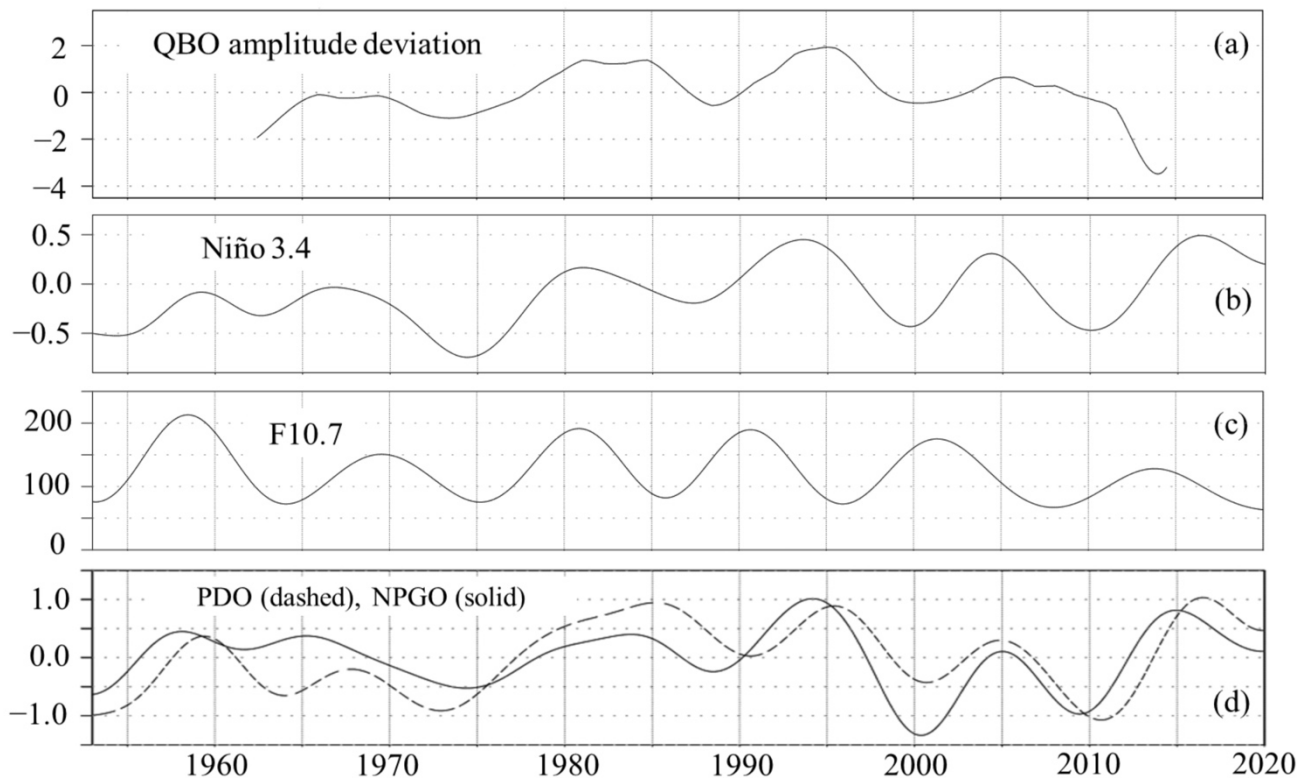


Figure 1. (a) QBO amplitude deviation ( $\text{m s}^{-1}$ ) from a linear fit at 20 hPa. Low-pass filtered ( $> 96$  months) (b) Niño 3.4 SSTa ( $^{\circ}\text{C}$ ), (c) solar radio flux F10.7 ( $10^{-22} \text{ W m}^{-2} \text{ Hz}^{-1}$ ), and (d) PDO and NPGO indices.

- In the time series of the QBO amplitude from 1950s to 2014, there are four maxima ( $\text{QBO}_{\text{max}}$ ) around 1967, 1983, 1995, and 2005, and three minima ( $\text{QBO}_{\text{min}}$ ) around 1973, 1988, and 2000.
- Composite analyses of  $\text{QBO}_{\text{max}}$  and  $\text{QBO}_{\text{min}}$  based on these extrema reveal that the decadal amplitude variations have maximum amplitude of about  $3 \text{ m s}^{-1}$  at 20 hPa in the vertical.
- In the horizontal structure there appear off-equator extrema of about  $3.5 \text{ m s}^{-1}$  around  $5^{\circ}\text{N}$  at 20 hPa, while at 50 hPa extrema of about  $1.8 \text{ m s}^{-1}$  are situated around  $5^{\circ}\text{S}$ .