



## **Upper Troposphere-Lower Stratosphere (UTLS) – Main Arena for the Interplay between Solar Variability and Stratospheric Winds’ QBO**

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A new hypothesis (consistent with the recent measurements and models’ results) explaining the complicated influence of *11 year solar cycle* and *stratospheric winds QBO* on the tropical UTLS thermodynamics will be presented. We supposed that besides the high latitude channel for the solar influence on the atmospheric system (based on downward control principle), other mechanisms should exist for descending and amplification of solar signal.

Tropical UTLS region seems to have a good potential to modulate or even amplify the solar influence on the atmospheric chemistry, dynamics and temperature regime. One reason that makes the “picture” unclear is the comprehensively interactive nature of Solar-QBO signal. Statistical analyses showed that the solar influence on the atmospheric circulation system strongly depends on QBO phase. The QBO induced secondary meridional circulation redistributes the direct radiative input of the Sun in a different manner, strongly affecting the wave propagating conditions (particularly the horizontal gradients of mean zonal wind) in the lower to middle stratosphere and correspondingly the whole troposphere-stratosphere circulation. On the other hand the 11 year solar variability alters the duration of QBO phase - trough modulation of the equatorial waves’ vertical propagation conditions. So it turns out that the modulation factor is being forced by the modulated one, and so on . . . , which explains the difficulties in separation and understanding of the both impacts.

A thorough statistical analysis of 56 years’ records of temperature and winds from NCEP/NCAR reanalysis will be presented, giving the quantitative impact of QBO and Solar cycle in total variability of UTLS temperature and winds. An explanation of the results in the light of the above hypothesis will be presented.