Geophysical Research Abstracts
Vol. 17, EGU2015-2494, 2015
EGU General Assembly 2015


# The prediction of equatorial total ozone up to the end of 2018 basing on the exact seasonal synchronization of the quasi-biennial oscillation (QBO) of equatorial stratospheric zonal wind.

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Significant effect of the quasi-biennial oscillation (QBO) on the processes determining the Earth's weather and climate causes the need to forecast the QBO evolution. The quasi-biennial alternations of zonal wind direction in the equatorial stratosphere are related with successive descent of easterly and westerly wind regimes. Our analysis has shown that the delay (stagnation stage) of easterly wind regime descent is observed during each QBO cycle, not just occasionally, as is commonly believed. Moreover, every stagnation starts near solstice (in January or July) and lasts up to the following first, second or third equinox (April or October). The duration of stagnation varies discretely (one, three or five seasons) from cycle to cycle causing the discretely variable period of QBO cycle, which can be equal only 24, 30, or 36 months being appointed as time interval between the beginnings of successive stagnations. The unambiguous relation of the QBO period with duration of corresponding stagnation makes it possible to predict in advance the wind changes. The verification of our previous forecasts for QBO cycles in 2002-2013 shows the excellent agreement between the really observed and predicted wind variations that proves the validity of forecast by this method. The correlation between model and actual wind speed values is 0.95, which is statistically significant at the 99% confidence level. Consequently we can predict the evolution of two QBO cycles up to the end of 2018. The current QBO cycle, starting in January 2014, will last 30 months and will be ended in June 2016. The subsequent QBO cycle will begin in July 2016, will last also 30 months and will be ended in December 2018. Thereafter the following QBO cycle will certainly begin in January 2019; however, its period can be determined only by the end of 2018, when the length of appropriate stagnation stage will be defined. Basing on the predicted wind QBO we can forecast the equatorial total column ozone (TOZ) variations which are closely related to the QBO of zonal wind. According to our results, the minimum TOZ values will be observed near January 2015 and July 2017, and maximum TOZ values will be observed near January 2016 and July 2018 during subsequent two ozone QBO cycles.

The variations of the equatorial zonal wind and total ozone are predictable in advance for two or five years depending on the period of the current QBO cycle. This reliable long-range predictability provides the evidence of exact seasonal synchronization of the equatorial QBO cycle, rather than its seasonal modulation as is generally accepted. Searching the explanation for exact link between seasons and QBO is highly relevant for the correct understanding of the QBO generation mechanism.