

I have read the track-changes revised version and the responses to reviewers. The authors have conscientiously tried to address each of the reviewers' comments. I still have a hard time in understanding the meaning of some important sentences. I think that a significant effort is needed to clarify the meaning of many of the sentences; perhaps ACP has personnel who can help sort that out during typesetting? If so, then I recommend publication.

1. In the abstract, it is still hard sometimes to understand the sense of physical relationships. For example, one can say that during QBO E at 30 hPa the polar vortex is weaker during the NH winter (the "Holton-Tan effect"). This is a specific statement of both phase and amplitude of a relationship between two specific locations, which is what is required for the reader to be able to comprehend what you mean. Please consider this in thinking about all of your statements. Please make sure that it is clear where the locations are that you are talking about and what the phase relationship is. If you are going to describe a pattern, then you need to describe the pattern and not just say "increasing" or something like that.

I still cannot understand the meaning of (line 35) "As the increasing of the QBO wind, both BU and MerU change from increasing to decreasing with the increasing height." What does increasing of the QBO wind mean? The QBO exists over a broad range of latitude and altitude and descends with time. Does it mean when U at 30 hPa over the equator goes from easterly to westerly there are change in BU? (But what does change in BU mean?) Does it mean when the amplitude of the QBO is larger? What does it mean for something to "change from increasing to decreasing with the increasing height"? Since it is the QBO, would whatever you are talking about then increase again with increasing height? Are you talking about at the equator? If so, is there an opposite phased response at higher latitudes? Are you talking only about amplitude, or are you also talking about phase?

137-39: "Both BU and MerU increase with the increasing of MEI (an indicator of ENSO) and decrease with increasing F10.7 (an indicator of solar activity) responses to ENSO and F10.7 are strongest (positive and negatively, respectively) in the southern stratospheric polar jet region below 70 km." What does it mean for BU to increase with increasing MEI? Does the whole data set increase by +10 m/s at every location in latitude-altitude when the MEI goes up by 0.1? When the MEI is positive, aren't there both positive and negative wind anomalies in different regions? If so, how can BU increase with increasing MEI?

163-66: Do you have any possible mechanism or other evidence that the QBO is controlled by the lunar period? Since the QBO period varies from 22 to 34 months, how can that be related to a mathematical superposition of an earth year and a lunar month? Why would lunar gravity affect the tropical stratosphere? The normal theory of causation involves deep convection exciting gravity waves, with wave – mean flow interaction. It is a highly developed theory and

has been tested in many ways. Are you sure you want to say that the QBO is due to the moon? I don't think that Baldwin et al. said that the QBO is related to the lunar period.

1120: I believe that there is a 1985 paper about the diurnal tide by Hitchman and Leovy, JAS, p. 557.

Since the QBO is a fundamental part of the atmosphere, and is included in the data set, it strikes me as odd to view "the BU" as "responding" to the QBO, rather than simply observing that there is a QBO signal in the data set. Why say that a data set responds to part of itself instead of saying simply that the data exhibits a QBO signal?