

***Interactive comment on* “On the intrinsic time-scales of temporal variability in measurements of the surface solar radiation” by M. Bengulescu et al.**

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We thank the Anonymous Referee #2 for the review and encouraging comments.

MAJOR COMMENT “Primarily I believe it is important to establish the signal/noise status of the components before discussing their physical origin i.e. sections 5.3 and 5.4 should be placed before sections 5.1 and 5.2. These sections then question the validity of linking the various components to features observed in solar data e.g. the discussion of the high frequency components with solar rotation, which appear to be due to noise and the dyadic properties of EMD.”

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ANSWER. We thank the Reviewer for this suggestion. We agree that it facilitates the reading of this Section. This was done. Note that we have renamed Section 5.1 in “Discriminating deterministic signals from stochastic components in the IMFs”.

COMMENT. “Along the same lines in Section 5.3 it is stated that ‘unambiguous interpretations of QBO-like components seems to be out of reach’ and yet the authors still discuss the possibility that it could be related to the solar QBO. If the authors insist on including this discussion I believe the terrestrial QBO should also be mentioned as this also has a well know impact on weather on Earth, such as the severity of winters, which would also affect cloud cover. However, it is my opinion that the authors should either not try and make any conclusions concerning the QBO or at least stress that with the current analysis they cannot be sure that this is a real signal. Finally with regards to the QBO I believe that the link between galactic cosmic rays and cloud coverage is still highly debated and so I would either remove the comment concerning this or refer to papers concerning the debate.”

ANSWER. This paragraph has been rewritten and is now: Lastly, the components indicative of low-frequency variability on time-scales greater than one year are discussed. The intrinsic time-scales found in these IMFs seem to match once more those pertaining to the so-called quasi-biennial oscillations that have been observed in solar activities and proxies with periodicities between 0.6 and 4 years (Bazilevskaya et al., 2015; Kolotkov et al., 2015; Vecchio et al., 2012), as well in meteorological data like Harrison (2008) who identifies a 1.68 year peak in cloud cover or high-latitude stratospheric temperatures and geopotential heights (Labitzke and Loon, 1988). Nevertheless, within the scope of the current analysis, the interpretation of these low frequency variability components as a real, possibly QBO-like, signal is uncertain.

MINOR REMARKS. Thank you for spotting these points. All of them have been taken into account and the text was rewritten accordingly.

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