

Interactive comment on “The complex dynamics of the seasonal component of Earth’s surface temperature” by A. Vecchio et al.

Anonymous Referee #2

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The paper by Vecchio et al. uses US surface temperature to argue that the nutation of the orbit of the Earth modulates the phase of the annual cycle of surface temperature.

The authors find that seasonal anomalies in the annual cycle occur more likely when the inclination of the moon orbit, which determine the Earth’s nutation cycle, is maximum: see their figure 4.

I found this paper interesting and I believe it should be published. However, I believe it should be slightly revised.

1) In the title the authors refer to "Earth’s surface temperature", however in the paper they study the US record. I would suggest to change the title to better agree with the contest of the paper. That is, they should refer to "USA’s surface temperature"

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2) A possible climatic effect of the 18.6 luni-solar nodal cycle has been noted and studied by several other authors. The present paper should reference at least some of those studies. For example: McKinnell, S. M., and W. R. Crawford (2007), The 18.6-year lunar nodal cycle and surface temperature variability in the northeast Pacific, *J. Geophys. Res.*, 112, C02002, doi:10.1029/2006JC003671. Rob Wilson, Greg Wiles, Rosanne D'Arrigo, Chris Zweck, Cycles and shifts: 1,300 years of multi-decadal temperature variability in the Gulf of Alaska, *Clim Dyn* 2006 DOI 10.1007/s00382-006-0194-9

The argument advanced in those papers is that the 18.6 luni-solar nodal cycle induces climate change by means of tidal forces more than by means of a variation of the insolation due to the nutation of the Earth. I suggest the authors to discuss this issue in their comment. That is, is it possible by means of their analysis to determine whether the effect the authors find is due to insolation or to tidal forces driving ocean oscillations?

3) I would suggest the authors to add a spectral analysis of the data depicted in Figure 4. In fact, a simple visual analysis of the data may be misleading. For example, apparently the period from 1904 to 1984 appears to be covered by exactly four cycles that would imply a 20 year cycle.

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