Earth Syst. Dynam. Discuss.,
https://doi.org/10.5194/esd-2020-74-RC1, 2020

Earth System Dynamics
Discussions
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Interactive comment on "ESD Ideas: Long-period tidal forcing in geophysics – application to ENSO, QBO, and Chandler wobble" *by* Paul R. Pukite

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Received and published: 28 November 2020

I am a physical oceanographer who knows nothing about the Chandler wobble, is only slightly familiar with the QBO, but is a longtime expert on ENSO.

To be blunt, trying to shoehorn ENSO into a periodic tidal framework stretches reality to fit someone's preconceived theory. Only the most motivated reasoning can believe this.

Over the past four decades we have seen numerous out-of-nowhere theories - including those with apparent hindcast skill and much more plausible than the one here - attempt to explain and predict ENSO - but they have all failed at the only realistic test of such theories: a successful prediction. I have resolved never to pay attention to such

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theories until they produce such a (public) prediction that subsequently comes true; that resolve has saved me from wasting lots of time. I commend this approach to readers of ESD. Let these authors announce an advance prediction of an El Nino event, then publish if and only if it verifies. Apparently, since the approach here is periodic, they should be able to produce a prediction of all the events over decades, past and future.

The best way to see the non-tidal nature of ENSO is to note that its behavior is well-represented in models of the coupled ocean-atmosphere system ranging from the idealized (e.g. Cane and Zebiak 1987 MWR) to modern GCMs ... none of which contain tides. These models DO have predictive skill, which is regularly tested by issuing detailed public forecasts. This is by no means to say that the problem is solved, but that the mechanisms involved are contained within the known (but very complex and multi-scale) nonlinear interactions of the ocean-atmosphere system. A voluminous literature digs into these interactions, explaining the coupled feedbacks that enable ENSO behavior and provide insight that is useful to understand less-dramatic signals in other tropical basins. Our understanding is NOT "so poor that there is no clear consensus for any of the behaviors" (L13-14). The authors should read the McPhaden et al paper they cite more carefully, and dig into its reference list that would correct this statement.

Various clues in the submission suggest the authors' lack of familiarity with the field: L10: "Subtle mathematical insights are required to make the connection". Apparently the authors' minds are more subtle than those of generations of geophysicists. L17-20: "The challenge lies in simplifying the math of fluid dynamics and applying the appropriate signal processing techniques. With that, an elegant analytical framework can be applied to perhaps solve the mystery once and for all." Well. Mathematical physicists have developed simplifications of Laplace's equations over 200 years. Many such are widely discussed. What the useful ones have in common is that they are physically-based; that is, they make scale approximations that isolate particular phenomena and thereby reveal their role in ENSO. One example would be the beautiful theory of equa-

torial planetary waves, central to ENSO. L23-24: "it is straightforward to model ENSO behavior". If it's so straightforward, please do this, and publish your prediction. You'll be famous. L25: "deviously concealed". Nuff said.

I am sorry to have wasted an hour on this.

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