

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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To my knowledge, the problem discussed is not so easy, as it could be imagined. Of course, El Nino oscillation and QBO seems to be reproduced by GCMs, but predictions are still comprehensive, for example strong El Nino 2016 was unexpected. At the same time LOD started to decrease after 2016 and it was also unexpected. Very strong El Nino repeats at the beginning of the declining phase of LOD, what makes us to think about possible connection of these phenomena. But simple tides also do not explain what we observe. Chandler wobble frequency does not present anywhere else in Earth systems, thus we do not see any pike in the excitation spectra at 0.843 cpy, at the same time we know from theory, that Chandler frequency is somewhere near resonance. Amplitude of Chandler wobble is changing with 40 and 80-year modulations.

In the combinations of solar and lunar frequencies we can find some close-by modes. The interests of N. Sidorenkov, for sure, are in the field of interrelations of frequencies of El Nino, QBO and Chandler wobble. And in his book and papers this question was risen decades ago. I did not quite understand the author's calculations, why 0.42 – the remainder of the division of solar year by draconic month should be doubled to satisfy 0.84 cpy frequency of Chandler wobble, but I know that in the publications of Sidorenkov it is mentioned, that atmospheric processes and spectra of QBO, if doubled, will remind the spectra of Polar motion at annual and Chandler frequency. So, his works should be referred to. In my opinion, the hypothesis of Chandler wobble, El Nino and QBO teleconnections is not proved, but is interesting. Yu. Avsyuk, in particular, pointed out, that full moon in Perigee happens every 412 days, what is somewhere close to the Chandler frequency. Chandler spectrum peak is splitted and should be forced by something, otherwise it would damp. But the frequencies do not match exactly. Tidal effects for LOD are well modeled, but even here we do not know exactly, why long-term, 20 and 80 – year modulations exist. The working hypothesis is angular momentum exchange in the Earth interior. Thus, there are unresolved problems in geophysics, including mentioned in the article, and we need ways to solve them. At that, the possible synchronizations of geophysical and astronomical processes look intuitively very beautiful, but need further development.

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Discussion paper

