

The Cryosphere Discuss., community comment CC2
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Reply on CC1

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Community comment on "A strong link between variations in sea-ice extent and global atmospheric pressure?" by Jean-Louis Le Mouél et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-216-CC2>, 2021

After having extracted with SSA the quasi-periods (cyclicities) of the series of sea-ice extent and atmospheric pressure, the main point we wish to stress in this paper is the contribution of celestial mechanics in explaining these cyclicities, not to try and find a thermodynamic relation explaining the cyclicities. As we have shown in Courtillot et al (2021) regarding sunspots and in Lopes et al (2021) regarding the motion of the Earth's rotation pole, the angular momentum of planets plays a very important and often underestimated role on our star as well as on Earth. When trying to identify the signature of the Jovian planets, we found an unusually perfect harmonic sequence of 1 year : 1, 1/2, 1/3, 1/4 and 1/5 of a year. This can only have been forced by the variation of the Earth-Sun distance (see Lambeck 2005). The constant phase variation of 60 days (see Figure 05) as well as the regularity of the amplitudes of the other components argue for a simple linear relationship. It is still not possible to this day (refs in the paper) to solve analytically the Navier-Sokes equations in a fluid sphere in the turbulent regime (the solution is not unique unlike in the cylindrical case). We hope that our results, in addition to highlighting the presence of this remarkable harmonic series, will help towards a solution of that problem.