

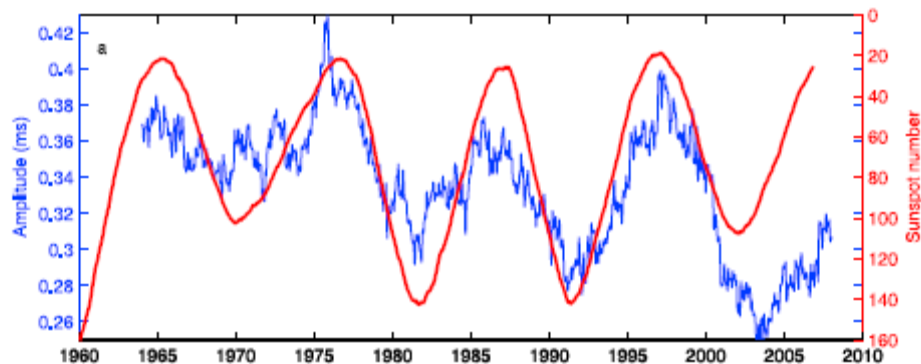
.....

General comments:

A major point of possible confusion that needs clarification:

The author argues (e.g. Fig 7 and other points in the paper) that solar maximum brings an Earth Deceleration, while a solar minimum brings an Earth Acceleration. This is a quite ambiguous statement because acceleration or deceleration are “variation in the speed”. The things appear more complex.

If we look at the figure in Le Mouél et al. (2010) we find the following:



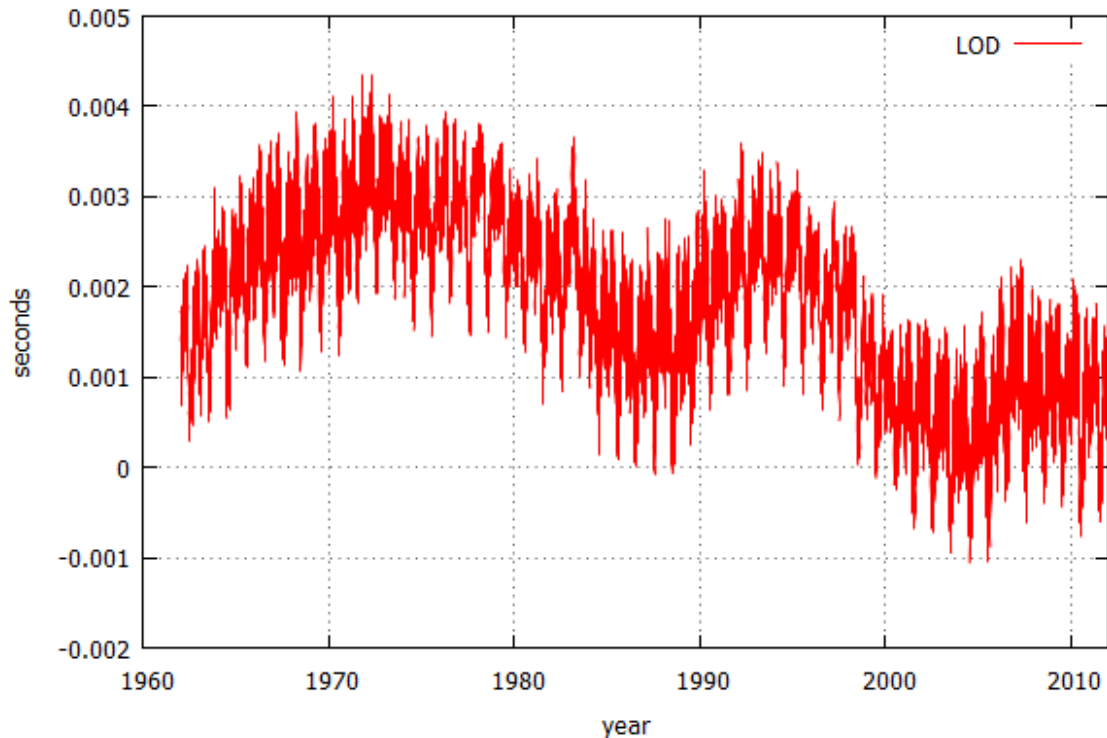
which plots in blue the amplitude of the semi-annual variation of LOD and in red the sunspot number.

The author should note that the “amplitude of the semi-annual oscillation” is not as the same of the LOD index. Essentially, the above figure is based on the following argument. LOD record presents an annual (12 month) and a semi-annual (6-month) oscillation. The amplitude of the semi-annual oscillation is low during solar maxima and is high during solar minima. This means that during solar maxima LOD varies less on a 6-month time scale, while during solar minima it varies more on 6-month intervals.

The author needs to be more explicit of how he thinks that this dynamics of the semi-annual oscillation of LOD, which appears to be directly linked to the 11-year solar cycle, influences the climate.

OK, Above figure well-known. This is now improved and better spelled out.

On the contrary, if we look at the evolution of LOD on the multidecadal scale it is possible to notice we notice that LOD is negatively correlated to the 60-year temperature oscillation as the figure below shows:



which means that the Earth spins slower during the 60-year temperature minima (solar minima ~1970) and spins faster during the 60-year temperature maxima (solar maxima assuming that it was ~2000-2004). See also Mazzarella and Scafetta. But this is true on a 60-year time scale and above. This issue too needs to be clarified in the paper.

Finally, the LOD oscillations are very small. In the paper the author appears to prefer a mechanism in which solar wind first changes LOD (it is not clear how) and later LOD changes the ocean oscillation and the climate. However, the mechanism may be inverted. Solar variation changes the climate oscillation (e.g. by means of cloud/albedo changes) that changes the wind/ocean oscillations which then alter the LOD. Is it possible to discriminate between the two cases?

Yes, but the oceanic oscillations seem very strictly related to changes in rotation. A “climatic oscillation” is hypothetical. They are included both in text and figures.

I have added quite a lot to back up the arguments better.

For me it is a clear message in the fact that LOD and sunspots correlate well, at the same time as there is correlation with geomagnetics and Earth’s shielding variations – it points

To a common driving factor: the Solar Wind.

This does not exclude direct effects from irradiance.

Detailed comments:

Line 44: "...~750 km s⁻¹ (fast solar wind)." Provide a citation

From the Web

Line 76: "Friis-Christensen and Lassen (1991)..." this paper has been criticized about the last data point that they plotted which was not actual data. Consider to add this reference which corrects the error:

OK, added

Thejll, P., and Lassen, K., 2000. Solar forcing of the northern hemisphere land air temperature: new data. J. Atmos. Solar-Terrest Phys. 62, 1207-1213.

Line 93-99. Consider adding also:

OK, included

Scafetta N., 2012. Multi-scale harmonic model for solar and climate cyclical variation throughout the Holocene based on Jupiter-Saturn tidal frequencies plus the 11-year solar dynamo cycle. Journal of Atmospheric and Solar-Terrestrial Physics 80, 296-311.

OK, added

where a harmonic model for solar variation is developed and hind-cast all previous solar minima/maxima for millennia and forecasts a new minimum in 2030-2040.

Line 98: "the future minimum at ~2040 will also generate Little Ice Age climatic conditions." This would be correct if anthropogenic GHG warming does not exist. But it exists, so the projected cooling may be partially compensated: see Scafetta (2012a) .

This was discussed in Mörrer 2010 (also 2007) – not vital here.

Line 151: "Sancetta"?

Ok, corrected

Line 158-162: the Gleissberg cycle is about 80-90 year, de Vries cycle is about 200-240 yr

(0 and 240 is OK, here

Line 214: "he record" -> "he records"

Line 221: "...cycle affect only the atmospheric circulation...."

OK. included

However,

Scafetta N., 2012. A shared frequency set between the historical mid-latitude aurora records and the global surface temperature. Journal of Atmospheric and Solar-Terrestrial Physics 74, 145-163.

OK, added

Mazzarella A. and N. Scafetta, 2012. Evidences for a quasi 60-year North Atlantic Oscillation since 1700 and its meaning for global climate change. Theoretical Applied Climatology 107, 599-609.

OK, added

Also talk about a direct influence on ocean circulations.

245: "lagging-behind the general rotation of the solid Earth." Provide a reference.

OK, done

Figure 5 and its comments: consider adding a comment to

Mazzarella A., A. Giuliacci and N. Scafetta, 2012. Quantifying the Multivariate ENSO Index (MEI) coupling to CO2 concentration and to the length of day variations.

Theoretical Applied Climatology DOI: [10.1007/s00704-012-0696-9](https://doi.org/10.1007/s00704-012-0696-9).

OK, done

Figure 8: "Medidional" ?

OK, corrected