

## ***Interactive comment on “Can irregularities of solar proxies help understand quasi-biennial solar variations?” by A. Shapoval et al.***

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Technically, the paper is as it is: application of a sophisticated technique to a non-homogeneous data set [the sunspot number].

I do have several concerns:

- 1) the sunspot series is very in-homogeneous, pieced together from data by different observers using different counting methods. This means that it is not easy to separate changes due to observers and due to the sun.
- 2) as the sunspot data is heavily smoothed it is not really necessary to require that daily values be present. Using monthly values should work just as well and they go back to 1749 [another century]. Especially for an alleged finding regarding long-term

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regimes, it is important to go back as far as possible.

- 3) the group sunspot number [GSN, Hoyt and Schatten] also goes back far and has different biases on problems than the International [Wolf] Number and it seems to me mandatory that the GSN also be analyzed with the technique advocated by the authors.
- 4) there is good evidence that the number of spots per group is not constant in time but has both a solar-cycle variation and [more importantly] an observer-dependent variation, in addition to a possible secular solar variation. So investigating the GSN is important and should be done.

Because of these concerns I do not consider the speculation about any long-term changes in solar behavior to be of sufficient validity to view the finding as establishing a new solar property that need be taken into account in our current understanding of solar activity and its causes. In particular, the relationship with the various 'quasi-biennial' variations seems tenuous at best. And the name [biennial] is poorly chosen as the Sun probably does not know about the terrestrial year.

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