

Interactive comment on “Influence of solar activity on hydrological processes” by J. Pérez-Peraza et al.

J. Pérez-Peraza et al.

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Dear Commenter:

I appreciate your participation in the discussion of our article and your commentaries about it.

The problem you state regarding the possibility that the high correlations we have obtained between solar activity and the low levels of the studied lakes were, nevertheless, merely coincidence is a problem that we have been conscious of at every stage of this investigation and that, to our opinion, has been dealt with, based on the properties of the statistic methods we applied, which give us confidence about the degree of reliability of our results.

However, your reference to a very interesting publication (Burroughs, 2000) dedicated to the analysis of important advances made in the field of the determination of climatological and meteorological cycles, most of them by researchers of international renown,

has attracted my attention and I will try to amplify my answer to your commentary using an example of a casual high correlation (Shaw, 1933; cited by Burroughs, 2003) between sunspots and the level of the Victoria Lake, in Eastern Africa, in the course of two decades (two solar cycles, approximately).

It is possible that N. Shaw did not have at his disposal information about the analyzed variables outside this period, or that he had decided to propose the possibility that the high correlation observed in the aforementioned period could be extrapolated to the next maximum of the solar spots (1928). It is manifest that a prediction without correlation is totally inappropriate -and not just a high correlation is desirable, but one that has been shown to be effective in a period significantly longer than the interval that separates it from the time when the prediction is to take place. In my opinion, cases like this ought to be the subject of a multidisciplinary analysis looking for the causes and the conditions in which the high correlation took place, before being confidently disregarded as obtained by chance.

J.M. Burroughs makes a reference to other cycle, cited in the Meteorological Handbook published by N. Shaw between 1926 and 1932, and apparently calculated by Abbé Gabriel (Burroughs, 2003). The cycle has a period of 744 years and combines 9202 synodic periods, 9946 tropical, 9986 draconic, 9862 anomalistic, 40 of the ascendant nod of the orbit of the moon, and 67 periods of sunspots. All this means that the cycle was not obtained, as is customary nowadays, by means of a statistical analysis of the sunspots (in fact, 67 periods of solar spots span exactly 744 years, assuming a median duration of the solar cycle equal to 11.1045 years.) The cycle was carefully calculated, but its application to a concrete case had a positive outcome only by chance, and I even suspect that its failure in the month of February, which for England is a winter month, could also have been product of chance: the meteorological systems of lower latitudes which, trying to equilibrate the exceptionally low temperatures in England from November to January, 1925, penetrated into the studied zone.

Chance is part of probability and is an element that participates in the process where

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very many factors intervene, notwithstanding that some of those factors may have a deterministic character. Our role then, when we enter this field of investigation, is to try to discover it on time.

I appreciate your participation in the discussion of our article and the cite from the book by J.M Burroughs, which will surely will provide me information and useful points of view in these topics.

Sincerely yours,

A. Leyva Contreras

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 605, 2005.

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