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Title: MILLENNIAL SCALE VARIABILITY IN HIGH MAGNITUDE FLOODING ACROSS BRITAIN
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Referee Comments

This is a potentially interesting paper, with useful data about historical floods in UK.
However, the paper is affected by a number of major problems that make impossible to accept it.
The weak points are listed below, in the order of appearance.

The introduction makes a short survey about the longest flooding series, in which this paper concerning Britain is in uppermost position. It neglects, however, the longest series of the Mediterranean rivers (e.g. Nile, Tiber, Arno, Po) that cover one, two Millennia and more.

A too rough oversimplification has been made concerning the anthropogenic changes within catchment areas. This may be true in some specific cases of relatively short periods, or wild areas, scarce population etc.
In general this is not the case of the longest series where the landscape has undergone profound transformations for wood cutting, marshes transformed in fields, crops and agriculture, urbanization, etc with substantial transformation of the river bed and embankments, diversion of rivers, or excavation of new canals to reduce flash floods and their impact on society.
In addition, rivers have undergone profound transformations in flood for the construction of bridges that may accumulate trees and other obstacles to the free flow, or the installation of floating or ground base water mills, or construction of gardens on the sides etc.
All the above factors are particularly relevant over the long term.

We should start with the consideration that a flood is recorded because it had a relevant impact on something. It is very likely recorded when water invades a city causing damages and killing people and animals; less in the case of a wild land, or unmanned countryside.

From this point of view we should separately consider urban flood series from series considering the whole river over its catchment area.
URBAN FLOODS: A series composed of floods in a specific city, e.g. London, is well documented and potentially almost complete. It has the problem, however, that citizens made any effort to reduce flows over time, with some protection works, e.g. raising embankments, excavating channels etc, that artificially changed the series reducing or even stopping the occurrence of floods. This affects time homogeneity.
WHOLE RIVER FLOODS. Some series consider what happened over the whole river, e.g. the Thames River from the spring to the discharge into the sea. It is clear that most of river flows over an obscure rural area, that is only partially documented, and the information is not homogeneous (neither in time nor in space) with more or less data depending on the type of damage it may cause over the various areas the River crosses and how local people may document and react.

Section 4: Spatial and temporal variability. This section should discuss how to solve the above mentioned problems.
In addition, the analysis of the causes leading to floods is too crude. The river flow is related to precipitation, but precipitation is only one among other variables. For instance, after a period of dryness, rainwater is unable to percolate through the soil and immediately runs over it, growing the river level. On the other hand, if ground has normal moisture content, soil percolation reduces the input to the river. If the underground water reservoir may store further water, it may act as a huge buffer. If the underground reservoir is full, for previous rain or snowmelt, all rainwater reaches the river. Groundwater percolation and storage capacity are equally relevant as precipitation. A river flow is a balance including precipitation (input) but also ground percolation and storage (output). We must know, or at least discuss, both of them.
Another problem is the river discharge in the case of high tides or strong winds dragging marine water into the river.

Analysis of the results
The paper indicates some wet and some dry periods. Periods of dryness or dampness over decades are obscure indicators. Physically speaking, a flood is an extreme event that happens in a certain time period for a particular weather situation that may extend over a wide surface area, affecting one or more counties. It is a matter of isolated peaks (a few days), repeated with a certain frequency over years in the frequency domain. Transforming this punctual problem in averages spread over time is a common approach that may be used in addition to the above peak analysis, but not to substitute it.
If a teleconnection exists, e.g. a number of rivers in flood for the passage of a rainy front, a number of rivers in various countries will respond simultaneously, i.e. same year, same month, same weeks, some days. Vague periods of dampness may be due to various reasons, e.g. bad maintenance of riverbeds because people was engaged in wars or facing famines. In the paper a critical analysis of what happened to the society during the anomalous periods and how it might have influenced the regular river flow is totally missing.

A contradictory statement is found concerning the solar activity: “no flood events recorded during the Spoerer Minimum” and the surprising conclusion “The flood-rich phase in different catchments around Britain (except Wales) during the late sixteenth and early seventeenth century corresponds to a phase of increased storminess in the North Atlantic (Lamb and Frydendahl, 1991) and increased solar activity (Muscheler et al., 2007), and is evidenced in flood accounts from catchments across southern and central Europe (e.g. Brazdil et al., 1999) suggesting a wider 25 flood-rich period, which relates to a particularly strong phase of solar forcing (Fig. 4).”

In Practice, the paper suffers for a series of major weakness from the historical, societal, hydrological and statistical point of view that oblige to reject it.