

Flood history of the Bavarian Alpine Foreland since the late Middle Ages in the context of internal and external climate forcing factors

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Referee Comment for Hydrology and Earth System Sciences

GENERAL COMMENTS

This manuscript is produced in a framework of European research on historical floods. Past years of systematic efforts of data collection are producing first exploratory results. Present manuscript show a primary overview about different climatic forcing factors explaining variability on flood frequency and seasonality. One of objectives is a better characterization of present uncertainty in central Europe on this natural risk.

Historical climatology is presented as a right speciality to collect historical information on that, generating and analyzing data (qualitative, quantitative, instrumental), obtaining results to improve knowledge of climatic and risk temporal patterns of low frequency.

Results are very interesting. Considering floods as a complex phenomena, with different factors at different time scale, including human factors, regional detailed approaches give us to scientific community partial but solid results to reduce uncertainties on this matter.

Many techniques or methods for historical information treatment results new and interesting to be applied in other researches. Classification by indices is more or less usual, but corrections of variation on river bed depth result a concept very important for a better management of historical information of "context" when historical floods must be reconstructed more carefully as be possible.

SPECIFIC COMMENTS

-- Section 1. Introduction. P. 7412. Lines 5-10...

Authors give details of documentary sources researched for flood database. One question about it: for region under study, there are documentary sources available from local authorities (City Councils or similar)? From my experience, these sources are enoughly correct and reliable to obtain information on flood events in historical time. Any comment about this potential documentary source would be appreciated.

-- Section 3. Database. Authors mention clearly origin of information (biblio. references, databases...) collected for flood database. But is not easy to appreciate what is dimension and general characteristics of information available about flood events. Not all public know these details for alpine region or central Europe.

Authors should describe basic characteristics of flood database used for development of work into manuscript: number of flood chronologies, extreme years of flood data series available, total amount of flood events by spatial units (subregions, valleys, basins, cities.... as authors consider). Temporal distribution of flood events

available is also illustrative. One figure with evolution of raw data, flood events before treatment and adjustment would be wellcome (by basins or cumulated). It could give opportunity to compare with similar approaches from other regions or basins.

-- P. 7417. Lines 5-20. Organization of information about flood events is excellent. This is not a criticism, but this comment is needed to be highlighted. At present, with improvement and increasing information on historical floods, researchers involved can work with criteria suggested by authors: all information must be organized in flood events, considering all flood records or cases. One flood record can be unique to know about one flood event. But other flood events may consist of a large number of flood records. A detailed analysis is needed to identify flood events, avoiding biases or wrong interpretations of data.

-- P. 7424. Lines 3-5. Authors find good coherence between solar sunspots and flood frequency variabilities. It seems evident that cold periods record higher frequency of flood events. At least for any specific cases. I recognize for example for my study area strong coincidence for Wolf Minimum, not for Maunder Minimum. Considering complexity of climatic system, and having data for other similar period at historical scale, authors could give any comment about relation between this forcing factor and flood events? For example, both processes don't show temporal inercy or delete. How could affect so quickly solar sunspot to flood frequencies? Or any atmospheric mechanism is producing any direct effect?

-- P. 7425. Lines 8-9. Description of NAO climatic pattern. For public not focused on climatology, more detailed description of NAO pattern would be grateful. This is a journal of hydrology. For example, details about regions affected by NAO patterns, seasonality, atmospheric processes involved. Any basic reference on NAO pattern would be also positive to make easy acces to more details.

-- P. 7438. Figure 5. All flood chronologies are plotted as an unique flood data series. It means a regional indices is created. Please, authors must define how this index is created. Is weighted? It use all events?, only level 3? all series? Please, more information is needed.

TECHNICAL CORRECTIONS

-- P. 7416. Line 24. Reference to "Figure 4a" has any problem. It's not available as a figure. May be "Figure 2a" ??

-- P. 7425. Line 6. "com-pared" by "compared"

-- P. 7435. Figure 2a and 2b.

Style of this figure must be changed. Saturation of black dots produce too visual noise for a correct comprehension of figure.