

## ***Interactive comment on “Low Water Stage Marks on Hunger Stones: Verification for the Elbe River in 1616–2015” by Libor Elleder et al.***

### **Anonymous Referee #1**

Received and published: 12 December 2019

The paper addresses a very interesting issue of historical hydrology, dealing with hydrological droughts based on documented epigraphic records of low flows in central Europe. This type of information is rare, which increases the scientific relevance of this paper. The objectives of this paper are well described, and the methodology provides a step forward to previous manuscripts on this topic, by using laser scanner to provide a 3D record of the hunger stones. The results show a detailed record of cluster periods with low flows in the Elbe River, and relations with some historical climatological periods such as the Minimum Maunder. Particularly on the first part of the paper, it is not very easy to read, and some sentences are too long. English use may need some improvements. I cannot help on this because I am not native speaker, but I have provided some editing comments. In summary, the paper deserves publication after

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some moderate/minor changes.

Specific comments:

Lines 97-98. Suggested modification of the sentence. A remaining issue is to verify the credibility of the information on low water levels, and its transformation to provide robust information on runoff previous to 1825 and even before 1726.

Lines 104-106. Suggested change These palaeoflood indicators comprise various type of sedimentary (e.g. slackwater flood deposits) and botanical evidences such as impact marks and damages on trees (Benito et al, 2004, 2015).

Line 106-107. However, similar methods for estimating low water levels and flow rates are seldom addressed, with some exceptions (Shamir et al., 2013). Shamir, E. et al., 2013. Geomorphology-based index for detecting minimal flood stages in arid alluvial streams. Hydrol. Earth Syst. Sci., 17, 1021-1034.

Line 107-108. Therefore, low water level indicators available through documentary sources are unique data records (Brazdil et al., 2018) for recording past hydrological droughts, with the precision given by physical imprints provided by epigraphic marks.

Line 129. The specific issues and questions addressed are: Line 133. Are there consistent relations in the heights of stage minima among different stones?

Line 136. Suggest change the title 2. The Elbe river region in the Czech Republic

Line 145. Delete “rock”

Line 167. Ploucnice River and Jilovsky stream should be placed on map in Fig 1

Line 174. Insert in brackets like this (1 ell=59 cm)

Line 183. (see chapters on methodology and documentary sources).

Line 196. Check if the proper word is acquired or recorded by

Line 361. The brackets are confusing. Probably better as . . .in Strahov, Wiesenfeld,

1844).

Line 426. Rhine from 70 AD to 1858 ... Please, check if 70AD is correct or some numbers are missing.

Line 482. ... Walter, 1901) of which reported altitudes exist for 1541, ....

Line 494. Figure caption is confusing until the text is read. Probably change the caption as follow. Fig. 2. Drawing documenting the position of the hunger stones known as Ara Bakchi, Altarstein or Elfenstein near Bacharach, perhaps in the dry season of 1636, 1639 or 1642 (Merian, 1645).

Line 513. ... water levels of the Elbe River occurs typically from June to.. Line 571. Add space after between.

Line 649. Perhaps you meant August 2017

Line 666. In the locality opposite to Prossen. . .

Line 678. Marked DM minima includes years 1893..

Line 738. ... than marking the flood mark, due to the following reasons:

Line 763. Insert in brackets the translation of the inscription, otherwise we cannot follow the meaning of the popular inscription.

Line 916. Perhaps you meant “phenological”

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2019-113>, 2019.

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