

RC1 comment:

- A simple linear regression based on the neighbouring gauges has been used to fill the data. They have also selected specific highs and lows in the data for this purpose. The authors have observed a lag of up to 4 days for the waters to travel to the neighbouring gauges. Apart from this, the authors also use the maximum, minimum, and onset points of the flood data to fill in data that do not represent these conditions. In short, I find the gross assumption of an average time lag and the use of specific points overly simplistic, given the nonlinearity of the hydrodynamics of flows of varying intensity. More evidence of these kinds of assumptions would be useful for the readers to understand the reliability of the filled data. For instance, using cross-correlation between the time series of different gauges to show the time lag.

Changes made:

We addressed this issue by conducting a cross-correlation analysis to determine the dominant lag between Warsaw and the auxiliary gauges. The results are now reported in lines 226–234 of the revised manuscript.

RC1 comment:

- The authors could have used robust techniques like Long Short-Term Memory (LSTM) neural networks for data filling, as they can capture non-linear temporal patterns while selectively retaining information relevant to the current output in long time series. The authors need to present the existing variations in time lag across different gauge locations and discuss the associated uncertainties. Please refer to the work done by Ren et al. (2022) in this regard.

Changes made:

We addressed this issue by replacing the earlier linear regression-based method with an LSTM neural network model. Details of the method and the adopted parameters have been added to the revised manuscript in lines 235–270.

RC1 comment:

- The validation of the proposed linear-regression-based data filling is incomplete. A robust k-fold cross-validation is needed to assess the accuracy of the proposed data-filling methods. The data needs to be split iteratively into training and validation sets. Importantly, the error needs to be reported using RMSE, NSE, KGE, etc.

Changes made:

We added a detailed validation of the LSTM models, including the assessment procedure and the corresponding performance results. These additions are provided in lines 305–325 and 345–365

RC1 comment:

- Line 68, “km XXX of the Vistula River”, is difficult to understand. Please change similar lines in the manuscript.

Changes made:

We added an explanation of the Vistula river kilometre calculation in line 60 and simplified the notation throughout the manuscript, especially in lines 59, 77, 128, 138–141, 144, and 288.

RC1 comment:

- Line 127, what do the authors mean by “km 421 + 600”? Please modify similar lines to provide greater clarity to readers.

Changes made:

We simplified the notation throughout the manuscript, especially in lines 138-141, 144 and in Table 1.

RC1 comment:

- In Table 4, what does the last column indicate?

Changes made:

Following the replacement of the original reconstruction method with the LSTM-based approach, the previous Table 4 was removed, as it referred to the earlier method and was no longer applicable.

RC1 comment:

- Line 290, please use a clearer term than “early measurements”.

Changes made:

We have changed the indicated sections to improve readability.

RC2 comment:

Please refer to the figures in the text using either “Fig.” or “Figure” consistently.

Changes made:

We addressed this issue by harmonizing the notation throughout the manuscript. The relevant changes are provided in lines 137, 155, 216, 371, 436,

RC2 comment:

Please add the information that river kilometre marking starts at the mouth because it is done the other way round for many other river systems.

Changes made:

We added an explanation of the Vistula river kilometre calculation in line 60

RC2 comment:

125 – l. 134 and Table 1: Better replace “river km 421+600” etc. by standard decimal values.

Changes made:

We added standard decimal values. See lines 138-141, 144 and Table 1.

RC2 comment:

149-150: Is dredging and sand extraction the only reason for enhanced riverbed erosion and subsequent decrease of river stage since the 1940ies? Has it done to improve navigability? The data suggest that this process has been ongoing until today - is that true? Can you give recommendations how

to consider this long-term shift in subsequent data analyses or in hydrological models?

Changes made:

We added further information, especially in lines 64-65.

RC2 comment:

149: Do you mean “old readings” or “new readings” which “would be approximately 200 cm higher”?

Changes made:

We improved the clarity and readability of the text, lines 158-160.

RC2 comment:

151, l. 156: Not every reader might know the Kronstadt 60 (East European Reference System) and EVRF2007 (European Vertical Reference System) references. Please add a short explanation.

Changes made:

A short explanation of the Kronstadt60 and EVRF2007 reference systems was added in line 165 and in the corresponding footnote.

RC2 comment:

Providing a long-term time series of river stage is a merit on its own and is highly appreciated. I fully understand that converting stage data to discharge is not trivial and likely will not be possible for historical data at all. Nevertheless, I would suggest including references to available Vistula discharge data for more recent periods at least.

Changes made:

A short explanatory note and a reference to a study reconstructing river discharge during the largest Vistula flood events were added in lines 69–70.

RC2 comment:

297-298, Figure 4: The selection of periods for the Welch's t-test (1800-1830, and 2000-2023) seems to be highly arbitrary. Rather, I would suggest comparing the pre- and post-1915 period for UVP (see identified breakpoints) and performing a standard trend analysis for DWC.

Changes made:

Following the reviewer's suggestion, we divided the series into two sub-periods: 1800–1915 and 1916–2023. The test results supporting this division are presented in lines 384–388.

RC2 comment:

311-314: Incomplete phrase, please correct.

Changes made:

We improved the clarity and readability of the text, lines 377-379.

RC2 comment:

Figure 4A and Figure 5: What is the difference between these figures other than using either single dots or lines, and indication of the regression line or of the break points? I would suggest merging them. In addition, I urge to delete the regression line – it is not adequate facing the clear stepwise increase around 1915.

Changes made:

We deleted old figures to improve the clarity of the text. See new Figure 3, line 390

RC2 comment:

Figure 2 and 7 are not referred to in the text.

Changes made:

References to Figure 2 and to the former Figure 7, now renumbered as Figure 5, were added to the manuscript. Lines 96, 455.