

Interactive comment on “Causes for increased flood frequency in central Europe in the 19th century” by Stefan Brönnimann et al.

Anonymous Referee #2

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General comments The author presents an in-depth analysis of multidecadal variations of flood frequency in Switzerland. It is based on long series of discharge and rainfall, weather type reanalysis and climate model simulation. It gives a focus on the Rhine river in Basel and the outlet of Lake Lugano.

The paper is very interesting when it related periods prone to intense or weak rainfall or flood to a flood probability index based on the frequency of weather type. It shows changes in the general meteorological circulation, which can explain the fact that the 19th century was prone to flood event. It gives an interesting contribution to past climate analysis and exemplify that a cold period may have been prone to more frequent floods. It shows clearly that better understanding relations between weather regimes and sea-surface temperature may help research on the assessment of future climate

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change.

Specific comments I have only minor remarks on the paper which is well written. It could be improved on the following items.

End of section 2.4 The authors could provide more information on the limits of the reconstruction

Section 2.5 Equation (1) is not clear. I understand that n is relative to a number (as in equation (2), f relates to a frequency). Therefore, I expect to have: $wtl = (mtl/nl)/(nt/365)$
Line 207: "west-southwest cyclonic"

Section 3.1 Line 240: text refers to a flood event in 1882 (Rhine-Basel) which is not visible on Figure 4

Section 3.2 Line 271: give the starting and ending years of the flood rich, flood poor periods Instead of "($p=0.027$)", write: "(p-value of the Wilcoxon test: $p=0.027$)", Line 272: give the starting and ending years of the flood rich, flood poor periods Line 278: "Bibliothèque" Line 284: "over all"

References Lines 143-144: reference of Franke et al. (2017) is missing Line 278: reference of Bibliothèque universelle is missing

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