Response to the interactive comments to the manuscript **hess-2019-523**

"Flood trends in Europe: are changes in small and big floods different?"

by Miriam Bertola, Alberto Viglione, Julia Hall and Günter Blöschl

We reproduce in the following document all the comments of the Referee in *italic characters*, followed by our answer.

Anonymous Referee #3:

The article is very nice, and contains a lot of information and results. One thing which is not clear from is the catchment size. For example, the Rijn has a catchment size of 180.000 km2, and contains also smaller catchments. How is this handled in this paper? Can smaller catchments be part of larger catchments? This is important, because large catchments do show a negative trend. This is not explained, and maybe there is no explanation, but has to be investigated in the future, this , however, can be stated more explicitly. The following citation does NOT explain why the large catchment show different results: "Furthermore, in medium and large catchments the magnitude of the trends is in general smaller compared to the small catchments. This may be due to long-duration synoptic weather events, producing floods in medium and large catchments, in contrast to small catchments in western Europe where the largest peaks are often caused by summer convective events with high local intensities". Does this suggests that "long-duration synoptic weather events" do show a negative trend?

We thank the Anonymous Referee #3 for the time she/he has spent on our manuscript and for the useful and constructive comments that will help to improve the quality of the manuscript. We have carefully considered and addressed her/his comments in the following.

In this study, we analyse flood data from 2370 hydrometric stations in Europe, each one corresponding to a specific catchment size/area. Consequently, multiple smaller catchments can be part of a larger catchment. The Gumbel regional model is fitted to flood records that are pooled over regions. In each region, the regional trend corresponding to a large (hypothetical) catchment area is an output of the model and is determined by the flood records, within the region, that correspond to large catchment areas. We will clarify it in section 2.2. The trend in large catchments is shown in Figure 5 and its sign and estimated magnitude varies according to the location and the flood quantile considered.

In this work we do not aim at investigating the causes of the observed flood trends (this is actually planned for the next phase of this research). However, in the discussion section, we make hypotheses on the possible drivers of the resulting flood trends, based on the literature and on our understanding of these processes. The sentences pointed out by the Referee (lines 331-334) refer to the Atlantic region, where large catchments exhibit, in general, smaller trends (positive for the 2-year quantile and negative for the 100-year quantile) compared to the smaller catchments. We did not intend to attribute this difference to specific drivers, nor to suggest negative trends in long-duration synoptic weather events. These aspects will be investigated in future work. In these lines we hypothesize that different type of weather events could affect in different ways the flood trends in catchments of different size. We will change these sentences (lines 331-334) accordingly.