

## General reply

We thank both anonymous reviewers and S. M. Vicente-Serrano for their positive comments and valuable suggestions. The full transcriptions of the reviewers comments (in bold) and our reply (in italic) are given as attachments for each reviewer comment. A general reply to different comments on the comparison between river discharge and the SPI is given below.

All reviewers questioned different aspects of the comparison between the river discharge data and the SPI: correlations between different SPI time-scales and discharge (reviewer #1); generally low correlations between discharge and SPI; normalization of the discharge time series and their uncertainty (reviewer #2); significance level of the correlations in table 3 and their discussion (reviewer #3).

We calculated the temporal correlation between the normalized discharge and the different SPI time scales and added the 95% confidence interval (see Table RA below). The SPI-12 has the highest correlation with discharge; however it is not significantly higher than the correlations with the SPI-6 using GPCP in both NG and ZB basins. Furthermore, considering the confidence intervals, all the datasets have similar (and low) correlation values with the discharge in the ZB basin. The higher correlations values of the GPCP SPI-12 with discharge in the NG, when compared with the remaining datasets can be also influenced by the shorter record for NG and the decadal variability as pointed by reviewer #3. In addition to these points, the discharge normalization was performed by simply removing the mean annual cycle and dividing by the monthly standard deviation, which might not be the best approach as pointed out by reviewer #2.

The main goal of this comparison was to support the use of GPCP as a benchmark, but these results do not provide robust evidences. Since this was not the main goal of the manuscript, together with the reviewers comments and the new analysis we decided to remove it from the manuscript. With the current discharge data we have access we believe that it will be difficult to further explore the relations between discharge and the SPI in the four basins.

Table RA. Temporal correlation of the 3, 6 and 12-month SPI from ERAI, CAMS-OPI, S4LO and GPCP with the normalized monthly discharge in the NG and ZB basins. The correlations are given by the lower and upper bounds for a 95% confidence interval. (extended from Table 3 in the original submission)

	NG			ZB		
	3	6	12	3	6	12
ERAI	[0.18 0.41]	[0.30 0.51]	[0.24 0.47]	[0.12 0.32]	[0.35 0.53]	[0.35 0.53]
CAMS-OPI	[-0.04 0.21]	[0.15 0.39]	[0.14 0.38]	[0.24 0.44]	[0.38 0.55]	[0.37 0.55]
S4LO	[0.04 0.30]	[0.28 0.50]	[0.38 0.59]	[0.09 0.31]	[0.22 0.42]	[0.26 0.46]
GPCP	[0.19 0.42]	[0.38 0.58]	[0.56 0.72]	[0.30 0.48]	[0.46 0.62]	[0.46 0.61]