Reply to reviewer 2

We would like to thank the reviewer for valuable suggestions and comments. In this document, **P** refers to the page number and **L** refers to the line number in the recent paper. For example, **P3L65-70**, refers to page 3, lines 65-70.

Reviewer 1		
No	**Comment**	**Reply**
1	The authors performed an intercomparison of three different streamflow drought indicators, with the goal to highlight the differences in the drought characteristics associated to each index and to detail the implication on drought forecast. I found the overall goal of the study meaningful, given the confusion that still arise among scientists and operational users on the topic, but I also found the paper and its structure generally out of focus. The key message of the paper "....developers of DEWS and end-users should clearly agree among themselves upon a sharp definition on which type of streamflow drought is required to be forecasted for a specific application." is in my opinion, even if relevant, better suited for a short communication or letter paper rather then a research paper.	We would like to thank the reviewer for the acknowledgement of the goal of our study. We appreciate the suggestion from the reviewer that our manuscript is better suited for a short communication paper rather than a research paper. However, a short communication paper would only be an option, if a systematic intercomparison of threshold and standardized streamflow drought indices across Europe obtained from commonly used identification approaches would exist. Such intercomparison, however, does not exist and consequently a technical paper is needed, which describes and discusses the use of different drought identification approaches to derive streamflow drought across Europe. This has to precede the section that deals with the implication on drought forecasting. Hence this paper should be a technical research paper instead of a short communication paper.
2	The research results that should support this conclusion as reported in this paper are somewhat lacking in both clarity and rigorousness.	We believe that the conclusions of our study support the results that different drought indices generate different number of drought occurrences/frequency and timing, which are strongly related to climate regions. We believe that we improved clarity and rigorousness of our results in the revised manuscript through making the drought identification methods more consistent in terms of: (i) thresholds, (ii) data accumulation period, and (iii) temporal resolution (see our reply number 3 below for more details).
3	The main drawback of the analysis is the fact that the authors uses three drought indicators that rely on quite different input data and basis hypotheses to conclude that they provide a different picture of drought. This result is quite obvious after an attentive read, given the background premises: - daily data for threshold methods vs. monthly data for SSI. - 90th percentile for threshold methods vs. median for SSI (SSI=0). - Event-based approach for threshold vs. single monthly value for SSI All these discrepancies in the drought definition make the intercomparison a mere exercise, and its outcomes are hard to translate into actual	We would like to thank the referee for the comments and valuable suggestions. Our paper uses the drought threshold based on common practice in the drought community. Using a threshold method either a Fixed Threshold (FT) or Variable Threshold (VT), drought is identified if the streamflow falls below the threshold, which is commonly in the range of 10-30th percentile of flow duration curve (P70-90)(Hisdal et al., 2004; Van Loon, 2015). On the other hand, the standardized indices e.g., the Standardized Streamflow Index (SSI) identifies drought if the SSI value falls below 0, which is 50th percentile (P50). Our reason that we use different thresholds (50th percentile for SSI

	general considerations.	and 10th percentile for threshold for the VT and FT) is that we would like to follow common practice for the different approaches. However, the reviewer has a point that the comparison between threshold methods (VT and FT) and SSI is not equal regarding to the use of different percentiles. Thus, in the revised manuscript, we will change the threshold from P90 into P80 for VT and FT, and SSI≤-0.84 (~P80) to have a fair comparison between different drought indices (Tijdeman et al., 2020). We also agree with the reviewer that our study uses different temporal resolutions to analyze drought, which are daily for the threshold methods and monthly for SSI. Again, we followed the common practice to identify drought using these methods. Many studies used daily streamflow data to analyze drought using the threshold method and monthly streamflow data to analyze drought using the standardized indices. To the author's knowledge, only Tallaksen et al. (2009) used the monthly data to derive drought using the threshold method only for a scientific purpose. In the revised manuscript, we will add in a specific application an analysis of drought characteristics using monthly streamflow data in both FT and VT drought approaches.
4	An additional drawback is the general lack of details on the implementation of the three approaches, which severely limits the possibility for the readers to extrapolate meaningful information from the research outputs.	We will elaborate more the method section and will add more drought characteristics, such as drought duration and deficit volume using different methods in the revised manuscript. By adding more results especially in the forecasting section (Section 3.2) (see our reply 5 below and 6c), the reader hopefully will clearly see the differences in drought characteristics because of different drought identification methods.
5	Finally, the analysis on the implications on drought forecast, which should be the main focus of the paper according to the title, is very limited in scope, and it needs to be significantly expanded in order to keep it as the focus of the paper.	We thank the reviewer for the suggestion. We will expand the analysis using the series of 12 forecasts initiated from January 2003 to December 2003 with 7 months lead time for each initiation. We will do this by describing: (i) pan-European maps showing forecasted drought timing and duration (number of drought occurrence/frequency and drought deficit volume will be provided in the Supplementary Material), and (ii) summary of forecasted drought characteristics identified using different approaches (FT and VT with daily and monthly resolution, and SSI-1) in the Rhine River using the series of forecasts initiated from 1st January 2003 to 1st December 2003 with a lead time of 7-month.
6a	**Specific Comments**	We will briefly describe in the Introduction

	Introduction The authors should better highlight how different definitions of streamflow drought in DEWS exists also for two reasons: 1) different users have different needs that can be accommodate by different indicators (e.g. river navigation may be affected more by FT droughts that VT droughts), 2) different available input data lead to different definitions (e.g. threshold methods may not be suitable for monthly data, and daily data may not be available in near-real time).	why different definitions of streamflow drought exists in DEWS. However, would like to leave the decision of using which drought identification approach to the users. We explained this in the Conclusions (**P12L383-P13L388**) where we stated, "*The use of monthly-aggregated forecasted flow data (e.g. SSI) is the best practice for seasonal drought forecasts. This method, however, cannot be used to calculate the drought deficit volume, which is a key component for water managers coping with hydrological drought. If deficit volumes are required for decision-making, then threshold approaches (VT or FT) should be applied on 30-day averaged flow data. The choice of the drought identification method when forecasting streamflow drought, in the end, lies to the end-users specific requirements and decisions and there is no one drought identification approach that fits all needs*".
6b	**Data and Methods** The description of the different drought indices need to be more explicit. How the drought events are defined for each index? How is the onset computed? Severity? Duration? Any event definition in the SSI? Etc. . . Also, more consistency on the adopted thresholds need to be enforced (why SSI=0 is used as threshold when 90th percentile is used for VT and FT?). It is also worth to mention that a VT method based on the same LISFLOOD data is currently operationally implemented as part of EDO (https://edo.jrc.ec.europa.eu/).	We will expand the method section in the revised manuscript, as suggested. We will add some information on drought characteristics in the method section, such as drought timing or onset (month when drought starts), number of drought occurrences/frequency, duration, and deficit volume. As mentioned above, we will change the drought threshold into P80 for FT and VT and SSI≤-0.84 (~P80) for the standardized index (our reply number 3). The suggested information about the VT method applied in EDO will be added.
6c	**Results and discussion** There is a clear unbalance between the historical analysis and the forecast. Give the title of the paper, I would aspect much more emphasis on the latter.	We will extend our forecast analysis by providing: 1) a map displaying forecasted drought timing and duration across Europe using forecast data issued in August 2003, and 2) a table describing forecasted drought characteristics (occurrence, timing, duration, and deficit volume) using the series of 12 forecasts initiated from January 2003 to December 2003 with a lead time of 7-month (median ensemble) (see our reply number 5). The latter, however, can only be performed only for one river. In addition, we will also provide information of number of ensemble members indicating drought in percent (x ensembles out of 25).

References:

1. Hisdal, H., Tallaksen, L. M., Clausen, B., Peters, E., and Gustard, A.: Hydrological Drought Characteristics. In: Tallaksen, L. M. & Van Lanen, H. A. J.(Eds.) Hydrological Drought, Processes and Estimation Methods for Streamflow and Groundwater. Development in Water Science 48, Elsevier Science B.V., pg. 139-198, 2004.

2. Van Loon, A. F.: Hydrological drought explained, WIREs Water, https://doi.org/10.1002/wat2.1085, 2015.
3. Tijdeman, E., Stahl, K., and Tallaksen, L. M.: Drought characteristics derived based on the Standardized Streamflow Index: A large sample comparison for parametric and nonparametric methods, Water Resources Research, 56, e2019WR026315, https://doi.org/ 10.1029/2019WR026315, 2020.
4. Tallaksen, L.M., Hisdal, H., and Van Lanen, H.A.J.: Space-time modeling of catchment scale drought characteristics, Journal of Hydrology, 375, 363–372, 2009.