Dear Editor,

Many thanks for your revision.

We modified P1L30. We also insert the equation for IC in the manuscript and a new Appendix (Appendix A) to describe HR.

We hope that readers could now a better understanding of these two hydrological indicators.

Best regards,

Florentina Moatar

The remaining two variables, the hydrologic regime (HR; Sauquet et al., 2008) and the concavity index (CI; Catalogne, 2012), are dimensionless and characterize the general hydrology of each site. More specifically, the HR groups sites into one of 12 classes ranging from rainfall-dominated, to transitional, to glacial and snow melt dominated (see Appendix A). These classes generally fall into buffered (i.e., high baseflow) or highly variable (i.e., low baseflow) hydrologic regimes. The CI describes the concavity of the flow duration curve, where values close to 1 indicate low flow variability (e.g., large high storage capacity in aquifer or snow) and values close to 0 indicate high flow variability (e.g., low storage capacity exemplary of Mediterranean systems). The concavity index is computed as follows:

$$IC = \frac{Q_1 - Q_{10}}{Q_{10} - Q_{99}} \quad (6)$$

where Q_p is the daily flow exceed p% of the time derived from the flow duration curve.

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5. Appendix A: Classification of river flow regime for France

Sauquet et al. (2008) defined a classification system for river discharge based on the mean monthly runoff pattern (Fig. A1). Using this classification system, they published a map with each river reach assigned to one class along the main river network.

Generally, the uppermost basins located in mountainous areas display glacial and snowmelt-dominated regimes (Group 1–3). The lower the outlet, the lower the contributions of snowmelt to runoff. Group 4 to 6 were defined to be in the “transition” regime, where the seasonal variation in streamflow is affected as much by precipitation timing as by air temperature and topographic influences on snowpack formation and snowmelt timing. In this regime, high flows are typically observed in spring. Group 7 to 12 are rainfall-dominated regimes. These six rainfall-dominated groups differ along an axis of maximum and minimum monthly discharges. For instance, group 7 is characterized by very low flow in summer, reflecting the lack of deep groundwater storages in the catchment. In contrast, Group 12 exhibits nearly uniform flows through most of the year, and these river reaches are typically found where large aquifers moderate flows.

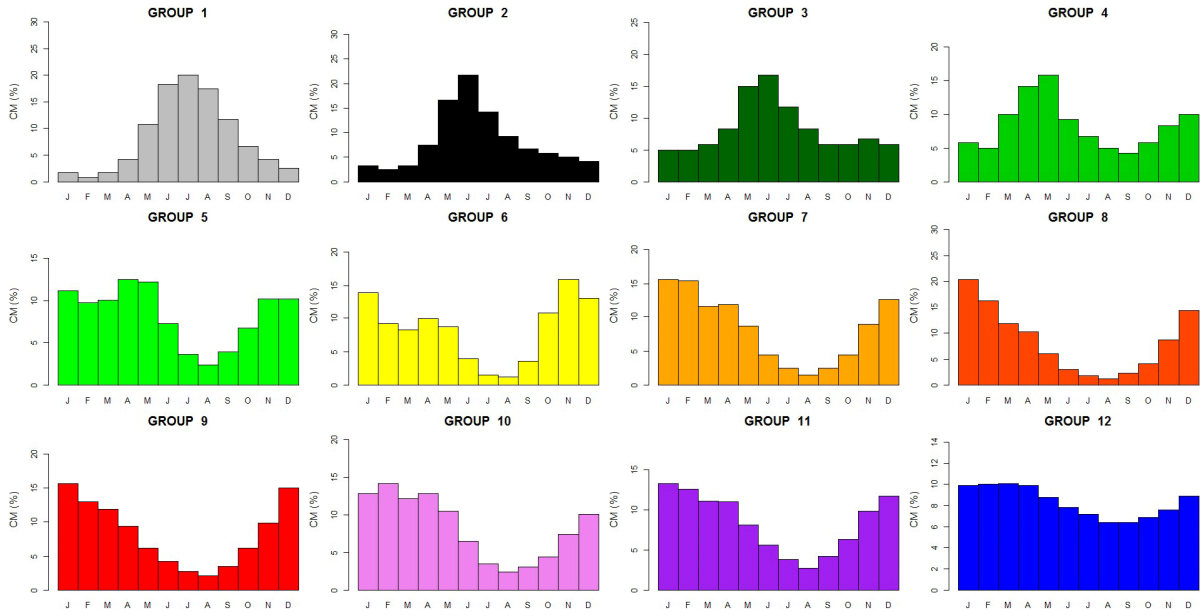

Figure A1. Reference dimensionless hydrographs representative of the classification of river flow regime for France (after Sauquet et al., 2008). The y-axis (CM) represent the percent of each month contributing to total annual runoff, equal to monthly runoff (mm) divided by the mean annual runoff (mm).