

Which hydrological signatures of intermittence of rivers and streams in order to identify causes and ecological impacts?

Chloé Roger, Ophélie Fovet, Isabelle Braud, Manuela Grippa, Basile Hector, Jérôme Molénat, T. Datry, Stéphane Audry, Flora Branger, Nathalie Folton,

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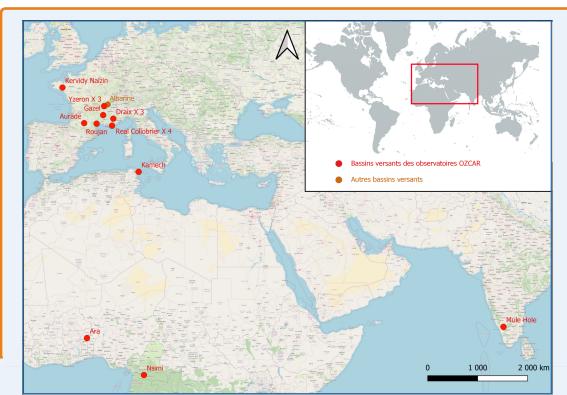
Which hydrological signatures of streams and rivers intermittence to identify causes and ecological consequences?



Roger C., Fovet O., Braud I., Grippa M., Hector B., Molénat J., Audry S., Branger F., Folton N., Le Bouteiller C., Nord G., Probst A., Probst J-L., Raclot D., Riotte J., Ruiz L., Zitouna R. and Datry T.

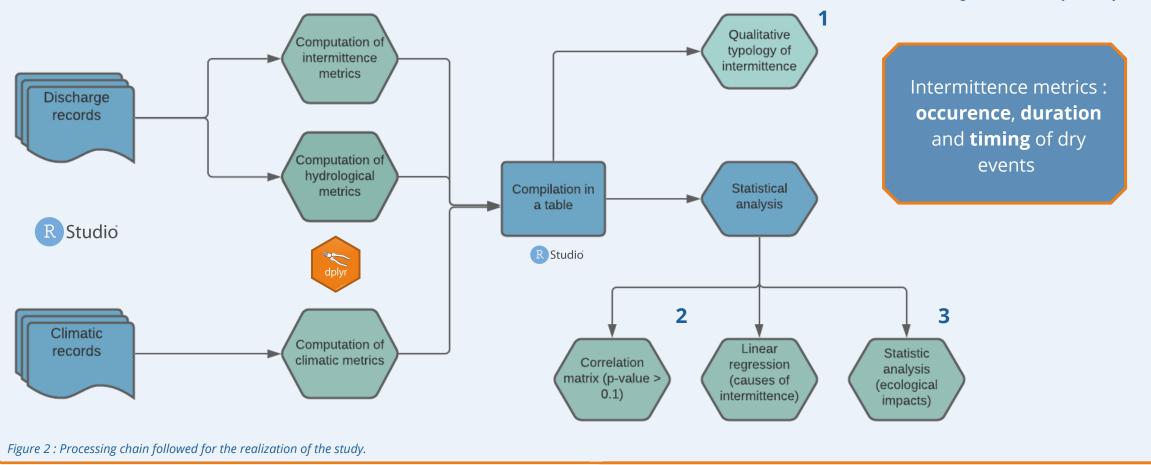


The aim of this project was to identify hydrological signatures which allow to quantify the intermittence of small headwaters watersheds of OZCAR network, in terms of frequency, duration and calendar. We then tried to identify the causes of this intermittence by a systemic approach, by mobilizing additional metrics (hydrological and climatic). And finally, we tried to connect hydrological signatures of intermittence to ecological datas, to identify potential impacts of dry events on ecological abundance of macro-invertebrates.



Materials and methods

Figure 1 : Location of the study sites



Results and perspectives

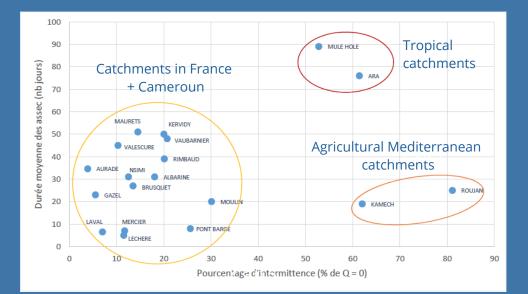


Figure 3 : Duration characteristics depending on dryness frequency for all basins. Circled in red: High frequency and duration. Circled in orange: High frequency, but low duration. Circled in yellow: Low to moderate frequency and duration.

³ Ecological impacts

Lack of aquatic ecological data **co-located** with hydrological measurements which challenges the OZCAR–RI

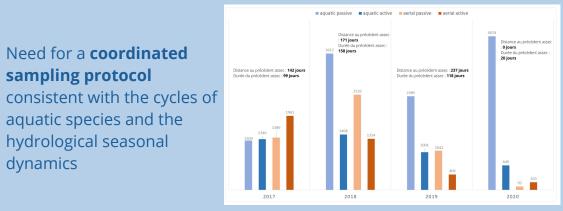


Figure 5 : Taxonomic abundance of macro invertebrates for each habitat and behavioral modality. In light blue, passive aquatic species. In dark blue, active aquatic species. In light orange, passive aerial species. In dark orange, active aerial species.

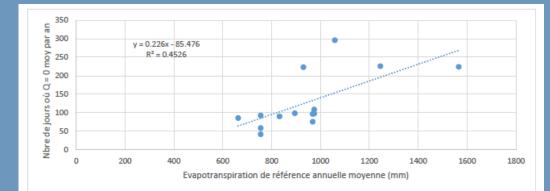


Figure 4 : Linear regression of annual ETO and dryness frequenc

- Major determinants of intermittence : climatic variables (r = 0.8, -0.8, 0.6)
- Secondary determinants : hydrological connectivity to groundwater (r = 0.5)
- Tertiary determinants : specific componants of watershed (e.g. : vegetation) r < 0.5

) Discussions and perspectives

- Analyzing **2nd order factors** within the French catchments
- Analyzing trends on the dry period characteristics (Roujan, Kamech, Reals, + Houay Pano)
- Needs for catchment storage capacity and storage estimates (piezometry, geophysics)
- Describing the **spatial dynamics** of hydrological intermittence (remotely sensed data e.g. altimetry, thermic images)