

Interactive comment on “A method for low flow estimation at ungauged sites, case study in Wallonia (Belgium)” by M. Grandry et al.

M. Grandry et al.

m.grandry@ulg.ac.be

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We first want to thank you for your constructive comments on our paper.

We will rewrite the abstract to make it clearer and more concise.

We will also follow your advice for the introduction. We will include further information about the studies that used different distributions, name the different techniques of low flow estimation and change the way we formulate the review of studies, so that it does not sound manipulative since it was not our intention. MAM7 is the mean of the annual minima of the 7-day average flows. There is therefore one value of AM7 per year, even for wetter years. When AM7 is associated to a return period (AM7_T),

this represents extreme events: the higher the return period is, the more extreme is the event. We chose the regional regression approach because it better corresponds to our objective. As this approach is based on physical parameters of catchments, it allowed us to better understand low flows from a physical point of view, in addition to estimating them.

As for the material and methods, we will make the equations more readable, we can put the variables in a table if it is easier to read, we will add some more explanation about the hydrological groups of soils, the estimation of Pe and PET, the method used to calculate recession coefficients, and the adjustment of the determination coefficient. The human influences that are smoothed out by averaging flows over some days are the influences of hydroelectricity (variation of hourly flows due to hydropeaking) and little abstraction from farmers. The annual minimum discharge and the annual minimum of 7-day average flows are indeed different. However, catchments with high human influences have not been considered. The data quality has been checked for the others (test of homogeneity, etc).

Concerning the results, we will quantify the differences between regions, add a table to compare the variables selected by the different methods, and see if we can confirm with our results the lower collinearity when using the stepwise method. p11596, L8. “Extremes” is maybe not the good word to use in this situation. We wanted to refer to very low and very high AM7. We should use outliers instead. We will clarify this in the paper. p11596, L12. The use of “any” is maybe not appropriate. AM7_T can be calculated for a return period between 5 and 50 years, which is the range most used by water managers. This is very important for managers who still have to decide which return period to consider in function of the aim of the project they work on. The use of this formula rather than the equations for each return period does not imply a high loss in precision for AM7_T estimates (between 0.1 and 3% for the global model).

The incertitude can indeed be calculated and we can consider it in the paper. The sensitivity can also be included in the paper to make the method more complete.

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We will also take into account all your technical corrections. Thank you for those.

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