Hydrology and Earth System Sciences

Discussions

Interactive comment on "Technical note: the caRamel R package for Automatic Calibration by Evolutionary Multi Objective Algorithm" *by* Céline Monteil et al.

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We would like to thank Elena Toth for constructive suggestions on our manuscript that will certainly improve the quality of it. Below we provide the Editor's comments verbatim in black italic text, and our responses are immediately below each comment in blue text.

Dear Authors, as I anticipated in the submission phase, I have two main suggestions: 1) adding a comparison not only with NSGA-II, but also with the other optimization model you merge in the Caramel (MEAS), since you are proposing an algorithm that should be an improvement above each one of the previous approaches.

We agree this would have been interesting but we didn't find a code of MEAS available, so we cannot do this comparison for this paper.

2) the algorithm, in terms of hydrological modelling, is only tested on a single catchment (and in addition, the details of such application are lacking): in order to prove the generality of the improvement allowed by the proposed approach, you should test the calibration of at least another study catchment.

We will add another example on a new catchment and using the open source hydrological model GR4J (Coron et al., 2017; Coron et al., 2019). We also suggest to change the title of the paper as "Multiobjective calibration by combination of stochastic and gradient-like parameter generation rules: the caRamel algorithm" to be more in the scope of the journal.

On the abstract/introduction phrasing: p. 1, l. 13: "caRamel()" why the parentheses?
We will supress this sentence.

p. 1, l "The comparison with another well-known optimizer (i.e. NSGA-II) confirms the quality of the algorithm"
We will change it.

p. 2, ll. 7-14: I would replace with: "CaRamel was initially developed and used for the calibration of hydrological models: Le Moine et al., 2015, Rothfuss et al., 2012, Magand et al., 2014, Monteil et al., 2015 (previously to the R package release) and Rouhier et al. (2017). The interesting performances of caRamel algorithm in such studies prompted us to describe in detail the algorithm in the present paper, and in particular its use as an R package, that can be used for any model in the R environment. The user has simply to define a vector-valued function (at least 2 objectives)

for the model to calibrate and lower and upper bounds for the calibrated parameters. This paper aims at describing the principles of caRamel algorithm and its use as an R-package, through the analysis of its results when used for the parametrisation of an hydrological model. A comparison with the widely used NSGA-II (available in the R package, "Multiple Criteria Optimization" MCO, Mersmann et al., 2014), is also presented."
We will change it.

References

Coron, L., Thirel, G., Delaigue, O., Perrin, C. and Andréassian, V. The Suite of Lumped GR Hydrological Models in an R package. Environmental Modelling and Software, 94, 166-171. DOI: 10.1016/j.envsoft.2017.05.002, 2017.

Coron, L., Delaigue, O., Thirel, G., Perrin, C. and Michel, C. airGR: Suite of GR Hydrological Models for Precipitation-Runoff Modelling. R package version 1.3.2.23. https://CRAN.R-project.org/package=airGR, 2019.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2019-259, 2019.