

Response Letter

Title: A Hydrological Emulator for Global Applications – HE v1.0.0

Journal: Geoscientific Model Development

We would like to thank the Editor and the referees for their detailed review of our manuscript and their positive feedback, constructive suggestions and criticisms. The responses to the Referees' comments are shown in blue font below. All the line numbers indicated refer to the main text of the revised manuscript (clean version without tracking changes).

Editor's comments:

In my role as Executive editor of GMD, I would like to bring to your attention our Editorial version 1.1:

<http://www.geosci-model-dev.net/8/3487/2015/gmd-8-3487-2015.html>

This highlights some requirements of papers published in GMD, which is also available on the GMD website in the 'Manuscript Types' section:

http://www.geoscientific-model-development.net/submission/manuscript_types.html

From your abstract and introduction I understand that you describe the newly developed Hydrological Emulator and evaluate its results. Therefore your paper is not an "Evaluation paper" but a "Development and Technical paper" and thus the criteria of this paper type are applied.

These are in particular:

Comment 1: "The main paper must give the model name and version number (or other unique identifier) in the title."

Response 1: We thank the Editor for all the comments and for allowing us to revise the manuscript. We will change the "Manuscript type" to "Development and Technical paper" during our submission of the revision, and we have added model name and version number in the title:

"A Hydrological Emulator for Global Applications – HE v1.0.0"

Comment 2: "All papers must include a section, at the end of the paper, entitled 'Code availability'.

Here, either instructions for obtaining the code, or the reasons why the code is not available should be clearly stated. It is preferred for the code to be uploaded as a supplement or to be made available at a data repository with an associated DOI (digital object identifier) for the exact model version described in the paper. Alternatively, for established models, there may be an existing means of accessing the code

through a particular system. In this case, there must exist a means of permanently accessing the precise model version described in the paper. In some cases, authors may prefer to put models on their own website, or to act as a point of contact for obtaining the code. Given the impermanence of websites and email addresses, this is not encouraged, and authors should consider improving the availability with a more permanent arrangement. After the paper is accepted the model archive should be updated to include a link to the GMD paper."

Therefore please provide a version number and preferably the acronym used within the article (HE). Additionally, we strongly recommend to make the exact code version, your article refers to, available via a permanent archive providing a DOI (e.g. Zenodo).

Response 2: We have tried our best to meet the journal requirements in terms of code availability. First, we have created a repository in the open-source software site GitHub (<https://github.com/JGCRI/hydro-emulator/>) to make the hydrological emulator freely available. We have released the version of the specific HE v1.0.0 referenced in this paper on <https://github.com/JGCRI/hydro-emulator/releases/tag/v1.0.0>, where the source code (written in Matlab), all related data inputs and outputs, as well as the detailed Readme file are available. The repository is maintained by our organization, the Joint Global Change Research Institute (JGCRI), and long-term commitment for maintaining the repository is a standard practice. For example, both Le Page et al. (2016) and Hartin et al. (2015) published in Geoscientific Model Development (GMD) provided their codes on the GitHub site maintained by JGCRI (<https://github.com/JGCRI/>). Second, there is an ongoing effort to incorporate the hydrological emulator developed in this study to Xanthos (Li et al., 2017, <https://github.com/JGCRI/xanthos>), which is an open-source global hydrologic model, and the code for the HE referenced in this paper will also be freely available in the next version of Xanthos.

We have clarified it in the "Code and/or data availability" section as follows:

"The hydrological emulator (HE) is freely available on the open-source software site GitHub (<https://github.com/JGCRI/hydro-emulator/>). We have released the version of the specific HE v1.0.0 referenced in this paper on <https://github.com/JGCRI/hydro-emulator/releases/tag/v1.0.0>, where the source code (written in Matlab), all related inputs, calibrated parameters and outputs for each of the global 235 basins, as well as the detailed Readme file are available."

References:

Hartin, C.A., Patel, P., Schwarber, A., Link, R.P. and Bond-Lamberty, B.P., 2015. A simple object-oriented and open-source model for scientific and policy analyses of the global climate system—Hector v1.0. *Geoscientific Model Development*, 8(4), pp.939-955.

Le Page, Y., West, T.O., Link, R., Patel, P., 2016. Downscaling land use and land cover from the Global Change Assessment Model for coupling with Earth system models. *Geoscientific Model Development*, 9(9), p.3055.

Li, X., Vernon, C.R., Hejazi, M.I., Link, R.P., Feng, L., Liu, Y., Rauchenstein, L.T., 2017, Xanthos – A Global Hydrologic Model, *Journal of Open Research Software*, 5(1), p.21.