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Hydrology and Earth System Sciences Discussions

Interactive comment on "A variable streamflow velocity method for global river routing model: model description and preliminary results" *by* T. Ngo-Duc et al.

Anonymous Referee #3

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General comments

Ngo-Duc et al. present an improved version of the variable velocity flow routing algorithm of Arora and Boer (1999) and rather than using a prescribed constant value of Manning roughness coefficient *n* they estimate it using Dingman and Sharma (1997) approach. In my opinion, this is an improvement over existing approaches and that this manuscript can be published in HESS if some additional results can be included in the manuscript.

Specific comments

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I would suggest to include some additional tests and results in the manuscript. While the manuscript compares the daily river discharge with observation-based estimates and those from the TRIP version with a constant flow velocity, it would be useful to see results from a version that uses variable flow velocity but a constant prescribed value of Manning roughness coefficient (*n*). This would give insight into the improvement gained by using a time-dependent *n* rather than a fixed value.

In addition, it would be useful to plot flow duration curves that will allow to see if compared to fixed flow velocity the use of variable velocity leads to higher frequency of extreme events, justifying the use of variable velocity algorithm for some assessment of flood related studies.

Technical corrections

Line 4, page 4390. In sentence "(TRIP) is a global river routing model which can help to isolate the river basins", consider replacing "can help isolate the river basins" by "represents the river basins" and rewording appropriately.

Lines 7-8, page 4390. Consider replacing "long-term discharge" by monthly and annual discharges and "short-term" fluctuations by changes in daily discharge.

Line 20, page 4391. Define hydraulic radius the first time the term is used.

Lines 10-15, page 4395. Replace multi-model analysis, which is unclear and vague with multi-model ensemble mean, which I believe is the correct term to use in context of mean of different models.

Lines 20-25, page 4401. There is no need to mention that TRIP output are available in netCDF format. In regard to TRIP's ability to be run at different resolutions it is not clear if this is the resolution of input data (runoff) that is then interpolated to TRIP's resolution of 1 degree, or if the river networks are available at different resolutions (which requires up or downscaling of river networks; a cumbersome process).

Table 2. Why is r-squared in column 10 of the table higher than 1. Coefficient of

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correlation by definition cannot be more than one, or is this something else.

Figure 1. Rather than saying "OK" and "not OKAY" which does not actually tell what is okay, why not clearly say that the red loop is repeated if equilibrium is not reached and the blue loop is operated when equilibrium is reached.

Figure 3. Write the durations which observed and modelled (T1 and T2) streamflow correspond to in the legend. For example, OBS (19xx-19xx), T1 (19xx-19xx), T2 (19xx-19xx).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 4389, 2007.

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