**Geoscientific
Model Development
Discussions**

Interactive comment on "The JGrass-NewAge system for forecasting and managing the hydrological budgets at the basin scale: the models of flow generation, propagation, and aggregation" *by* G. Formetta et al.

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The authors describe a modelling system, based on a readily available and open-source GIS JGrass, to simulate river discharges of the river Passer. A major advantage of this modelling system is its ability to predict the discharge at any intermediate point on the river network.

However, the presentation of the paper leaves much to desire. It does not justify clearly content or the work done. Considering the potential of this work, I recommend major

revision.

A. General comments:

1. In the title "The models" should be changed to "a model" or "models" (authors may decide which one is more appropriate here). Also it is easier for the readers, if same order is maintained in headings (in the text) along with consistent use of terminology (in section 2; replace "runoff production, aggregation, and routing" with 'generation, propagation/routing, and aggregation' and accordingly modify the sub-section heading 2.2).

2. This paper assumes that readers have a prior knowledge of "Jgrass-NewAge infrastructure" from literature. Since the paper and manual referred to in the manuscript are in preparation, this is not essentially true. So, a little more detail in this regard is required.

3. I get an impression that summer rainfall is 2-3 times more than winter (see the different ordinate scales in Fig. 7 (0-5 mm/h) and 8 (0-15 mm/h)), yet the highest discharge peak is seen in winter. It may be interesting for readers (who are not familiar with the region) to have some background of the physical and climatic setting of the basin along with observed intra-annual variability in precipitation etc...

4. Model calibration is done twice and reasons for that are introduced quite abruptly in the conclusion section. I was just wondering what will happen if you calibrate the model only once and simulate the discharge for the entire year? In this way, the rationale for calibrating twice can be explained more easily and earlier in the text itself.

5. When an analysis is done (in section 3), I am not sure if the readers are provided with the purpose and conclusions derived. I feel the same with the simulation results; conclusions based on the simulations are not given in much detail. Even with one year of data, some interpretation can be made regarding further modification or addition in the system.

6. Model details, especially the ADIGE components are given in detail, but they do not highlight what is new/ different from those used before. So in my opinion, details of the model should come first, then a comparison can be made with others, and not vice-versa.

7. There should be a separate subsection or at least a short paragraph about datasets (terrain, precipitation, etc.) used. It will be also good to discuss the data requirements of the modelling system.

8. Authors claim that the modelling system is built upon flexible components. This is not coming out clearly. The modelling system is built on Jgrass, an open source and free GIS. This point should also be highlighted.

9. Check subscripts and dimensions in eqs (3–6). I guess As should be dimensionless. Please give the units of Ds. What about unit of A in eq. (13)?

10. Figures: Figures need considerable improvement. Expand and check all captions carefully. Figures 7 , 8, 9 are hard to comprehend (especially the axes labels).

i. Figure 1 is nice. However, some improvement is required. Bigger arrows and more details embedded in the schematic will be appreciated. What does the right-most arrow depict?

ii. Figures 2 and 5 can be combined together. 2 (or 5) can be used in inset. The intermediate positions of figure 9 can also be marked here. Also in Figure 2, please check: In caption outlet of Passer river basin is at Saltusio, but in the text it is at Bojen.

iii. This will allow figure 9 to be plotted in a 3X3 panel format.

iv. Figures 7 and 8 are crucial for the paper. Please be more careful in preparing them. Check the captions: dates on top of figure and in caption differ! Your representation of dates (x-axis label) seems to differ in both the panels. Ideally it should be date and month. Simulation not " simulation data" is enough in caption.

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B. Specific comments (Page(line)):

Overall improvement in English is required. Apart from some technical clarifications, most of the comments here are regarding English usages and typos, and can be easily rectified.

944(5): "...consider statistics..." statistics here is not required.

944(20): "indexes" indices.

944(20): "discharge in" discharge at.

944(18-21): "The model has been tested.....modeled discharge" I am not sure what is meant by "scaling properties of discharge ". Also, a statement regarding the results obtained (or nature of simulations) is missing.

945(5-10): "in this context......and the PRMS model". Needs rewriting. I am confused with the statement about "large modelling system". Does it mean exhaustive data requirement or consideration of many processes?

945 (10): "...proper...." Maybe 'respective' will be a better word.

945 (14): "comparisons" comparison.

945 (14): "was still" replace it with something like 'being on'.

945 (18): "exist" exists.

945 (20): "distribute" distributed.

945 (20-21): As far as I remember, Beven (2001) does not talk only about lumped models. He discusses all types of models. Also check the reference style for distributed model references, ';' is missing.

945 (25): "unnecessary" is not a proper word here as it gives a different meaning. Perhaps something like . . ..'without representing the full spatial variability'.....would be better.

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945 (26- last para): It may read better if this paragraph is linked to the preceding paragraph...building from whether GIUH is lumped or distributed.

946 (3): " ...work is..." work are.

946 (3): " ...act in..." a better choice will be 'lies in'.

946 (6): " ...the constant flow velocity..." delete 'the'; "prediction" predictions.

946 (7): "...discharge at intranet location" I got the meaning, but I wonder if a more suitable replacement for 'intranet' can be found.

946 (10): "physics" not required. I am also not sure how remote-sensing provides new tools...it should be new data.

946 (12): "...floods and draughts..." Is it necessary to bring it here, without mentioning the specific spatial-temporal scales at which Jgrass-NewAge works?

946 (15): Maybe a better way to write this is...estimate the spatio-temporal variability...

946 (19): "parametrization" parameterization.

946 (24): "...confounded..." Do you mean 'explained'?

946(25): "..Any HRU instead..." this statement seems vague. Also HIs are important here, so 2-3 lines can be devoted to explain how they are delineated.

947 (5): "...Jgrass-NewAge statistics..." Jgrass-NewAge statistics model

947 (11): Expansion of OGC

947 (23): Title can highlight ADIGE: Jgrass....

947(25): "...Where L means a length such as mm..." something like... L is length (mm)

948(5): "...Differently form most of the models..." Is the model used different from above mentioned models only or some other models? Are there any similar models?

948 (5): "...coupled and generate runoff. . ." meaning is not clear.

948 (19): "...Eqs (1) and Eqs (2):" Delete.

948 (21): g12 or g21?

949 (6-9): Check subscripts, units etc.

949 (25): "...all..." delete

950 (1-6): First line of this paragraph is quite abrupt. I think a re-organisation or rewriting will make better sense. Actually the second sentence should start this section.

950 (8-9): In eq. (7) and (8), description of qsup/sub is missing.

950 (10): "In this calculations...Darcy's law average according..." consider rewriting.

951 (17): Eq. (13). Please check the dimensions. Is it (A) area or fraction of area?

952 (4): Eq. (14). Unit of if missing.

952 (5): Menabde and Sivapalan (2001) missing from reference.

952 (Section 3 heading): "passer" to Passer

952 (11): "...and shown in Fig..." delete. It is a good practice to avoid, as much as possible, usages such as...'shown in Fig' or 'as shown or given in Table' ...etc. Figures and tables should be mentioned in parenthesis along with concerned statements.

952 (14): " nord-est" North-east.

952 (15): Basin outlet at Bojen or at Saltusio? Check the figure caption.

952 (16): "500 (m) ..." change as 500 m ... and "...in (Fig. 6)..." remove parentheses.

952 (18): "...Jgrass-NewAge infrastructure..." model or infrastructure or stat? Use consistent terminology.

952 (19): "gemorphological" geo...

952 (20): If not given earlier, some reference for JGrass will be appreciated here.

952 (21): "The relationship area-perimeter" insert ' between' .

952 (22): "In (Fig.4) it is..." It is....

953 (4): "...were used data ..." data used were.

953 (10): correct spelling is meteorologic(al)

953 (20): Please be more clear how you arrive at this conclusion "where volume of discharge is considerable 'lly' greater than...precipitation...". From the Figs 7 and 8, I can understand it for the winter peak, but for summer, I am not sure. One way to see it will be to compare areal precipitation with discharge.

953 (25): "...simulation data..." simulation only.

953 (25): "...result are..." results are.

954 (4-5): "Taking in" taking into; remove "of" and "also" .

954 (7): "satisfactory, considerably" put an ' and' ; "better that" better than (actually consider rewriting the whole sentence!)

954 (8): some examples of "state-of-art models' will be helpful here.

954 (11): ". . .model are good..." ...is good.

954 (13): I am not sure, inferring this from statistics is valid, as there is only one peak in winter. Can you think of a physical reason, why the winter peaks are simulated better than summer peaks?

954 (14): "...than in summer" than the summer ones.

954 (20): In the last paragraph, some more detail is required....It can be described as an advantage of the model. Also add an "and" between link and therefore

954 (25): I am not sure if this conclusion follows from the text. Some sort of explanation

is required.

954 (25): "built in" built into.

955 (5): Vague statement about rainfall measurement errors. Needs detailed statement. The point made in text can be repeated here.

955 (15): "...any link end..." Not clear.

Interactive comment on Geosci. Model Dev. Discuss., 4, 943, 2011.