Hydrology and Earth System Sciences Discussions

Interactive
Comment

Interactive comment on "Combining semi-distributed process-based and data-driven models in flow simulation: a case study of the Meuse river basin" *by* G. Corzo et al.

Anonymous Referee #1

Received and published: 24 March 2009

General Comments

This paper uses ANNs as a replacement for a) the HBV model for sub-basins of the River Meuse and b) as a method for integrating all basin flows which a routing mechanism would normally do. This paper is novel in that it tries to integrate physical/conceptual and data-driven models. It should therefore be of interest to readers of HESS. The paper concludes that this integration with ANNs has potential which I think has been demonstrated by the paper. However, the organisation of the paper makes it difficult to follow in places. The authors should give some thought to how they could improve readability of the paper.

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Specific Comments

1. Title of the paper is fine but the final sentence of the abstract is not clear.

2. Section 3_2_2 needs expanding further. Can you explain the replacement in relation to Figure 1? Can you provide figures of errors of each basin under what you refer to as different flow conditions in a separate table? Can you then link explicitly to why you have chosen the basins you did for replacement with DDMs?

3. You need to tell the reader what data are available for which sub-basins, which is not currently clear.

4. The areas in Table 1 are incorrectly expressed using a period instead of a comma. For example, Chiers should be 2,207 km2 and not 2.207.

5. Section 3_2_3 needs more explanation, i.e. why did you choose 8 sub-basins for replacement?

6. Why did you choose only an ANN for the routing model and not other DDMS?

7. The two paragraphs on page 743 lines 18 to the end and then page 744, lines 1 and 2: these two paragraphs should be in the discussion as they have implications for the usefulness of the models. This warrants further discussion.

8. Give names of all sub-basins used in your 8 scenarios.

9. Explain the statement on page 749: The operational forecasting system requires more variable information in real time, and therefore, this approach may bring operational advantages. Also explain in more detail the paragraph that follows on rules for defining replacements as this is not clear what you mean.

10. Figure 7 adds very little to the paper and can be removed. Figure 8 is difficult to read and should be redrawn with different colours maybe. Also I can't see your conclusion that the DDM enhanced models are better at predicting the recession of the hydrograph. They look very similar to the HBV model on its own.

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11. Why did you not combine the best sub-basin replacement model with the routing replacement model instead of keeping these two things separate?

12. There are a quite a number of errors in the written English. I started to write down a few for guidance but the list has become quite long in the end:

NOTE that * means a quote around a word but this character wouldn't appear properly.

Page 730, line 13 : remove *of* before ANNs

Page 730, line 25 : add *are* between there and many at the end of the line

Page 731, line 6 : change *Linde* to *te Linde*

Page 731, line 21 : remove *between*

Page 732, line 4 : Put Solomatine and Dulal in brackets

Page 732, line 20 : change DDMs to DDM

Page 732, line 25 : change *in the recent years* to *in recent years*

Page 733, line 12 : change *Calibration* to *The calibration*

Page 733, line 15 : change *considered more* to *considered a more*

Page 734, line 20 : Luxembourg has a *u* in the name in English, unless you want to keep the German spelling

Page 734 : change title to HBVM model for the Meuse River Basin and capitalize all subsequent occurrences of river when it appears after Meuse.

Page 735, line 8 : place Berger in brackets

Page 735, line 9 : spell Meuse correctly

Page 736, line 2 : change researches to research, or change this to *works* or *studies*

Page 736, line 2 : add van in front of Deursen

Page 736, lines 12 to 16 : this is not a complete sentence so modify

Page 737, line 11 : change *run on daily basis* to *run on a daily basis*

Page 738, remove *s* from models in heading 3.2

Page 738, line 20 : remove *s* from replacements

Page 739, line 20 : change DDM to DDMs

Page 740, lines 5 and 6 : finish the sentence properly with the name of the algorithm and then put the references in brackets

Page 740, line 6 : *network where setup* doesn*t make sense : modify

Page 740, line 20 : remove *s* from sub:basins

Page 741, line 7 : remove *s* from *Inputs*

Page 741, line 9 : remove *s* from *sets*

Page 741, line 12 : remove the word *graph*

Page 741, line 14 : change *the future discharges* to *future discharge*

Page 741, line 20 : change *was* to *were*

Page 741, line 21 : change *where* to *were*

Page 742, line 6 : change the phrase *and are the individual* to *which are the individual*

Page 743, line 22 : correct spelling of *third*

Page 744, line 20 : change to *referred to as the Meuse source*

Page 744, line 21 : change *the error* to *an error*

Page 746, line 6 : change density to plural or add *function* afterwards

Page 746, line 9 : change *where* to *were*

Page 746, line 10 : put (a) and (b) in front of the names

Page 746, line 15 : change *as* to *to* and remove *the* in front of Fig. 2

Page 746, line 21 : move comma after data to after Verdre

Page 746, line 21 : change phrase to: *the dataset used for training and testing covers the periods 1992 to 1996 and 1997 to 1998, respectively*.

Page 748, line 5 : add a comma between routing and preprocessing

Page 748, line 12 : change to research and put brackets around de Wit et al.

Page 749, line 4 : change *the* to *a* before 36%

Page 749, line 12 : change to *the target is aimed at reproducing*

Page 749, line 17 : remove *the* from *that the replacing*

Page 749, line 20 : remove *s* from *flows*

Page 751, line 5 : change *such approach* to *such an approach*

Page 750, line 5 : remove *the* from *conducted in the*

Page 750, line 17 : change *relative* to *relatively*

Page 750, line 20 : remove *the* from *In the subsequent*

Page 750, line 23 : remove *of*

Page 750, line 24 : change *relate* to *relates*

Page 750, line 26 : add *the* to *in HBV* and remove *the* from *use the*

Page 751, line 11 : change *reproduces* to *reproduce*

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Page 752, line 1 : change to model*s with an apostrophe

Page 752, line 3 : remove *the* from *in the further studies*

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 729, 2009.

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