Hydrology and Earth System Sciences Discussions

Interactive
Comment

Interactive comment on "HYDROGEIOS: A semi-distributed GIS-based hydrological model fordisturbed river basins" *by* A. Efstratiadis et al.

P. Krause (Referee)

p.krause@uni-jena.de

Received and published: 21 August 2007

General comments:

All in all a comprehensive, interesting and nicely written paper. The research the authors are presenting, is relevant, interesting and of broader scientific interest. The authors are giving a comprehensive introduction which continues in section 2 with the basics of parameter uncertainty and calibration. These two sections might be subject of shortening if space should be saved for some reason.

The paper describes primarily a hydrological modelling system implemented in a GI-System. The authors are not telling us which GIS they used for their work, which could be of interest for some readers. The most novel approach is the coupling of

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU

the simple hydrological model, with a simple groundwater model and a simple water management network model inside a GIS. The outcome seems to be a robust system which produces surprisingly good results.

The concept of the model components is described nicely and understandable in the next section as well as their interactions. The authors give equations were necessary and helpful. Then the calibration and optimisation method used with HYDROGEIOS is described. Obviously the authors spent much time on this problem which is partly due to the incredible large amount of free calibration parameters.

Finally the paper is rounded up by a nicely presented case study and a summary containing some conclusions.

The weakest part of the presented system and results are the large amount of free parameters used to calibrate the model. With that much parameters and enough time it should be possible to get good fits whether the model is valid or not. What I do not understand is why the authors are using the distributed spatial attributes (e.g. Smax) for calibration. Wouldn't it be better to set up "reasonable" values a priory based on soil maps and physical soil properties and integrate that knowledge into the equations? The combination of such a priori information with an effective calibration parameter, with only one value valid for the whole catchment, would dramatically decrease the number of free parameters. This could be helpful to mitigate the problem of equifinality and model uncertainty and would be much more in-line with the basic concept of HRUs. For an improvement of the paper I would suggest that the authors should explain, discuss and/or justify why the choose this distributed calibration approach.

Specific comments/questions:

In section 4 the "coefficient of efficiency" is mentioned. Is that the Nash-Sutcliffe efficiency? Please specify because your term is not 100% clear.

I wonder why only permeability and slope were used for the HRU delineation. Is there

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

any reason for this. Please specify. What about landuse. As you calculate ET according to Penman-Monteith in advance you should have some information about landuse/landcover.

Technical corrections:

Section 4, line 20: shouldn't yt be y't?

Page 1952, line 16: Beven 1989 is missing in the references

Page 1953, line 7: There are more relevant citations for SWAT available

Page 1954, line 20: Madsen 2000 is missing in the references

Page 1954, line 21: Shoups/Schoups is spelled differently in the text and the references

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 1947, 2007.

EGU