

Interactive comment on “Simulating stream flow over data sparse areas – an application of internet based data” by M. T. Vu et al.

M. T. Vu et al.

tue@nus.edu.sg

Received and published: 27 March 2012

The paper addresses an important problem in hydrology concerning runoff prediction in data sparse areas. The paper demonstrates the use of different internet-based data sources for setup and simulation with the SWAT model. I find the paper to be of interest for hydrological modellers; however, the paper is rather short in the presentation and discussion of the results.

The following issues should be addressed:

1. In the paper the APHRODITE rainfall product is chosen. Other rainfall products are available, and the choice of the APHRODITE product is not justified. Add a discussion

C6443

on the choice of rainfall product, e.g. by summarising the results from Vu et al. (2011) (referred to in the paper) and other studies.

Authors' Response: Noted. Revised accordingly.

2. Local discharge data are used for calibration of the SWAT model. However, if this should have been a “true” demonstration of internet-based modelling, no local data should have been applied for the model calibration. It would be valuable to compare with such an approach, e.g. by using a non-calibrated SWAT model where model parameters are estimated from available physical parameters (e.g. land use, soil type, topography), or, if possible, by using satellite-based altimetry data for estimation of discharge.

Authors' Response: Noted.

The purpose was introduced in the introduction part. This is a trans-boundary region between 2 countries. The downstream country (Vietnam in this case) has all information about river discharge but it does not have the rainfall and other spatial information from upstream country (China) representing 49% of the catchment area. Hence observed discharge is used here for that purpose. The recommendation of using satellite based altimetry data to derive discharge is appreciated and will be considered to apply in our future researches.

3 The precipitation and temperature data are interpolated to station data. This approach seem inconsistent, since the raw precipitation and temperature data are gridded data, and the applied model is a distributed model. Why is this done? Seems to be a SWAT feature, but needs then to be justified.

Authors' Response:

The SWAT is semi-distributed model and it calculates spatial rainfall based on its own method (skewed distribution and mixed exponential distribution). The feature of SWAT to input rainfall is from station, hence bilinear interpolation approach from gridded data

C6444

is introduced. Otherwise, we would apply the gridded rainfall directly in the model.

4. The parameterisation of the model is not explained. How is the distribution of model parameters between sub-catchments and HRUs described? Ten parameters are selected for calibration, but are they assumed constant for the entire catchment?

Authors' Response:

There are 2 methods built-in SWAT for parameterizations: manual and auto. Manual method allows the user to step by step modify each parameter in each HRU whilst auto calibration by PARASOL is applied to the most sensitive parameters (chosen from Sensitivity Analysis part) to get the optimal parameters that met the objective function. The ten most sensitive parameters are assumed to be constant for the entire catchment. However, this paper does not focus much more on the calibration part, instead, it concentrates on the approach of using internet based data for sparse data region, hence the parameterization is not focused on and written in detail.

5. The evaluation and discussion of model performance should be elaborated. The results show that the model consequently underestimates low flow and underestimates the larger peak flows. Other performance measures should be included in the assessment to provide a broader evaluation of model performance

Authors' Response:

We agree that the model used auto calibration method which underestimate low flow and larger peak flow. However, the initial result is quite optimistic (with high NSE and R2 indices) and this problem can be solved by applying manual calibration to groundwater and adjust some sensitive parameters. However, this part is quite time consuming, thus we have not used it in this paper.

6. It is assumed that the land cover provided by the Global Land Cover product is representative for the conditions in the calibration and validation periods. Is this a reasonable assumption? And is this a critical assumption considering the calibration

C6445

approach applied?

Authors' Response:

Land cover from GLCC is reported for the year 2000. There are no updates in the data since 2000. The data can be accessed at: <http://landcover.usgs.gov/glcc/download.php>

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/8/C6443/2012/hessd-8-C6443-2012-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 11015, 2011.

C6446