Hydrology and Earth System Sciences Discussions

Interactive
Comment

Interactive comment on "Runoff regime estimation at high-elevation sites: a parsimonious water balance approach" *by* E. Bartolini et al.

Anonymous Referee #1

Received and published: 9 March 2011

I found this an interesting paper, and have a few questions:

1. (p961) The authors assume 30% of liquid precipitation is discharged as storm runoff. A justification for this value seems necessary. In many models this would be a calibration parameter - why is it not calibrated for this model?

2. (eq 1) The authors assume that there is no change in soil storage. A brief mention of this assumption is needed when it is introduced.

3. (p962) How are the effects of sub-daily temperature fluctuations parameterised?

4. (p963) The parameter sigma, which quantifies within-month variability of daily temperature, is calibrated. Why is it calibrated? Are there no records of daily temperature data with which to estimate it? How far do the calibrated values vary from the measured

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values?

5. (p968) Why is the bias distributed equally among months? Why not in proportion to Pj?

6. (972) the suggestion that the discrepancy between regional and reference values of melt rate is because of use of a monthly model seems unusual. I had the impression that the model produced monthly melt by integrating over many values of daily melt, in which case the model does not operate directly at the monthly scale.

7. (Fig 6a & 6b) It seems curious that the QI values for the regional model are better than those for the individually calibrated case, for these 2 basins

8. (Fig 8a) Since TEST1 is a special case of WB, with s=0, how can TEST1 slightly outperform WB for a few catchments?

One of the benefits of using a process-based conceptual model is that it allows checking of internal states (here snowpack storage). It would be interesting to show an additional graph which showed monthly flow, monthly snowmelt, and monthly snow storage, for the 4 catchments. This would illustrate the models predictions of differences between catchments in runoff generation mechanisms, and produce a testable hypothesis on snowpack storage.

Minor points (p966) line 12 should 'rainfall' be 'infiltration'? (p966) eqn 12b should $Pj*$ be $0.7Pj*$?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 957, 2011.

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