

## ***Interactive comment on* “Evaluation of the transferability of hydrological model parameters for simulations under changed climatic conditions” by S. Bastola et al.**

### **Anonymous Referee #2**

Received and published: 24 August 2011

#### General comments

The paper addresses an important issue related to the use of hydrological modelling for climate change impact assessment. Can hydrological models calibrated to current climatic conditions be applied with confidence for simulation under changed climatic conditions? This question is being addressed by using a split sample calibration-validation methodology, defining climatic conditions in terms of average rainfall. While changes in average conditions are projected in a future climate, other effects of climate change in terms of e.g. more extreme precipitation events and severe dry periods are generally

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of more concern. Thus, it is important that models are transferable for credible assessment of the resulting changes in flow regimes due to such changes. These aspects are not considered in the paper, and hence the value of the analysis is somehow limited.

In addition to this methodological concern, I find the presentation of the research results inadequate. The methodology and the results are not presented with a sufficient degree of detail for the reader to fully understand the approach and interpret the results. In addition, the paper lacks consistent definitions of evaluation criteria and assessment measures (see detailed comments below).

#### Detailed comments

1. Page 5894, l. 10-11. I don't think this is correct. Split-sample calibration-validation is typically used in hydrological model calibration.
2. Page 5895, l. 26-27. How is the downscaling performed? This is an important issue in relation to the projection of changes in extremes.
3. Page 5897, l. 25-26. Not clear why this is important.
4. Page 5898, l. 5-9. Performance measures should be defined.
5. Page 5898, l. 24-28. Why are Pww and Pdd shown? These results are not used.
6. Page 5898, l. 16-19. Describe how the GLUE methodology is applied for defining behavioural models.
7. Page 5899-5900. Not clear why a study on reparameterisations of the NAM and HYMOD is included in the paper. Seems to be out of place. The results are not used.
8. Page 5900, l. 16-17. Not clear, cf. comment 3.
9. Table 2. What is shown in the Table? Best performance measure? Selected behavioural model? Symbols are not defined.
10. Figure 2. Fewer parameter points shown for the TANK and TOPMODEL. Different definitions of behavioural models? Different No. of model evaluations?
11. Figure 8. What is shown in (a)-(d)?

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 5891, 2011.

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