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Hydrology and Earth System Sciences Discussions

Interactive comment on "Climate change impact assessment as function of model inaccuracy" *by* P. Droogers et al.

P. Droogers et al.

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HESS 2007-0085, Reply to Review: Climate change impact assessment as function of model inaccuracy Peter Droogers; FutureWater; Costerweg 1G; 6702 AA Wageningen; The Netherlands; +31 (0)317 460050; p.droogers@futurewater.nl

1 Reply to Editor and Reviewers I would like to start thanking the Editor and the two Reviewers for spending their time in evaluating our paper. We’re glad to see many useful suggestions to improve the quality of our paper. We acknowledge their perception that the topic of uncertainty analysis is often lacking in climate change impact studies. It is therefore that the paper explores this topic rather than providing a final solution to this.

In this reply we’ll include a

2 General comments 2.1 Calculation of MSR The Model-Scenario-Ratio (MSR) raised interesting discussions. In the original manuscript was a significant typo as the Absolute sign was missing. The correct definition is:

Model-Scenario-Ratio = 1 – ABS([Scenario Impact]accurate - [Scenario Impact]inaccurate) Based on this equation some typical example calculations are:

Case 1 Case 2 Case 3 Case 4 Case 5 Case 6 Accurate Reference 100 100 100 100 1000 1 Scenario 50 50 500 500 1001 100 Scenario Impact -0.5 -0.5 4.0 4.0 0.0 99.0 Inaccurate Reference 150 150 150 150 1000 1 Scenario 75 10 600 200 999 200 Scenario Impact -0.5 -0.9 3.0 0.3 0.0 199.0 MSR 1.0 0.6 0.0 -2.7 1.0 -99.0

• Case 1: Model is not very accurate (50% error), but difference between reference and scenario are for accurate and inaccurate model similar  MSR = 1 • Case 2: Model is not very accurate (50% error), and quite different on impact assessment  MSR 0.6 • Case 3: Model is not very accurate (50% error), and very different on impact assessment  MSR 0.0 • Case 4: Model is not very accurate (50% error), and very different on impact assessment  MSR 0.0 • Case 5: Model is very accurate, impact is very small  MSR = 1.0 • Case 6: Model is very accurate, impact is large and completely different  MSR = -99.0

Note that the MRC is comparable to the well-known Nash-Sutcliffe criterion to compare model performance. Nash-Sutcliffe can range from -∞ to 1. An N-S of 1 corresponds to a perfect match of modeled output to the observed data. An N-S of 0 indicates that the model predictions are as accurate as the mean of the observed data, whereas an N-S less than zero occurs when the observed mean is a better predictor than the model.

We’ve included more text on the MSR in the manuscript and have placed it in

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the Methods and Materials section.

3 Reply to Editor Thanks for your constructive remarks on our manuscript. We’ve included these in the revised version of the manuscript. Specific comments on your two main points and smaller suggestions: • 1st We’ve included a more detailed and rigorous description of the Model-Scenario-Ratio (see above). • 2nd We’ve included more literature on parameter uncertainty. We’ve made it also clear that our research is not aiming at parameter uncertainty as such, but are looking for a more robust impact assessment procedure. • Smaller comments raised by you were included in the revised manuscript.

4 Reply to referee #1 (16-Oct-2007) I would like to thank you for spending time on reading and reviewing our manuscript.

Based on you recommendations we’ve expanded the presented Model-Scenario-Ratio discussion (see above). We like your suggestion of applying other equations, but prefer to keep the original one to have a clear message: one should include model inaccuracies in impact assessment studies. We hope that this paper might generate more attention to this topic which might lead to other approaches.

Other points mentioned by you were included in the revised manuscript. More specifically: • We’ve modified the title based on your suggestion. We didn’t include the name of the model as this might be confused with the much more common SWAT model. • We’ve modified the abstract.

5 Reply to referee #1 (5-Nov-2007) We would like to start with thanking you for your time spent on reviewing our manuscript.

We’ve made, based on your suggestions and of the other reviewer and the editor, quite some changes in the manuscript. Specific recommendations mentioned by you: 1. We’ve made it clear in the beginning that all references to “model” refers to the assessment model SWAP. 2. Included in the

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revised manuscript. 3. Changes in the revised manuscript. 4. “during summer” added. 5. Table included and this 10% further explained. 6. This table create too much confusion and was also some superfluous. We’ve deleted it in the revised manuscript. 7. This section was completely rewritten. 8. Further explained in the revised manuscript. 9. Table caption expanded.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 2875, 2007.

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Interactive Comment