Simple benchmark models as a basis for model efficiency criteria

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With 5 figures and 1 table in the text

Abstract: Selecting environmental models to support water management decisions is challenging given the number and diversity of existing models. The Benchmark Models for the Water Framework Directive (BMW) project has identified the need for a priori qualitative criteria (e.g. model applicability and relevance for the management task) to select models. In addition to these qualitative criteria, model assessment should also include objective measures of performance to determine model credibility with regard to a specific application. To avoid misinterpretation of a model’s simulation ability and to objectively assess the performance of different models on different catchments, model assessment should be comparative and include a benchmark model used as a reference in order to set a basic/minimum performance objective. This benchmark model can be a simple (baseline) model or a more complex one, depending on the performance level requested by the end-user. Relative evaluation criteria can then be established to assess model performance with reference to this benchmark. The formulation of such relative criteria can be general enough to be used in many fields of environmental sciences where models are applied to simulate time-series. However, the interpretation of relative criteria will remain conditioned by the nature and the formulation of the selected benchmark model. Choosing this baseline model can sometimes be difficult, especially when various types of catchments are studied.

Key words: catchment modelling, model evaluation, model performance, criteria, baseline model.

1. Introduction

The EU project Benchmark Models for the Water Framework Directive (BMW) aims at providing criteria to select and assess models that will contribute to the implementation of the Water Framework Directive. Kämäri et al. (2006) and Hutchins et al. (2006) define several stages in the overall evaluation process proposed by the BMW project. One step of model evaluation (Step 2) must de-

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