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Hypothesis testing of hydrological models: first look at your data!

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We address the hypothesis testing of hydrological models when faced with significant epistemic uncertainties in the observations. A novel method is proposed for developing limits of acceptability based only on an analysis of the available observations and the consideration of event mass balance for successive rainfall-runoff events. It is shown that there are many events that are subject to epistemic uncertainties in the input data so that mass balance is not satisfied. The proposed approach allows taking these epistemic uncertainties into account in a pragmatic way before any model runs are made. It is an approach that might be applicable in other areas of environmental science where similar basic principles are fundamental to models, but which might not be satisfied by the observations.