

Interactive comment on “Disinformative data in large-scale hydrological modelling” by A. Kauffeldt et al.

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Received and published: 21 January 2013

I will begin by congratulating the authors for their effort in bringing to light the effect of disinformation in hydrological models, and in particular their effect large scale data and modeling. This work is impressive considering the vast amount of data that has been used (Kauffeldt et al., 2013). Disinformation of hydrological data has subtly eluded hydrologist, professionals and literature for most part of our hydrological history (Beven, 2012; Beven et al., 2011). Thus, it is possible that many well behaved hydrological models that exist today have plaque by this issue. And because formal statistics do not handle this issue in a universally accepted manner (Beven, 2012; Hassan et al., 2008), this awareness is crucial for the current advancement and understanding of hydrological sciences.

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The proposal of an independent way to identify disinformation prior to (large-scale) hydrological modeling is novel. This minimizes epistemic errors before being obscured by the algorithms and filters underlying hydrological models.

The authors present sources of disinformation for large-scale hydrological models: 1) hydrography; 2) data consistency. As the authors noted, a correct basin representation is a prerequisite for correct hydrological modeling. The up-scaling and down-scaling of hydrography usually anticipates the addition or removal of finer hydrographic features and this obviously affects the quality of the model. It is therefore not surprising that the authors work find representation of river networks as one source of disinformation for large scale models. Similarly, some components of the hydrologic cycle may be (subjectively) thought as less or more important when the hydrography is scaled, leading to closure problems in the water balance equation, often leading to closure problems (Beven, 2012).

Scaling in hydrography require similar scales in data input in order for the model to work. This issue is a potential source for disinformation in hydrological modeling as different components of the water balance equation are governed by different physical systems. Here again, it is not surprising that the authors work show inconsistencies in data used. In particular, the authors highlight the effect of snow on runoff in high altitudes and latitudes. Also, emphasis is placed on disinformation introduced by the estimation of actual evapotranspiration.

In summary, it can be said from the author's work and relevant literature that source of disinformation leading to epistemic errors in large scale hydrological models primarily stems from the issues of the choice and methods of scaling. In particular, the disinformation arises from scaling effect on: river networks, precipitation undercatch such as snow, and actual evapotranspiration. I anticipate the authors work will create an awaking amongst hydrologist to explore ways by which we can minimize the epistemic errors which introduces disinformation in our models (for both large and small scales).

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References:

Beven, K. J.: Rainfall-Runoff Modelling: The Primer, Second Edition, 2nd ed., Wiley-Blackwell, Lancaster, UK., 2012.

Beven, K., Smith, P. J. and Wood, A.: On the colour and spin of epistemic error (and what we might do about it), Hydrology and Earth System Sciences, 15(10), 3123–3133, doi:10.5194/hess-15-3123-2011, 2011.

Hassan, A. E., Bekhit, H. M. and Chapman, J. B.: Uncertainty assessment of a stochastic groundwater flow model using GLUE analysis, Journal of Hydrology, 362(1-2), 89–109, doi:10.1016/j.jhydrol.2008.08.017, 2008.

Kauffeldt, A., Halldin, S., Rodhe, A., Xu, C.-Y. and Westerberg, I. K.: Disinformative data in large-scale hydrological modelling, Hydrology and Earth System Sciences Discussions, 10(1), 487–517, doi:10.5194/hessd-10-487-2013, 2013.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 487, 2013.

HESSD

10, C11–C13, 2013

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