

Evaluating “weather-like” models (lots of data)

[Forecast Verification: A Practitioner's Guide in Atmospheric Science](#), 2nd Edition
Ian T. Jolliffe (Editor), David B. Stephenson (Editor)
ISBN: 978-0-470-66071-3

Smith, L.A. (1997) [The Maintenance of Uncertainty](#). In Proc. International School of Physics "Enrico Fermi", Course CXXXIII, 177-246, Societ'a Italiana di Fisica, Bologna, Italy.

Suckling, E.B. and Smith, L.A. (2013) [An evaluation of decadal probability forecasts from state-of-the-art climate models](#) Journal of Climate, 26 (23): 9334-9347. [Supplementary material](#). [[Pre-print](#)]

Bröcker, Jochen, Leonard A. Smith, 2007: [Scoring Probabilistic Forecasts: The Importance of Being Proper](#). *Wea. Forecasting*, **22**, 382–388.

Evaluating “climate-like” models (not much data)

[Model Selection and Multimodel Inference: A Practical Information-Theoretic Approach](#), 2nd Edition
Burnham, Kenneth P., Anderson, David R.
ISBN 978-0-387-22456-5

Koutsoyiannis, D.: HESS Opinions "[A random walk on water](#)", Hydrol. Earth Syst. Sci., 14, 585-601, doi:10.5194/hess-14-585-2010, 2010.

Masson, D. and R. Knutti, 2011, [Climate model genealogy](#), *Geophysical Research Letters*, 38, L08703, doi:10.1029/2011GL046864

Held, Isaac M., 2005: [The Gap between Simulation and Understanding in Climate Modeling](#). *Bull. Amer. Meteor. Soc.*, **86**, 1609–1614.

Knutti, R., [The end of model democracy?](#), 2010, Editorial for *Climatic Change*, 102, 395–404, doi:10.1007/s10584-010-9800-2

Learning from our mistakes

[Good Thinking](#)

I. J. Good
ISBN: 978-0486474380

[How the Laws of Physics Lie](#)

Nancy Cartwright
ISBN: 978-0198247043

Statistical inference for ensembles of models

Lee, L. A., Carslaw, K. S., Pringle, K. J., Mann, G. W., and Spracklen, D. V.: [Emulation of a complex global aerosol model to quantify sensitivity to uncertain parameters](#), *Atmos. Chem. Phys.*, 11, 12253-12273, doi:10.5194/acp-11-12253-2011, 2011.

Daniel Williamson, Michael Goldstein, Lesley Allison, Adam Blaker, Peter Challenor, Laura Jackson, Kuniko Yamazaki: [History matching for exploring and reducing climate model parameter space using observations and a large perturbed physics ensemble](#)
Climate Dynamics, October 2013, Volume 41, Issue 7-8, pp 1703-1729

Kennedy, M. and O'Hagan, A. (2001). [Bayesian calibration of computer models](#) (with discussion). *Journal of the Royal Statistical Society, Series B.* **63**, 425-464

Craig, P. S., Goldstein, M., Seheult, A. H., and Smith, J. A. (1996), [Bayes Linear Strategies for Matching Hydrocarbon Reservoir History](#)," in *Bayesian Statistics 5*, eds. Bernardo, J. M., Berger, J. O., Dawid, A. P., and Smith, A. F. M., Oxford University Press, pp. 69-95.

Knutti, R., R. Furrer, C. Tebaldi, J. Cermak and G.A. Meehl, 2010, [Challenges in combining projections from multiple models](#), *Journal of Climate*, 23, 2739-2758, doi:10.1175/2009JCLI3361.1.

Lee, L. A., Carslaw, K. S., Pringle, K. J., and Mann, G. W.: [Mapping the uncertainty in global CCN using emulation](#), *Atmos. Chem. Phys.*, 12, 9739-9751, doi:10.5194/acp-12-9739-2012, 2012.

Oakley, J. and O'Hagan, A.: [Probabilistic sensitivity analysis of complex models: a Bayesian approach](#), *J. Roy. Stat. Soc. B*, 66, 751–769, 2004.

Oakley J. E. and O'Hagan, A. (2010). SHELF: the Sheffield Elicitation Framework (version 2.0), School of Mathematics and Statistics, University of Sheffield, UK. (<http://tonyohagan.co.uk/shelf>)

O'Hagan, A., Buck, C. E., Daneshkhah, A., Eiser, J. E., Garthwaite, P. H., Jenkinson, D. J., Oakley, J. E. and Rakow, T. (2006). [Uncertain Judgements: Eliciting Expert Probabilities](#). Chichester: Wiley.

Saltelli, A., Chan, K., and Scott, M. E.: [Sensitivity Analysis](#), New York, Wiley, 2000.

Why good statistical methods aren't enough

Frigg, R., S. Bradley, H. Du, & L. A. Smith, Laplace's Demon and the Adventures of His Apprentice, *Philos. Sci.* (2014). ([preprint](#))

Smith, L. A., [What might we learn from climate forecasts?](#) Proceedings of the National Academy of Sciences of the United States of America 99, 2487 (2002).

Joseph D Daron and David A Stainforth: [On predicting climate under climate change](#), 2013 *Environ. Res. Lett.* **8** 034021 (includes video abstract!)

Stainforth et al., [Confidence, uncertainty and decision-support relevance in climate predictions](#). *Phil Trans Roy Soc*365 (1857), 2145 (2007).

Stainforth et al. [Issues in the interpretation of climate model ensembles to inform decisions](#). *Phil Trans Roy Soc.* 365 (1857), 2163 (2007).

How can we be scientific in the face of epistemic errors?

Book

K. J. Beven, 2009, *Environmental Modelling: An Uncertain Future?* Routledge: London (ISBN Hb: 978-0-415-46302-7; Pb: 978-0-415-45759-0) see <http://www.uncertain-future.org.uk>

Papers

1. Beven, K.J. and A.M. Binley (1992), The future of distributed models: model calibration and uncertainty prediction, *Hydrological Processes*, 6, 279-298.
2. Beven, K J, 2002, Towards a coherent philosophy for environmental modelling, *Proc. Roy. Soc. Lond. A*, 458, 2465-2484.
3. Beven, K J, 2006, A manifesto for the equifinality thesis, *J. Hydrology*, 320, 18-36.
4. Beven, K J, 2007, Working towards integrated environmental models of everywhere: uncertainty, data, and modelling as a learning process. *Hydrology and Earth System Science*, 11(1), 460-467.
5. Faulkner, H, Parker, D, Green, C, Beven, K, 2007, Developing a translational discourse to communicate uncertainty in flood risk between science and the practitioner, *Ambio*, 16(7), 692-703
6. Blazkova, S., and K. Beven, 2009, A limits of acceptability approach to model evaluation and uncertainty estimation in flood frequency estimation by continuous simulation: Skalka catchment, Czech Republic, *Water Resour. Res.*, 45, W00B16, doi:10.1029/2007WR006726.
7. Beven, K., Smith, P. J., and Wood, A., 2011, On the colour and spin of epistemic error (and what we might do about it), *Hydrol. Earth Syst. Sci.*, 15, 3123-3133, doi: 10.5194/hess-15-3123-2011.
8. Beven, K J, 2012, Causal models as multiple working hypotheses about environmental processes, *Comptes Rendus Geoscience, Académie de Sciences, Paris*, 344: 77–88, doi:10.1016/j.crte.2012.01.005 .
9. Beven, K. J. and Alcock, R., 2012, Modelling everything everywhere: a new approach to decision making for water management under uncertainty, *Freshwater Biology*, 56, doi:10.1111/j.1365-2427.2011.02592.x
10. Beven, K. J., and Binley, A. M., 2013, GLUE, 20 years on. *Hydrol. Process.* DOI: 10.1002/hyp.10082.

Commentaries

1. Beven, K J, 2011, I believe in climate change but how precautionary do we need to be in planning for the future?, *Hydrological Processes*, **25**, 1517–1520, DOI: [10.1002/hyp.7939](https://doi.org/10.1002/hyp.7939).
2. Beven, K J and Westerberg, I, 2011, On red herrings and real herrings: disinformation and information in hydrological inference, *Hydrological Processes*, **25**, 1676–1680, DOI: [10.1002/hyp.7963](https://doi.org/10.1002/hyp.7963).
3. Beven, K J, Buytaert, W and Smith, L. A., 2012, On virtual observatories and modeled realities (or why discharge must be treated as a virtual variable), *Hydrological Processes*, DOI: [10.1002/hyp.9261](https://doi.org/10.1002/hyp.9261)
4. Juston, J. M., A. Kauffeldt, B. Q. Montano, J. Seibert, K. J. Beven and I. K. Westerberg, 2012, Smiling in the rain: Seven reasons to be positive about uncertainty in hydrological modelling, *Hydrological Processes*, DOI: [10.1002/hyp.9625](https://doi.org/10.1002/hyp.9625)
5. Beven, K J, 2013, So how much of your error is epistemic? Lessons from Japan and Italy. *Hydrological Processes*, *27*(11): 1677–1680, DOI: [10.1002/hyp.9648](https://doi.org/10.1002/hyp.9648)
6. Beven, K., and P. Young (2013), A guide to good practice in modeling semantics for authors and referees, *Water Resour. Res.*, *49*(8): 5092-5098 DOI: [10.1002/wrcr.20393](https://doi.org/10.1002/wrcr.20393).

Effective dissemination of uncertain forecasts

Stephens E, Edwards T, Demeritt, D.: [Communicating probabilistic information from climate model ensembles—lessons from numerical weather prediction](#). (2012) *WIREs Climate Change*. 3: 409-26