Professor Leonard Smith: Abstract
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Seeing Through Geophysical Models: Moving Beyond Naive Realism

Computer models of the Earth's oceans and atmosphere are among the most complicated nonlinear simulation models ever produced by science. Interpreting the output of these models, whether for scientific purposes or for decision support, is significantly enhanced by considering the known uncertainties that go into them including uncertainty in the initial conditions, uncertainty in the parameter values, and uncertainty in the mathematical structure of the model(s) itself. In addition to these known unknowns, we can also profitably look for hints of unknown unknowns. After a general introduction to these issues in the context of ensemble forecasting, we will consider a collection of actual applications, applications with timescales of a few minutes, or a few days, or a few months, and or a few decades. As it turns out, improving how we see through our weather models can hold direct implications on climate time scales. In short, the utility of our simulations can be significantly increased if we acknowledge that our models are imperfect and interpret them accordingly.