



Whither low-order climate models?

Jan Viebahn and Henk A. Dijkstra

Utrecht University, Institute for Marine and Atmospheric Research Utrecht, Utrecht, Netherlands (dijkstra@phys.uu.nl)

A zoo of low-order (small degrees of freedom) deterministic and stochastic climate models has appeared in the literature with each focussing on specific aspects of (paleo)climate variability. The advantage of these models is that their behavior can be analyzed in detail and hence cause and effect (mechanisms) can be disentangled efficiently. Indeed, much insight has been obtained by ‘thinking deep about simple models’. However, the disadvantage is that each model usually contains idealizations and severe approximations such that the mechanisms underlying a certain phenomenon in these models may not represent the mechanisms which are at work in more detailed models and in observations. The danger is thus that low-order model results will be ignored by many of the climate science community.

In this presentation, focus will be on several issues related to the use of low-order model results. Did the results of these models contribute to a better understanding of observed climate variability or did they only aggravate the confusion about cause and effect? In the spirit of ‘essentially all models are wrong but some are useful’ (George Box), which type of models (e.g. stochastic versus deterministic, ad hoc versus truncated, etc.) has been more useful than others (has been the best fit for purpose)? Does this provide future guidelines on the development and usage of these models? Example models and their results will serve to address these issues.