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Earth System Dynamics
Discussions

Interactive comment on "Reconciling the signal and noise of atmospheric warming on decadal timescales" *by* Roger N. Jones and James H. Ricketts

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Thank for you having submitted your article to Earth System Dynamics. We now have received two referees reports, which are mostly positive and encourage revision before publication.

The manuscript is slightly unusual in having a fairly developed introduction. It touches on philosophical and technical aspects of inference, hypothesis testing and selection, with even a long citation of climate scientist J. Slingo (taken outside the formal scientific literature). The submitted article also briefly reviews physical reasons as why the warming occurs in steps or gradually, by reference to research on entropy production and / or dynamical systems concepts. Epistemology of statistical inference and com-

plex system dynamics are vast domains indeed. The introduction of Jones and Ricket would easily provide ample opportunity for further discussion and debate (among others there are different competing paradigms of inference). The physical study of the dynamics of complex systems is no less potentially overwhelming. By attempting to embrace such general questions as a prelude to a specific investigation, the authors end up being quite specific in their choices of references (some might say : 'patchy'). I would encourage the authors to better focus the article on the statistical application they are interested in, with only a brief introduction which puts the approach in context. When needed, references to textbooks and reviews are welcome. Extra care also needs to be given to the choice and definitions of words: among others the word 'linear' will be understood differently by a statistician and by a physicist. Remember that main role of the introduction in a research paper is to explain why the study is justified and how it improves on previous attempts and / or addresses unsolved problems.

The discussion is a bit long as well. It brings upfront a list of meta-scientific arguments as to why 'shifts have not been recognized earlier', which include sociological and even psychological elements. Even if the arguments sound plausible, their epistemological status in speculative. Intertwining meta-scientific arguments with a technical investigation about the reality of climate shifts is hazardous. There is certainly a way to express the conclusions of the paper and convey the message about the relevance of climate shifts more soberly and more efficiently. After all, the essence of the argument reads as follows: Dynamical systems display shifts and bifurcations; authors therefore allow themselves to consider as plausible a hypothesis of thermal jumps; their statistical investigation shows that such shifts explain the data better than would a 'gradualist' view.

Referees #2 suggests to split the manuscript. At this stage, I would only consider one manuscript which focuses on the statistical analysis of the observations. Both the introduction and discussion need to be re-written. Once this is done, please proceed as usual and address referees' comments one by one. The broader and perhaps loser

discussion of why gradual trends are usually privileged could be spared for another article where the epistemological status of that discussion can be better framed.

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