Nonlinear Processes
in Geophysics
Discussions

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Interactive comment on "Toward enhanced understanding and projections of climate extremes using physics-guided data mining techniques" *by* A. R. Ganguly et al.

A. R. Ganguly et al.

evan.kodra@gmail.com

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We appreciate the short yet meaningful comments by Anonymous Referee # 2. Our responses to the specific points raised by this referee are as follows:

– "This paper appears to be a review paper... ": This manuscript is intended as a perspectives paper. The first goal is to motivate an emerging and urgent area of research while providing an assessment of the literature in that or related areas. The second goal is a call to action for researchers and practitioners. Specifically, two interdisciplinary communities are targeted. The first is that sub-community of geoscientists, earth and environmental engineers, and experts in climate impacts, adaptation

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and vulnerability, who would want to adopt or apply innovative data science methods. This group includes, for example, climate or impacts researchers engaged in statistical downscaling, statistical evaluation of models, or analysis of observed and modeled trends and patterns. In addition, this paper attempts to target the primary readership of the journal Nonlinear Processes in Geophysics, specifically, who are interested in innovative data science methods and their applications in geophysics. We note that data science in this context includes computer science (e.g., data mining and machine learning), nonlinear dynamics (including network science), signal processing, and statistics. The second target group is that sub-community of data scientists who would be interested to bring their methods and tools to address societal challenges in climate science and impacts or adaptation. This group includes researchers in the emerging area of climate informatics.

– "...because it does not contain new previously unpublished information": This primary intent of the perspectives paper is not to overwhelm with previously unpublished materials. However, there is significant unpublished information in each of the examples, which are all designed to motivate the next steps in this important research topic. Thus, Figures 4 and 5 are unpublished, Figure 1 is an (unpublished) summary of the state of knowledge which also serves as a motivation, while Figures 2, 3 and 6 are new summaries of our prior publications designed to motivate and/or exemplify the research topics.

– "However, as a review paper, it lacks sufficient context to allow a non-expert to read and get a sense of the field": This perspectives paper is designed to have enough depth and context for the target audience as described above. The primary audience is either expected to have background in the data science aspects of climate and impacts, or data scientists with an interest in contributing to climate science and impacts. While this perspectives paper is targeted towards specific (albeit broad and interdisciplinary) research communities, we hope that sections of the paper will also appeal to other readers of this journal who may not be experts in the specific areas mentioned above.