

Interactive comment on “Brief communication “Likelihood of societal preparedness for global change”” by R. M. Vogel et al.

Anonymous Referee #2

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The paper addresses an important issue, namely how it is feasible to detect a trend for certain (earth system) processes. The authors argue that a sound trend test is needed in order to estimate proper likelihoods which should support human actions and avoid over- and under-preparedness. They discuss in their article very briefly type I (when falsely asserting a condition which does not exist) and type II errors (when failing to identify a difference when one exists) and their implications for political action. The authors criticize that most of the decision makers are not able to interpret statistics and the meaning of type I/II errors adequately and demand advanced approaches.

Overall, the argumentation of the authors is straightforward, although the article is quite short and hard to understand for non-experts in the field. In the current form it is not clear for me for which audience the paper is written. Concerning the conclusions it

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reads like a paper which provides some advice for responsible persons in universities, etc. However, in general the conclusions drawn by the authors are correct, but the question remains what is really new in this paper?

It is my major criticism that for every measurement the situation is quite different, e.g. for river run-off data it is well-known that in case of long-range correlations it is hard to distinguish between trends and autocorrelations (persistence, etc.), while for precipitation this does not play such an important role, because of the stochasticity of precipitation events. This should not be disregarded and should become clear in the paper. The listing of certain “earth system processes” at the beginning of the paper implies that for all of the processes the situation is similar, which is not the case. Of course, non-stationarities, autocorrelations, etc. might have an influence on the interpretation of trend tests. Common trend tests, like Mann-Kendall can provide false positive results in case of long-range autocorrelations.

However, the authors demand new statistical tools that are needed to sharpen insights into system properties. Here I have doubts, whether the problem can be solved by statistical tools alone. Statistics is in any case retrospective, i.e. it has limitations in terms of future assessments. This holds in particular when we have to deal with non-stationary situations. Even better measurements will not solve this underlying problem, because the length of data series is often too short for an accurate statistical approach. However, certain advancements are feasible. Nevertheless, these sometimes need tremendous computer power. Examples are shown in Kropp & Schellnhuber 2011. The authors should make suggestions what they have in mind when suggesting the development of new methodologies. This is indeed a scientific challenge.

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