



Signal, Insight and Noise: Contrasting the Decision Relevance of climate models with climate science

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It is often said that, as the Earth warms, the impacts of climate change will become more apparent as the "signal will come out of the noise". The extent to which this vague, intuitively appealing claim may prove relevant to decisions makers and scientists is considered, with a focus on hydrology.

While one might argue that local temperatures will eventually be observed to increase almost everywhere as a planet warms, and hence the "signal" from changes in the local climate distribution will come out of the "noise" of natural variability, similar arguments flounder for other high impact variables. While confidence that warmer oceans will expand is founded on the most basic of physical insight, the effect on local sea levels is far from certain.

Contrasting the behaviours within (and across) CMIP3 and CMIP5 climate model output archives shows that the concept of "signal" and "noise" in precipitation is challenging to grasp firmly. Methodologies to determine when quantitative analysis of model output might be considered fit for purpose is discussed. How would one establish that today's models provide decision relevant information on precipitation in a 2x CO₂ world beyond that available 50 or 80 years ago? To what extent is it only our insight which has increased, not our quantitative grasp of expected impacts?