Geophysical Research Abstracts
Vol. 14, EGU2012-**PREVIEW**, 2012
EGU General Assembly 2012

Will current probabilistic climate change information, as such, improve adaptation?

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Probabilistic climate scenarios are currently being provided to end users, to employ as probabilities in adaptation decision making, with the explicit suggestion that they quantify the impacts of climate change relevant to a variety of sectors.
These “probabilities” are, however, rather sensitive to the assumptions in, and the structure of the modelling approaches used to generate them.
It is often argued that stakeholders require probabilistic climate change information to adequately evaluate and plan adaptation pathways. On the other hand, some circumstantial evidence suggests that on the ground decision making rarely uses well defined probability distributions of climate change as inputs.
Nevertheless it is within this context of probability distributions of climate change that we discuss possible drawbacks of supplying information that, while presented as robust and decision relevant, , is in fact unlikely to be so due to known flaws both in the underlying models and in the methodology used to "account for" those known flaws.

How might one use a probability forecast that is expected to change in the future, not due to a refinement in our information but due to fundamental flaws in its construction? What then are the alternatives? While the answer will depend on the context of the problem at hand, a good approach will be strongly informed by the timescale of the given planning decision, and the consideration of all the non-climatic factors that have to be taken into account in the corresponding risk assessment. Using a water resources system as an example, we illustrate an alternative approach to deal with these challenges and make robust adaptation decisions today.