



EGUsphere, community comment CC2  
<https://doi.org/10.5194/egusphere-2022-9-CC2>, 2022  
© Author(s) 2022. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Reply on AC1**

Richard Rosen

---

Community comment on "Technical Note: Quantifying Hazard Probability and Risk from Ensemble Projections of Downscaled Climate Variables" by James P. Kossin et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-9-CC2>, 2022

---

I agree that the earth system models relied on by the IPCC in their reports have some correspondence with reality, but as I am sure you know, their results differ widely from each other even with respect to projections of the global average temperature increase. That is they differ by almost a factor of 3.0 from low to high due to a doubling of CO<sub>2</sub> in the atmosphere. Yet, it should be easiest to predict the global average temperature most accurately. Localized regional temperature forecasts should inherently be even less accurate, and precipitation forecasts are known to be less accurate than temperature forecasts. Thus, using the word "probability", whether in your article or in IPCC reports, has always been controversial. Many of us have urged the IPCC to use a term like "model distribution or model likelihood", indicating that the numerical distributions cited are purely a product of model runs, and that we as scientists have no idea of the actually real world probability distributions. In fact, looking at actual global temperature trend data over the past 40 years, to my eye the trend is running much closer to the mid-range of the model results than the model result distribution would suggest. That is, intuitively to me, the uncertainty in the global temperature increase for a doubling of CO<sub>2</sub> might only be from 2.4 to 3.2 degrees C, not from 1.6 to 4.5 degrees C like the model results produce. But either way, the use of the word "probability" in most climate change papers is very deceptive for journalists and the public because it suggests that climate scientists know much more than they do.

In summary, if you are trying to calculate uncertainty ranges for regional temperature and precipitation impacts, the uncertainty ranges produced by climate models are so large that use of the term "probability" is misleading, if not deceptive, and we all must be careful in our use of mathematical terminology. Note, a further problem when try to calculate "probabilities" is that some distribution, like a Gaussian curve, is often assumed, which also has no basis in scientific fact.