ACS> Vol.2 No.4, October 2012

OPEN ACCESS

Communicating the Probabilities of Extreme Surface Temperature Outcomes

PDF (Size:264KB) PP. 538-545 DOI: 10.4236/acs.2012.24049

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ABSTRACT

The magnitude of the future global warming is uncertain, but the possible dramatic changes associated with high temperatures have seen rising attention in the literature. Projections of temperature change in the literature are often presented in probabilistic terms and typically highlight the most likely ranges of future temperature under assumed emission scenarios. However, focusing on these high probability outcomes of global warming omits important information related to the threats of low-probability but high-impact outcomes under more extreme change. As such, we argue that the literature should place more emphasis on communicating the probabilities of extreme temperature change, in a way that is accessible to policymakers and the general public. The damage associated with climate change is likely to be non-linear with temperature, and thus extreme temperature changes may pose a larger risk than the most likely outcomes. We use a simple climate model to explore the probabilities of high surface temperature under business as usual emissions scenarios, given current knowledge of the climate system. In a business as usual scenario (A1FI) we find the probability of "likely" warming (central 66%) to be approximately 4.4 °C-6.9 °C in 2100 (above 1900 levels). However, we find extreme (>7 °C) warming to embody a notable portion of damage risk compared to this likely range.

KEYWORDS

Risk; Communication of Climate Change; Probability

Cite this paper

N. Rive and G. Myhre, "Communicating the Probabilities of Extreme Surface Temperature Outcomes," *Atmospheric and Climate Sciences*, Vol. 2 No. 4, 2012, pp. 538-545. doi: 10.4236/acs.2012.24049.

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