



## **Global mean temperature indicators linked to warming levels avoiding climate risks**

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Global mean temperature rise limits are used as basis for international climate policy. These limits are informed by risk assessments which draw upon projections of climate impacts under various warming levels and thus can be taken as proxies for societally acceptable levels of climate change. Because of well-understood methodological differences in climate models and observational datasets, indicators used to define acceptable levels of warming and those used to track the evolution of the Earth System under climate change are not directly comparable. Effectively, different definitions of global mean temperature are applied, which also has direct implications for assessments of climate sensitivity. We will provide an analysis of common definitions of global mean temperature and a characterization of the different states of the Earth System reached at a warming level of 1.5°C. Specifically, we will illustrate how this definitional mismatch might lead to carbon budget overestimates and differences in sea-level rise and heat extreme estimates. Our findings show that awareness of the implications of differing interpretations of global mean temperature is needed for a more effective communication between different scientific communities as well as scientists and decision makers.