

CGD SEMINAR



DATE: Tuesday, 27 September 2016

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Climate sensitivity, the limits of linear models and implications for science and society

SPEAKER: Reto Knutti, ETH, Zurich

ABSTRACT:

Equilibrium climate sensitivity (ECS) characterizes the Earth's global temperature response to change in the energy budget on timescales of centuries. It has, maybe for unjustified reasons, reached almost iconic status as the single number that describes how bad climate change will be. While the 'likely' range of ECS of 1.5-4.5°C is the same as given by Charney in 1979, the present estimate is much more robust, being based on quantitative analyses of recent warming, past climate states, analysis of feedbacks, and climate modelling. Along the way, we have gained important insights into the timescales of the climate system response, natural variability, and the limitations in observations, climate models and the simple concepts underlying ECS and radiative forcing. But recent results also suggest that the state- and forcing-dependency of feedbacks are not appreciated enough, and not considered appropriately in many studies. A non-constant feedback factor likely explains some of the differences in estimates of equilibrium climate sensitivity from different methods and types of data. Clarifying the value and applicability of the linear forcing feedback framework and a better quantification of feedbacks on various timescales and spatial scales remains a high priority in order to better quantify ECS. Estimates of transient climate response (TCR) are better constrained by observed warming and are far more relevant than those of ECS for predicting warming over the next century. Newer metrics relating global warming directly to cumulative CO₂ show that in order to keep warming to within 2°C, future CO₂ emissions have to remain strongly limited, irrespective of ECS being at the high or low end of assessed range. The response of society both before and after Paris 2015 has been ineffective in triggering the required emission reductions; debates on considering an ever lower target are strongly at odds with the current real-world level of action. These debates are moot, however, as the decisions that need to be taken now to limit warming to 1.5 or 2 °C are very similar.

Live chat: <http://www.fin.ucar.edu/it/mms/ml-live-chat1.htm>

Live webcast: <http://www.fin.ucar.edu/it/mms/ml-live.htm>

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