Fourth International Conference on Earth System Modelling
4ICESM-85, 2017

Committed warming inferred from observations

T. Mauritsen (1) and R. Pincus (2,3)

(1) Max Planck Institute for Meteorology, Atmospheric Department, Hamburg, Germany (thorsten.mauritsen@mpimet.mpg.de), (2) University of Colorado, Boulder, USA, (3) NOAA Earth System Research Lab, Physical Sciences Division, Boulder, USA

Climate change is not equilibrated with anthropogenic forcing but instead lags behind due to thermal inertia of the oceans, implying that warming will continue if atmospheric composition is held fixed. Additional warming currently masked by aerosol-induced cooling will be quickly unleashed if fossil fuel emissions cease, while committed warming will be damped by reductions in other short-lived forcing agents such as methane and by carbon uptake by the oceans. Here we use the instrumental record of global-mean warming, recently-improved estimates of Earth's energy imbalance, and estimates of radiative forcing from the fifth IPCC assessment report, to infer likelihoods of committed warming over pre-industrial. As society aspires to limit global warming to 1.5 to 2 K above pre-industrial temperatures, regular updates of these estimates, though simplistic, can provide transparent guidance as uncertainty regarding transient climate sensitivity inevitably narrows and understanding the limitations of the framework is advanced.