Effects of climate uncertainties on welfare optimal investment streams into mitigation technologies

H. Held, E. Kriegler, K. Lessmann, and A. Lorenz
Potsdam Institute for Climate Impact Research (PIK), Integrated Systems Analysis, Potsdam, Germany
(held@pik-potsdam.de, +49 331 288-2600)

We discuss a stylised portfolio of climate change mitigation options and ask the following question: what is the intertemporally optimal mix of these options under the boundary condition of a climate guardrail and uncertainty about the temperature response to rising carbon dioxide concentrations? We impose a guardrail that requires the increase of global mean temperature T to be limited to 2K with at least a minimum probability P (e.g., P=0.75). The uncertainty about the temperature response is captured by a PDF for climate sensitivity and ocean heat uptake. For economic optimisation, we use an ensemble-version of the growth model MIND [1]. As a key results we show that robust climate protection paths will require aggressive mitigation measures [2]. In this context it is also possible to ask for the economic potential of reducing uncertainty in climate sensitivity [3] and ocean heat uptake [4] that is generically by orders of magnitude larger than the costs induced by the related research programmes.

References