



The role of permafrost feedback in amplifying future warming

Thomas Schneider von Deimling, Anders Levermann, Veronika Huber, Malte Meinshausen, and John Schellnhuber

Potsdam Institute for Climate Impact Research, Earth System Analysis, Potsdam, Germany (schneider@pik-potsdam.de, +49 331 288 2642)

State-of-the-art climate models show ever increasing model-skill in reproducing present day climate characteristics, but it is unclear to what extent these models realistically represent key feedback mechanisms occurring in a warmer climate. One key uncertainty stems from future carbon cycle contributions, with many of the underlying processes only being about implemented into latest generation climate models. In our study we focus on one of these feedbacks, namely the emission of carbon from thawing permafrost soils.

We have constructed a simplified module for quantifying the additional warming that can result from permafrost carbon emissions. The model was designed by comprising various lines of evidence from observational and modeling studies. By varying a large set of uncertain model input parameters we scan a broad range of different permafrost feedback behaviour.

Considering a worst-case scenario, we put our analysis of permafrost carbon feedback into a perspective of physical climate feedbacks and discuss the issue of climate instability.