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Climate engineering: May we cure the symptoms of a changing climate?

Ulrike Niemeier
(Max Planck Institute for Meteorology, Hamburg)

Abstract

In Paris, 2015, politicians agreed on a 1.5 K goal of maximum temperature rise, which would require a very fast transition to a fossil-free economy. But attempts to initiate the decrease of CO2 emissions have not been very successful in the last years. In this situation climate engineering may become an important issue. Climate engineering is the deliberate large-scale manipulation of the climate to counteract anthropogenic climate change. To better understand possible consequences of climate engineering, numerical climate model studies were performed to estimate possible risk and side effects. A climate engineered climate differs from a natural one of the same global mean temperature.

Different climate-engineering techniques, carbon capture and reducing incoming solar radiation, the so called solar radiation management (SRM) have been proposed to possibly counteract global warming. The pro and cons of these techniques will be discussed. The artificial injection of sulfur will be taken as an example for performing climate engineering within model studies and to discuss climate impacts, limits and uncertainties, as well as consequences of stopping climate engineering and an estimate of a time frame how long climate engineering may have to be performed when started.