



Different climate engineering methods would create different responses of the hydrological cycle

Hauke Schmidt and Ulrike Niemeier

Max Planck Institute for Meteorology, Hamburg, Germany (hauke.schmidt@mpimet.mpg.de)

The authors had the extraordinary pleasure and privilege to work with the late Jon Egill Kristjansson within the IMPLICC project on "Implications and risks of engineering solar radiation to limit climate change" and in several subsequent projects on the same topic. One of the early and still valid concerns with respect to climate engineering via the manipulation of solar radiation was that such measures would not be able to reproduce some historical climate but create a new one. In particular the increase of global mean precipitation resulting from global warming would be overcompensated. In joint work with Jon Egill we have argued that the degree of overcompensation would depend on the specific method, among them the injection of sulfur into the stratosphere, mirrors in space, and marine cloud brightening through artificial emissions of sea salt. It would be larger for aerosol based methods than for space mirrors. Work lead by Jon Egill has then shown that the situation would be very different for cirrus cloud thinning. In this presentation we will revisit the arguments given in these studies.