



Integrated mitigation and solar radiation management scenarios under combined climate guardrails

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In addition to the climate policy options ‘mitigation’ and ‘adaptation’ solar radiation management (SRM) has been put on the agenda. As SRM costs are comparably low compared to mitigation costs, including SRM risks in the analysis proves essential. In our contribution we focus on precipitation pattern changes as potential side-effects of SRM and perform an integrated mitigation-SRM-based analysis on the basis of economic welfare optimization, constrained by climate guardrails.

We define a tolerable scale of precipitation changes by the anomalies that would have been tolerated under a temperature target. Given that metric and a temperature target, by utilizing the integrated assessment model MIND, we derive the cost reduction, induced by including the additional option of SRM. We show that the cost reduction is a strong function of the fraction of Giorgi regions, for which we require compliance with the newly defined SRM guardrail. Compliance with all Giorgi regions might eliminate most of the economic gain achievable through SRM. The effects of alternative parameterizations of the SRM-precipitation pattern change influence chain are discussed.