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Complementing CO_2 emission reduction by Geoengineering might strongly enhance future welfare

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Despite the Paris agreement to keep global warming "well below 2K", no decisive emission reduction has yet taken place. This has sparked renewed interest in the possibility of cooling the planet through "Solar Radiation Management" (SRM). The technique most likely to become feasible in the near future is sulphate-based SRM: creating an artificial veil of sulphate aerosol in the stratosphere to reflect part of the incoming solar radiation.
SRM has the potential to mitigate global warming at low implementation cost. This could greatly reduce the chance of temperature-induced damages (e.g. sea level rise) and climate tipping. On the other hand, even if SRM can offset global mean temperature changes, residual climate change will still be present, in particular changes in precipitation. In addition, SRM does little to prevent ocean acidification. Finally, SRM itself could lead to severe environmental damages.
A decision for or against SRM requires a careful cost-benefit analysis. A simple model that can be employed for this purpose is the Nobel prize winning DICE model (Dynamic Integrated model of Climate and Economy), originally designed to find an economically optimal pathway of CO_2 abatement. We add SRM as a second policy option and aim to find an optimal climate policy including both CO_2 abatement and SRM.
However, this cost-benefit analysis is complicated by many uncertainties. Neither do we know how damaging global warming really is, nor do we know whether SRM will really be feasible. We approach this by including two stochastic elements in our analysis. First, a highly damaging climate tipping can occur with a temperature-dependent probability. Second, SRM can be "banned" with a certain probability each time step (reflecting the possibility that SRM proves infeasible or too environmentally damaging to continue).
We find that under a wide range of model parameters, SRM has the potential to greatly enhance future welfare. However, even if successful, SRM cannot replace CO_2 abatement, but complements it. If only SRM and no CO_2 abatement is used, global warming is not stabilised and will exceed 2K. The optimal policy combines CO_2 abatement and modest SRM and succeeds in keeping global warming below 2K. We conclude that with our current knowledge, SRM should be taken seriously as a policy option, but the prospect of SRM provides no excuse to abandon CO_2 emission reduction.