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Crop yields in a geoengineered climate

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Crop models predict that recent and future climate change may have adverse effects on crop yields^{1,2}. Intentional deflection of sunlight away from the Earth could diminish the amount of climate change in a high-CO₂ world^{3,4,5,6}. However, it has been suggested that this diminution would come at the cost of threatening the food and water supply for billions of people⁷. Here, we carry out high-CO₂, geoengineering and control simulations using two climate models to predict the effects on global crop yields. We find that in our models solar-radiation geoengineering in a high-CO₂ climate generally causes crop yields to increase, largely because temperature stresses are diminished while the benefits of CO₂ fertilization are retained. Nevertheless, possible yield losses on the local scale as well as known and unknown side effects and risks associated with geoengineering indicate that the most certain way to reduce climate risks to global food security is to reduce emissions of greenhouse gases.

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Contributions

K.C. and L.C. provided climate simulations, D.B.L. provided the yield model, J.P. carried out the analyses. All authors contributed to designing the analyses and to writing the manuscript.

Competing financial interests

The authors declare no competing financial interests.

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Supplementary information

PDF files

1. Supplementary Information (3,872K)

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