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### Can computer models give a win-win result for marine cloud brightening?

The best climate modelers are very careful about putting caveats on their results and admit that there are differences about the polarity let alone magnitude of some of their predictions. However, models are steadily getting better and at present, they are the only tool we have to study climate problems. Much of the effort to date has been concentrated on the comparisons between model results rather than finding the best times and seasons to use geoengineering. This is a bit like testing road vehicles with the steering locked. The broad consensus is that global warming will increase evaporation from the sea and so increase precipitation. If geoengineering with stratospheric sulphur is used to completely cancel the temperature rises it will over-correct the precipitation increases and so produce droughts. In contrast, the model predictions for marine cloud brightening in the troposphere show increases and reductions of precipitation with a trend for reductions in wet places and increases in dry ones. The strongest reductions are over the sea and one case shows that a small reduction in precipitation on land is more than offset by lower evaporation. The effects of marine cloud brightening have a higher frequency response than stratospheric sulphur. It would be very surprising if it produced exactly the same effect through the year in all places so it follows that intelligent choice of where and when to use it would be better, or at least less bad, than steady, all-year everywhere spraying. The paper suggests that it may be possible to improve the usefulness of climate models by borrowing an engineering idea from telecommunications to get an everywhere to everywhere transfer function. The oceans would be divided into a number of regions. The model settings for the concentration of condensation nuclei in each region would be altered up and down in each region with different random sequences each of which would be correlated with model predictions round the world.

### Biography

Stephen Salter is emeritus Professor of Engineering Design at the University of Edinburgh. After an Apprenticeship in the aircraft industry he worked on a range of problems including robotics, renewable energy, desalination, oil hydraulics, mine clearance, explosion suppression and voter-friendly traffic-congestion charging.

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### Notes: