



Impacts of future radiation management scenarios on terrestrial carbon dynamics simulated with fully coupled NorESM

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We have simulated 3 different radiation management geoengineering methods (CCT – cirrus cloud thinning; SAI – stratospheric aerosol injection; MSB – marine sky brightening) on top of future RCP8.5 scenario with the fully coupled Norwegian Earth System Model (NorESM). A globally consistent cooling in both atmosphere and soil is observed with all methods. However, precipitation patterns are dependent on the used method. Globally CCT and MSB methods do not affect the vegetation carbon budget, while SAI leads to a loss compared to RCP8.5 simulations. Spatially the most sensitive region is the tropics. Here, the changes in vegetation carbon content are related to the precipitation changes. Increase in soil carbon is projected in all three methods, the biggest change seen in SAI method. Simulations with CCT method leads to twice as much soil carbon retention in the tropics compared to the MSB method. Our findings show that there are unforeseen regional consequences of such geoengineering methods in the biogeochemical cycles and they should be considered with care in future climate policies.