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Simulating Potential Impacts of Solar Radiation Modification on African Climate

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Increased greenhouse gas emissions continue to warm the planet, fuelling climate extremes such as heatwaves, floods, and droughts. These events devastate socio-economic activities globally, but their impacts are even more severe in Africa, where people are more vulnerable. International negotiations on reducing greenhouse gas emissions are slow, while emissions themselves continue to rise. Solar Radiation Modification (SRM), which involves reflecting a small portion of incoming sunlight back into space, has been proposed as the cheapest and fastest way to cool the planet. Interest in SRM research has grown in recent years, but its deployment remains contentious due to the associated risks. This study explores the potential impacts of SRM on the African climate through advanced climate simulations. By simulating various SRM scenarios, we aim to understand how SRM intervention could alter temperature, precipitation patterns, freshwater availability, and heat stress across the continent. Our findings indicate that while SRM could potentially reduce average temperatures and heat stress, it may also lead to unintended consequences such as changes in rainfall distribution and increased frequency of droughts in certain regions. These results underscore the complexity of SRM as a climate intervention and highlight the need for comprehensive risk assessments before considering its implementation. This research contributes to the broader discourse on climate geoengineering by providing region-specific insights into the potential benefits and risks of SRM for Africa.

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