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## Terrestrial carbon cycle response to solar radiation modification and carbon dioxide removal under potential temperature overshoots

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Global warming could surpass the 1.5 °C temperature target within a decade and even inevitably exceed 2 °C in this century, if fossil fuel emissions are not abated sufficiently and artificial interventions are not implemented. Even a temporary overshoot beyond 2 °C potentially disrupts the global carbon cycle, with the risk of irreversible and devastating changes to current terrestrial carbon sinks, such as the tropical forests and the northern high-latitude permafrost. Large-scale geoengineering is proposed as an adjunct to the conventional mitigation to partially counteract anthropogenic warming, and avoid dramatic alterations in the Earth system and the hazardous consequences. However, carbon dioxide removal and solar radiation modification differ in their role in interacting with the terrestrial carbon cycle, through directly interfering with the carbon cycle and indirect perturbation by changing the energy balance. The varied regional responses also affect the capacity of global carbon uptake, which further impacts on the efficacy of geoengineering. It's prudent to investigate the responses of the global terrestrial carbon balance in such context, i.e., the delayed consideration of solar radiation modification or carbon dioxide removal on top of various possible overshoot scenarios, to bring the global temperature back to and maintain the long-term targets.