

The Reversibility of Climate Change

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Abstract

It is by now widely accepted that increasing greenhouse gas (GHG) emissions into the atmosphere is causing climate change. Some aspects of climate change have yet to emerge from observational evidence and may be nonlinear. The question we would like to ask is how reversible are those climate system responses? I will use the global hydrological cycle and the ocean's thermohaline circulation as examples to show hysteresis behaviour in the climate system from idealized climate modelling experiments. I will also show some examples of reversible climate change, such as global mean surface air temperature, atmospheric water vapour content and Arctic sea ice. I will also briefly discuss some issues about geoengineering climate.

Reference:

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2. Wu, P., L. Jackson, A. Pardaens and N. Schaller, 2011: Extended warming of the northern high latitudes due to an overshoot of the Atlantic Meridional Overturning Circulation. *Geophys. Res. Lett.*, 38, L24704, doi:10.1029/2011GL049998.
3. Wu, P., R. Wood, J. Ridley and J. Lowe, 2010: Temporary acceleration of the hydrological cycle in response to a CO₂ rampdown. *Geophys. Res. Lett.*, 37, L12705, doi:10.1029/2010GL043730. see also Research Spotlight in EOS.