The influence of sea ice albedo on the global hydrological cycle

(Preliminary results)

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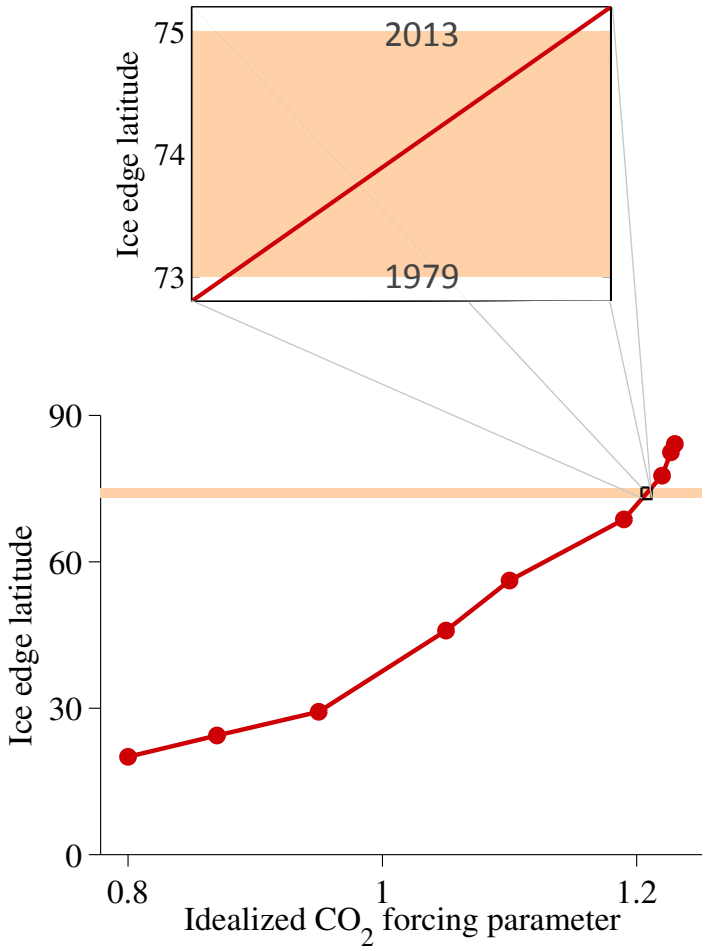
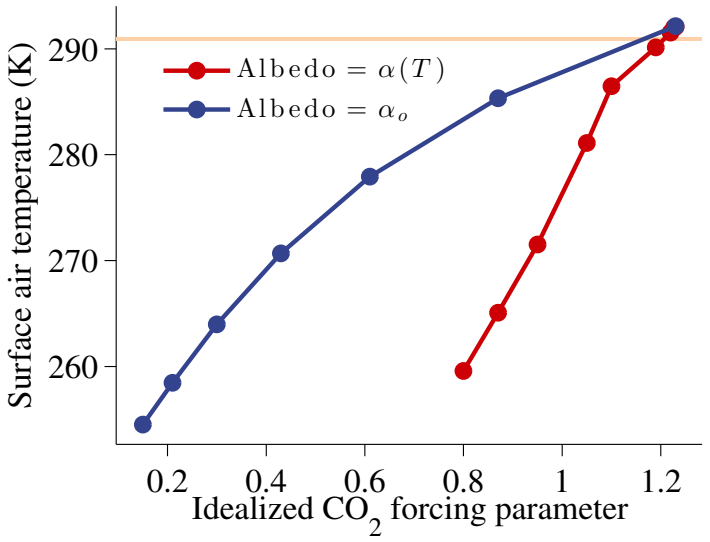
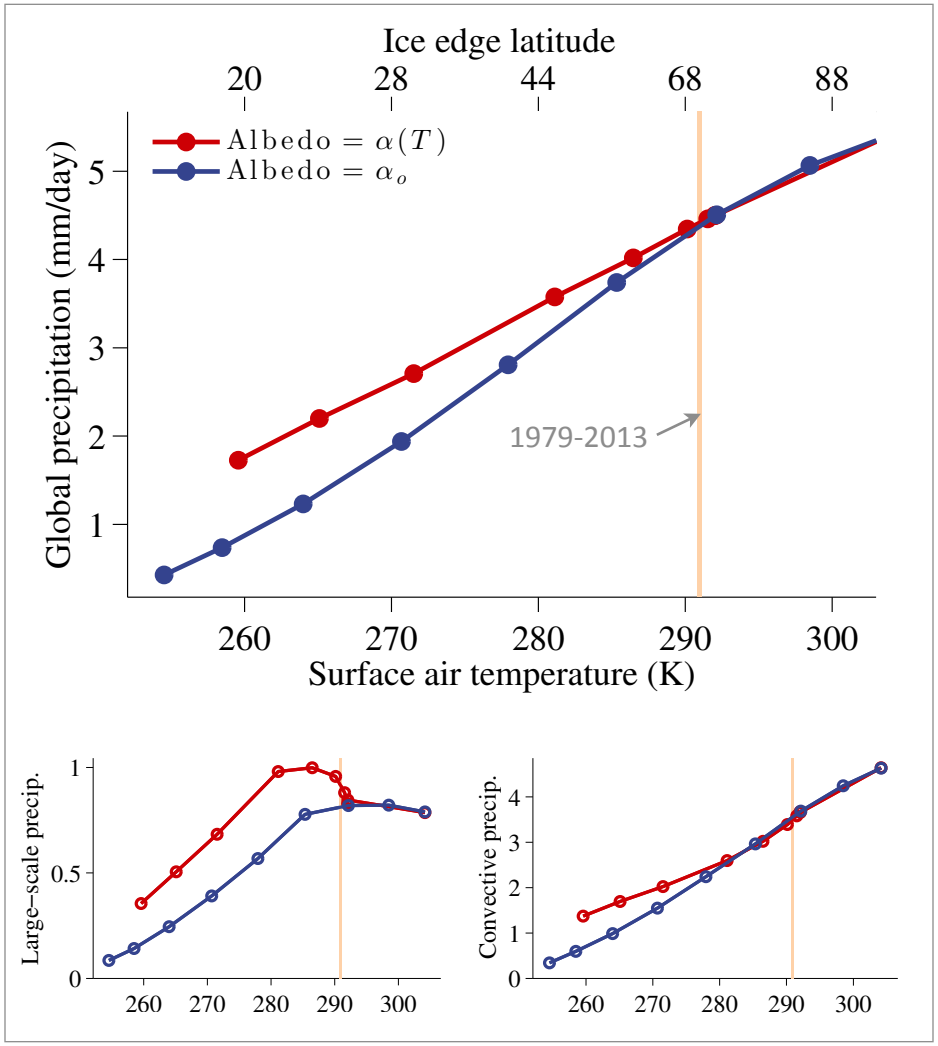


- Since 1979, the annual-mean Arctic sea ice edge moved from 73°N to 75°N (ice extent diminished by 20%).
- Investigate influence of albedo change in broader context of climates ranging from completely ice-covered to ice-free.
- Use idealized GCM (annual mean, no land, ...).
- Either vary albedo with surface temperature ($\alpha(T)$) or assign ocean albedo everywhere (α_o).





- Sea ice albedo causes appreciable increase in global hydrological cycle, but only for ice covers a bit larger than today.
- Increase mainly in large-scale condensation rather than convection.
- Because less sunlight is absorbed at surface to evaporate water and hence make rain, higher albedo causing more precipitation is surprising,
- but consistent with more vigorous atmospheric circulation and direct effect of steeper temperature gradient.