National Aeronautics and Space Administration
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California Institute of Technology

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Falling Snow Radiative Effects Enhance the Global Warming Response of the Tropical Pacific Atmosphere – JGR-Atmosphere

Chen, *C-A, *J-L (Frank) Li, *Mark Richardson, *Eric Fetzer, *G. Stephens, and Co-Authors*

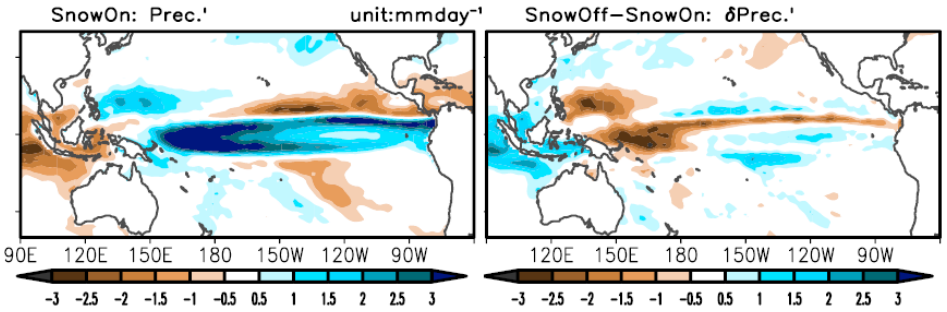

Figure *Change in precipitation following a 140-year ramp in CO_2 to 4× preindustrial values. (left) change in a model that includes snow radiative effects, blue meaning increase and brown decrease with time, (right) the same model without snow radiation minus the left plot. For the right panel, the colours are opposite to the left panel, meaning that there are weaker changes in precipitation.*

Science Question: The tropical Pacific is a heat engine that drives climate conditions elsewhere. Pacific convection is expected to intensify and move, possibly affecting things like El Nino. Snowflakes form at the top of deep convective clouds, and most models do not let these snowflakes interact with radiation. We investigate how this affects simulated Pacific climate change.

Data & Results: Allowing snowflakes to reflect sunlight & interact with infrared heat in a model improves its current-day simulation, and leads to a bigger shift and intensification of Pacific convective activity under global warming.

Significance: Projected changes in the Pacific may be larger than reported before. This could have knock-on effects to climate change in bordering land areas.

This paper is highlighted in Nature Climate Change:
https://www.nature.com/articles/s41558-018-0335-2

Chen, Chao-An, ***J.-L. F. Li,** *__Mark Richardson__, Wei-Liang Lee**, *Eric Fetzer**, *__G. Stephens,__ Huang-Hsiung Hsu, Yi-Hui Wang, Jia-Yuh Yu (2018), Falling snow radiative effects enhance the global warming response of the Tropical Pacific atmosphere, JGR-atmos. https://doi.org/10.1029/2018JD028655.

***Authors from JPL/CalTech**