Future Changes in Mean and Extreme Daily Snowfall over the United States

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ABSTRACT

The characteristics of snowfall and the subsequent accumulation of winter snowpacks across the continental United States (US) will change in a warmer climate. These changes will have many societally relevant implications by influencing water supply and flood management, recreation, ecosystem health and diversity, and the occurrence of hazardous and damaging snowstorms. Snow is a normal part of the climate for most regions of the US, so these changes will potentially affect a significant fraction of the US population. It is therefore critical that US decision makers are armed with integrated projections of long- term climate changes affecting snowfall for the entire US when preparing for future climate conditions.

This study explores how anthropogenic climate change is projected to influence snowfall characteristics (timing, amount, and intensity) over the continental United States (CONUS) using a suite of dynamically downscaled, high-resolution (12km, 25km, and 50km) climate change simulations from the North America Coordinated Regional Climate Downscaling Experiment (NA-CORDEX) and the Framework for Assessing Climate's Energy-water-land nexus using Targeted Simulations (FACETS) ensembles. Analysis includes an evaluation of the historical climate simulations as well as an estimation of future changes in mean and extreme snowfall for all of CONUS.

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