Understanding Changes in “Big Snow” Events in Eastern North America

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Exploring snowfall

Using a 50-member regional climate model ensemble (1955-2099) from the ClimEx project, we explore the statistics of highly impactful snowfall in Eastern North America in a warming climate and address where and when we might be able to detect and expect significant changes in event impact and frequency over time.

95th percentile snowfall

The largest 95th percentile snowfalls are along the coastline, and not in the North where the most snow falls overall. The 95th percentile daily snowfall increases in some parts of the northeast, and in high-elevation regions of Virginia and North Carolina.

Acknowledgments

Special thanks to Martin Leduc and Dominique Paquin (Ouranos, Montreal) for providing the data and to NASA GISS for the tools to visualize it.

References

The ClimEx Project. http://www.climex-project.org/

Changes in “Big Snow” events

For a given decade, we define a “big snow” event to be a day of snow that had over 1% of that decade’s snowfall (10% of the annual average). Over time, the northern US is projected to receive more big snow events, especially in some parts in New England as well as in lake effect regions such as upstate New York and Michigan.

Conclusions

Despite a warming climate, we still expect big impact snowfalls to persist for many decades, and in some regions may actually increase. The mechanism is associated with higher humidity warm air masses interacting with Arctic cold air outbreaks to produce higher intensity snowfall, even as total snowfall decreases in most areas. Further work will focus on characterizing these changes more carefully and calibrating the model simulations to direct observations over the last few decades.