

Who knew? Ammonia-rich bird poop cools the atmosphere

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by CSU External Relations Staff

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It turns out bird poop helps cool the Arctic.

That's according to new research from Colorado State University atmospheric scientists, who are working to better understand key components of Arctic climate systems.

Publishing in *Nature Communications* and featured by the *American Association for the Advancement of Science*, Associate Professor of Atmospheric Science Jeff Pierce and graduate student Jack Kodros present evidence linking ammonia emissions from summertime Arctic seabird-colony excrement, called guano, to newly formed atmospheric aerosol particles. These particles can in turn influence Arctic cloud properties and their effects on climate.

Clouds and climate

Clouds play a key role in modulating Arctic temperature; thus, understanding factors that influence clouds is essential, Pierce says. Central to the development of clouds is the availability of cloud condensation nuclei – small atmospheric particles around which water can condense.

Using a combination of observations and computer modeling, Pierce, Kodros and co-authors at Dalhousie University, University of Toronto, and Environment and Climate Change Canada determined that migratory-seabird colonies have a definitive influence on atmospheric particles and clouds in the pristine summertime Arctic.

They report the presence of summertime bursts of atmospheric particles linked to ammonia emissions from seabird-colony guano. These particles can spread throughout the Arctic, fostering cloud-droplet formation, and in turn reflect sunlight back to space for a net cooling effect.

“This newly identified and fascinating ecological-atmospheric connection highlights the interconnectedness of the many components of Earth’s climate system,” Pierce said.

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