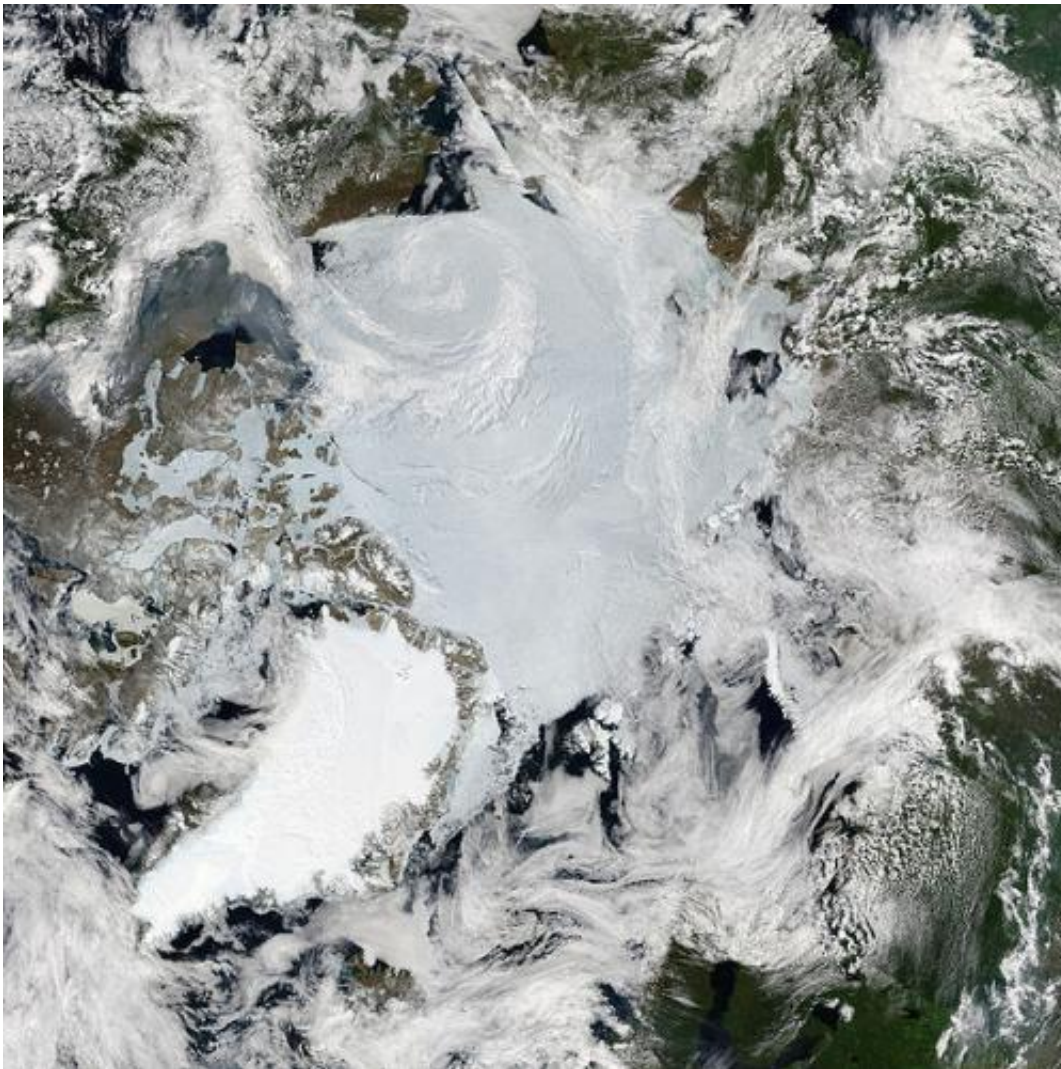


Scientists lack vital knowledge on rapid Arctic climate change

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Mosaic of images of the Arctic by MODIS. Credit: NASA

Arctic climate change research relies on field measurements and samples that are too scarce, and patchy at best, according to a comprehensive review study from Lund University in Sweden. The researchers looked at thousands of scientific studies, and found that around 30 percent of cited studies were clustered around only two research stations in the vast Arctic region.

The Arctic is said to be warming at a rate of almost twice the global average, and the changes associated with climate change in the area include rising sea levels due to melting ice sheets, negative impacts on the livelihood of local communities, the disruption of ecosystems, and a potential effect on global climate patterns.

Another major concern is that the parts of the Arctic ground and soil that are frozen, known as permafrost, store huge amounts of [carbon](#). The thawing of permafrost could therefore trigger a significant release of greenhouse gases that could further accelerate [climate](#) change. "Our study shows that we only have a patchy understanding of the full geographic range of soil carbon storage capacity across the Arctic. This means that we could make mistakes in projecting how much soil carbon is actually stored—and what will happen to this carbon store under [climate change](#)," explains Dr. Dan Metcalfe who led the study.

In terms of Arctic warming, the researchers found that science thus far has focused disproportionately on slowly warming areas, meaning that the impact of future temperature change could potentially have been underestimated.

"We have certainly acted on some of these predictions, though more can, of course, always be done. However, the concern is whether they were the right actions, given that the underlying predictions are based on an incomplete picture of Arctic ecosystem patterns and processes," says Dr. Metcalfe.

Relatively colder, more rapidly [warming](#) sites, meanwhile, were shown to be under-sampled and less cited, particularly among microbiology-related studies. The poorly sampled and cited areas were mainly in the Canadian high-Arctic archipelago and the Arctic coastline of Russia; areas that constitute a large fraction of the Arctic ice-free land area.

"As a first step, this study has given us a map of the areas where our knowledge is insufficient. A next step could be to conduct a broader environmental survey, then compare the results with other, better studied areas. The scientific community could also do a better job in being more thorough, so that data from fairly well-sampled areas is put to use and actually cited, and that hasn't always been the case," concludes Dr. Metcalfe.

More information: Daniel B. Metcalfe et al. Patchy field sampling biases understanding of climate change impacts across the Arctic, *Nature Ecology & Evolution* (2018). [DOI: 10.1038/s41559-018-0612-5](https://doi.org/10.1038/s41559-018-0612-5)

Provided by Lund University

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