It may not be the temperature, but the humidity melting polar ice

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Increased cloud cover and higher humidity in the Arctic may be speeding the meltdown of sea ice near the top of the world, according to Rutgers University scientists who analyzed 26 years worth of climate data from the region.

Jennifer Francis and Elias Hunter of the Rutgers Institute for Marine and Coastal Sciences concluded that changes in spring and summer weather patterns are playing a role in shrinking the polar ice cap — a trend that has scientists looking for major shifts in Arctic ecology, and the maritime industry thinking about an easily traveled Northwest Passage.

Cloud cover and atmospheric moisture help retain heat energy over Arctic waters; more frequent clear skies would allow more energy to radiate to space, Francis and Hunter report in EOS Transactions, the journal of the American Geophysical Union.

Scientists have understood that Arctic melting was one result of a warming climate, but the Rutgers study identifies heating retained by cloud cover as one of the driving mechanisms, rather than wind patterns that can shift from year to year, the Rutgers researchers said.

Francis is an associate research professor who has been documenting the ice cap retreat. She says scientists suspected that one factor behind the melting has been the North Atlantic Oscillation, a years-long climatic phenomenon that changes wind patterns and can change the level of atmospheric heat and moisture over the Arctic Ocean.

Under that surmise, melting should have slowed, after an extended positive period in the oscillation from the mid-1990s shifted back to a more neutral mode, Francis says.

In fact, the melting has accelerated in recent years, says Francis, who analyzes data to track the ice cap's seasonal changes. Satellite sensor data enabled Francis and Hunter to measure the extent and thickness of Arctic cloud cover, humidity levels, temperatures and winds.

Francis and Hunter correlated that information with seasonal fluctuations in sea ice off the Arctic shores of Canada, Alaska, Scandinavia and Russia, from the first melt of spring to the "summer minimum ice extent" when the ice cap recedes to its maximum distance from those shores.

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