

Climate change generates more Arctic tundra vegetation

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Researchers in Finland have discovered that climate change has impacted various regions of the Arctic tundra by helping increase the levels of vegetation. Their data suggest that this rise could potentially speed up global warming. The Finnish Meteorological Institute researchers used satellite observations to assess how vegetation impacts snowmelt and, in turn, the terrestrial albedo (i.e. reflectivity) in the Arctic tundra regions. The team gathered the necessary information over a 16-year period during the March to June months.

"The study revealed that vegetation was thicker in Norway," explains Juval Cohen of the Finnish Meteorological Institute. "With the exception of the differences in vegetation, the other prevailing conditions, such as

temperature, precipitation and [solar radiation](#), were almost the same in both countries. The difference in the melting of snow between Finland and Norway affects the albedo on land. During the [snowmelt](#) period, the albedo was almost always higher in Finland."

Keeping the bare tundra, or even limiting vegetation, would delay the melting of snow in spring, according to Dr. Cohen. "This, in turn, could possibly slow down global warming," he says, commenting on the findings.

Experts say global warming has been playing havoc with snowmelts in the last 10 years or so. That is, they are happening earlier in spring than ever before. This earlier melting of snow also affects the reflectivity of [land areas](#). The researchers say the albedo on land plays a role in balancing the energy of Earth because it establishes the ratio between solar radiation reflected by surfaces and radiation absorbed by surfaces.

The albedo of snow is higher compared with the bare ground because snow is bright and reflects most of the [incoming sunlight](#) back into space. Ground that is free of snow is darker and thus absorbs most of the incoming solar energy.

According to the researchers, [global warming](#) has moved the tree line towards the north and has increased vegetation in regions of the Arctic tundra, because plants now have the ability to survive in areas that were once too cold for them.

The team also observed that vegetation growth in the Lapland regions of the tundra are impacted by reindeer husbandry. Vegetation levels decrease when reindeer grazing grows; both consumption and trampling of plants reduces vegetation.

The satellite images also show significant differences in the levels of

vegetation on two sides of a fence separating grazing grounds.

The researchers also measured the difference in the solar energy absorbed in both Finland and Norway during the period of melting snow. Based on their observations, the amount of solar radiation absorbed in Norway was greater compared with the one in Finland, and resulted in a lower albedo.

"In April and May in Norway, an area of 100 x 100 kilometres absorbs about 100 000 terajoules more solar radiation than a corresponding area in Finland," the researchers say. "This is enough energy to melt an ice cube roughly 330 x 1 000 x 1 000 metres in size."

Provided by CORDIS

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