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From: University of Alaska
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Scientists: Polar ice clouds may be climate change symptom

As the late summer sun sets in the Arctic, bands of wispy, luminescent clouds shine against the deep blue of the northern sky.

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To the casual observer, they may simply be a curiosity, dismissed as the waning light of the midnight sun. But to scientists, these noctilucent ice clouds could be an upper-atmospheric symptom of a changing climate.

"The question which everyone in Alaska is dealing with is what are the symptoms of climate change and, as in medicine, how do these symptoms reflect the underlying processes," said Richard Collins, a researcher at the Geophysical Institute at the University of Alaska Fairbanks. "It is believed that [these clouds] are an indicator of climate change."

Dozens of scientists from several countries will gather at the University of Alaska Fairbanks Aug. 20-23 to discuss the latest findings on noctilucent clouds and other phenomena of the earth's upper atmosphere during the Eighth International Workshop on Layered Phenomena in the Mesopause Region. Sessions will include information on the latest ground-based and satellite data on the mesopause region, an area of the atmosphere 50 miles above Earth's surface and the site of the coldest atmospheric temperatures.

Noctilucent clouds form under conditions that counter common logic. They only form in the summer, when solar radiation is most intense, Collins said. That solar heating, rather than warming the mesopause, causes cooling, he said. "The mesopause region is colder in summer under perpetual daylight than it is in winter under perpetual darkness."

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The reason lies in the movement of air within the atmosphere, Collins said. Solar radiation heats the lower atmosphere, causing a rising cell of air over the summer pole, he said. "As the air rises it cools and that beats out the radiative heating." Those cold temperatures allow the ice clouds to form in the mesopause. The clouds could serve as an indicator of climate change because an increase in carbon dioxide, which causes heating in the lower atmosphere, causes cooling in the upper atmosphere.

Collins said the noctilucent clouds are a relatively new phenomenon. History indicates that humans first recorded their presence in the 19th century, he said. Satellite and ground-based data has been limited, he said, but it appears that the clouds have become more prevalent over time. A new satellite, Aeronomy of Ice in the Mesosphere, or AIM, was launched in April 2007 to observe clouds and their environment in the mesopause, Collins said scientists are looking forward to having more reliable data, which could contribute to a broader understanding of the upper atmosphere, noctilucent clouds and how both fit into the climate system.

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