

Polar clouds make their way south, and scientists want to know why

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In the summer of 1999, a remarkable display appeared over the northern reaches of the U.S. mainland: Long and beautiful bands of rare clouds gleamed in the night sky where they never had been seen before.

These high-altitude clouds are common at the planet's polar caps. But they weren't expected so far south of the North Pole. Many scientists fear that the explanation may lie in global warming.



Noctilucent clouds

Pekka Parviainen

Special to the Star Tribune

A national team of 16 scientists -- including John Harlander, a physics professor at St. Cloud State University -- are tackling the puzzle in the first major study of the silvery blue formations called polar mesospheric clouds (PMCs) or noctilucent clouds.

The \$92 million project, sponsored by NASA, involves launching a satellite in 2006 to carry into orbit four instruments specially designed to document the clouds' temperatures and chemical composition. Harlander's assignment is to design the instrument that will help determine moisture conditions where the clouds form.

The goal of the 23-month satellite mission is to learn why the clouds form and why they change.

Mystery clouds

Cloud watching has been a human obsession since prehistoric people climbed hills to monitor the sky.

Over centuries of study, though, no one ever had recorded a sighting of PMCs until the 1880s.

Most of the clouds we see are those that form within 6 miles of the Earth's surface, where the planet's warmth meets cooler air. But these long, strange noctilucent bands were 30 to 50 miles high, where clouds shouldn't exist because that region of the atmosphere is very dry.

Scientists now know that altitude is the reason the PMCs give off their eerie shine after sundown. They continue reflecting sunlight after the lower atmosphere is shrouded in Earth's shadow.

What isn't known is why clouds formed at such high altitudes. A century ago, skywatchers attributed them to water and dust from volcanic eruptions. But that theory doesn't explain why the clouds have been seen more often since the 1920s and why they appear to be expanding their reach.

For more than a century, the clouds were seen only in northernmost latitudes, beyond 50 degrees north and south -- in Finland, for example. (The Twin Cities area is 45 degrees north.)

That explains the hubbub among scientists in June 1999, when sightings of huge PMCs were verified over Colorado and Utah, at about 40 degrees north. Since then, sightings also have been reported in Montana. The clouds may well have appeared over Minnesota, too, Harlander said, but there are no officially recorded sightings.

More sightings in lower latitudes are likely, according to Timo Nousiainen, a scientist at the Finnish Meteorological Institute in Helsinki. The displays are expected to be more and more magnificent, he and other scientists predict.

But that hardly is cause for celebration.

New greenhouse effect?

It is very likely, Nousiainen wrote in a research paper, that industrial activity spawned the clouds by emitting so-called greenhouse gases. Indeed, the clouds may be "the first visible sign of our impact on the climate of Earth," he said.