

News

Enigmatic clouds illuminated

Satellite data shed light on twilight skies.

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SAN FRANCISCO New findings from the edge of space are unmasking Earth's highest clouds.

A NASA satellite called Aeronomy of Ice in the Mesosphere (AIM) is sending back the first detailed information on the 'noctilucent' clouds, which shimmer overhead just after sundown at high latitudes, where they reflect the below-horizon Sun.

The AIM data reveal that the clouds are ten times brighter than previously thought, and form at a broader range of altitudes. Although it had been thought that the clouds were limited to a single altitude band of 82 kilometres, in fact they can form at anywhere between 79 and 90 kilometres. AIM has also shown that small patchy groupings of cloud can grow dramatically with even a tiny fall in temperature.

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Noctilucent clouds form when water vapour condenses onto 'seed' particles in the mesosphere, the layer of the atmosphere that extends from about 50 to 80 kilometres up. They have appeared more frequently and at lower latitudes in recent years, perhaps as a result of rising concentrations of greenhouse gases.

Increasing amounts of methane can result in more water vapour at the relevant altitudes, and rising levels of carbon dioxide cause temperatures in the mesosphere to drop, enhancing the conditions in which the clouds can occur. Noctilucent clouds typically form at temperatures of between -134 and -148 °C.

The new details from AIM, reported on 10 December at a meeting of the American Geophysical Union in San Francisco, California, include strange 'ice rings' that appear in some of the clouds, says project co-investigator Gary Thomas of the University of Colorado in Boulder.

These crescent-shaped blobs may be caused by atmospheric disturbances that propagate upwards from near Earth's surface — a phenomenon not seen before. "If true, it opens up an entirely new mechanism we had not thought of before this mission was launched," says Russell.

AIM's photographs are far more detailed than earlier studies, with a resolution of 5 kilometres. "The detail is so much richer with AIM," says Matt DeLand of Science Systems and Applications, Inc. in Lanham, Maryland, who is not involved with the mission but works on other satellite data. "It's fascinating stuff."

The first AIM data came from noctilucent clouds over the Arctic. The mission is currently gathering data on clouds in the Southern Hemisphere.

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Cloudscape: noctilucent clouds are seen in twilight skies at high latitudes.

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