

## **The horizontal and vertical structure of noctilucent clouds: Small scale dynamics in the summer mesopause region**

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Noctilucent clouds (NLC) are thin ice clouds forming in the summer mesopause region at high latitudes. Their highly structured appearance has attracted scientific interest since more than 130 years as they are found at an altitude of about 83 km where the atmosphere pressure is about 5 orders of magnitude lower than at the earth surface.

The structured appearance of NLC has been linked to atmospheric waves and their transition to turbulence, these clouds are therefore used as tracers for dynamics in a height region that is difficult to study otherwise.

We use the ALOMAR RMR-lidar, located in Northern Norway at 69°N, that is able to measure NLC with sub-second resolution. Although the ice particles in NLC are only a few tenths of nanometer their size can be measured when observing the clouds at different colors. In combination with ground and space based cameras or radars the horizontal structure is investigated on scales from meters to hundreds of kilometers.

We present recent results indicating that the rich structures of NLC - that are even visible to the naked eye - are caused by the peculiar nature of the clouds. Lidar observations give evidence that at times the brightest part of NLC is confined to 100 m vertical extend, giving a superior resolution to small scale atmosphere dynamics compared to, e.g., airglow layers in the Mesosphere lower Thermosphere region.