

# **Noctilucent clouds above ALOMAR: Highly resolved particle properties in the context of multiannual observations.**

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Noctilucent clouds (NLC) are the visible manifestation of icy particles persistently present in the polar summer Mesopause region. These clouds affect the water distribution in the mesopause region and also affect the chemical composition e.g. the abundance of metals. We report on observations of NLC using the ALOMAR Rayleigh/Mie/Raman (RMR) lidar in Northern Norway at 69N from 1997 to 2005. At this latitude NLC occur regularly from the beginning of June to the middle of August. Using the primary wavelength of the lidar at 532 nm we have observed NLC signatures covering all local times even during highest solar background conditions. We will briefly report on the year-to-year variation of the NLC occurrence, which shows for bright clouds a modulation by solar activity while weak clouds steadily re-occur. For bright cloud events, we extend our observations by using the backscatter from NLC particles at all three wavelengths emitted by the lidar. The wavelengths are widely separated, from the infrared (1064 nm) over the visible (532 nm) into the ultraviolet (355 nm) spectral range, which allows to study the sizes of the NLC particles. Presuming that the particles consist of ice, we are able to derive the three parameters number density, median radius and width describing the size distribution. We discuss the observations during the recent 9 summers with respect to the water vapour trapped and transported by the noctilucent clouds.