



First common volume measurements of PMSE and NLC layers above EISCAT, Tromsö

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Close to the mesopause in the atmosphere at medium to high latitudes ice particles form during the summer months. The ice particles are observed in noctilucent clouds (NLC) and cause the formation of specific radar echoes, Polar Mesospheric Summer Echoes (PMSE). While NLC and PMSE are both linked to the presence of ice particles and observed at similar overlapping altitudes, they are also influenced by other parameters, e.g. neutral atmospheric dynamics, turbulence and dusty plasma effects, and their exact formation conditions are still subject to investigations. We here present first results from a number of simultaneous observations of both phenomena.

The "Mesoclouds" campaign was conducted between 8–20 August 2015 with the aim to investigate PMSE and NLC activity in the common volume of the atmosphere above the Tromsö EISCAT station. For simultaneous optical and radar measurements of NLC and PMSE layers we ran EISCAT VHF (224 MHz) and UHF (930 MHz) radars at Tromsö (Norway) as well as two optical NLC cameras located at Kiruna and Nikkaluokta (Sweden). Both locations of the NLC cameras are about 200 km south of Tromsö, which permits making NLC triangulation measurements. Three NLC/PMSE cases above Tromsö are discussed. The first case on 9-10 August displayed NLC and PMSE layers simultaneously above Tromsö. The second case on 12-13 August showed a partial coincidence of NLC and PMSE: NLC were observed in the evening and morning hours whereas PMSE were mostly seen in the morning hours. In the third case on 19-20 August no NLC were observed, while PMSE were observed in the morning hours. We present the observational data, investigate peculiar dynamical features intrinsic to PMSE and NLC layers in the common atmospheric volume and discuss its implications for observation of ice particles.