

## **STRATOSPHERIC AND SOLAR CYCLE EFFECTS ON LONG TERM VARIABILITY OF MESOSPHERIC ICE CLOUDS**

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Ice layers in the summer mesosphere at middle and polar latitudes are very sensitive to background conditions, such as temperatures, water vapor, and transport. These layers appear as 'noctilucent clouds' (NLC) and 'polar mesosphere clouds'(PMC) when observed by optical methods from the ground or from satellites, respectively. A newly developed model of the atmosphere called LIMA (Leibniz Institute Middle Atmosphere Model) nicely reproduces the mean conditions of the summer mesopause region and is used to study the ice layer morphology (LIMA/ice). The background variability has a major impact on the geographical distribution of ice clouds. Since ice layer formation is very sensitive to the thermal structure of the mesopause region the morphology of NLC and PMC is frequently used to study, for example, inter-hemispheric differences of upper mesosphere temperatures and long term variations. Model runs of LIMA/ice are now available for 1961 until 2008. We present results regarding inter-annual variability of upper mesosphere temperatures, water vapor, and ice clouds, and also long term and solar cycle variations. The model results are compared with lidar and satellite borne (PMC) observations. LIMA reproduces the main features of solar cycle and trends deduced from long term observations. We will present an explanation of the trends in the background atmosphere and ice layer parameters.

mesospheric ice layers, solar cycle, trends

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