Long term variations of mesospheric ice layers from LIMA

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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.