Geophysical Research Abstracts, Vol. 9, 01973, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01973

Interhemispheric differences of mesospheric ice layers and implications for coupling mechanisms

F.-J. Lübken, U. Berger, and F. Herbort

Leibniz Institute of Atmospheric Physics, 18225 Kühlungsborn, Germany (contact: luebken@iap-kborn.de, Fax: –49-38293-6850)

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. They also lead to very strong radar echoes known as 'polar mesosphere summer echoes' (PMSE) which allows permanent observations even during bad weather conditions. 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. 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/PMC/PMSE is frequently used to study, for example, inter-hemispheric differences of upper mesosphere temperatures. Some ice cloud observations suggest a difference between the northern (NH) and southern hemisphere (SH) summer. However, details of this potential difference and the physical and photo-chemical processes involved are not understood. With LIMA we have studied in detail the inter-annual variability of upper mesosphere temperatures and ice clouds in the NH and SH, as well as potential interhemispheric differences. It turns out that the NH/SH temperature difference increases with decreasing latitude which, for example, explains the non-existence of PMSE at 62°S, whereas they are frequently observed at similar NH colatitudes.