



Studying the PMC – mesospheric temperature correlation with Odin/OSIRIS and TIMED/SABER

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Studying the conditions for Polar Mesospheric Cloud (PMC) formation and existence, particularly with respect to the mesospheric temperature, is important since PMCs may serve as an indicator of climate change and assist in understanding the physics in the mesospheric region. Satellite measurements have the advantage of near global geographic and wide temporal coverage. The OSIRIS instrument on the Odin satellite has detected PMCs in both hemispheres since fall 2001. More than 1500 clouds were observed by OSIRIS in the Northern Hemisphere during each of the special Odin summer-mesospheric campaigns that took place on July 1-15 2002 and July 1-15 2003.

The SABER instrument on the TIMED satellite produces vertical profiles of mesospheric kinetic temperature, retrieved under non-LTE conditions. As SABER temperatures are available for both periods when Odin performed NH summer-mesospheric measurements it is possible to perform a global-scale study of the relationship between PMC properties and coincident mesospheric temperatures. This paper reports a detailed analysis of the OSIRIS PMC – SABER temperature correlation for different space/time coincidence criteria. It is found that for coincidences of PMC and temperature data within ~ 3 hours or less in time and $\sim 2^\circ$ or less in latitude/longitude PMCs with a peak in the 82-84 km height range were only observed when the mean value of the temperature was less than $\sim 140^\circ\text{K}$. Bright PMCs occurred only when the temperature was at or below $\sim 134^\circ\text{K}$.