



Properties of Polar Mesospheric Clouds detected by Odin/OSIRIS since 2001

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The properties of polar mesosphere, including the formation and brightness of Polar Mesospheric Clouds (PMCs), are believed to be a sensitive indicator of the climate change. The Optical Spectrograph and InfraRed Imager System (OSIRIS) instrument on the sun-synchronous polar orbiting Odin satellite has observed PMCs in both hemispheres since November, 2001. These clouds are detected as the limb radiance enhancement at altitudes between 80 and 87 km at several chosen wavelengths in the UV region. The OSIRIS PMC database created from all available Odin mesospheric observations between November 2001 and September 2005 is used to study various PMC properties, including interseasonal, interannual and interhemispheric differences in cloud brightness, altitudes and detection frequency. The high sensitivity of the limb-scattering technique and the low signal-to-noise ratio at PMC altitudes also permits OSIRIS to observe very faint clouds that are only about 20% brighter than the corresponding Rayleigh background. We have performed a careful analysis of all OSIRIS mesospheric scans taken equatorward of 50°N during each northern hemisphere (NH) PMC season from 2002 until 2005 and found indications for possible anticorrelation between PMC properties at lower and higher altitudes. In 2003 and 2004, when there was an overall maximum in the NH PMC brightness and occurrence frequency, there were no PMC detections at latitudes <50°N. However, during the years of 2002 and 2005, when lower PMC brightness and occurrence frequency were measured over the NH in general, several faint clouds were observed at latitudes between 45°N and 48°N. These findings, as well as possible causes for the observed latitudinal differences in PMC properties, are discussed in the present work.