



Polar Mesospheric Cloud Occurrence from Geostationary Satellite Observations in the Northern Hemisphere for the Period 2001 to 2005

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Polar Mesospheric Clouds (PMC) are the highest clouds in the atmosphere occurring over the summer polar regions at around 83 km in the Mesosphere. Since their discovery in 1885, they have attracted much research and recently they have attracted attention as possible indicators of Climate Change. In the past, their height and optical thinness restricted the opportunities for observation of PMC; however the development of remote sensing satellites has provided a consistent method of observing them in the Mesosphere. Observations of PMC have been made from both numerous polar orbiting satellites and the European geostationary weather satellites (METEOSAT). METEOSAT observations of PMC are in the visible band of the high resolution radiometer (MVIS) of the first generation weather satellite; they have a greater spatial extent per observation at a higher frequency rate than those of polar orbiting platforms.

The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) maintains an archive of METEOSAT observations. By building a suitable data management and image analysis infrastructure, we were able to use the archive to make PMC observations in the stored visible band imagery. The design and development of the system (PMC-Explorer) and details of dealing with EUMETSAT data formats are described.

PMC occurrence frequencies for the Northern Hemisphere summers are presented for years 2001 to 2005. The seasonal properties are presented, inter-annual comparisons are made and five year seasonal means are calculated and compared with the 1995 season. A comparison with similar published data from polar orbiting satellites is made. An increase PMC in observations between 2001 and 2005 is presented. The potential impact of Climate Change on the occurrence frequency of PMC is discussed.

Finally, suggestions are made on further uses of the EUMETSAT archive for PMC research and the potential of comparisons with other remote sensing platforms.