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Climatology of Arctic and Antarctic polar stratospheric clouds (PSCs) from 2002-2007 as observed by MIPAS

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Satellite limb emission measurements of the mid-infrared (IR) radiation are, besides recently available spaceborne lidar observations, the only method to obtain continuous global data on the polar stratospheric cloud (PSC) coverage also during polar night. Beside the detection of PSCs, in the mid-IR, distinct spectral signatures allow the determination of their chemical composition.

The Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) on Envisat is in operation since June 2002. During the first phase of measurements (June 2002 - March 2004) MIPAS was operated in its nominal, high spectral resolution mode. For the second phase, since beginning of 2005, the spectral resolution was reduced. Due to vertical oversampling, this resulted in a better vertical resolution but, a reduced global coverage because of a duty cycle of 30-40%. Thus, MIPAS sounded PSCs over the Antarctic in 2002, 2003, 2005 and 2006, and over the Arctic during the winters 2002/03, 2003/04, 2004/05 (from mid-Jan 2005 onwards), 2005/06, and 2006/07.

Here we show a climatology of the measured existence of PSCs over the different years. We analyse the correlation of PSC appearance with the stratospheric situation. Further, the initial phase of the appearance of NAT will be investigated and compared to the situation in the Antarctic winter 2003 where we had found that the first existence of NAT was closely correlated with strong gravity wave activity over the Antarctic Peninsula leading to a belt of NAT particles around the Antarctic continent in the stratosphere.