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Polar Stratospheric Clouds: Satellite Observations, Processes, and Role in Ozone Depletion

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The important role of polar stratospheric clouds (PSCs) in stratospheric ozone depletion during winter and spring at high latitudes has been known since the 1980s. However, contemporary observations by the spaceborne instruments MIPAS (Michelson Interferometer for Passive Atmospheric Sounding), MLS (Microwave Limb Sounder), and CALIOP (Cloud-Aerosol Lidar with Orthogonal Polarization) have brought about a comprehensive and clearer understanding of PSC spatial and temporal distributions, their conditions of existence, and the processes through which they impact polar ozone. Within the SPARC (Stratosphere-troposphere Processes And their Role in Climate) PSC initiative (PSCi), those datasets have been synthesized and discussed in depth with the result of a new vortex-wide climatology of PSC occurrence and composition. We will present our results within this vPICO together with a review of the significant progress that has been made in our understanding of PSC nucleation, related dynamical processes, and heterogeneous chlorine activation. Moreover, we have compiled different techniques for parameterizing PSCs and we will show their effects in global models.

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