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Detection and mapping of polar stratospheric clouds using limb scattering observations

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Abstract. Satellite-based measurements of Visible/NIR limb-scattered solar radiation are well suited for the detection and mapping of polar stratospheric clouds (PSCs). This publication describes a method to detect PSCs from limb scattering observations with the Scanning Imaging Absorption spectroMeter for Atmospheric CartographY (SCIAMACHY) on the European Space Agency's Envisat spacecraft. The method is based on a color-index approach and requires a priori knowledge of the stratospheric background aerosol loading in order to avoid false PSC identifications by stratospheric background aerosol. The method is applied to a sample data set including the 2003 PSC season in the Southern Hemisphere. The PSCs are correlated with coincident UKMO model temperature data, and with very few exceptions, the detected PSCs occur at temperatures below 195–198 K. Monthly averaged PSC descent rates are about 1.5 km/month for the –50° S to –75° S latitude range and assume a maximum between August and September with a value of about 2.5 km/month. The main cause of the PSC descent is the slow descent of the lower stratospheric temperature minimum.

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