



Seasonal variation of stratospheric BrO and NO₂ derived from ground based measurements during 1997–2009 in Kiruna, Sweden

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BrO in the stratosphere plays a crucial role as a catalyst of O₃ destruction. Although apparatuses sensing light intensity have the difficulty in detecting BrO due to the small absorption of BrO relative to other absorbers in the same wavelength range, several studies have proved the performance of field measurements of BrO. In particular, ground-based zenith-sky Differential Optical Absorption Spectroscopy (DOAS) has successfully monitored BrO and other trace gases related to stratospheric ozone chemistry such as O₃, NO₂, and OCIO. In this study, we investigated the temporal characteristics of stratospheric BrO and NO₂ in a polar region using zenith-sky DOAS. The observation was conducted at the Swedish Institute for Space Physics in Kiruna (Sweden, 68.84°N, 20.41°E) since 1996. We present the seasonal variation of BrO and NO₂ for the period of 1997–2009 and focus on their averaged seasonal trends with respect to different years. Being one of the longest measurements of spectroscopic measurements of trace gases in the Arctic, the Kiruna observation will contribute to a better understanding of the impacts of stratospheric trace gases and insights into mechanisms of their chemical reactions.