

Fussen Didier

Title:

A global climatology of the mesospheric sodium layer from GOMOS data during the 2002-2008 period

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Abstract:

This paper presents a climatology of the mesospheric sodium layer built from the processing of 7 years of GOMOS data. With respect to preliminary results already published for the year 2003, a more careful analysis was applied to the averaging of occultations inside the climatological bins (10° in latitude-1 month). Also, the slant path absorption lines of the Na doublet around 589 nm shows evidence of partial saturation that was responsible for an underestimation of the Na concentration in our previous results. The sodium climatology has been validated with respect to the Fort Collins lidar measurements and, to a lesser extent, to the OSIRIS 2003-2004 data. Despite the important natural sodium variability, we have shown that the Na vertical column has a marked semi-annual oscillation at low latitudes that merges into an annual oscillation in the polar regions, a spatial distribution pattern that was unreported so far. The sodium layer seems to be clearly influenced by the mesospheric global circulation and the altitude of the layer shows clear signs of subsidence during polar winter. The climatology has been parameterized by time-latitude robust fits to allow for easy use. Taking into account the non-linearity of the transmittance due to partial saturation, an experimental approach is proposed to derive mesospheric temperatures from limb remote sounding measurements.