



Atomic oxygen derived from SCIAMACHY OH(9-6) nightglow measurements

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Atomic oxygen is the most abundant reactive species in the upper mesosphere and lower thermosphere (UMLT) and its exothermic recombination reactions dominate chemical heating. In addition, knowledge of atomic oxygen is indispensable for the derivation of temperature, CO₂, ozone, and other constituents in the UMLT. Therefore, it is essential to know the atomic oxygen abundance with absolute accuracy.

Differences in recent satellite datasets have stimulated a resurgence of the discussion on the absolute value of atomic oxygen in the UMLT.

In this study we present a new atomic oxygen dataset based on hydroxyl Meinel band near-infrared emission measurements performed by SCIAMACHY on Envisat from 2002 to 2012. The OH spectra used here stem from the OH(9-6) ro-vibrational transition with low rotational quantum numbers. This data and atomic oxygen obtained from SCIAMACHY atomic oxygen green line measurements typically agree within 10–20%. The agreement between the SCIAMACHY data and the most recent SABER atomic oxygen dataset of Mlynarczyk et al. [2018] is significantly better than for the previous SABER dataset [Mlynarczyk et al., 2013]. Around 90 km both datasets typically agree within 10%, whereas SABER shows a larger negative bias at the lower boundary (85 km) and a positive bias at the upper boundary (95 km).