



Five years of OH measurements at the Global Atmosphere Watch Observatory Hohenpeissenberg

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We present the first long-term measurements of atmospheric OH concentrations made on 941 days over a total period of 5 years (1999-2003). OH concentrations were measured at the Global Atmosphere Watch (GAW) Observatory Hohenpeissenberg in Southern Germany in rural background air using chemical ionization mass spectrometry (CIMS). A broad range of other atmospheric chemical and meteorological parameters were measured simultaneously. The OH detection limit was 2×10^5 molecules cm^{-3} (2-sigma) based on 5 min signal integration. OH showed a clear diurnal and seasonal variation with peak values of more than 10^7 cm^{-3} and $1.5 \times 10^6 \text{ cm}^{-3}$ in summer and winter, respectively. Nighttime OH values were typically near or below the detection limit, maximum values around $1 \times 10^6 \text{ cm}^{-3}$ (5 min average) were observed in about 30 nights over the entire 5-year period. More than 90% of the variance of OH could be explained by the variance of $\text{J}(\text{O}^1\text{D})$. A surprising consequence is that - for the conditions prevailing at Hohenpeissenberg - annual cycles of NO_x , CO, NMHCs and other OH reactants are of minor importance for the OH variability. The observed strong relationship between OH and $\text{J}(\text{O}^1\text{D})$ was used to remove the seasonality in the OH data by normalizing with $\text{J}(\text{O}^1\text{D})$. The results were then used to investigate the entire 5-year data set for any underlying trend in OH levels at Hohenpeissenberg due to influences other than UV variability. No detectable trend was found for the evaluated period.