



On the relationship between HCHO and CO in the marine boundary layer during INDOEX

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In a number of recent field experiments significant positive correlations have been observed between HCHO and CO. One example was in the remote atmosphere marine boundary layer over the Indian ocean during the INDOEX campaign in February/March 1999. Here a positive correlation ($R^2 = 0.62$) was observed in photochemically aged (1-8 days) airmasses exported from the Indian subcontinent. The age of the airmasses deduced from back-trajectory calculations indicates that primary emissions of HCHO together with CO from combustion processes are not responsible for the observed correlation. In this study we use the 3D chemical transport model MATCH-MPIC to investigate the nature of the correlation. The model is able to reproduce the experimental result and indicates that the HCHO-CO relationship is similar to the well known O₃-CO relationship, since O₃ production generally implies HCHO production as an intermediate. While the O₃-CO relationship describes the photochemical O₃ production in a past timeframe, integrating the net O₃ production along the trajectory of the air parcel, we argue that the HCHO-CO relationship gives a measure for the remaining ozone production potential in a present timeframe, and thus describes the photochemical activity of the airmass.