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Further Results on Segregation of Volatile Organic Compounds and HO_x Radicals above a Deciduous Forest (ECHO Campaigns)

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Recent analysis of field experiments and LES – modelling showed that the intensity of segregation, e.g. of the reaction isoprene + OH, near canopies is not zero. Values are found in the range up to 15-30% by different authors. A further analysis on ECHO data from measurements at a deciduous forest site at the Research Center Jülich, Germany, is performed to find out if intermittent organized turbulence or inhomogeneous distributions of isoprene sources is the main cause for segregation. For this purpose direct measurements of OH, HO_2, NO, NO_x, isoprene and some other compounds are analyzed.

A modified quadrant analysis is applied to detect a) parameter to describe intermittency, and b) burst occurrence and duration. Organized bursts are identified and their occurrence and magnitude is compared to results from third order cumulant expansion method (CEM). In addition, the spectral contribution to the segregation intensity is discussed. The impact of turbulent non local transport on the intensity of segregation can be separated from periods where the spatial distribution of sources is of influence. The results are also compared to model results e.g. by Krol et al. (2000) and Patton et al. (2001).