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Volatile Organic Compounds (VOCs) measurements onboard the HALO research aircraft during OMO-ASIA

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The objective of the OMO-Asia campaign that took place in summer 2015 was to study the free-radical chemistry at higher altitudes during the Asian summer monsoon taken over a wide area of Asia. VOC measurements (e.g. acetone, acetonitrile, benzene, and toluene) were conducted using a strongly modified instrument based on a commercial Proton-Transfer-Reaction Mass Spectrometer (PTRMS) from Ionicon.

The PTRMS data are generally in good agreement with VOC measurements taken by the GC instrument from Max Planck Institute for Chemistry. In the outflow of the Monsoon plume acetone and acetonitrile volume mixing ratios (VMR) up to 1500 pptV and 180 pptV have been measured, respectively, pointing to a small contribution from biomass burning sources of which acetonitrile is an important tracer. Comparison with VOCs simulated in the atmospheric chemistry model EMAC model exhibits an underestimation (factor of ∼3 for acetone).

The measured data were analyzed with the help of 10 days back trajectories to distinguish air mass origins. For air masses originating from North America (NA) an enhancement of ∼500 pptV acetone relative to the atmospheric background (∼500 pptV) can be traced back to active biogenic acetone sources in the NA boreal summer. An average enhancement of ∼400 pptV acetone comes from the Asian summer monsoon. Acetone – CO correlations in the monsoon relative to background air is being analyzed for further characterization and estimation of the sources.