

1.075 Measurement of stable carbon isotope ratios of VOC in the outflow of major population centres in Europe and Asia.

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Abstract:

An automated high volume air sampling system has been deployed from 10th to 28th July 2017 on the German Research Aircraft HALO during the EMeRGe-Europe (Effect of Megacities on the transport and transformation of pollutants on the Regional and Global scales) campaign. The goal of this mission was the measurement of the pollution emitted, transported and transformed from the major European population centres (MPCs) London, Paris, Rhine-Ruhr-Area, Rome and Po Valley. The whole air samples were analysed for the mixing ratios and stable carbon isotope ratios of selected volatile organic compounds with GC-MSD-C-IRMS in the laboratory afterwards. One key experiment was the identification of the source of the air masses and the residence times of the VOC by collecting whole air samples on the ground in specific metropolitan regions. During 7 flights, mostly below 6 km altitude, 141 air samples in total were collected on HALO, and additional 28 samples at ground sites in London, Milan and Rome. We determined stable carbon isotope ratios and mixing ratios of several aldehydes, ketones, alcohols, and aromatics. With HALO's special characteristics of long endurance and long-range flights an extended area could be investigated. This allowed investigating air masses of different origin, characteristics, and atmospheric processing. Between March 10 and April 9, 2018, a similar campaign (EMeRGe-Asia) was conducted from Taiwan with the goal to investigate the pollution outflow from Asian megacities such as Taipei, Hongkong, Shanghai, Beijing, Manila, Seoul and Tokio. During 12 flights in total 144 whole air samples were collected, which again were analyzed for selected VOC. Additionally, for specific flights ground samples were collected in Taipei and Manila. In this contribution, we will give a data overview and show first exemplary results.