# 1.128 First results of VOC and ozone measurements in European and Asian Major Population Centers (MPC) during the research aircraft campaign EMeRGe (2017/2018).

Early Career Scientist

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Abstract:

EMeRGe (Effect of Megacities on the transport and transformation of pollutants on the Regional and Global scales) aims to investigate the impact of MPC emissions on air pollution and chemical processing at local, regional and hemispheric scales by making dedicated airborne measurements using the German research aircraft HALO (Gulfstream G550). Optimized transects and vertical profiling for diverse MPCs (e.g. Rom, London, Paris, Taipei, Manila, Shanghai) were performed to determine the composition of various pollution plumes entering and leaving Europe and leaving Asia.
We contributed with two custom-made instruments for the measurement of volatile organic compounds (VOCs) and ozone, respectively. VOCs were measured with a Proton-Transfer-Reaction Mass Spectrometer (PTR-MS) and ozone with both an UV photometer and a fast (10 Hz) chemiluminescence sensor. The sophisticated set of detected tracers allowed to distinguish, identify and characterize different air mass types and their chemical fate. Examples are biomass burning affected air detected using acetonitrile or air imported by long-range transport with enhanced VOC concentrations (e.g. acetone) at high altitudes. Furthermore, we could sample high VOC concentrations in local pollution plumes, especially downwind of Asian MPCs. The air mass age is estimated based on the ratio of toluene to benzene, which allowed identifying freshly polluted plumes near the Taiwanese coast or chemically aged air masses from China due to long-range transport.