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EMeRGe in Europe and Asia: Weather/Chemical Weather Forecasting, Flight Track Targets and First Results

John P. Burrows and the EMeRGe Forecasting Team

University of Bremen, Institute of Environmental Physics and Remote Sensing IUP/IFE, Bremen, Germany (burrows@iup.physik.uni-bremen.de)

The Effect of Megacities on the Transport and Transformation of Pollutants on the Regional to Global Scales (EMeRGe) aircraft campaign in Europe took place in July 2017 and EMeRGe in Asia during March and April 2019. The research goals of EMeRGe are the assessment of our understanding and prediction of the transport and transformation of pollution plumes from European and Asian Major Population Centers, MPC. This includes the impact of plumes of pollution from biomass burning, which is often impacting simultaneously with MPC emissions on air quality and tropospheric chemistry. The German High Altitude and LOng Range (HALO) research aircraft was a key instrument platform for the EMeRGe observations. In addition, the UK NERC FAAM and the Italian CNR light aircraft flew with optimized payloads in EMeRGe in Europe. During EMeRGe in Asia drone aircraft experiments were made in Taiwan and the Japanese and Korean research aircraft also made measurements. Completing the Observations, extensive satellite and ground made measurements were made available for EMeRGe.

The optimal selection of flight tracks for the HALO and FAAM flights was challenging, because of both operational flight restrictions and the changing weather. Using the forecasts for meteorological parameters and atmospheric composition by the Copernicus Atmosphere Monitoring Service (CAMS) and the Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) model during the daily flight planning procedure was a key element in the selection of the resultant flight plan. This system was essential for the planning of release experiments made by the DLR team from MPC to tag air masses, which HALO or FAAM then encountered. In both Europe and Asia, the influence from fire emissions in both local plumes and long-range transport were observed. The purpose of this talk is to give insight into the general meteorological situation and linked pollution transport as predicted by the models and to relate this to the measurements made during EMeRGe.