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Simulation of mineral dust transport to the East China Sea with FLEXPART 10.4

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Particulate matter is of special interest in atmospheric studies because it has important effects on both the Earth's climate and on human health. Currently, aerosols contribute largest to the overall uncertainty of the net radiative effects in studies of climate change. At the same time, aerosols are responsible for a large fraction of the overall impact of air quality on human health. Mineral dust is an important aerosol constituent and makes up a significant part of the total aerosol load. After its emission, mineral dust can be transported over very large distances in the atmosphere, and in extreme cases influence air quality far away from its source region.

The project *Effect of Megacities on the Transport and Transformation of Pollutants on the Regional to Global Scales* (EMeRGe) consisted of two measurement campaigns with the research aircraft HALO. HALO operated for two four-week periods in Europe (based close to Munich) and East Asia (based in Taiwan) in July 2017 and March 2018, respectively. The aircraft was fully equipped with extensive measurement instrumentation to sample atmospheric composition with a focus on the air pollution outflow from major population centers.

Here, we present simulations of coarse-mode aerosol transport to the East China Sea, where EMeRGe-Asia flight *E_AS_F#11* was flying from Taiwan to Japan and back on 30 Mar 2018. During the flight, enhanced concentrations of aerosol in the 0.5-3µm diameter range were measured using an optical particle counter (OPC) in several different locations. We used version 10.4 of the FLEXPART Lagrangian dispersion model to simulate sensitivity fields to emissions of dust, sea-sealt, and biomass burning aerosol. Combined with emission data for the three aerosol species, we can estimate the contribution of the different species and source regions to the measured aerosol enhancements.

Among others, our simulations show that mineral dust from as far as the Sahara desert in North Africa can contribute significantly to the total aerosol concentration over the East China Sea.