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## The Effects of Anthropogenic Aerosol Emissions from Chile and Mexico in ECHAM-HAMMOZ

Tuuli Miinalainen<sup>1</sup>, Harri Kokkola<sup>2</sup>, Kari E. J. Lehtinen<sup>1,2</sup>, and Thomas Kühn<sup>1,2</sup>

<sup>1</sup>Department of Applied Physics, University of Eastern Finland (UEF), Kuopio, Finland

<sup>2</sup>Atmospheric Research Centre of Eastern Finland, Finnish Meteorological Institute, Kuopio, Finland

In this research project we studied the climatic effects of anthropogenic aerosol emissions originating from Chile and Mexico. In particular, we studied black carbon (BC), organic carbon (OC) and sulfur dioxide (SO<sub>2</sub>).

By using aerosol-climate model ECHAM6.3.0-HAM2.3-MOZ1.0, we analyzed how each aerosol species affects the local cloud properties and radiative balance in the atmosphere. As we here are interested in the maximum impact, we simulated each aerosol species with separate model runs. The reference scenario (BASE) was simulated with the full representation of anthropogenic aerosol emissions from the ECLIPSEV6a emission inventory for the year 2015. Then, we constructed otherwise identical scenarios but the anthropogenic aerosol emissions from Chile and Mexico for each aerosol type were removed (NO\_BC, NO\_OC and NO\_SO2).

The results indicate that for Chile the sulfur emissions seem to have the greatest impact on both cloud condensation nuclei (CCN) and cloud droplet number concentration. This result is plausible since there the SO<sub>2</sub> emissions are much higher than BC and OC emissions. For Mexico, the OC emissions had the most notable effect on CCN, but the cloud droplets are more affected by the SO<sub>2</sub> emissions. When looking at the radiative properties, we found out that the direct effects were rather minor compared to semi-direct and indirect effects. This indicates that aerosol-cloud interactions have much larger regional effect on radiation than the aerosol direct effect.