

Supplementary material to:

Simulation of ash clouds after a Laacher See-type eruption

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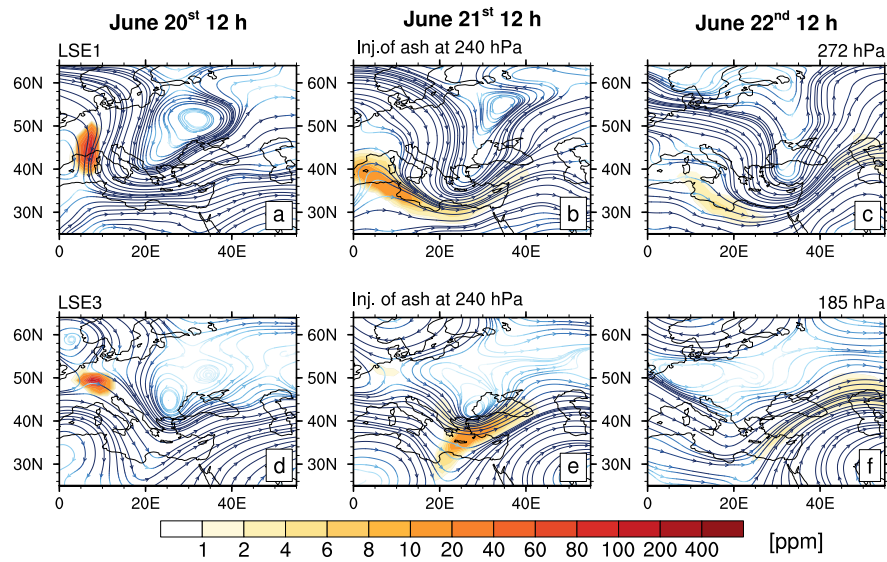


Figure 1: Streamlines of the zonal wind [m s^{-1}] over Europe for LSE1 at 272 hPa and LSE3 at 185 hPa at June 20th, 21st and 22nd right after the second eruption phase. The altitude shown is the level with the highest ash concentration over the three days.

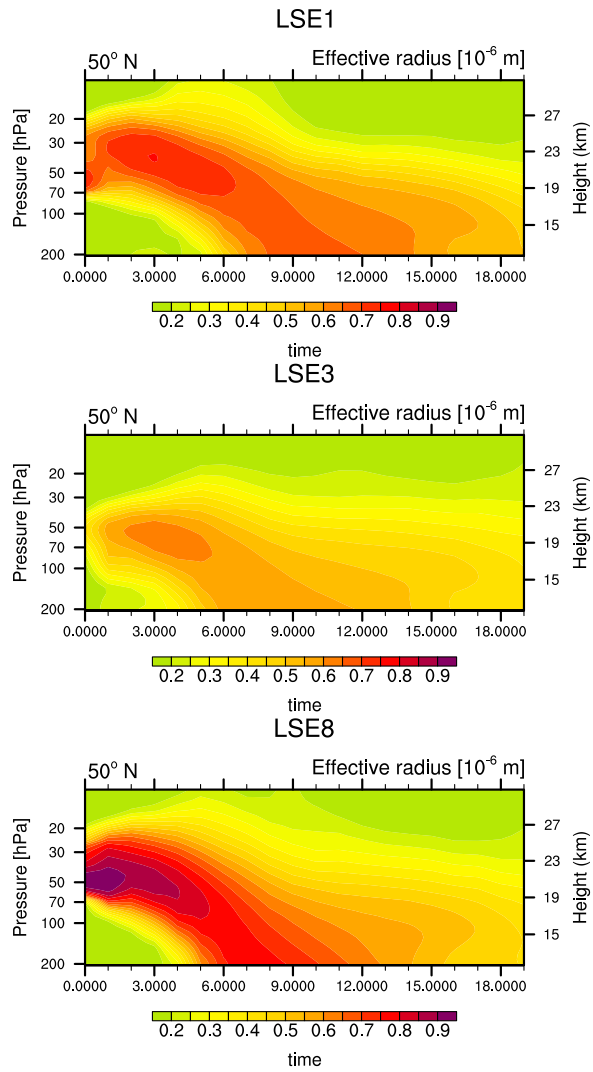


Figure 2: Effective radius [μ m] of sulfate aerosols over time as cross section at 50°N of LSE1, LSE3 and LSE8. Injection at lower latitude (LSE3) shows smaller radii and the simulation without fine ash (LSE8) larger radii than LSE1

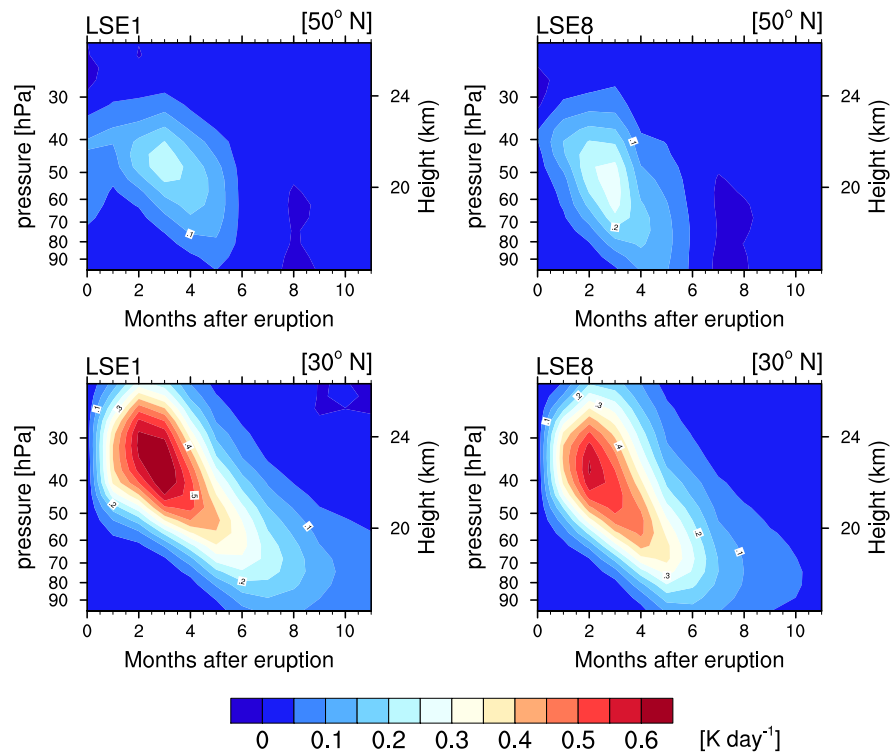


Figure 3: Zonal mean heating rate at 30°(top) and 50°N (bottom) of LSE1(left) and LSE8 (right).

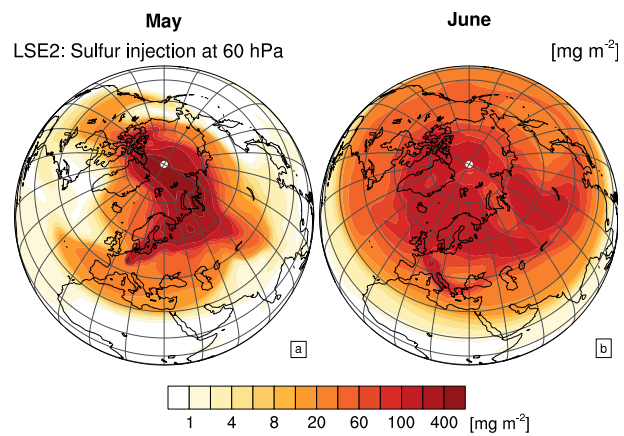


Figure 4: Monthly mean sulfur burden (SO_2 plus sulfate) shortly after the eruption (May, left and June, right) for the scenarios LSE2. Plotted values are 1, 2, 4, 8, 10, 20 mg m^{-2} etc.

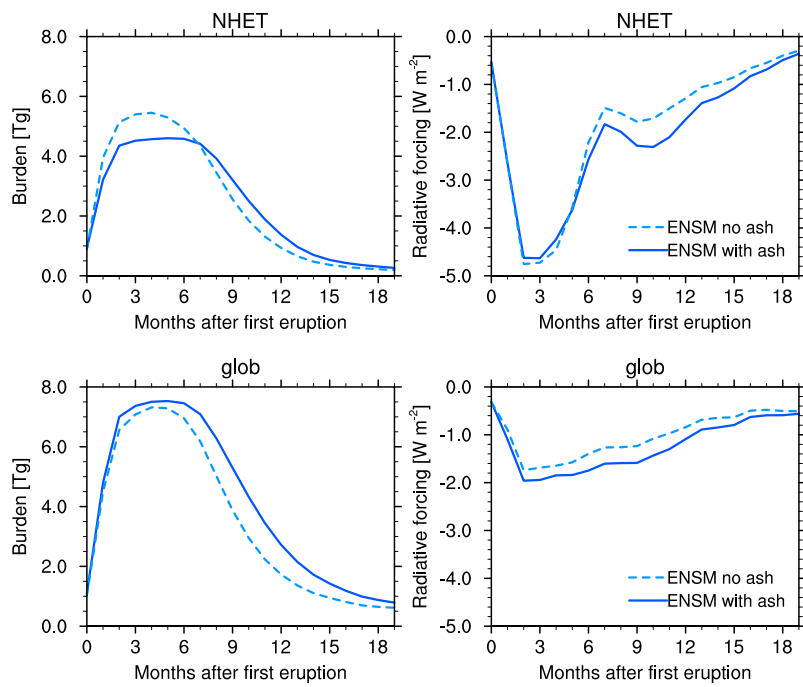


Figure 5: Hovmöller diagrams of the ensemble mean of sulfate burden (left) and net radiative forcing (right, all sky, top of atmosphere) of sulfate aerosols. Top: averaged over the northern hemisphere extra-tropics (30° to 90°N). Bottom: Global average. The ensemble mean was calculated of simulations with an initial injection of 15 Tg SO₂ at different eruption days, with injection of fine ash (solid, LSE1, LSE6, LSE7) and without (dashed, LSE8, LSE10, LSE11).

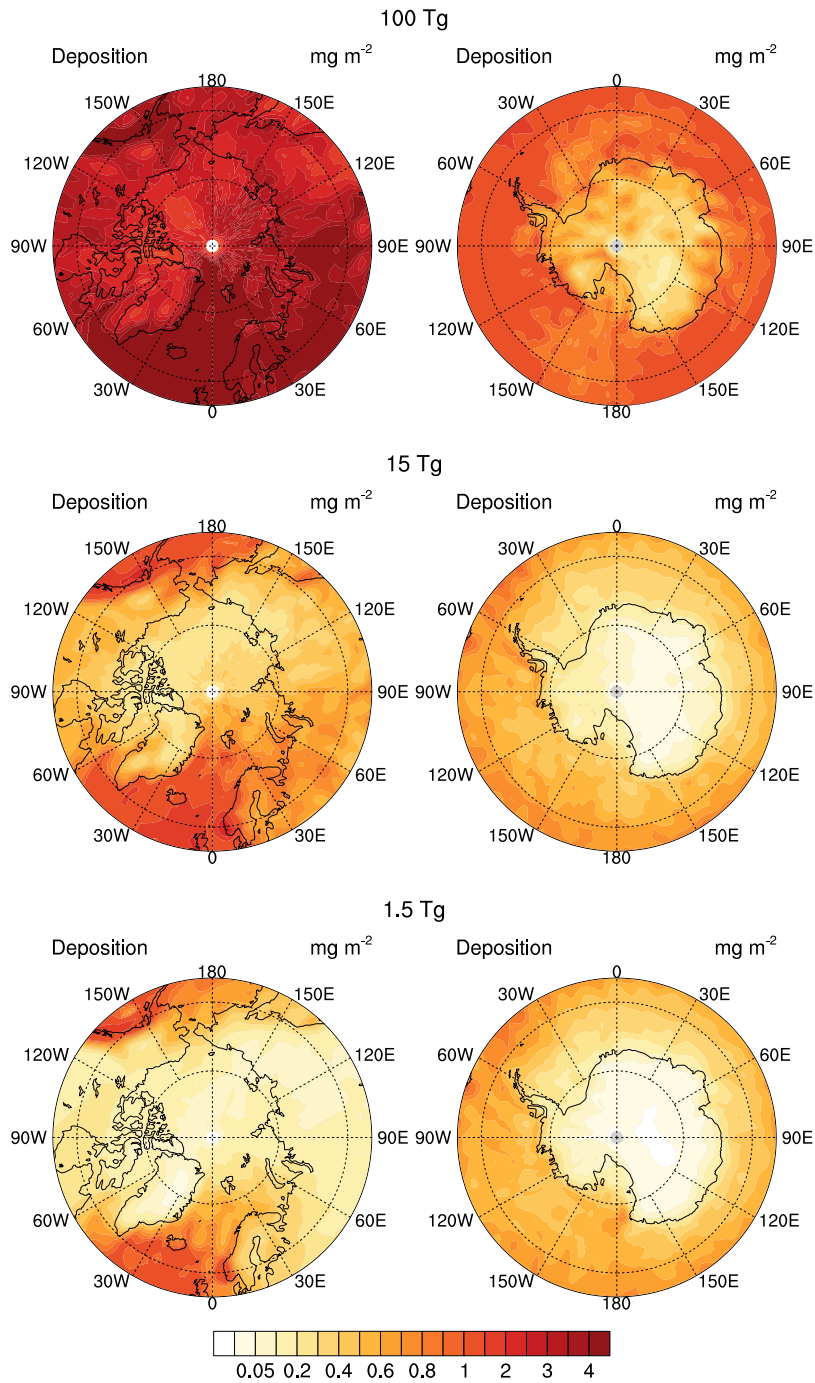


Figure 6: Deposition of simulations with 1.5, 15 and 100 Tg SO₂. Deposition over central Greenland (70°N to 80°N, 30°W to 50°W) 2.5 mg m⁻², 0.4 mg m⁻², and 0.09 mg m⁻². Over Antarctica (75°S to 85°S, 0° to 60°E) roughly 0.45 mg m⁻², 0.05 mg m⁻² and, up to 0.02 mg m⁻².