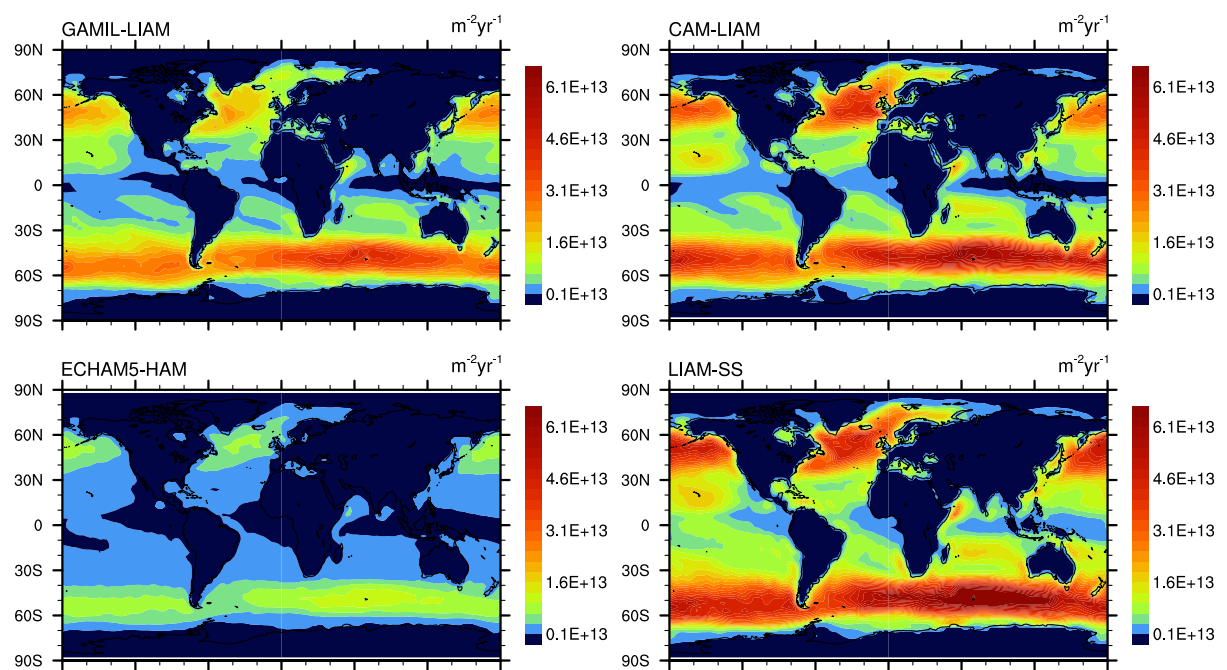
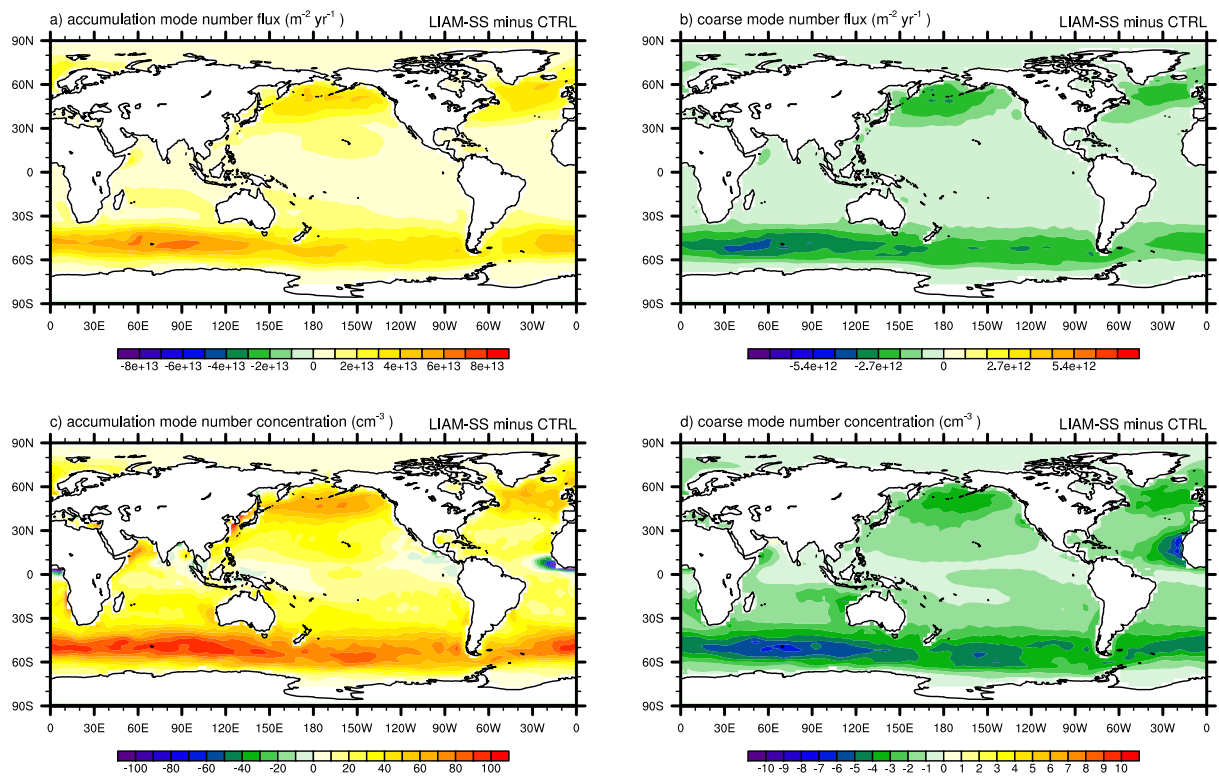


**Fig. R1:** a: The annual mean 10m wind speed from the ERA-Interim reanalysis (1989-2009 average). b-d: Differences between the GCM simulations and ERA-Interim. The right string over each panel shows the global mean.



**Fig. R2:** Annual mean number flux of the soluble accumulation mode particles caused by sea salt emission in GAMIL-LIAM, CAM3-LIAM, ECHAM5-HAM, and ECHAM5-HAM using the sea salt emission scheme from LIAM. The unit is  $\text{m}^{-2} \text{yr}^{-1}$ .



**Fig. R3:** Comparison between the standard ECHAM5-HAM results (referred to as "CTRL") and a simulation using the sea salt emission scheme from LIAM (labeled as "LIAM-SS"). The upper row shows differences in the annual mean sea salt number flux for a) accumulation mode, and b) coarse mode. The lower row shows differences in the annual mean number concentration of the c) soluble accumulation mode, and d) soluble coarse mode.