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Impact of aerosols on the diurnal cycle of marine stratocumulus clouds

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Anthropogenic aerosols particles, that are potentially able to alter cloud radiative properties and the onset of precipitation, are likely to modify the life cycle of boundary layer clouds, hence their forcing on climate (the 2^{nd} aerosol indirect effect). LES models are well suited for the simulation of the coupling between the numerous processes involved in the boundary layer dynamics. An ideal steady state diurnal cycle of boundary layer stratocumulus is simulated with such a LES model, using state of the art parameterisations of radiative transfer and precipitation formation and assuming a pristine aerosol background. The simulation is then repeated for different aerosol concentrations in order to evaluate the influence on drizzle formation and on cloud optical properties, and hence on the diurnal cycle. The second indirect effect is quantified in term of deviations from the steady-state and amplification/damping of the diurnal cycle amplitude.