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Feedback of African aerosol on South Easttern Atlantic low level clouds simulated with a regional climate model

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Atmospheric aerosol particles are known to influence the radiative balance at regional and global scales through their interactions with clouds (first and secondary aerosol indirect effects) and solar/infrared radiation (direct radiative forcing). In addition, the feedback mechanisms associated with the absorption of solar radiation due to absorbing particles (especially smoke) on cloud microphysical properties (semi-direct effect) is also recognized as an important radiative perturbation. In this context, the Namibian coast along the Atlantic ocean is an ideal region to study these processes because it is characterized by both the presence of anthropogenic smoke particles and persistent stratocumulus clouds, which are known to be essential in the global radiative budget. This has been the main motivation for the development of the AEROCLO-sA project (FR), in collaboration with the the ORACLES (US) and CLARIFY (UK) programs. In this context, we evaluate the capacity of a regional climate model (RegCM) to represent aerosol stratocumulus interactions and their impact on regional climate by comparing simulations performed with and without explicit biomass burning aerosol. We will present preliminary results of simulations, performed over the 2002-2012 period at 30 km resolution. A particular attention will be paid to SW aerosol optical depth, absorbing properties (AAOD and SSA), heating rate, representation and changes in Sc cloud macrophysical/microphysical and optical properties.