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Simulation of the transport, vertical distribution, radiative properties and shortwave direct effect of smoke with the ALADIN-C regional climate model during the ORACLES and LASIC experiments.

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The Southeastern Atlantic Ocean represents one of the main regions regions at the global scale where smoke aerosols can produce a positive direct radiative forcing in the shortwave, which is opposite to the general net cooling effect due to natural and anthropogenic aerosols. However, such estimates are very uncertain and are linked to the cloud microphysical /macrophysical and optical properties of low (stratocumulus) clouds in addition to radiative properties (especially absorption) of smoke as well as the vertical distribution of smoke vs. low clouds. All these properties need to be evaluated before estimating the direct radiative forcing exerted by smoke (in the solar spectral range) at the Top of the Atmosphere and over this region. In this study, we will present first results of the comparisons between the regional climate model (RCM) ALADIN-Climat simulations, performed for the September 2016, and in-situ (surface and aircraft) as well as OMI and MODIS remote-sensing (aerosols, clouds) observations obtained during the ORACLES and LASIC field campaigns.