

Local impact of stochastic shallow convection on clouds and precipitation in the tropical Atlantic

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The local impact of stochastic shallow convection on resolved convection, clouds and precipitation, isolated from its remote impact through the large-scale circulation, is tested in a case study over the tropical Atlantic on 20th December 2013. A stochastic shallow convection scheme is compared to the operational shallow convection and a case with no representation of shallow convection in ICON at a convection-permitting resolution. In the stochastic case, convective heating is substantially increased in the subcloud layer, the boundary layer is deeper, while evaporation is enhanced at the expense of sensible heat flux at the ocean's surface. As a result, the stochastic case proves to be superior in reproducing low-level cloud cover, deep convection and its organization, as well as the distribution of precipitation in the Atlantic ITCZ. The local stochastic convection invigorates the resolved convection and is crucial for a better representation of resolved deep clouds.