Analyse orientée processus d'AROME-OM Antilles avec un focus sur la convection peu profonde

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Since February 2016, the AROME-OM model is operational over the Carribean area at a 2.5 km horizontal resolution. Availability of these operational forecasts raises several scientific questions : i) to what extent this new generation of models significantly improves the forecast in the Overseas ii) does this huge ensemble of simulated data represent an opportunity to study the processes that govern the shallow convection in a wide range of thermodynamical situations and its spatial organization (Stevens, 2020).

This study is conducted for the January-February 2020 period that corresponds to the period of the EUREC4a international measurement campaign (http://eurec4a.eu/) that took place East off the island of Barbados (13N, 57W) providing additional observational data sets. During the EUREC4a campaign, the AROME-OM was also run at 1.3 km offering an opportunity to evaluate the added value by this increase in resolution.

Comparisons at the Barbados site shows the good skill of the AROME-Antilles model to represent the double peak of cloud fraction with one peak located at the base of the cumulus and the other at the trade-wind inversion ; those two peaks are associated with the presence of very shallow cumulus and much thicker cumulus that reach 3 km with a frequent occurrence of an anvil at this altitude.

The two versions of AROME (2.5 km and 1.3 km) show a very skill in representing the 4 different cloud organizations during the EUREC4A campaign and, with four cases-study, we show how the large-scale environment (PW, vertical velocity, stability, wind surface) drives these cloud organizations.