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Evaluation of a convective-microphysics parametrisation package in Tropical MJO-conditions

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The physical parametrisations inside the ALARO (ALADIN - AROME) NWP model are centred around the 3MT (Modular, Multi-scale, Microphysics and Transport) scheme. 3MT touches so many aspects of the feedbacks that determine the model-atmosphere's behaviour that it is difficult to characterise it synthetically, but it is aimed to tackle the typical convection grey-zone problems. Key elements to do so are scale-awareness, prognostic closure and no distinction of the origin of condensation from the microphysical point of view.

The aim of the study is to test the ALARO model, which is developed and tuned mainly for mid-latitude weather, in the tropics. More precisely the model will be evaluated in the framework of the Madden-Julian Oscillation (MJO). This framework is chosen because it really targets the key concepts of the 3MT-scheme since the coupling between small-scale convective motions, mesoscale convective clusters, and the planetary scale waves appears to be fundamental to the MJO.

The period of interest is chosen to be April 2009, which is a part of the well documented "Year of Tropical Convection" MJO case and the domain is centred around the Indian Ocean. Model runs were performed in two ways, the first one being a continuous run, where the model was initialized from the ECMWF re-analysis and runs freely for the whole month with coupling every six hours to the re-analysis. For the second run, the model is re-initialized every 24 houres (also coupled every six hours) from the re-analysis.

As a first indication precipitation fields are analysed and compared with satellite data. First results look promising, especially for the daily re-initialized runs. Next cloudiness as well as vertical transport fluxes will be investigated. As a final step we will try to recreate the MJO index based on the first two principal components of the Empirical Orthogonal Functions of outgoing longwave radiation, u-wind at 850 and 200 hPa.