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Evaluation of convective lifecycles in convection permitting weather forecasts for tropical Africa.

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Tropical Africa is subject to weather extremes at a variety of space- and time-scales, leading to droughts, floods and severe storms. The weather has a huge impact on the local population: droughts and floods impact on weather dependent industries such as agriculture or fishing, which much of the population rely on for their livelihoods, while severe storms can lead to destruction of property and even loss of life. Despite this, global numerical weather prediction performance remains notoriously poor in tropical Africa, particularly at smaller scales.

The UK Met Office has recently begun running an ensemble weather forecasting system for tropical Africa at convection permitting scale (4.4 km). This forecasting system clearly has enormous potential to enable improved weather forecasts in tropical Africa. Previous studies indicate that convection permitting models can provide greater skill than lower resolution global models for sub-regions within tropical Africa. However, skill remains fairly poor and further evaluation work is necessary to identify potential model improvements.

This presentation describes an evaluation of the lifecycles of convective systems in the UK Met Office tropical Africa model. 10.8 micron brightness temperatures are used to identify and follow convective systems both in the model and in geostationary satellite observations, which provide both high temporal (15 minute) and spatial (~3 km) resolution. We evaluate the size, diurnal cycle, propagation, initiation and lifecycle of convective systems in the model and the link between these properties and the magnitude of surface precipitation produced. Finally we analyse and evaluate the response of storm systems and hence precipitation in the model to large scale atmospheric drivers such as the Madden-Julian Oscillation and African easterly waves. This process oriented evaluation helps identify of the causes of model errors, facilitating future improvements in the model.