Title:
Biases in the representation of convection in convective-permitting versions of the Unified Model

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Abstract:
Convective permitting models are now being used operationally at a number of Met Services around the world, both for weather prediction and climate simulations. Unlike the decades of experience the community has built up evaluating systematic errors in Global models, the understanding of systematic errors in convective scale models is a very young and new field. This activity is made more difficult by the fact that the domain size of these models is usually rather small (typically country scale) and so unlike Global models which simulate all weather types every day, the convective scale models need to be run over many selected case studies or parts of the world to generate enough statistics for systematic error evaluation.

The Met Office runs the UKV, an operational 1.5km resolution configuration of the Unified Model (UM) over the U.K. However the UM is also run at convective permitting resolutions in many other parts of the world thanks to either research projects (such as the NOAA Hazardous Weather Testbed) or the UM collaboration with other countries (such as Australia) which allows the model to be evaluated in both tropical and mid-latitude environments.

The representation of convection is one of the most challenging aspects for all models and convective scale models are no exception. There is great model sensitivity to the specification of sub-grid mixing and model resolution, leading to differences in the initiation of convection and properties of convective cells. Results will be presented of model validation against radar (cell statistics) and our efforts to summarise and categorise convection biases drawn from a diverse range of locations around the world.