USE OF CONVECTION-ALLOWING MODEL ENSEMBLES IN FORECASTING SEVERE CONVECTIVE HAZARDS

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Only just over one year ago the Australian Bureau of Meteorology moved into production its first ever true convection-allowing model (CAM), the ACCESS-City model (APS2 edition). This model provides exciting new avenues for the prediction of severe local convection in the form of explicitly generated pseudo-storms on the 1.5 km model grid. Casting these storms through the lens of simulated radar reflectivity allows subjective and objective comparisons to observed storms on radar, and allows for a quick human appraisal of otherwise very complex model output.

A noteworthy advance in the utility of CAMs for the prediction of severe convection transpired well over decade ago inspired by an annual Hazardous Weather Testbed at the National Weather Center in Norman, Oklahoma. The most severe explicitly generated and realistic-looking model storms produced strong updrafts (large updraft speeds) collocated with storm-scale rotation (assessable through the relative vertical vorticity). A simple product of these two quantities, integrated over the 2-5 km above ground layer (a layer in which storm-scale rotation is most often observed on Doppler radar) became known as updraft helicity (UH) and, to this day, has been the most successful proxy for supercells and its hazards modelled in CAMs.

Hourly or multi-hourly maxima of UH (with the maximum taken over UH values at every model time step) can be used to create a range of very useful proxies for high-end severe convection, such as maximum UH products, storm tracks or UH neighbourhood probabilities. These proxies can easily be extended into CAM ensembles to account for the timing, placement and intensity uncertainties inherent in any individual CAM integration.

The presentation will focus in how CAMs and CAM ensembles can be employed to predict severe convection out to 1-2 days in advance through utilising simulated reflectivity and updraft helicity output.