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Scale-selective verification of rainfall forecasts

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Numerical Weather Prediction (NWP) models are becoming operational at

increasingly finer scales with the expectation that local weather, including convective rainfall, will be more accurately predicted. At the UK Met Office an NWP model with a grid spacing of 4 km is now operational and the next model with a grid spacing of 1.5 km is being developed. Finer resolution does produce more realistic simulations of convective storms. However, this does not necessarily mean more accurate forecasts. The faster growth of errors on the small scales that are now being resolved in conjunction with pre-existing errors on larger scales may limit the usefulness of such models.

It is vital that we are able to assess the scales over which a forecast has useful skill and how those scale vary with forecast lead time. To do this a verification method has been developed that compares fractions of

occurrences of rainfall amounts within varying sized neighbourhoods with

equivalent fractions observed by radar.

The method will be described. It has proved to be particularly useful for identifying the scales over which improved model resolution has added and retained skill and the scales over which forecast output should be interpreted and presented. It also provides a means of assessing the scales over which changes to model formulation or data assimilation have greatest impact.

One of the benefits of this approach is the link between verification and post processing. Probability forecasts can be generated using the

fractions from the neighbourhood approach over the scales at which the

model is found to have a useful level of skill. Examples will be shown.