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# Representation of model error in a convective-scale ensemble

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Errors in weather forecasts originate from a number of sources: (i) the forecast's initial conditions, (ii) the boundary conditions and (iii) the model formulation, which all follow from and influence the data assimilation schemes used. Meso-to-convective-scale data assimilation and forecasting present new challenges because at these scales model errors are thought to become dominant. Here we investigate sources of model error that affect the forecast skill at convective scale. We present work on the effect of model error resulting from the parameterisation of unresolved processes (specifically microphysics and turbulent boundary layer processes). An experimental 1.5-km resolution convection-permitting version of the UK Met Office's 24-member Global and Regional Ensemble Prediction System (MOGREPS) has recently been developed (the 1.5km-EPS). The 1.5km-EPS accounts for model error from unresolved processes through the use of a stochastic perturbation technique known as the random parameters (RP) scheme. We assess the ability of the RP scheme to increase ensemble spread and make comparisons with observations. We determine the sensitivity of diagnostics, such as variances and correlation length scales, to the size and structure of the model errors. By switching on and off the different sources of forecast error (initial condition error, lateral boundary condition error and model error) we attempt to disentangle the effect of model error from initial condition and boundary condition errors. This work has also been extended to include a 93-member ensemble; preliminary results of the effect of ensemble size on the forecast error statistics will be presented.