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A comparison between the MetOffice ETKF (MOGREPS) and an ensemble of 4DEnVars

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At the MetOffice the 4DEnVar algorithm is being tested as a possible replacement for 4DVar. The verification fit to observations for 4DEnVar is significantly worse in the southern hemisphere, especially for the surface pressure fields and 500 hPa geopotential height. The forecast trials so far have used the MetOffice ETKF (MOGREPS) ensemble to calculate the errors of the day that are needed for 4DEnVar. A similar signal in the southern hemisphere verification has also been seen when using MOGREPS to calibrate the static part of the background error covariance matrix for non-hybrid 4DVar trials. Both results suggest that MOGREPS may not be the best system from which to sample forecast error.

For this reason work is underway to develop an ensemble of 4DEnVars with perturbed observations with the aim of producing more reliable samples of the forecast error. We present the forecast error statistics from both systems and compare reliability and sharpness diagnostics. Particular emphasis is given to identifying the reason for the poor verification scores in the southern hemisphere.