A data assimilation-centred convective-scale ensemble for Singapore and its background error statistics

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Singapore is an island-country located in maritime southeast Asia. It experiences seasonal and diurnal variations in the weather due to the monsoons and strong solar heating of land in the region. Two convective-permitting ensemble prediction systems have been developed to understand the uncertainty associated with weather prediction in Singapore. The data assimilation-centred ensemble (DACE) features multiple upgrades to the SINGV-EPS downscaler system, including (i) a new science configuration, (ii) a centring of the ensemble on the data assimilation analysis from SINGV-DA, (iii) an adaptive selection of the ensemble members from the global ensemble, and (iv) an inflation of the ensemble perturbations from the global ensemble. Evaluation of the performance of DACE and SINGV-EPS against the baseline global ECMWF ensemble is underway using the METPlus verification package. This will be followed by an exploration of potential implications for convective-scale data assimilation in the tropics, done through studying the seasonal and diurnal variation of time-dependent background error structures estimated by DACE.