New challenges in Australia-wide convective-scale data assimilation

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Over the last year, a convective-scale NWP system covering the whole Australian continent, called ACCESS-A, has been developed. This system will replace the Bureau's existing ACCESS-C, which consists of seven small domains over populous regions. Similar to ACCESS-C, the new ACCESS-A runs hourly 4D-Var and assimilates a range of conventional and satellite observations. With a horizontal grid spacing of ~1.5 km and over a billion grid points, this is an extremely large convective-scale DA system.

ACCESS-A marks a major upgrade to many aspects of the Bureau's convective-scale NWP. We have changed to the RAL3.2 physics configuration that is designed for both tropics and mid-latitudes. Several new observation types have been introduced to the data assimilation, including new satellite radiances and radar reflectivity. ACCESS-A also includes its own land surface DA, rather than borrowing from the global land DA. ACCESS-A also introduces large-scale blending, which improves the forecast skill significantly.

There were several challenges to resolve that were not manifest in the global or ACCESS-C systems. These including satellite bias correction for geostationary Himawari radiances to compensate for the diurnal cycle. Additionally, the automated surface observation quality control has been revised for to better handle sparsely observed areas like central Australia.