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Implementation of a flow-dependent background error correlation length scale formulation in the NEMOVAR OSTIA system

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OSTIA is the Met Office's Operational Sea Surface Temperature (SST) and Ice Analysis system, which produces L4 (globally complete, gridded) analyses on a daily basis. Work is currently being undertaken to replace the original OI (Optimal Interpolation) data assimilation scheme with NEMOVAR, a 3D-Var data assimilation method developed for use with the NEMO ocean model. A dual background error correlation length scale formulation is used for SST in OSTIA, as implemented in NEMOVAR. Short and long length scales are combined according to the ratio of the decomposition of the background error variances into short and long spatial correlations. The pre-defined background error variances vary spatially and seasonally, but not on shorter time-scales. If the derived length scales applied to the daily analysis are too long, SST features may be smoothed out. Therefore a flow-dependent component to determining the effective length scale has also been developed. The total horizontal gradient of the background SST field is used to identify regions where the length scale should be shortened. These methods together have led to an improvement in the resolution of SST features compared to the previous OI analysis system, without the introduction of spurious noise. This presentation will show validation results for feature resolution in OSTIA using the OI scheme, the dual length scale NEMOVAR scheme, and the flow-dependent implementation.