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Integration of Total Suspended Matter data from geostationary and polar-orbiting satellites over the North Sea using DINEOF

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Total Suspended Matter (TSM) from the SEVIRI and MODIS sensors are analysed using DINEOF (Data INterpolating Empirical Orthogonal Functions), an EOF-based technique to reconstruct missing data. The complementary nature of geostationary and polar data, with different spatial and temporal resolutions, is used in this work to combine these two data sets into a unique estimate of the North Sea TSM. The technique to achieve the merging is based on DINEOF, and consists on estimating a first EOF basis using the polar TSM data, which is used in a second step for the merging procedure. The merging analysis is based on the formalism of optimal interpolation, but an important difference is that the error covariance is not parametrized a priori using an analytical expression, but expressed using the spatial EOF basis calculated by DINEOF. This EOF basis represents more realistically the complex variability of the TSM data sets than the parametric covariance used in most optimal interpolation applications.

Preliminary results will be shown demonstrating the possibilities of this approach. Given the high temporal and spatial resolution of the final TSM dataset, an analysis of tidal dynamics in the North Sea and their influence in TSM will be presented.