



## **The new CMEMS optimally interpolated sea surface salinity and density reprocessed dataset (1993-2015): validation and preliminary analysis**

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Monitoring Sea Surface Density (SSD), Salinity (SSS) and Temperature (SST) allows investigating important aspects of the Earth system dynamics, ranging from global hydrological cycle to ocean thermohaline circulation, with relevant implications on both local/regional, short scale processes, and global climate. Different approaches have been recently proposed to combine in situ measurements and satellite data and provide gap-free SSS at regular spatial and temporal resolution, aiming to resolve also ocean mesoscale. Here, we present a new global dataset of optimally interpolated SSS and SSD maps, based on the multidimensional covariance model proposed by Droghei et al. (2016). The dataset covers the whole period from 1993 to 2015 at  $\frac{1}{4}^{\circ} \times \frac{1}{4}^{\circ}$  spatial resolution and weekly sampling, and is presently distributed by the Copernicus Marine Environment Monitoring Service (CMEMS). The technique allows to interpolate in situ salinity and in situ density measurements using satellite sea surface temperature differences as an additional parameter in the optimal estimate. The validation with independent TSG measurements and the analysis of spatial wavenumber spectra show that the multidimensional optimum interpolation (OI) method significantly increases the L4 effective resolution while reducing the errors with respect to more classical approaches. A preliminary analysis of global SSS/SSD variability and trends is presented.