Introduction
The dynamic interpolation (DI) merges along-track ocean altimetry data into continuous maps in time and space. Contrary to classical linear optimal interpolation (LI), DI has the advantage of accounting for non-linear processes which allow to significantly reduce the interpolation error in highly turbulent regions. DI has been successfully applied to Observing System Simulation Experiments (OSSEs) showing the significant improvements compared with standard linear objective mapping (Ubelmann et al., 2015). We recently applied DI to real along-track data to produce high-resolution gridded maps in regional configurations (Gulf-Stream, Mediterranean, portion of ACC…). Here, we present these configurations and the validations against maps distributed by the Copernicus Marine Environment Monitoring Service (CMEMS).

Methods & Results
✓ A simple non-linear propagator (1-layer OG model) can be effective to mitigate poor temporal SSH coverage
✓ A 2D Fourier decomposition is propagated with the tangent linear:

\[ q = \nabla^2 \psi - \frac{1}{L_H^2} \psi \]

\[ \frac{\partial}{\partial t} \frac{\partial}{\partial x} + \nabla (\psi, q) - B \frac{\partial}{\partial x} = 0 \]

✓ Inversion performed in Fourier space:

\[ \eta = (Q^T \psi + \Gamma^T H^T R^T H) \psi + \Gamma^T H^T R^T \psi \]

✓ Unresolved physics parameterized with additional Fourier modes in \( \Gamma \)

Key points:
- Input data originate from validated and calibrated along-track dataset produced by CLS for the CMEMS
- 5 regional studies: Gulfsteam, Gulfstream extended, Western Mediterranean Sea, Urdintsev and Arabian
- Validation is based on comparison of maps with independent along-track, drifters, Sea Surface Temperature, Chlorophyll
- Outputs: Sea level anomaly, Absolute dynamic topography, Geostrophic velocity anomaly, Absolute geostrophic velocities

Towards better representation of the turbulent regions

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Conclusions & Perspectives
A serie of validations and comparisons against independent data have been conducted to assess the performances with respect to the reference CMEMS gridded maps. If it is sometimes a challenge to outperform in low-energy areas, we found that the mesoscale of intense jets can be significantly improved, revealing new eddies and smoother trajectories. Beyond the Gulf-Stream configuration, a serie of regional products will be developed and soon to be available on Aviso (www.aviso.altimetry.fr). Additional investigations will be carried out in other high-variability area such as the Kuroshio or the Agulhas system to further validate the method.

References
Ubelmann et al., 2015, Dynamic Interpolation of Sea Surface Height and Potential Applications for Future High-Resolution Altimetry Mapping, JTECH, 33, 1691–1699