

A global high-resolution temperature and salinity reconstruction by spatiotemporal multiscale correlations and dynamic height constraints

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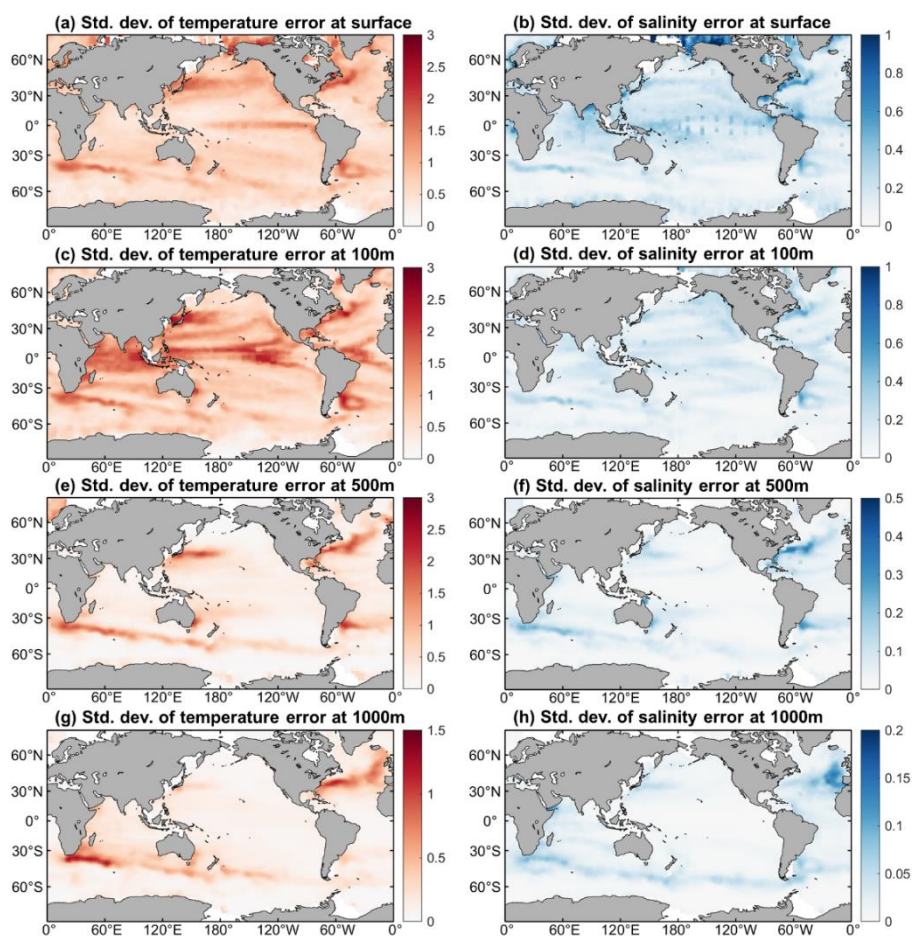


Figure S1. Standard deviation ($2^\circ \times 2^\circ$ average) of temperature/salinity profile errors against the WOA23, displayed at the surface (a, b), 100 m (c, d), 500 m (e, f), and 1000 m (g, h).

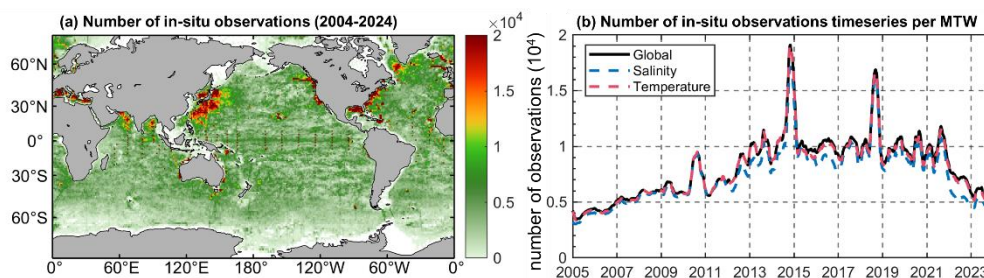


Figure S2. (a) $1^\circ \times 1^\circ$ binned spatial distribution of total in-situ observations. (b) Timeseries of the global number of profiles per MTW: total profiles (black solid line), temperature profiles (red dashed line), and

salinity profiles (blue dashed lines).

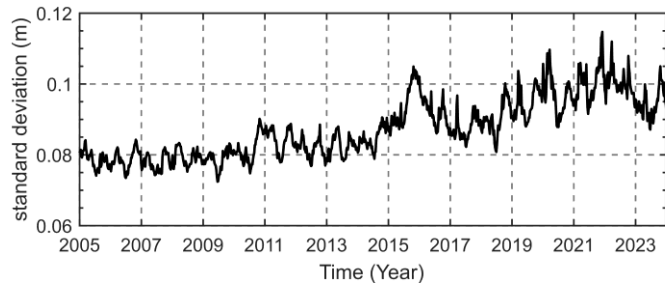


Figure S3. Spatially averaged standard deviation of the AVISO level-4 SLA.

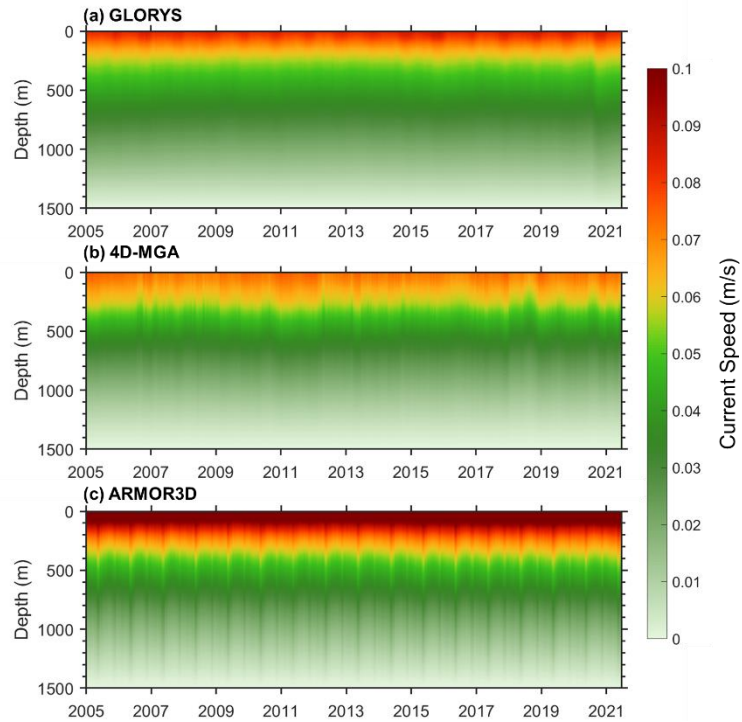


Figure S4. Timeseries of horizontally averaged geostrophic current speed over 2005–2021 for GLORYS (a), 4D-MGA (b) and ARMOR3D (c).