



Supplement of

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

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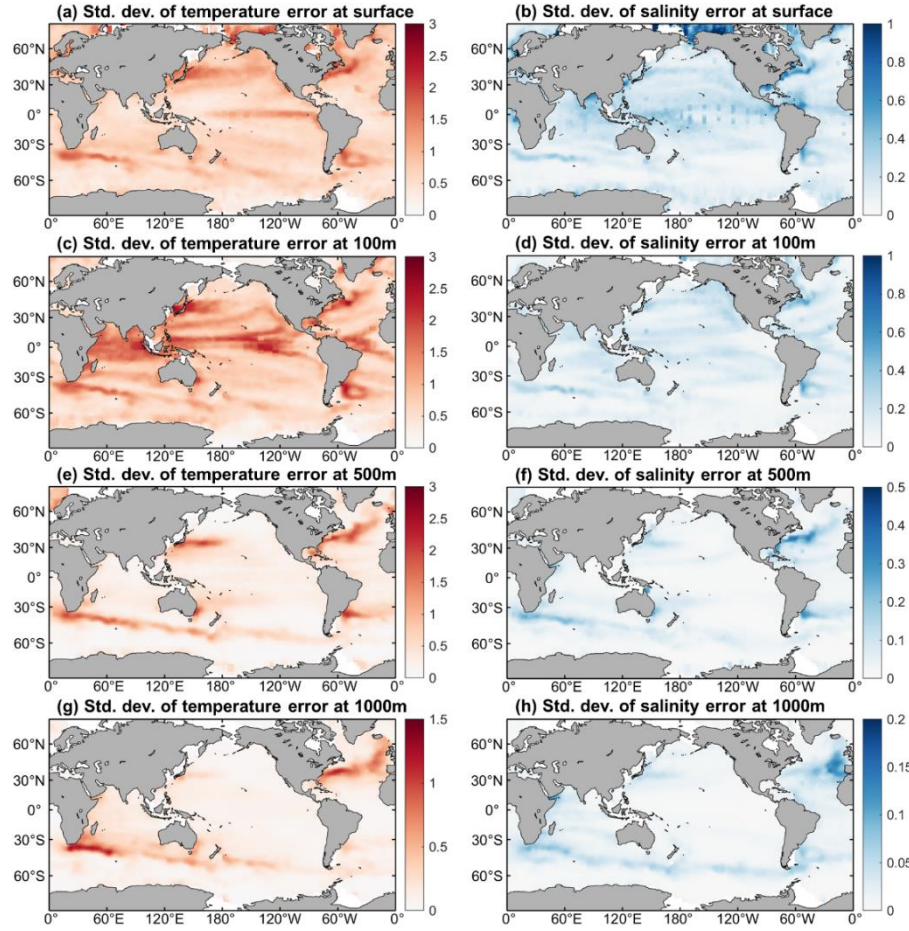


Figure S1. Standard deviation ($2^\circ \times 2^\circ$ average) of temperature/salinity profile errors against WOA23, displayed at the surface (a, b), 100 m (c, d), 500 m (e, f), and 1000 m (g, h).

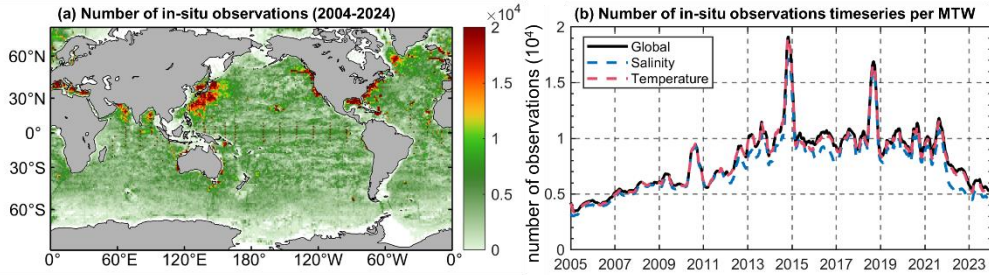


Figure S2. (a) $1^\circ \times 1^\circ$ binned spatial distribution of total in-situ observations. (b) Timeseries of the global number of profiles per MTW: total profiles (black solid line), temperature profiles (red dashed line), and salinity profiles (blue dashed line).

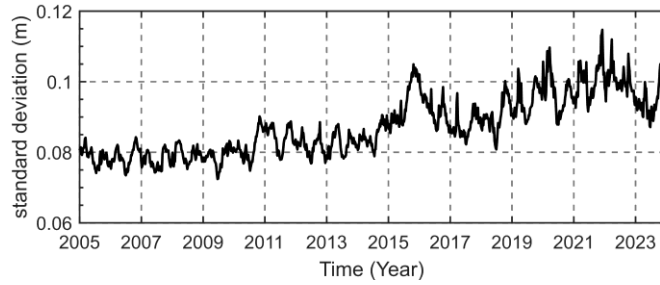


Figure S3. Spatially averaged standard deviation of the AVISO level-4 SLA.

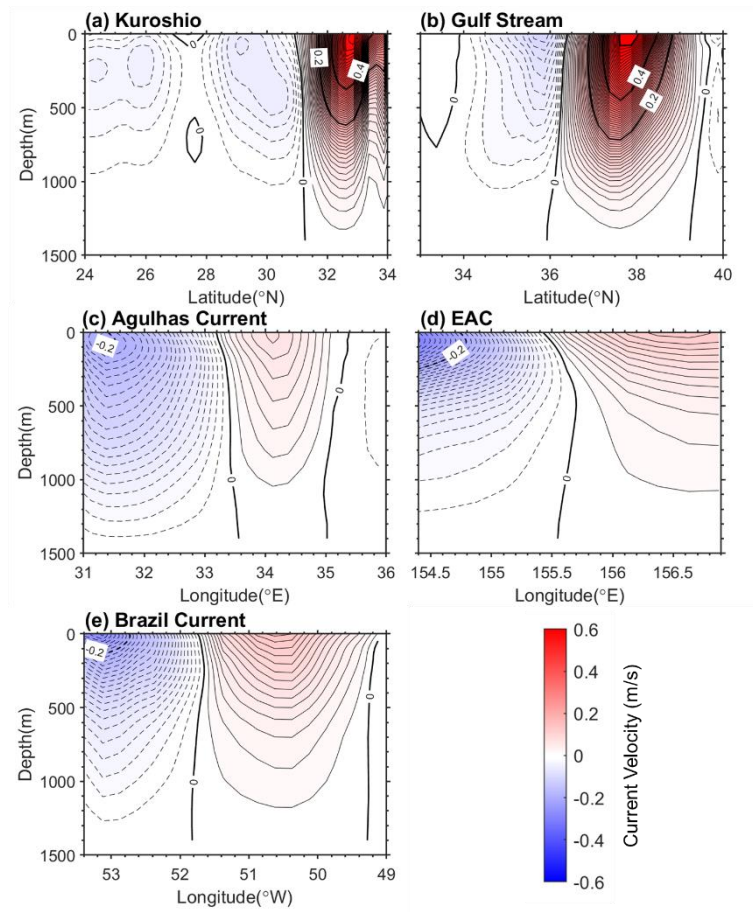


Figure S4. Climatological (2005-2022) geographic velocity sections in WBC sections from the ARMOR3D product. The contour interval is 0.01 m/s of the Kuroshio (a) at 137°E, the Gulf Stream (b) at 68.5°W, the Agulhas Current (c) at 31°S, the EAC (d) at 27°S and the Brazil Current (e) at 37°S. The positive values in (a) and (b) represent the eastward currents, while they represent the northward currents in (c), (d) and (e).

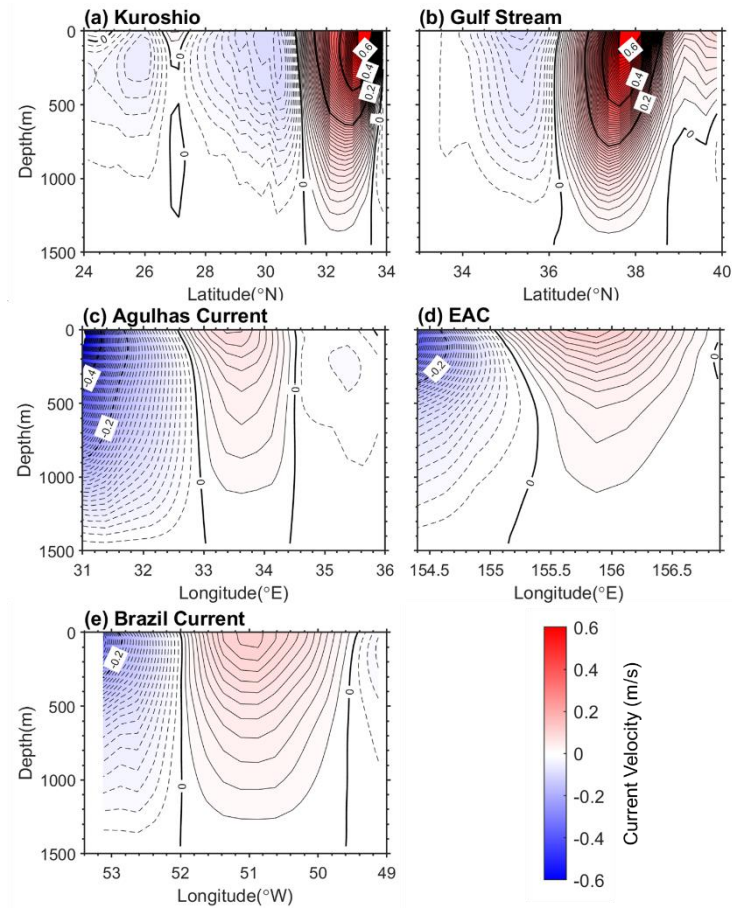


Figure S5. Climatological (2005-2021) geographic velocity sections in WBC sections from the GLORYS product. The contour interval is 0.01 m/s of the Kuroshio (a) at 137°E, the Gulf Stream (b) at 68.5°W, the Agulhas Current (c) at 31°S, the EAC (d) at 27°S and the Brazil Current (e) at 37°S. The positive values in (a) and (b) represent the eastward currents, while they represent the northward currents in (c), (d) and (e).

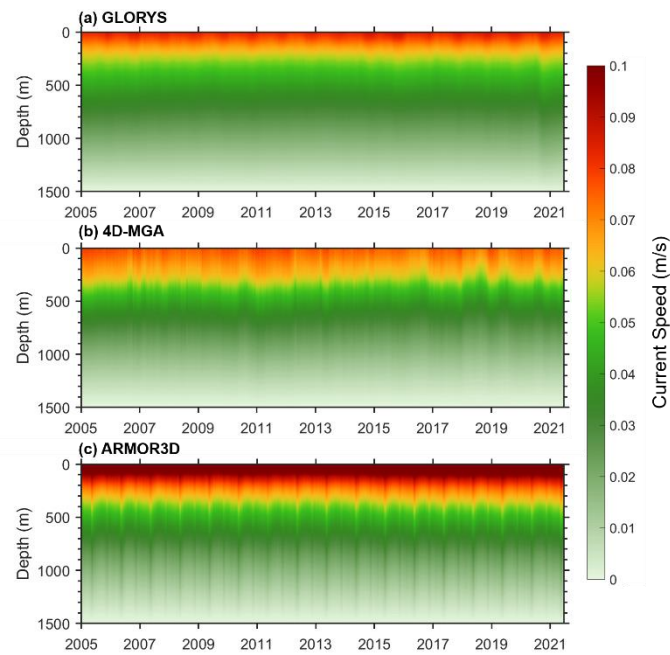


Figure S6. Timeseries of horizontally averaged geostrophic current speed over 2005–2021 for GLORYS (a), 4D-MGA (b) and ARMOR3D (c).