

Llc4320 was considered to be too energetic at submesoscale but appears to be much weaker than reality seen by SWOT.

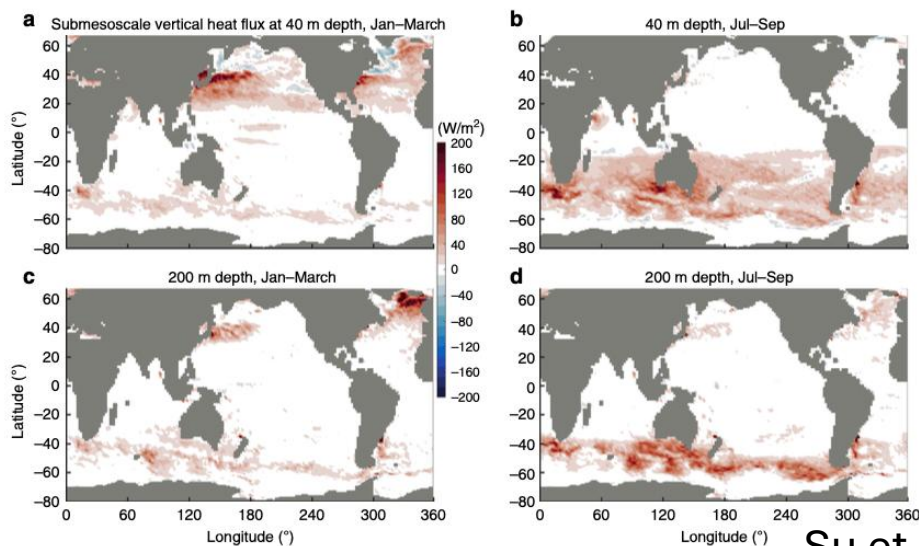
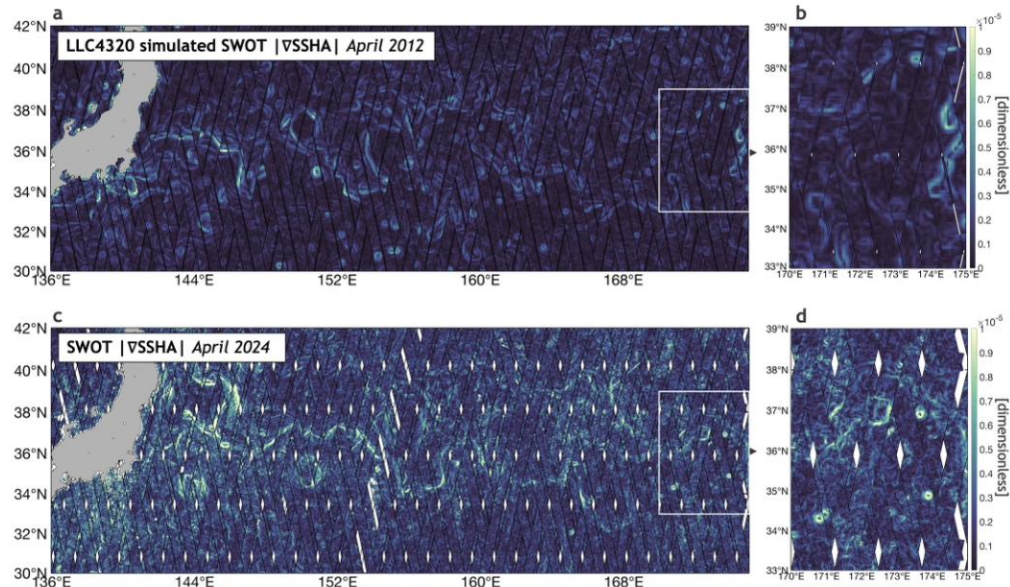


Fig. 3 Global patterns of submesoscale vertical heat transport. Values are spatially smoothed over $3^\circ \times 3^\circ$ square boxes; positive values indicate upward. The heat flux is calculated at 40 m depth (**a, b**) and 200 m depth (**c, d**) during the winter or summer seasons: **a, c** Jan-March mean and **b, d** Jul-Sep mean. In most area of mid-latitudes, vertical heat transport at submesoscales is $\sim 20\text{--}100\text{ W/m}^2$ and is systematically upwards

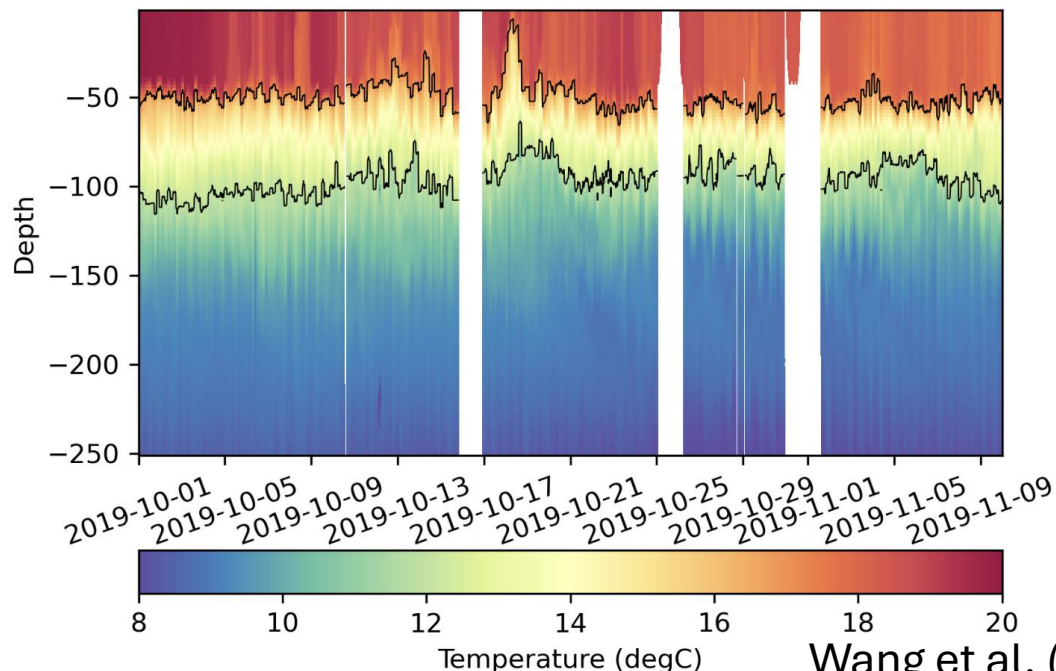
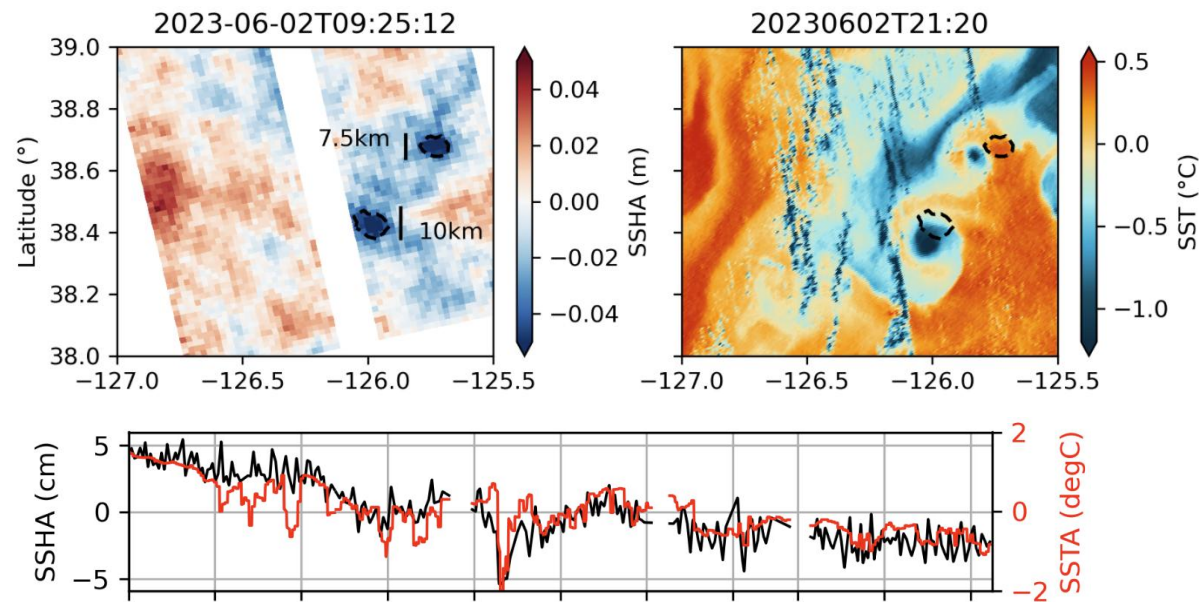
Su et al. 2018



Extended Data Fig. 3 | SWOT observes much stronger SSHA gradients than models predict in the Kuroshio Extension. **a**, One cycle of simulated SWOT SSHA gradient magnitude from the $1/48^\circ$ global LLC4320 model, high-pass-filtered with a 50-km two-dimensional Gaussian kernel, during April 2012.

b, Zoom-in to a smaller region. **c**, Cycle 13 of SWOT SSHA gradient magnitude, high-pass-filtered with a 50-km two-dimensional Gaussian kernel. **d**, Zoom-in to the same region as **b**.

Archer et al. 2025



Wang et al. (in prep)