#24 # Comprehensive study on sub-mesoscale phenomena in the East Asian marginal seas, western North Pacific, and Arctic Ocean

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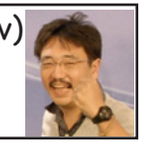
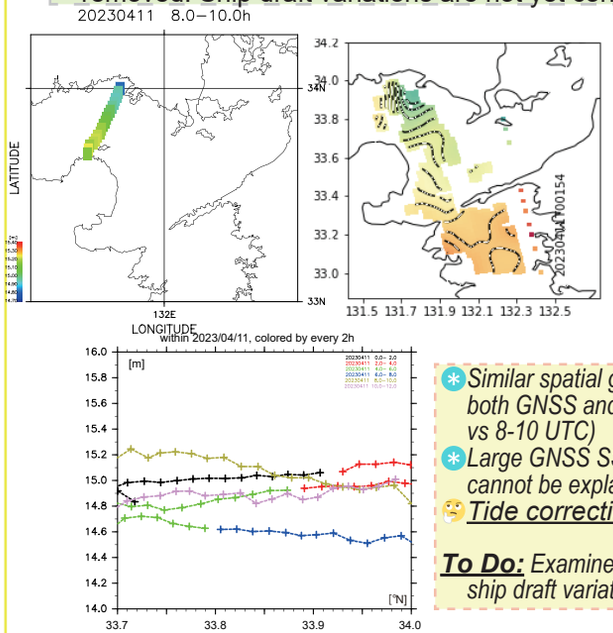


1. vs GNSS on a ferryboat north of Bungo Chan.

SWOT: L3 v0.3 SSDT (geoid, tide removed), 1-day path 006
GNSS: Ferry *New Kunisaki* (725t, 10 cruises per day), 1 Hz sampling with u-blox F9P, processed with Pride PPP AR. Geoid (EGM08) and tides (NAO 99b) removed. Ship draft variations are not yet corrected



- *Similar spatial gradient (lower SSDT in the north) in both GNSS and SWOT, but at different time (0 UTC vs 8-10 UTC)*
- *Large GNSS SSDT variations within a day, which cannot be explained by ship draft changes only*
- *Tide corrections are incomplete?*

To Do: *Examine different tide models, and remove ship draft variations by the GNSS-R method*

2. vs tide gauge in Japan Sea

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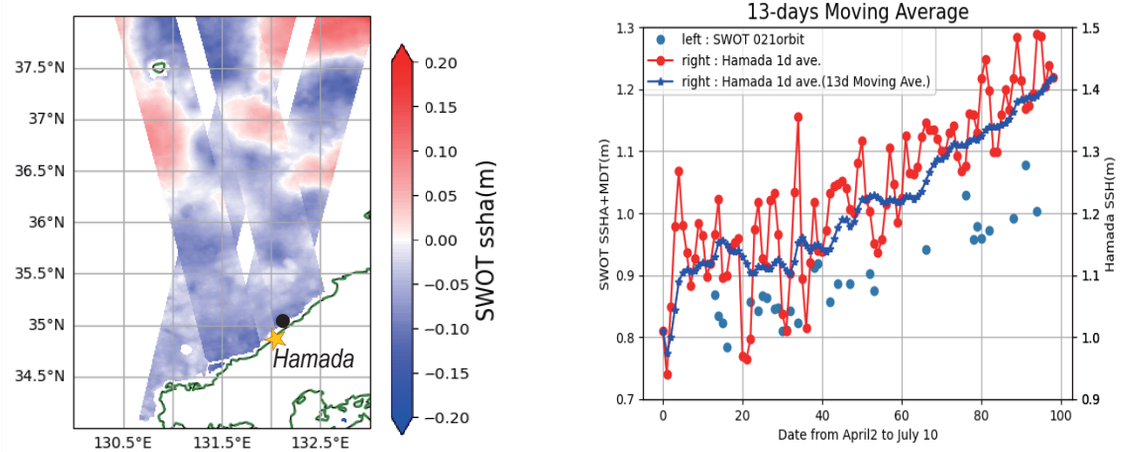
SWOT: L3 v1.0 SSHA (geoid, tide removed), 1-day paths
Tide Gauge (TG): Hourly data at Hamada station (34.897°N, 132.066°E) tide removed by 1-d avg. and 13-d avg.



- *Similar long-term trend (seasonal?), both TG and SWOT, although the TG trend is slightly steeper*
- *Snapshot obs (bot SWOT and TG) includes high-freq. variations, which are larger in TG data*

To Do: *Comparison with tide-included data. Signals (both seasonal and coastal-trapped) could be enlarged in a shallow port w.r.t. offshore areas.*

3. vs HF radar and numerical model in Bungo Chan.

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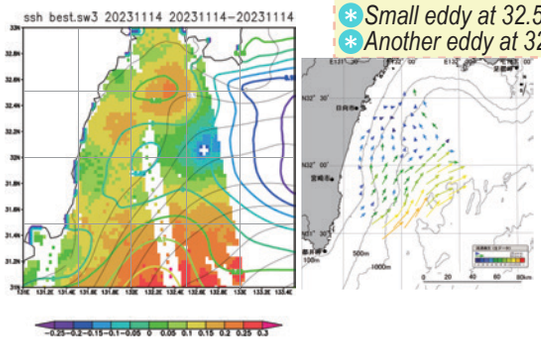
SWOT: L3 v0.3 SSHA (geoid, tide removed), 21-day paths, 2023/11/14
Model: SSHA (color contour) & SSDT (think black line) from JCOPE-T assimilation model (no SWOT data assimilated)
HF radar: surface currents by 13.5MHz phased array ANTs operated by Miyazaki Pref., tide removed



- *Small eddy at 32.5°N is resolved in the model.*
- *Another eddy at 32°N is displaced westward in the model*
- *HF radar shows eastward meander of the Kuroshio along 32°N, suggesting presence of negative SSHA north of 32°N*
- *Similar small eddies were recognized by buoys in May 2023.*

To Do: *JAMSTEC will deploy 120 small buoys in June-Feb 2024 in the western North Pacific area*

4. vs drifters in Arctic Ocean

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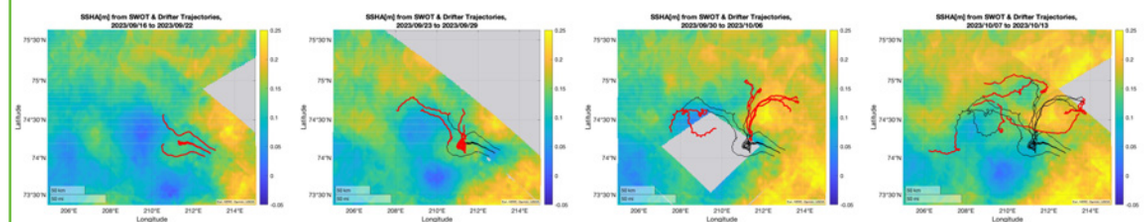
SWOT: L3 v1.0 SSDT (geoid, tide removed), 21-day paths, 1/60° grid interpolated and 7-day averaged
Drifters: trajectories of 7 small drifters (red lines show the given 7-day period)



- *Curves of drifter trajectories qualitatively agree with SWOT eddies*
- *But SWOT data were systematically missing in some periods (e.g. 2023/9/22-9/27)*
- *Operational faults? Natural causes?*

To Do: *Tokyo Univ. will deploy drifters in Arctic Beaufort Sea or Canadan Basin (74°N ,150°W) in 2024/9, and Antarctic Totten Glacier (66°S 118°E) in 2025/2 for investigations of the heat transport by dispersion and turbulence.*
Time series of eddy activities will be obtained from SWOT data, through quantitative comparisons with drifters