

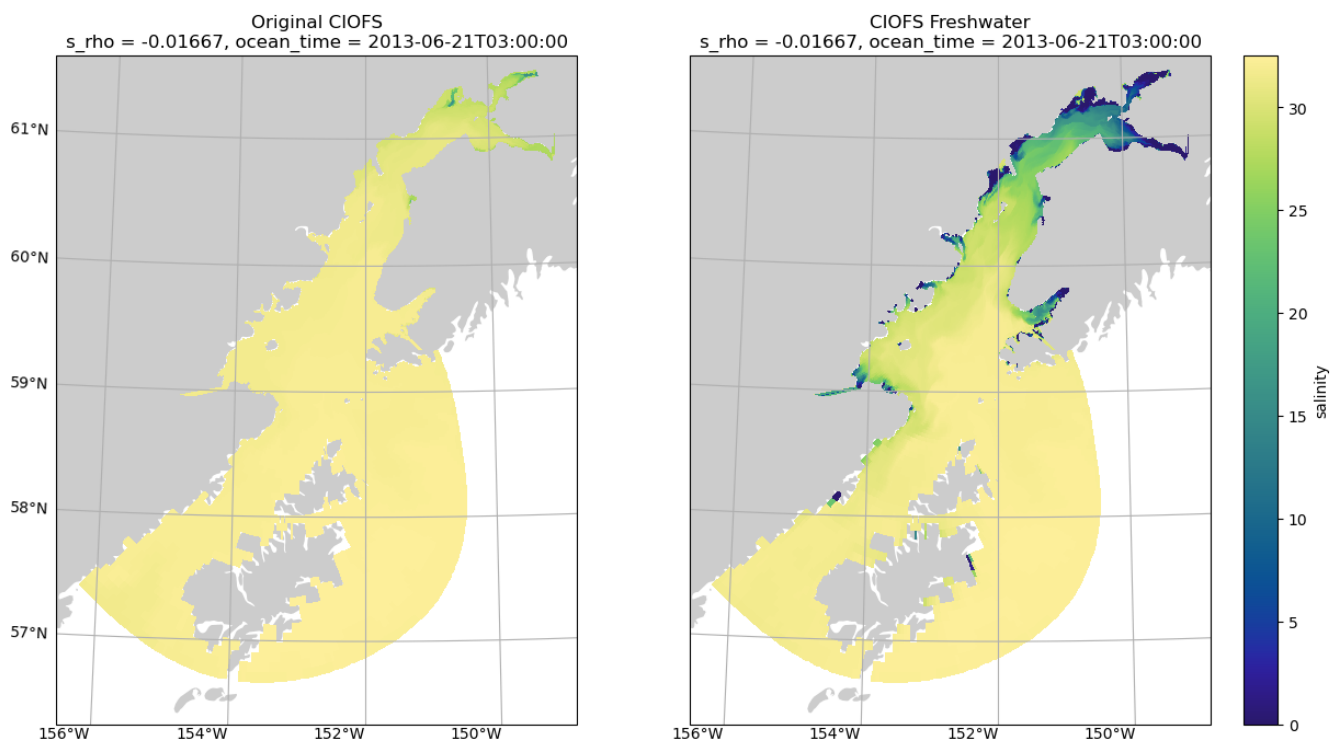
Cook Inlet Circulation Modeling - Freshwater Forcing Experiment and Lagrangian Analysis

Contents

HF Radar Model Comparisons

- Overview HF Radar Data
- HF Radar (UAF)

Final Report to the National Oceanic Atmospheric Administration National Centers for Coastal Ocean Science Kasitsna Bay Lab



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October 11, 2024

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Kasitsna Bay Lab, Axiom Data Science, Anchorage, AK.

Online report: <https://ciofs-fresh.axds.co/>

PDFs of parts of report:

- [Main content](#)
- [Model-data comparison: moorings](#)
- [Model-data comparison: CTD transects](#)
- [Model-data comparison: CTD profiles](#)
- [Model-data comparison: HF Radar](#)
- [Model-data comparison: ADCP](#)
- [Model-data comparison: drifters](#)

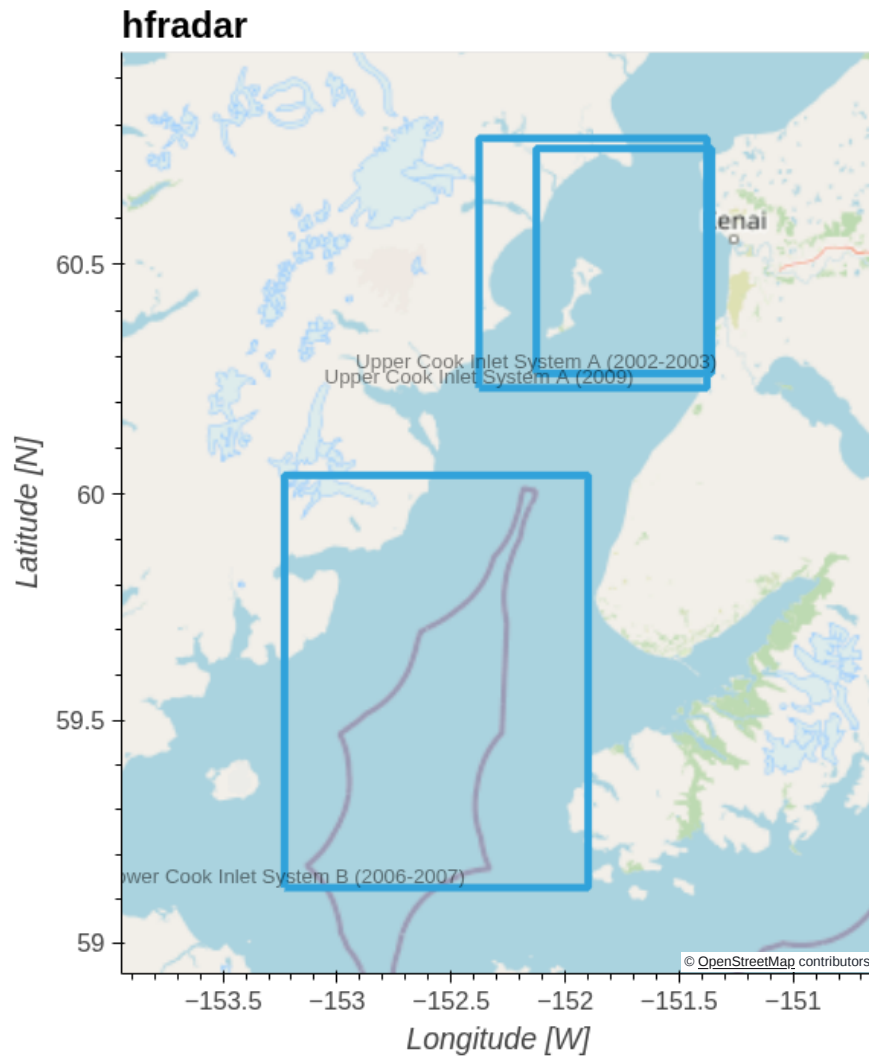
Overview HF Radar Data

Detailed model-data comparison page: [HF Radar model-data comparison page](#)

See the original full dataset description page in the [original report](#) for more information or the new [catalog page](#).

Note that the map shows all datasets from the catalog; it is not limited to the current report time periods.

[8MB zipfile of plots](#)



Taylor Diagrams

Taylor diagrams summarize the skill of the two models in capturing the HF Radar datasets. The data has been grouped by region (Figs. 1 and 2). Correlations are higher for the northward tidal component of velocity, which is most along-channel oriented for the HF Radar areas, than for the eastward component, and CIOFS Hindcast and Fresh perform similarly. The subtidal components are poorly captured by both models: low correlations for the eastward component and even lower and negative (not shown on plot) for the northward component. Skill scores are shown in the next plots for each dataset.

HFRadar by Region

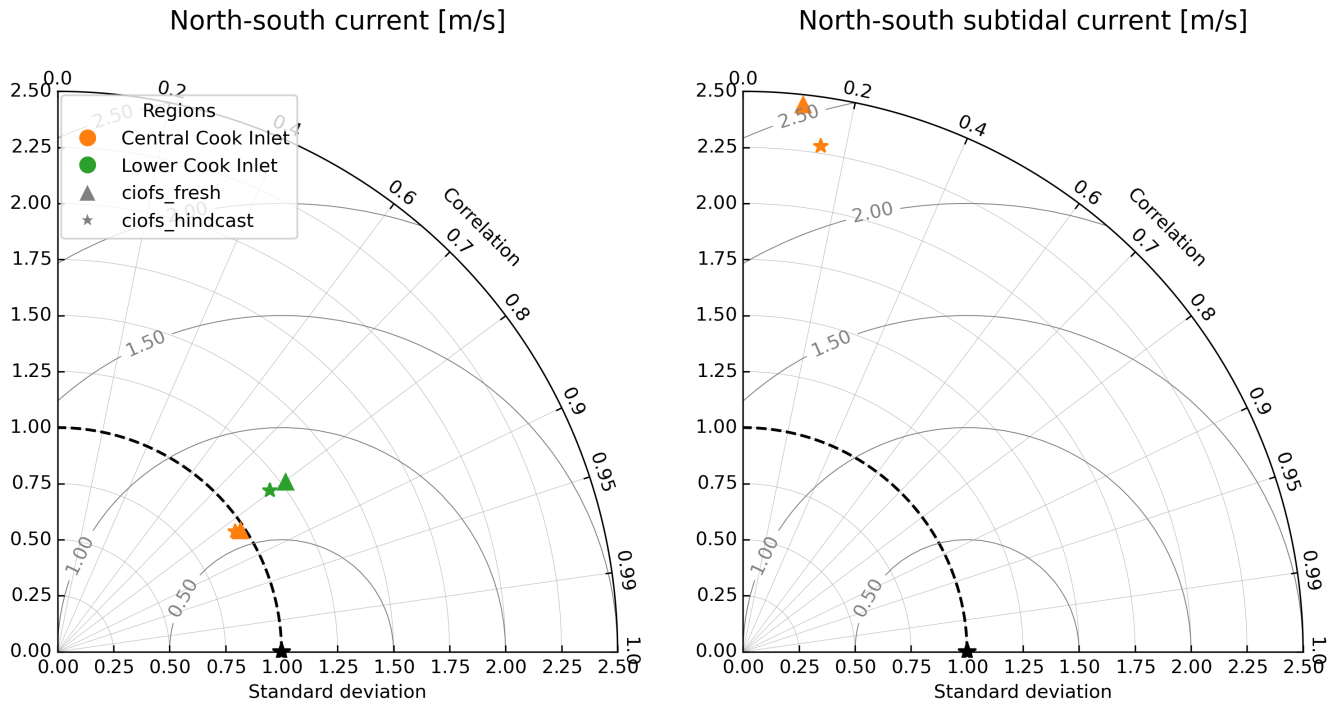


Fig. 1 Taylor Diagram summarizing skill of CIOFS Hindcast (stars) and CIOFS Fresh (triangles) for north-south velocity component for the full tidal signal (left) and subtidal signal (right), grouped by region of Cook Inlet, for HF Radar data.

HFRadar by Region

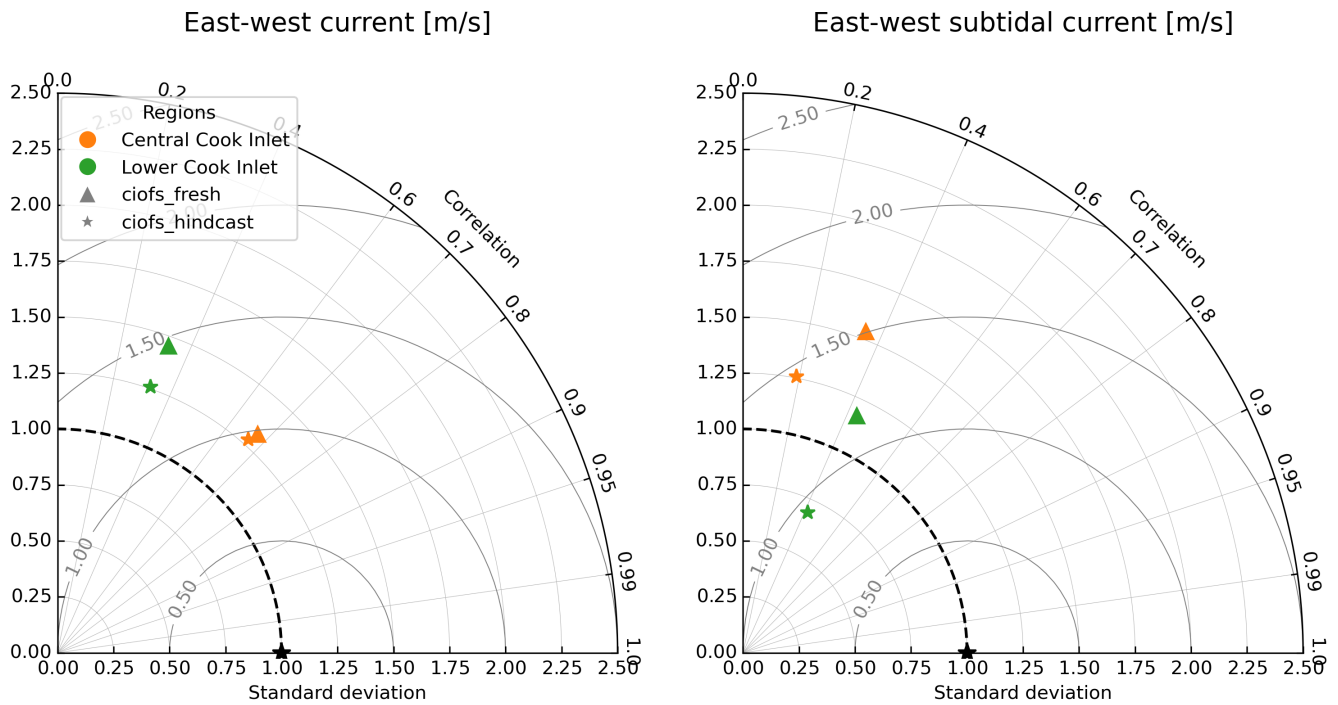


Fig. 2 Taylor Diagram summarizing skill of CIOFS Hindcast (stars) and CIOFS Fresh (triangles) for east-west velocity component for the full tidal signal (left) and subtidal signal (right), grouped by region of Cook Inlet, for HF Radar data.

CIOFS_HINDCAST

lower-ci_system-B_2006

Tidal

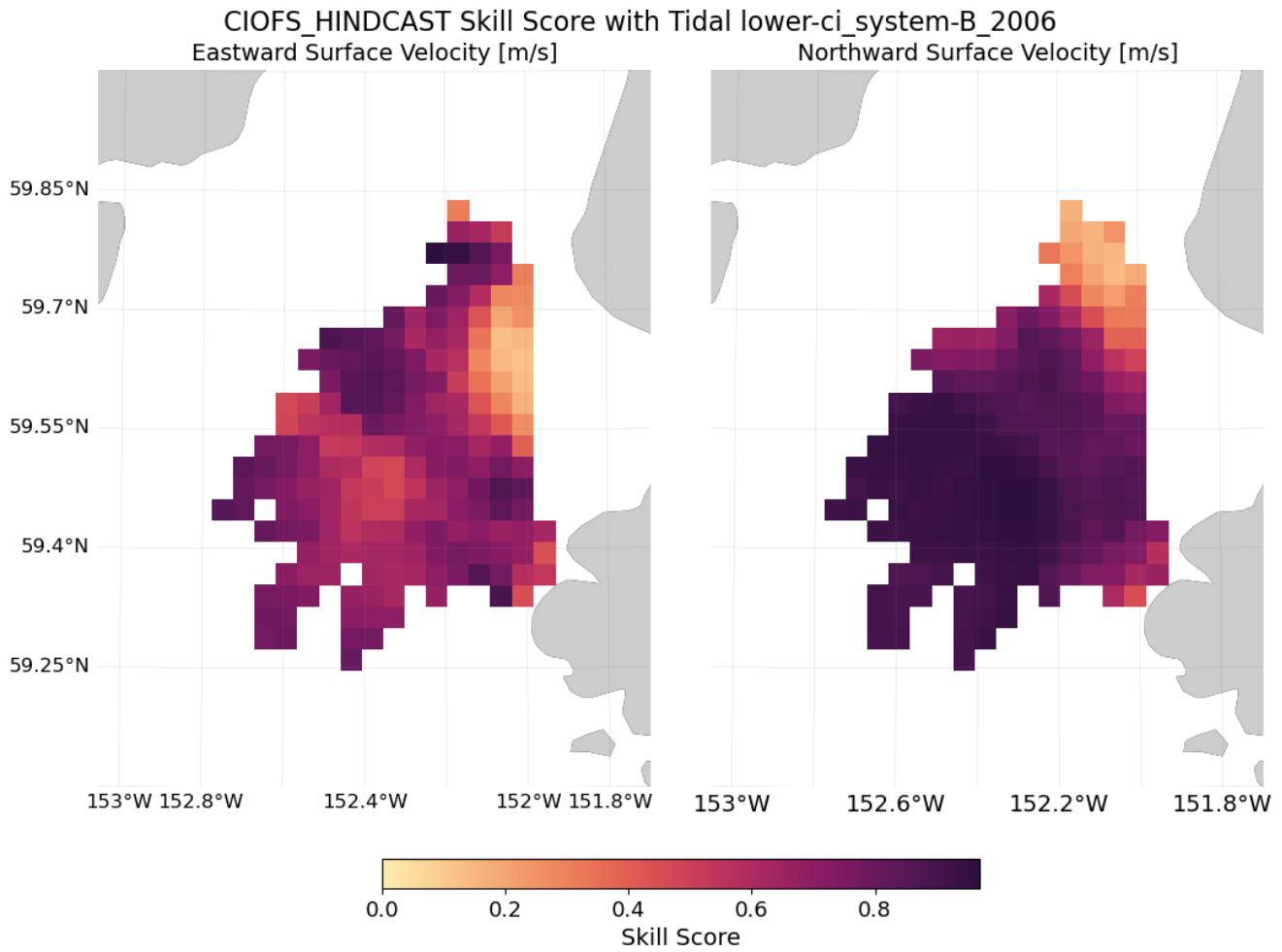


Fig. 3 Tidal surface currents skill score for CIOFS_HINDCAST and dataset lower-ci_system-B_2006

Subtidal

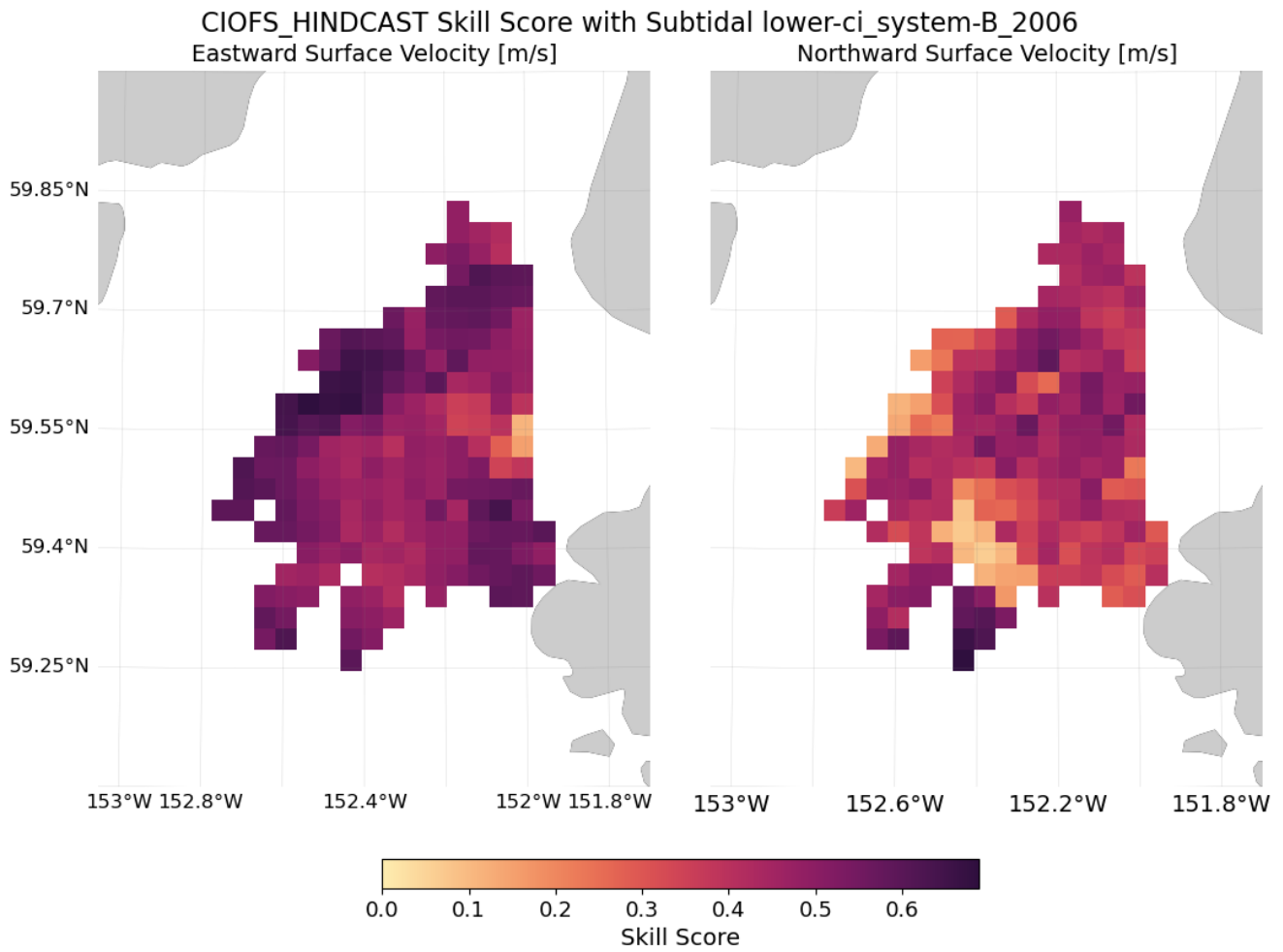


Fig. 4 Subtidal surface currents skill score for CIOFS_HINDCAST and dataset lower-ci_system-B_2006

upper-ci_system-A_2003

Tidal

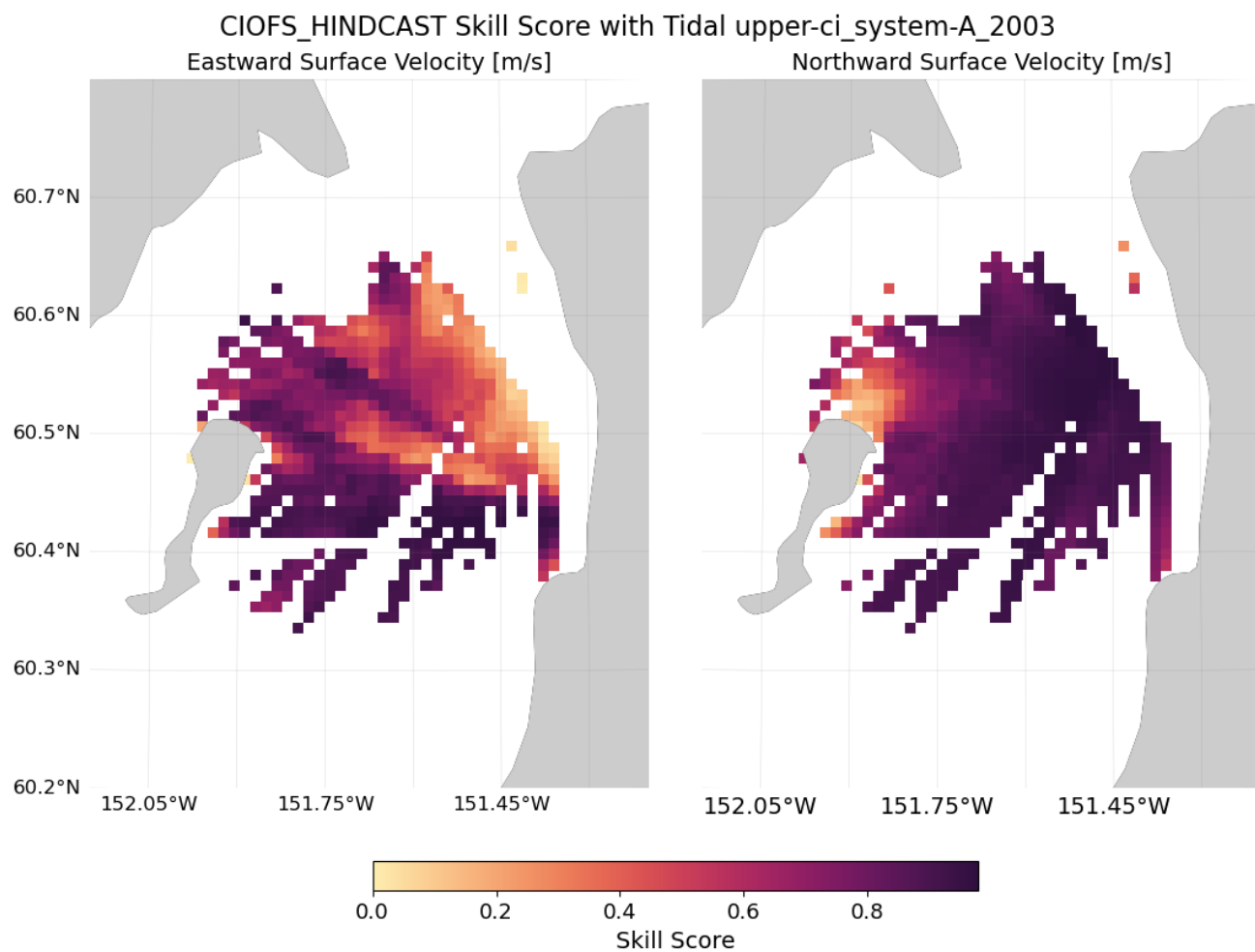


Fig. 5 Tidal surface currents skill score for CIOFS_HINDCAST and dataset upper-ci_system-A_2003

Subtidal

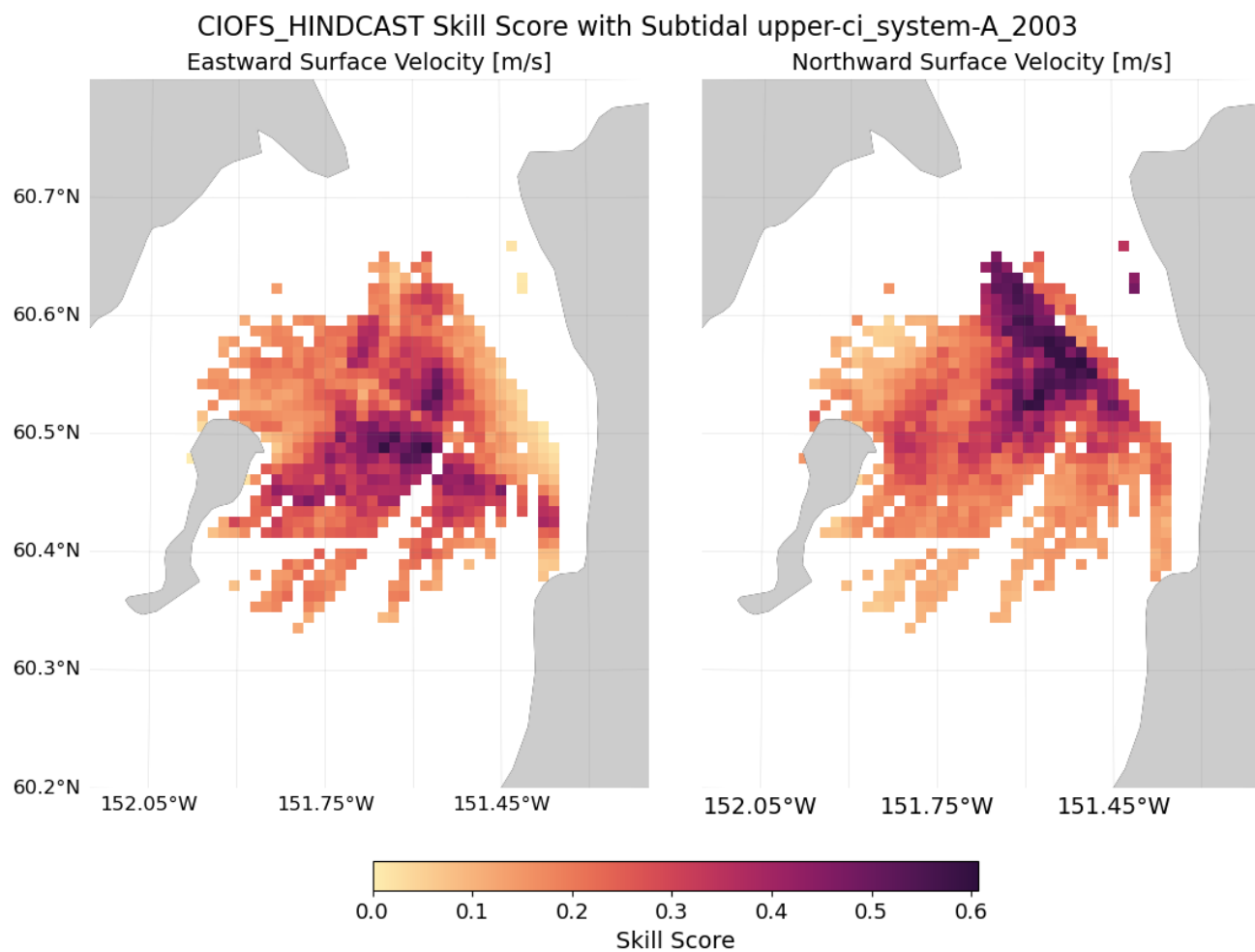


Fig. 6 Subtidal surface currents skill score for CIOFS_HINDCAST and dataset upper-ci_system-A_2003

CIOFS_FRESH

lower-ci_system-B_2006

Tidal

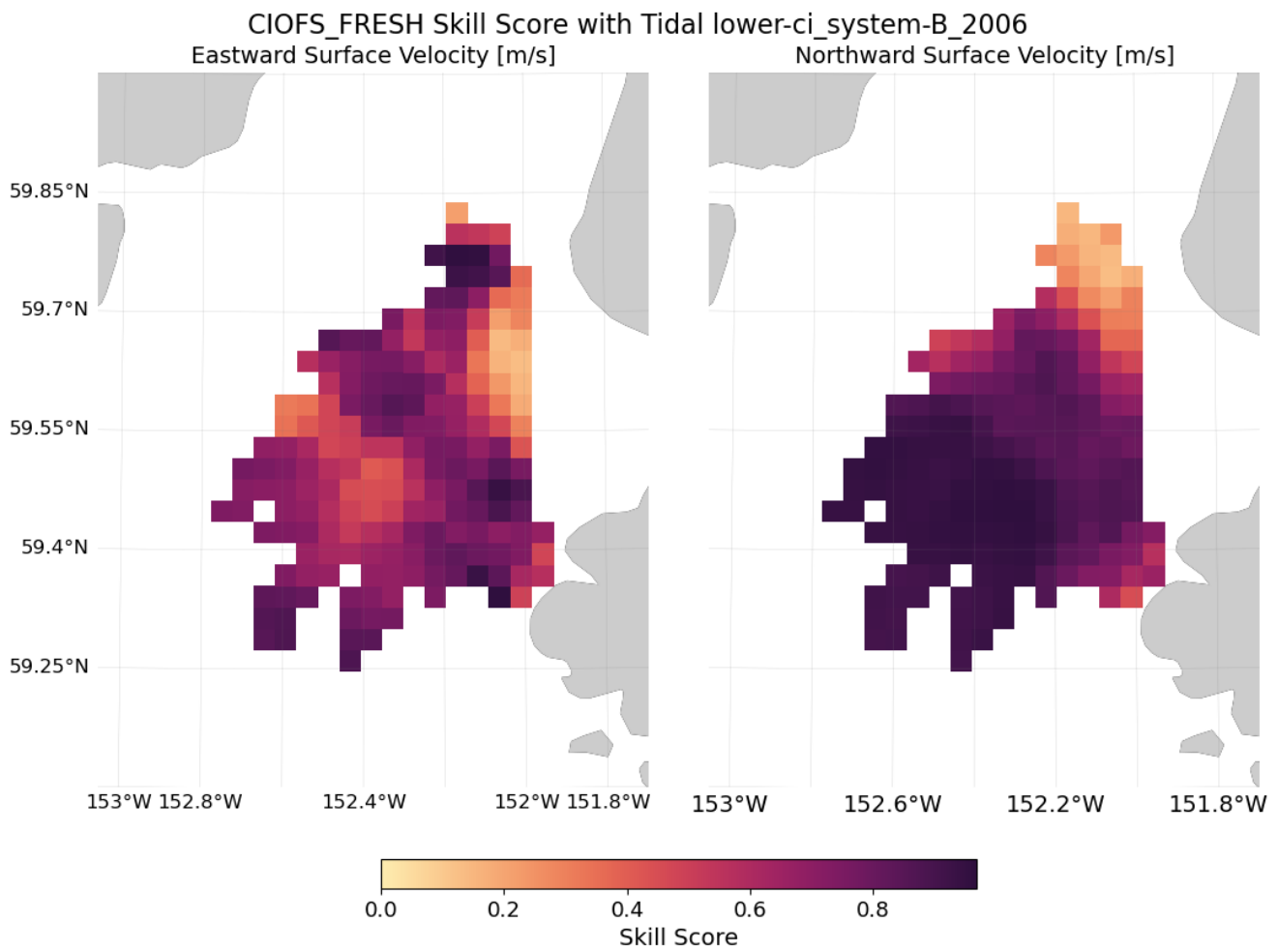


Fig. 7 Tidal surface currents skill score for CIOFS_FRESH and dataset lower-ci_system-B_2006

Subtidal

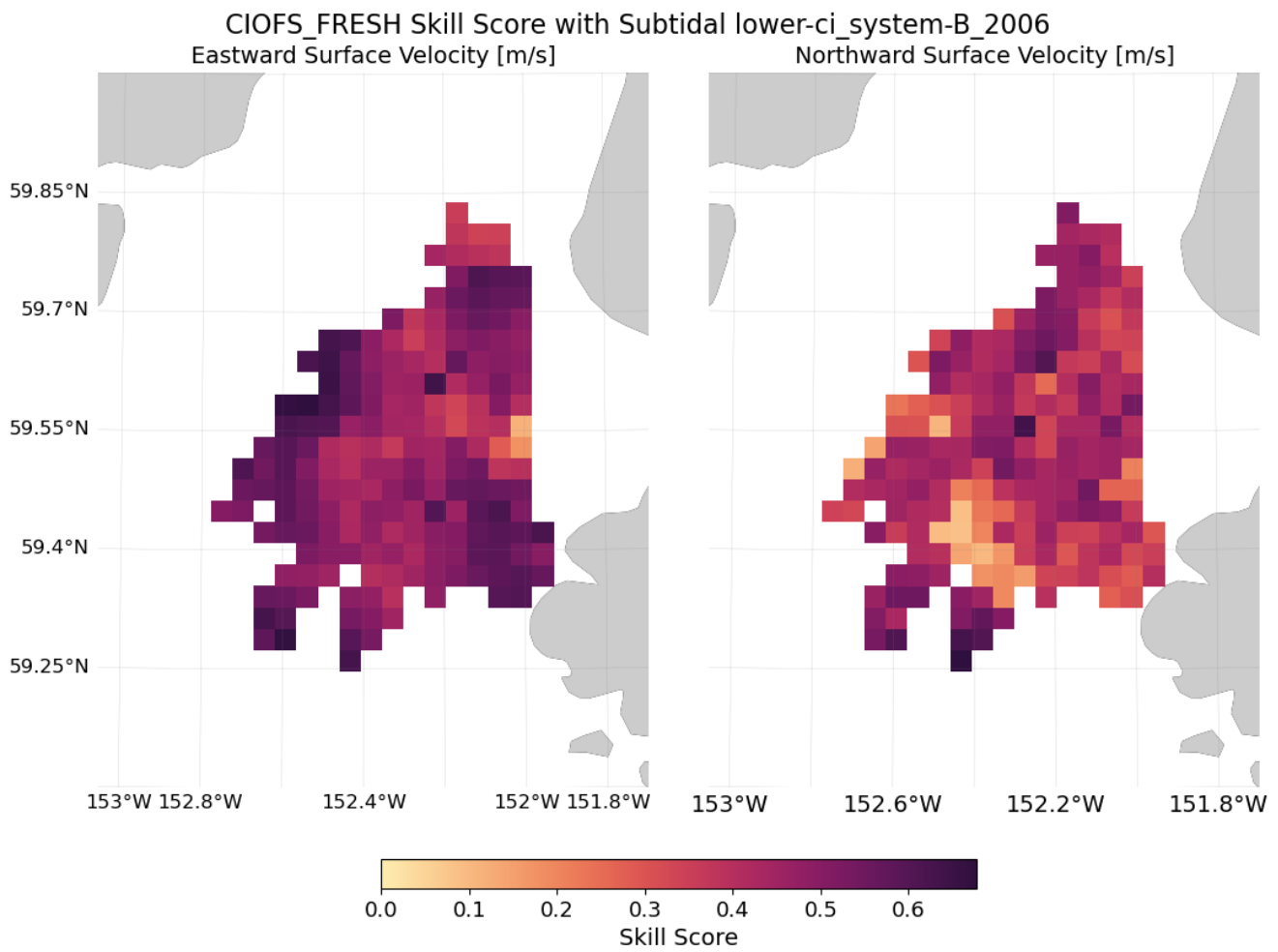


Fig. 8 Subtidal surface currents skill score for CIOFS_FRESH and dataset lower-ci_system-B_2006

upper-ci_system-A_2003

Tidal

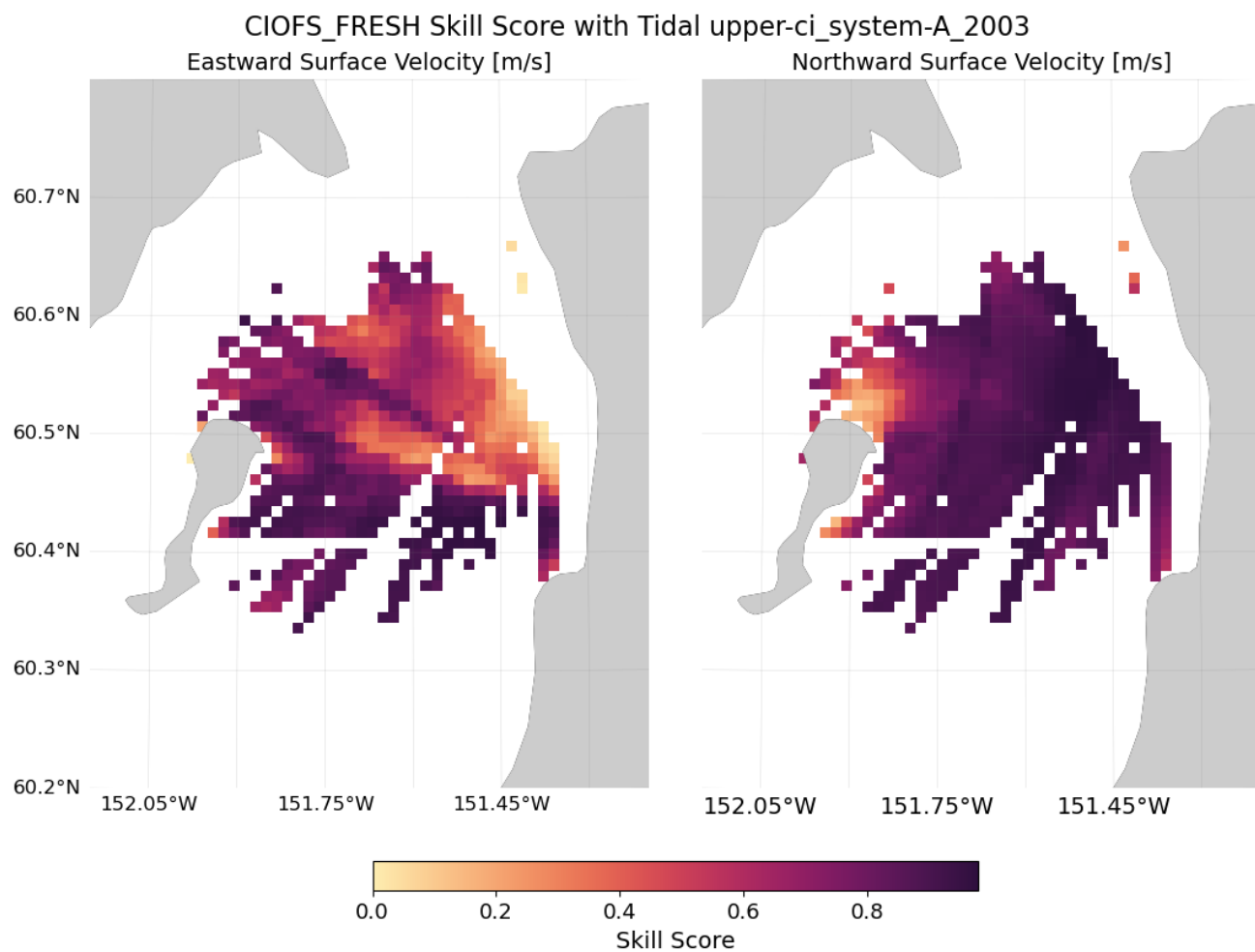


Fig. 9 Tidal surface currents skill score for CIOFS_FRESH and dataset upper-ci_system-A_2003

Subtidal

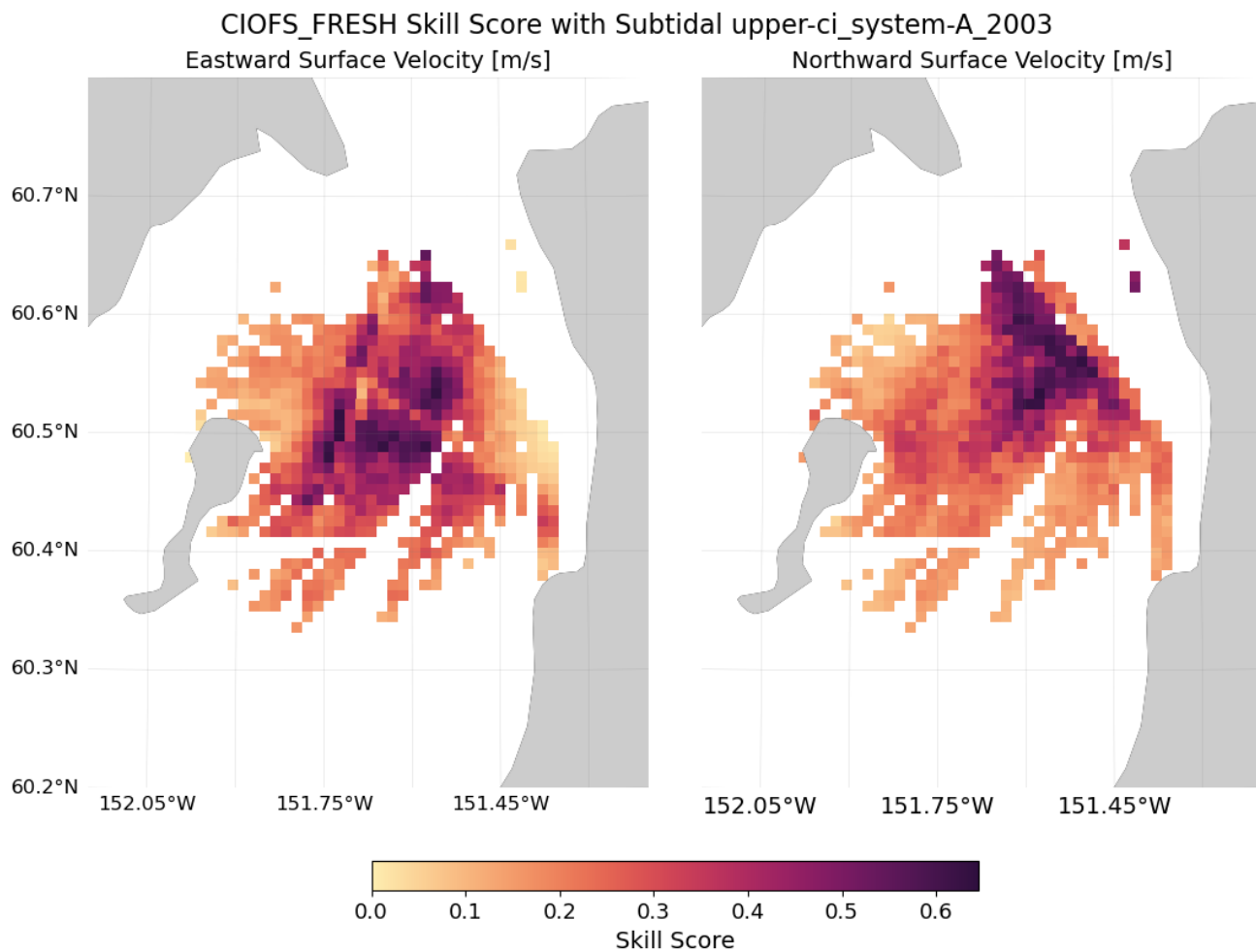


Fig. 10 Subtidal surface currents skill score for CIOFS_FRESH and dataset upper-ci_system-A_2003

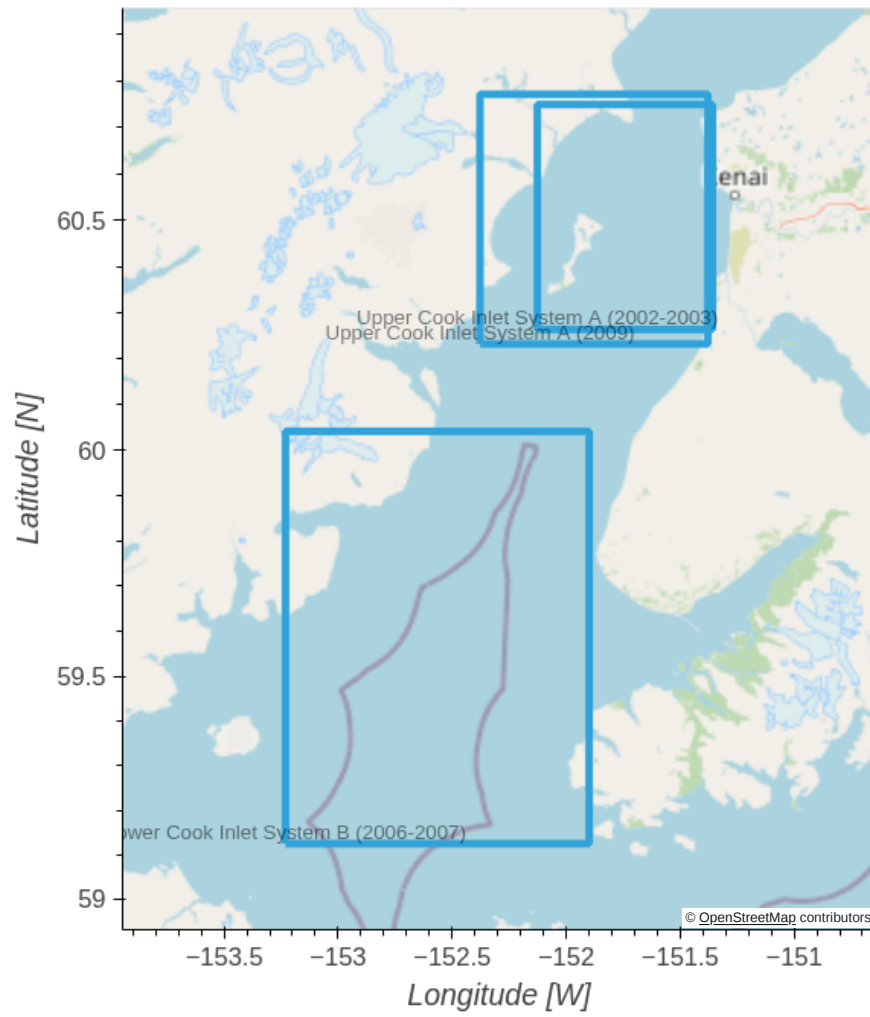
HF Radar (UAF)

- hfradar

See the full dataset page for more information: [page:hfradar](#)

Note that the map shows all datasets from the catalog; it is not limited to the current report time periods.

hfradar



lower-ci_system-B_2006

M2 Tidal Ellipses

CIOFS_HINDCAST

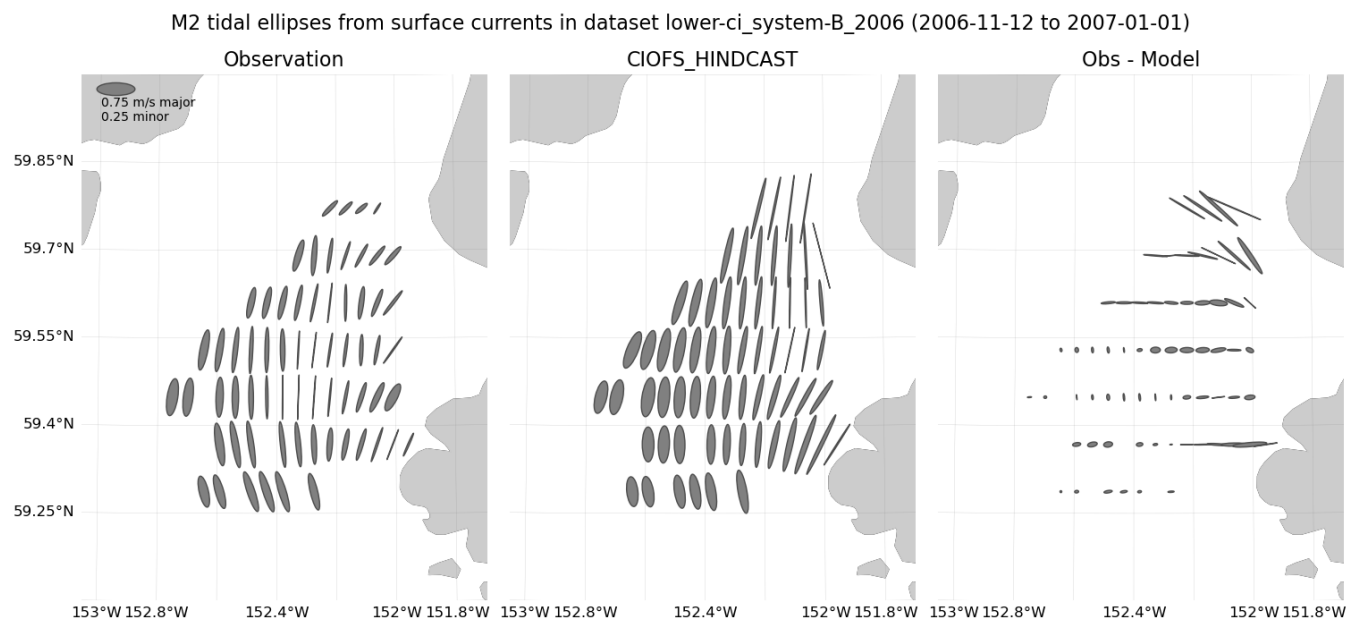


Fig. 11 M2 tidal ellipses from surface currents for CIOFS_HINDCAST and dataset lower-ci_system-B_2006

CIOFS_FRESH

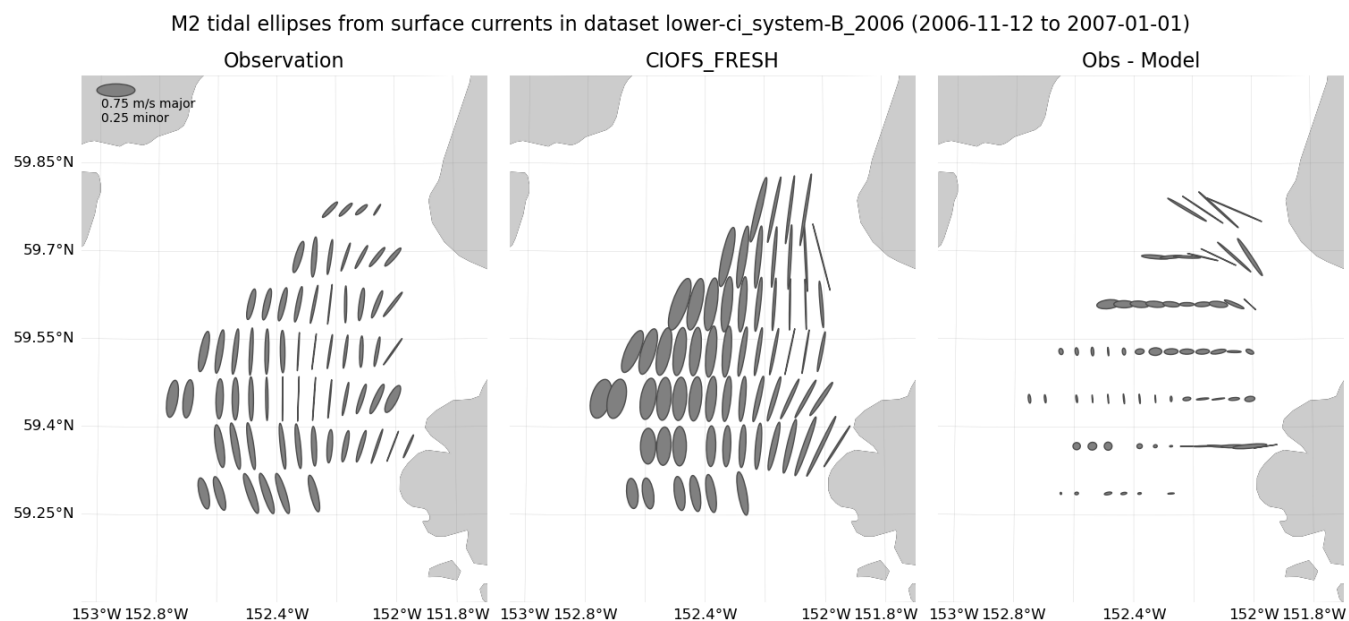


Fig. 12 M2 tidal ellipses from surface currents for CIOFS_FRESH and dataset lower-ci_system-B_2006

K1 Tidal Ellipses

CIOFS_HINDCAST

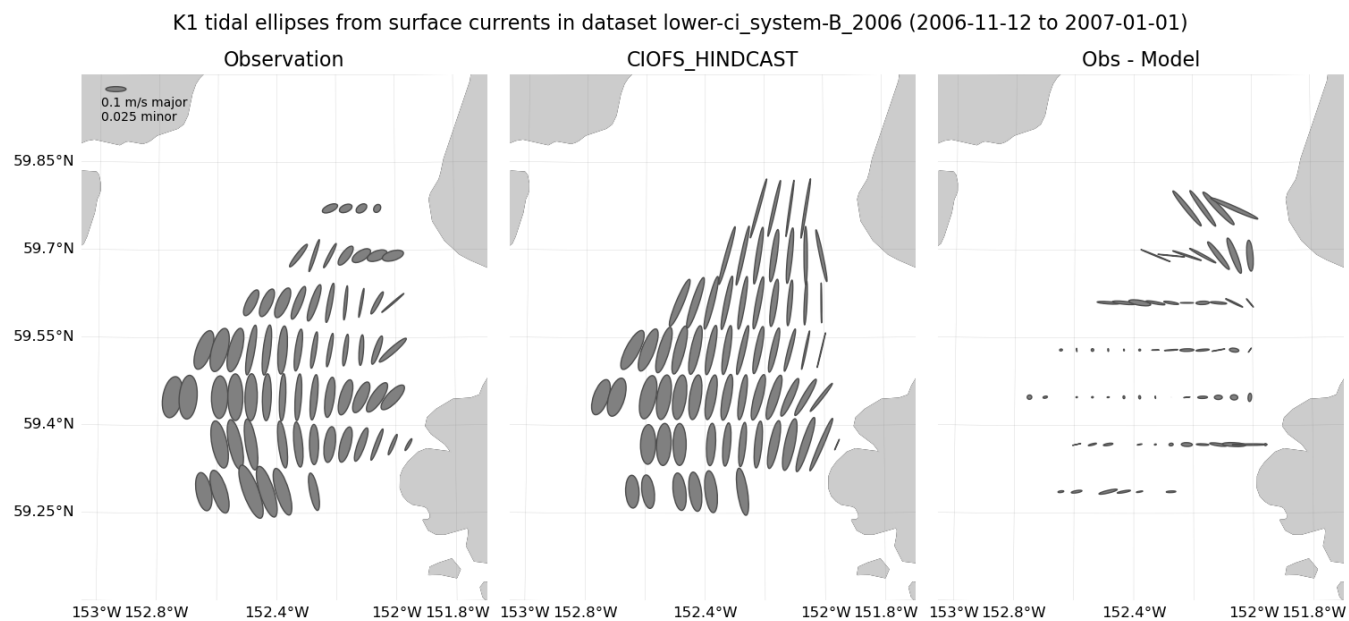


Fig. 13 K1 tidal ellipses from surface currents for CIOFS_HINDCAST and dataset lower-ci_system-B_2006

CIOFS_FRESH

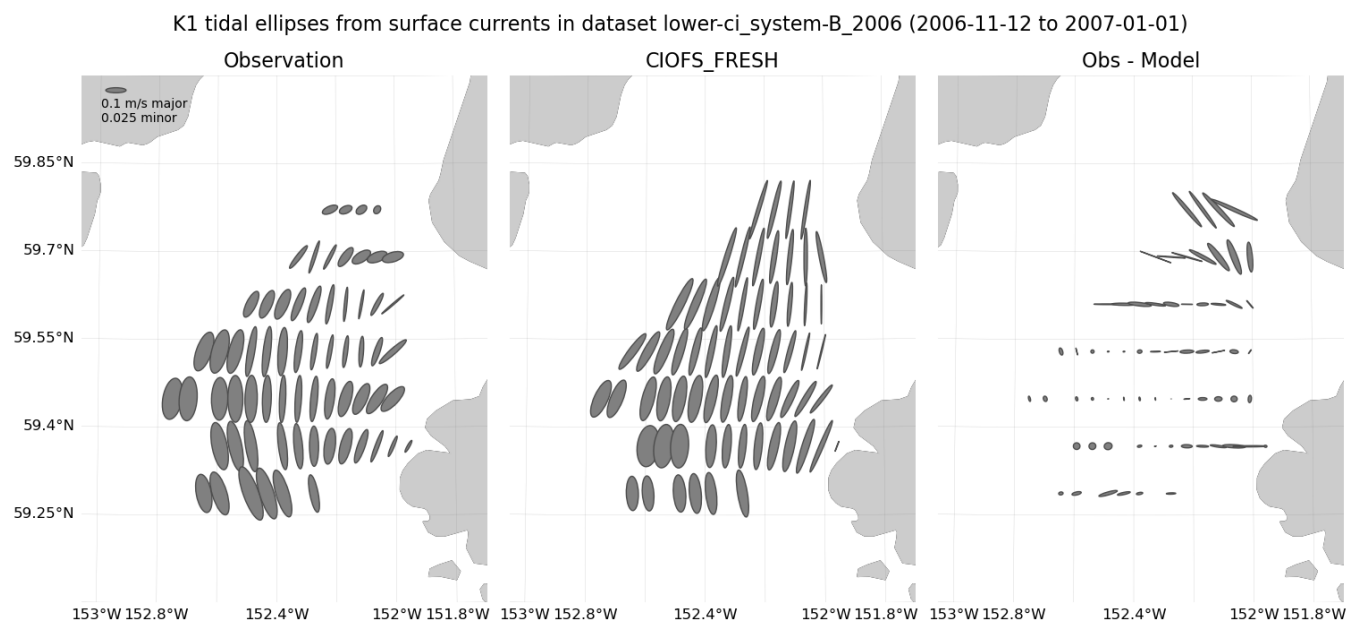


Fig. 14 K1 tidal ellipses from surface currents for CIOFS_FRESH and dataset lower-ci_system-B_2006

upper-ci_system-A_2003

M2 Tidal Ellipses

CIOFS_HINDCAST

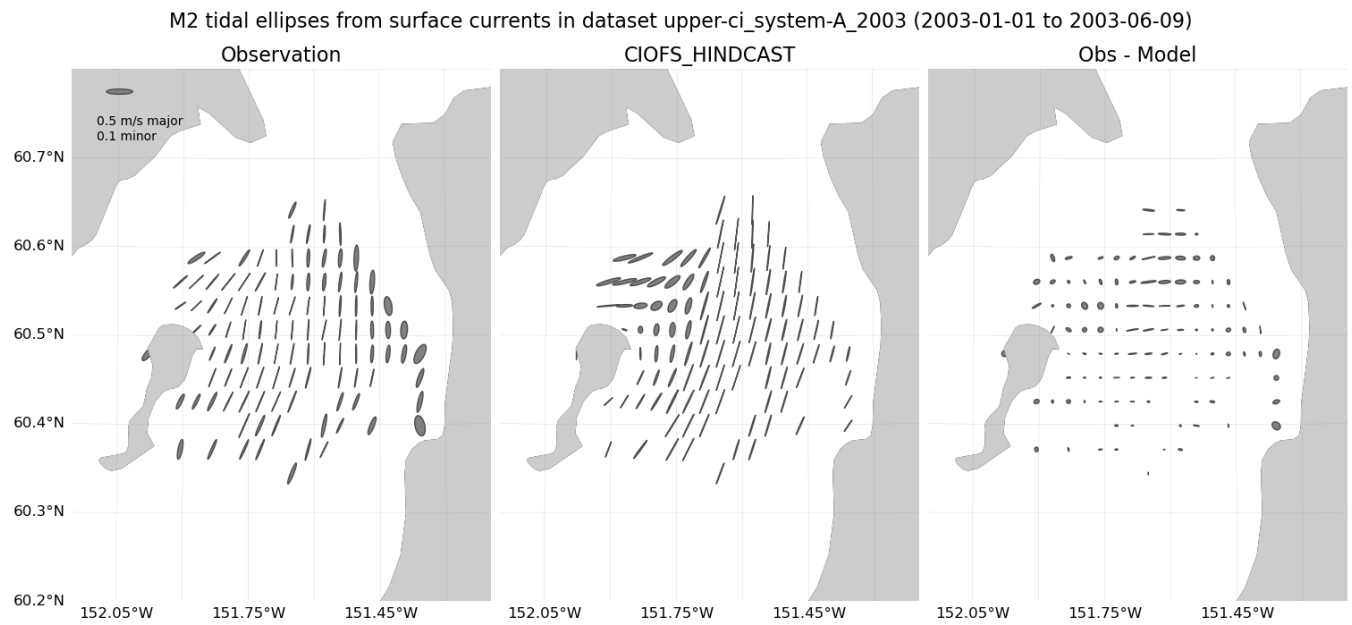


Fig. 15 M2 tidal ellipses from surface currents for CIOFS_HINDCAST and dataset upper-ci_system-A_2003

CIOFS_FRESH

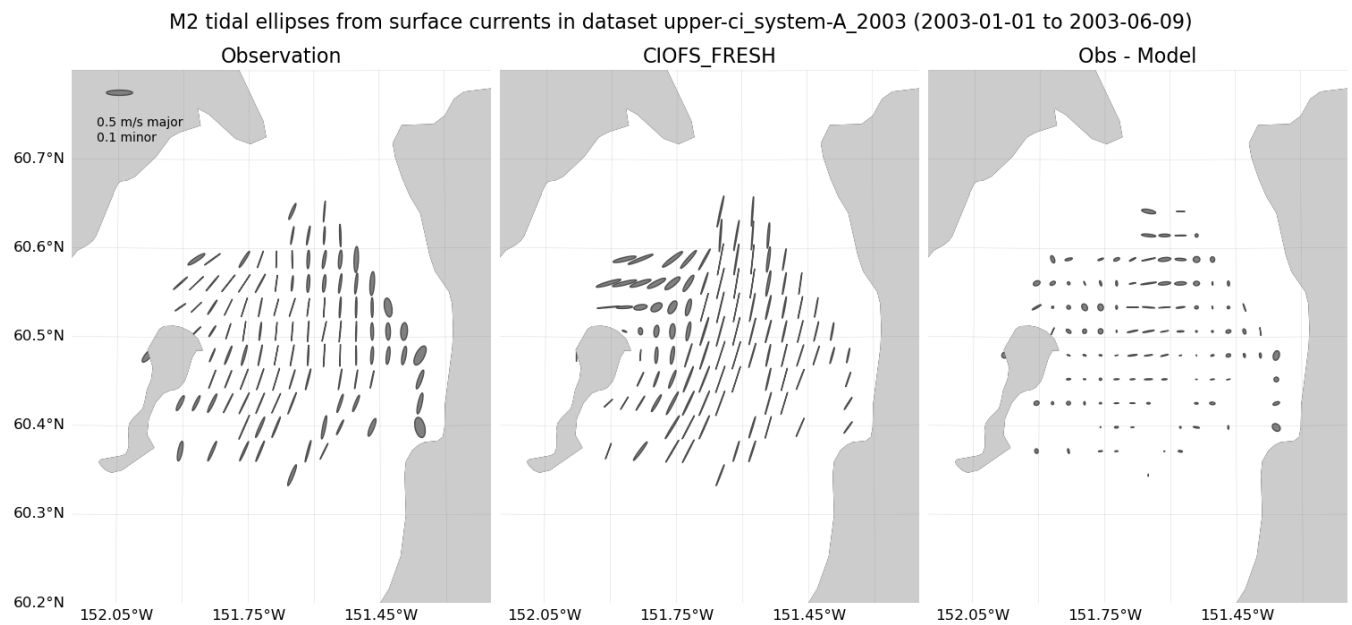


Fig. 16 M2 tidal ellipses from surface currents for CIOFS_FRESH and dataset upper-ci_system-A_2003

K1 Tidal Ellipses

CIOFS_HINDCAST

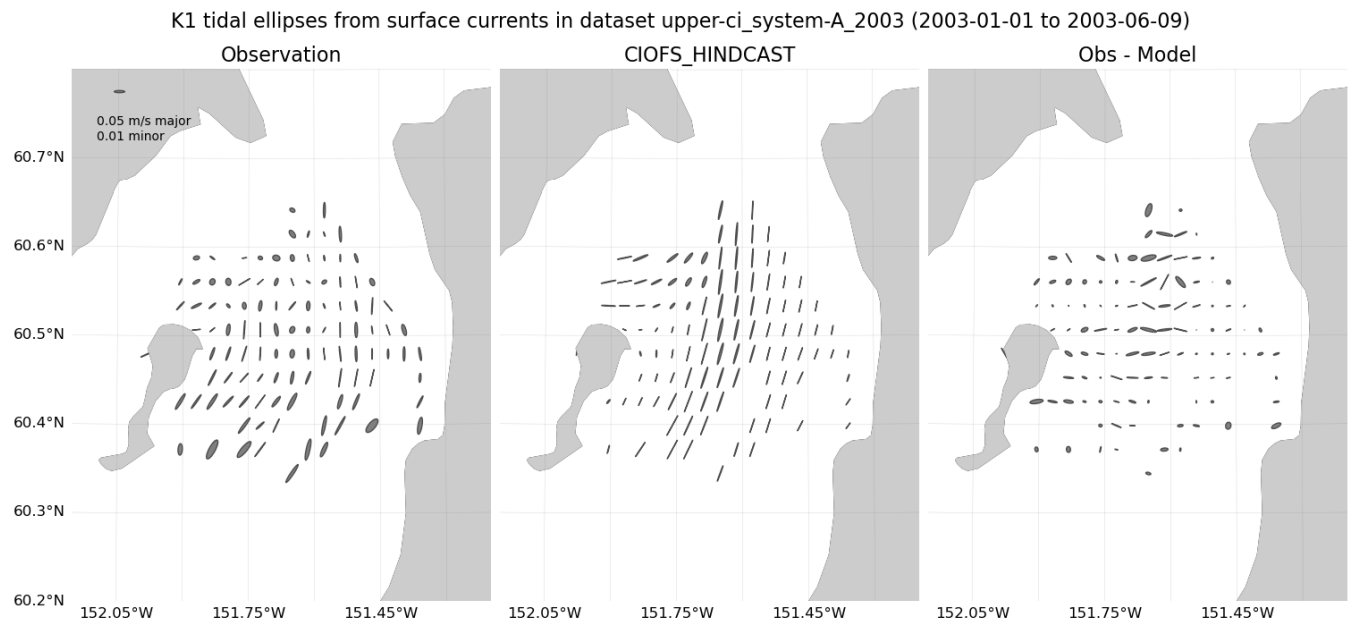


Fig. 17 K1 tidal ellipses from surface currents for CIOFS_HINDCAST and dataset upper-ci_system-A_2003

CIOFS_FRESH

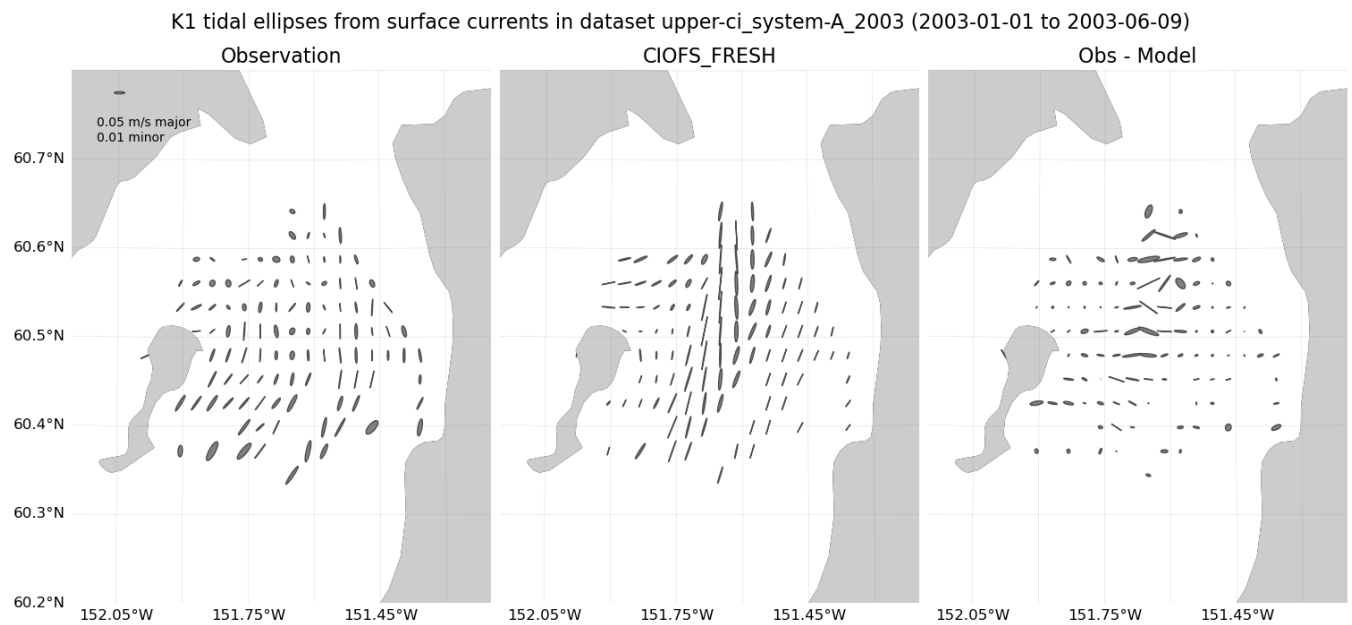


Fig. 18 K1 tidal ellipses from surface currents for CIOFS_FRESH and dataset upper-ci_system-A_2003

lower-ci_system-B_2006-2007

Subtidal Mean

CIOFS_HINDCAST

lower-ci_system-B_2006-2007: east: bias: -0.0 corr: 0.5 ioa: nan mse: 0.0 ss: 0.2 rmse: 0.0 north: bias: -0.1 corr: -0.1 ioa: nan
mse: 0.0 ss: -0.9 rmse: 0.1
depth: -0.0m

Subtidal surface currents averaged 2006-11-12 to 2007-01-01

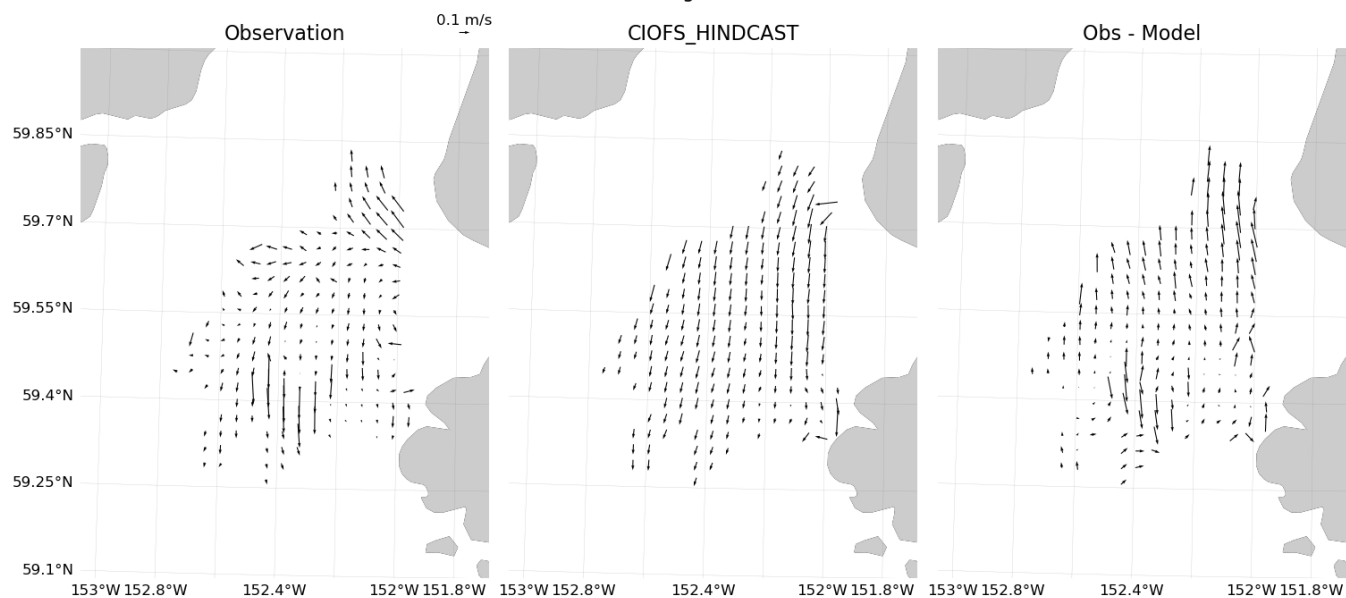


Fig. 19 Subtidal mean from surface currents for CIOFS_HINDCAST and dataset lower-ci_system-B_2006-2007

CIOFS_FRESH

lower-ci_system-B_2006-2007: east: bias: -0.0 corr: 0.5 ioa: nan mse: 0.0 ss: -0.1 rmse: 0.0 north: bias: -0.1 corr: -0.1 ioa: nan
mse: 0.0 ss: -1.9 rmse: 0.1
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Subtidal surface currents averaged 2006-11-12 to 2007-01-01

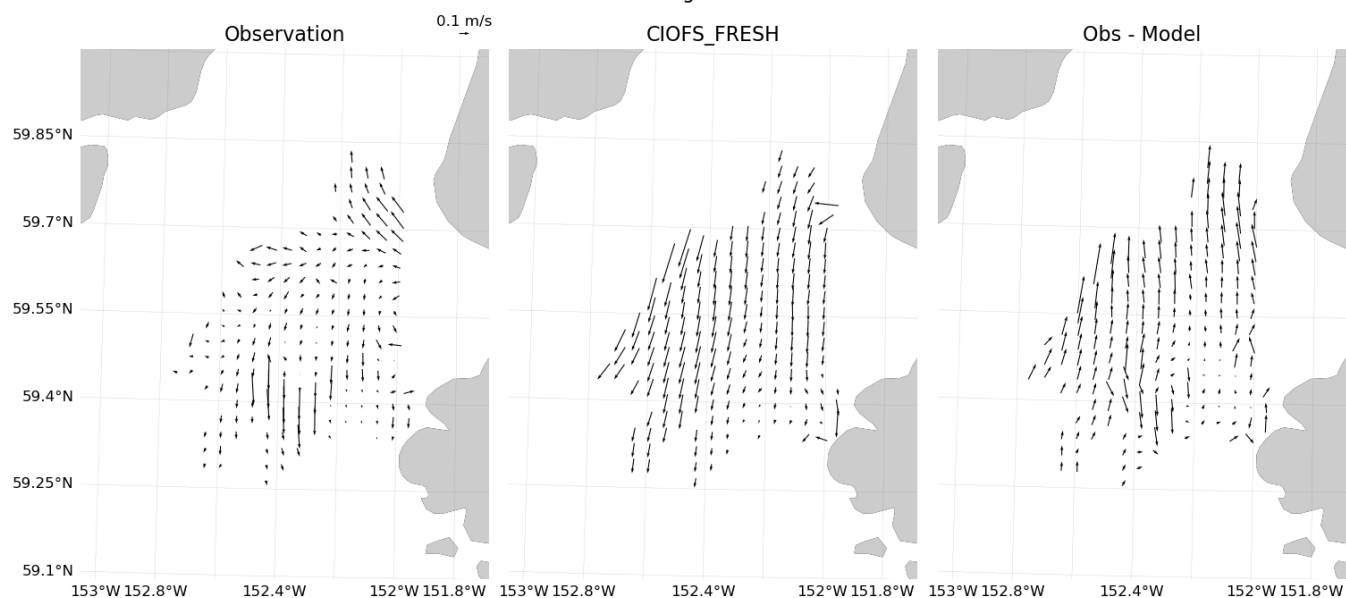
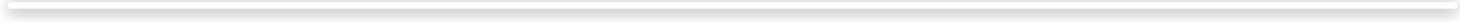


Fig. 20 Subtidal mean from surface currents for CIOFS_FRESH and dataset lower-ci_system-B_2006-2007

Hourly

CIOFS_HINDCAST

0:00



[_images/hfradar_lower-ci_system-B_2006-2007_east_north_2006-11-12_2007-01-01_remove-under-50-percent-data_units-to-meters.mp4](#)

Fig. 21 Hourly from surface currents for CIOFS_HINDCAST and dataset lower-ci_system-B_2006-2007

CIOFS_FRESH

0:00



[_images/hfradar_lower-ci_system-B_2006-2007_east_north_2006-11-12_2007-01-01_remove-under-50-percent-data_units-to-meters1.mp4](#)

Fig. 22 Hourly from surface currents for CIOFS_FRESH and dataset lower-ci_system-B_2006-2007

Subtidal, 6-Hourly

CIOFS_HINDCAST

0:00



[_images/hfradar_lower-ci_system-B_2006-2007_east_north_2006-11-12_2007-01-01_remove-under-50-percent-data_units-to-meters_subtidal_resample-6H.mp4](#)

Fig. 23 Subtidal, 6-hourly from surface currents for CIOFS_HINDCAST and dataset lower-ci_system-B_2006-2007

CIOFS_FRESH

0:00

[images/hfradar_lower-ci_system-B_2006-2007_east_north_2006-11-12_2007-01-01_remove-under-50-percent-data_units-to-meters_subtidal_resample-6H1.mp4](#)

Fig. 24 Subtidal, 6-hourly from surface currents for CIOFS_FRESH and dataset lower-ci_system-B_2006-2007

upper-ci_system-A_2002-2003

Subtidal Mean

CIOFS_HINDCAST

upper-ci_system-A_2002-2003: east: bias: 0.0 corr: 0.2 ioa: nan mse: 0.0 ss: -1.4 rmse: 0.1 north: bias: -0.1 corr: 0.1 ioa: nan
mse: 0.0 ss: -5.8 rmse: 0.2
depth: -0.0m

Subtidal surface currents averaged 2003-01-01 to 2003-06-09

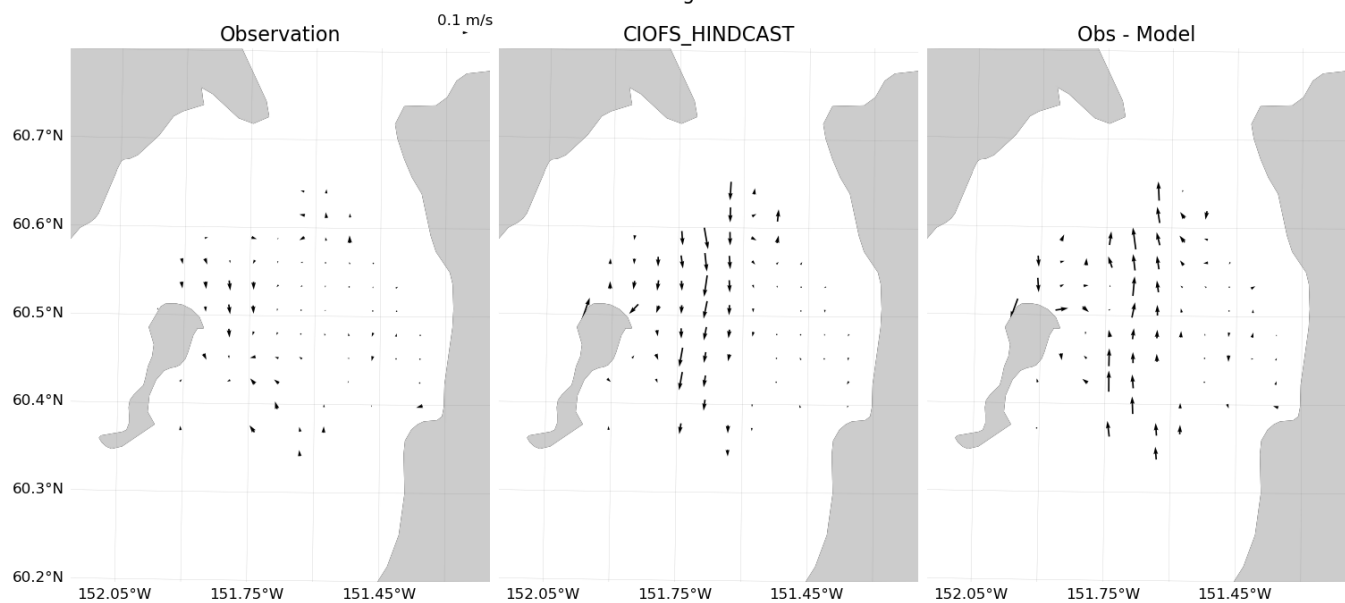


Fig. 25 Subtidal mean from surface currents for CIOFS_HINDCAST and dataset upper-ci_system-A_2002-2003

CIOFS_FRESH

upper-ci_system-A_2002-2003: east: bias: -0.0 corr: 0.4 ioa: nan mse: 0.0 ss: -1.9 rmse: 0.1 north: bias: -0.1 corr: 0.1 ioa: nan
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Subtidal surface currents averaged 2003-01-01 to 2003-06-09

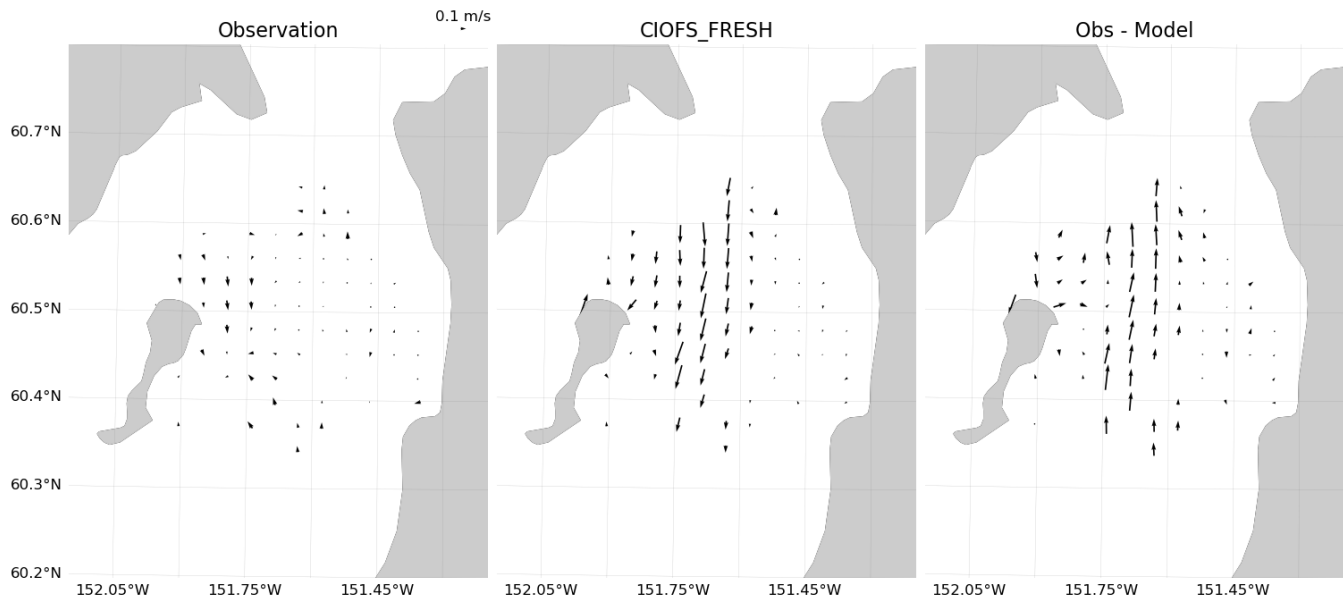


Fig. 26 Subtidal mean from surface currents for CIOFS_FRESH and dataset upper-ci_system-A_2002-2003

Hourly

CIOFS_HINDCAST

0:00

[images/hfradar_upper-ci_system-A_2002-2003_east_north_2003-01-01_2003-06-09_remove-under-50-percent-data_units-to-meters.mp4](#)

Fig. 27 Hourly from surface currents for CIOFS_HINDCAST and dataset upper-ci_system-A_2002-2003

CIOFS_FRESH

0:00

[images/hfradar_upper-ci_system-A_2002-2003_east_north_2003-01-01_2003-06-09_remove-under-50-percent-data_units-to-meters1.mp4](#)

Fig. 28 Hourly from surface currents for CIOFS_FRESH and dataset upper-ci_system-A_2002-2003

Subtidal, 6-Hourly

CIOFS_HINDCAST

0:00

[_images/hfradar_upper-ci_system-A_2002-2003_east_north_2003-01-01_2003-06-09_remove-under-50-percent-data_units-to-meters_subtidal_resample-6H.mp4](#)

Fig. 29 Subtidal, 6-hourly from surface currents for CIOFS_HINDCAST and dataset upper-ci_system-A_2002-2003

CIOFS_FRESH

0:00

[_images/hfradar_upper-ci_system-A_2002-2003_east_north_2003-01-01_2003-06-09_remove-under-50-percent-data_units-to-meters_subtidal_resample-6H1.mp4](#)

Fig. 30 Subtidal, 6-hourly from surface currents for CIOFS_FRESH and dataset upper-ci_system-A_2002-2003

lower-ci_system-B_2006

Tidal Constants

CIOFS_HINDCAST



CIOFS_FRESH



upper-ci_system-A_2003

Tidal Constants

CIOFS_HINDCAST



