



The Bureau
of Meteorology

OceanMAPSv4.1i Review

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Bluelink
Ocean Forecasting



OceanMAPSv4.1i

System

Model

OFAM3 (MOM5)
75S-75N, 0-360
0.1° x 0.1°, 51 z*-levels (5m top cell)

Data assimilation

EnKF-C / Hybrid-DLETKF
48 dynamic members
144 low-mode members
FGAT, Restart initialisation

Atmospheric forcing

ACCESS-G4 (APS4)
Bulk formulae

Observations

In situ profiles (GTS, GDAC)
Satellite altimetry (RADARSAT, J3, SARAL, Sentinel-3A, Cryosat-2)
Satellite SST (AMSR2, NAVOCEANO, NPP-VIIRS, NOAA20-VIIRS)

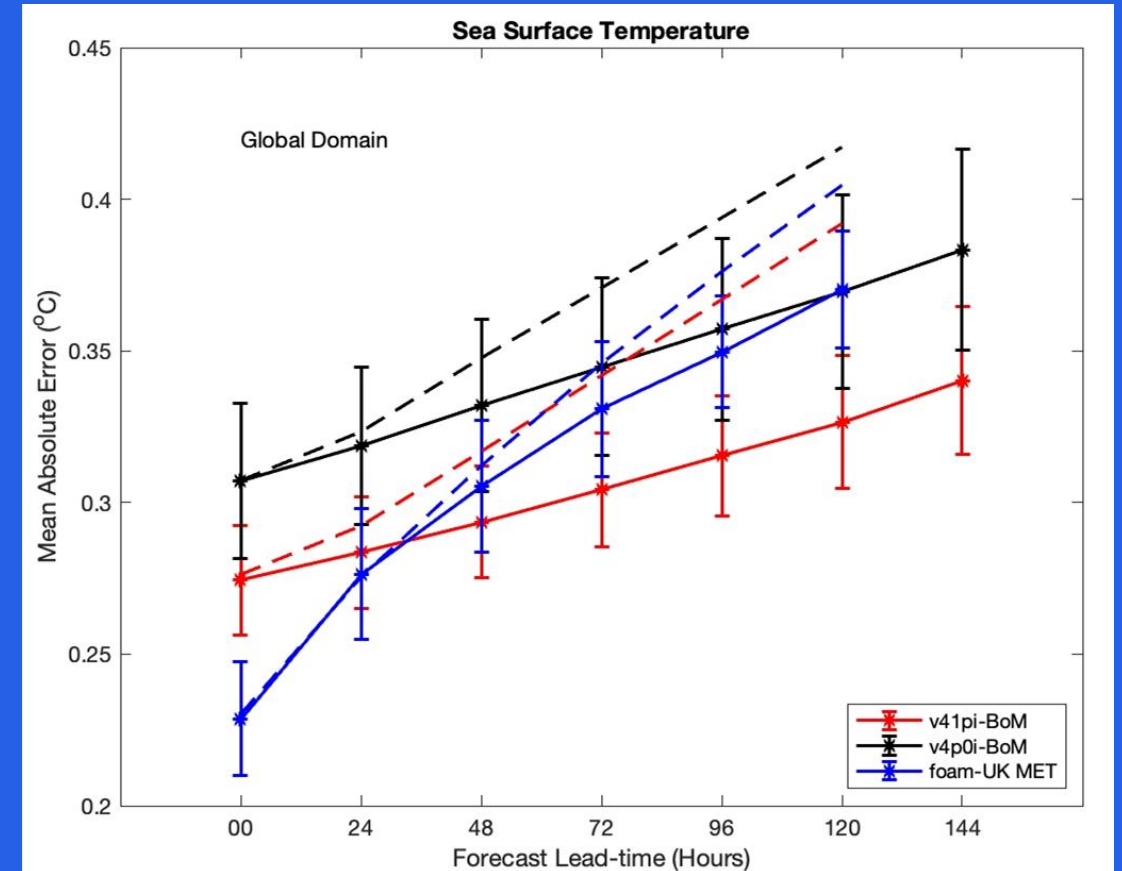
Forecasts

EnKF BRT (-3 day analysis)
EnKF NRT (-2 day analysis)
Daily 7 day forecasts (001, Av. RES)

Impact

Performance

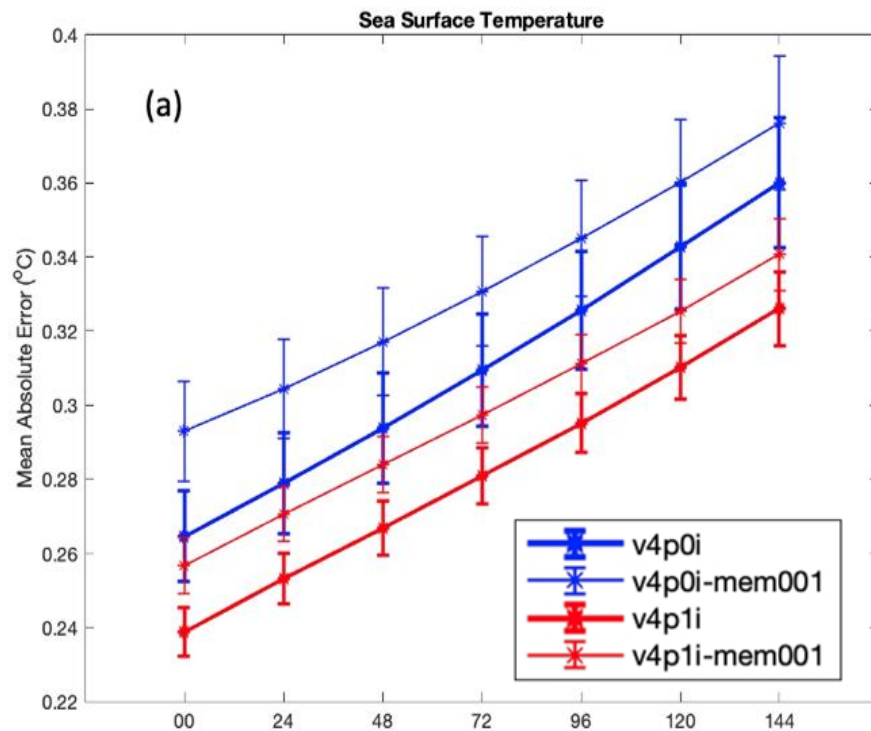
- Reduced forecast innovation
- Reduced latency (-2 days)
- More dynamically balanced increments
- Uniform latency
- Beats persistence
- Reduction in abyssal noise
- Improved separation of eddies
- Sustaining low signal to noise eddies
- Improved skill ocean currents



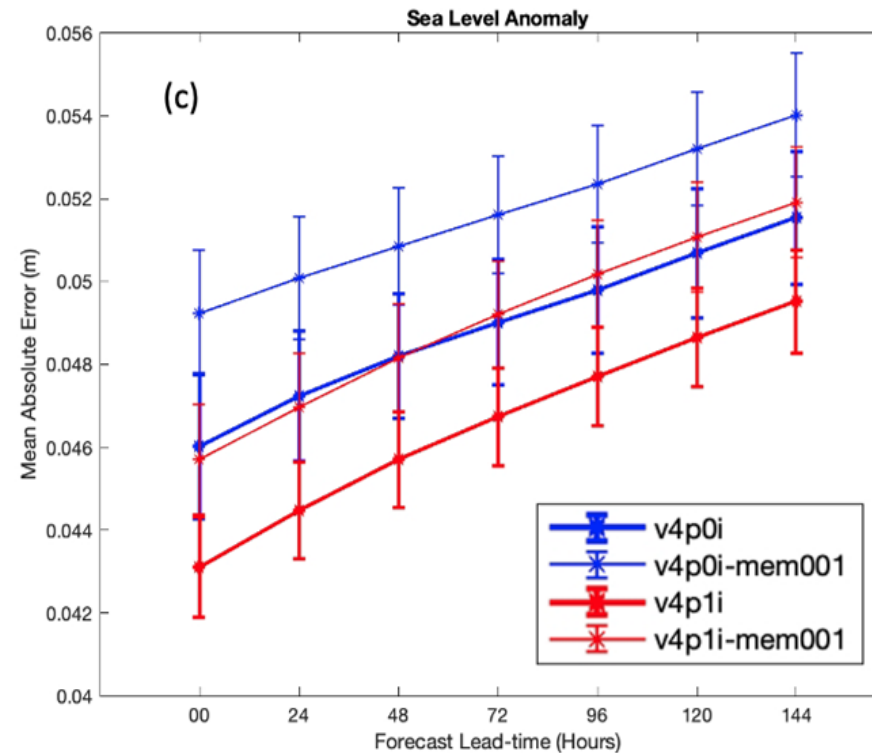
OceanMAPSv4.1i vs 4.0i performance (recap)

Mean Absolute Error vs Forecast Lead Time

Sea surface temperature



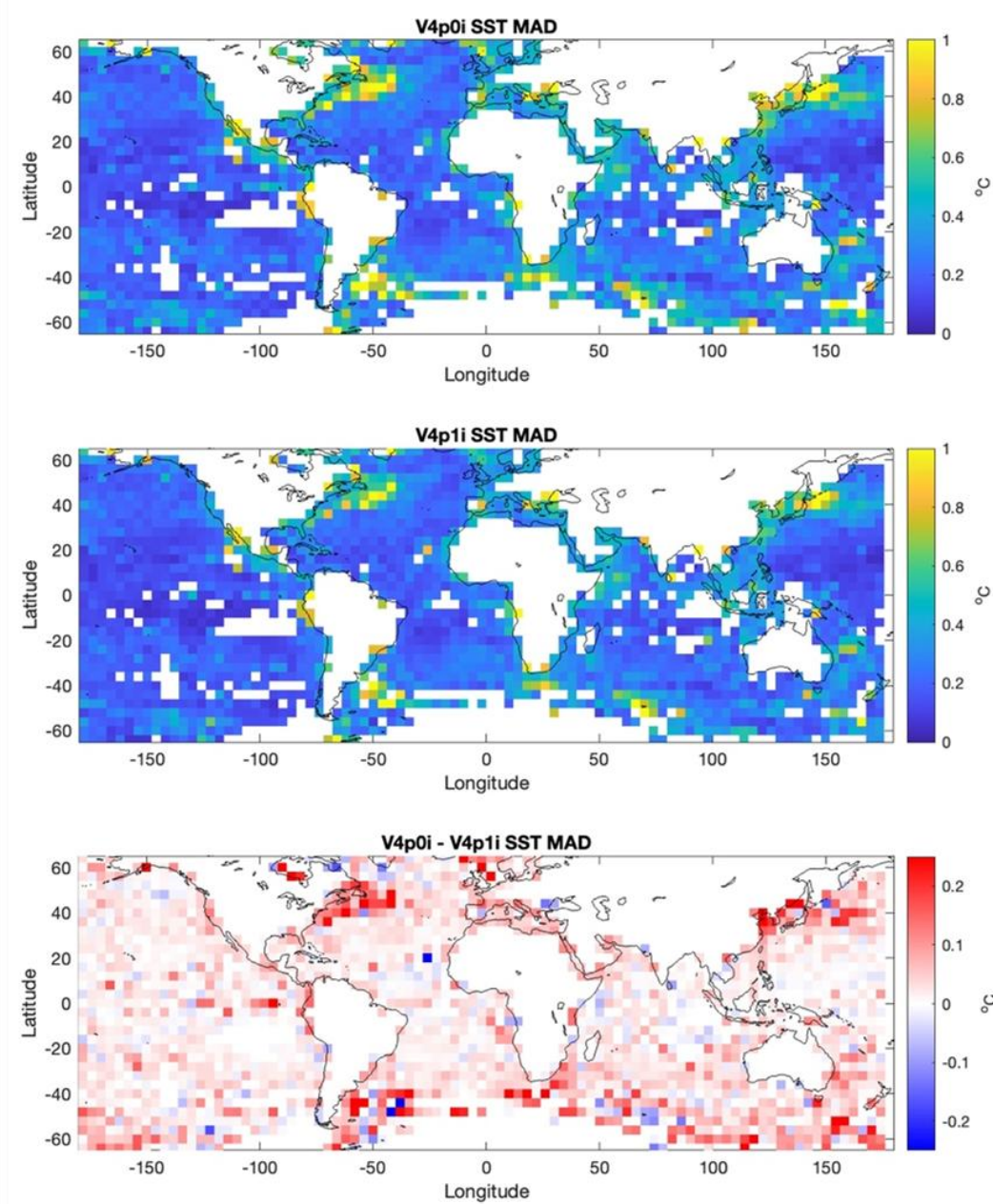
Sea Level Anomaly



- 3 day to 1 day DA cycle
- Reduced latency
- Improved innovation statistics
- More balanced increments



OFFICIAL



Red
=
reduced error

OFFICIAL

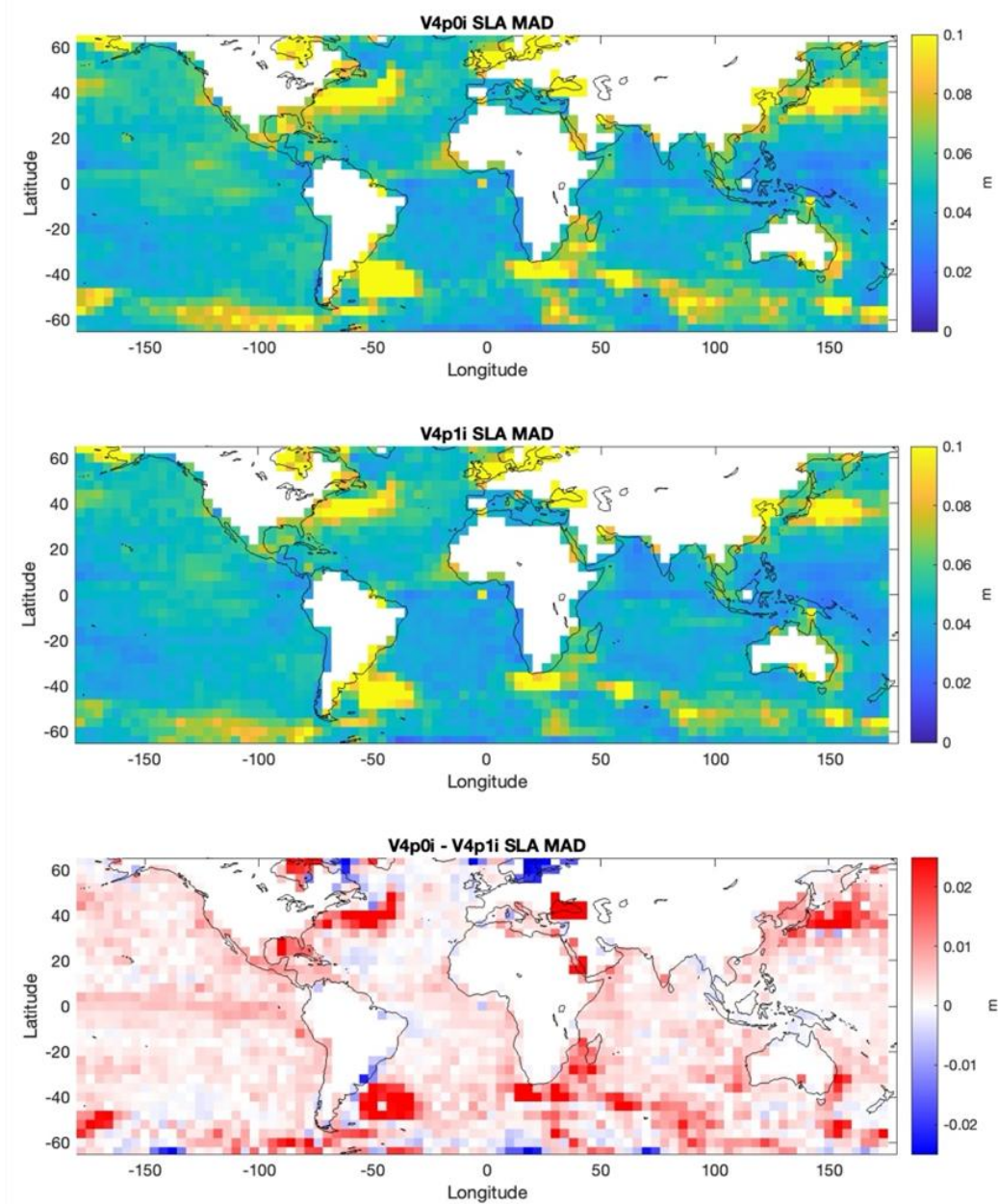
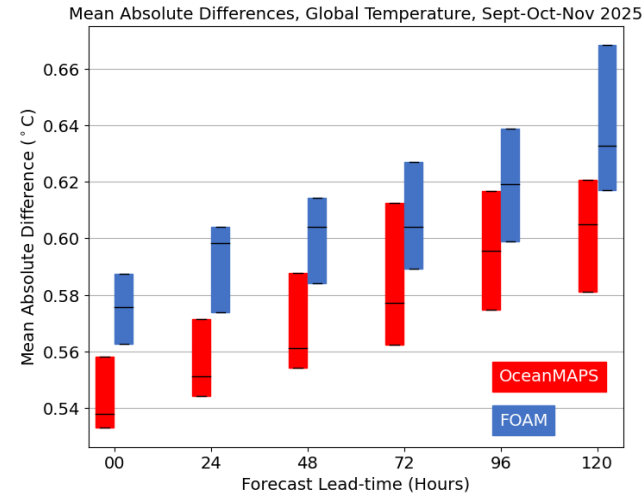
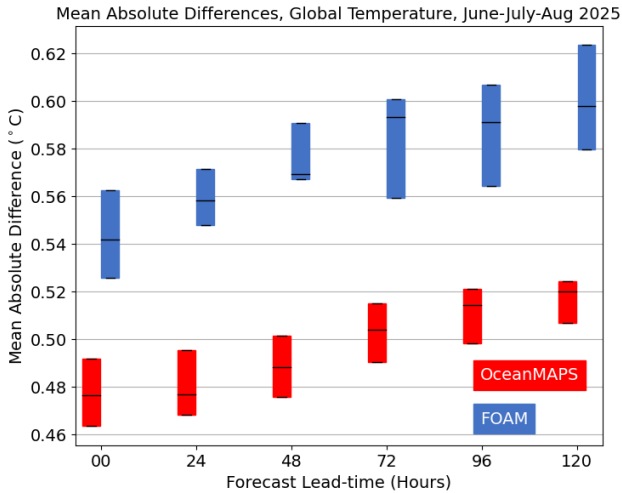


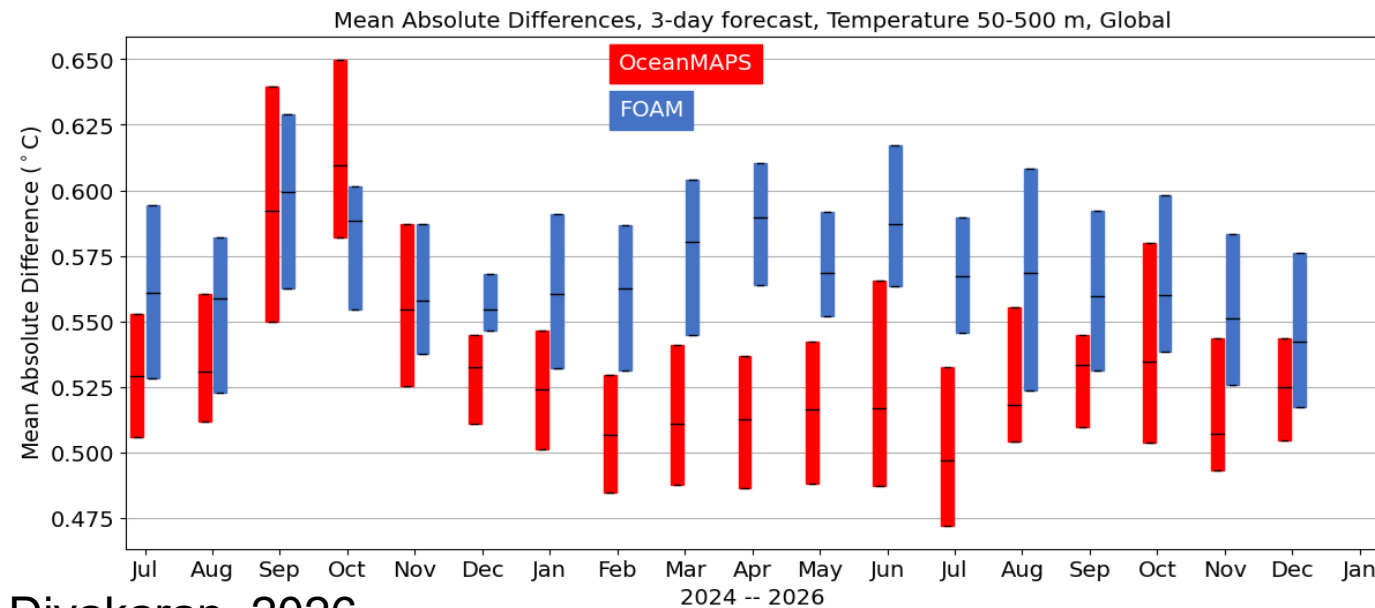
Figure 7 SLA Mean absolute error in 4° spatial bin for v4p0i(top), v4p1i(middle) and difference in MAD between v4p0i and v4p1i(bottom), based on SLA Jason-3 observations and averaged restart products from each system.

CLASS4/ KPI - Subsurface Temperature – MAD



Mean Absolute Difference as a function of forecast lead time over (left) JJA and (right) SON 2025 is shown

- **Red:** OceanMAPS v4.1i
- **Blue:** FOAM (UK Met Office)



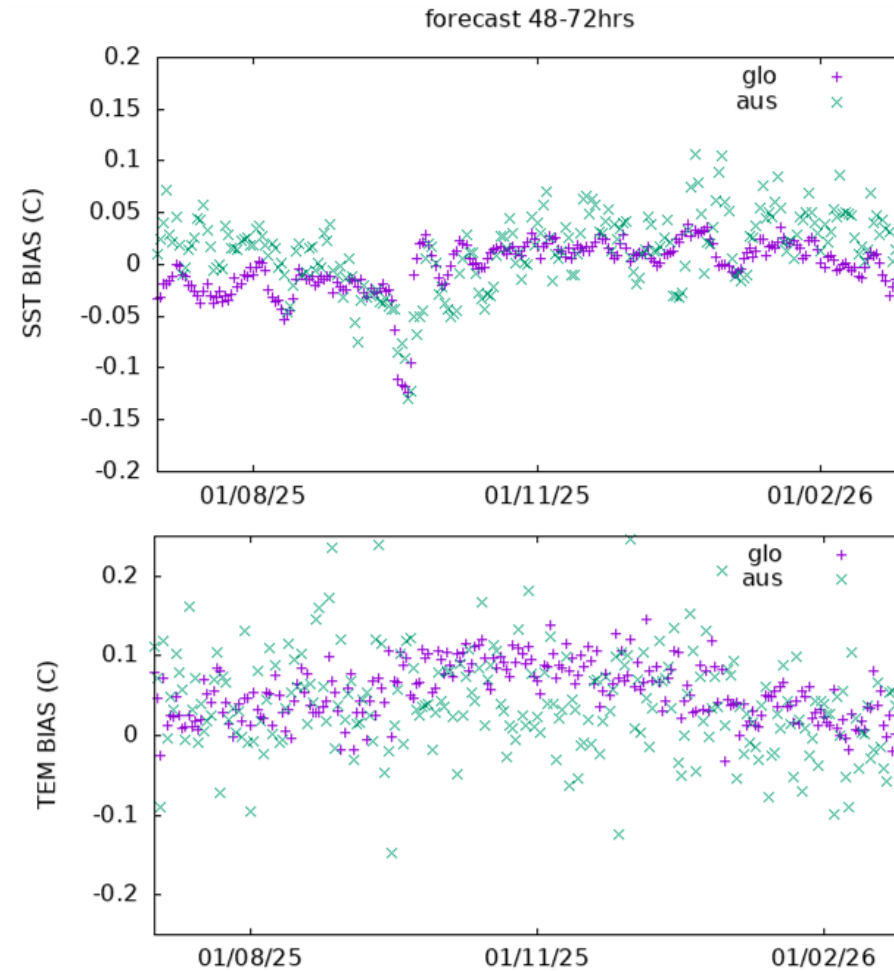
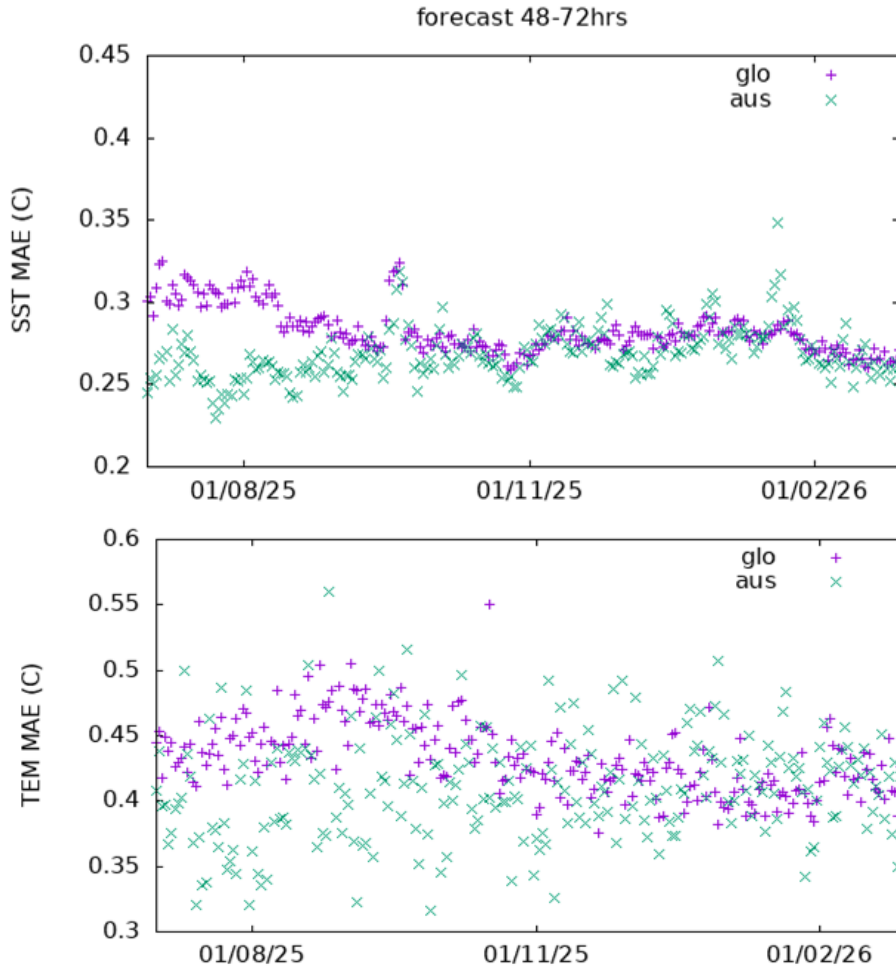
Monthly Mean Absolute Difference from July 2024 to Jan 2026 is shown

- **Red:** OceanMAPS v4.1i
- **Blue:** FOAM (UK Met Office)



OceanMAPS v4.1i - SST and Temperature BIAS and MAE

July 2025 – March 2026



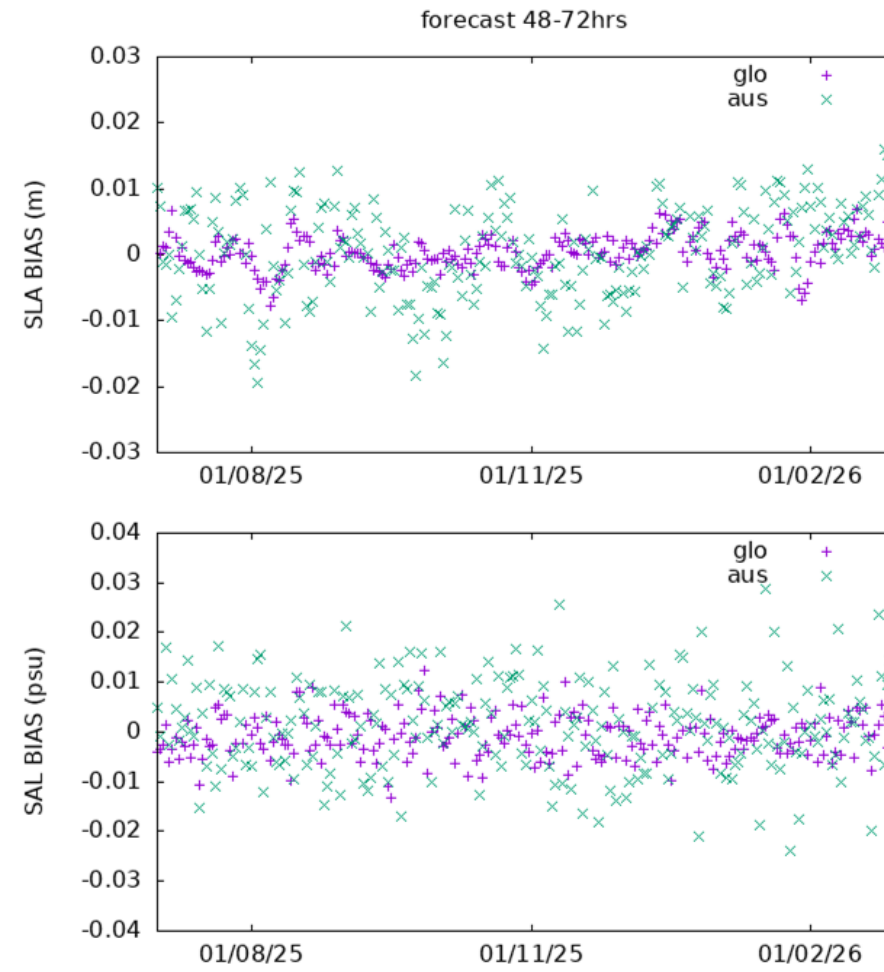
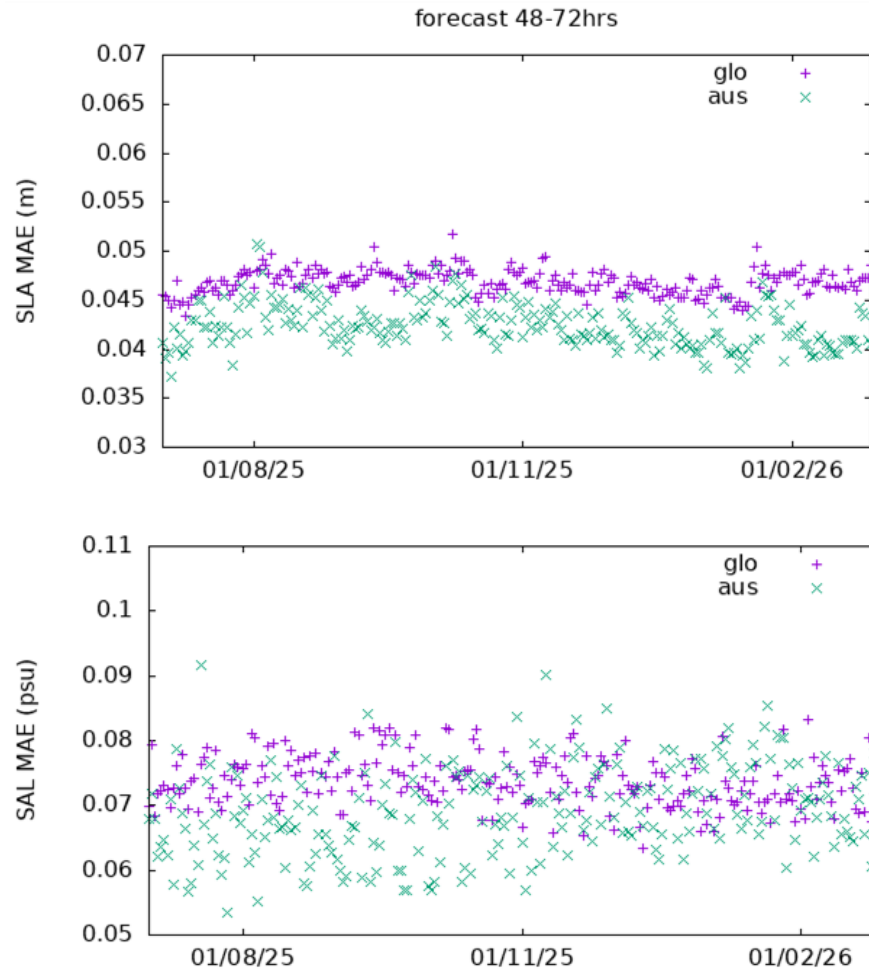
SST

TEM



OceanMAPS v4.1i - SLA and Salinity BIAS and MAE

July 2025 to March 2026



SLA

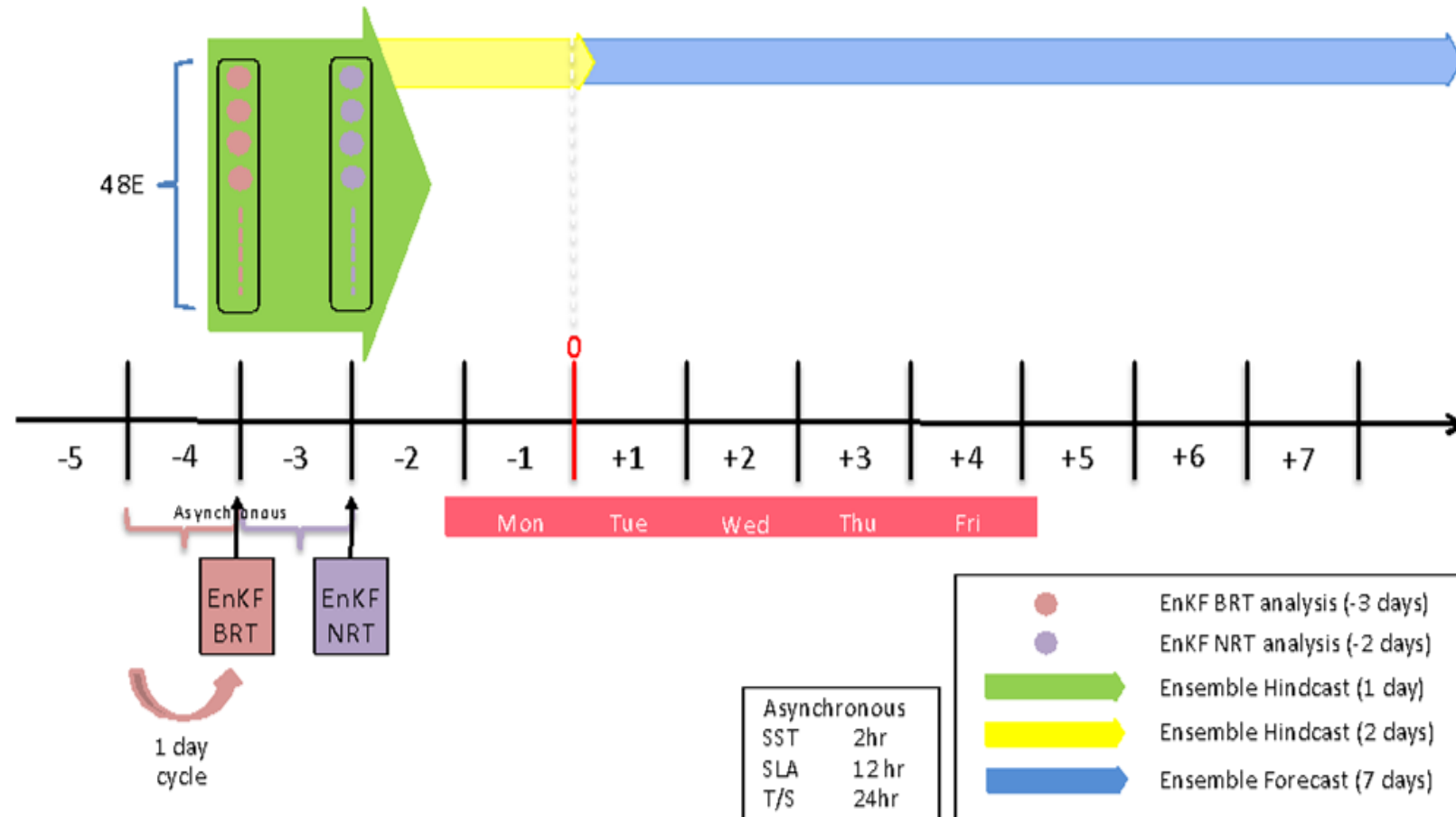
SAL



Updated Operational Schedule

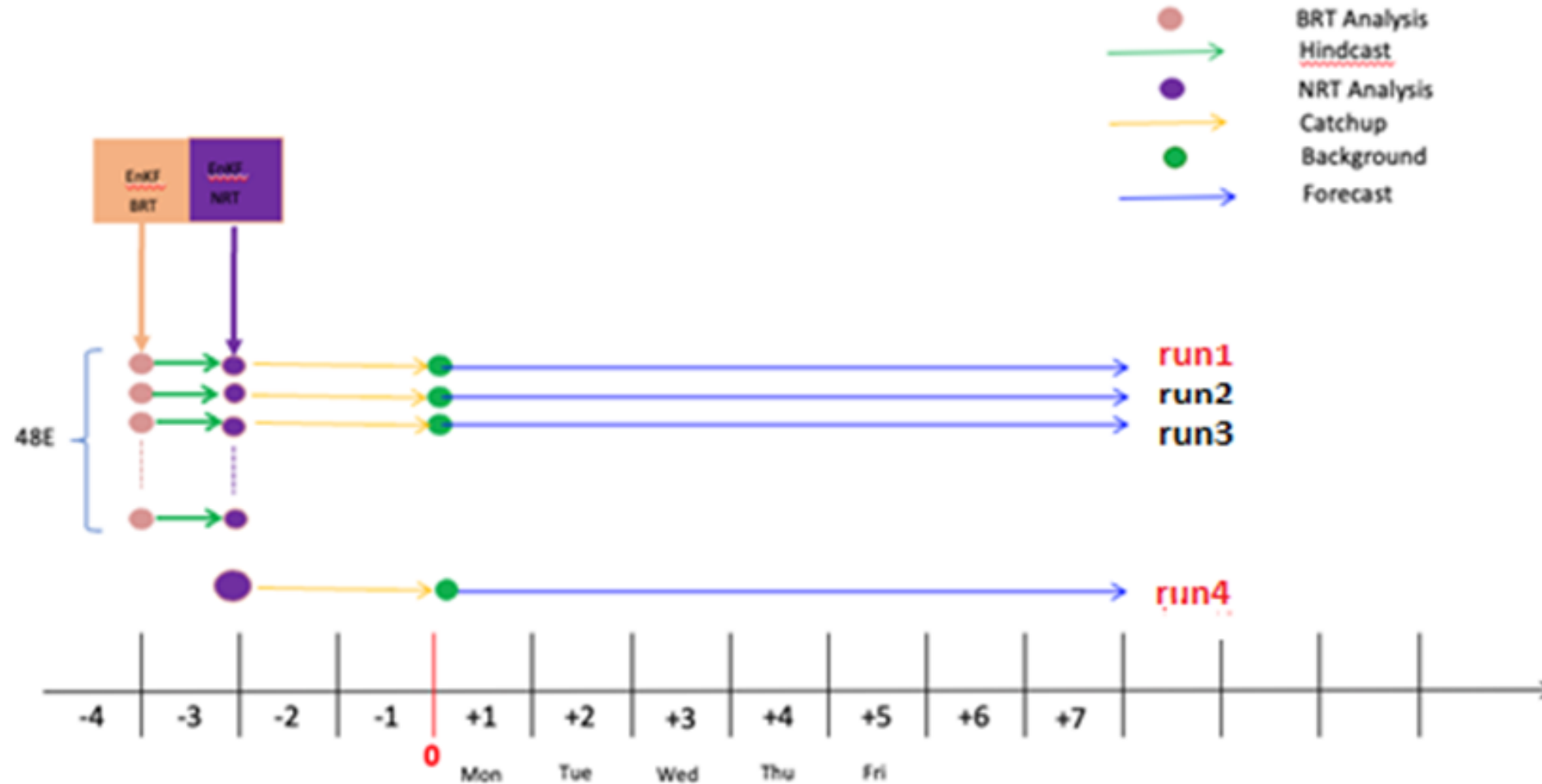
- The behind real time (BRT) EnKF analysis runs remains 3 days behind forecast base time and run frequency has increased from every three days to every day.
- Near real time (NRT) EnKF analysis runs 2 days behind forecast base date.
- The DA observation window for the BRT and NRT analyses is 1 day (reduced from 3 days for the BRT).
- The deterministic forecast is obtained with no atmospheric forcing perturbations.
- The ensemble average restart is now calculated from the full 48 members, up from 16 members.
- Daily forecasts of members 1, 2 and 3 and average restart





Forecast cycle – Deterministic forecasts

BRT Analysis + 1-Day Hindcast + NRT Analysis + 2 DAY Catchup + Forecast



NEMO based system development (OceanMAPS v5)

Timelines

	NEMO-based	Type		MOM-based	Type
2023/ 2024	ORCA025 + EnKF-C	Research prototype 1 (reanalysis)	2023/ 2024	EnKORe ongoing	Reanalysis
2024/ 2025	ORCA12 + EnKF-C	Research prototype 2 (reanalysis)	2024/ 2025	OceanMAPS 4.0i	Operational
2025/ 2026	NEMO (ORCA12) + EnKF-C	Real-time prototype	2025/ 2026	OceanMAPS4.1i	Operational
~2028	<i>OceanMAPSv5</i> (ORCA12 + EnKF-C)	?Operational?	~2028	?Retired?	?Retired?

Operational systems are underpinned by a reanalysis

OceanMAPS 4.0i --> ***EnKORe 10 year reanalysis (EnKORe, Ensemble Kalman Filter Ocean Reanalysis)***

OceanMAPS 5.0 -- > ***ORCA12+ENKF-C development system***

