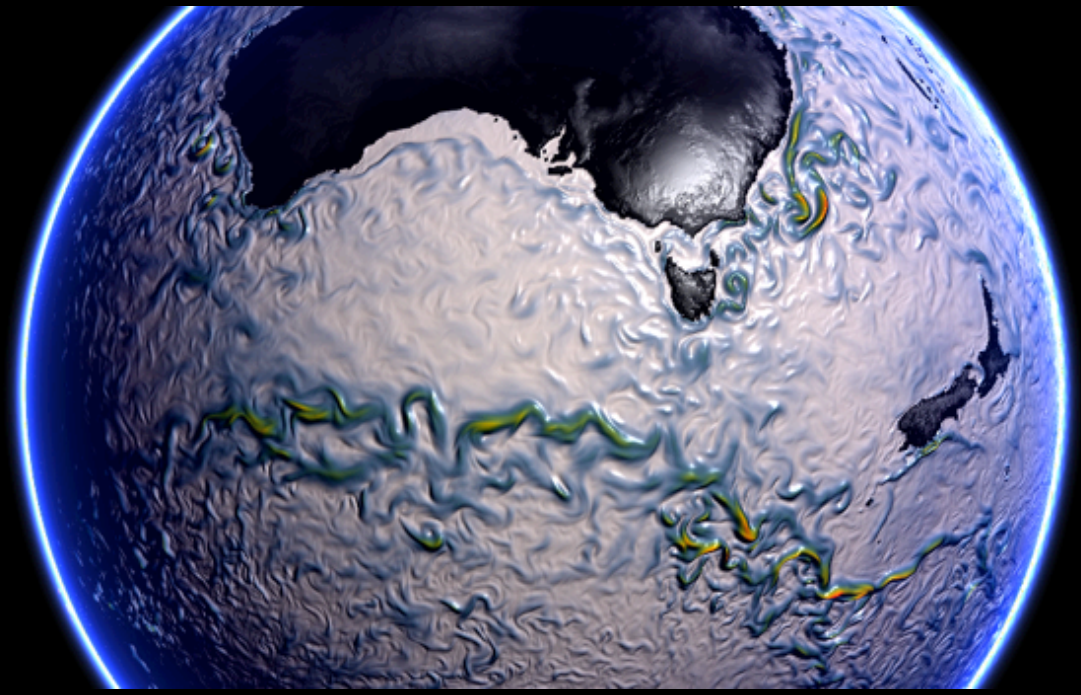

OceanMAPS 3.3 developments

Divakaran, Brassington, Sakov, Velic, Huang, Zhong, Fiedler, Chamberlain, Sandery and Kiss

Bluelink Ocean Forecasting

Australian Government Bureau of Meteorology

CSIRO

NAVY

Ocean Model Analysis and Prediction System
OceanMAPS version 3.2

Ocean Model
MOM 5, Griffies et al., 2008
z* vertical coordinate
Smith and Sandwell, v11.1
3600 × 1500 × 51

0-360, 75S-75N (0.1° × 0.1°)
0-15 m (Δz = 5 m)
15-90 m (Δz~5 to 10 m)
90-200m (Δz=10 m)
Minimum column depth – 15 m

GOTM, K-eps mixed layer scheme
No tides
No sea-ice

Data Assimilation
ENKF-C (Sakov, 2014)
Ensemble optimal interpolation
State vector (eta, T, S, u, v)
144-member ensemble
Restart initialisation

Observations
Satellite altimetry (Jason3, Sentinel3A, Cryosat2, AltiKa)
Satellite SST (Metop-A, Metop-B, VIIRS, AVHRR, AMSR2)
In situ profiles Argo, CTD, XBT

Forcing
ACCESS-G APS2 (fluxes)
Climatological river discharge

Bluelink Ocean Forecasting

Australian Government Bureau of Meteorology

CSIRO

NAVY

Thanks also to GFDL, the global ocean observing system, IMOS and JCOMM

Ocean Model Analysis and Prediction System
OceanMAPS version 3.2

Ocean Model
MOM 5
z* vertical coordinate
Smith and Sandwell, v11.1
3600 × 1500 × 51

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Climatological river discharge

Bluelink Ocean Forecasting

Australian Government Bureau of Meteorology

CSIRO

NAVY

Thanks also to GFDL, the global ocean observing system, IMOS and JCOMM

Ocean Model Analysis and Prediction System
OceanMAPS version 3.3

Ocean Model
MOM 5
z* vertical coordinate
Smith and Sandwell, v11.1
3599 × 1499 × 51

0-360, 75S-75N (0.1° × 0.1°)
0-15 m (Δz = 5 m)
15-90 m (Δz~5 to 10 m)
90-200m (Δz=10 m)
Minimum column depth – 15 m

GOTM, K-eps
No tides
No sea-ice

Data Assimilation
ENKF-C (Sakov, 2014)
FGAT - Ensemble optimal interpolation
State vector (eta, T, S, u, v)
144-member ensemble
Restart initialisation

Observations
Satellite altimetry (Jason3, Sentinel3A, Cryosat2, AltiKa)
Satellite SST (Metop-A, Metop-B, VIIRS, AVHRR, AMSR2)
In situ profiles Argo, CTD, XBT

Forcing
ACCESS-G APS3 (bulk-formulae)
Climatological river discharge

Bluelink Ocean Forecasting

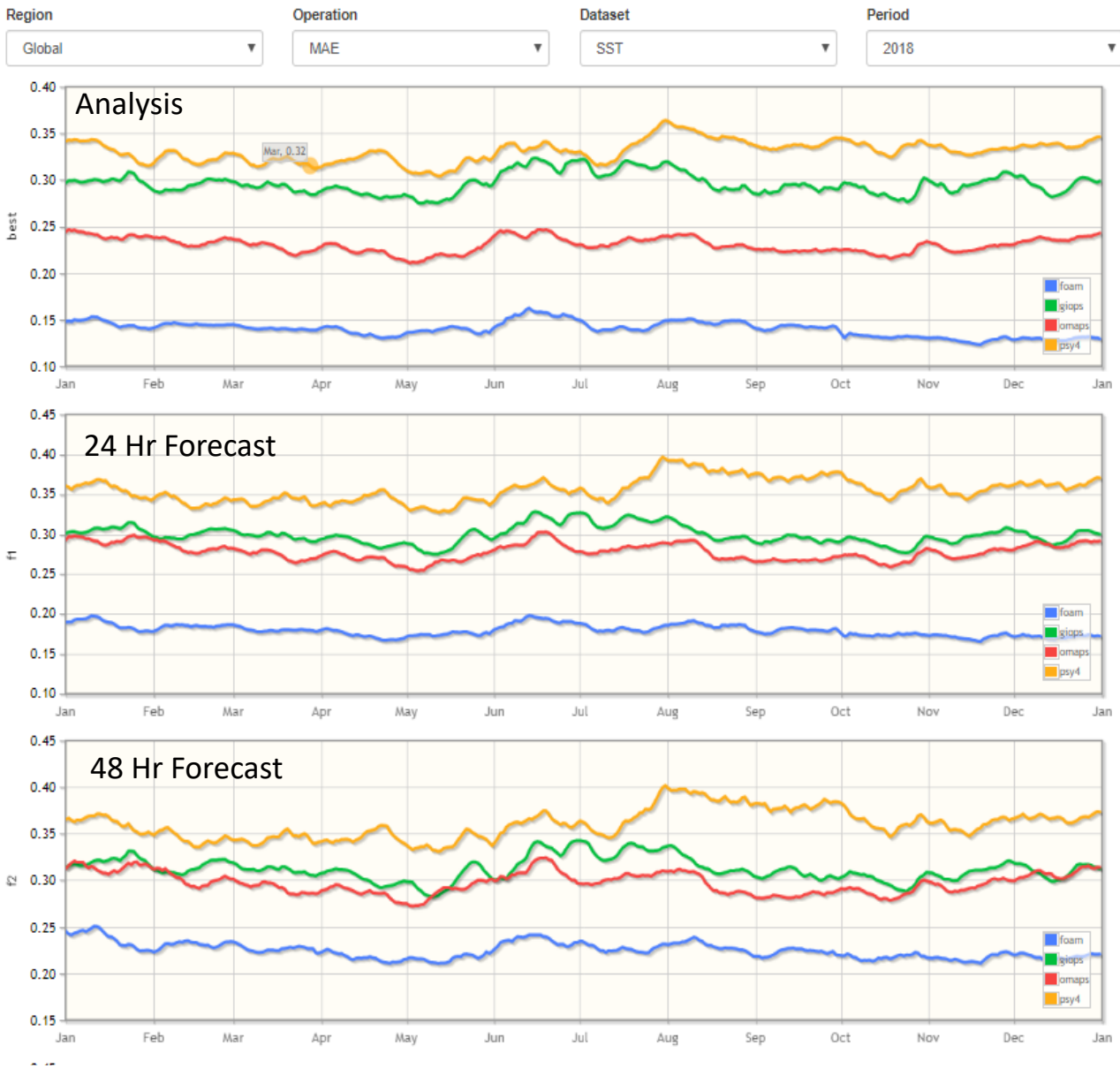
Australian Government Bureau of Meteorology

CSIRO

NAVY

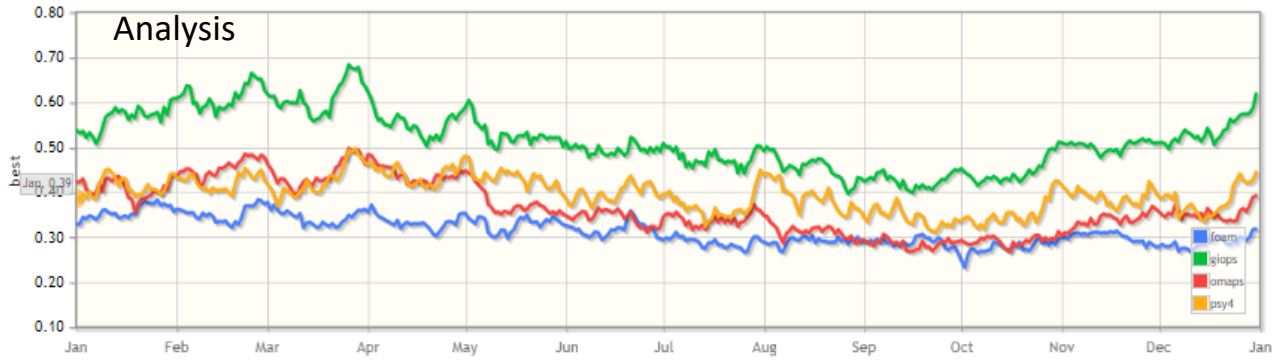
Thanks also to GFDL, the global ocean observing system, IMOS and JCOMM

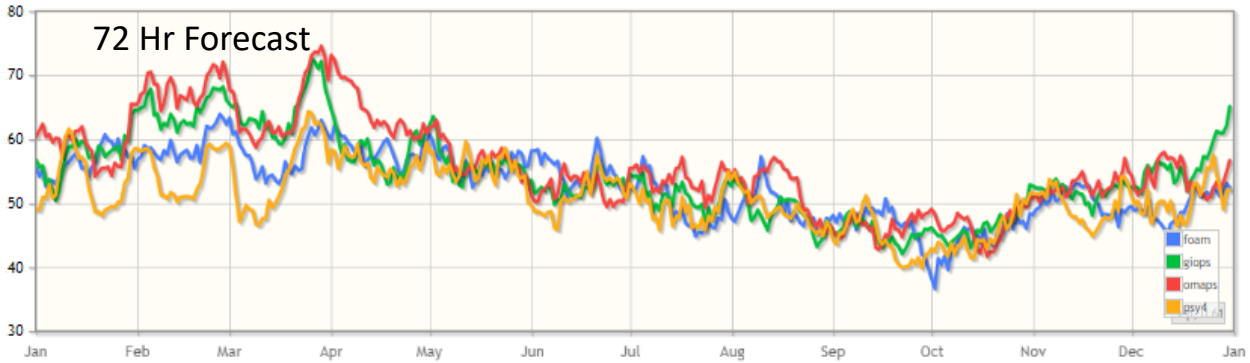
CLASS-4 Global Ocean Forecast Intercomparison

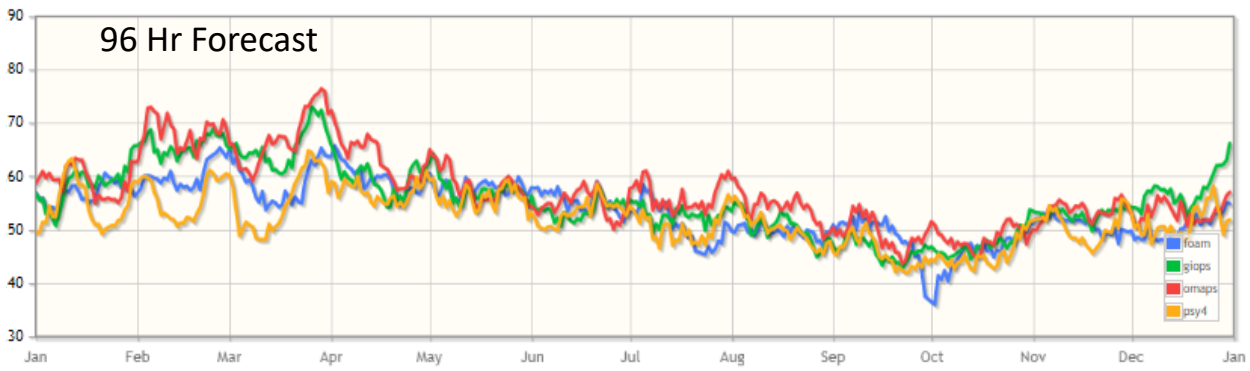


CLASS-4 Global Ocean Forecast Intercomparison

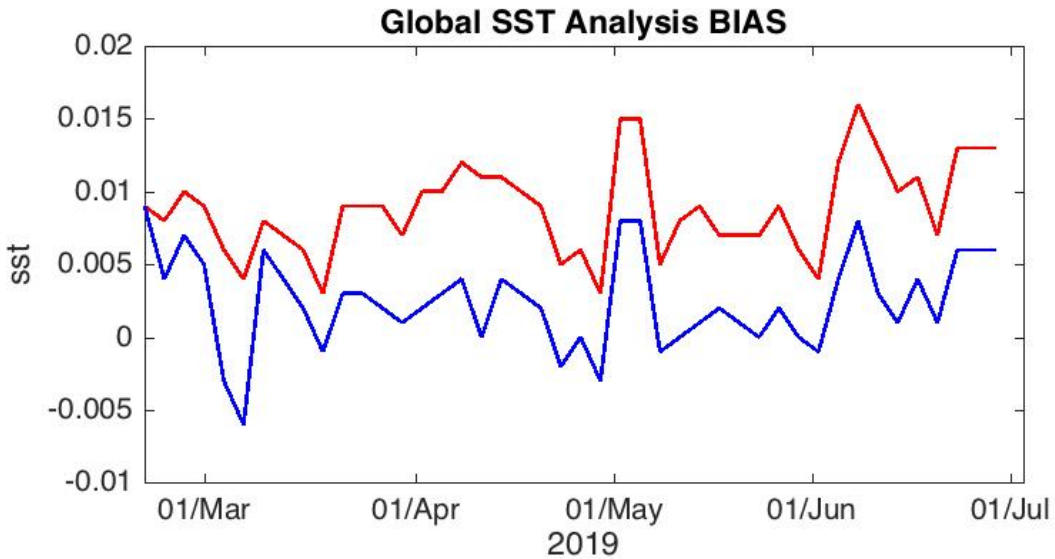
Region: Australia | Operation: MAE | Dataset: Temperature | Period: 2018

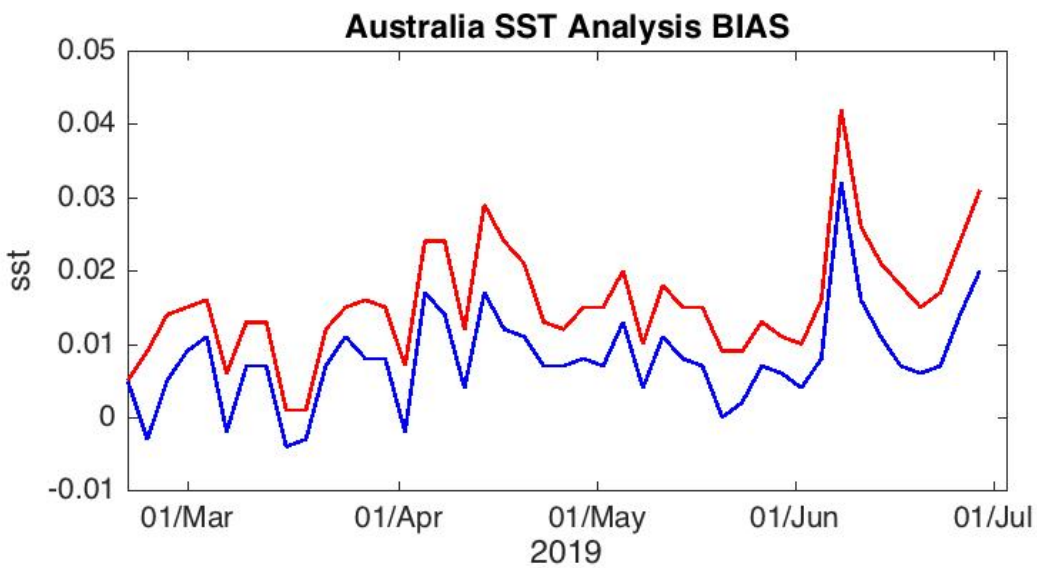


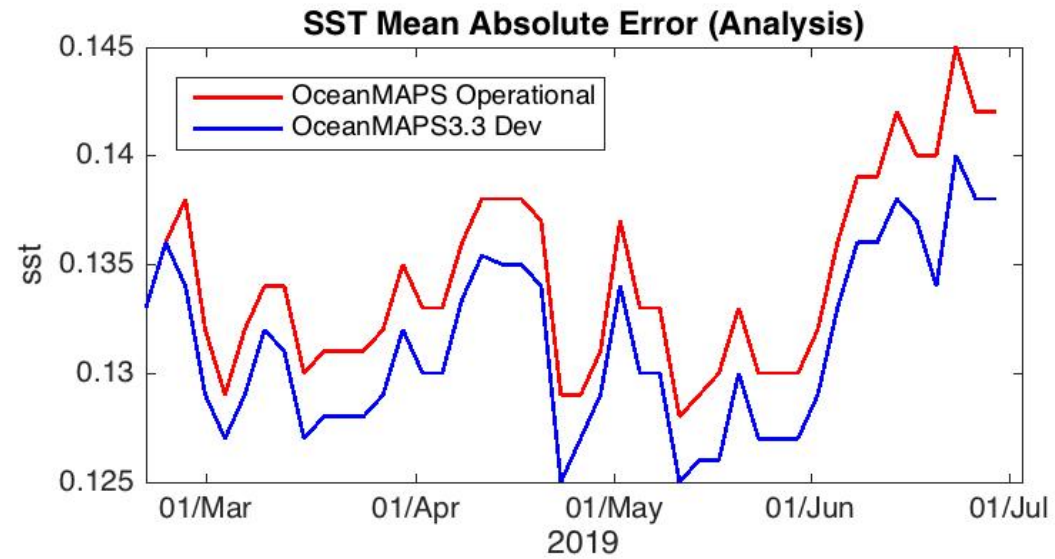


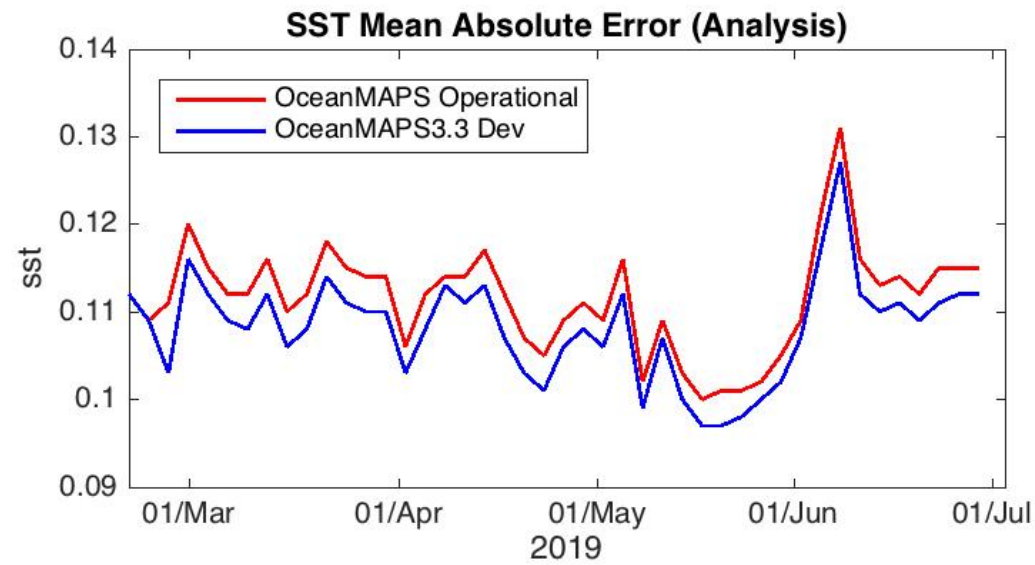


OceanMAPS Data Assimilation Statistics – SST Analysis

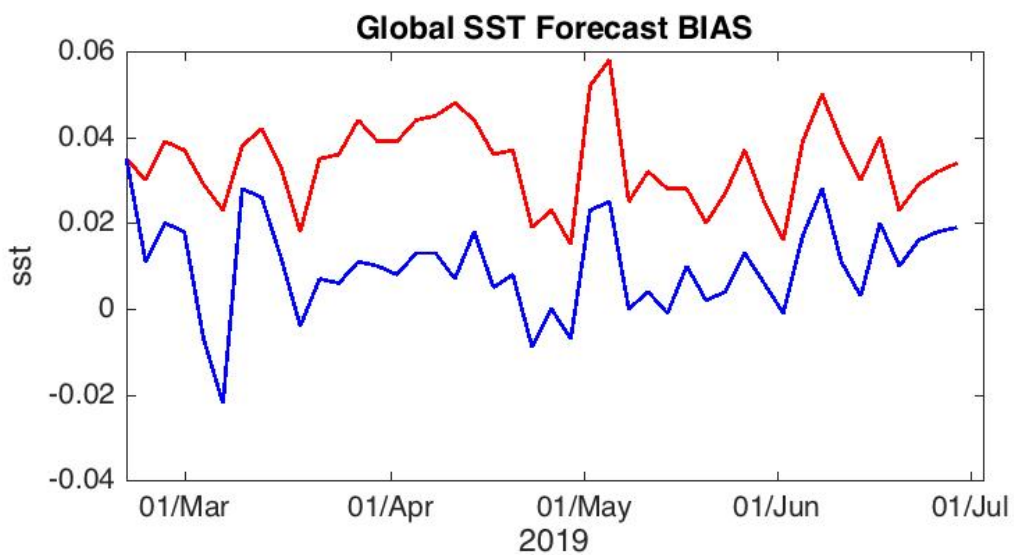


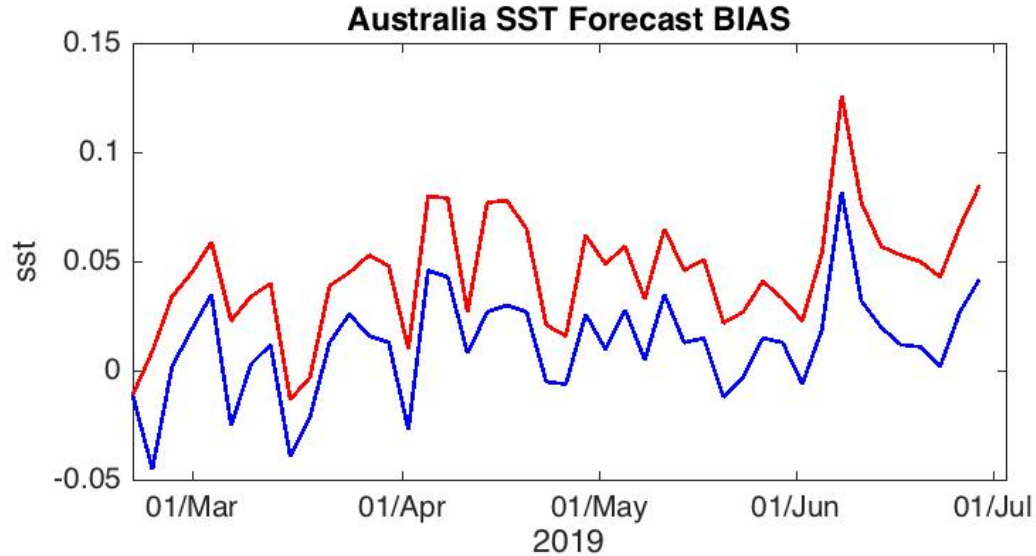


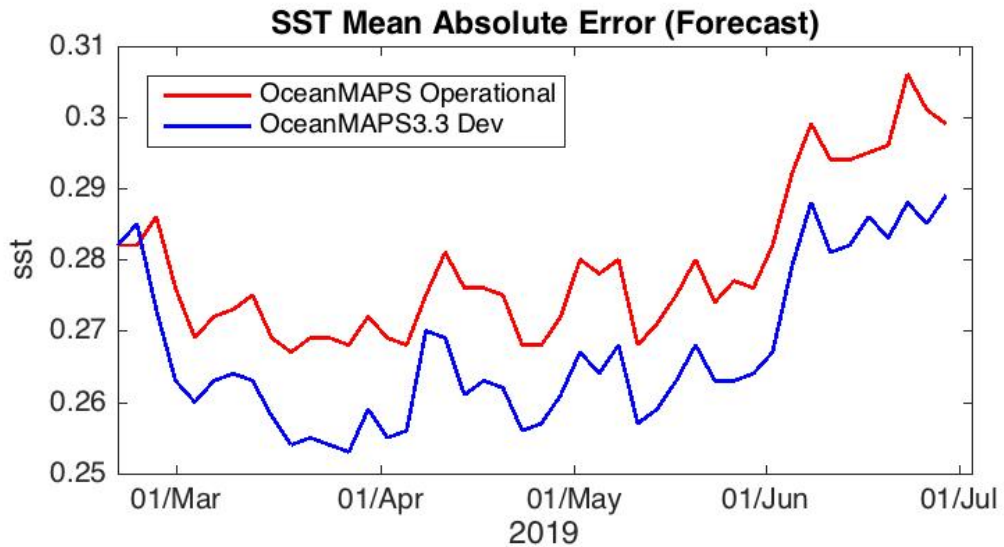


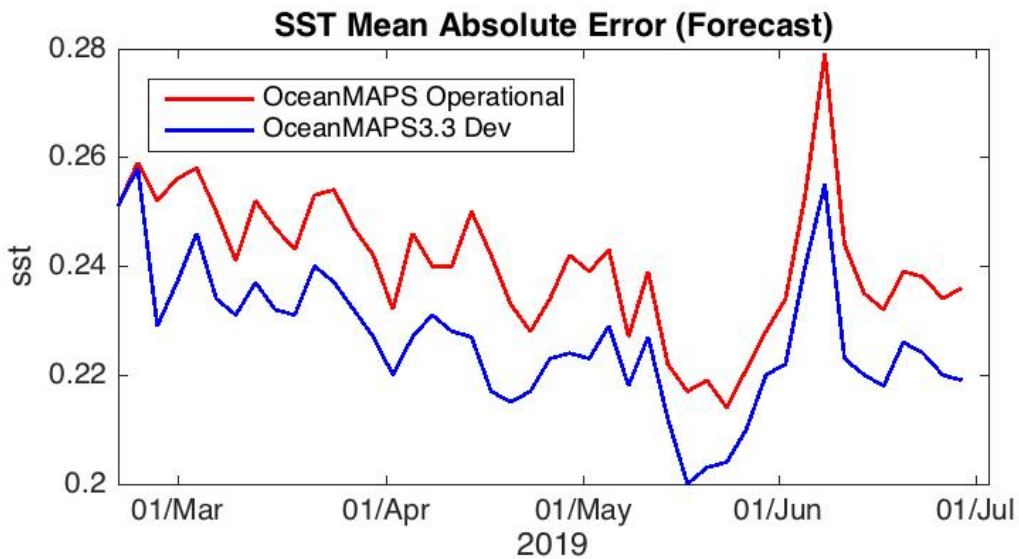


OceanMAPS Data Assimilation Statistics – SST Forecast

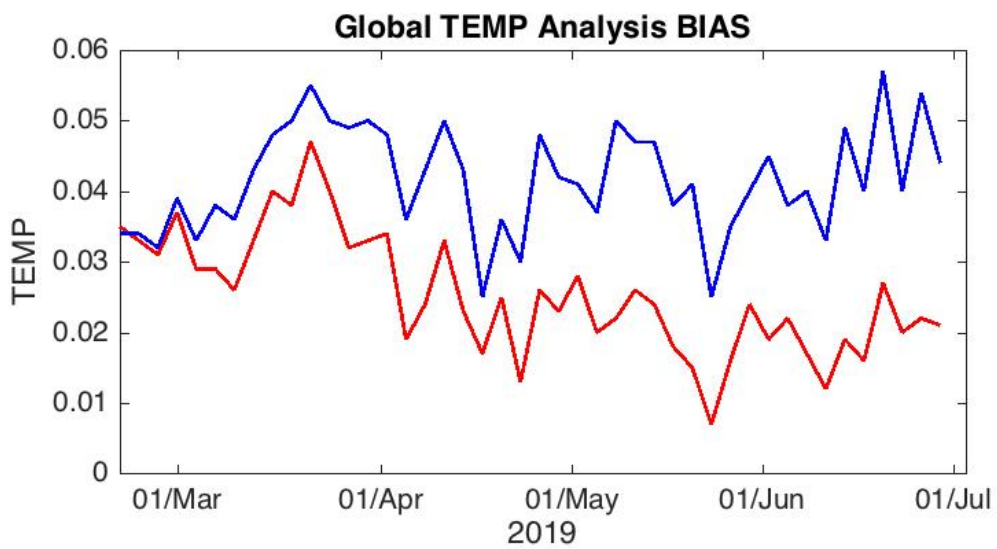


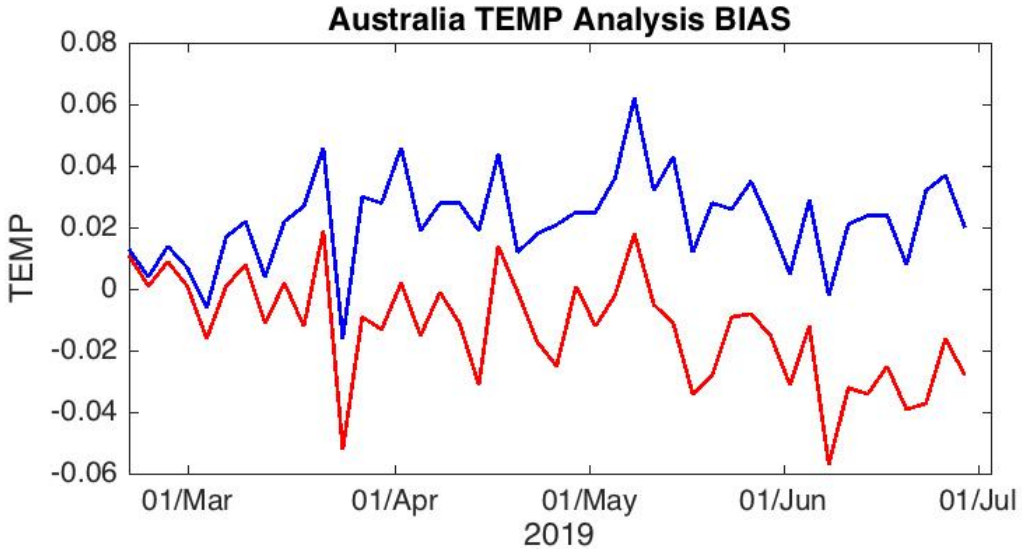


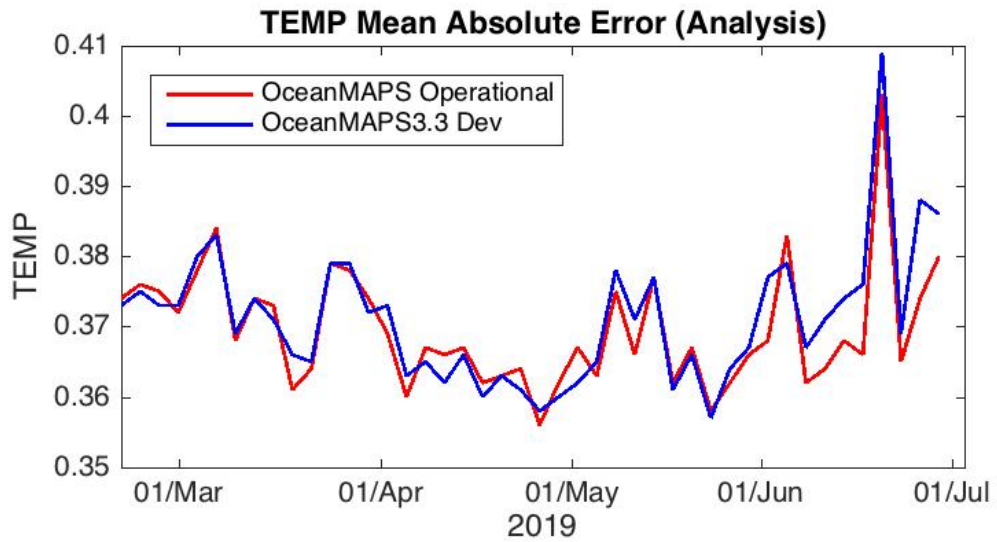


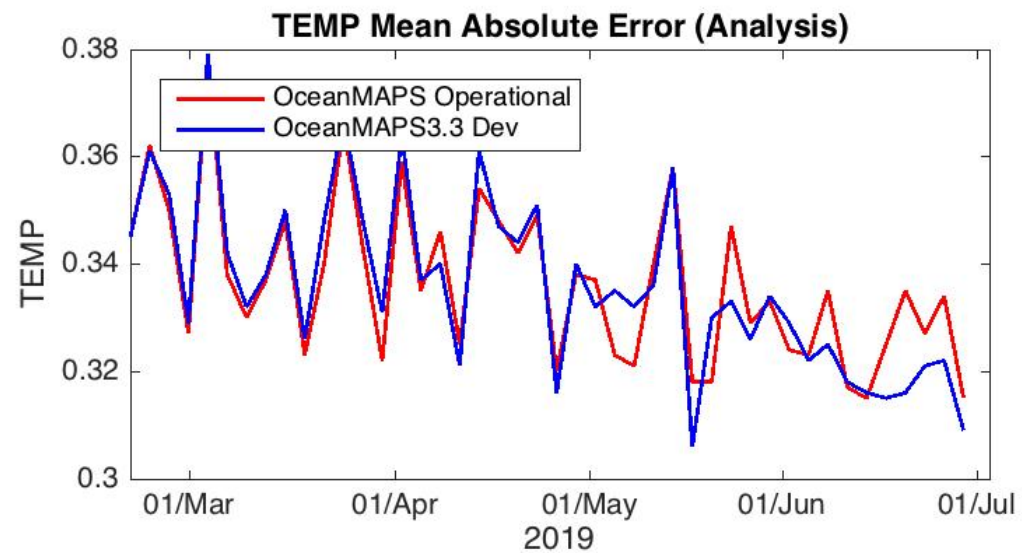


OceanMAPS Data Assimilation Statistics – TEMP Analysis

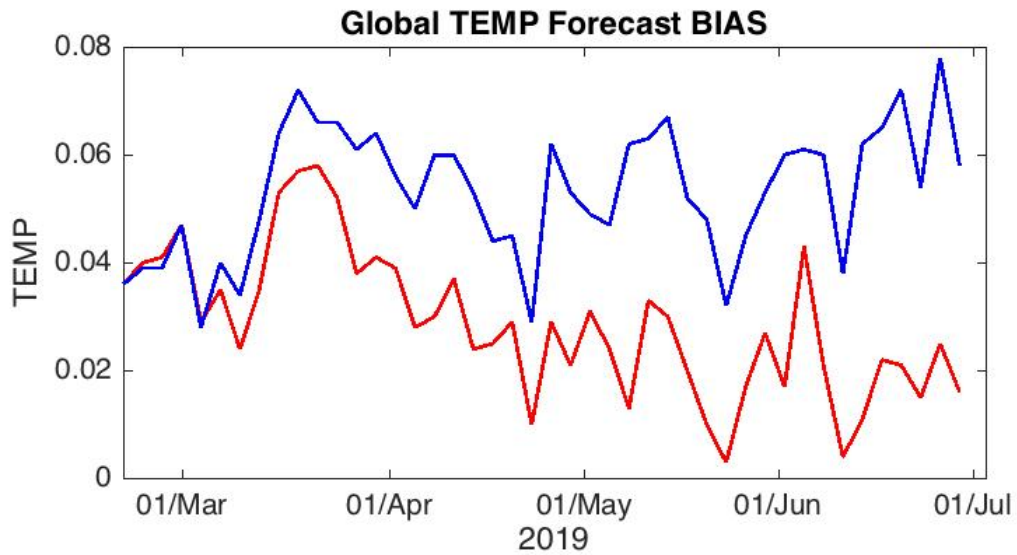


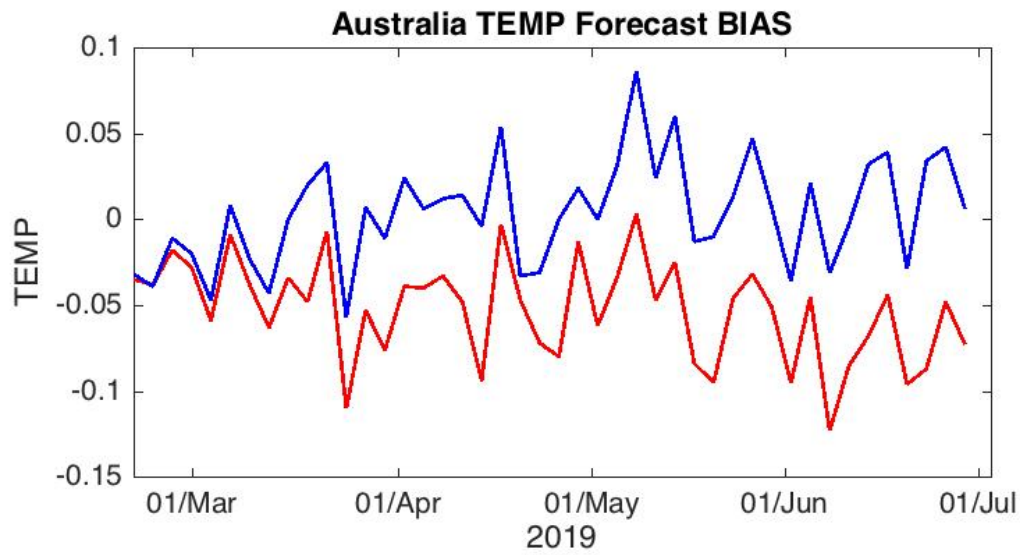


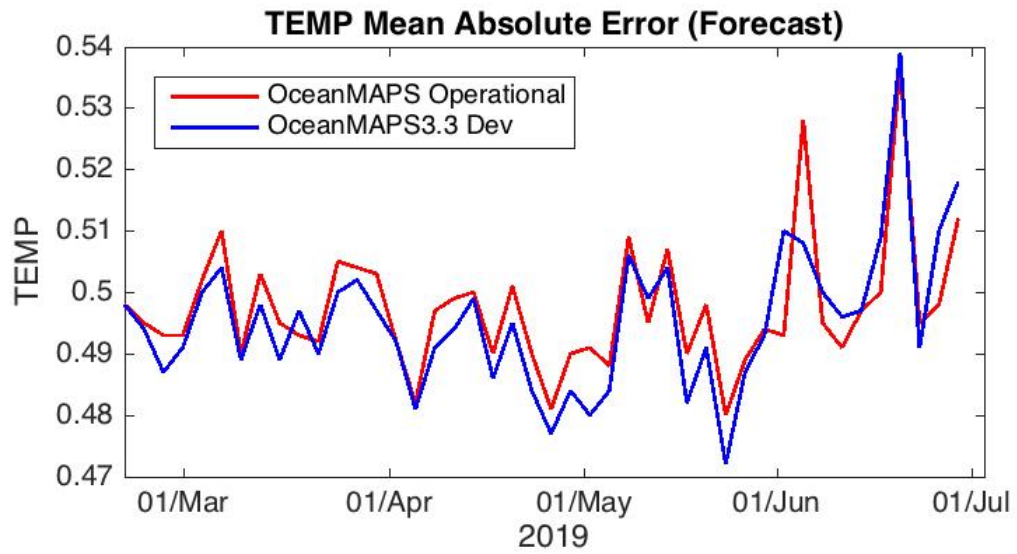


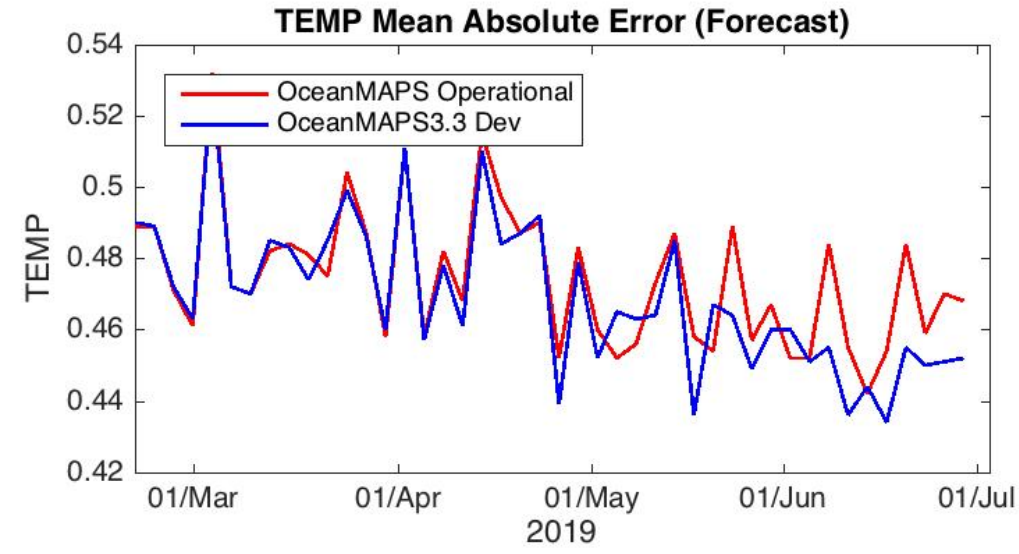


OceanMAPS Data Assimilation Statistics – TEMP Forecast

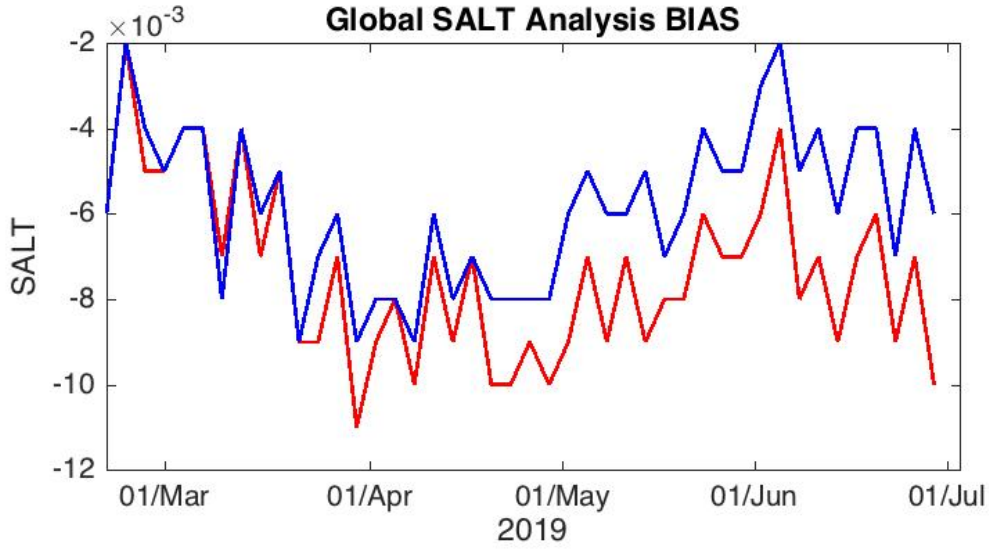


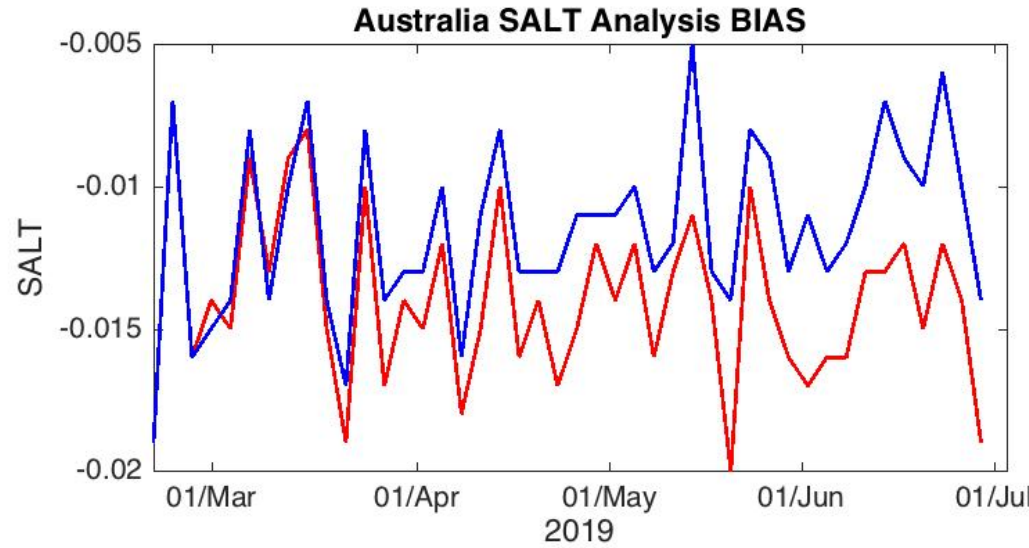


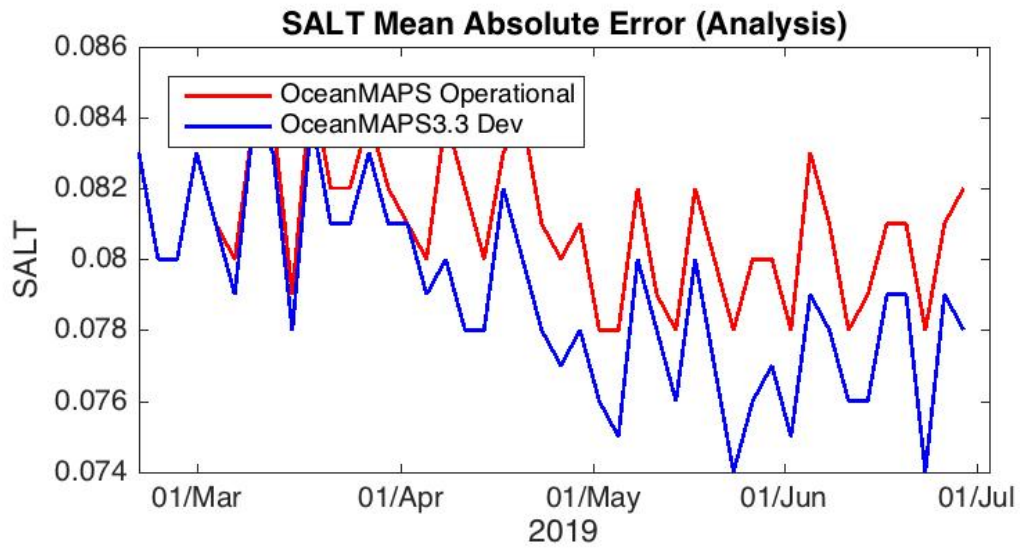


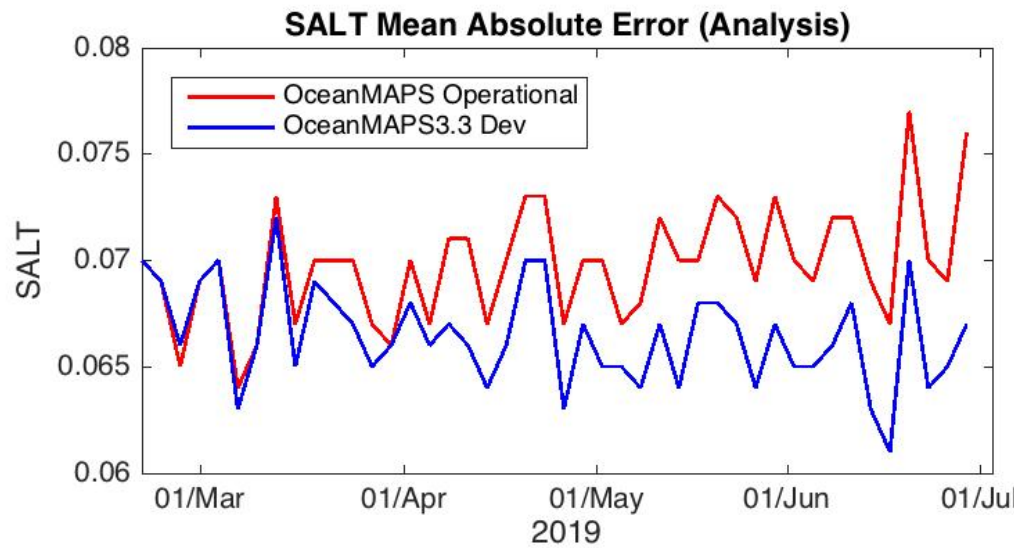


OceanMAPS Data Assimilation Statistics – SALT Analysis

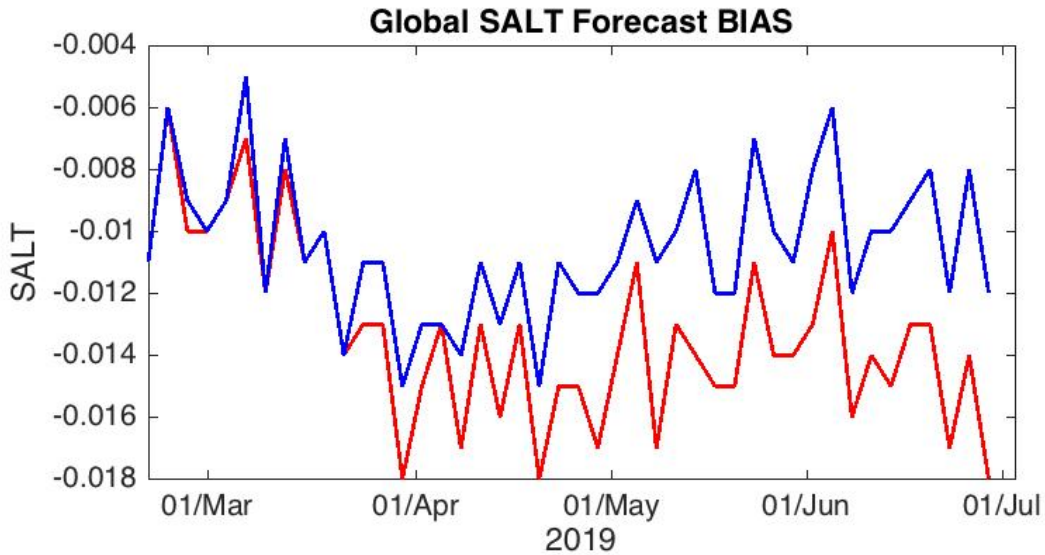


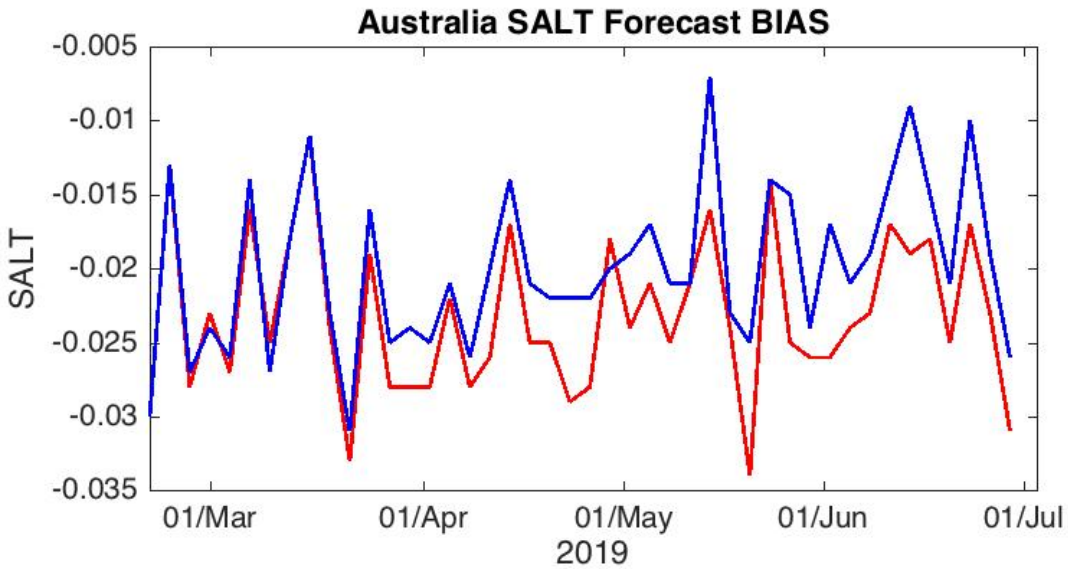


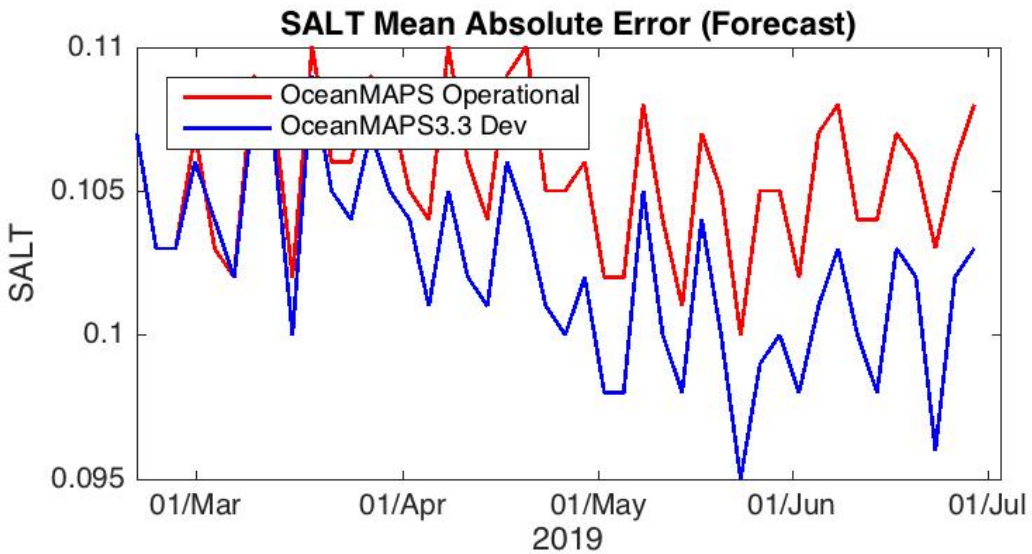


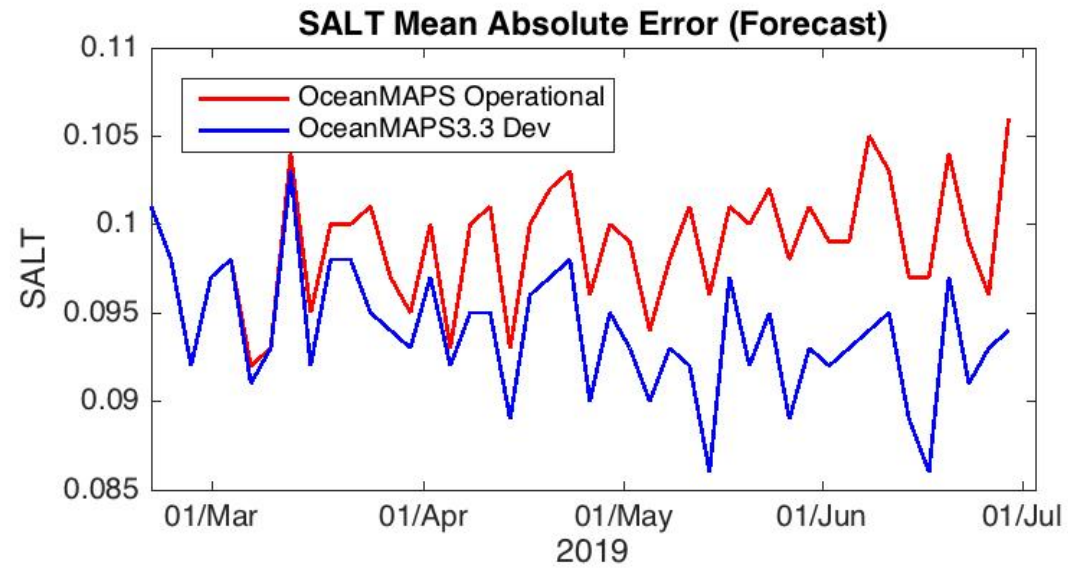


OceanMAPS Data Assimilation Statistics – SALT Forecast

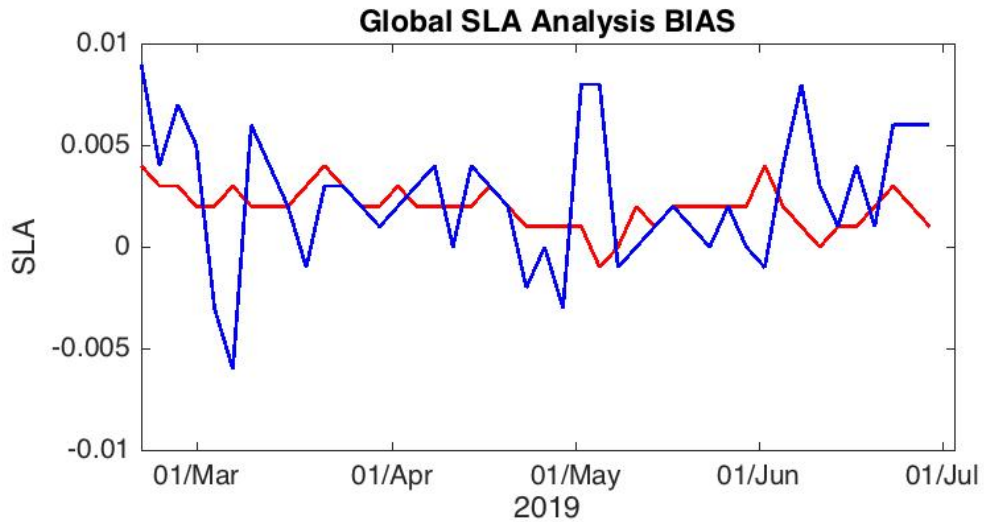


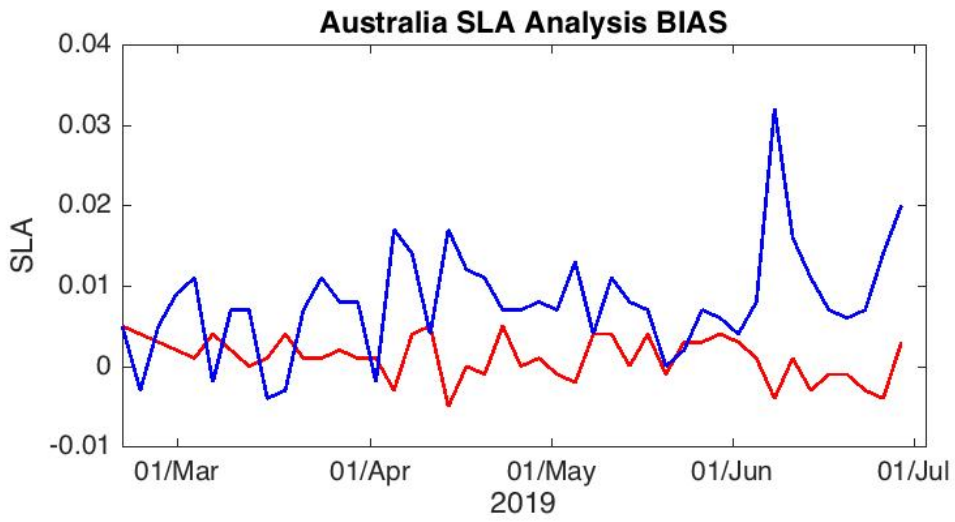


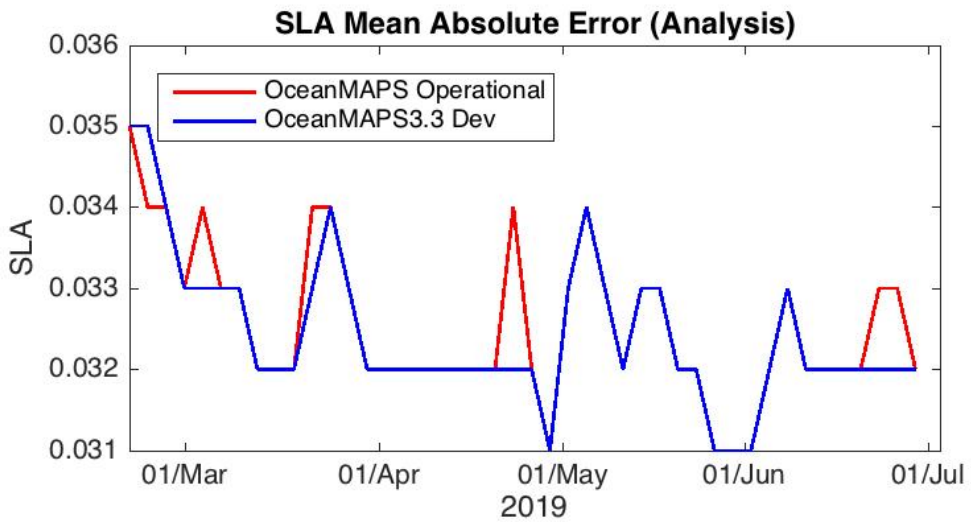


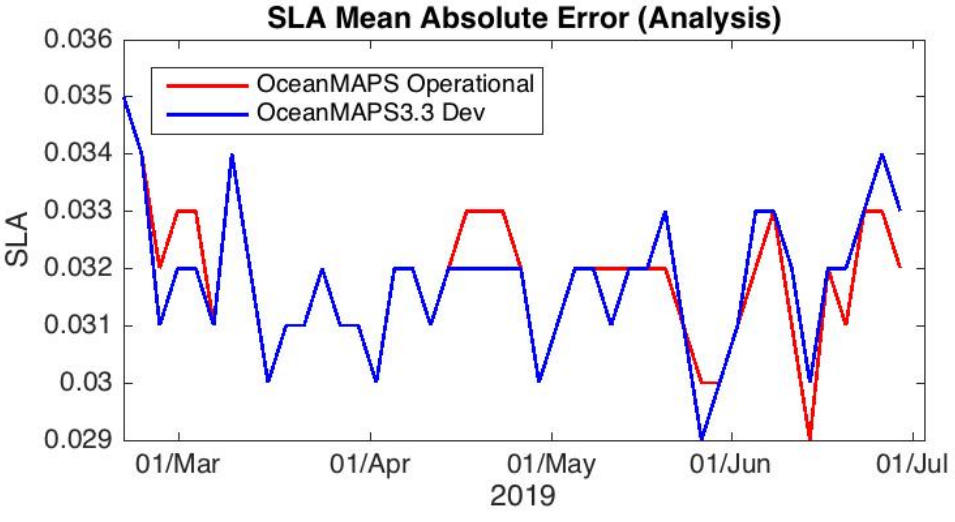


OceanMAPS Data Assimilation Statistics – SLA Analysis

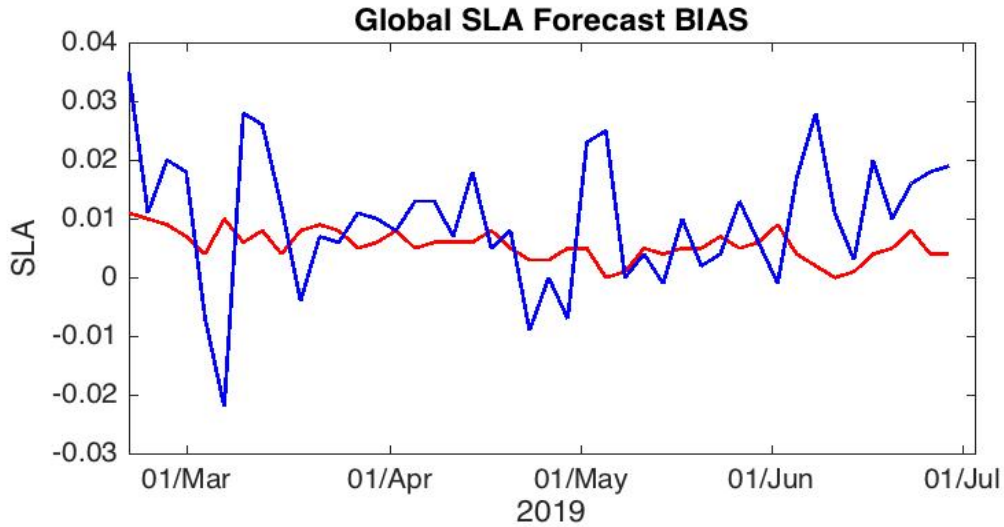


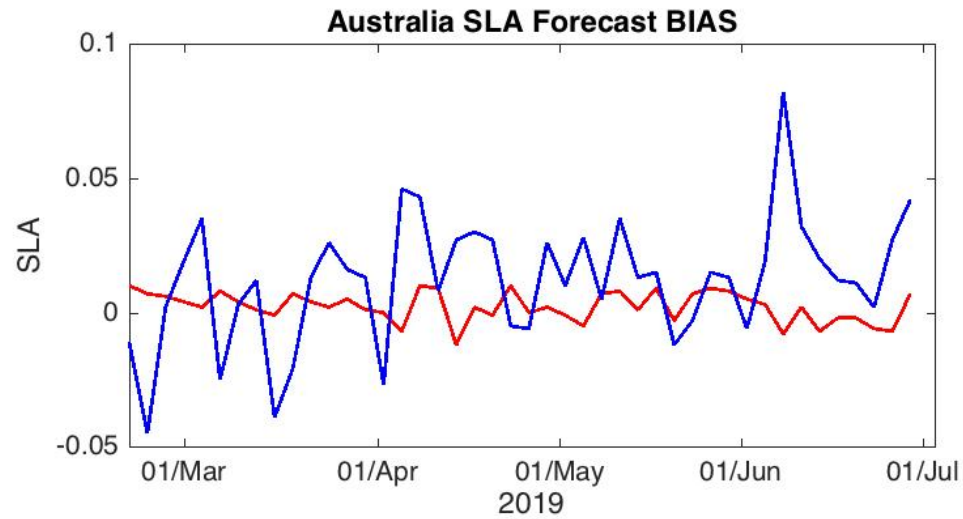


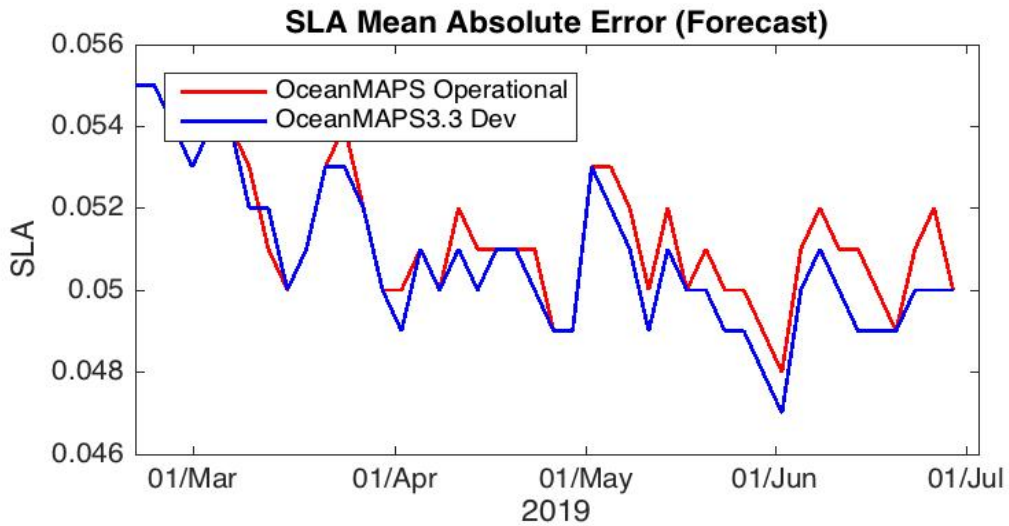


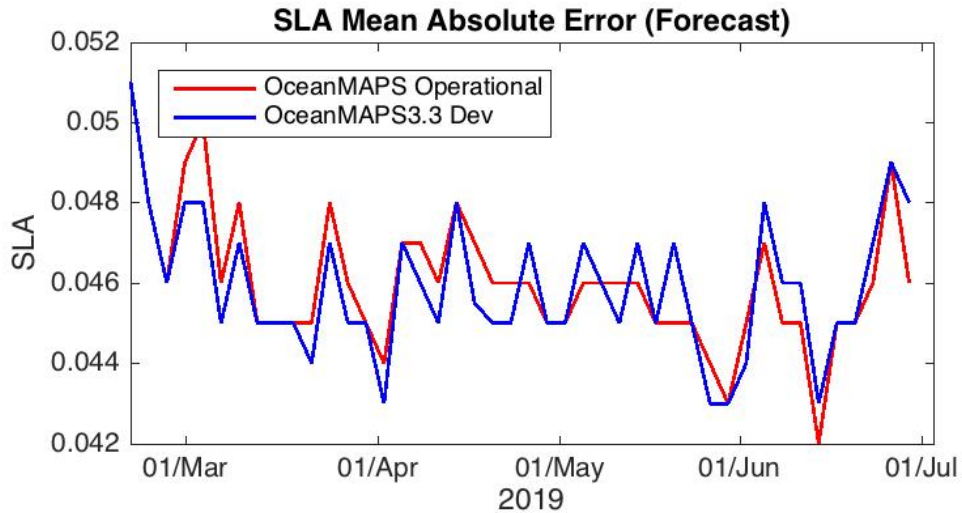


OceanMAPS Data Assimilation Statistics – SLA Forecast

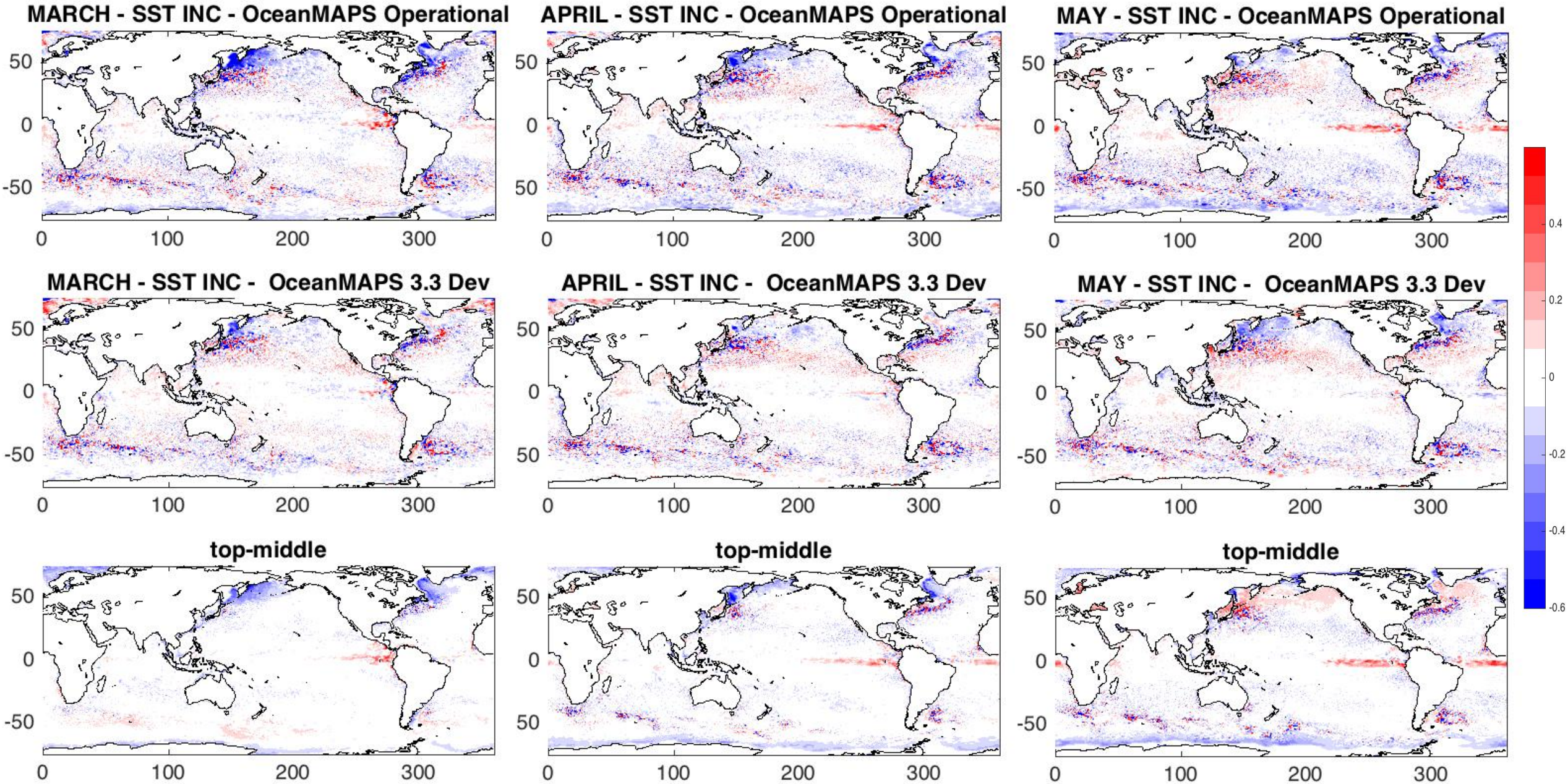








Monthly Mean SST Data Assimilation increment



Summary

- OceanMAPS 3.3 system planned to use ACCESS-APS3 fluxes in bulk mode.
- Along with improved implementation of k-ε mixing scheme, and FGAT DA assimilation.

✓ The current OceanMAPS 3.3 Dev system show improvements in SST and SALT compared to operational version.

✓ TEMP and SLA MAE are comparable to OceanMAPS3.2 operational version.