# ioda-plots

- spatial and temporal binning of obs space statistics

- quickly generate a whole giant bucket load of plots, automatically, from any ioda formatted files, with little or no configuration required

- Not always the prettiest plots, but highly automatic

- Decrease amount of data needed to be saved for long experiments, and speed up plotting for real-time usage

JCSDA Real-Time Observation Monitoring

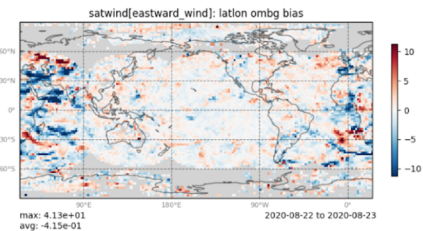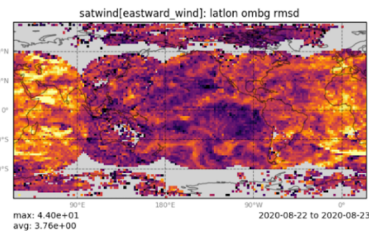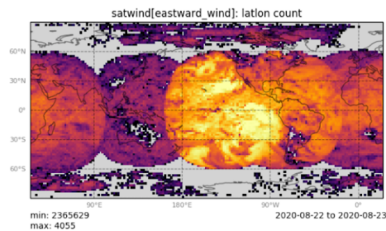updated: Wed 26 Aug 2020 12:22:38 AM UTC

Realtime HofX > satwind

satwind
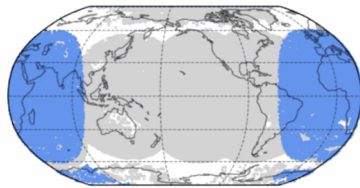
The satellite wind product is provided by the Office of Satellite and Product Operations (OSPO) service. For more information please visit:
https://www.emc.ncep.noaa.gov/mmb/data_processing/prepbufr.doc/table_2.htm

2020-08-23 02:40:00 ±10min

JEDI HofX

For each variable and/or satellite channel, shown are the observation counts (left), O-B RMSD (center), and O-B bias (right).
Click on any variable name below to expand and view the plots.
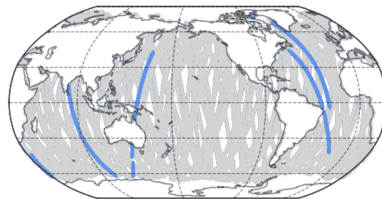
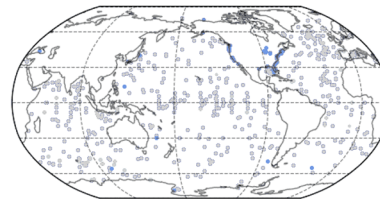**eastward_wind**   −

satwind[eastward_wind]: latlon count

satwind[eastward_wind]: latlon ombg rmsd

satwind[eastward_wind]: latlon ombg bias

min: 2365629
max: 4055

2020-08-22 to 2020-08-23

max: 4.40e+01
avg: 3.76e+00

2020-08-22 to 2020-08-23

max: 4.13e+01
avg: -4.15e-01

9:28 AM

soca.jcsda.org
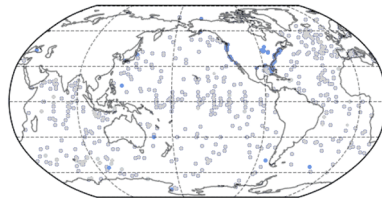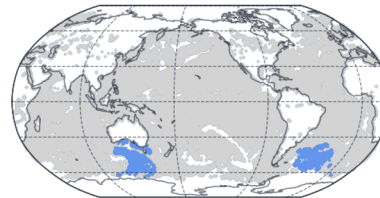
Time Averaged Statistics

Time averaged statistics for up to the past 30 days. Stats are binned on a 1 degree grid.

Counts

Number of observations passing quality control (left) and the percentage of bad obs removed (right).

sst count_qc (66f890c)
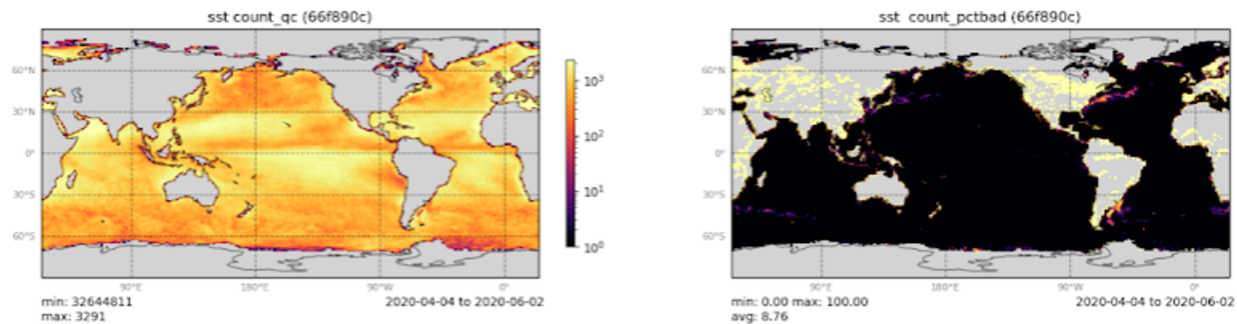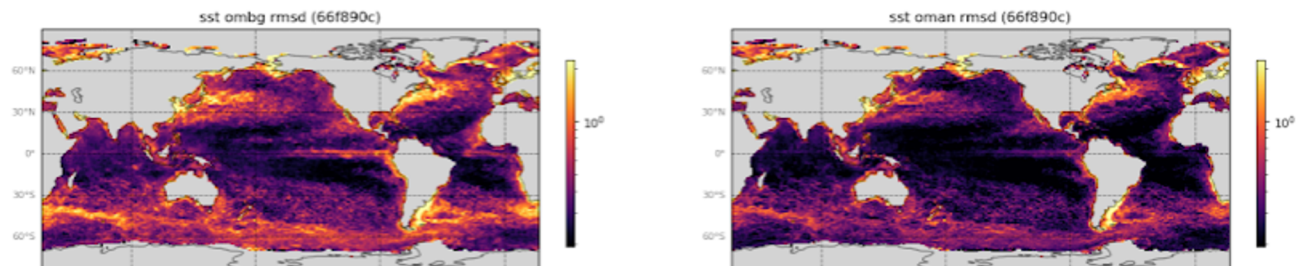
min: 32644811
max: 3291

2020-04-04 to 2020-06-02

sst count_pctbad (66f890c)
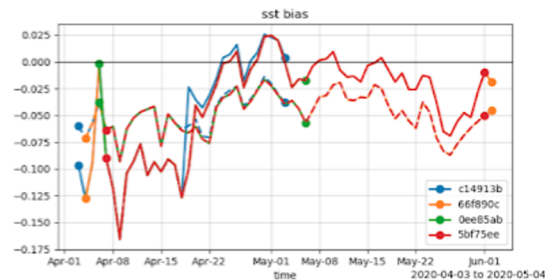
min: 0.00 max: 100.00
avg: 8.76

2020-04-04 to 2020-06-02

RMSD

Root mean squared deviation for O-B (left) and O-A (right).

sst ombg rmsd (66f890c)

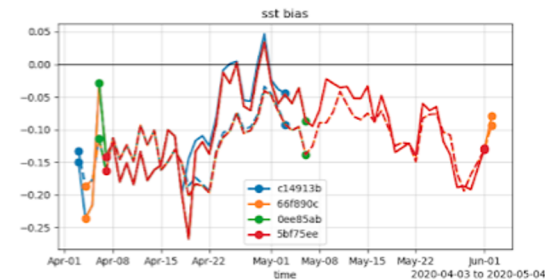sst oman rmsd (66f890c)

Timeseries of bias and RMSD for O-B (solid line) and O-A (dashed line). If multiple colors are shown, they represent the realtime/retrospective runs from the given git hash of the **release/nightly** or **master** branches of the repository.

Global

NH
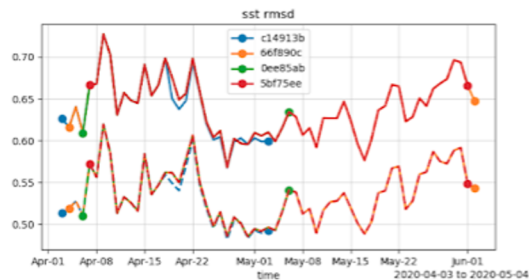
Northen hemisphere midlatitudes (20N-60N).

TP

Tropics (20S-20N).

```
2018-03-01 hofx files  →  iodplots bin ...

2018-03-02 hofx files  →  iodplots bin ...                iodaplots merge/cat ...

2018-03-03 hofx files  →  iodplots bin ...

...

                                                          iodaplots plot
```
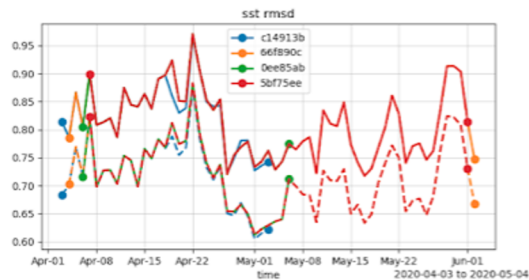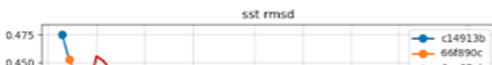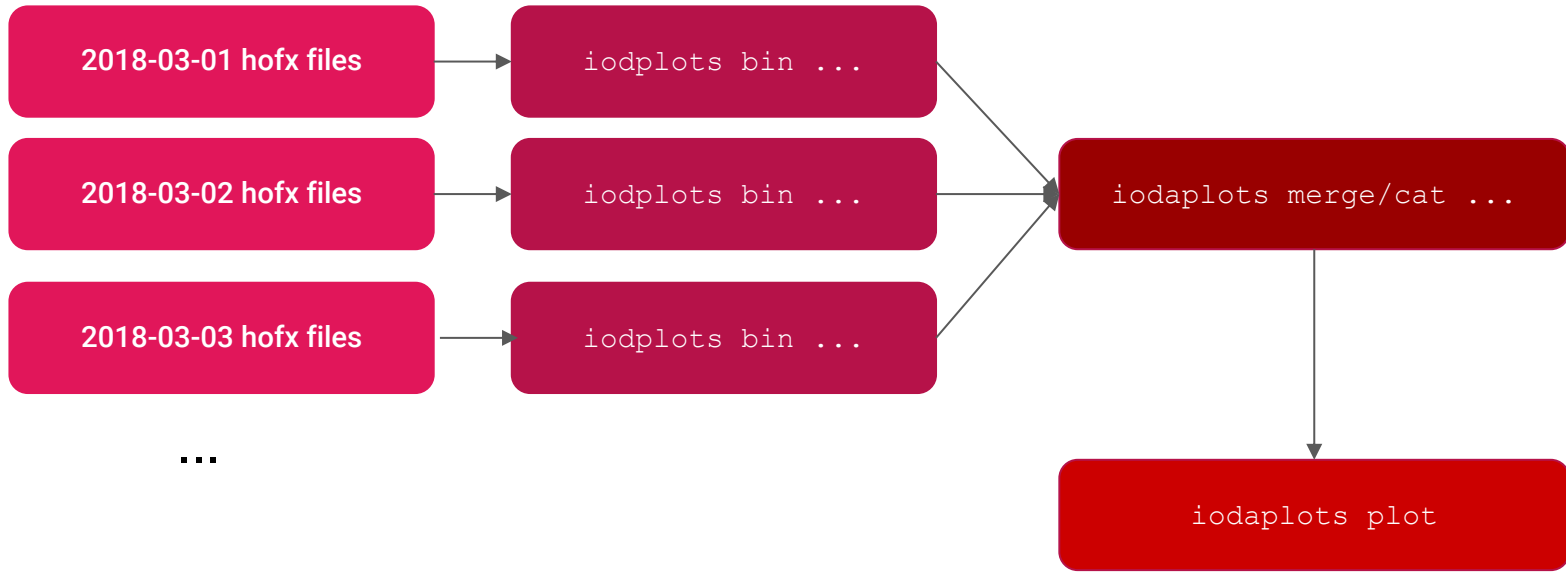
```
1    # ----------------------------------------------
2    # binning section use by the 'bin' command
3    # ----------------------------------------------
4    binning:
5
6      # metrics: WHAT should be binned?
7      metrics:
8      - name: obs
9        source: "@ObsValue"
10     - name: ombg
11       source: "@ombg"
12     - name: oman
13       source: "@oman"
14     - name: inc
15       source: "@oman - @ombg"
16
17     # bins: HOW should it be binned?
18     bins:
19     - name: latlon
20       dimensions:
21       - name: latitude
22         resolution: 1.0
23       - name: longitude
24         resolution: 1.0
25
26     - name: lat
27       dimensions:
```

ioda plots can be run with no configuration and will try to guess what should be binned and plotted. Or, a custom yaml file can be given:

metrics: what should be binned.

- **by default** O-B, O-A, obs value, and counts are calculated.
- counts / mean / and sum-of-square-diff-from-mean are binned

```
15     source: "@oman - @ombg"
16
17     # bins: HOW should it be binned?
18     bins:
19     - name: latlon
20       dimensions:
21       - name: latitude
22         resolution: 1.0
23       - name: longitude
24         resolution: 1.0
25
26     - name: lat
27       dimensions:
28       - name: latitude
29         resolution: 5.0
30
31     - name: lon_eq
32       dimensions:
33       - name: longitude
34         resolution: 5.0
35         bounds: [-180, 10.0]
36       - name: latitude
37         bounds: [-5.0, 5.0]
38
39     - name: global
40       dimensions: []
41
42     # - name: nino34
```

bins: how the spatial binning is done

- **by default:** latlon 1 degree, global, and vertical profile (if depth/height coordinate available)
- any dimension name can be used, so long as it is in the ioda files
- clipping to certain regions (e.g. NH/SH/TP, or nino3.4)
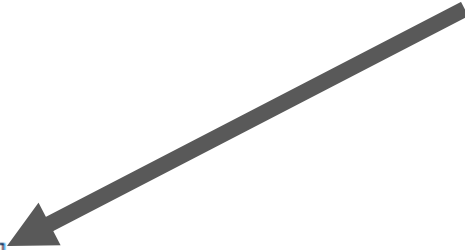
```
49
50   # ------------------------------------------
51   # plotting section used by the 'plot' command
52   # ------------------------------------------
53   plotting:
54
55     # WHAT should be plotted?
56     basic:
57     - class: PlotType2D*
58       any:
59       - metric: [ombg, oman, inc]
60         stat: [rmsd, bias]
61       - metric: [obs,]
62         stat: [mean, stddev, count]
63
64     - class: PlotType1D*
65       metric: obs
66       stat: [mean, stddev, count]
67
68     # composite: #TODO, currently in progress
69     # - class: PlotType1D*
70     #   name: rmsd
71     #   plot:
72     #   - metric: ombg
73     #     stat: rmsd
74     #     args: {ls: '-'}
75     #   - metric: oman
76     #     stat: rmsd
77     #     args: {ls: '--'}
78
79     # TODO currently in progress
```

plots

- **by default:** every variable / metric/ binning combination is given its own plot (for a LOT of plots)
- only a subset of plots can be selected, and/or metrics combined into single plot

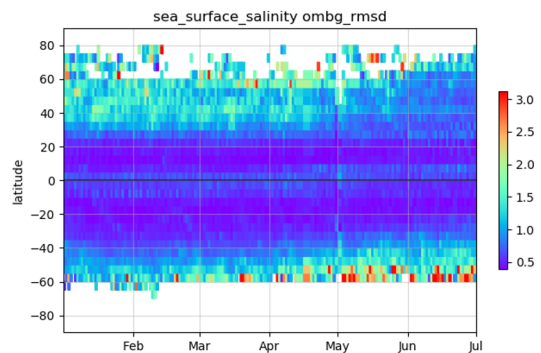Types of plots automatically chosen based on what the binning dimension types are:

- PlotType1D
  - PlotType1DLat
  - PlotType1DTimeseries
  - PlotType1DProfile
- PlotType2D
  - PlotType2DHovmoller
  - PlotType2DLatLon
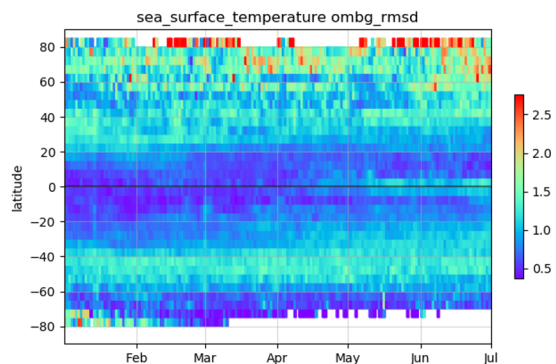
SOCA Static covarance model testing

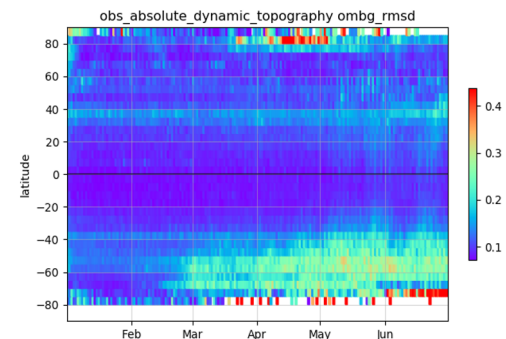| SMAP	MW: GMI, AMSR2, WindSat IR: NOAA-19	Jason-2, Cryosat-2, SARAL, Sentinel-3

sea_surface_salinity ombg_rmsd

2016-01-01 01Z to 2016-07-01 00Z   JCSDA ioda-plots

sea_surface_temperature ombg_rmsd

2016-01-01 00Z to 2016-07-01 00Z   JCSDA ioda-plots

obs_absolute_dynamic_topography ombg_rmsd

2016-01-01 00Z to 2016-06-30 23Z   JCSDA ioda-plots

sea_surface_salinity ombg_rmsd

2016-01-01 01Z to 2016-07-01 00Z   JCSDA ioda-plo

sea_surface_temperature ombg_rmsd

2016-01-01 00Z to 2016-07-01 00Z   JCSDA ioda-plots

obs_absolute_dynamic_topography ombg_rmsd
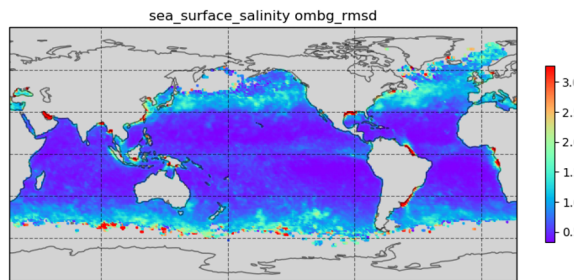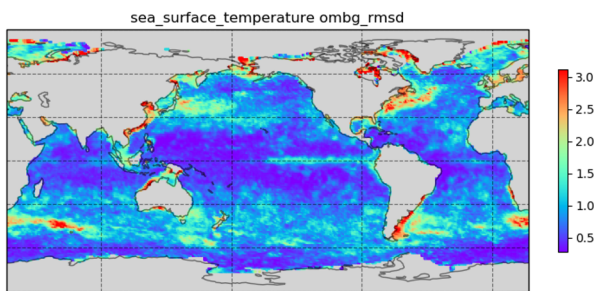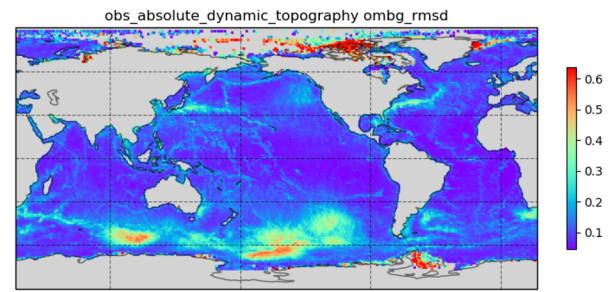
2016-01-01 00Z to 2016-06-30 23Z   JCSDA ioda-plots
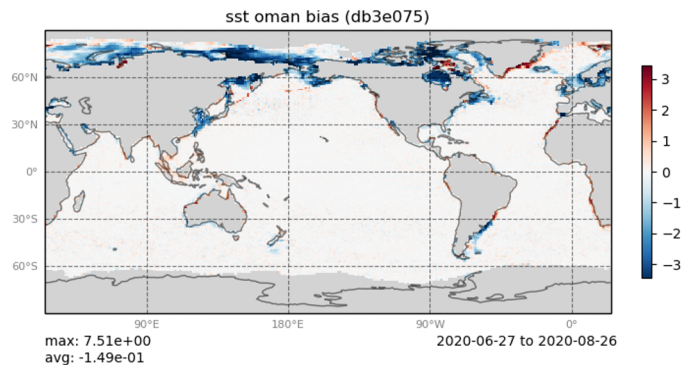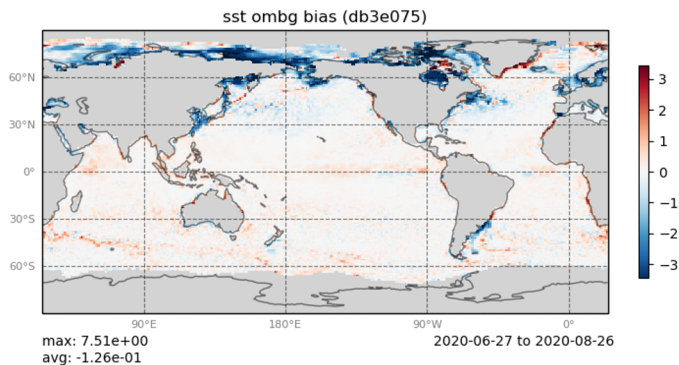
experiment comparisons

```
iodaplots plot --exp path_to_exp1 --exp path_to_exp2
```


Time Averaged Statistics (diff with `master`)

Time averaged statistics for up to the past 30 days. Stats are binned on a 1 degree grid, and shown as the difference from the `master` branch.
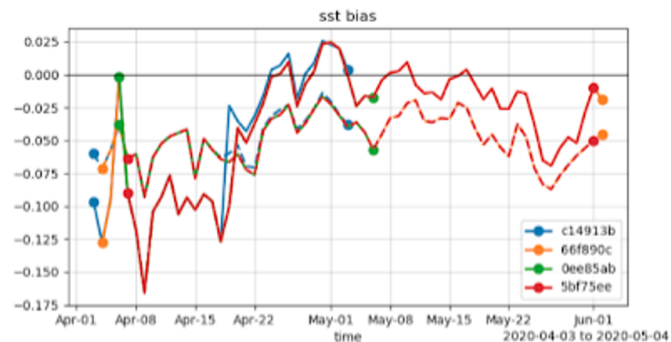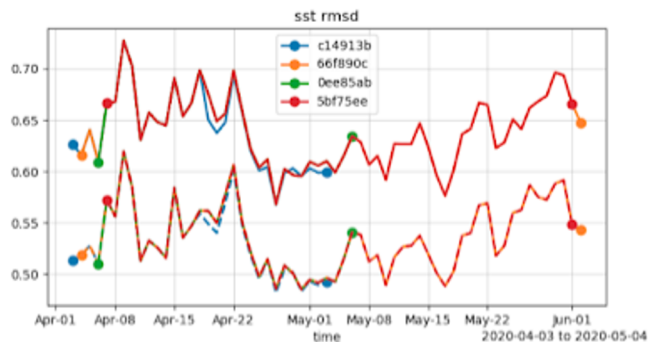
RMSD

Root mean squared deviation for O-B (left) and O-A (right), for `master - release/nightly`

experiment comparisons

```
iodaplots plot --exp path_to_exp1 --exp path_to_exp2
```