

DIAGTOOL REPORT



Round Robin (GT cotier) : Wet tropospheric correction. Eaustralia. J2. Wet rad vs Wet gpd vs Wet ecmwf.

25 avril 2022

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1 General description

- Figures and notes have been included in this report to evaluate different altimetry products.
- In order to test different version of the Wet tropospheric correction used to calculate the sea level anomaly. Each version has been compared with a reference version. In this case the Wet_rad is the reference one.
- The sea level anomaly has been calculated using each version of the variable and has been compared to the sea level anomaly calculated using the reference version.
- The region of study is Eaustralia
- Mission : J2
- Git last tag : 0.9 Ajouter les rapports ssb
- Git changeset number : ddb8b8d-2022-04-25

2 Processing

2.1 sla formula

2.1.1 Wet_rad product ' sla

```
sla = ORBIT.ALT.PO.E_GDR_E -  
      RANGE.ALT -  
      MEAN_SEA_SURFACE.MODEL.CNESCLS15 -  
      SEA_STATE_BIAS.ALT.NON_PARAMETRIC -  
      IONOSPHERIC_CORRECTION.MODEL.GIM -  
      WET_TROPOSPHERIC_CORRECTION.RAD -  
      DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -  
      DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -  
      OCEAN_TIDE_HEIGHT.MODEL.FES14B -  
      SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -  
      POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017
```

2.1.2 Wet_gpd product ' sla

```
sla = ORBIT.ALT.PO.E_GDR_E -  
      RANGE.ALT -  
      MEAN_SEA_SURFACE.MODEL.CNESCLS15 -  
      SEA_STATE_BIAS.ALT.NON_PARAMETRIC -  
      IONOSPHERIC_CORRECTION.MODEL.GIM -  
      WET_TROPOSPHERIC_CORRECTION.GPD_PLUS -  
      DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -  
      DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -  
      OCEAN_TIDE_HEIGHT.MODEL.FES14B -  
      SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -  
      POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017
```

2.1.3 Wet_ecmwf product ' sla

```
sla = ORBIT.ALT.PO.E_GDR_E -  
      RANGE.ALT -  
      MEAN_SEA_SURFACE.MODEL.CNESCLS15 -  
      SEA_STATE_BIAS.ALT.NON_PARAMETRIC -  
      IONOSPHERIC_CORRECTION.MODEL.GIM -  
      WET_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -  
      DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -  
      DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -  
      OCEAN_TIDE_HEIGHT.MODEL.FES14B -  
      SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -  
      POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017
```

2.2 Binning

Each track has been divided to a set of sections, where the center of each section is separated by the sample frequency of the satellite times it's velocity.

The data located within the sections limits represent the altimetry time-series on which the statistics will be calculated and visualized in this report.

2.3 Filtering

- The sla has been filtered by a threshold of 3 m.
- Each sla time-serie has been filtred by a window of $[-4\sigma, 4\sigma]$, where σ is the standard deviation of the sla time serie

3 Spatial coherence analysis

3.1 sla

3.1.1 sla's count

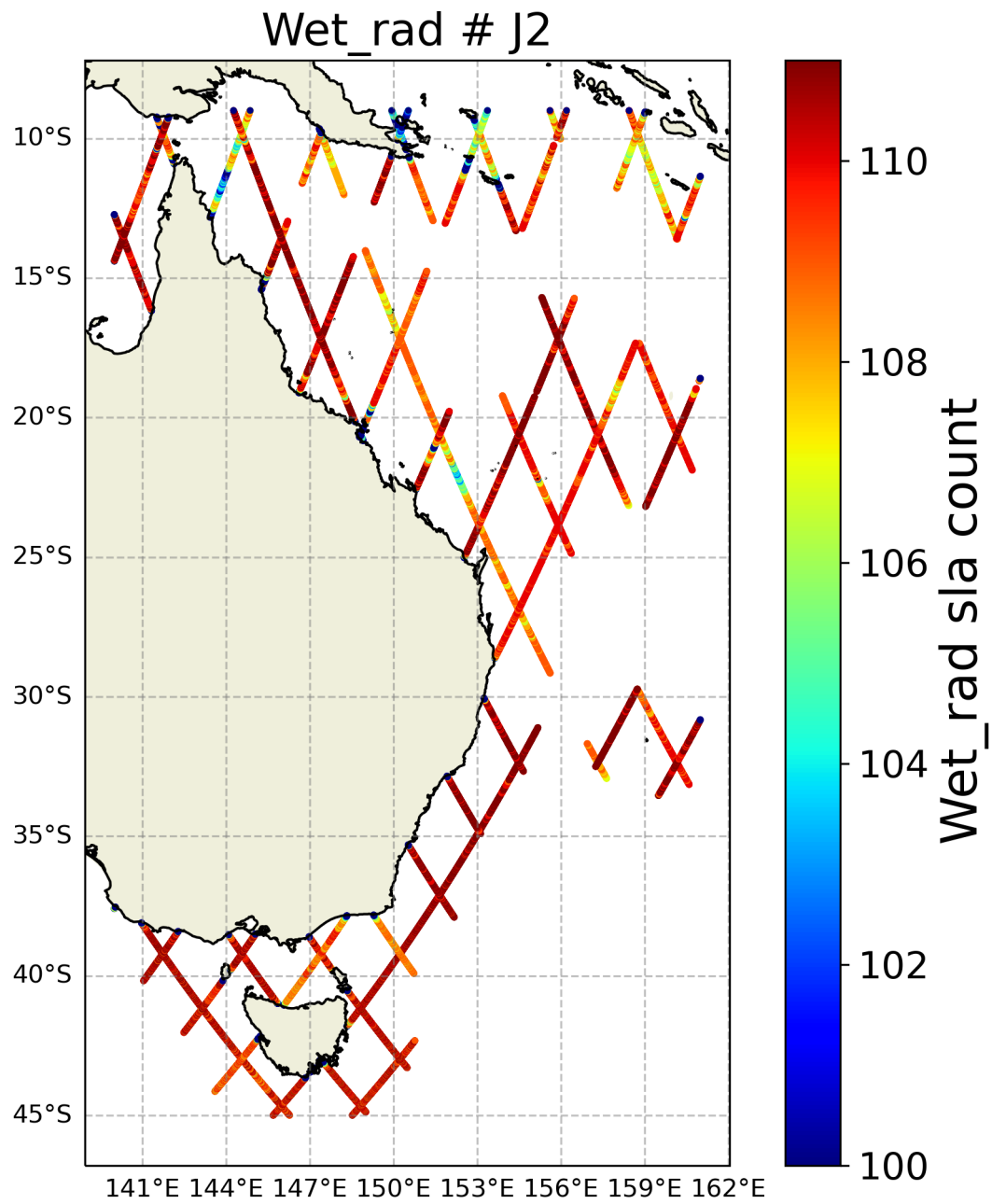


FIGURE 1 – Spatial coherence analysis of the count of the Wet_rad version of sla variable

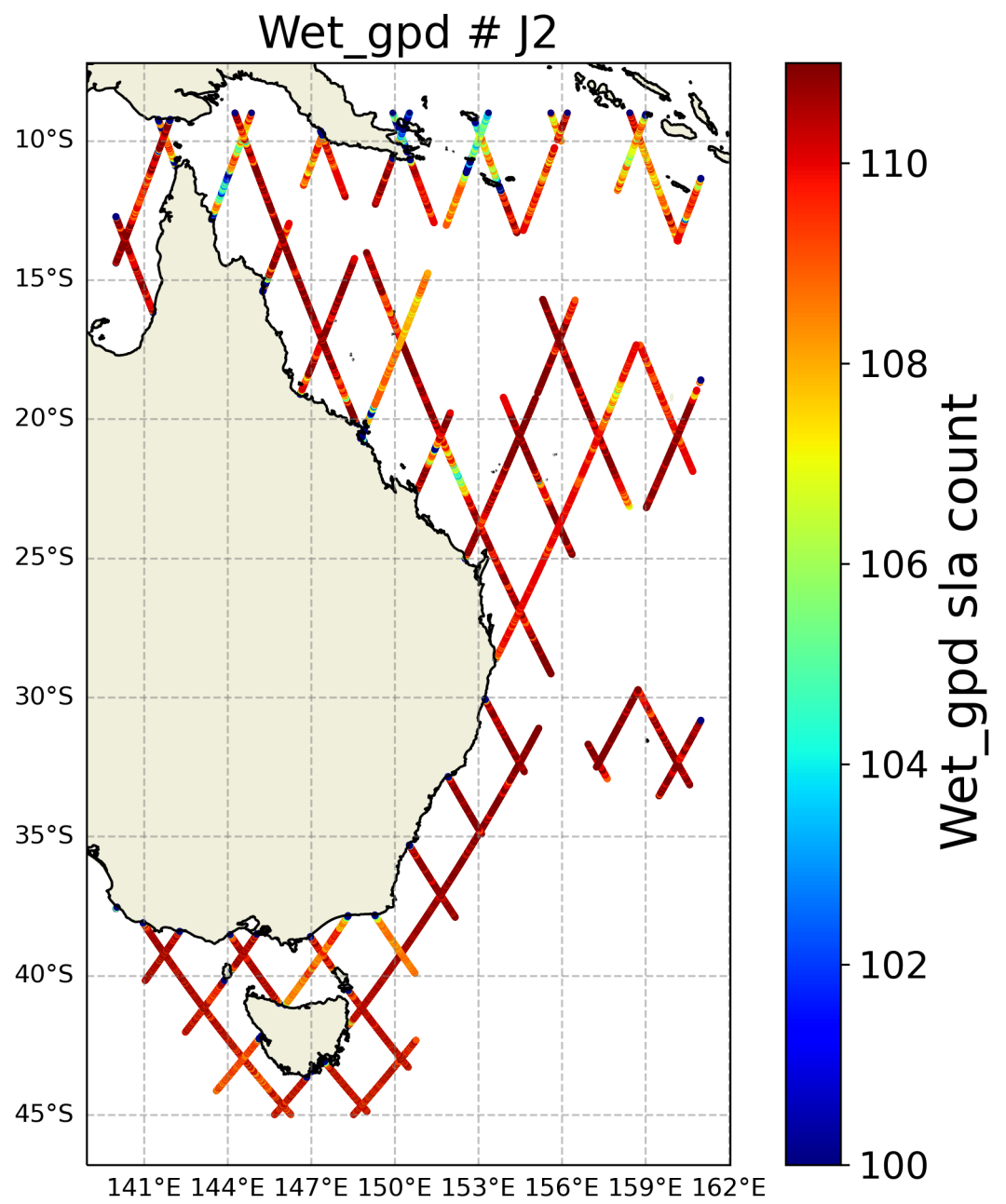


FIGURE 2 – Spatial coherence analysis of the count of the Wet_gpd version of sla variable

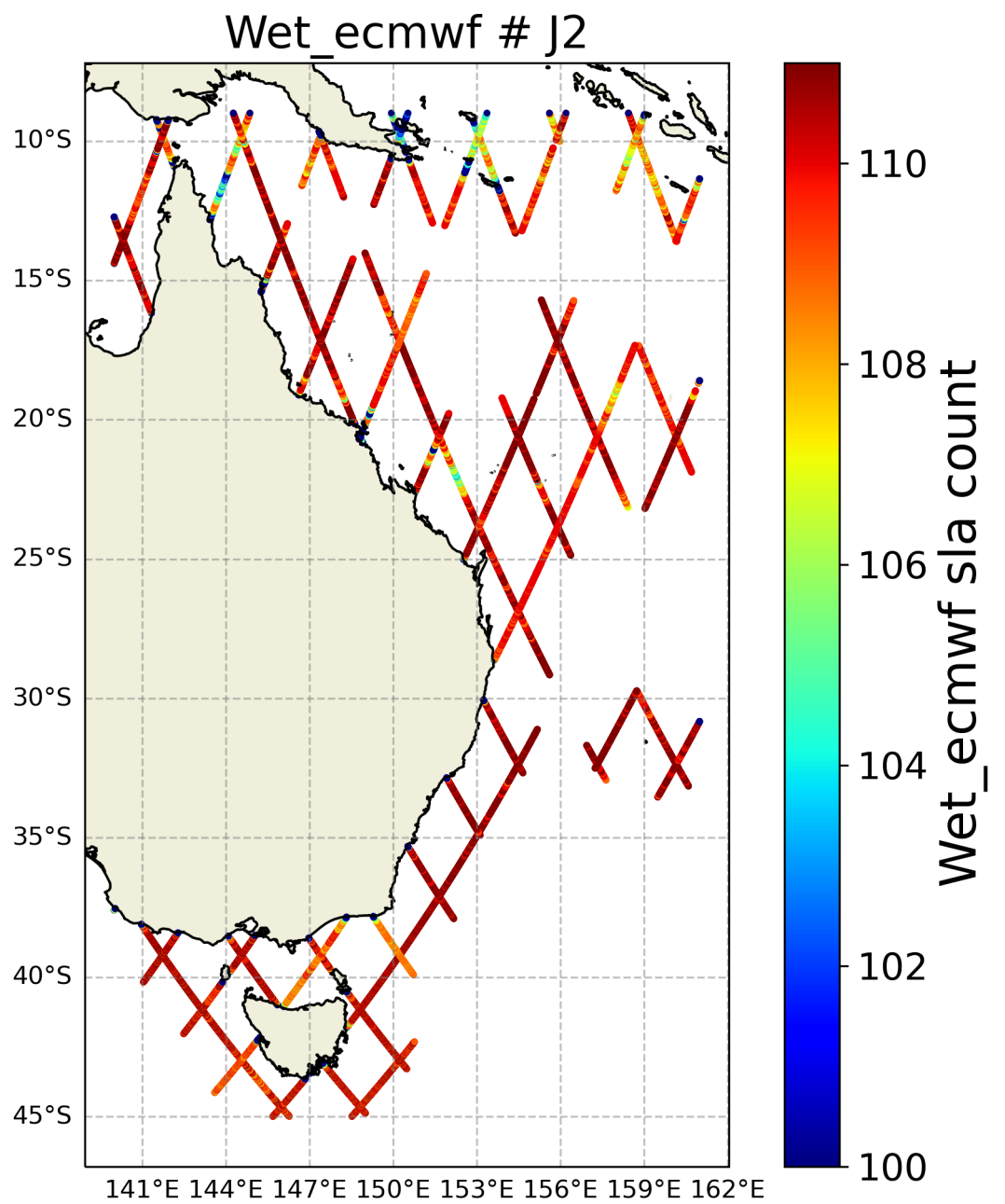


FIGURE 3 – Spatial coherence analysis of the count of the Wet_ecmwf version of sla variable

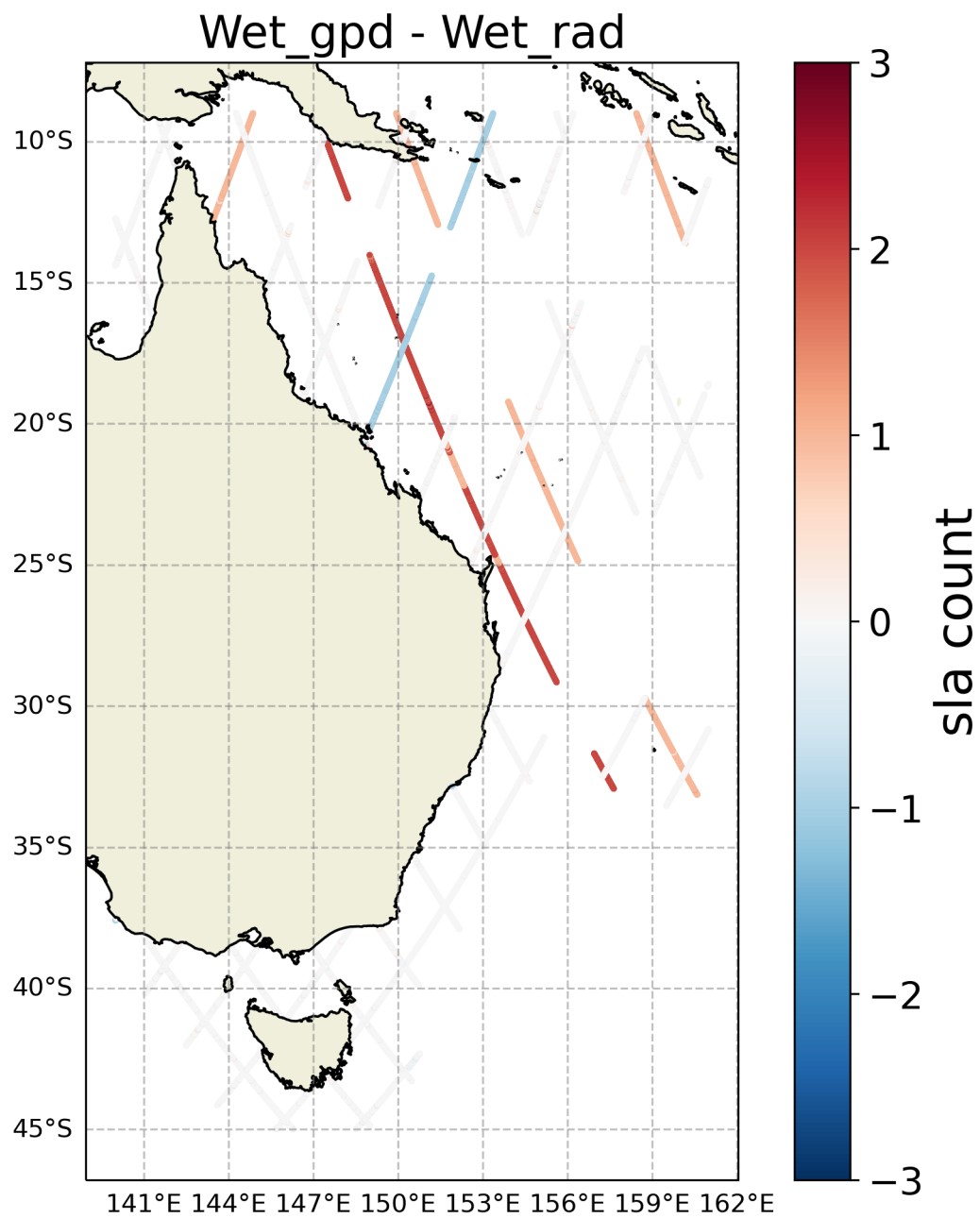


FIGURE 4 – Spatial coherence analysis of the Difference in sla 's count between Wet_gpd and Wet_rad

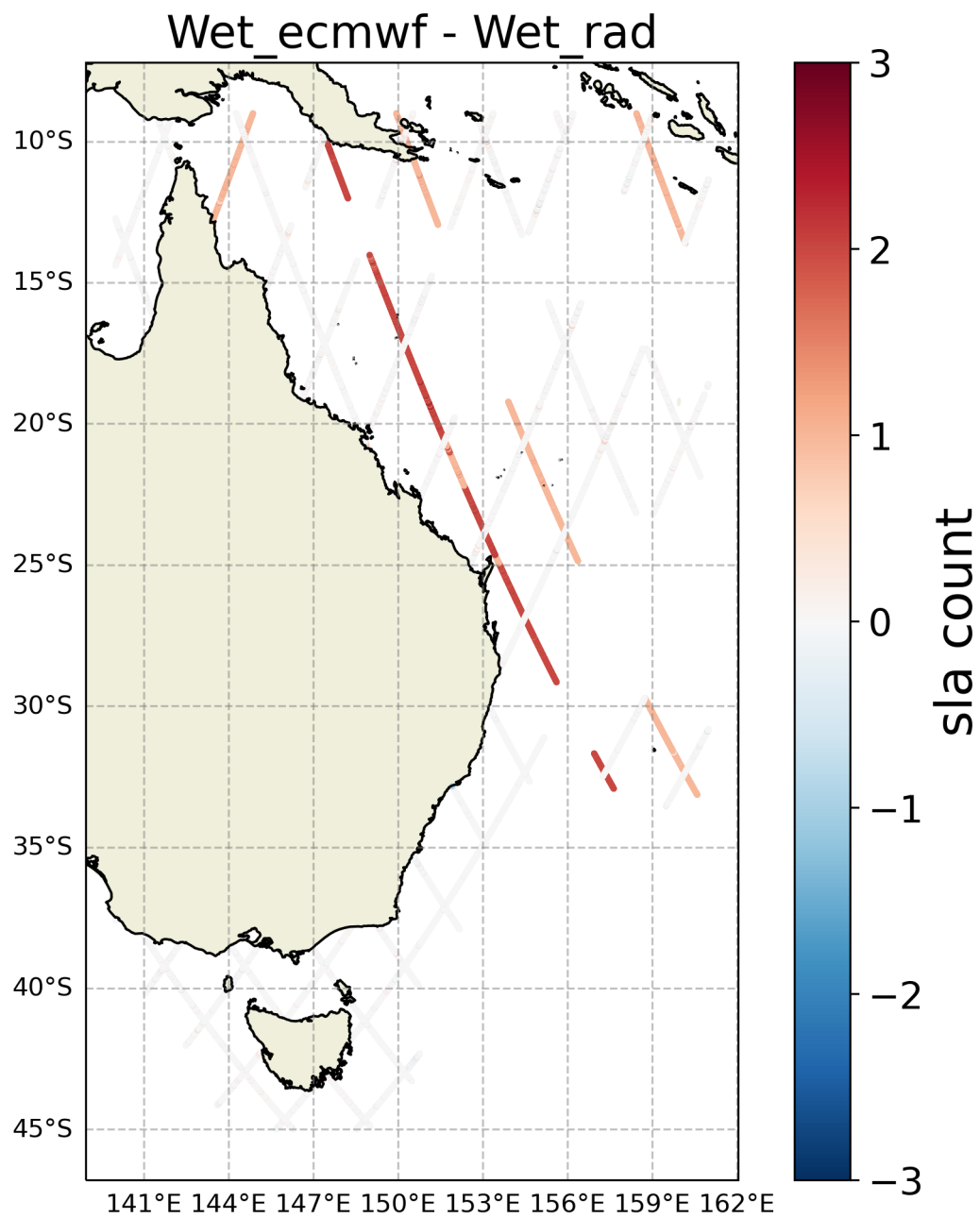


FIGURE 5 – Spatial coherence analysis of the Difference in sla 's count between Wet_ecmwf and Wet_rad

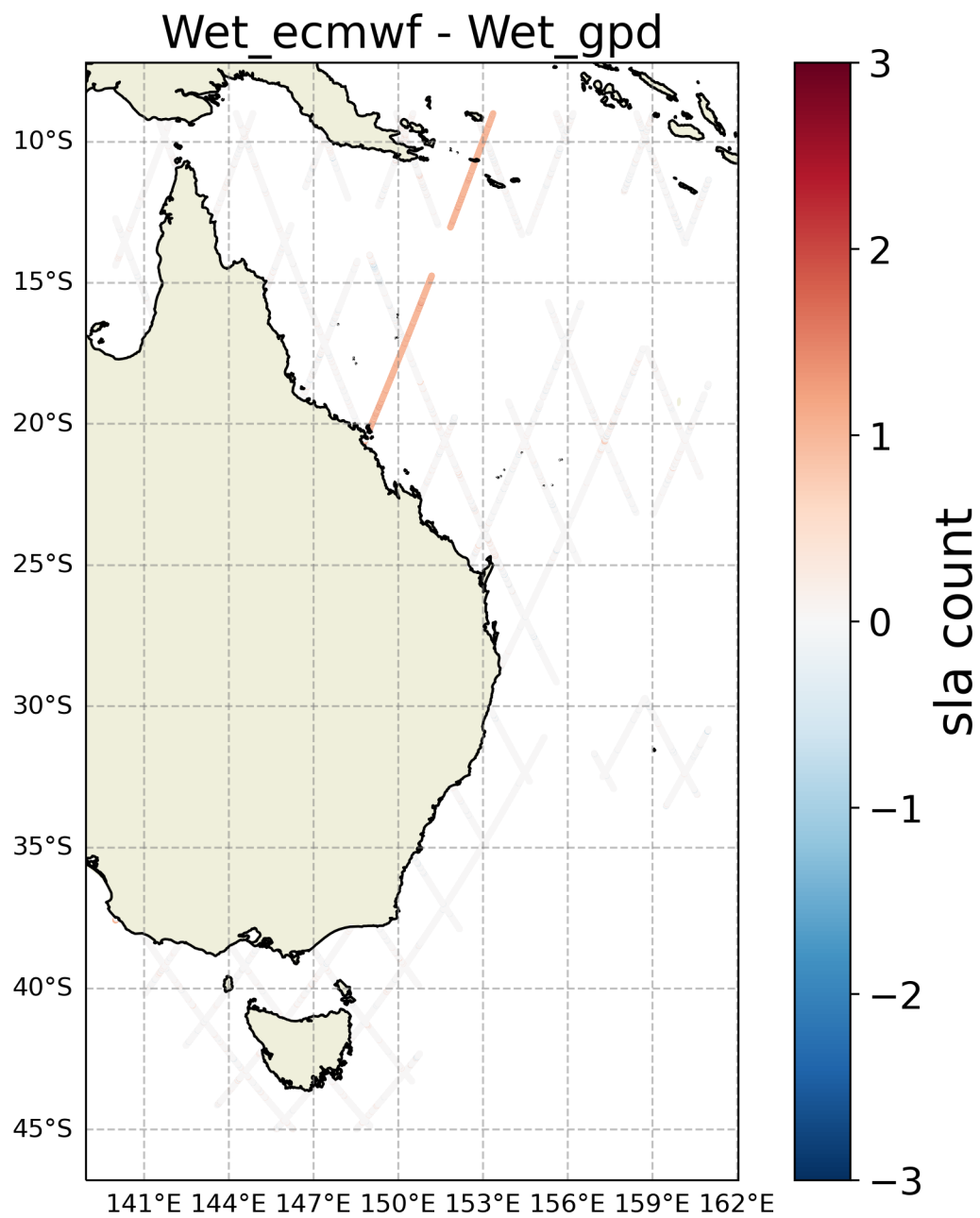


FIGURE 6 – Spatial coherence analysis of the Difference in sla 's count between Wet_ecmwf and Wet_gpd

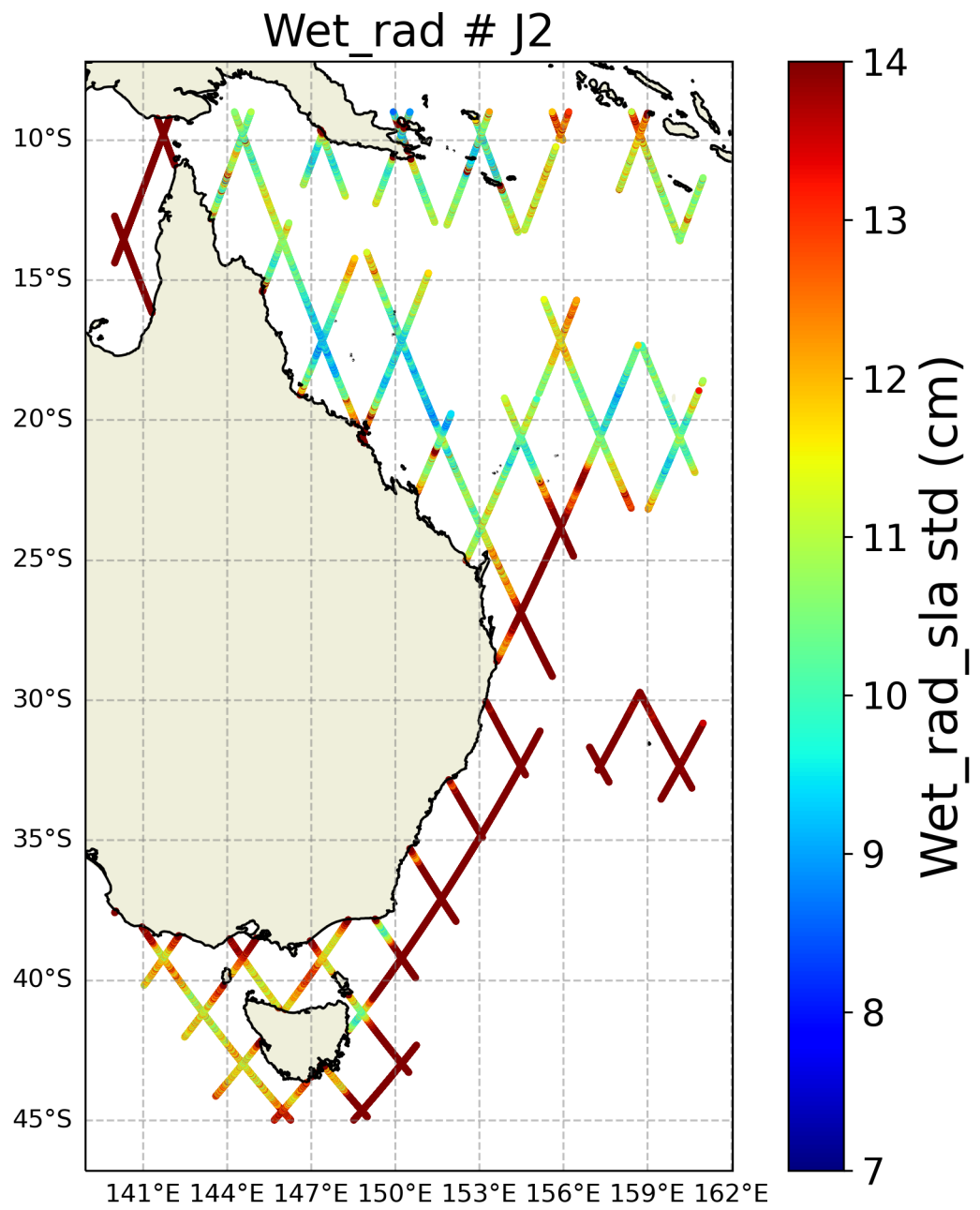


FIGURE 7 – Spatial coherence analysis of the std of the Wet_rad version of sla variable

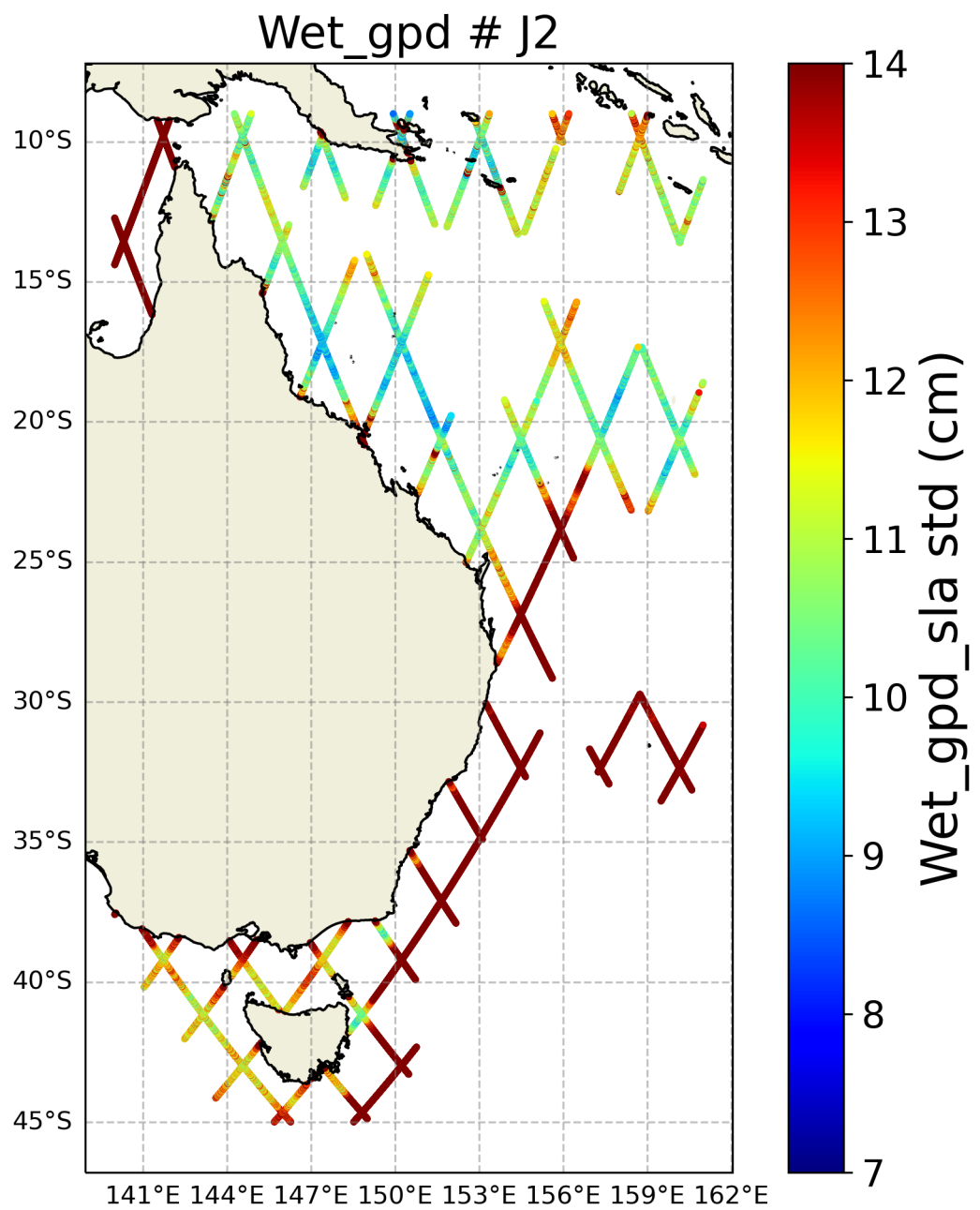


FIGURE 8 – Spatial coherence analysis of the std of the Wet_gpd version of sla variable

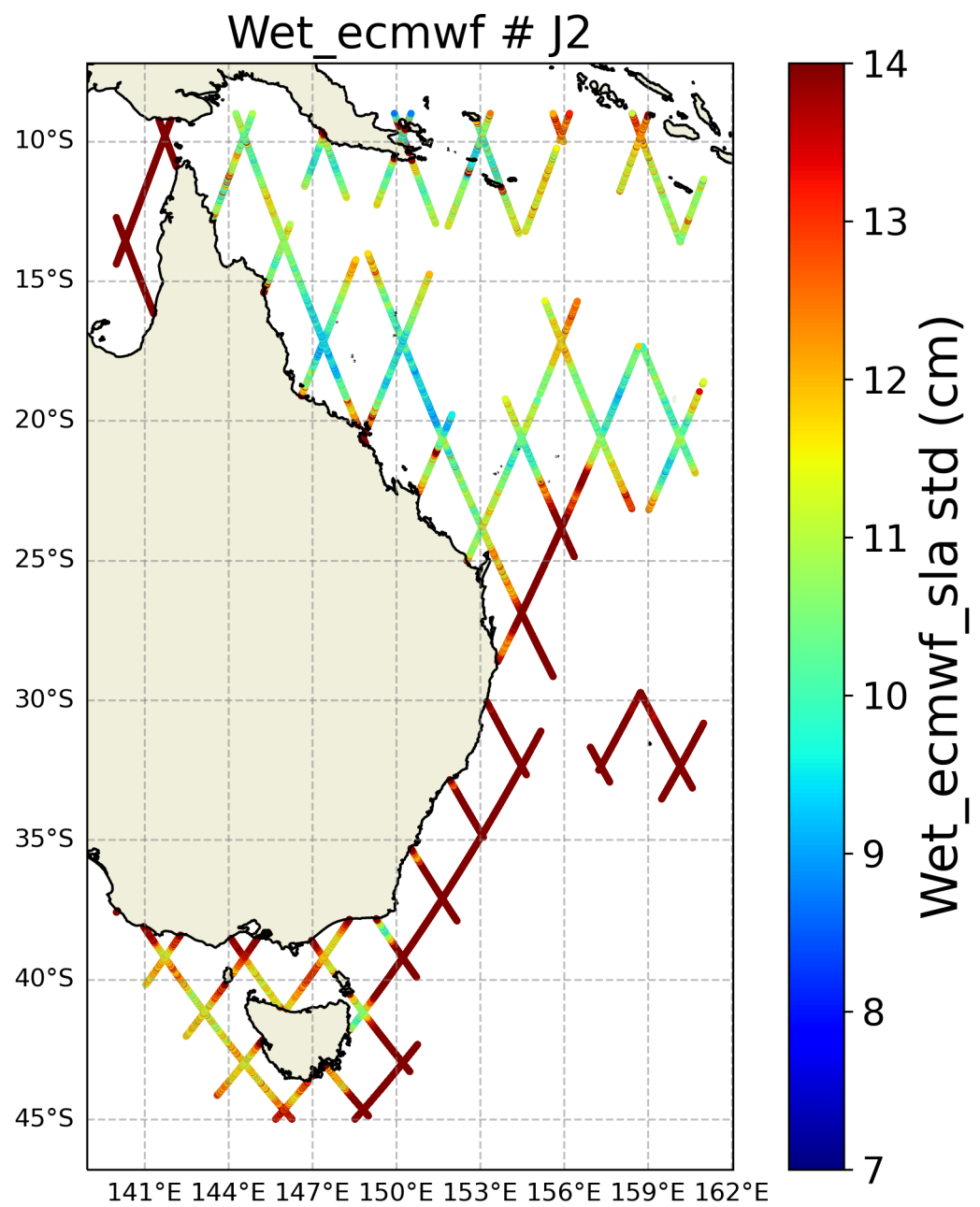


FIGURE 9 – Spatial coherence analysis of the std of the Wet_ecmwf version of sla variable

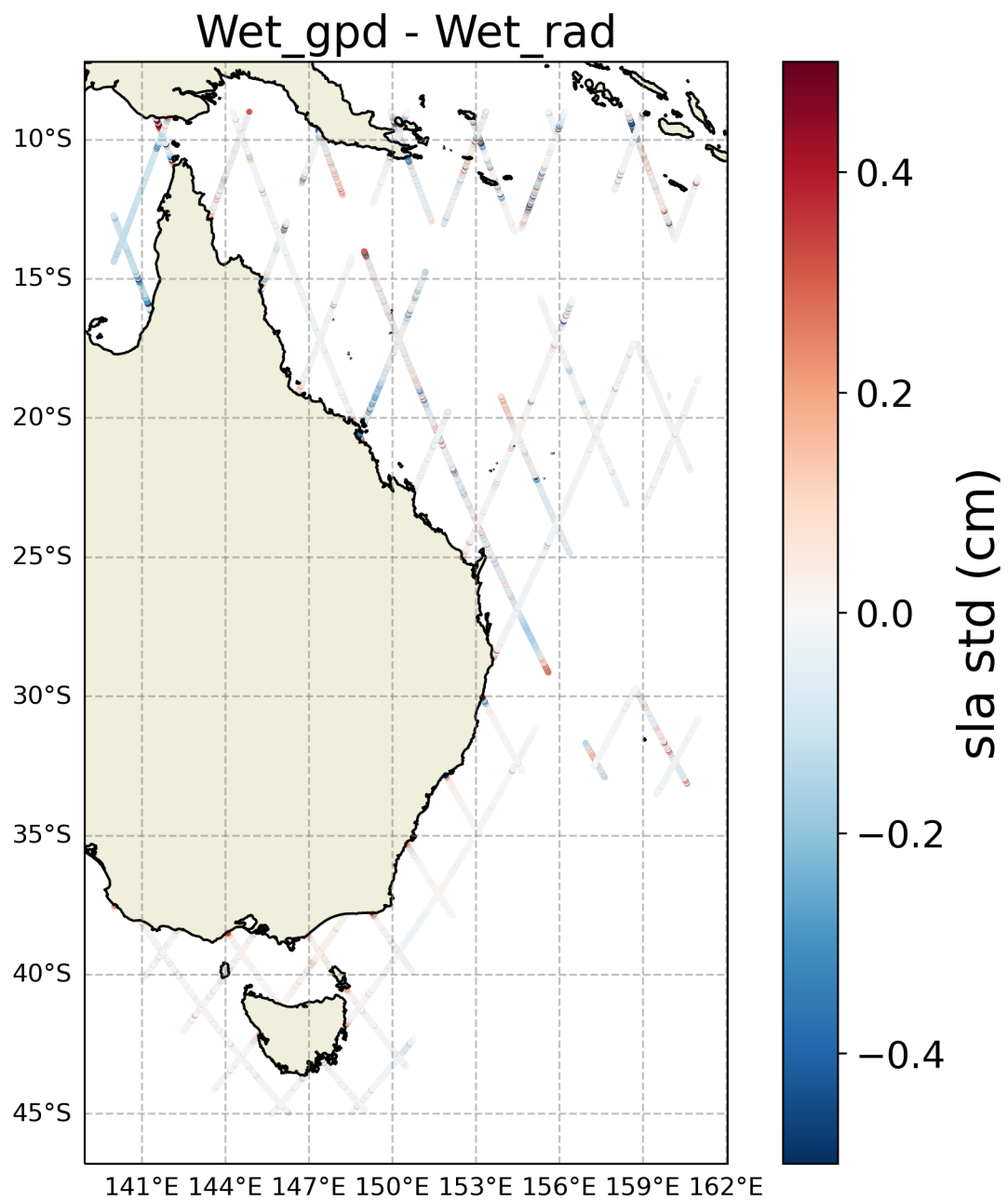


FIGURE 10 – Spatial coherence analysis of the Difference in sla 's std between Wet_gpd and Wet_rad

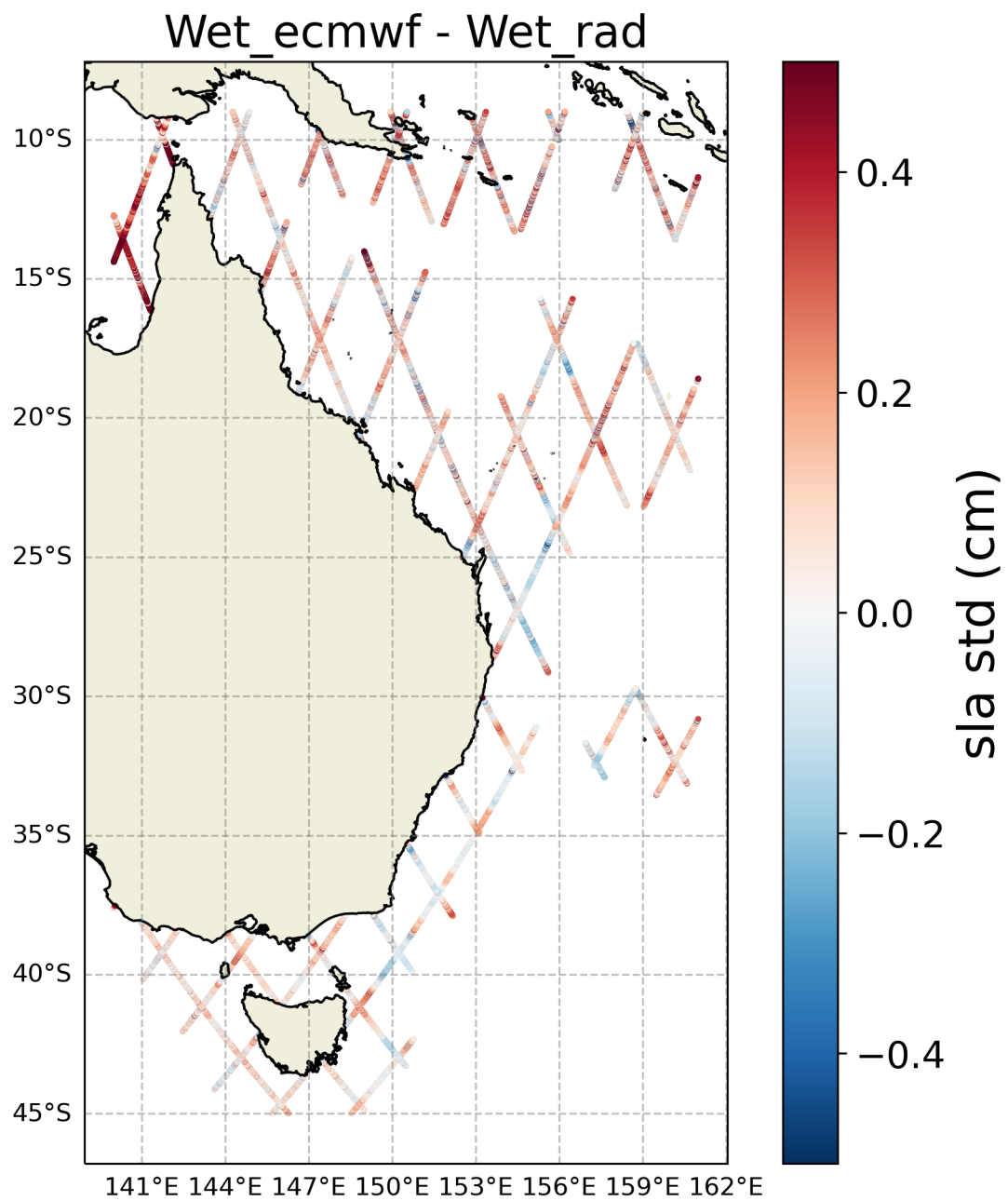


FIGURE 11 – Spatial coherence analysis of the Difference in sla 's std between Wet_ecmwf and Wet_rad

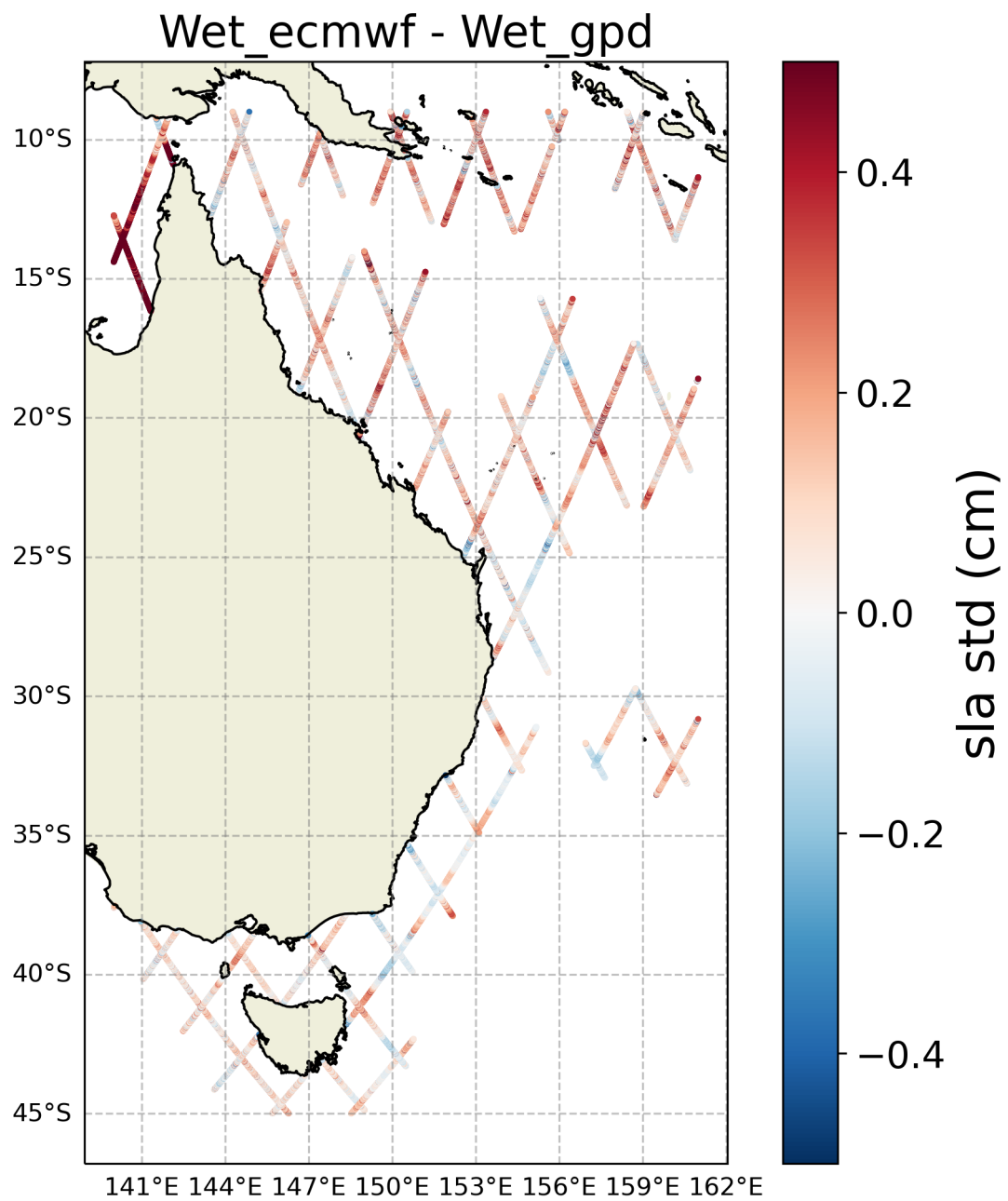


FIGURE 12 – Spatial coherence analysis of the Difference in sla 's std between Wet_ecmwf and Wet_gpd

3.1.3 sla's mean

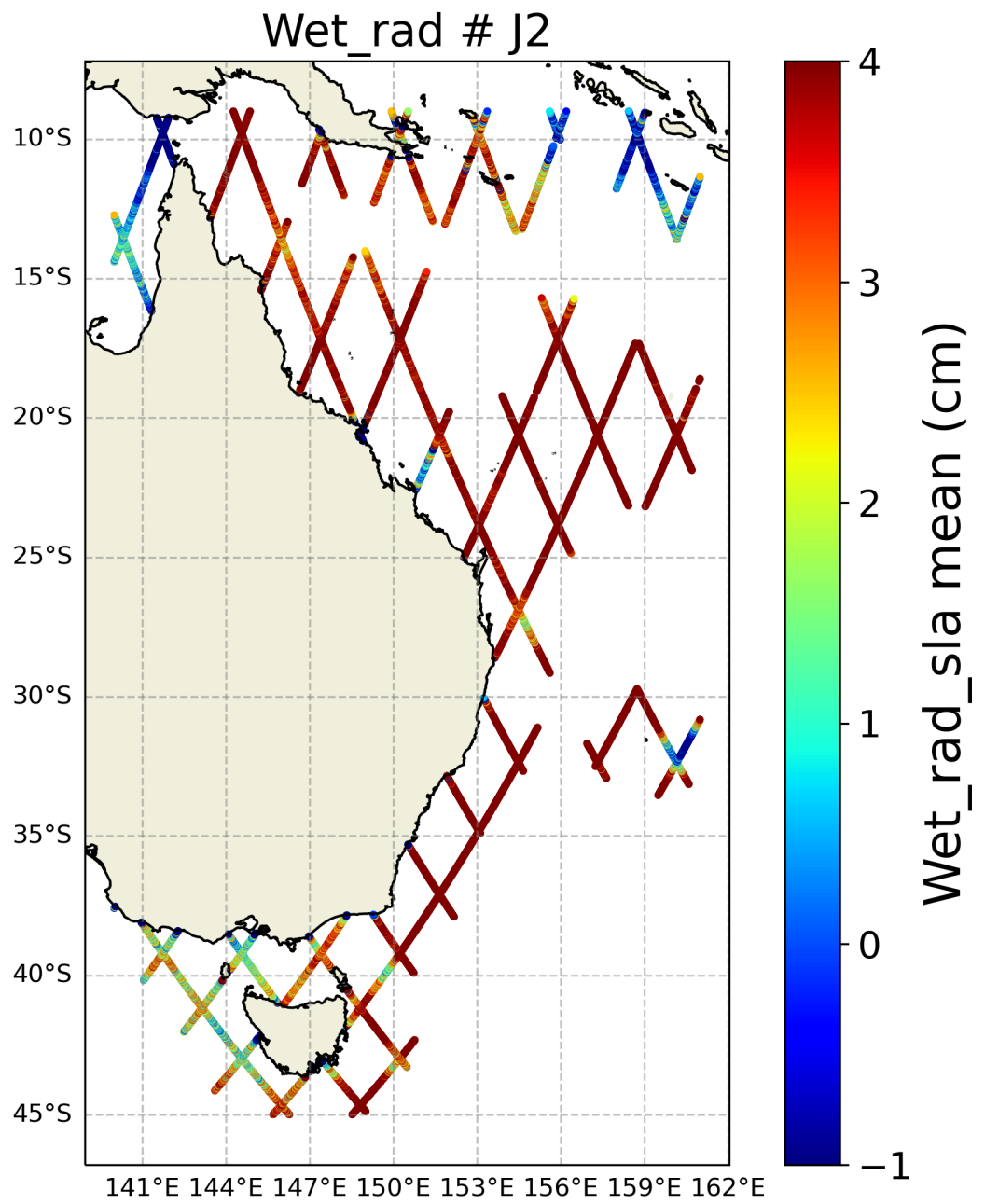


FIGURE 13 – Spatial coherence analysis of the mean of the Wet_rad version of sla variable

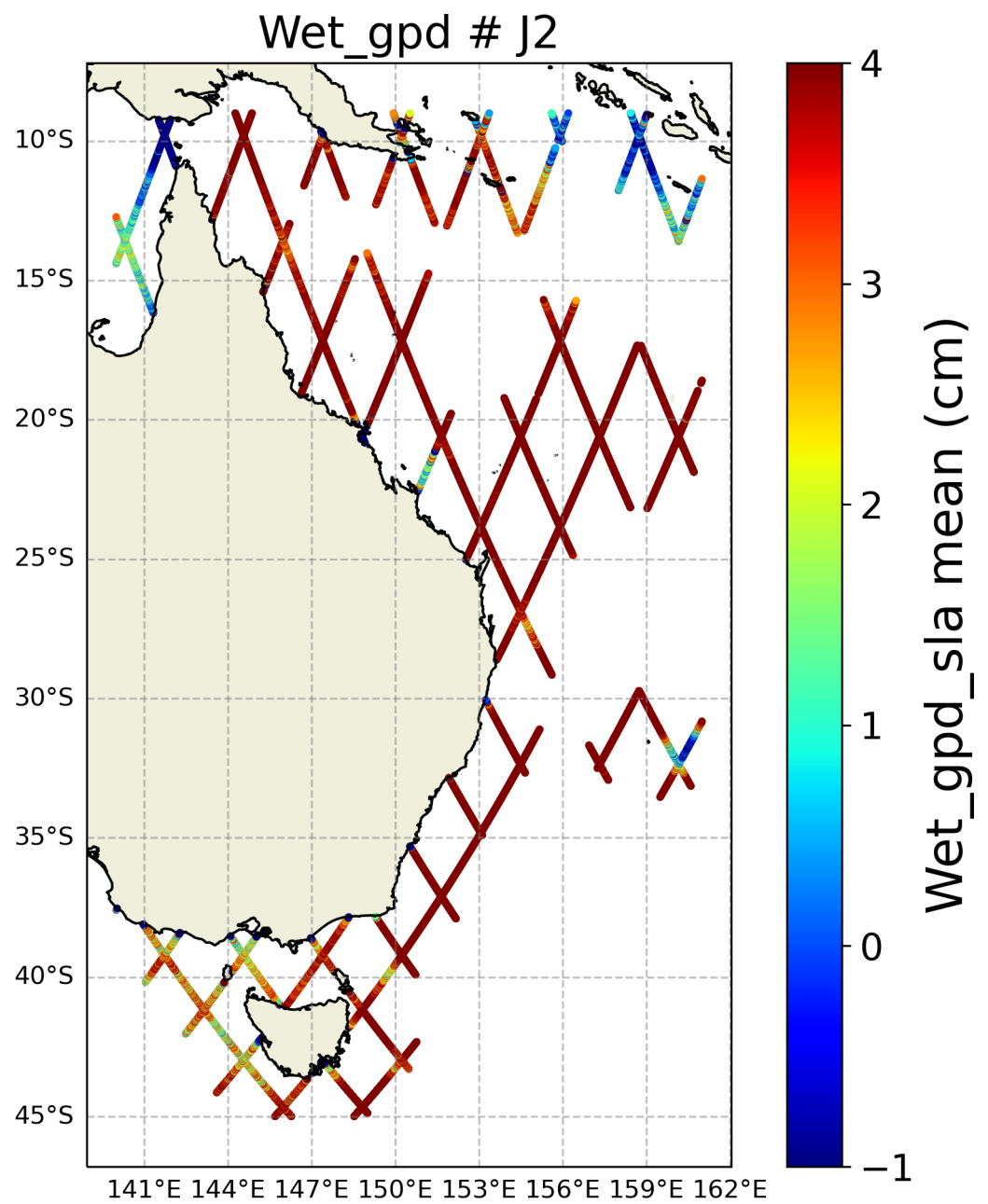


FIGURE 14 – Spatial coherence analysis of the mean of the Wet_gpd version of sla variable

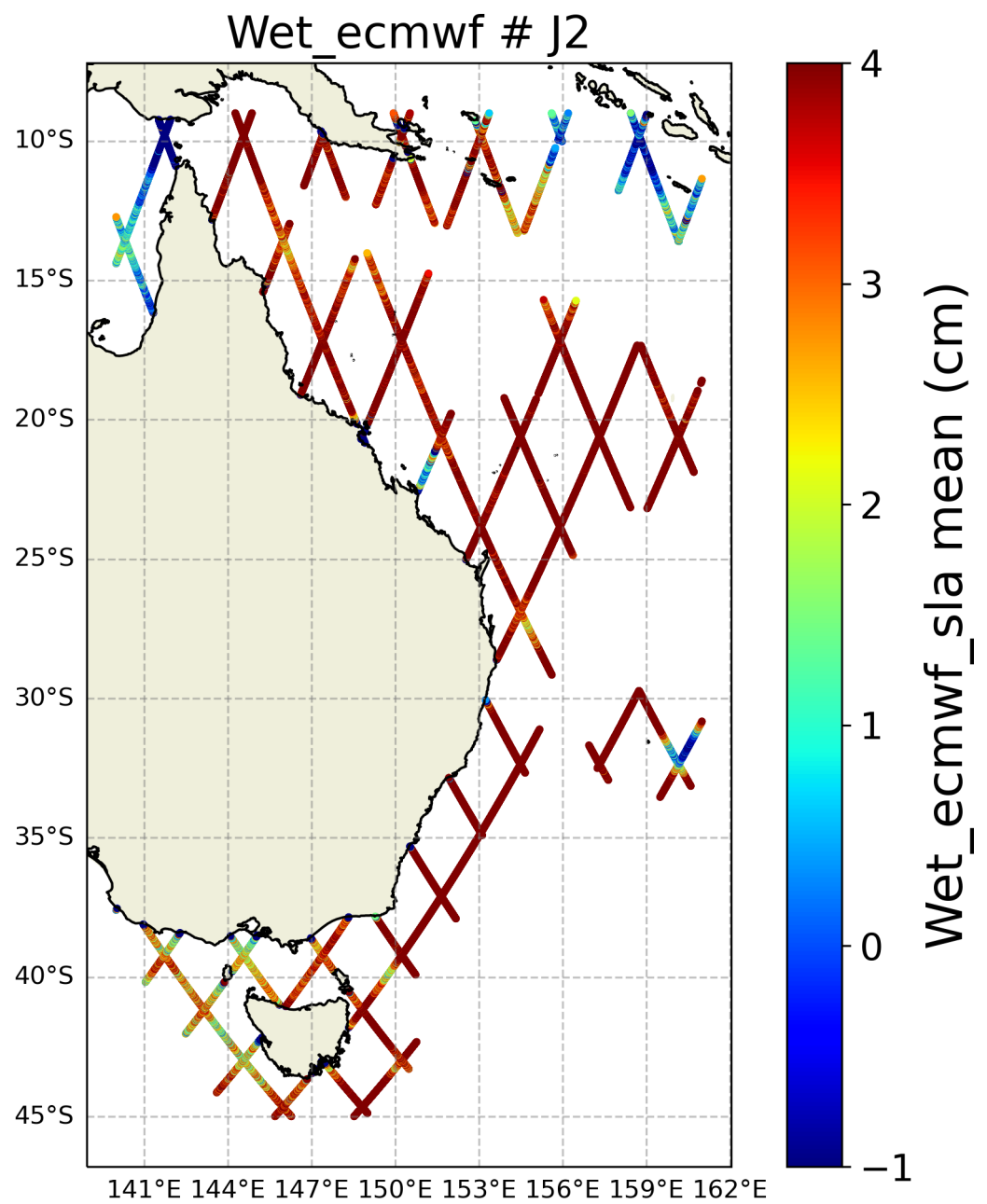


FIGURE 15 – Spatial coherence analysis of the mean of the Wet_ecmwf version of sla variable

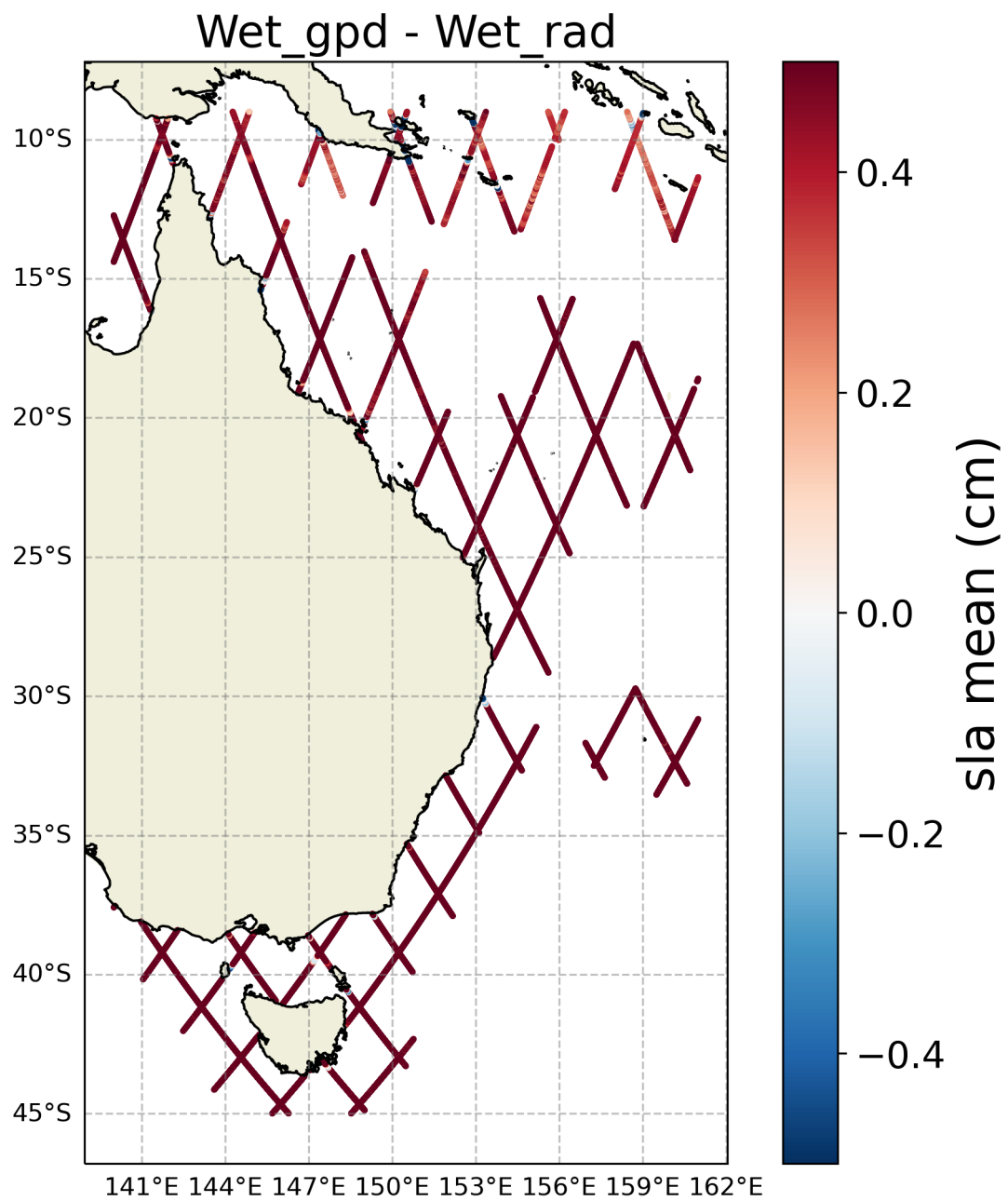


FIGURE 16 – Spatial coherence analysis of the Difference in sla 's mean between Wet_gpd and Wet_rad

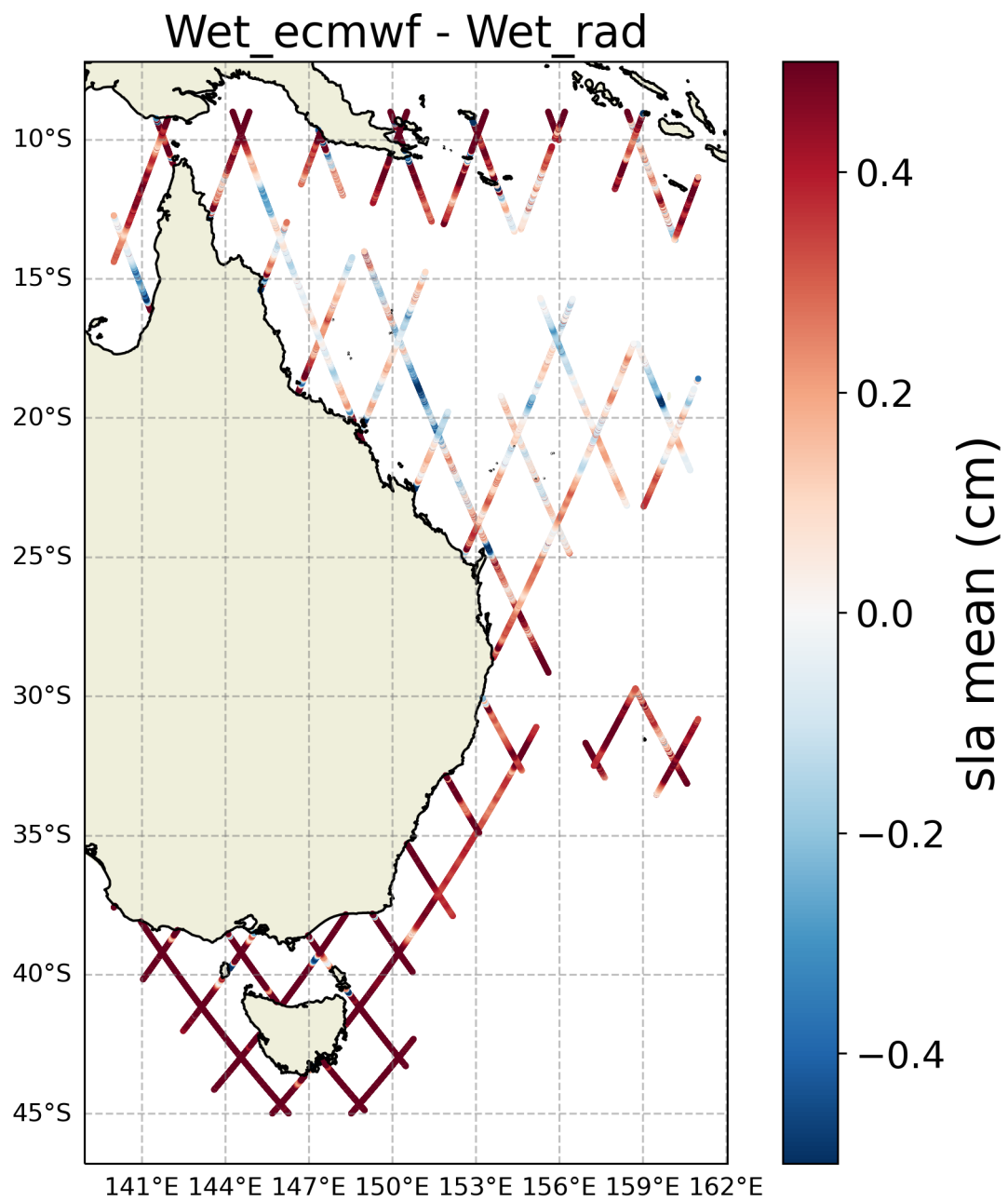


FIGURE 17 – Spatial coherence analysis of the Difference in sla 's mean between Wet_ecmwf and Wet_rad

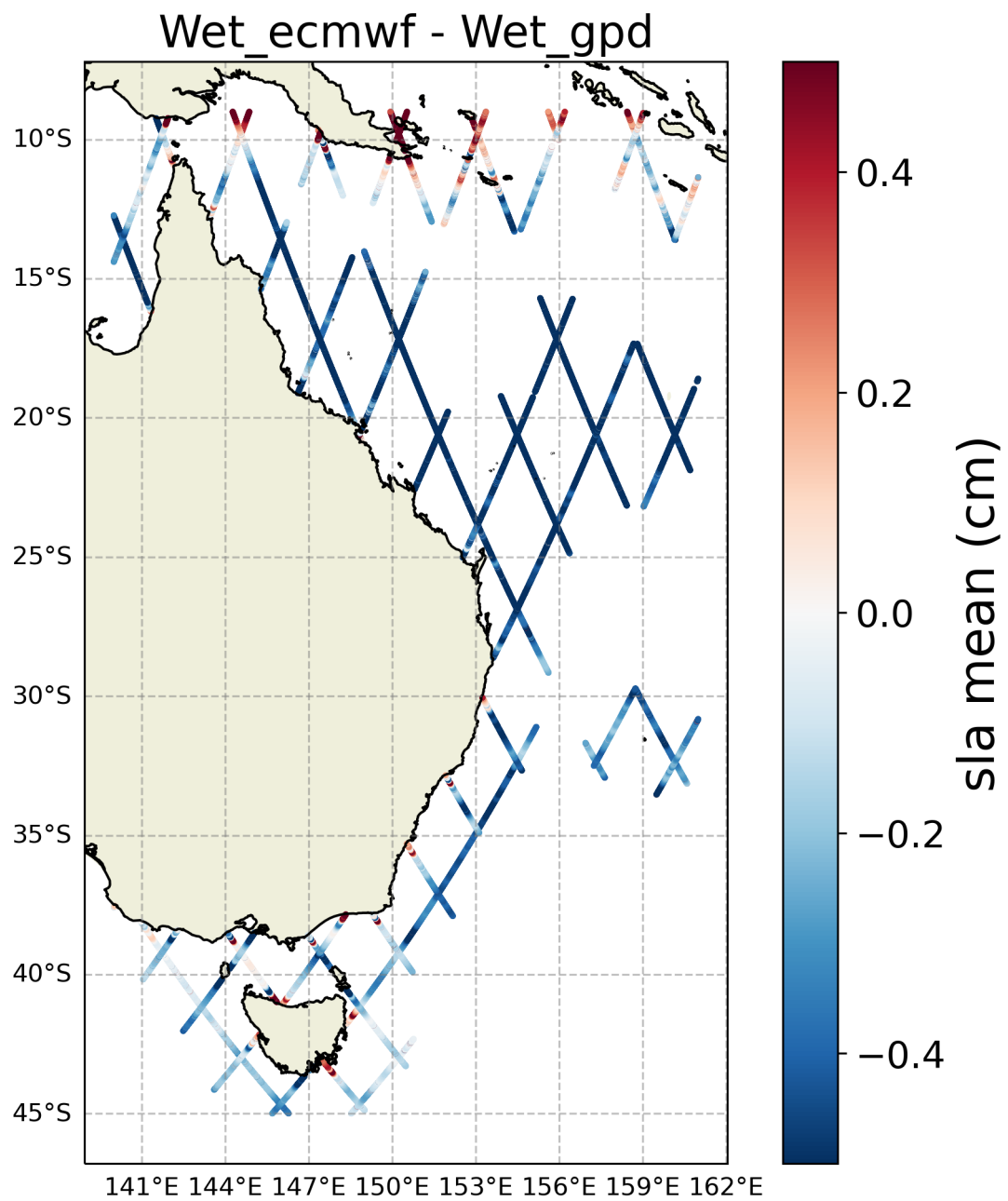


FIGURE 18 – Spatial coherence analysis of the Difference in sla 's mean between Wet_ecmwf and Wet_gpd

3.2 Wet

3.2.1 Wet 's count

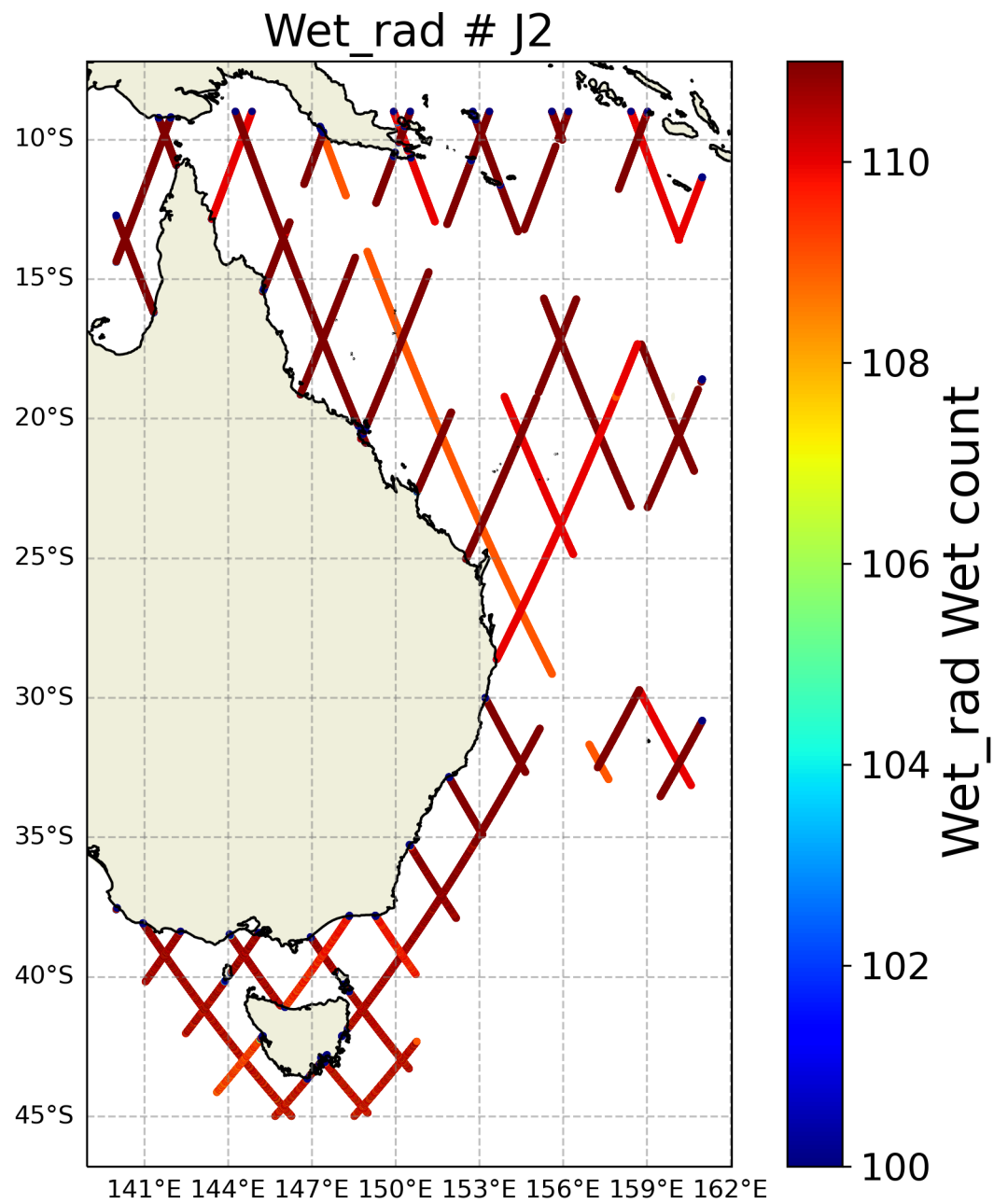


FIGURE 19 – Spatial coherence analysis of the count of the Wet_rad version of Wet variable

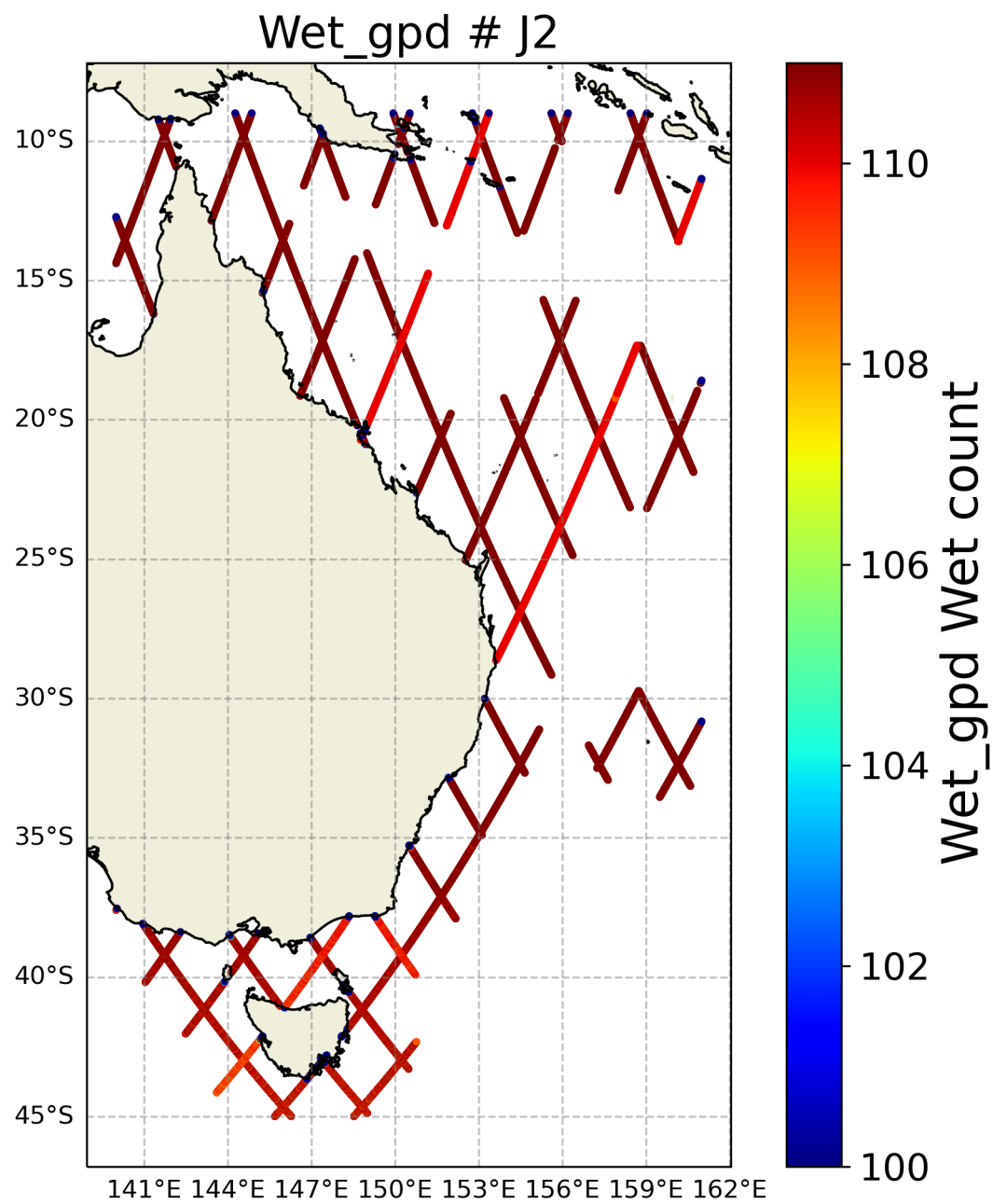


FIGURE 20 – Spatial coherence analysis of the count of the Wet_gpd version of Wet variable

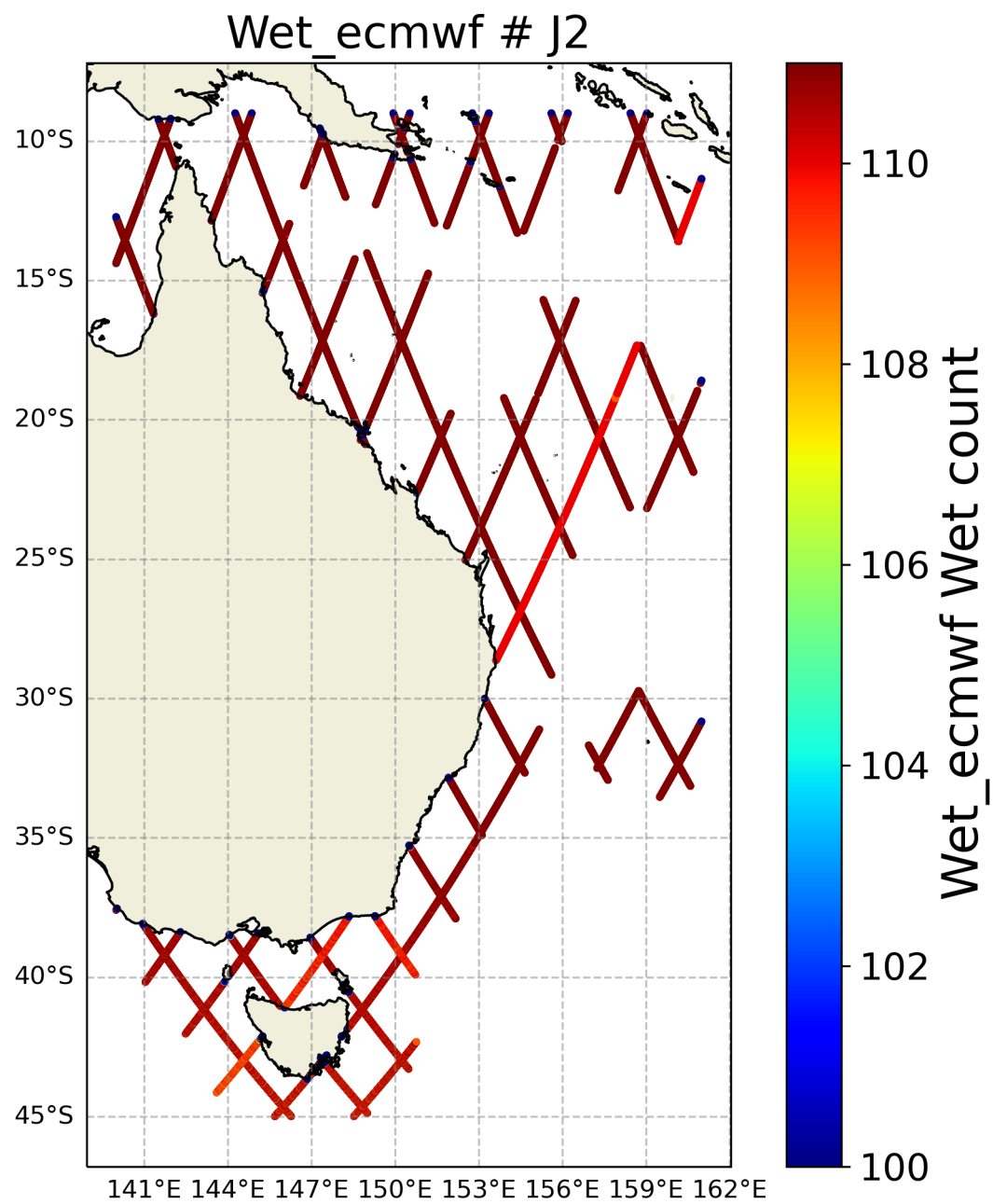


FIGURE 21 – Spatial coherence analysis of the count of the Wet_ecmwf version of Wet variable

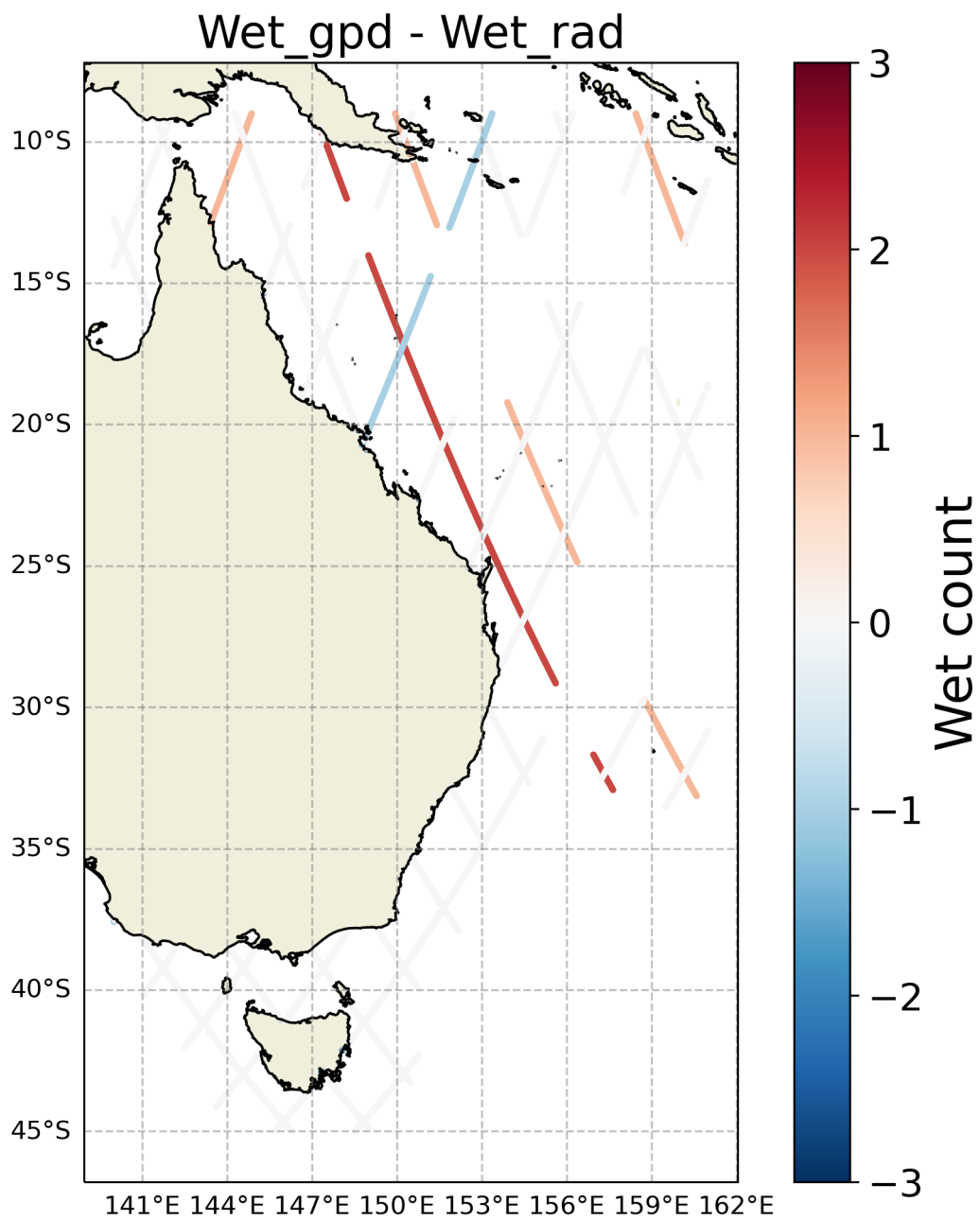


FIGURE 22 – Spatial coherence analysis of the Difference in Wet 's count between Wet_gpd and Wet_rad

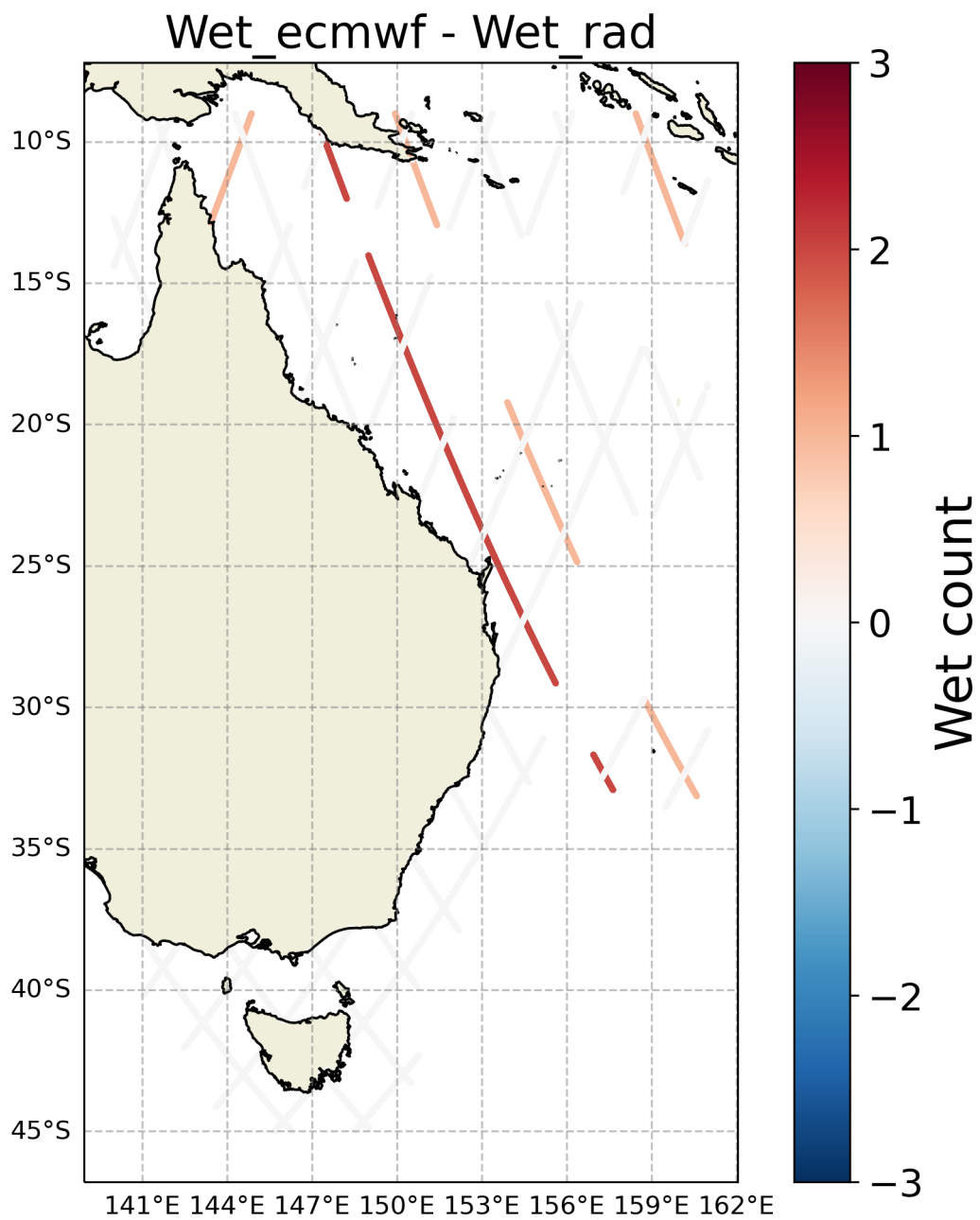


FIGURE 23 – Spatial coherence analysis of the Difference in Wet 's count between Wet_ecmwf and Wet_rad

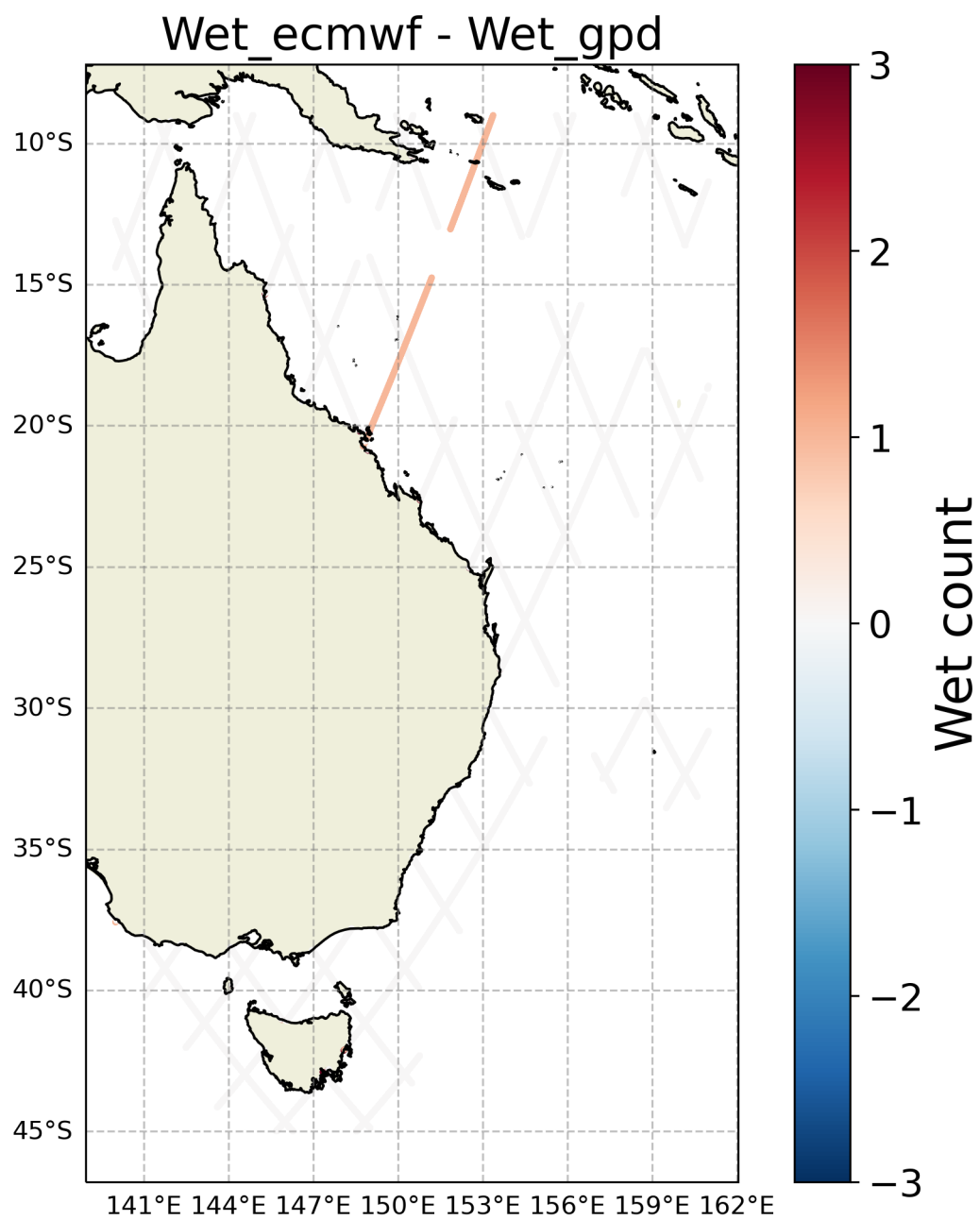


FIGURE 24 – Spatial coherence analysis of the Difference in Wet 's count between Wet_ecmwf and Wet_gpd

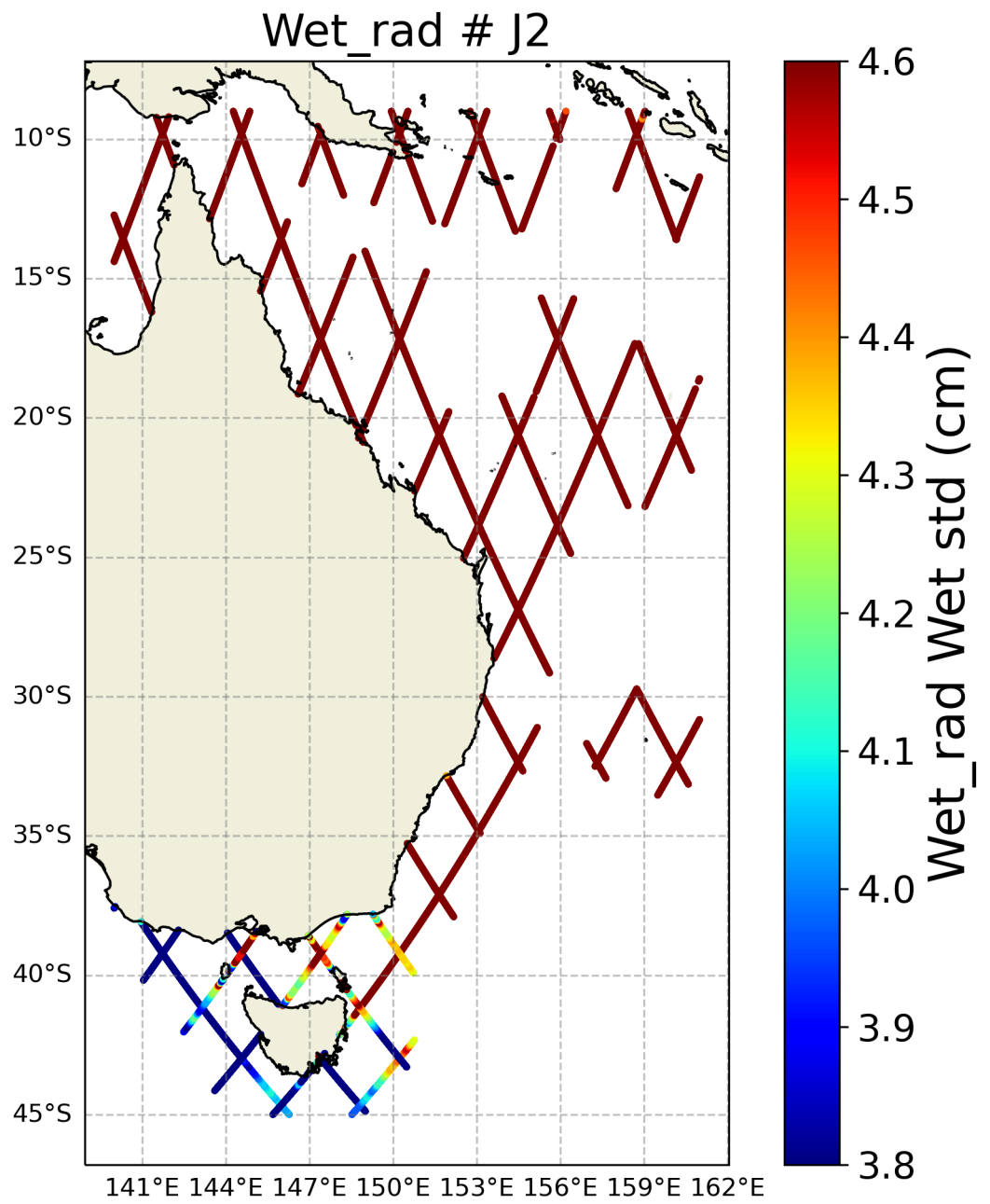


FIGURE 25 – Spatial coherence analysis of the std of the Wet_rad version of Wet variable

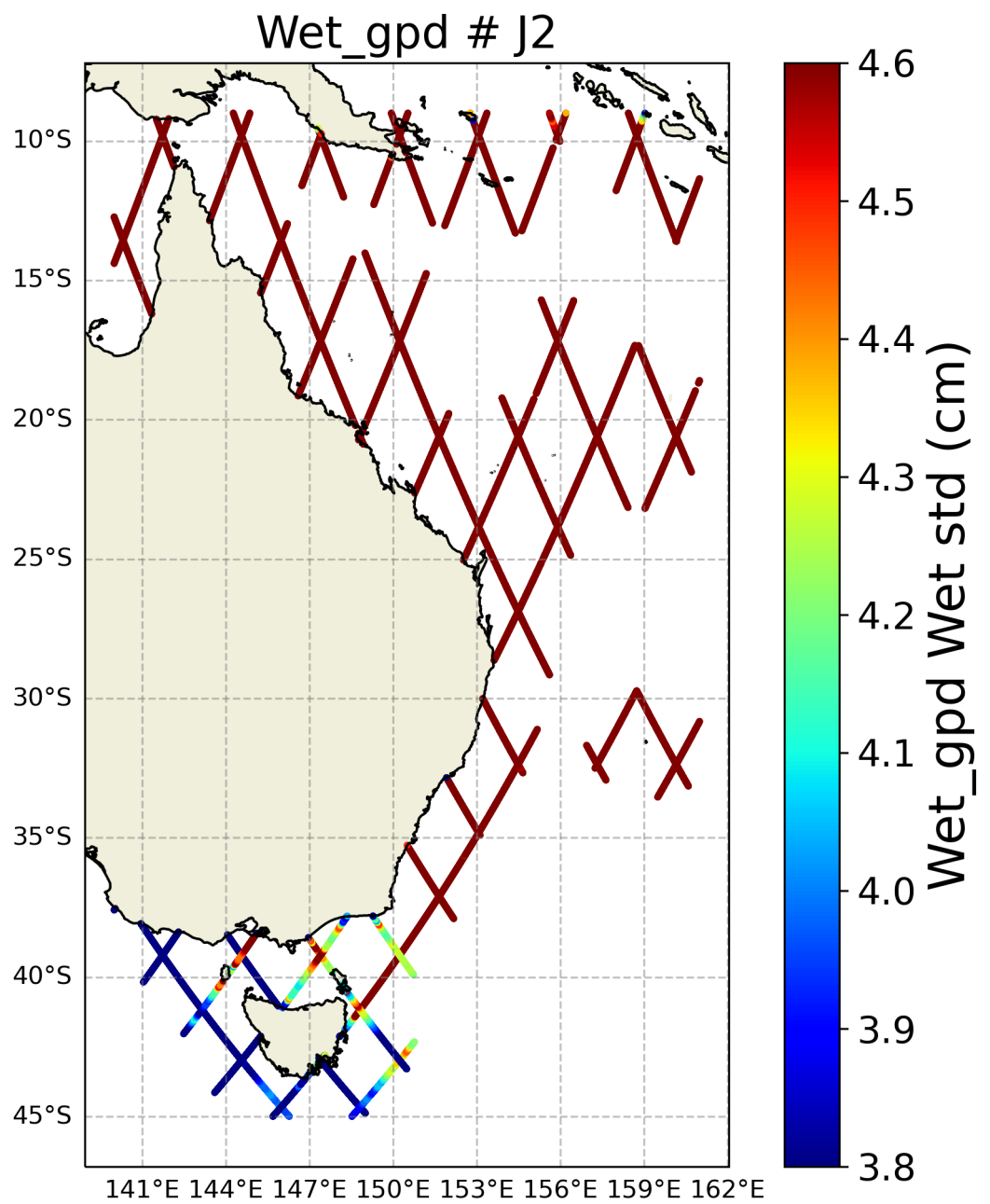


FIGURE 26 – Spatial coherence analysis of the std of the Wet_gpd version of Wet variable

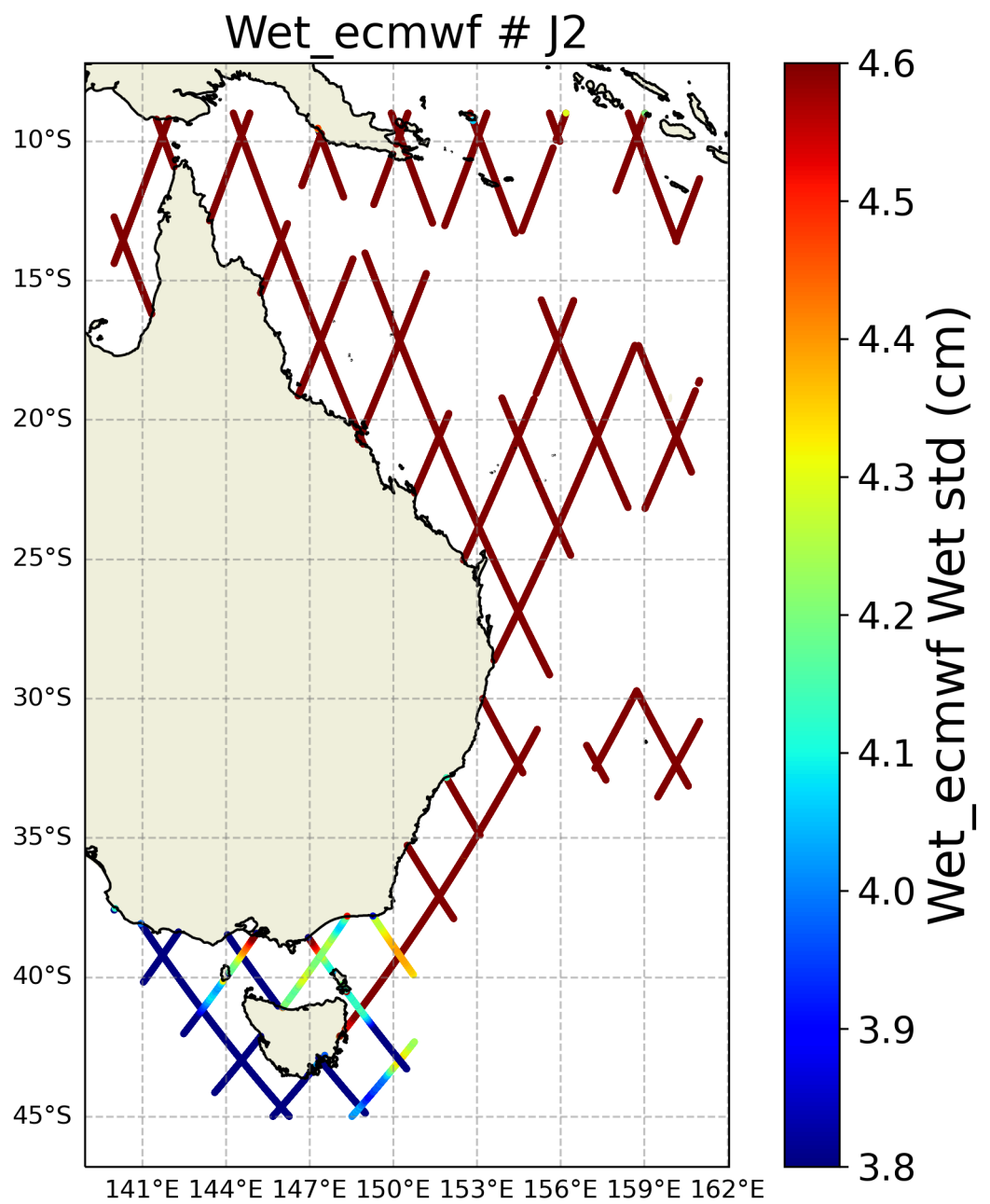


FIGURE 27 – Spatial coherence analysis of the std of the Wet_ecmwf version of Wet variable

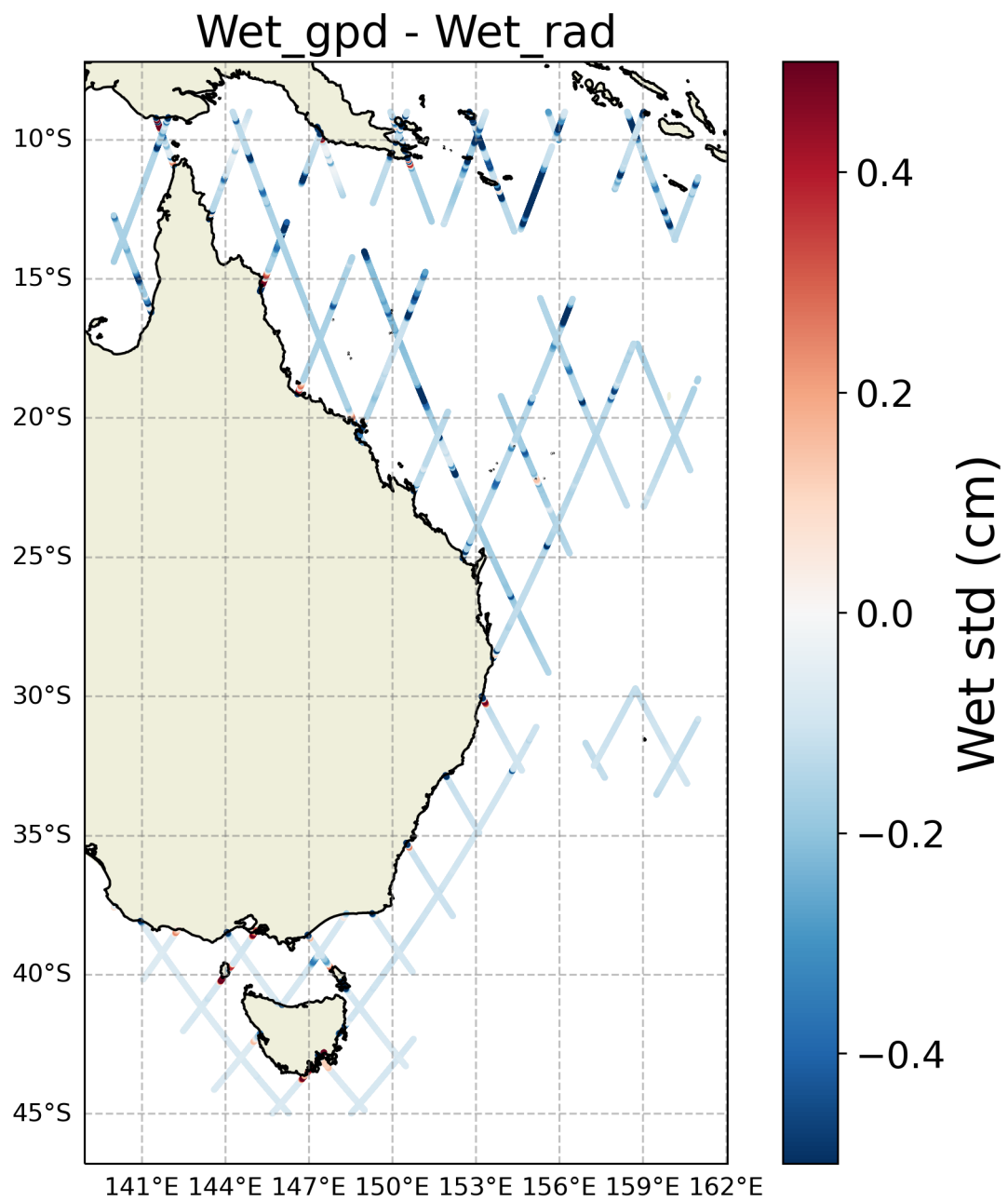


FIGURE 28 – Spatial coherence analysis of the Difference in Wet 's std between Wet_gpd and Wet_rad

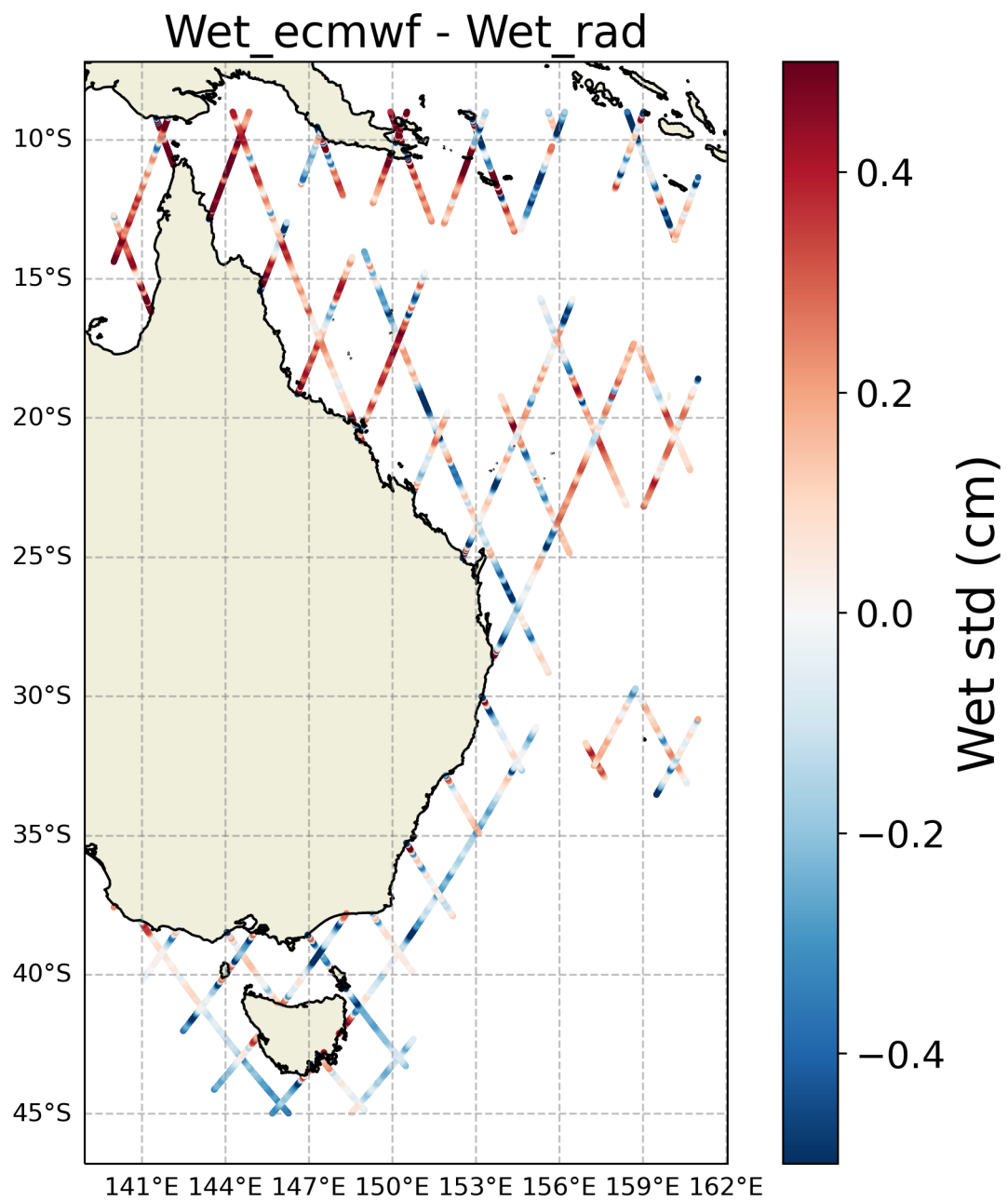


FIGURE 29 – Spatial coherence analysis of the Difference in Wet 's std between Wet_ecmwf and Wet_rad

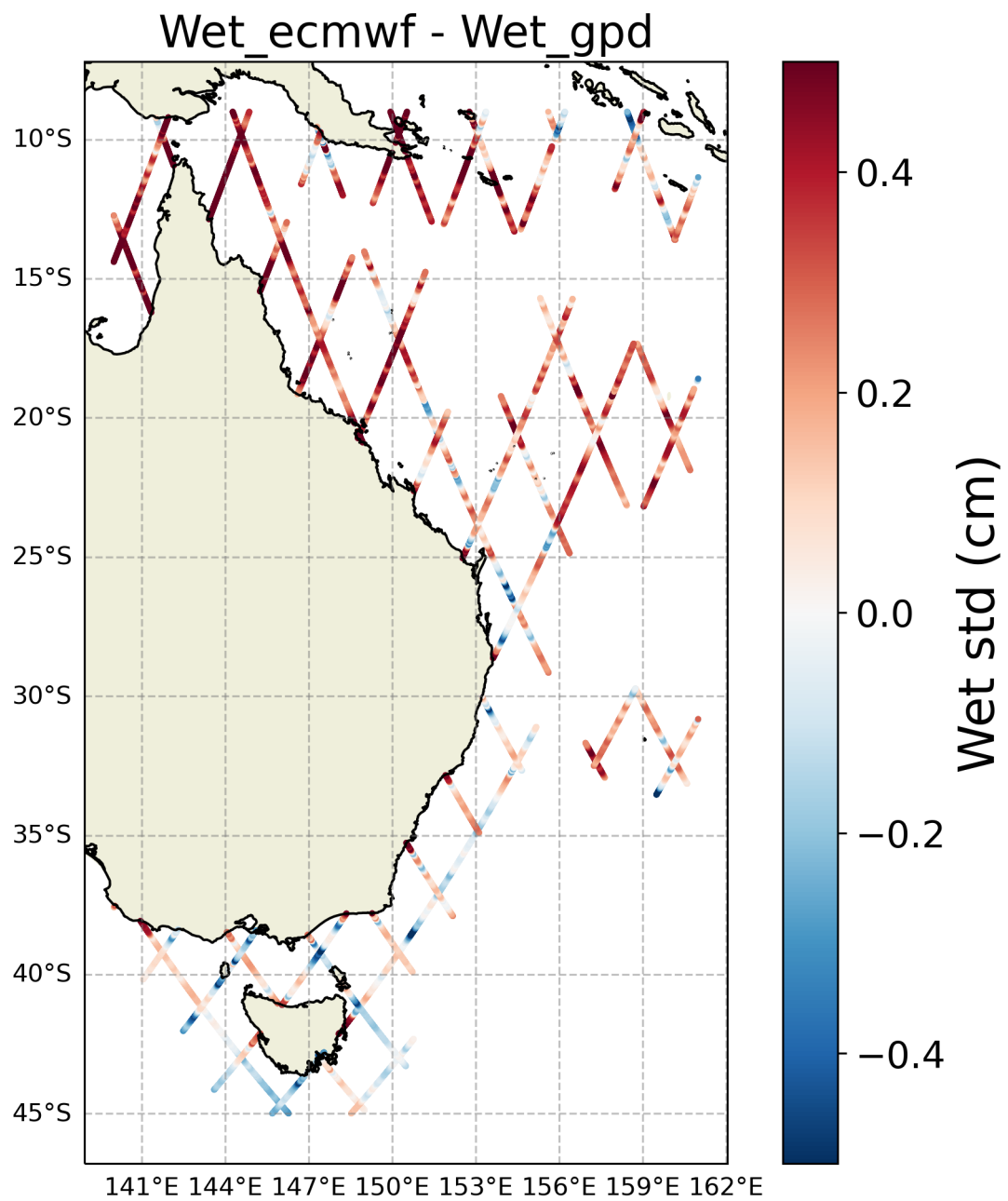


FIGURE 30 – Spatial coherence analysis of the Difference in Wet 's std between Wet_ecmwf and Wet_gpd

3.2.3 Wet 's mean

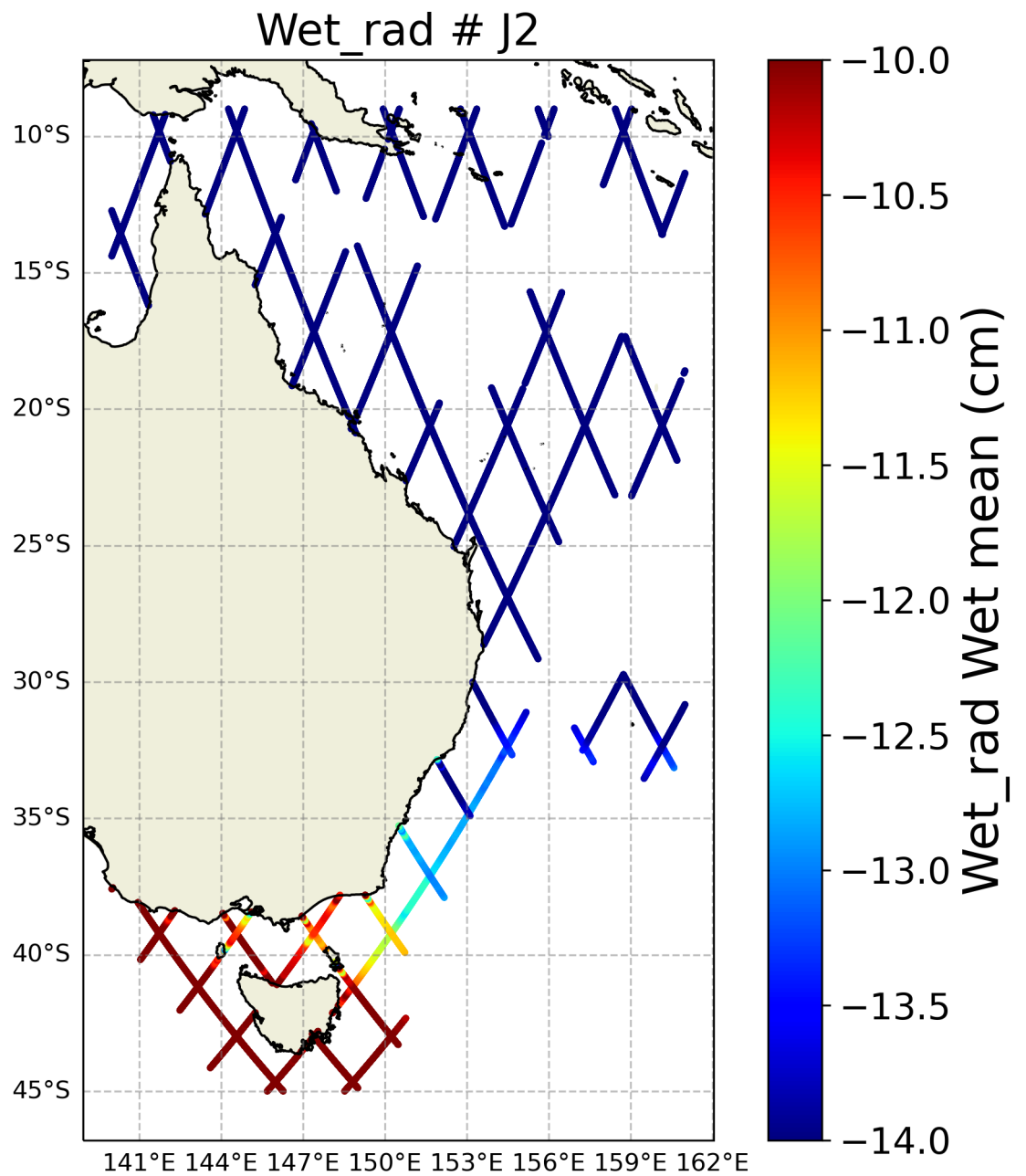


FIGURE 31 – Spatial coherence analysis of the mean of the Wet_rad version of Wet variable

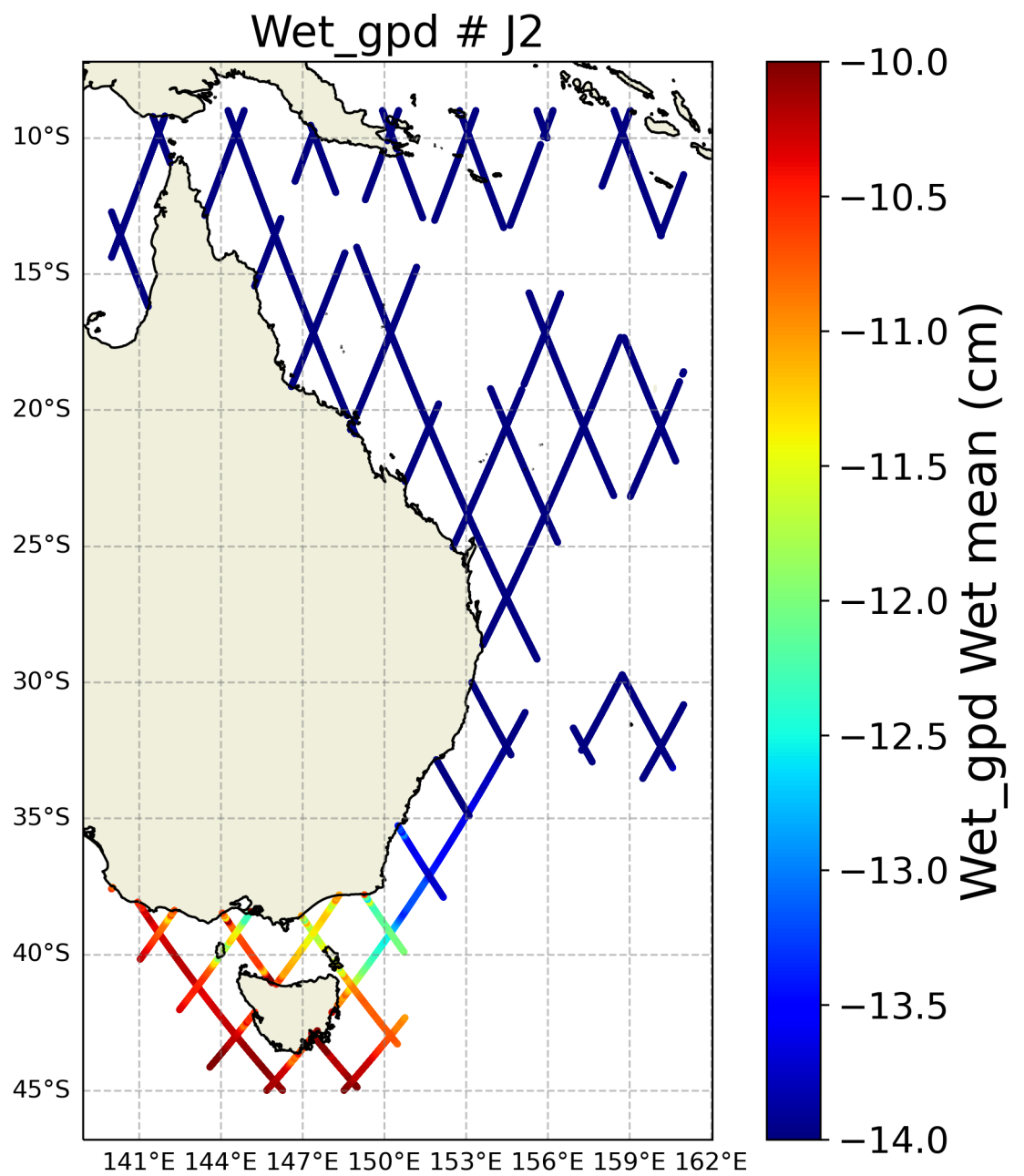


FIGURE 32 – Spatial coherence analysis of the mean of the Wet_gpd version of Wet variable

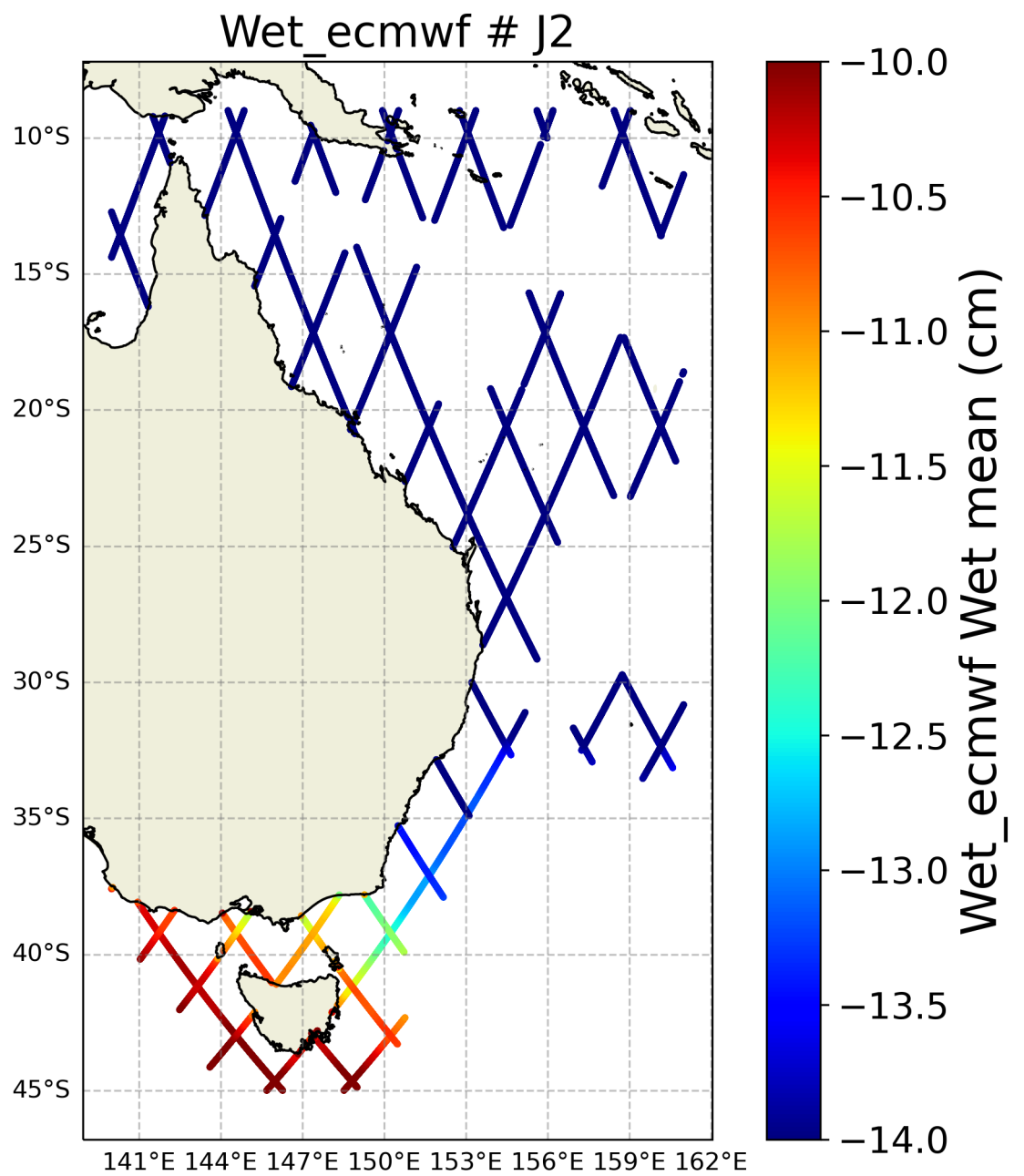


FIGURE 33 – Spatial coherence analysis of the mean of the Wet_ecmwf version of Wet variable

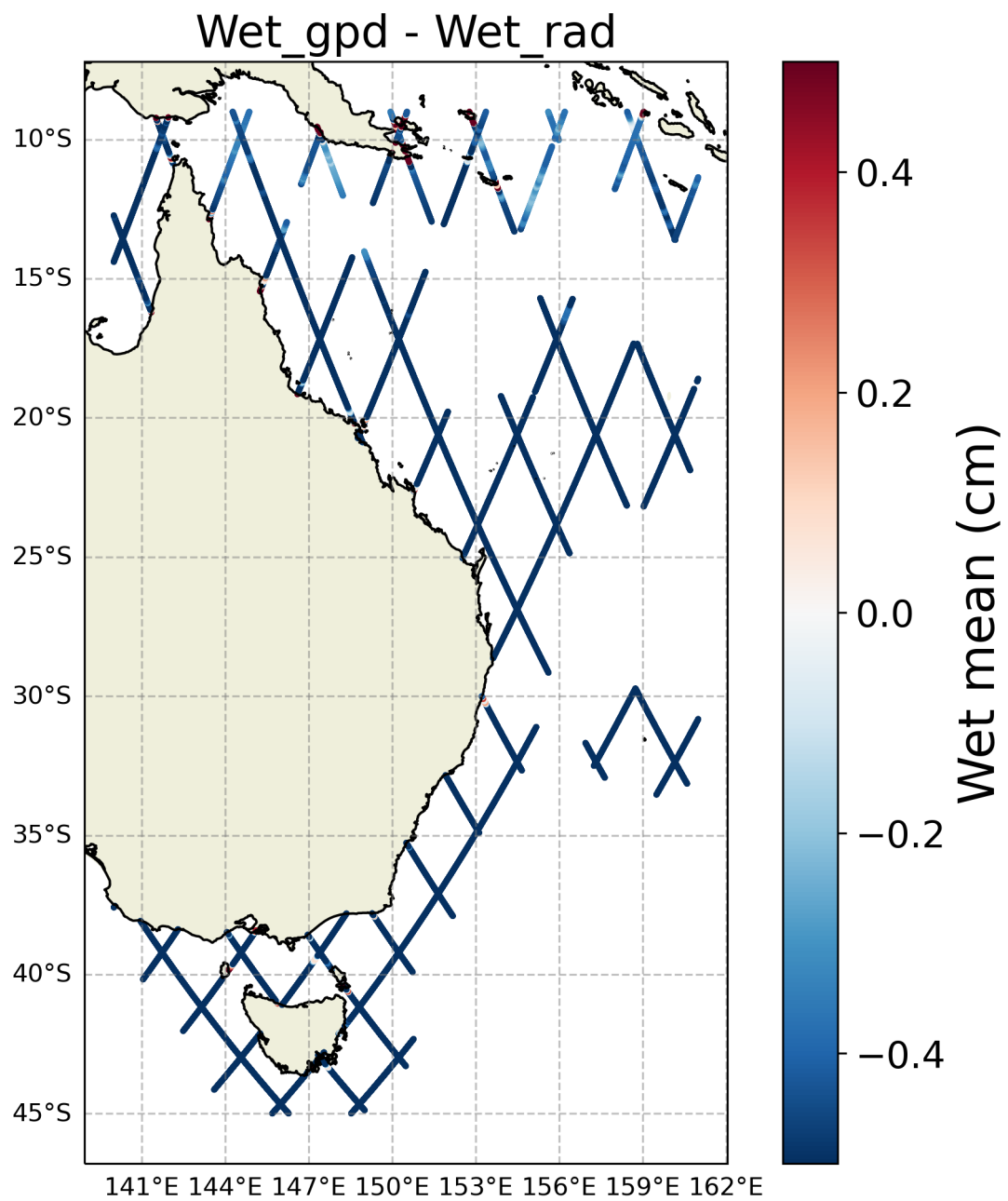


FIGURE 34 – Spatial coherence analysis of the Difference in Wet 's mean between Wet_gpd and Wet_rad

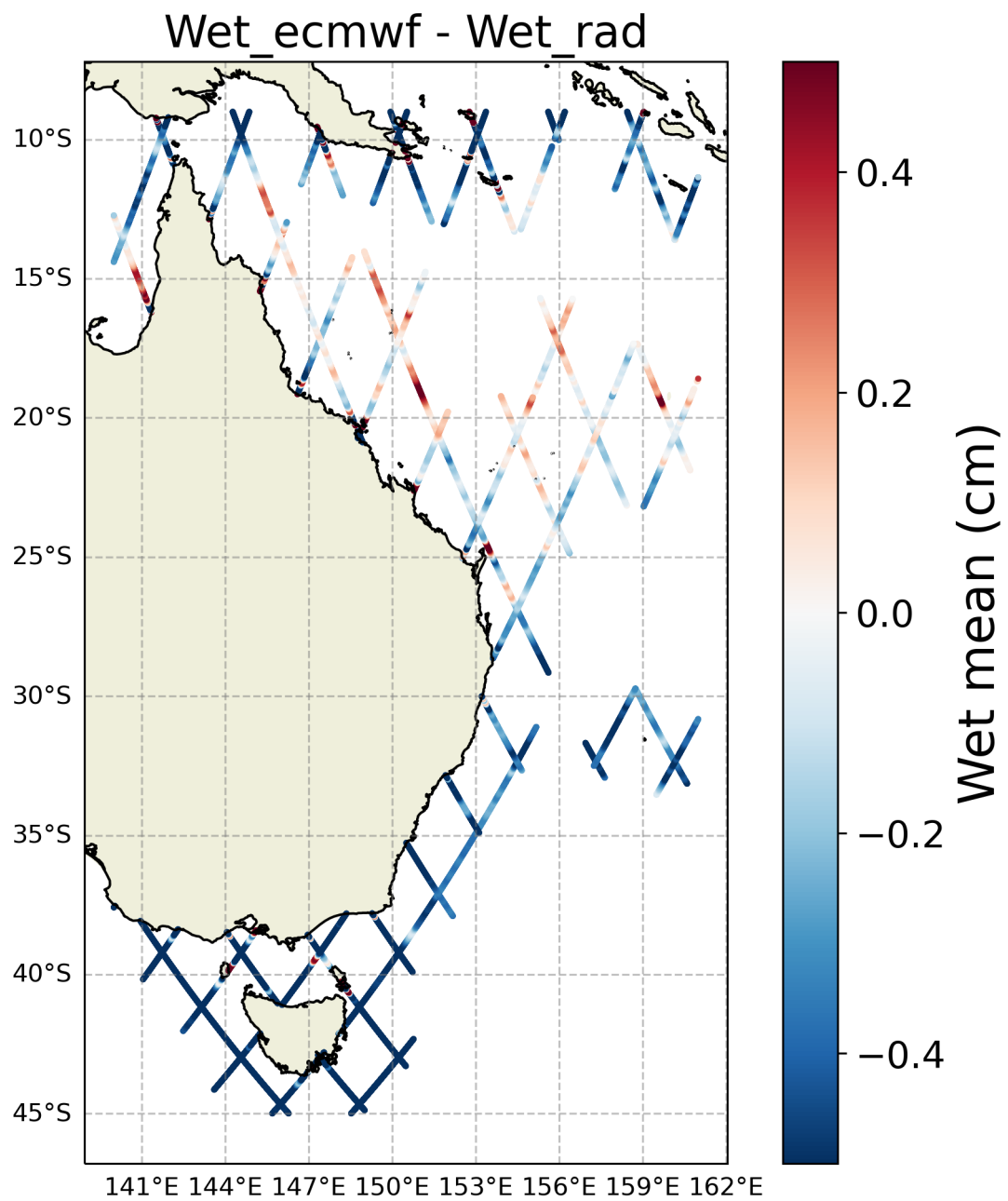


FIGURE 35 – Spatial coherence analysis of the Difference in Wet 's mean between Wet_ecmwf and Wet_rad

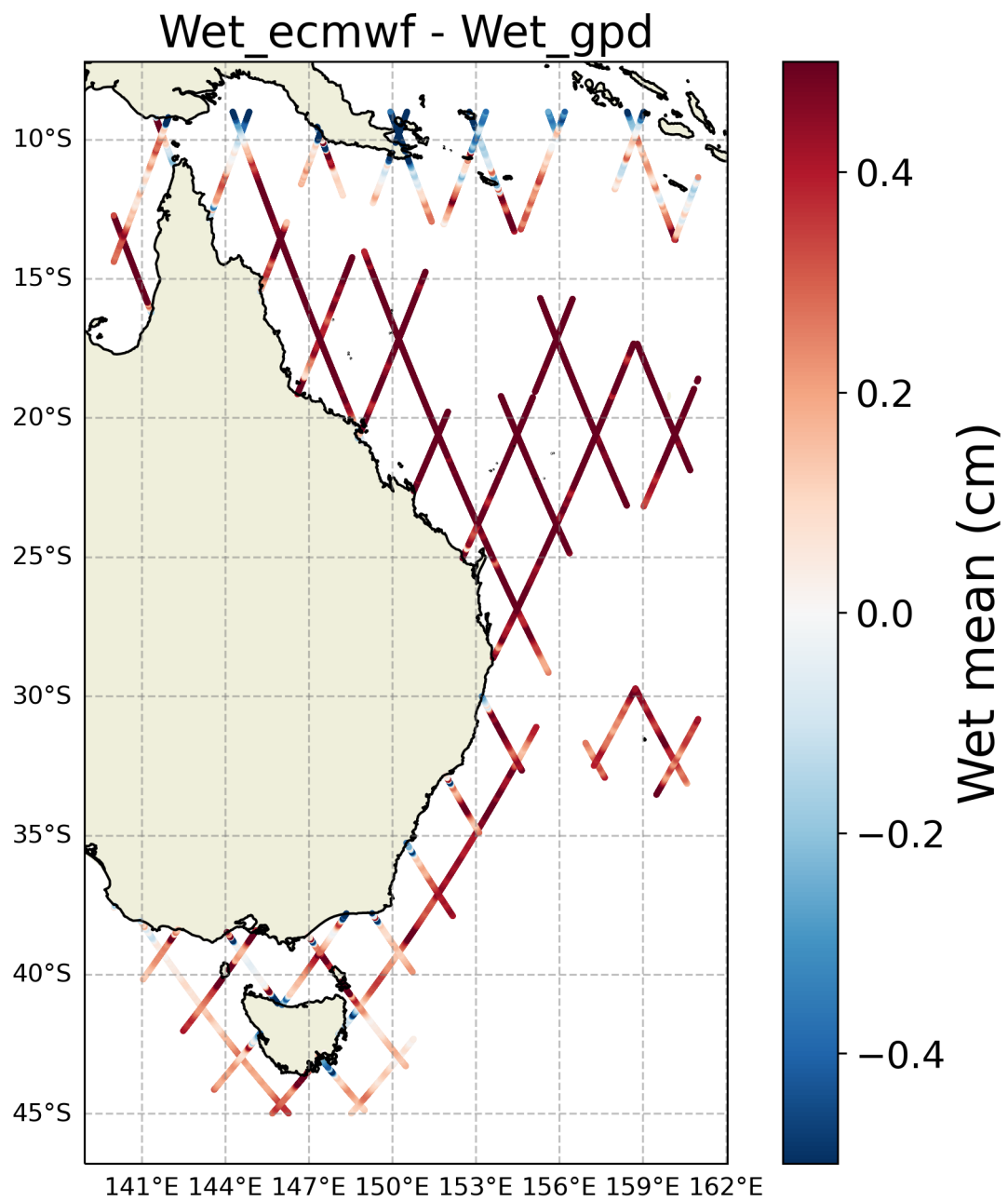


FIGURE 36 – Spatial coherence analysis of the Difference in Wet 's mean between Wet_ecmwf and Wet_gpd

4 Histograms

4.1 Wet

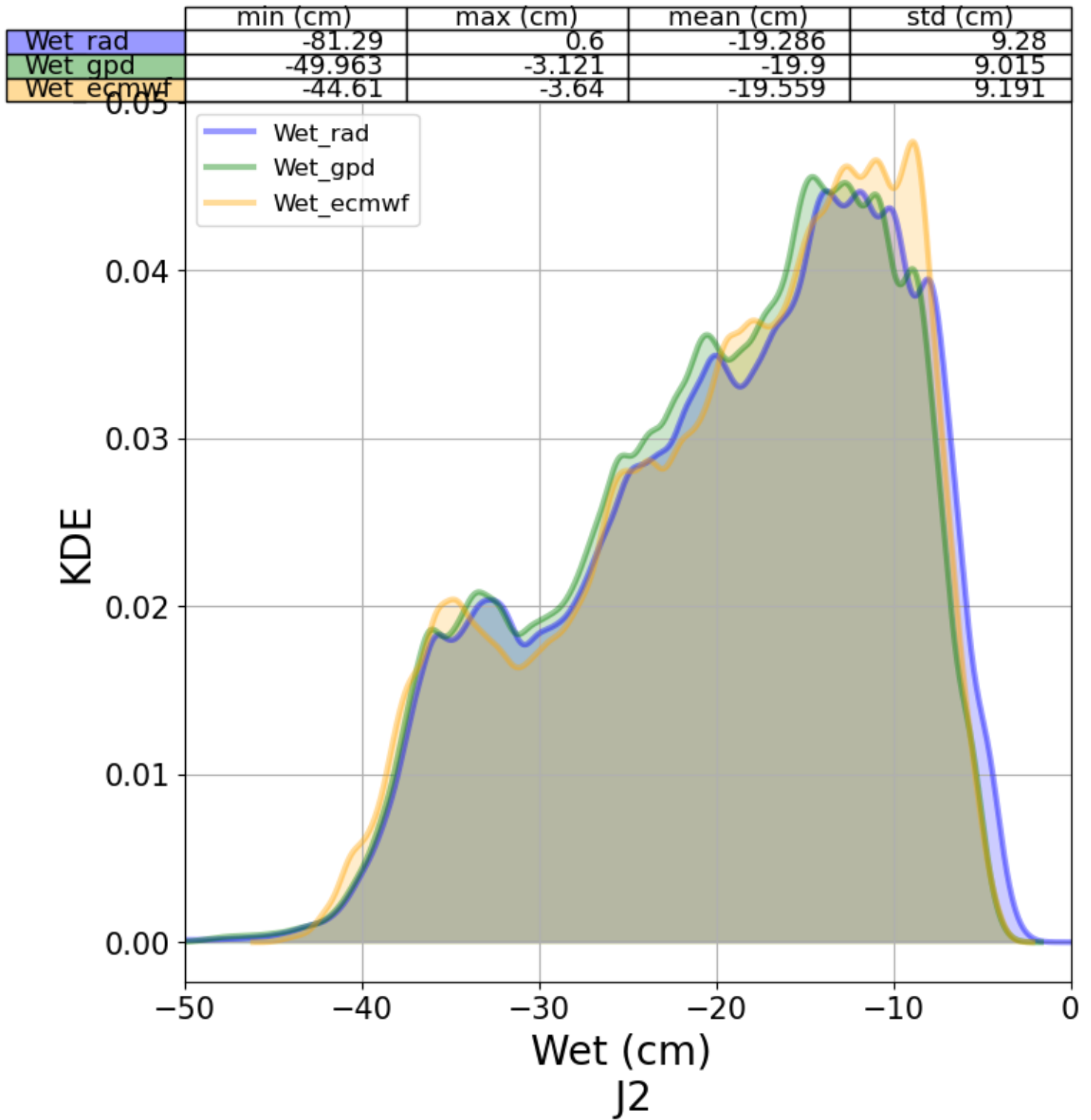


FIGURE 37 – Histogram of each of Wet version

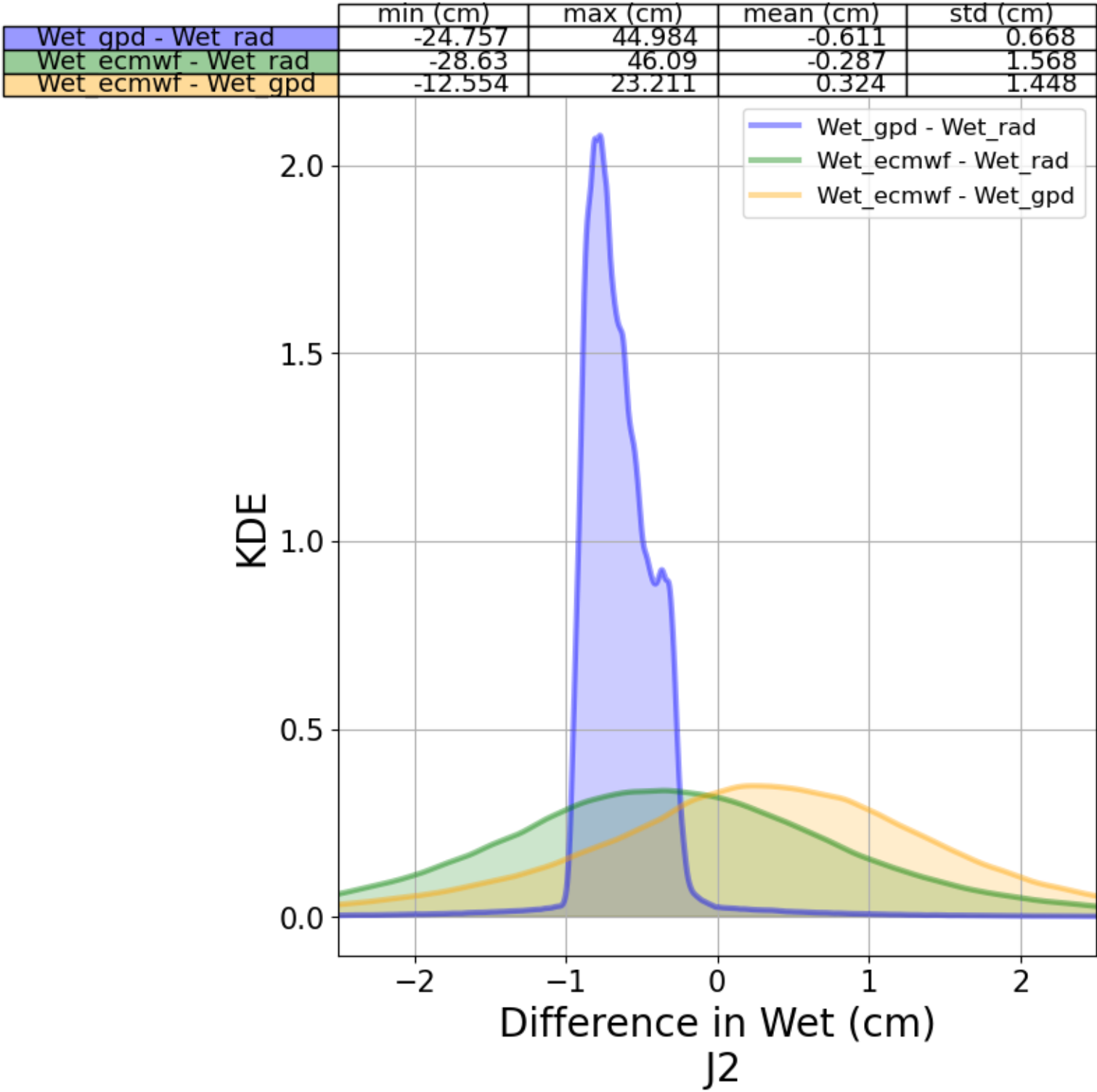


FIGURE 38 – Histograms of difference of each Wet version and reference one

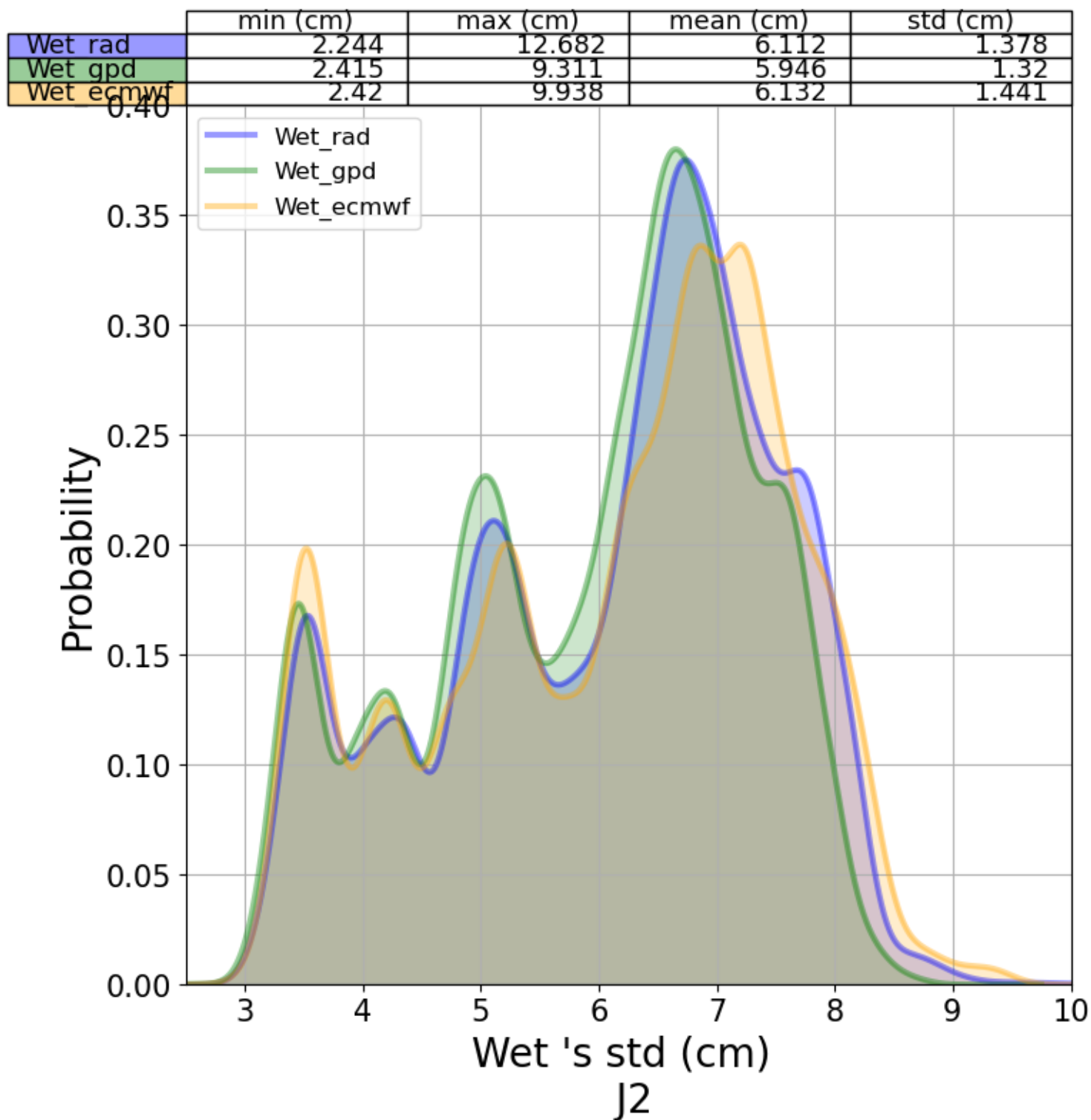


FIGURE 39 – Histograms of the standard deviation of each Wet version

4.2 sla

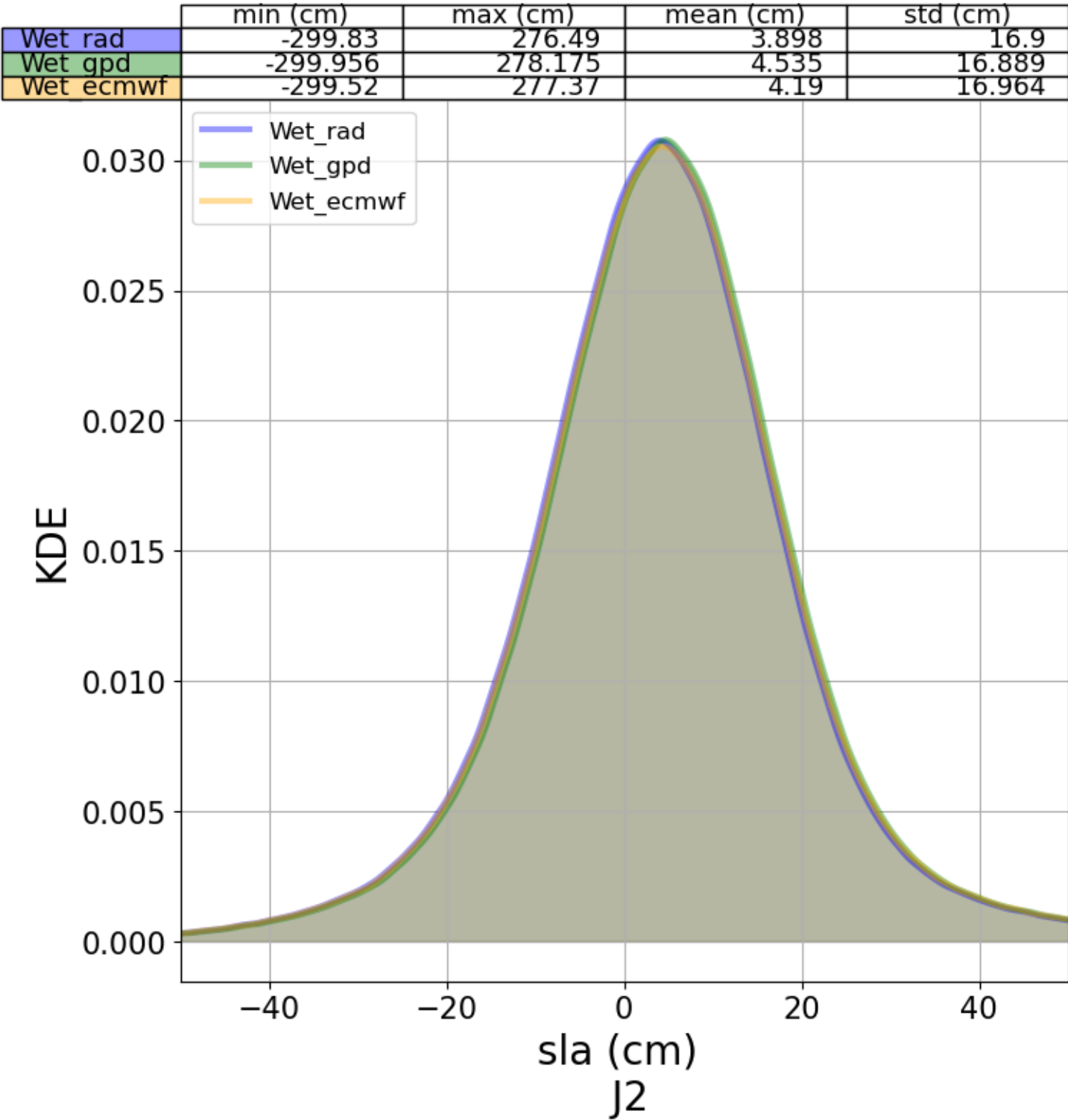


FIGURE 40 – Histogram of each of sla version

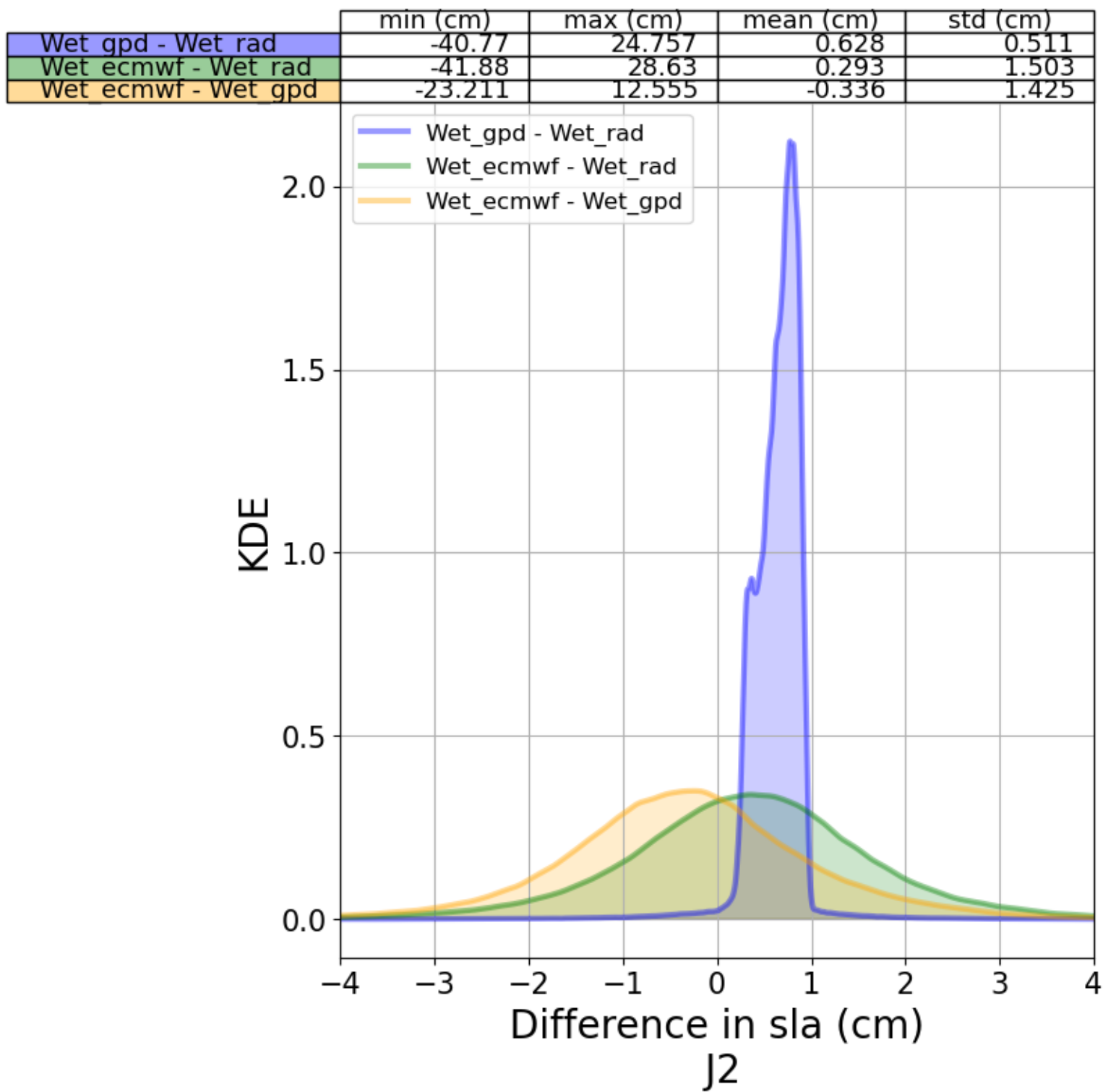


FIGURE 41 – Histograms of difference of each sla version and reference one

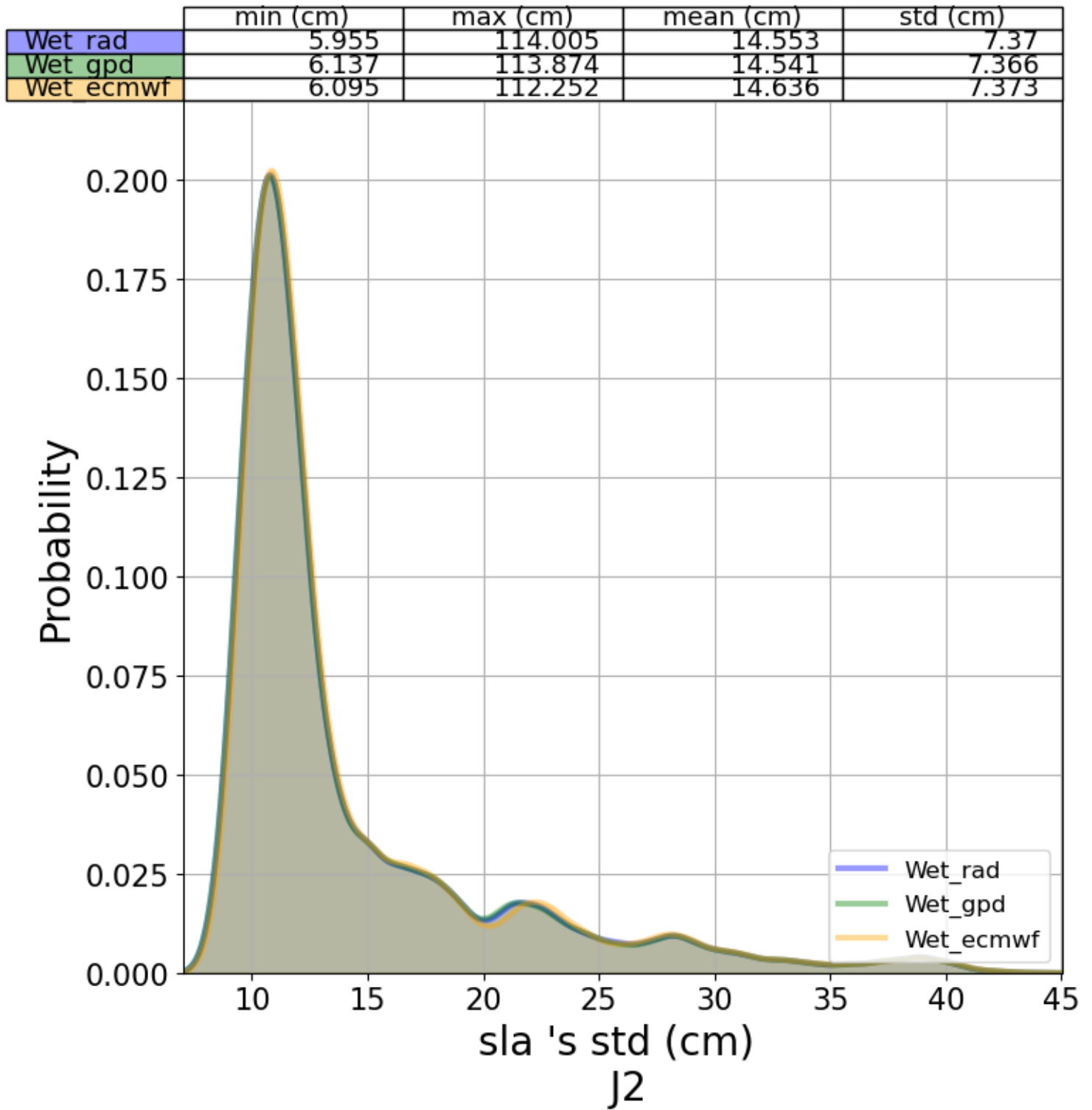


FIGURE 42 – Histograms of the standard deviation of each sla version

5 Along-track analysis

5.1 Wet

5.1.1 Wet 's count

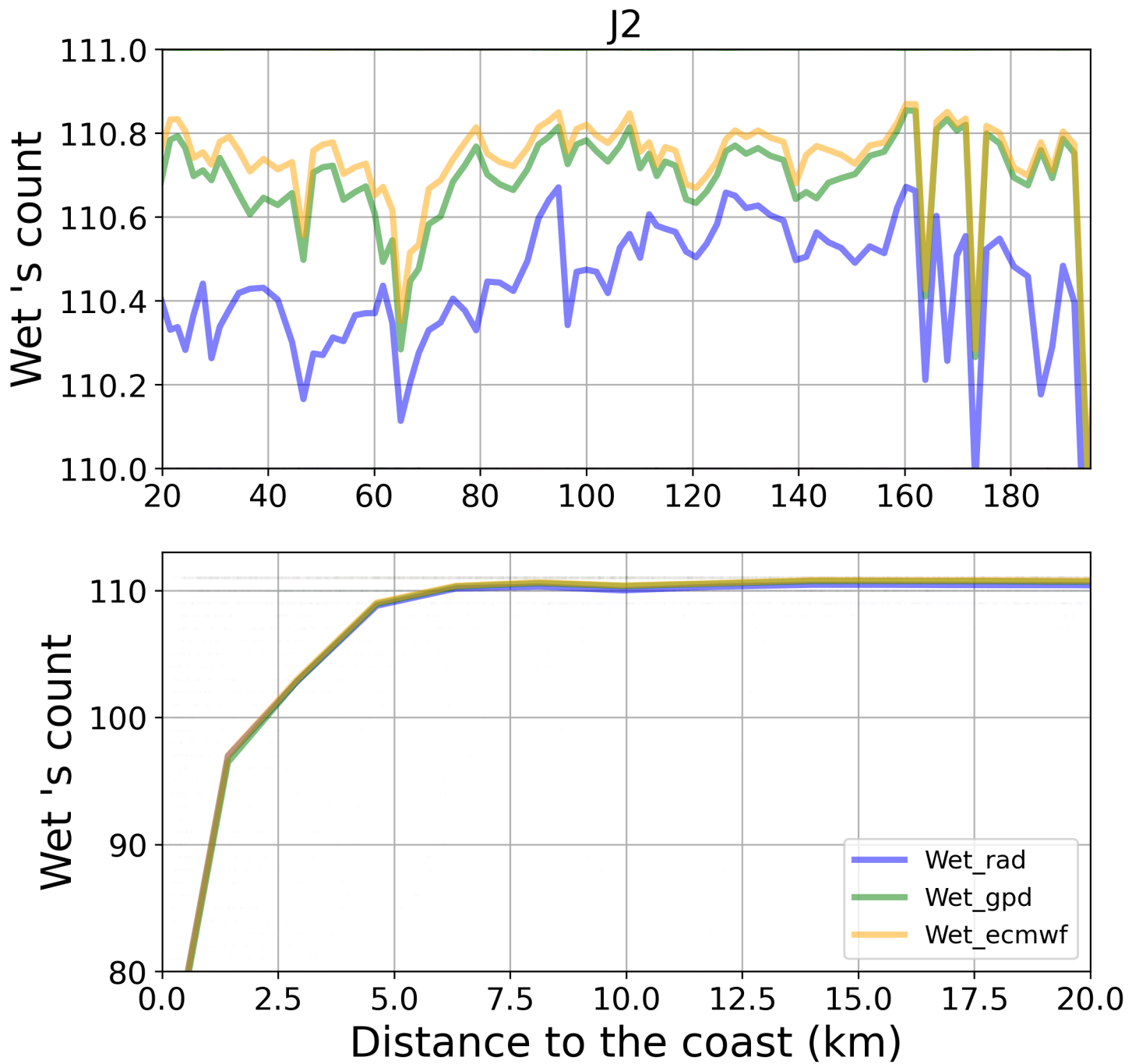


FIGURE 43 – Along-track analysis of Wet 's count

J2

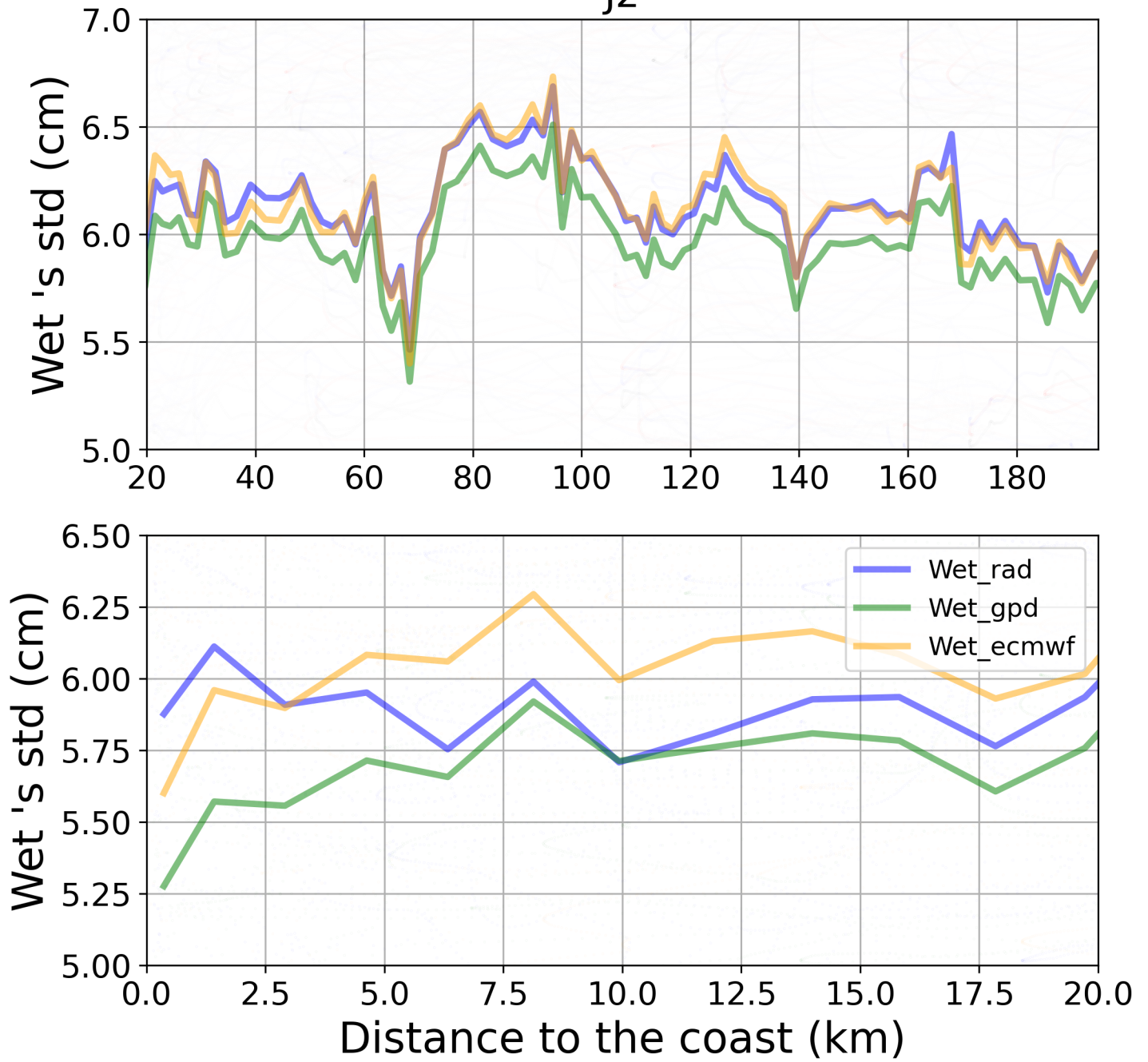


FIGURE 44 – Along-track analysis of Wet 's std

J2

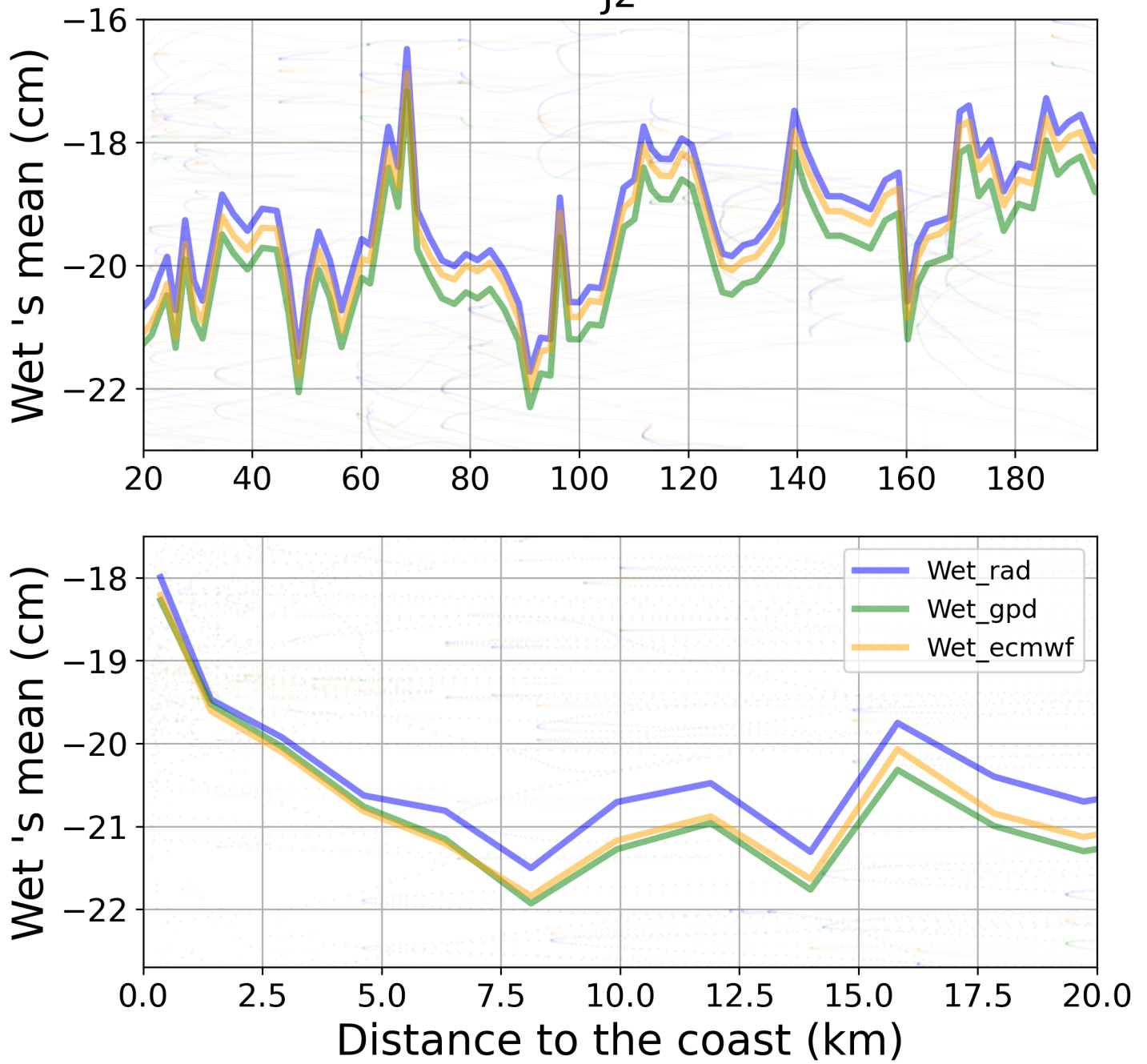


FIGURE 45 – Along-track analysis of Wet 's mean

5.2 sla

5.2.1 sla's count

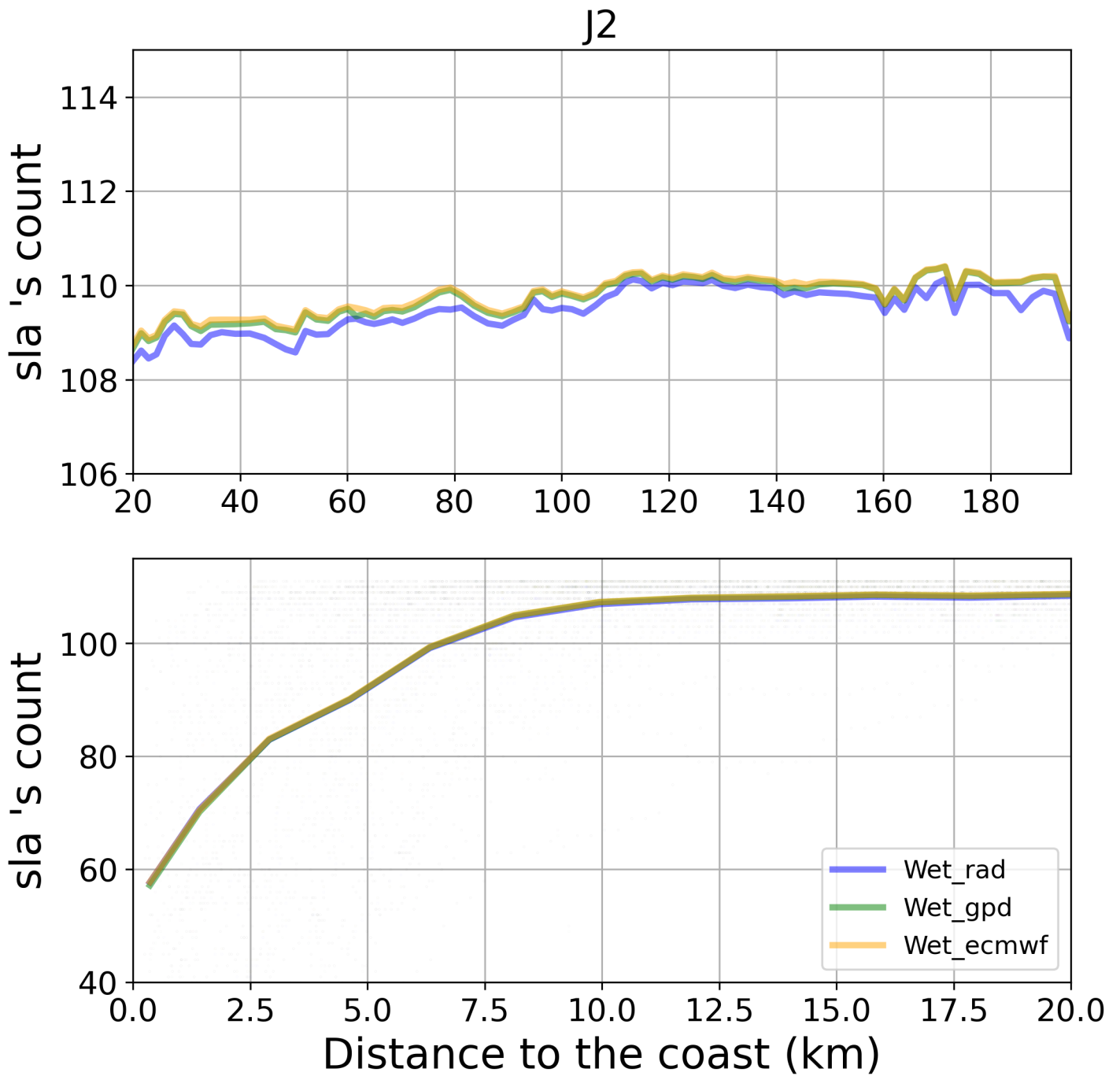


FIGURE 46 – Along-track analysis of sla's count

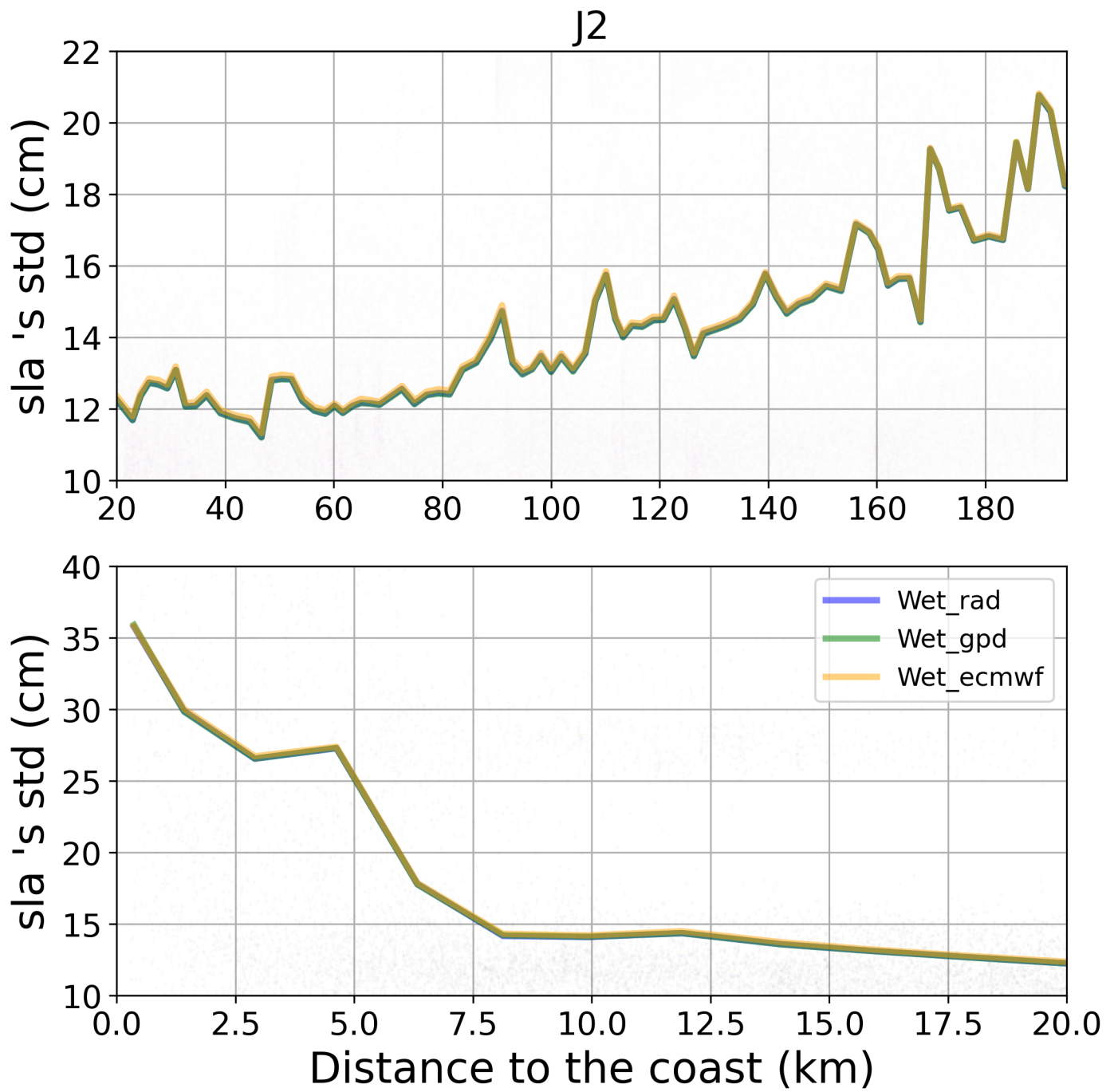


FIGURE 47 – Along-track analysis of sla 's std

J2

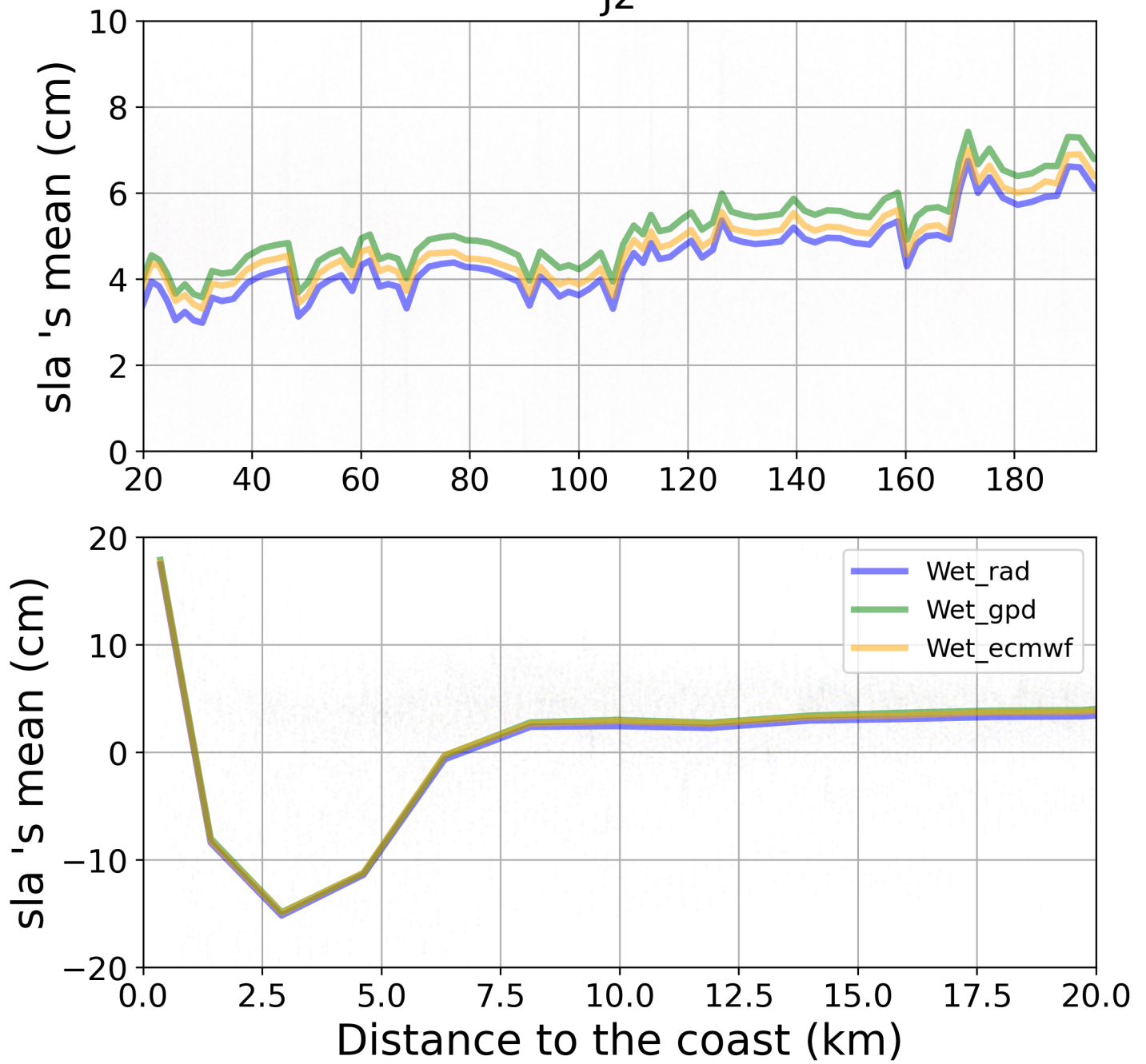


FIGURE 48 – Along-track analysis of sla 's mean

6 Comparison with Insitu Data (Tide Gauge)

The size of the marker representing each point in the figures below increase by getting closer to the coast

6.1 Station : Lorne_Jetty

- Nearest track to Lorne_Jetty station is the track number track88
- The area of interest is limited by :
 - A circle which it's center is the Lorne_Jetty tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km

6.1.1 correlation visualization in maps view % Lorne_Jetty tide gauge

Correlation Altimetry data with respect to Lorne_Jetty Tide gauge data

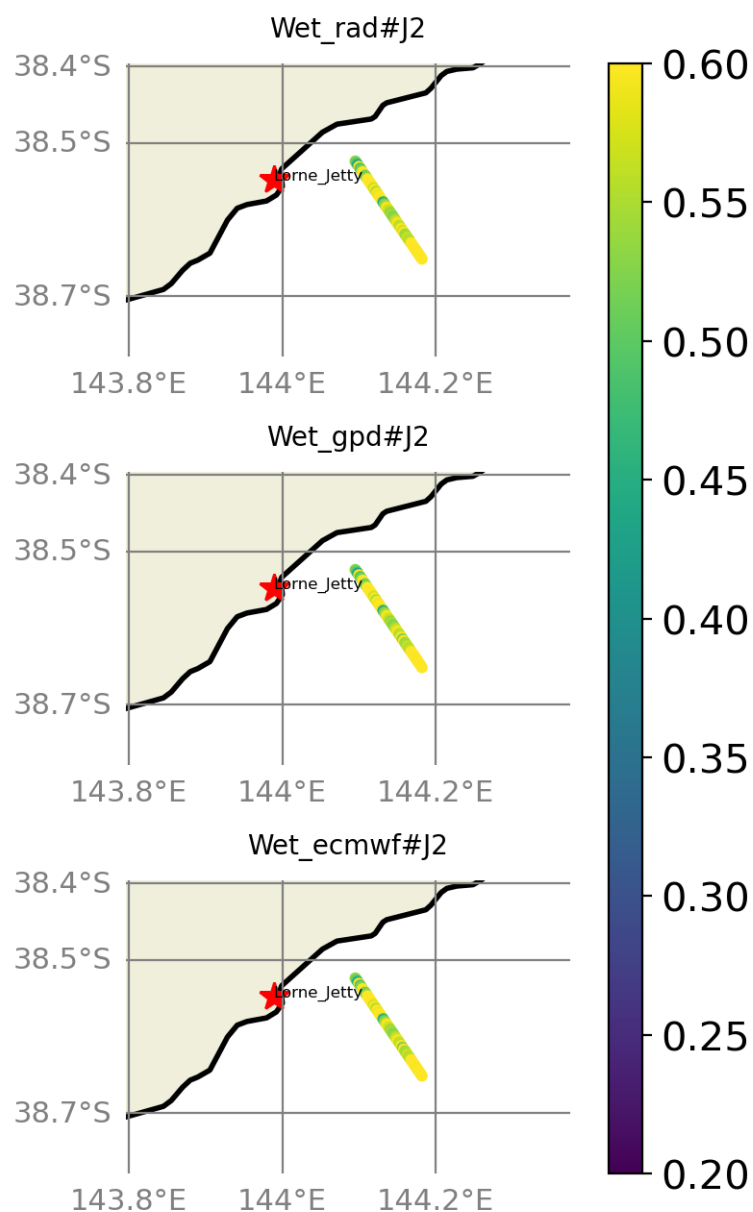


FIGURE 49 – correlation visualization in maps view % Lorne_Jetty tide gauge

6.1.2 rmsd visualization in maps view % Lorne_Jetty tide gauge

Rmsd (m) Altimetry data with respect to Lorne_Jetty Tide gauge data

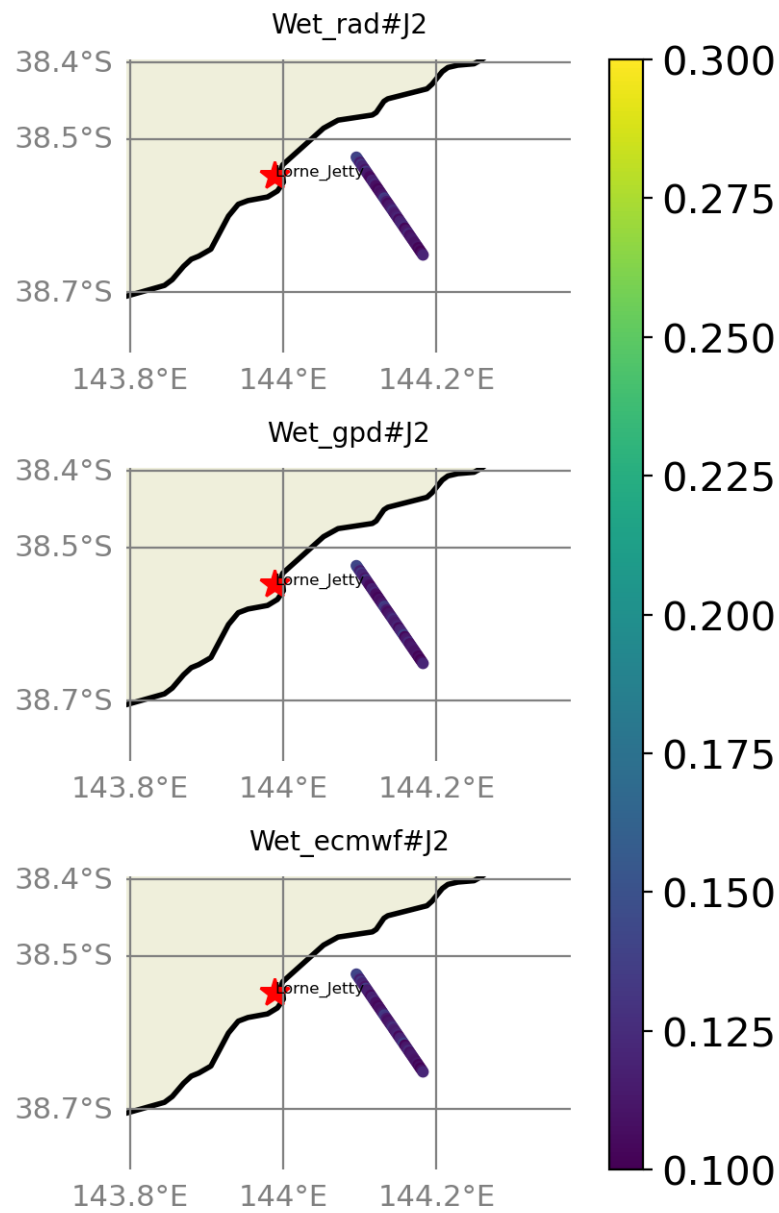


FIGURE 50 – rmsd visualization in maps view % Lorne_Jetty tide gauge

6.1.3 std visualization in maps view % Lorne_Jetty tide gauge

Std (m) Altimetry data with respect to Lorne_Jetty Tide gauge data

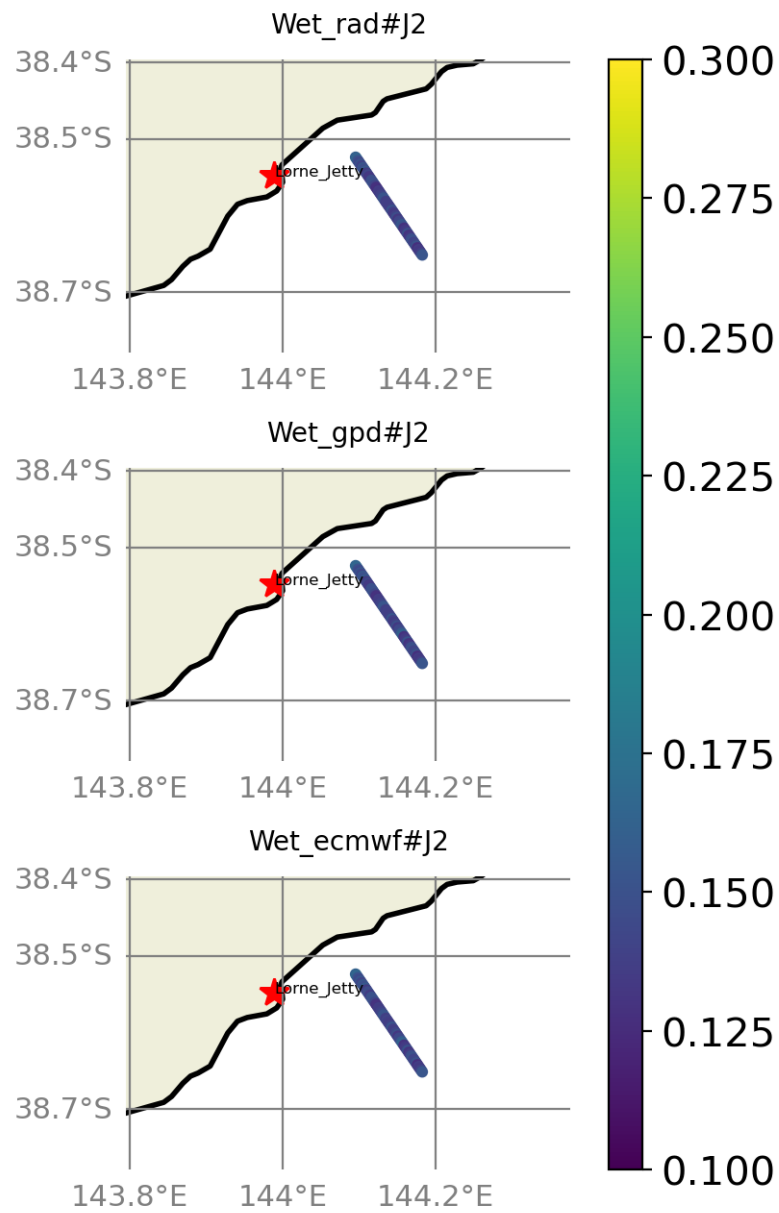


FIGURE 51 – std visualization in maps view % Lorne_Jetty tide gauge

6.1.4 valid_data_percent visualization in maps view % Lorne_Jetty tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Lorne_Jetty Tide gauge data

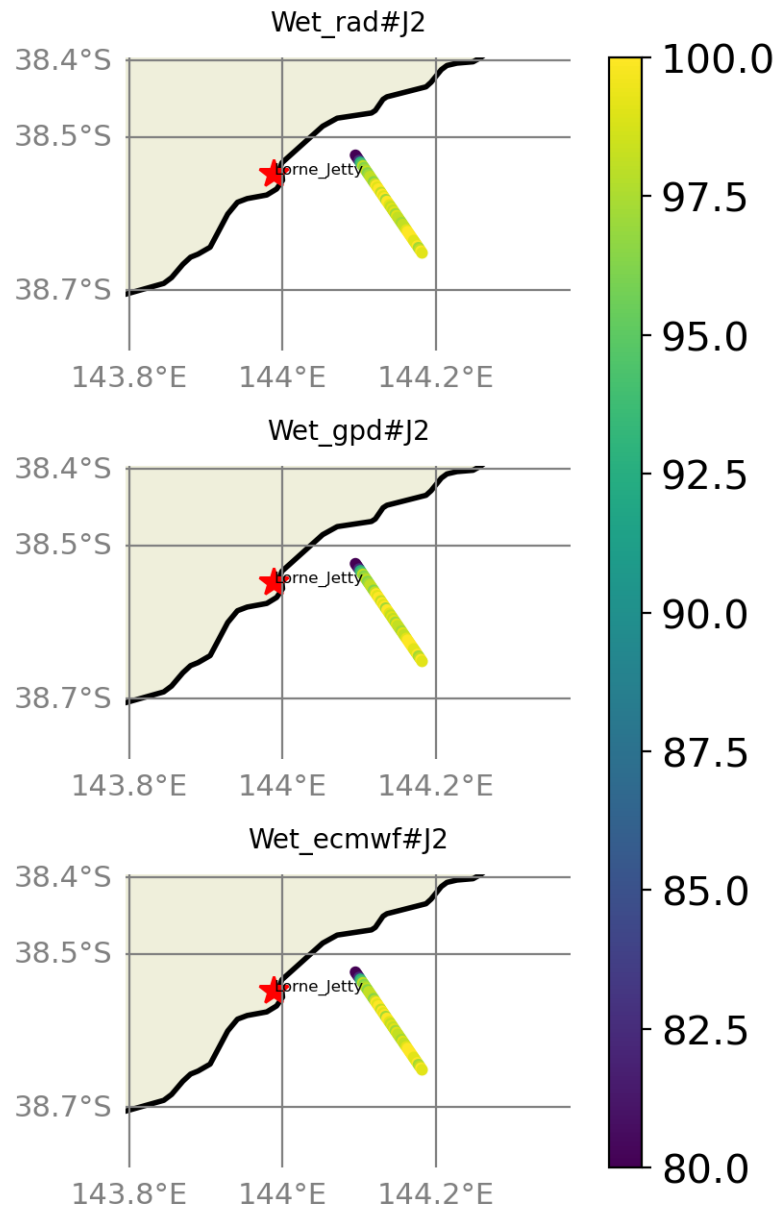


FIGURE 52 – valid_data_percent visualization in maps view % Lorne_Jetty tide gauge

6.1.5 Valid data (%) in function of distance to coast/Lorne_Jetty station

The formula to calculate the percentage of valid data in each time serie is;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time serie, i is the index of the time serie, np is the number of the selected altimetry time series. $maxNB = 109$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

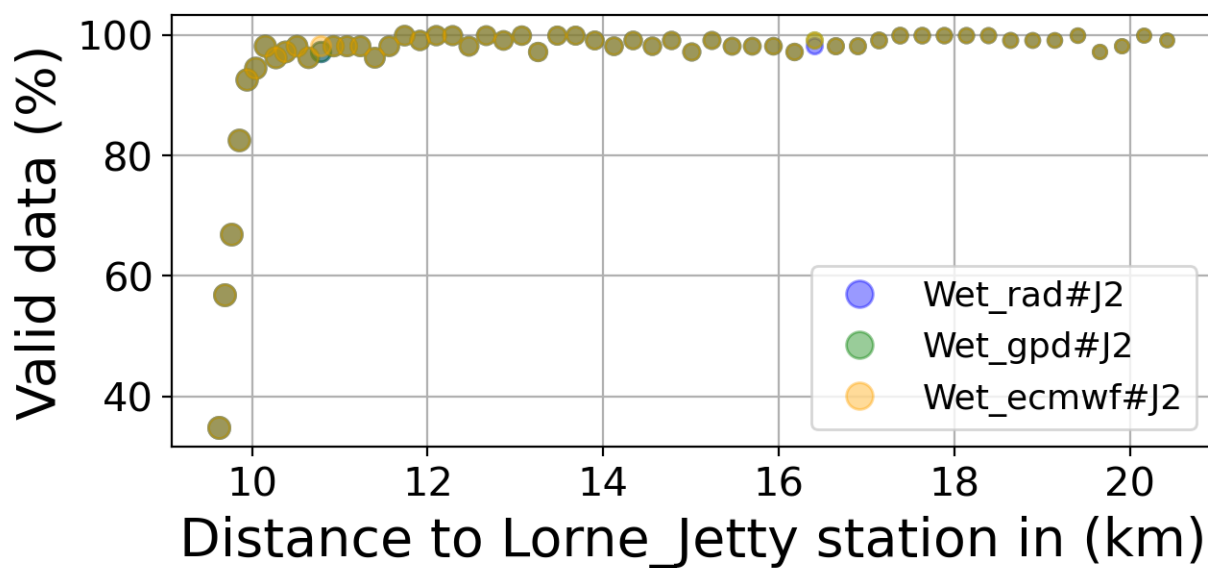
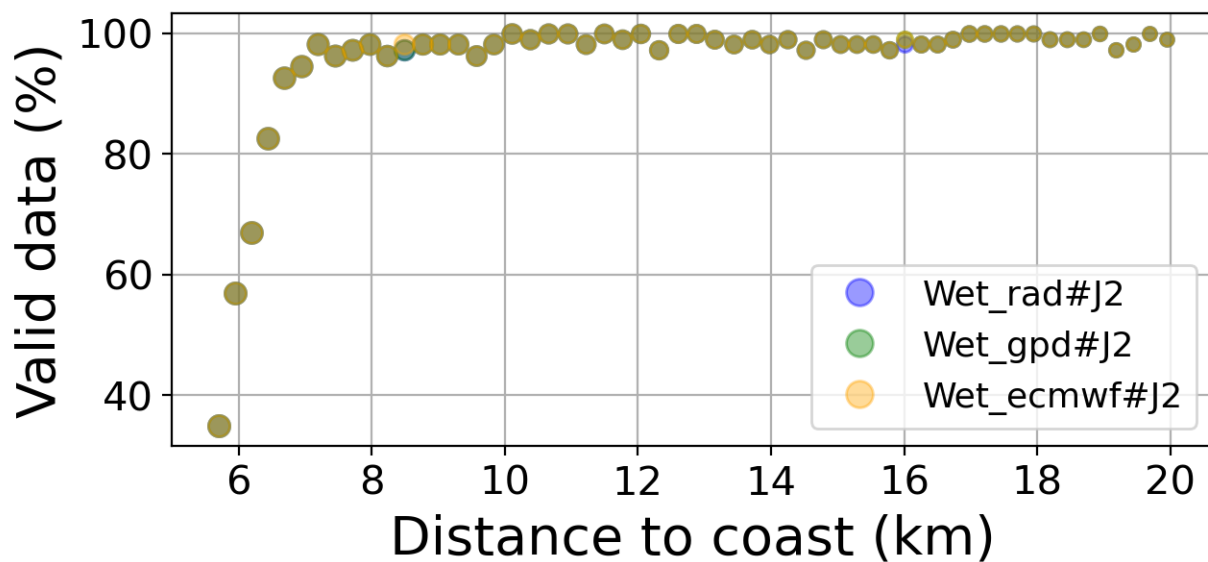


FIGURE 53 – Valid data (%) in function of distance to coast/Lorne_Jetty station

6.1.6 Std in function of distance to coast/Lorne_Jetty station

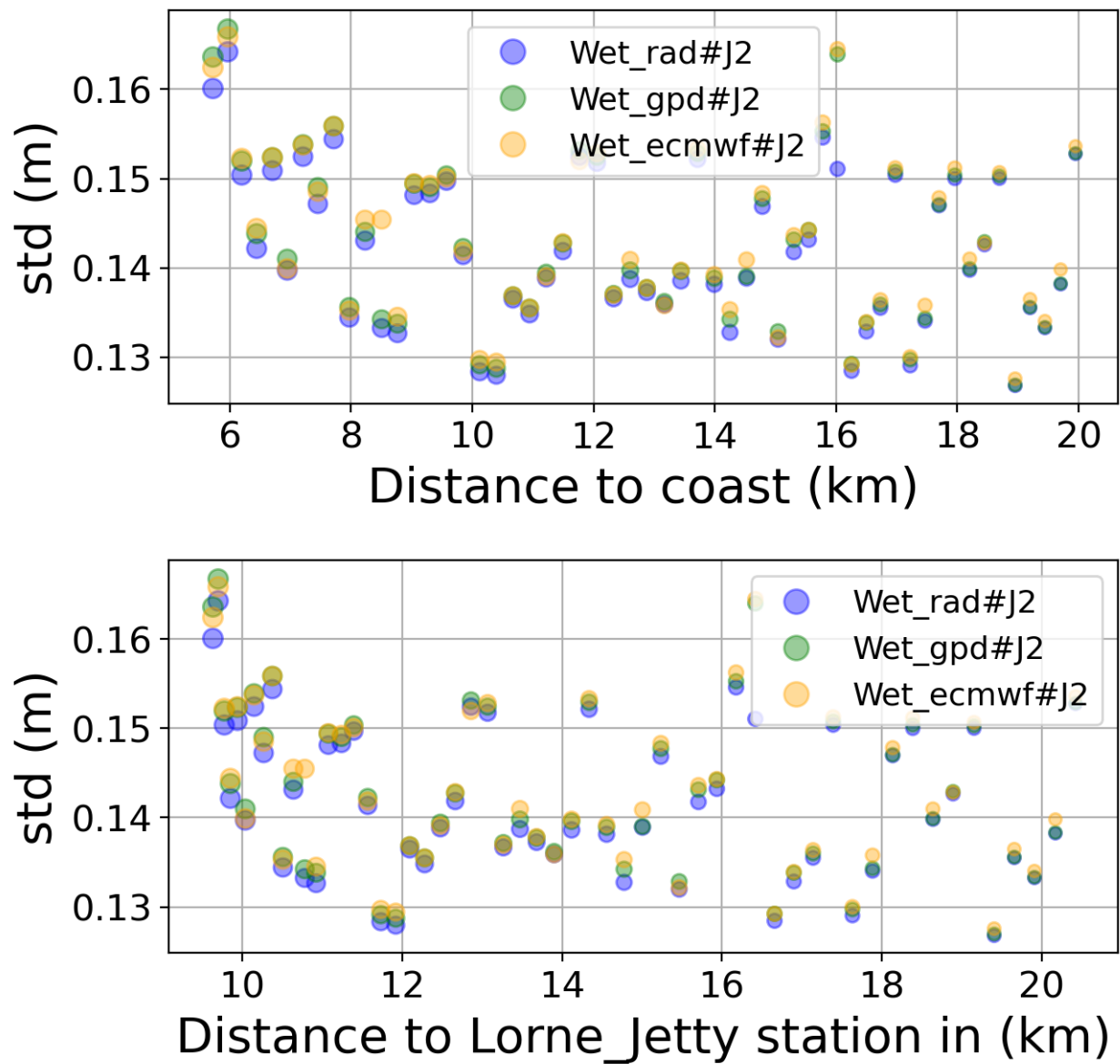


FIGURE 54 – Std in function of the distance to the coast/Lorne_Jetty station

6.1.7 Correlation in function of distance to coast/Lorne_Jetty station

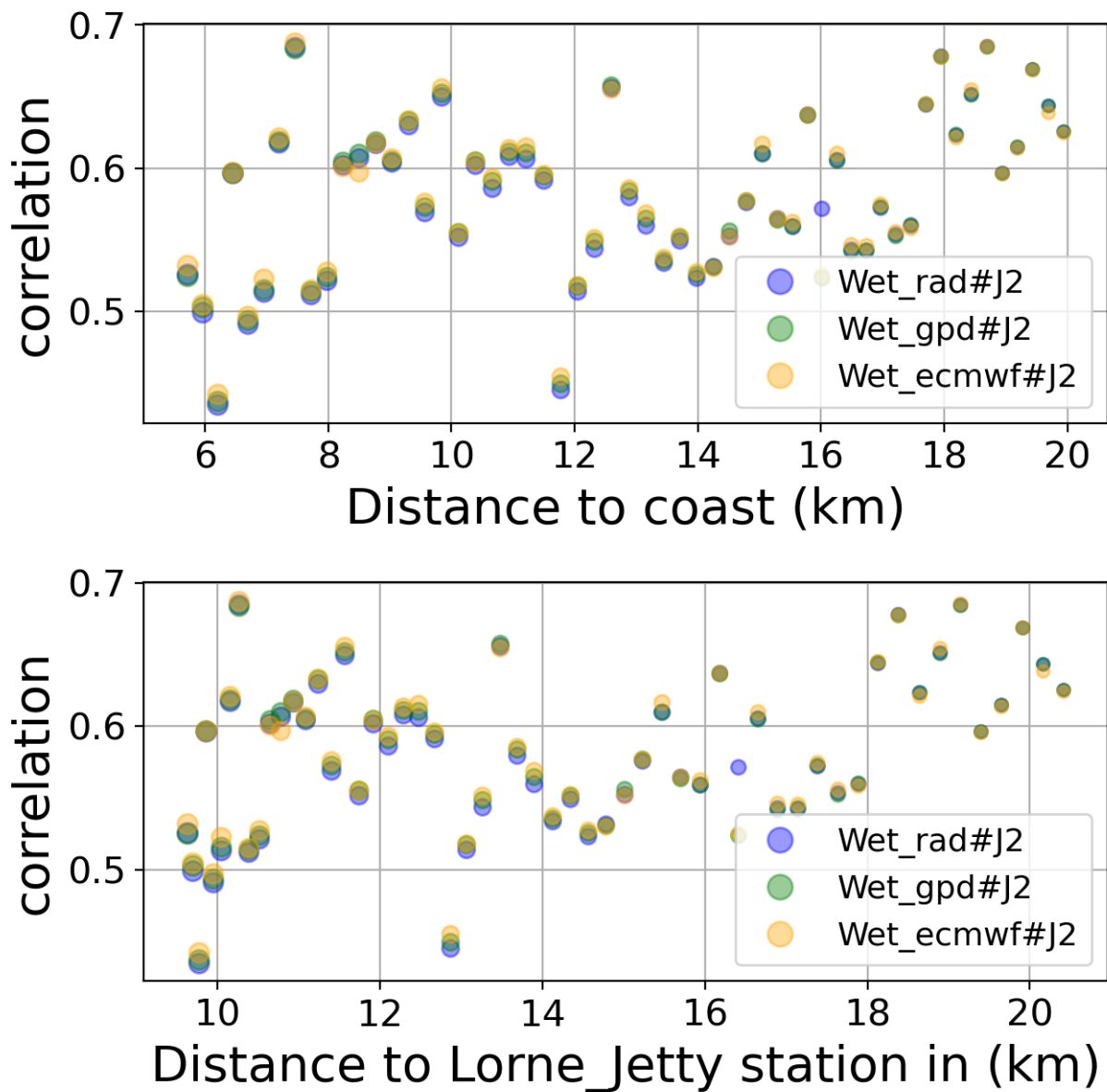


FIGURE 55 – Correlation in function of the distance to the coast/Lorne_Jetty station

6.1.8 Taylor Diagram

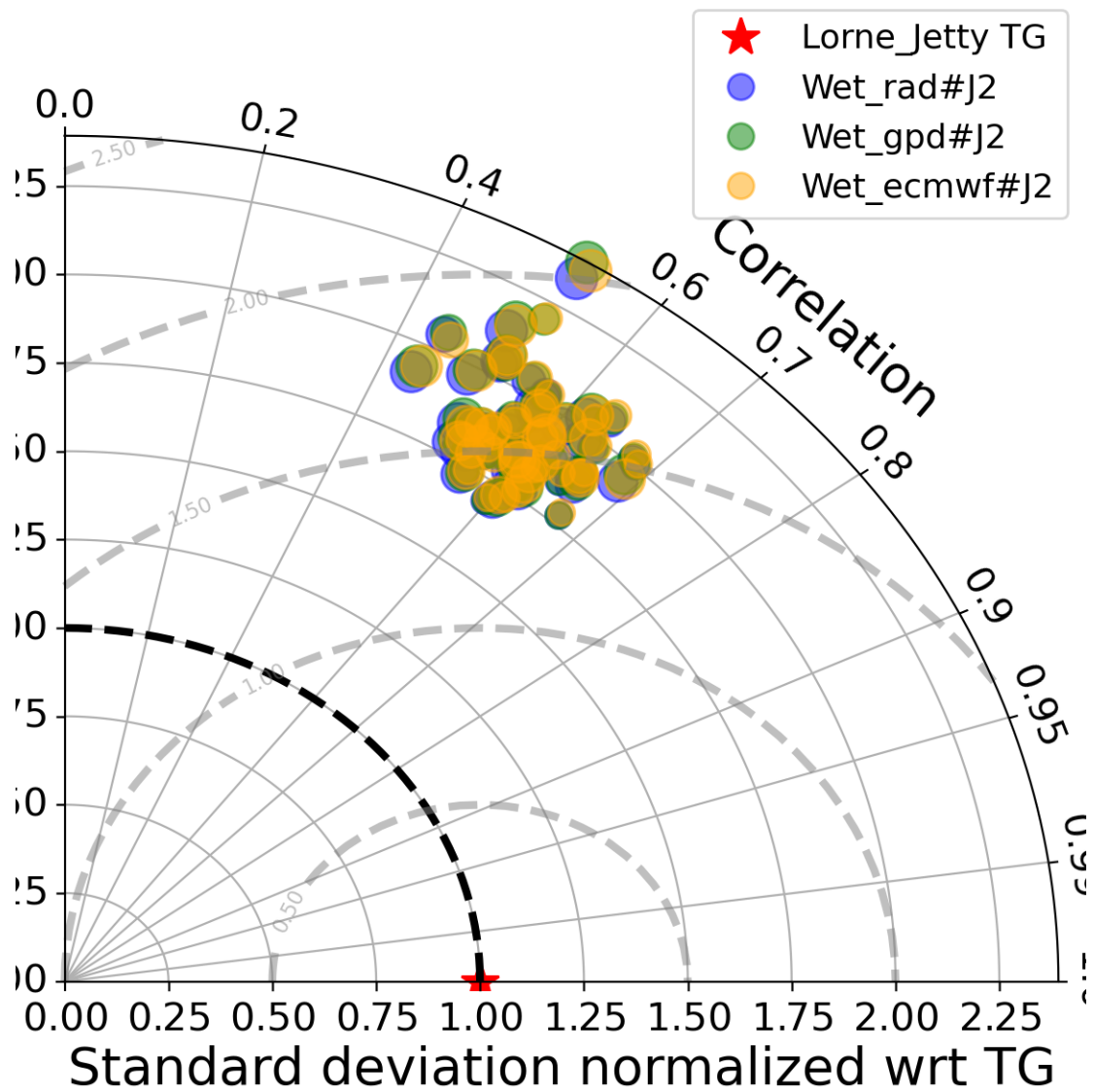


FIGURE 56 – Taylor diagram

6.1.9 Mean statistics table of products comparison with Lorne_Jetty tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	95.74	0.581	0.142	0.116
Wet_gpd#J2	95.757	0.582	0.143	0.117
Wet_ecmwf#J2	95.773	0.583	0.144	0.117

FIGURE 57 – Mean statistics table of the common points in the altimetry products

6.1.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 109 point.

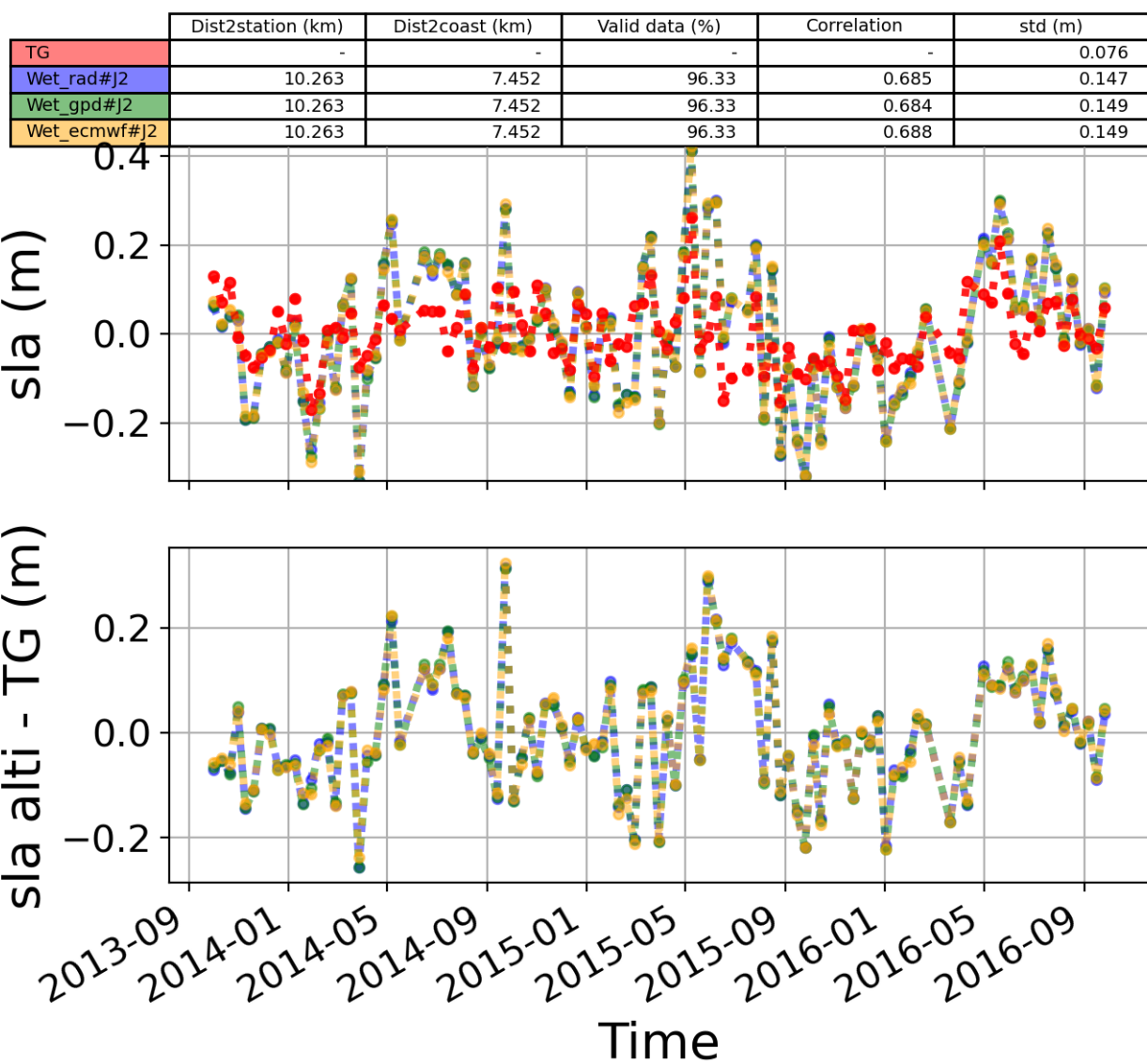


FIGURE 58 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

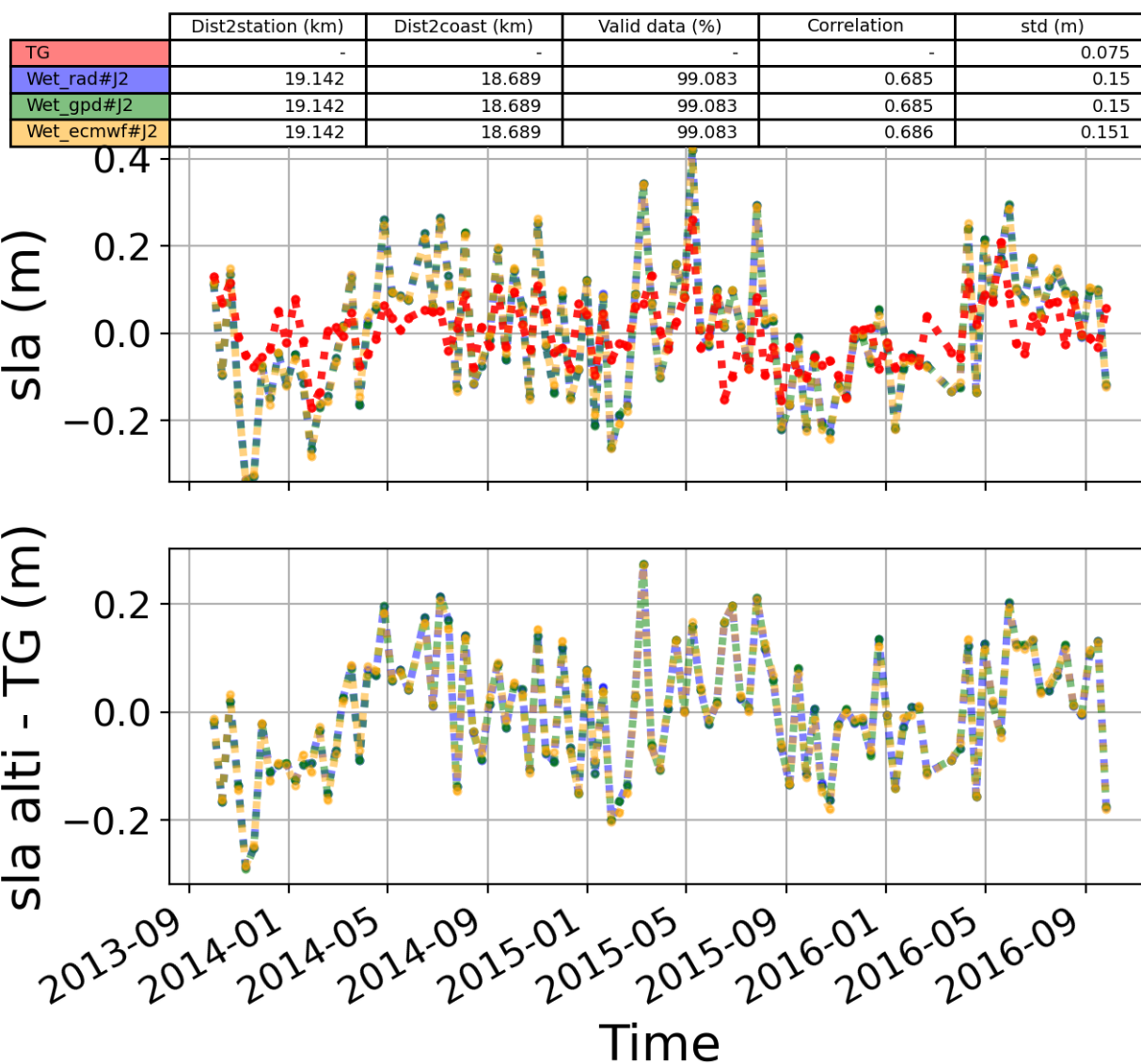


FIGURE 59 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.2 Station : Bundaberg

- Nearest track to Bundaberg station is the track number track149
- The area of interest is limited by :
 - A circle which it's center is the Bundaberg tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.2.1 correlation visualization in maps view % Bundaberg tide gauge

Correlation Altimetry data with respect to Bundaberg Tide gauge data

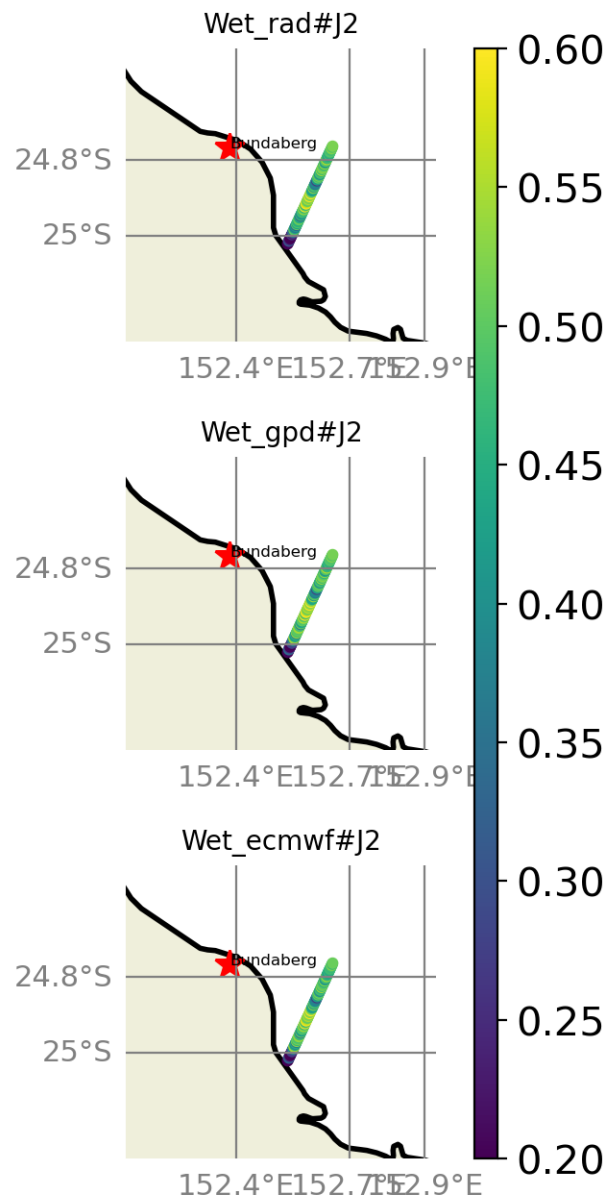


FIGURE 60 – correlation visualization in maps view % Bundaberg tide gauge

6.2.2 rmsd visualization in maps view % Bundaberg tide gauge

Rmsd (m) Altimetry data with respect to Bundaberg Tide gauge data

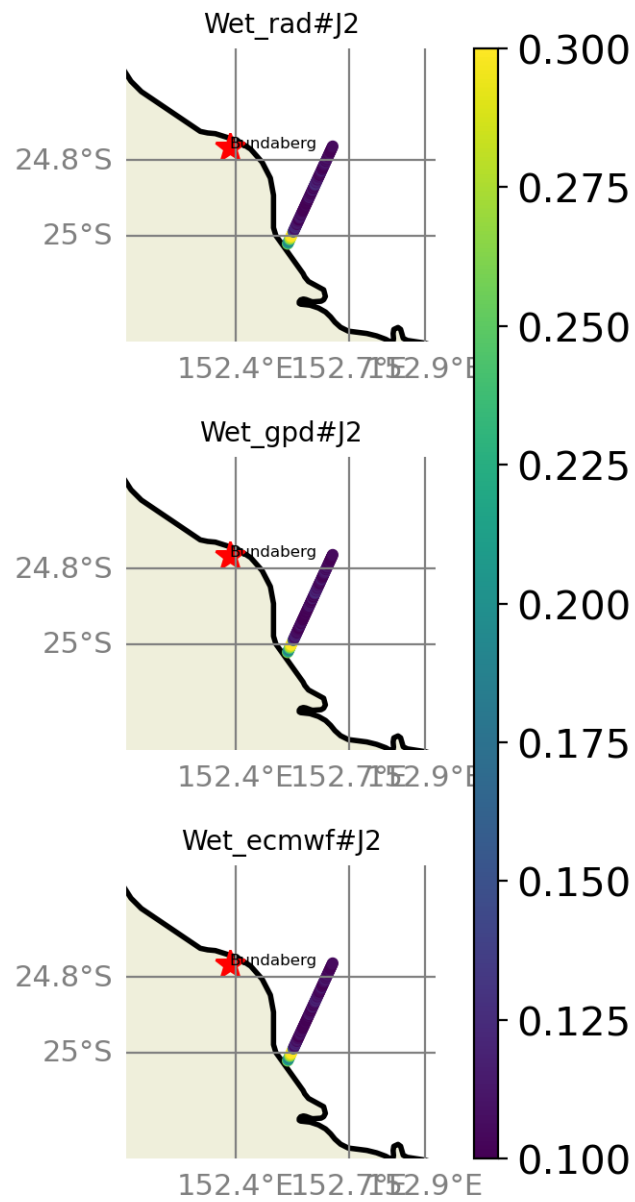


FIGURE 61 – rmsd visualization in maps view % Bundaberg tide gauge

6.2.3 std visualization in maps view % Bundaberg tide gauge

Std (m) Altimetry data with respect to Bundaberg Tide gauge data

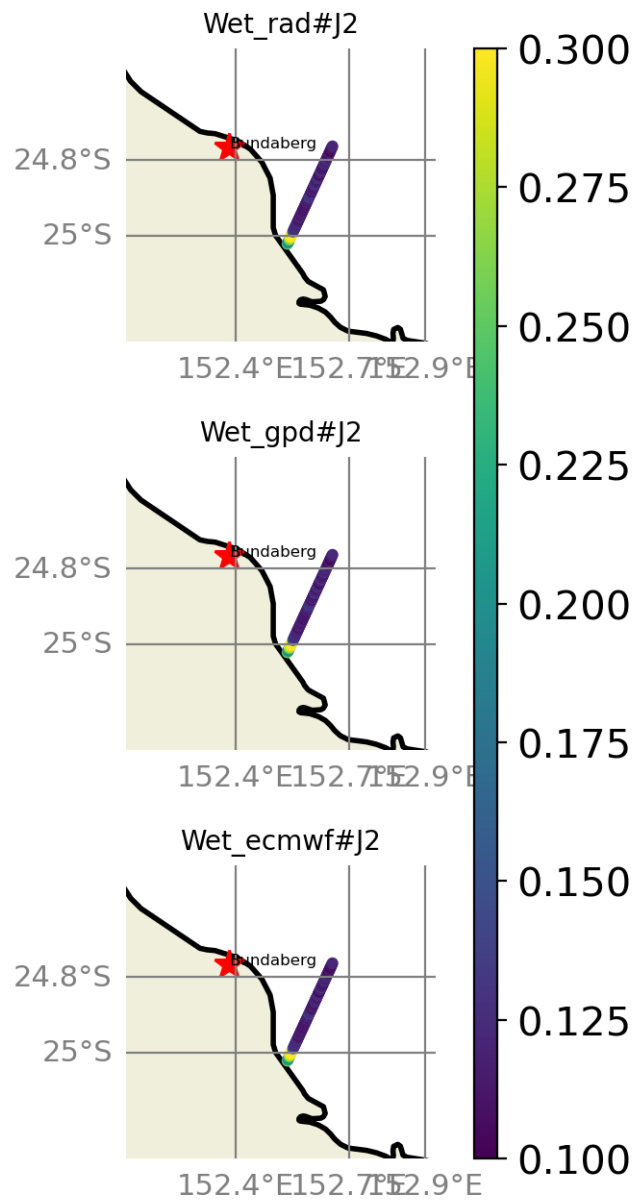


FIGURE 62 – std visualization in maps view % Bundaberg tide gauge

6.2.4 valid_data_percent visualization in maps view % Bundaberg tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Bundaberg Tide gauge data

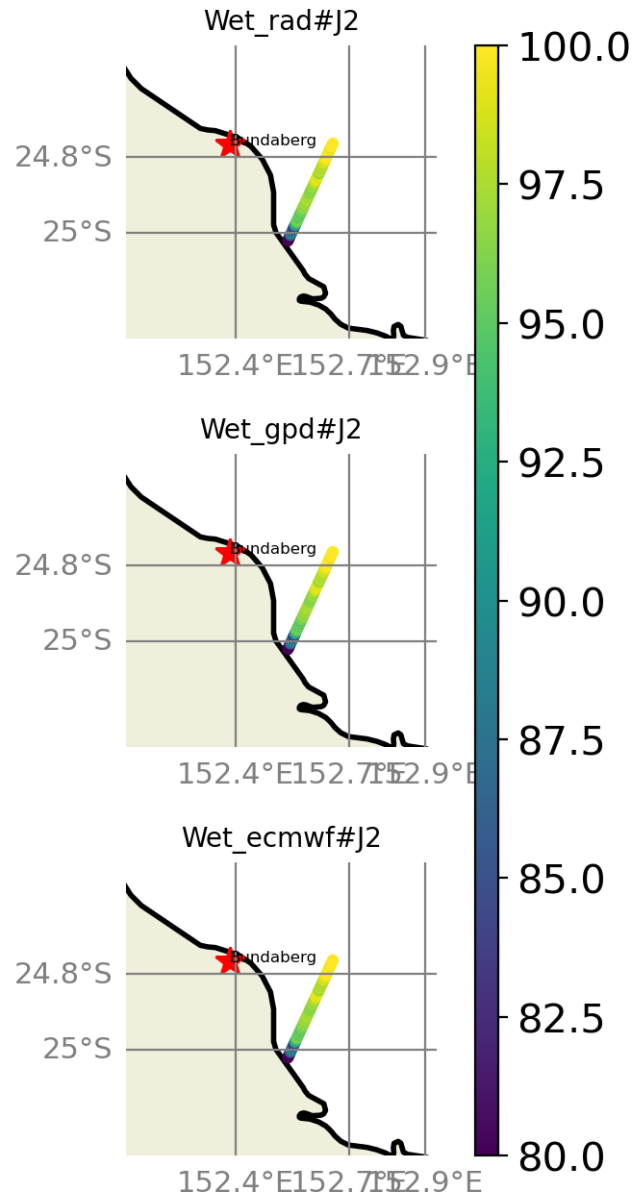


FIGURE 63 – valid_data_percent visualization in maps view % Bundaberg tide gauge

6.2.5 Valid data (%) in function of distance to coast/Bundaberg station

The formula to calculate the percentage of valid data in each time series is;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time series, i is the index of the time series, np is the number of the selected altimetry time series. $maxNB = 111$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

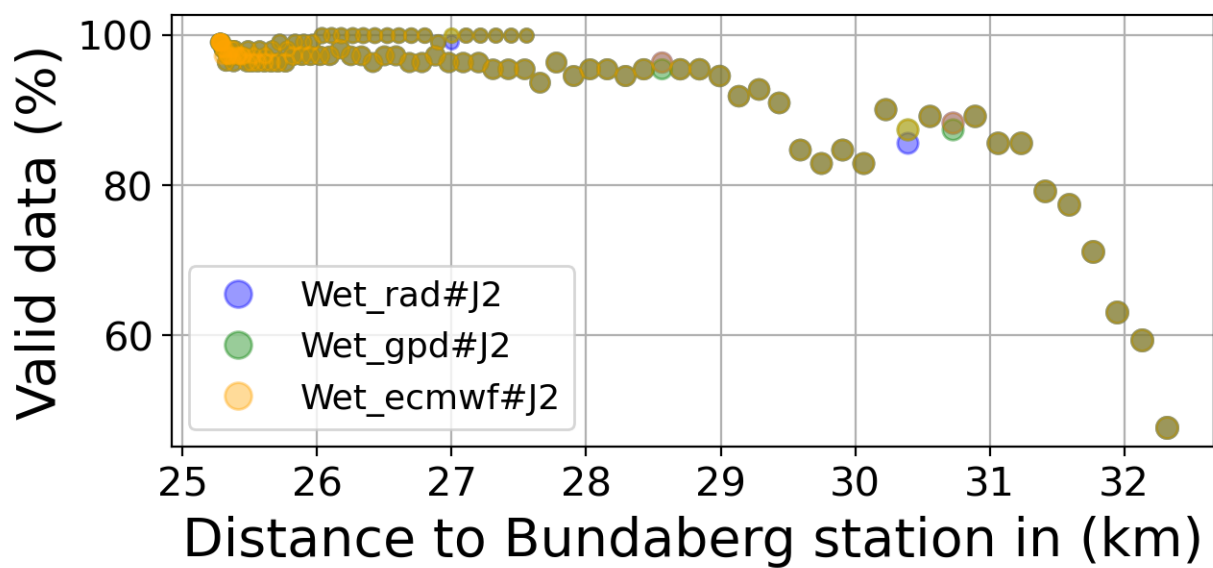
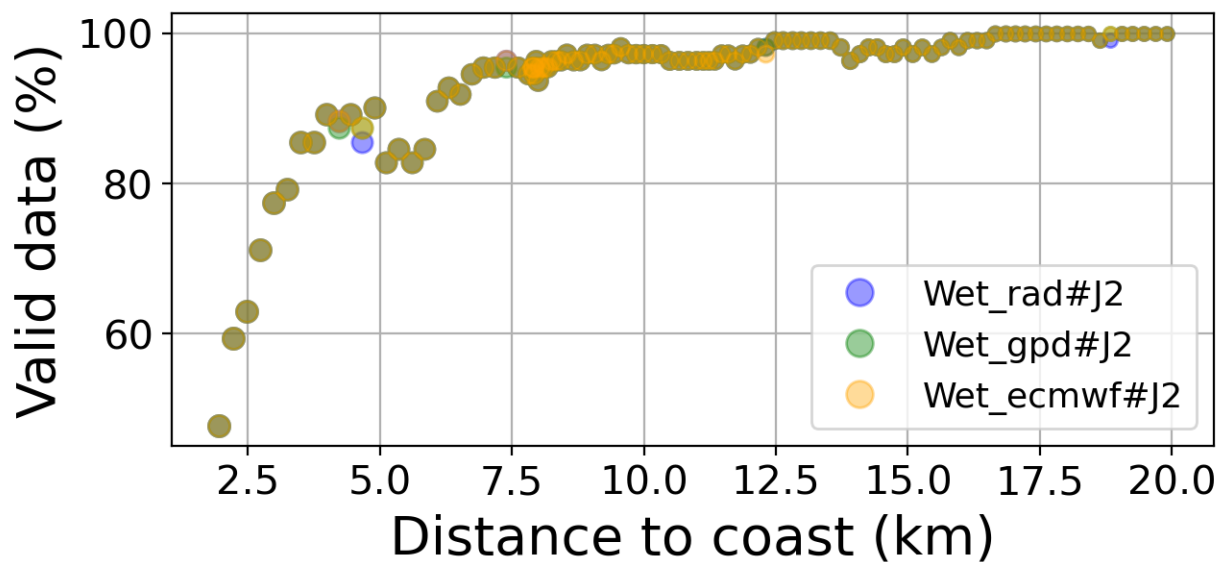


FIGURE 64 – Valid data (%) in function of distance to coast/Bundaberg station

6.2.6 Std in function of distance to coast/Bundaberg station

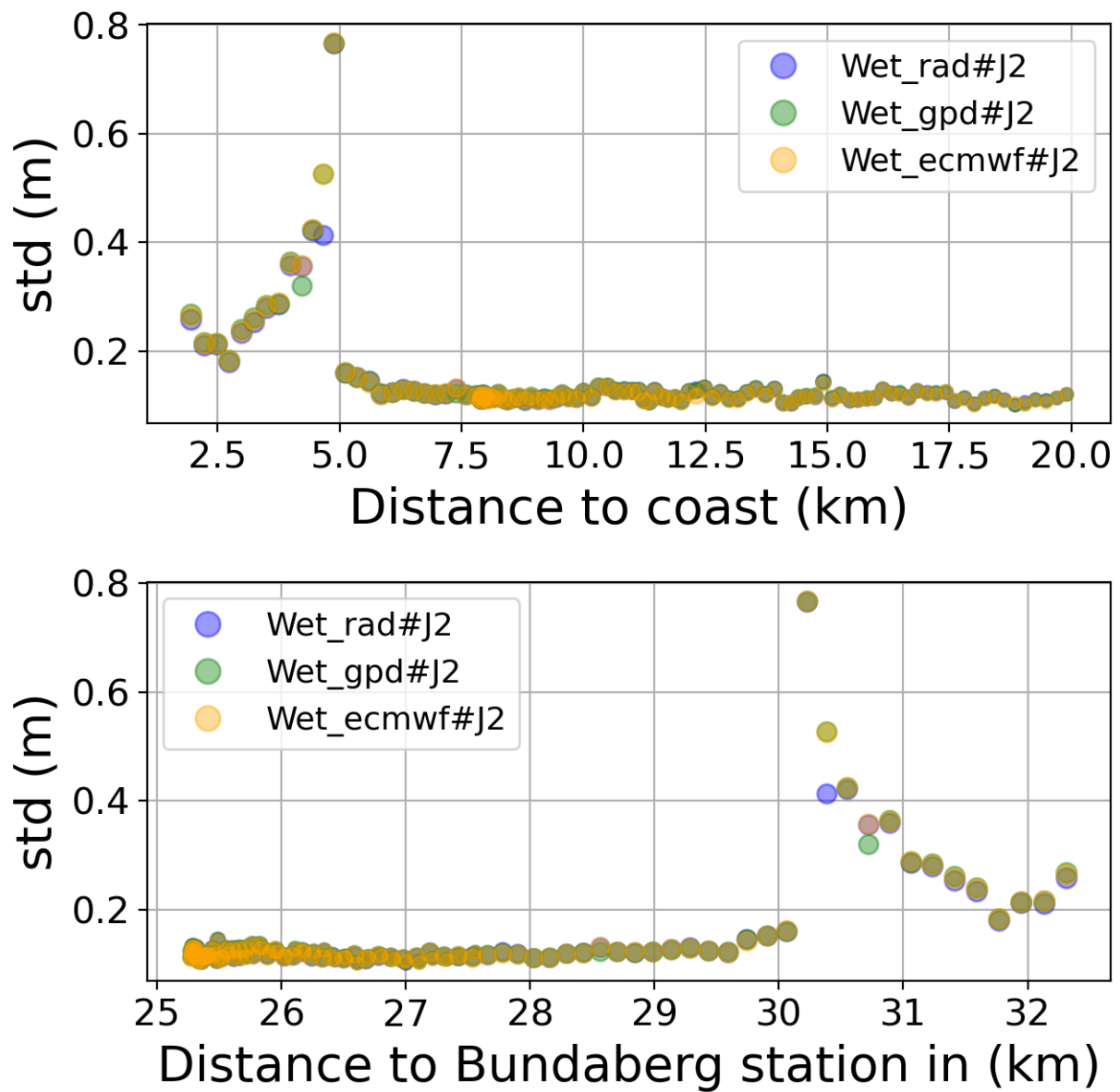


FIGURE 65 – Std in function of the distance to the coast/Bundaberg station

6.2.7 Correlation in function of distance to coast/Bundaberg station

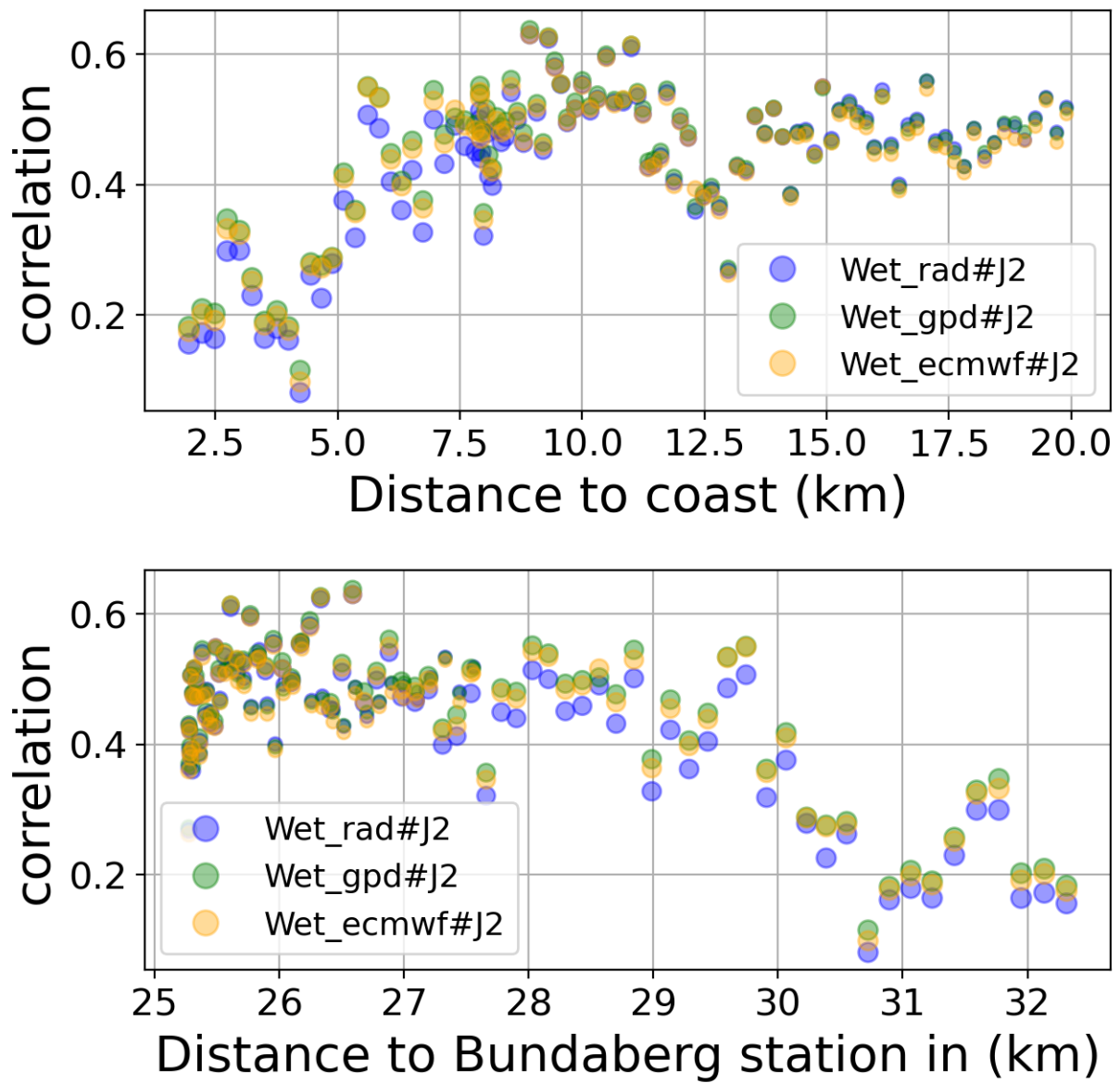


FIGURE 66 – Correlation in function of the distance to the coast/Bundaberg station

6.2.8 Taylor Diagram

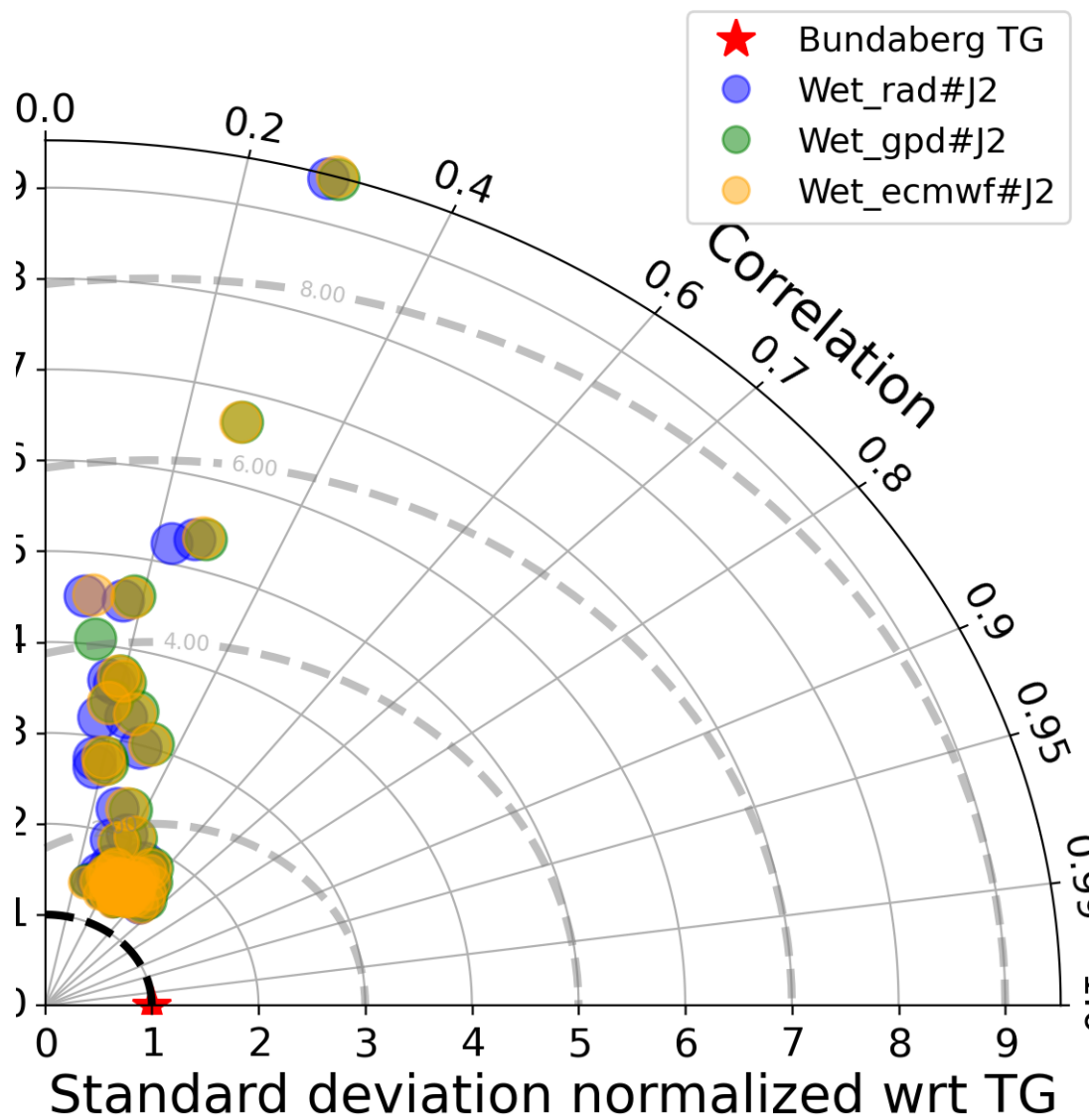


FIGURE 67 – Taylor diagram

6.2.9 Mean statistics table of products comparison with Bundaberg tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	94.544	0.441	0.145	0.134
Wet_gpd#J2	94.552	0.455	0.146	0.134
Wet_ecmwf#J2	94.561	0.448	0.146	0.134

FIGURE 68 – Mean statistics table of the common points in the altimetry products

6.2.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 111 point.

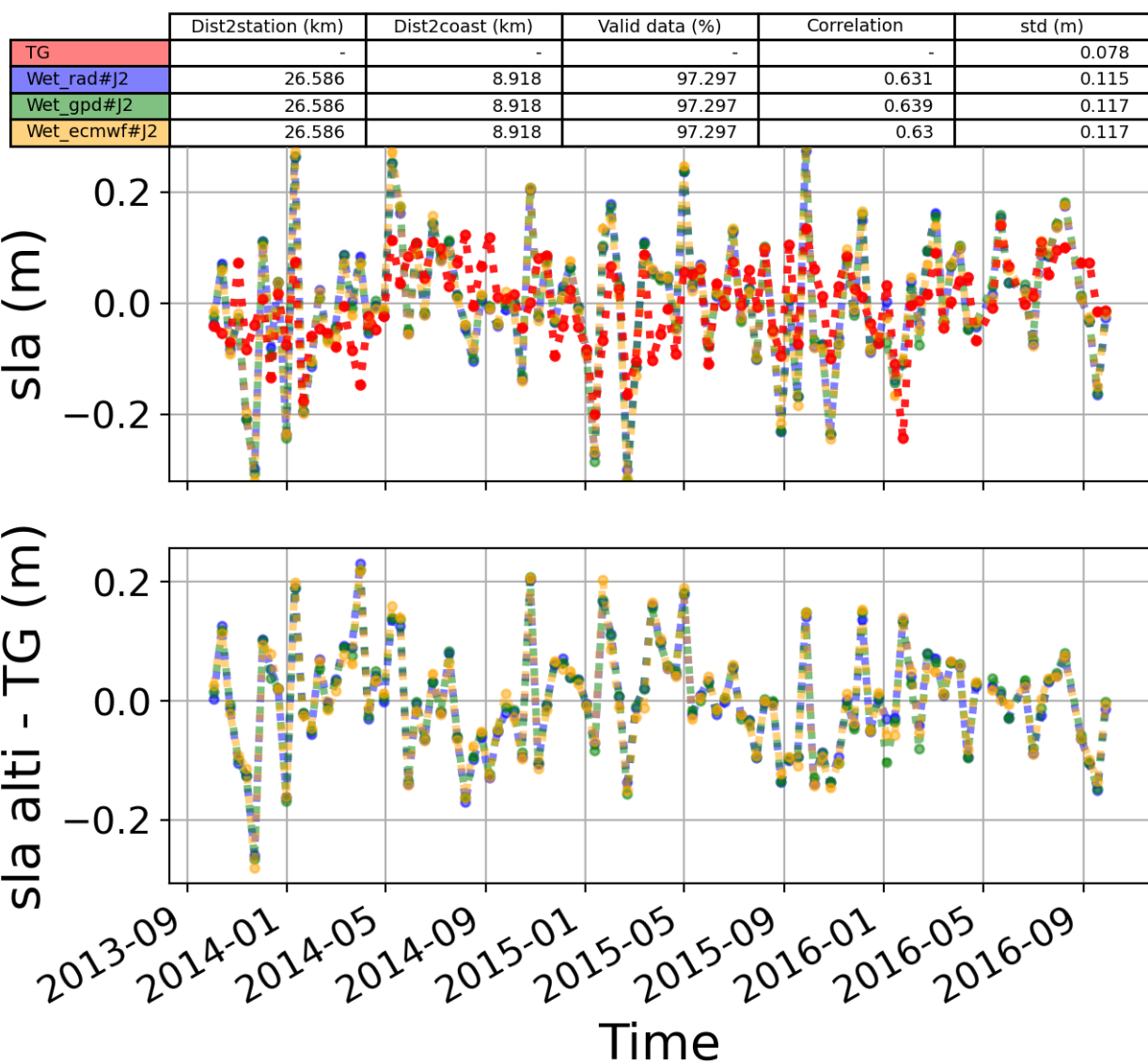


FIGURE 69 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.3 Station : Thursday_Island

- Nearest track to Thursday_Island station is the track number track138
- The area of interest is limited by :
 - A circle which it's center is the Thursday_Island tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.3.1 correlation visualization in maps view % Thursday_Island tide gauge

Correlation Altimetry data with respect to Thursday_Island Tide gauge data

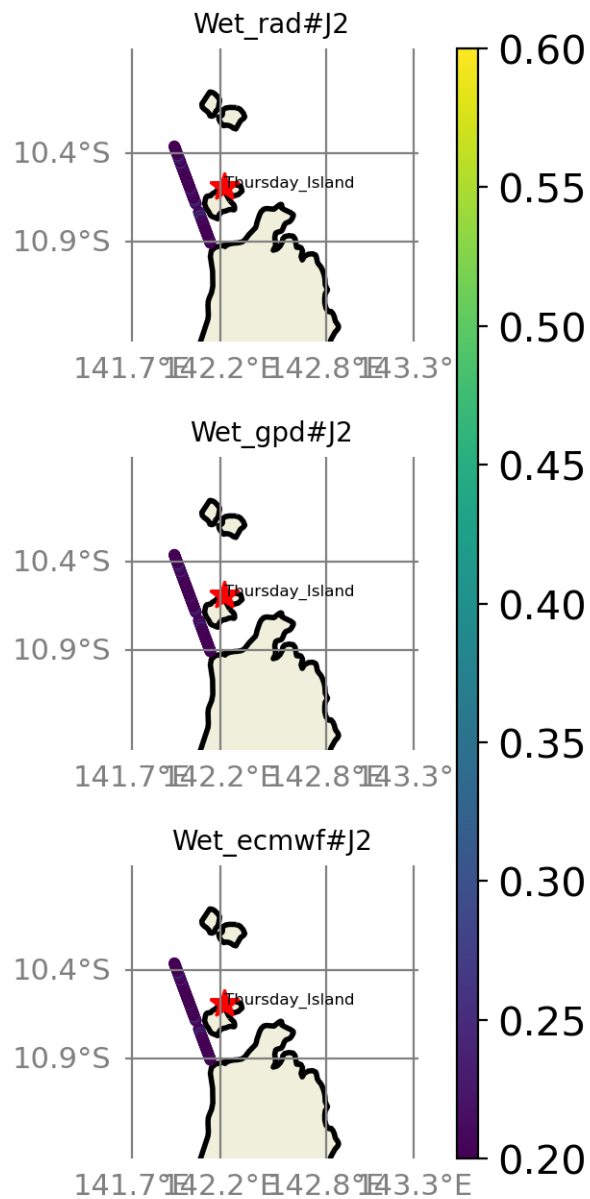


FIGURE 70 – correlation visualization in maps view % Thursday_Island tide gauge

6.3.2 rmsd visualization in maps view % Thursday_Island tide gauge

Rmsd (m) Altimetry data with respect to Thursday_Island Tide gauge data

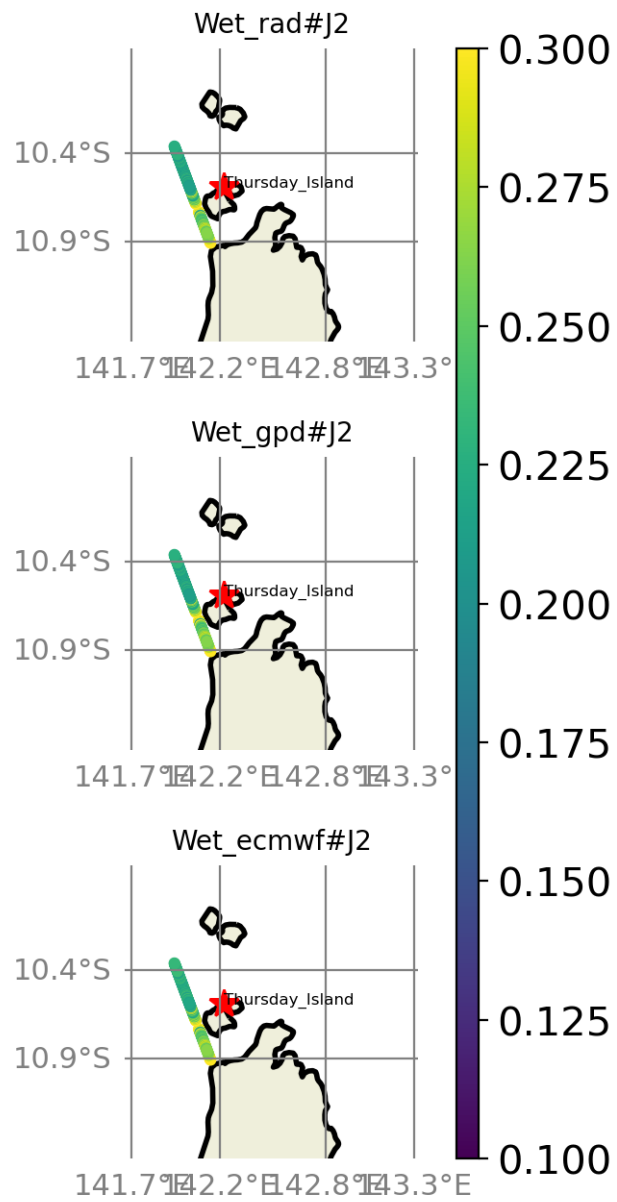


FIGURE 71 – rmsd visualization in maps view % Thursday_Island tide gauge

6.3.3 std visualization in maps view % Thursday_Island tide gauge

Std (m) Altimetry data with respect to Thursday_Island Tide gauge data

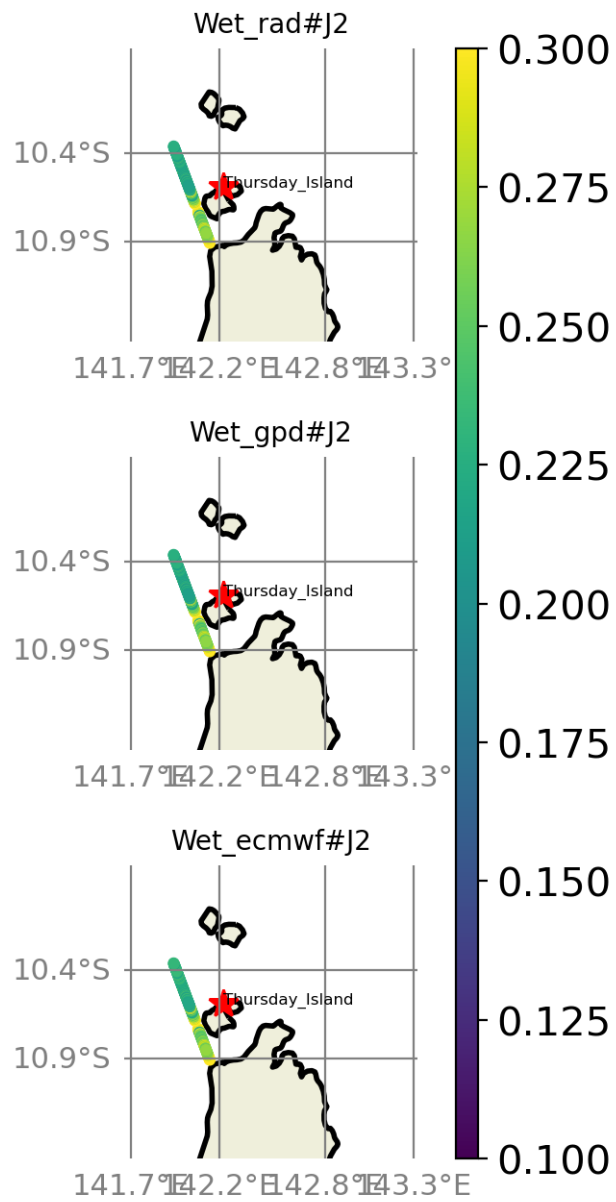


FIGURE 72 – std visualization in maps view % Thursday_Island tide gauge

6.3.4 valid_data_percent visualization in maps view % Thursday_Island tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Thursday_Island Tide gauge data

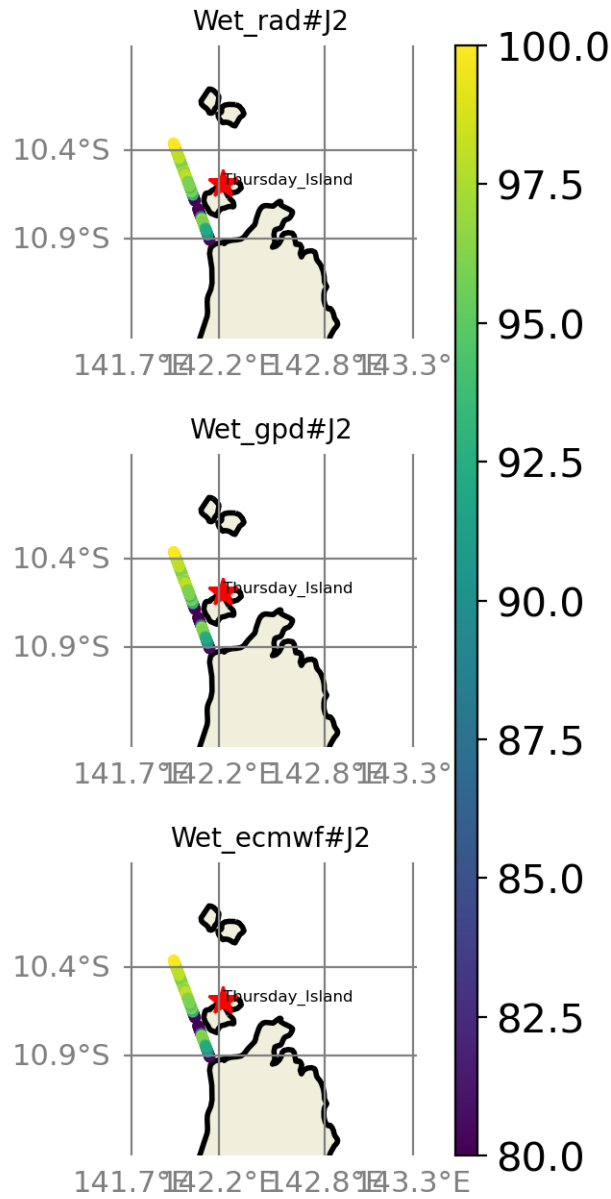


FIGURE 73 – valid_data_percent visualization in maps view % Thursday_Island tide gauge

6.3.5 Valid data (%) in function of distance to coast/Thursday_Island station

The formula to calculate the percentage of valid data in each time serie is;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time serie, i is the index of the time serie, np is the number of the selected altimetry time series. $maxNB = 51$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

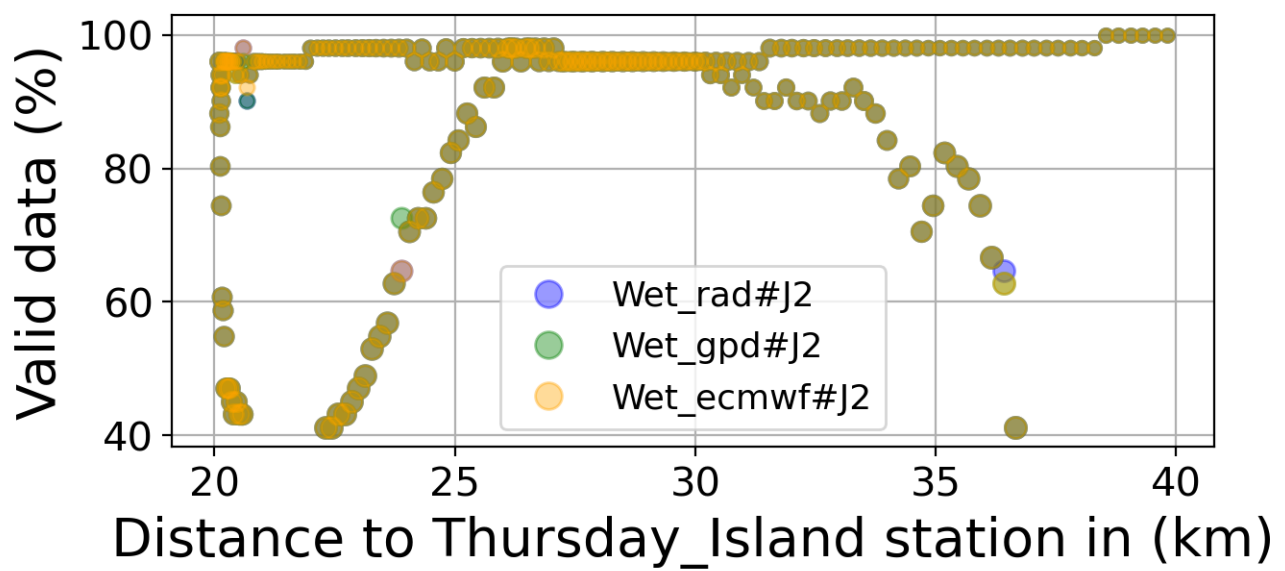
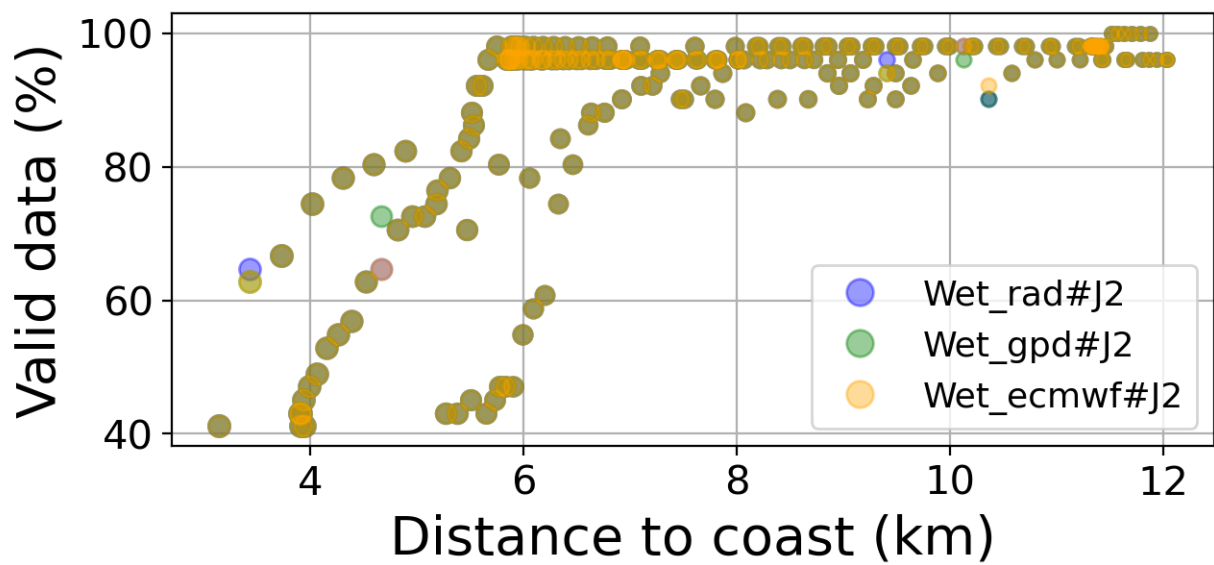


FIGURE 74 – Valid data (%) in function of distance to coast/Thursday_Island station

6.3.6 Std in function of distance to coast/Thursday_Island station

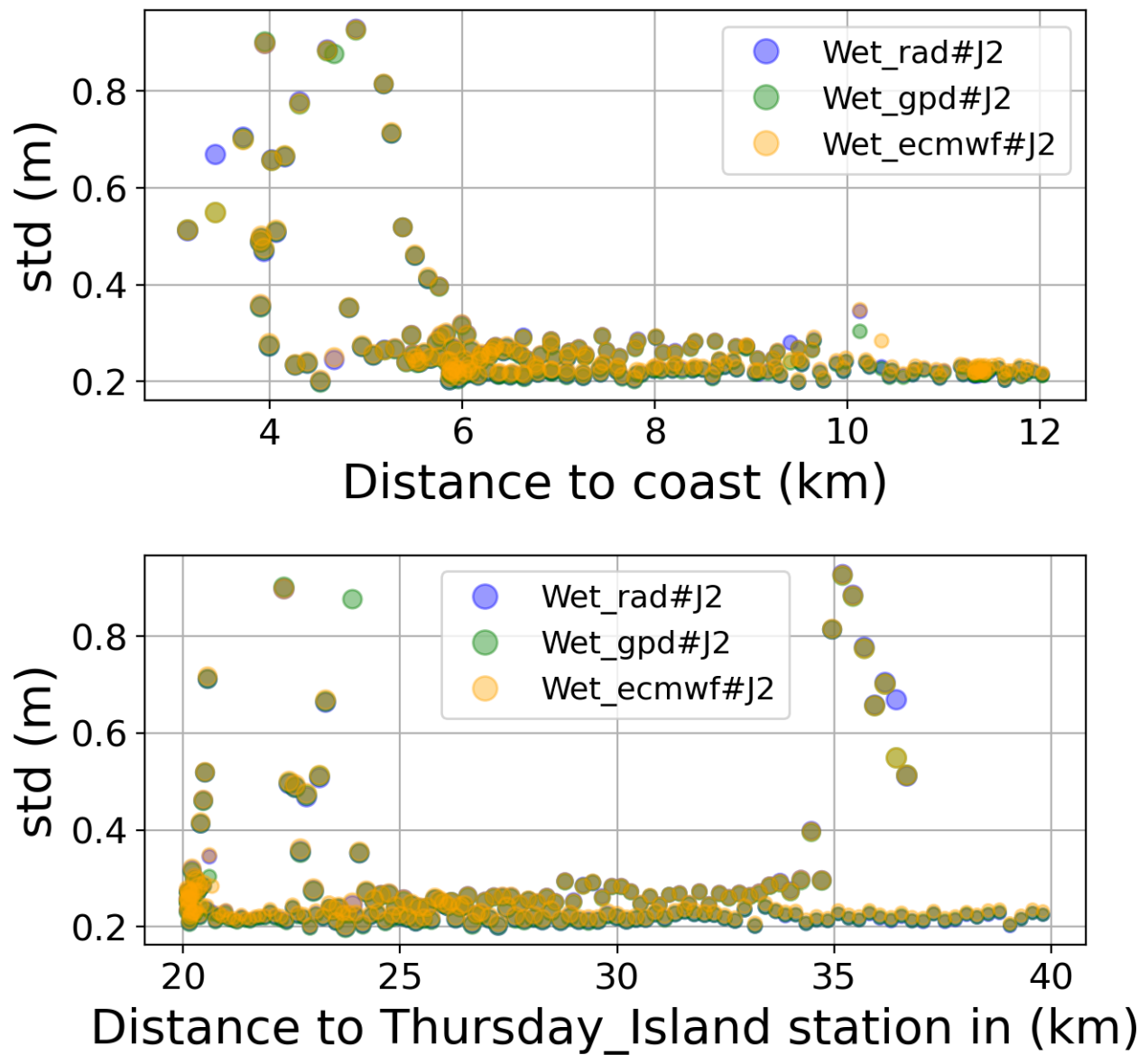


FIGURE 75 – Std in function of the distance to the coast/Thursday_Island station

6.3.7 Correlation in function of distance to coast/Thursday_Island station

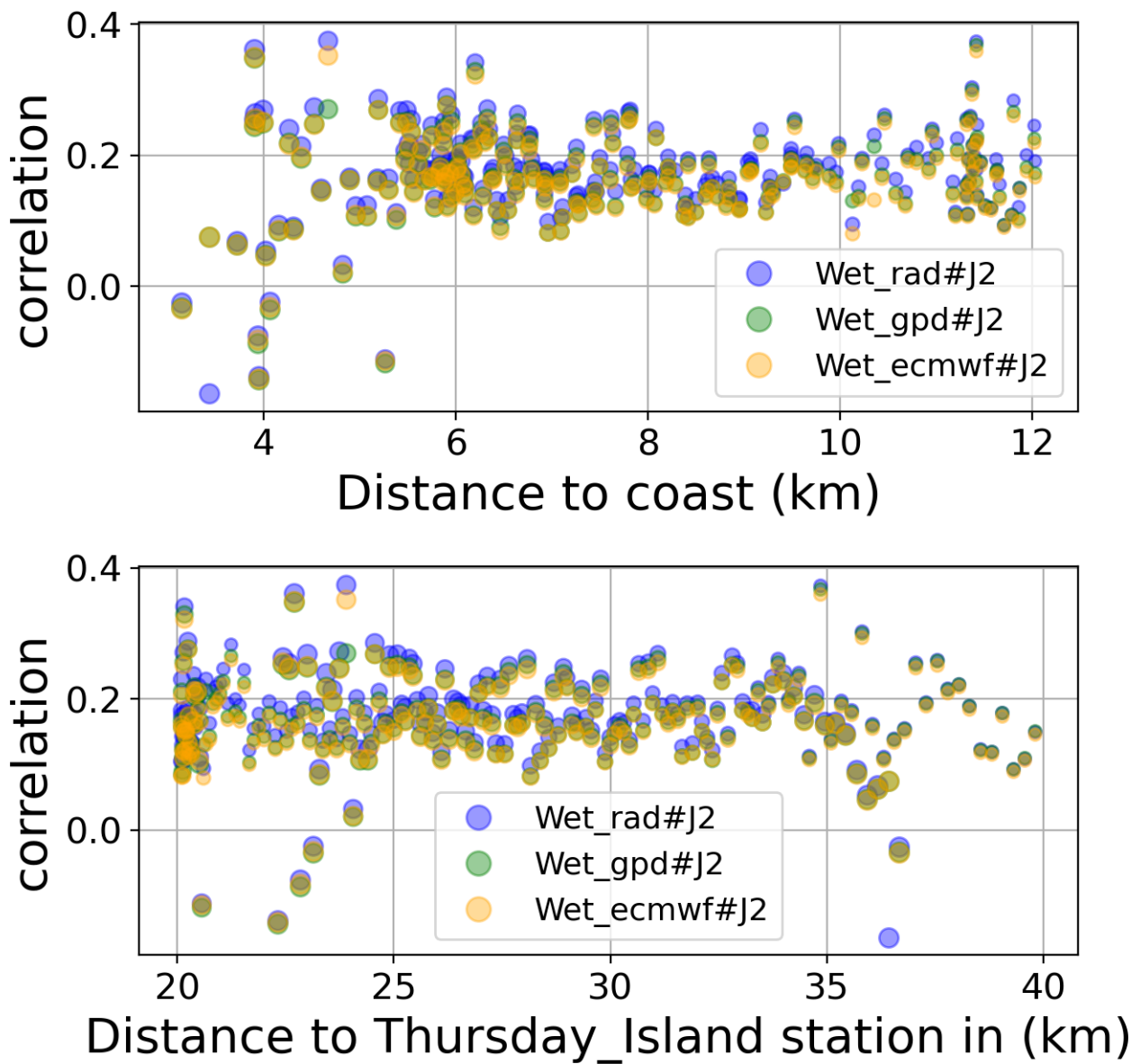


FIGURE 76 – Correlation in function of the distance to the coast/Thursday_Island station

6.3.8 Taylor Diagram

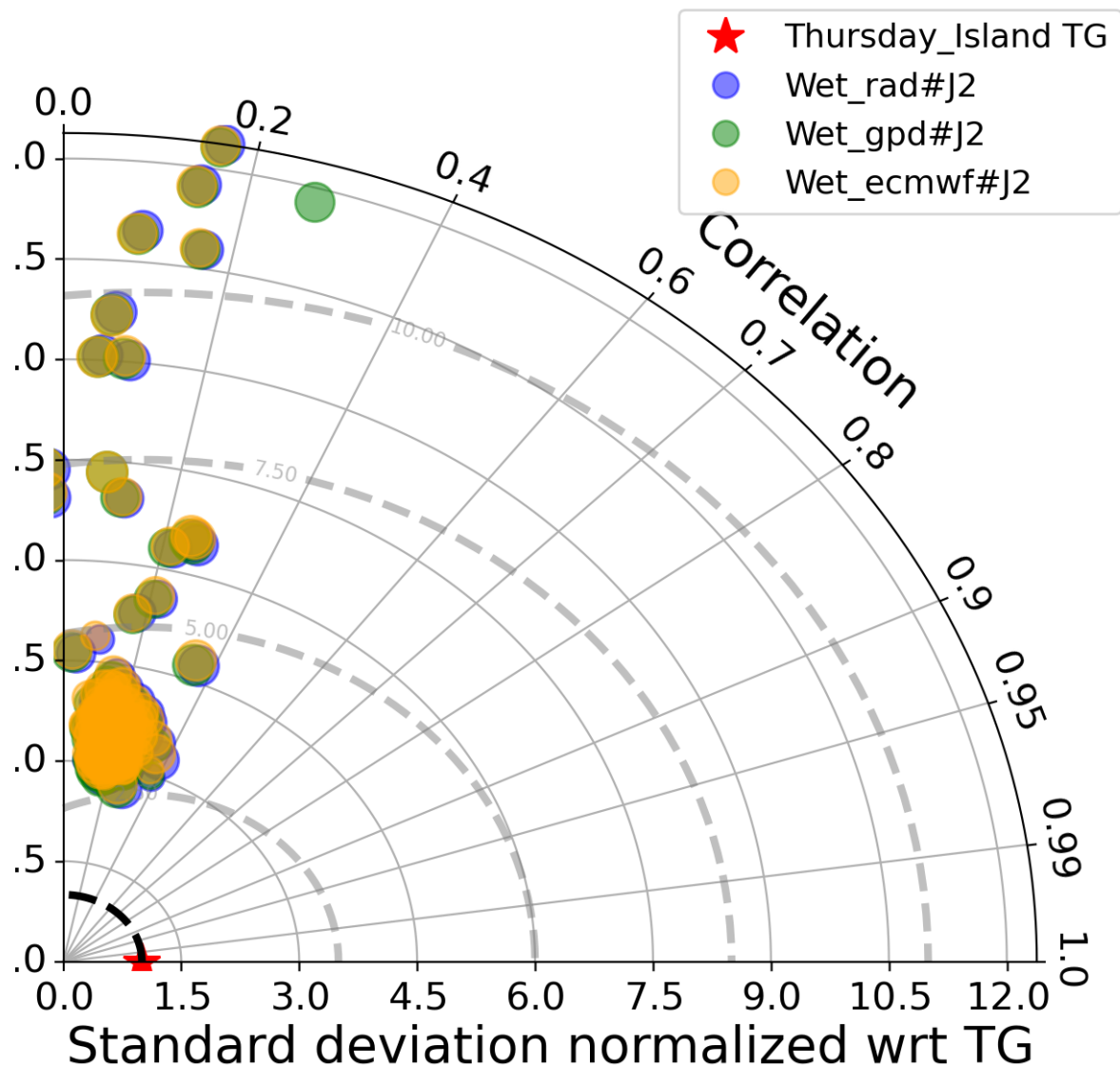


FIGURE 77 – Taylor diagram

6.3.9 Mean statistics table of products comparison with Thursday_Island tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	88.581	0.179	0.276	0.274
Wet_gpd#J2	88.591	0.168	0.277	0.276
Wet_ecmwf#J2	88.572	0.165	0.279	0.278

FIGURE 78 – Mean statistics table of the common points in the altimetry products

6.3.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 51 point.

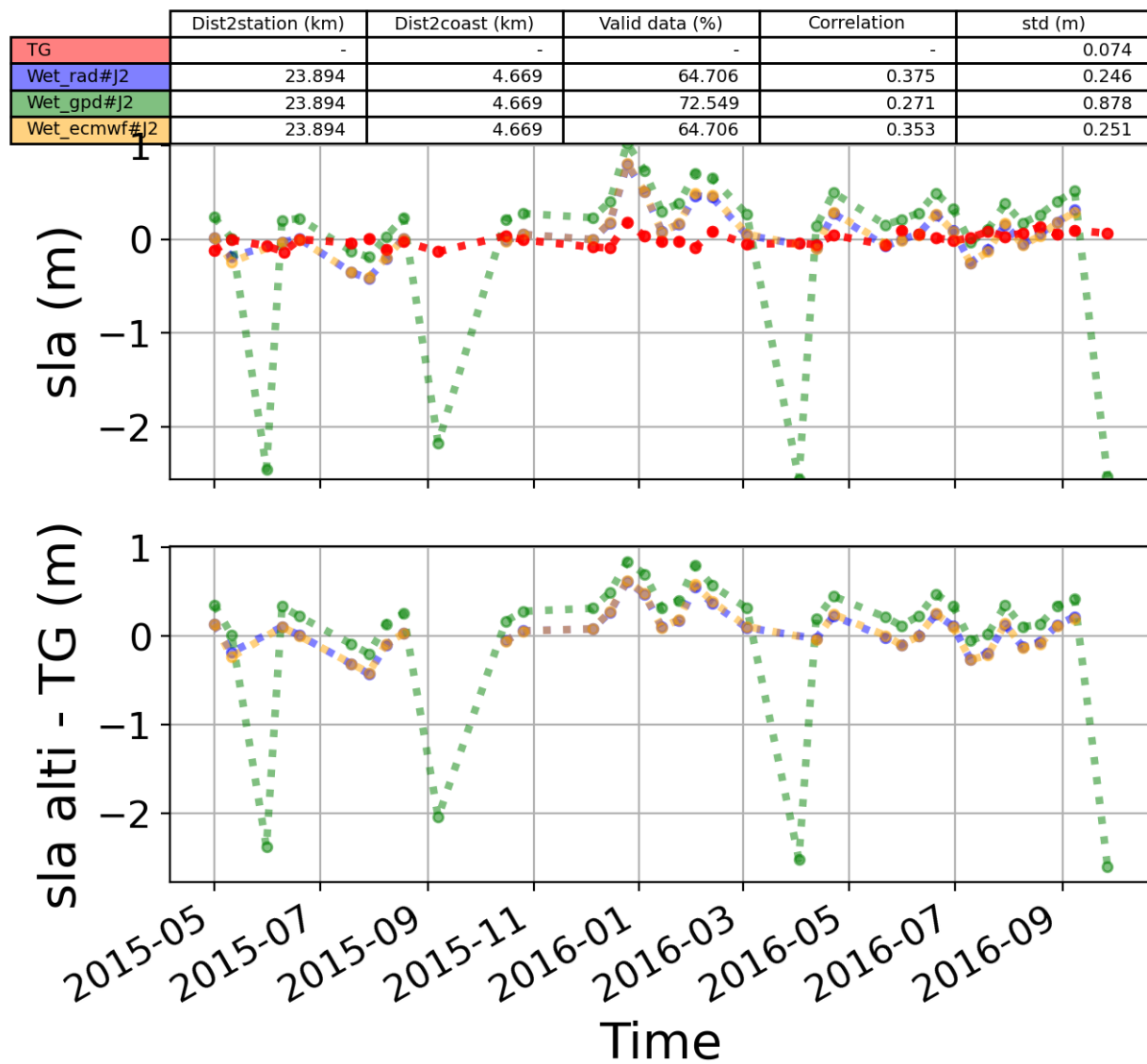


FIGURE 79 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

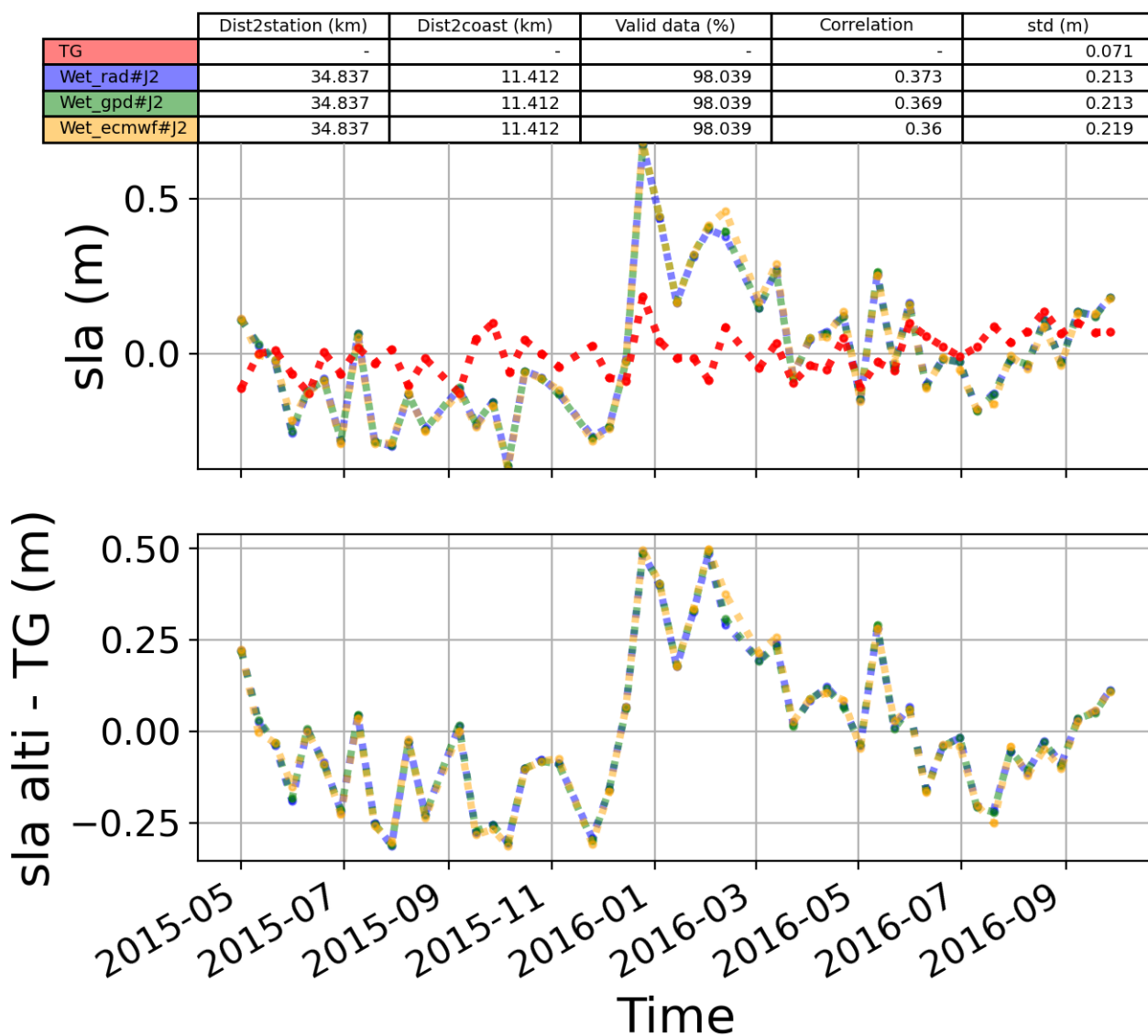


FIGURE 80 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.4 Station : Southport

- Nearest track to Southport station is the track number track47
- The area of interest is limited by :
 - A circle which it's center is the Southport tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : $[-43.55, -43.2]^{\circ}$

6.4.1 correlation visualization in maps view % Southport tide gauge

Correlation Altimetry data with respect to Southport Tide gauge data

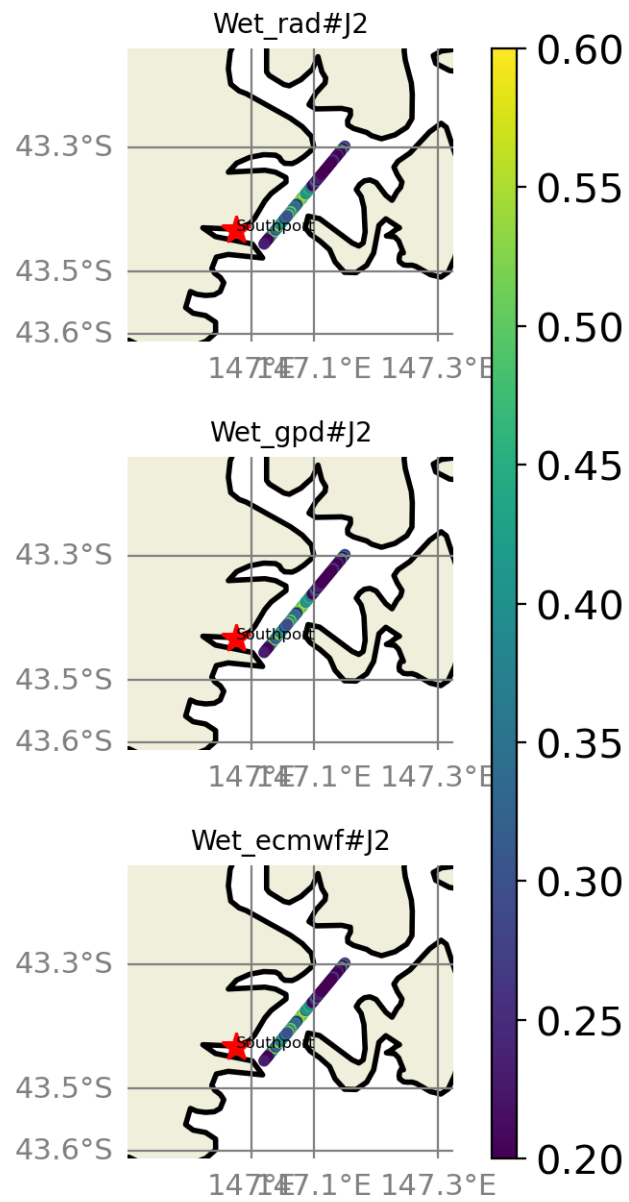


FIGURE 81 – correlation visualization in maps view % Southport tide gauge

6.4.2 rmsd visualization in maps view % Southport tide gauge

Rmsd (m) Altimetry data with respect to Southport Tide gauge data

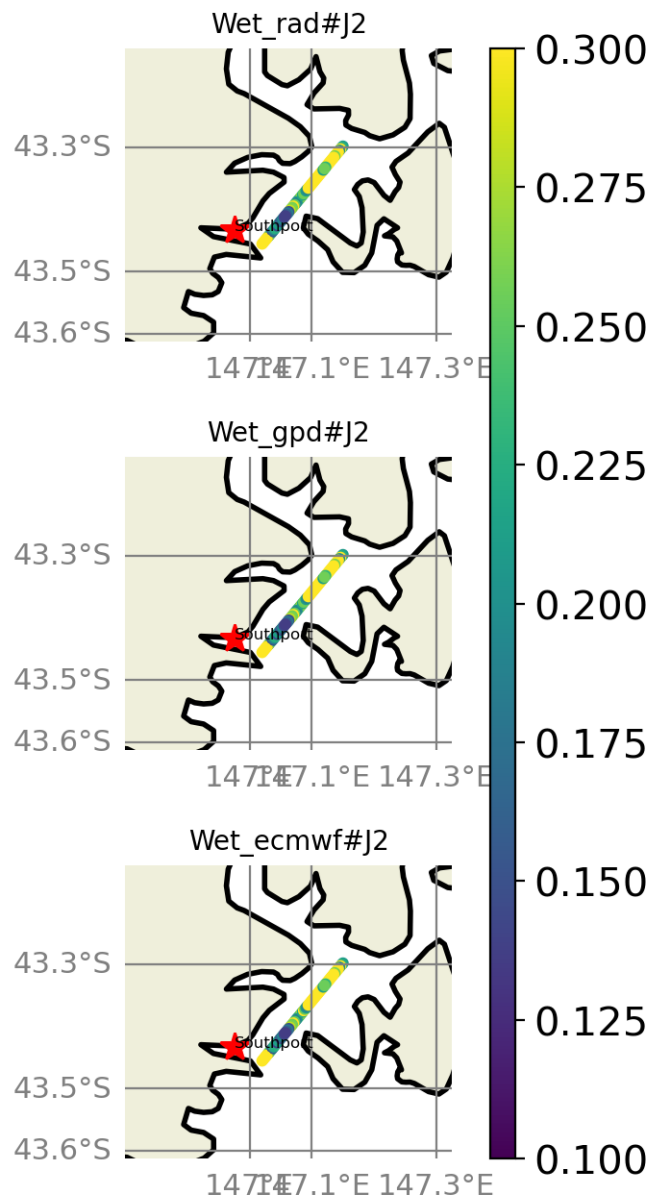


FIGURE 82 – rmsd visualization in maps view % Southport tide gauge

6.4.3 std visualization in maps view % Southport tide gauge

Std (m) Altimetry data with respect to Southport Tide gauge data

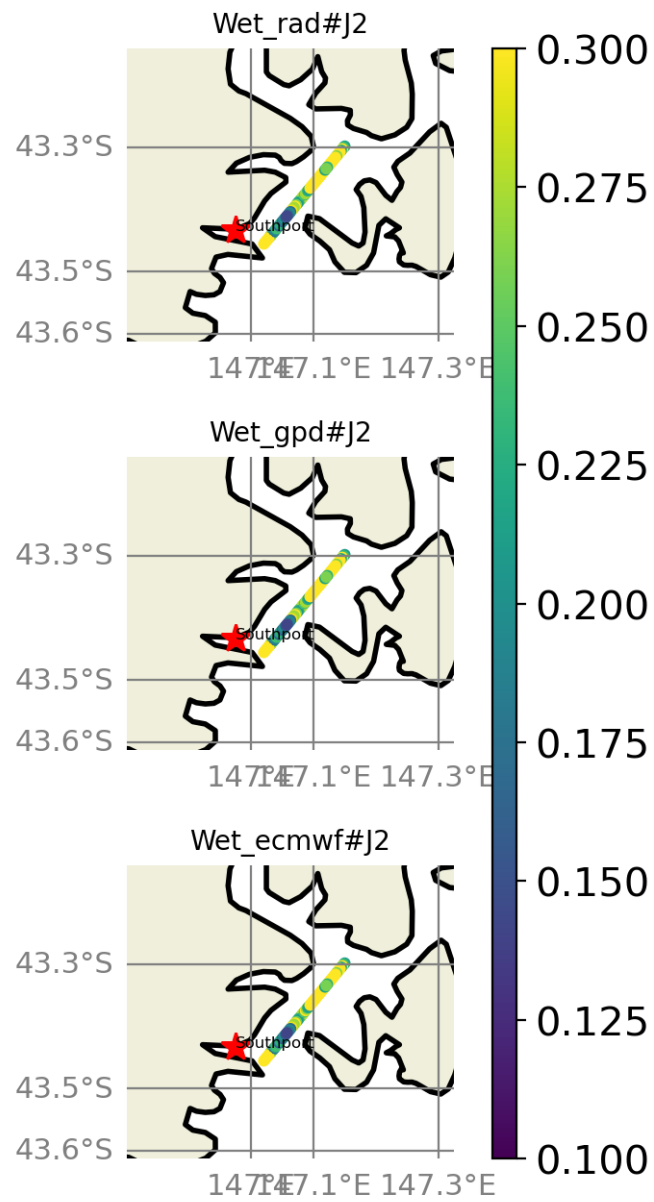


FIGURE 83 – std visualization in maps view % Southport tide gauge

6.4.4 valid_data_percent visualization in maps view % Southport tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Southport Tide gauge data

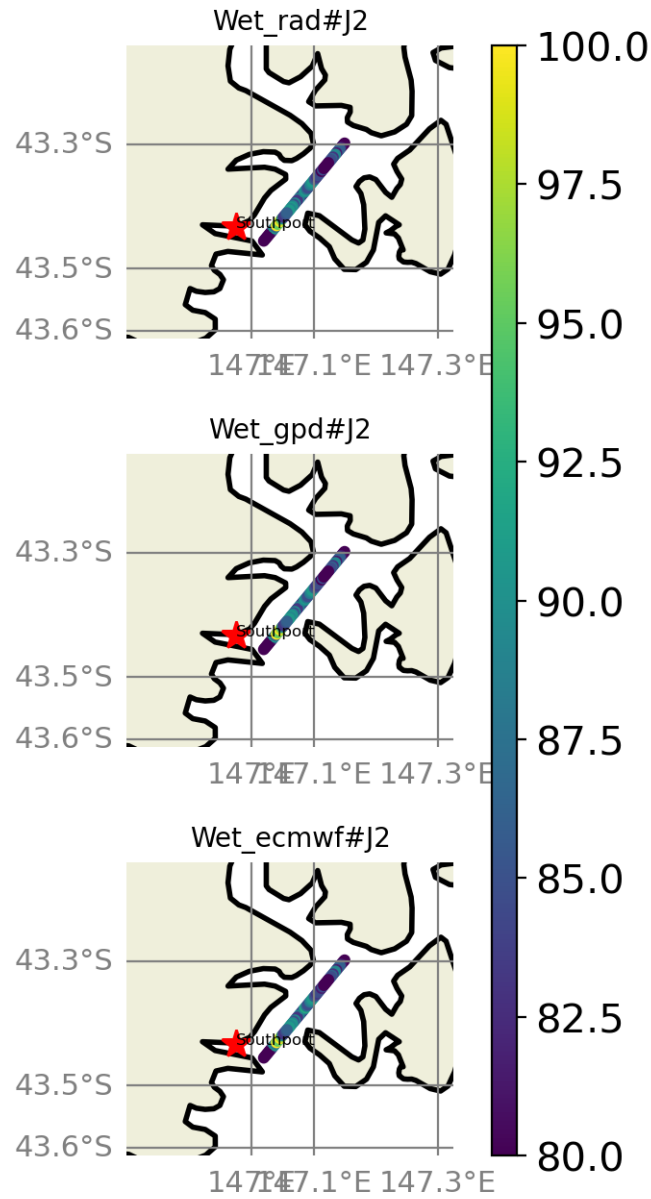


FIGURE 84 – valid_data_percent visualization in maps view % Southport tide gauge

6.4.5 Valid data (%) in function of distance to coast/Southport station

The formula to calculate the percentage of valid data in each time series is;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time series, i is the index of the time series, np is the number of the selected altimetry time series. $maxNB = 65$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

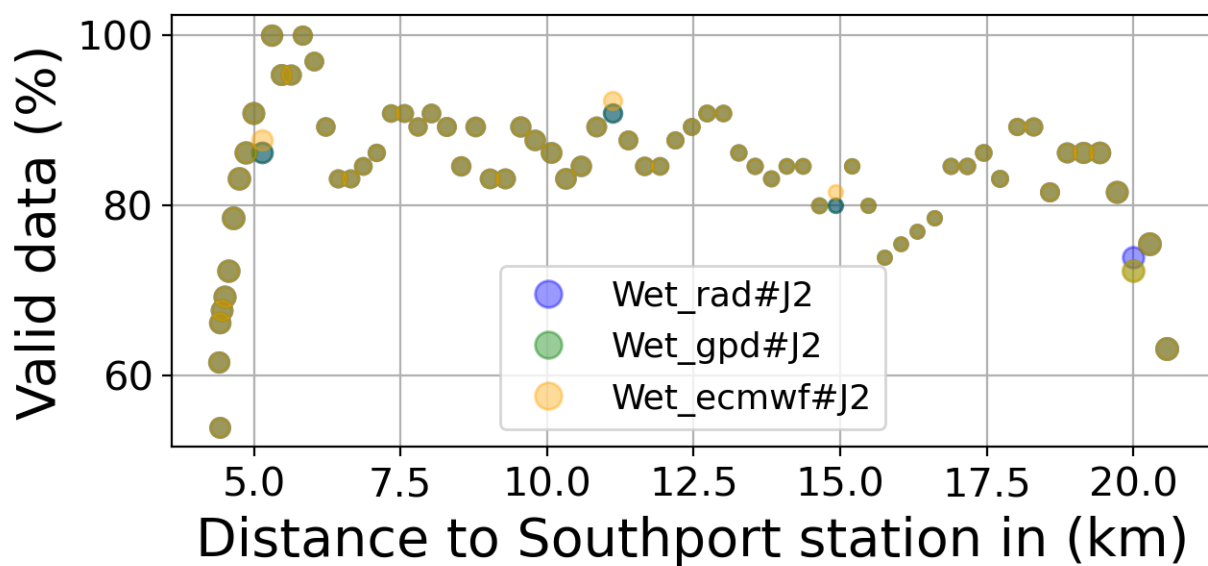
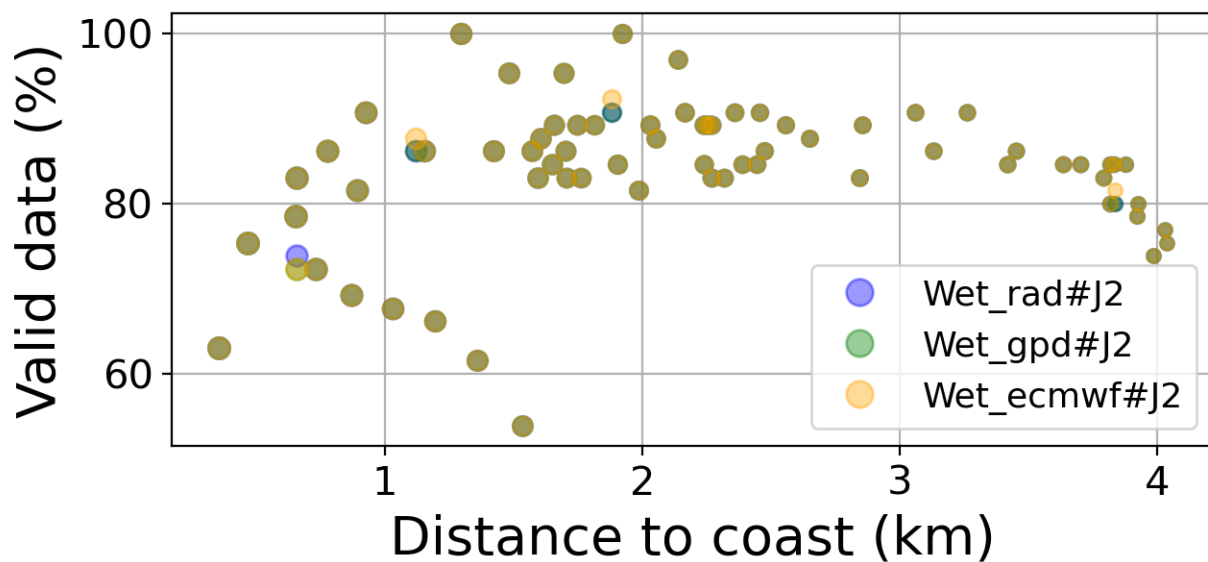


FIGURE 85 – Valid data (%) in function of distance to coast/Southport station

6.4.6 Std in function of distance to coast/Southport station

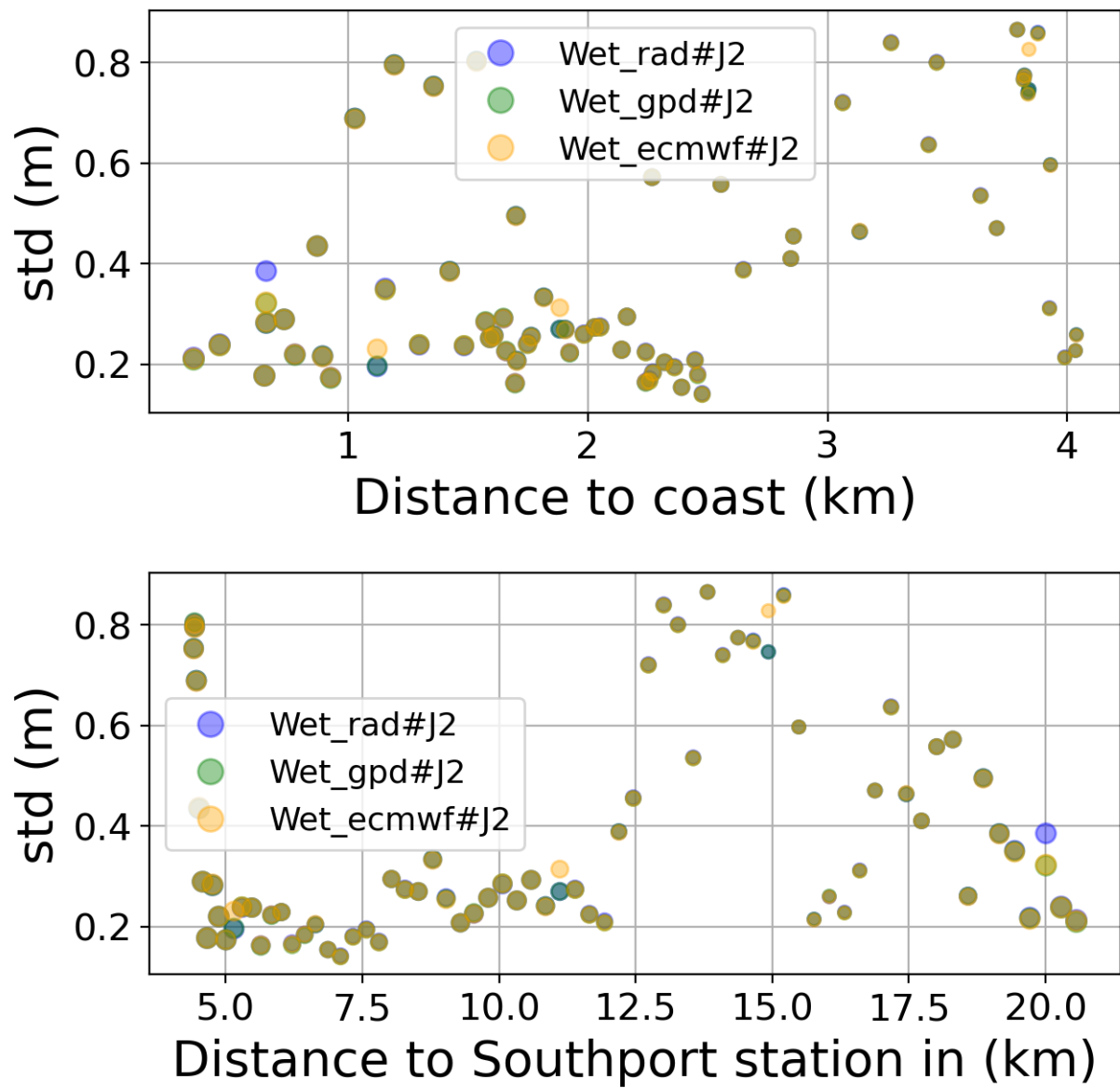


FIGURE 86 – Std in function of the distance to the coast/Southport station

6.4.7 Correlation in function of distance to coast/Southport station

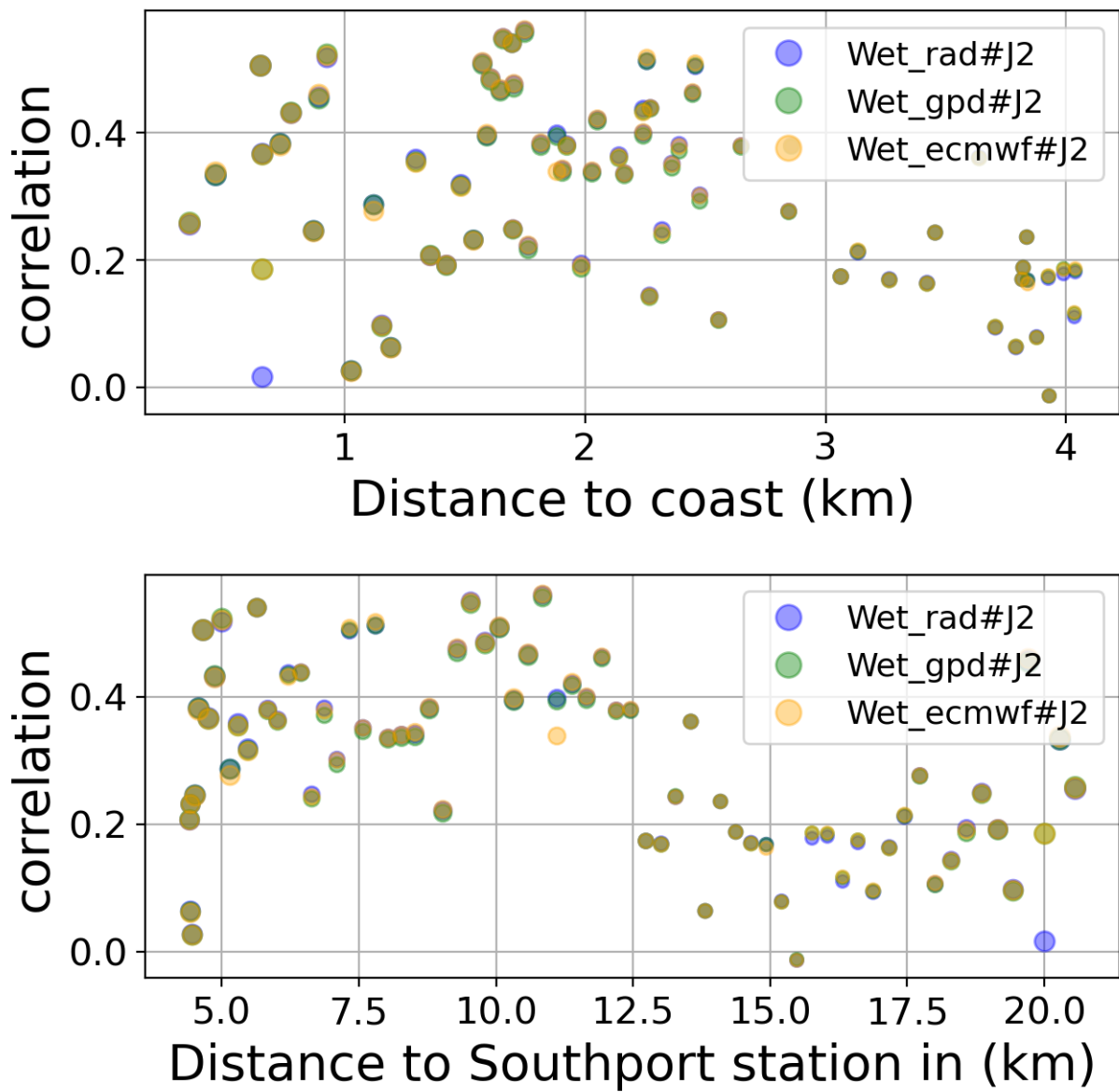


FIGURE 87 – Correlation in function of the distance to the coast/Southport station

6.4.8 Taylor Diagram

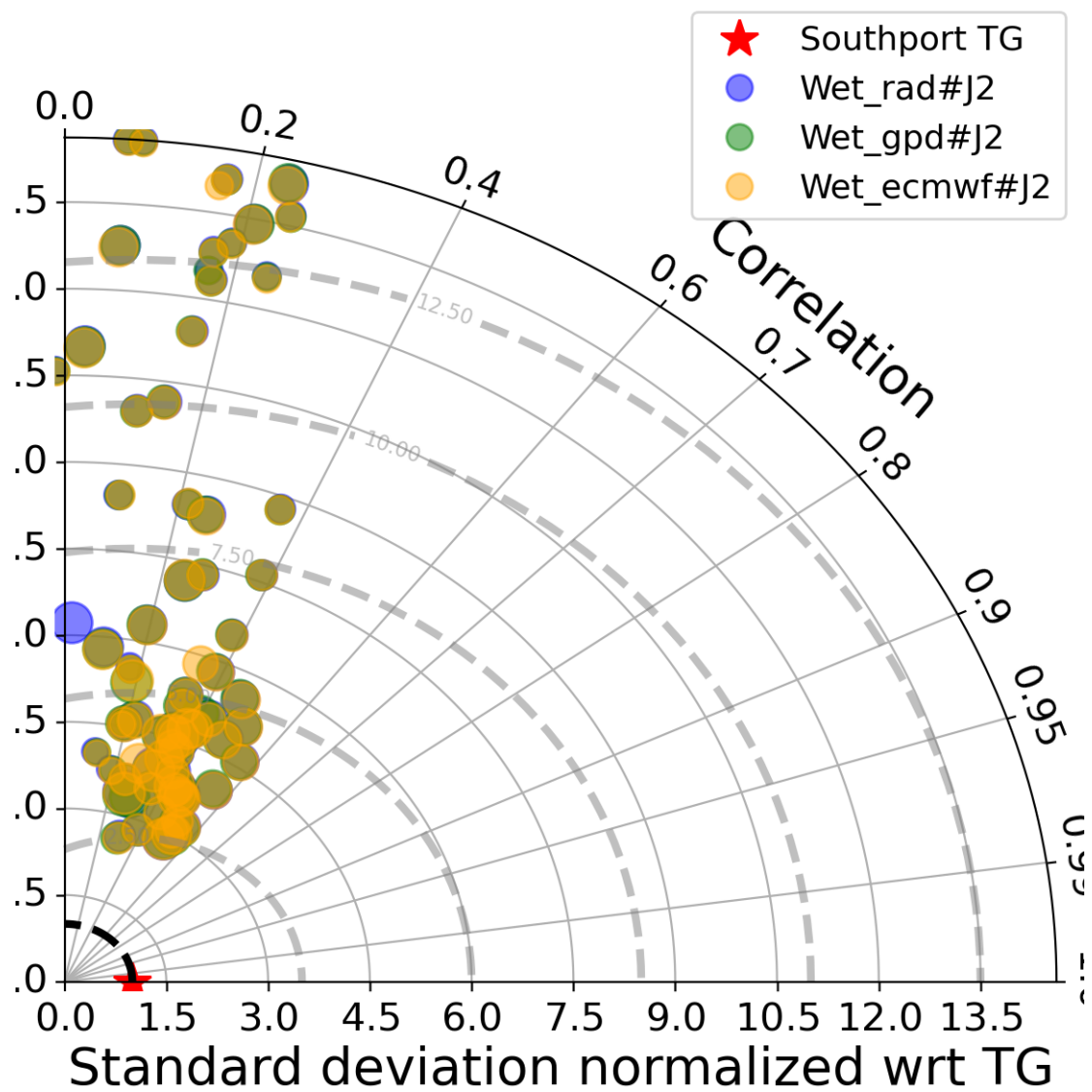


FIGURE 88 – Taylor diagram

6.4.9 Mean statistics table of products comparison with Southport tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	83.792	0.299	0.385	0.373
Wet_gpd#J2	83.77	0.3	0.383	0.372
Wet_ecmwf#J2	83.835	0.301	0.385	0.373

FIGURE 89 – Mean statistics table of the common points in the altimetry products

6.4.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 65 point.

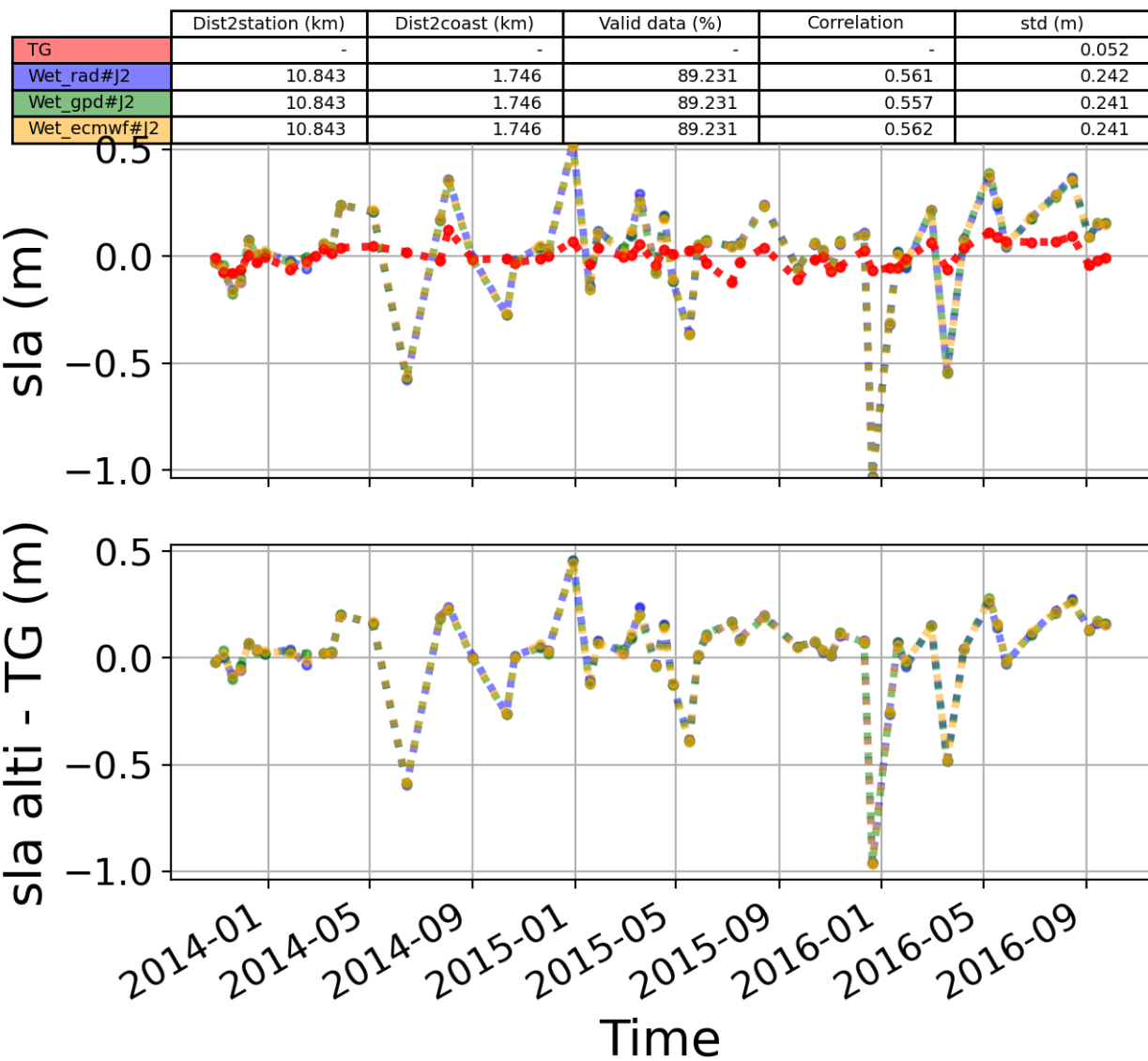


FIGURE 90 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.5 Station : Townsville

- Nearest track to Townsville station is the track number track175
- The area of interest is limited by :
 - A circle which it's center is the Townsville tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.5.1 correlation visualization in maps view % Townsville tide gauge

Correlation Altimetry data with respect to Townsville Tide gauge data

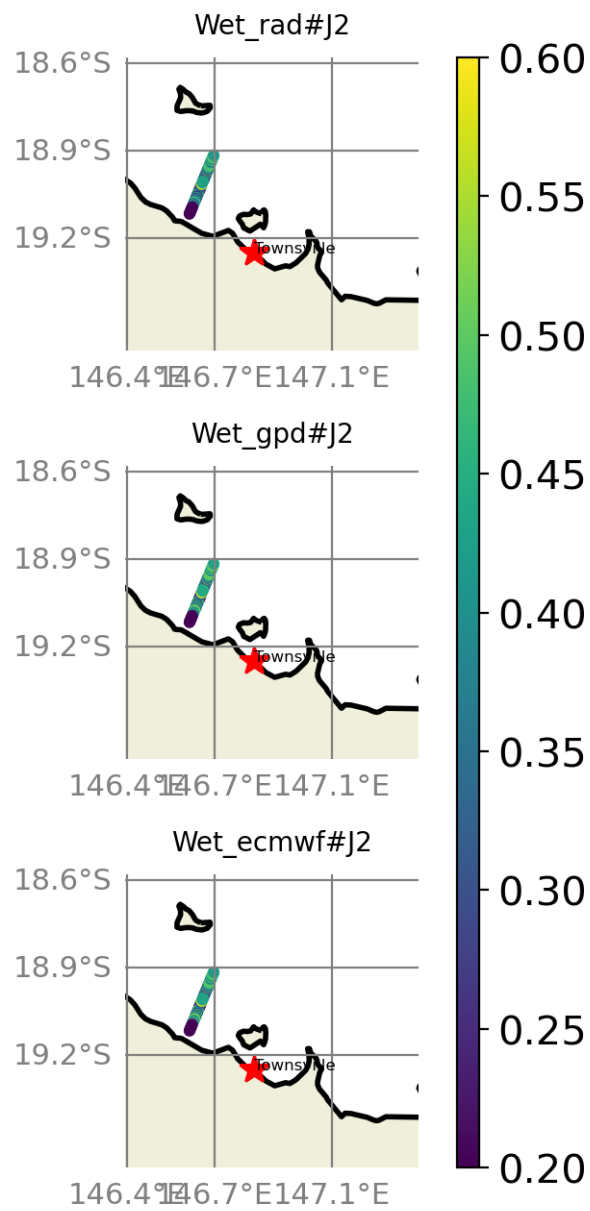


FIGURE 91 – correlation visualization in maps view % Townsville tide gauge

6.5.2 rmsd visualization in maps view % Townsville tide gauge

Rmsd (m) Altimetry data with respect to Townsville Tide gauge data

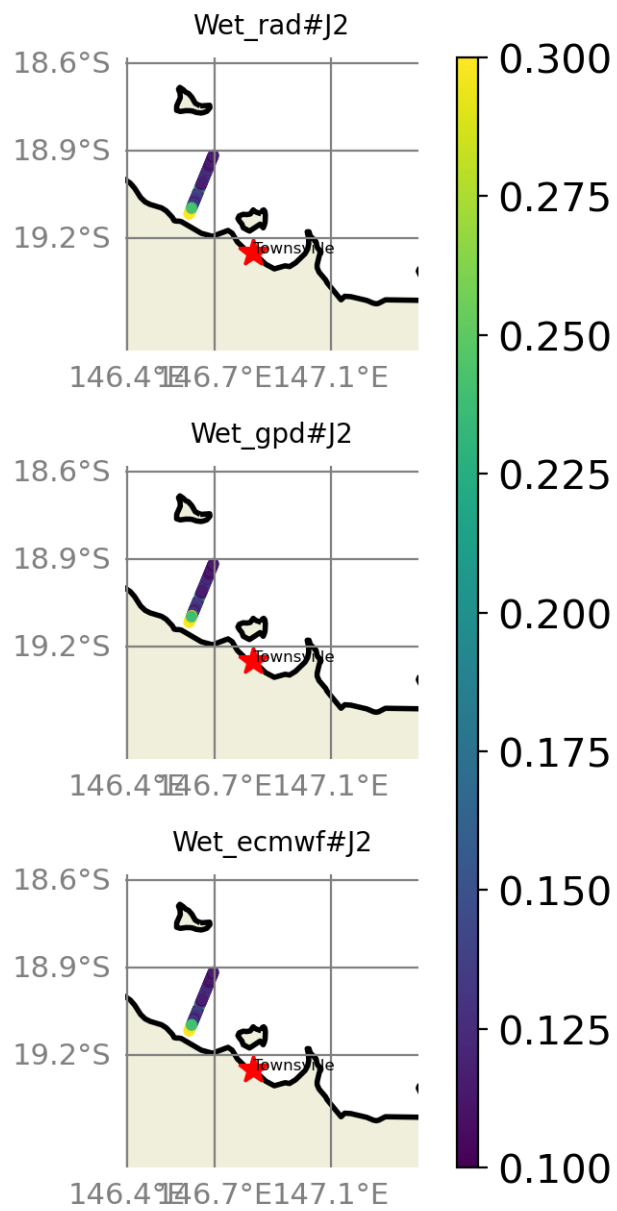


FIGURE 92 – rmsd visualization in maps view % Townsville tide gauge

6.5.3 std visualization in maps view % Townsville tide gauge

Std (m) Altimetry data with respect to Townsville Tide gauge data

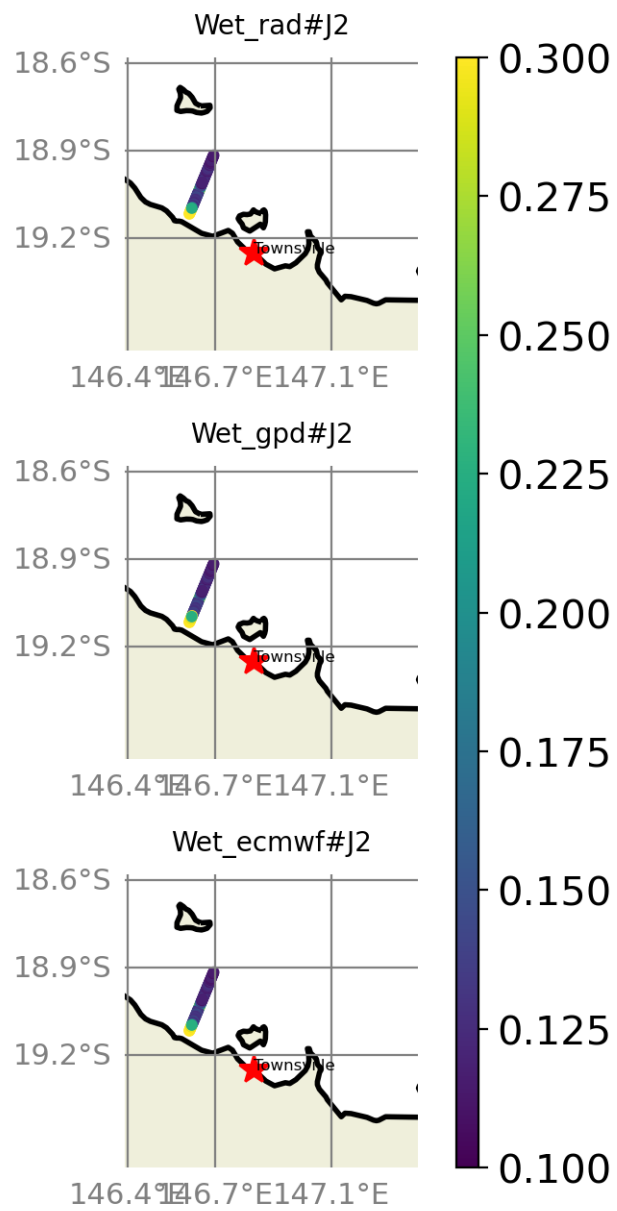


FIGURE 93 – std visualization in maps view % Townsville tide gauge

6.5.4 valid_data_percent visualization in maps view % Townsville tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Townsville Tide gauge data

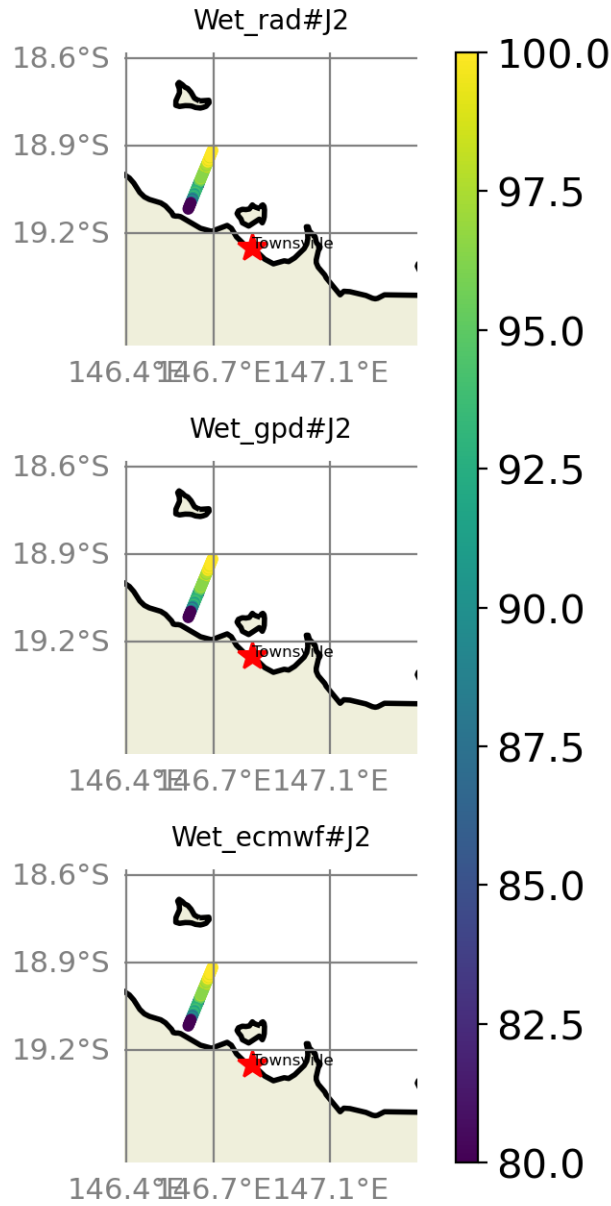


FIGURE 94 – valid_data_percent visualization in maps view % Townsville tide gauge

6.5.5 Valid data (%) in function of distance to coast/Townsville station

The formula to calculate the percentage of valid data in each time series is;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time series, i is the index of the time series, np is the number of the selected altimetry time series. $maxNB = 85$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

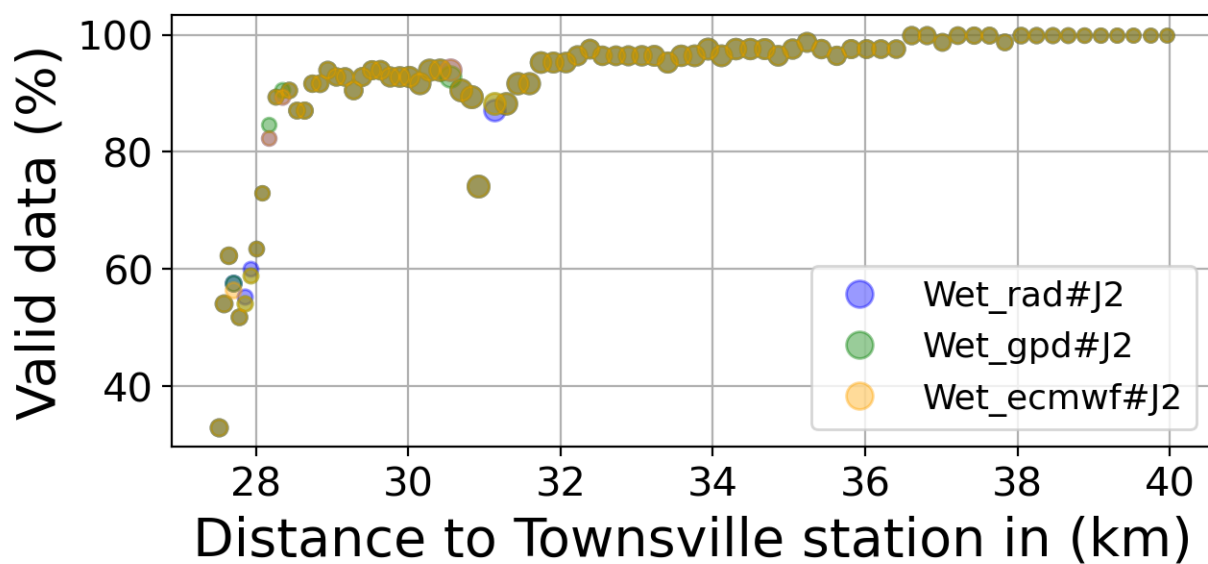
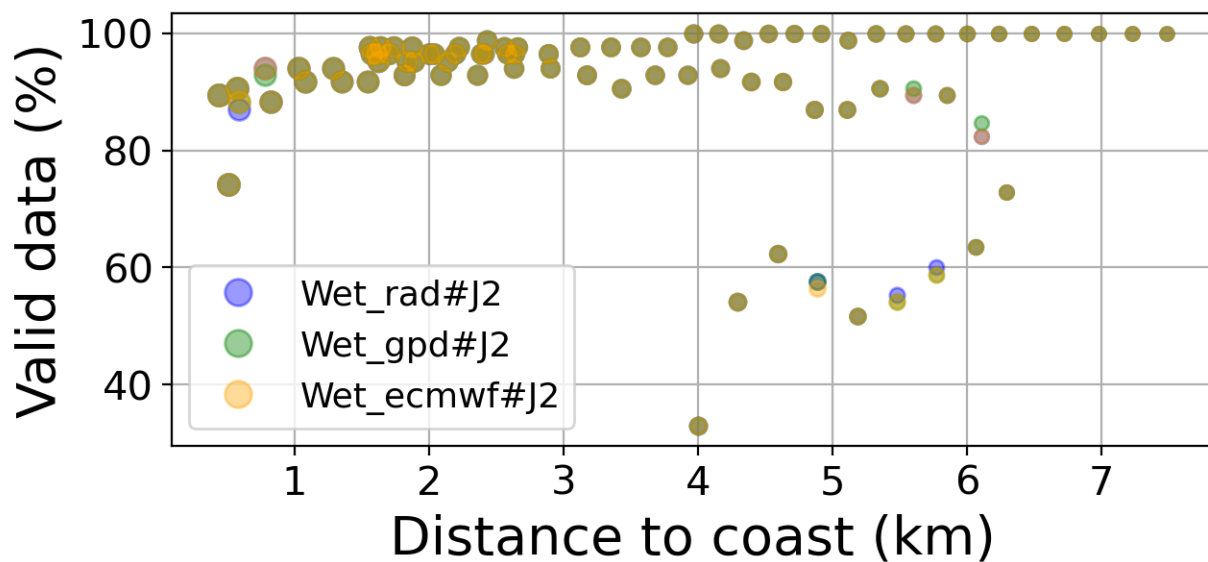


FIGURE 95 – Valid data (%) in function of distance to coast/Townsville station

6.5.6 Std in function of distance to coast/Townsville station

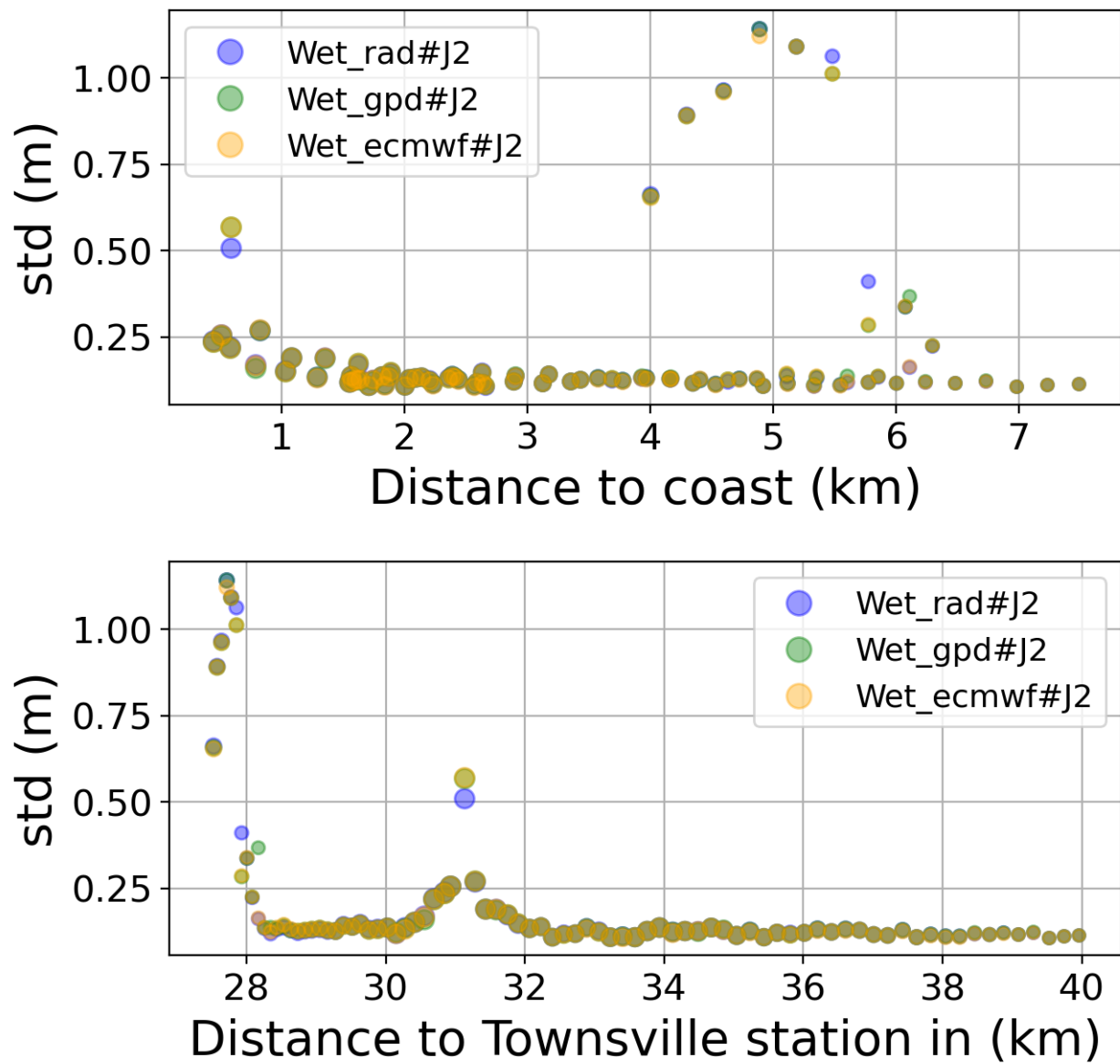


FIGURE 96 – Std in function of the distance to the coast/Townsville station

6.5.7 Correlation in function of distance to coast/Townsville station

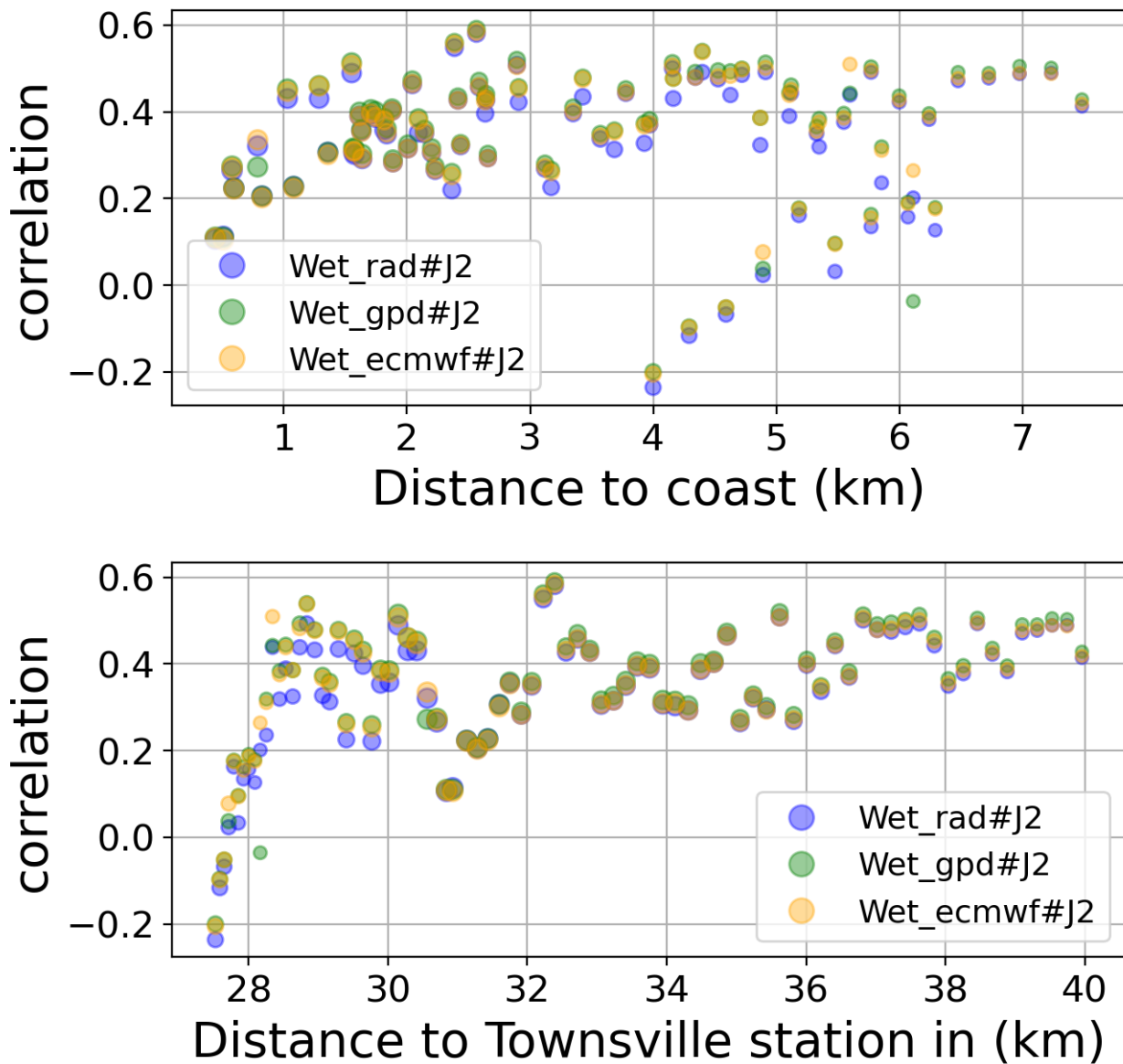


FIGURE 97 – Correlation in function of the distance to the coast/Townsville station

6.5.8 Taylor Diagram

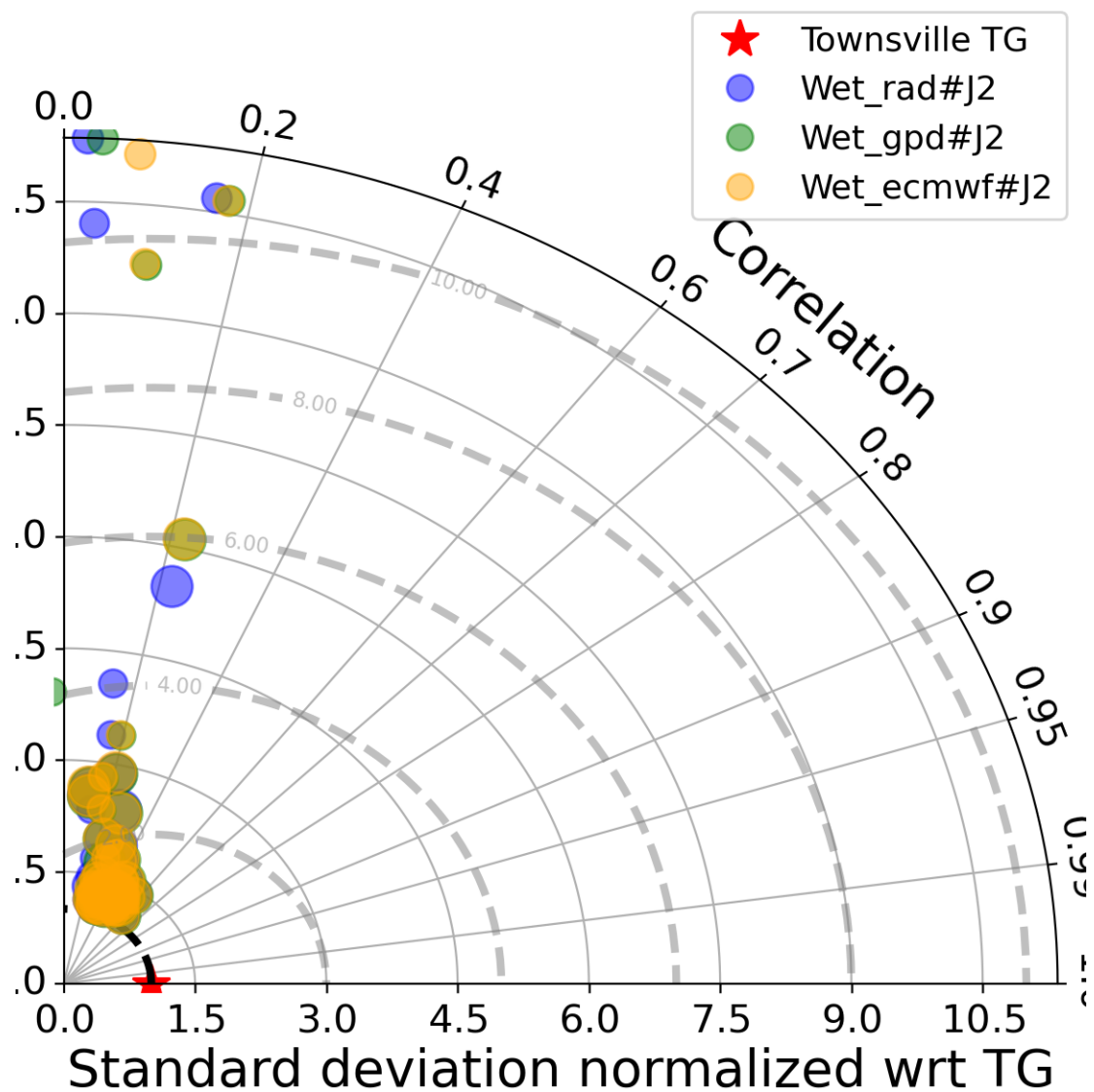


FIGURE 98 – Taylor diagram

6.5.9 Mean statistics table of products comparison with Townsville tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	90.861	0.335	0.208	0.209
Wet_gpd#J2	90.875	0.353	0.21	0.208
Wet_ecmwf#J2	90.832	0.352	0.207	0.206

FIGURE 99 – Mean statistics table of the common points in the altimetry products

6.5.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 85 point.

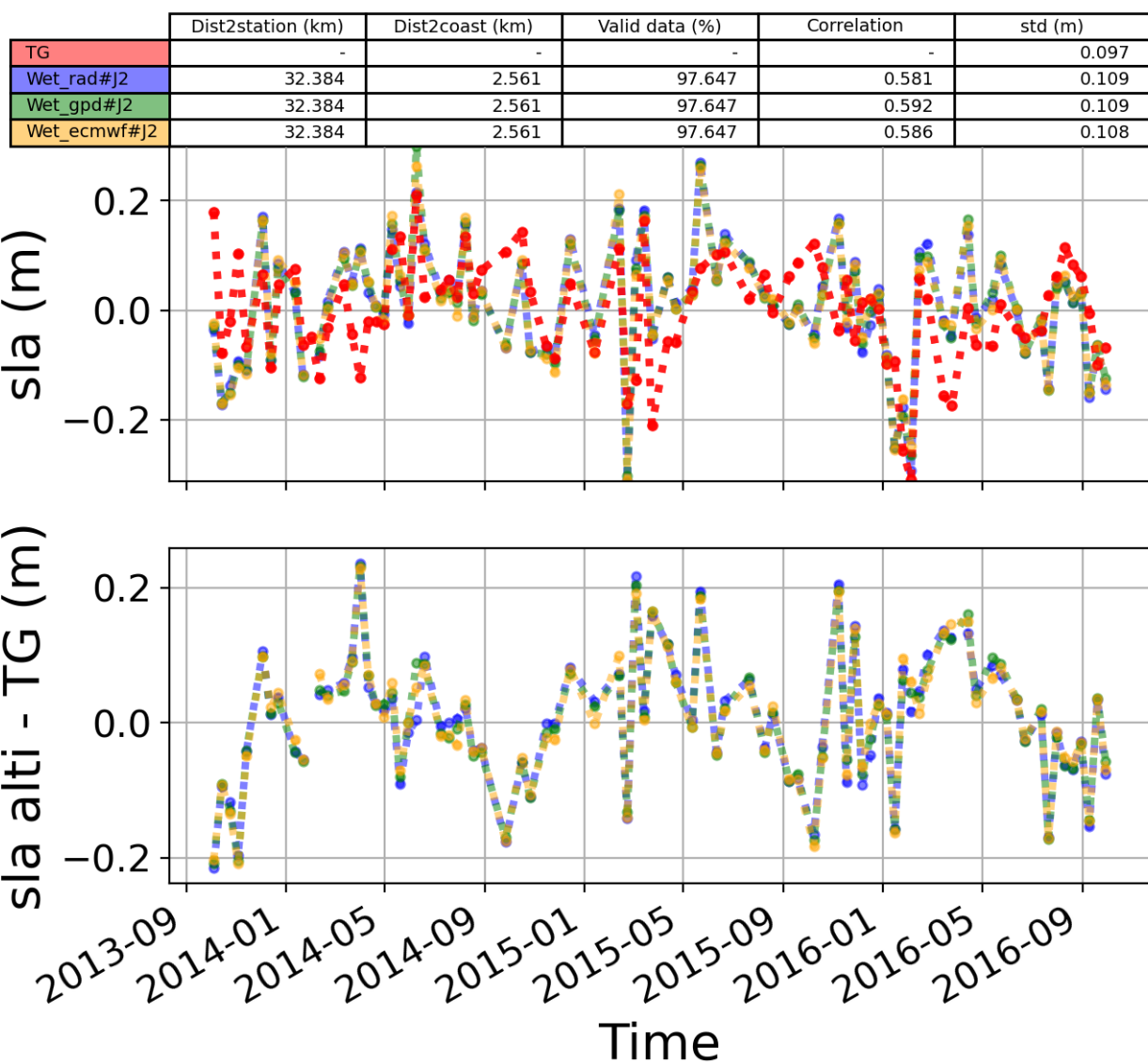


FIGURE 100 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.6 Station : Booby_island

- Nearest track to Booby_island station is the track number track138
- The area of interest is limited by :
 - A circle which it's center is the Booby_island tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.6.1 correlation visualization in maps view % Booby_island tide gauge

Correlation Altimetry data with respect to Booby_island Tide gauge data

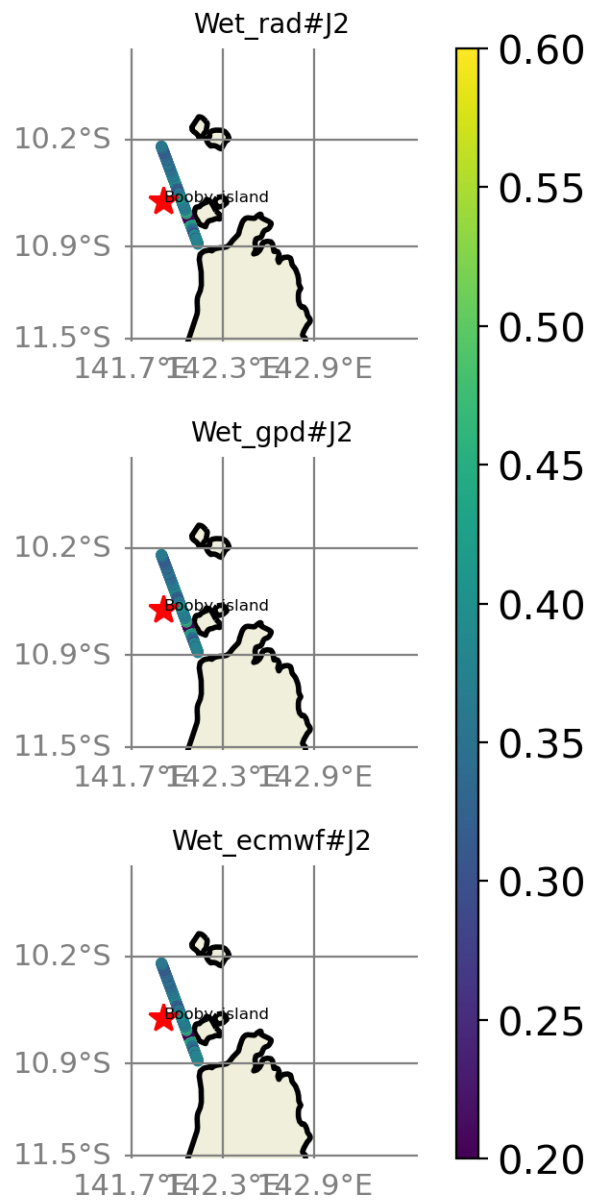


FIGURE 101 – correlation visualization in maps view % Booby_island tide gauge

6.6.2 rmsd visualization in maps view % Booby_island tide gauge

Rmsd (m) Altimetry data with respect to Booby_island Tide gauge data

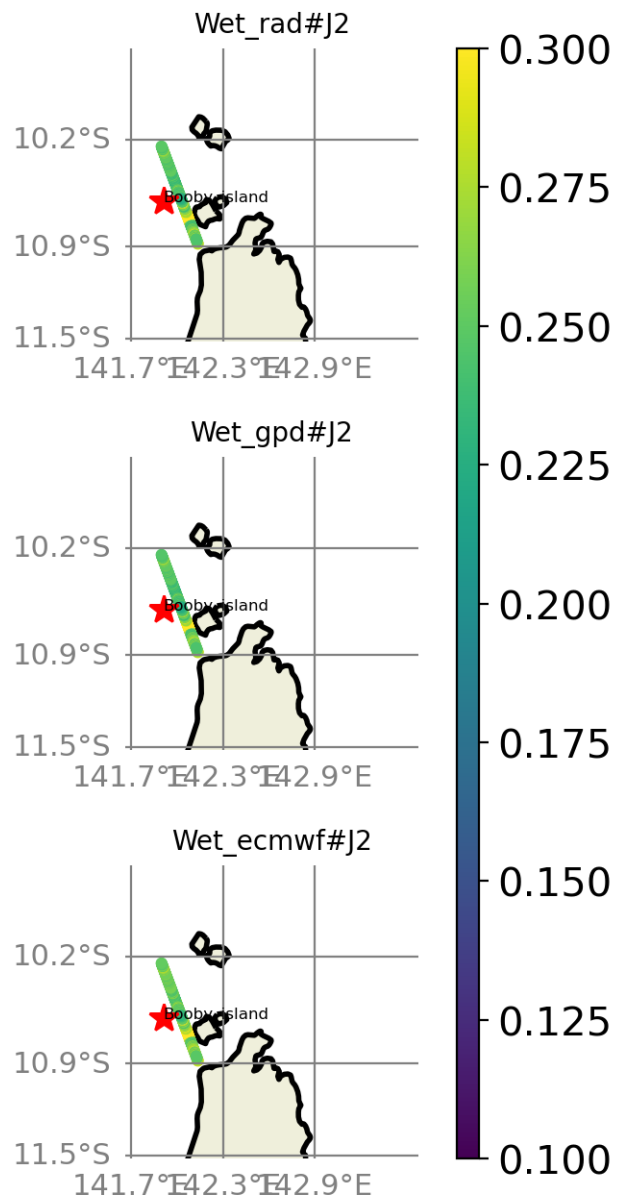


FIGURE 102 – rmsd visualization in maps view % Booby_island tide gauge

6.6.3 std visualization in maps view % Booby_island tide gauge

Std (m) Altimetry data with respect to Booby_island Tide gauge data

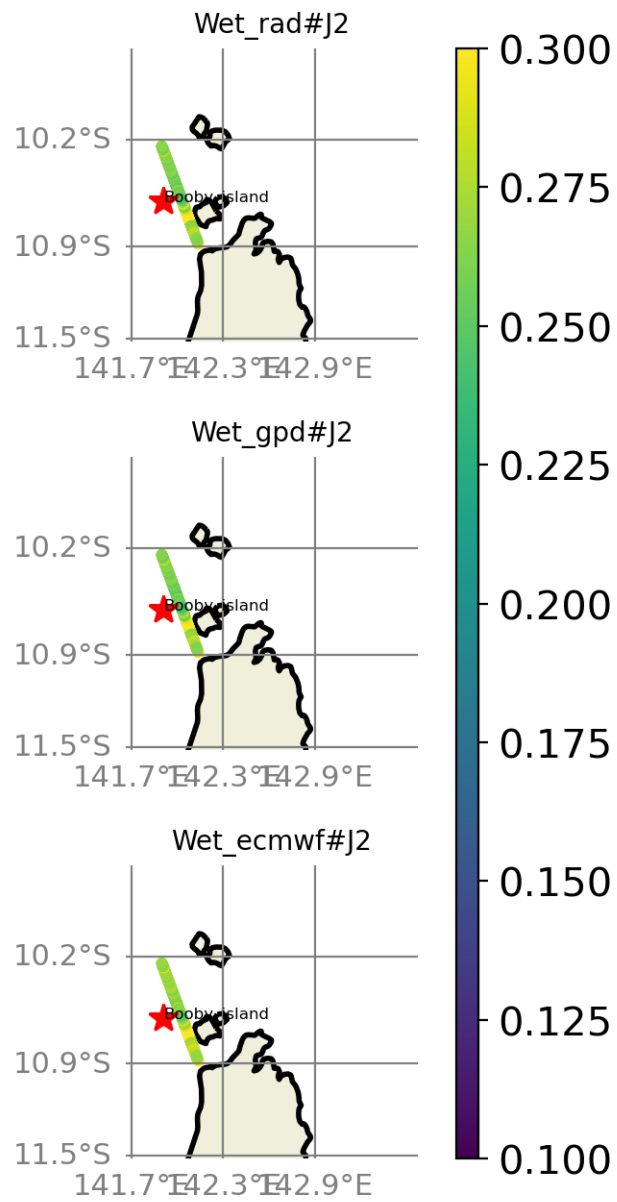


FIGURE 103 – std visualization in maps view % Booby_island tide gauge

6.6.4 valid_data_percent visualization in maps view % Booby_island tide gauge

Valid_Data_Percent (%) Altimetry data with respect to Booby_island Tide gauge data

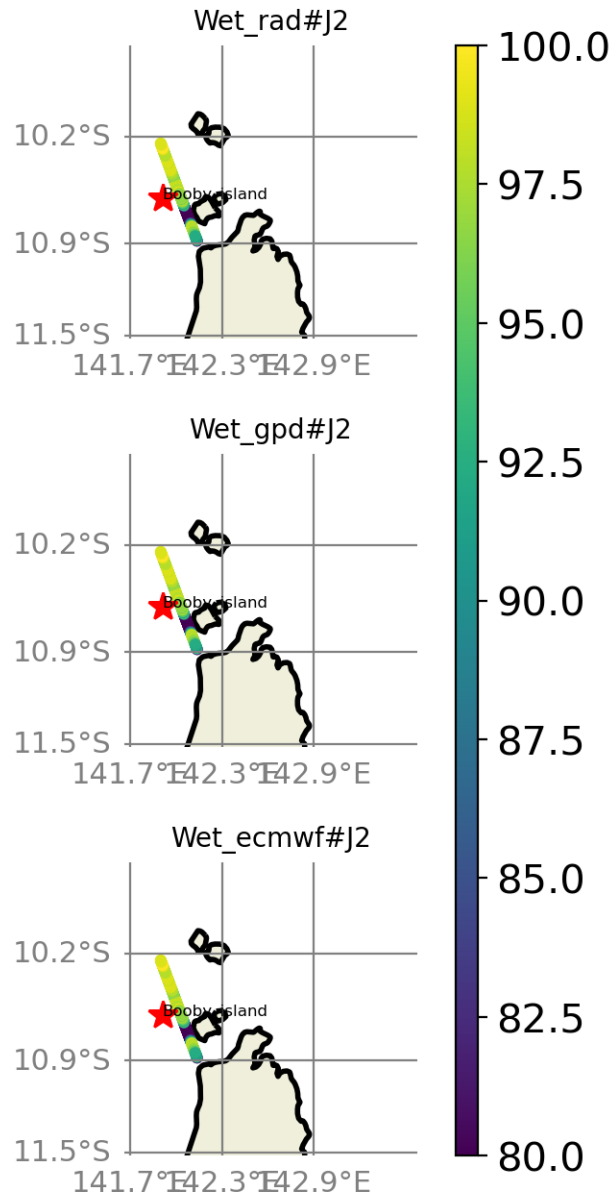


FIGURE 104 – valid_data_percent visualization in maps view % Booby_island tide gauge

6.6.5 Valid data (%) in function of distance to coast/Booby_island station

The formula to calculate the percentage of valid data in each time serie is ;

$$pvd_i = \frac{nvd_i}{maxNB}, i = 1, np$$

Where pvd and nvd are the percentage of data and the number of altimetry data in the period covered by the tide gauge sla time serie, respectively in the time serie, i is the index of the time serie, np is the number of the selected altimetry time series. $maxNB = 91$ point is the maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie.

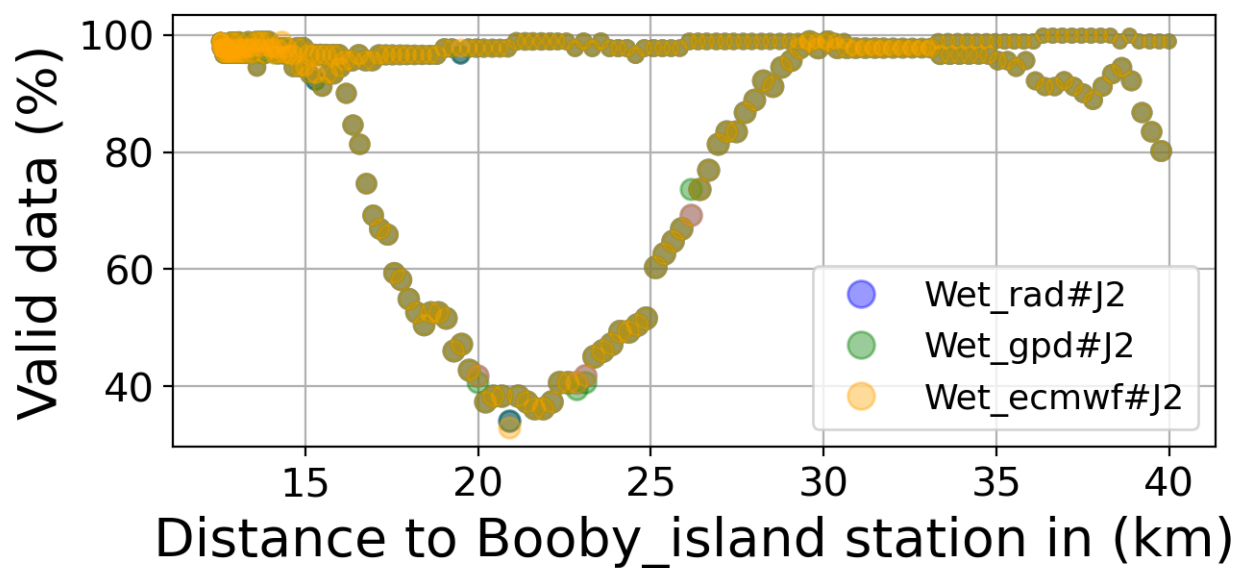
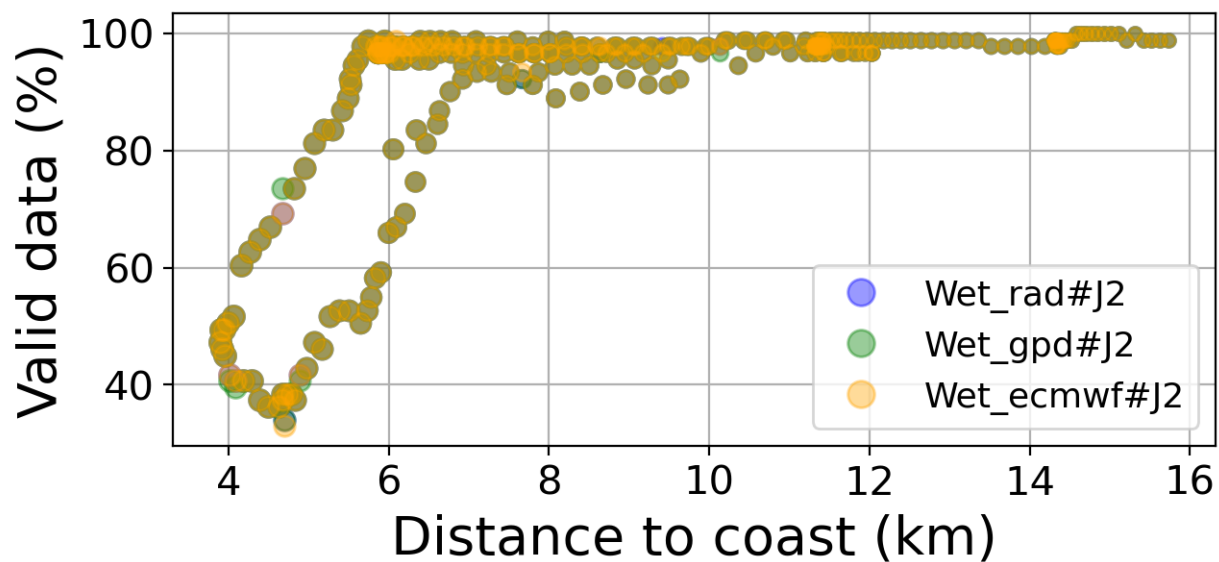


FIGURE 105 – Valid data (%) in function of distance to coast/Booby_island station

6.6.6 Std in function of distance to coast/Booby_island station

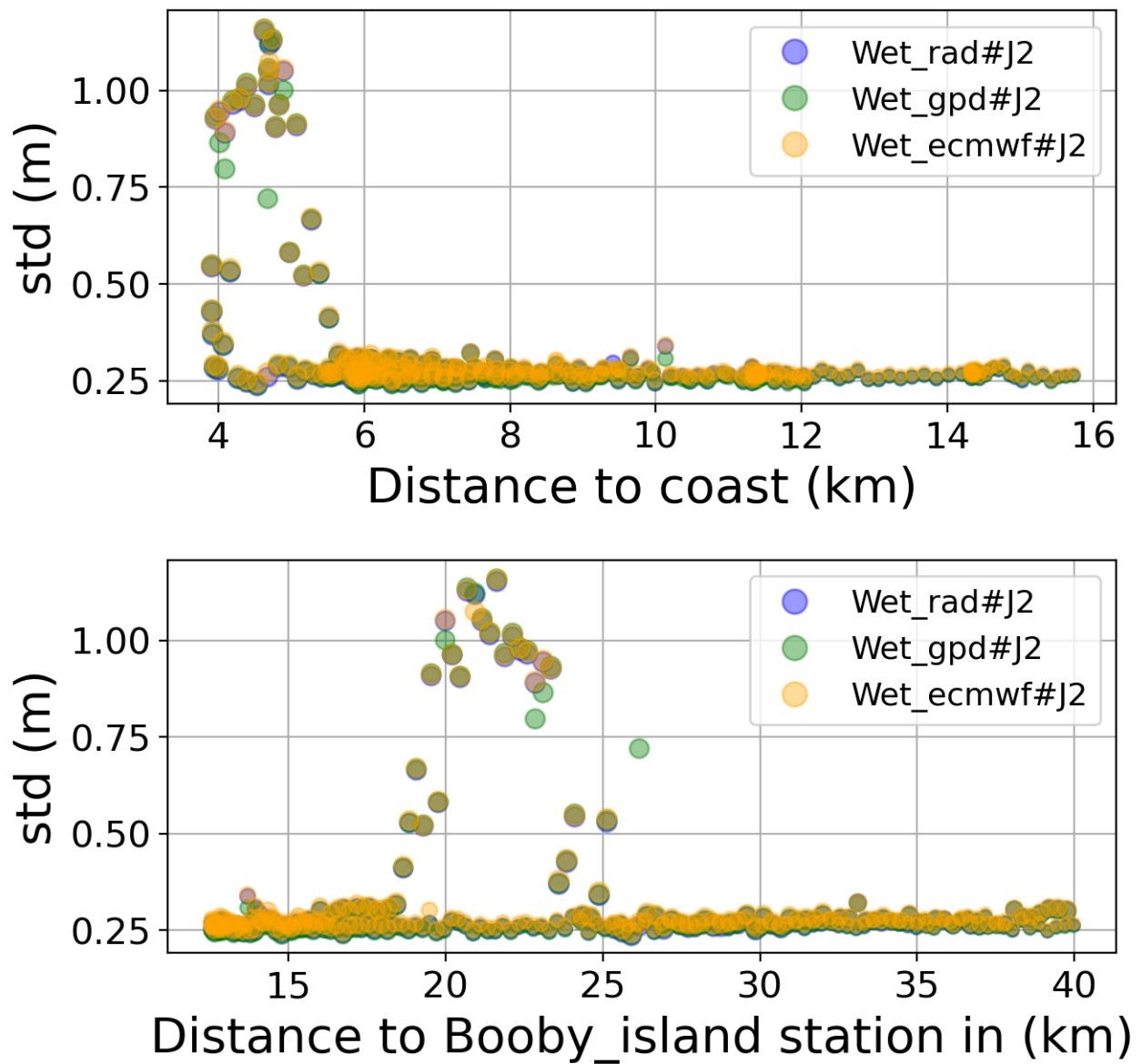


FIGURE 106 – Std in function of the distance to the coast/Booby_island station

6.6.7 Correlation in function of distance to coast/Booby_island station

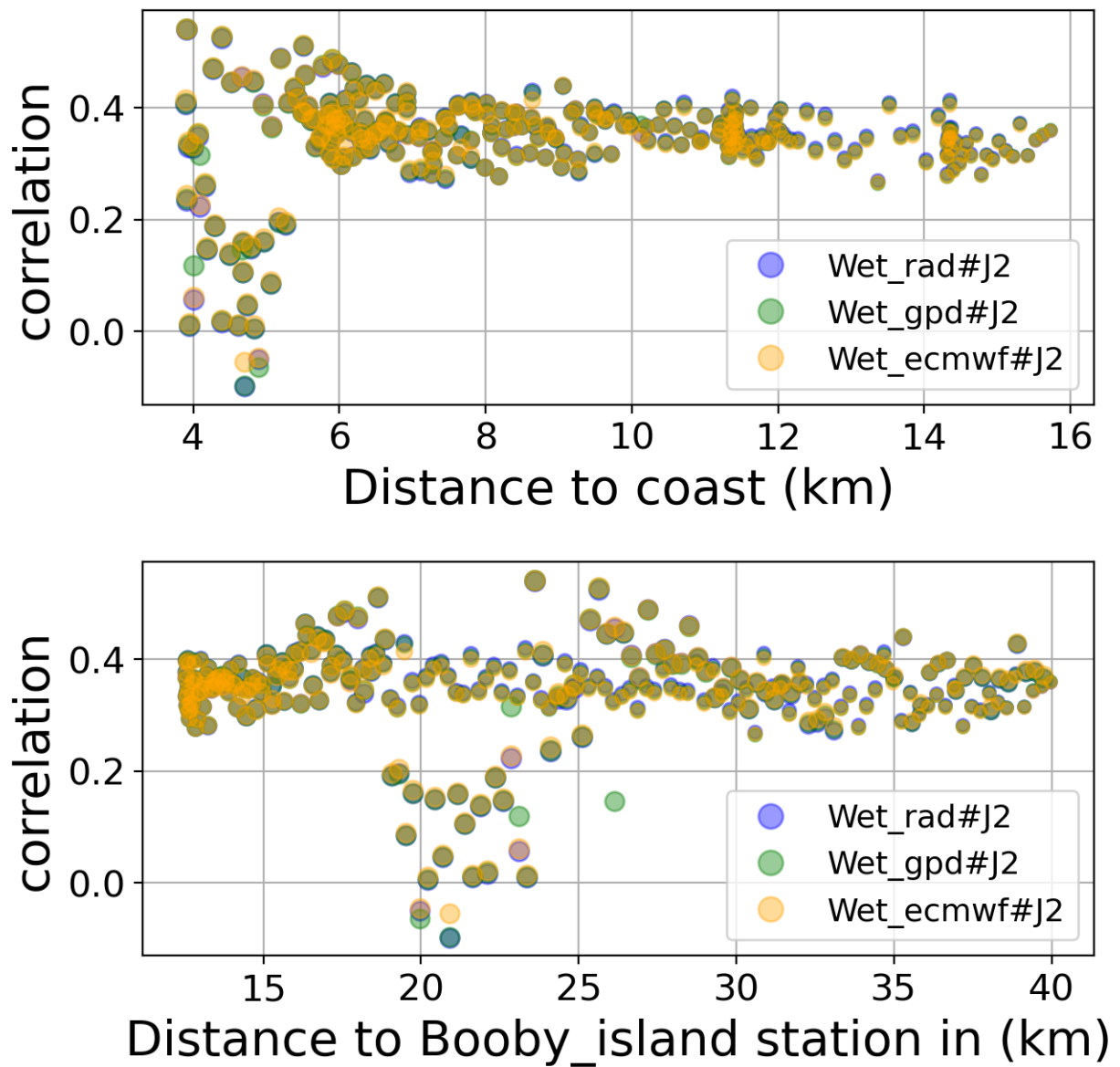


FIGURE 107 – Correlation in function of the distance to the coast/Booby_island station

6.6.8 Taylor Diagram

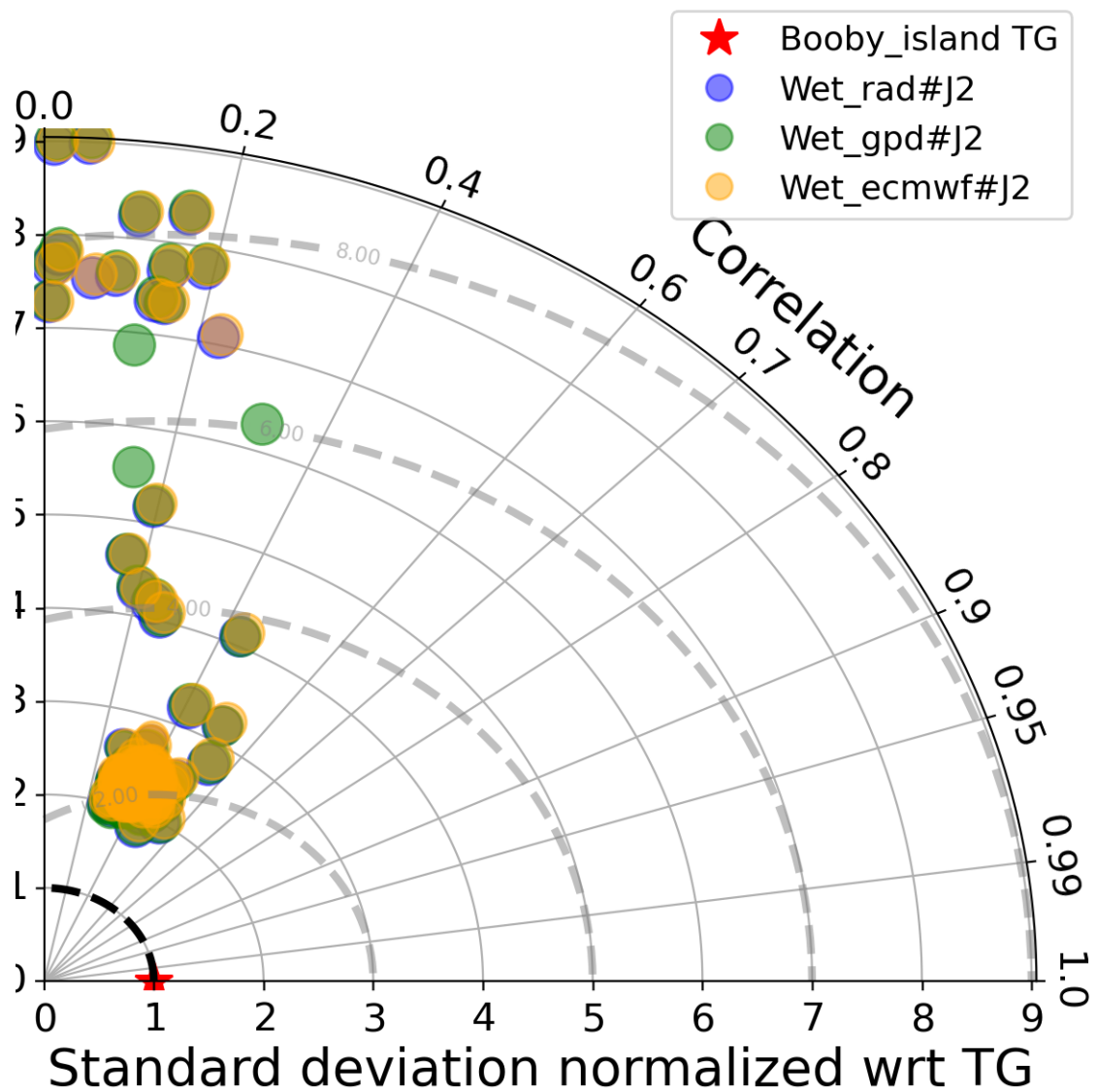


FIGURE 108 – Taylor diagram

6.6.9 Mean statistics table of products comparison with Booby_island tide gauge data

The table below contains the mean statistics of the common points between the different products in the selected area.

Product	Valid data (%)	Correlation	std (m)	rmsd (m)
Wet_rad#J2	89.015	0.344	0.322	0.305
Wet_gpd#J2	89.011	0.342	0.322	0.306
Wet_ecmwf#J2	89.02	0.342	0.328	0.311

FIGURE 109 – Mean statistics table of the common points in the altimetry products

6.6.10 The most correlated sla altimetry Time series with the tide gauge sla time serie

The maximum number of valid altimetry points in the set of all the altimetry sla time series covered by the period of time of the Tide gauge sla time serie is 91 point.

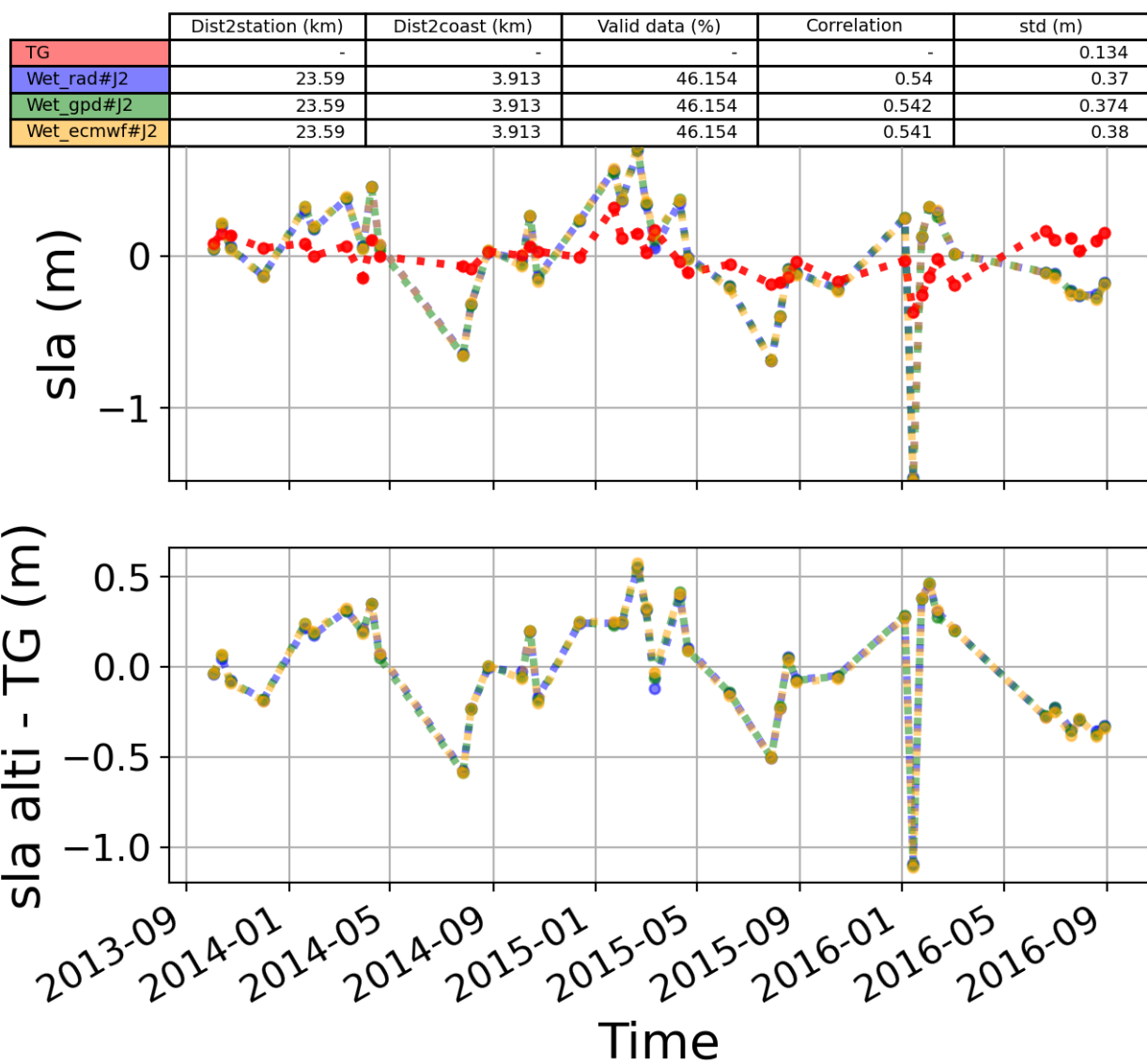


FIGURE 110 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie