

DIAGTOOL REPORT



**Round Robin (GT cotier) : Ionospheric correction.
Nea. J3. Iono filtered vs Iono gim.**

7 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 Ionospheric correction used to calculate the sea level anomaly. Each version has been compared with a reference version. In this case the Iono_gim 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 Nea
- Mission : J3
- Git last tag : 0.5 Mettre à jour les rapports de la wet, range et tide apres application de binning X-track
- Git changeset number : 8fa7971-2022-04-07

2 Processing

2.1 sla formula

2.1.1 Iono_filtered product ' sla

$$\text{sla} = \text{ORBIT.ALTICNES_POE_F} - \text{RANGE.ALTICNES} - \text{MEAN_SEA_SURFACE.MODEL.CNESCLS15} - \text{SEA_STATE_BIAS.ALTICNES} - \text{IONOSPHERIC_CORRECTION.ALTICNES} - \text{WET_TROPOSPHERIC_CORRECTION.RAD} - \text{DRY_TROPOSPHERIC_CORRECTION.RAD} - \text{DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR} - \text{OCEAN_TIDE_HEIGHT.MODEL.FES14B} - \text{SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71} - \text{POLE_TIDE_HEIGHT.MODEL.DESAI_2015}$$

2.1.2 Iono_gim product ' sla

$$\text{sla} = \text{ORBIT.ALTICNES_POE_F} - \text{RANGE.ALTICNES} - \text{MEAN_SEA_SURFACE.MODEL.CNESCLS15} - \text{SEA_STATE_BIAS.ALTICNES} - \text{IONOSPHERIC_CORRECTION.MODEL.GIM} - \text{WET_TROPOSPHERIC_CORRECTION.RAD} - \text{DRY_TROPOSPHERIC_CORRECTION.RAD} - \text{DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR} - \text{OCEAN_TIDE_HEIGHT.MODEL.FES14B} - \text{SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71} - \text{POLE_TIDE_HEIGHT.MODEL.DESAI_2015}$$

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 filtered 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

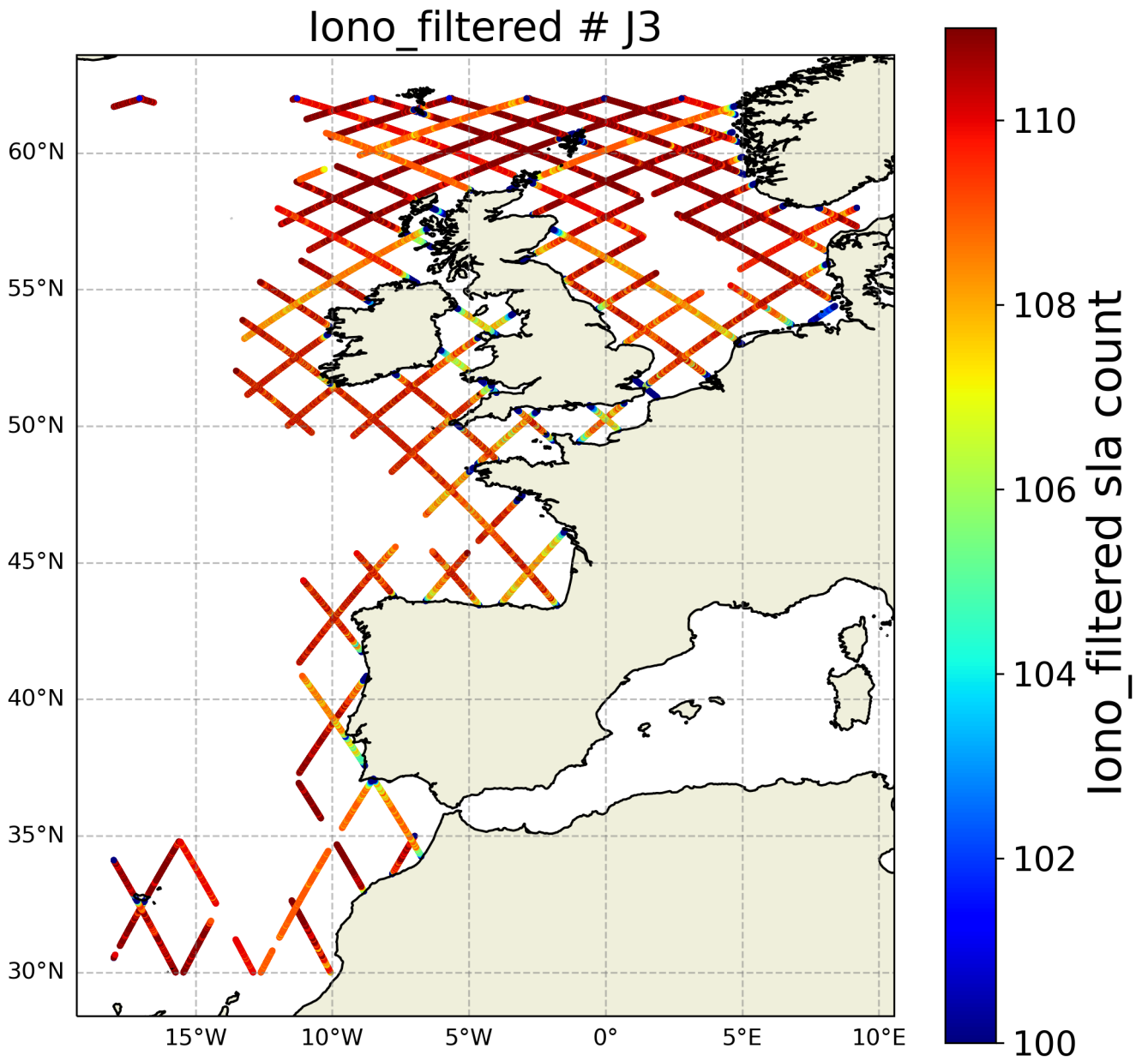


FIGURE 1 – Spatial coherence analysis of the count of the Iono_filtered version of sla variable

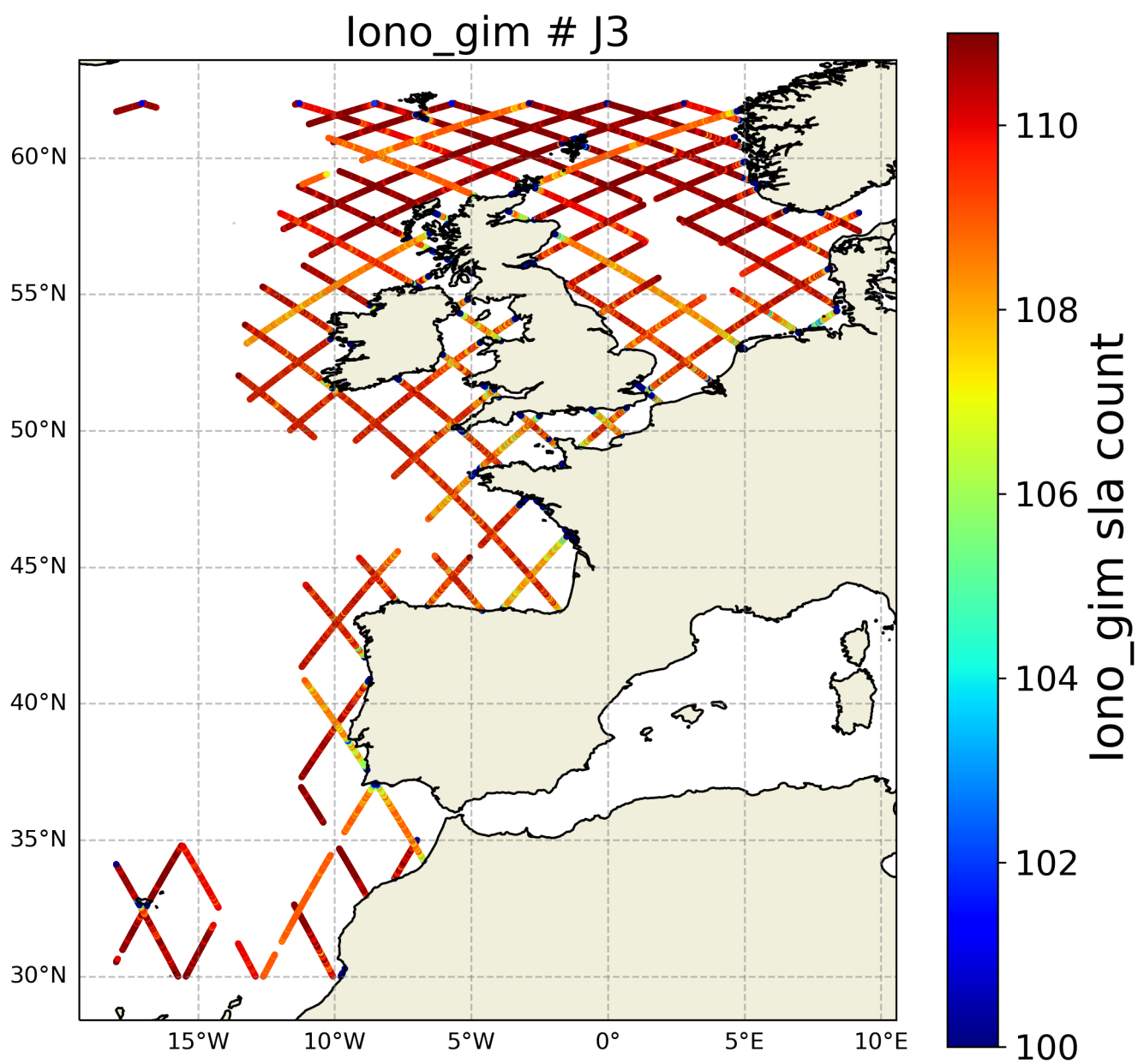


FIGURE 2 – Spatial coherence analysis of the count of the Iono_gim version of sla variable

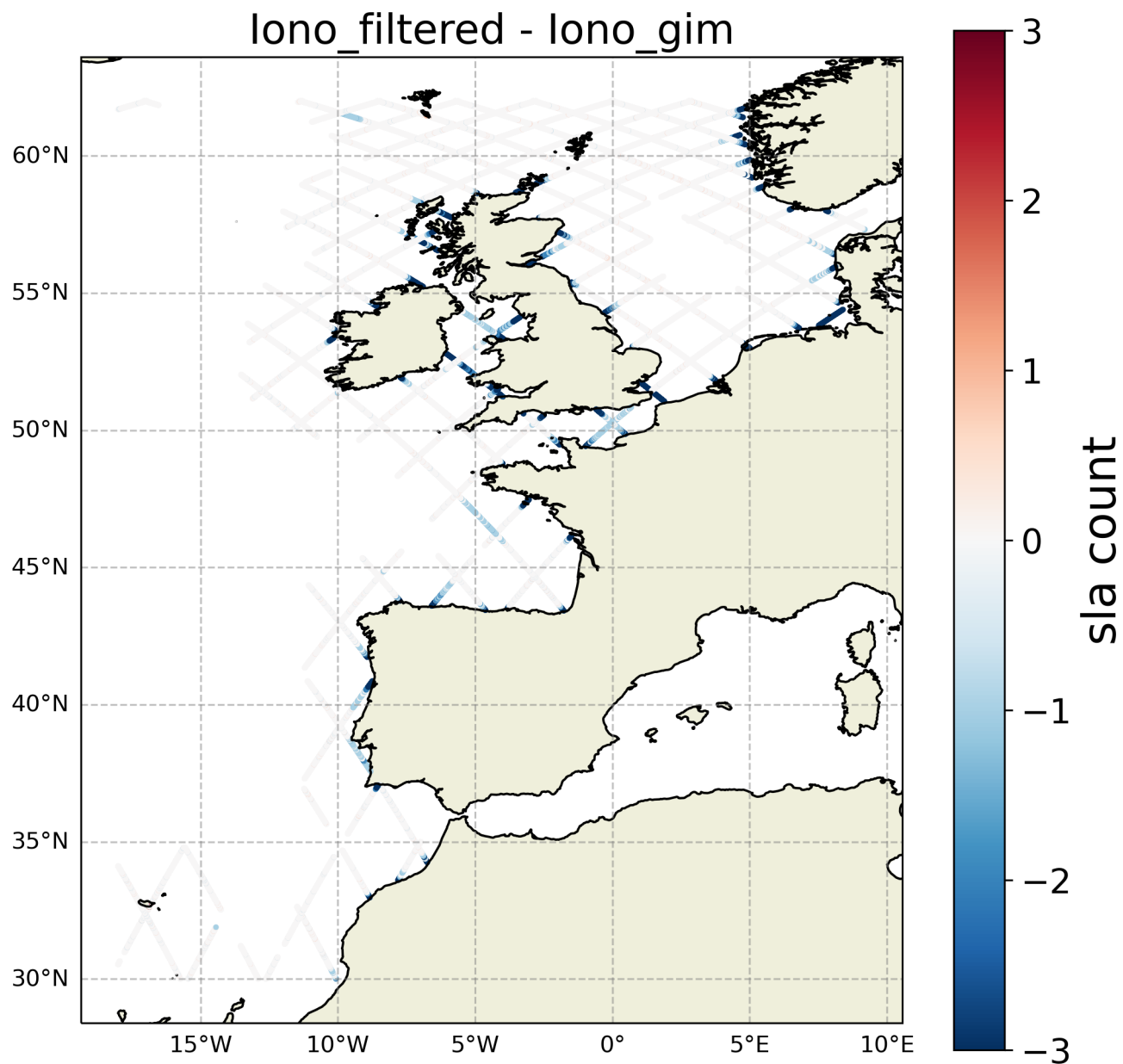


FIGURE 3 – Spatial coherence analysis of the Difference in sla 's count between Iono_filtered and Iono_gim

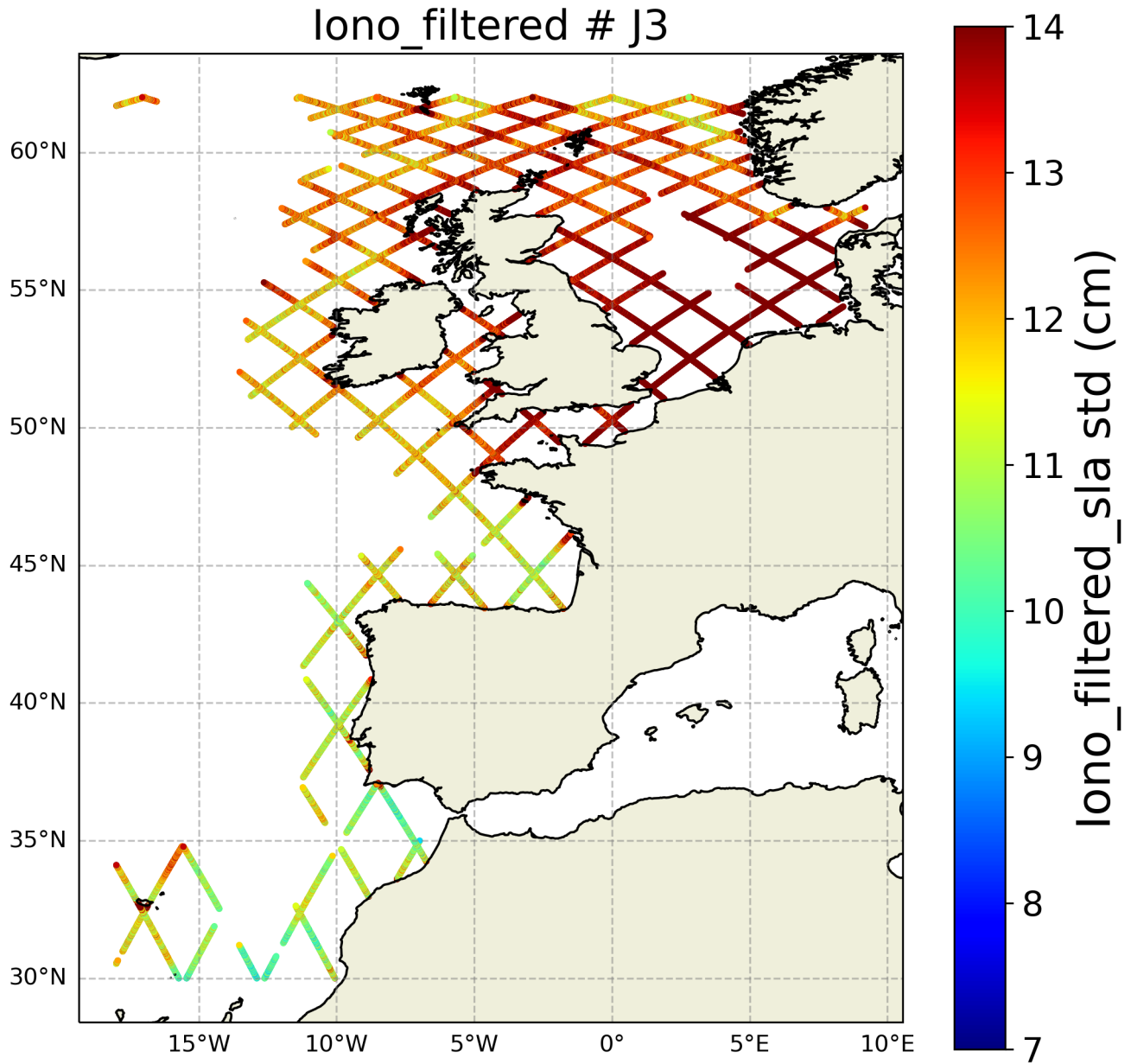


FIGURE 4 – Spatial coherence analysis of the std of the lono_filtered version of sla variable

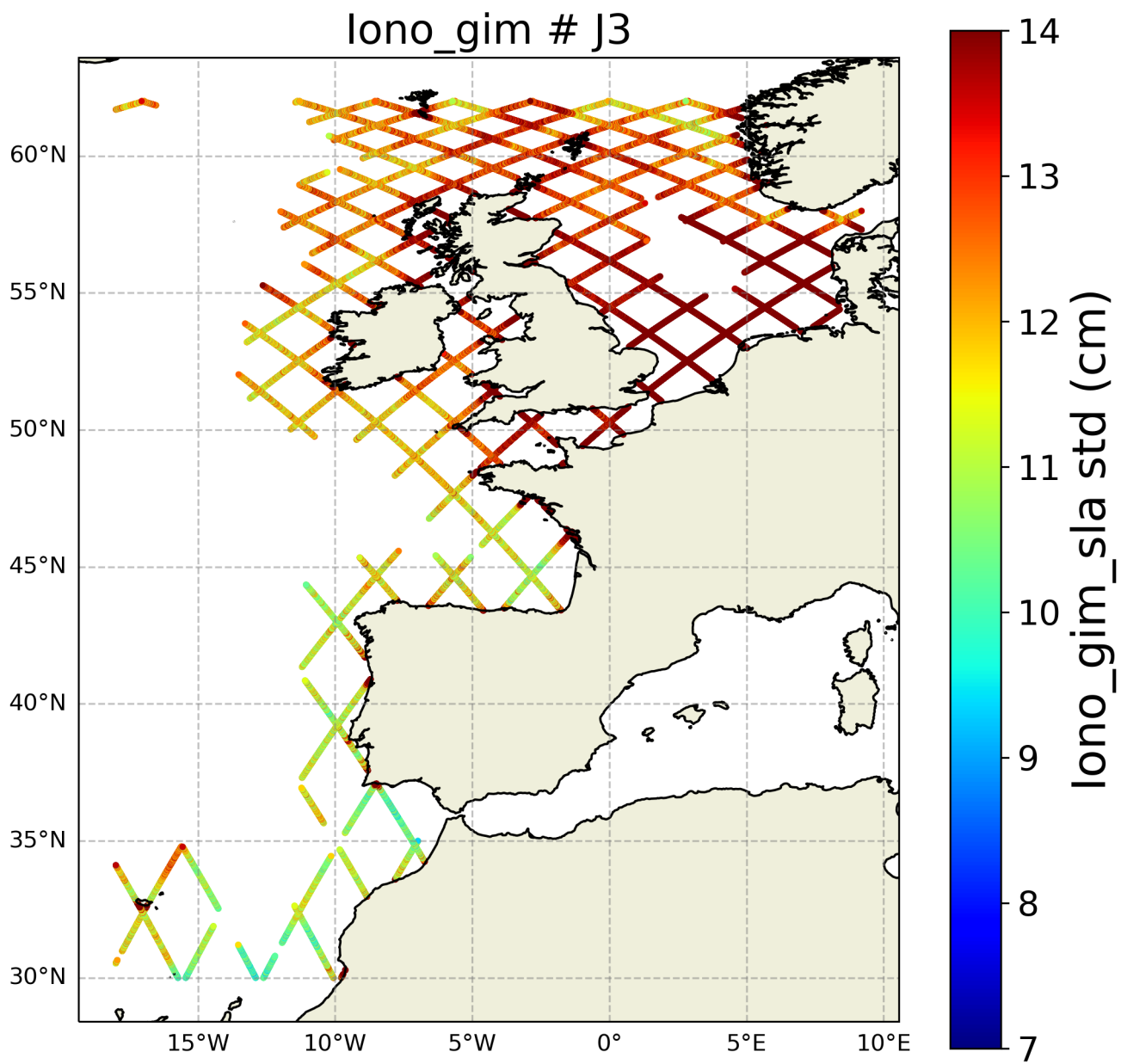


FIGURE 5 – Spatial coherence analysis of the std of the Iono_gim version of sla variable

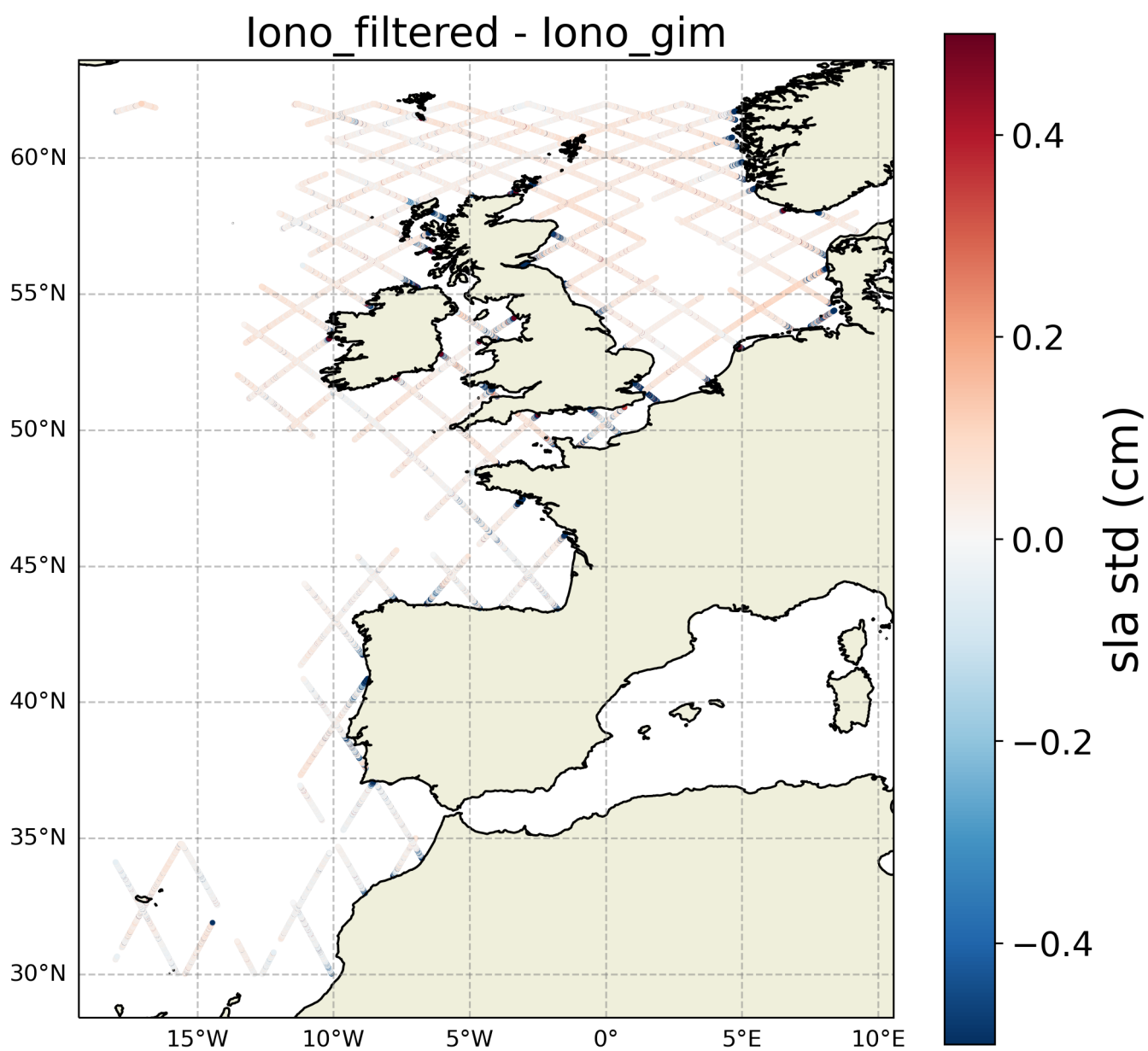


FIGURE 6 – Spatial coherence analysis of the Difference in sla 's std between Iono_filtered and Iono_gim

3.1.3 sla's mean

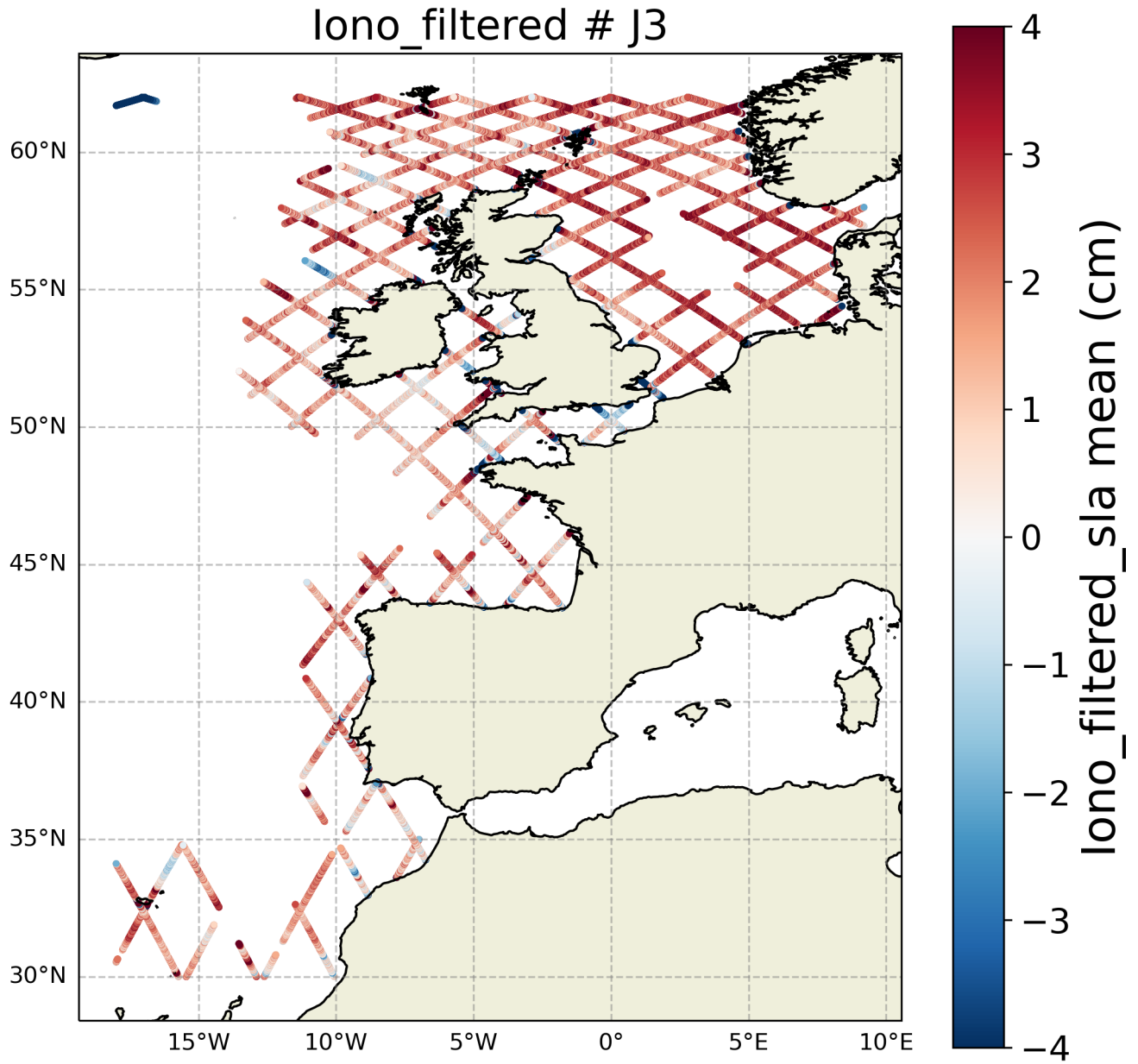


FIGURE 7 – Spatial coherence analysis of the mean of the Iono_filtered version of sla variable

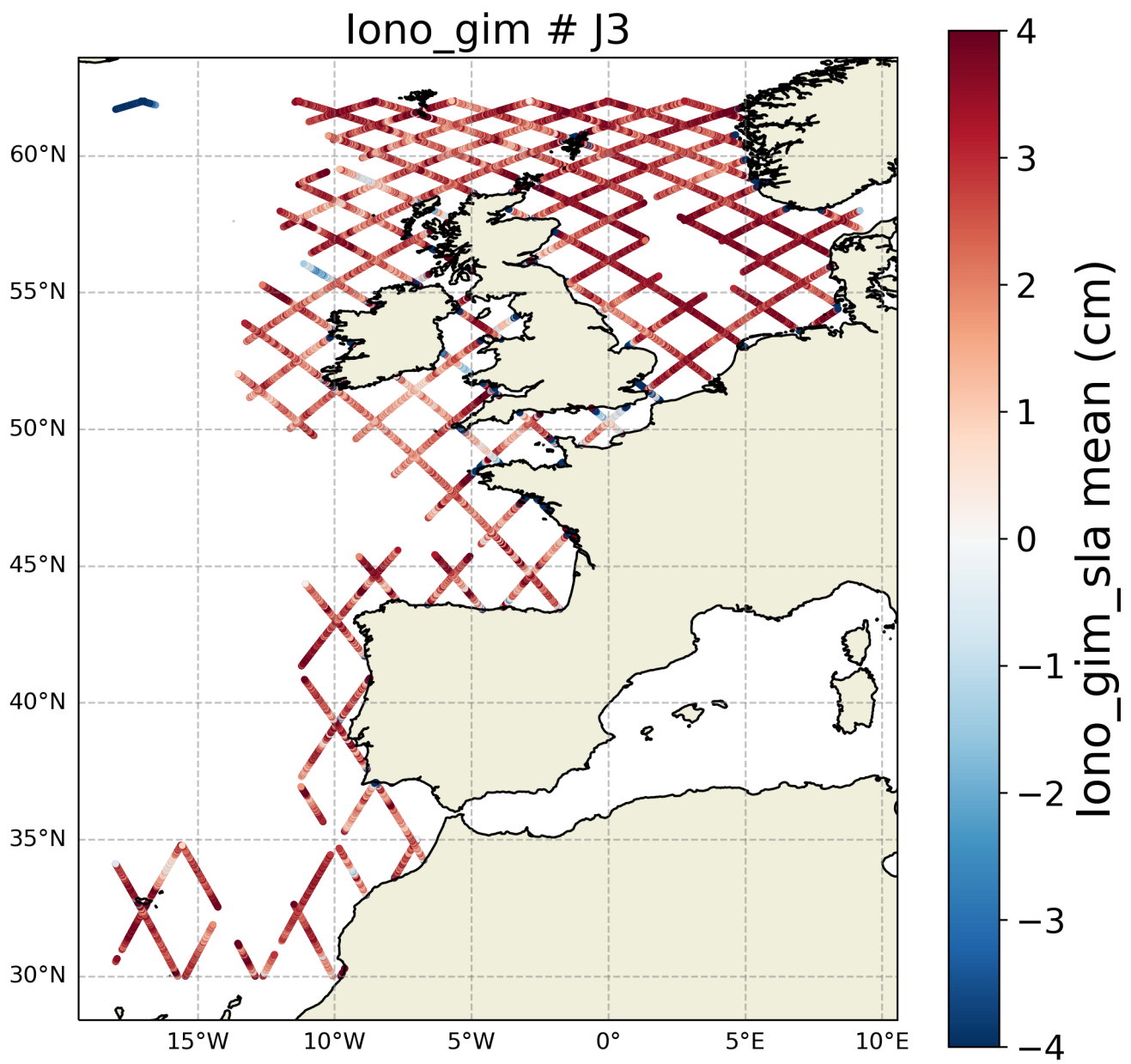


FIGURE 8 – Spatial coherence analysis of the mean of the Iono_gim version of sla variable

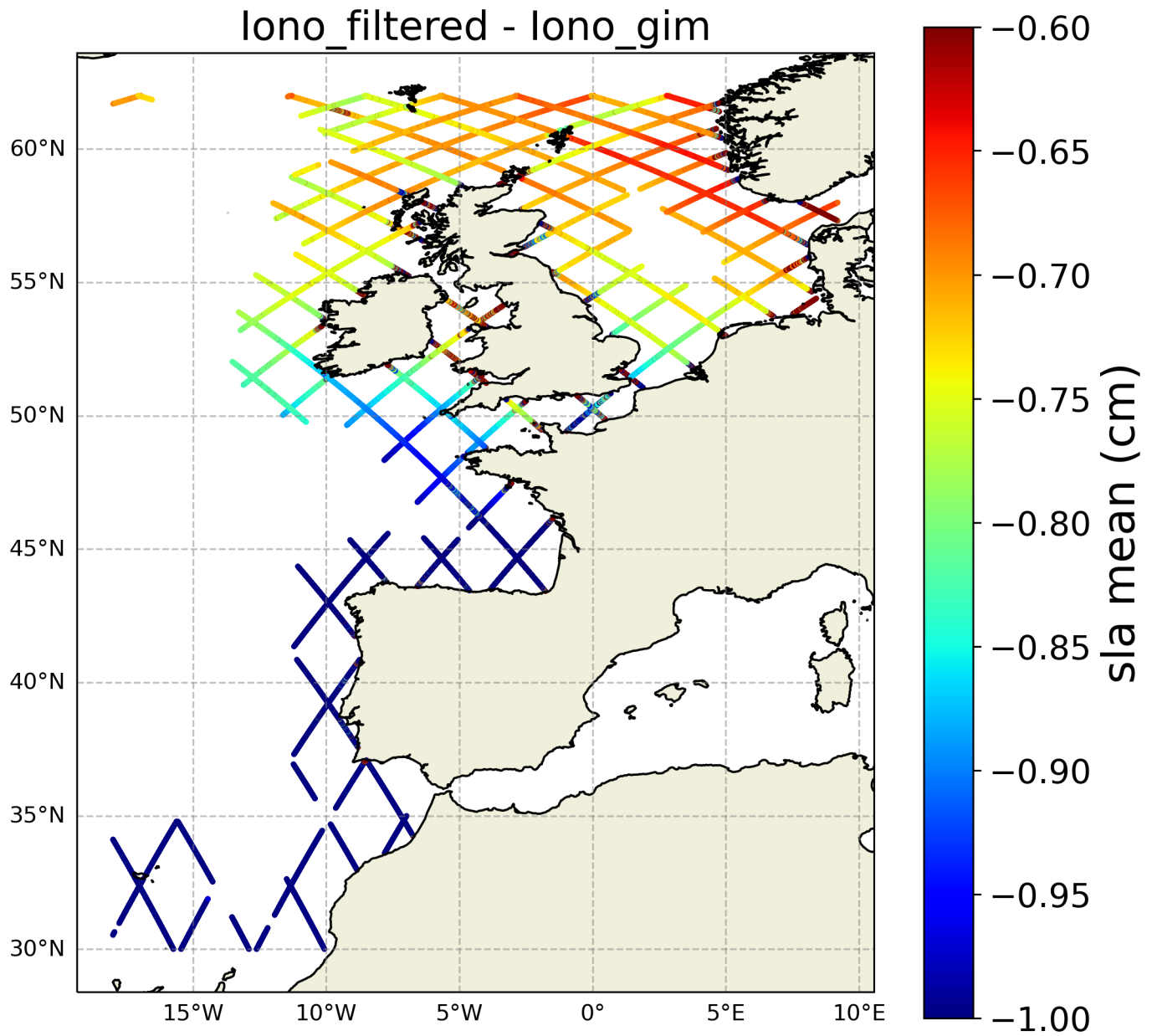


FIGURE 9 – Spatial coherence analysis of the Difference in sla 's mean between Iono_filtered and Iono_gim

3.2 Iono

3.2.1 Iono's count

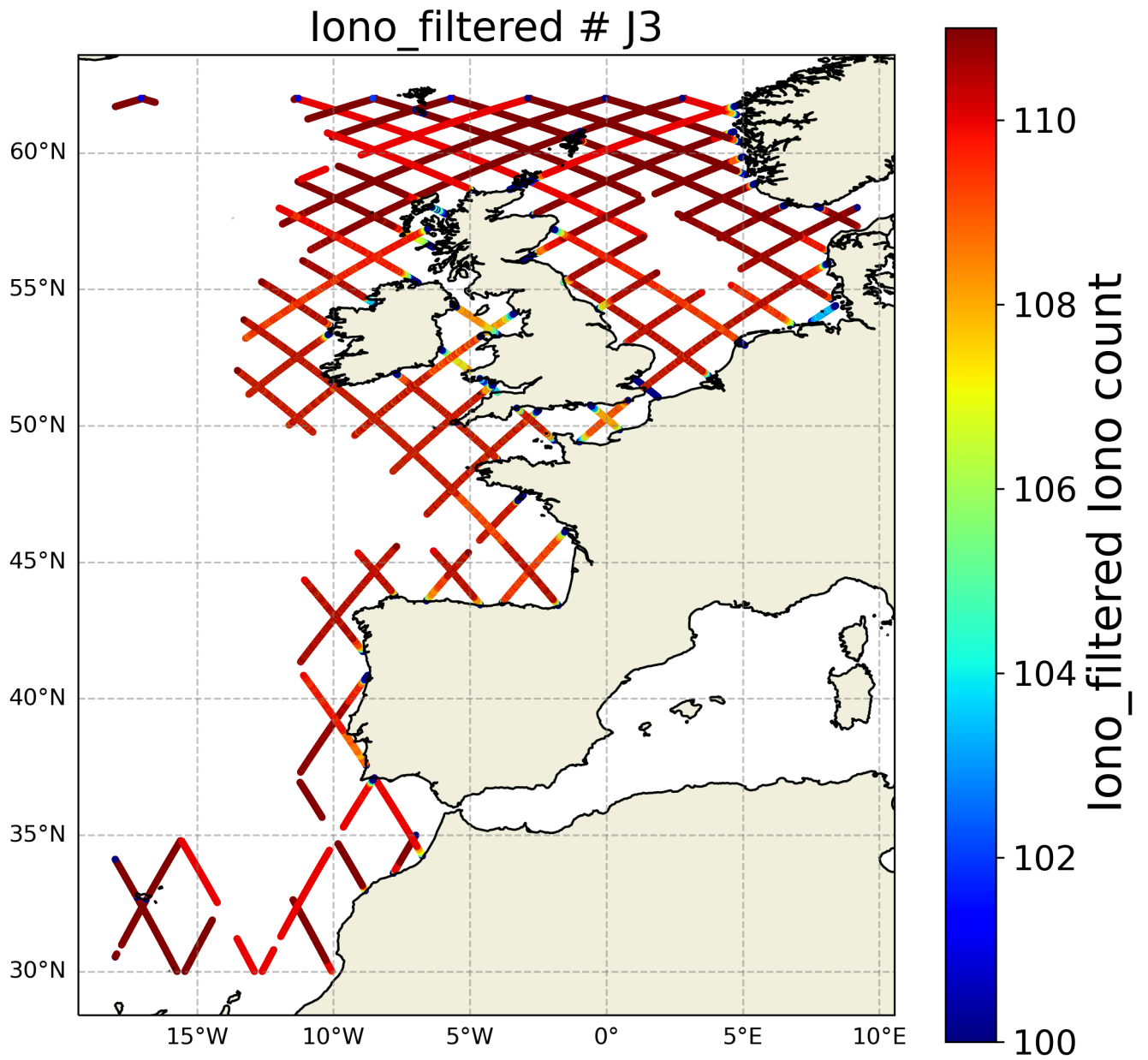


FIGURE 10 – Spatial coherence analysis of the count of the Iono_filtered version of Iono variable

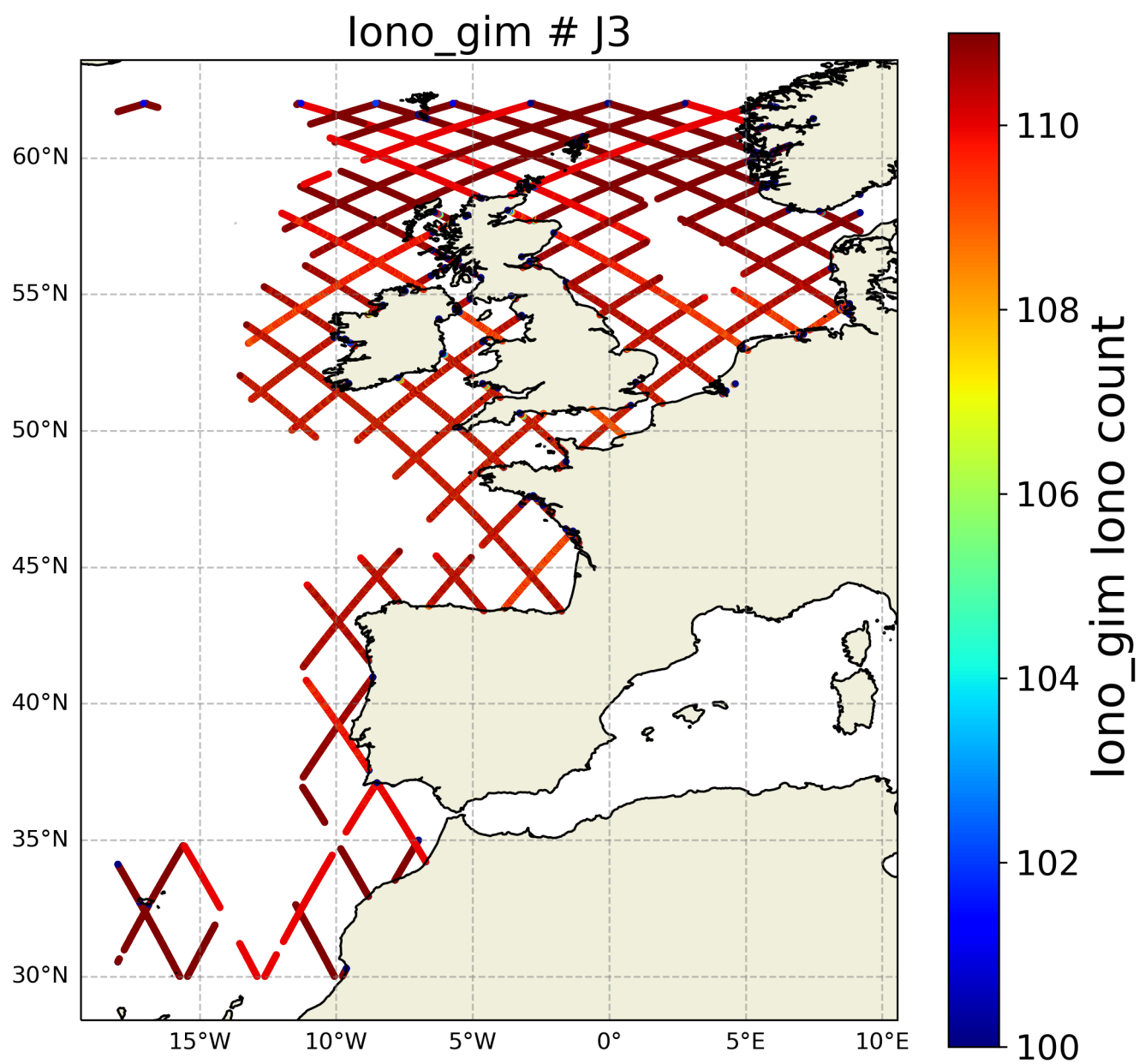


FIGURE 11 – Spatial coherence analysis of the count of the Iono_gim version of Iono variable

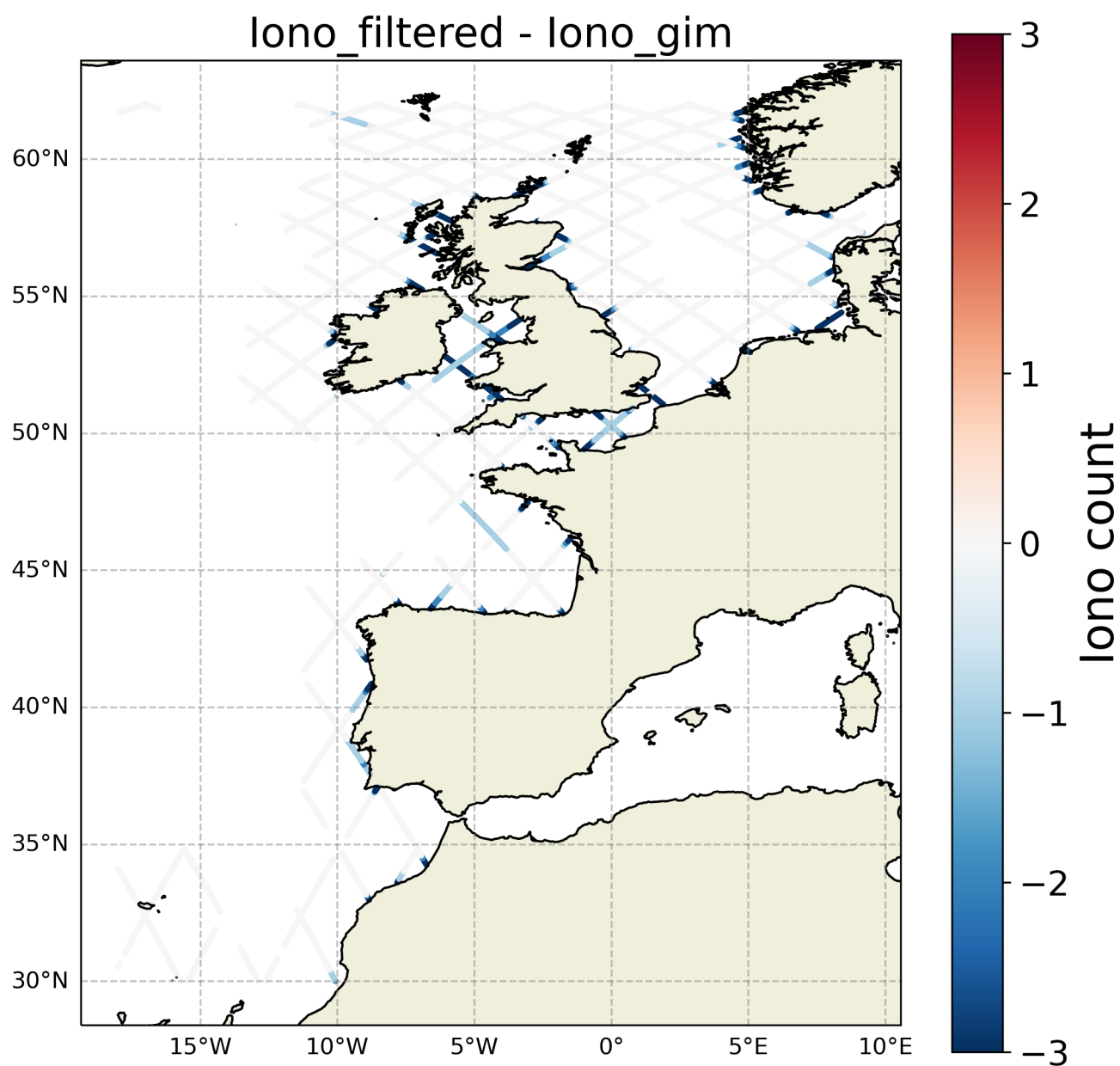


FIGURE 12 – Spatial coherence analysis of the Difference in Iono 's count between Iono_filtered and Iono_gim

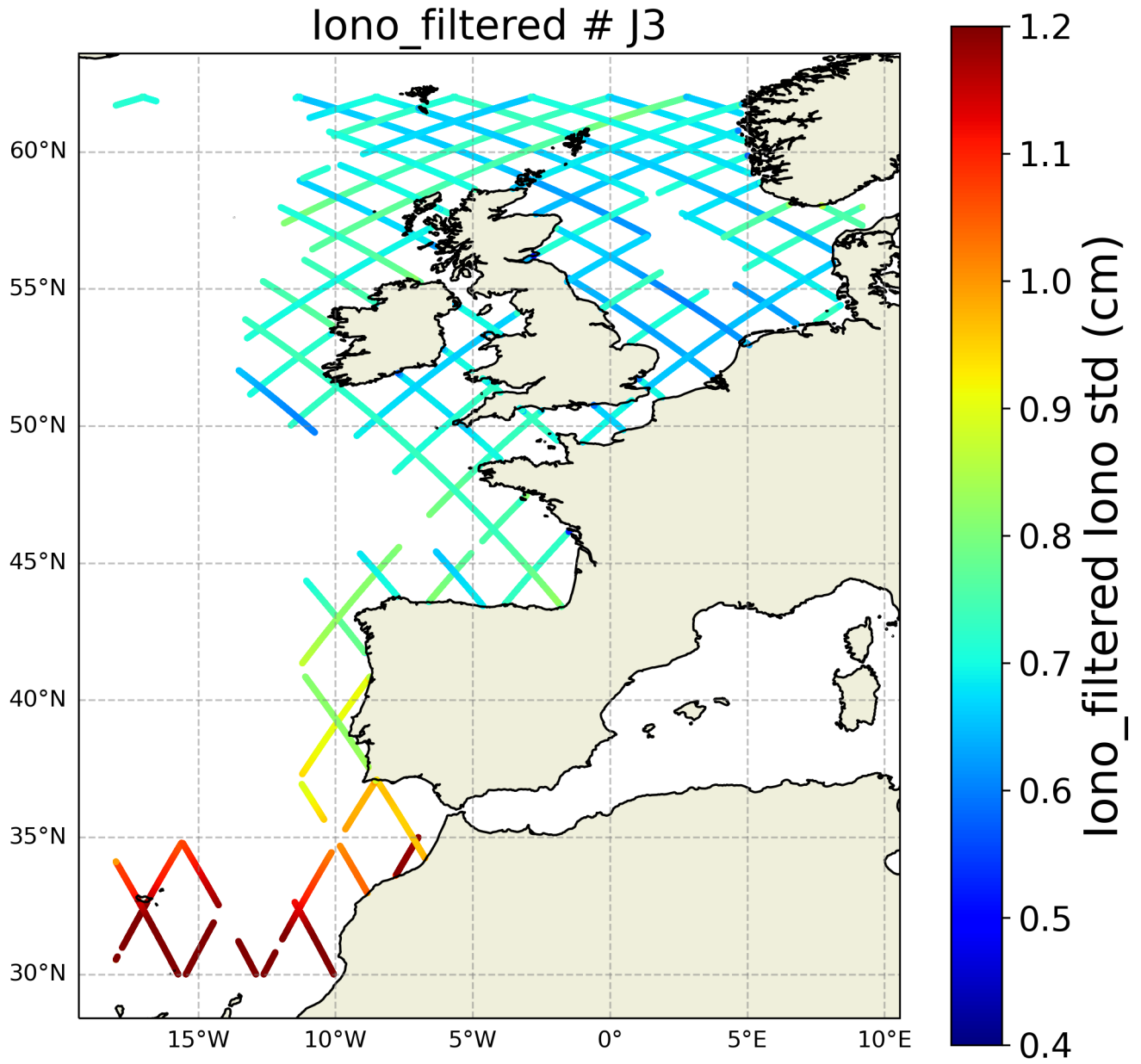


FIGURE 13 – Spatial coherence analysis of the std of the Iono_filtered version of Iono variable

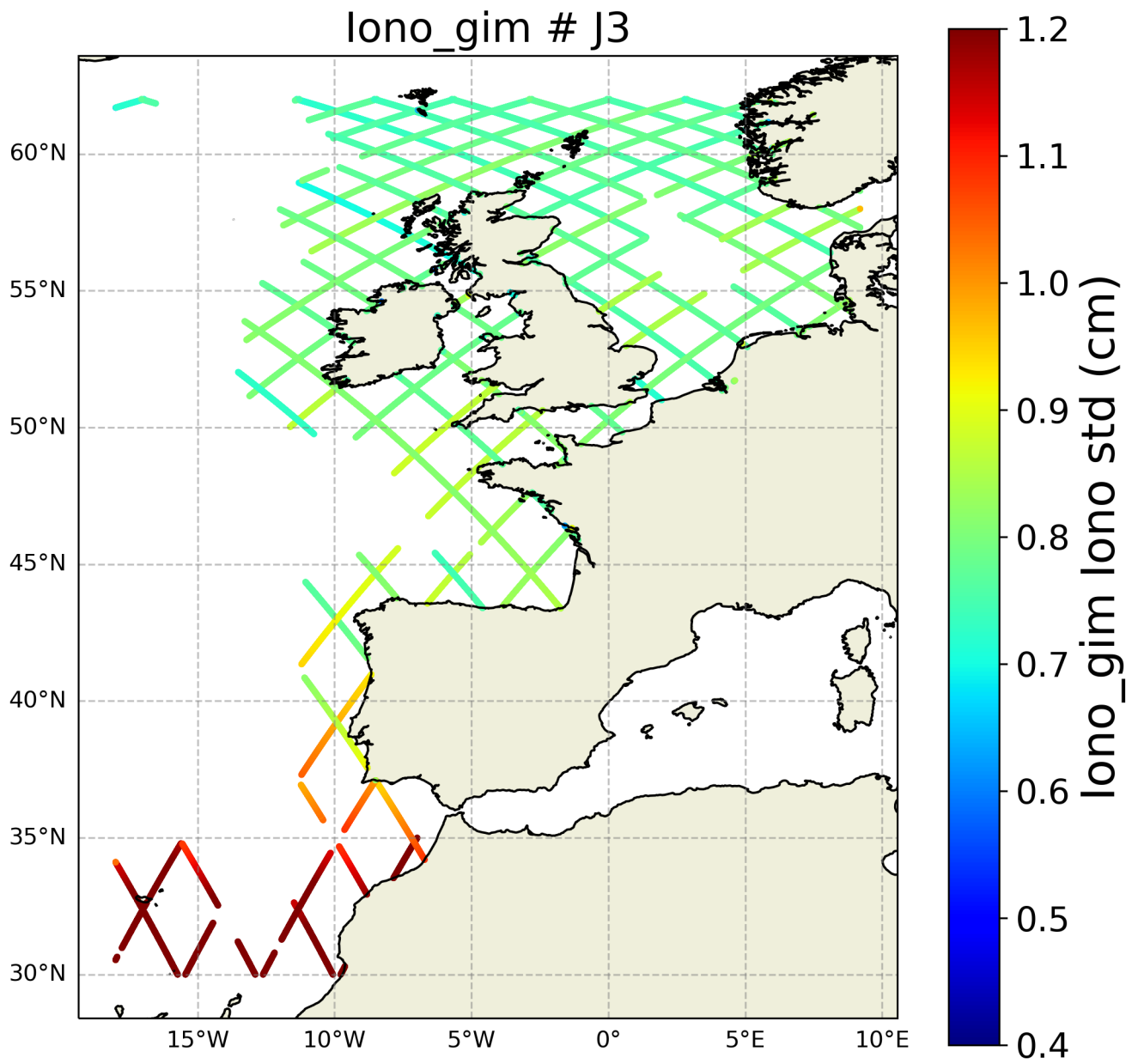


FIGURE 14 – Spatial coherence analysis of the std of the Iono_gim version of Iono variable

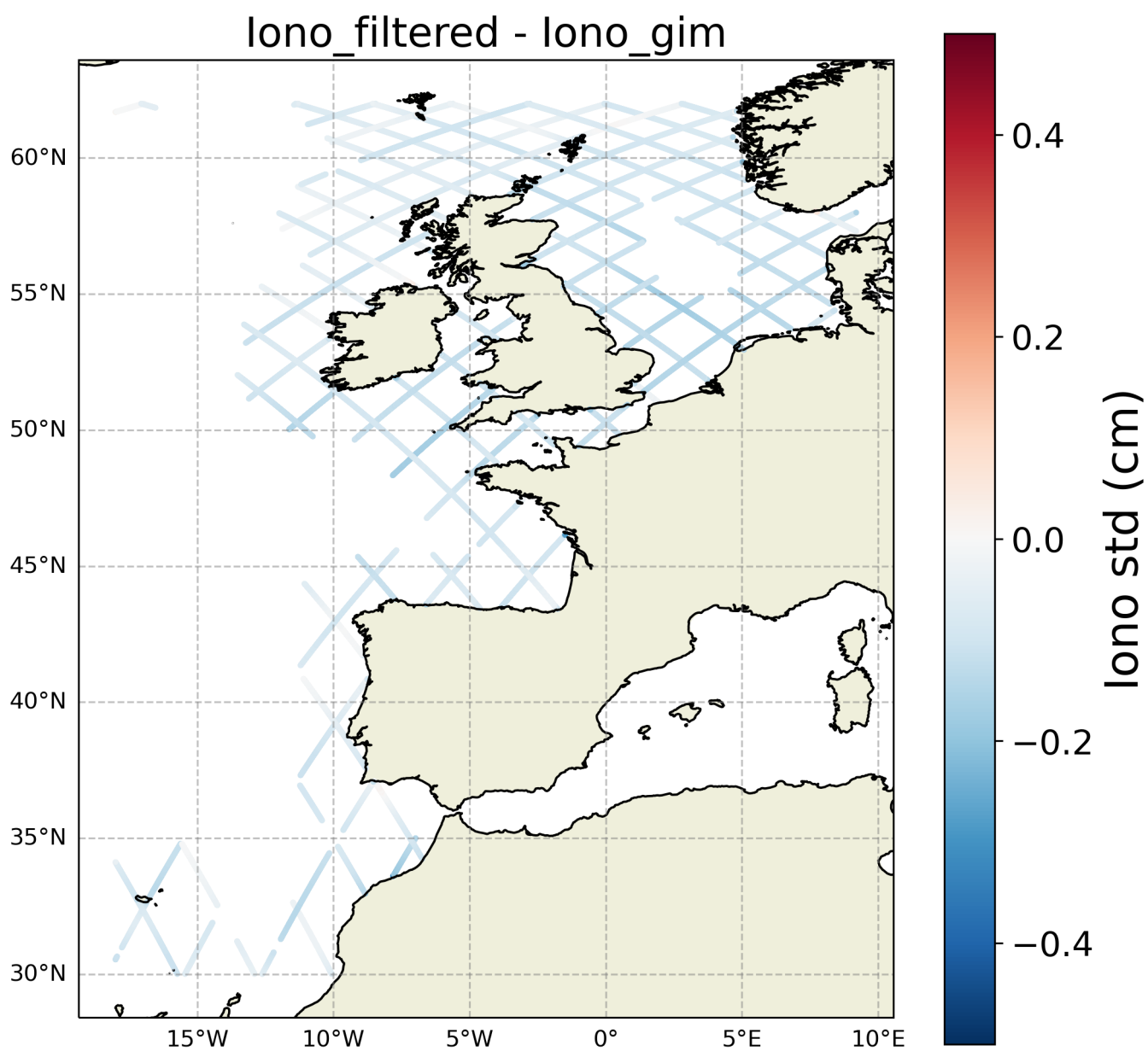


FIGURE 15 – Spatial coherence analysis of the Difference in Iono 's std between Iono_filtered and Iono_gim

3.2.3 Iono's mean

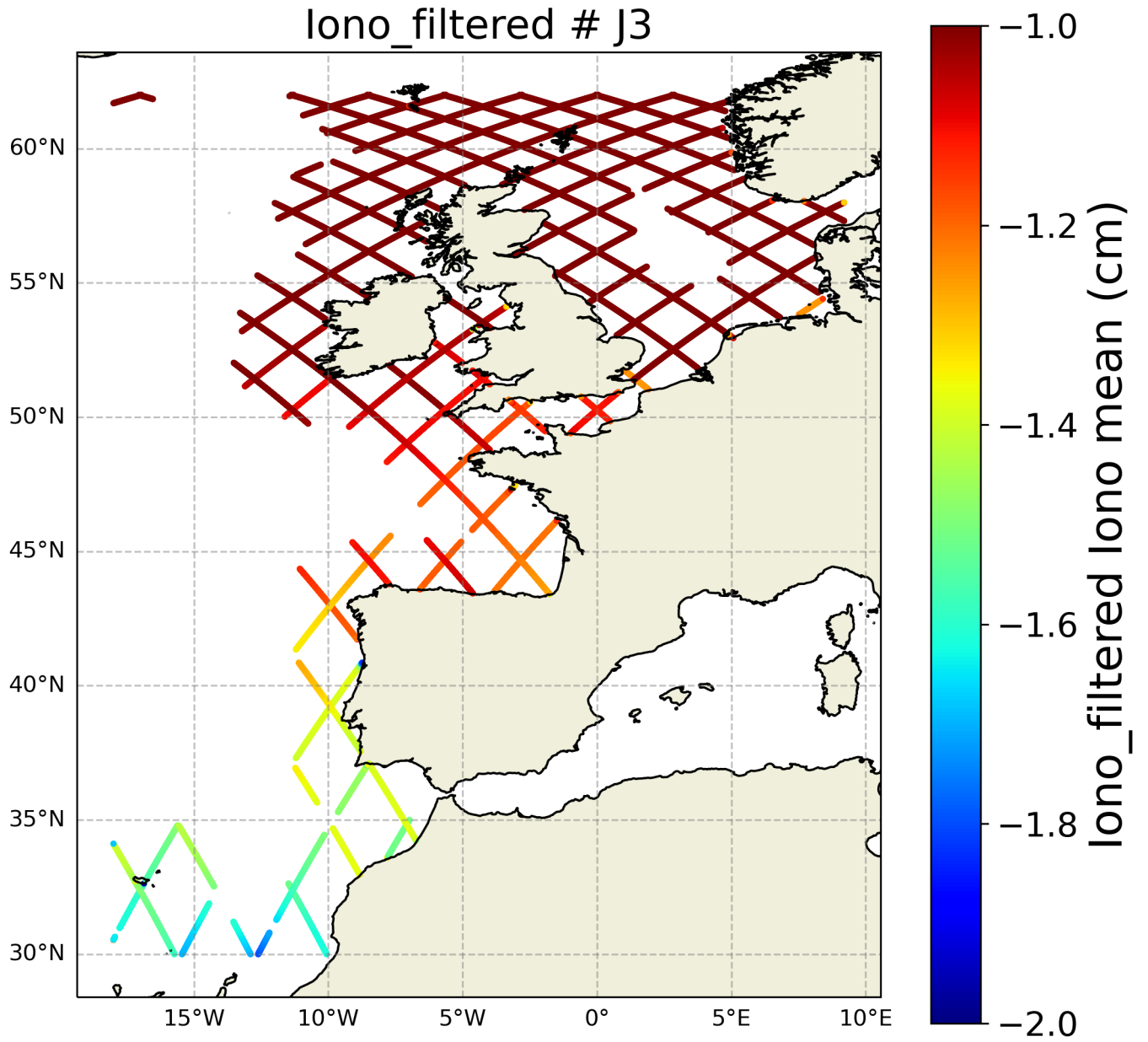


FIGURE 16 – Spatial coherence analysis of the mean of the Iono_filtered version of Iono variable

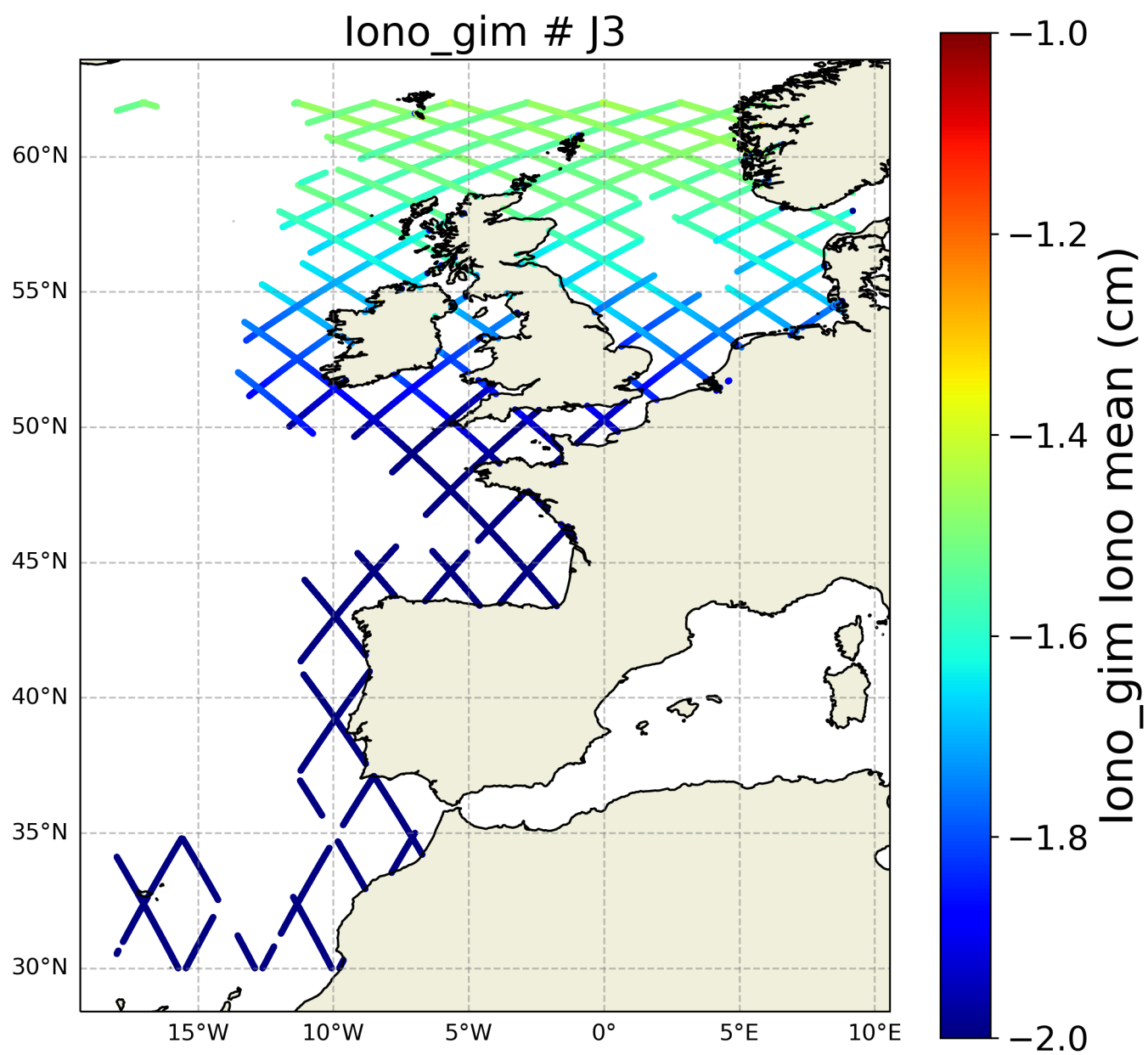


FIGURE 17 – Spatial coherence analysis of the mean of the Iono_gim version of Iono variable

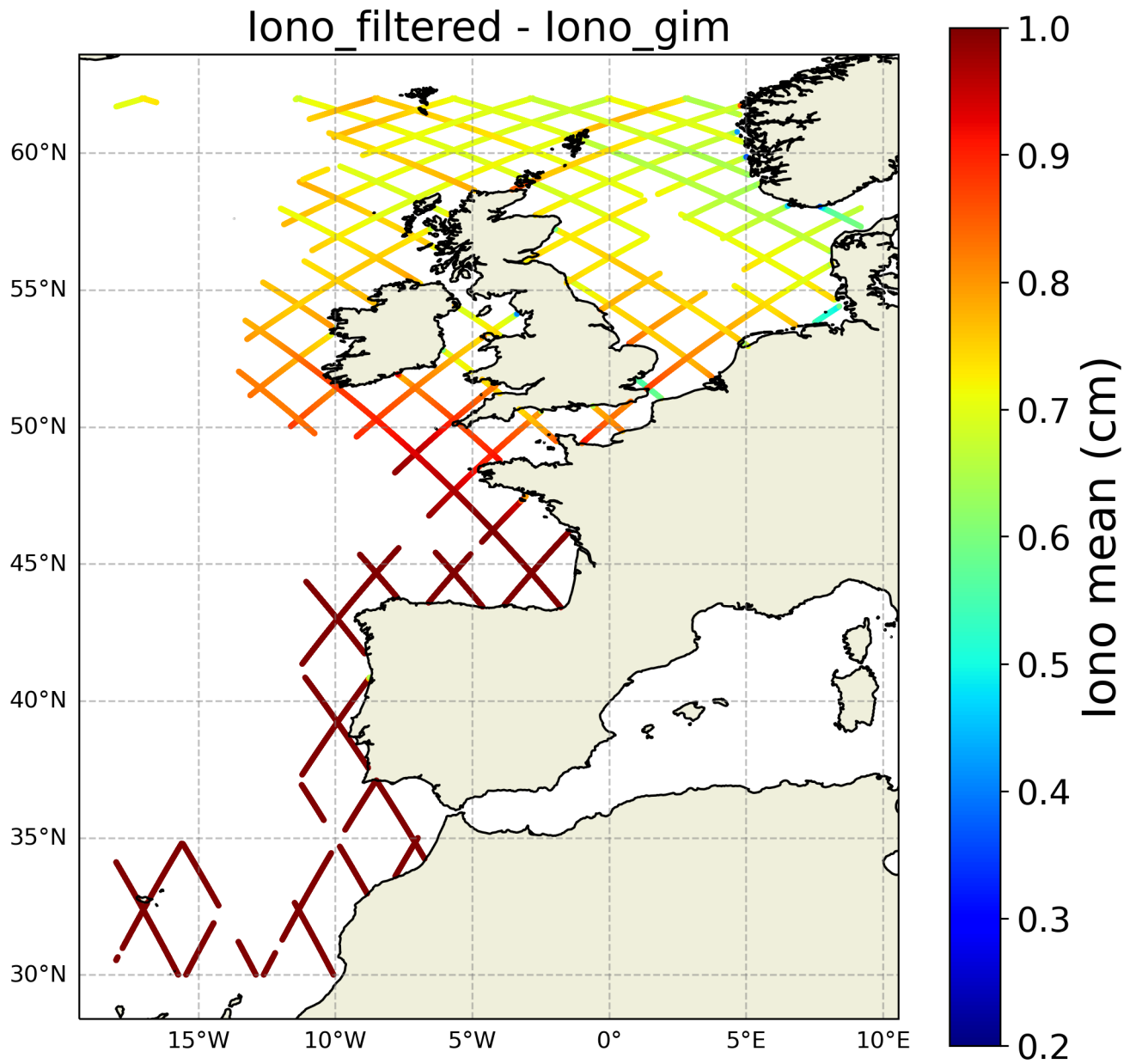


FIGURE 18 – Spatial coherence analysis of the Difference in Iono 's mean between Iono_filtered and Iono_gim

4 Histograms

4.1 Iono

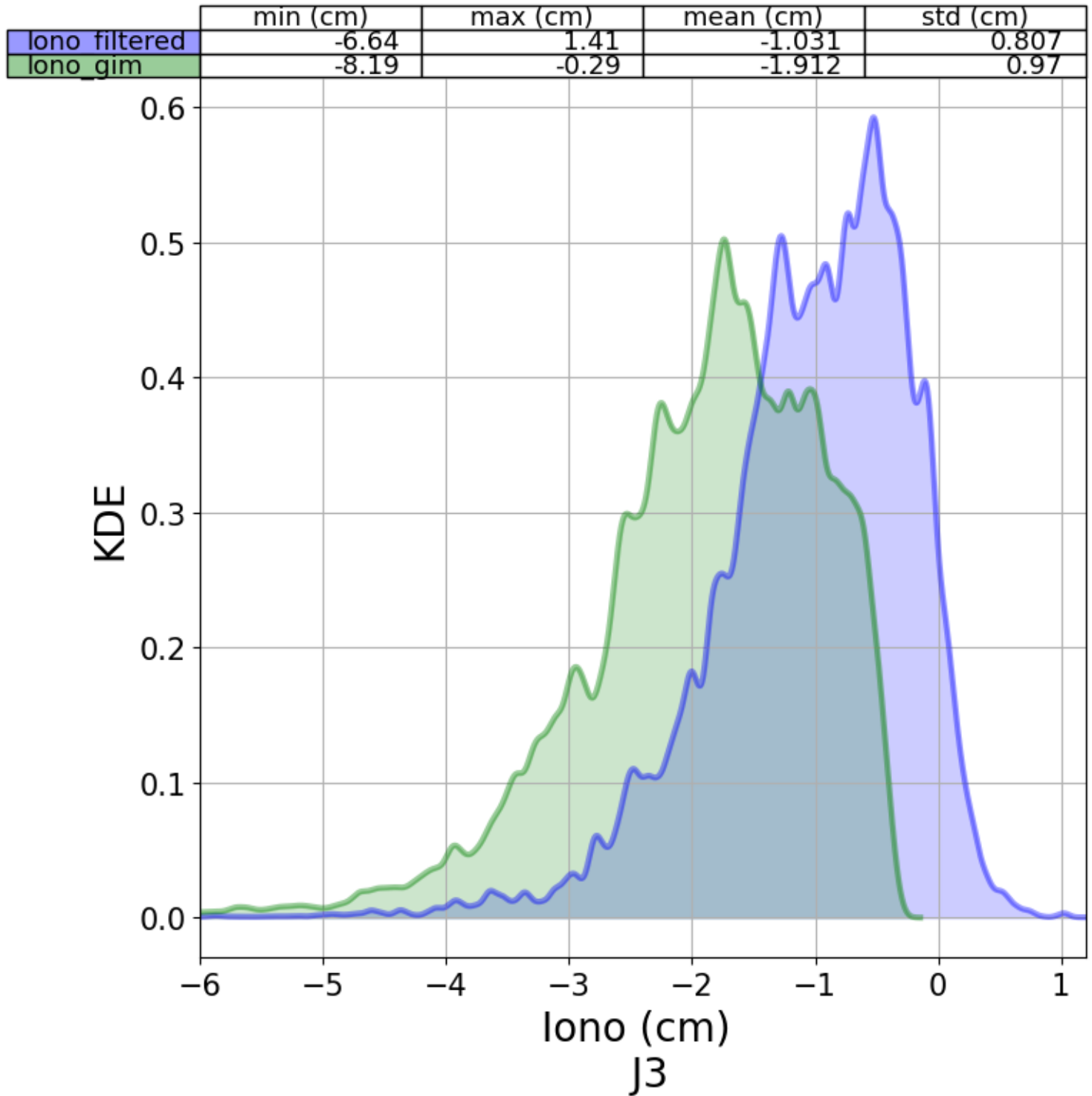


FIGURE 19 – Histogram of each of Iono version

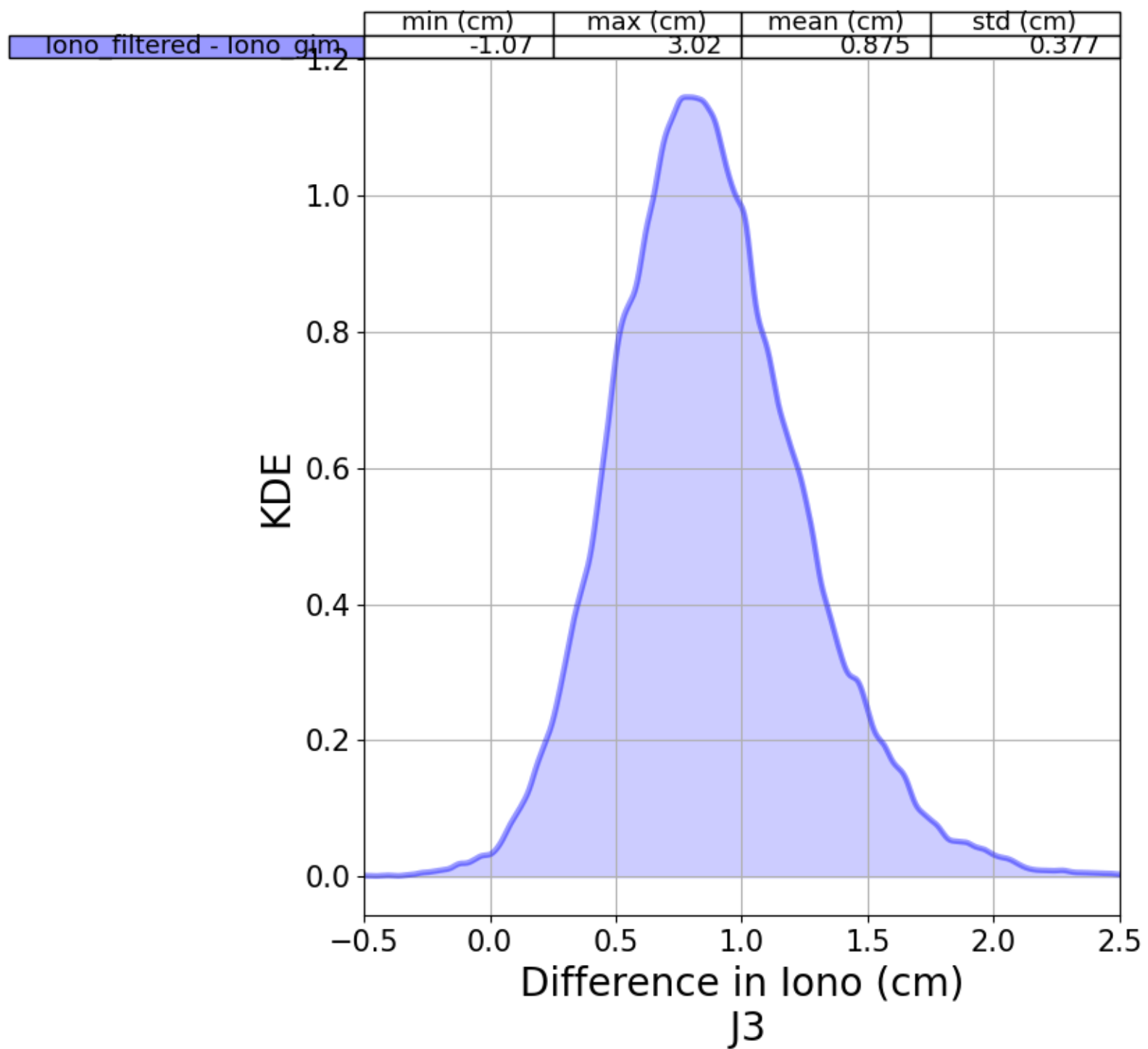


FIGURE 20 – Histograms of difference of each Iono version and reference one

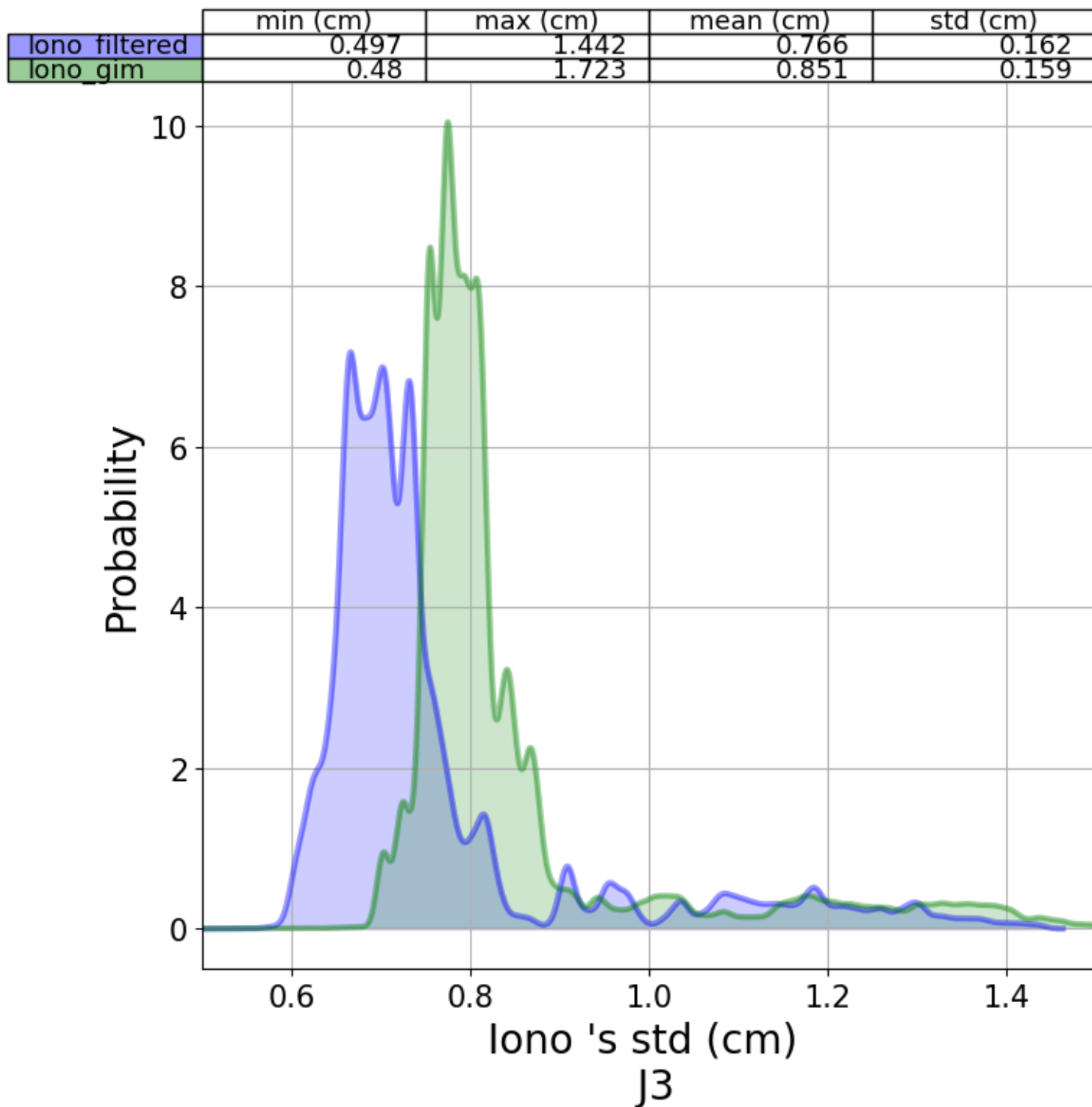


FIGURE 21 – Histograms of the standard deviation of each Iono version

4.2 sla

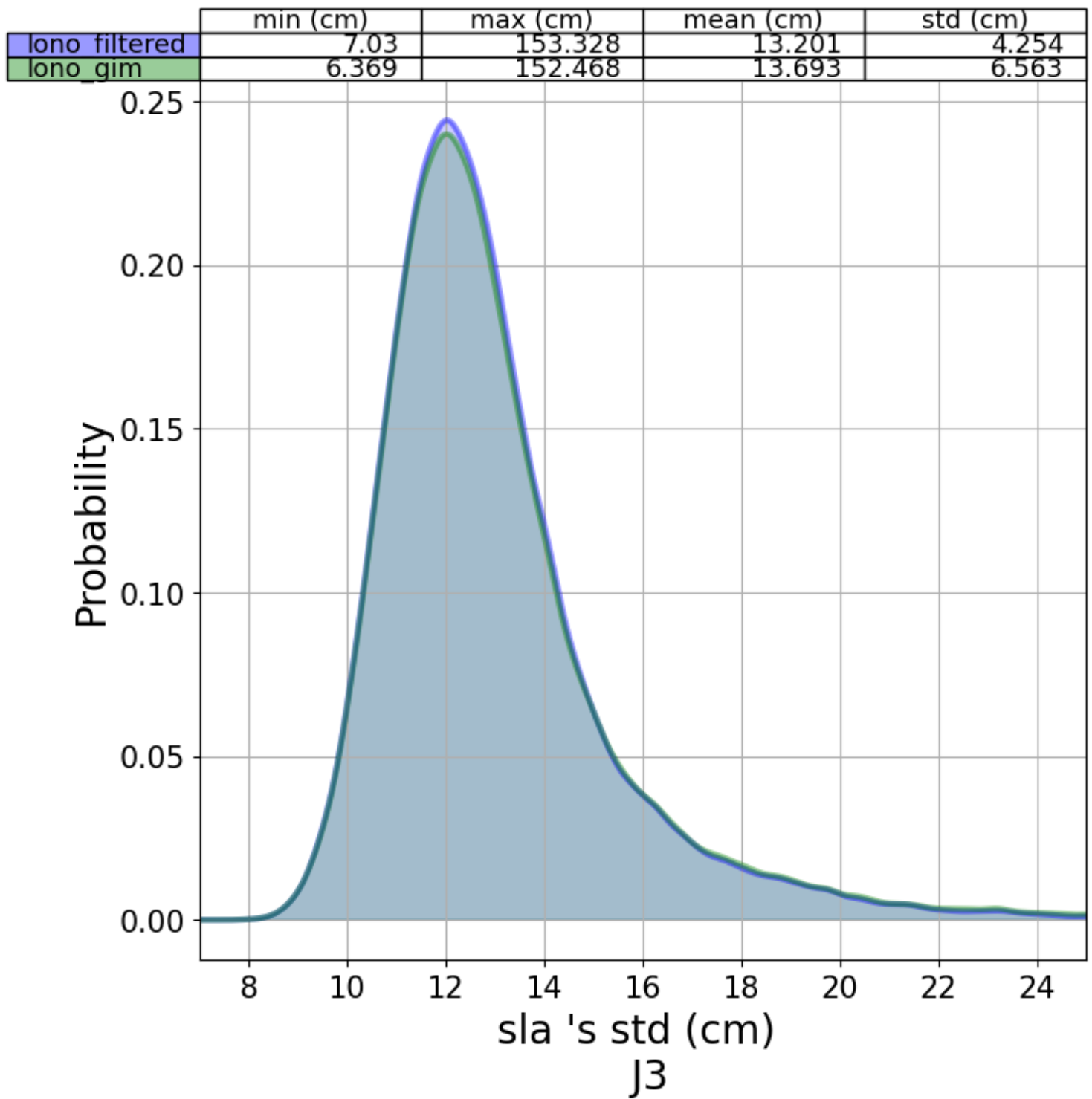


FIGURE 22 – Histograms of the standard deviation of each sla version

5 Along-track analysis

5.1 Iono

5.1.1 Iono's count

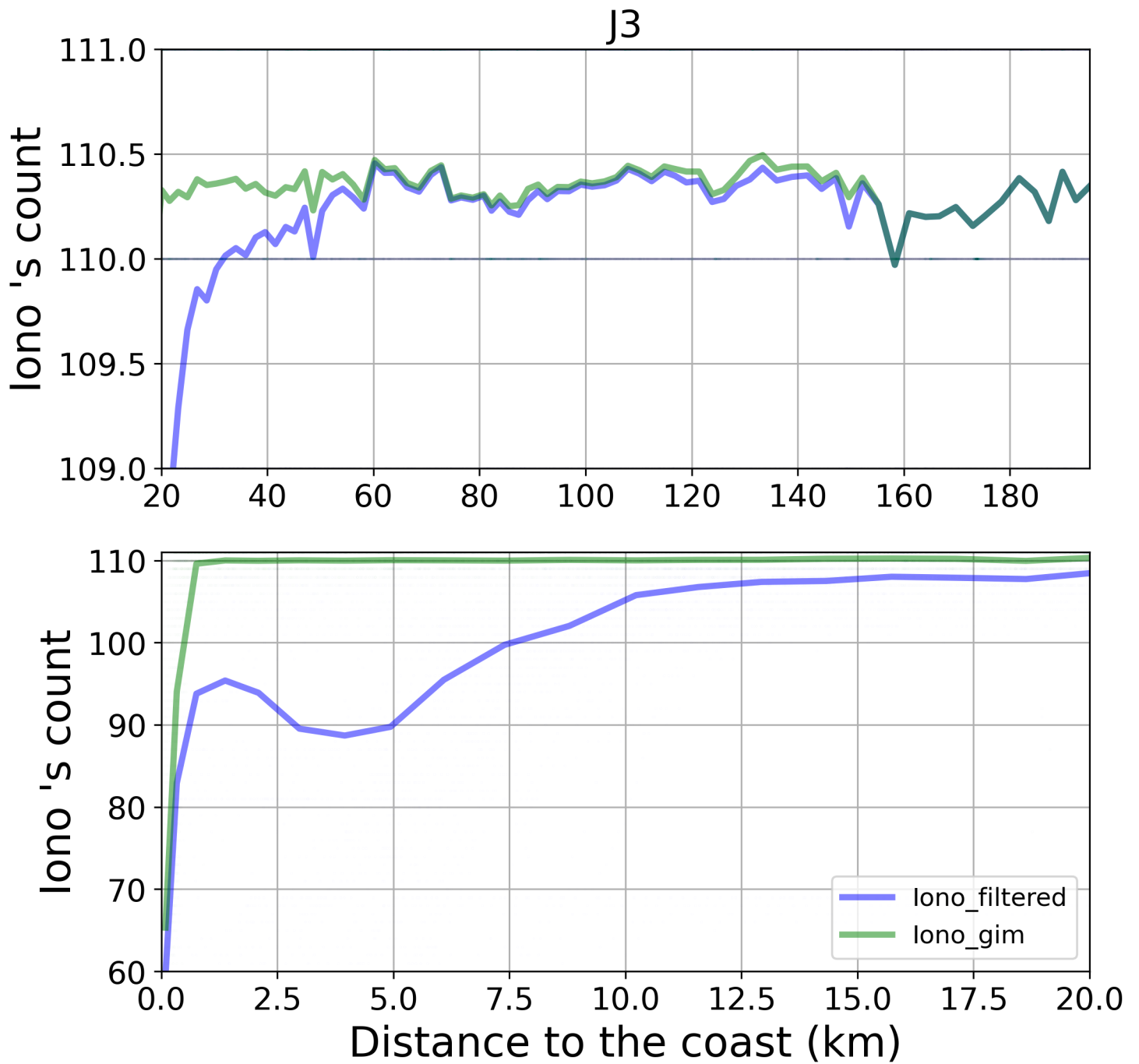


FIGURE 23 – Along-track analysis of Iono's count

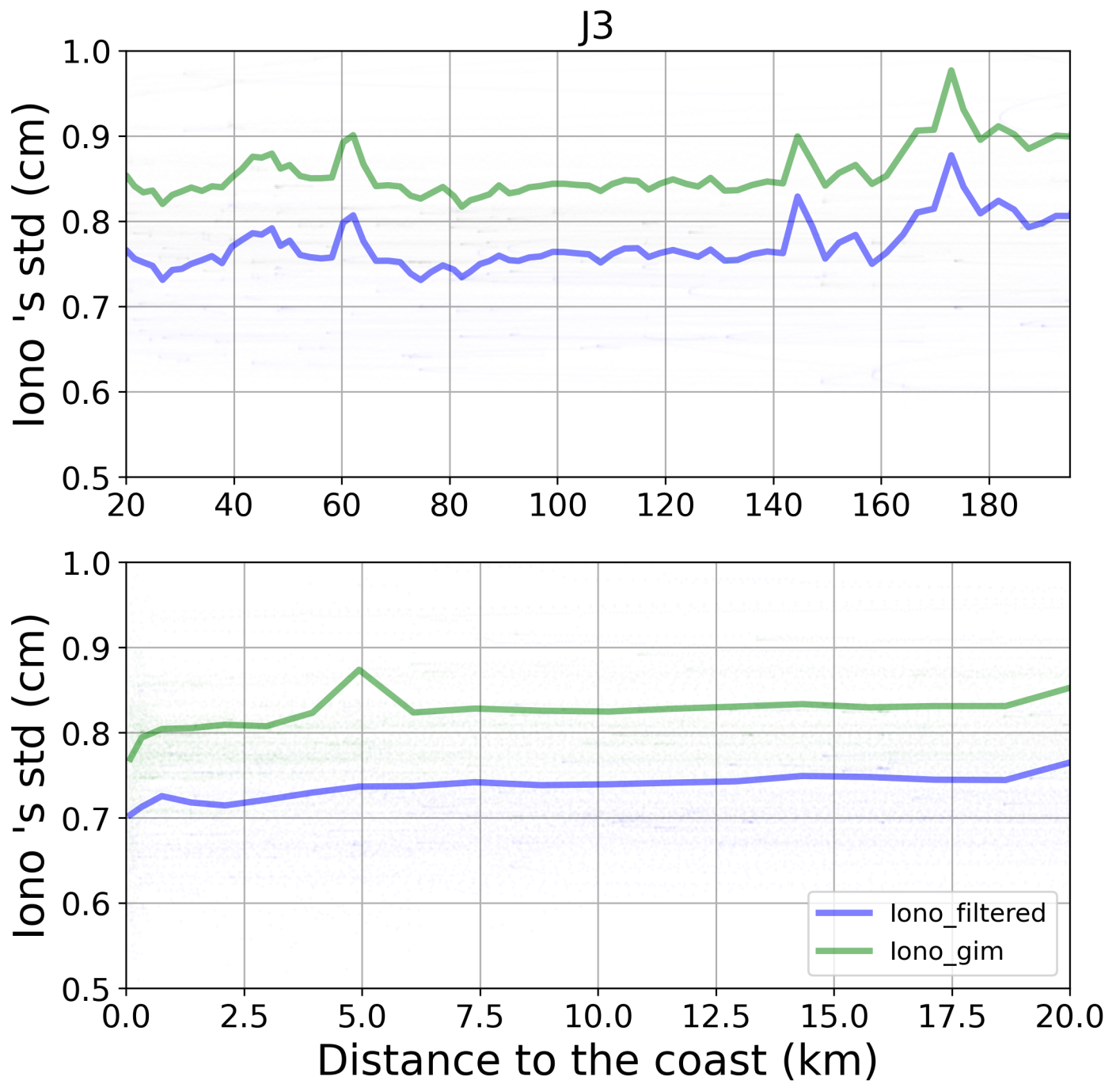


FIGURE 24 – Along-track analysis of Iono's std

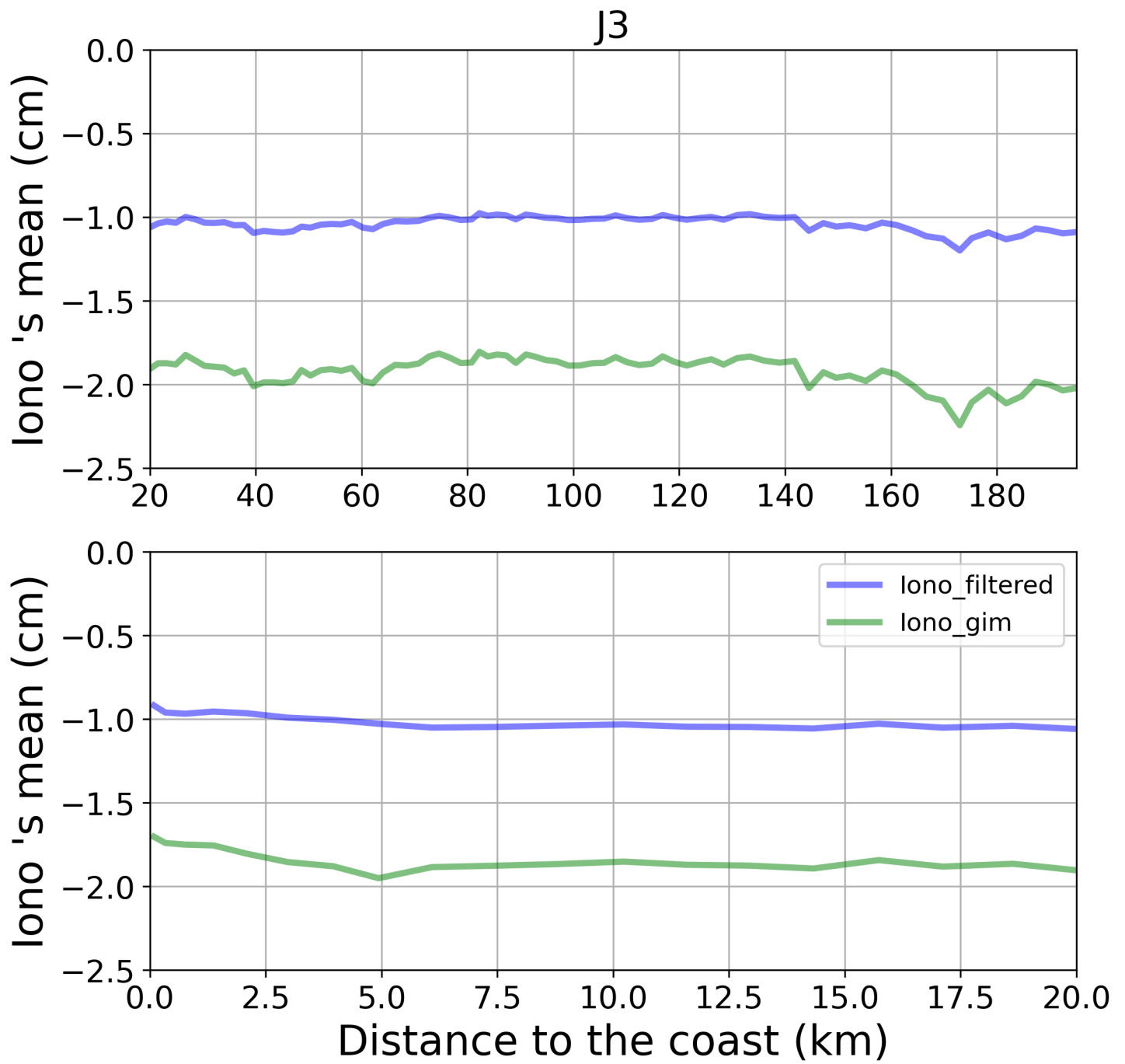


FIGURE 25 – Along-track analysis of Iono's mean

5.2 sla

5.2.1 sla 's count

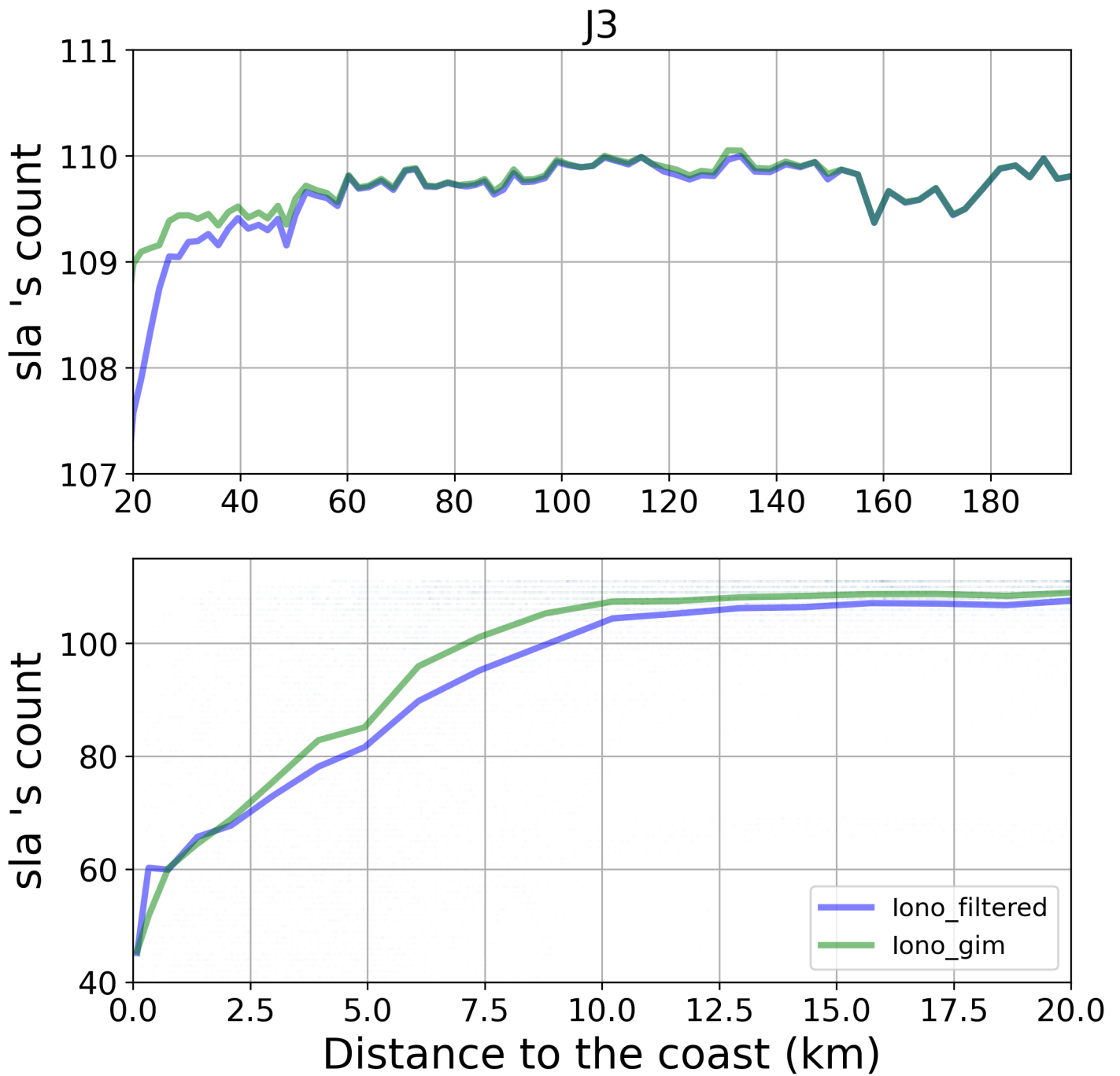


FIGURE 26 – Along-track analysis of sla 's count

J3

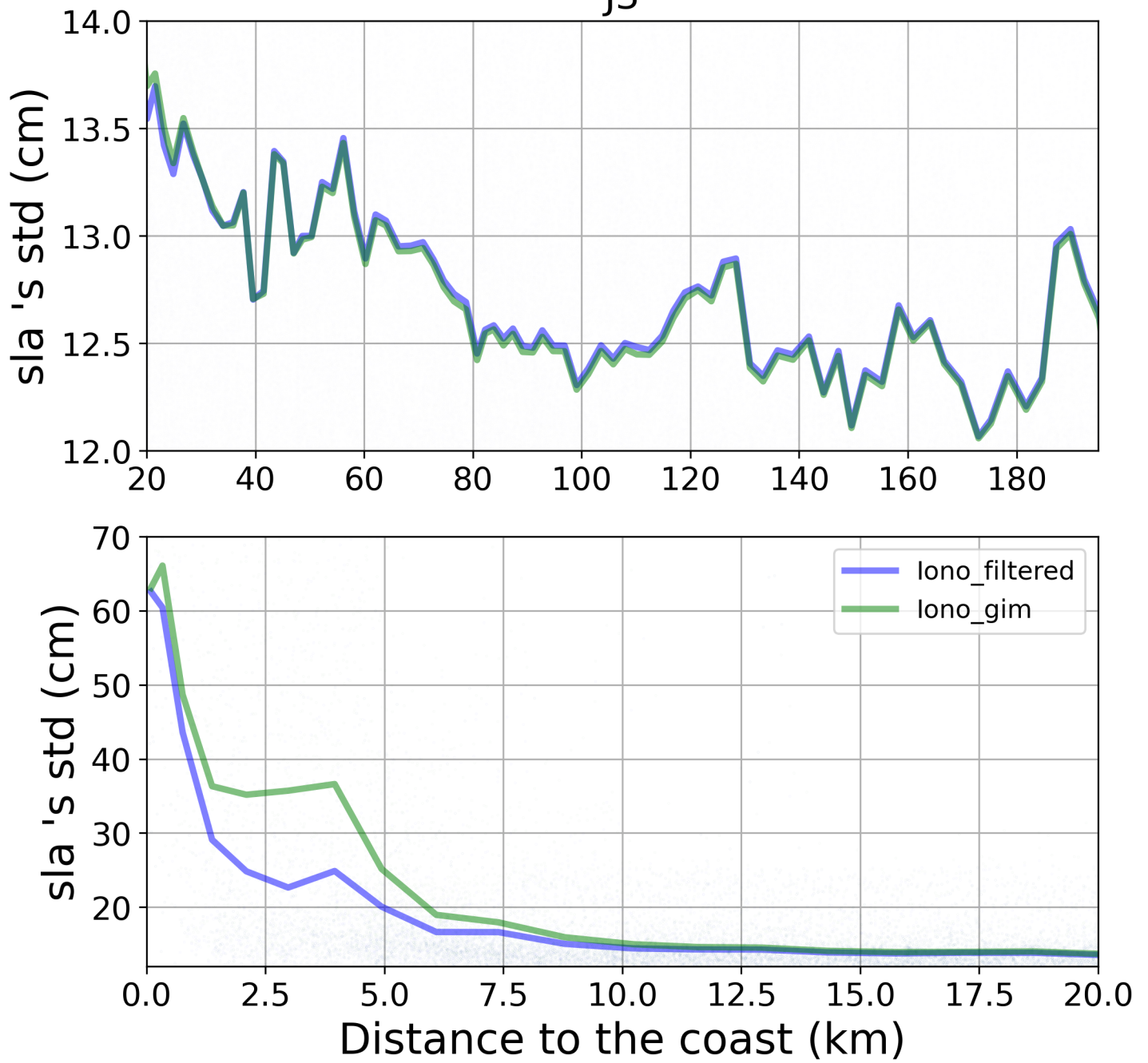


FIGURE 27 – Along-track analysis of sla 's std

J3

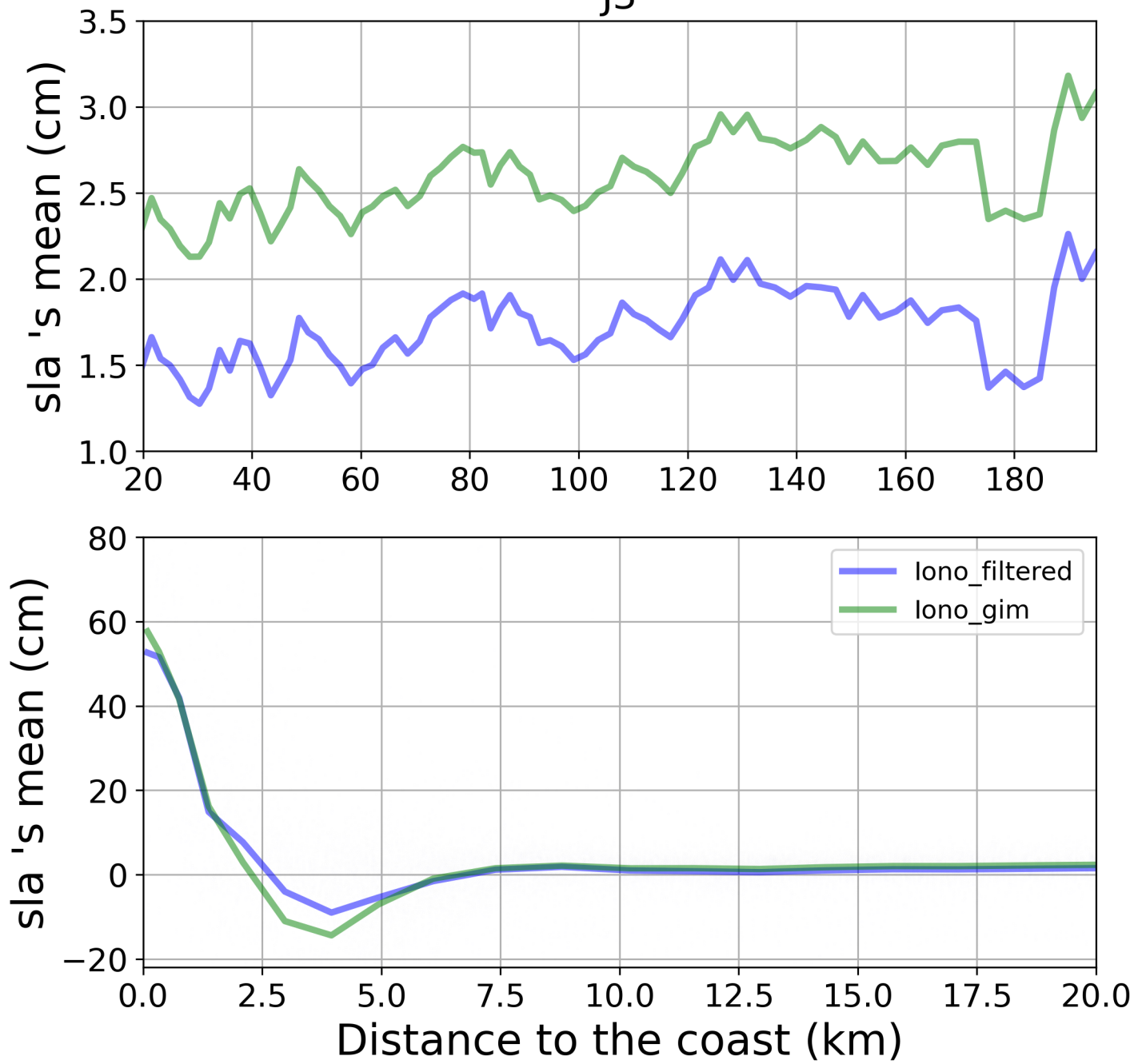


FIGURE 28 – Along-track analysis of sla 's mean

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 tide Gauge station

6.1 Station : HERBAUDIERE

- Nearest track to HERBAUDIERE station is the track number track70
- The area of interest is limited by :
 - A circle which it's center is the HERBAUDIERE tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : [None, 47.1] °

6.1.1 correlation visualization in maps view % HERBAUDIERE tide gauge

6.1.2 rmsd visualization in maps view % HERBAUDIERE tide gauge

6.1.3 std visualization in maps view % HERBAUDIERE tide gauge

6.1.4 valid_data_percent visualization in maps view % HERBAUDIERE tide gauge

6.1.5 Valid data (%) in function of distance to coast/HERBAUDIERE 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. $maxNB = 93$ 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.

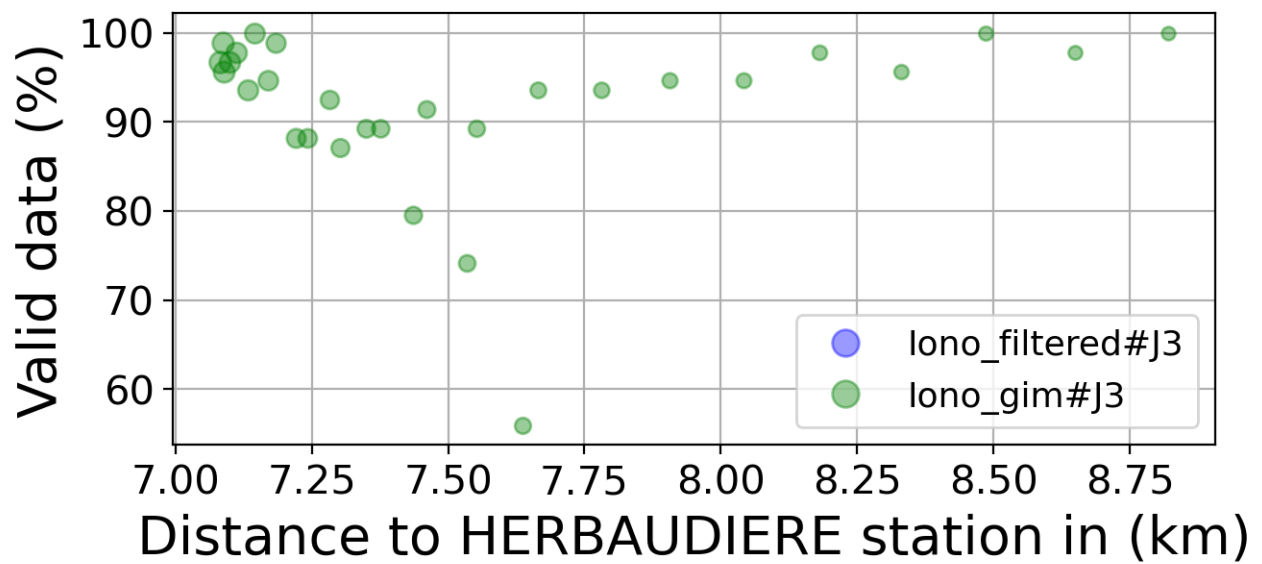
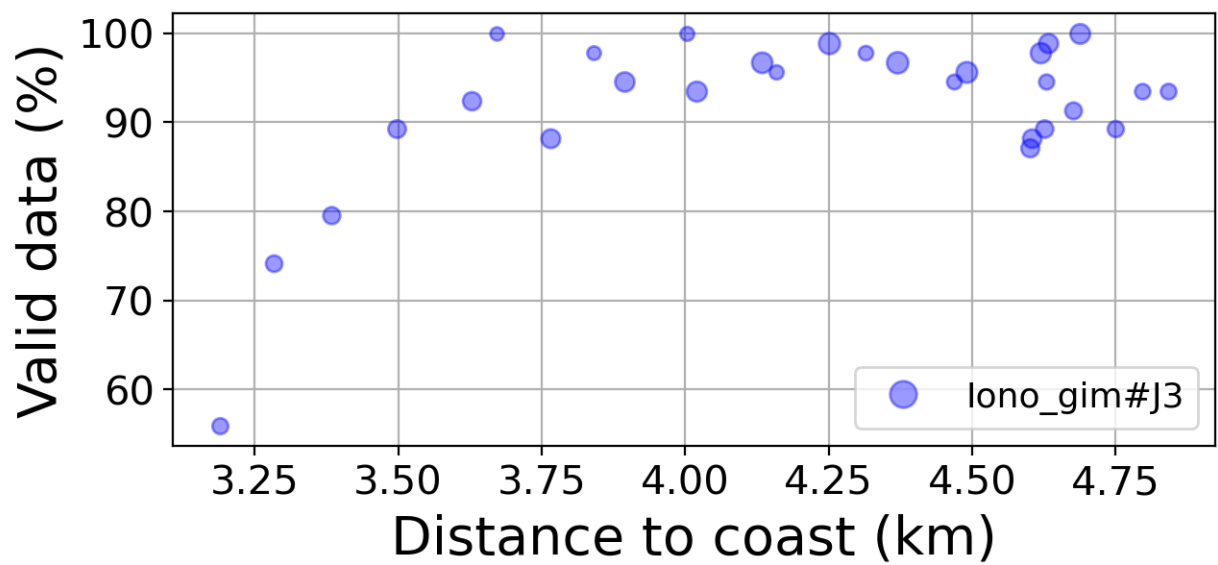


FIGURE 29 – Valid data (%) in function of distance to coast/HERBAUDIÈRE station

6.1.6 Std in function of distance to coast/HERBAUDIÈRE station

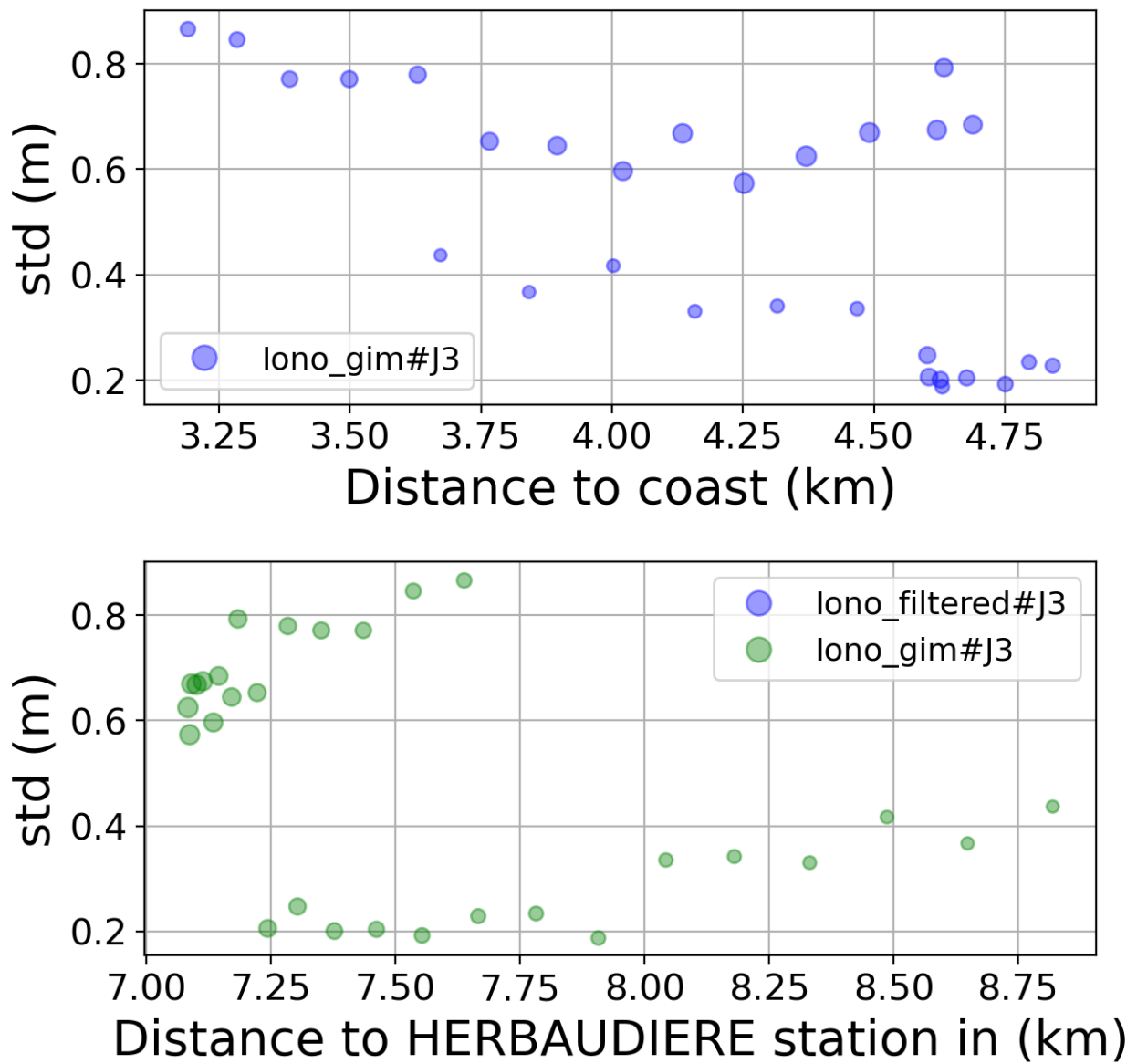


FIGURE 30 – Std in function of the distance to the coast/HERBAUDIÈRE station

6.1.7 Correlation in function of distance to coast/HERBAUDIÈRE station

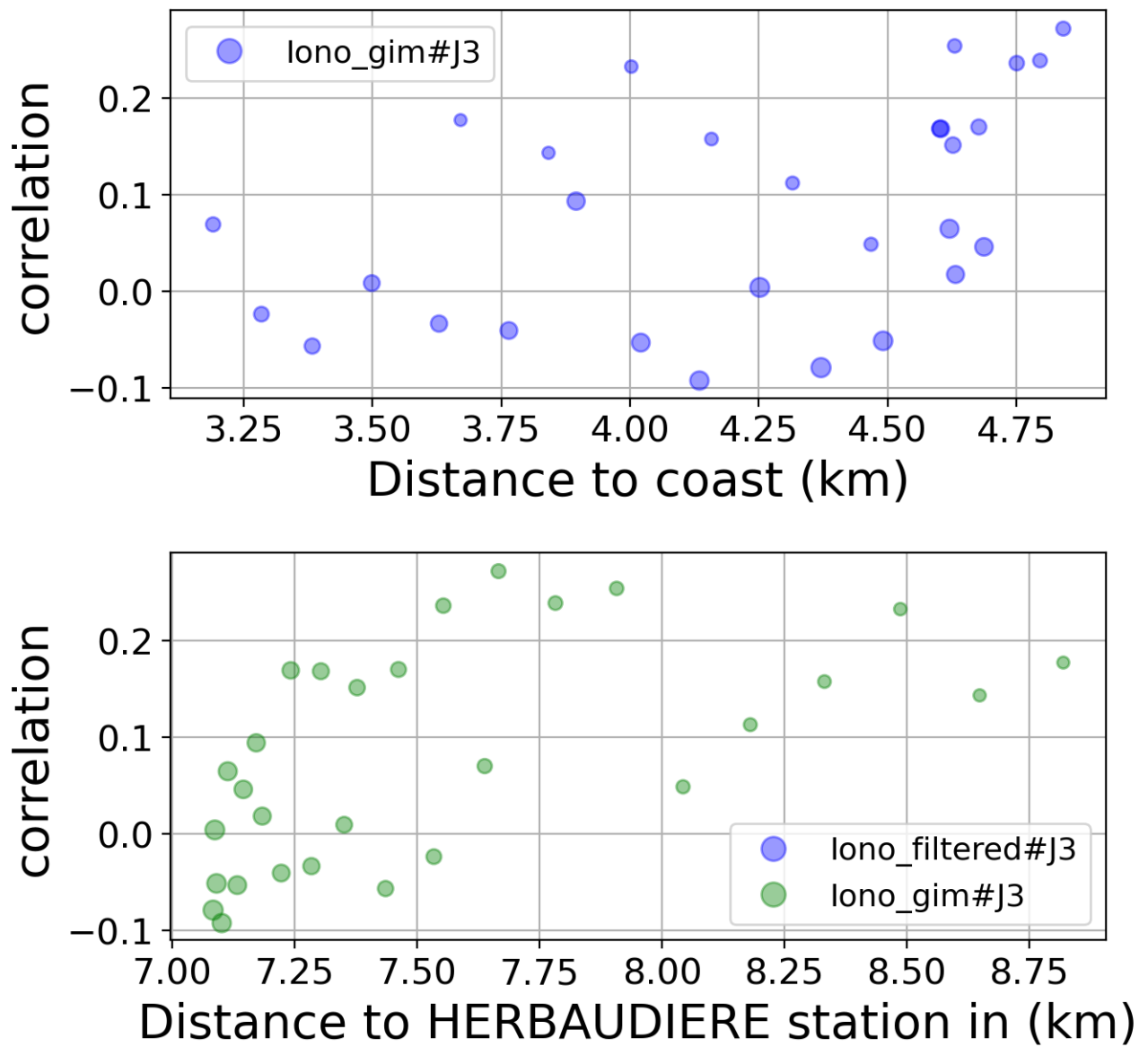


FIGURE 31 – Correlation in function of the distance to the coast/HERBAUDIÈRE station

6.1.8 Taylor Diagram

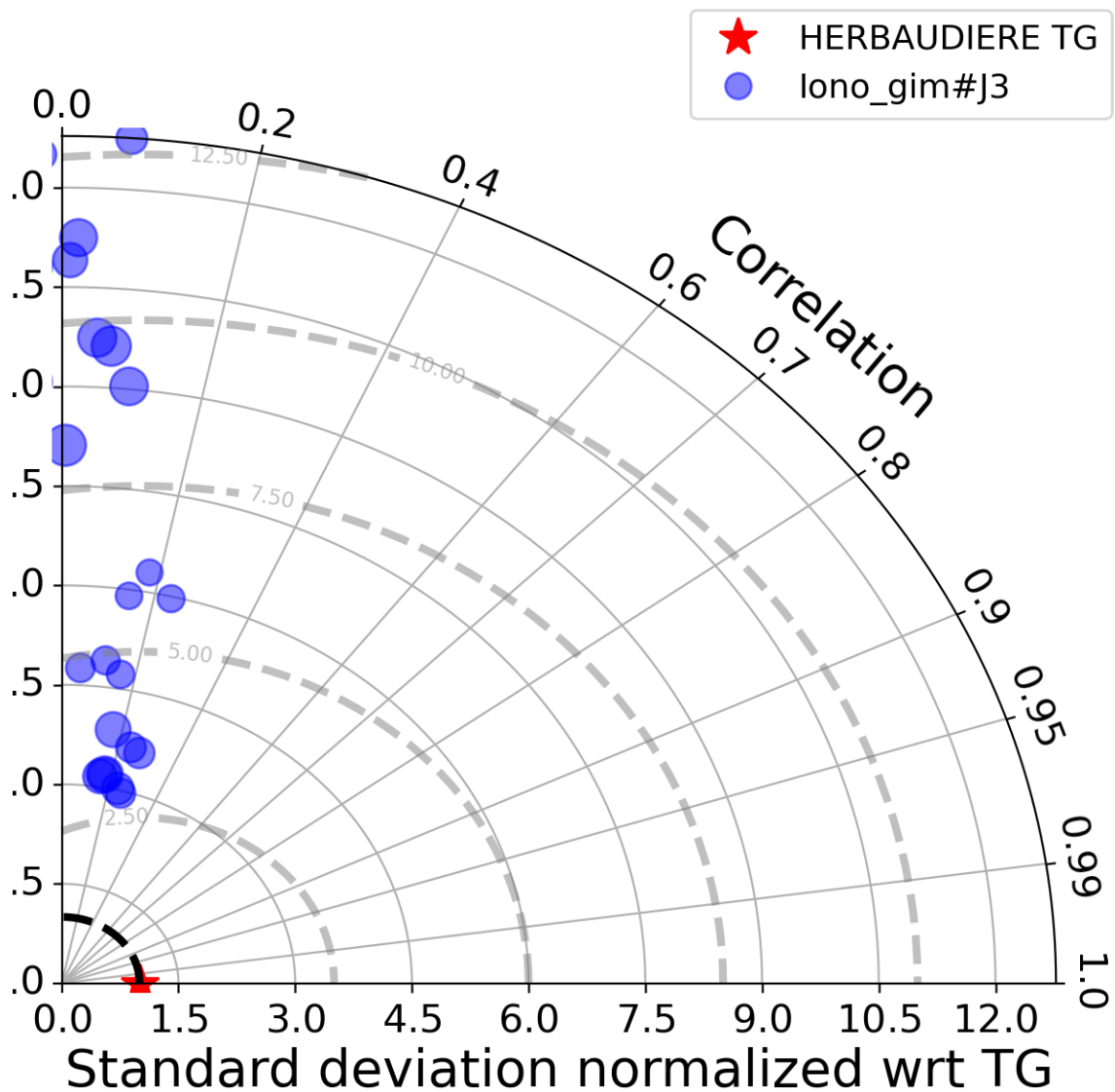


FIGURE 32 – Taylor diagram

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

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 93 point.

The altimetry products don't share a common point which is close to the tide gauge station and has more than 80 % of data

6.2 Station : Llandudno

- Nearest track to Llandudno station is the track number track222
- The area of interest is limited by :
 - A circle which it's center is the Llandudno tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : [None, 53.4] °

6.2.1 correlation visualization in maps view % Llandudno tide gauge

Correlation Altimerty data with respect to Llandudno Tide gauge data

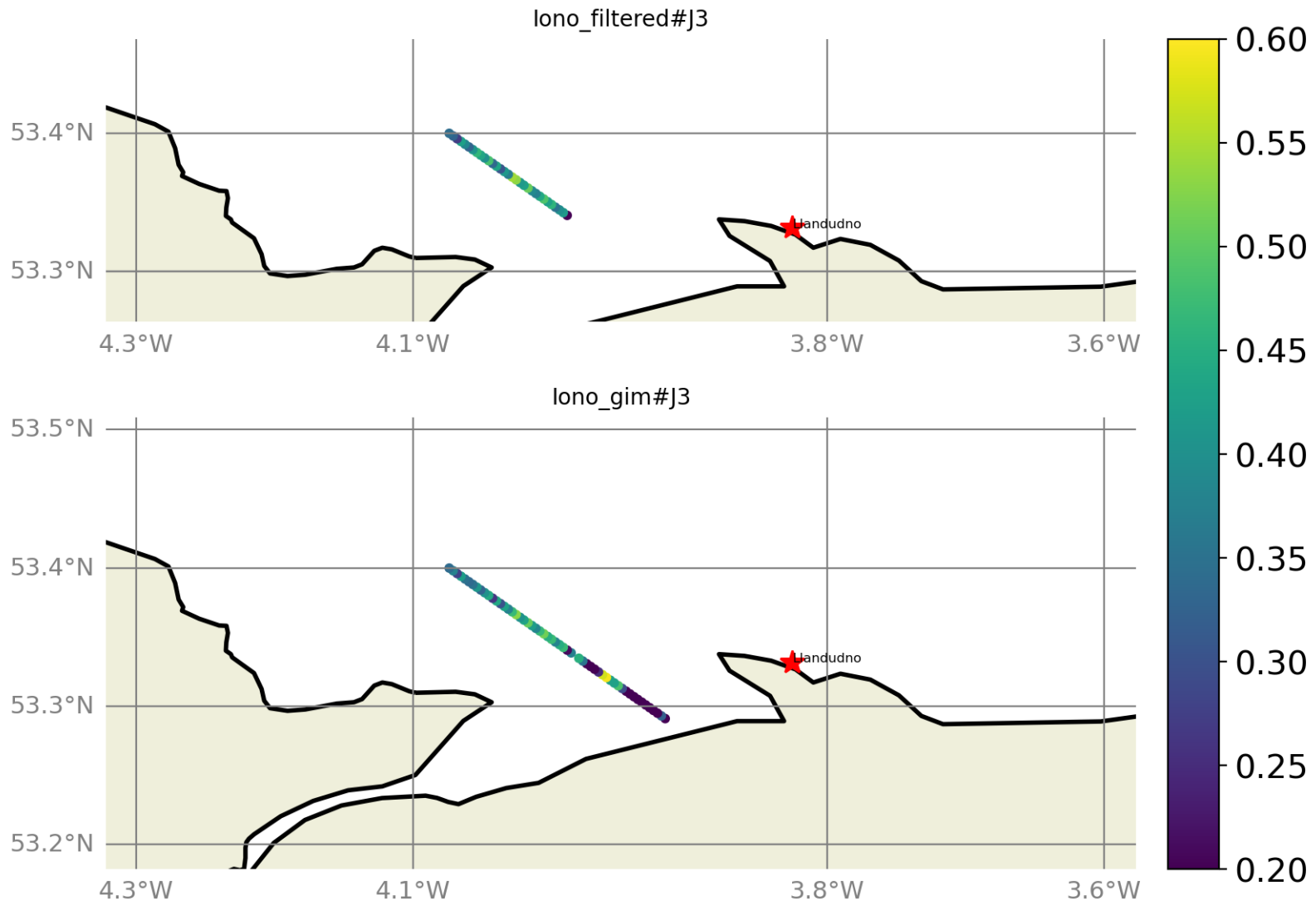


FIGURE 33 – correlation visualization in maps view % Llandudno tide gauge

6.2.2 rmsd visualization in maps view % Llandudno tide gauge

Rmsd (m) Altimerty data with respect to Llandudno Tide gauge data

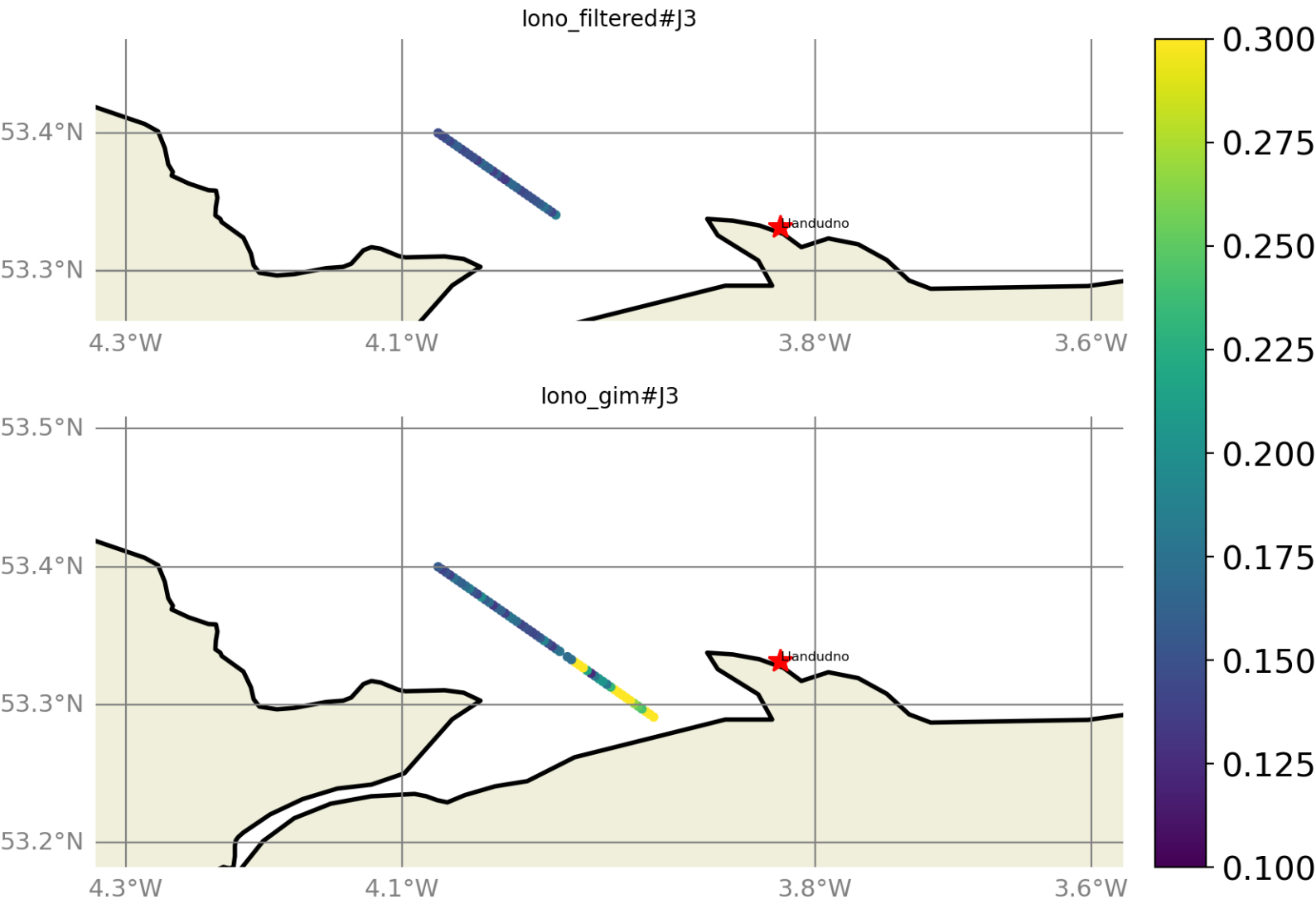


FIGURE 34 – rmsd visualization in maps view % Llandudno tide gauge

6.2.3 std visualization in maps view % Llandudno tide gauge

Std (m) Altimerty data with respect to Llandudno Tide gauge data

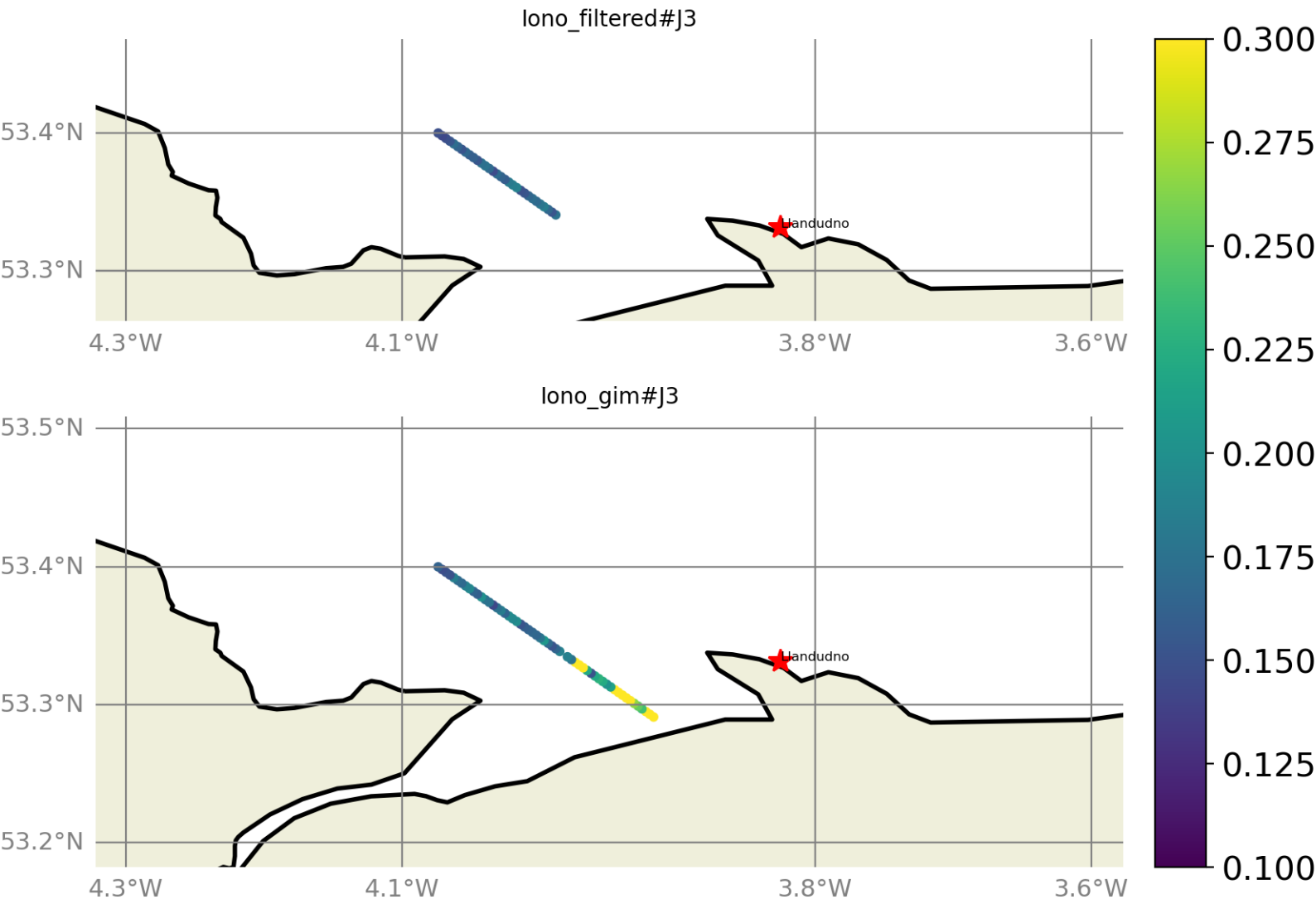


FIGURE 35 – std visualization in maps view % Llandudno tide gauge

6.2.4 valid_data_percent visualization in maps view % Llandudno tide gauge

Valid_Data_Percent (%) Altimerty data with respect to Llandudno Tide gauge data

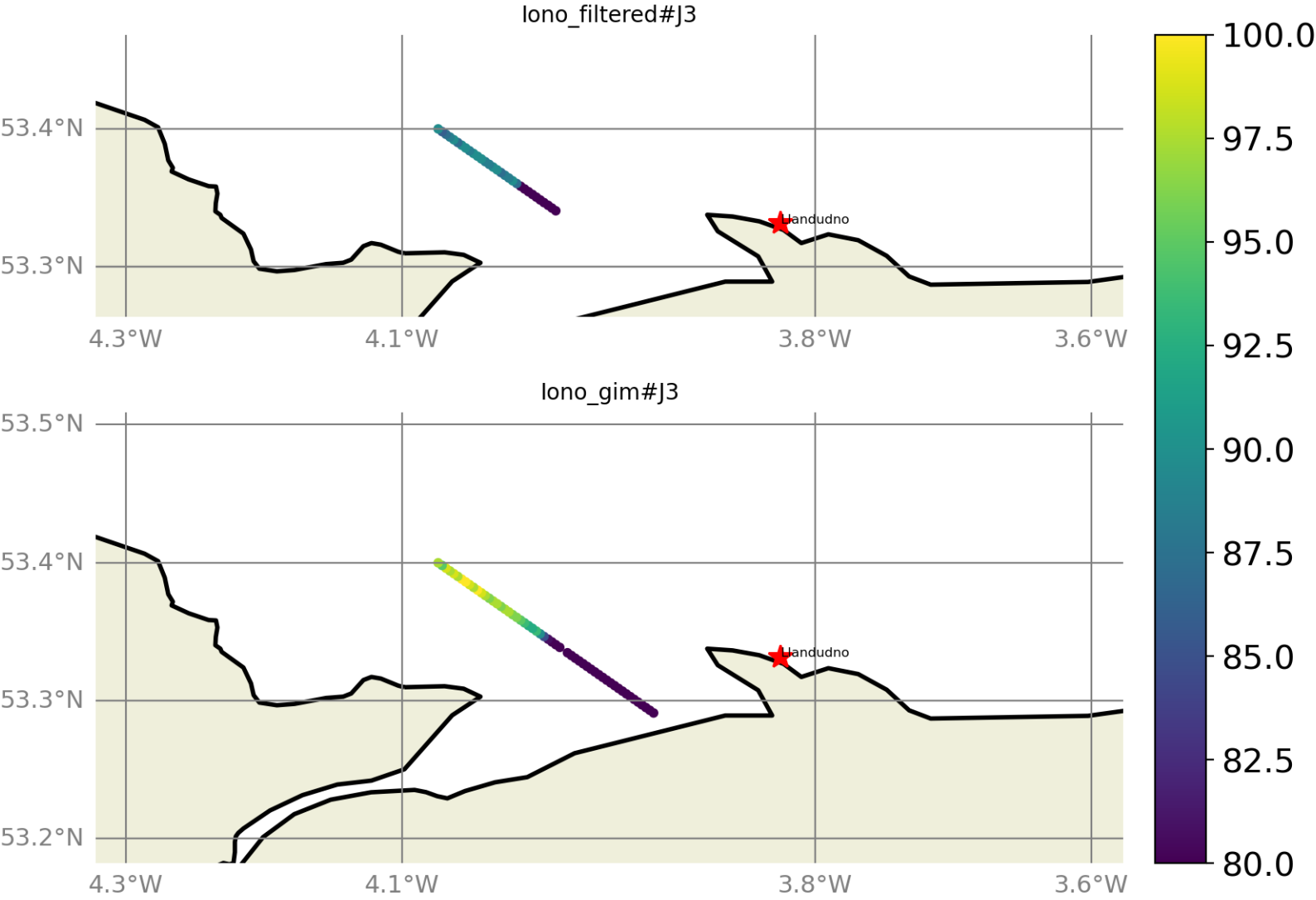


FIGURE 36 – valid_data_percent visualization in maps view % Llandudno tide gauge

6.2.5 Valid data (%) in function of distance to coast/Llandudno 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. $maxNB = 78$ 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.

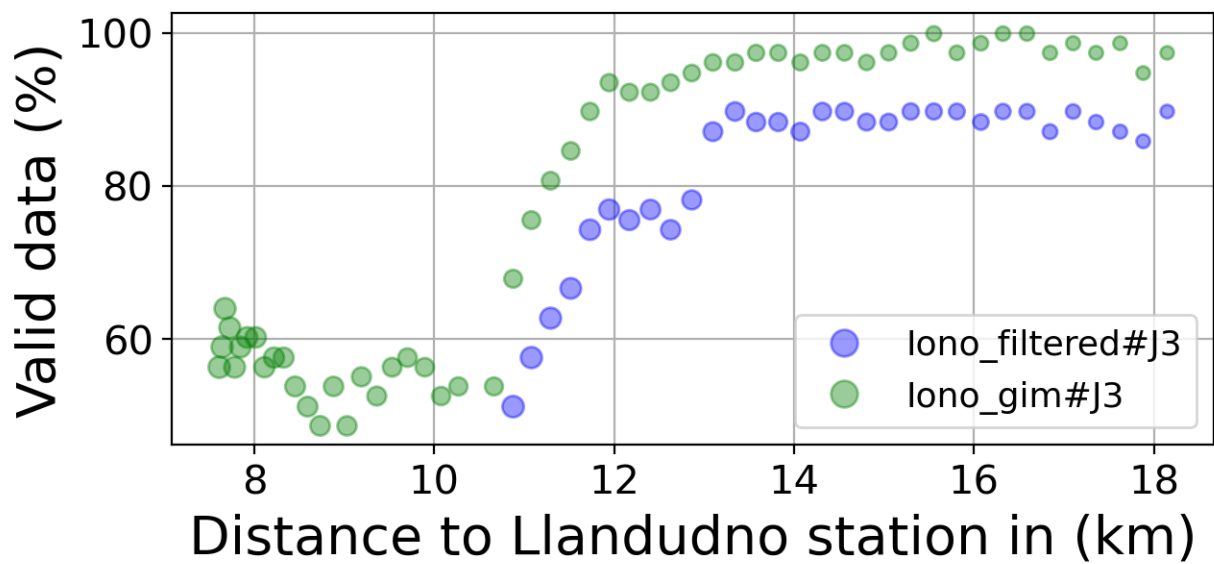
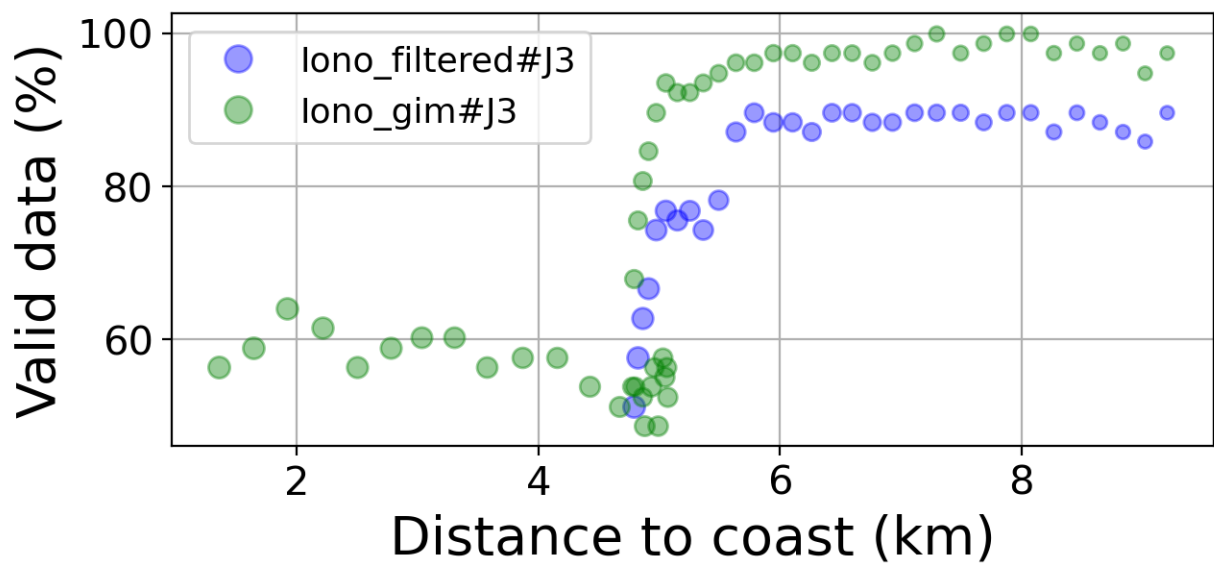


FIGURE 37 – Valid data (%) in function of distance to coast/Llandudno station

6.2.6 Std in function of distance to coast/Llandudno station

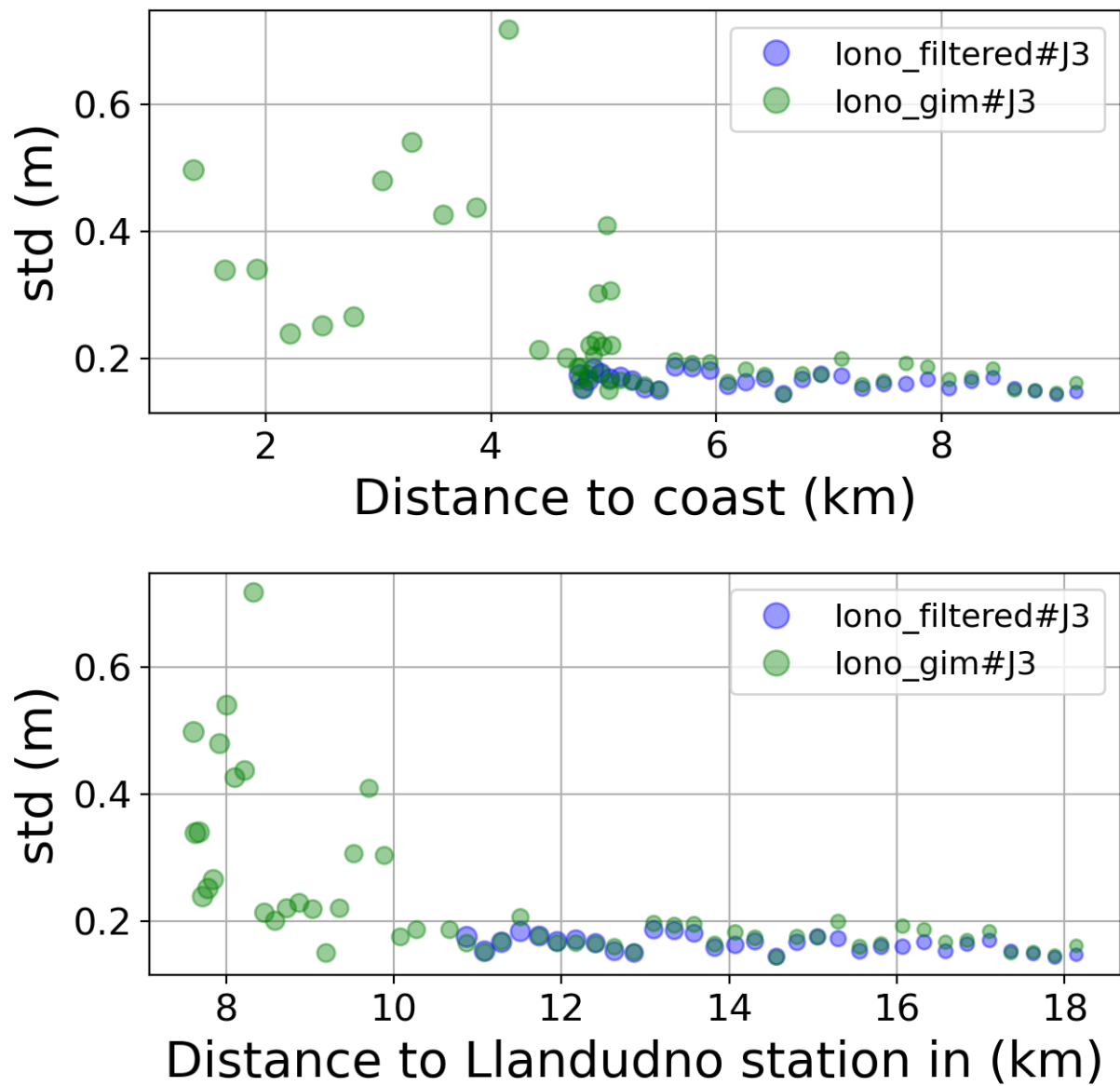


FIGURE 38 – Std in function of the distance to the coast/Llandudno station

6.2.7 Correlation in function of distance to coast/Llandudno station

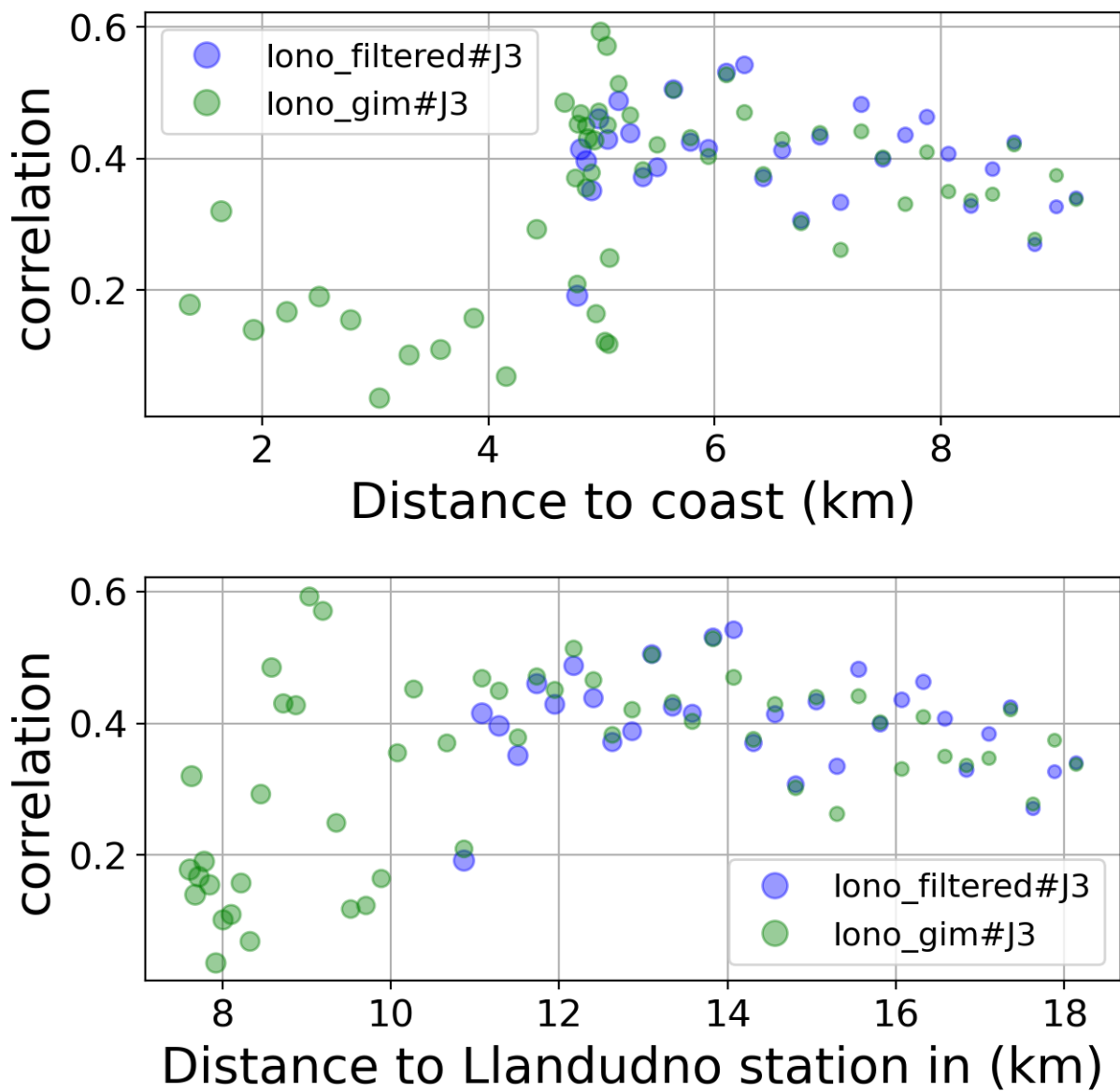


FIGURE 39 – Correlation in function of the distance to the coast/Llandudno station

6.2.8 Taylor Diagram

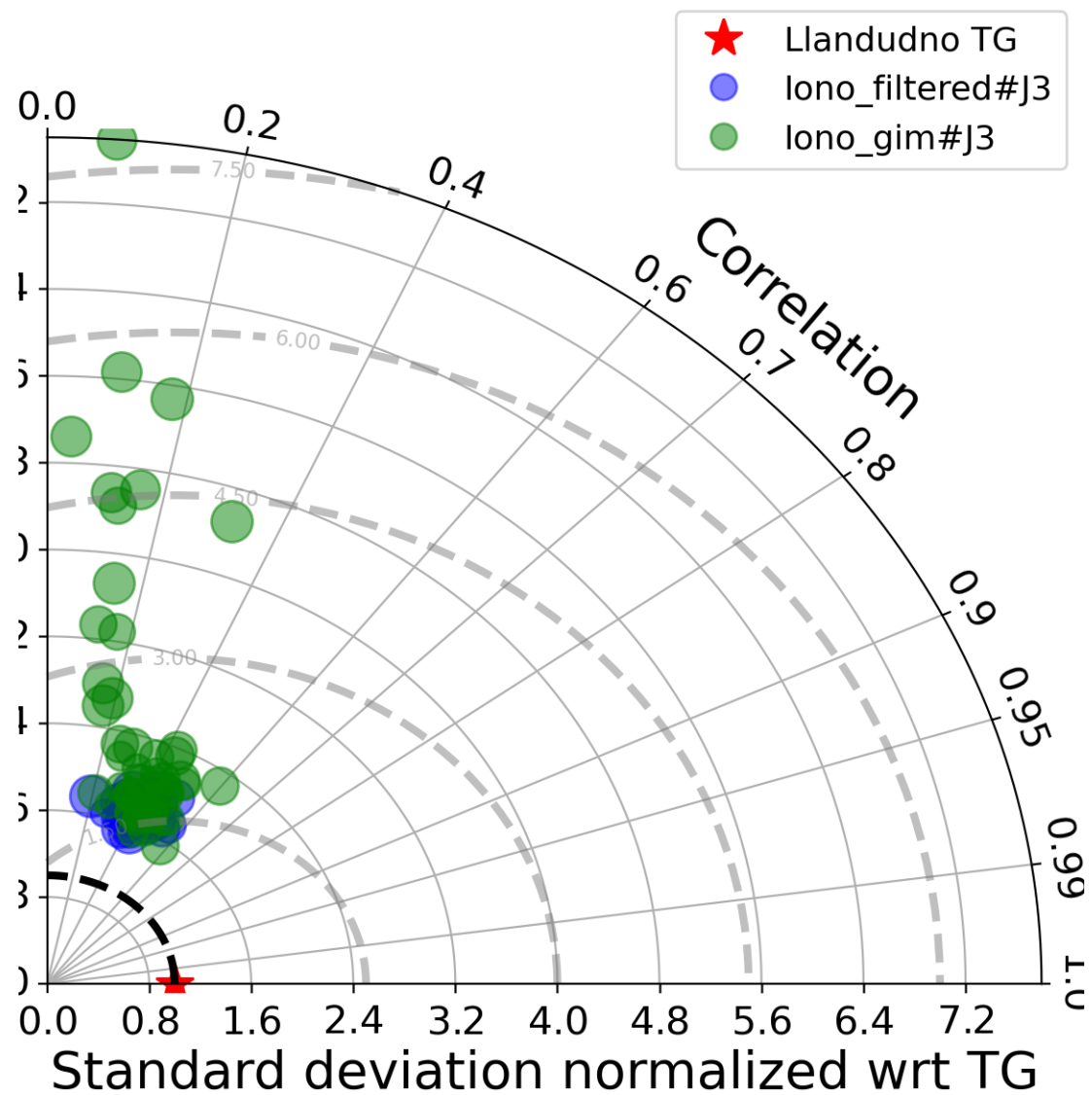


FIGURE 40 – Taylor diagram

6.2.9 Mean statistics table of products comparison with Llandudno 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)
lono_filtered#J3	82.506	0.403	0.164	0.153
lono_gim#J3	94.086	0.4	0.171	0.159

FIGURE 41 – 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 78 point.

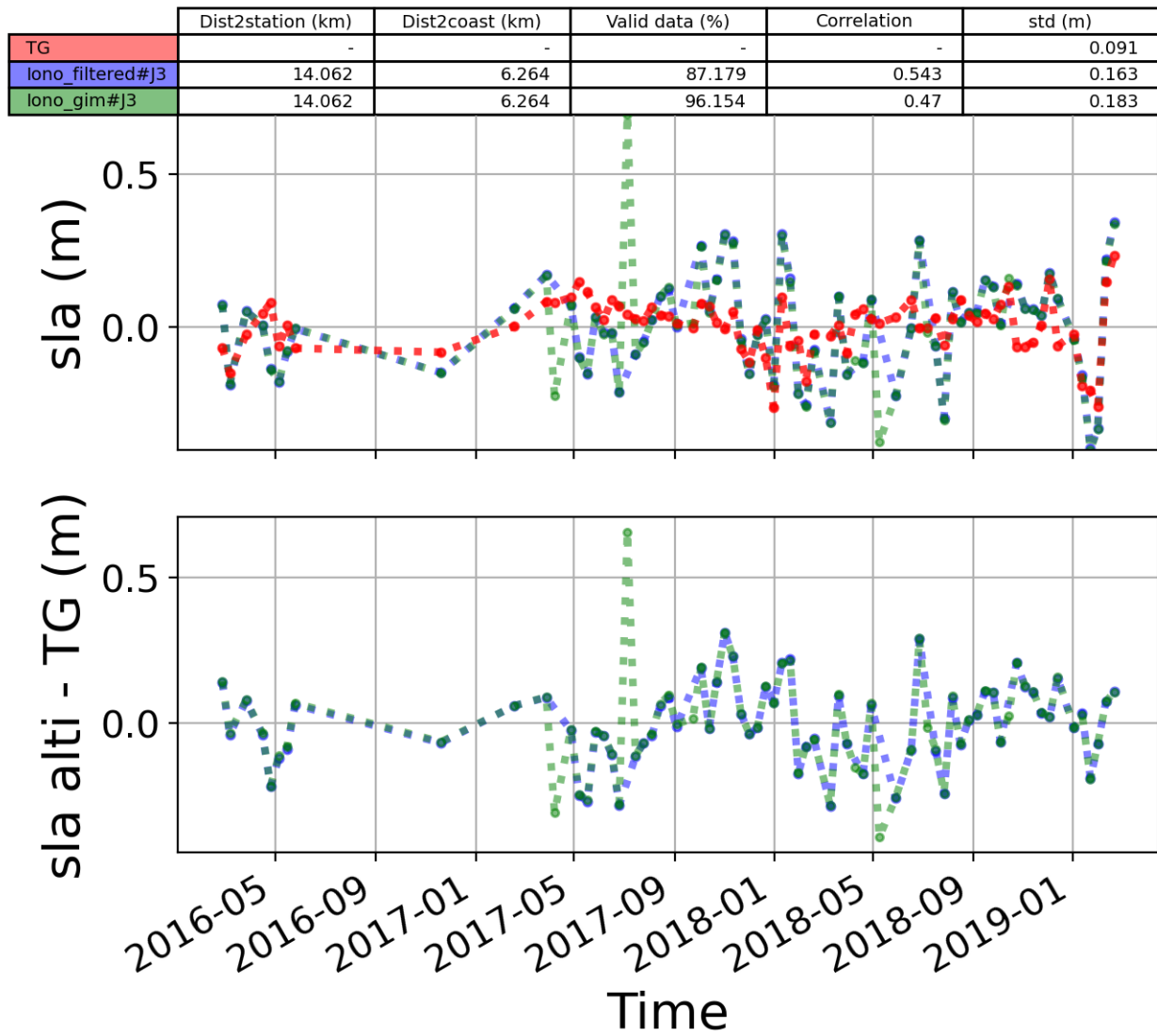


FIGURE 42 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

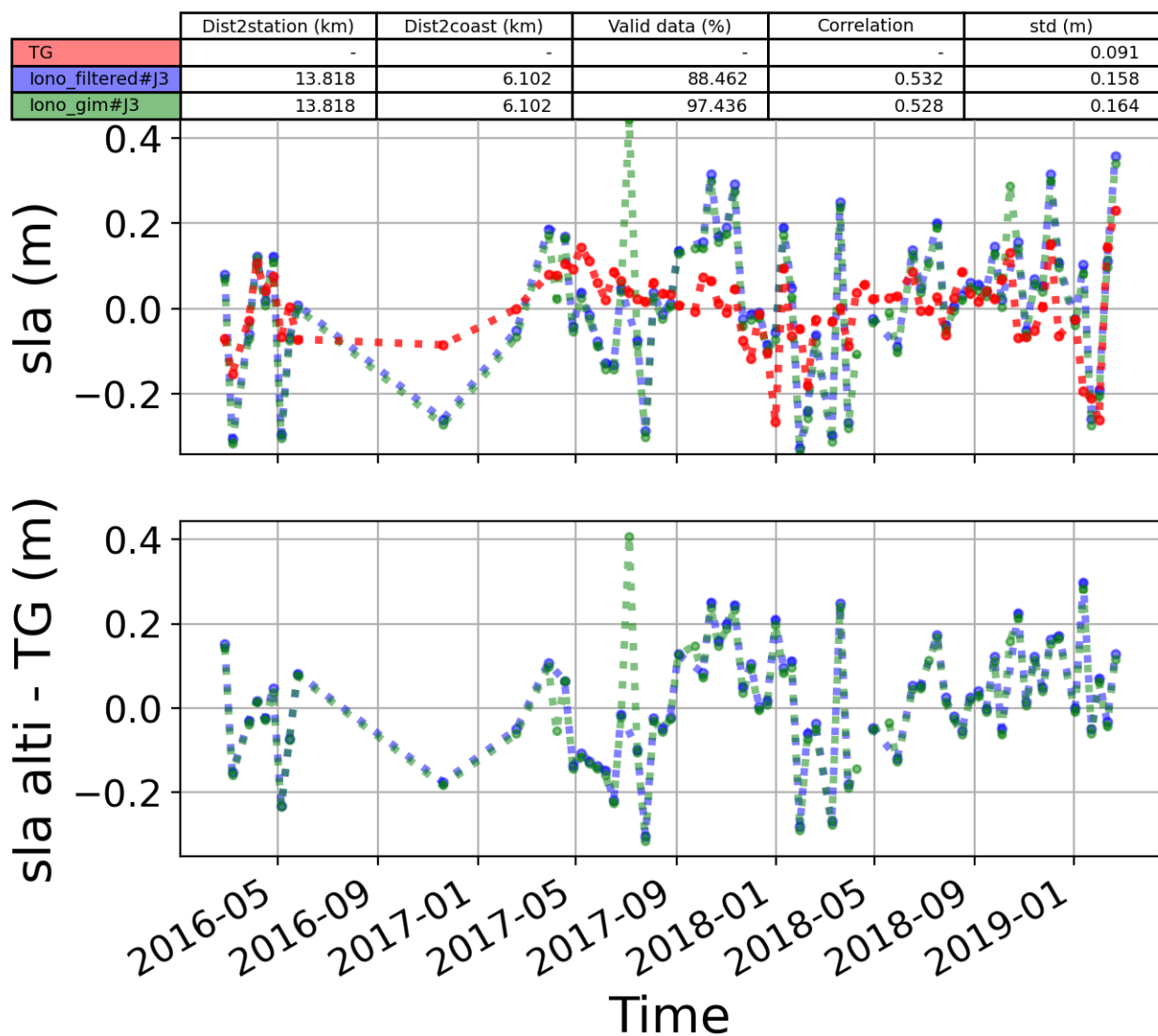


FIGURE 43 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.3 Station : Newhaven

- Nearest track to Newhaven station is the track number track137
- The area of interest is limited by :
 - A circle which it's center is the Newhaven 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 % Newhaven tide gauge

Correlation Altimerty data with respect to Newhaven Tide gauge data

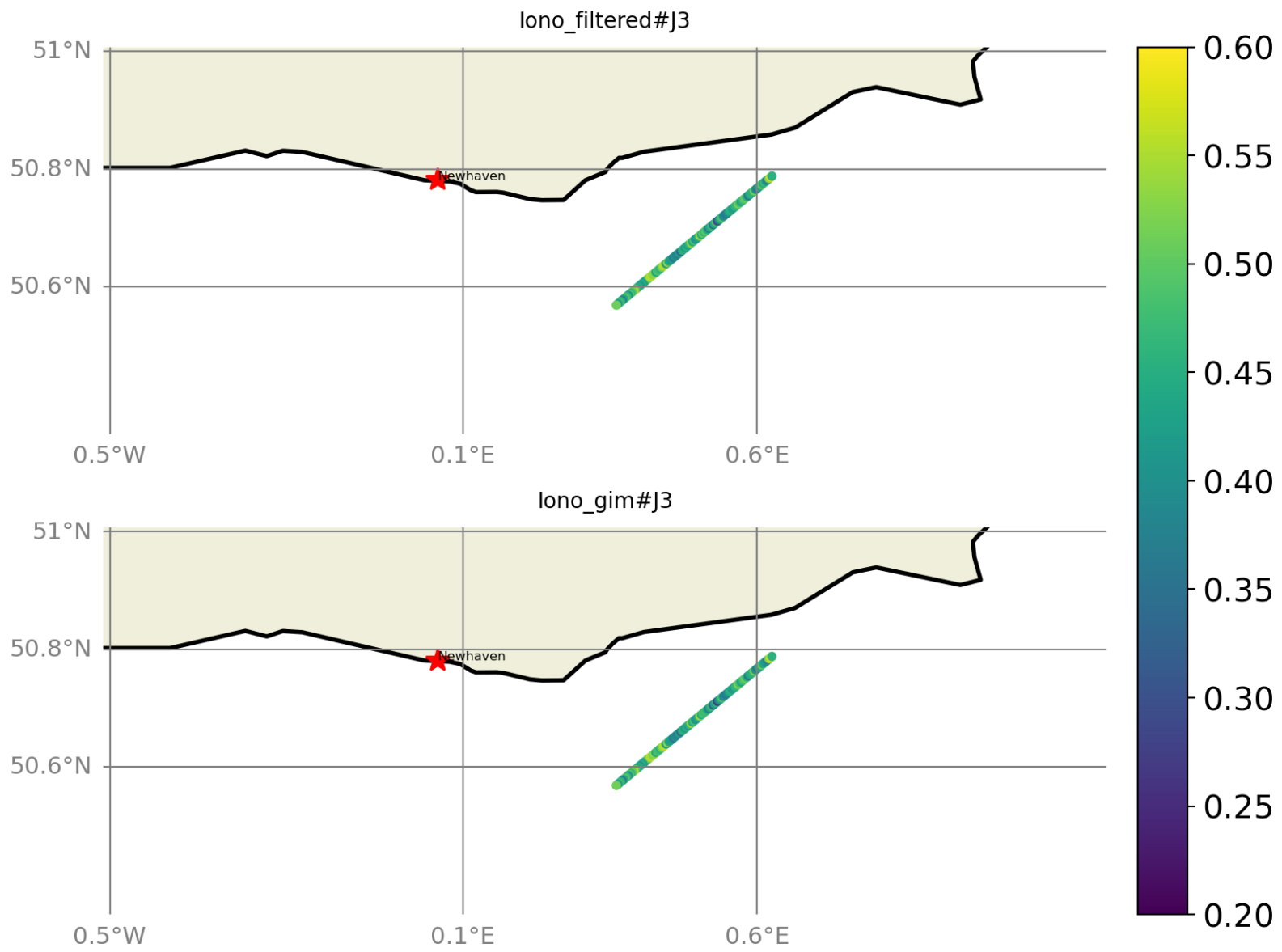


FIGURE 44 – correlation visualization in maps view % Newhaven tide gauge

6.3.2 rmsd visualization in maps view % Newhaven tide gauge

Rmsd (m) Altimerty data with respect to Newhaven Tide gauge data

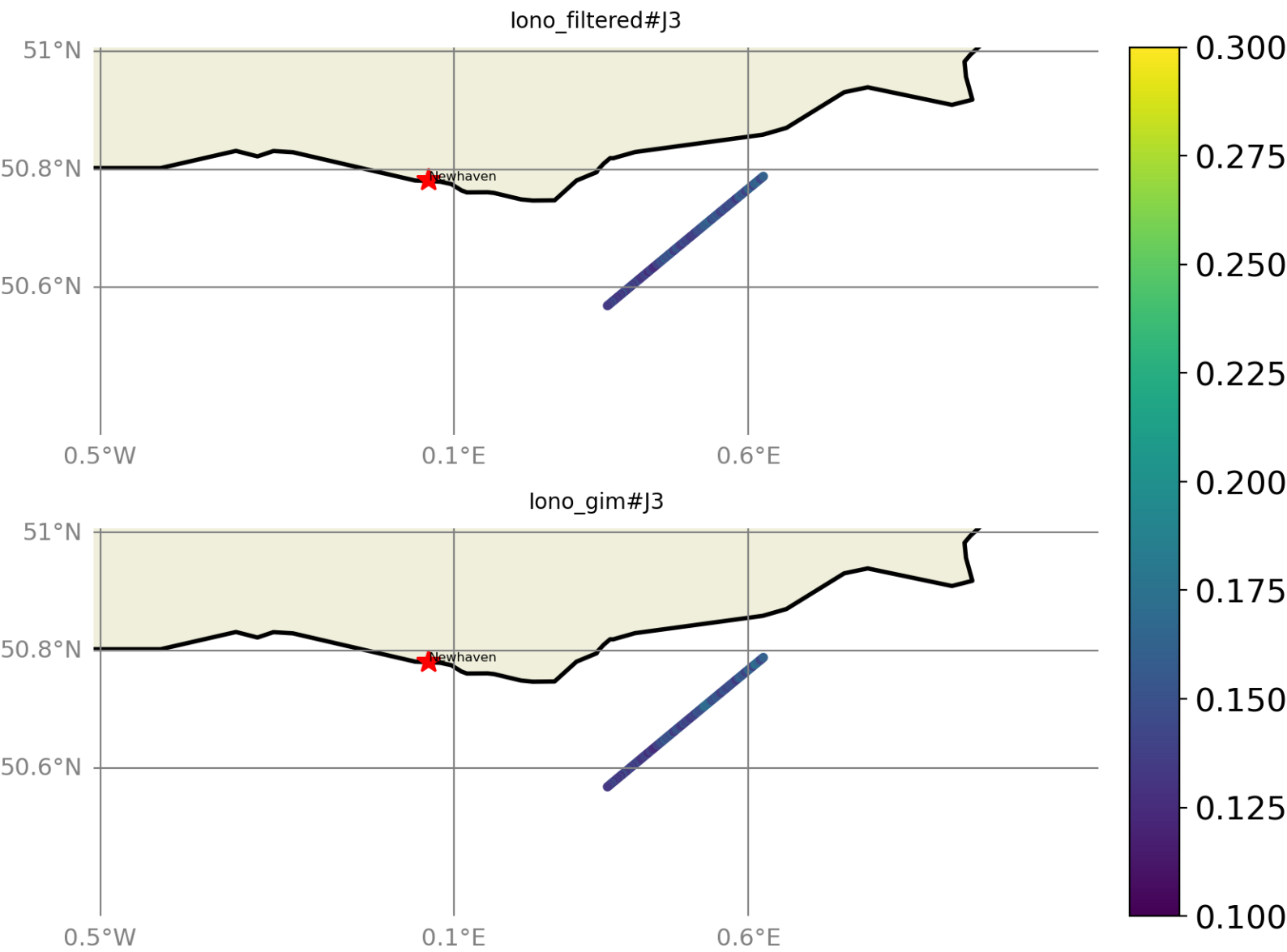


FIGURE 45 – rmsd visualization in maps view % Newhaven tide gauge

6.3.3 std visualization in maps view % Newhaven tide gauge

Std (m) Altimerty data with respect to Newhaven Tide gauge data

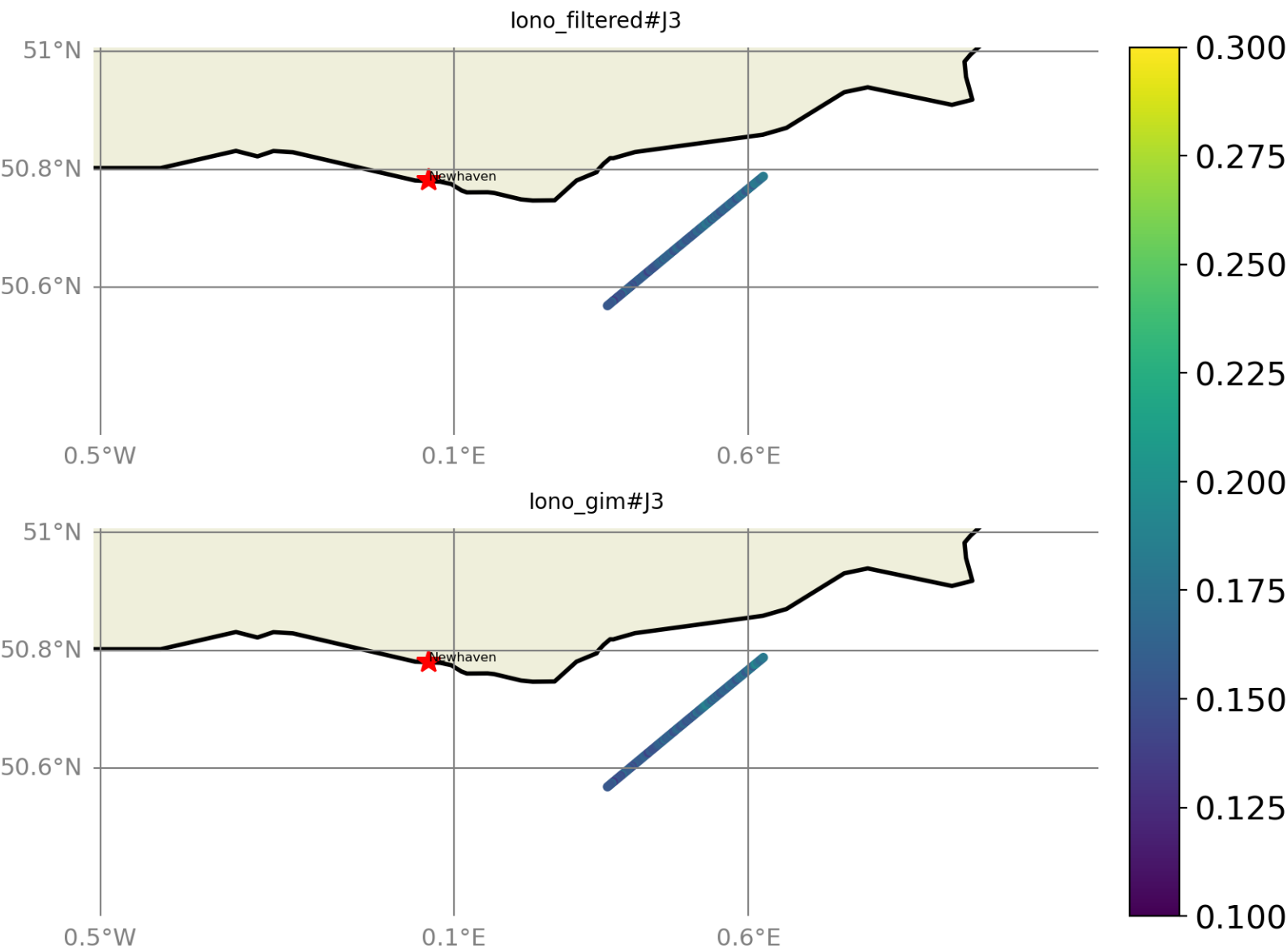


FIGURE 46 – std visualization in maps view % Newhaven tide gauge

6.3.4 valid_data_percent visualization in maps view % Newhaven tide gauge

Valid_Data_Percent (%) Altimerty data with respect to Newhaven Tide gauge data

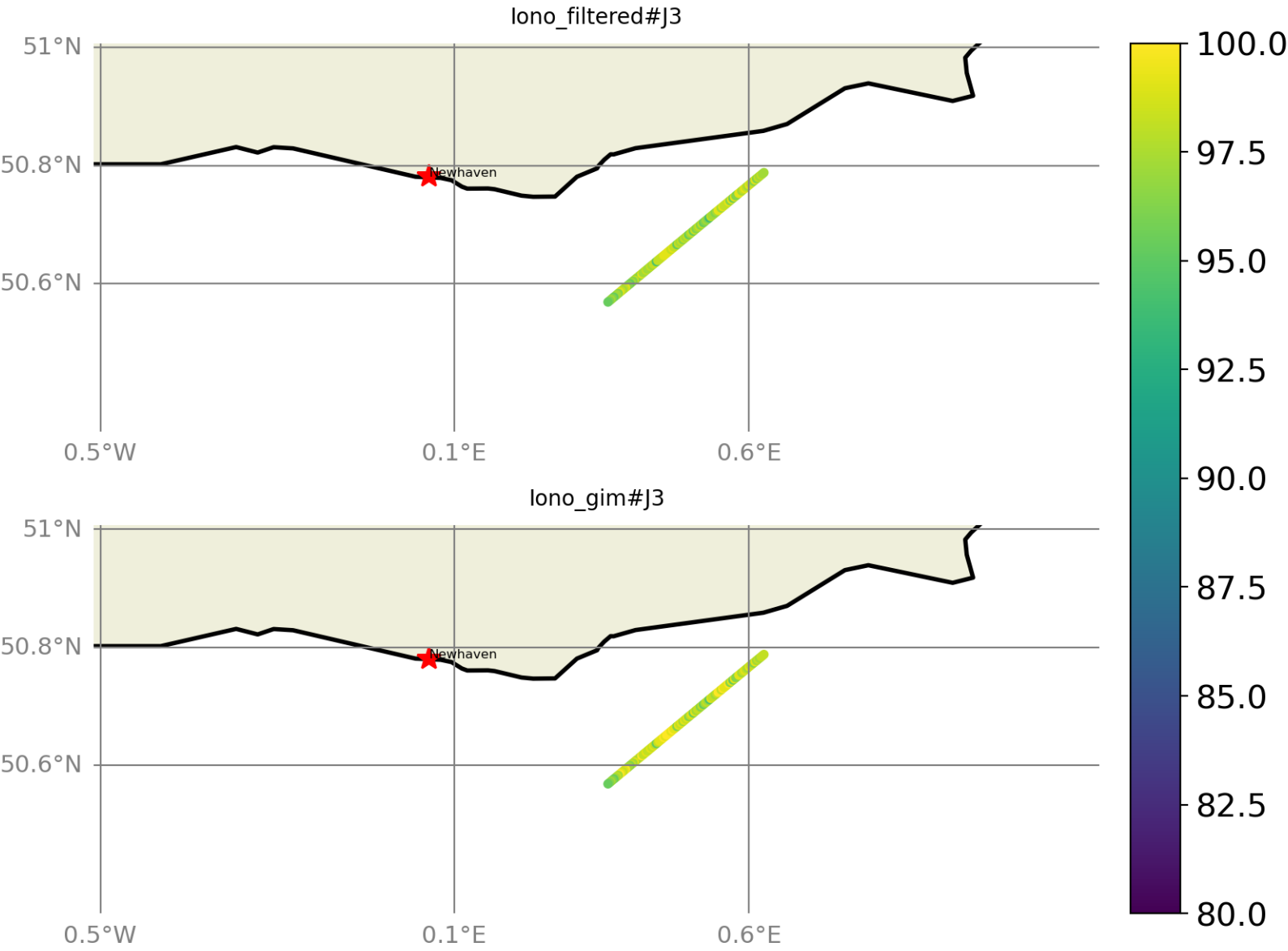


FIGURE 47 – valid_data_percent visualization in maps view % Newhaven tide gauge

6.3.5 Valid data (%) in function of distance to coast/Newhaven 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. $maxNB = 108$ 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.

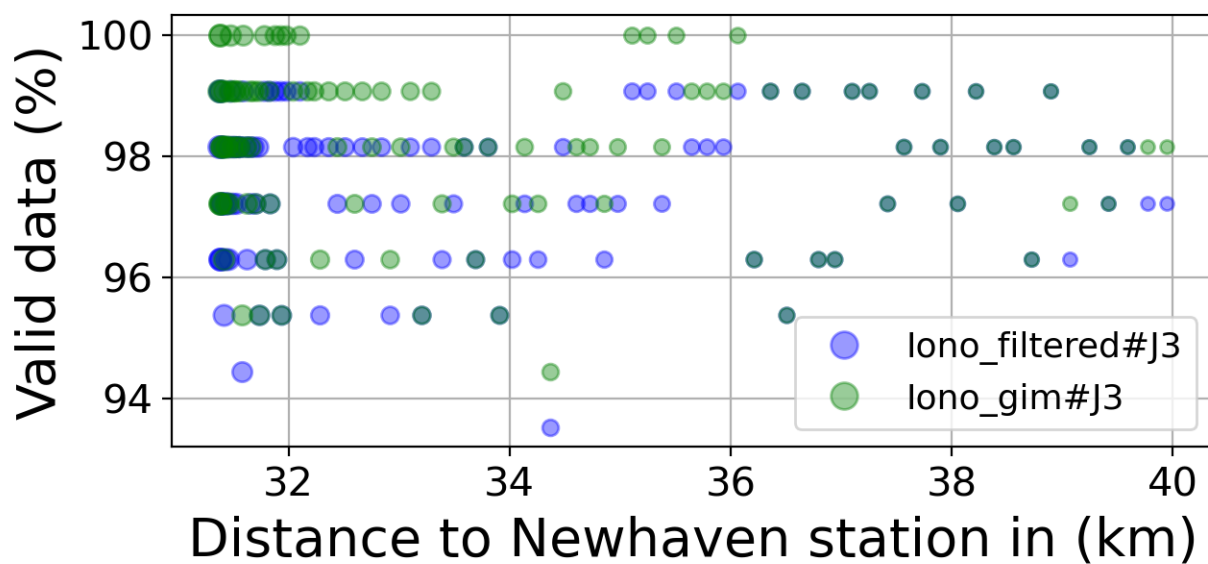
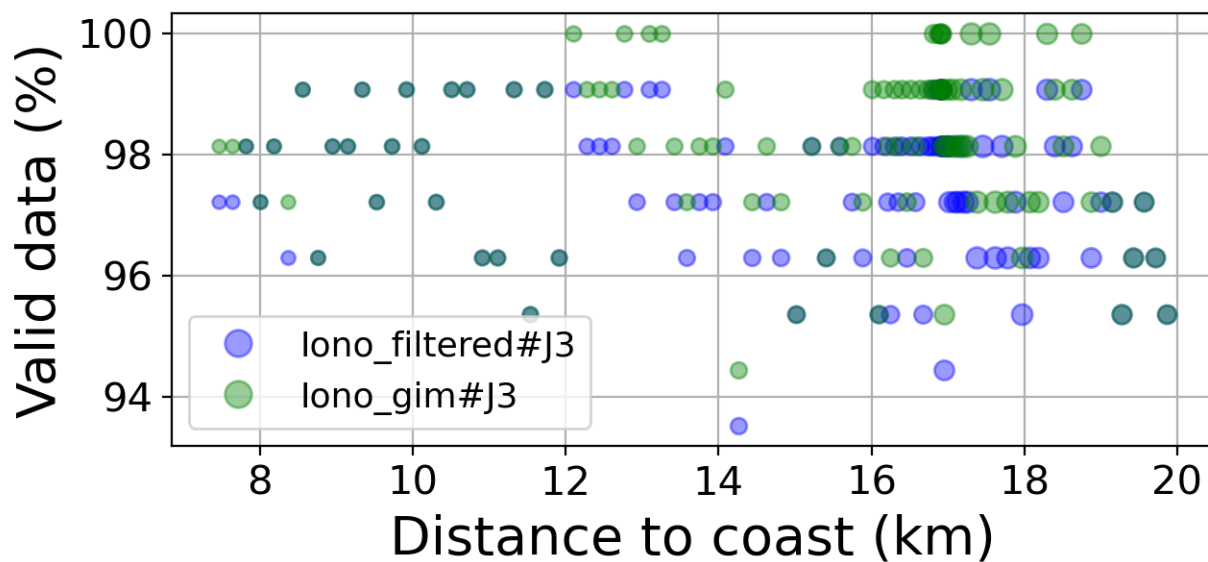


FIGURE 48 – Valid data (%) in function of distance to coast/Newhaven station

6.3.6 Std in function of distance to coast/Newhaven station

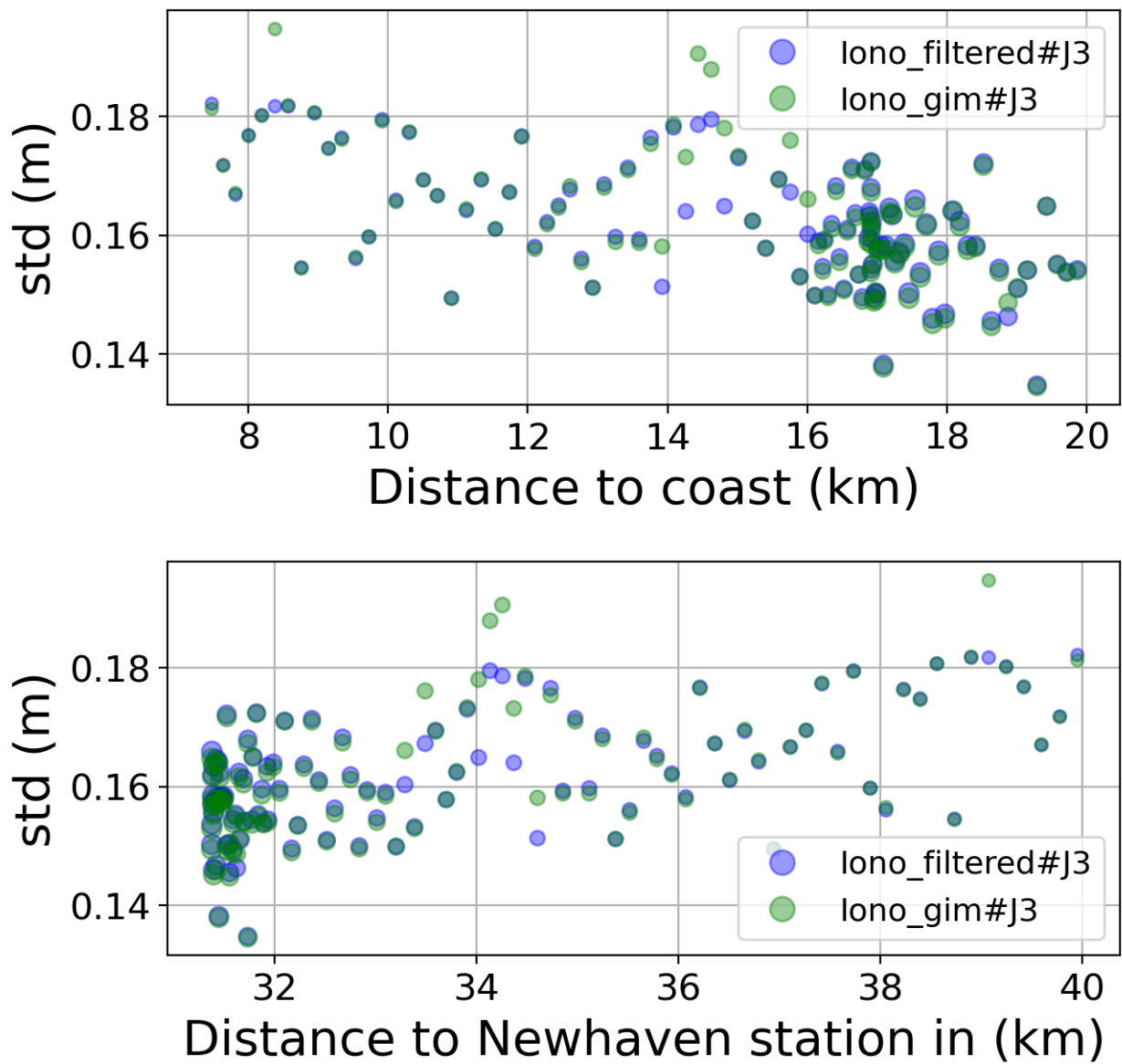


FIGURE 49 – Std in function of the distance to the coast/Newhaven station

6.3.7 Correlation in function of distance to coast/Newhaven station

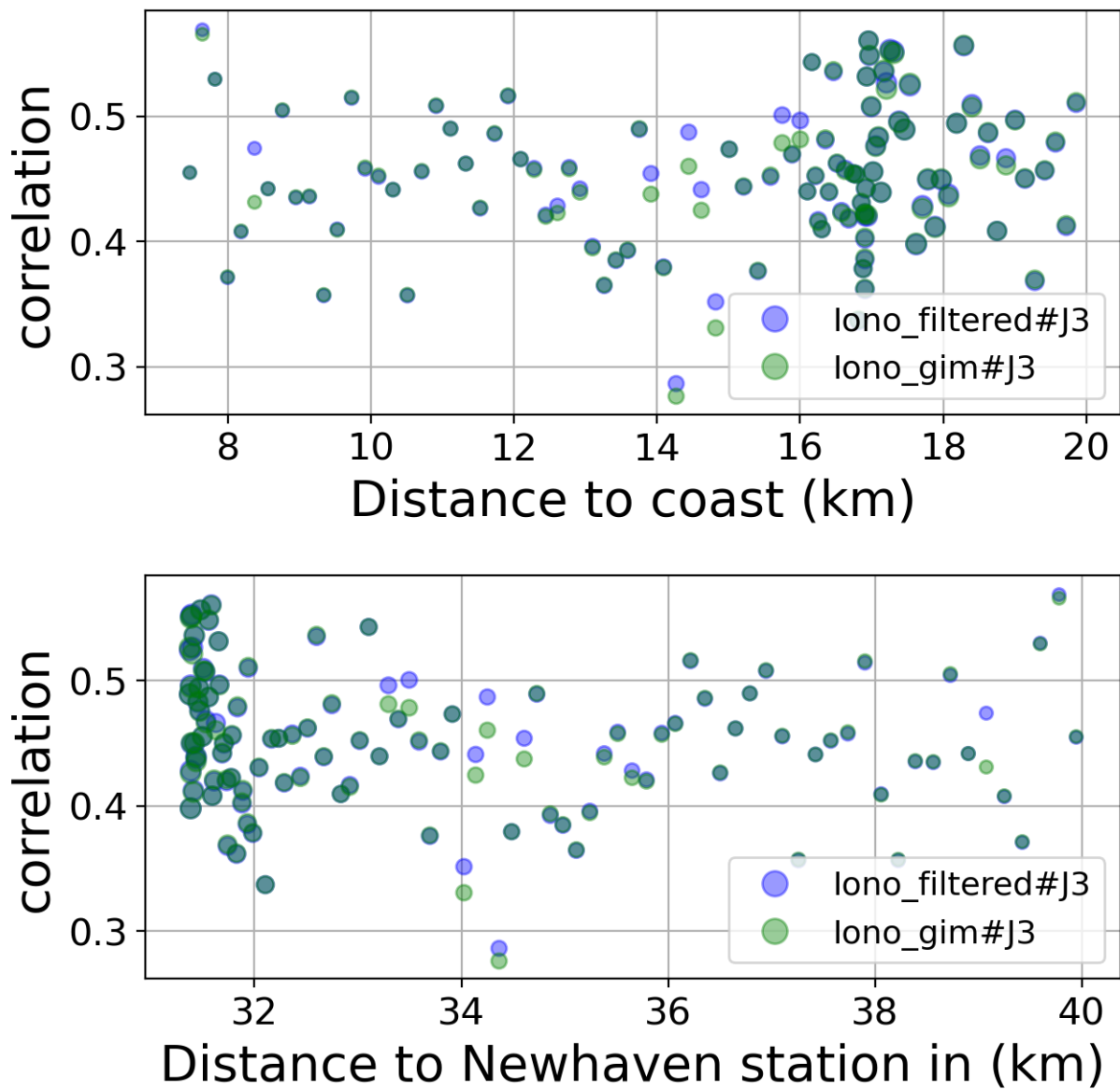


FIGURE 50 – Correlation in function of the distance to the coast/Newhaven station

6.3.8 Taylor Diagram

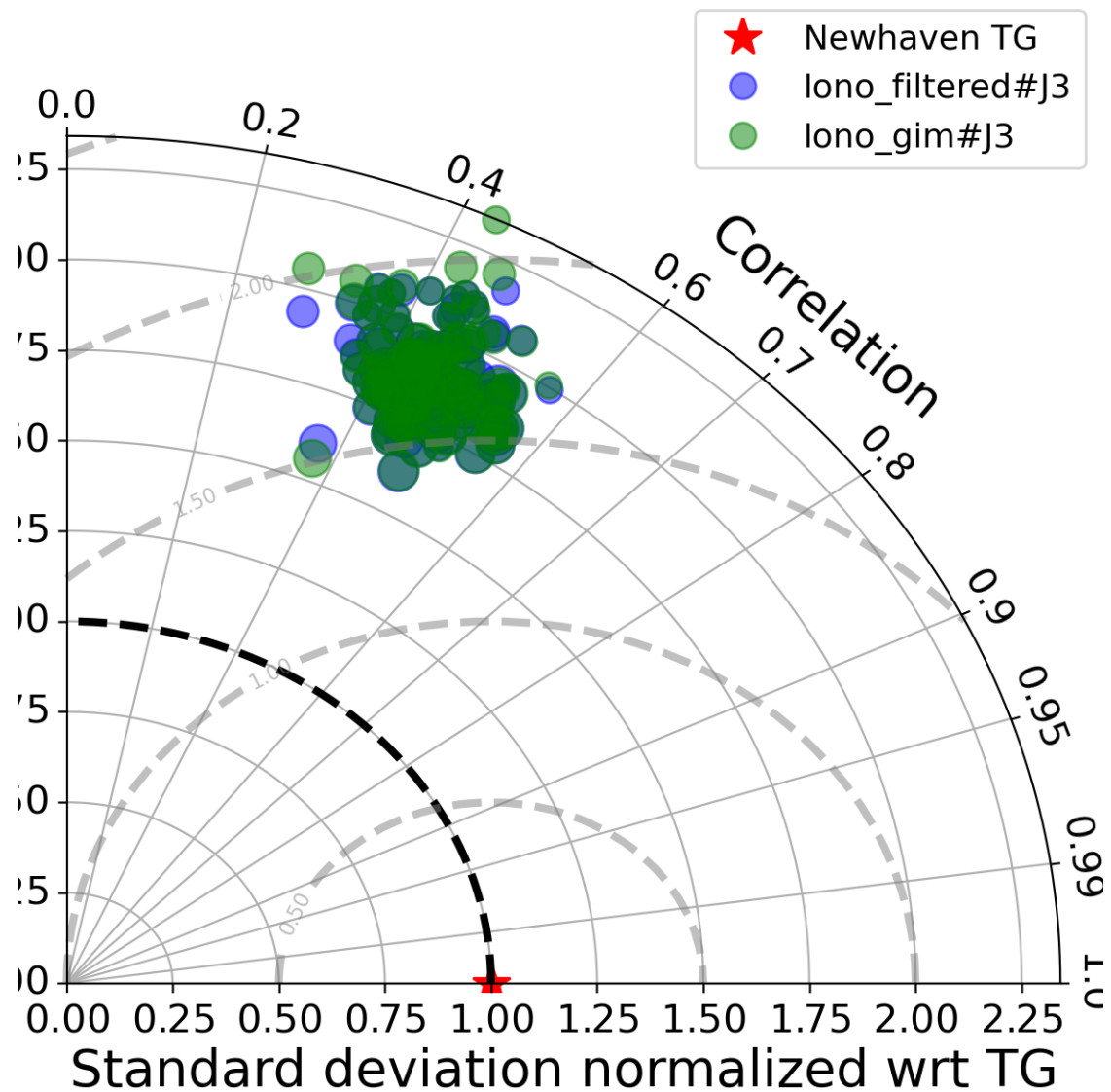


FIGURE 51 – Taylor diagram

6.3.9 Mean statistics table of products comparison with Newhaven 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)
lono_filtered#J3	97.508	0.453	0.162	0.145
lono_gim#J3	98.131	0.452	0.162	0.145

FIGURE 52 – 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 108 point.

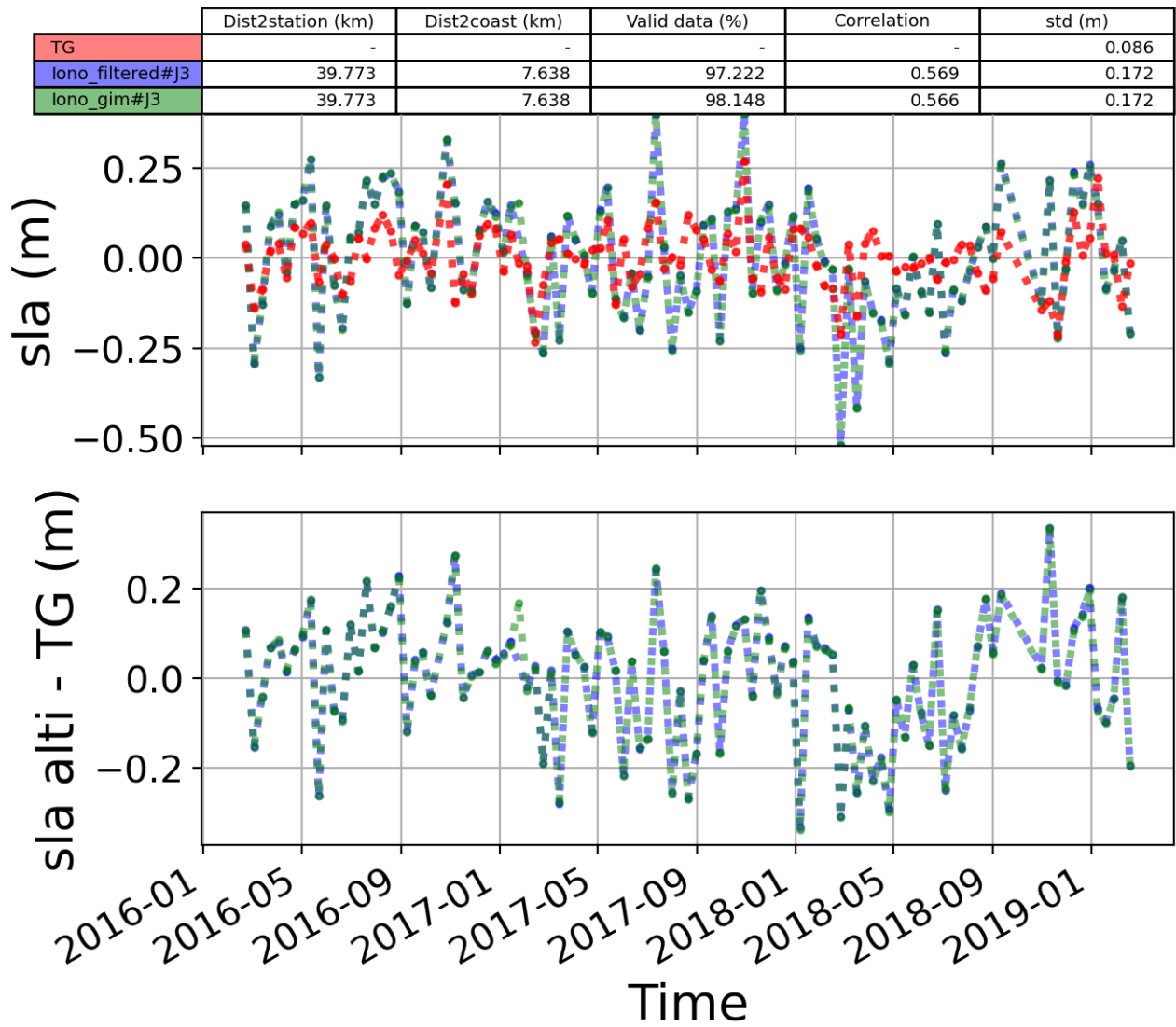


FIGURE 53 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.4 Station : CALAIS

- Nearest track to CALAIS station is the track number track44
- The area of interest is limited by :
 - A circle which it's center is the CALAIS tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 14 Km
 - Latitude limits : [50.8, 51.21] °

6.4.1 correlation visualization in maps view % CALAIS tide gauge

Correlation Altimerty data with respect to CALAIS Tide gauge data

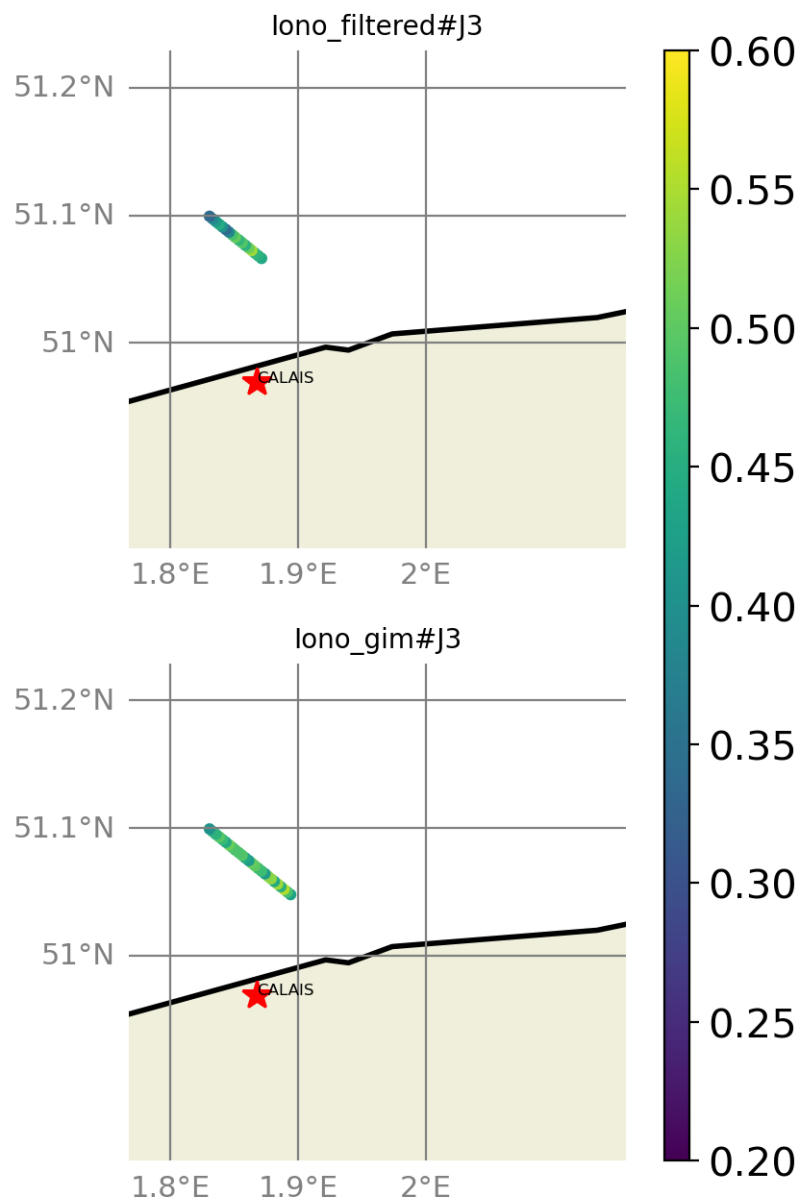


FIGURE 54 – correlation visualization in maps view % CALAIS tide gauge

6.4.2 rmsd visualization in maps view % CALAIS tide gauge

Rmsd (m) Altimerty data with respect to CALAIS Tide gauge data

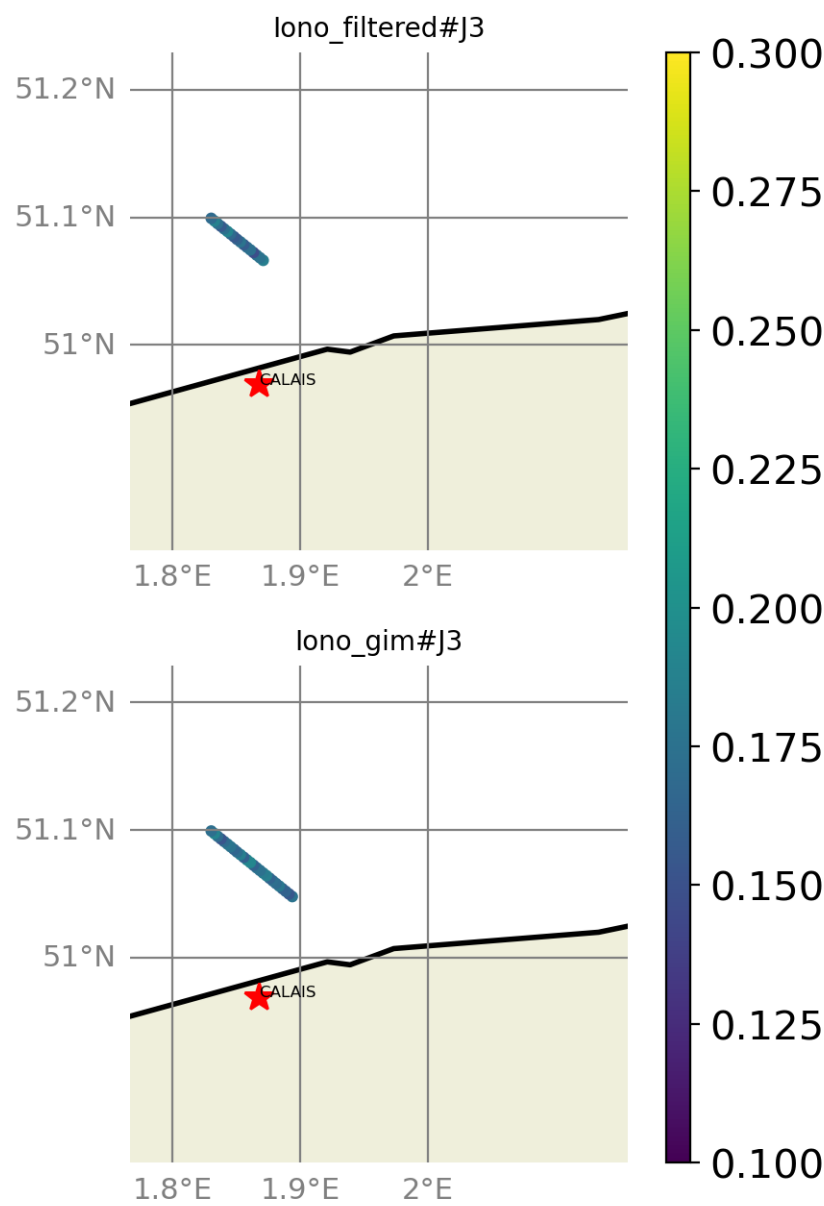


FIGURE 55 – rmsd visualization in maps view % CALAIS tide gauge

6.4.3 std visualization in maps view % CALAIS tide gauge

Std (m) Altimerty data with respect to CALAIS Tide gauge data

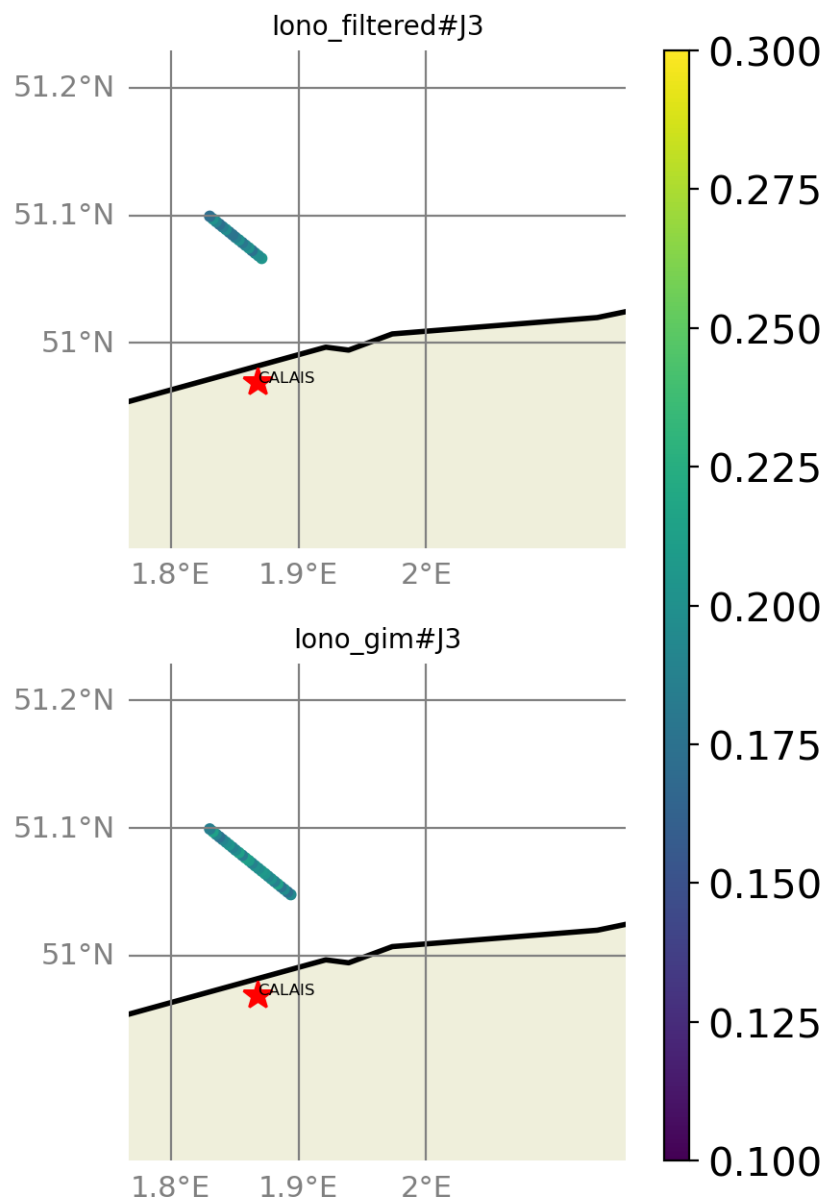


FIGURE 56 – std visualization in maps view % CALAIS tide gauge

6.4.4 valid_data_percent visualization in maps view % CALAIS tide gauge

Valid_Data_Percent (%) Altimerty data with respect to CALAIS Tide gauge data

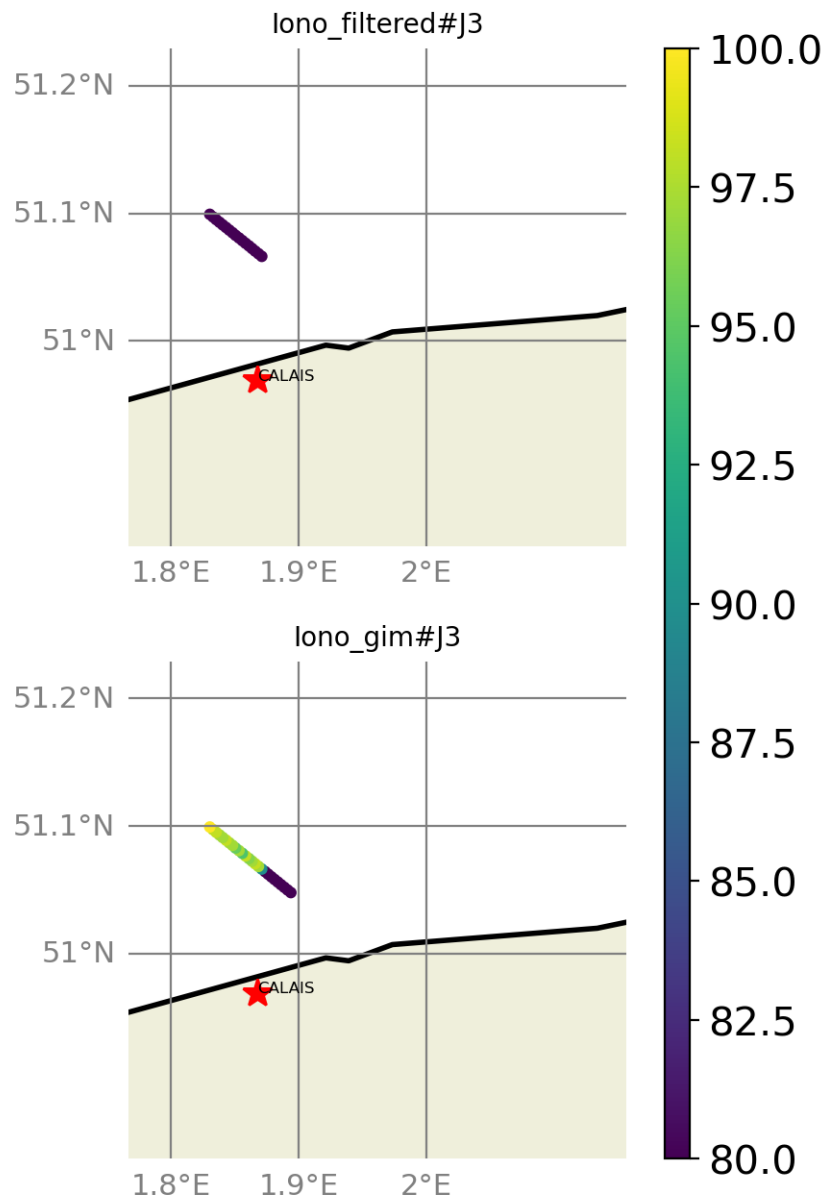


FIGURE 57 – valid_data_percent visualization in maps view % CALAIS tide gauge

6.4.5 Valid data (%) in function of distance to coast/CALAIS 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. $maxNB = 108$ 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.

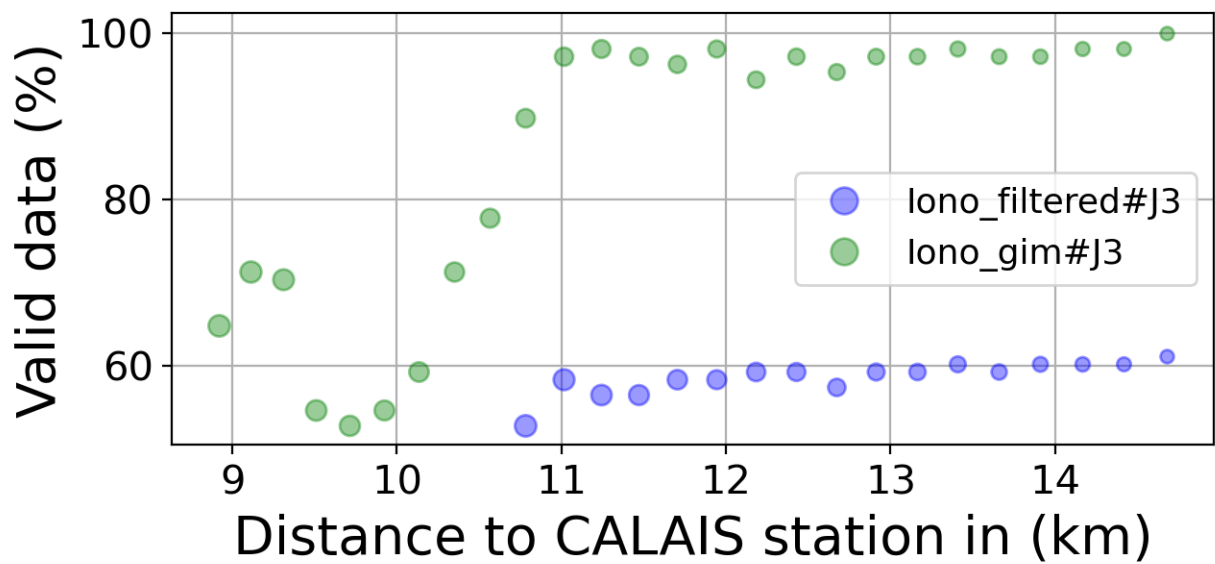
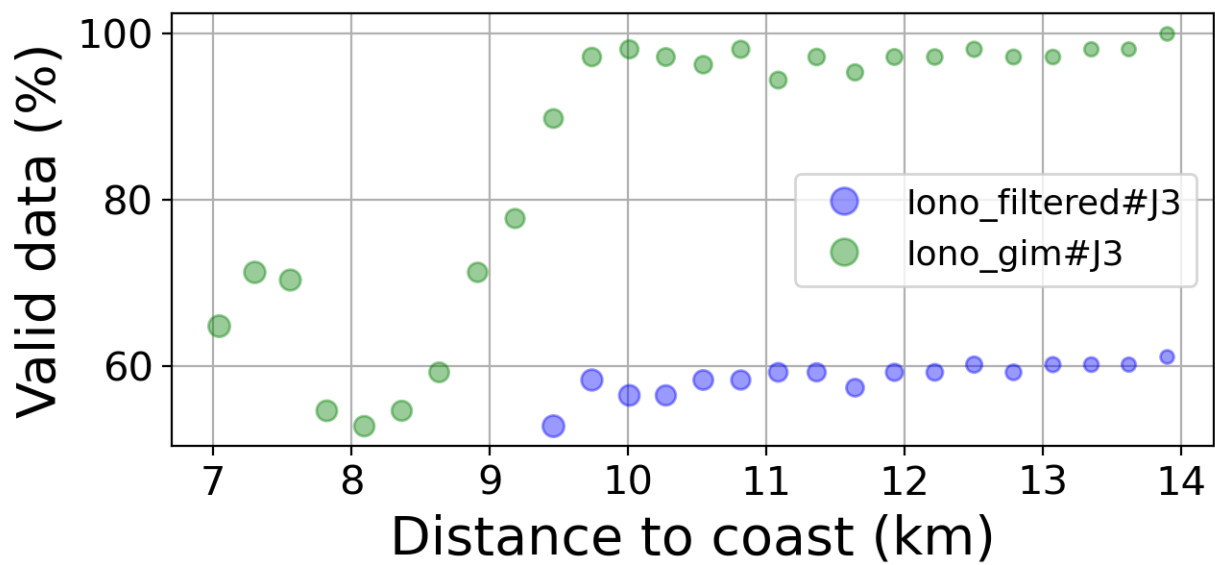


FIGURE 58 – Valid data (%) in function of distance to coast/CALAIS station

6.4.6 Std in function of distance to coast/CALAIS station

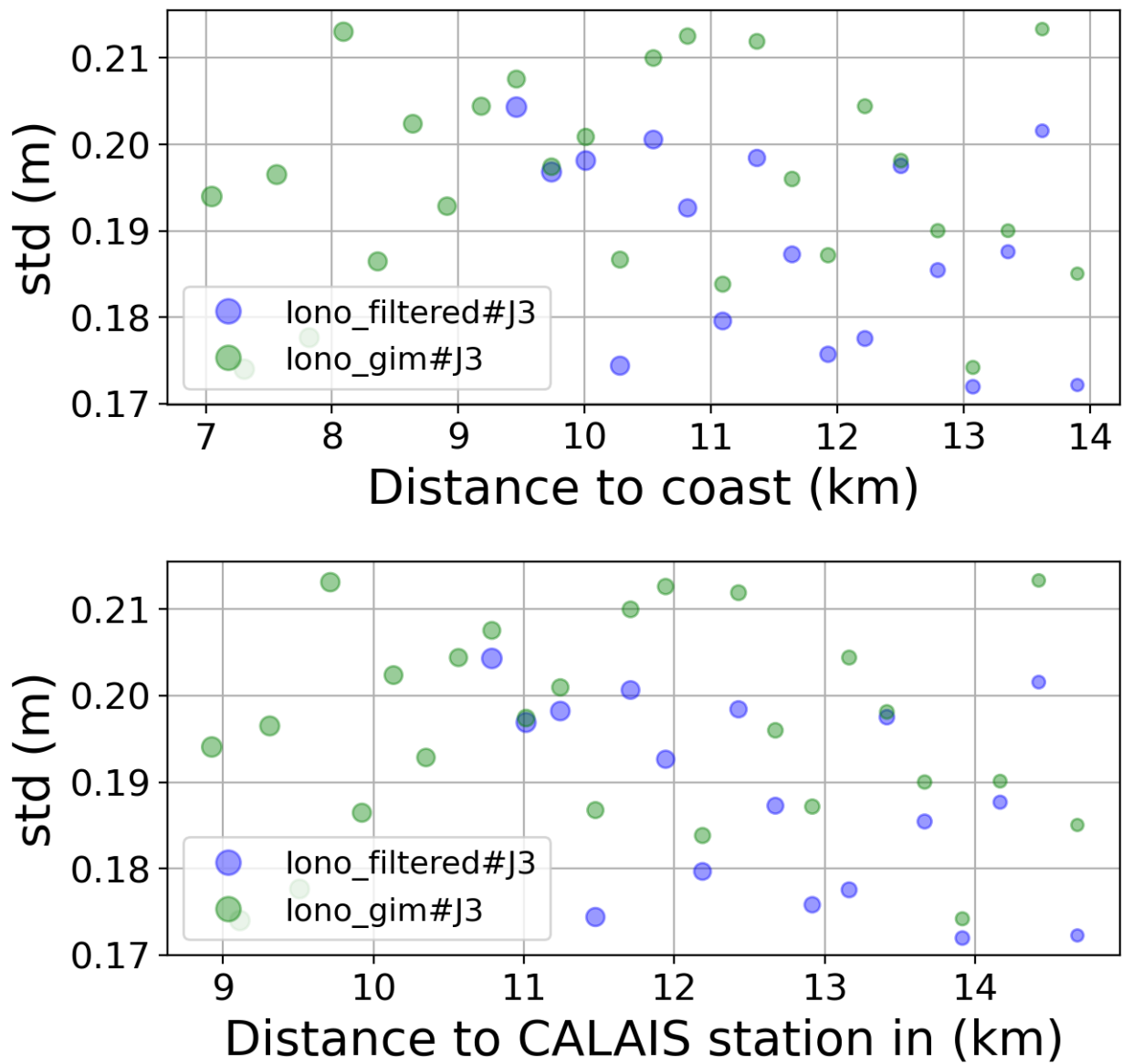


FIGURE 59 – Std in function of the distance to the coast/CALAIS station

6.4.7 Correlation in function of distance to coast/CALAIS station

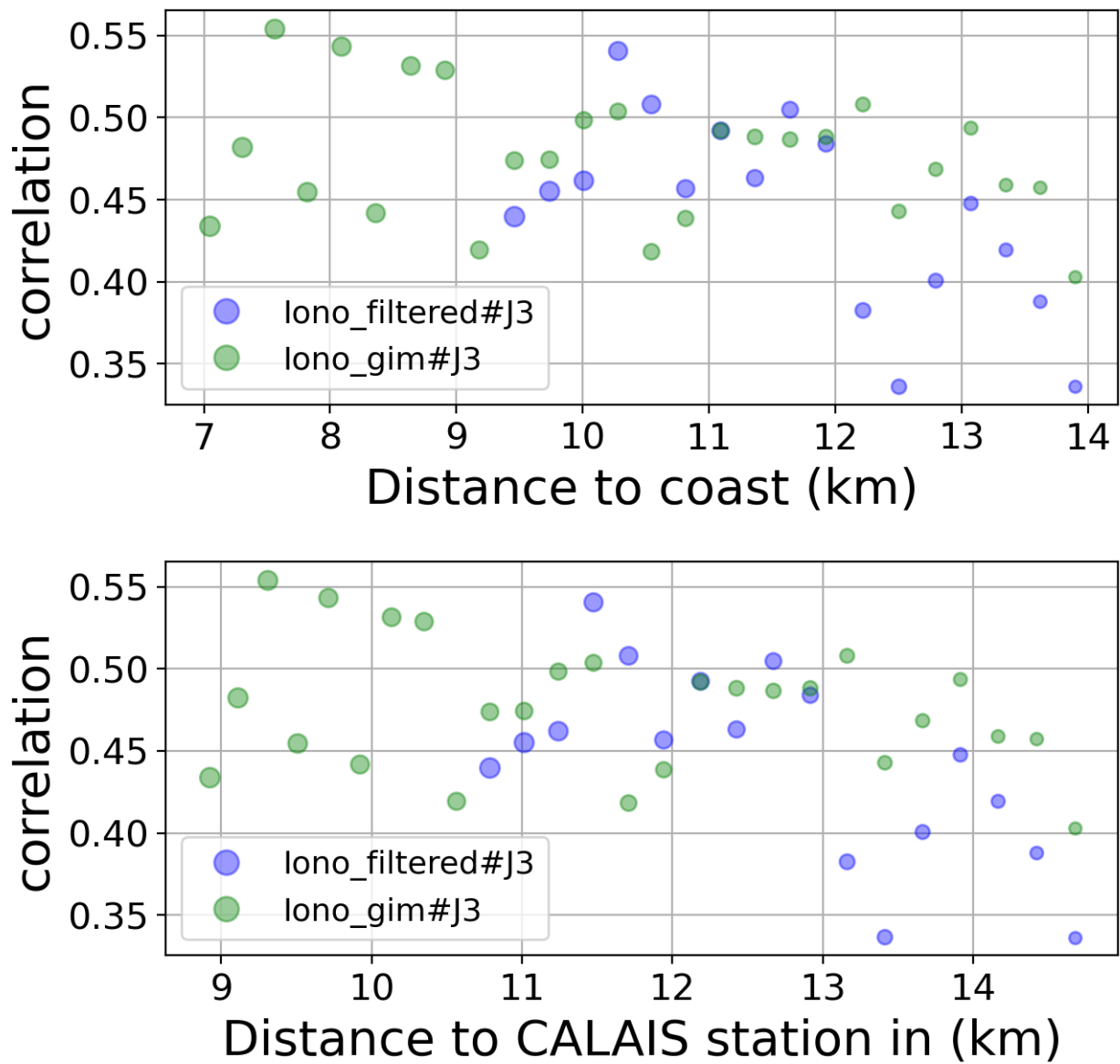


FIGURE 60 – Correlation in function of the distance to the coast/CALAIS station

6.4.8 Taylor Diagram

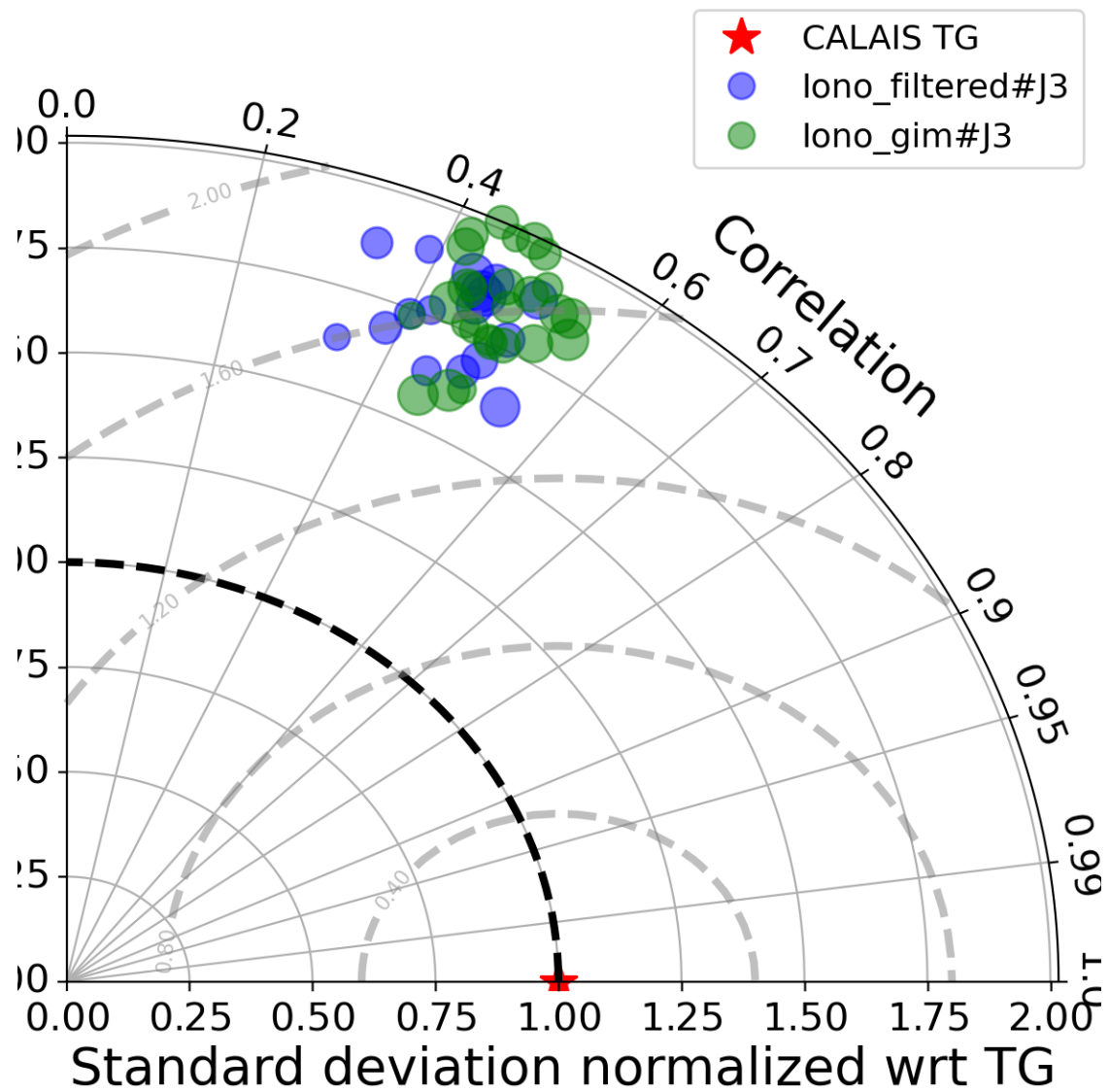


FIGURE 61 – Taylor diagram

6.4.9 Mean statistics table of products comparison with CALAIS 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)
lono_filtered#J3	58.606	0.442	0.188	0.17
lono_gim#J3	96.895	0.47	0.197	0.175

FIGURE 62 – 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 108 point.

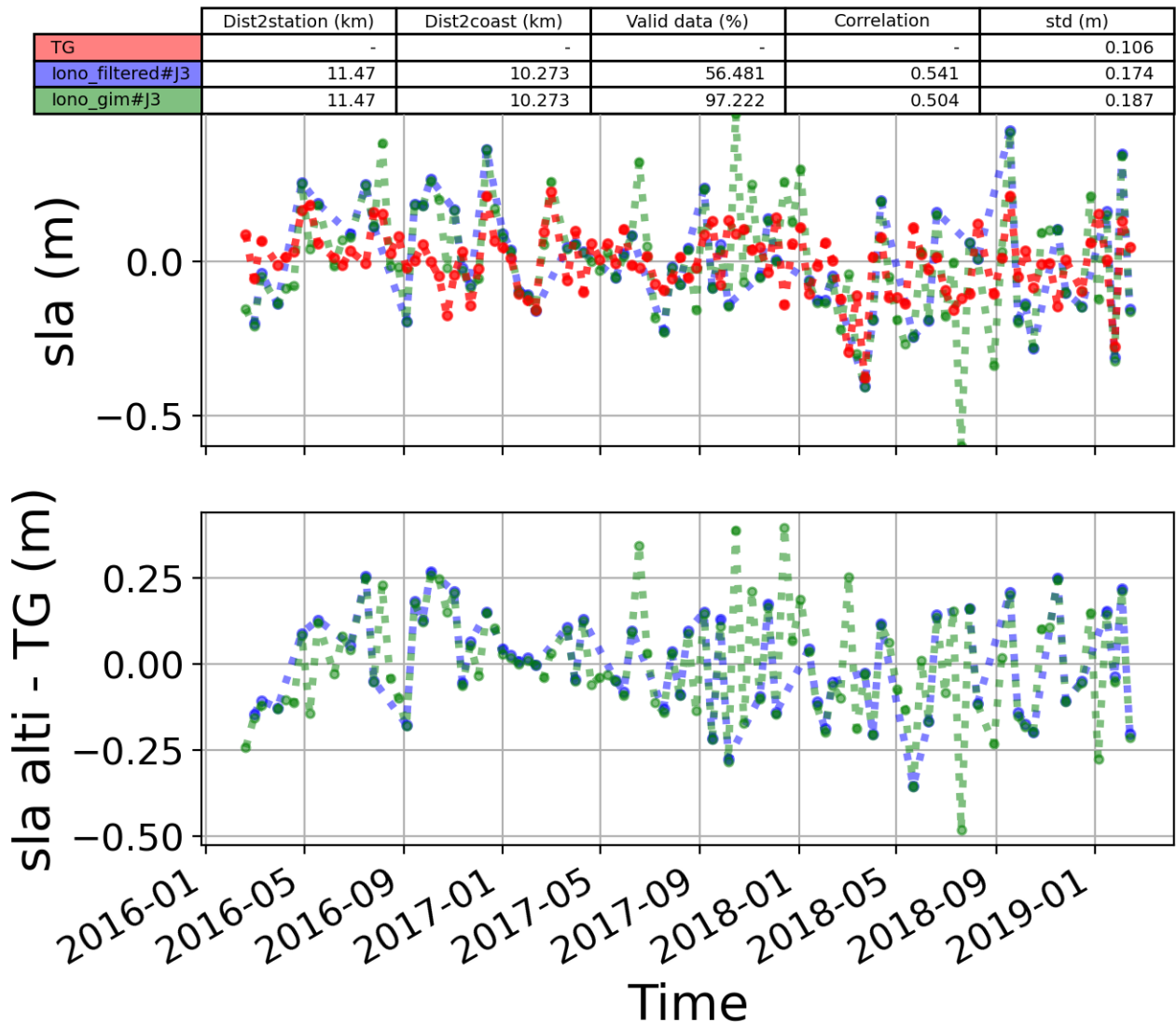


FIGURE 63 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

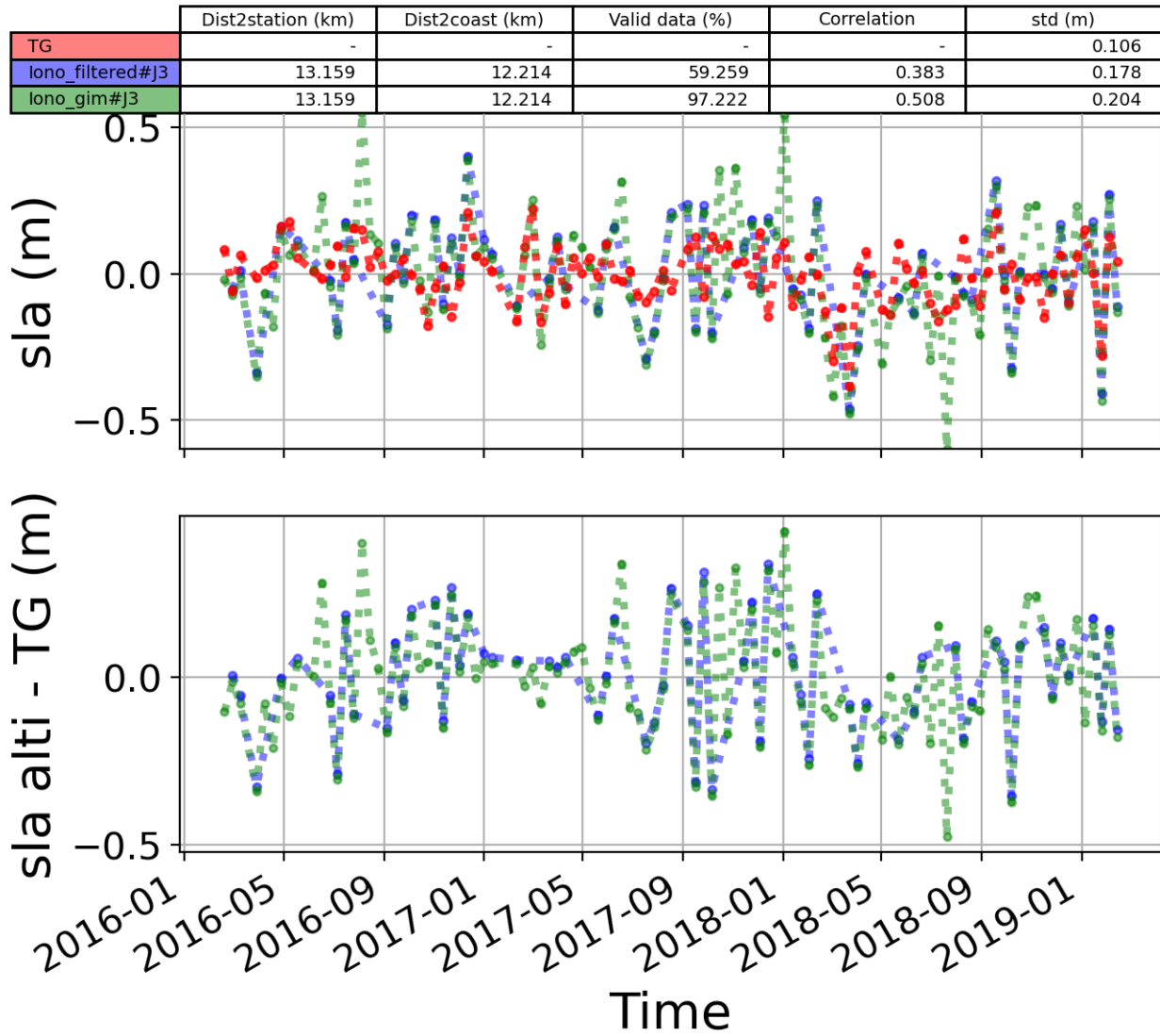


FIGURE 64 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.5 Station : Portpatrick

- Nearest track to Portpatrick station is the track number track87
- The area of interest is limited by :
 - A circle which it's center is the Portpatrick tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km

6.5.1 correlation visualization in maps view % Portpatrick tide gauge

6.5.2 rmsd visualization in maps view % Portpatrick tide gauge

6.5.3 std visualization in maps view % Portpatrick tide gauge

6.5.4 valid_data_percent visualization in maps view % Portpatrick tide gauge

6.5.5 Valid data (%) in function of distance to coast/Portpatrick 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 serie, i is the index of the time serie, np is the number of the selected altimetry time series. $maxNB = 59$ 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.

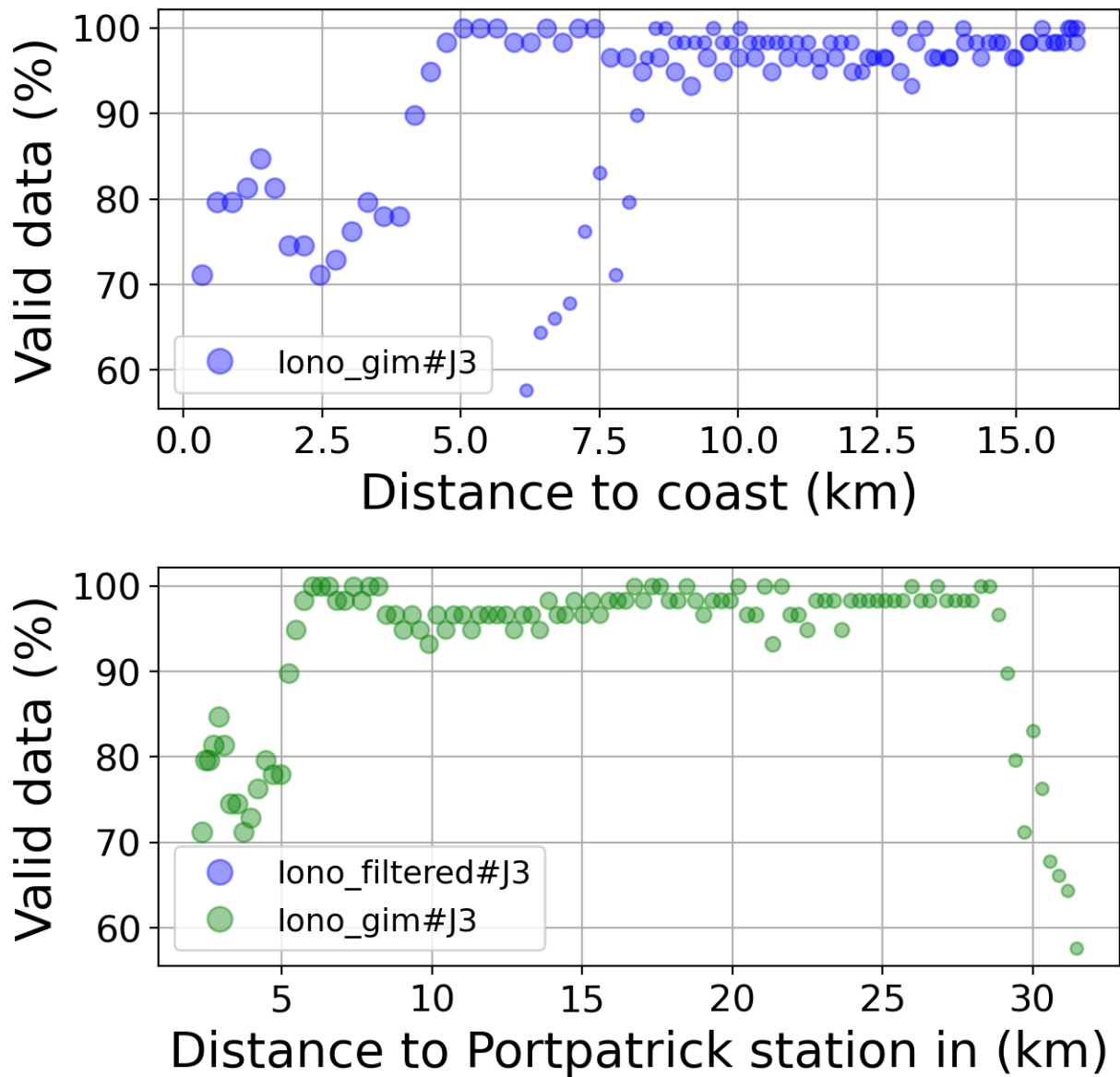


FIGURE 65 – Valid data (%) in function of distance to coast/Portpatrick station

6.5.6 Std in function of distance to coast/Portpatrick station

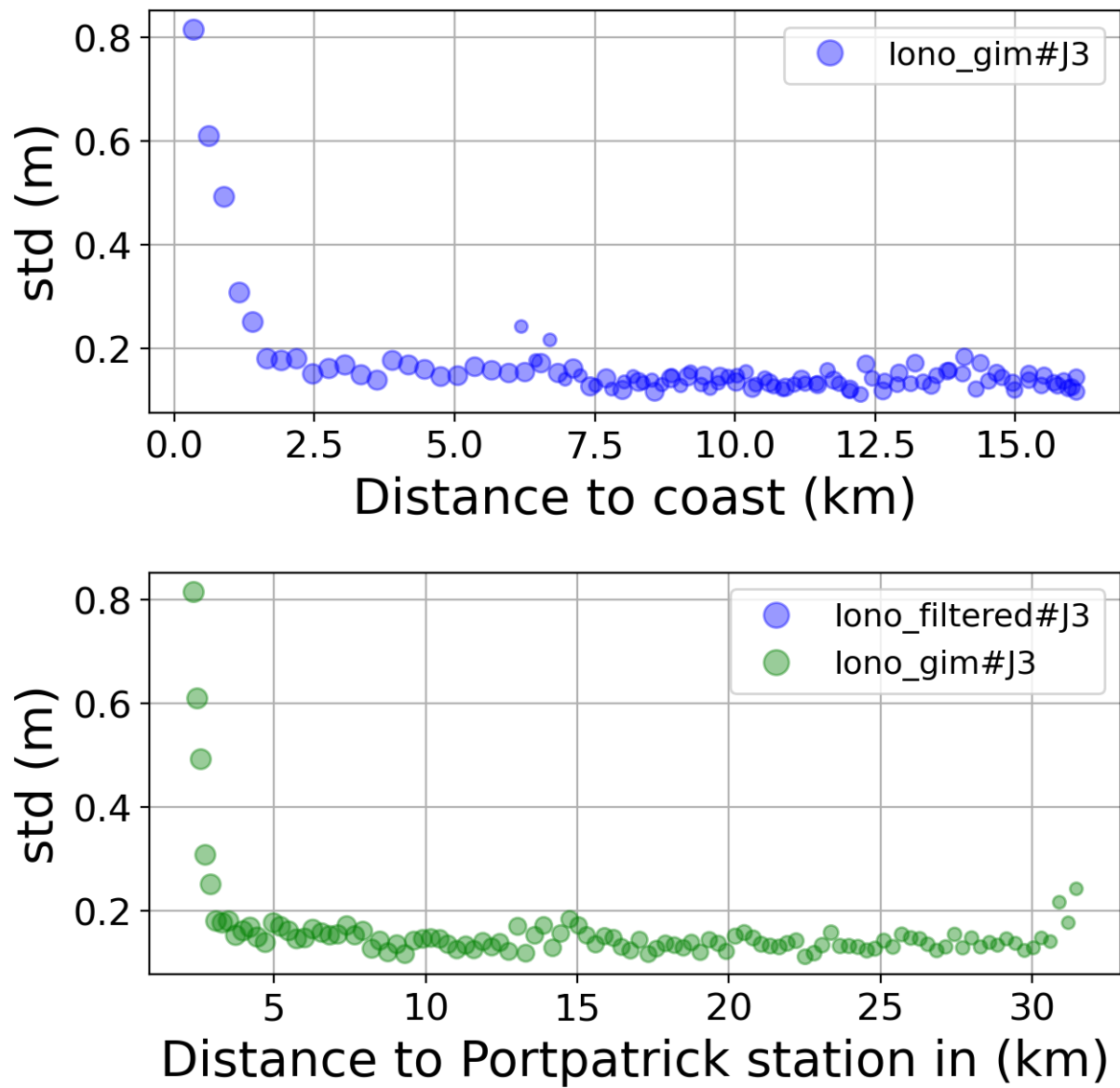


FIGURE 66 – Std in function of the distance to the coast/Portpatrick station

6.5.7 Correlation in function of distance to coast/Portpatrick station

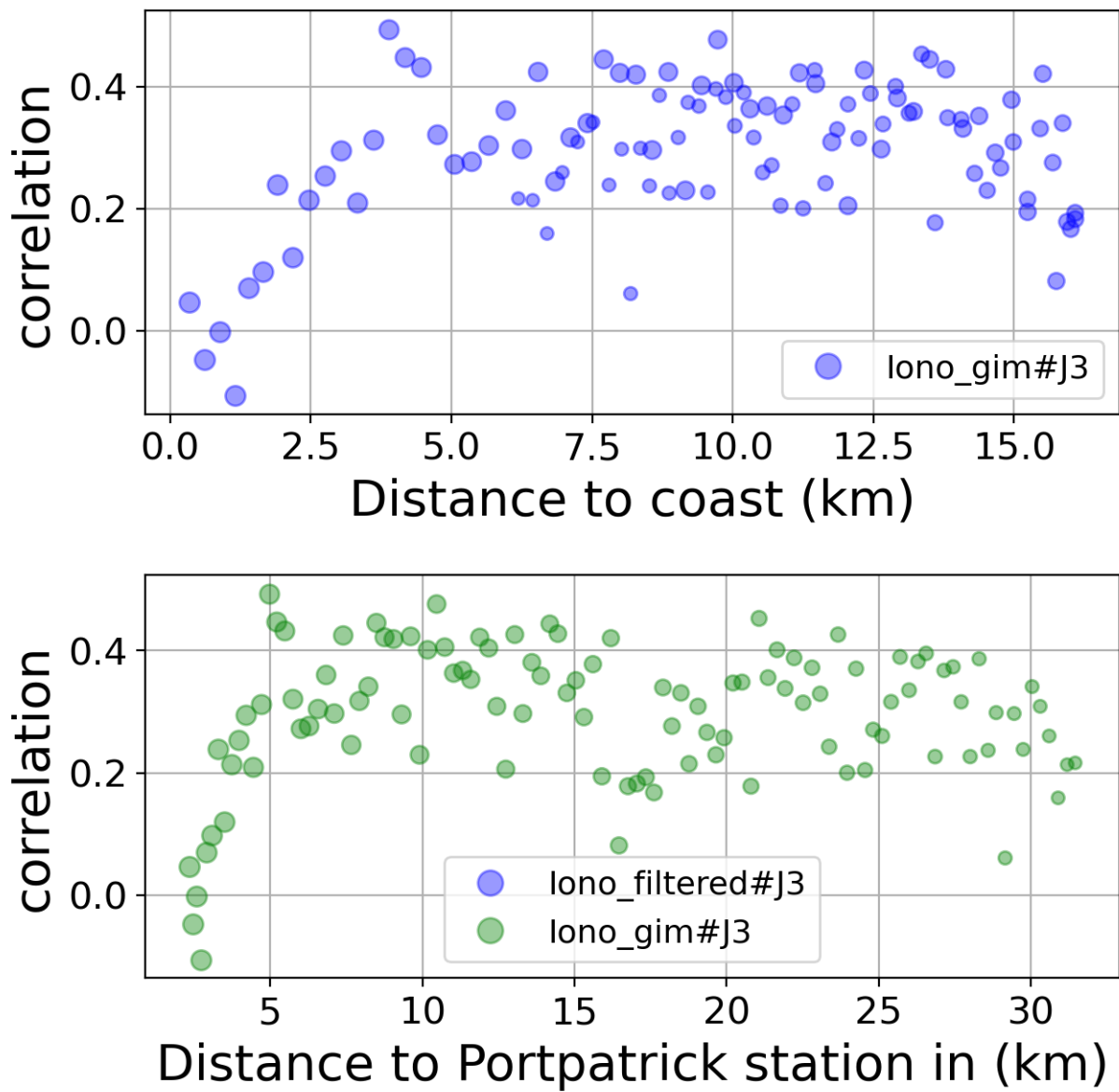


FIGURE 67 – Correlation in function of the distance to the coast/Portpatrick station

6.5.8 Taylor Diagram

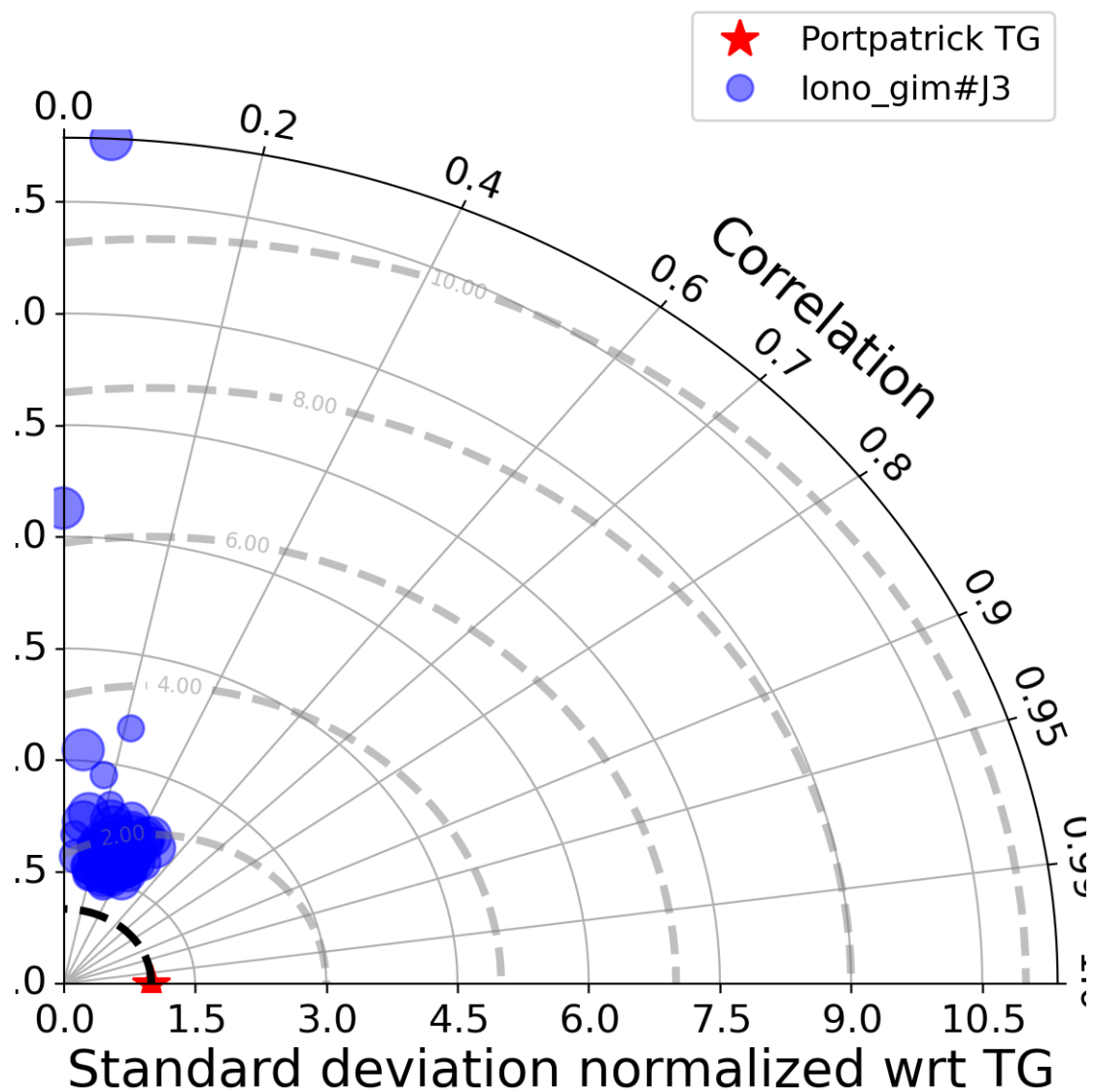


FIGURE 68 – Taylor diagram

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

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 59 point.

The altimetry products don't share a common point which is close to the tide gauge station and has more than 80 % of data

6.6 Station : Newlyn

- Nearest track to Newlyn station is the track number track70
- The area of interer is limited by :
 - A circle which it's center is the Newlyn tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : [49.8, 50.06] °

6.6.1 correlation visualization in maps view % Newlyn tide gauge

Correlation Altimerty data with respect to Newlyn Tide gauge data

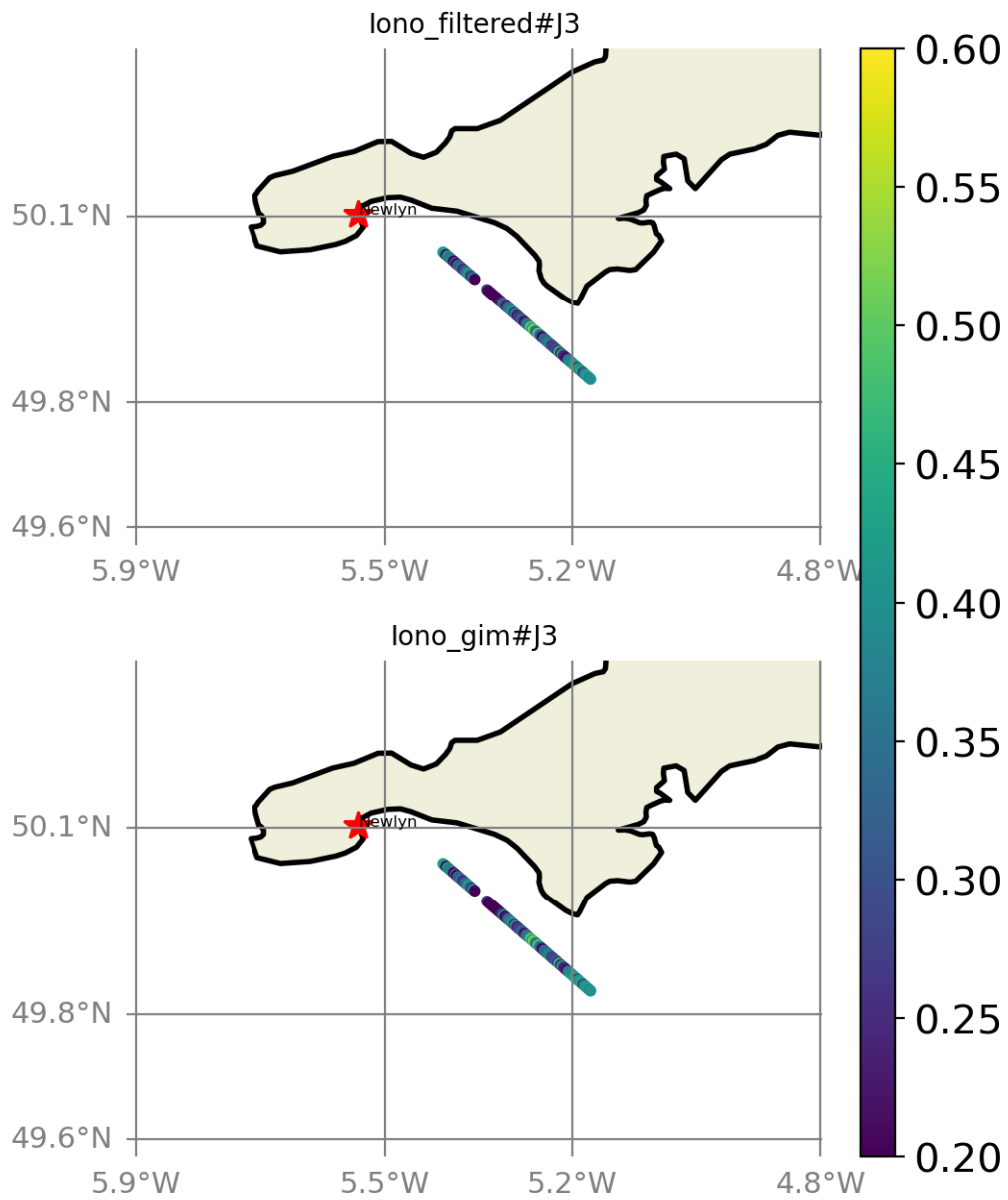


FIGURE 69 – correlation visualization in maps view % Newlyn tide gauge

6.6.2 rmsd visualization in maps view % Newlyn tide gauge

Rmsd (m) Altimerty data with respect to Newlyn Tide gauge data

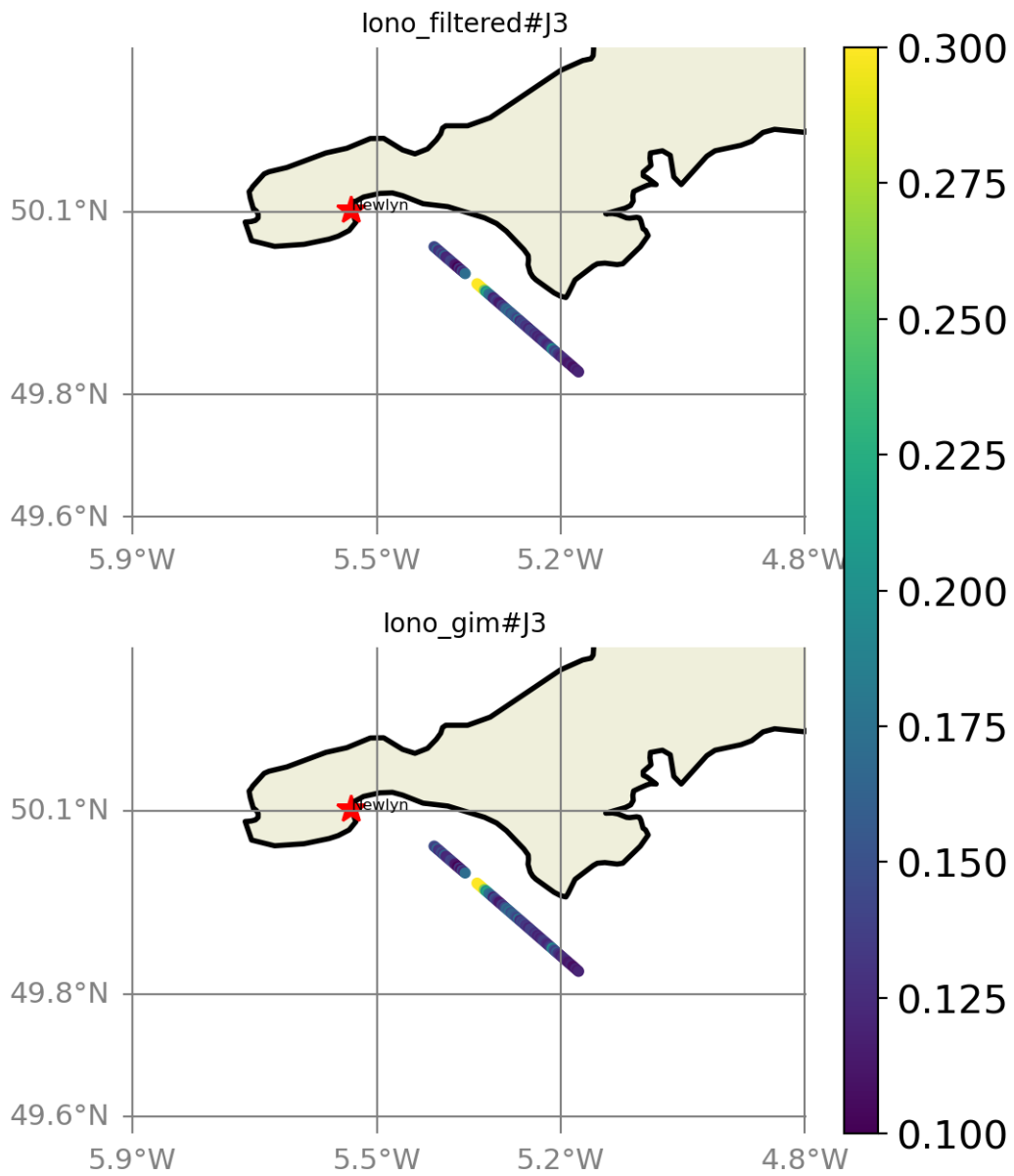


FIGURE 70 – rmsd visualization in maps view % Newlyn tide gauge

6.6.3 std visualization in maps view % Newlyn tide gauge

Std (m) Altimerty data with respect to Newlyn Tide gauge data

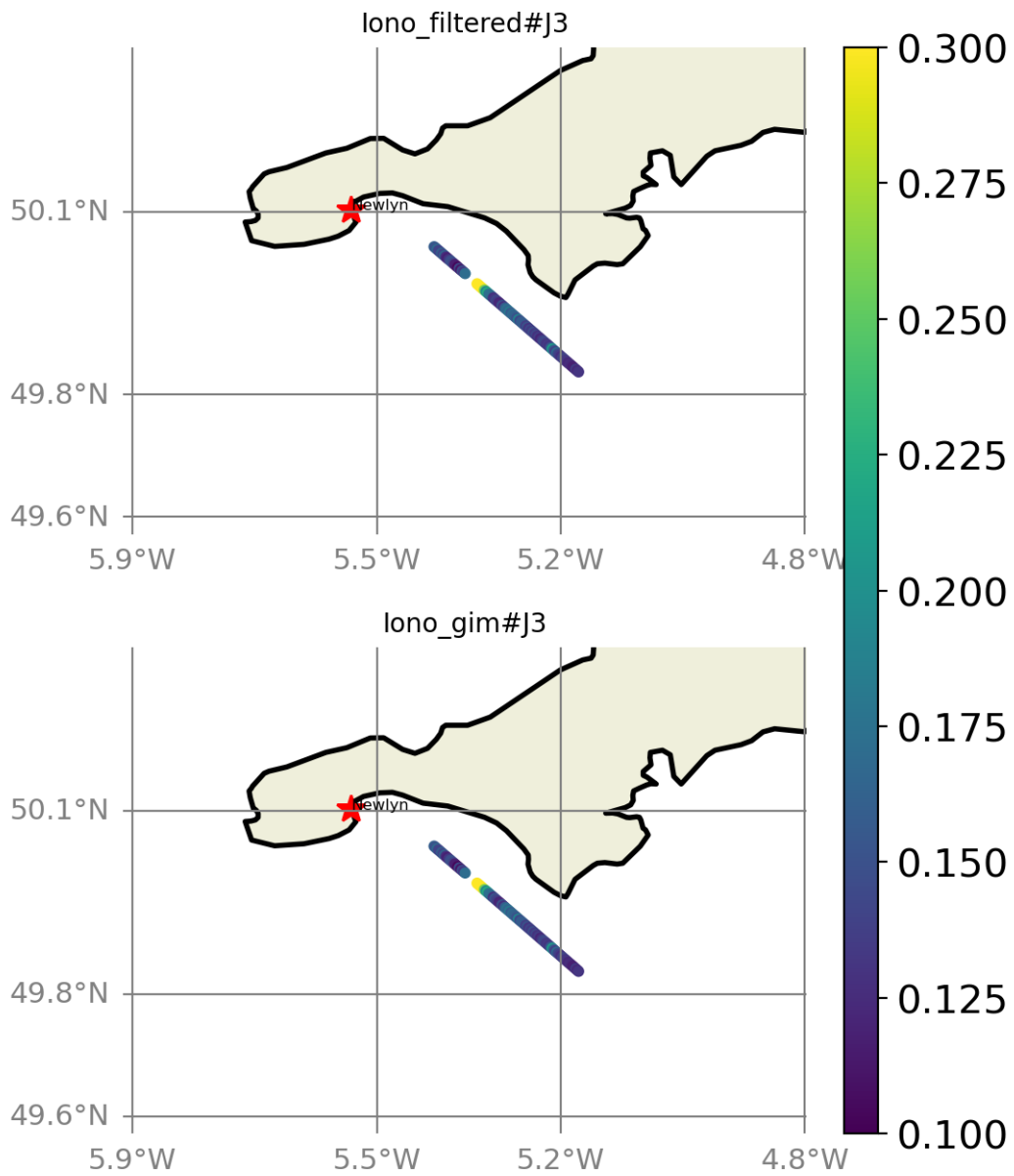


FIGURE 71 – std visualization in maps view % Newlyn tide gauge

6.6.4 valid_data_percent visualization in maps view % Newlyn tide gauge

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

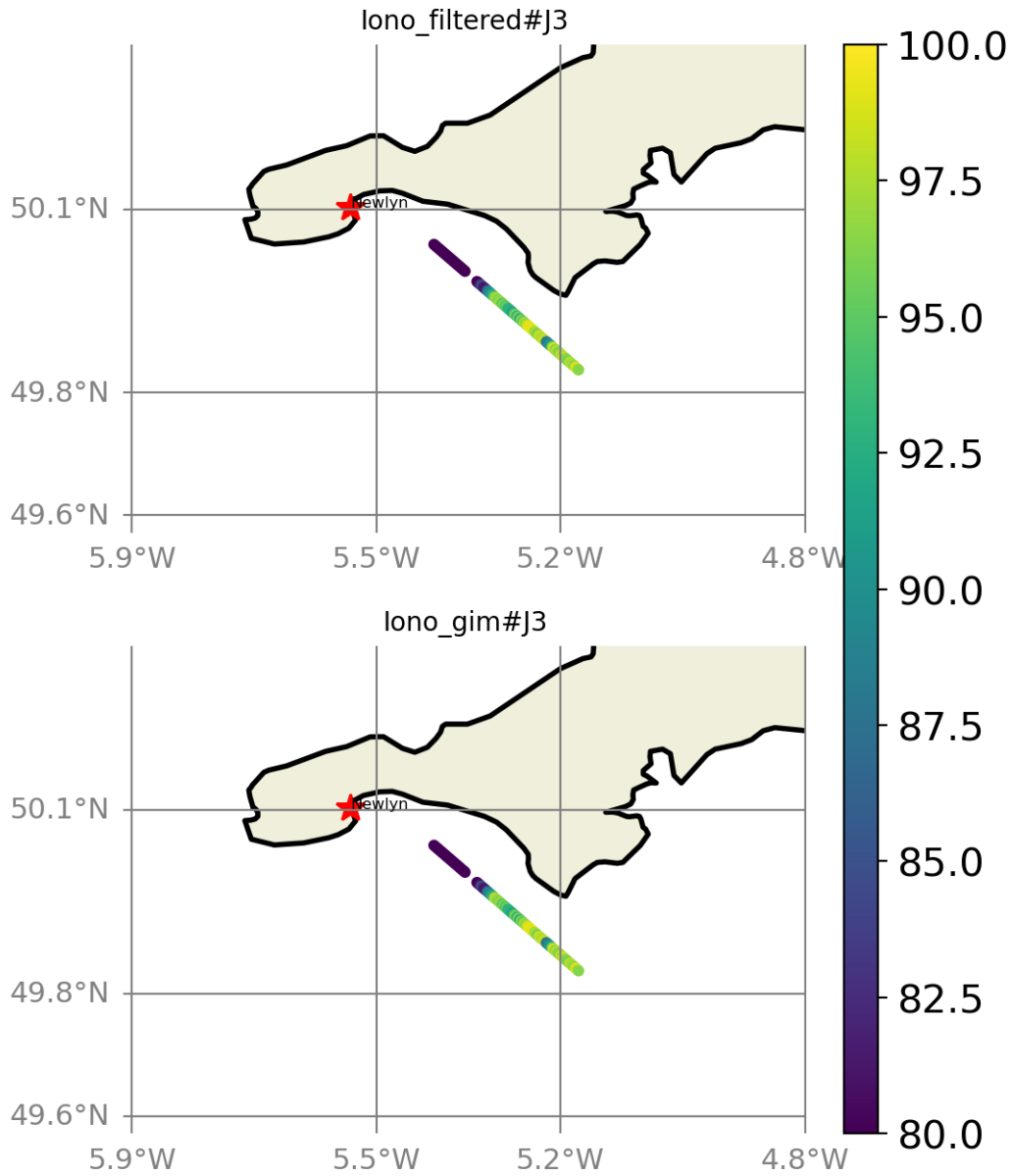


FIGURE 72 – valid_data_percent visualization in maps view % Newlyn tide gauge

6.6.5 Valid data (%) in function of distance to coast/Newlyn 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. $maxNB = 111$ 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.

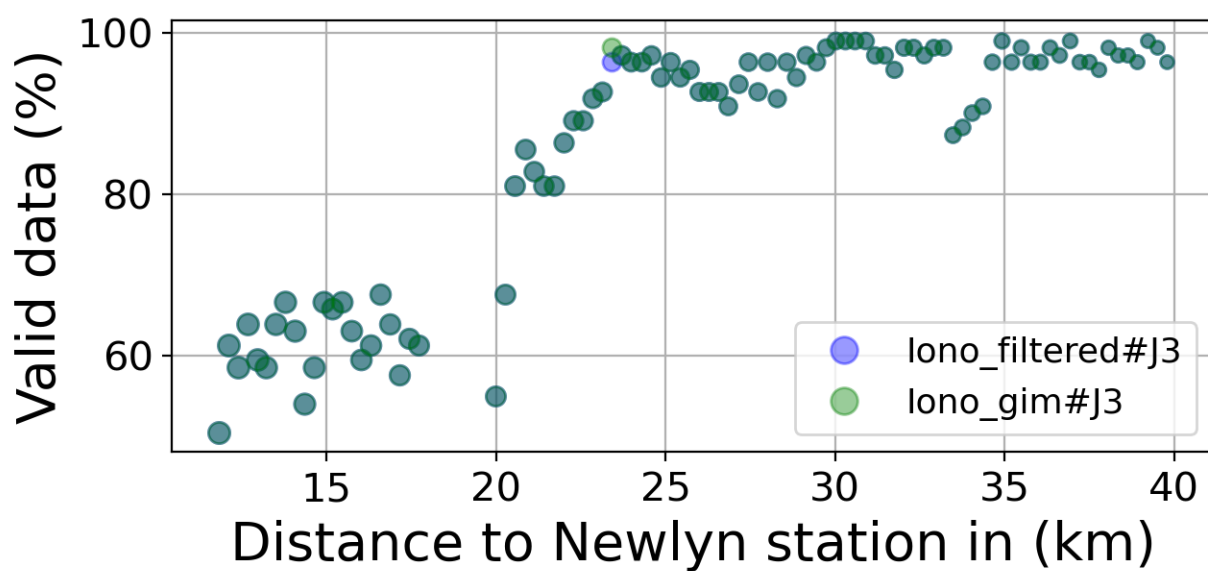
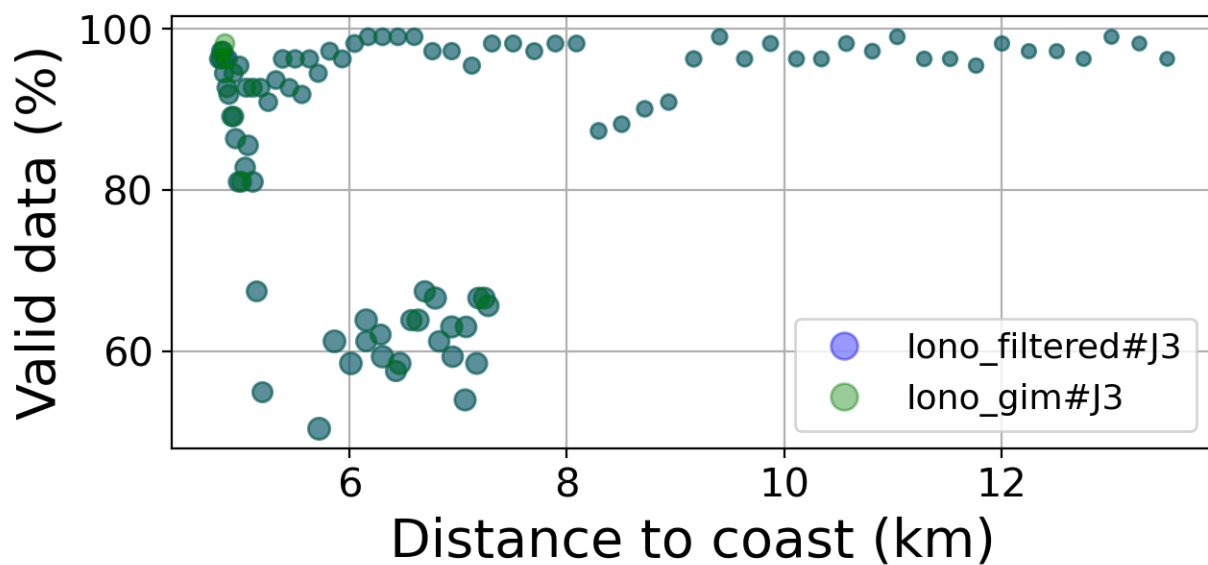


FIGURE 73 – Valid data (%) in function of distance to coast/Newlyn station

6.6.6 Std in function of distance to coast/Newlyn station

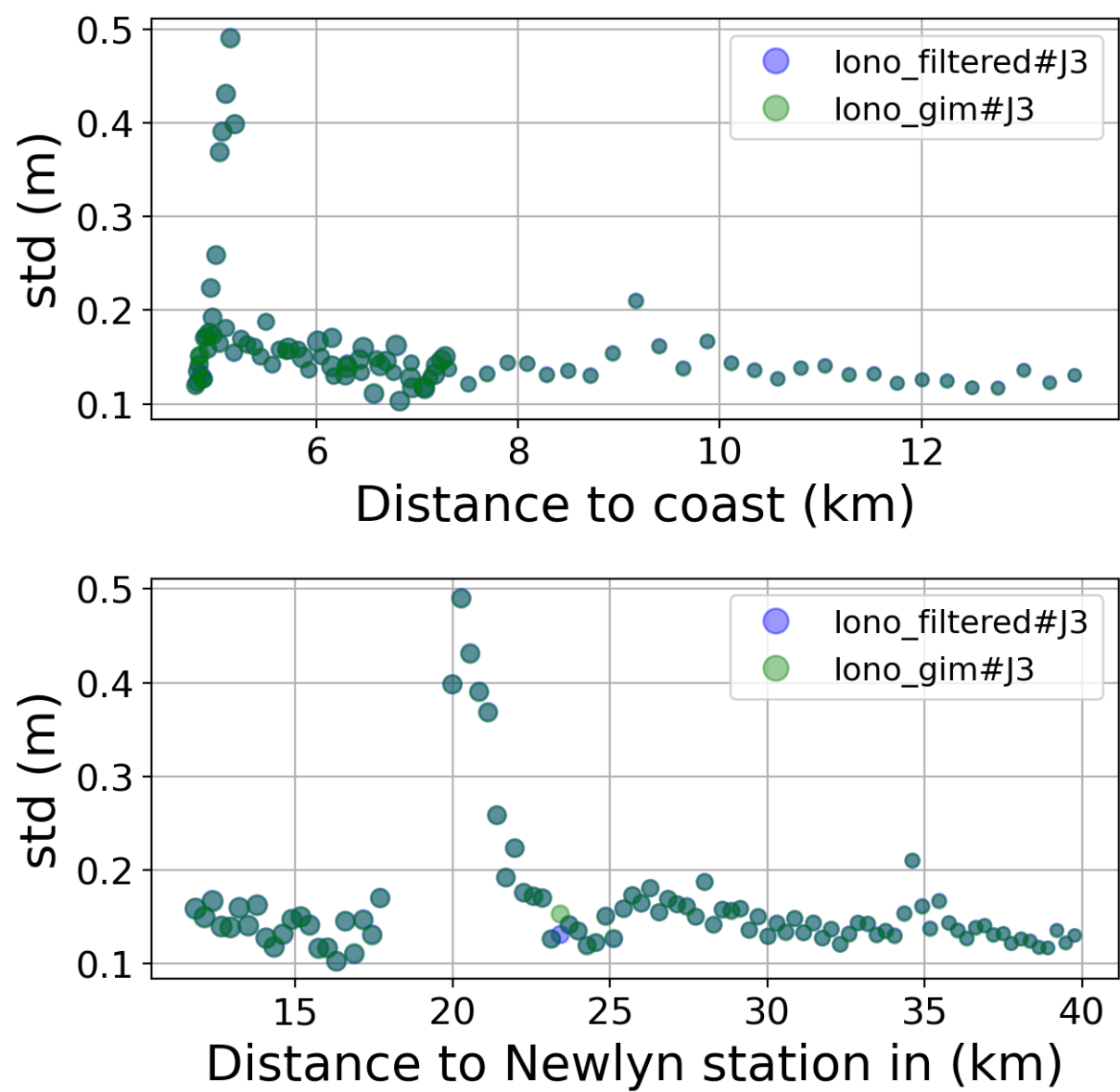


FIGURE 74 – Std in function of the distance to the coast/Newlyn station

6.6.7 Correlation in function of distance to coast/Newlyn station

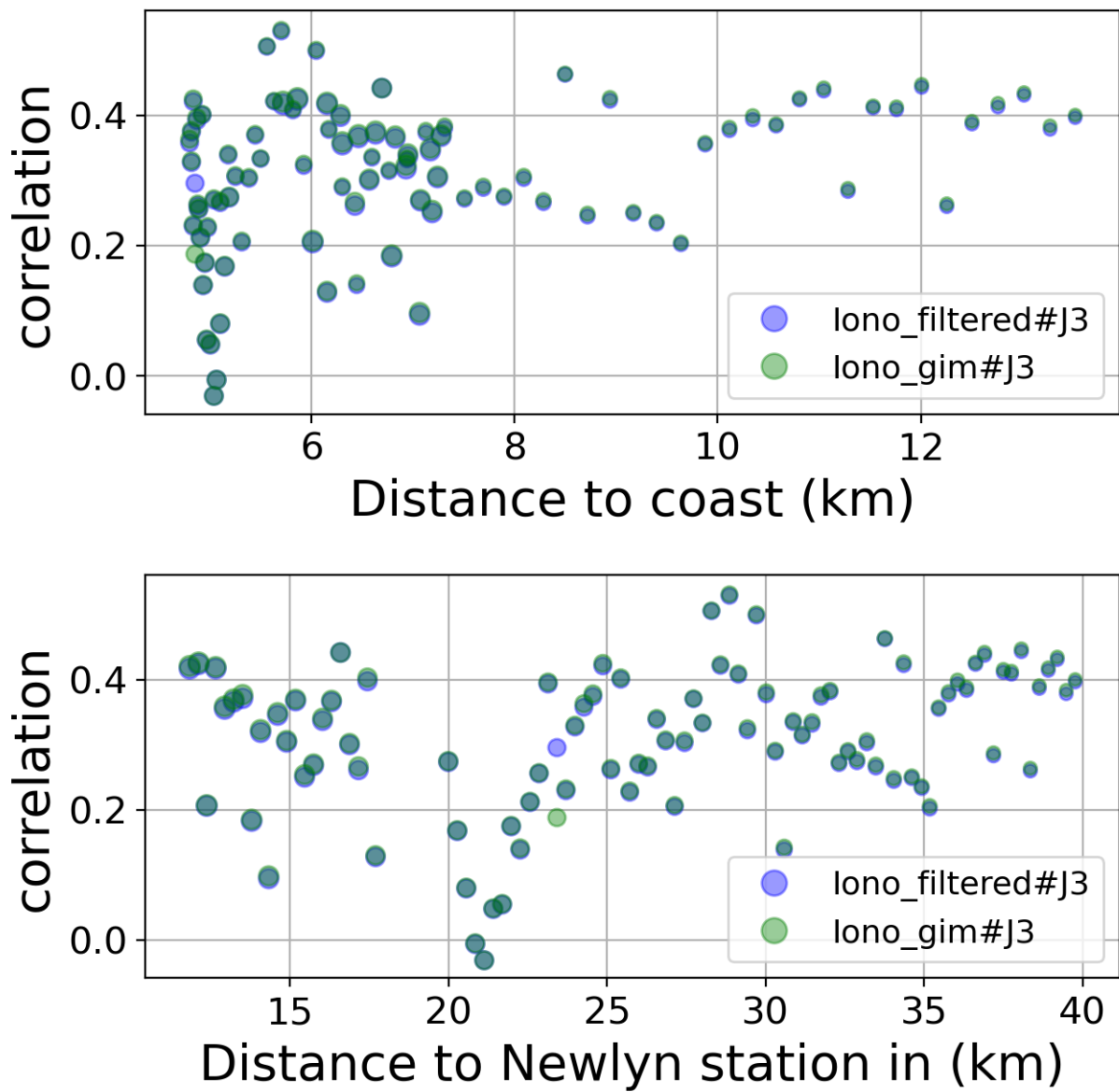


FIGURE 75 – Correlation in function of the distance to the coast/Newlyn station

6.6.8 Taylor Diagram

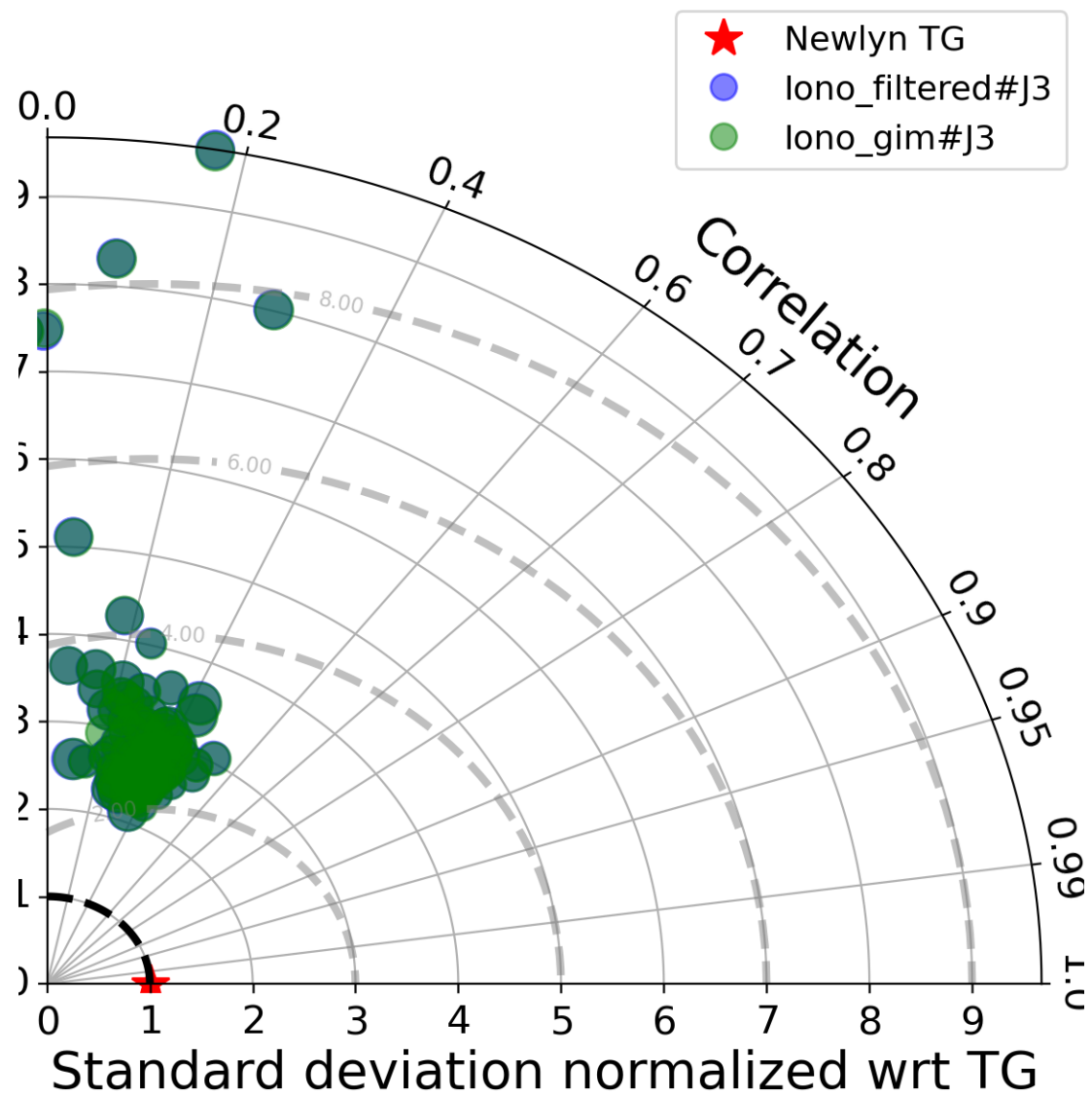


FIGURE 76 – Taylor diagram

6.6.9 Mean statistics table of products comparison with Newlyn 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)
lono_filtered#J3	85.958	0.311	0.161	0.154
lono_gim#J3	85.977	0.313	0.161	0.154

FIGURE 77 – 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 111 point.

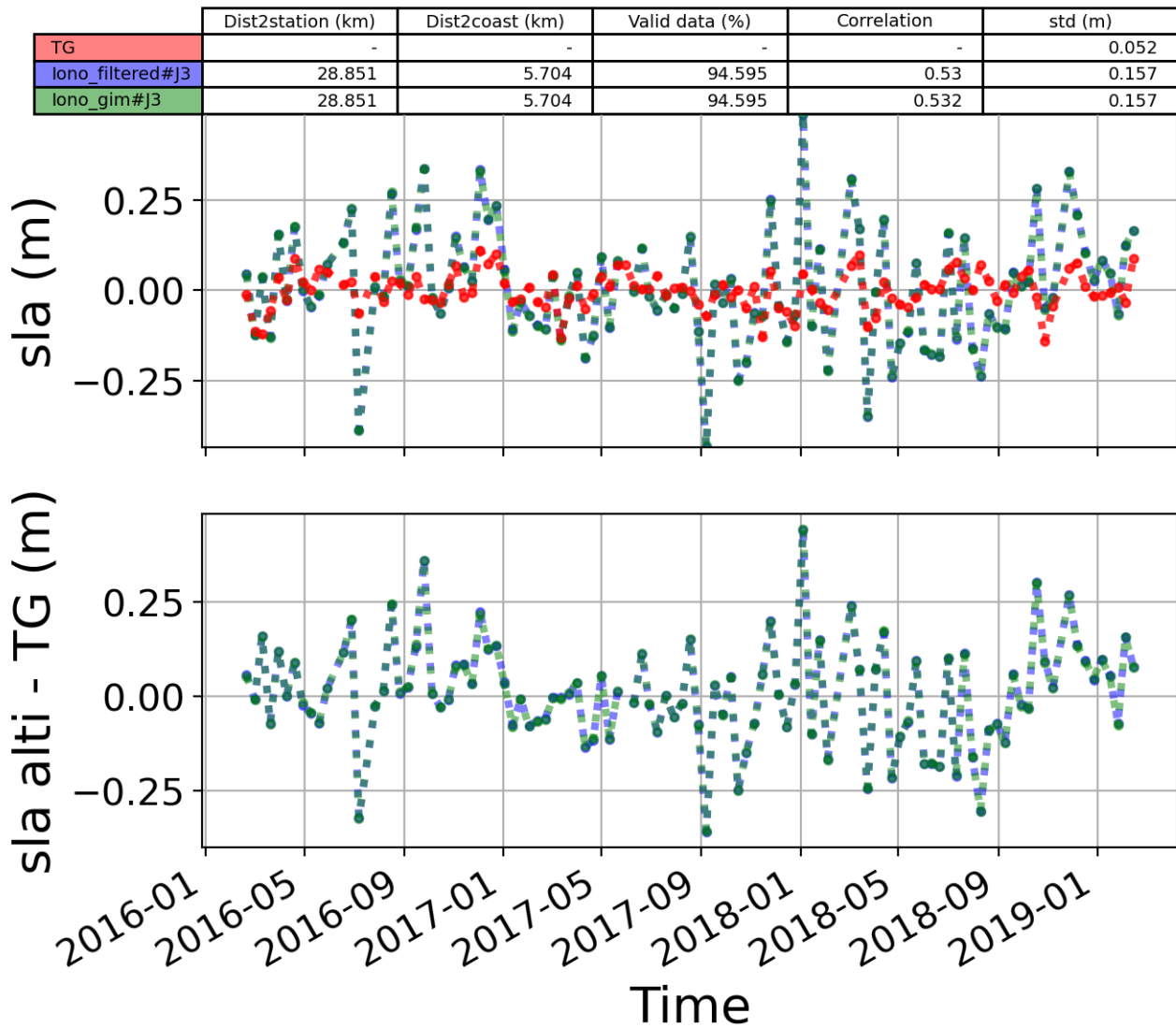


FIGURE 78 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.7 Station : LE_CONQUET

- Nearest track to LE_CONQUET station is the track number track61
- The area of interest is limited by :
 - A circle which it's center is the LE_CONQUET tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.7.1 correlation visualization in maps view % LE_CONQUET tide gauge

Correlation Altimerty data with respect to LE_CONQUET Tide gauge data

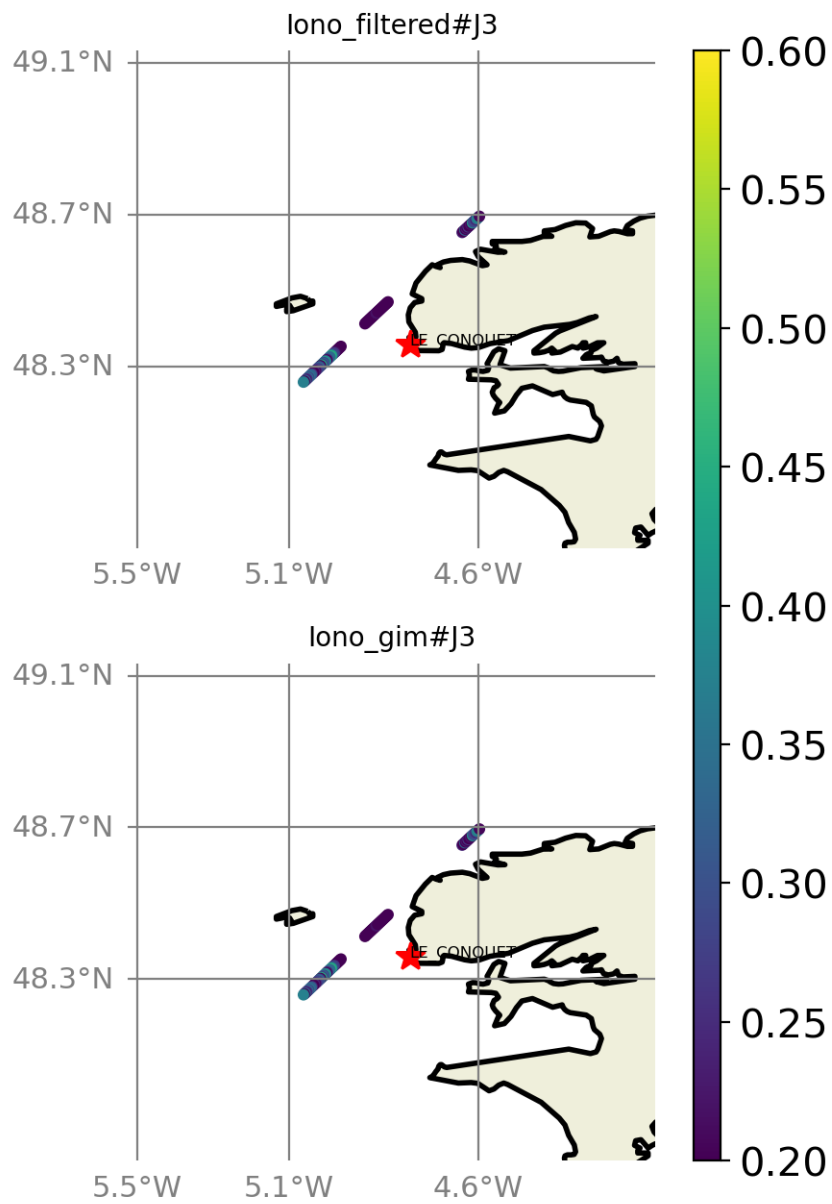


FIGURE 79 – correlation visualization in maps view % LE_CONQUET tide gauge

6.7.2 rmsd visualization in maps view % LE_CONQUET tide gauge

Rmsd (m) Altimerty data with respect to LE_CONQUET Tide gauge data

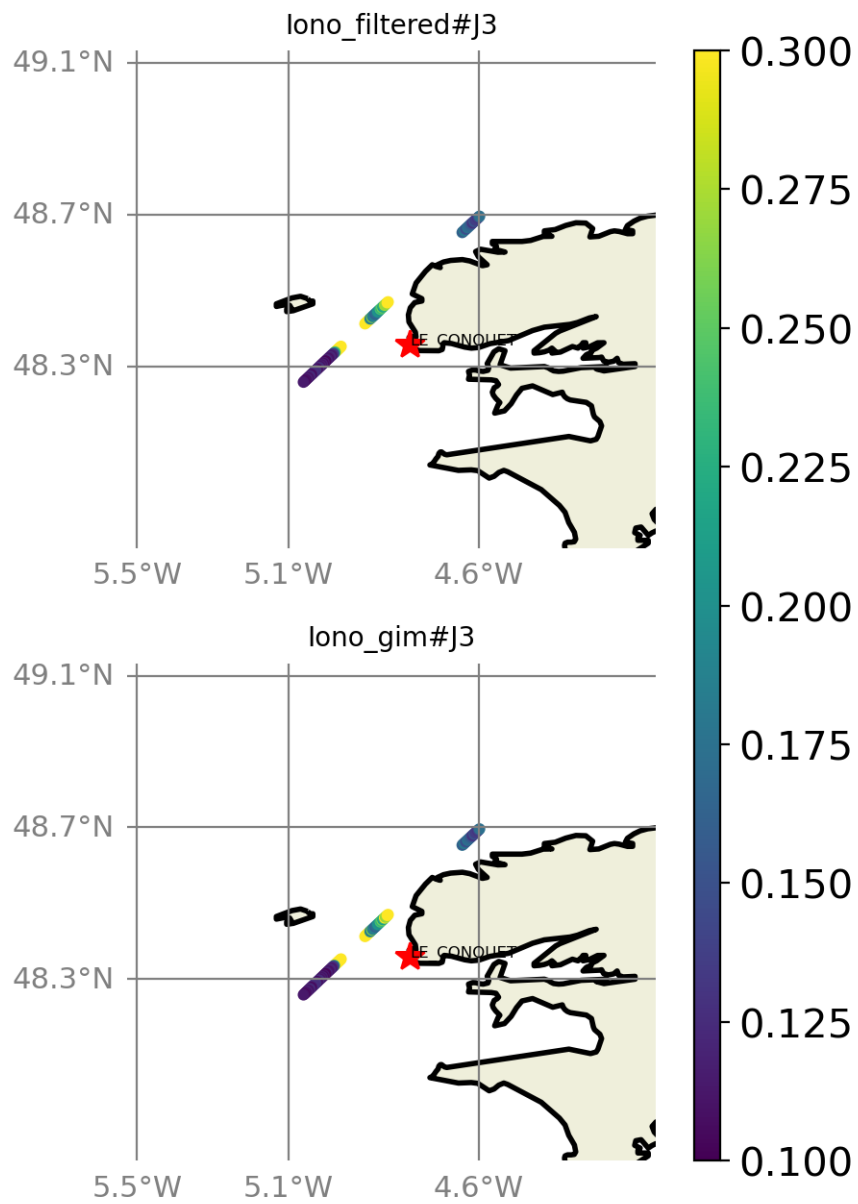


FIGURE 80 – rmsd visualization in maps view % LE_CONQUET tide gauge

6.7.3 std visualization in maps view % LE_CONQUET tide gauge

Std (m) Altimerty data with respect to LE_CONQUET Tide gauge data

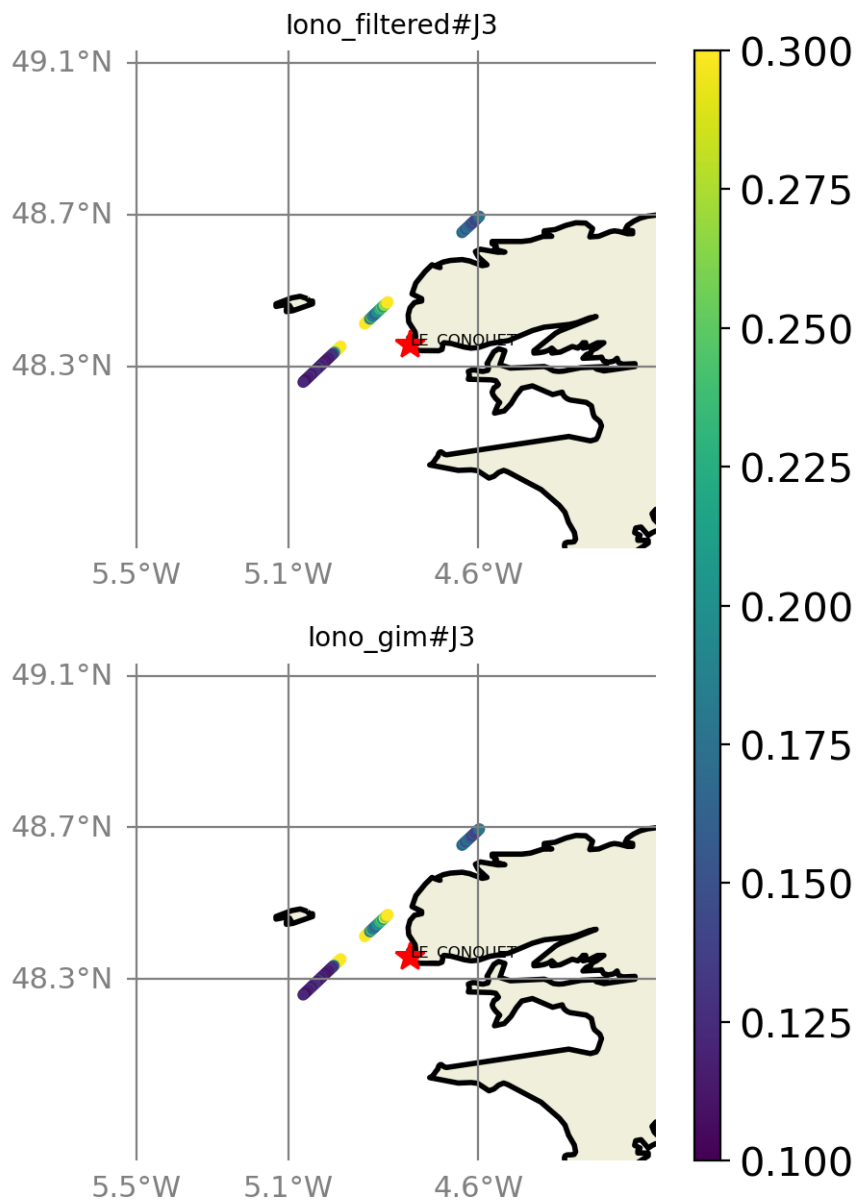


FIGURE 81 – std visualization in maps view % LE_CONQUET tide gauge

6.7.4 valid_data_percent visualization in maps view % LE_CONQUET tide gauge

Valid_Data_Percent (%) Altimerty data with respect to LE_CONQUET Tide gauge data

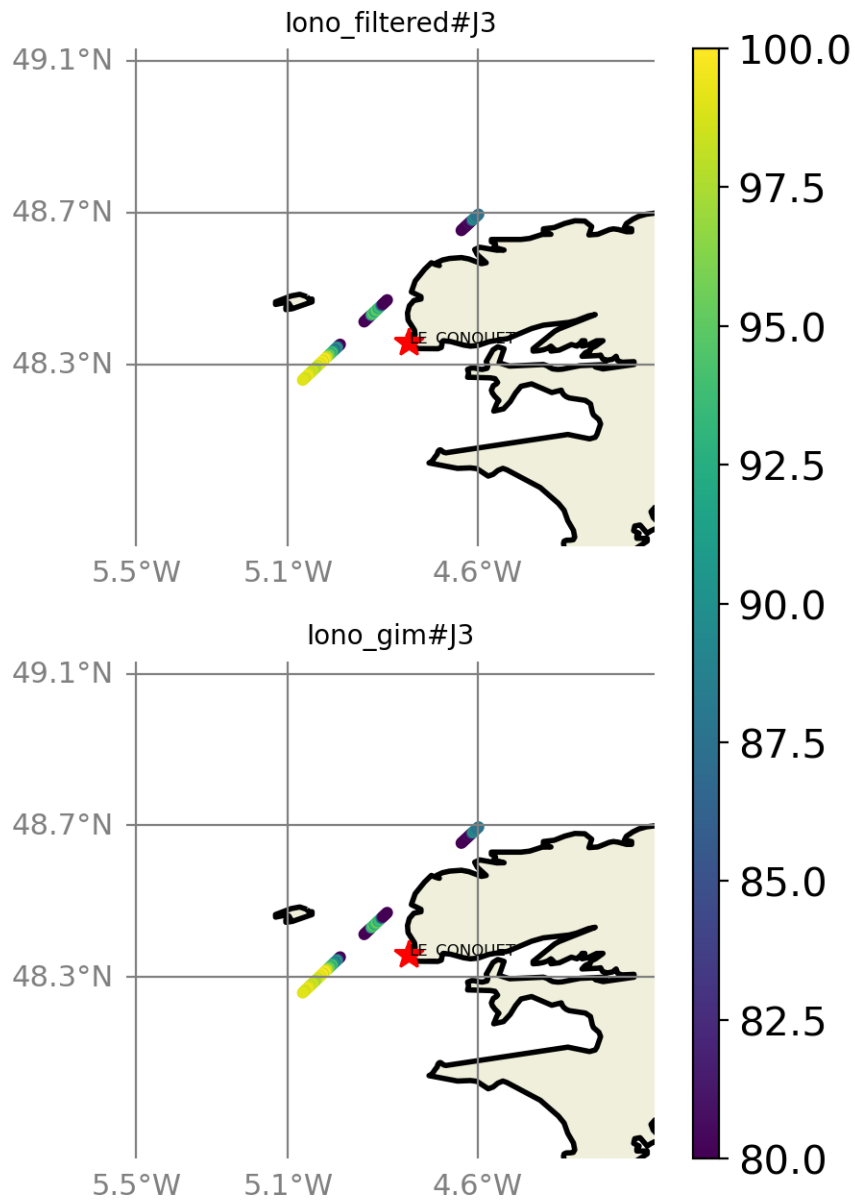


FIGURE 82 – valid_data_percent visualization in maps view % LE_CONQUET tide gauge

6.7.5 Valid data (%) in function of distance to coast/LE_CONQUET 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. $maxNB = 105$ 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.

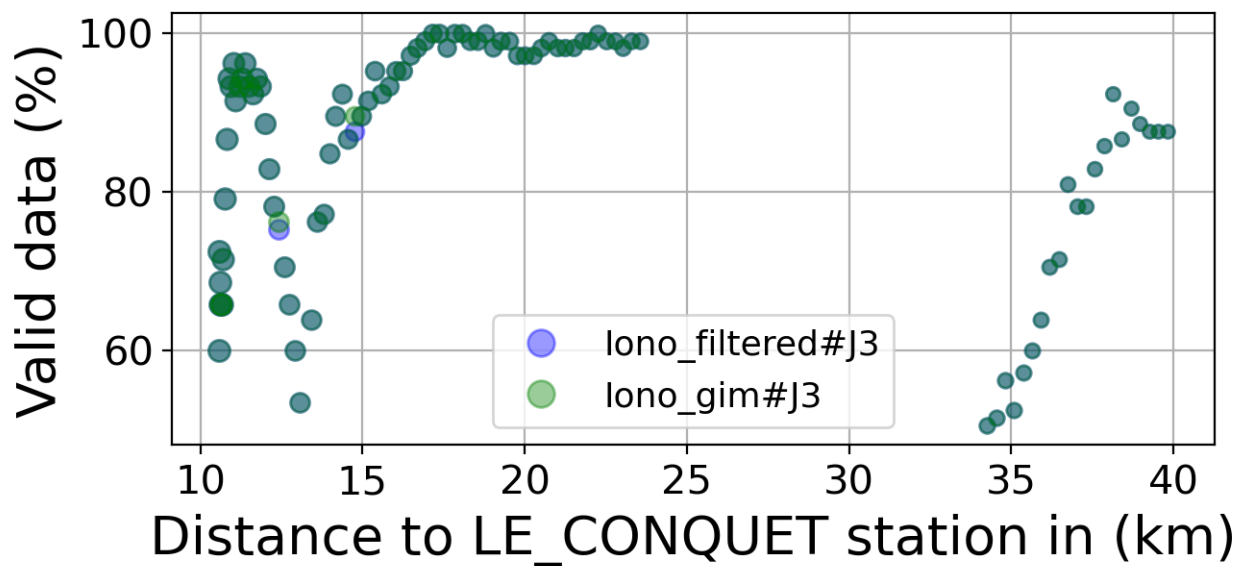
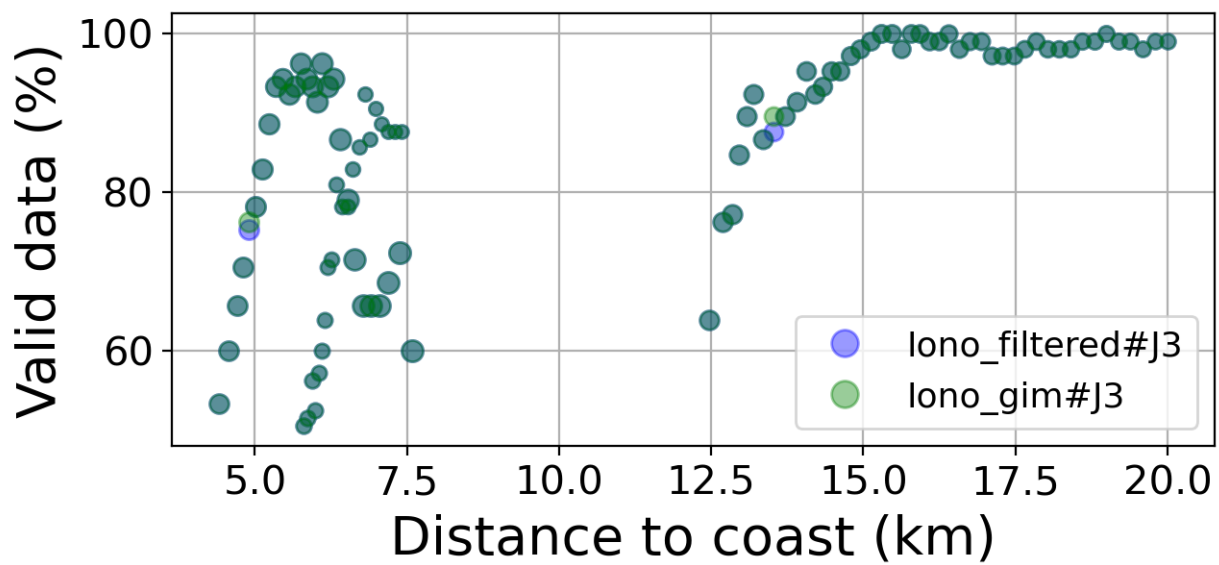


FIGURE 83 – Valid data (%) in function of distance to coast/LE_CONQUET station

6.7.6 Std in function of distance to coast/LE_CONQUET station

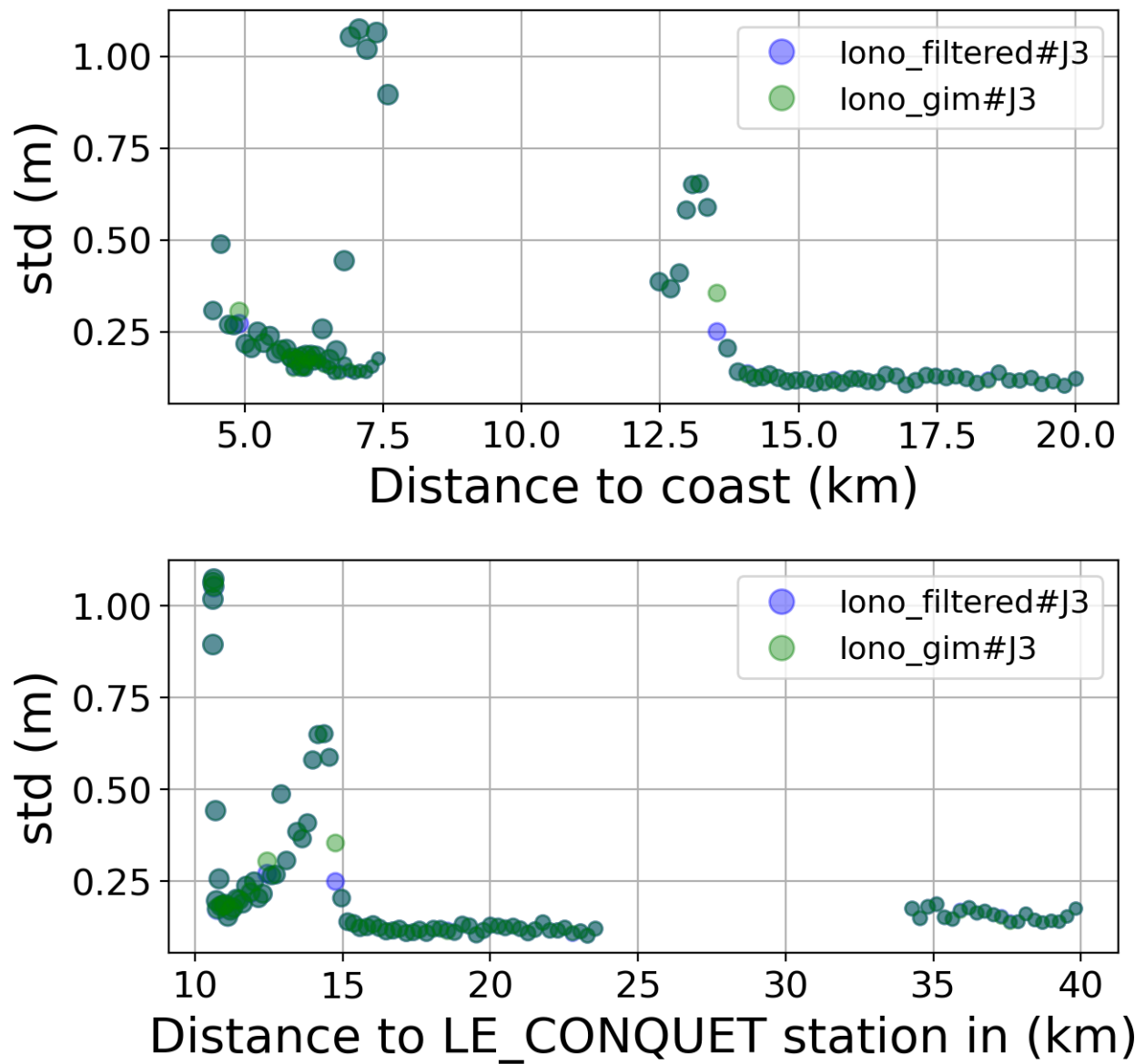


FIGURE 84 – Std in function of the distance to the coast/LE_CONQUET station

6.7.7 Correlation in function of distance to coast/LE_CONQUET station

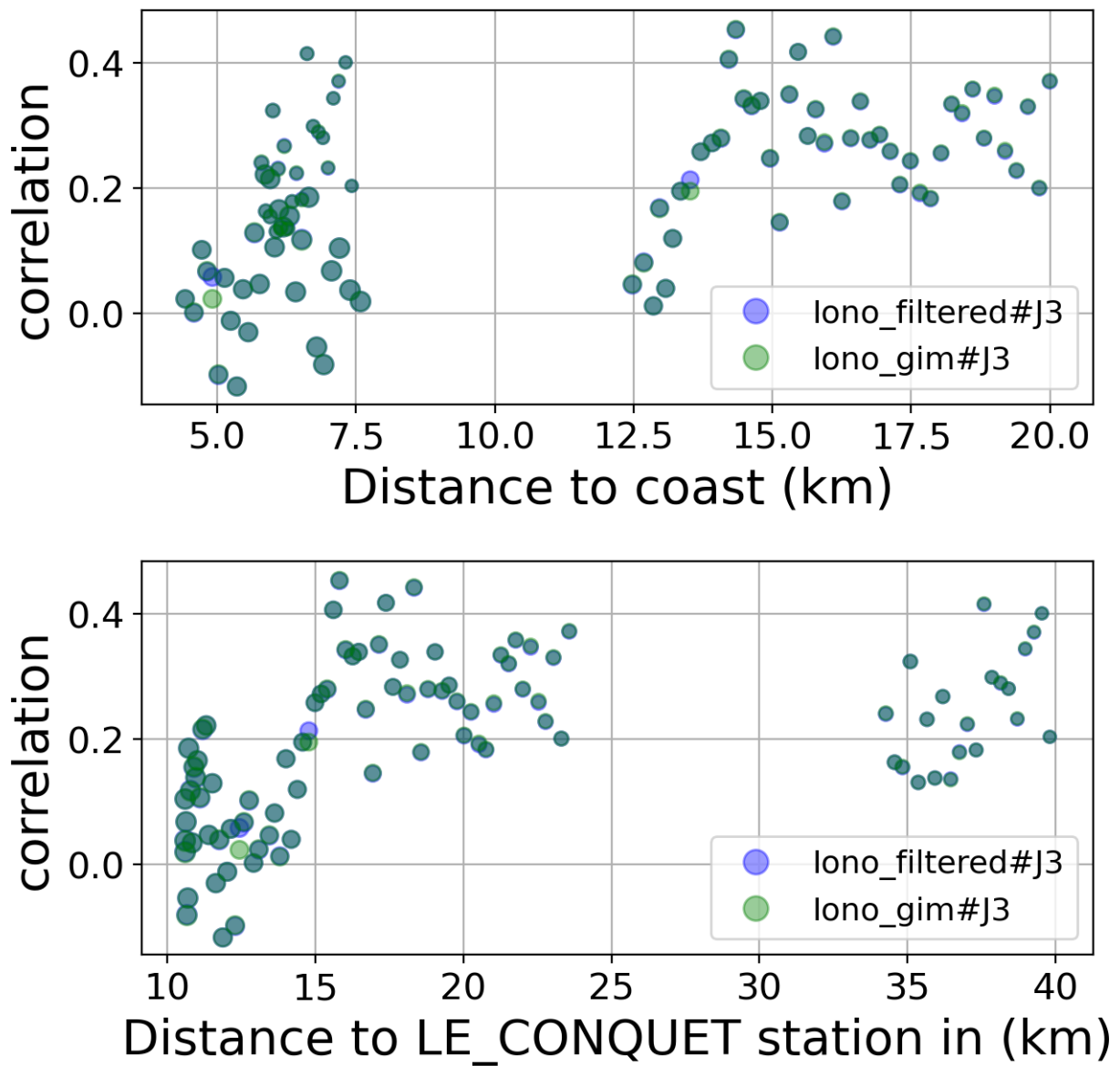


FIGURE 85 – Correlation in function of the distance to the coast/LE_CONQUET station

6.7.8 Taylor Diagram

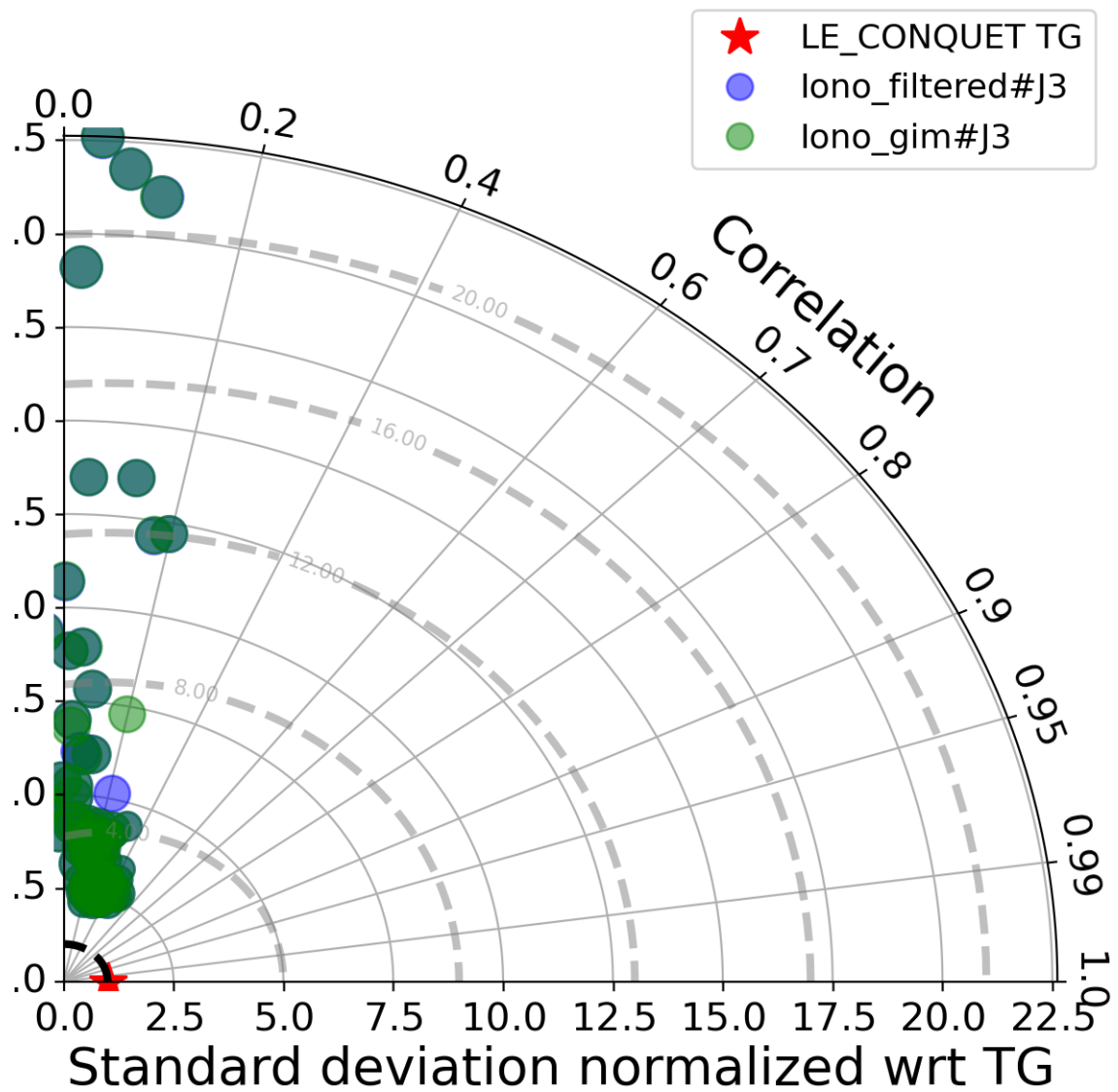


FIGURE 86 – Taylor diagram

6.7.9 Mean statistics table of products comparison with LE_CONQUET 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)
lono_filtered#J3	85.897	0.2	0.238	0.236
lono_gim#J3	85.927	0.2	0.24	0.237

FIGURE 87 – Mean statistics table of the common points in the altimetry products

6.7.10 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 105 point.

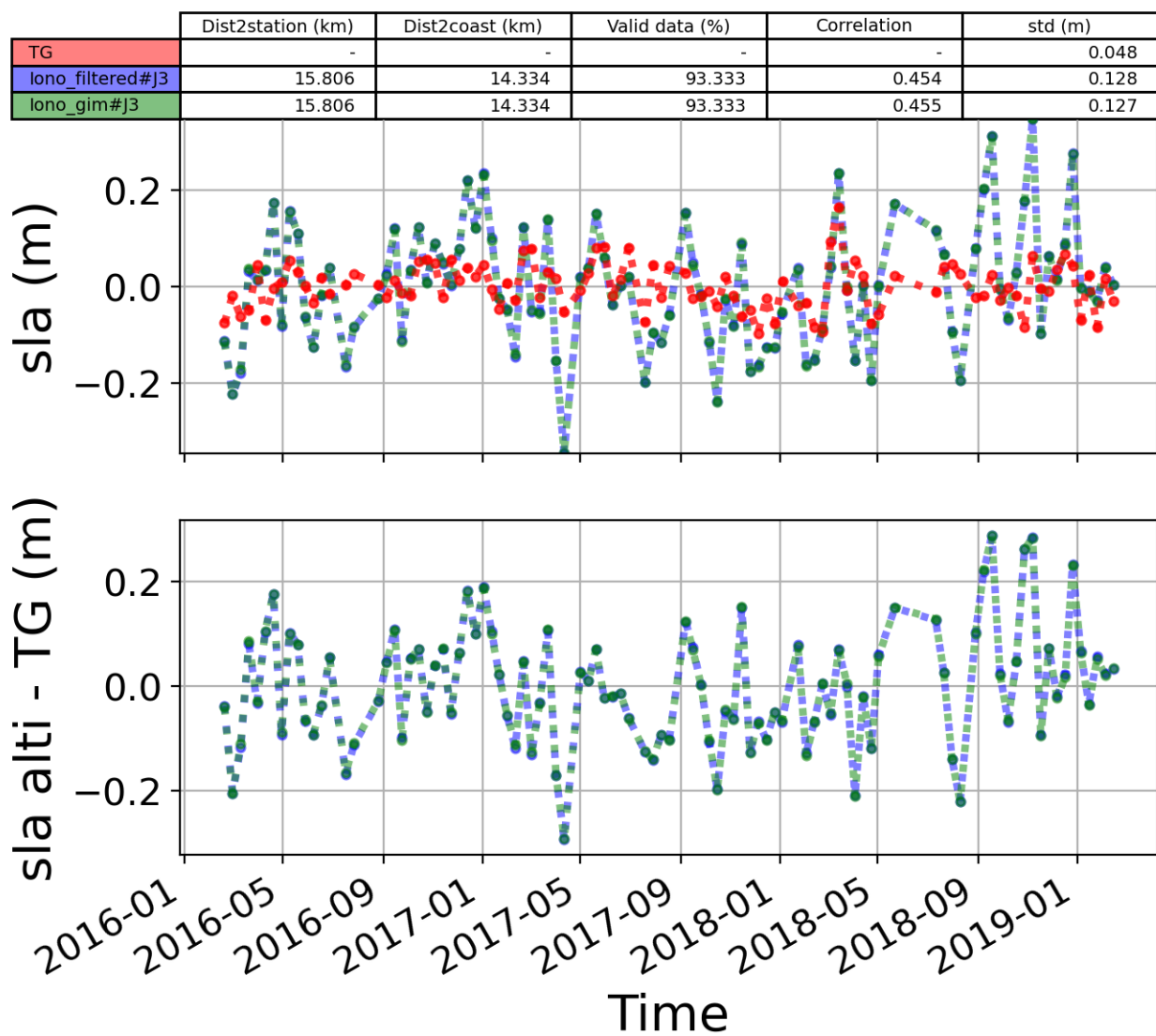


FIGURE 88 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.8 Station : Holyhead

- Nearest track to Holyhead station is the track number track163
- The area of interest is limited by :
 - A circle which it's center is the Holyhead tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.8.1 correlation visualization in maps view % Holyhead tide gauge

Correlation Altimerty data with respect to Holyhead Tide gauge data

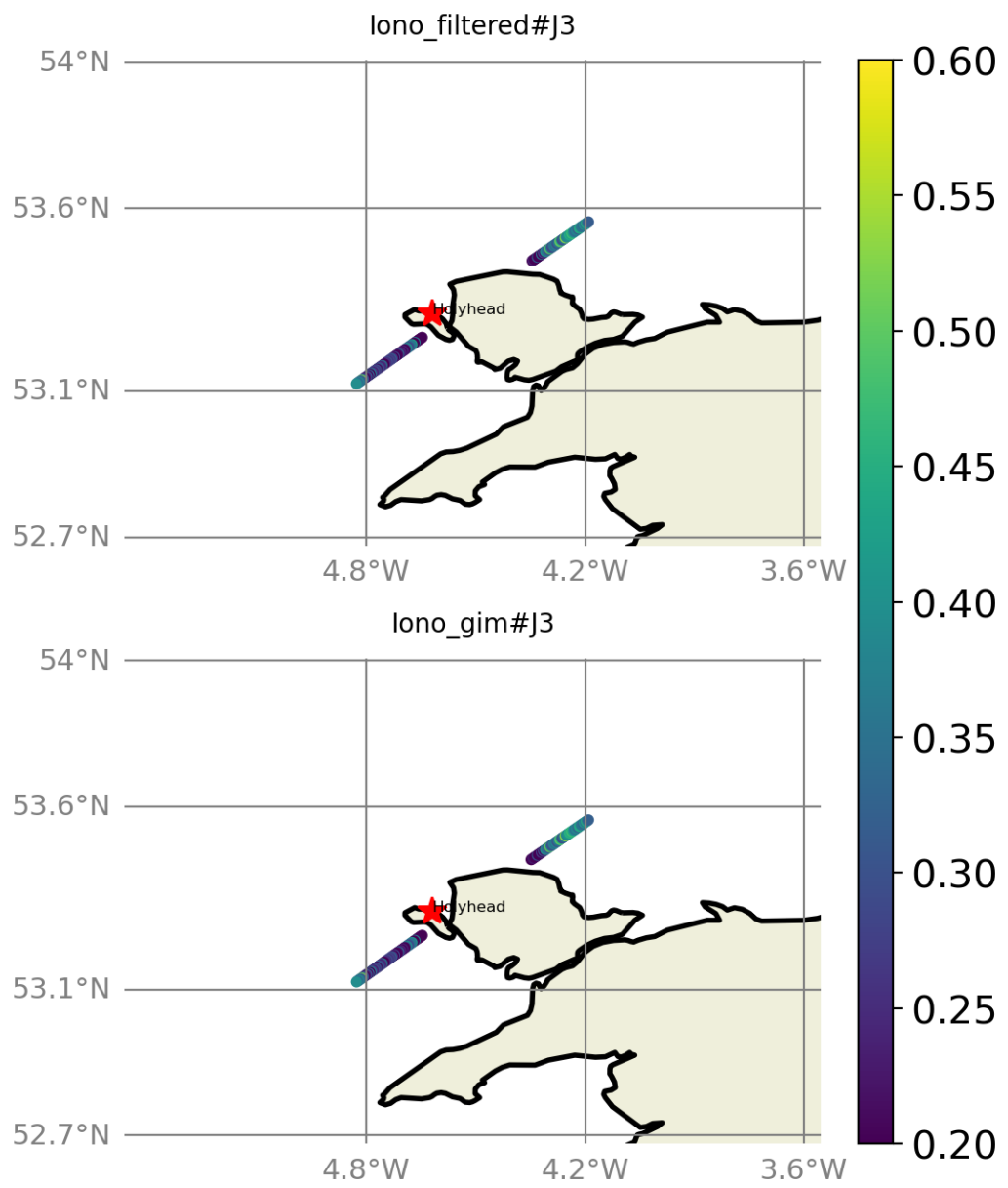


FIGURE 89 – correlation visualization in maps view % Holyhead tide gauge

6.8.2 rmsd visualization in maps view % Holyhead tide gauge

Rmsd (m) Altimerty data with respect to Holyhead Tide gauge data

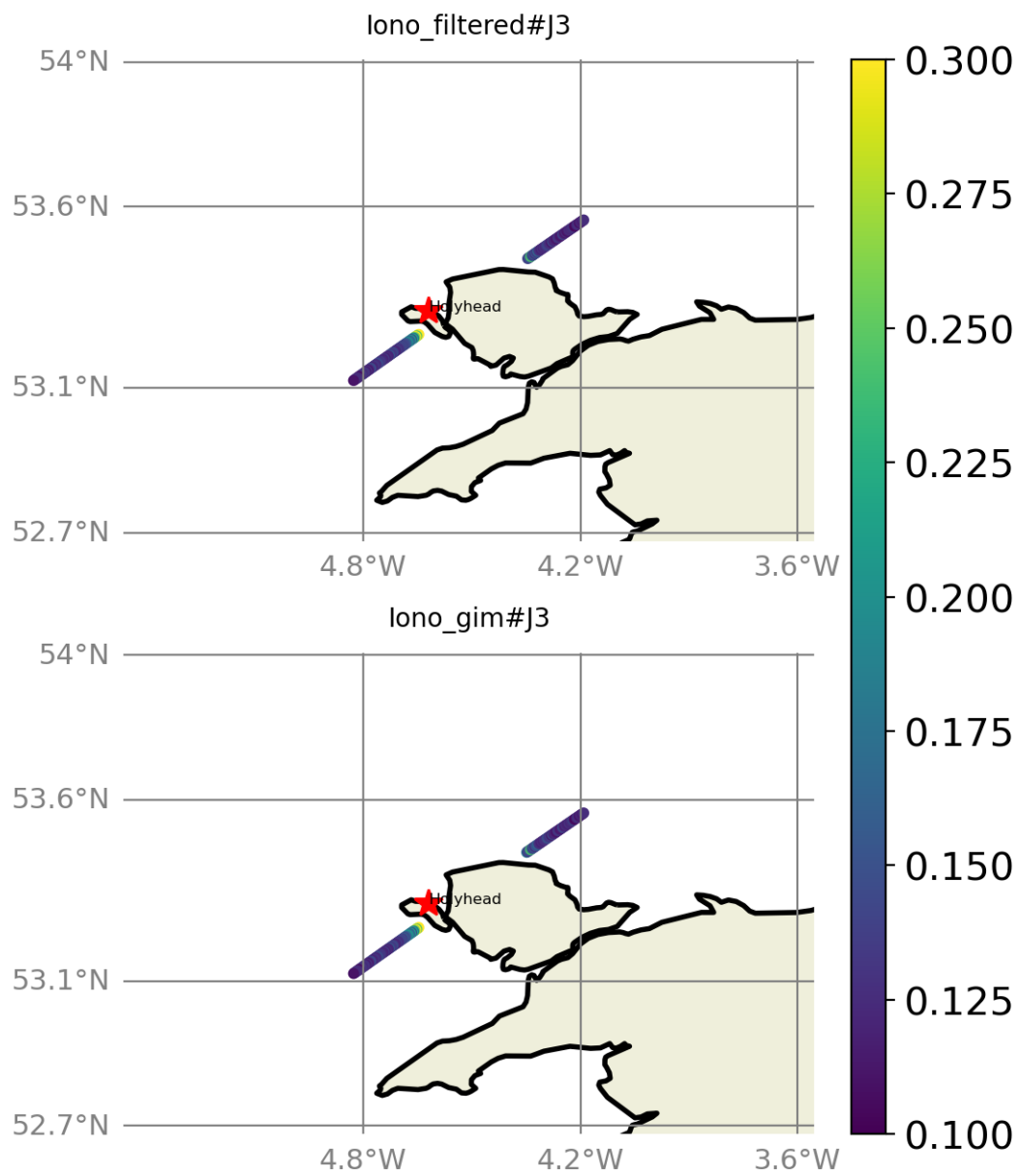


FIGURE 90 – rmsd visualization in maps view % Holyhead tide gauge

6.8.3 std visualization in maps view % Holyhead tide gauge

Std (m) Altimerty data with respect to Holyhead Tide gauge data

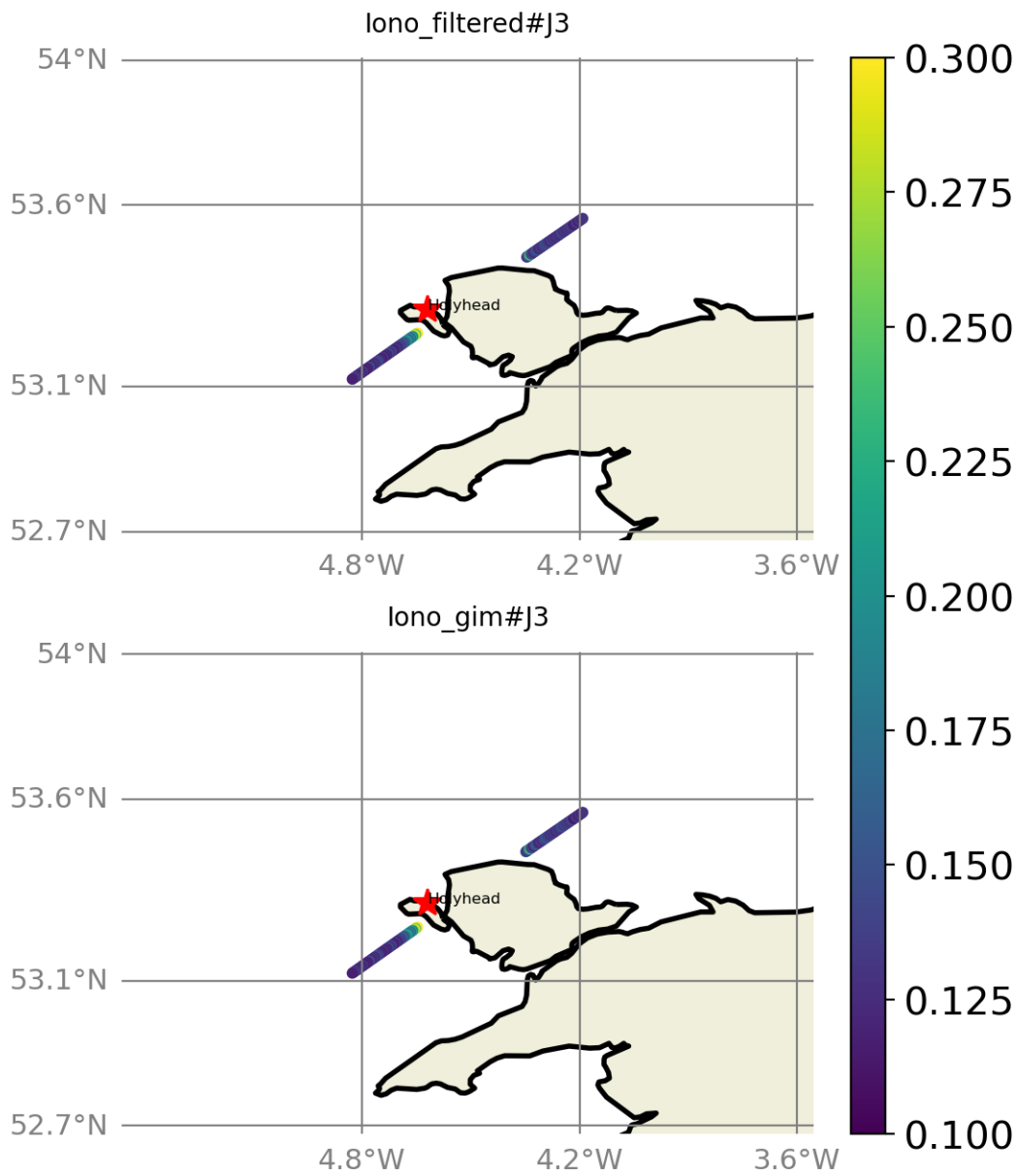


FIGURE 91 – std visualization in maps view % Holyhead tide gauge

6.8.4 valid_data_percent visualization in maps view % Holyhead tide gauge

Valid_Data_Percent (%) Altimerty data with respect to Holyhead Tide gauge data

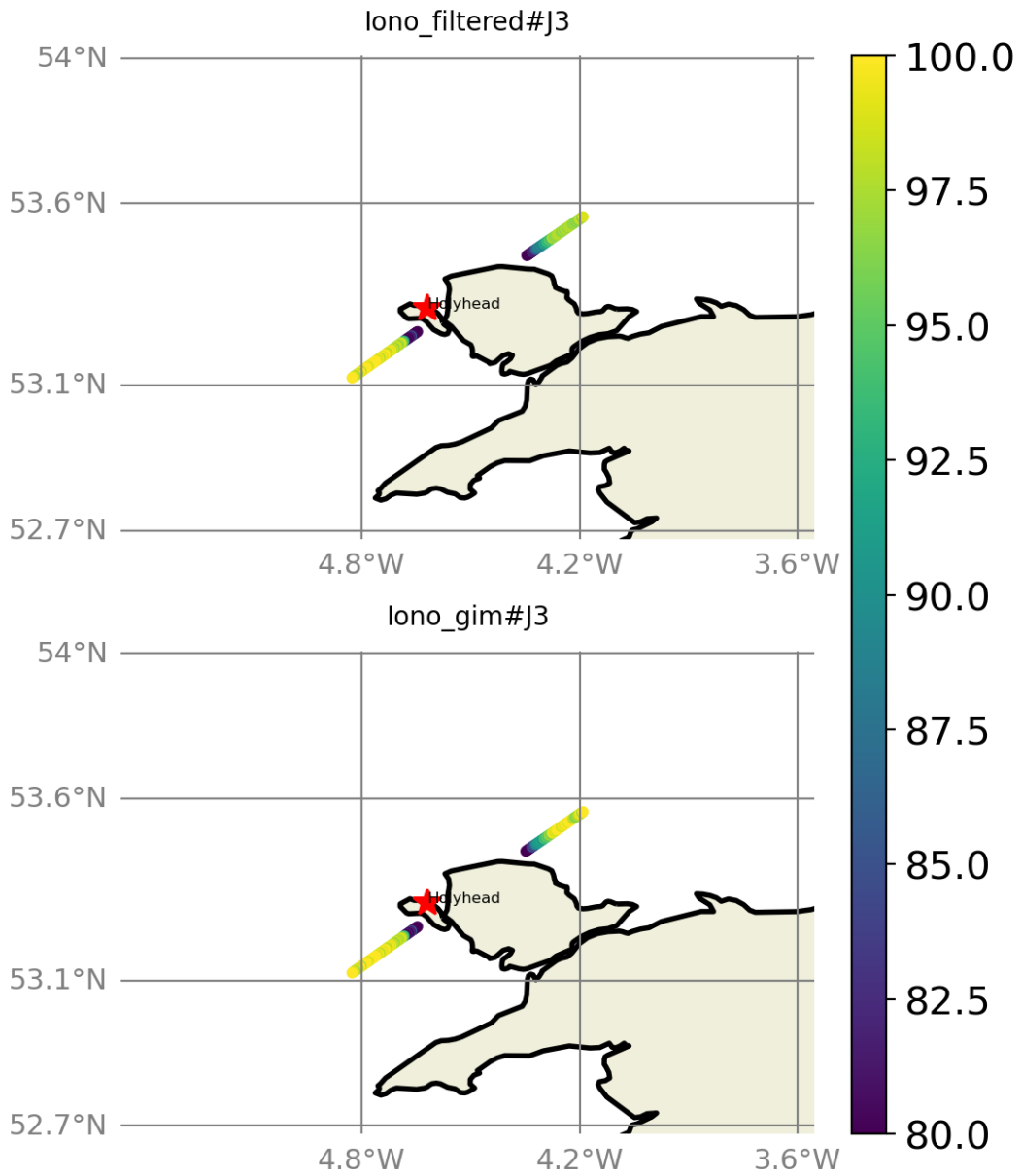


FIGURE 92 – valid_data_percent visualization in maps view % Holyhead tide gauge

6.8.5 Valid data (%) in function of distance to coast/Holyhead 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. $maxNB = 88$ 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.

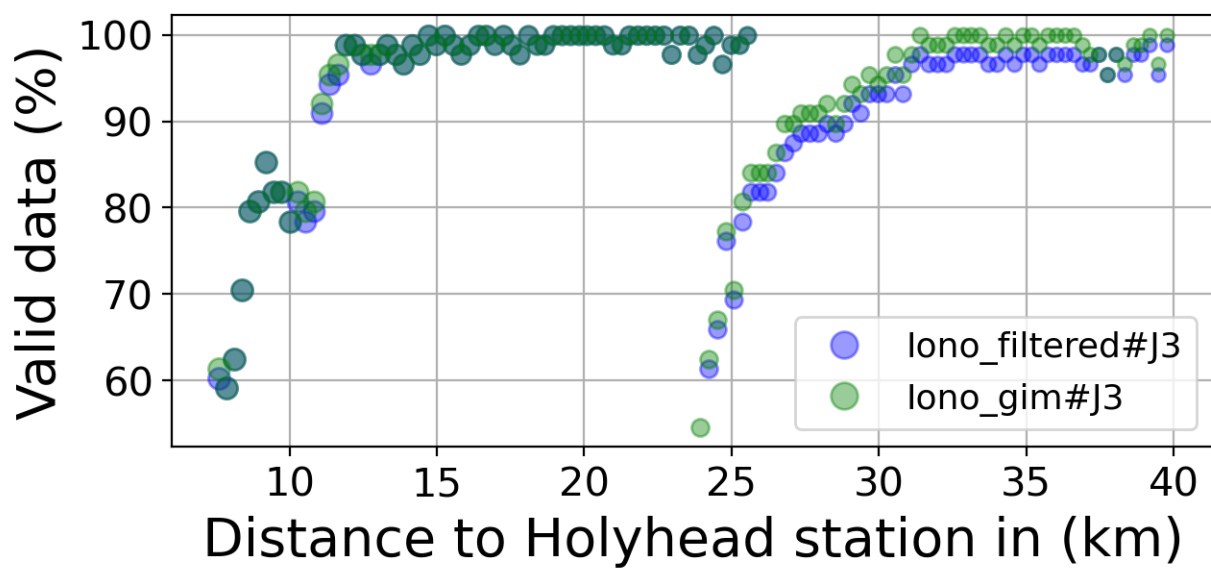
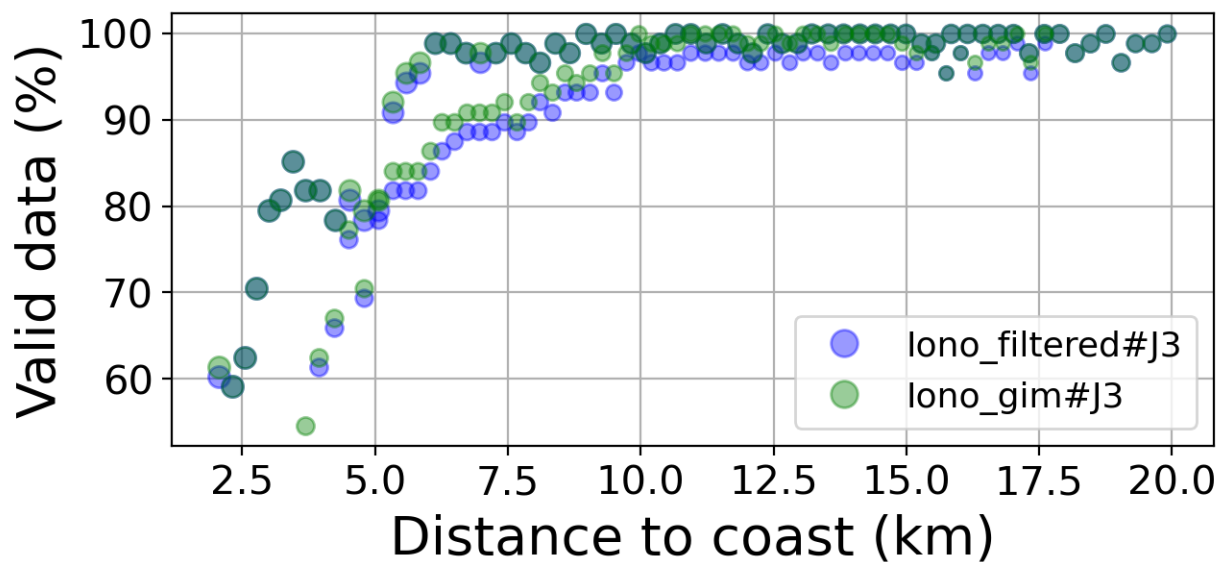


FIGURE 93 – Valid data (%) in function of distance to coast/Holyhead station

6.8.6 Std in function of distance to coast/Holyhead station

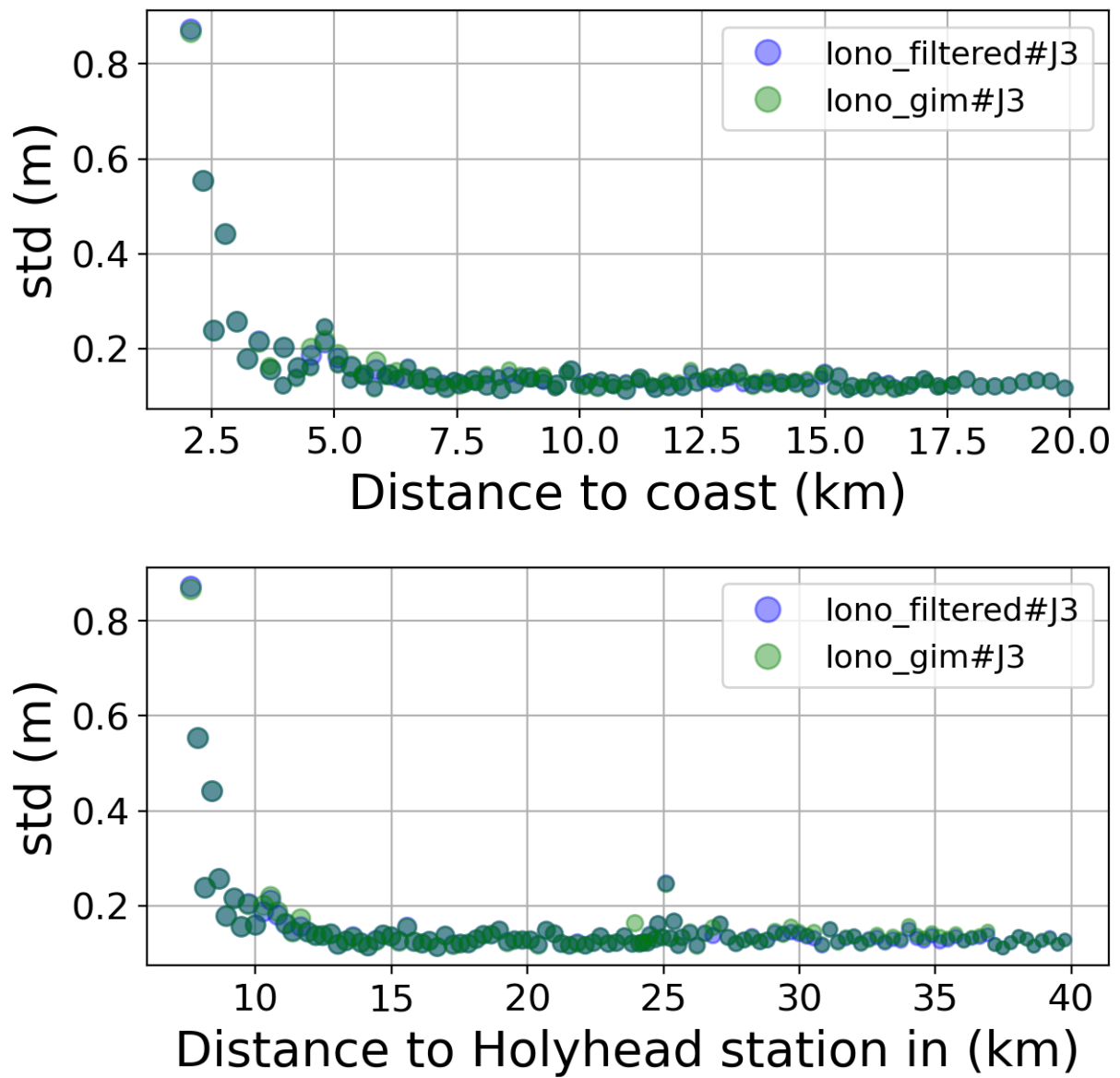


FIGURE 94 – Std in function of the distance to the coast/Holyhead station

6.8.7 Correlation in function of distance to coast/Holyhead station

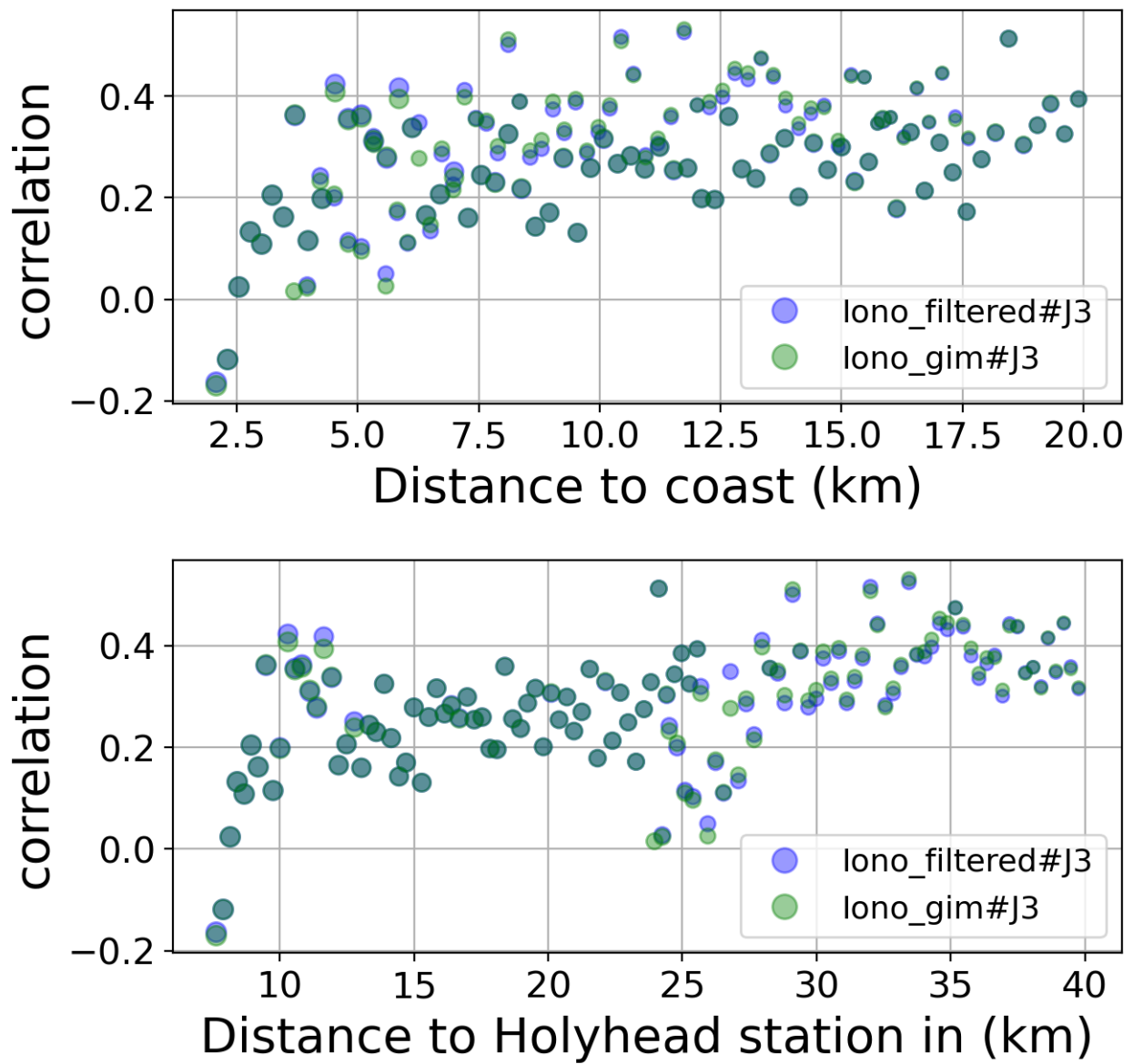


FIGURE 95 – Correlation in function of the distance to the coast/Holyhead station

6.8.8 Taylor Diagram

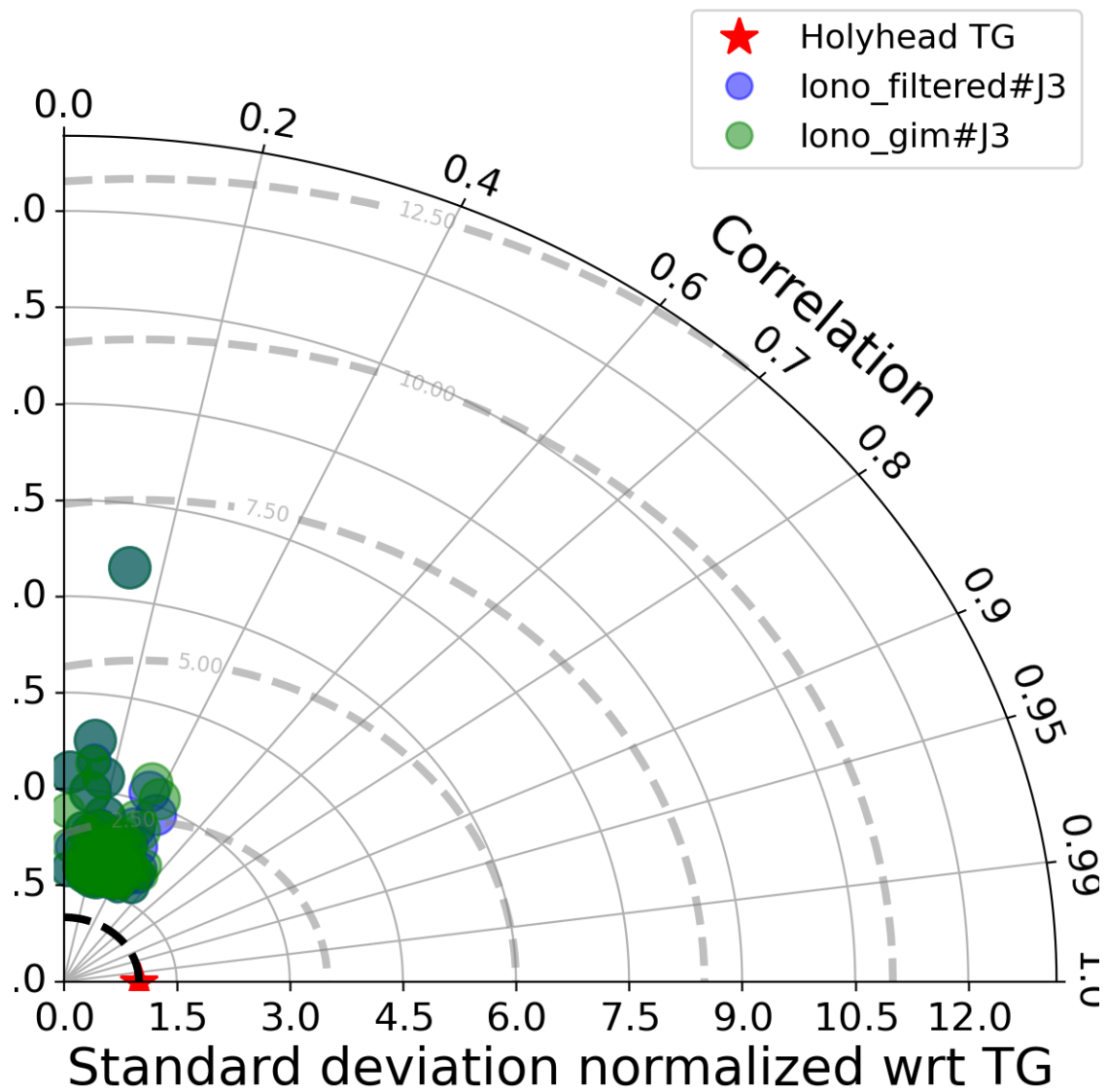


FIGURE 96 – Taylor diagram

6.8.9 Mean statistics table of products comparison with Holyhead 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)
lono_filtered#J3	93.049	0.288	0.151	0.148
lono_gim#J3	93.987	0.289	0.152	0.149

FIGURE 97 – Mean statistics table of the common points in the altimetry products

6.8.10 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 88 point.

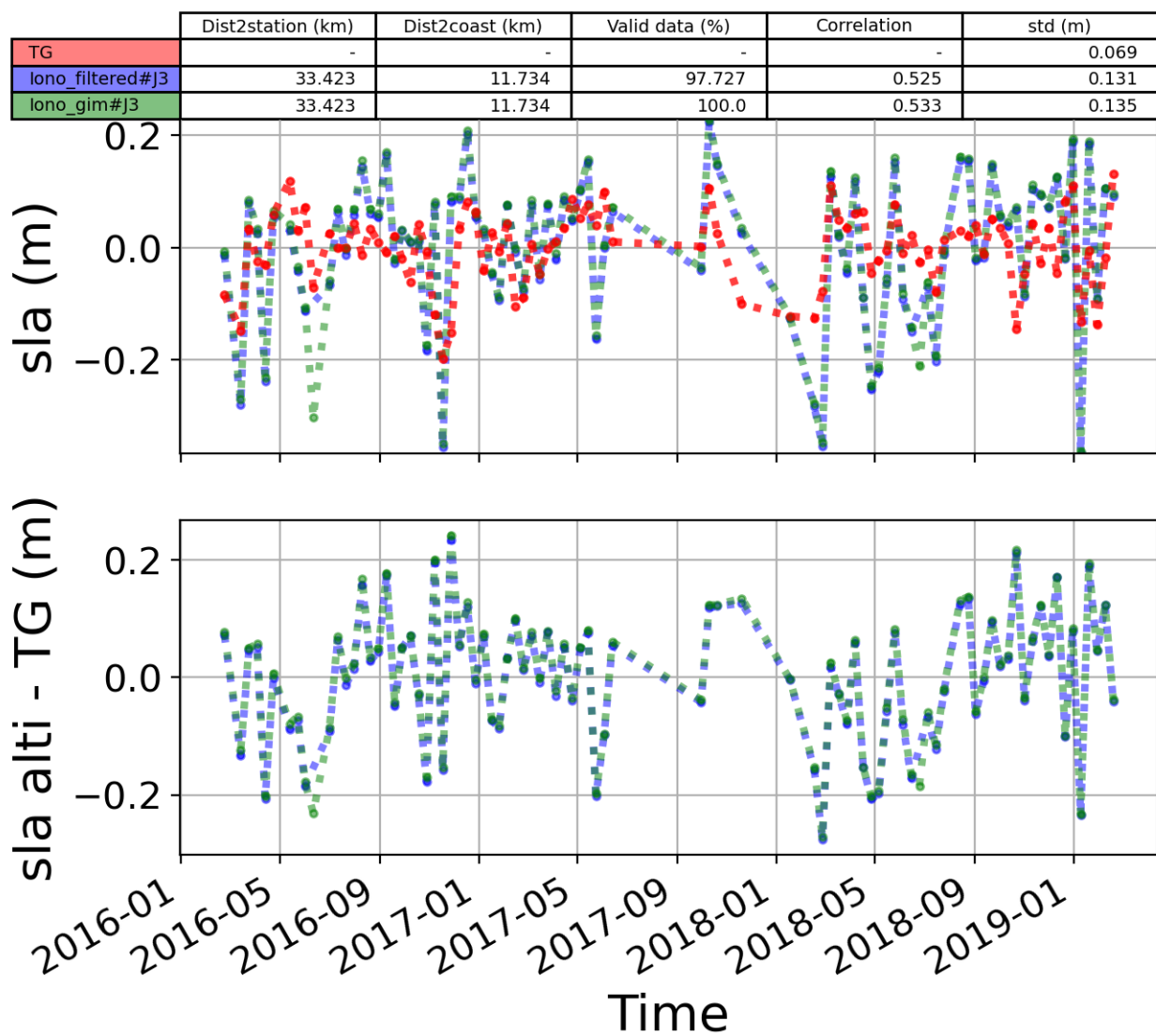


FIGURE 98 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.9 Station : LE_CROUESTY

- Nearest track to LE_CROUESTY station is the track number track137
- The area of interest is limited by :
 - A circle which it's center is the LE_CROUESTY tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.9.1 correlation visualization in maps view % LE_CROUESTY tide gauge

Correlation Altimerty data with respect to LE_CROUESTY Tide gauge data

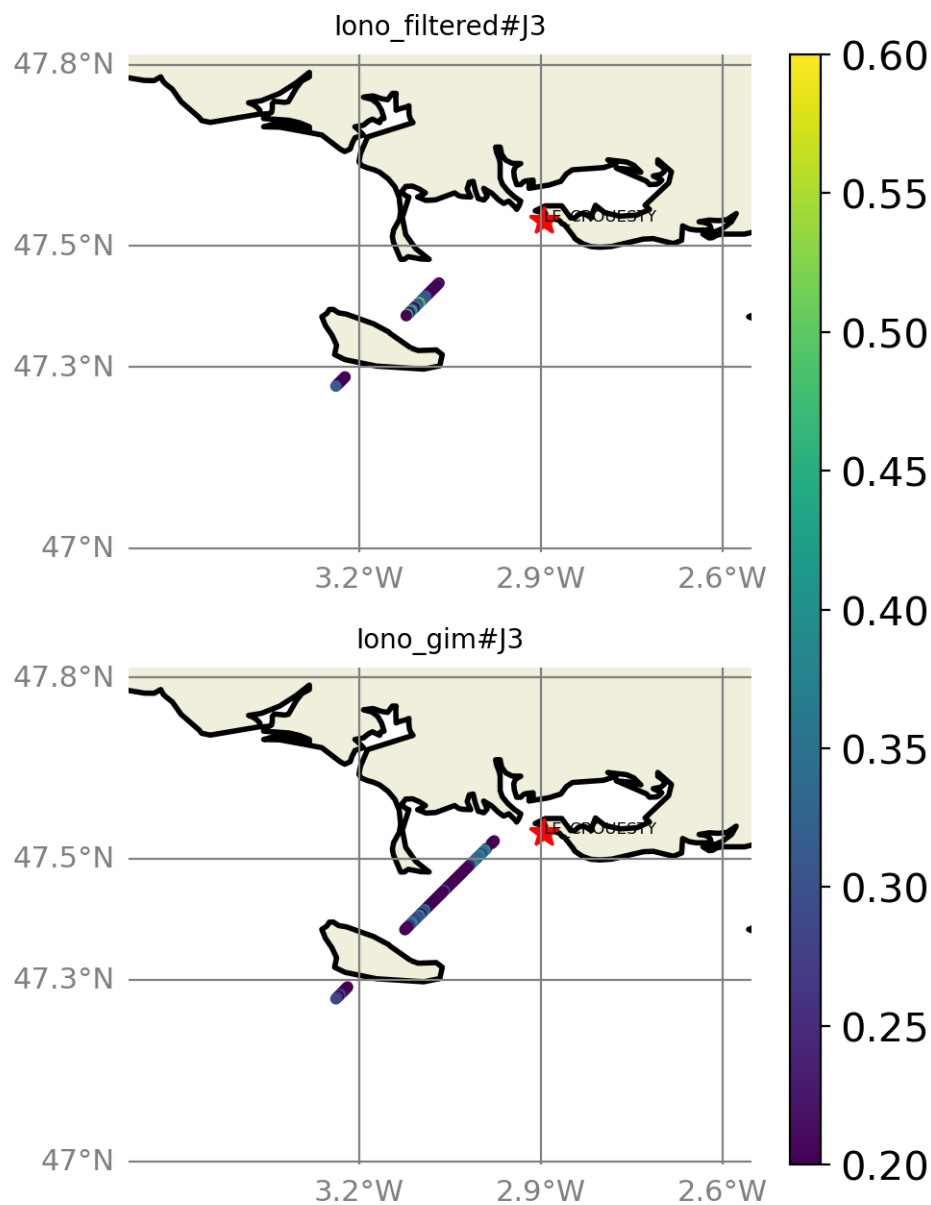


FIGURE 99 – correlation visualization in maps view % LE_CROUESTY tide gauge

6.9.2 rmsd visualization in maps view % LE_CROUESTY tide gauge

Rmsd (m) Altimerty data with respect to LE_CROUESTY Tide gauge data

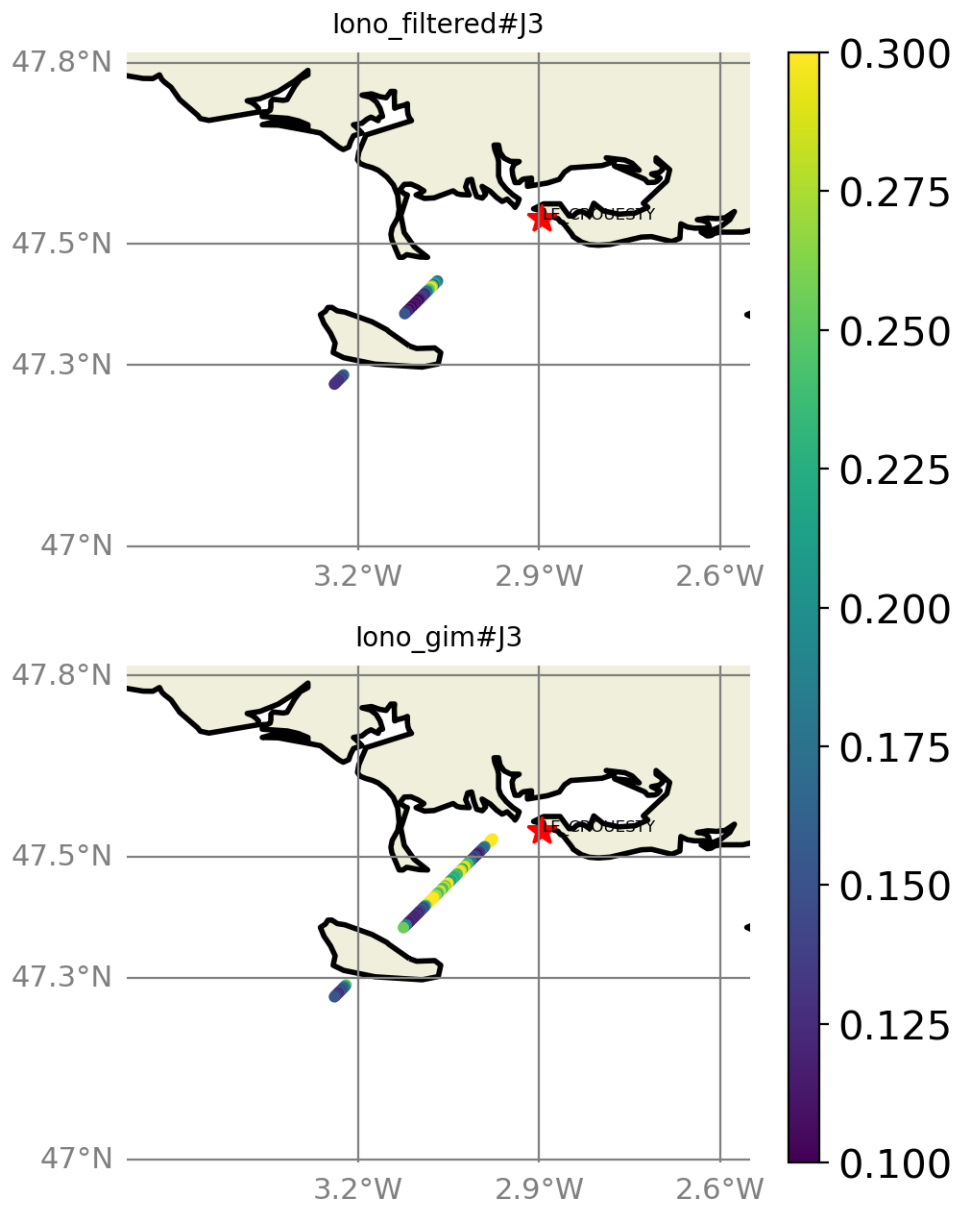


FIGURE 100 – rmsd visualization in maps view % LE_CROUESTY tide gauge

6.9.3 std visualization in maps view % LE_CROUESTY tide gauge

Std (m) Altimerty data with respect to LE_CROUESTY Tide gauge data

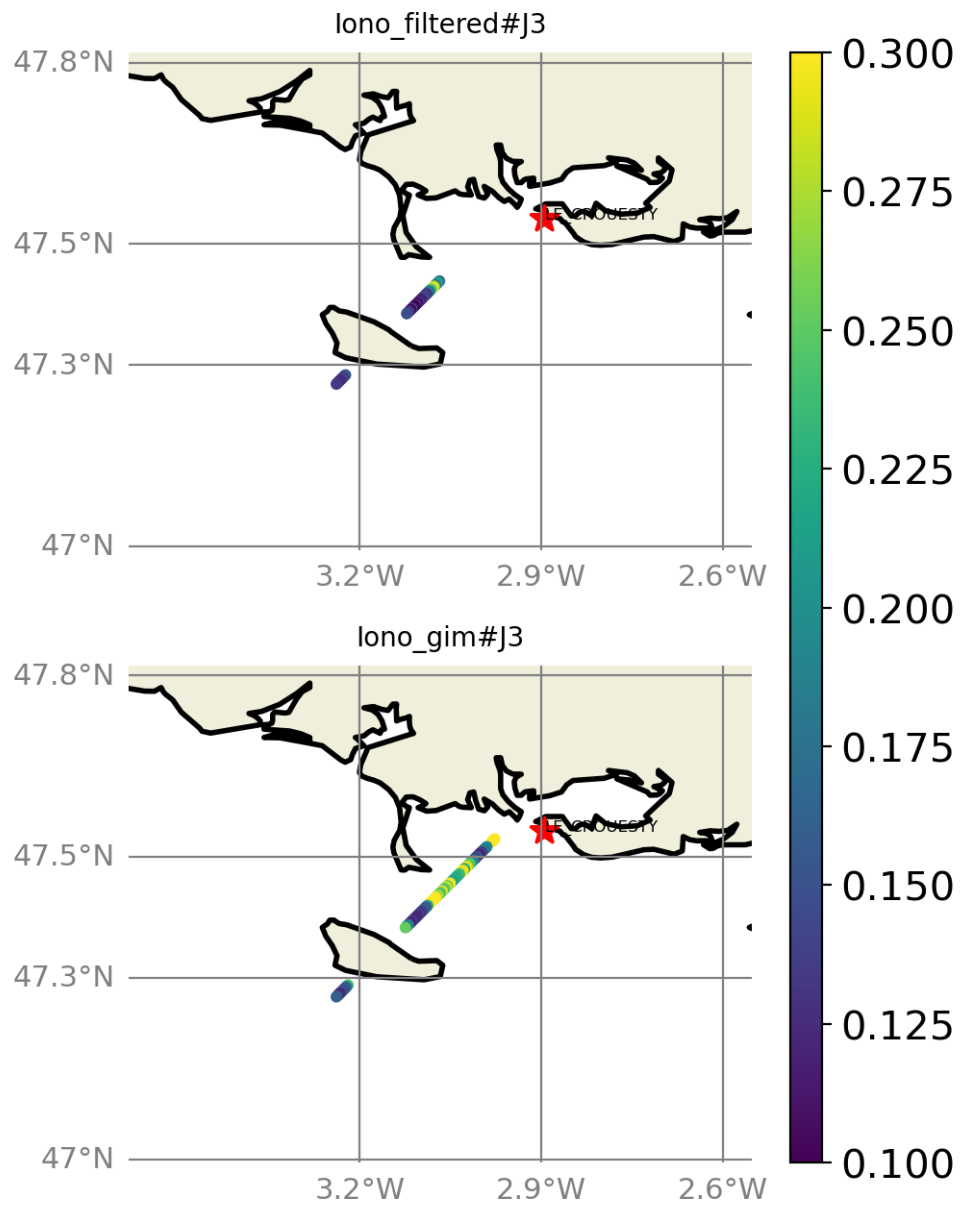


FIGURE 101 – std visualization in maps view % LE_CROUESTY tide gauge

6.9.4 valid_data_percent visualization in maps view % LE_CROUESTY tide gauge

Valid_Data_Percent (%) Altimerty data with respect to LE_CROUESTY Tide gauge data

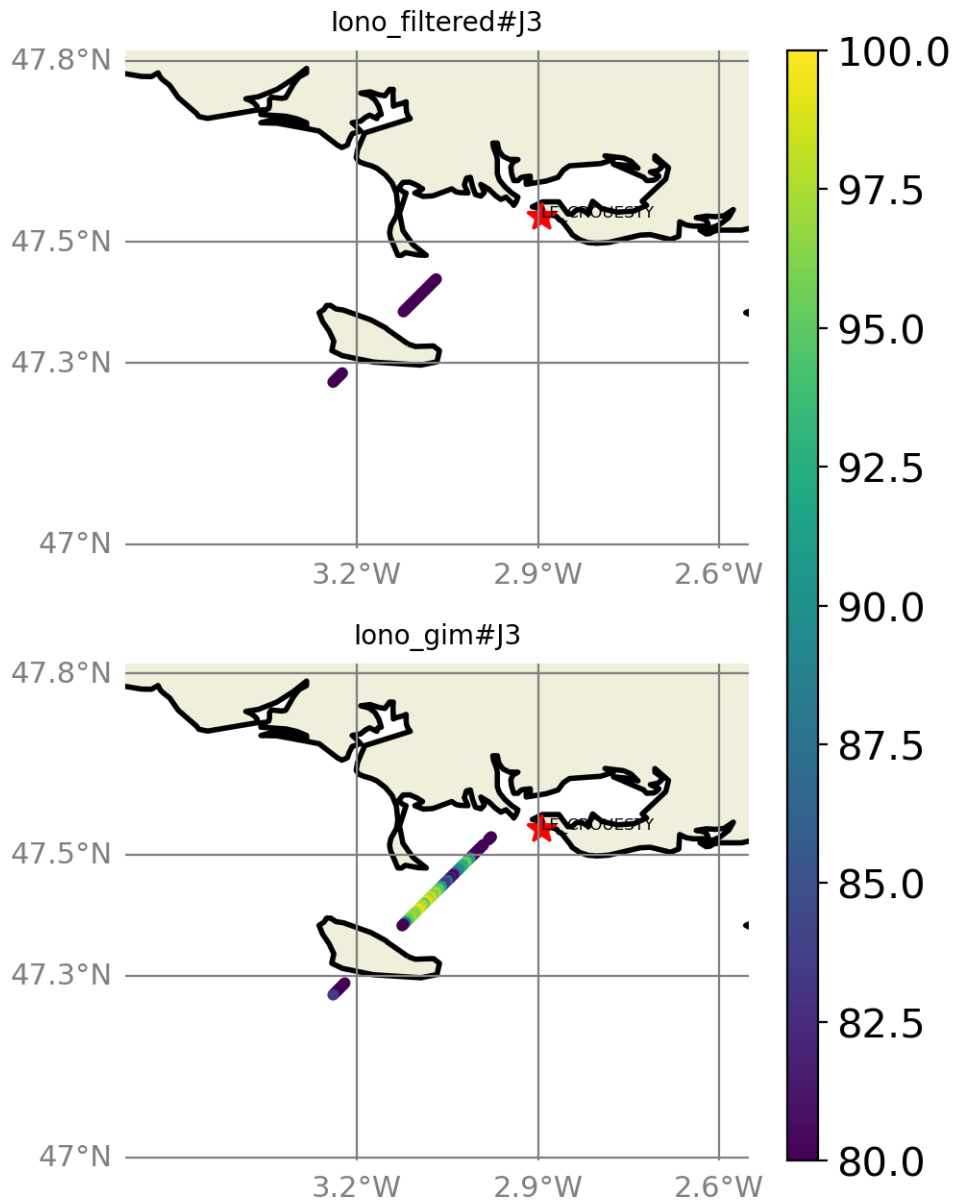


FIGURE 102 – valid_data_percent visualization in maps view % LE_CROUESTY tide gauge

6.9.5 Valid data (%) in function of distance to coast/LE_CROUESTY 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. $maxNB = 103$ 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.

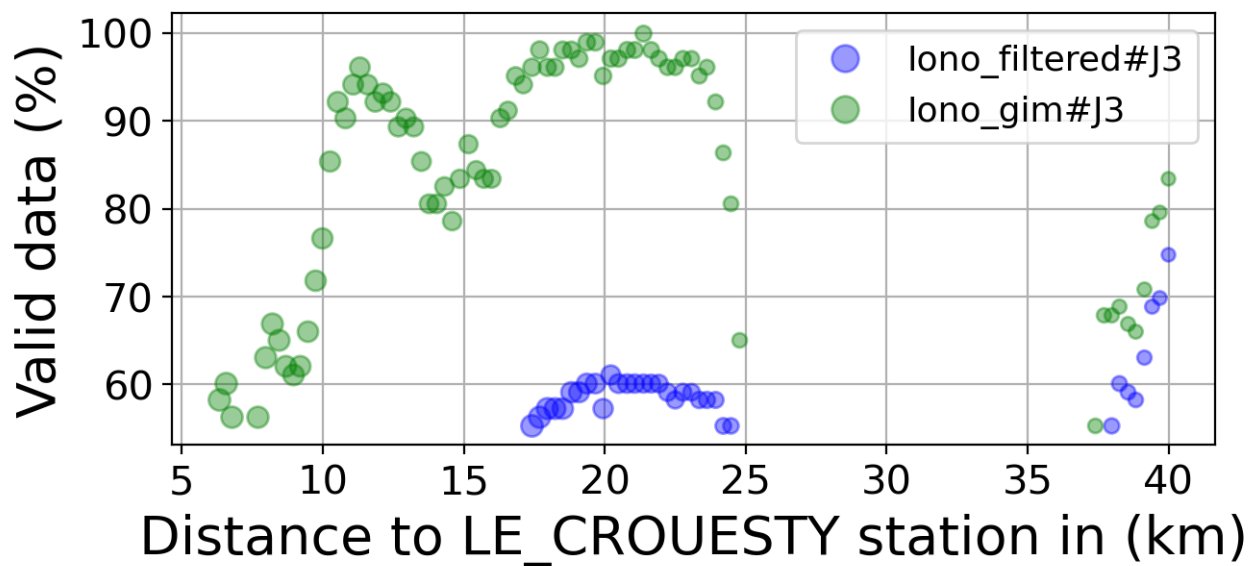
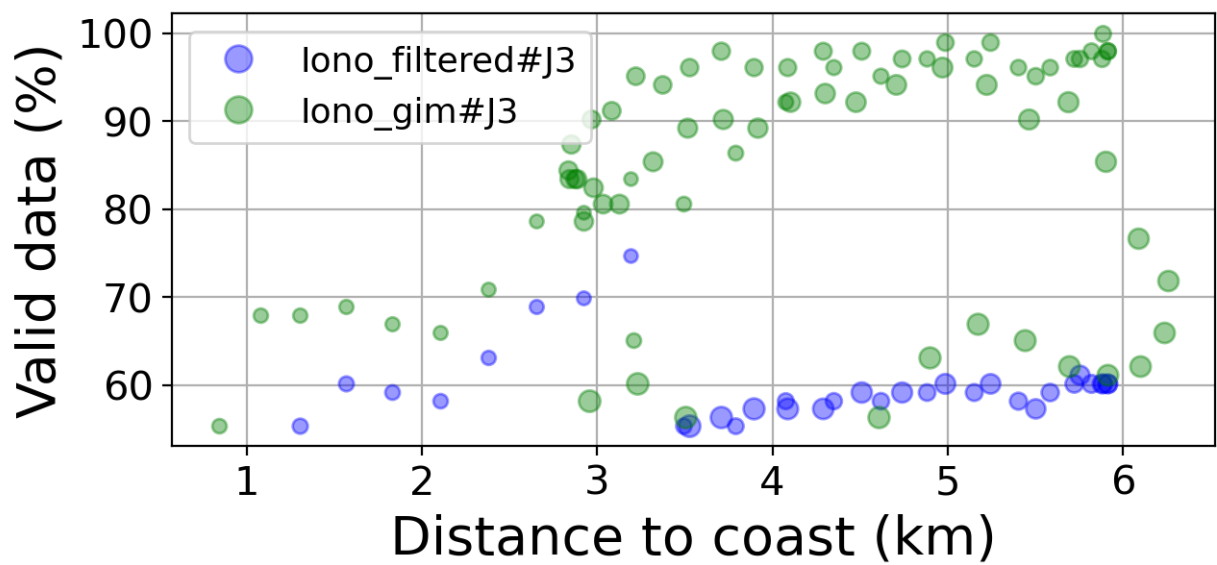


FIGURE 103 – Valid data (%) in function of distance to coast/LE_CROUESTY station

6.9.6 Std in function of distance to coast/LE_CROUESTY station

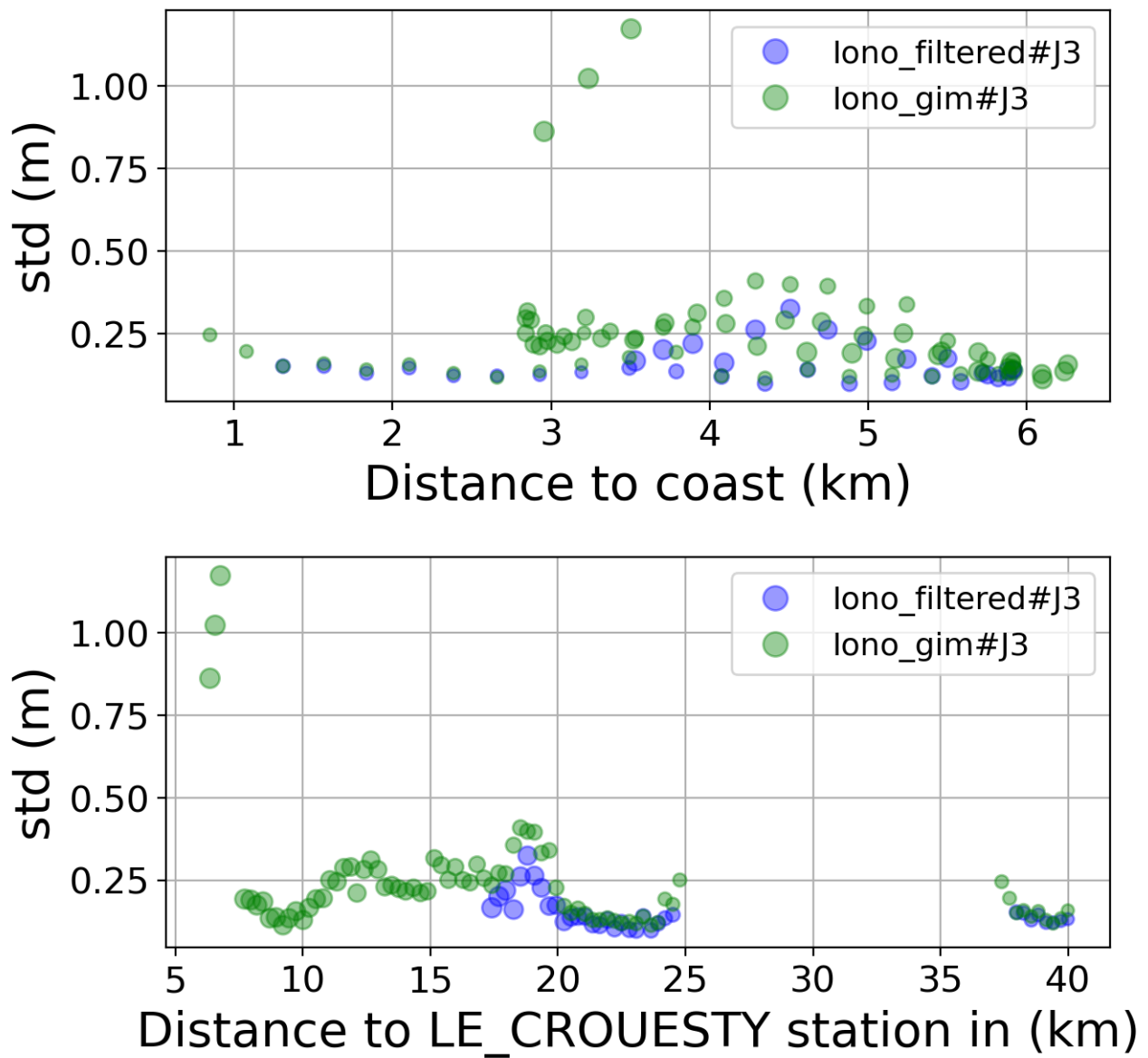


FIGURE 104 – Std in function of the distance to the coast/LE_CROUESTY station

6.9.7 Correlation in function of distance to coast/LE_CROUESTY station

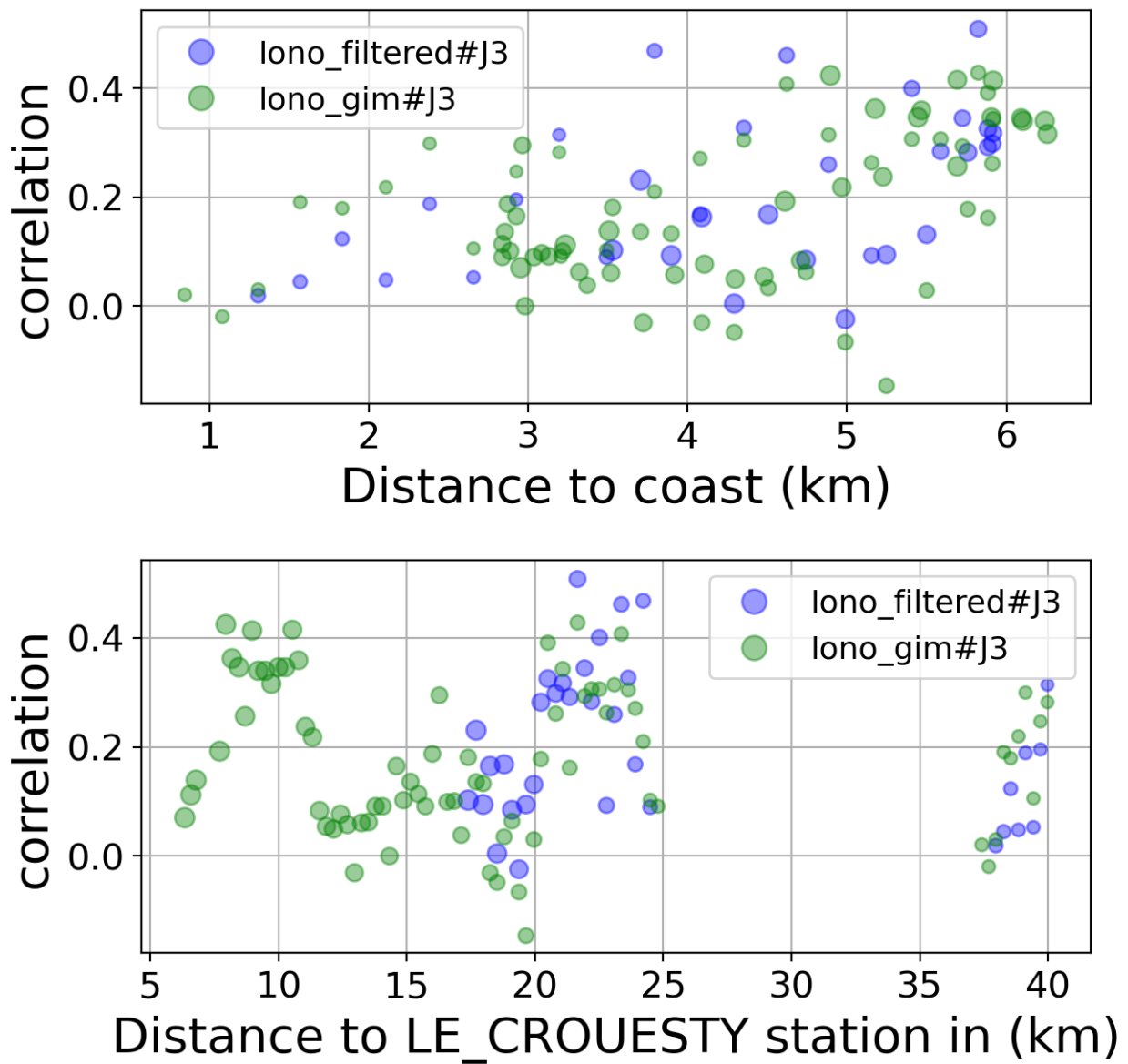


FIGURE 105 – Correlation in function of the distance to the coast/LE_CROUESTY station

6.9.8 Taylor Diagram

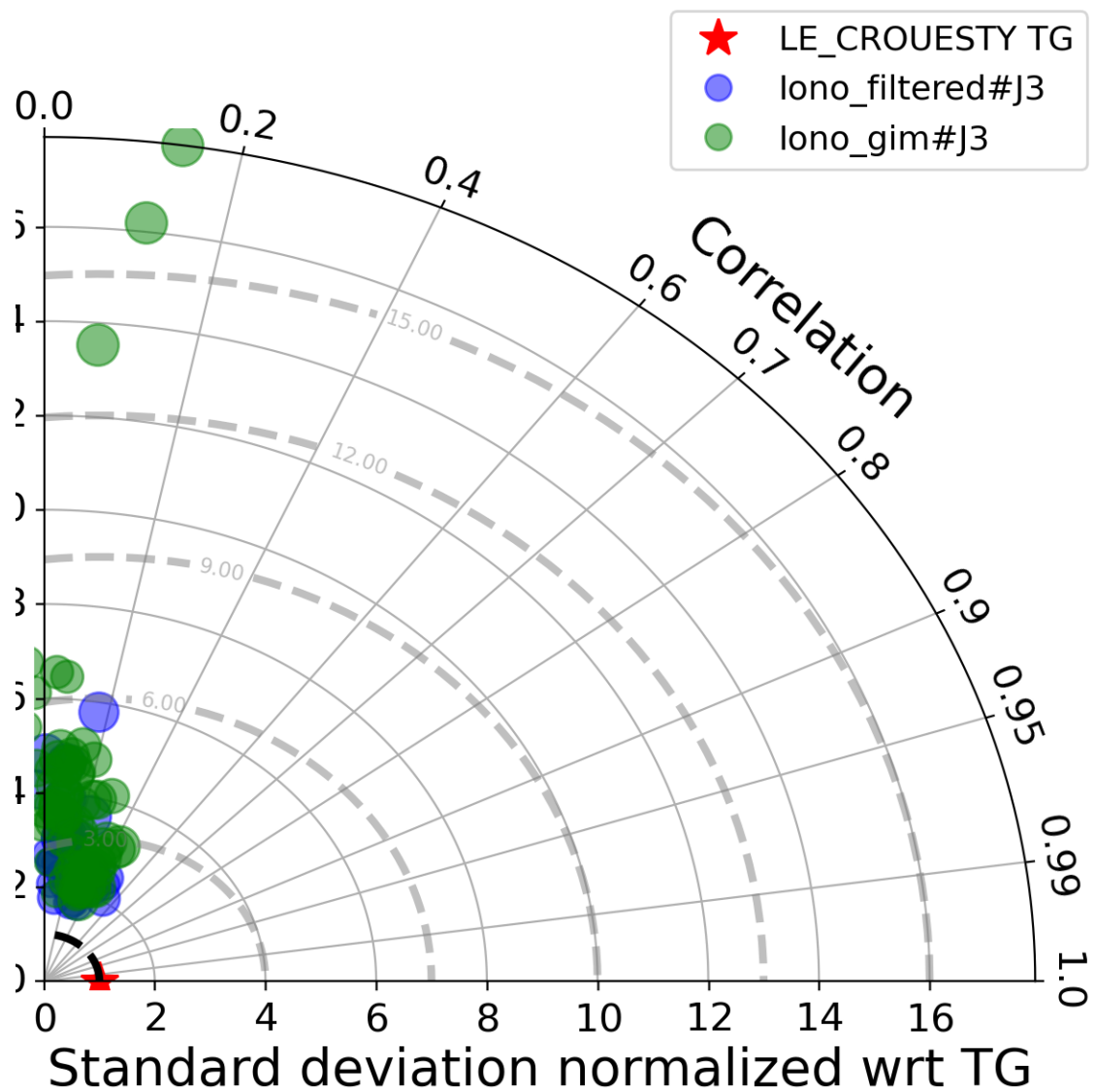


FIGURE 106 – Taylor diagram

6.9.9 Mean statistics table of products comparison with LE_CROUESTY 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)
lono_filtered#J3	59.794	0.205	0.155	0.155
lono_gim#J3	90.52	0.188	0.197	0.197

FIGURE 107 – Mean statistics table of the common points in the altimetry products

6.9.10 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 103 point.

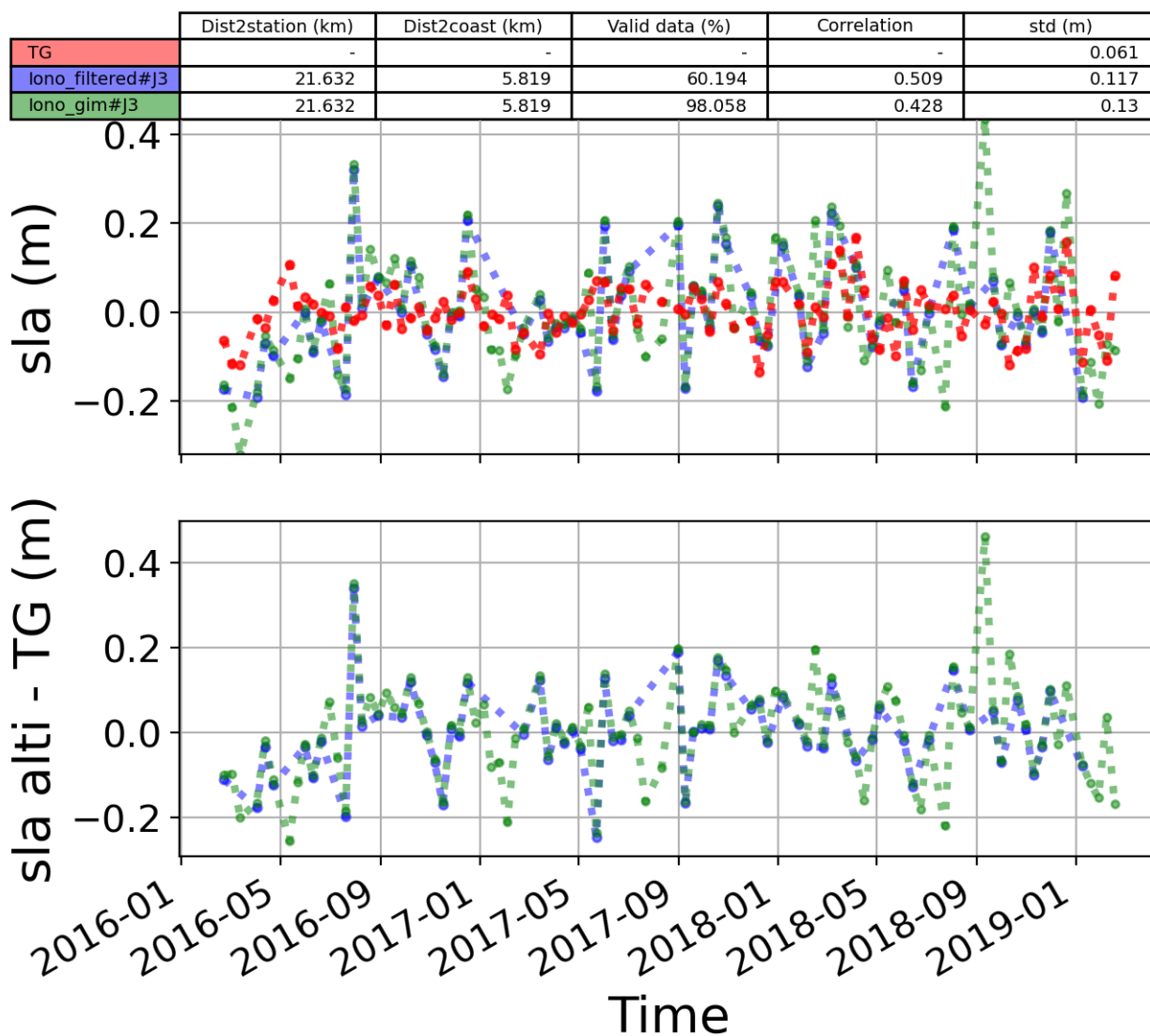


FIGURE 108 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.10 Station : North_Shields

- Nearest track to North_Shields station is the track number track120
- The area of interest is limited by :
 - A circle which it's center is the North_Shields tide gauge station location and has a Raduis of 40 Km
 - Maximum distance to the coast : 20 Km

6.10.1 correlation visualization in maps view % North_Shields tide gauge

Correlation Altimerty data with respect to North_Shields Tide gauge data

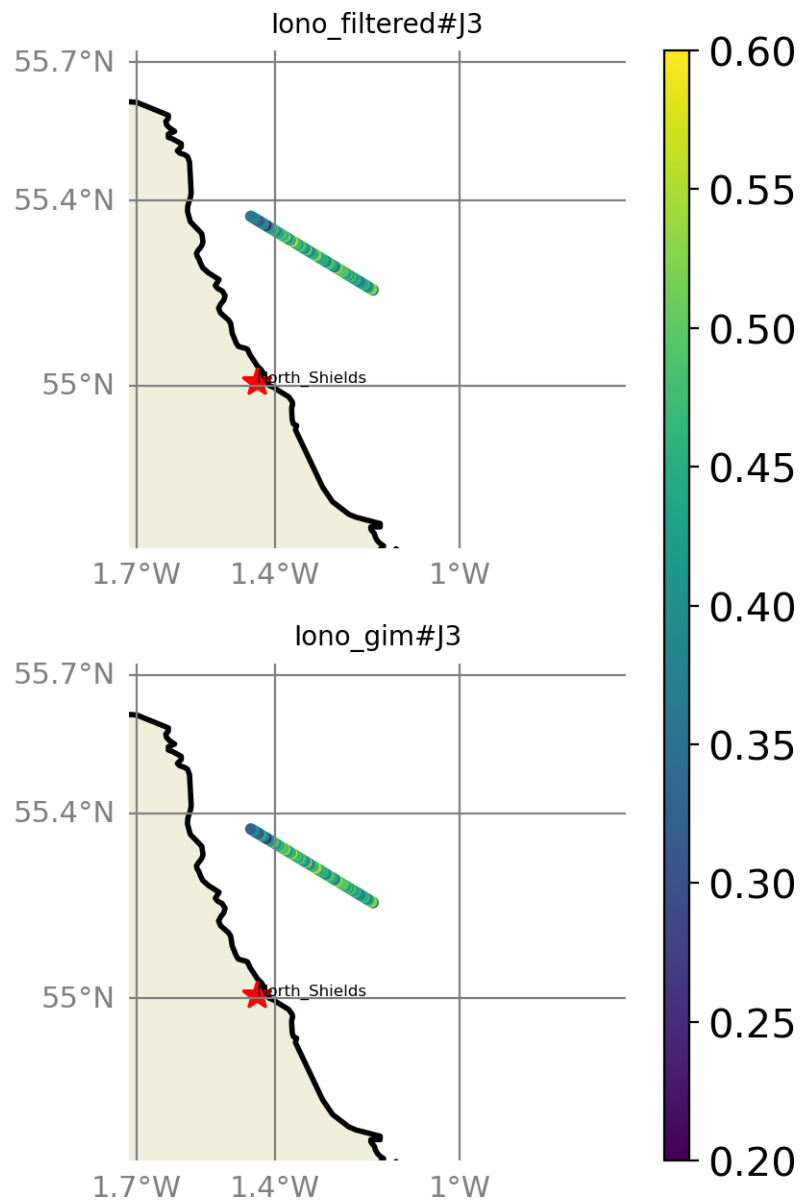


FIGURE 109 – correlation visualization in maps view % North_Shields tide gauge

6.10.2 rmsd visualization in maps view % North_Shields tide gauge

Rmsd (m) Altimerty data with respect to North_Shields Tide gauge data

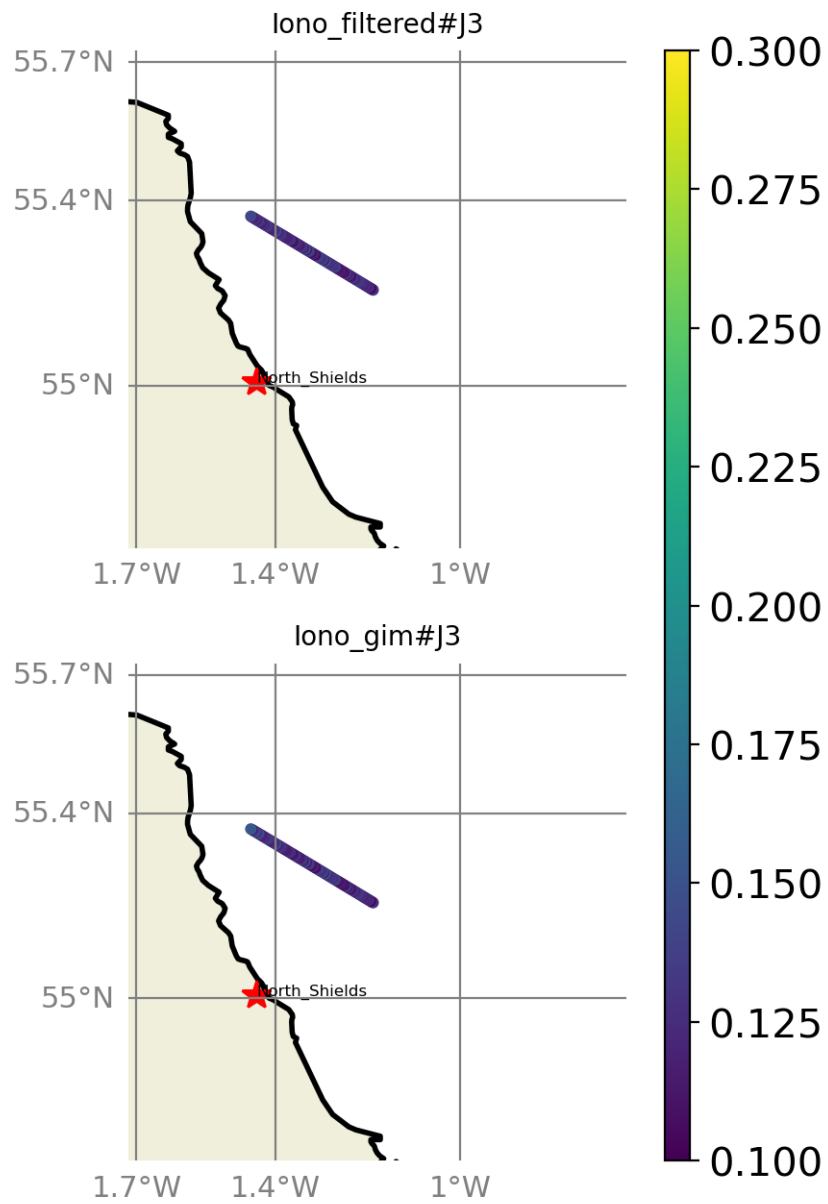


FIGURE 110 – rmsd visualization in maps view % North_Shields tide gauge

6.10.3 std visualization in maps view % North_Shields tide gauge

Std (m) Altimerty data with respect to North_Shields Tide gauge data

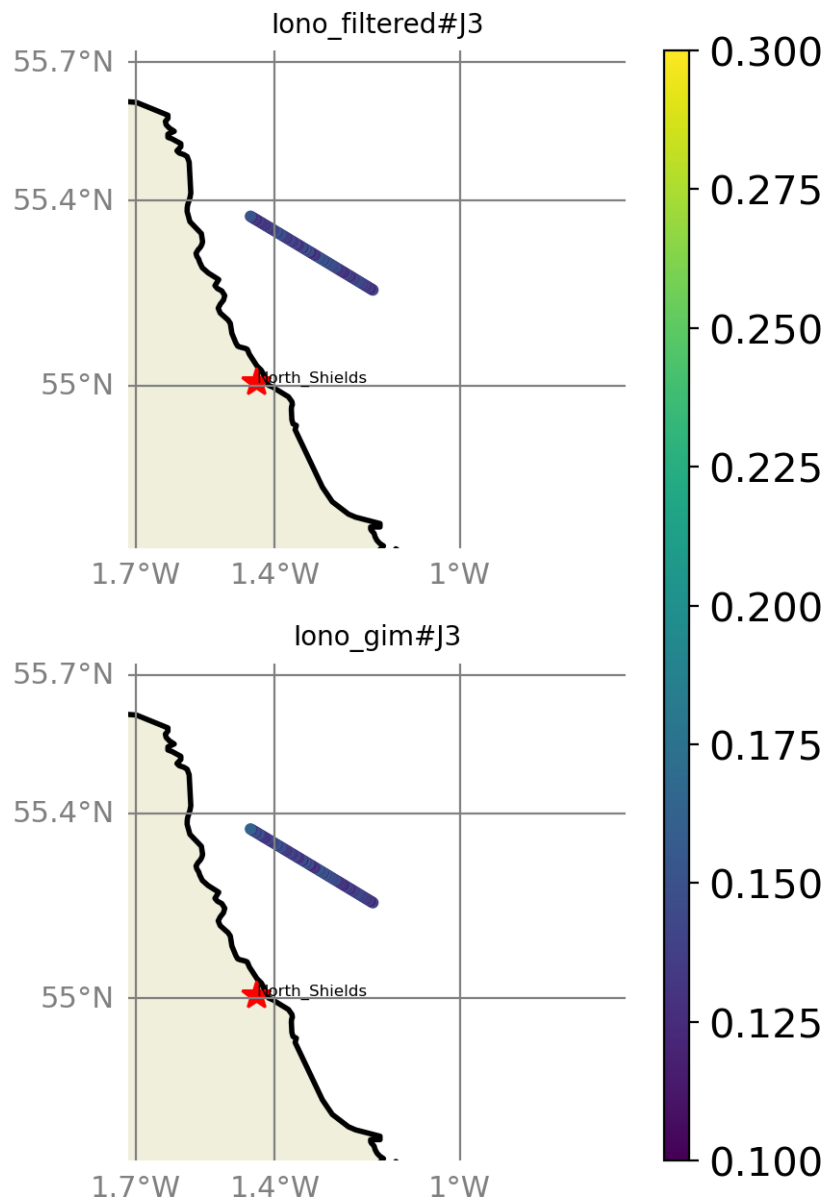


FIGURE 111 – std visualization in maps view % North_Shields tide gauge

6.10.4 valid_data_percent visualization in maps view % North_Shields tide gauge

Valid_Data_Percent (%) Altimerty data with respect to North_Shields Tide gauge data

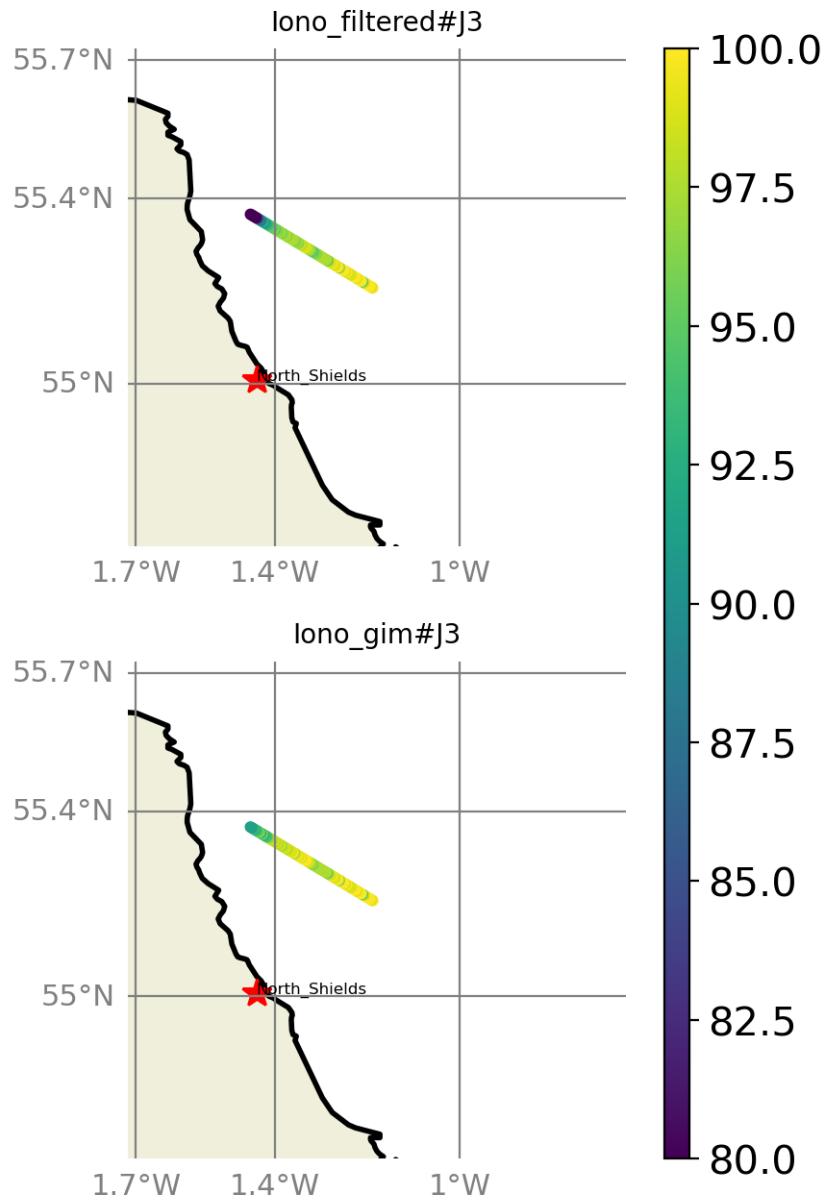


FIGURE 112 – valid_data_percent visualization in maps view % North_Shields tide gauge

6.10.5 Valid data (%) in function of distance to coast/North_Shields 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. $maxNB = 82$ 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.

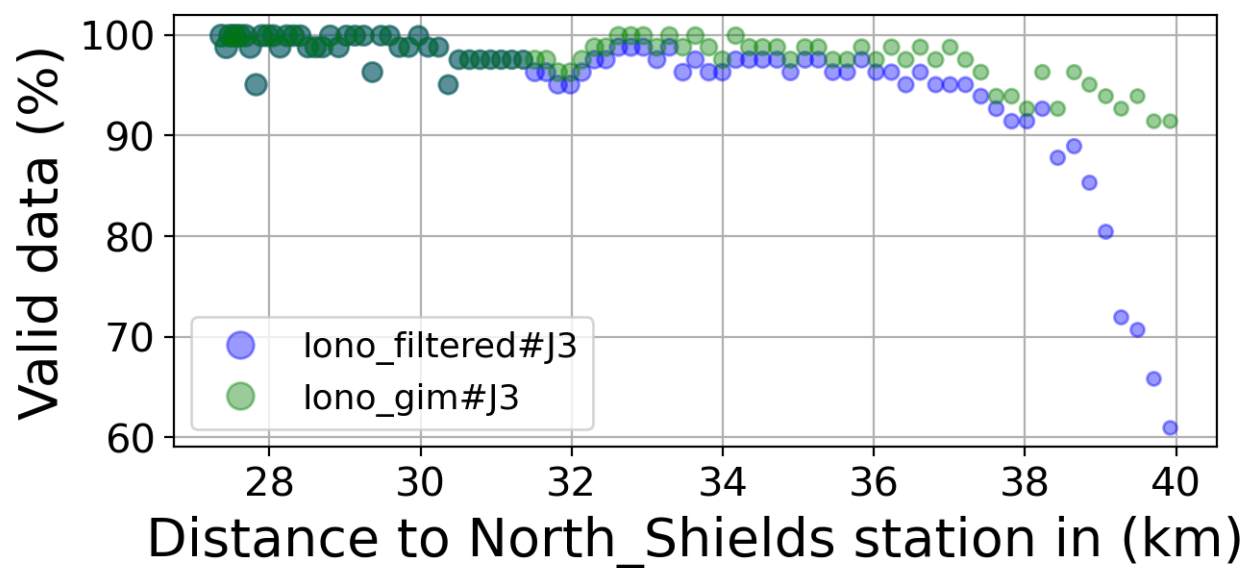
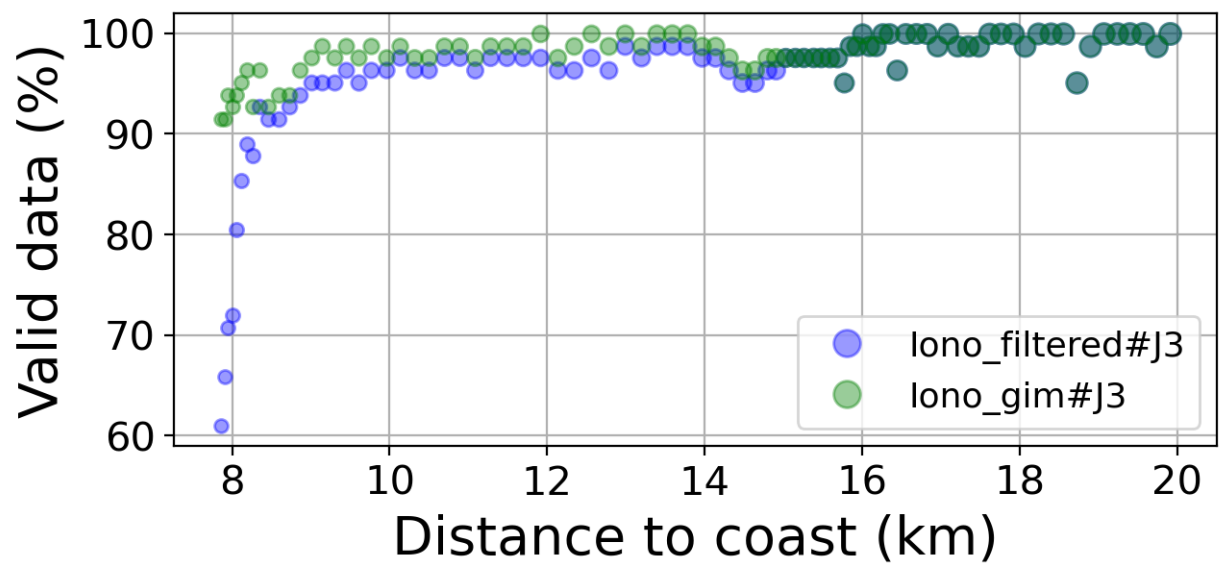


FIGURE 113 – Valid data (%) in function of distance to coast/North_Shields station

6.10.6 Std in function of distance to coast/North_Shields station

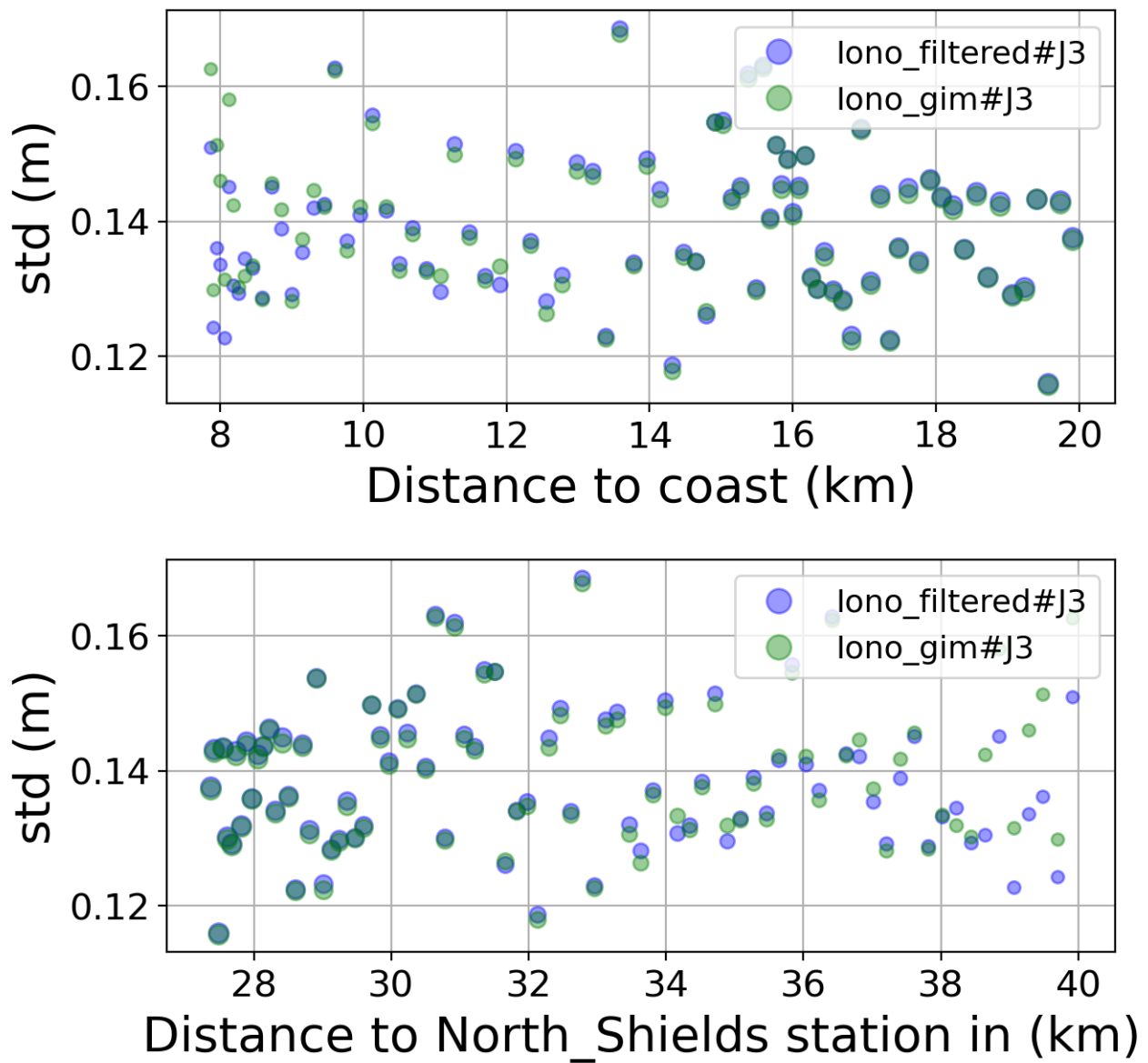


FIGURE 114 – Std in function of the distance to the coast/North_Shields station

6.10.7 Correlation in function of distance to coast/North_Shields station

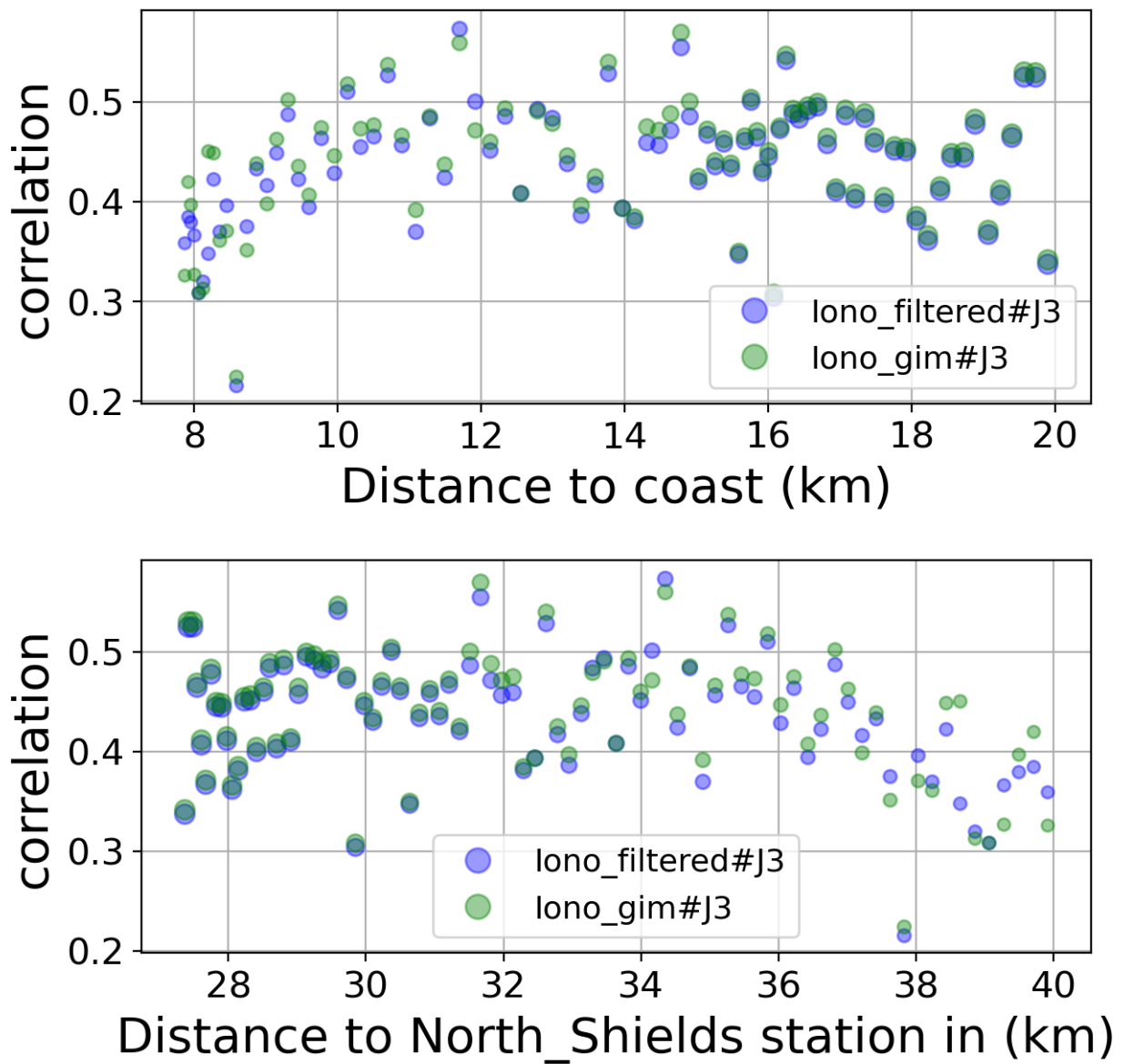


FIGURE 115 – Correlation in function of the distance to the coast/North_Shields station

6.10.8 Taylor Diagram

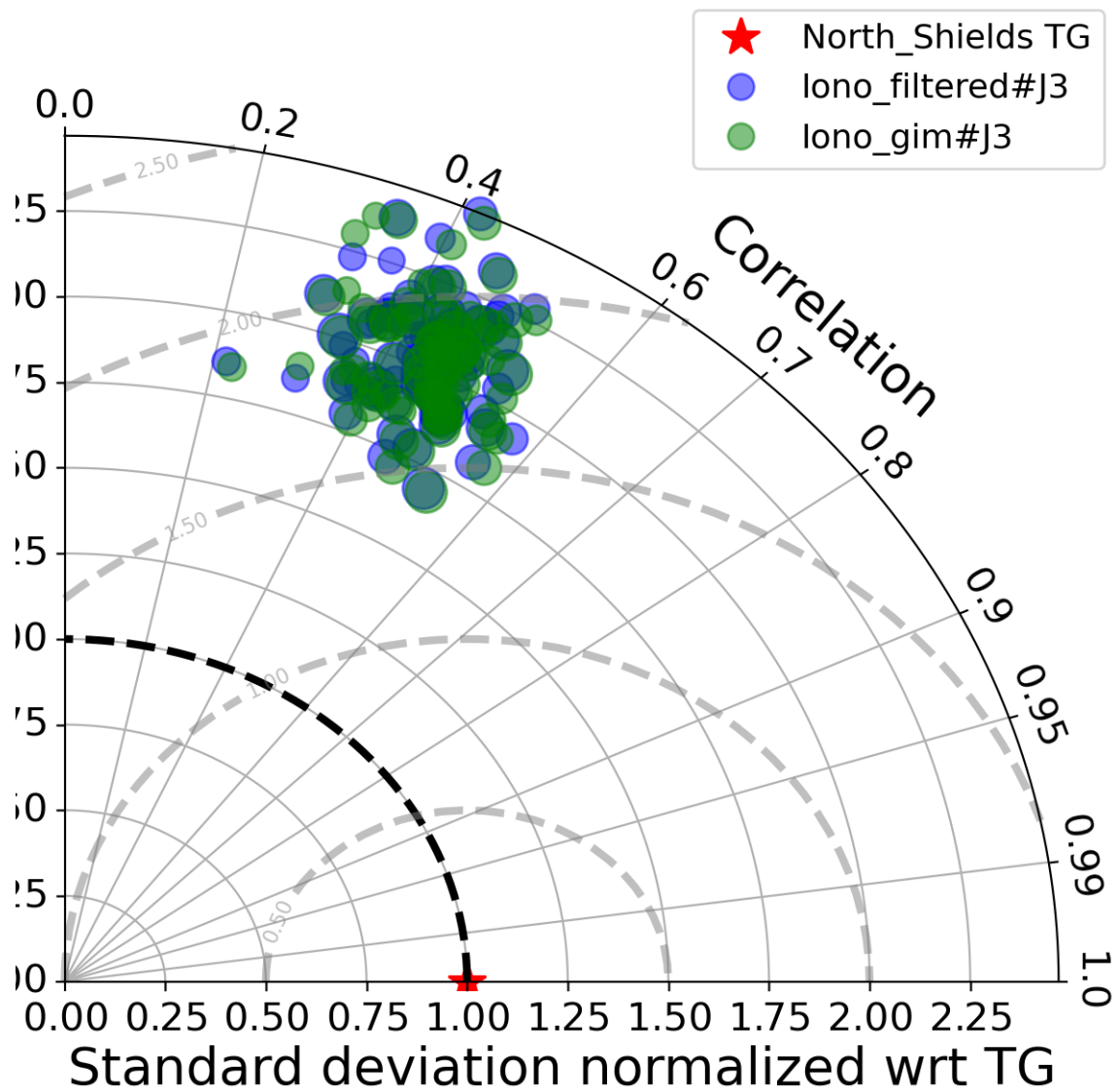


FIGURE 116 – Taylor diagram

6.10.9 Mean statistics table of products comparison with North_Shields 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)
lono_filtered#J3	95.595	0.437	0.139	0.125
lono_gim#J3	97.948	0.442	0.14	0.125

FIGURE 117 – Mean statistics table of the common points in the altimetry products

6.10.10 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 82 point.

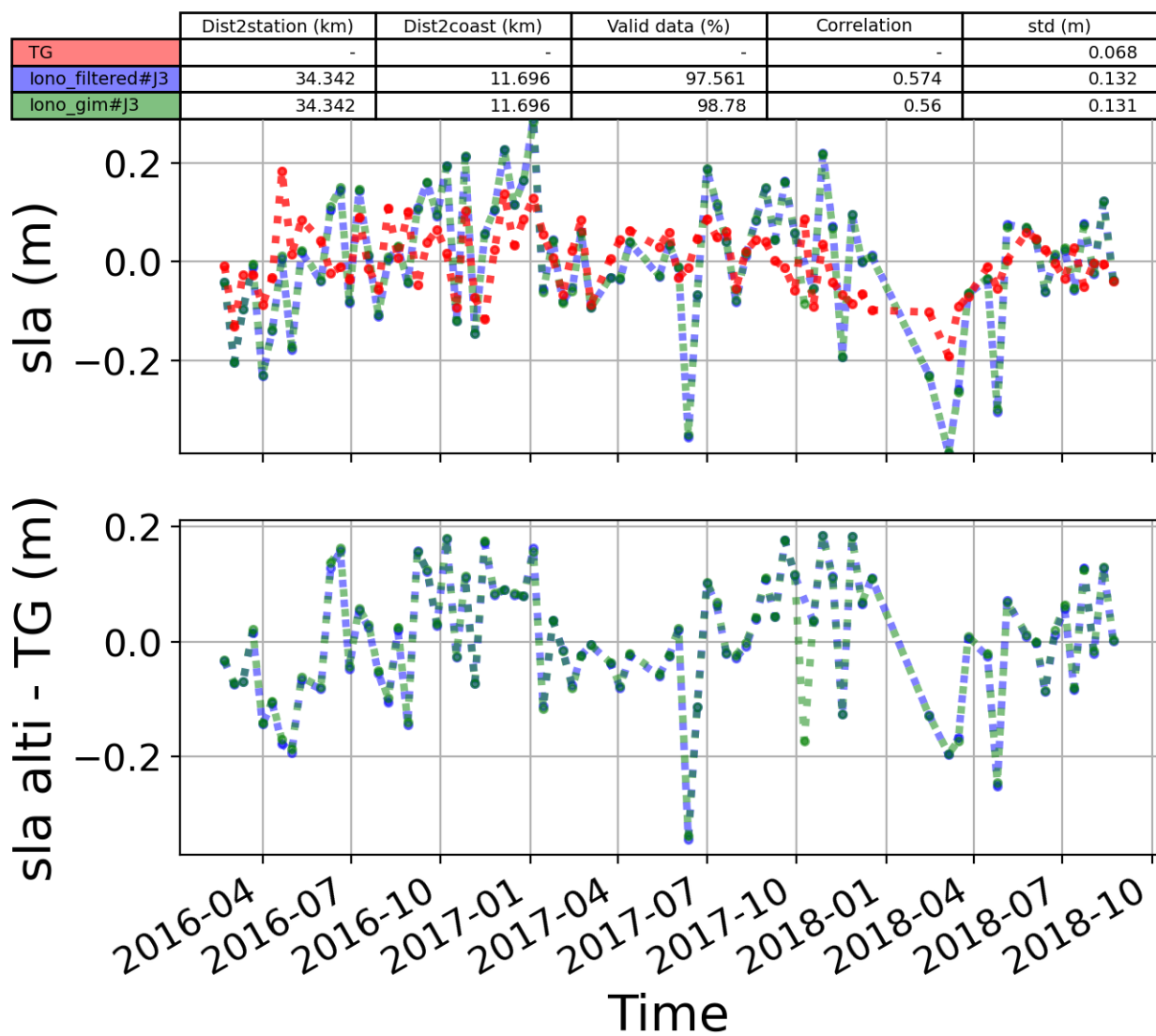


FIGURE 118 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

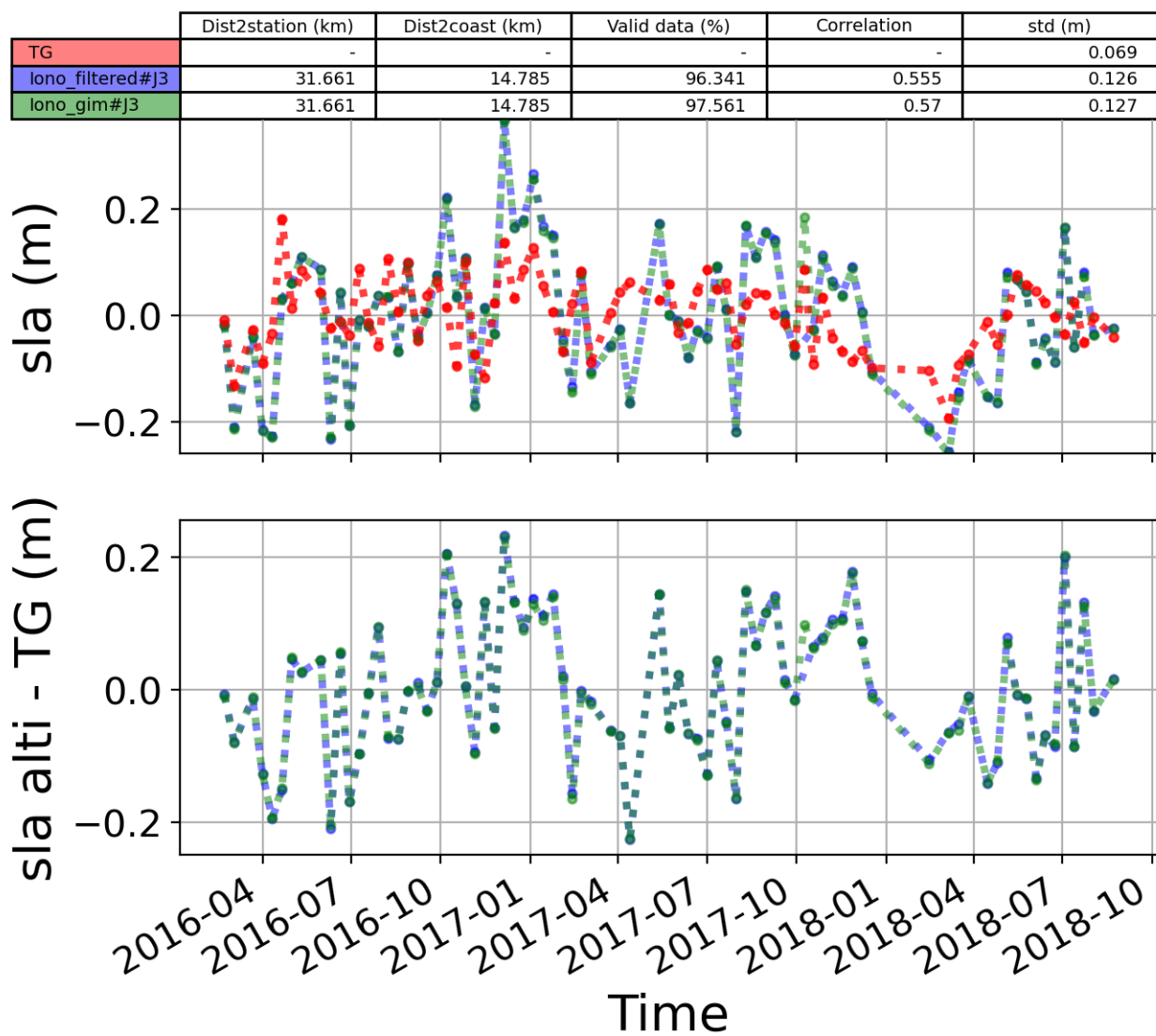


FIGURE 119 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie