

DIAGTOOL REPORT



**Round Robin (GT cotier) : Ionospheric correction.
Medsea. J2. Iono filtered vs Iono gim.**

11 avril 2022

Table of Contents

1	General description	7
2	Processing	8
2.1	sla formula	8
2.1.1	Iono_filtered product ' sla	8
2.1.2	Iono_gim product ' sla	8
2.2	Binning	8
2.3	Filtering	8
3	Spatial coherence analysis	9
3.1	sla	9
3.1.1	sla 's count	9
3.1.2	sla 's std	12
3.1.3	sla 's mean	15
3.2	Iono	18
3.2.1	Iono 's count	18
3.2.2	Iono 's std	21
3.2.3	Iono 's mean	24
4	Histograms	27
4.1	Iono	27
4.2	sla	30
5	Along-track analysis	31
5.1	Iono	31
5.1.1	Iono 's count	31
5.1.2	Iono 's std	32
5.1.3	Iono 's mean	33
5.2	sla	34
5.2.1	sla 's count	34
5.2.2	sla 's std	35
5.2.3	sla 's mean	36
6	Comparison with Insitu Data (Tide Gauge)	37
6.1	Station : SETE	37
6.1.1	correlation visualization in maps view % SETE tide gauge	37
6.1.2	rmsd visualization in maps view % SETE tide gauge	38
6.1.3	std visualization in maps view % SETE tide gauge	39
6.1.4	valid_data_percent visualization in maps view % SETE tide gauge	40
6.1.5	Valid data (%) in function of distance to coast/SETE station	40
6.1.6	Std in function of distance to coast/SETE station	42
6.1.7	Correlation in function of distance to coast/SETE station	43
6.1.8	Taylor Diagram	44
6.1.9	Mean statistics table of products comparison with SETE tide gauge data	44
6.1.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	45

6.2	Station : Mentès	47
6.2.1	correlation visualization in maps view % Mentès tide gauge	48
6.2.2	rmsd visualization in maps view % Mentès tide gauge	49
6.2.3	std visualization in maps view % Mentès tide gauge	50
6.2.4	valid_data_percent visualization in maps view % Mentès tide gauge	51
6.2.5	Valid data (%) in function of distance to coast/Mentès station	51
6.2.6	Std in function of distance to coast/Mentès station	53
6.2.7	Correlation in function of distance to coast/Mentès station	54
6.2.8	Taylor Diagram	55
6.2.9	Mean statistics table of products comparison with Mentès tide gauge data	55
6.2.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	56
6.3	Station : Ibiza	58
6.3.1	correlation visualization in maps view % Ibiza tide gauge	59
6.3.2	rmsd visualization in maps view % Ibiza tide gauge	60
6.3.3	std visualization in maps view % Ibiza tide gauge	61
6.3.4	valid_data_percent visualization in maps view % Ibiza tide gauge	62
6.3.5	Valid data (%) in function of distance to coast/Ibiza station	62
6.3.6	Std in function of distance to coast/Ibiza station	64
6.3.7	Correlation in function of distance to coast/Ibiza station	65
6.3.8	Taylor Diagram	66
6.3.9	Mean statistics table of products comparison with Ibiza tide gauge data	66
6.3.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	67
6.4	Station : LA_FIGUEIRETTE	69
6.4.1	correlation visualization in maps view % LA_FIGUEIRETTE tide gauge	70
6.4.2	rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge	71
6.4.3	std visualization in maps view % LA_FIGUEIRETTE tide gauge	72
6.4.4	valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge	73
6.4.5	Valid data (%) in function of distance to coast/LA_FIGUEIRETTE station	73
6.4.6	Std in function of distance to coast/LA_FIGUEIRETTE station	75
6.4.7	Correlation in function of distance to coast/LA_FIGUEIRETTE station	76
6.4.8	Taylor Diagram	77
6.4.9	Mean statistics table of products comparison with LA_FIGUEIRETTE tide gauge data	77
6.4.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	78
6.5	Station : Ancona	80
6.5.1	correlation visualization in maps view % Ancona tide gauge	81
6.5.2	rmsd visualization in maps view % Ancona tide gauge	82
6.5.3	std visualization in maps view % Ancona tide gauge	83
6.5.4	valid_data_percent visualization in maps view % Ancona tide gauge	84
6.5.5	Valid data (%) in function of distance to coast/Ancona station	84
6.5.6	Std in function of distance to coast/Ancona station	86
6.5.7	Correlation in function of distance to coast/Ancona station	87
6.5.8	Taylor Diagram	88
6.5.9	Mean statistics table of products comparison with Ancona tide gauge data	88
6.5.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	89
6.6	Station : Livourne	91

6.6.1	correlation visualization in maps view % Livourne tide gauge	92
6.6.2	rmsd visualization in maps view % Livourne tide gauge	93
6.6.3	std visualization in maps view % Livourne tide gauge	94
6.6.4	valid_data_percent visualization in maps view % Livourne tide gauge	95
6.6.5	Valid data (%) in function of distance to coast/Livourne station	95
6.6.6	Std in function of distance to coast/Livourne station	97
6.6.7	Correlation in function of distance to coast/Livourne station	98
6.6.8	Taylor Diagram	99
6.6.9	Mean statistics table of products comparison with Livourne tide gauge data	99
6.6.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	100
6.7	Station : MONACO_FONTVIEILLE	102
6.7.1	correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge	103
6.7.2	rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge	104
6.7.3	std visualization in maps view % MONACO_FONTVIEILLE tide gauge	105
6.7.4	valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge	106
6.7.5	Valid data (%) in function of distance to coast/MONACO_FONTVIEILLE station	106
6.7.6	Std in function of distance to coast/MONACO_FONTVIEILLE station	108
6.7.7	Correlation in function of distance to coast/MONACO_FONTVIEILLE station	109
6.7.8	Taylor Diagram	110
6.7.9	Mean statistics table of products comparison with MONACO_FONTVIEILLE tide gauge data	110
6.7.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	111
6.8	Station : Erdemli	113
6.8.1	correlation visualization in maps view % Erdemli tide gauge	114
6.8.2	rmsd visualization in maps view % Erdemli tide gauge	115
6.8.3	std visualization in maps view % Erdemli tide gauge	116
6.8.4	valid_data_percent visualization in maps view % Erdemli tide gauge	117
6.8.5	Valid data (%) in function of distance to coast/Erdemli station	117
6.8.6	Std in function of distance to coast/Erdemli station	119
6.8.7	Correlation in function of distance to coast/Erdemli station	120
6.8.8	Taylor Diagram	121
6.8.9	Mean statistics table of products comparison with Erdemli tide gauge data	121
6.8.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	122
6.9	Station : Almeria	123
6.9.1	correlation visualization in maps view % Almeria tide gauge	124
6.9.2	rmsd visualization in maps view % Almeria tide gauge	125
6.9.3	std visualization in maps view % Almeria tide gauge	126
6.9.4	valid_data_percent visualization in maps view % Almeria tide gauge	127
6.9.5	Valid data (%) in function of distance to coast/Almeria station	127
6.9.6	Std in function of distance to coast/Almeria station	129
6.9.7	Correlation in function of distance to coast/Almeria station	130
6.9.8	Taylor Diagram	131
6.9.9	Mean statistics table of products comparison with Almeria tide gauge data	131
6.9.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	132
6.10	Station : Civitavecchia	134
6.10.1	correlation visualization in maps view % Civitavecchia tide gauge	135

6.10.2	rmsd visualization in maps view % Civitavecchia tide gauge	136
6.10.3	std visualization in maps view % Civitavecchia tide gauge	137
6.10.4	valid_data_percent visualization in maps view % Civitavecchia tide gauge	138
6.10.5	Valid data (%) in function of distance to coast/Civitavecchia station	138
6.10.6	Std in function of distance to coast/Civitavecchia station	140
6.10.7	Correlation in function of distance to coast/Civitavecchia station	141
6.10.8	Taylor Diagram	142
6.10.9	Mean statistics table of products comparison with Civitavecchia tide gauge data	142
6.10.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	143
6.11	Station : FOS-SUR-MER	144
6.11.1	correlation visualization in maps view % FOS-SUR-MER tide gauge	145
6.11.2	rmsd visualization in maps view % FOS-SUR-MER tide gauge	146
6.11.3	std visualization in maps view % FOS-SUR-MER tide gauge	147
6.11.4	valid_data_percent visualization in maps view % FOS-SUR-MER tide gauge	148
6.11.5	Valid data (%) in function of distance to coast/FOS-SUR-MER station	148
6.11.6	Std in function of distance to coast/FOS-SUR-MER station	150
6.11.7	Correlation in function of distance to coast/FOS-SUR-MER station	151
6.11.8	Taylor Diagram	152
6.11.9	Mean statistics table of products comparison with FOS-SUR-MER tide gauge data	152
6.11.10	The most correlated sla altimetry Time series with the tide gauge sla time serie	153

Table des figures

1	Spatial coherence analysis of the count of the Iono_filtered version of sla variable	9
2	Spatial coherence analysis of the count of the Iono_gim version of sla variable	10
3	Spatial coherence analysis of the Difference in sla 's count between Iono_filtered and Iono_gim	11
4	Spatial coherence analysis of the std of the Iono_filtered version of sla variable	12
5	Spatial coherence analysis of the std of the Iono_gim version of sla variable	13
6	Spatial coherence analysis of the Difference in sla 's std between Iono_filtered and Iono_gim	14
7	Spatial coherence analysis of the mean of the Iono_filtered version of sla variable	15
8	Spatial coherence analysis of the mean of the Iono_gim version of sla variable	16
9	Spatial coherence analysis of the Difference in sla 's mean between Iono_filtered and Iono_gim	17
10	Spatial coherence analysis of the count of the Iono_filtered version of Iono variable	18
11	Spatial coherence analysis of the count of the Iono_gim version of Iono variable	19
12	Spatial coherence analysis of the Difference in Iono 's count between Iono_filtered and Iono_gim	20
13	Spatial coherence analysis of the std of the Iono_filtered version of Iono variable	21
14	Spatial coherence analysis of the std of the Iono_gim version of Iono variable	22
15	Spatial coherence analysis of the Difference in Iono 's std between Iono_filtered and Iono_gim	23
16	Spatial coherence analysis of the mean of the Iono_filtered version of Iono variable	24
17	Spatial coherence analysis of the mean of the Iono_gim version of Iono variable	25
18	Spatial coherence analysis of the Difference in Iono 's mean between Iono_filtered and Iono_gim	26
19	Histogram of each of Iono version	27
20	Histograms of difference of each Iono version and reference one	28
21	Histograms of the standard deviation of each Iono version	29
22	Histograms of the standard deviation of each sla version	30

23	Along-track analysis of Iono 's count	31
24	Along-track analysis of Iono 's std	32
25	Along-track analysis of Iono 's mean	33
26	Along-track analysis of sla 's count	34
27	Along-track analysis of sla 's std	35
28	Along-track analysis of sla 's mean	36
29	correlation visualization in maps view % SETE tide gauge	37
30	rmsd visualization in maps view % SETE tide gauge	38
31	std visualization in maps view % SETE tide gauge	39
32	valid_data_percent visualization in maps view % SETE tide gauge	40
33	Valid data (%) in function of distance to coast/SETE station	41
34	Std in function of the distance to the coast/SETE station	42
35	Correlation in function of the distance to the coast/SETE station	43
36	Taylor diagram	44
37	Mean statistics table of the common points in the altimetry products	45
38	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	46
39	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	47
40	correlation visualization in maps view % Mentès tide gauge	48
41	rmsd visualization in maps view % Mentès tide gauge	49
42	std visualization in maps view % Mentès tide gauge	50
43	valid_data_percent visualization in maps view % Mentès tide gauge	51
44	Valid data (%) in function of distance to coast/Mentès station	52
45	Std in function of the distance to the coast/Mentès station	53
46	Correlation in function of the distance to the coast/Mentès station	54
47	Taylor diagram	55
48	Mean statistics table of the common points in the altimetry products	56
49	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	57
50	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	58
51	correlation visualization in maps view % Ibiza tide gauge	59
52	rmsd visualization in maps view % Ibiza tide gauge	60
53	std visualization in maps view % Ibiza tide gauge	61
54	valid_data_percent visualization in maps view % Ibiza tide gauge	62
55	Valid data (%) in function of distance to coast/Ibiza station	63
56	Std in function of the distance to the coast/Ibiza station	64
57	Correlation in function of the distance to the coast/Ibiza station	65
58	Taylor diagram	66
59	Mean statistics table of the common points in the altimetry products	67
60	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	68
61	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	69
62	correlation visualization in maps view % LA_FIGUEIRETTE tide gauge	70
63	rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge	71
64	std visualization in maps view % LA_FIGUEIRETTE tide gauge	72
65	valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge	73
66	Valid data (%) in function of distance to coast/LA_FIGUEIRETTE station	74
67	Std in function of the distance to the coast/LA_FIGUEIRETTE station	75

68	Correlation in function of the distance to the coast/LA_FIGUEIRETTE station	76
69	Taylor diagram	77
70	Mean statistics table of the common points in the altimetry products	78
71	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	79
72	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	80
73	correlation visualization in maps view % Ancona tide gauge	81
74	rmsd visualization in maps view % Ancona tide gauge	82
75	std visualization in maps view % Ancona tide gauge	83
76	valid_data_percent visualization in maps view % Ancona tide gauge	84
77	Valid data (%) in function of distance to coast/Ancona station	85
78	Std in function of the distance to the coast/Ancona station	86
79	Correlation in function of the distance to the coast/Ancona station	87
80	Taylor diagram	88
81	Mean statistics table of the common points in the altimetry products	89
82	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	90
83	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	91
84	correlation visualization in maps view % Livourne tide gauge	92
85	rmsd visualization in maps view % Livourne tide gauge	93
86	std visualization in maps view % Livourne tide gauge	94
87	valid_data_percent visualization in maps view % Livourne tide gauge	95
88	Valid data (%) in function of distance to coast/Livourne station	96
89	Std in function of the distance to the coast/Livourne station	97
90	Correlation in function of the distance to the coast/Livourne station	98
91	Taylor diagram	99
92	Mean statistics table of the common points in the altimetry products	100
93	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	101
94	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	102
95	correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge	103
96	rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge	104
97	std visualization in maps view % MONACO_FONTVIEILLE tide gauge	105
98	valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge	106
99	Valid data (%) in function of distance to coast/MONACO_FONTVIEILLE station	107
100	Std in function of the distance to the coast/MONACO_FONTVIEILLE station	108
101	Correlation in function of the distance to the coast/MONACO_FONTVIEILLE station	109
102	Taylor diagram	110
103	Mean statistics table of the common points in the altimetry products	111
104	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	112
105	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	113
106	correlation visualization in maps view % Erdemli tide gauge	114
107	rmsd visualization in maps view % Erdemli tide gauge	115
108	std visualization in maps view % Erdemli tide gauge	116
109	valid_data_percent visualization in maps view % Erdemli tide gauge	117
110	Valid data (%) in function of distance to coast/Erdemli station	118
111	Std in function of the distance to the coast/Erdemli station	119
112	Correlation in function of the distance to the coast/Erdemli station	120

113	Taylor diagram	121
114	Mean statistics table of the common points in the altimetry products	122
115	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	123
116	correlation visualization in maps view % Almeria tide gauge	124
117	rmsd visualization in maps view % Almeria tide gauge	125
118	std visualization in maps view % Almeria tide gauge	126
119	valid_data_percent visualization in maps view % Almeria tide gauge	127
120	Valid data (%) in function of distance to coast/Almeria station	128
121	Std in function of the distance to the coast/Almeria station	129
122	Correlation in function of the distance to the coast/Almeria station	130
123	Taylor diagram	131
124	Mean statistics table of the common points in the altimetry products	132
125	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	133
126	The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie	134
127	correlation visualization in maps view % Civitavecchia tide gauge	135
128	rmsd visualization in maps view % Civitavecchia tide gauge	136
129	std visualization in maps view % Civitavecchia tide gauge	137
130	valid_data_percent visualization in maps view % Civitavecchia tide gauge	138
131	Valid data (%) in function of distance to coast/Civitavecchia station	139
132	Std in function of the distance to the coast/Civitavecchia station	140
133	Correlation in function of the distance to the coast/Civitavecchia station	141
134	Taylor diagram	142
135	Mean statistics table of the common points in the altimetry products	143
136	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	144
137	correlation visualization in maps view % FOS-SUR-MER tide gauge	145
138	rmsd visualization in maps view % FOS-SUR-MER tide gauge	146
139	std visualization in maps view % FOS-SUR-MER tide gauge	147
140	valid_data_percent visualization in maps view % FOS-SUR-MER tide gauge	148
141	Valid data (%) in function of distance to coast/FOS-SUR-MER station	149
142	Std in function of the distance to the coast/FOS-SUR-MER station	150
143	Correlation in function of the distance to the coast/FOS-SUR-MER station	151
144	Taylor diagram	152
145	Mean statistics table of the common points in the altimetry products	153
146	The 1st most correlated sla altimetry Time serie with tide gauge sla time serie	154

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 Medsea
- Mission : J2
- Git last tag : 0.7 Appliquer le flag à l'adaptive
- Git changeset number : b8633aa-2022-04-11

2 Processing

2.1 sla formula

2.1.1 Iono_filtered product ' sla

```
sla = ORBIT.ALT.PO_E_GDR -  
      RANGE.ALT -  
      MEAN_SEA_SURFACE.MODEL.CNESCLS15 -  
      SEA_STATE_BIAS.ALT.NON_PARAMETRIC -  
      IONOSPHERIC_CORRECTION.ALT.FILTR_ITER -  
      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 Iono_gim product ' sla

```
sla = ORBIT.ALT.PO_E_GDR -  
      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
```

2.2 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 its 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 1 m.
- Each sla time-series 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

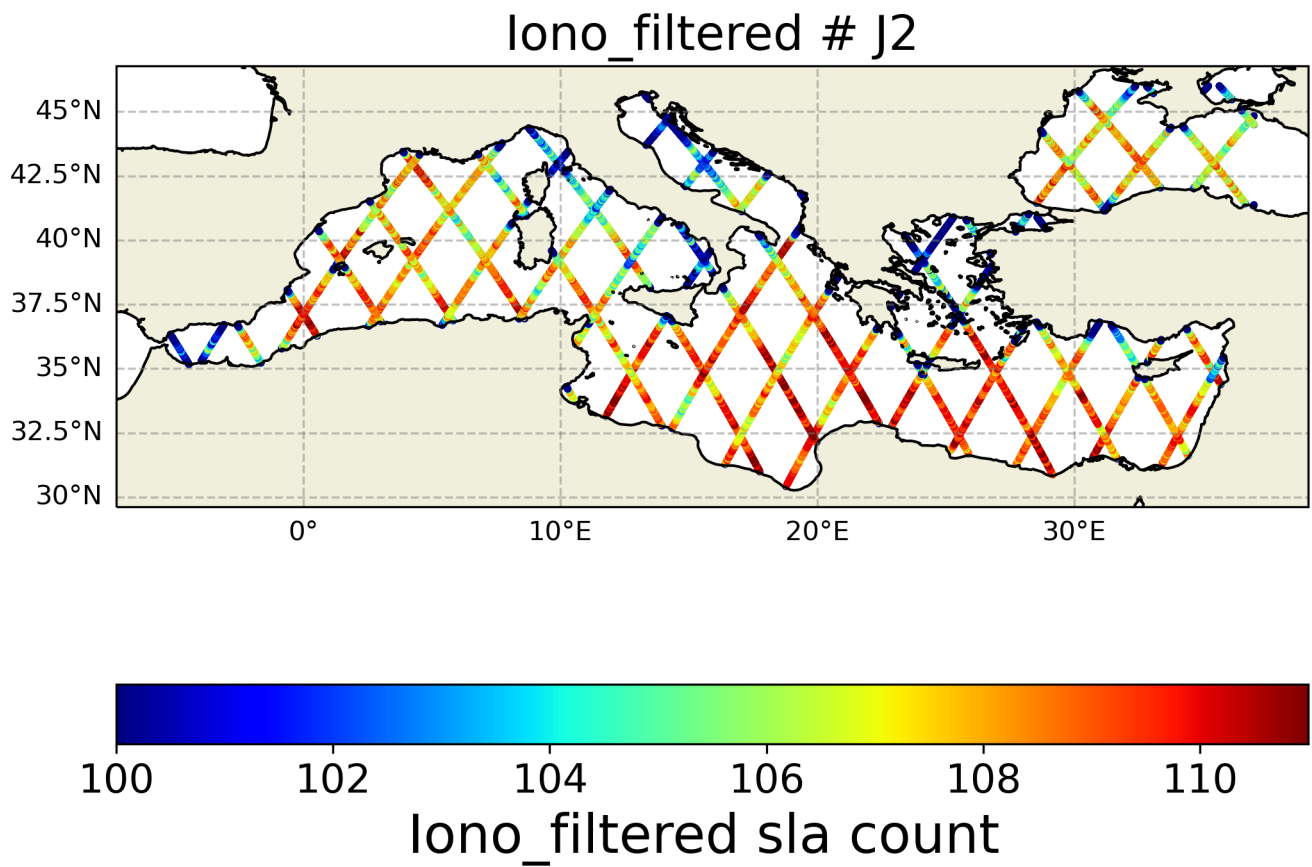


FIGURE 1 – Spatial coherence analysis of the count of the Iono_filtered version of sla variable

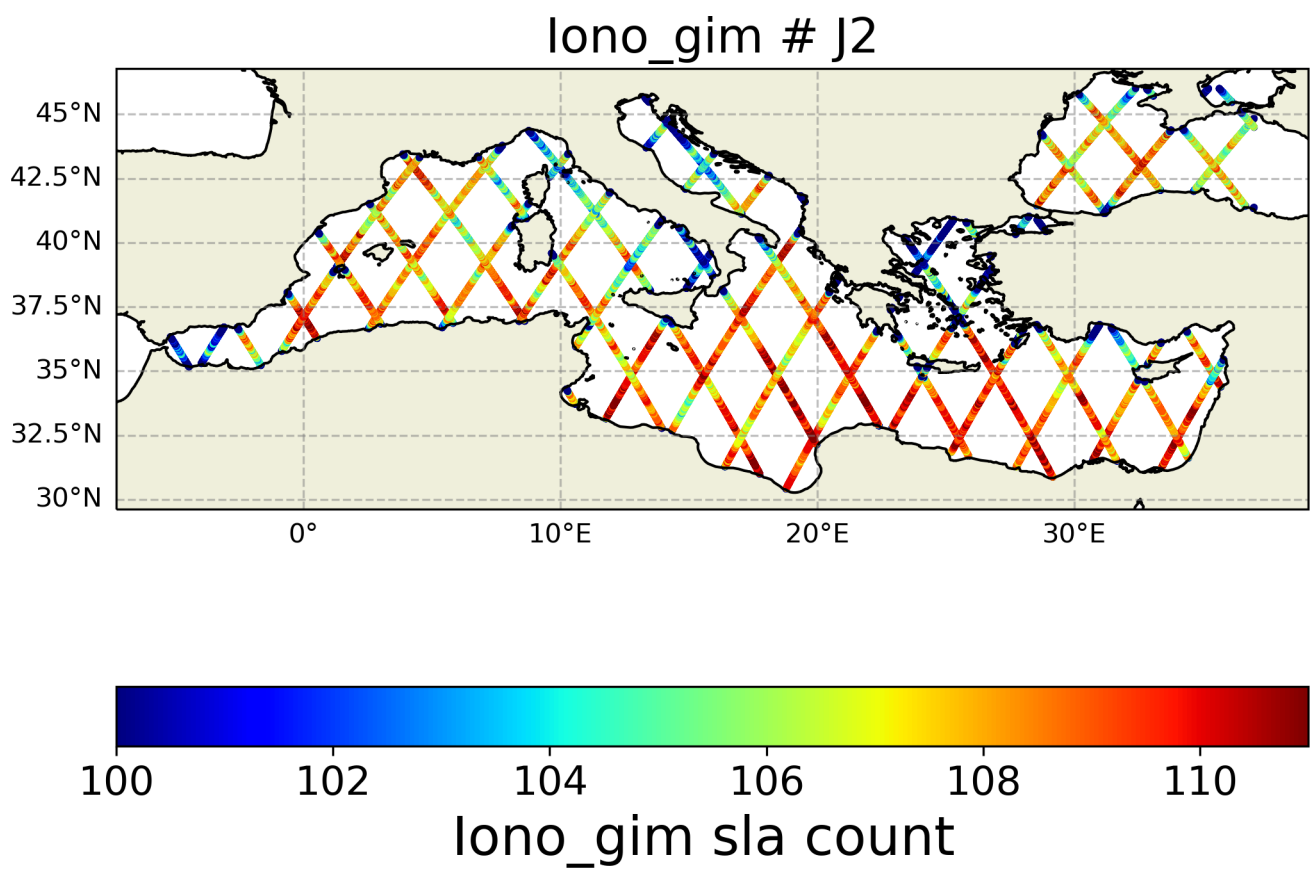


FIGURE 2 – Spatial coherence analysis of the count of the Iono_gim version of sla variable

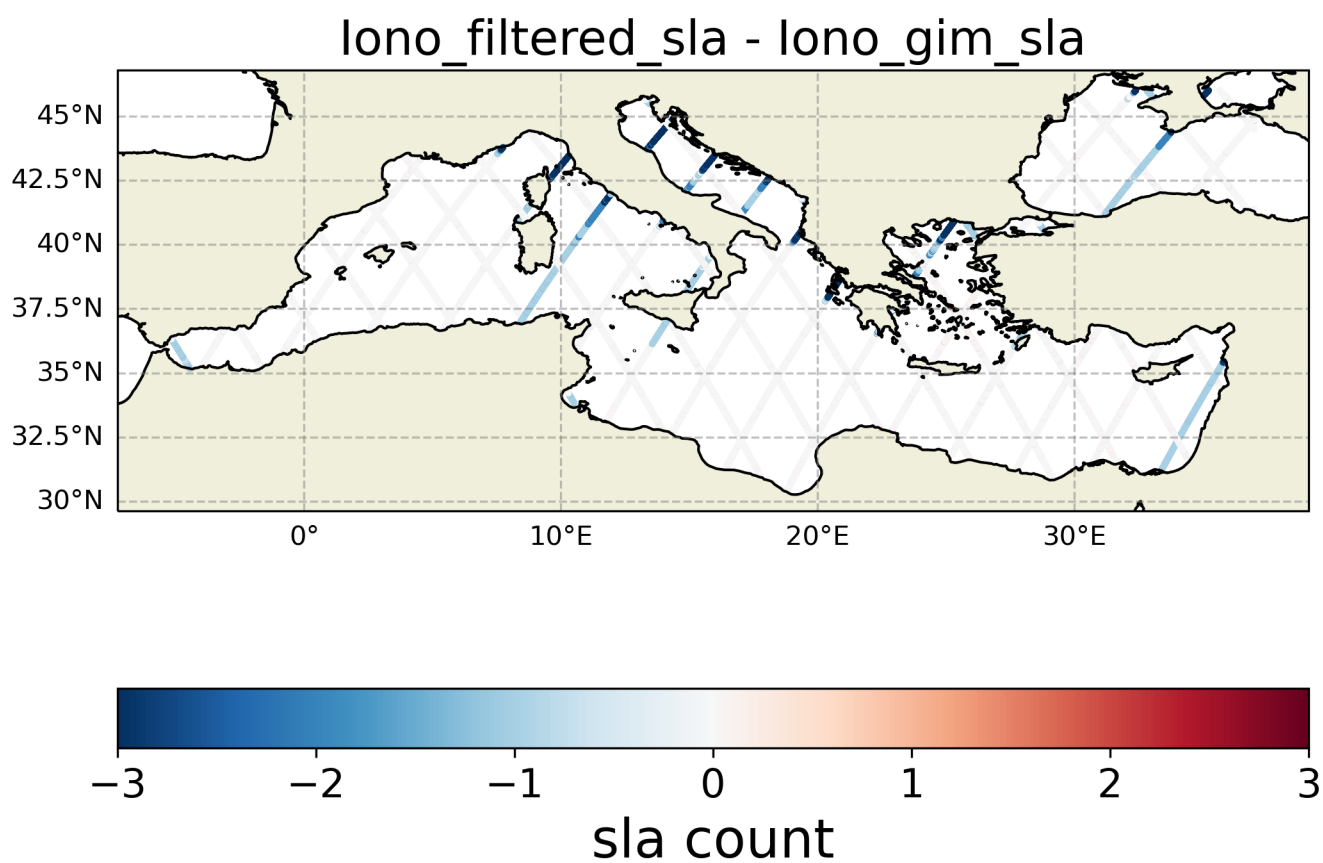


FIGURE 3 – Spatial coherence analysis of the Difference in sla 's count between Iono_filtered and Iono_gim

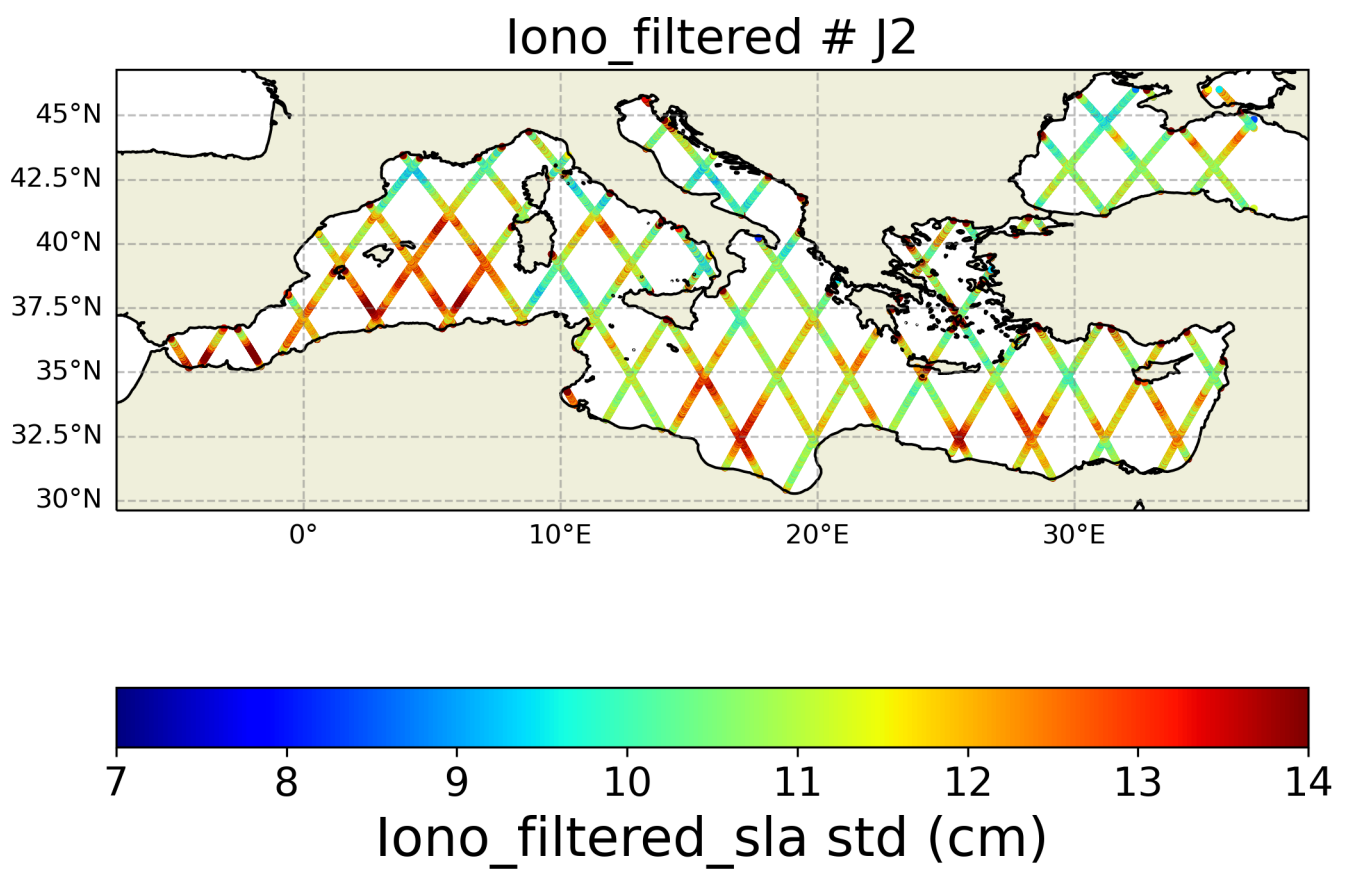


FIGURE 4 – Spatial coherence analysis of the std of the lono_filtered version of sla variable

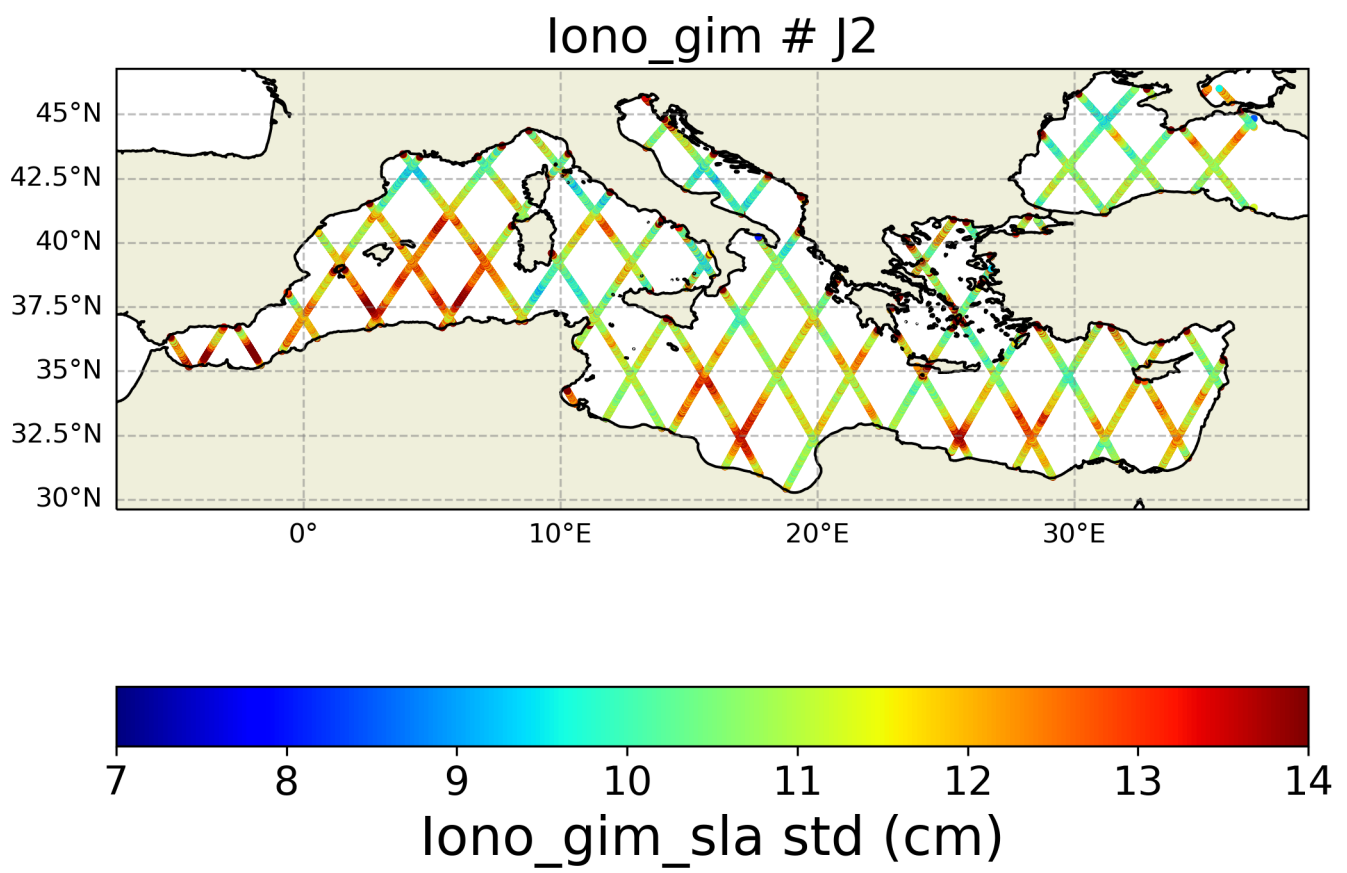


FIGURE 5 – Spatial coherence analysis of the std of the Iono_gim version of sla variable

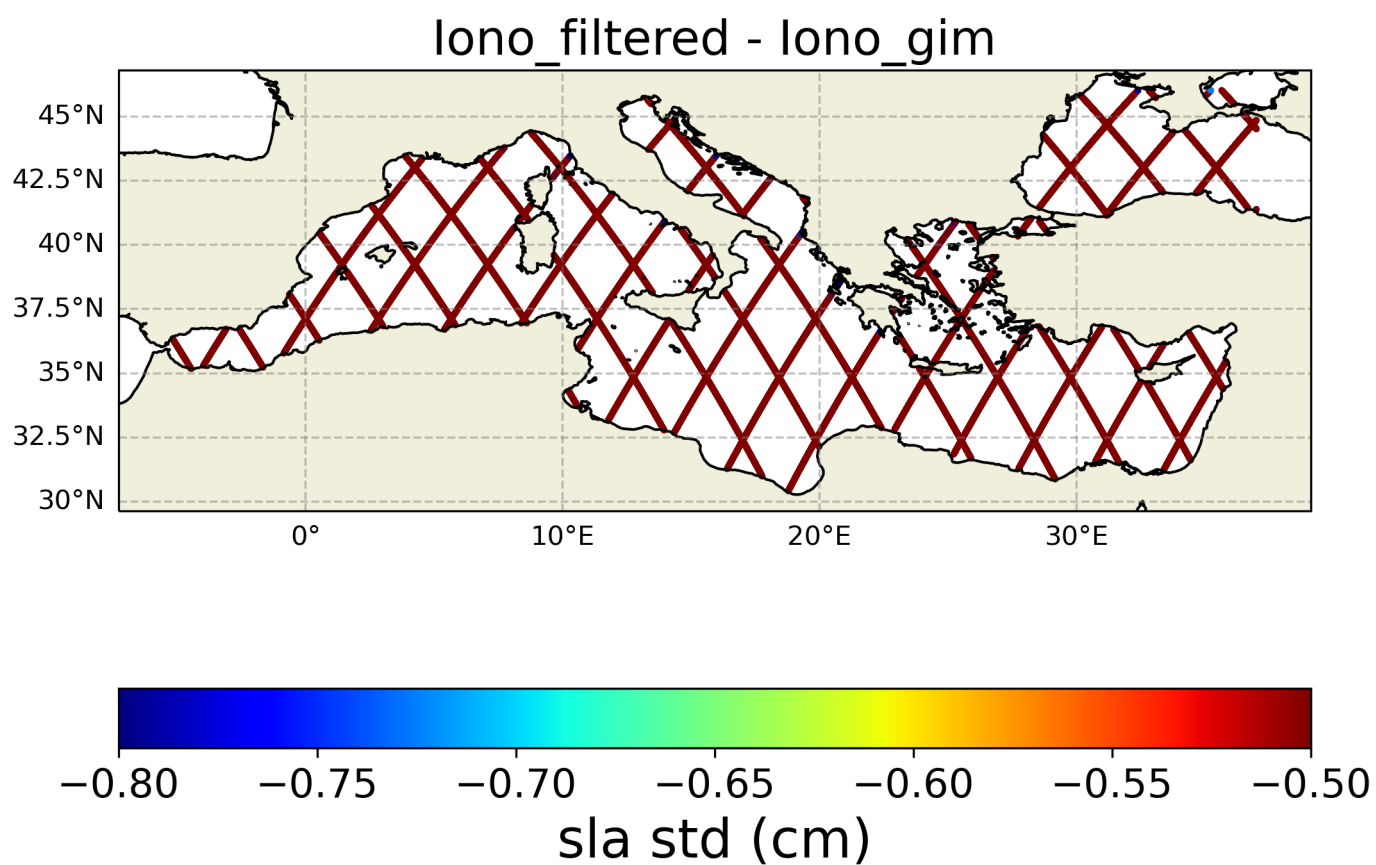


FIGURE 6 – Spatial coherence analysis of the Difference in sla 's std between Iono_filtered and Iono_gim

3.1.3 sla's mean

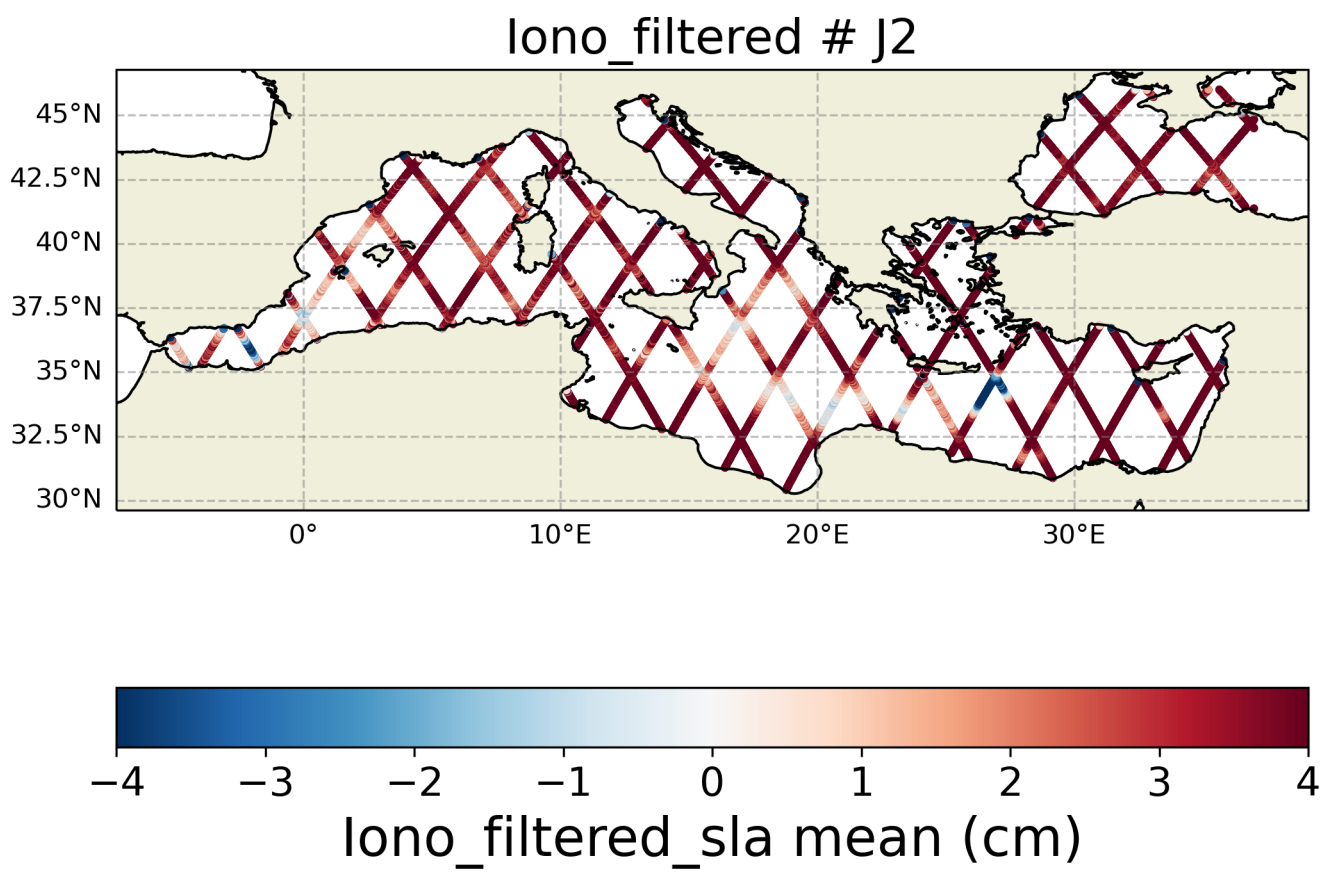


FIGURE 7 – Spatial coherence analysis of the mean of the lono_filtered version of sla variable

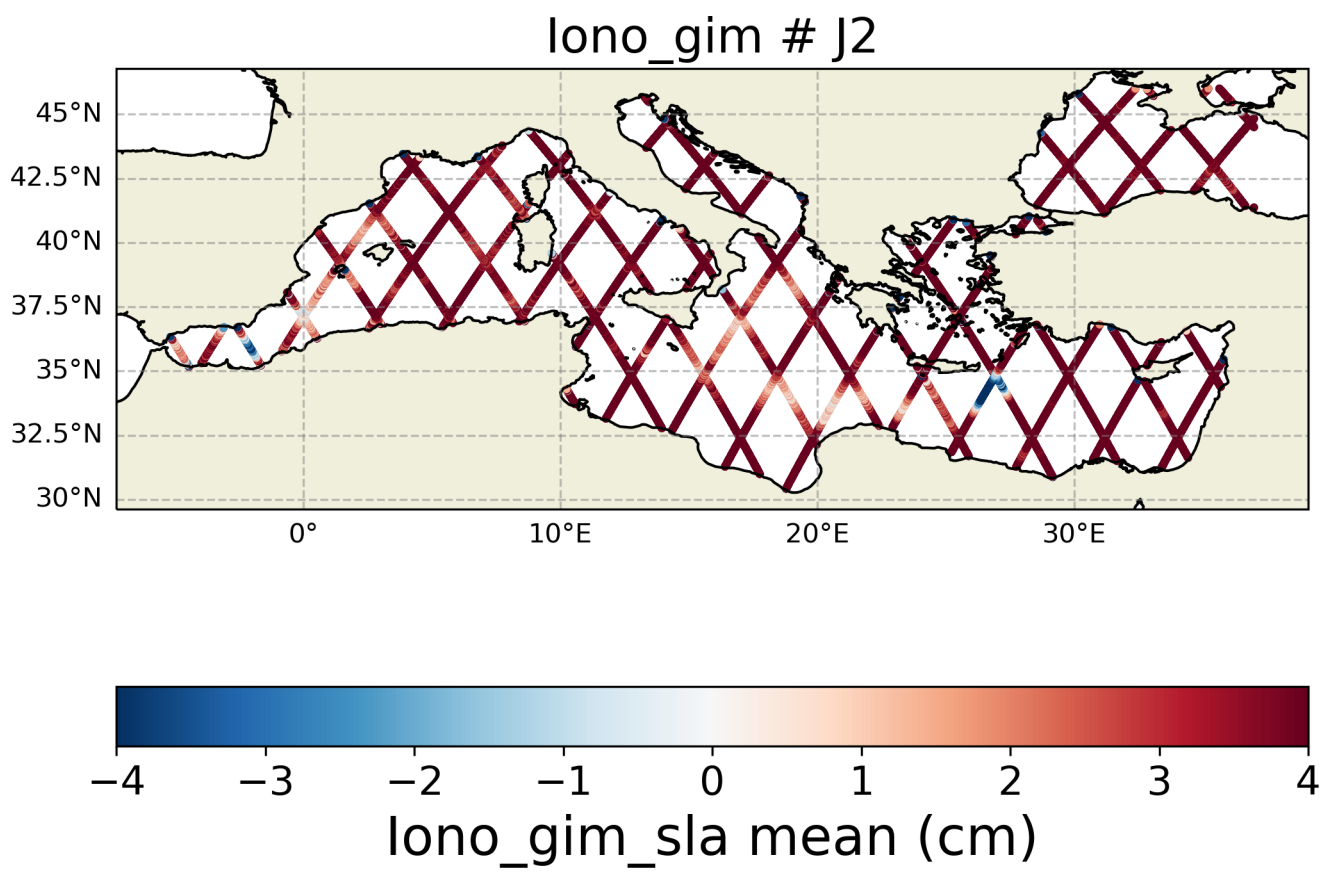


FIGURE 8 – Spatial coherence analysis of the mean of the Iono_gim version of sla variable

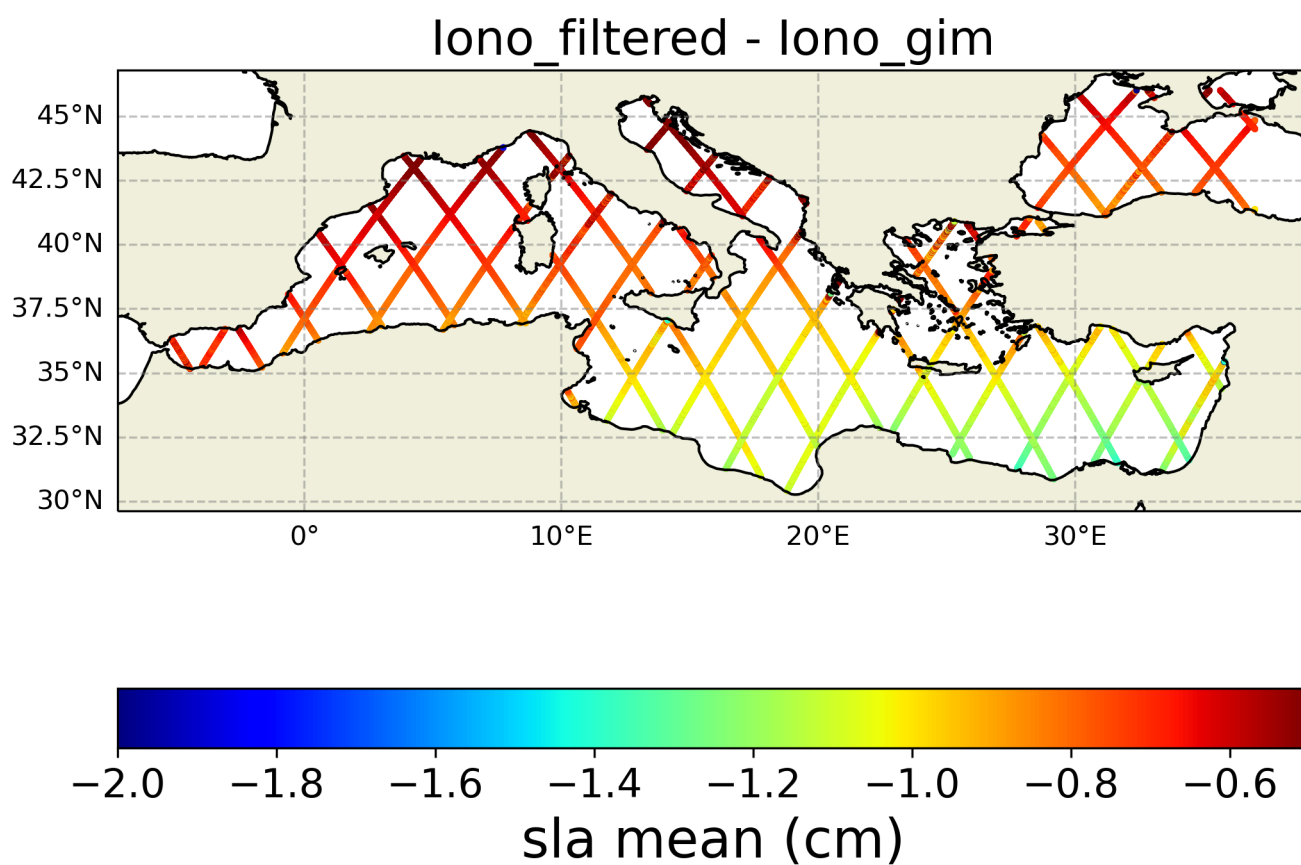


FIGURE 9 – Spatial coherence analysis of the Difference in sla 's mean between Iono_filtered and Iono_gim

3.2 Iono

3.2.1 Iono's count

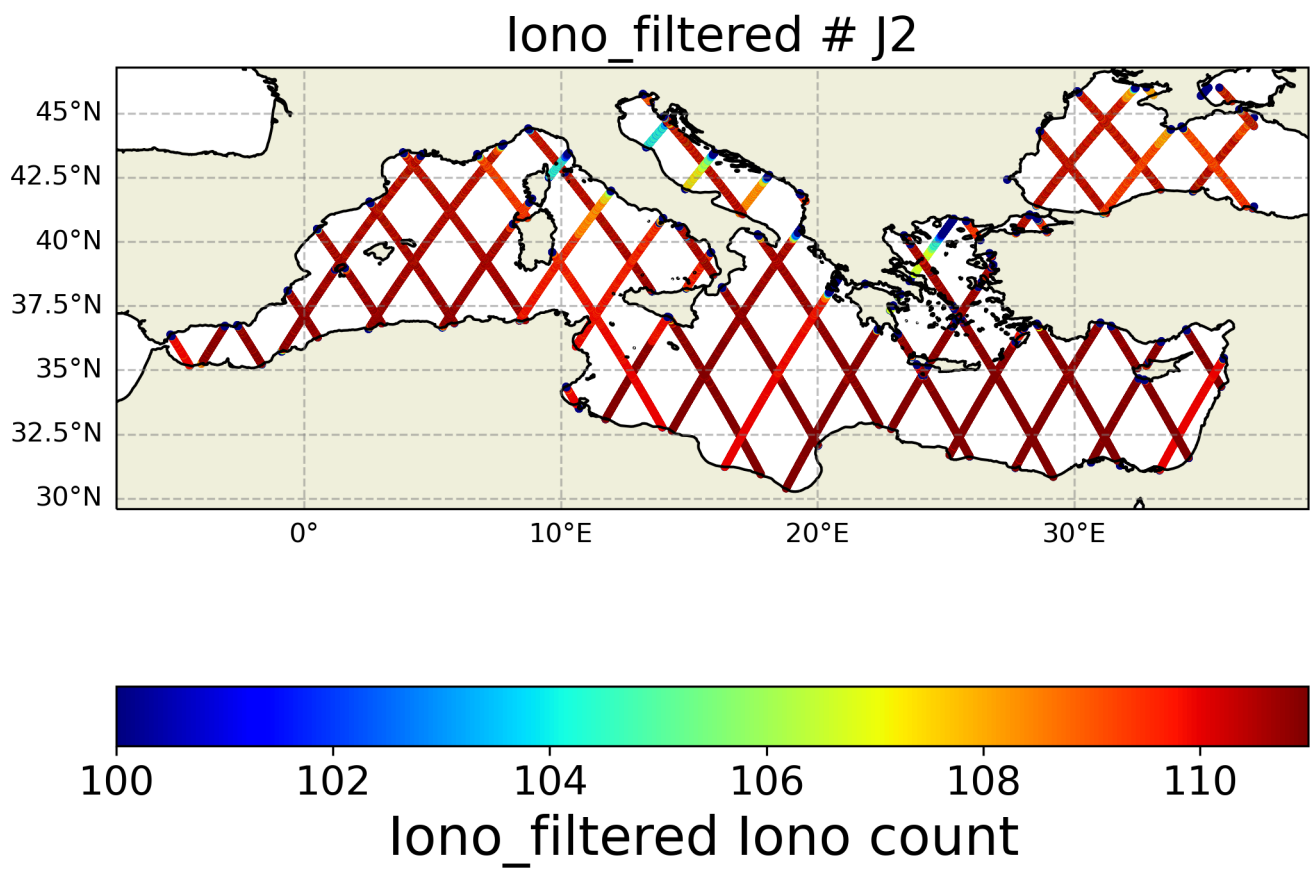


FIGURE 10 – Spatial coherence analysis of the count of the Iono_filtered version of Iono variable

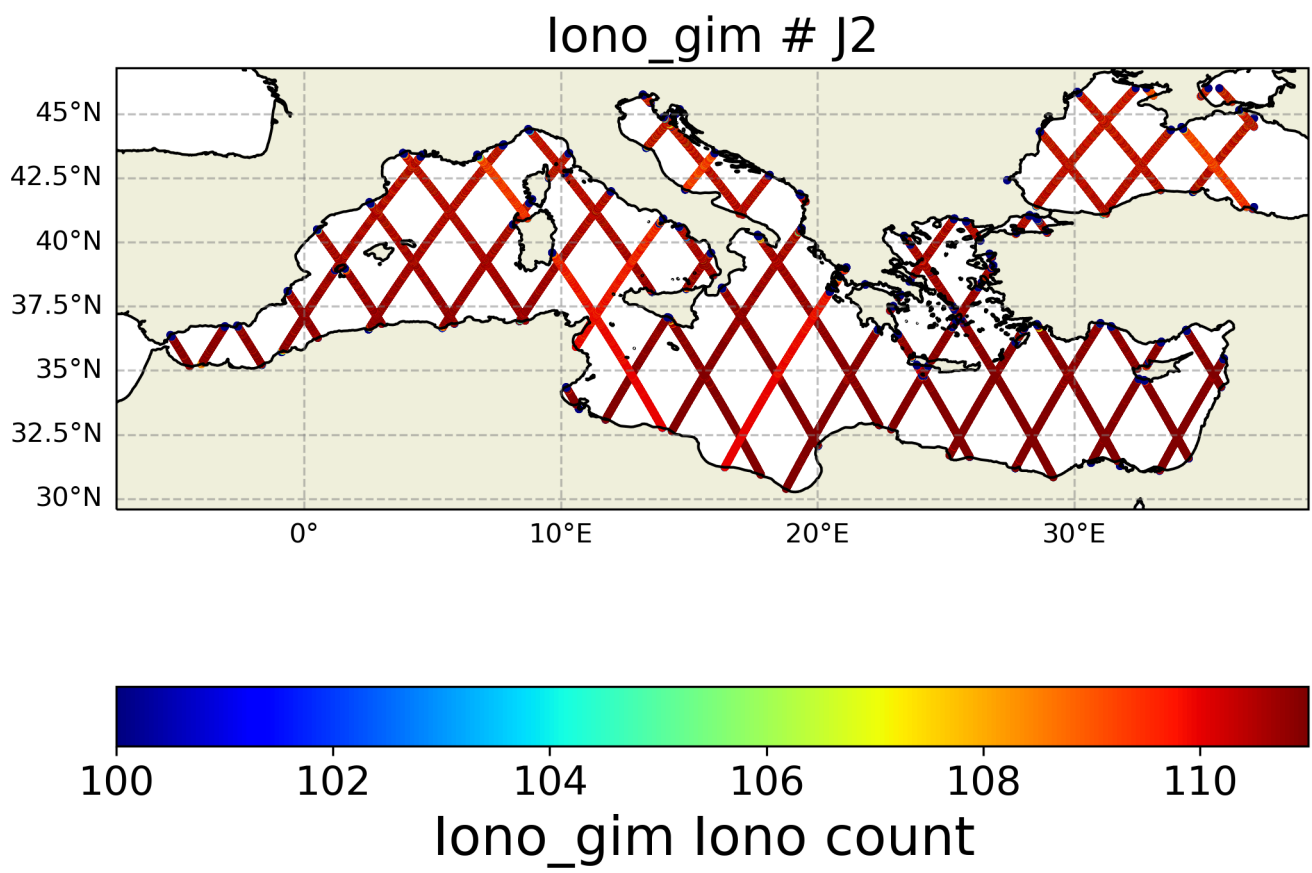


FIGURE 11 – Spatial coherence analysis of the count of the Iono_gim version of Iono variable

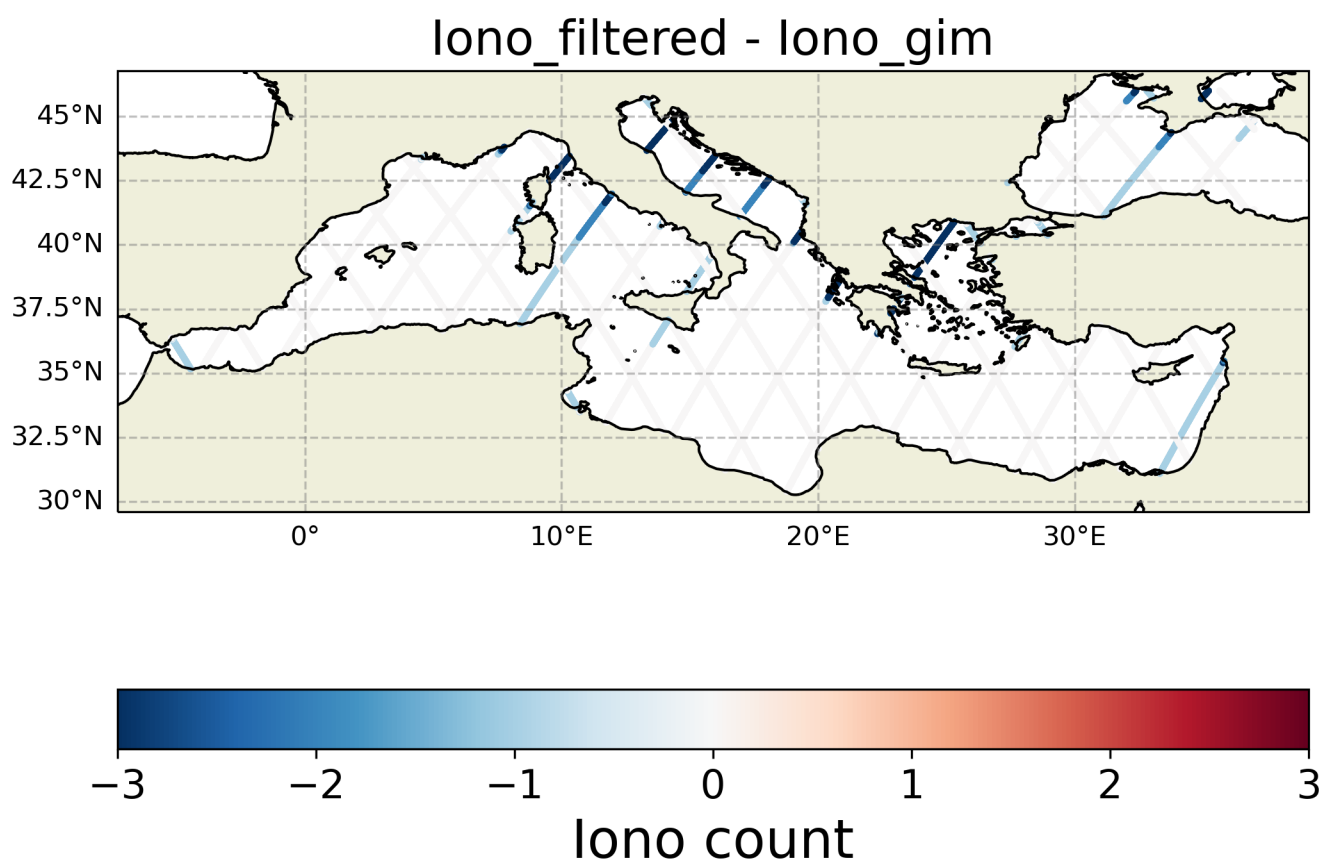


FIGURE 12 – Spatial coherence analysis of the Difference in Iono 's count between Iono_filtered and Iono_gim

3.2.2 Iono's std

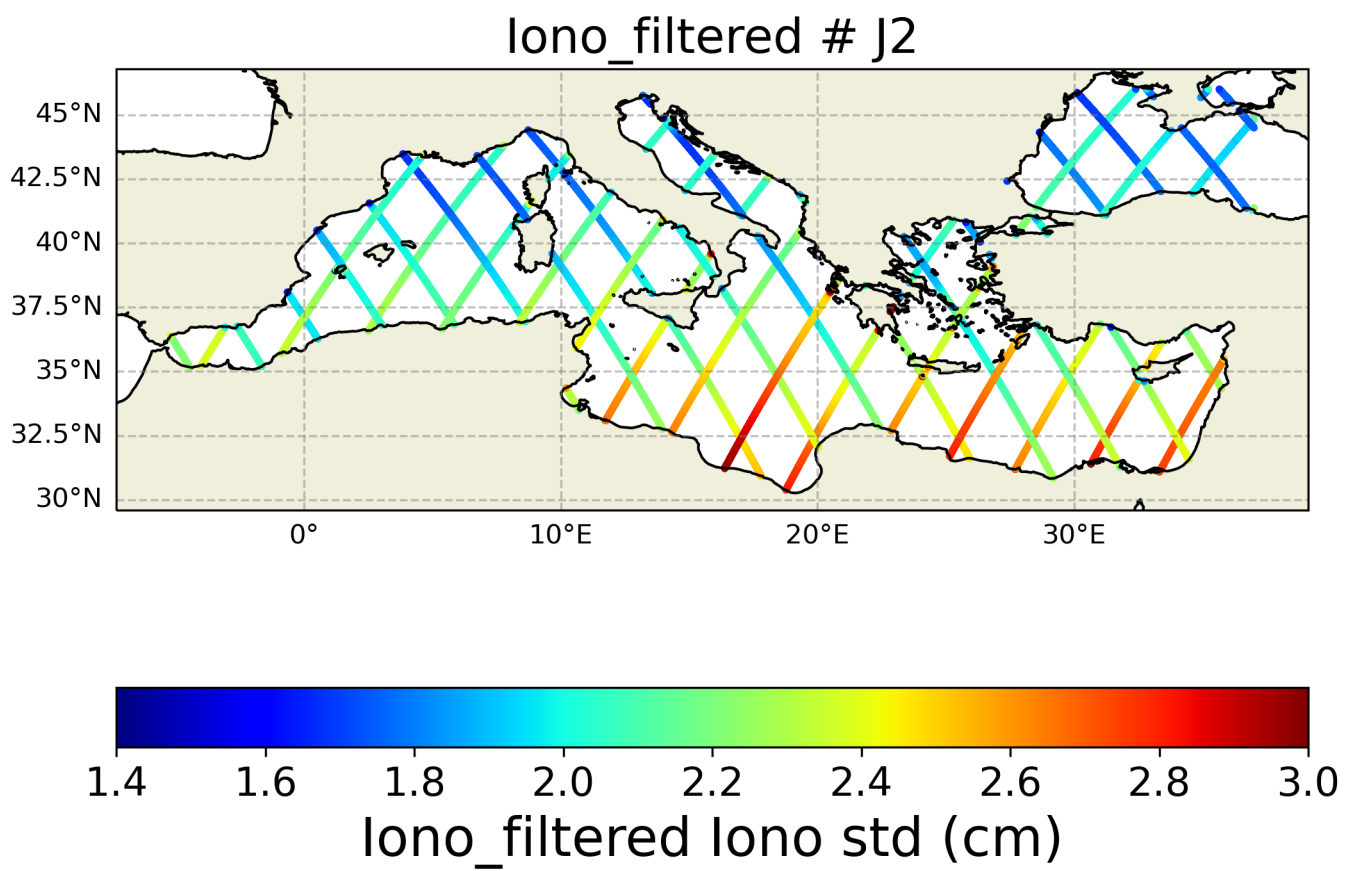


FIGURE 13 – Spatial coherence analysis of the std of the Iono_filtered version of Iono variable

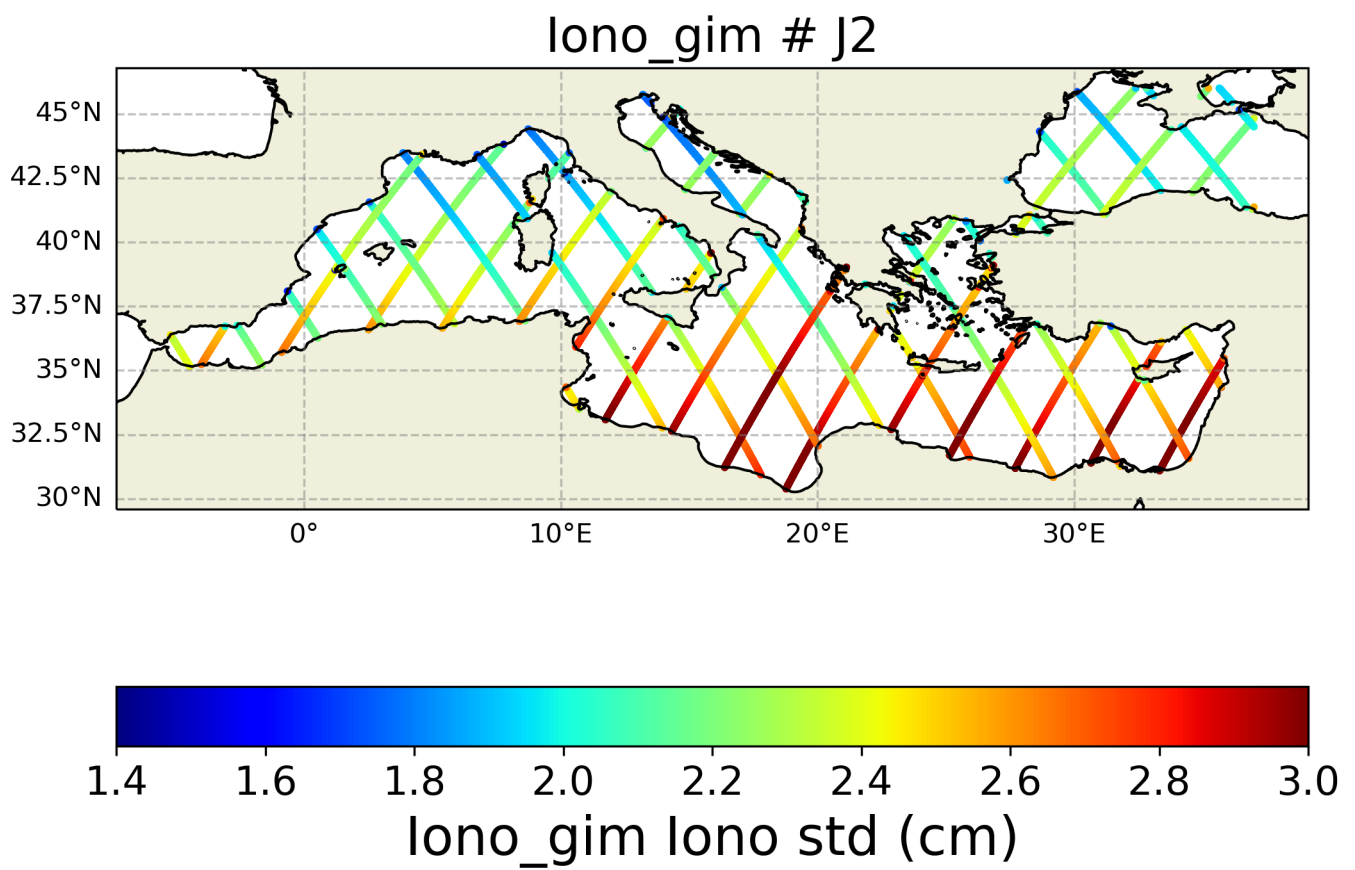


FIGURE 14 – Spatial coherence analysis of the std of the Iono_gim version of Iono variable

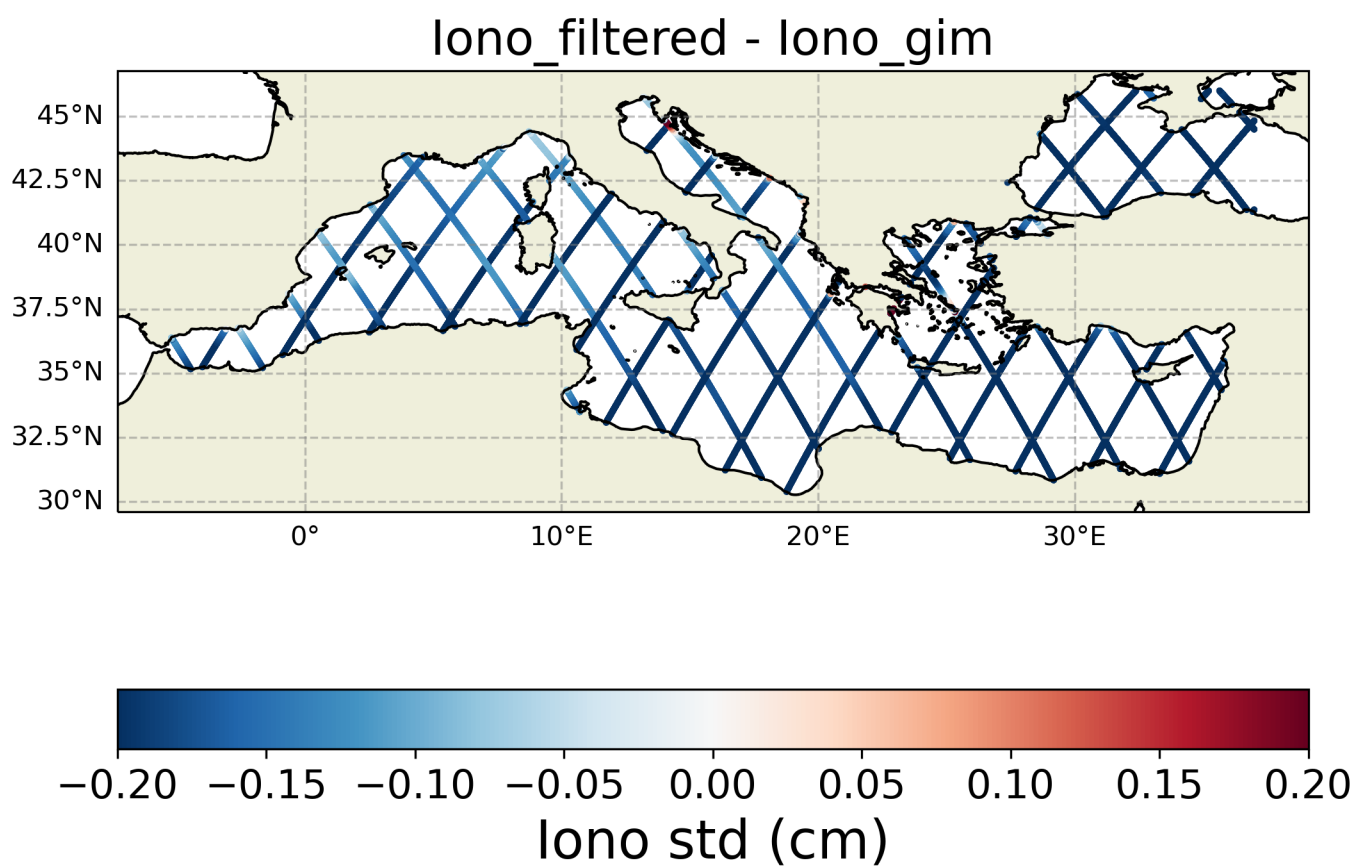


FIGURE 15 – Spatial coherence analysis of the Difference in Iono 's std between Iono_filtered and Iono_gim

3.2.3 Iono's mean

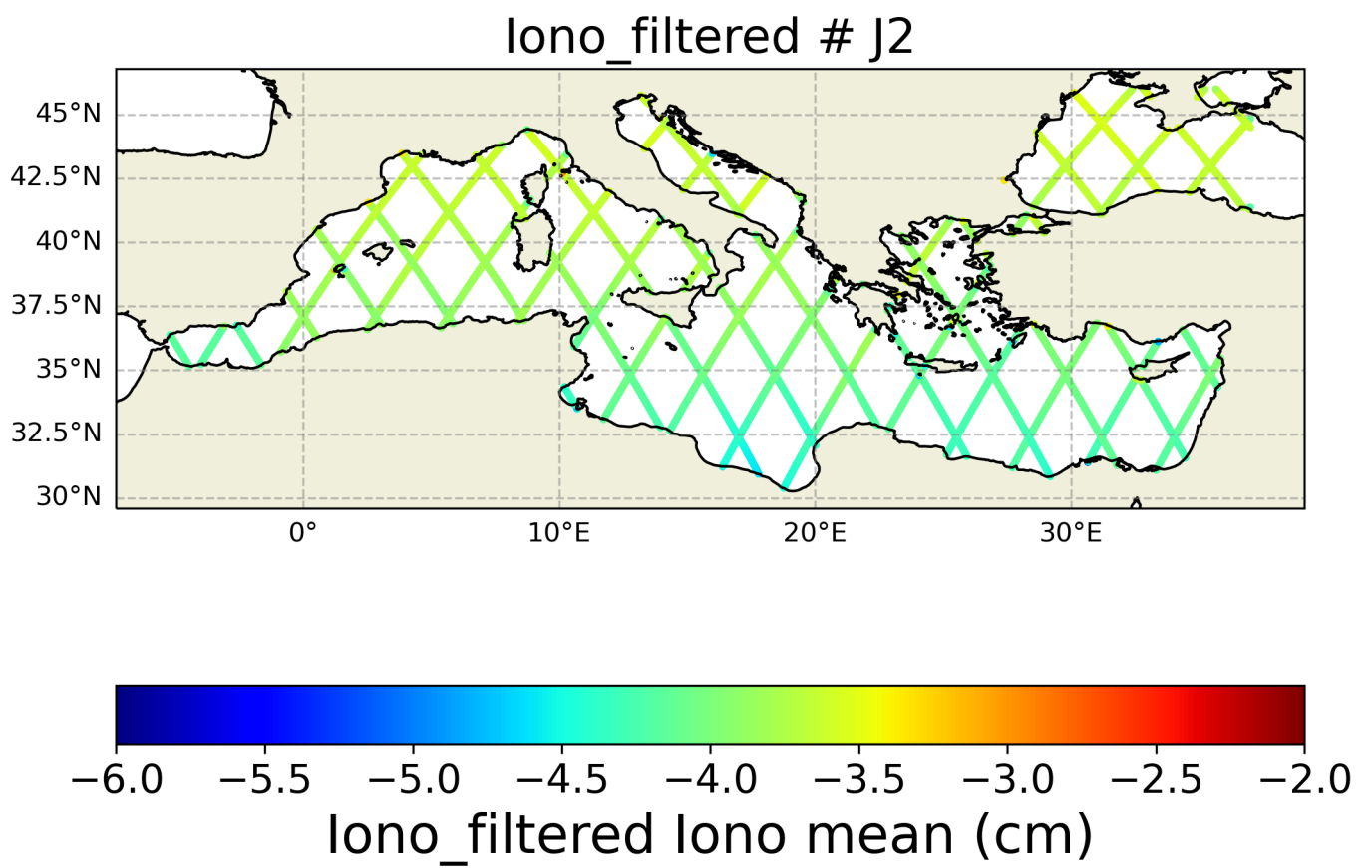


FIGURE 16 – Spatial coherence analysis of the mean of the Iono_filtered version of Iono variable

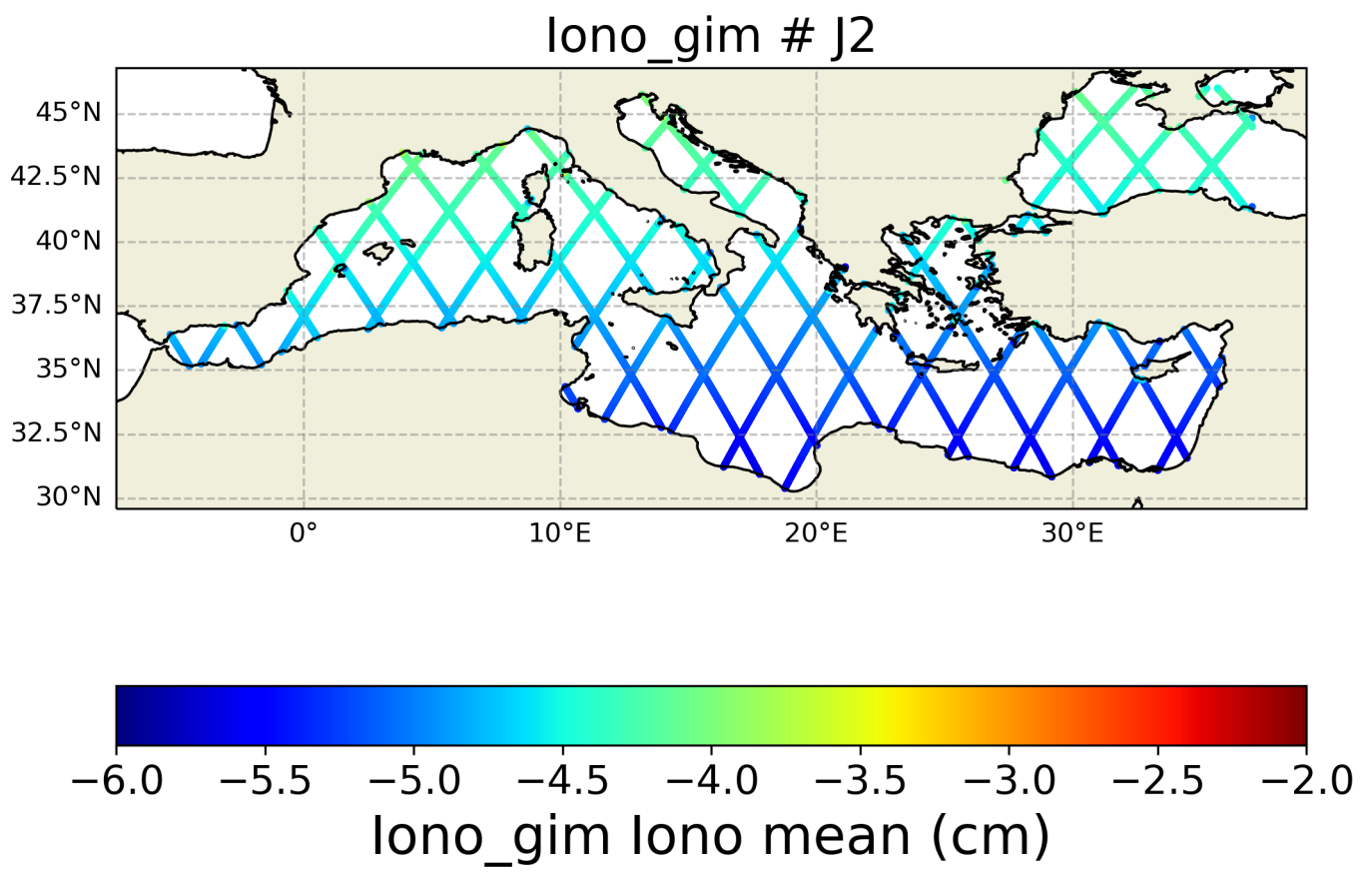


FIGURE 17 – Spatial coherence analysis of the mean of the Iono_gim version of Iono variable

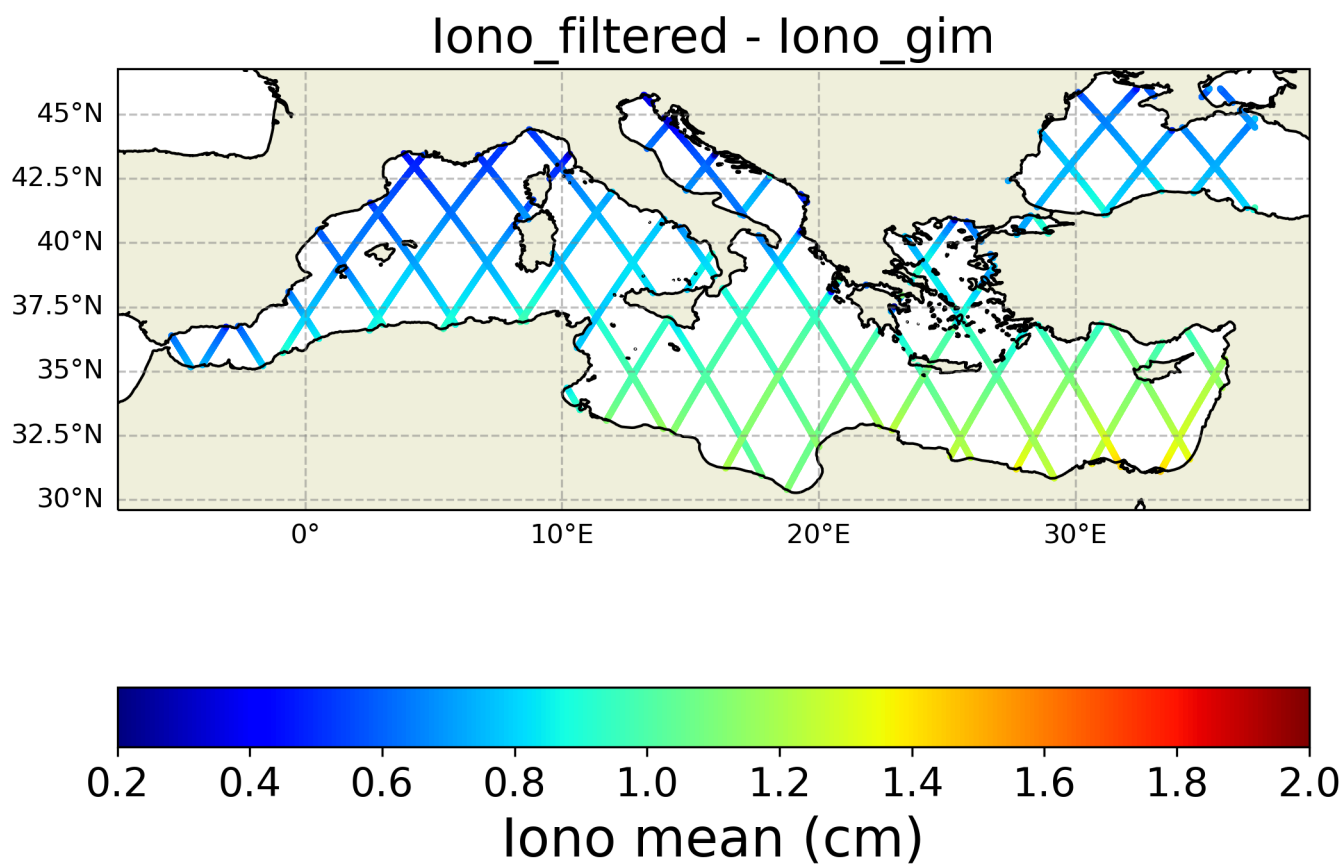


FIGURE 18 – Spatial coherence analysis of the Difference in Iono 's mean between Iono_filtered and Iono_gim

4 Histograms

4.1 Iono

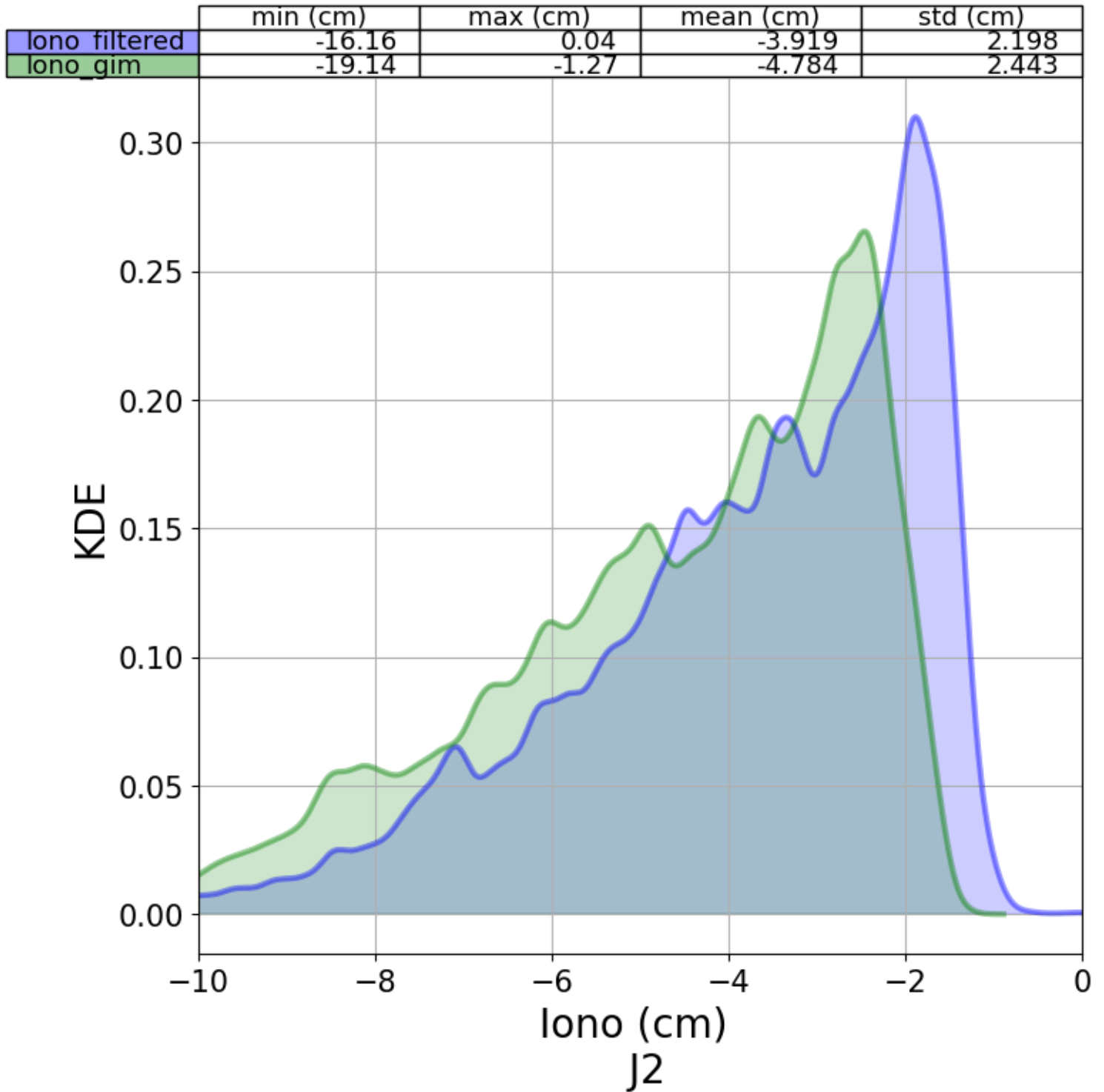


FIGURE 19 – Histogram of each of Iono version

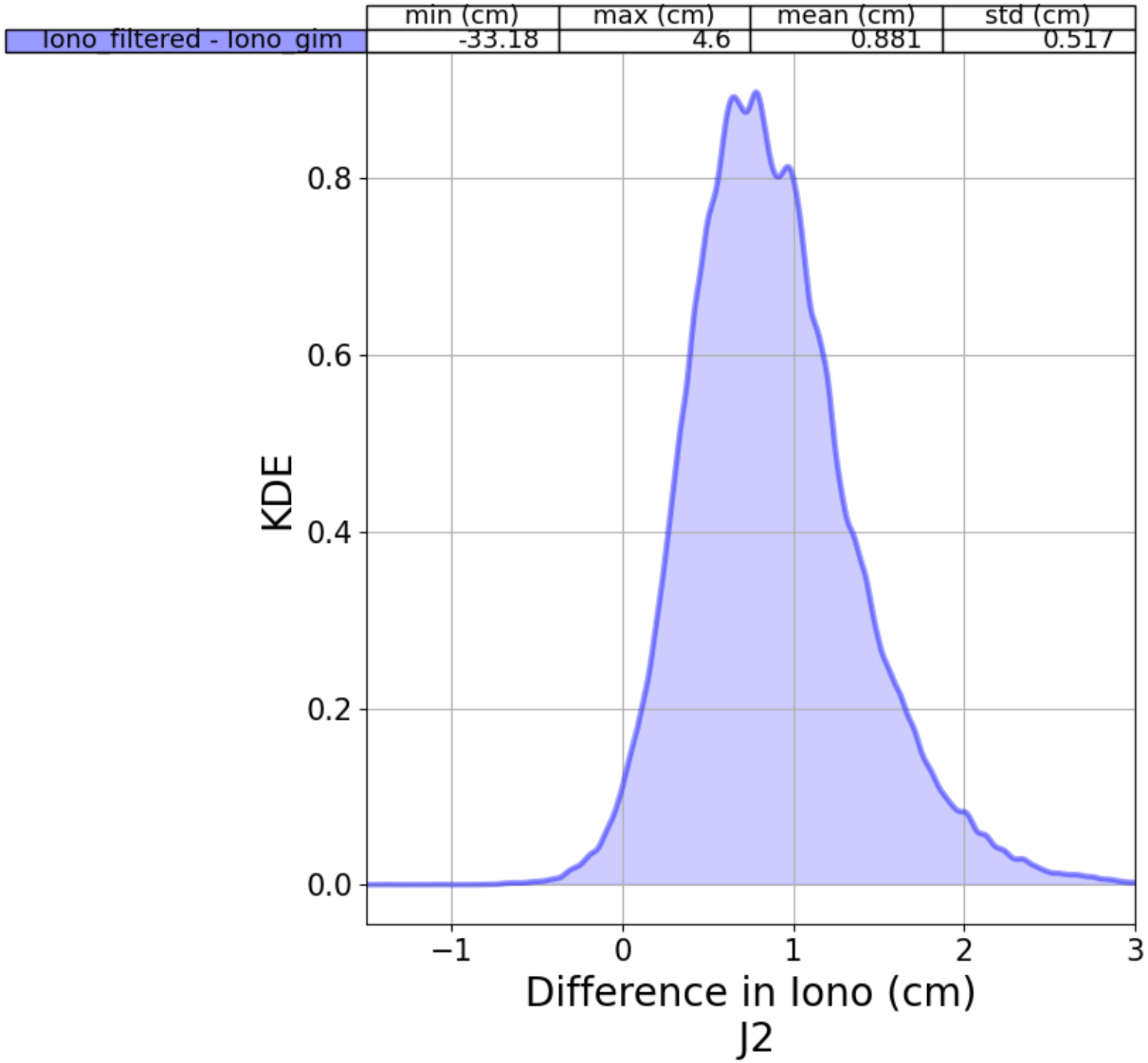


FIGURE 20 – Histograms of difference of each Iono version and reference one

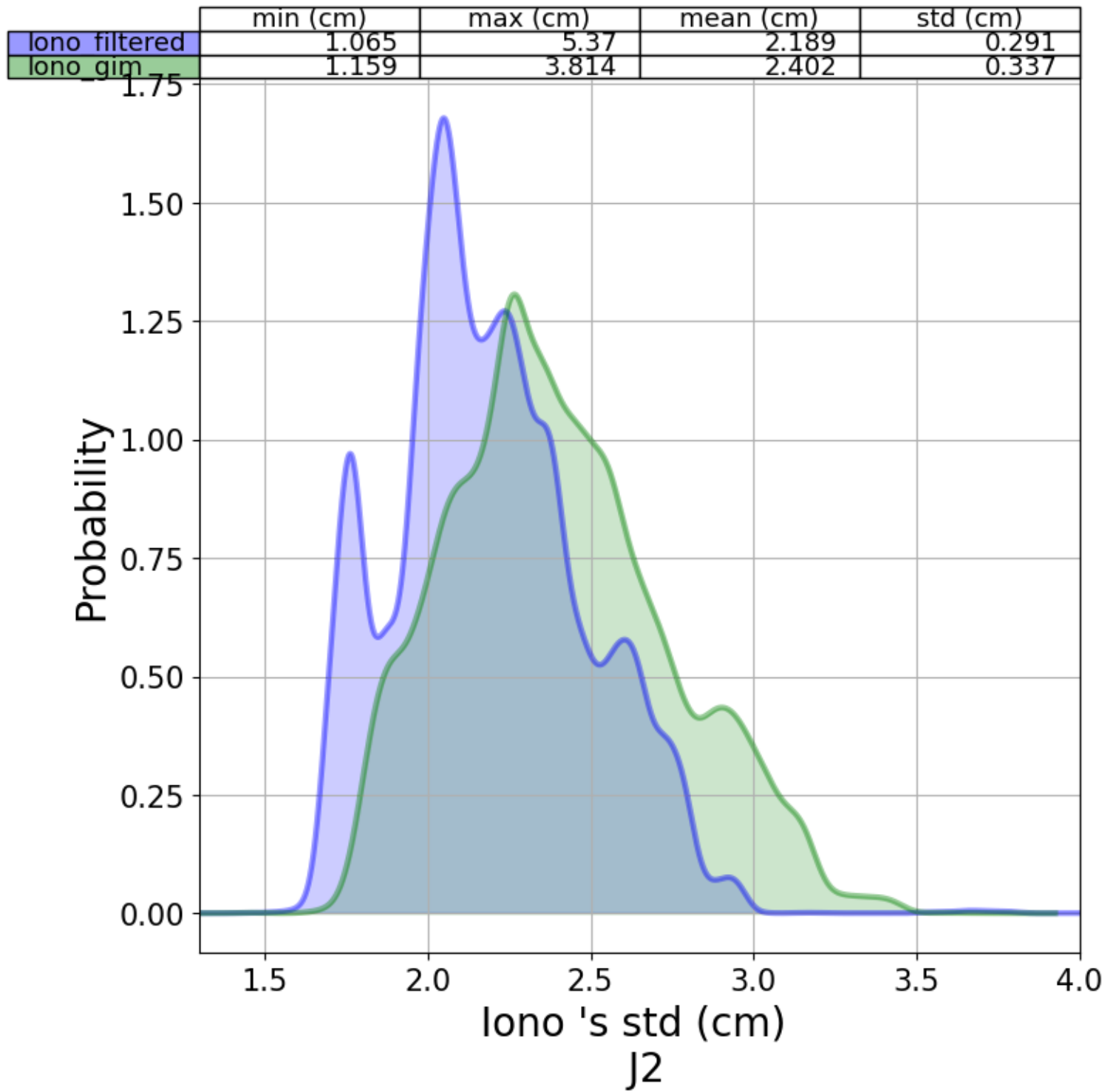


FIGURE 21 – Histograms of the standard deviation of each Iono version

4.2 sla

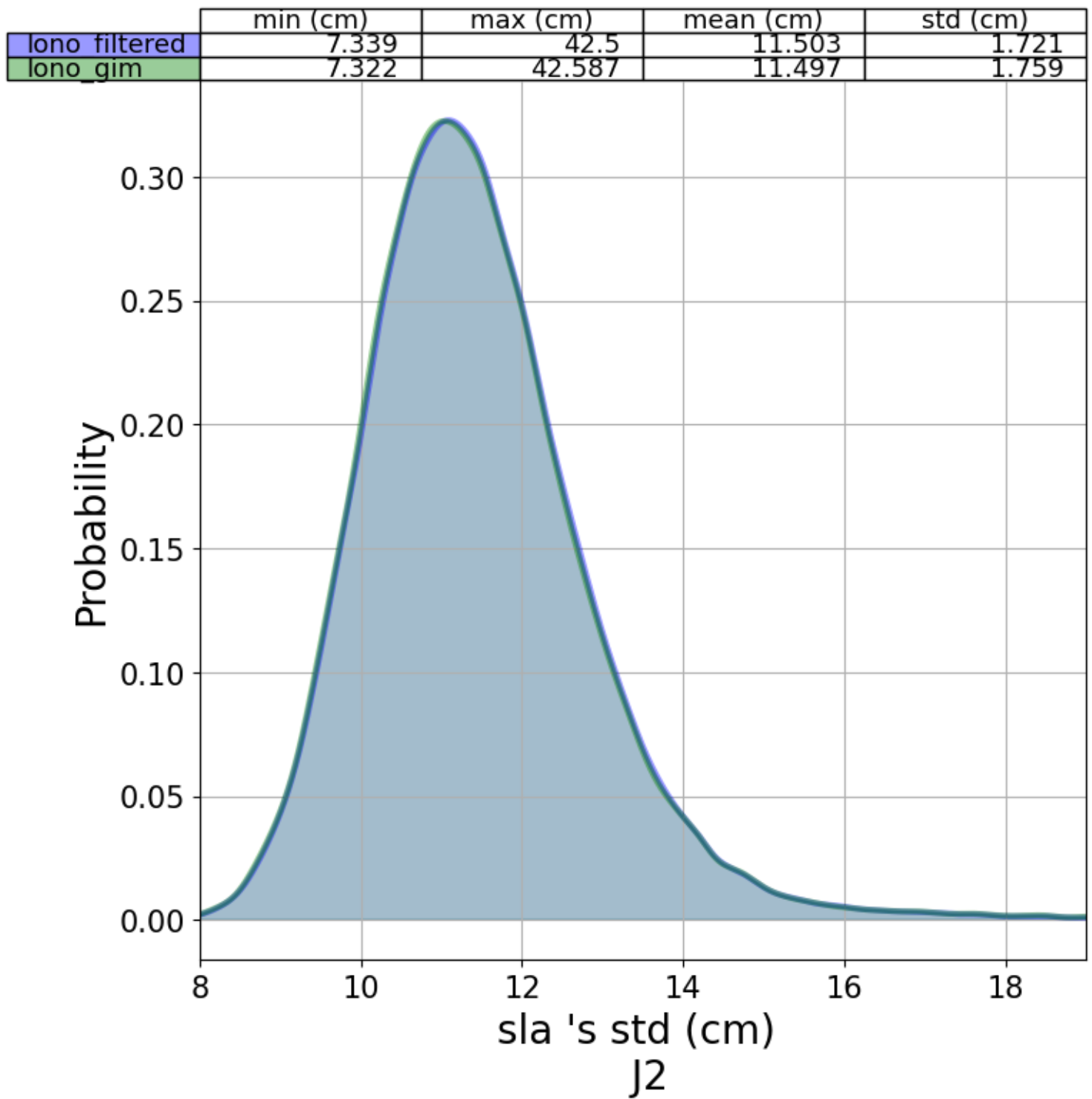


FIGURE 22 – Histograms of the standard deviation of each sla version

5 Along-track analysis

5.1 Iono

5.1.1 Iono's count

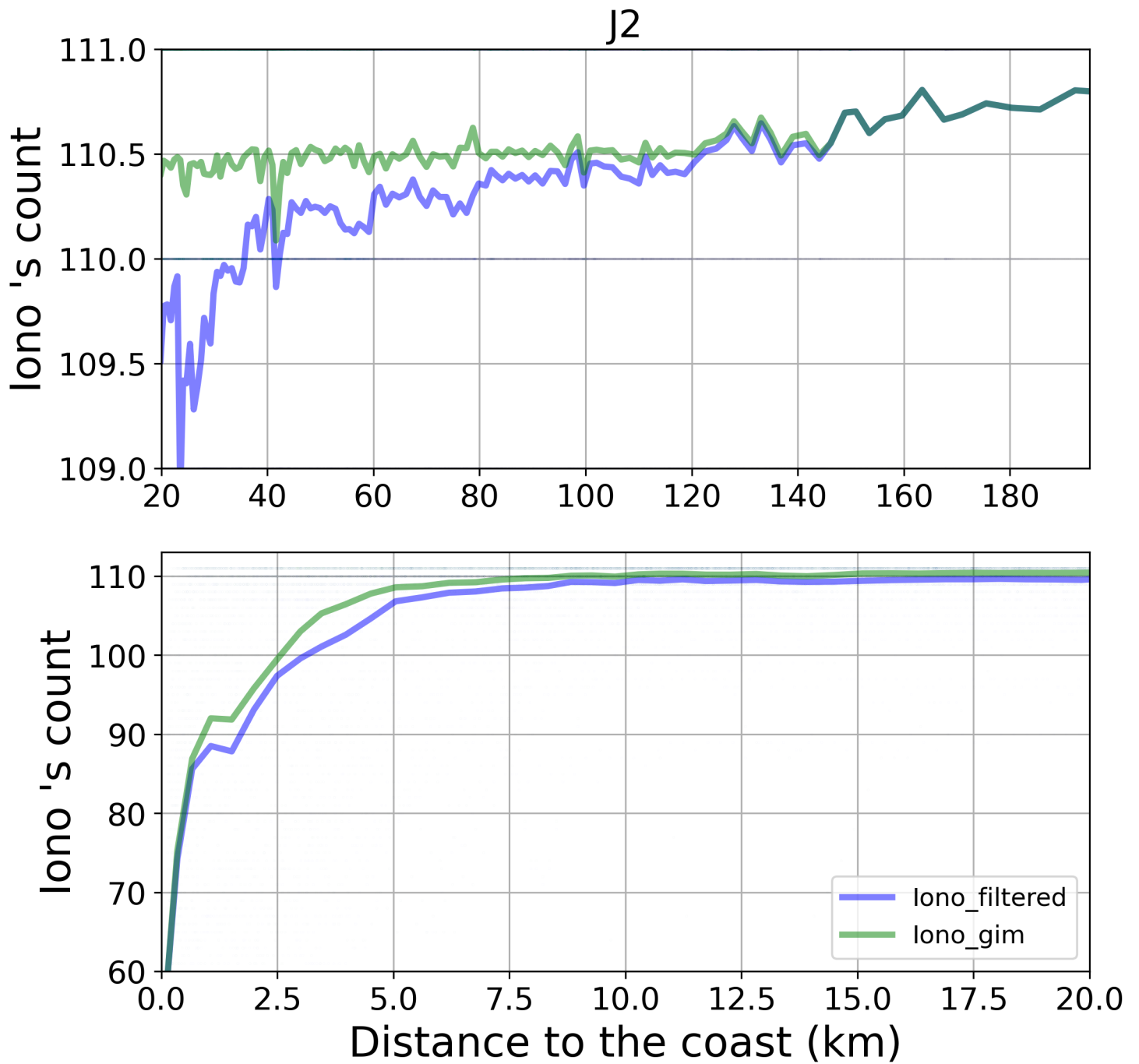


FIGURE 23 – Along-track analysis of Iono's count

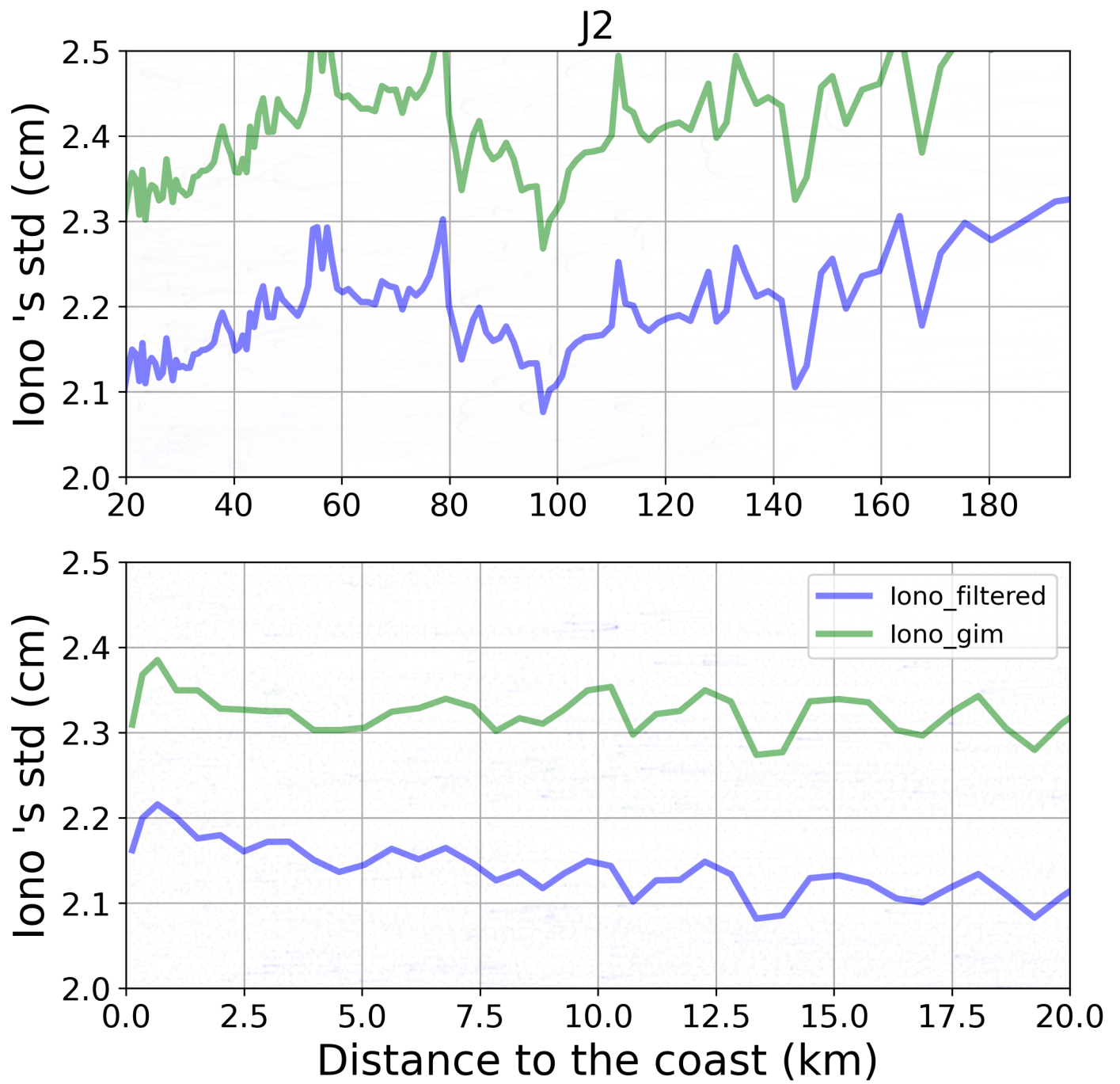


FIGURE 24 – Along-track analysis of Iono's std

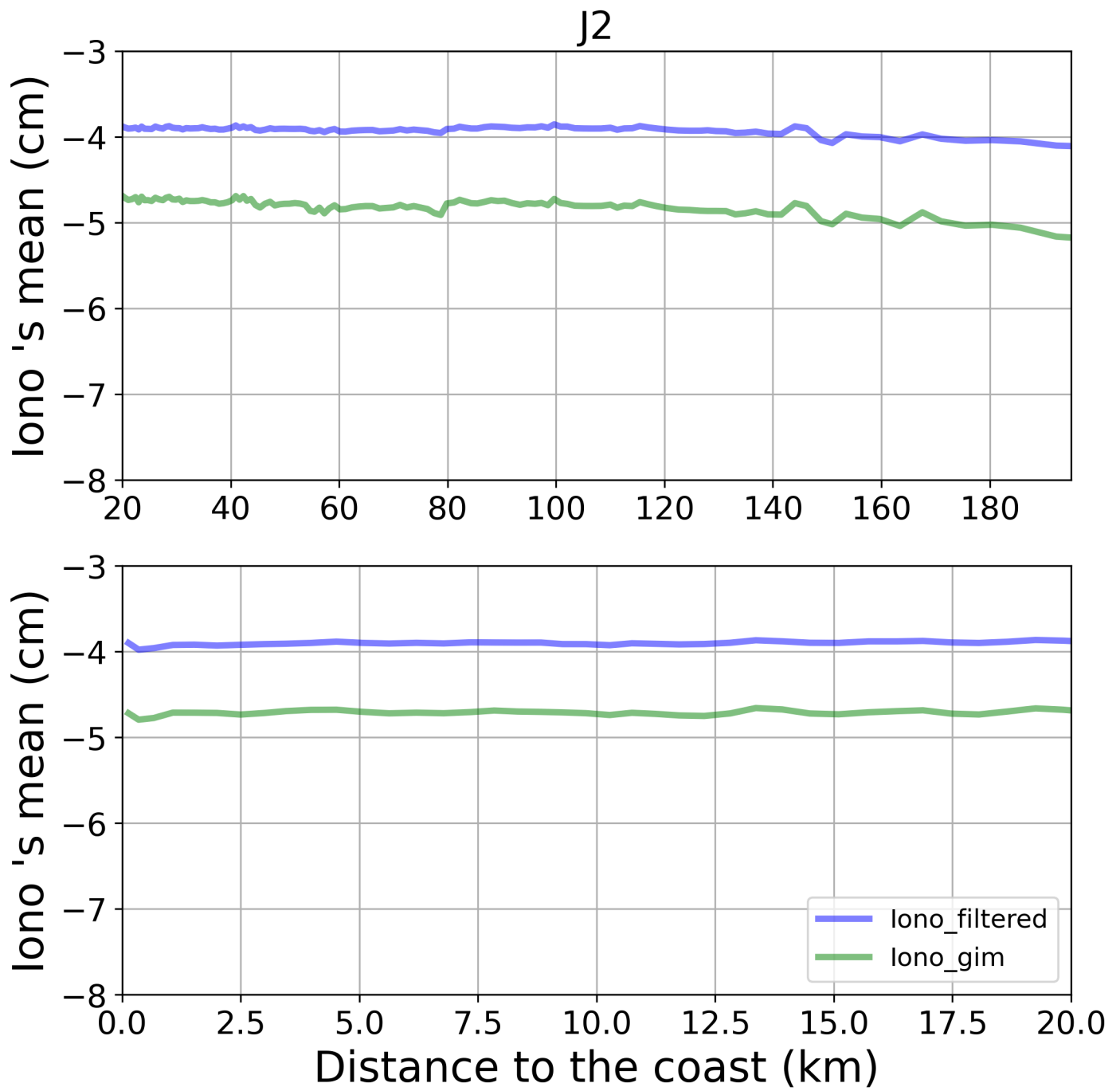


FIGURE 25 – Along-track analysis of Iono's mean

5.2 sla

5.2.1 sla 's count

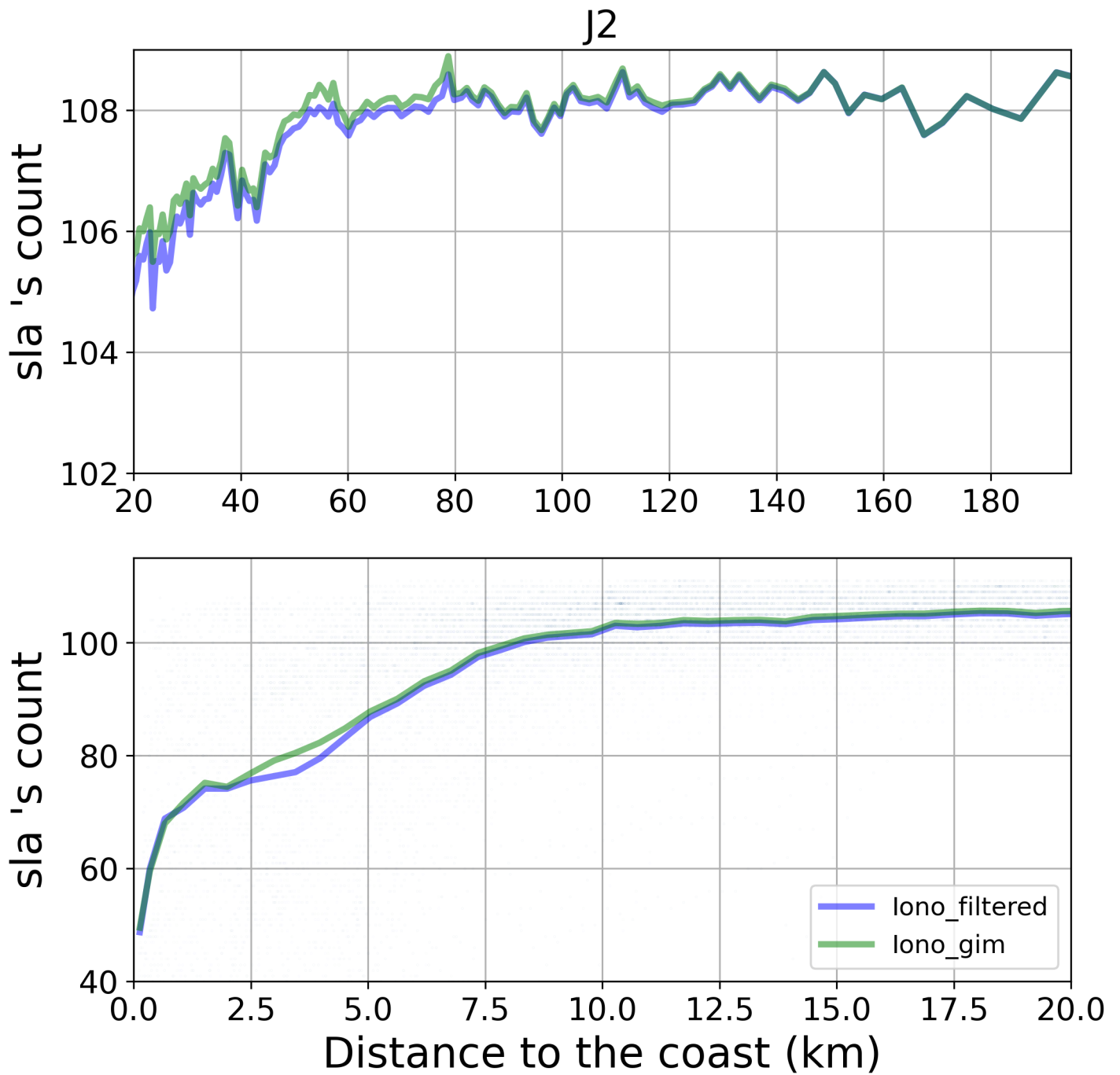


FIGURE 26 – Along-track analysis of sla 's count

J2

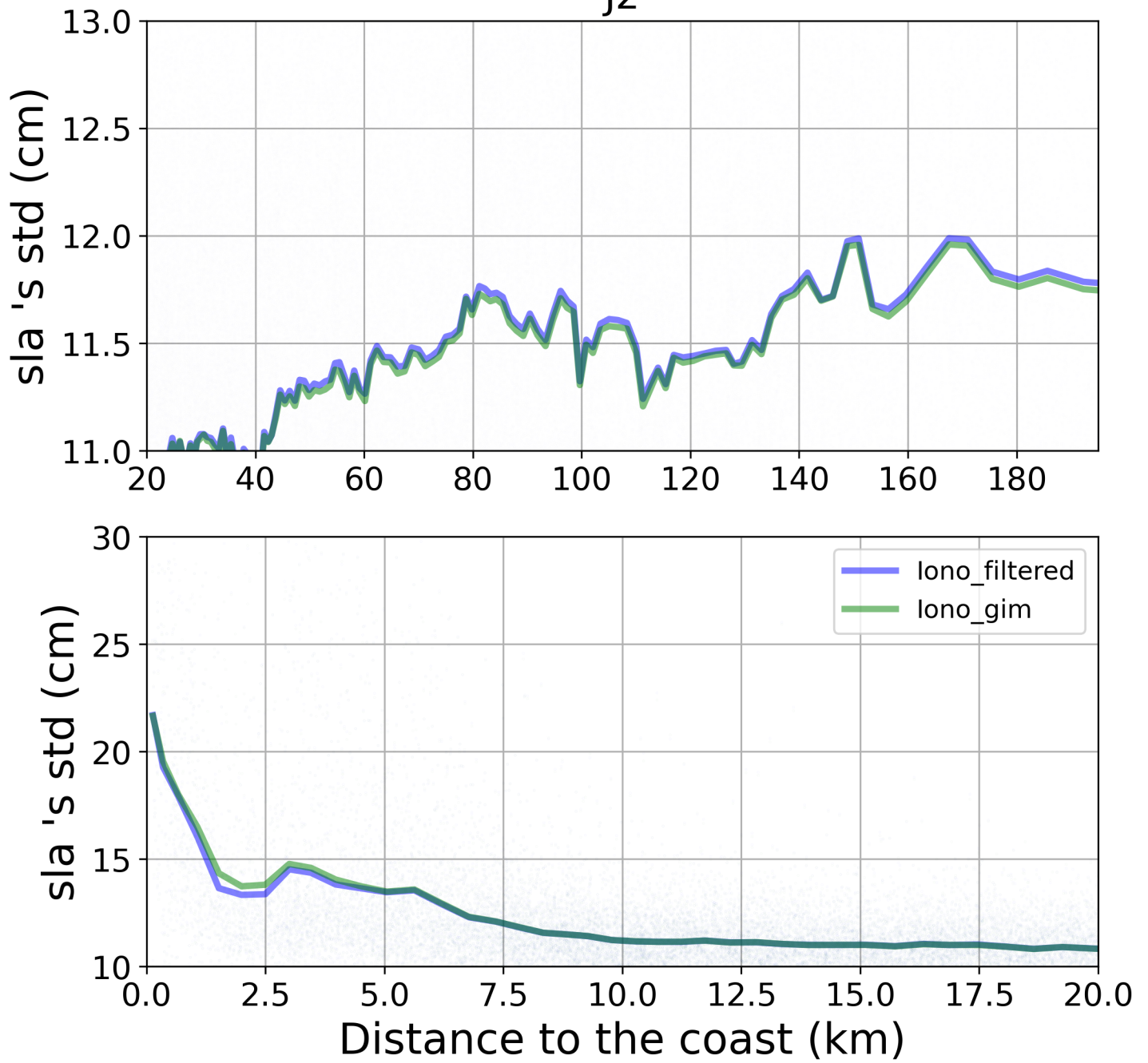


FIGURE 27 – Along-track analysis of sla 's std

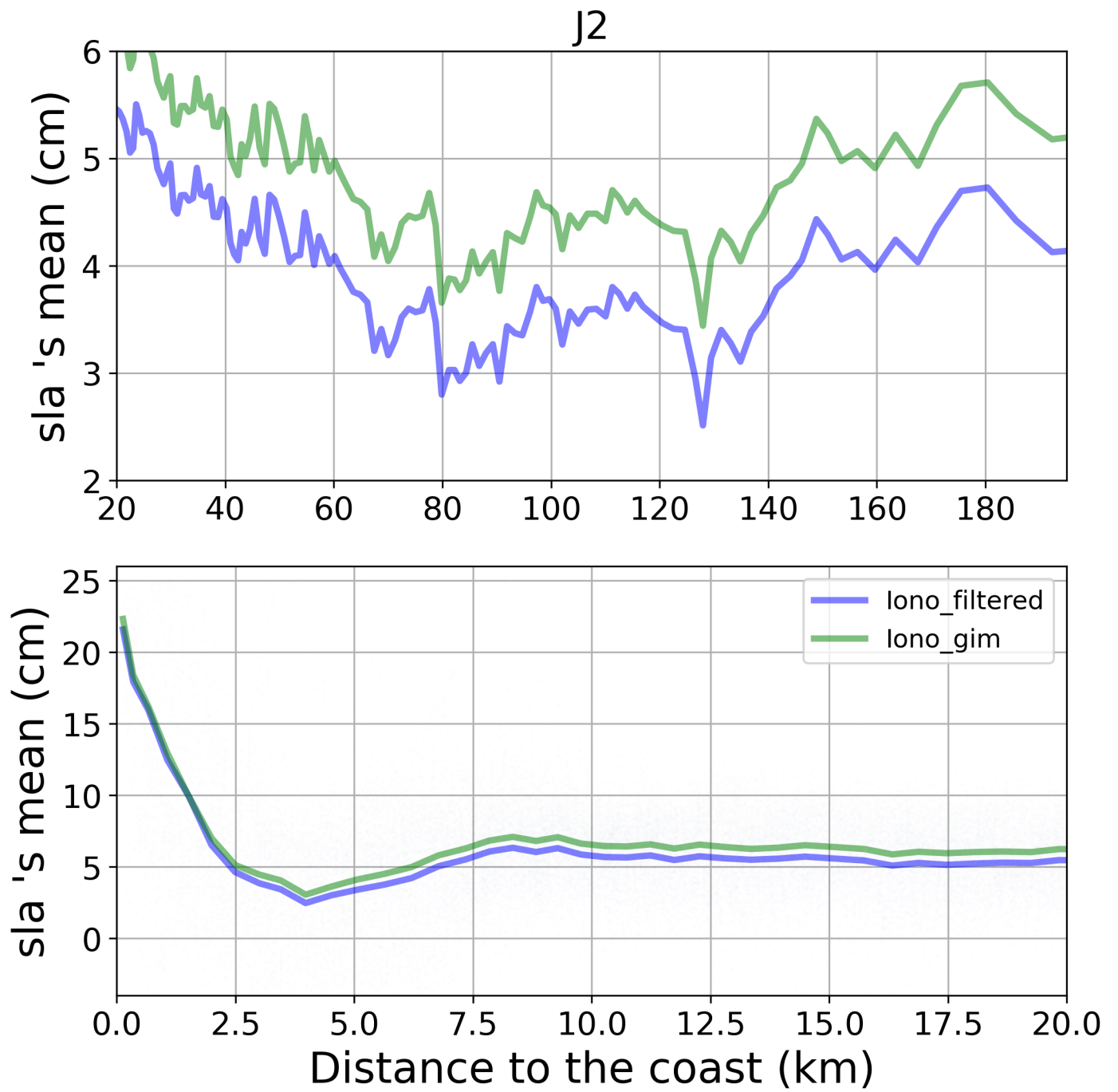


FIGURE 28 – Along-track analysis of sla 's mean

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 coast

6.1 Station : SETE

- Nearest track to SETE station is the track number track146
- The area of interest is limited by :
 - A circle which it's center is the SETE 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 % SETE tide gauge

Correlation Altimetry data with respect to SETE Tide gauge data

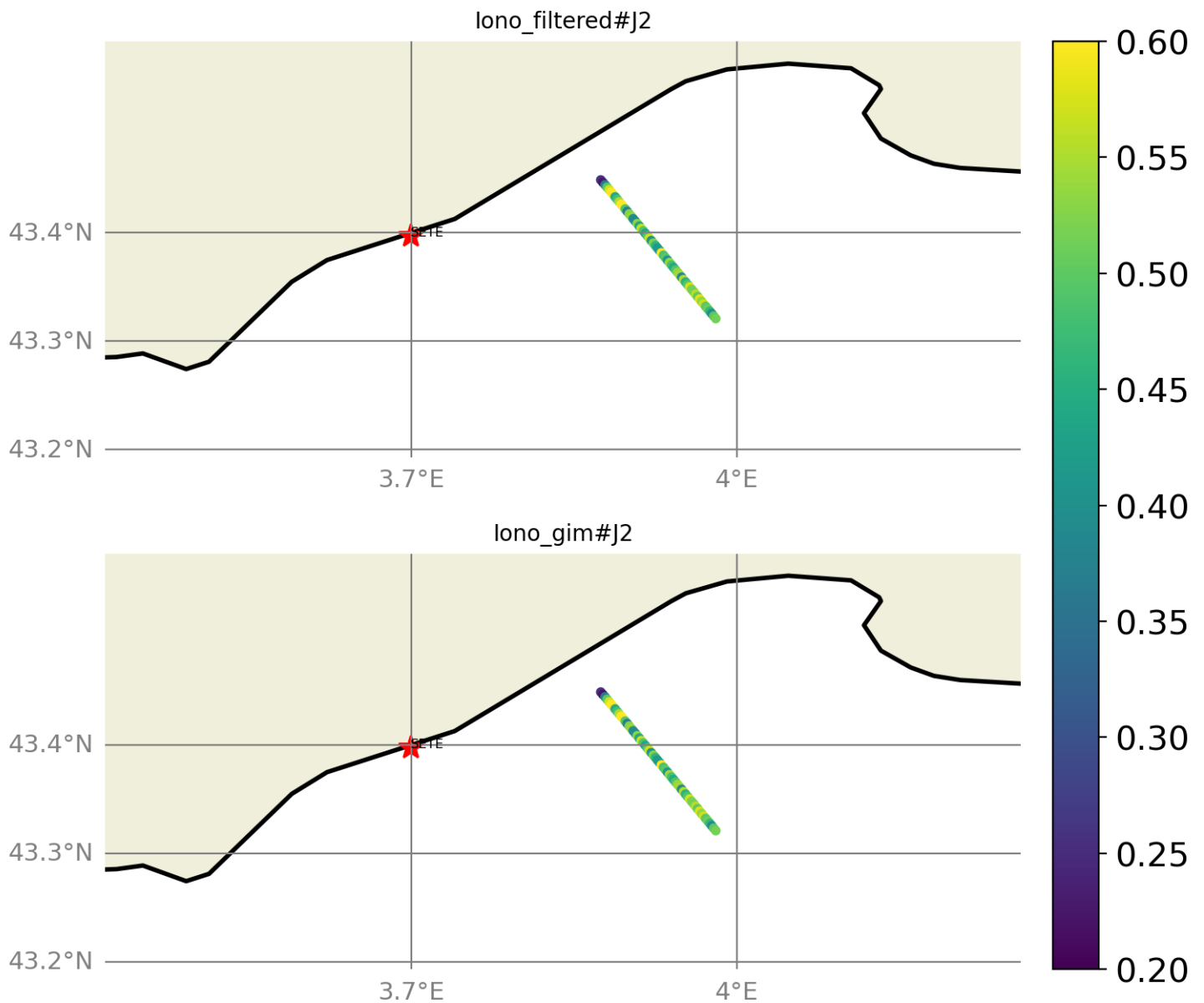


FIGURE 29 – correlation visualization in maps view % SETE tide gauge

6.1.2 rmsd visualization in maps view % SETE tide gauge

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

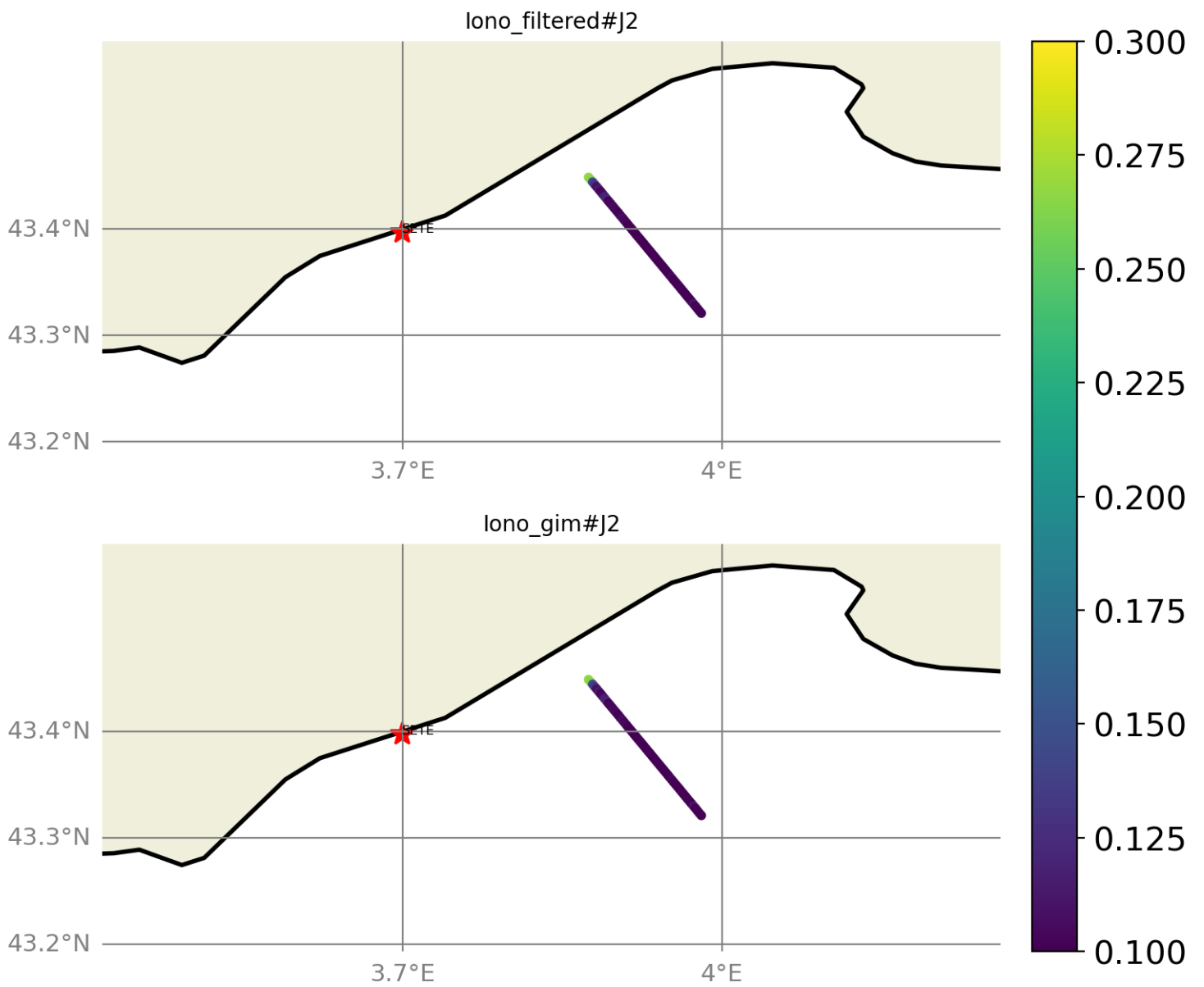


FIGURE 30 – rmsd visualization in maps view % SETE tide gauge

6.1.3 std visualization in maps view % SETE tide gauge

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

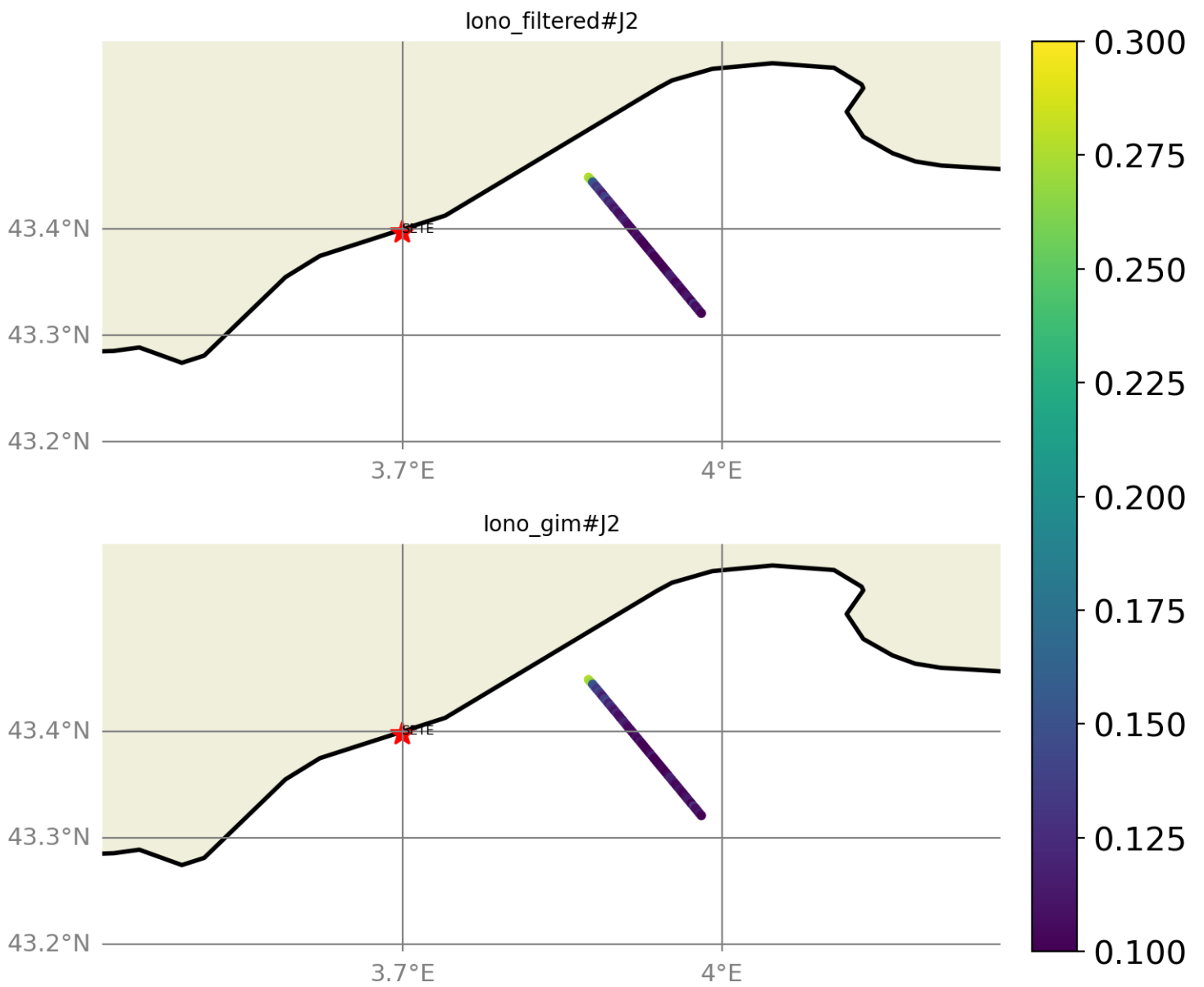


FIGURE 31 – std visualization in maps view % SETE tide gauge

6.1.4 valid_data_percent visualization in maps view % SETE tide gauge

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

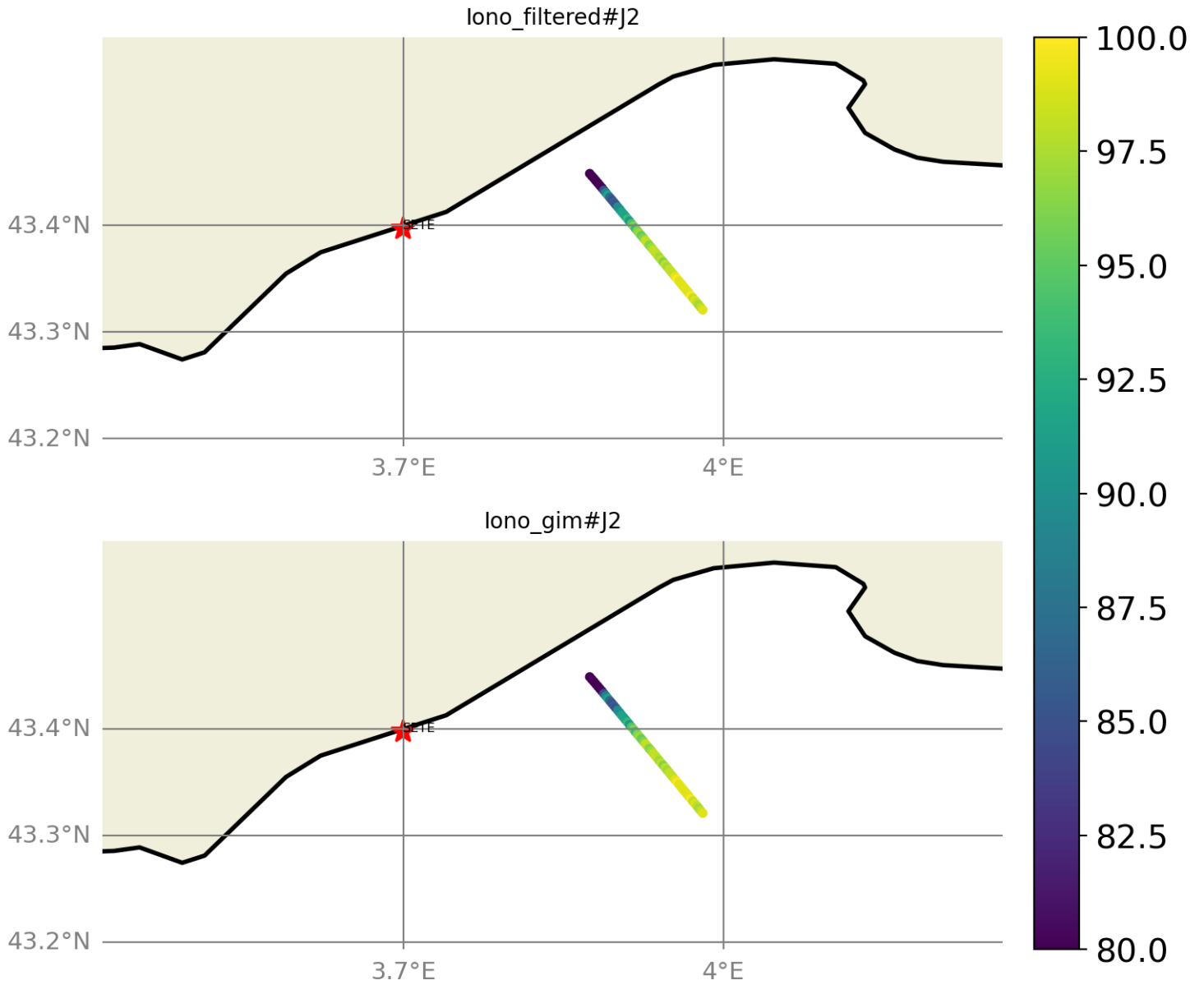


FIGURE 32 – valid_data_percent visualization in maps view % SETE tide gauge

6.1.5 Valid data (%) in function of distance to coast/SETE 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 series, respectively in the time series, i is the index of the time series, np is the number of the selected altimetry time series. $maxNB = 106$ 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 series.

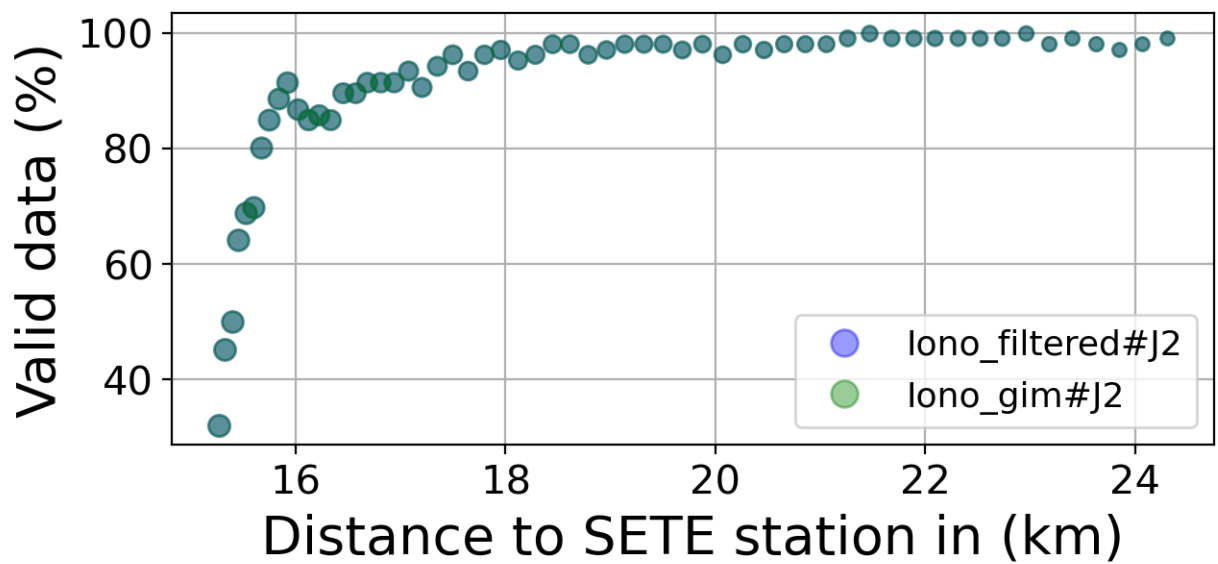
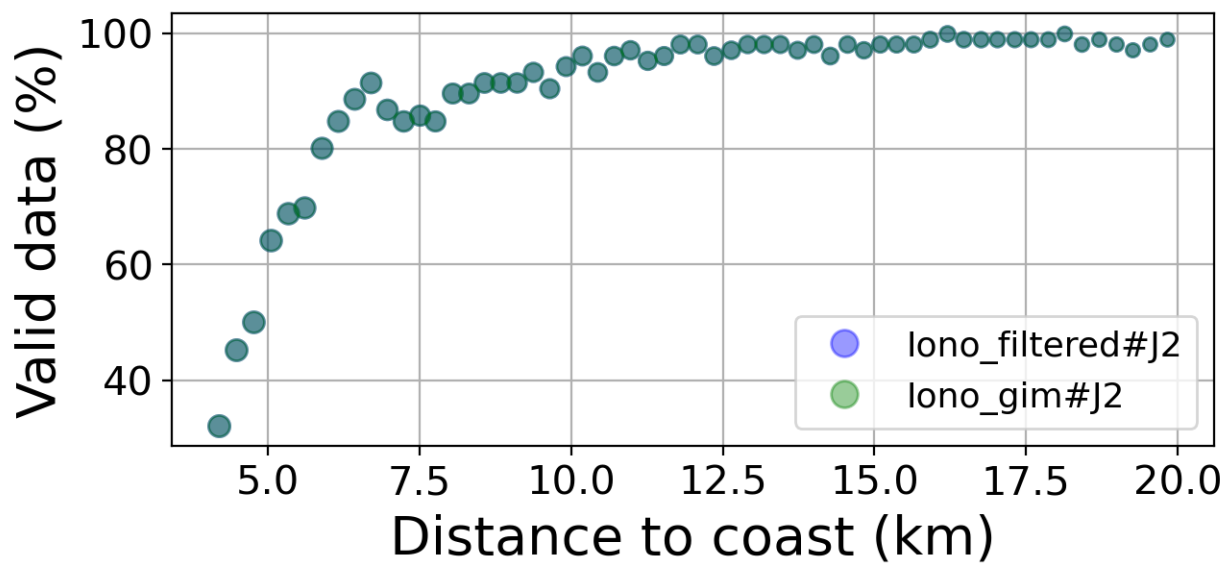


FIGURE 33 – Valid data (%) in function of distance to coast/SETE station

6.1.6 Std in function of distance to coast/SETE station

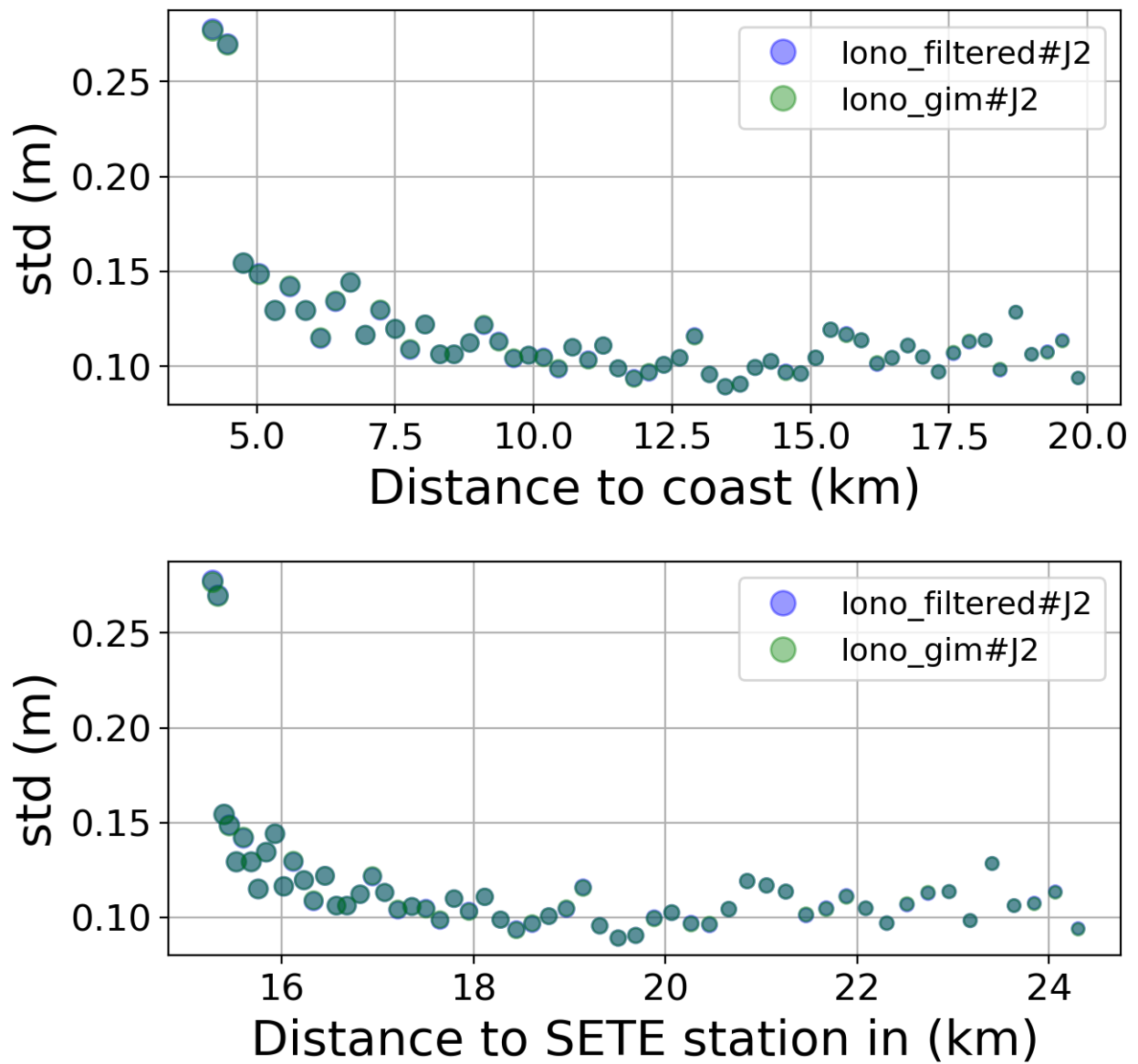


FIGURE 34 – Std in function of the distance to the coast/SETE station

6.1.7 Correlation in function of distance to coast/SETE station

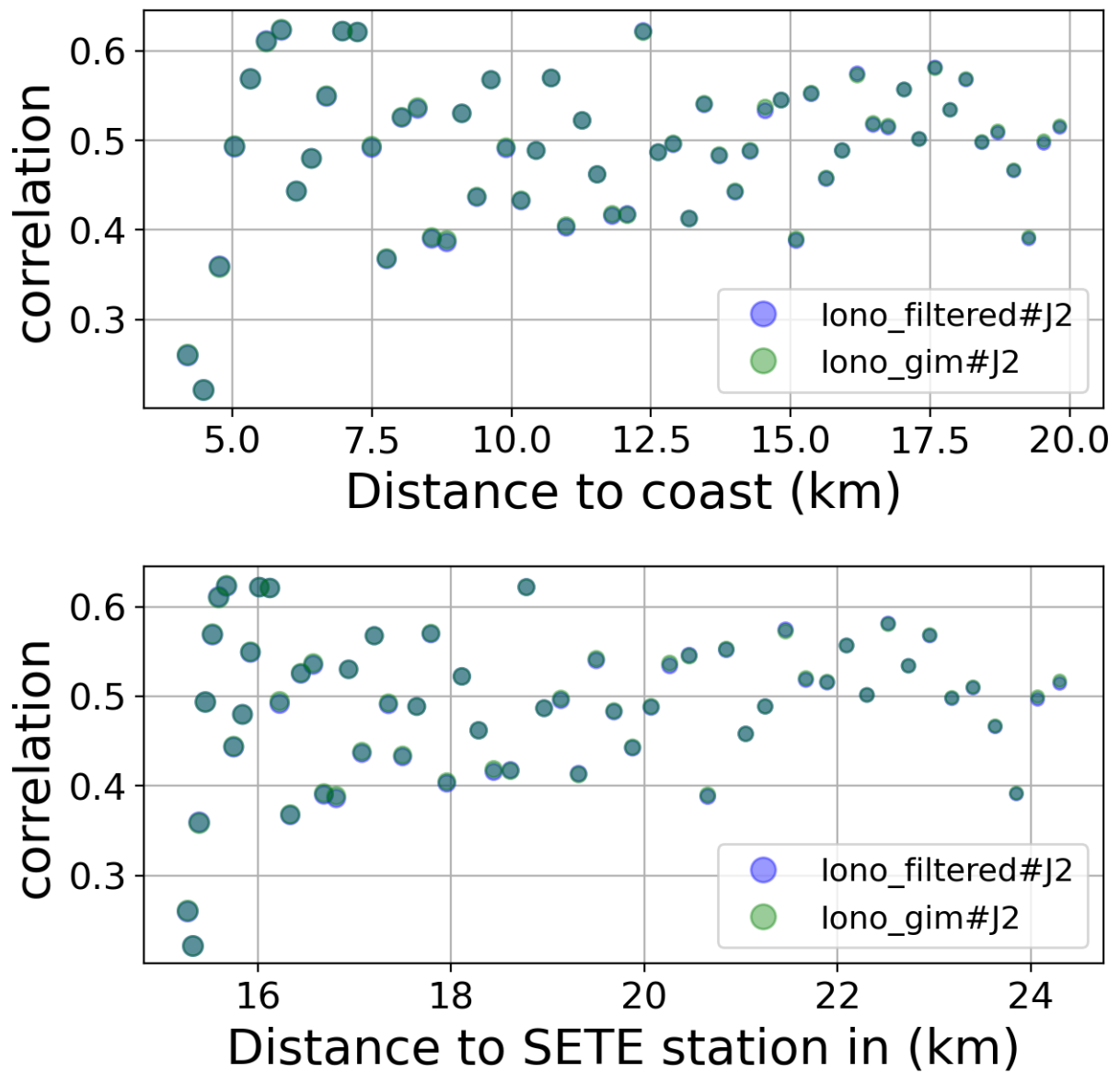


FIGURE 35 – Correlation in function of the distance to the coast/SETE station

6.1.8 Taylor Diagram

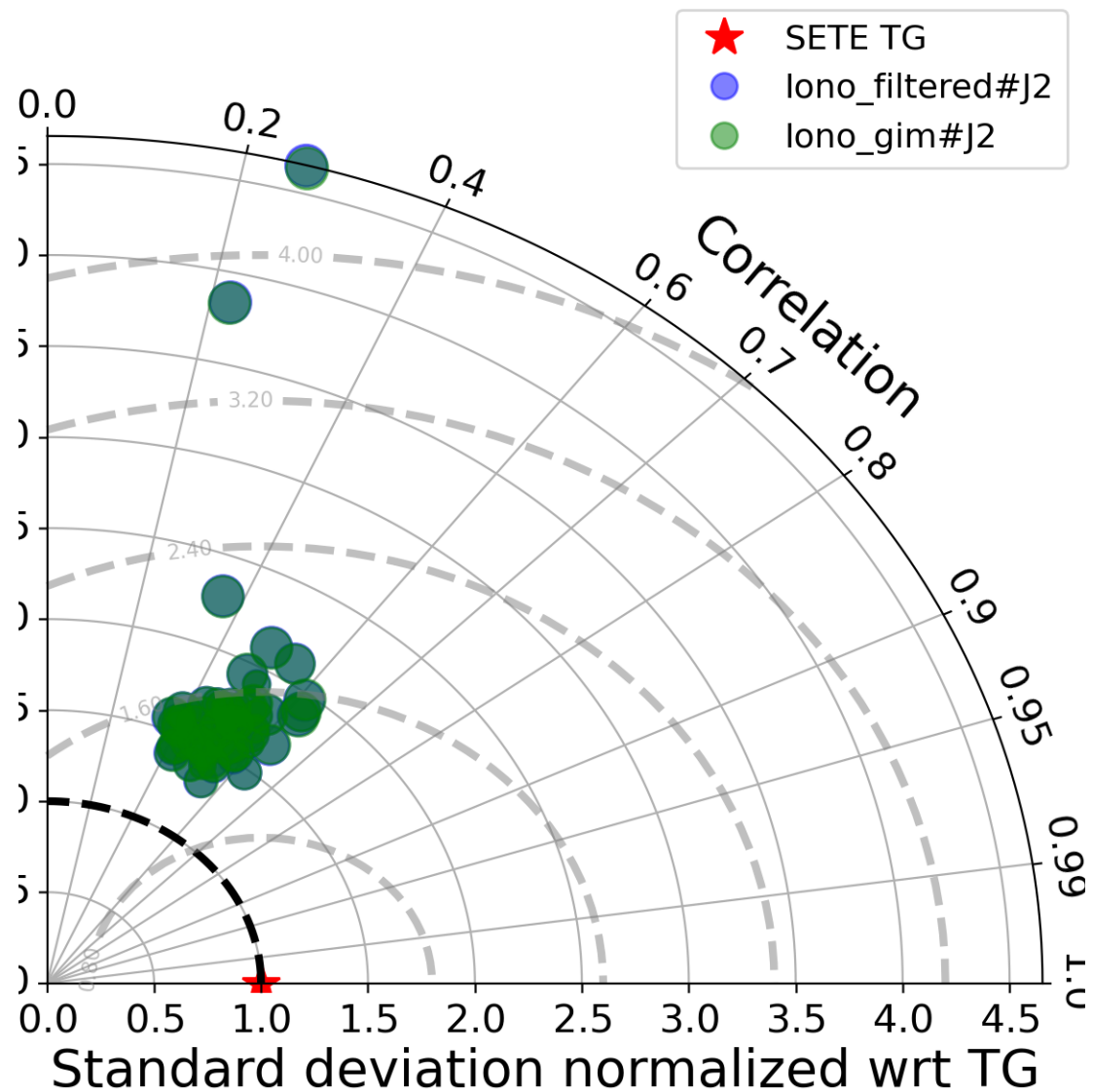


FIGURE 36 – Taylor diagram

6.1.9 Mean statistics table of products comparison with SETE 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#J2	90.908	0.491	0.117	0.103
lono_gim#J2	90.908	0.492	0.117	0.103

FIGURE 37 – 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 106 point.

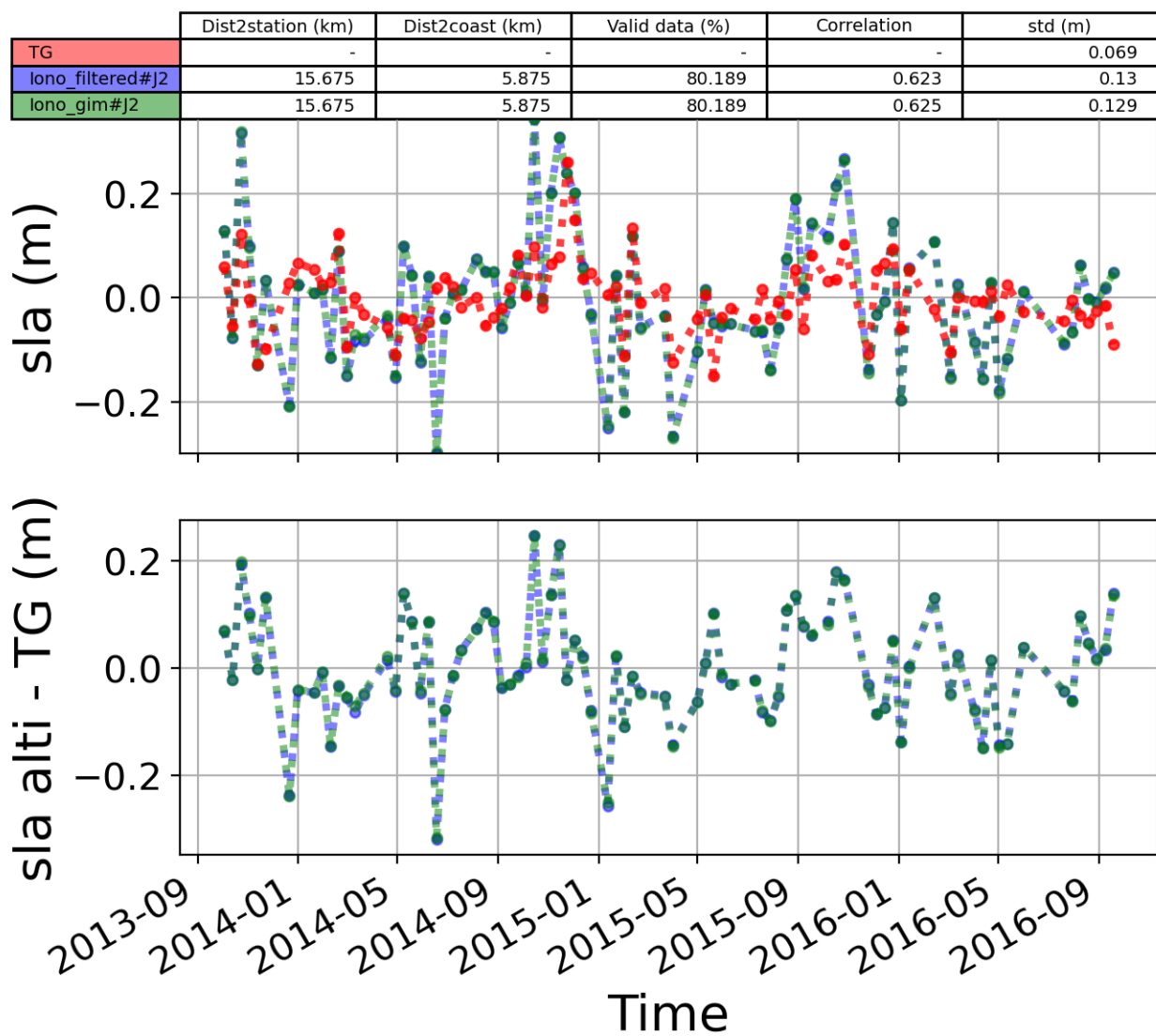


FIGURE 38 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

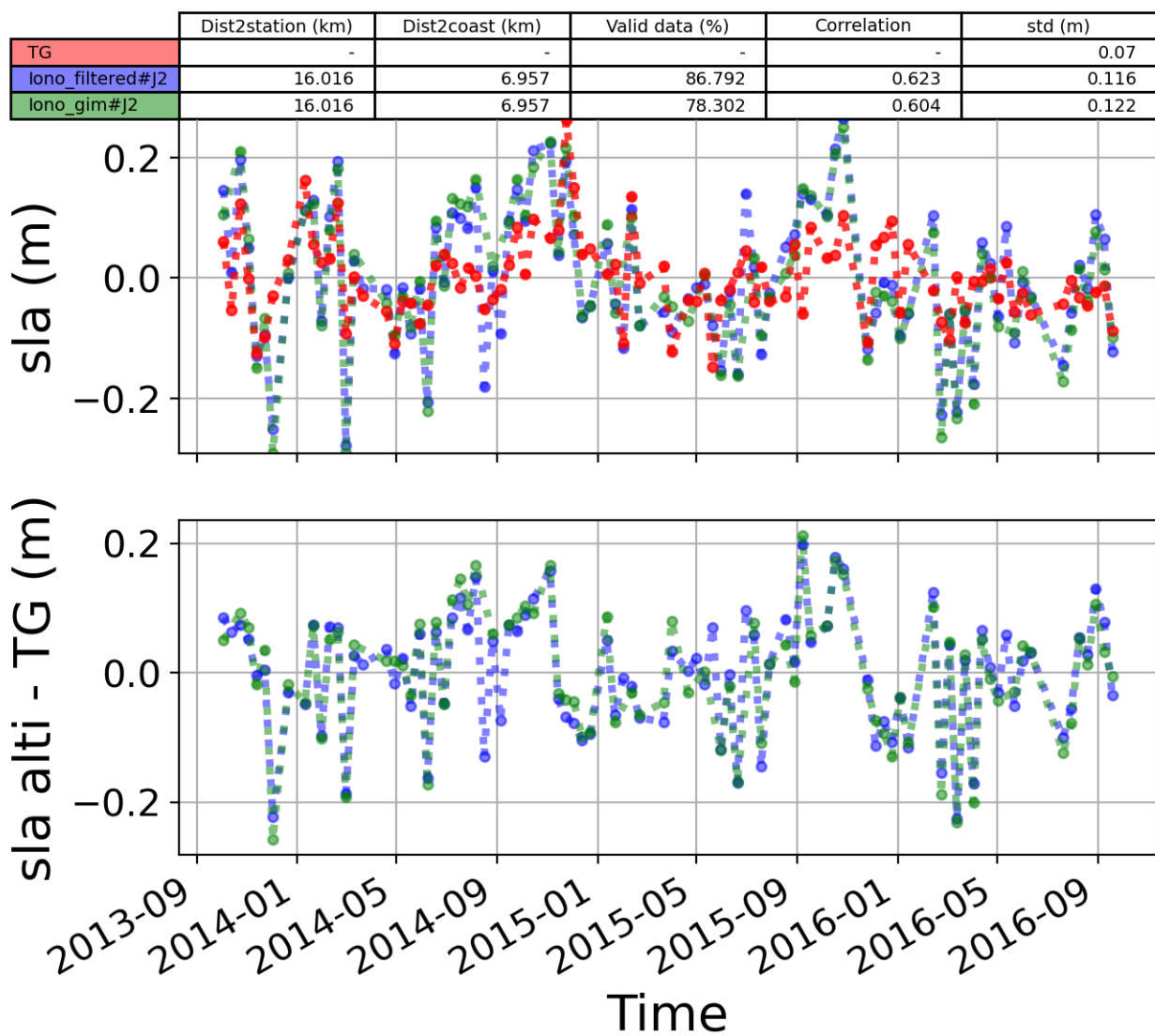


FIGURE 39 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.2 Station : Mentès

- Nearest track to Mentès station is the track number track109
- The area of interest is limited by :
 - A circle which it's center is the Mentès tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : $[38.5, 39]^\circ$

6.2.1 correlation visualization in maps view % Mentès tide gauge

Correlation Altimetry data with respect to Mentès Tide gauge data

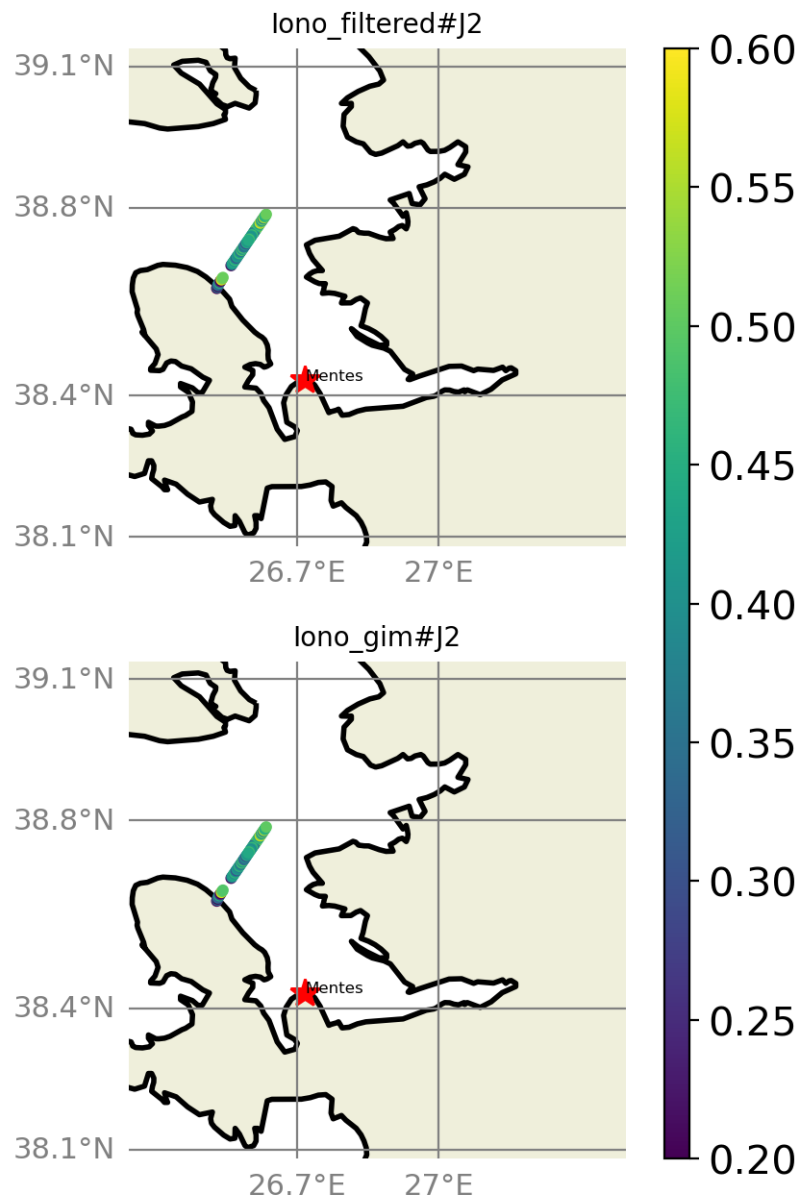


FIGURE 40 – correlation visualization in maps view % Mentès tide gauge

6.2.2 rmsd visualization in maps view % Mentès tide gauge

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

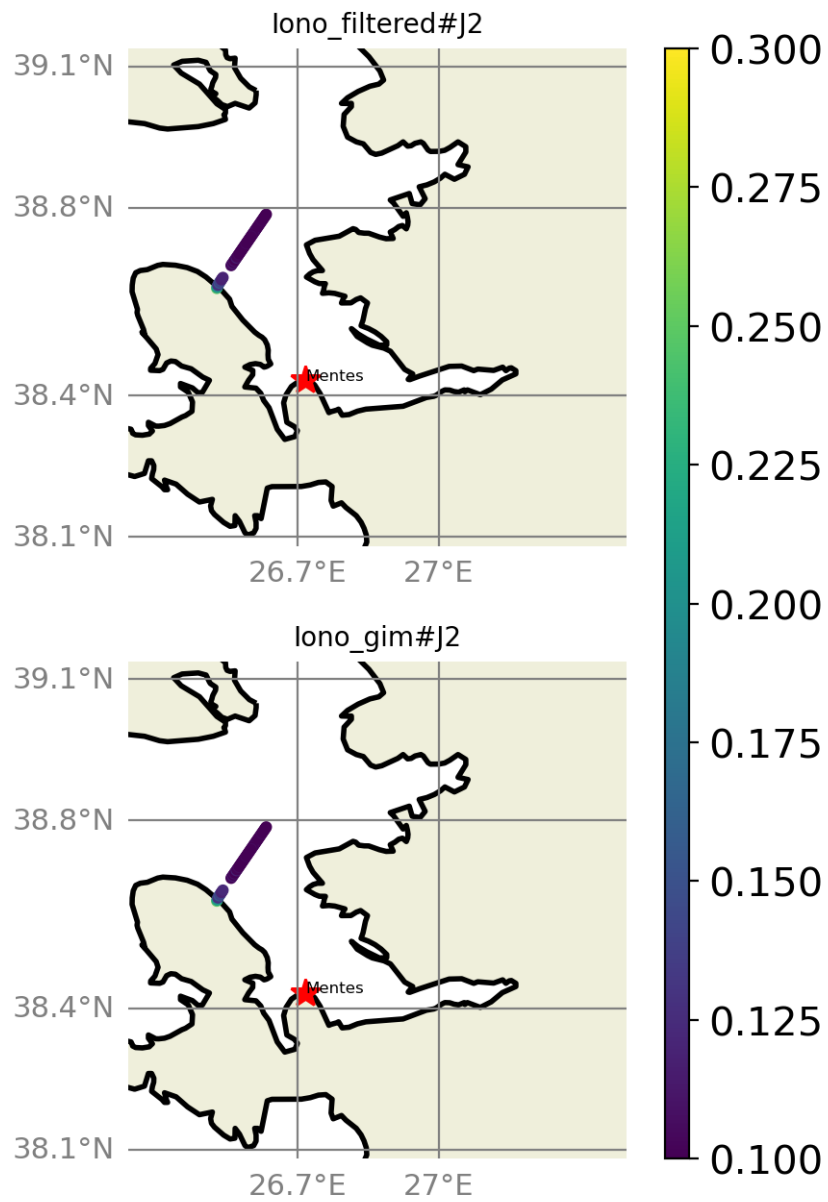


FIGURE 41 – rmsd visualization in maps view % Mentès tide gauge

6.2.3 std visualization in maps view % Mentès tide gauge

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

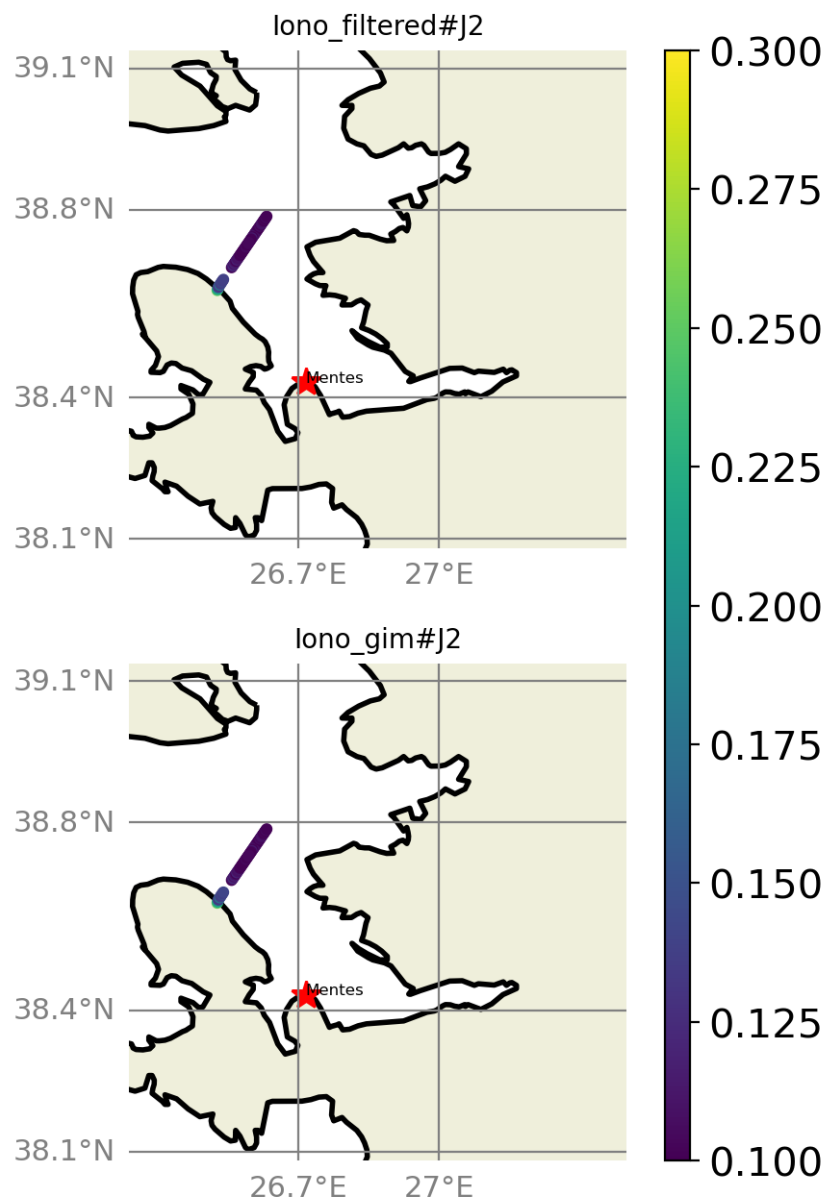


FIGURE 42 – std visualization in maps view % Mentès tide gauge

6.2.4 valid_data_percent visualization in maps view % Mentos tide gauge

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

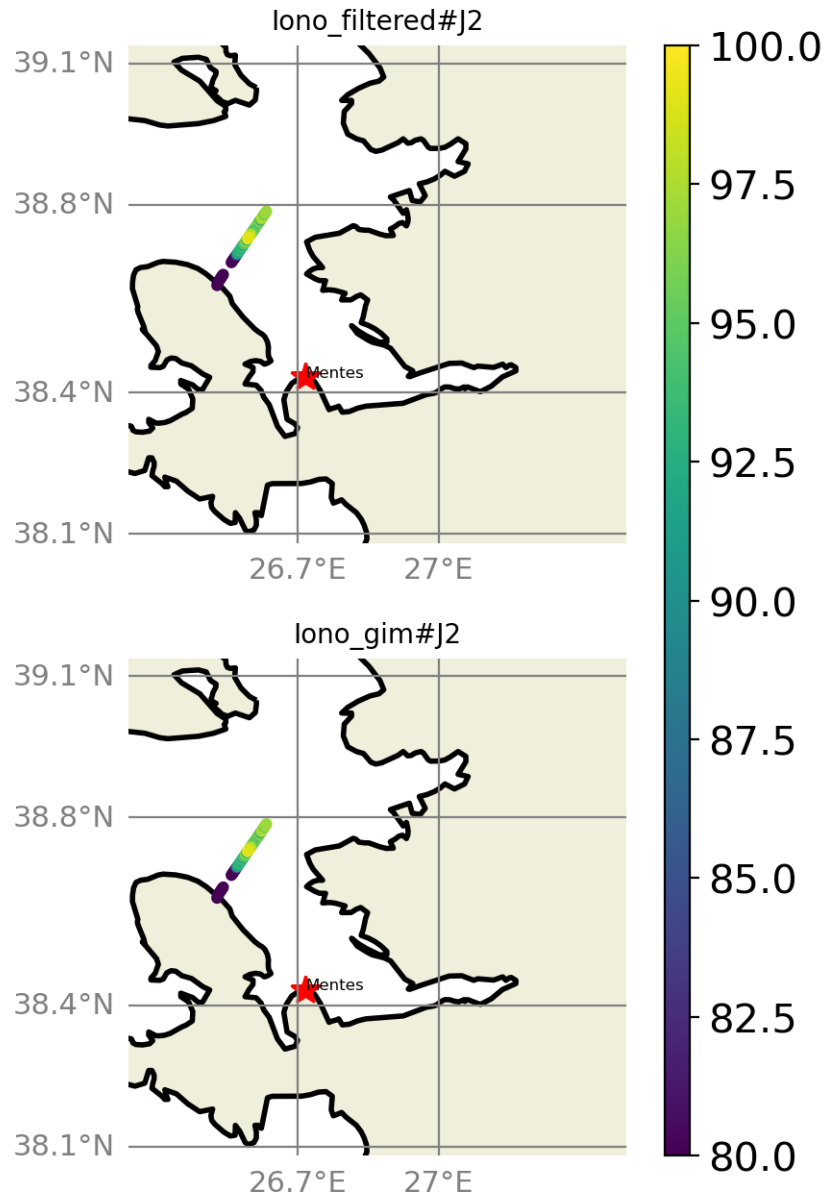


FIGURE 43 – valid_data_percent visualization in maps view % Mentos tide gauge

6.2.5 Valid data (%) in function of distance to coast/Mentos 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. $maxNB = 101$ 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.

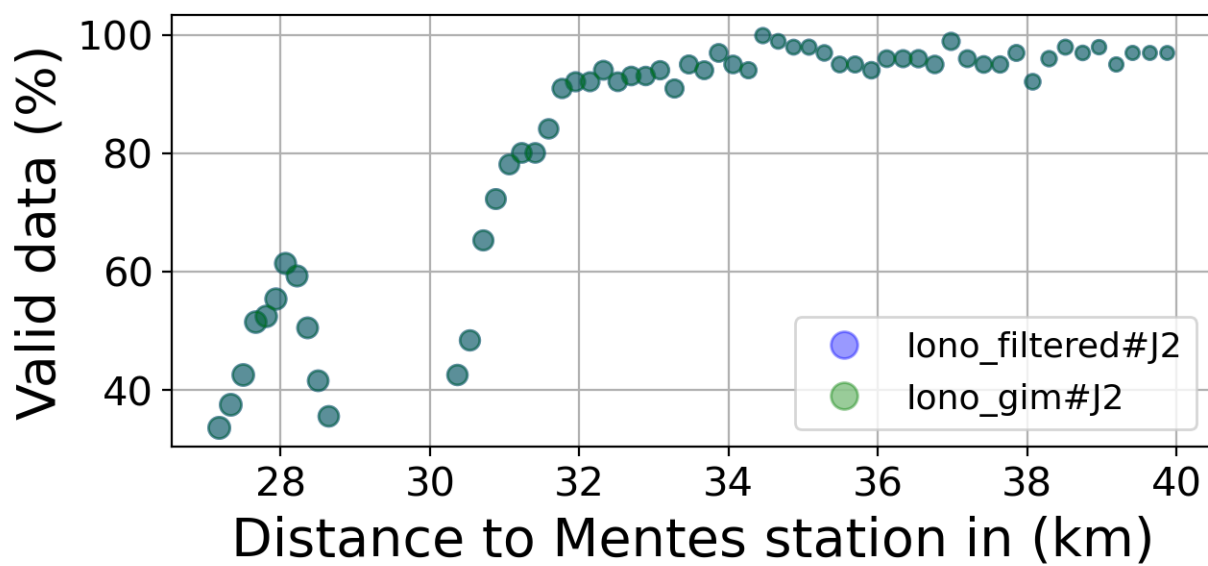
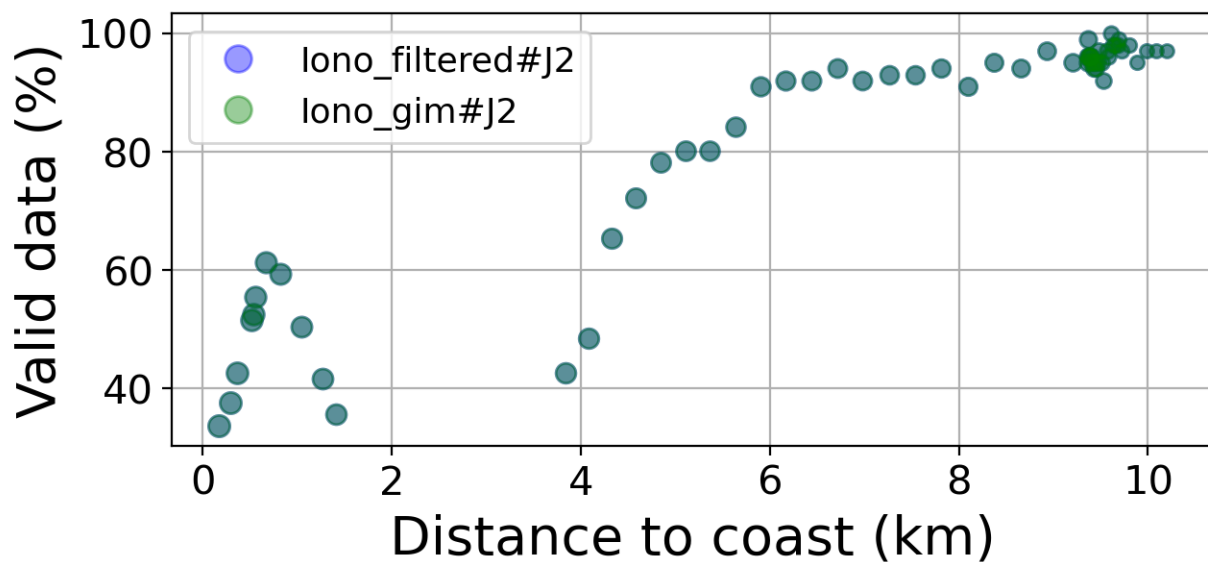


FIGURE 44 – Valid data (%) in function of distance to coast/Mentos station

6.2.6 Std in function of distance to coast/Mentes station

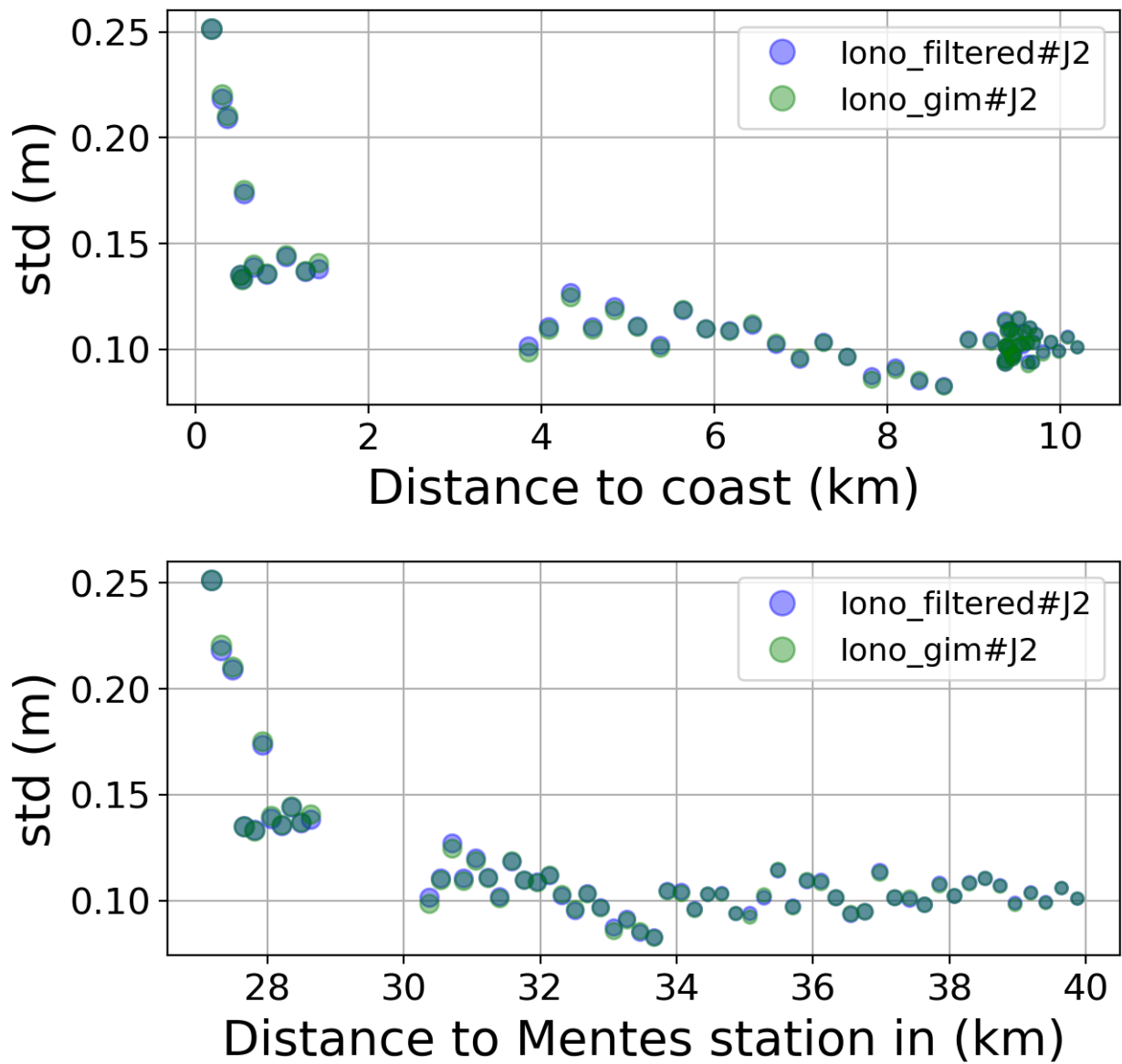


FIGURE 45 – Std in function of the distance to the coast/Mentes station

6.2.7 Correlation in function of distance to coast/Mentes station

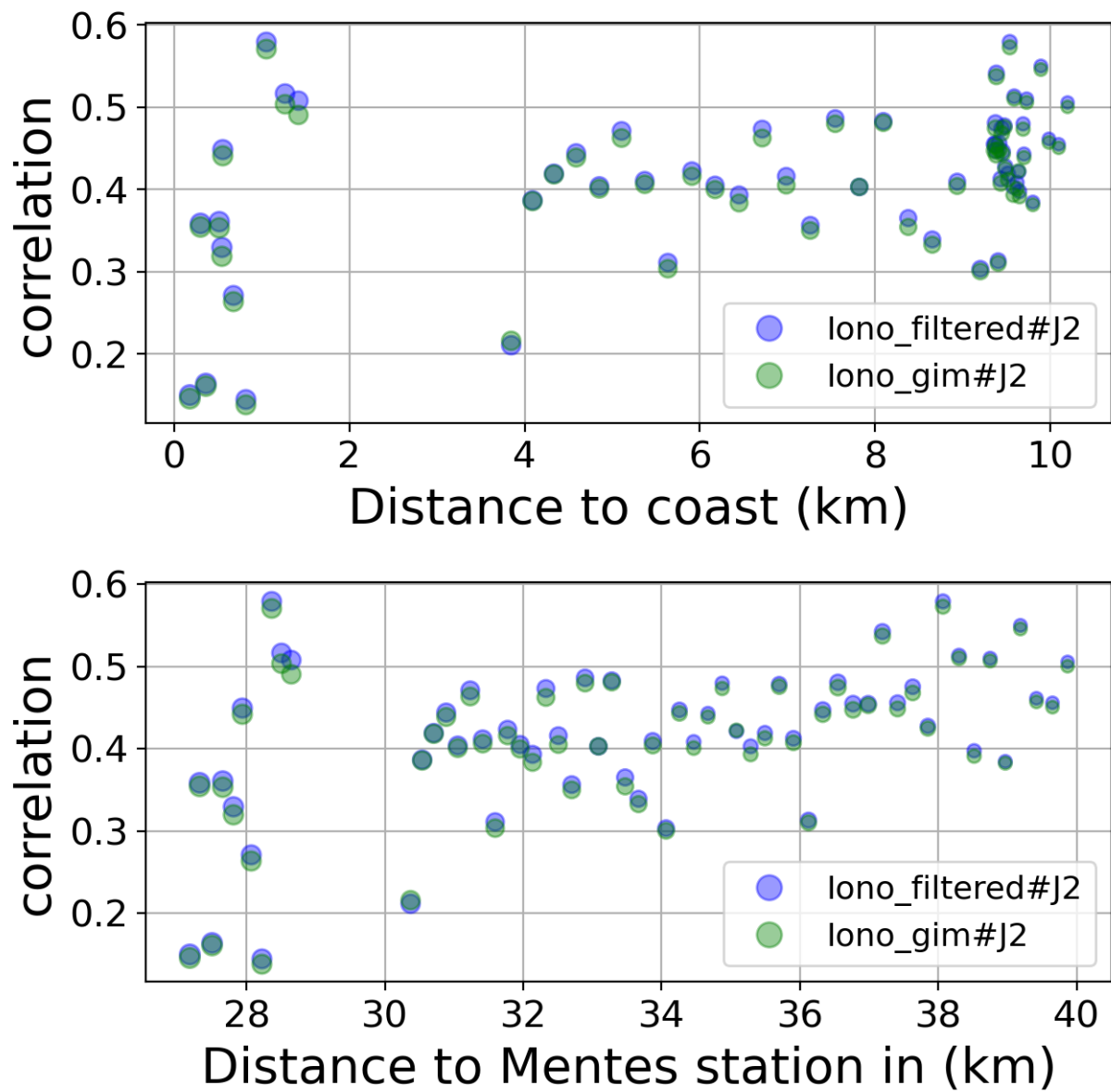


FIGURE 46 – Correlation in function of the distance to the coast/Mentes station

6.2.8 Taylor Diagram

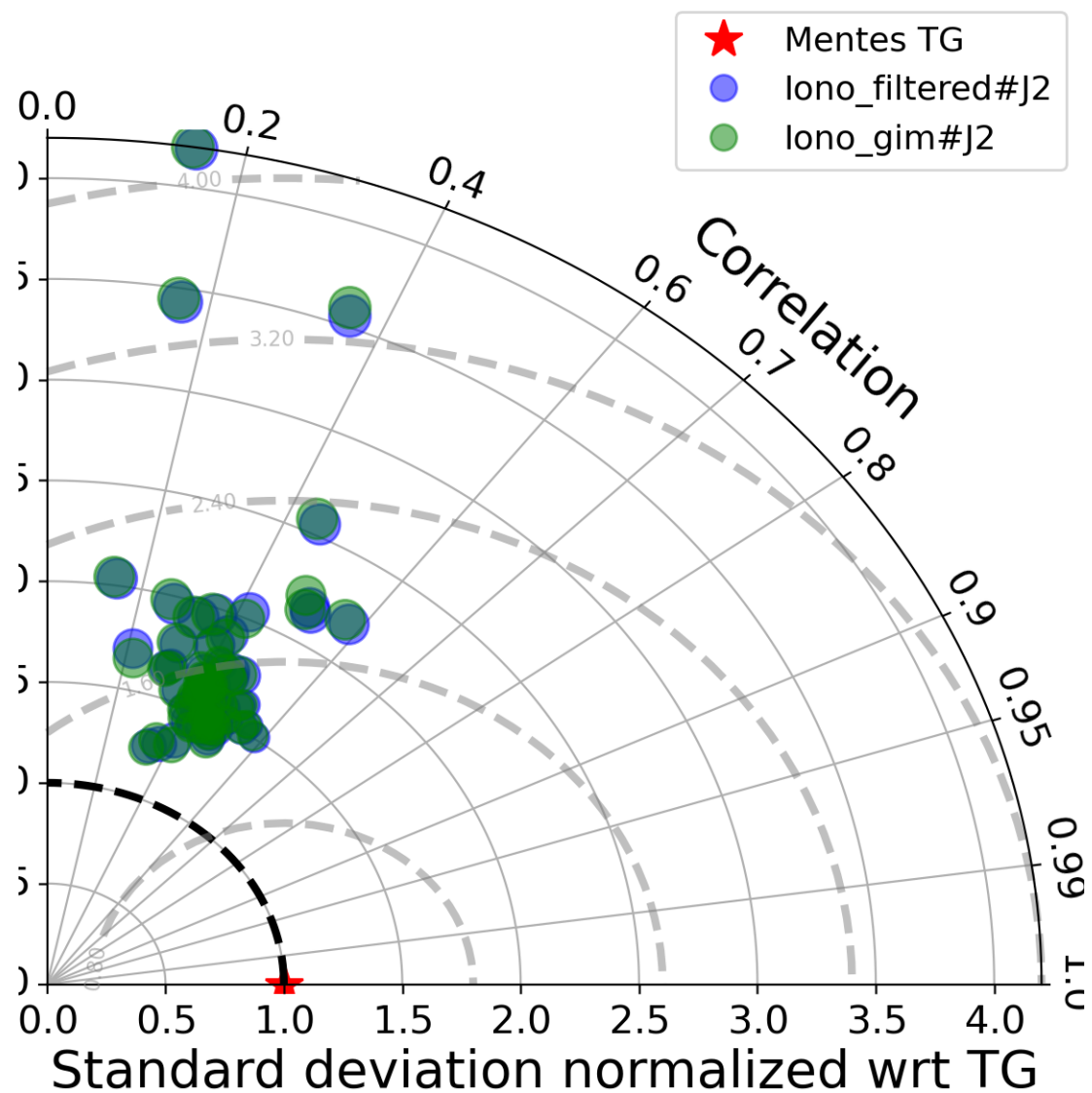


FIGURE 47 – Taylor diagram

6.2.9 Mean statistics table of products comparison with Mentos 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#J2	82.883	0.415	0.115	0.107
lono_gim#J2	82.883	0.409	0.115	0.107

FIGURE 48 – 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 101 point.

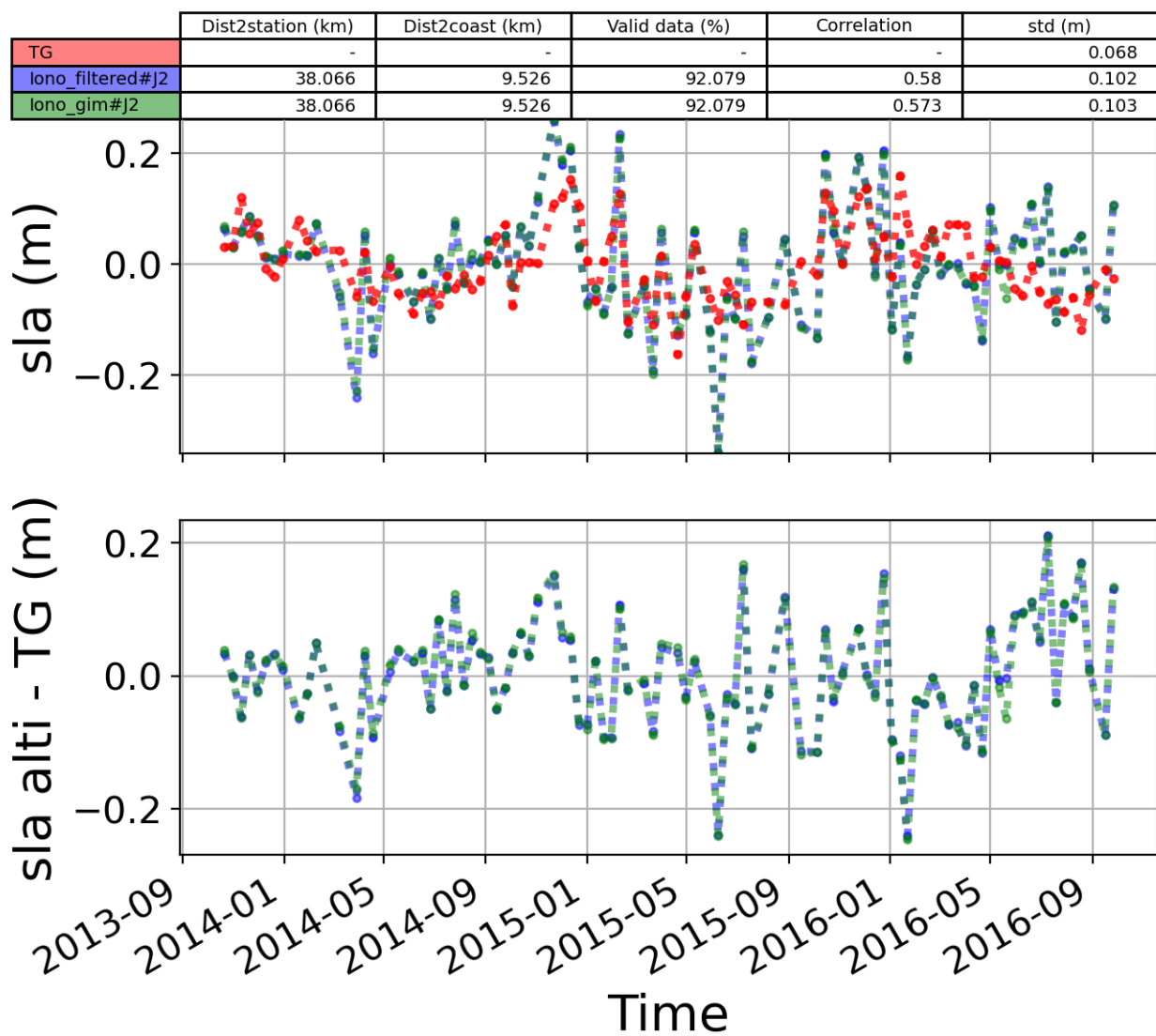


FIGURE 49 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

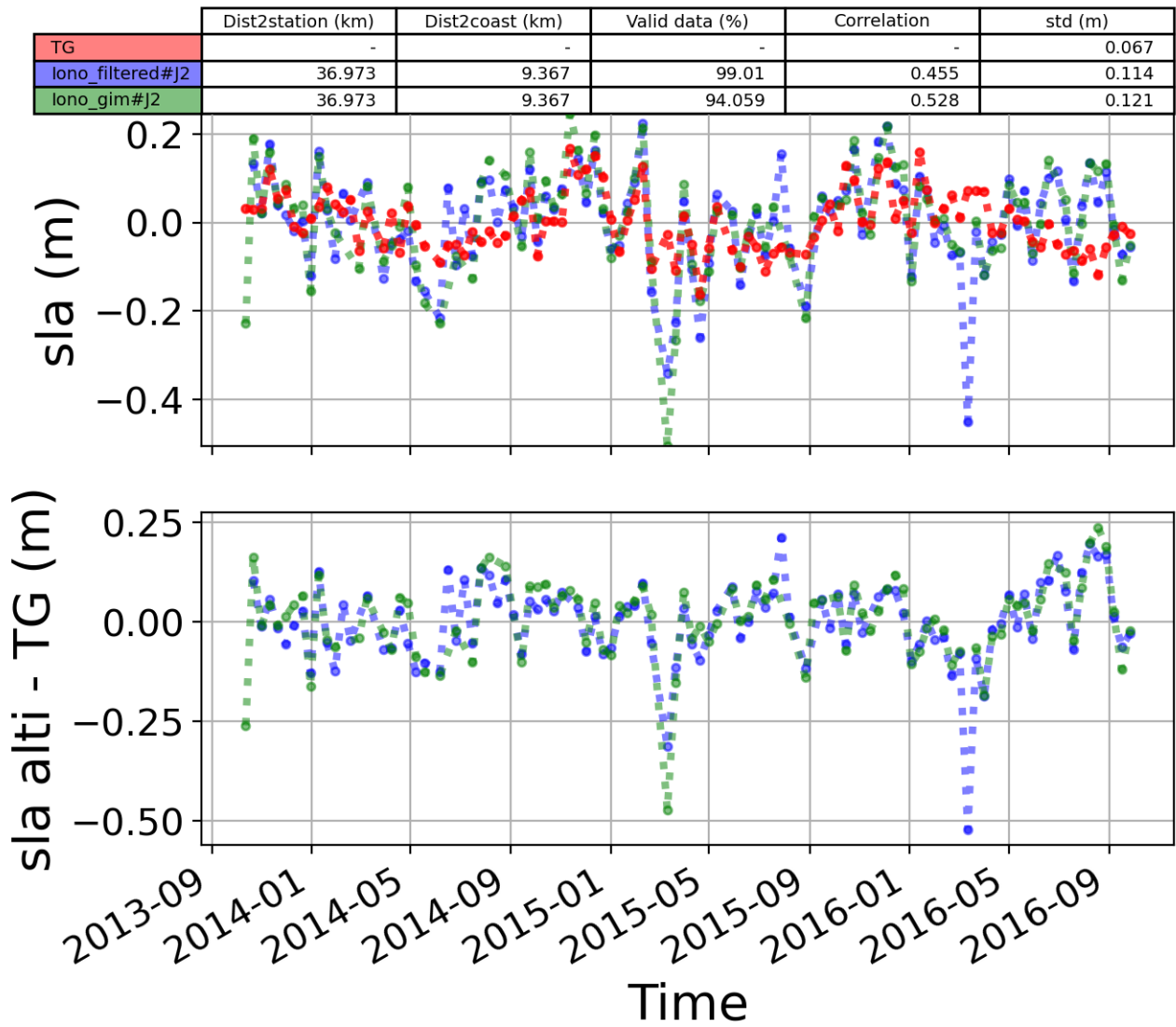


FIGURE 50 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.3 Station : Ibiza

- Nearest track to Ibiza station is the track number track248
- The area of interest is limited by :
 - A circle which it's center is the Ibiza tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km
 - Latitude limits : [38.6, 39.05] °

6.3.1 correlation visualization in maps view % Ibiza tide gauge

Correlation Altimetry data with respect to Ibiza Tide gauge data

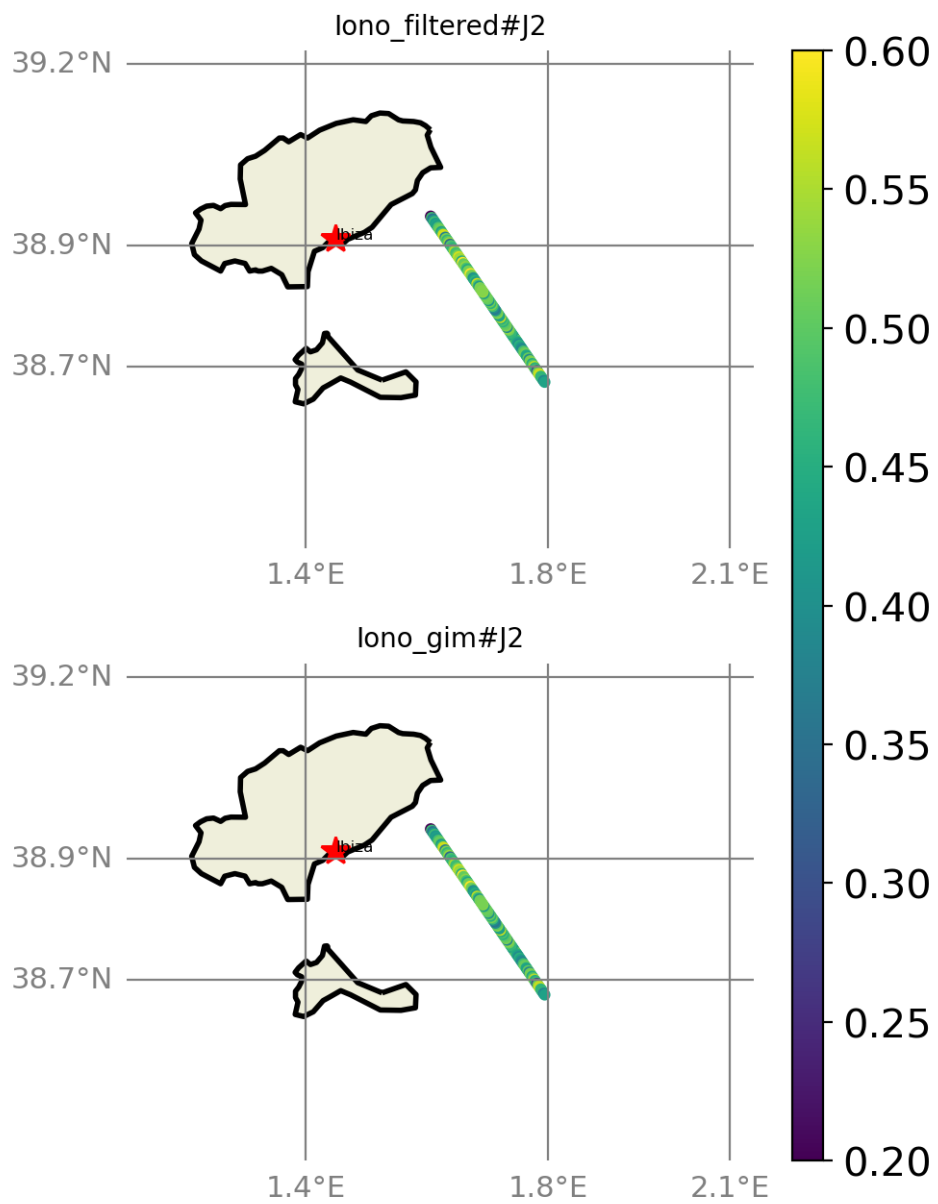


FIGURE 51 – correlation visualization in maps view % Ibiza tide gauge

6.3.2 rmsd visualization in maps view % Ibiza tide gauge

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

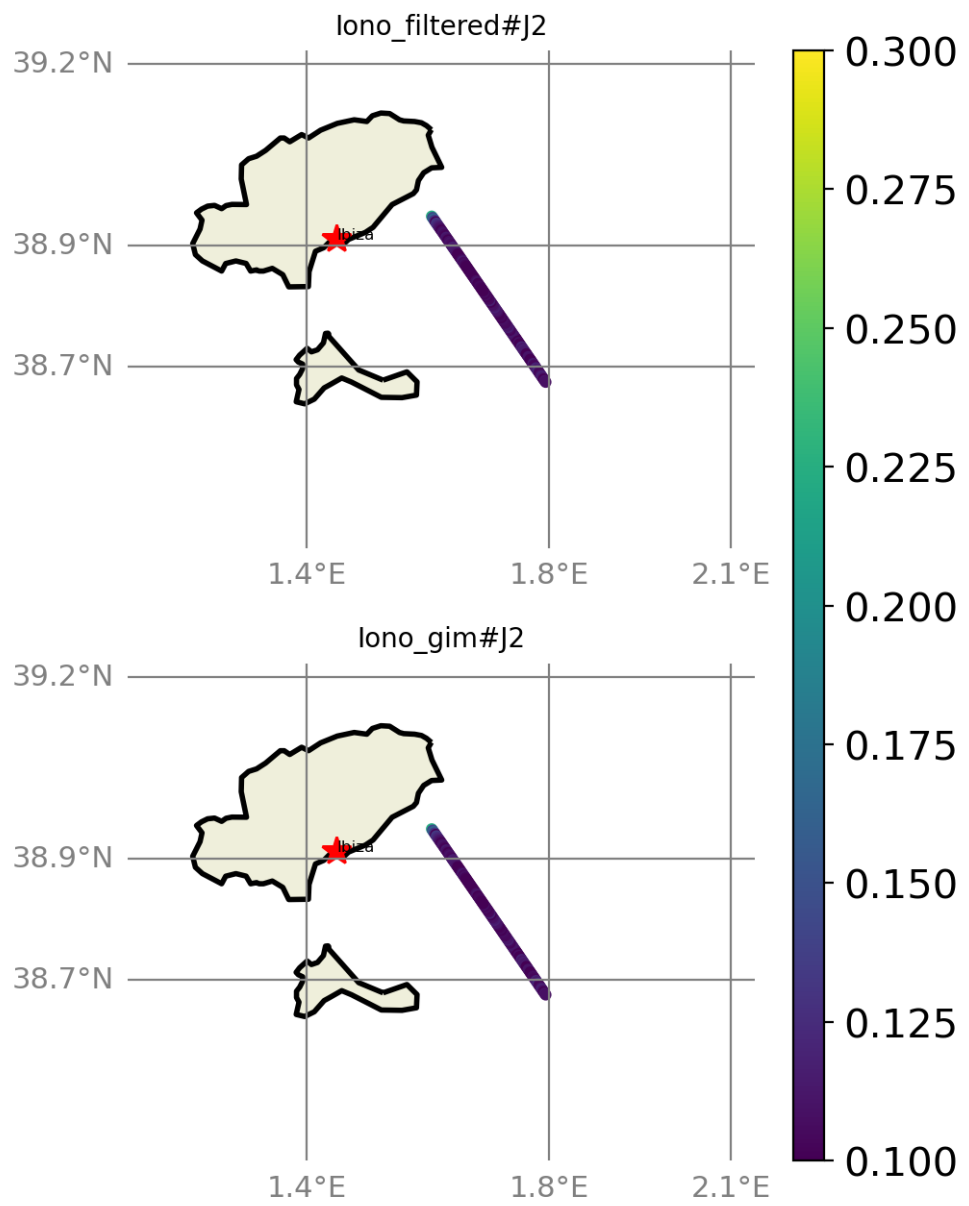


FIGURE 52 – rmsd visualization in maps view % Ibiza tide gauge

6.3.3 std visualization in maps view % Ibiza tide gauge

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

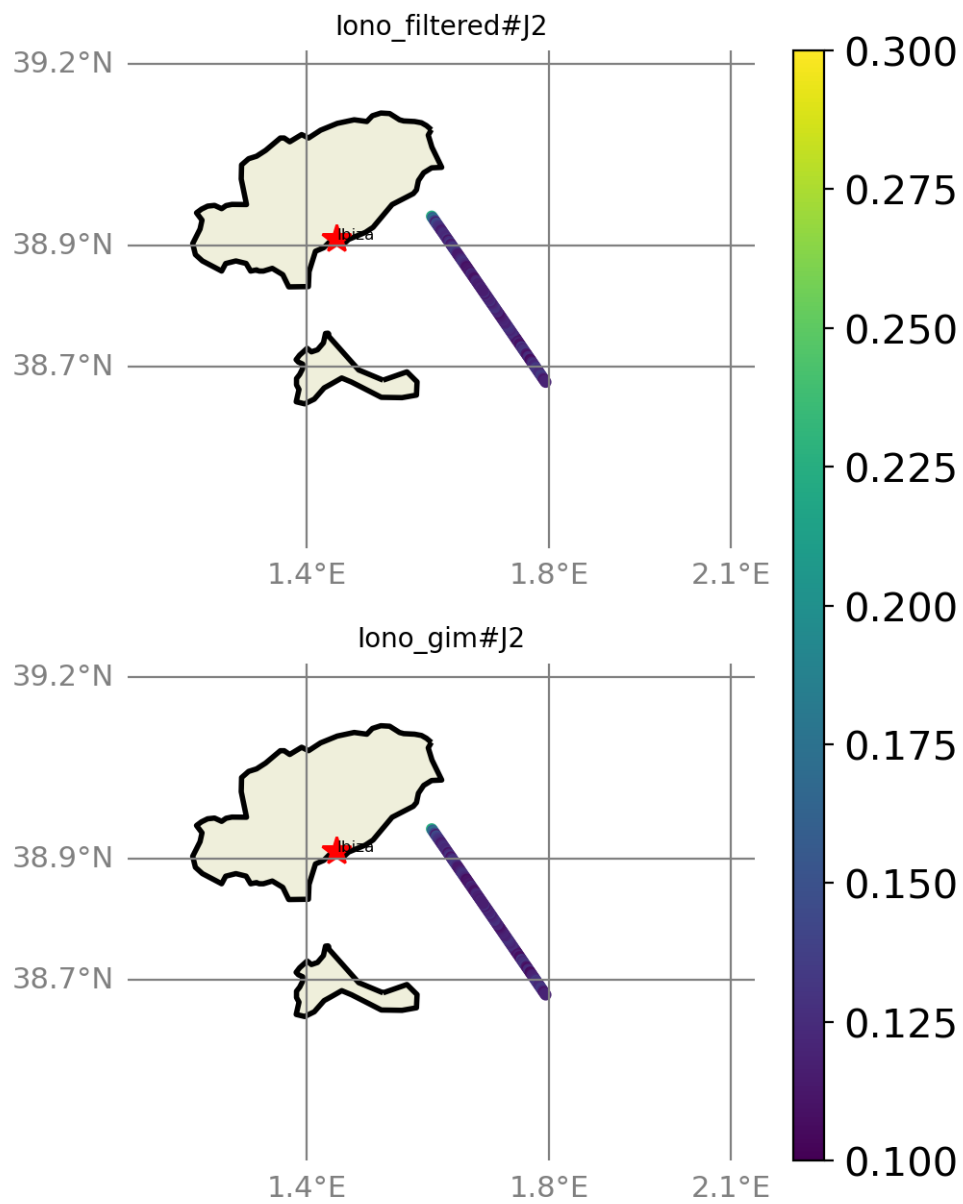


FIGURE 53 – std visualization in maps view % Ibiza tide gauge

6.3.4 valid_data_percent visualization in maps view % Ibiza tide gauge

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

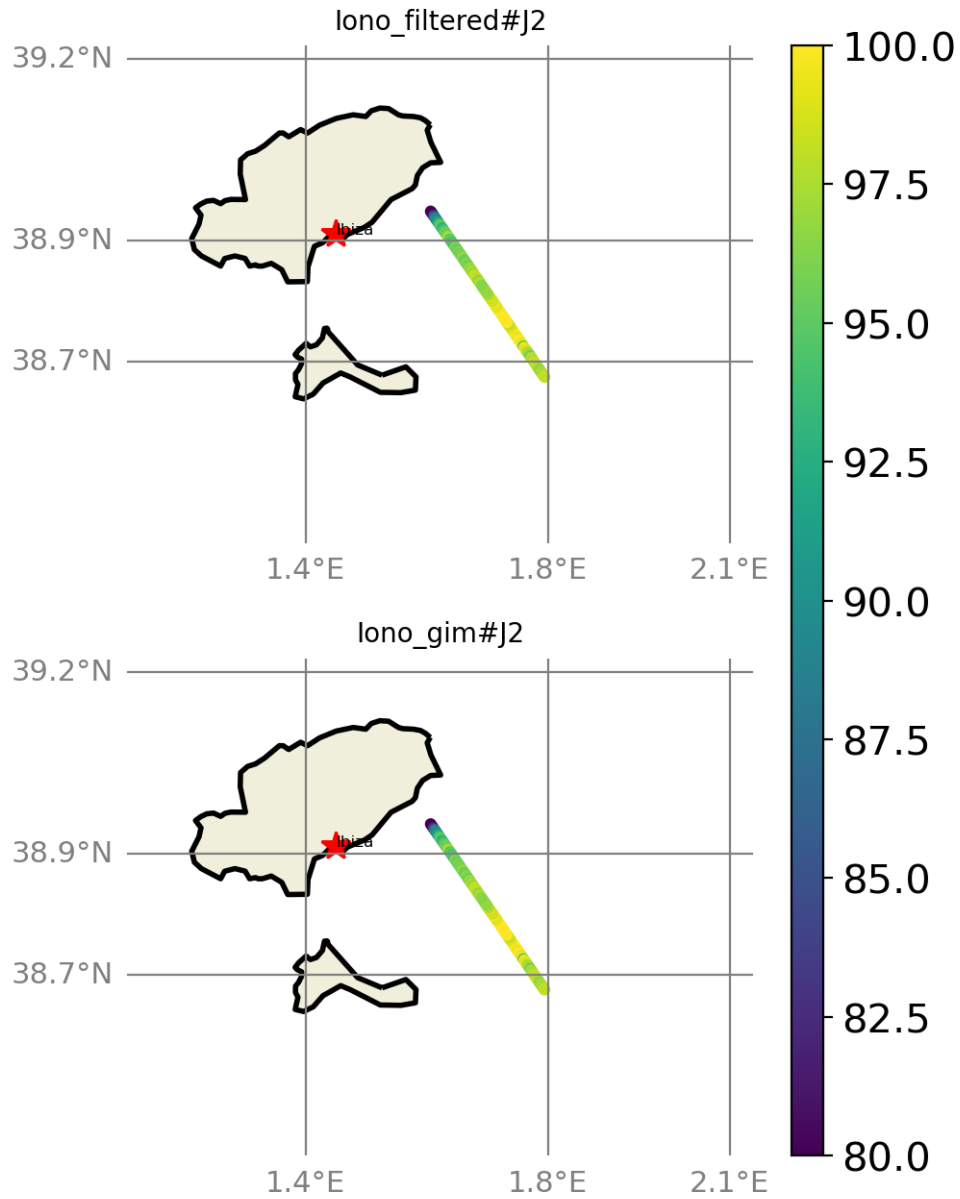


FIGURE 54 – valid_data_percent visualization in maps view % Ibiza tide gauge

6.3.5 Valid data (%) in function of distance to coast/Ibiza 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. $maxNB = 110$ 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.

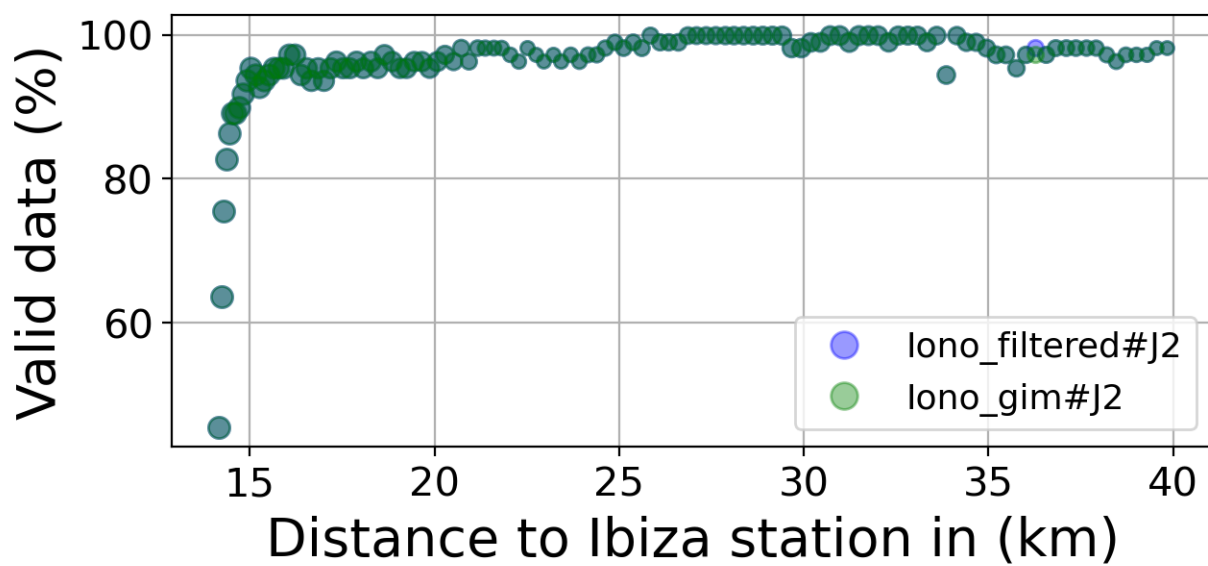
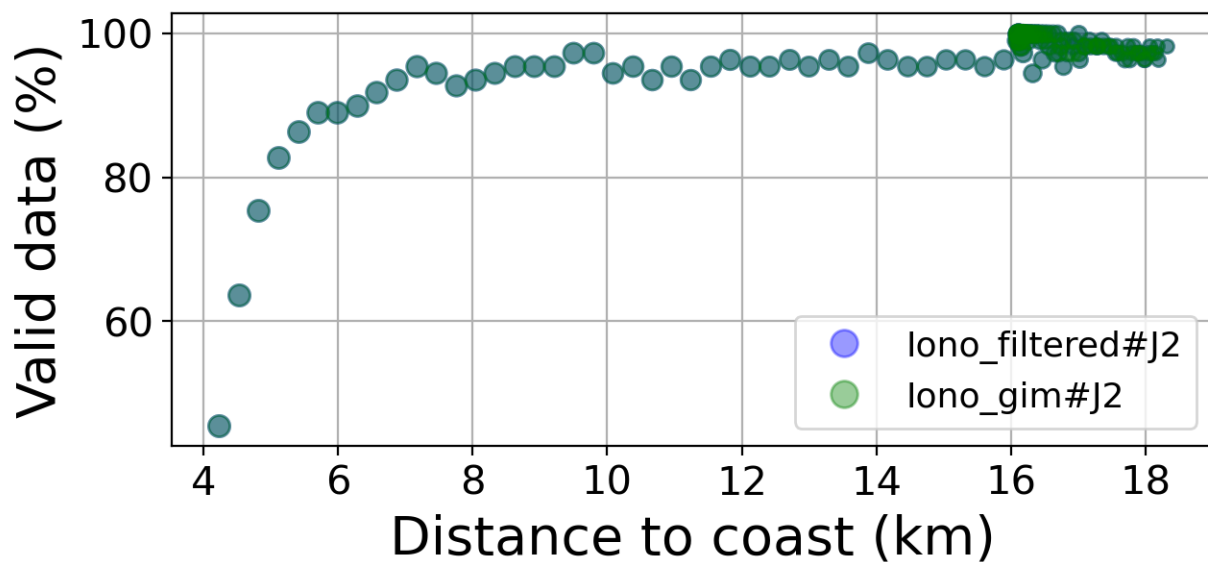


FIGURE 55 – Valid data (%) in function of distance to coast/Ibiza station

6.3.6 Std in function of distance to coast/Ibiza station

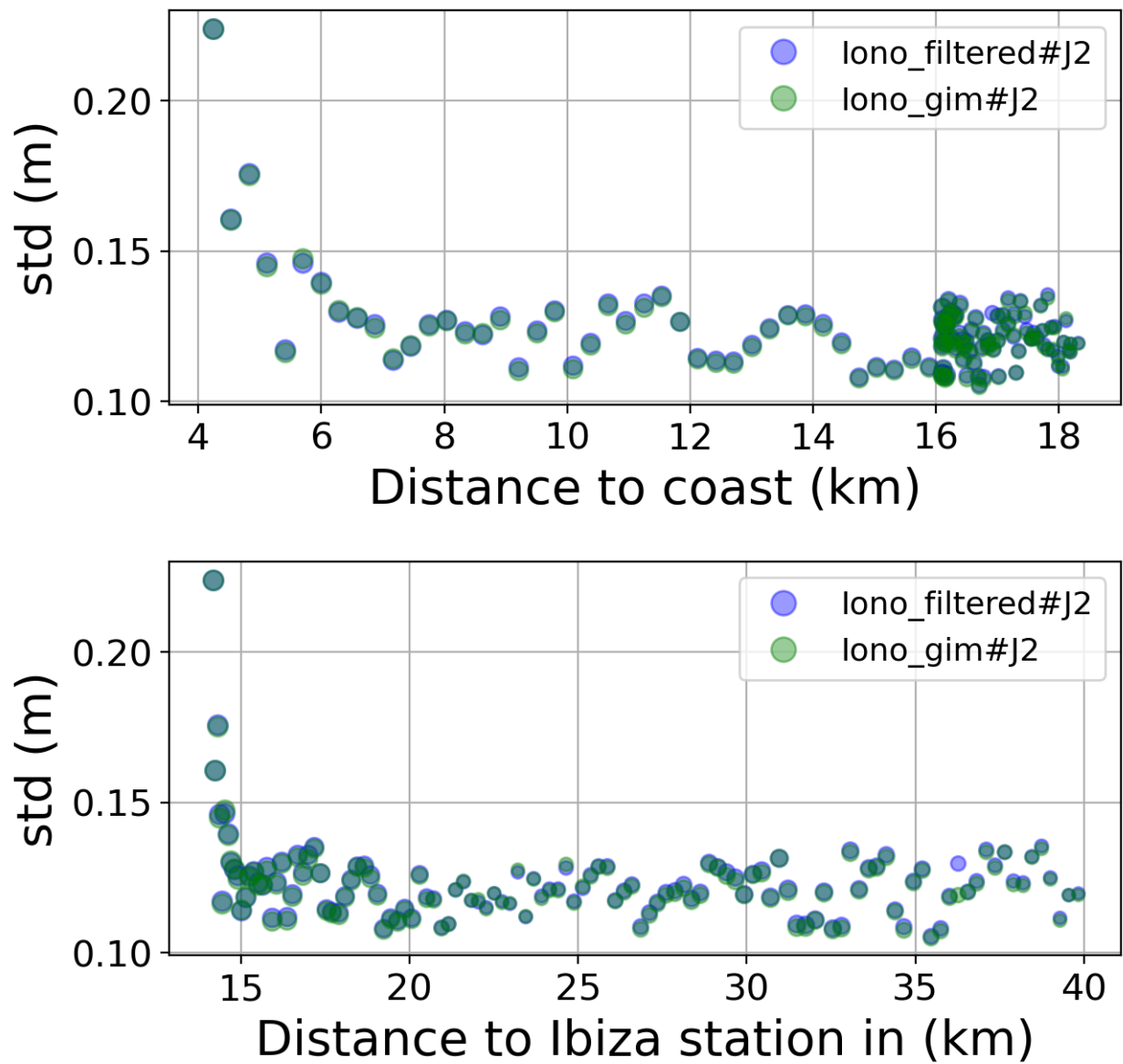


FIGURE 56 – Std in function of the distance to the coast/Ibiza station

6.3.7 Correlation in function of distance to coast/Ibiza station

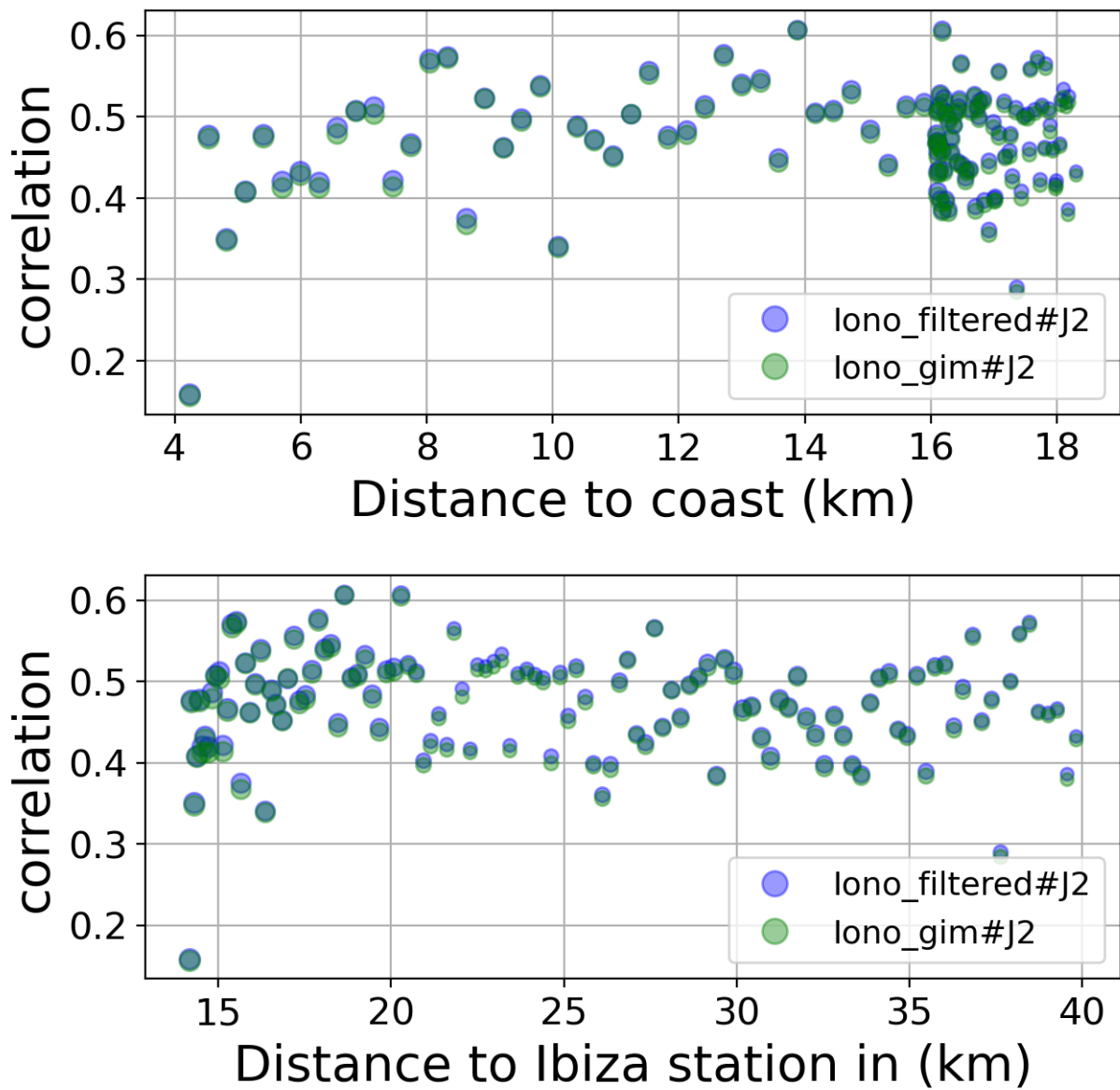


FIGURE 57 – Correlation in function of the distance to the coast/Ibiza station

6.3.8 Taylor Diagram

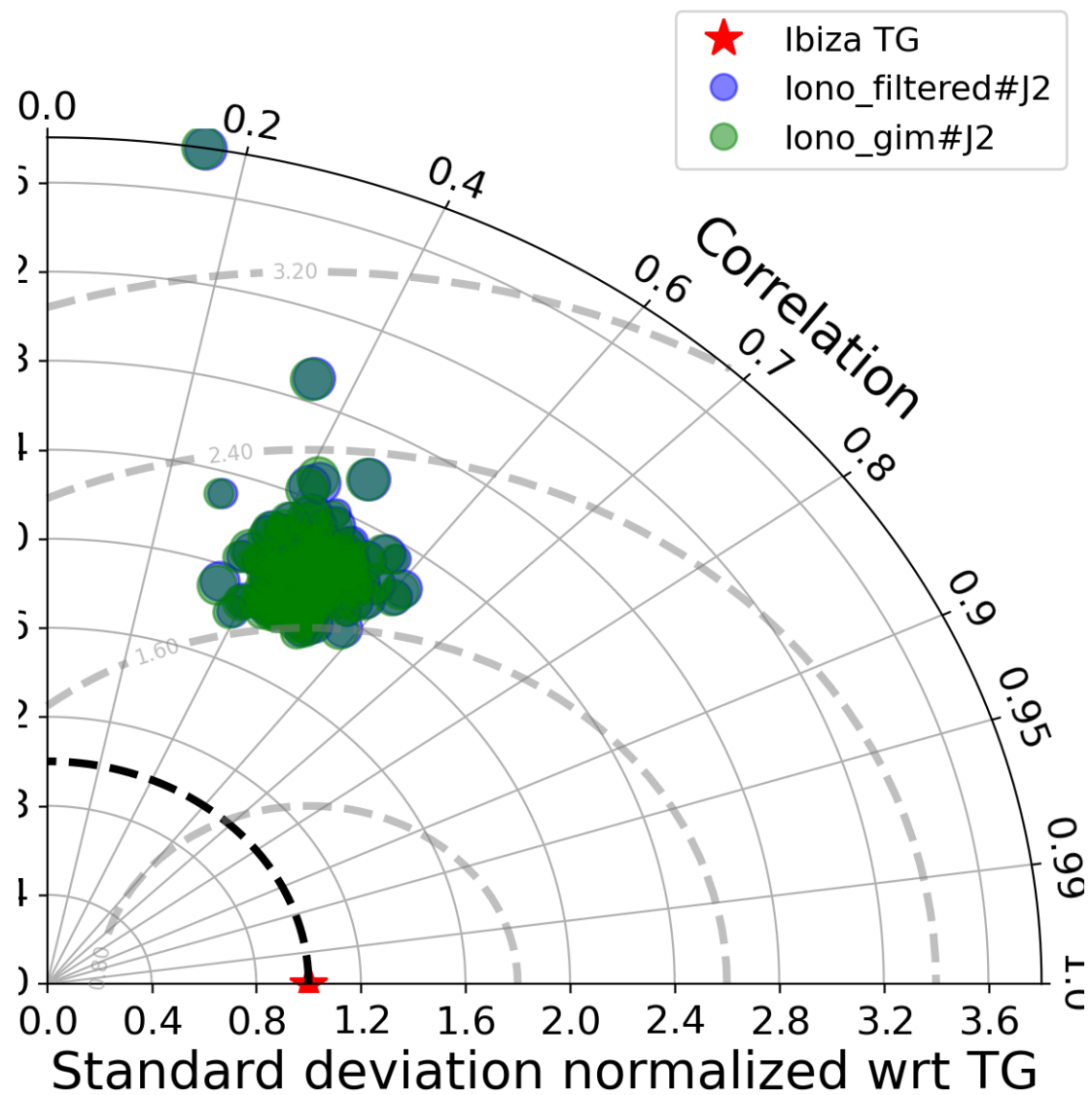


FIGURE 58 – Taylor diagram

6.3.9 Mean statistics table of products comparison with Ibiza 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#J2	96.165	0.474	0.124	0.109
lono_gim#J2	96.157	0.47	0.123	0.109

FIGURE 59 – 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 110 point.

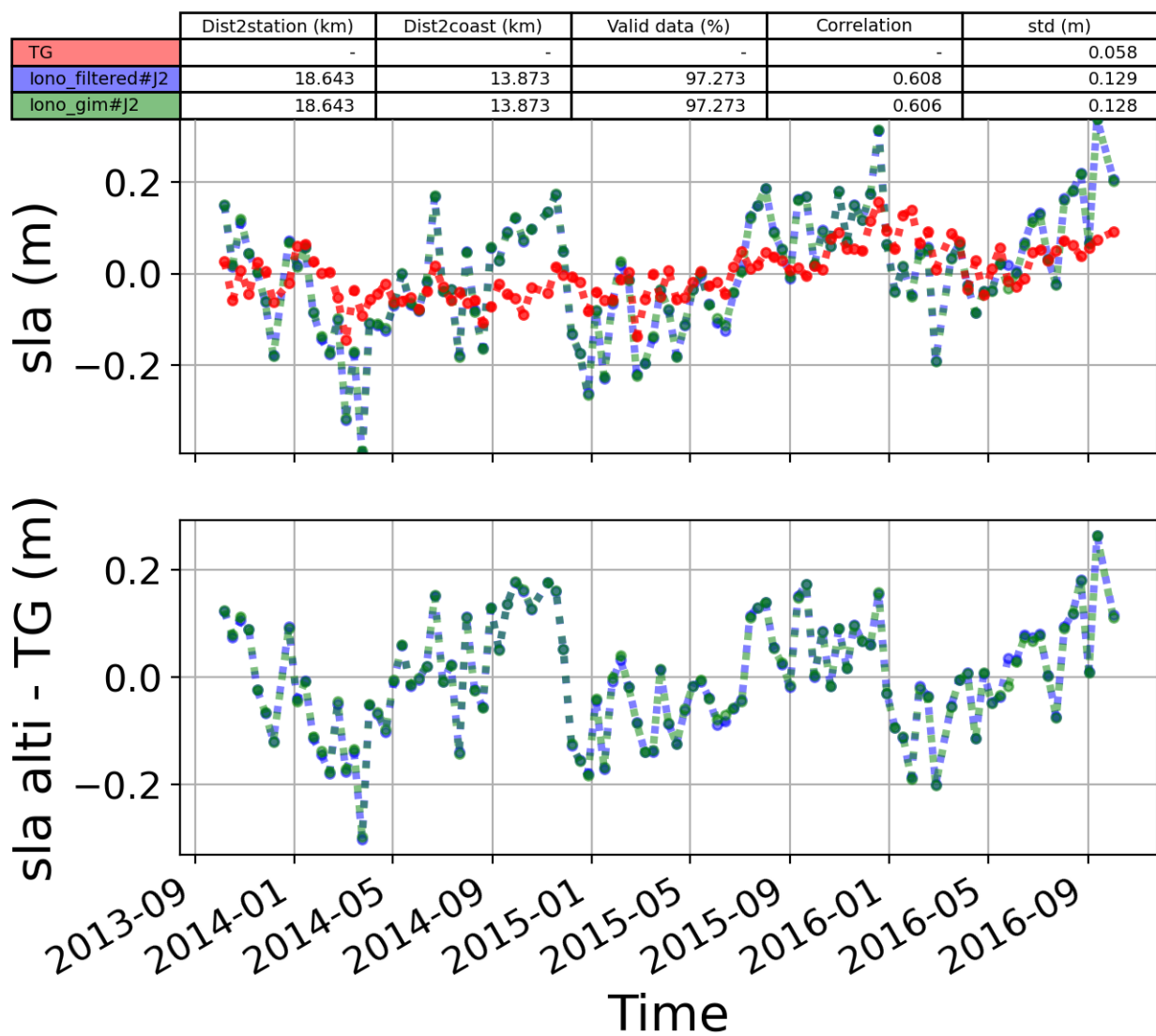


FIGURE 60 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

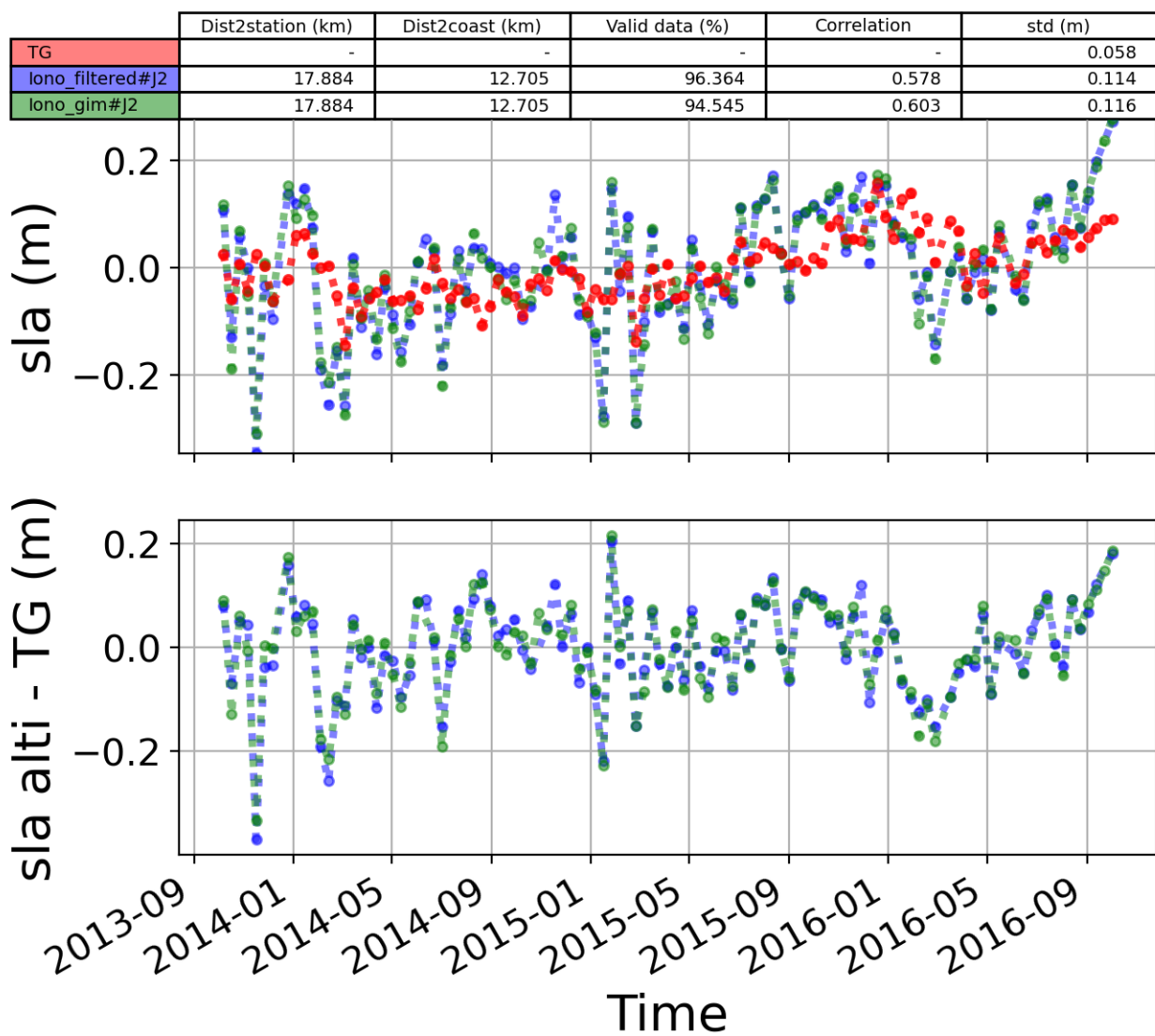


FIGURE 61 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.4 Station : LA_FIGUEIRETTE

- Nearest track to LA_FIGUEIRETTE station is the track number track222
- The area of interest is limited by :
 - A circle which it's center is the LA_FIGUEIRETTE tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km

6.4.1 correlation visualization in maps view % LA_FIGUEIRETTE tide gauge

Correlation Altimetry data with respect to LA_FIGUEIRETTE Tide gauge data

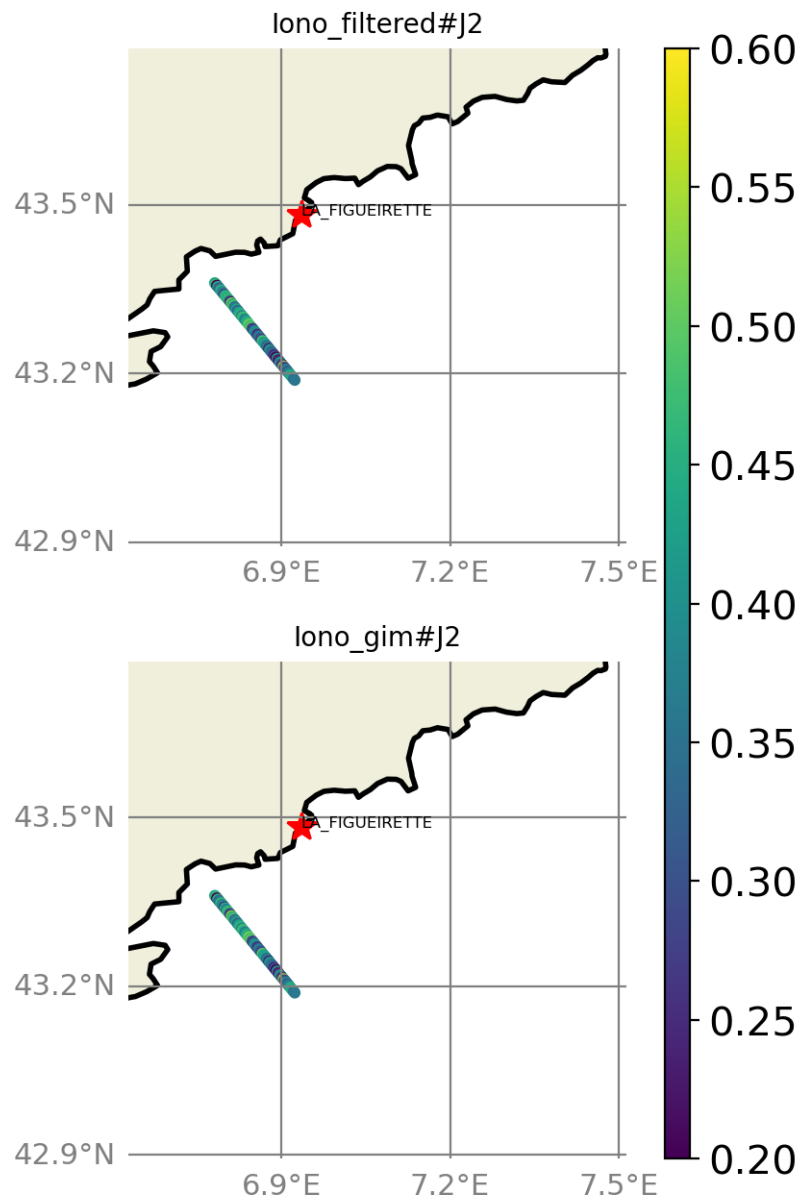


FIGURE 62 – correlation visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.2 rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge

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

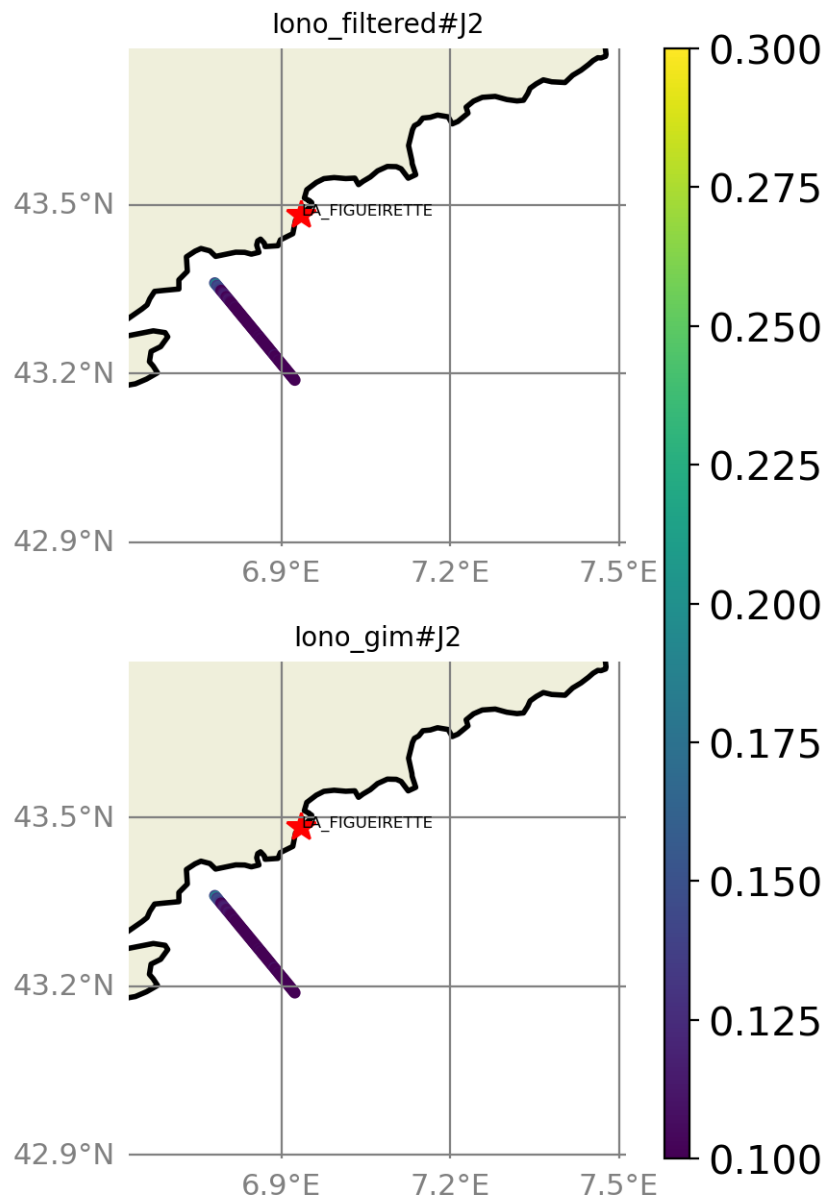


FIGURE 63 – rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.3 std visualization in maps view % LA_FIGUEIRETTE tide gauge

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

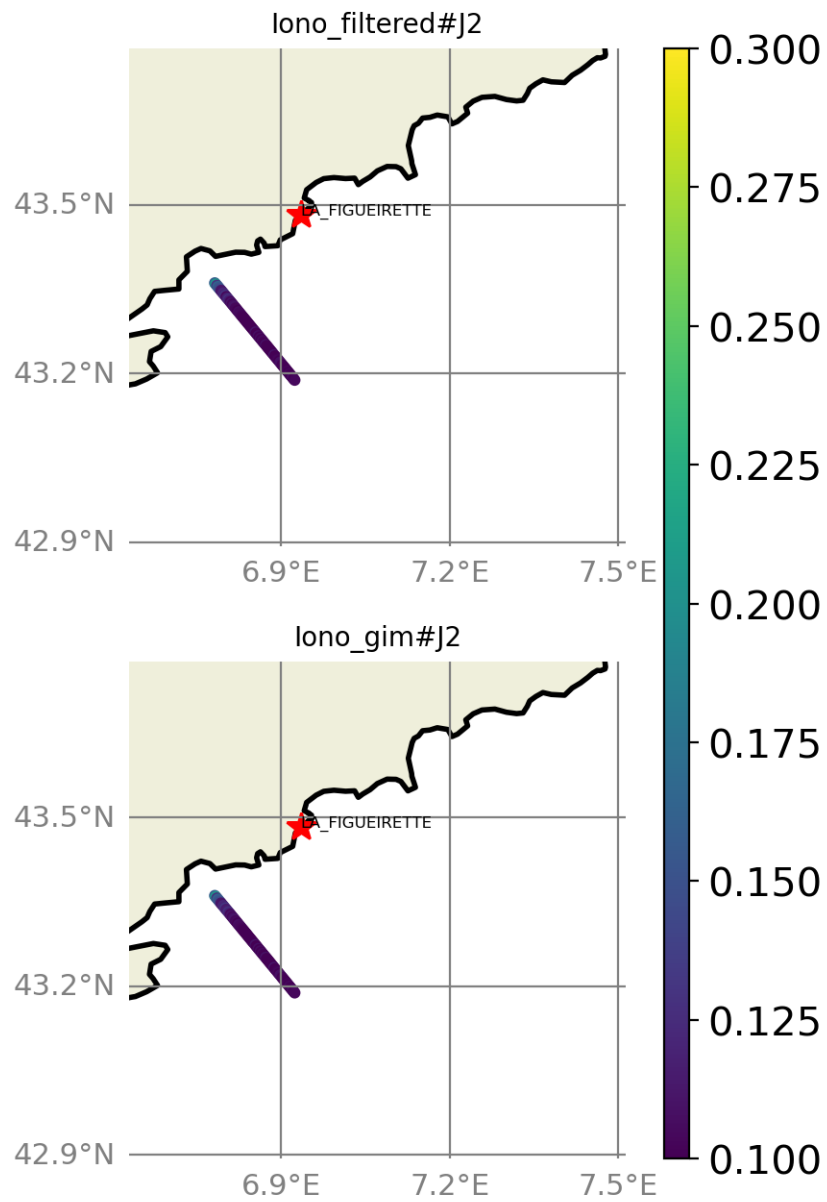


FIGURE 64 – std visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.4 valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge

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

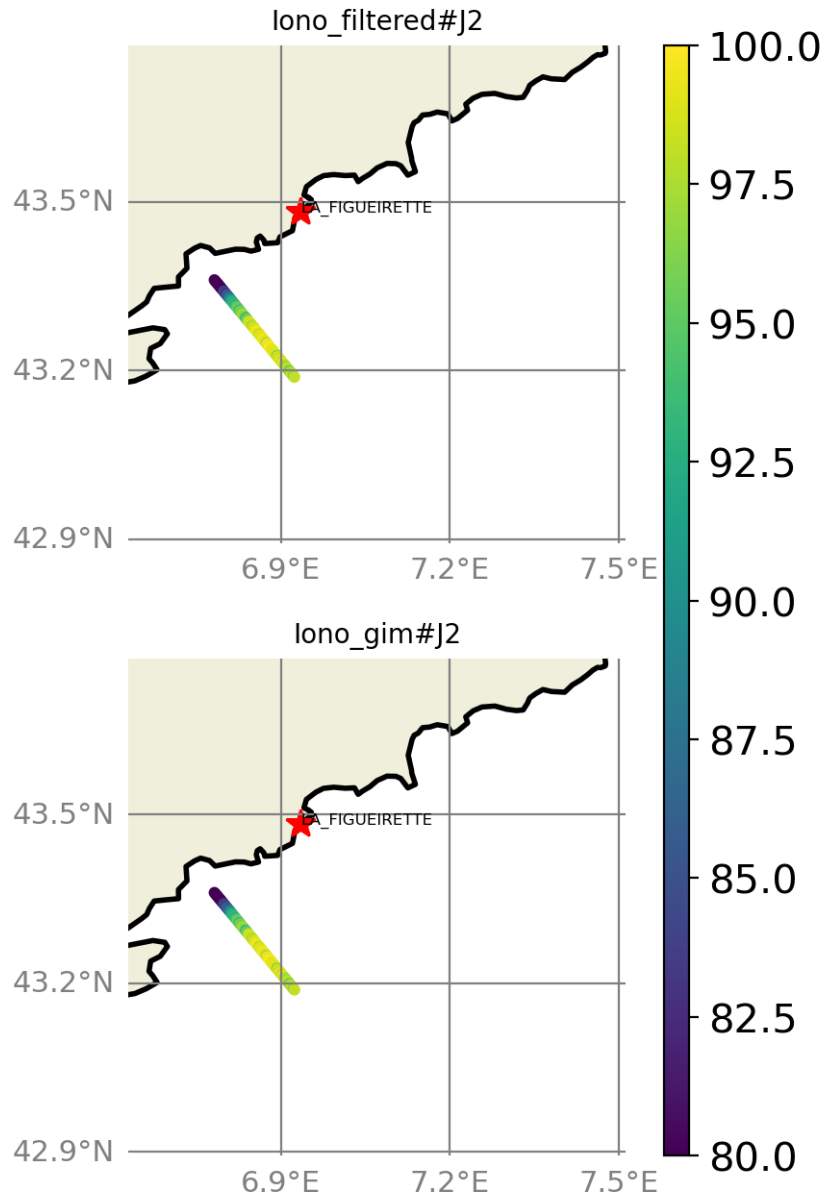


FIGURE 65 – valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.5 Valid data (%) in function of distance to coast/LA_FIGUEIRETTE 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.

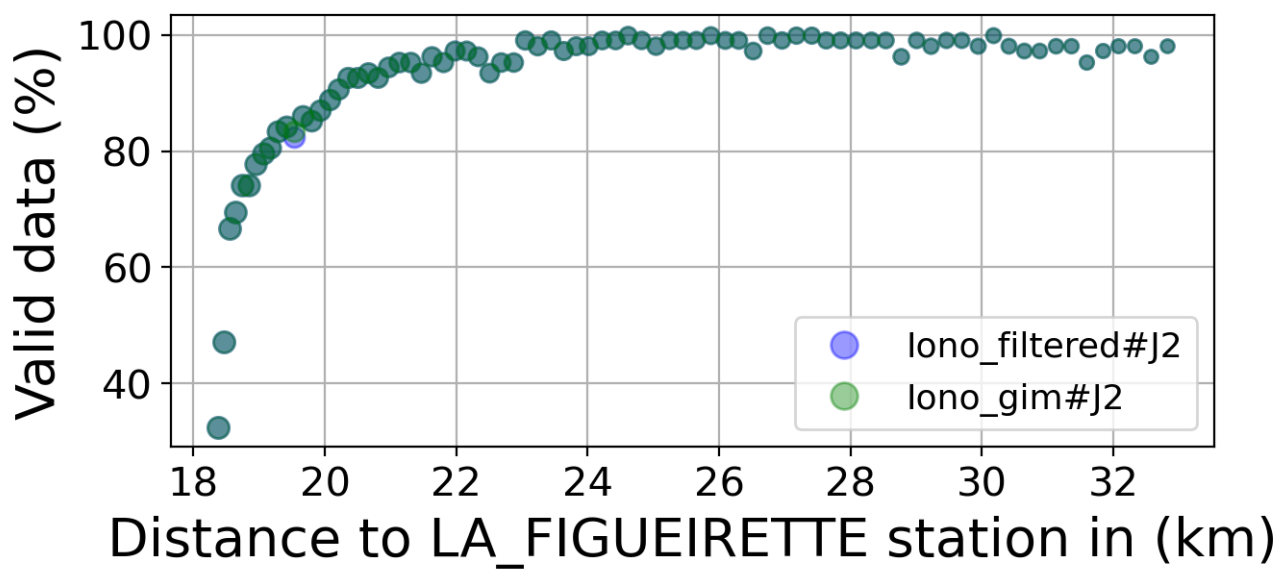
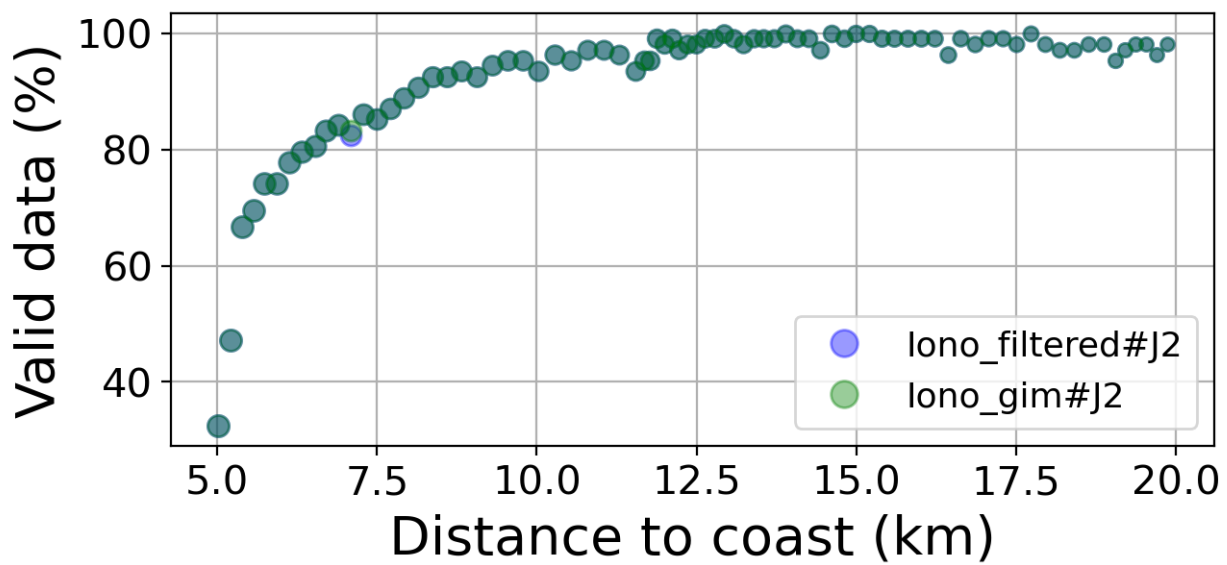


FIGURE 66 – Valid data (%) in function of distance to coast/LA_FIGUEIRETTE station

6.4.6 Std in function of distance to coast/LA_FIGUEIRETTE station

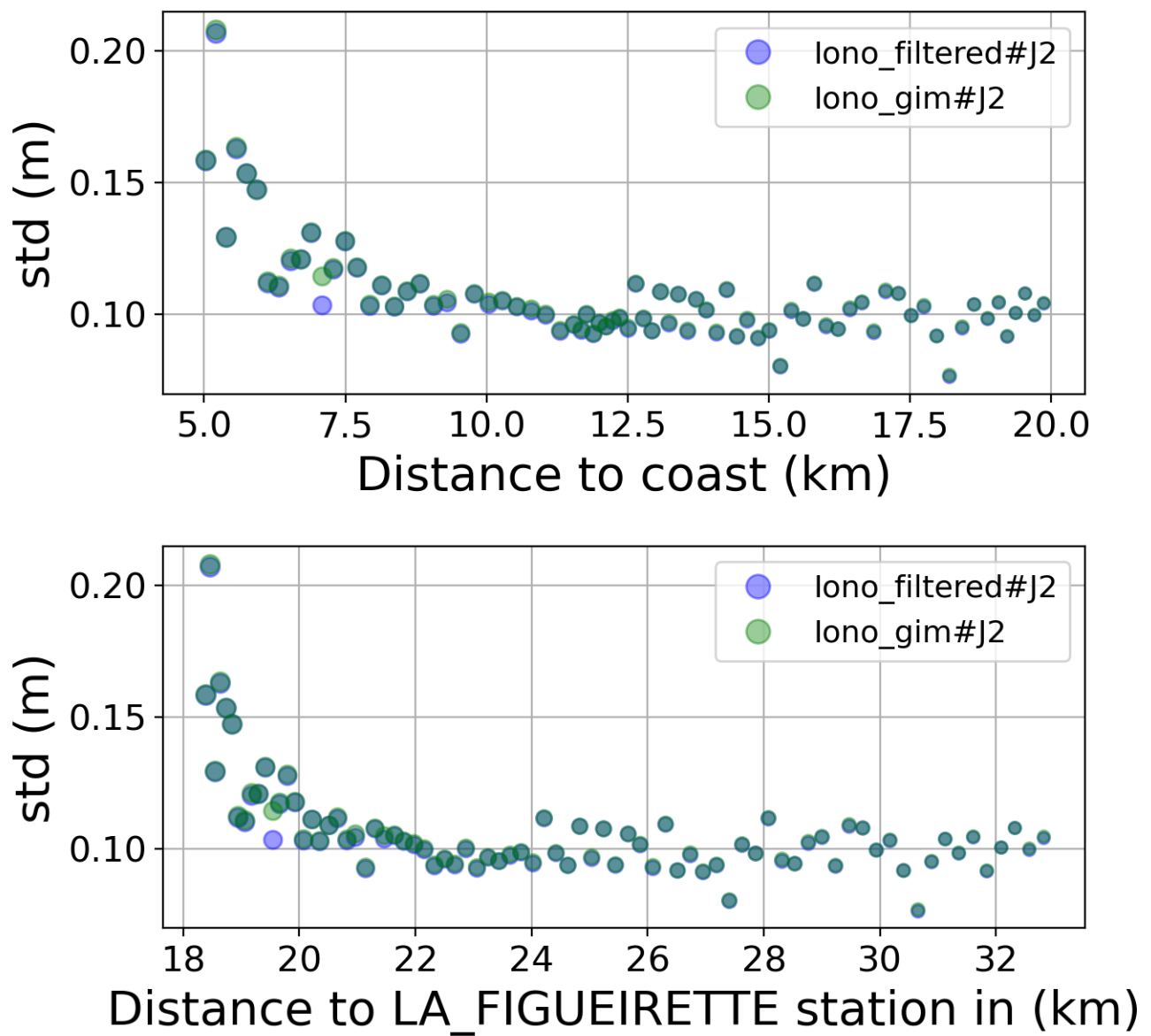


FIGURE 67 – Std in function of the distance to the coast/LA_FIGUEIRETTE station

6.4.7 Correlation in function of distance to coast/LA_FIGUEIRETTE station

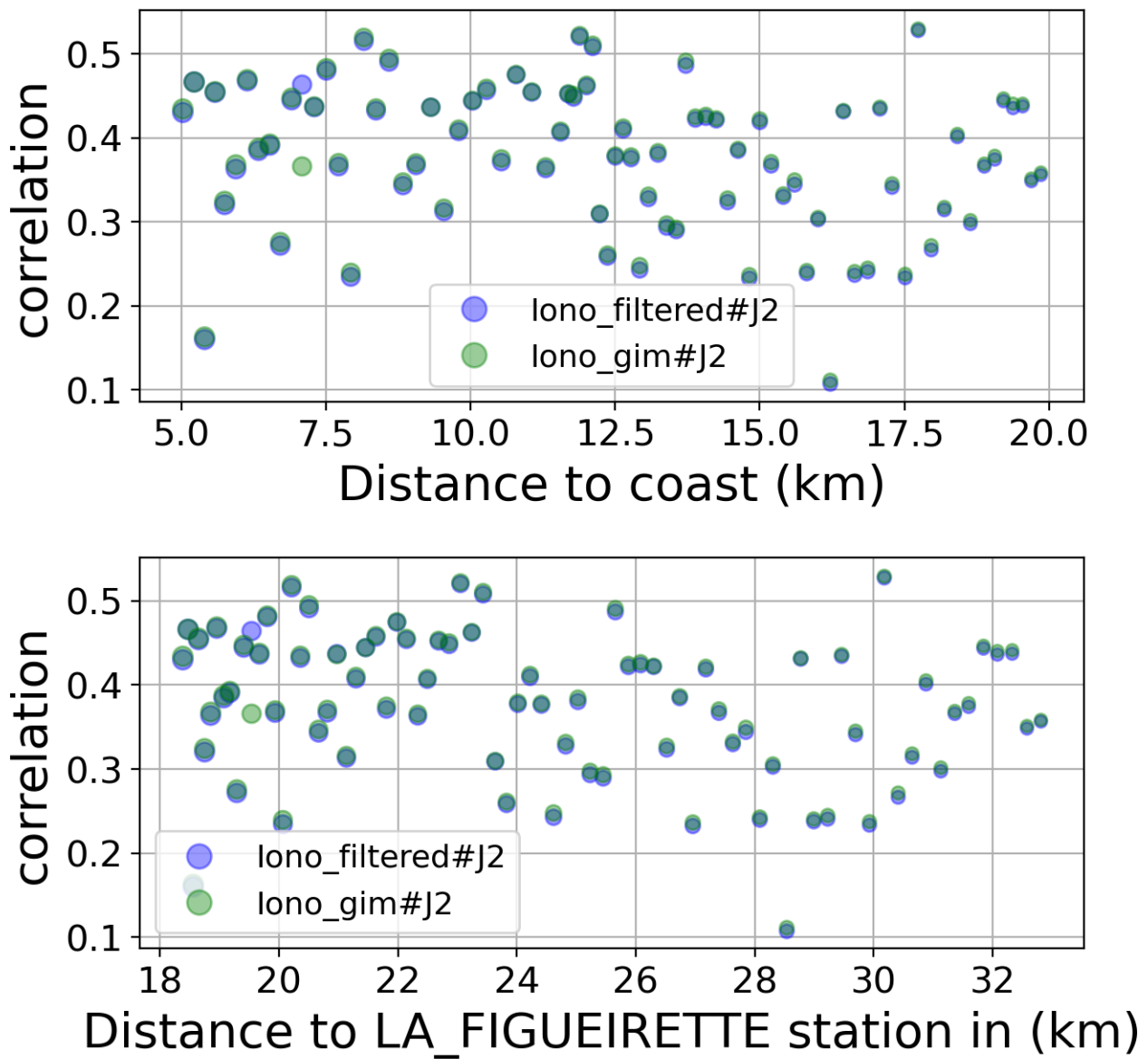


FIGURE 68 – Correlation in function of the distance to the coast/LA_FIGUEIRETTE station

6.4.8 Taylor Diagram

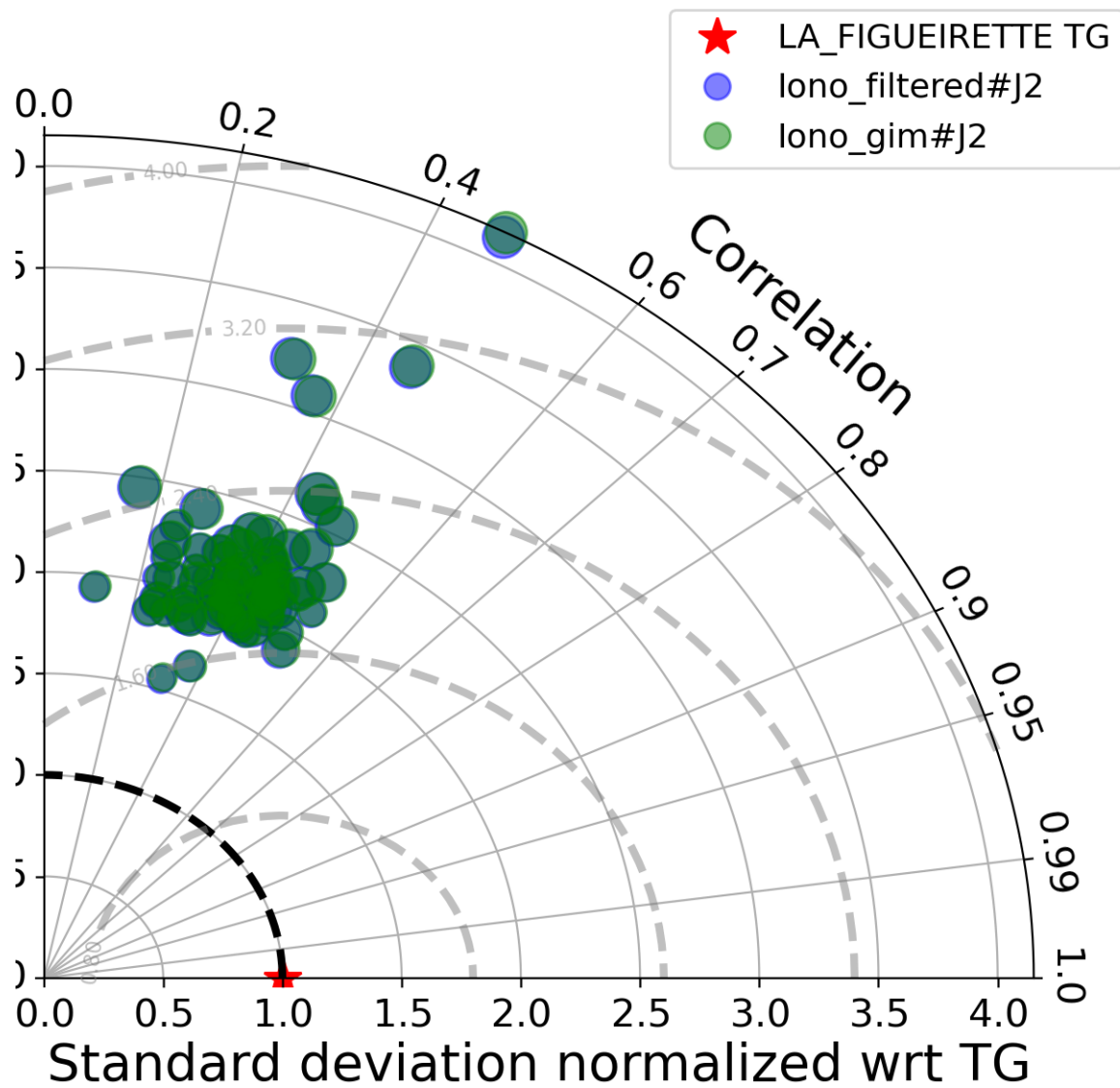


FIGURE 69 – Taylor diagram

6.4.9 Mean statistics table of products comparison with LA_FIGUEIRETTE 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#J2	92.83	0.377	0.106	0.099
lono_gim#J2	92.842	0.379	0.107	0.1

FIGURE 70 – 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.

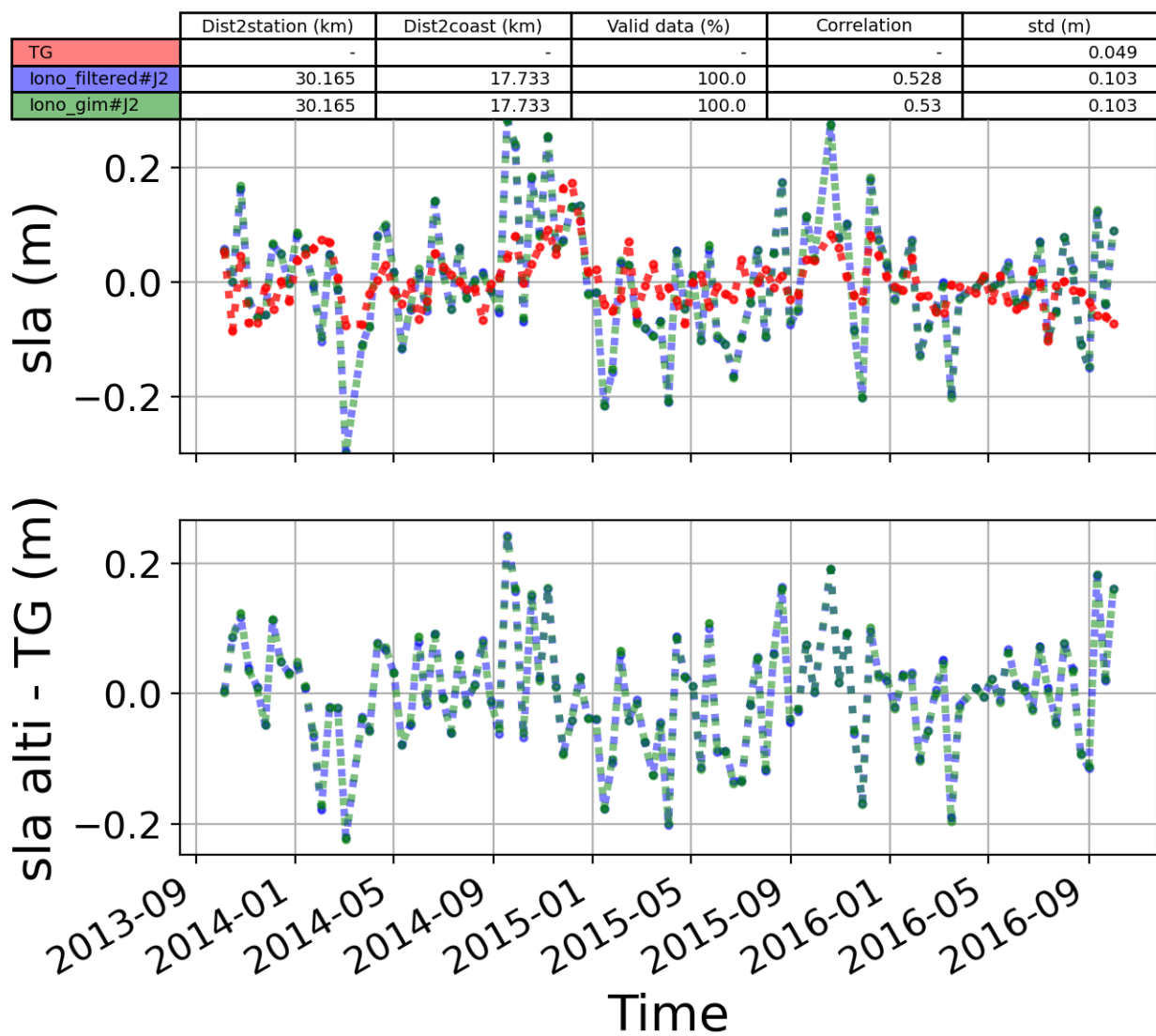


FIGURE 71 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

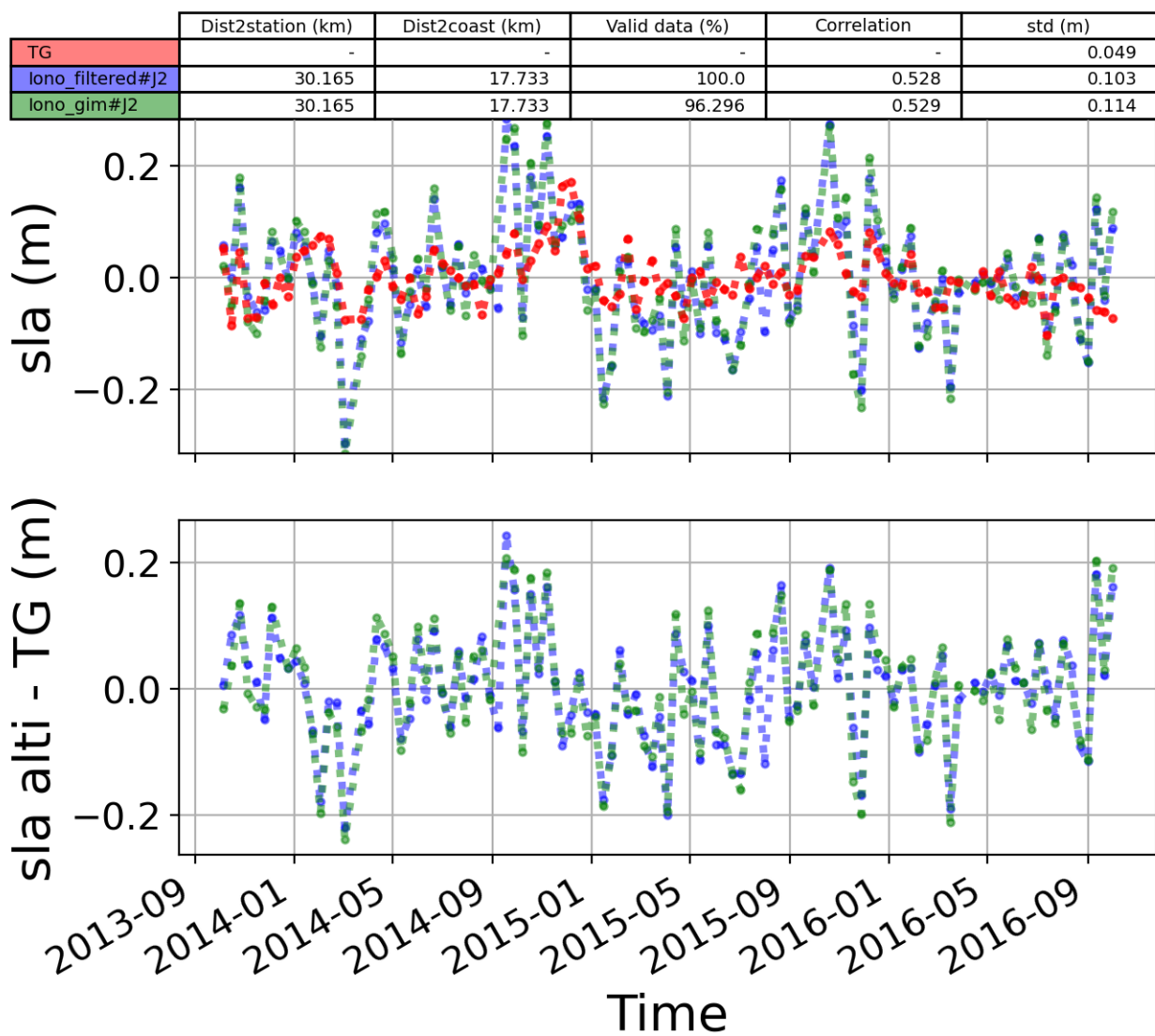


FIGURE 72 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.5 Station : Ancona

- Nearest track to Ancona station is the track number track161
- The area of interest is limited by :
 - A circle which it's center is the Ancona 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 % Ancona tide gauge

Correlation Altimetry data with respect to Ancona Tide gauge data

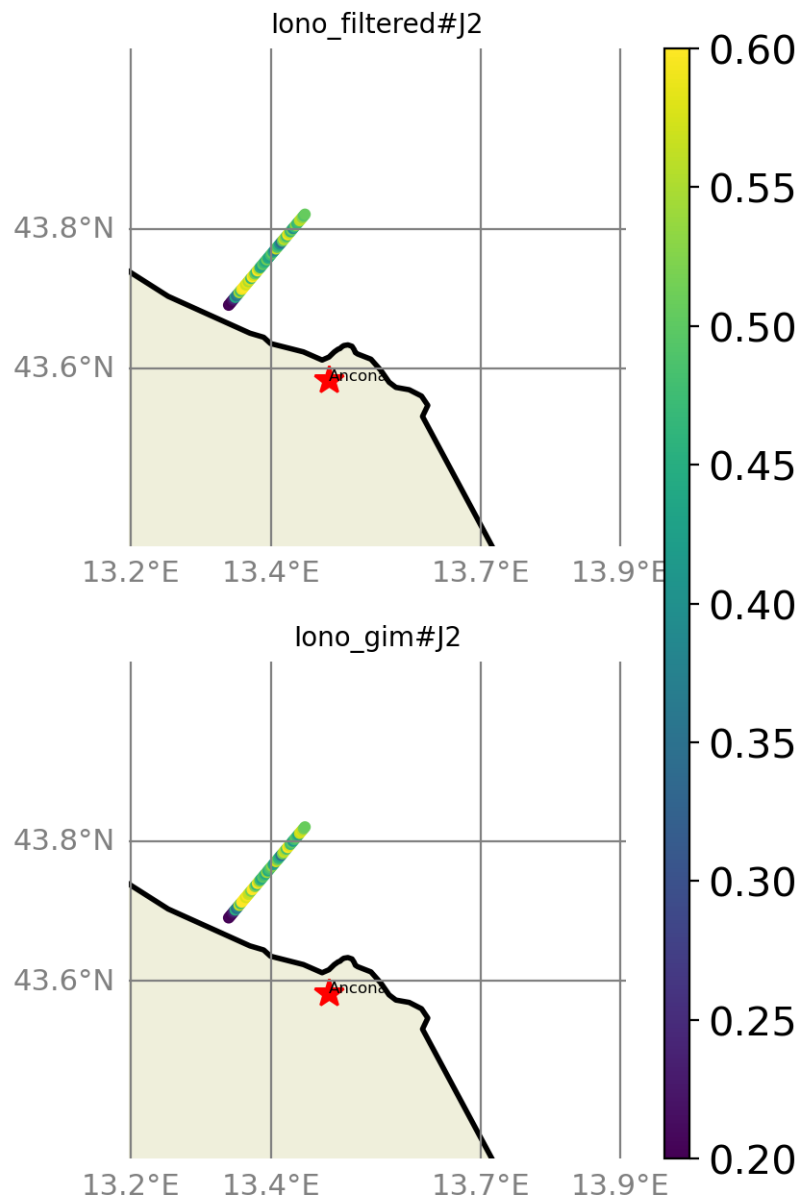


FIGURE 73 – correlation visualization in maps view % Ancona tide gauge

6.5.2 rmsd visualization in maps view % Ancona tide gauge

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

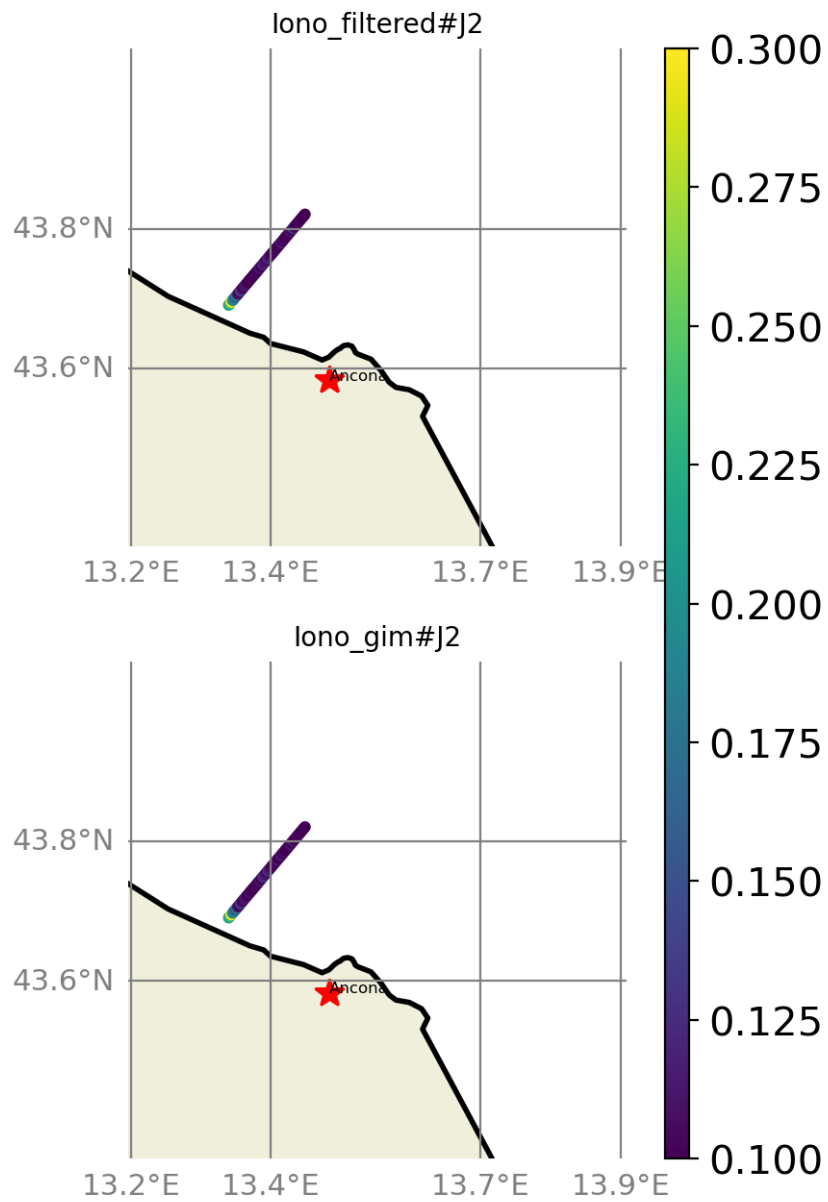


FIGURE 74 – rmsd visualization in maps view % Ancona tide gauge

6.5.3 std visualization in maps view % Ancona tide gauge

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

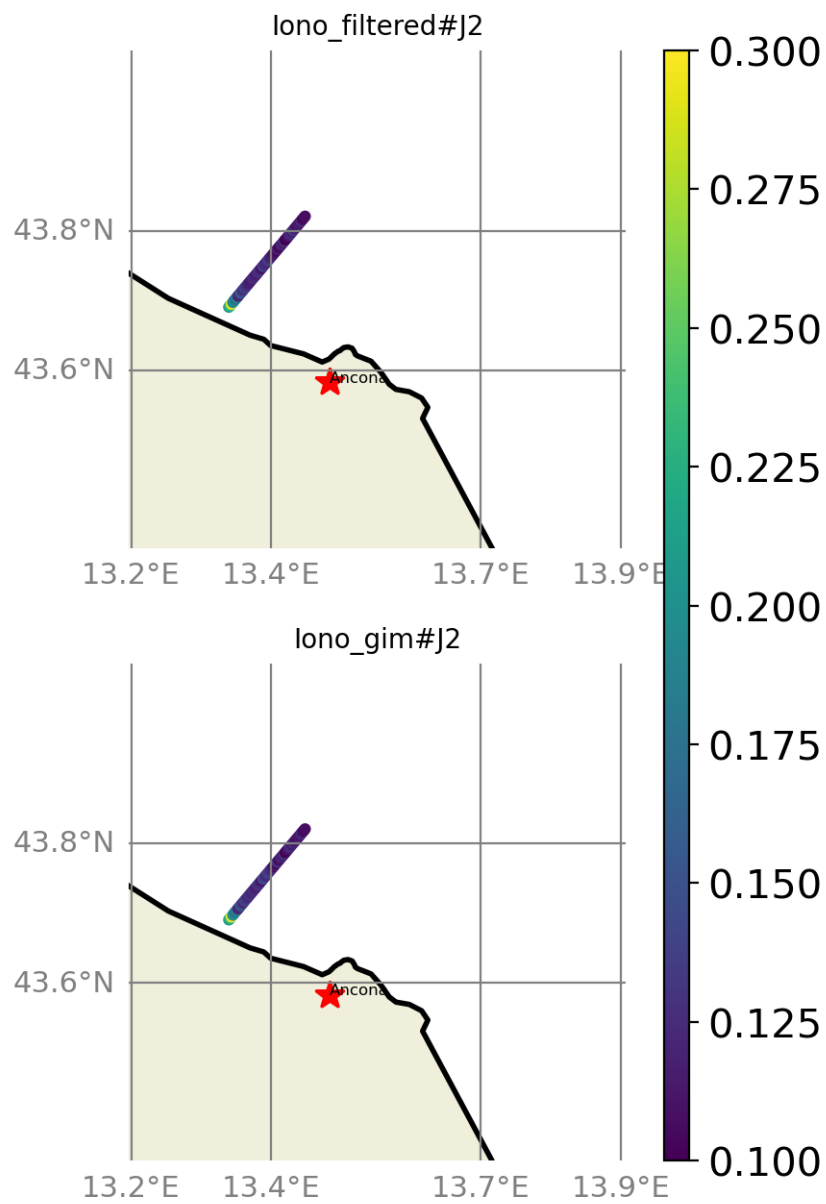


FIGURE 75 – std visualization in maps view % Ancona tide gauge

6.5.4 valid_data_percent visualization in maps view % Ancona tide gauge

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

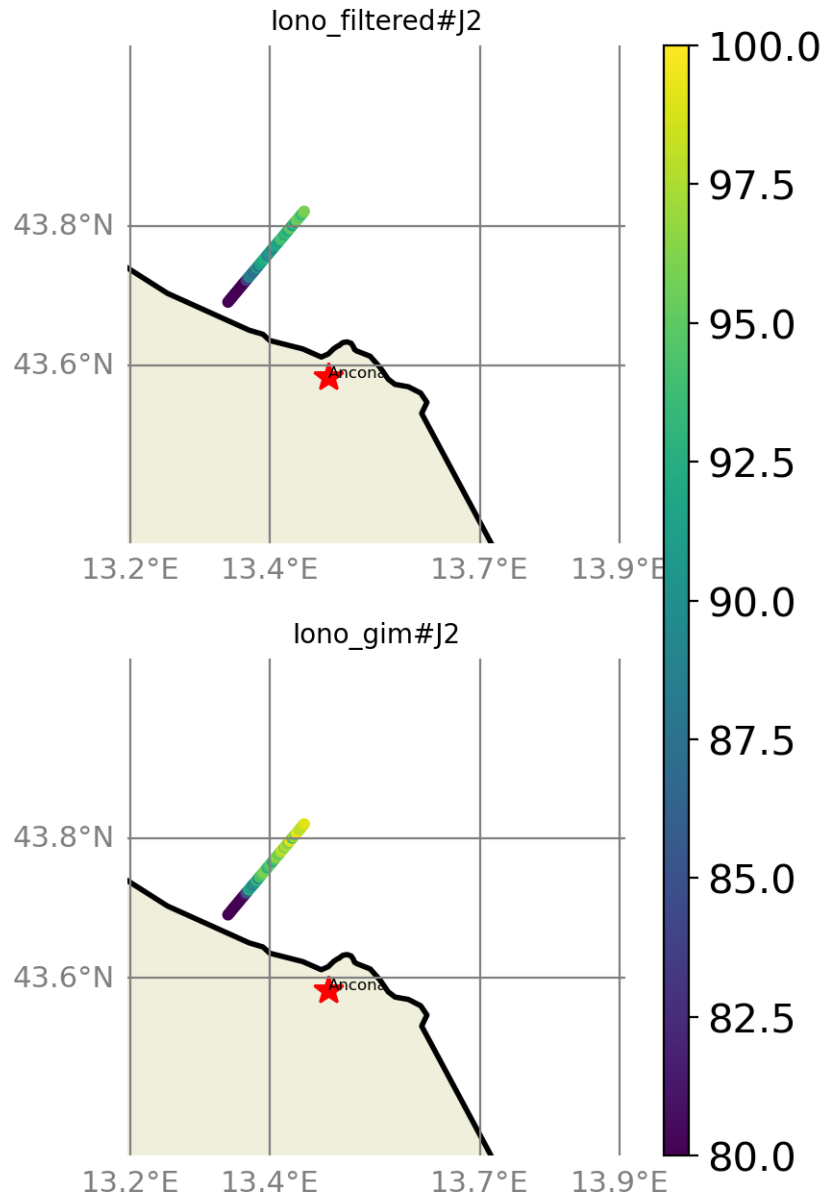


FIGURE 76 – valid_data_percent visualization in maps view % Ancona tide gauge

6.5.5 Valid data (%) in function of distance to coast/Ancona 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 series, respectively in the time series, i is the index of the time series, np is the number of the selected altimetry time series. $maxNB = 100$ 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 series.

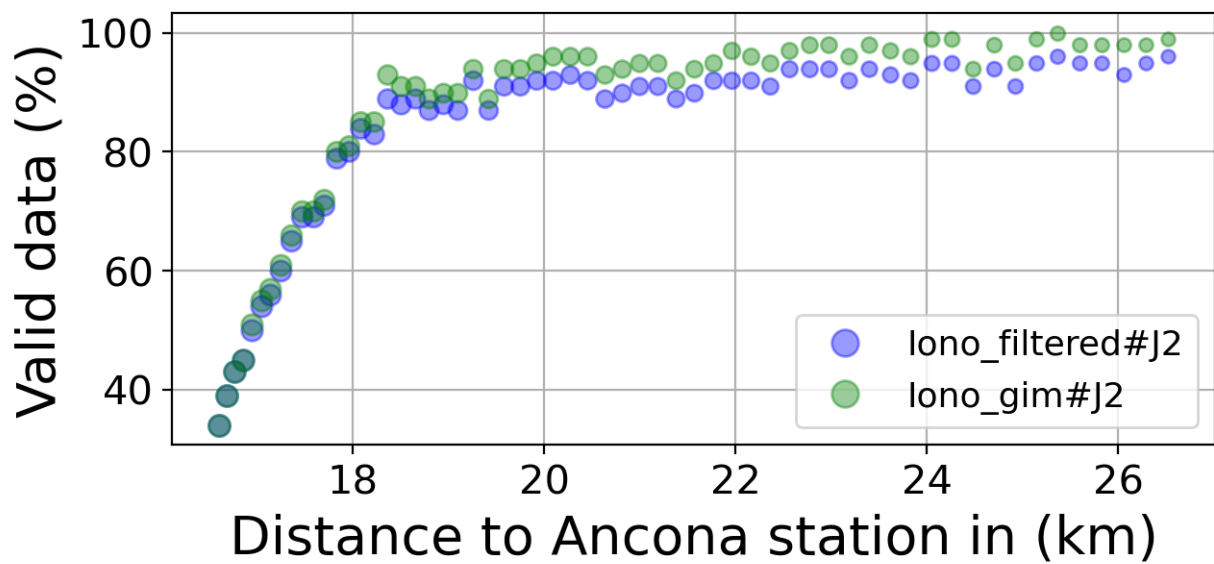
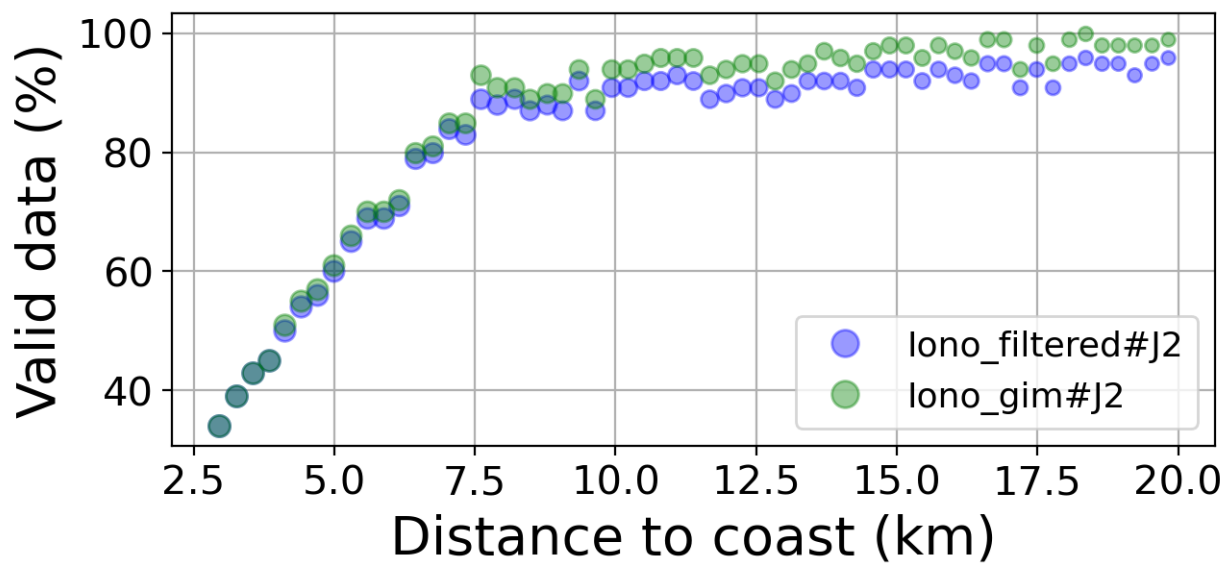


FIGURE 77 – Valid data (%) in function of distance to coast/Ancona station

6.5.6 Std in function of distance to coast/Ancona station

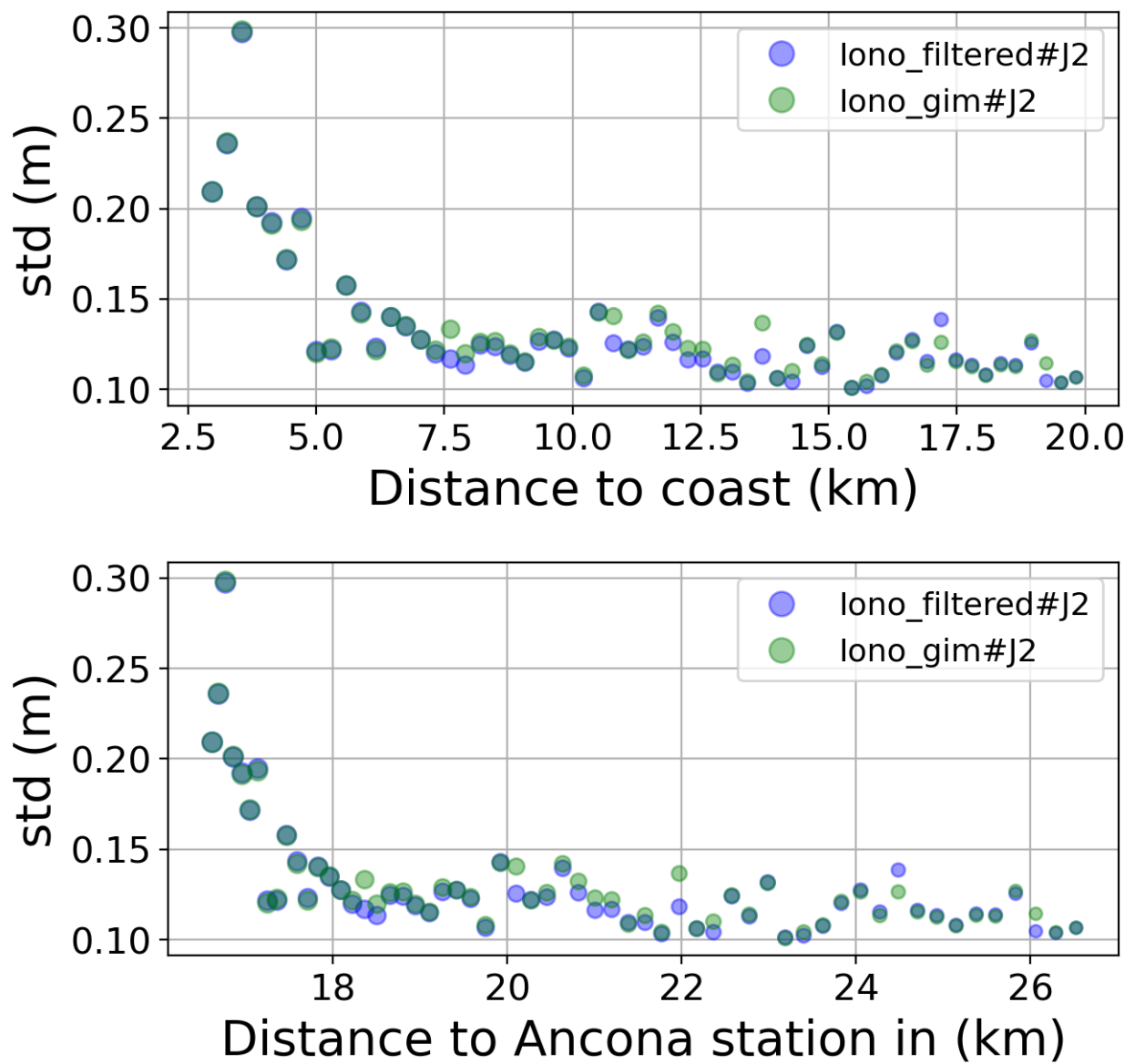


FIGURE 78 – Std in function of the distance to the coast/Ancona station

6.5.7 Correlation in function of distance to coast/Ancona station

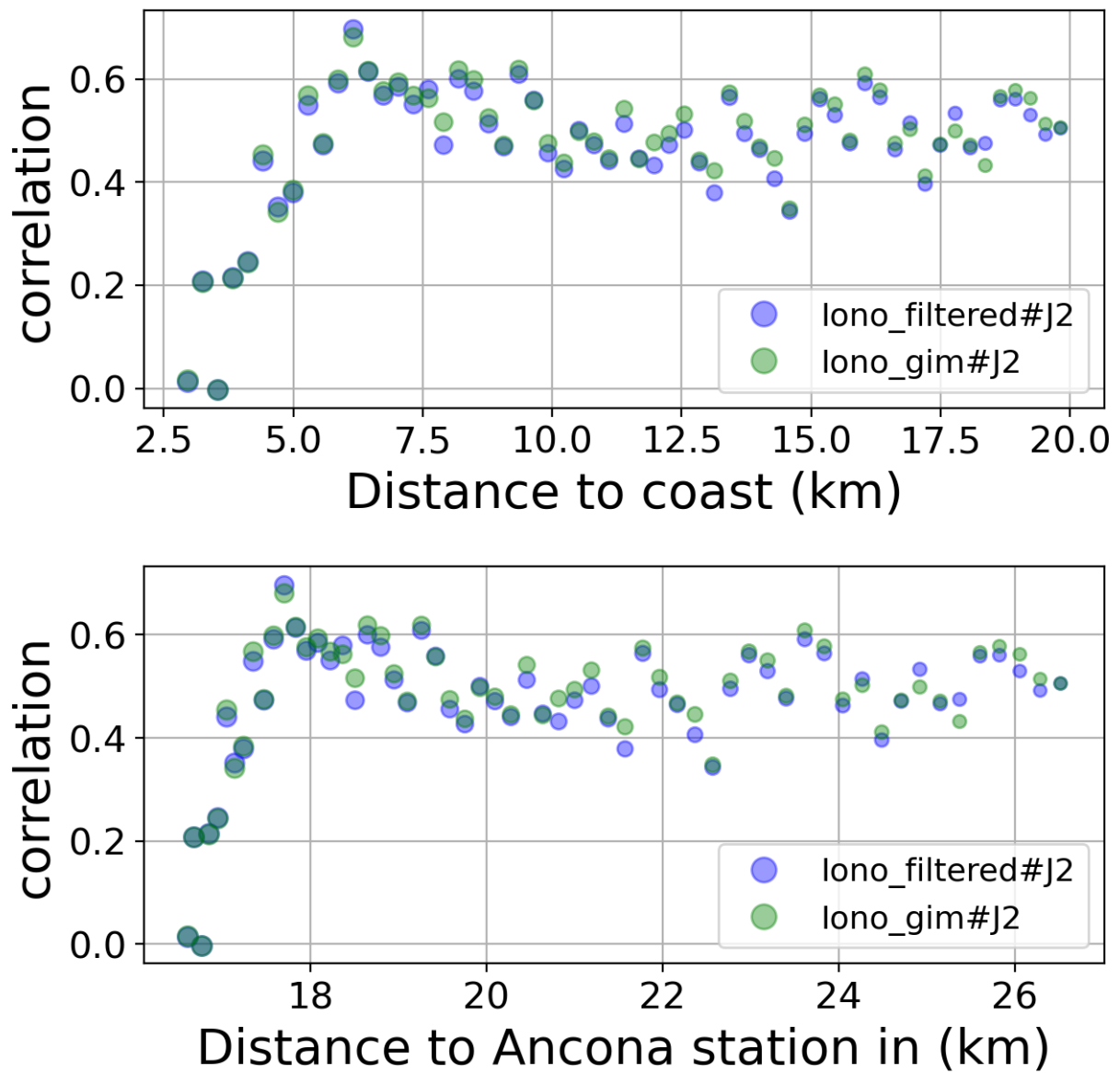


FIGURE 79 – Correlation in function of the distance to the coast/Ancona station

6.5.8 Taylor Diagram

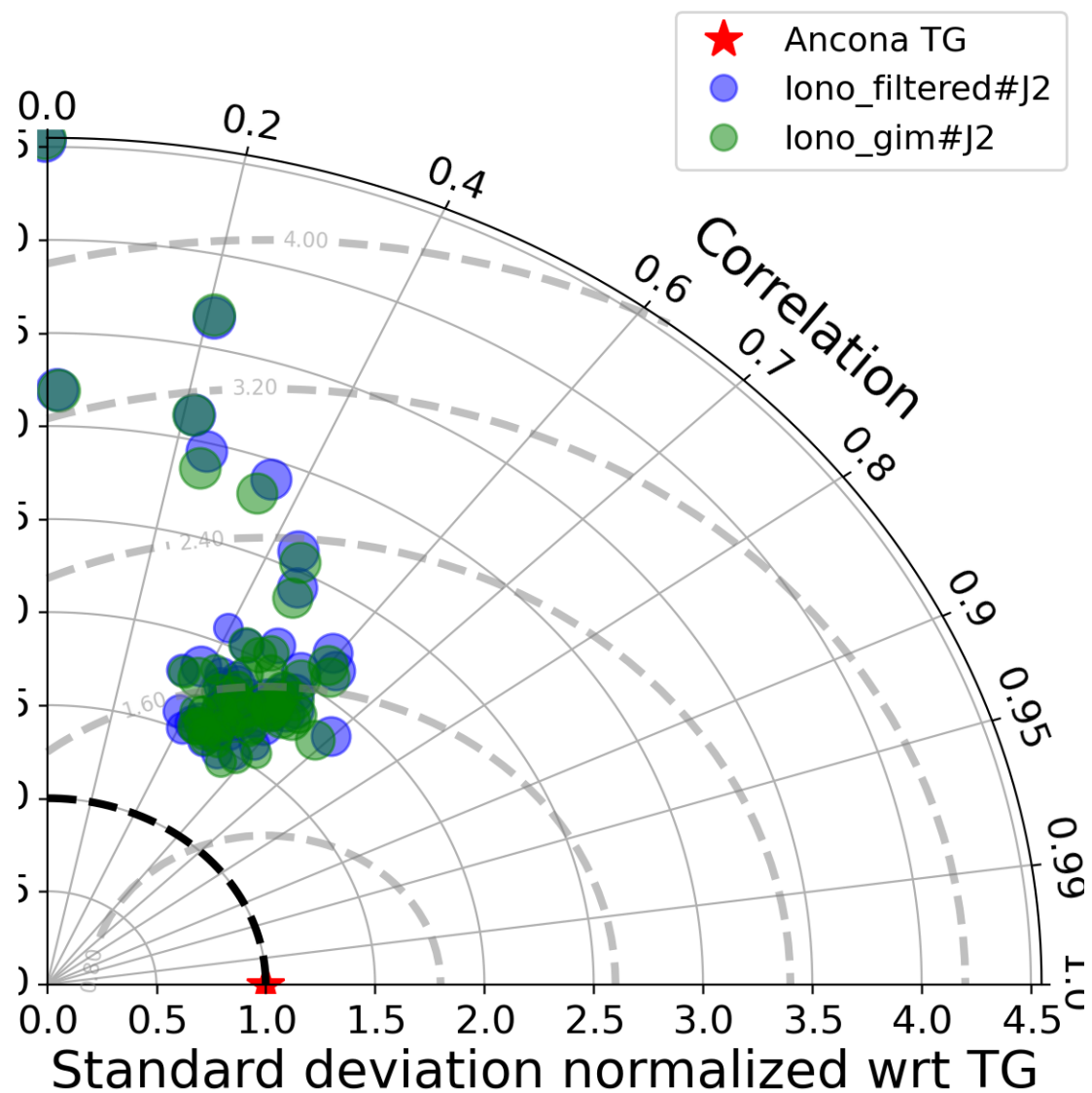


FIGURE 80 – Taylor diagram

6.5.9 Mean statistics table of products comparison with Ancona 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#J2	83.559	0.472	0.131	0.117
lono_gim#J2	86.322	0.481	0.133	0.117

FIGURE 81 – 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 100 point.

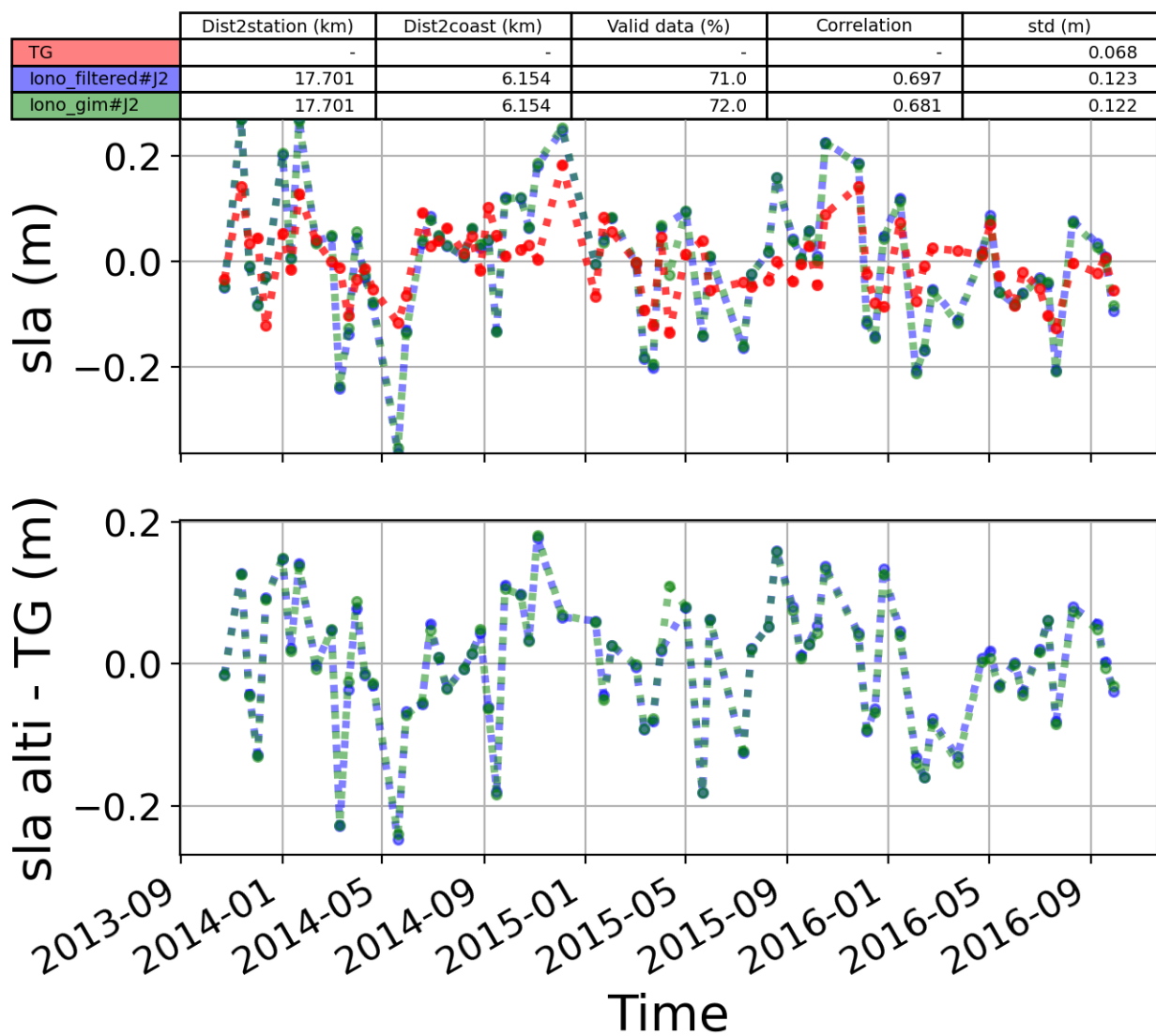


FIGURE 82 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

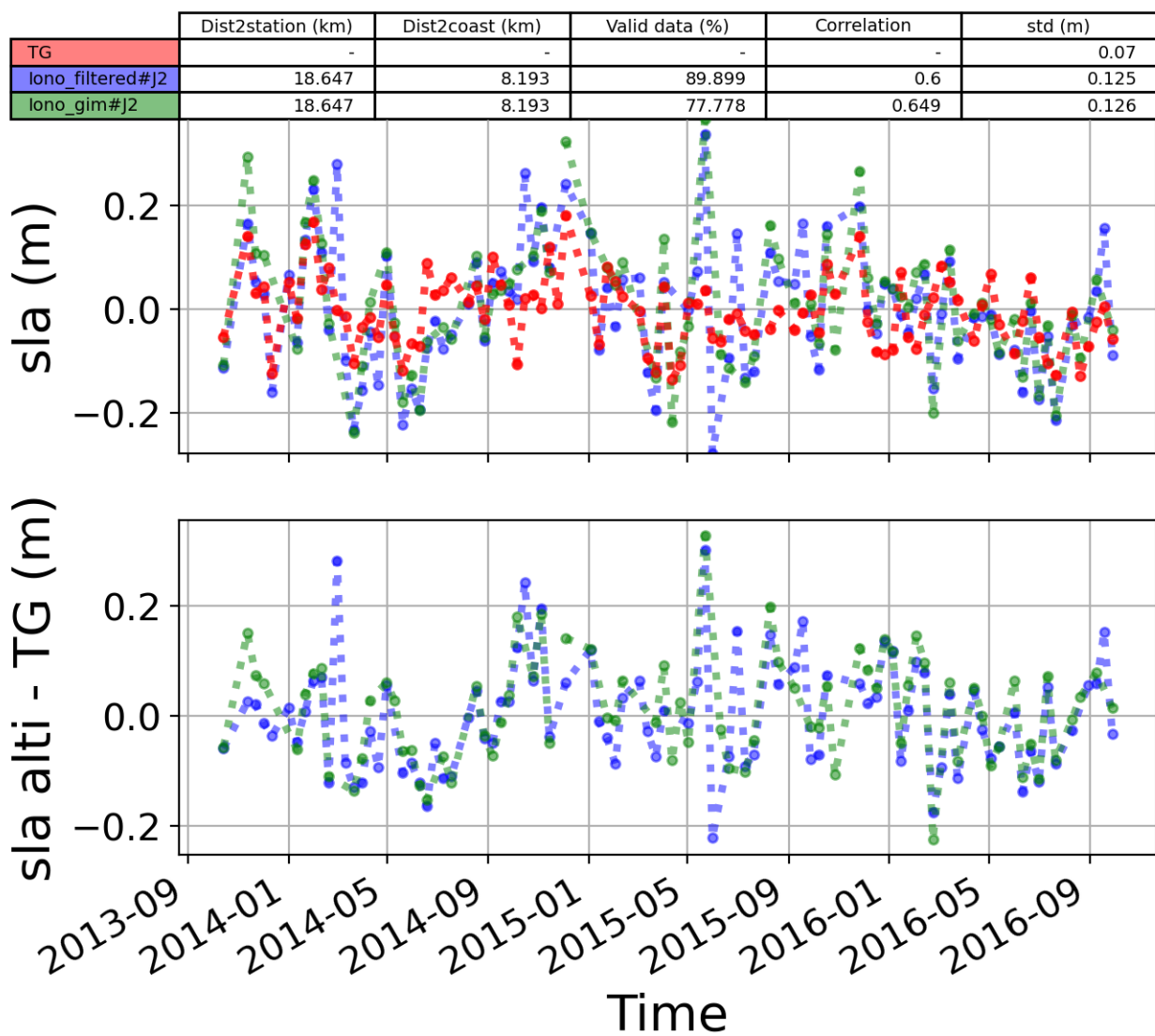


FIGURE 83 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.6 Station : Livourne

- Nearest track to Livourne station is the track number track85
- The area of interest is limited by :
 - A circle which it's center is the Livourne tide gauge station location and has a Radius of 40 Km
 - Maximum distance to the coast : 20 Km

6.6.1 correlation visualization in maps view % Livourne tide gauge

Correlation Altimetry data with respect to Livourne Tide gauge data

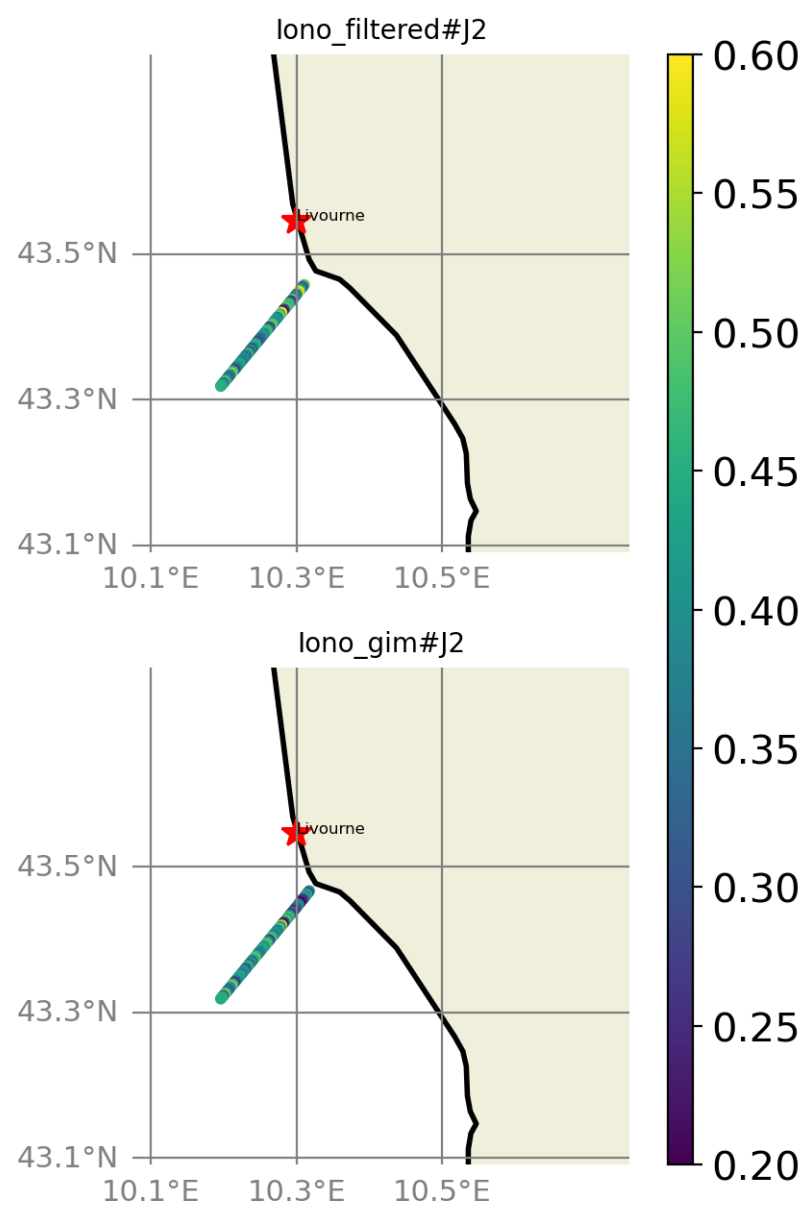


FIGURE 84 – correlation visualization in maps view % Livourne tide gauge

6.6.2 rmsd visualization in maps view % Livourne tide gauge

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

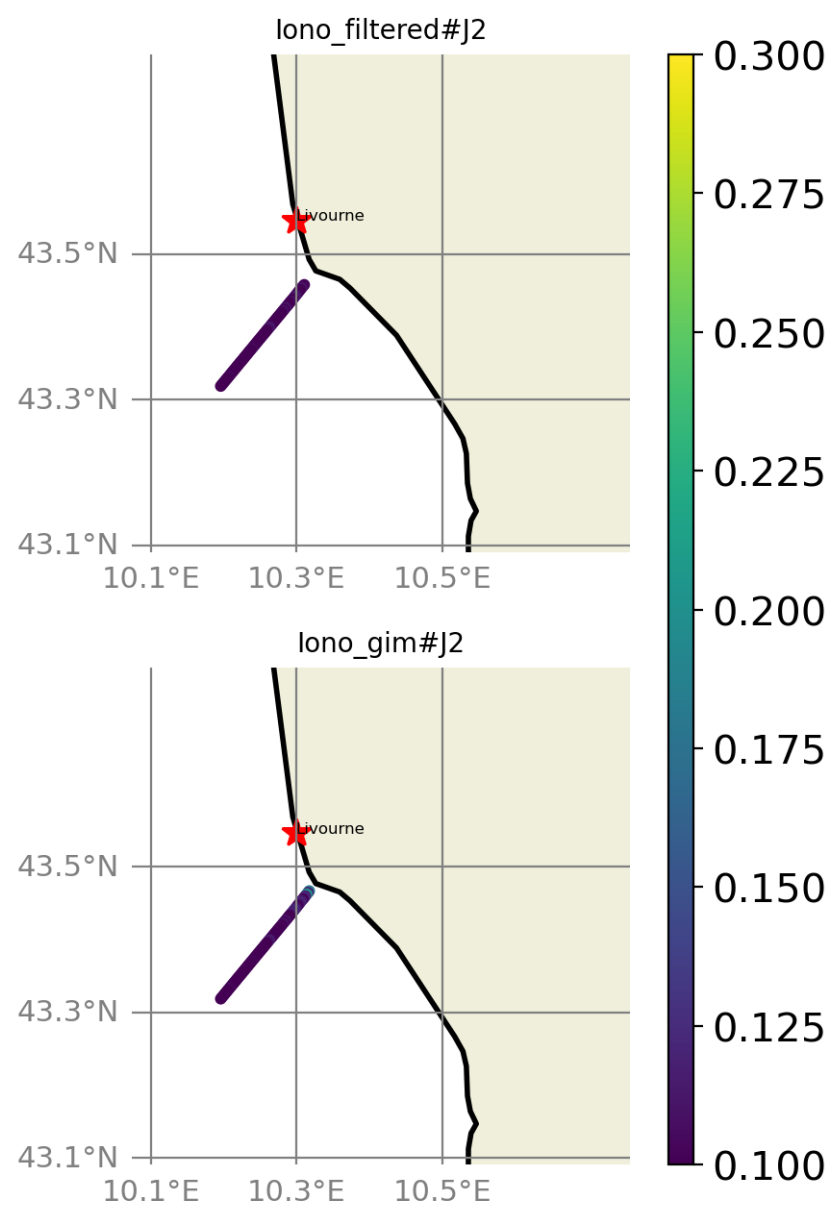


FIGURE 85 – rmsd visualization in maps view % Livourne tide gauge

6.6.3 std visualization in maps view % Livourne tide gauge

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

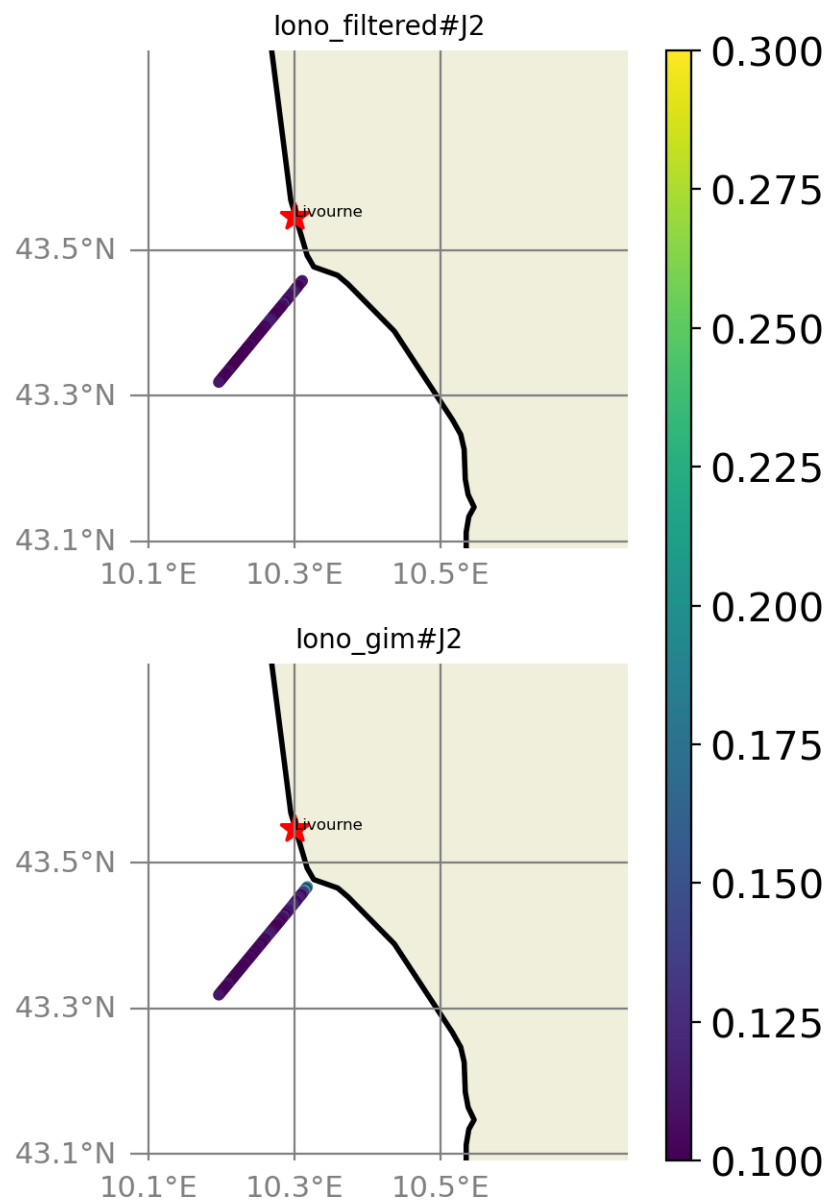


FIGURE 86 – std visualization in maps view % Livourne tide gauge

6.6.4 valid_data_percent visualization in maps view % Livourne tide gauge

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

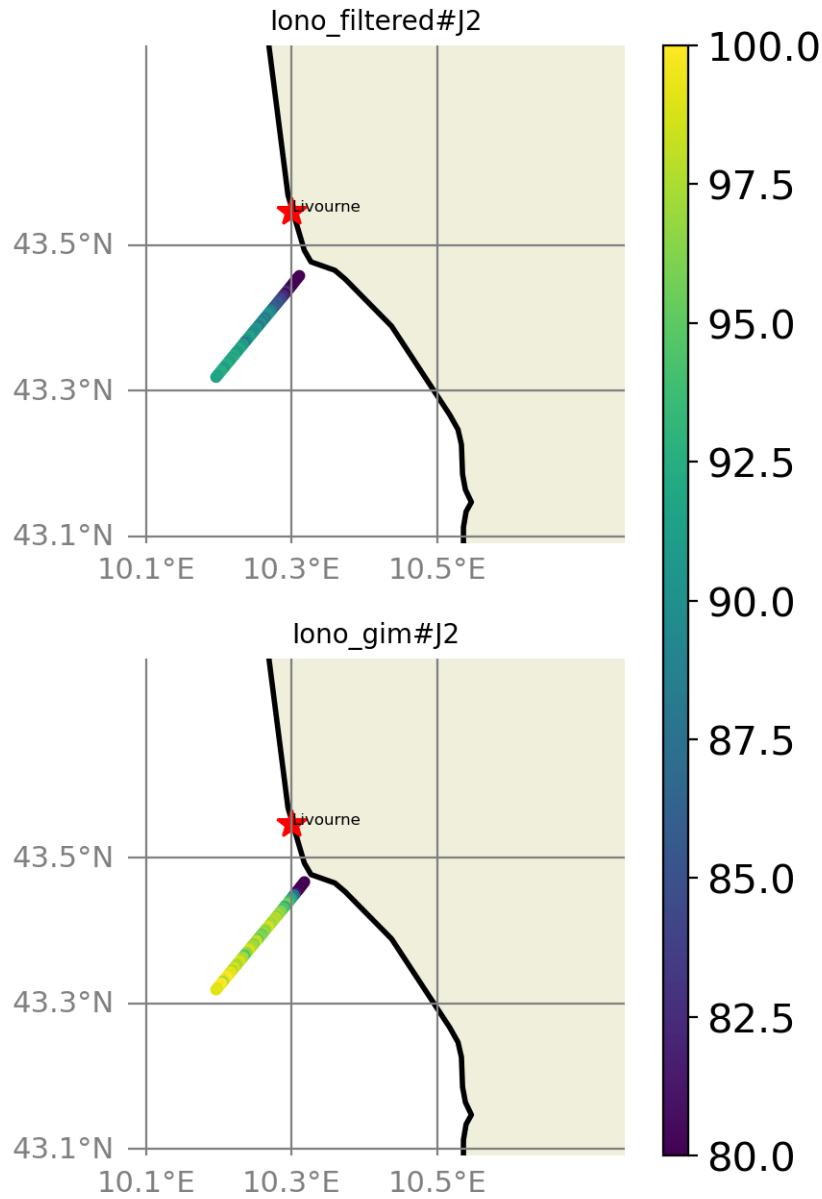


FIGURE 87 – valid_data_percent visualization in maps view % Livourne tide gauge

6.6.5 Valid data (%) in function of distance to coast/Livourne 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. $maxNB = 107$ 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.

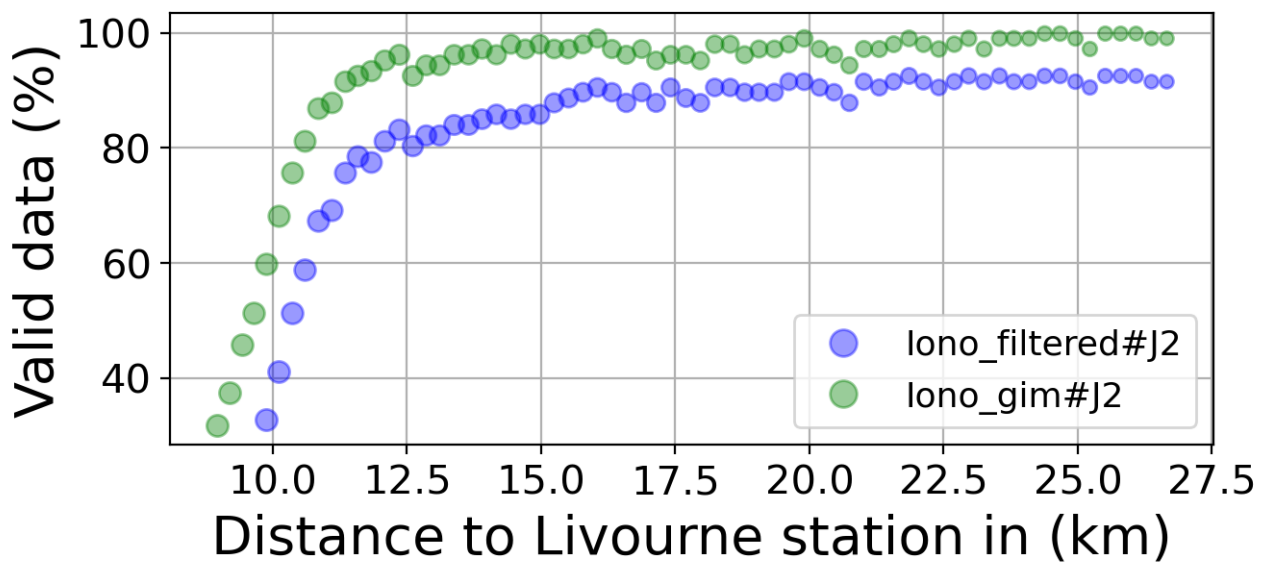
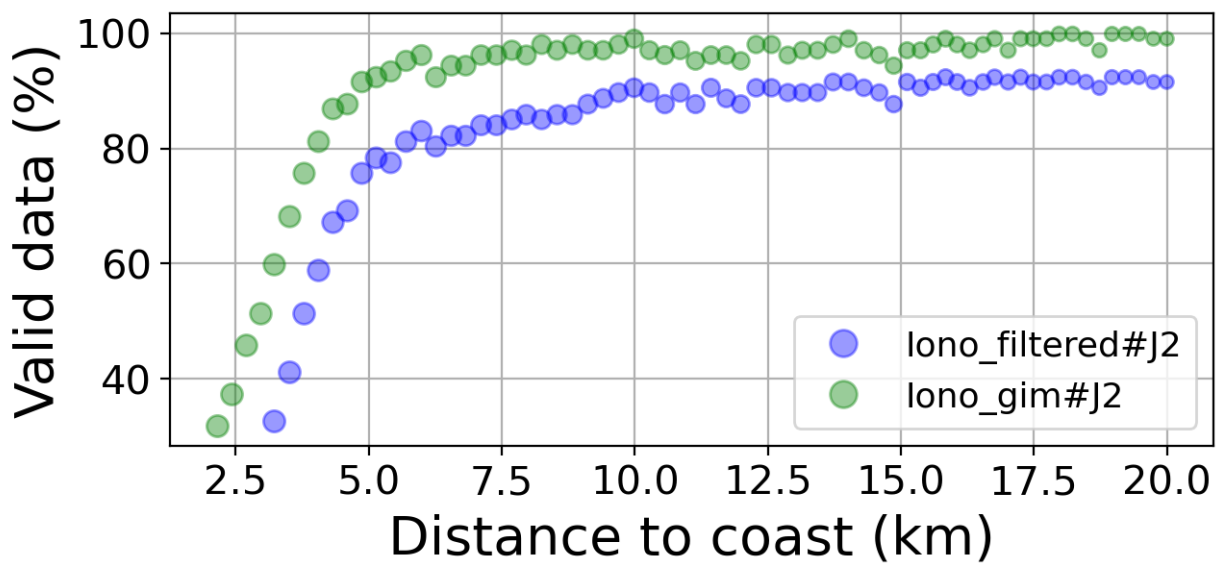


FIGURE 88 – Valid data (%) in function of distance to coast/Livourne station

6.6.6 Std in function of distance to coast/Livourne station

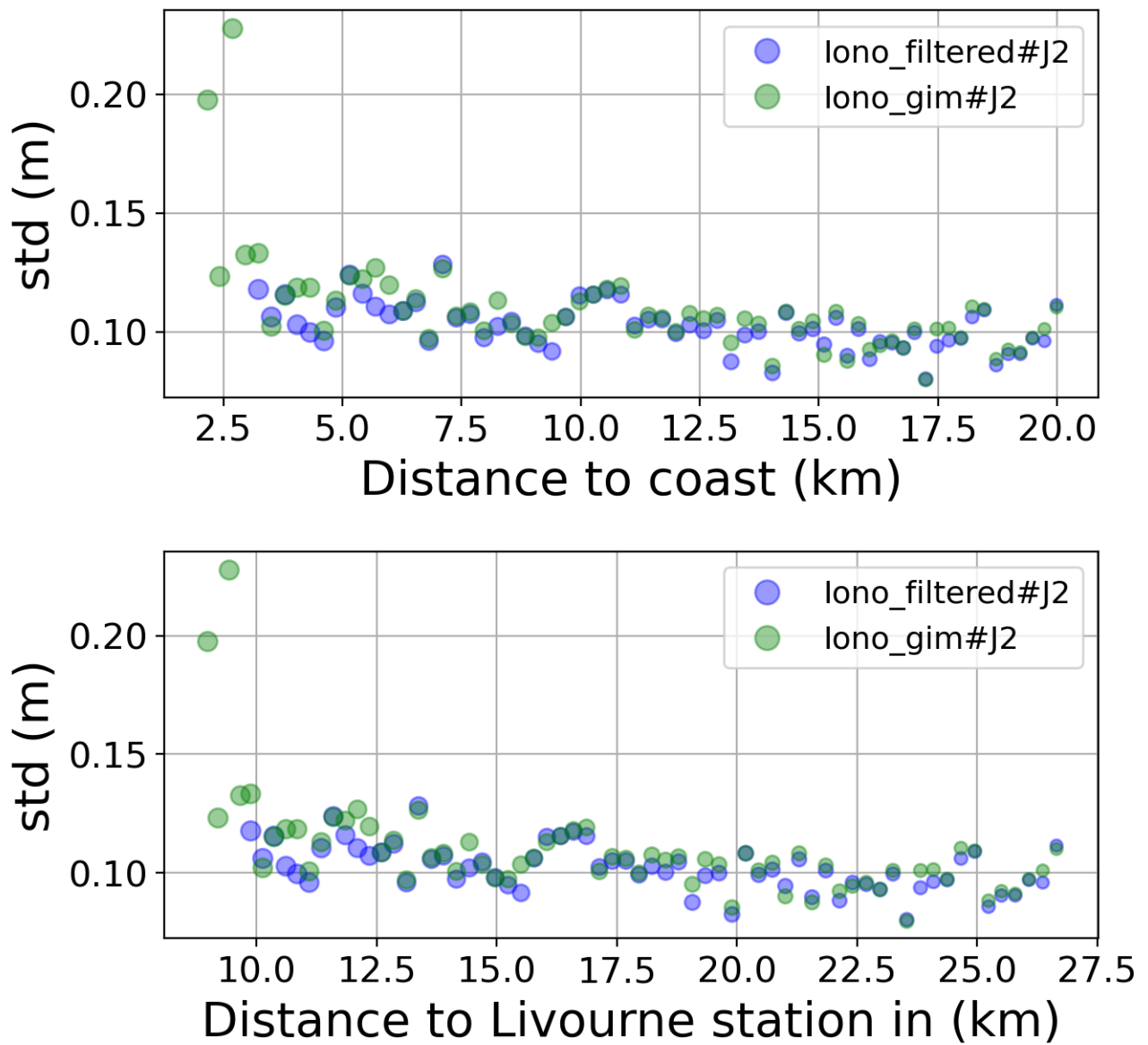


FIGURE 89 – Std in function of the distance to the coast/Livourne station

6.6.7 Correlation in function of distance to coast/Livourne station

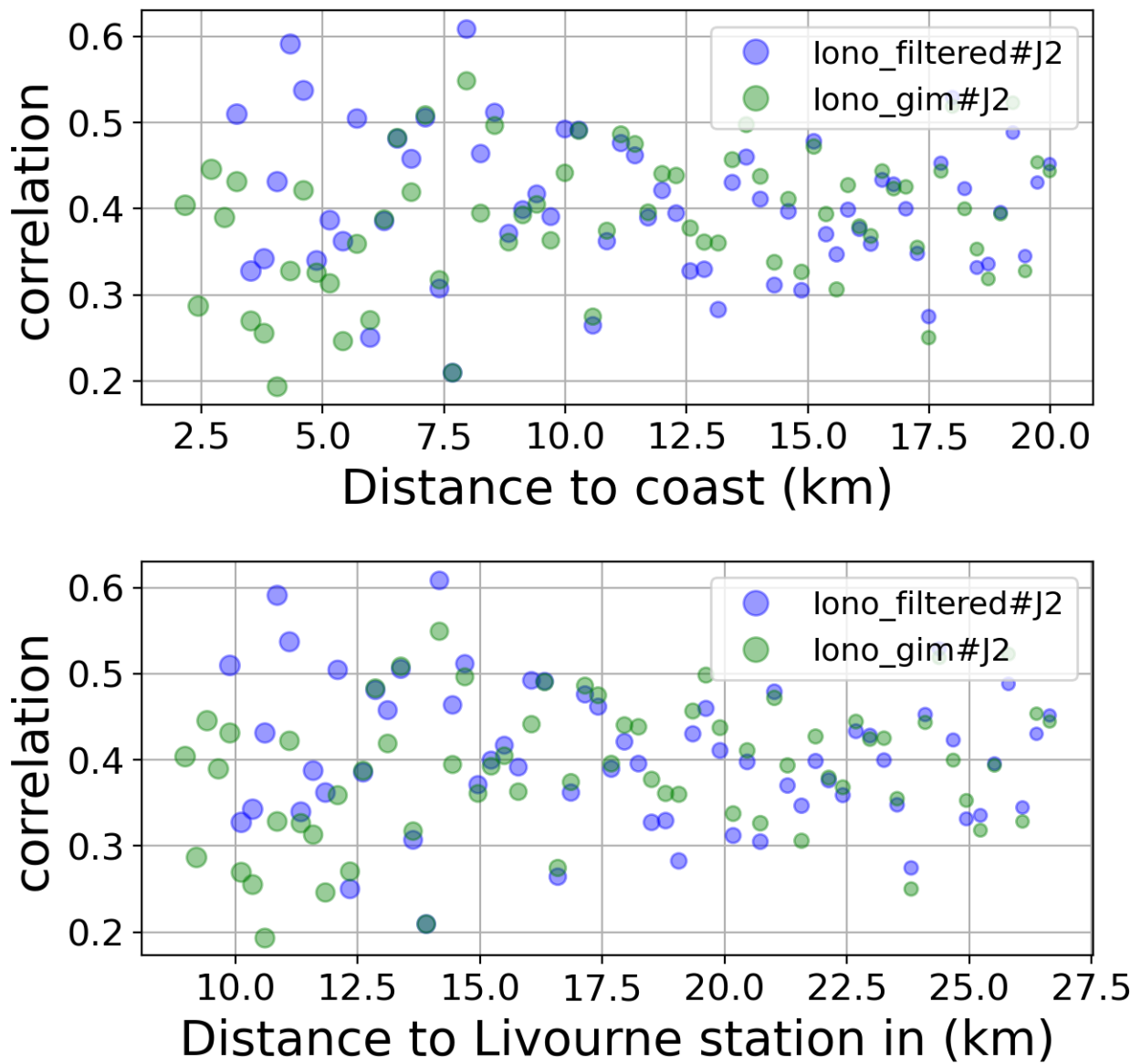


FIGURE 90 – Correlation in function of the distance to the coast/Livourne station

6.6.8 Taylor Diagram

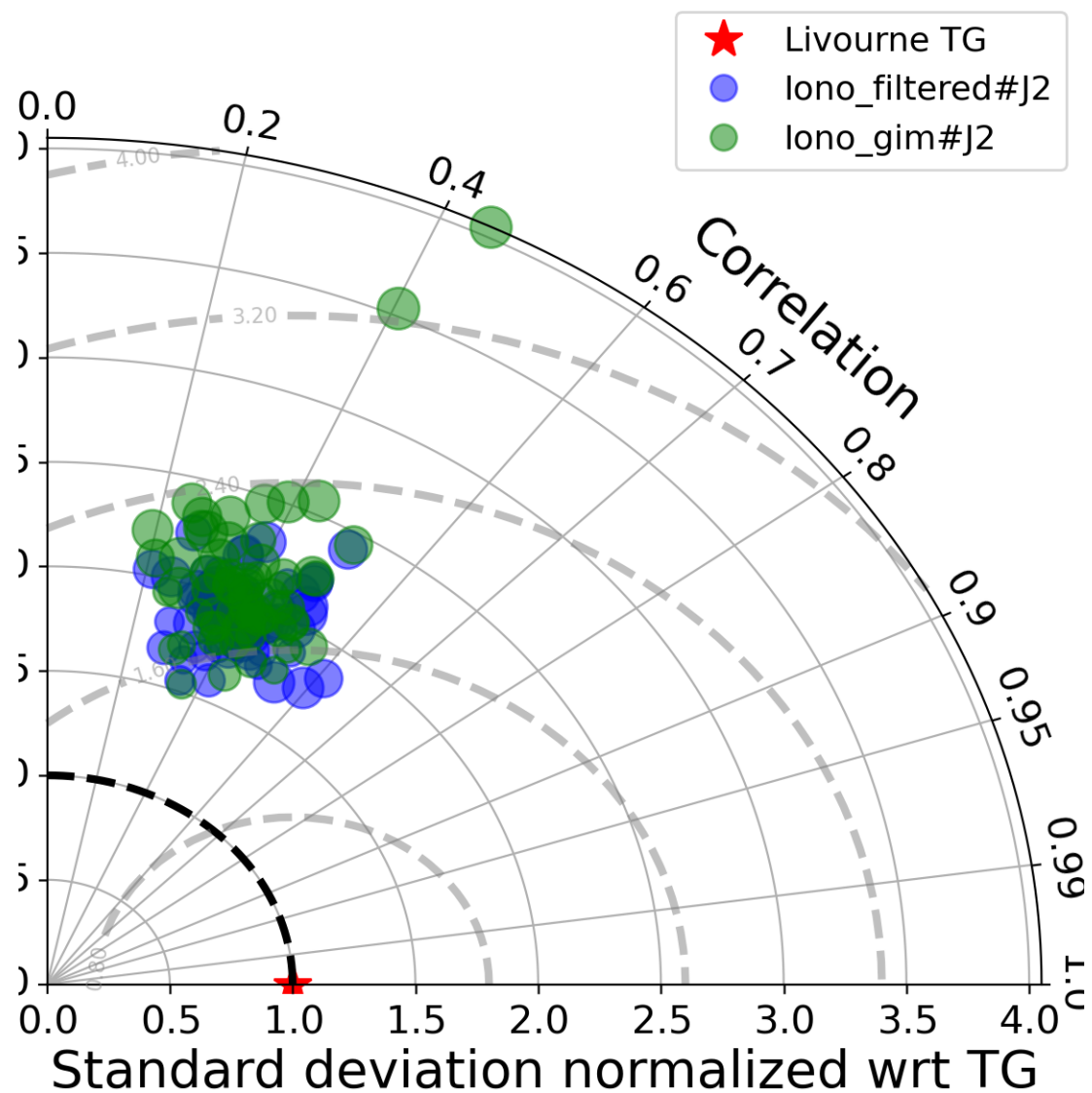


FIGURE 91 – Taylor diagram

6.6.9 Mean statistics table of products comparison with Livourne 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#J2	85.195	0.405	0.102	0.094
lono_gim#J2	95.238	0.389	0.105	0.098

FIGURE 92 – 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 107 point.

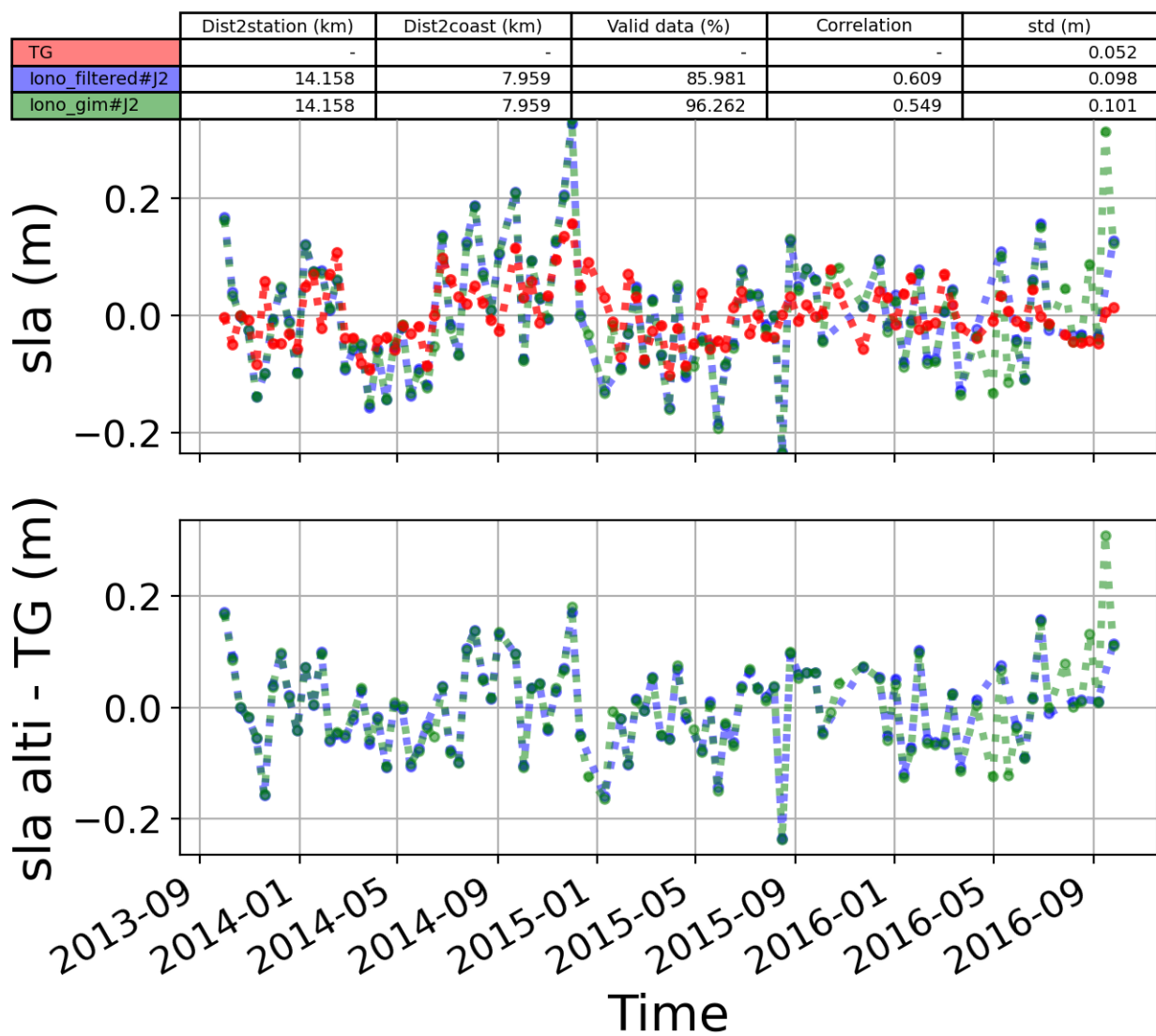


FIGURE 93 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

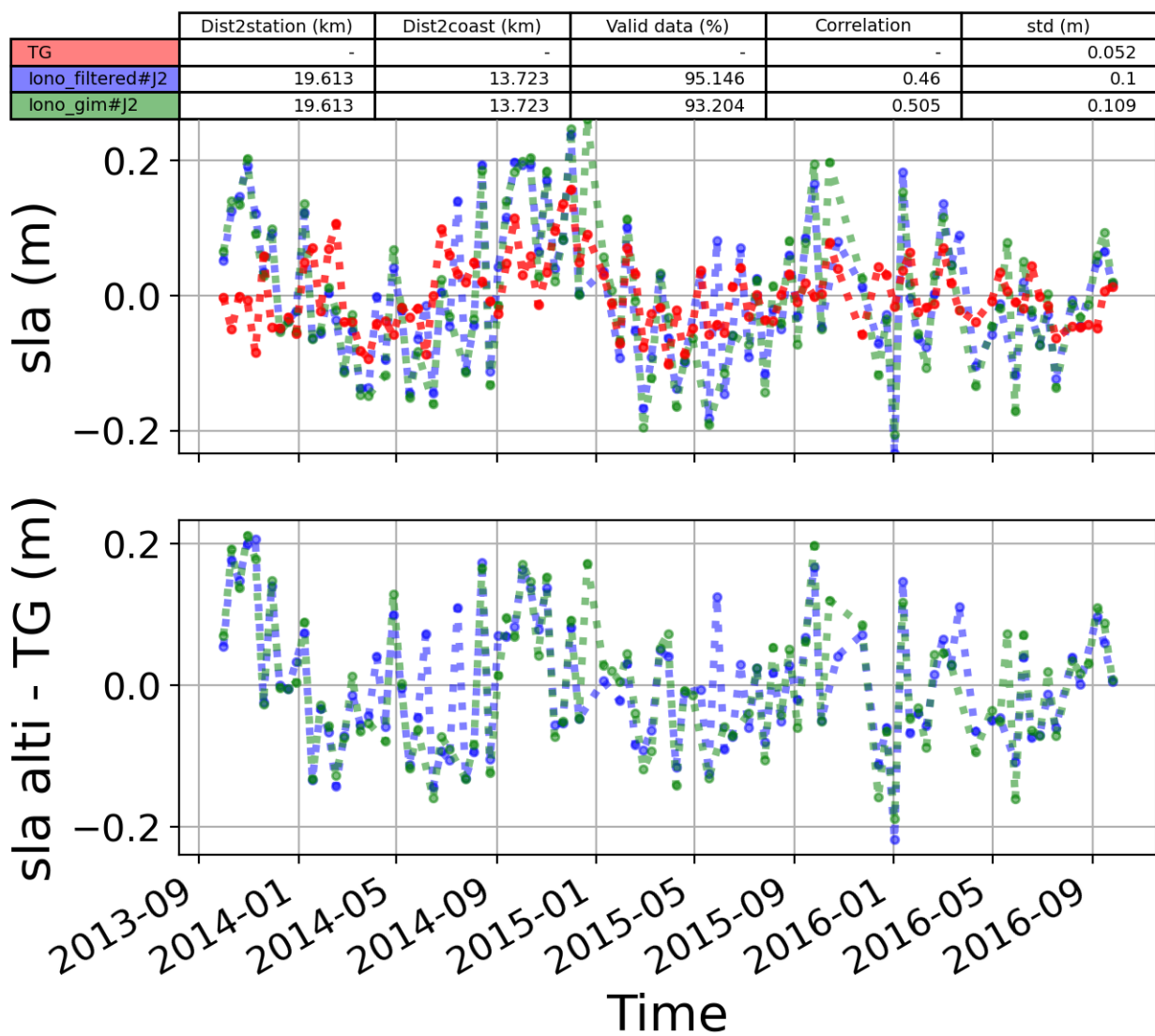


FIGURE 94 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.7 Station : MONACO_FONTVIEILLE

- Nearest track to MONACO_FONTVIEILLE station is the track number track9
- The area of interest is limited by :
 - A circle which it's center is the MONACO_FONTVIEILLE tide gauge station location and has a Radius of 40 Km

6.7.1 correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge

Correlation Altimetry data with respect to MONACO_FONTVIEILLE Tide gauge data

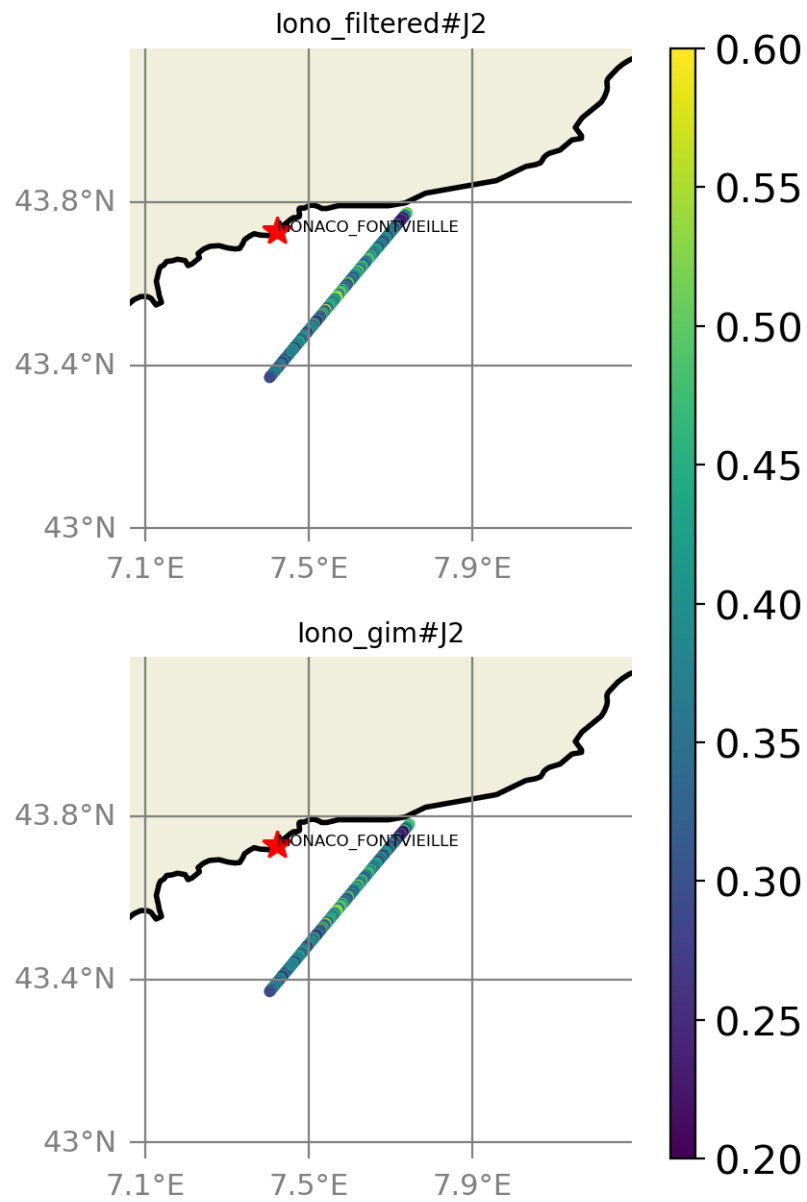


FIGURE 95 – correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.2 rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge

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

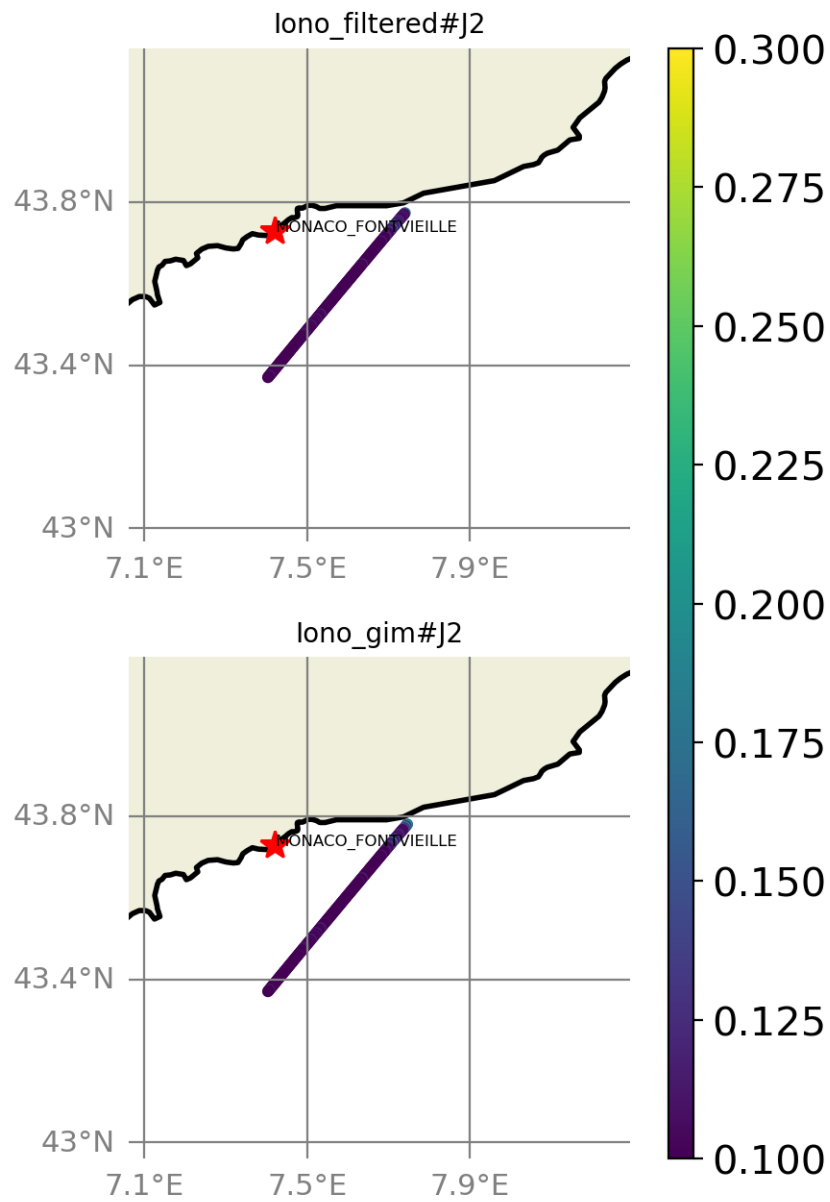


FIGURE 96 – rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.3 std visualization in maps view % MONACO_FONTVIEILLE tide gauge

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

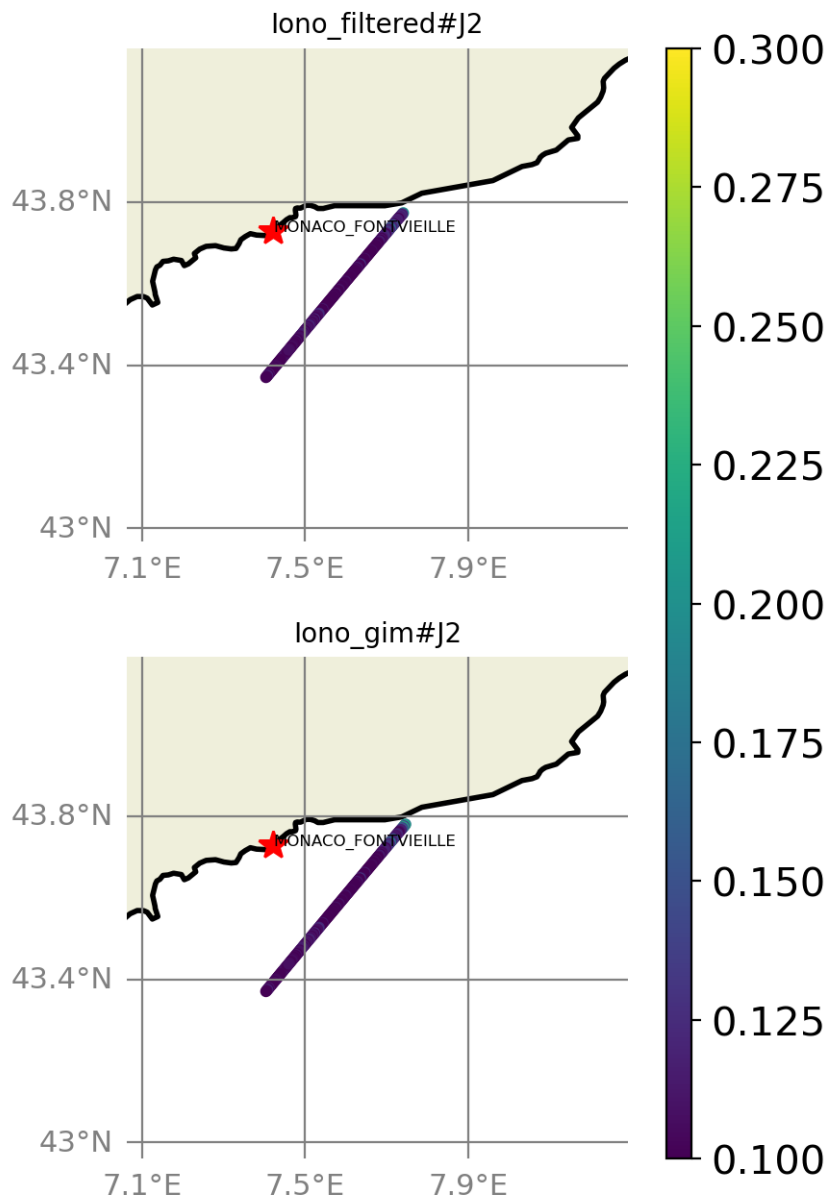


FIGURE 97 – std visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.4 valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge

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

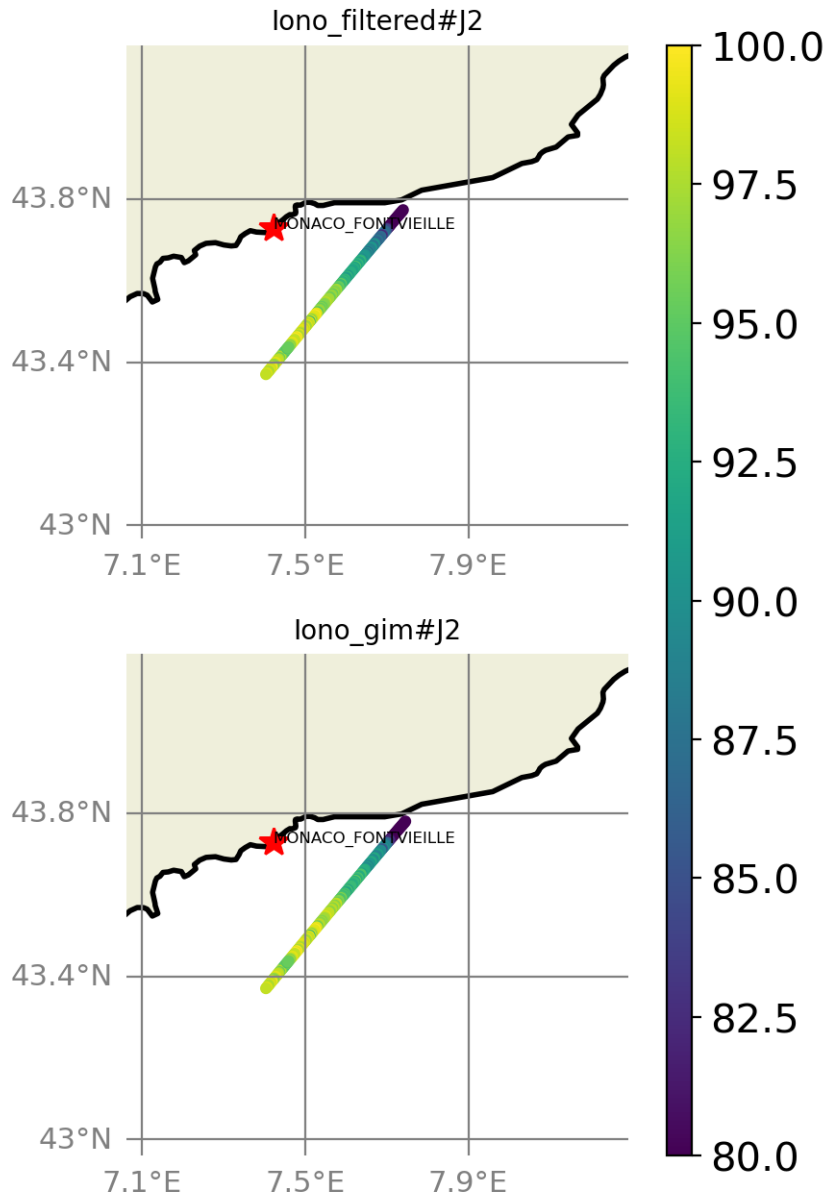


FIGURE 98 – valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.5 Valid data (%) in function of distance to coast/MONACO_FONTVIEILLE 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. $maxNB = 107$ 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.

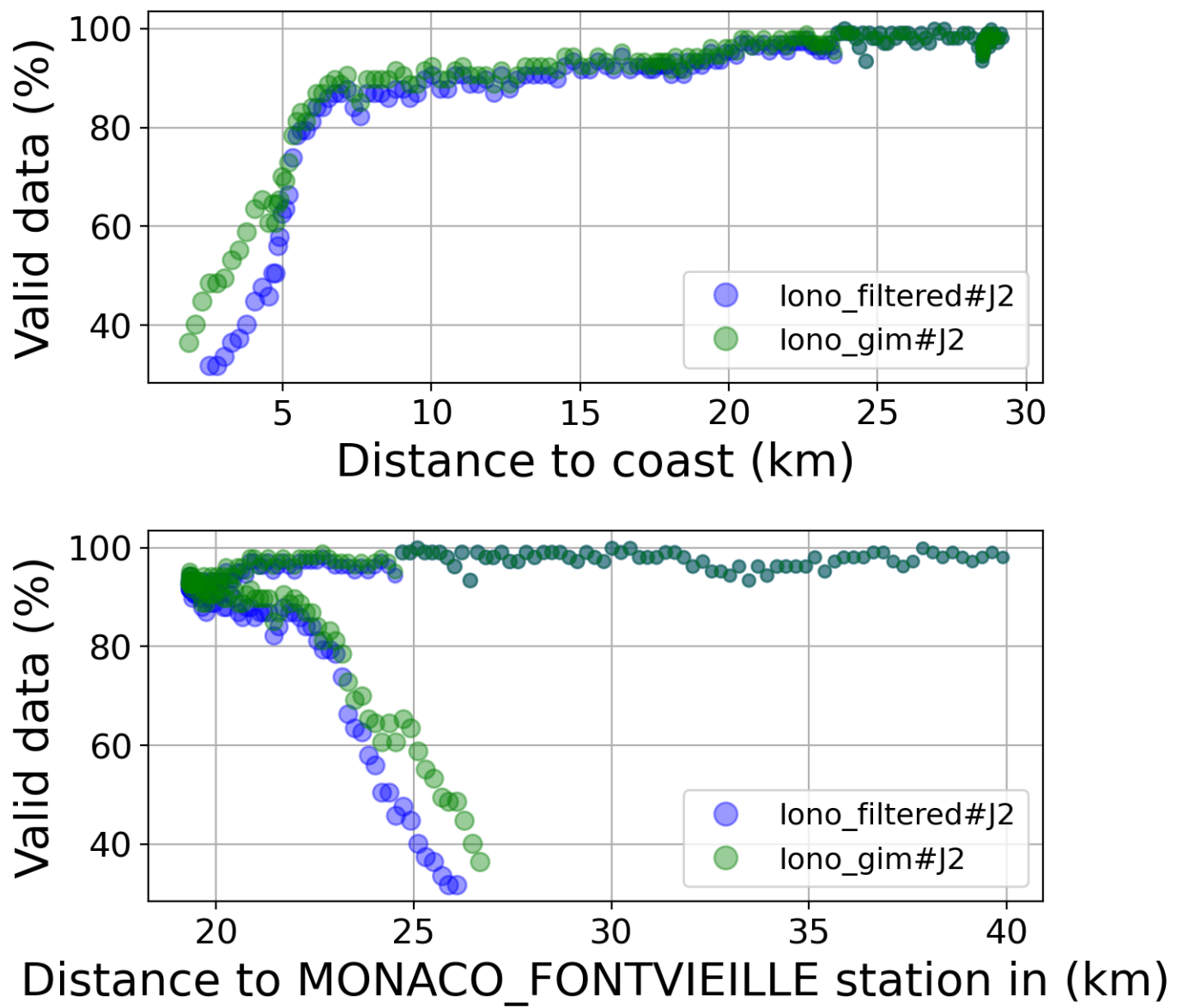


FIGURE 99 – Valid data (%) in function of distance to coast/MONACO_FONTVIEILLE station

6.7.6 Std in function of distance to coast/MONACO_FONTVIEILLE station

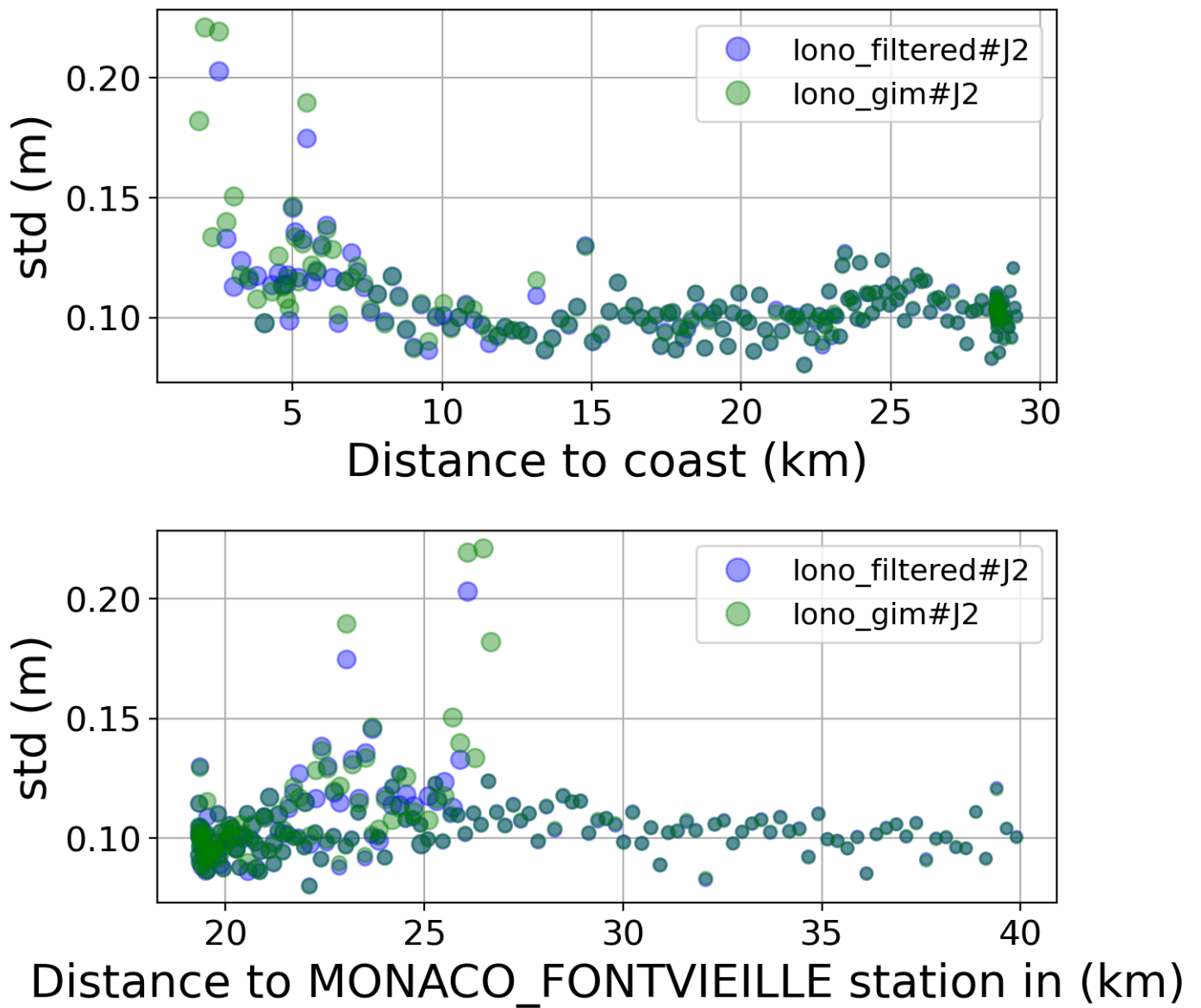


FIGURE 100 – Std in function of the distance to the coast/MONACO_FONTVIEILLE station

6.7.7 Correlation in function of distance to coast/MONACO_FONTVIEILLE station

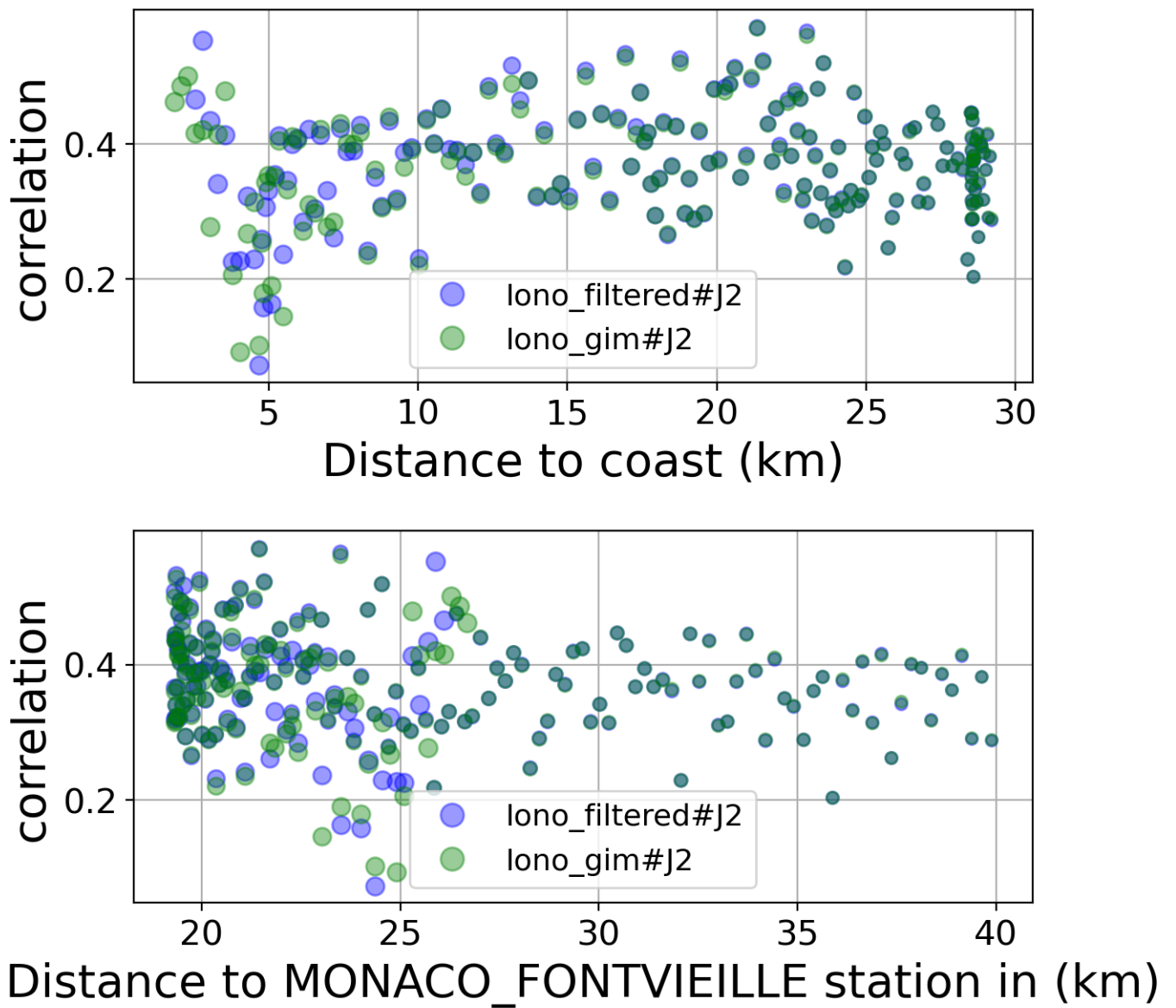


FIGURE 101 – Correlation in function of the distance to the coast/MONACO_FONTVIEILLE station

6.7.8 Taylor Diagram

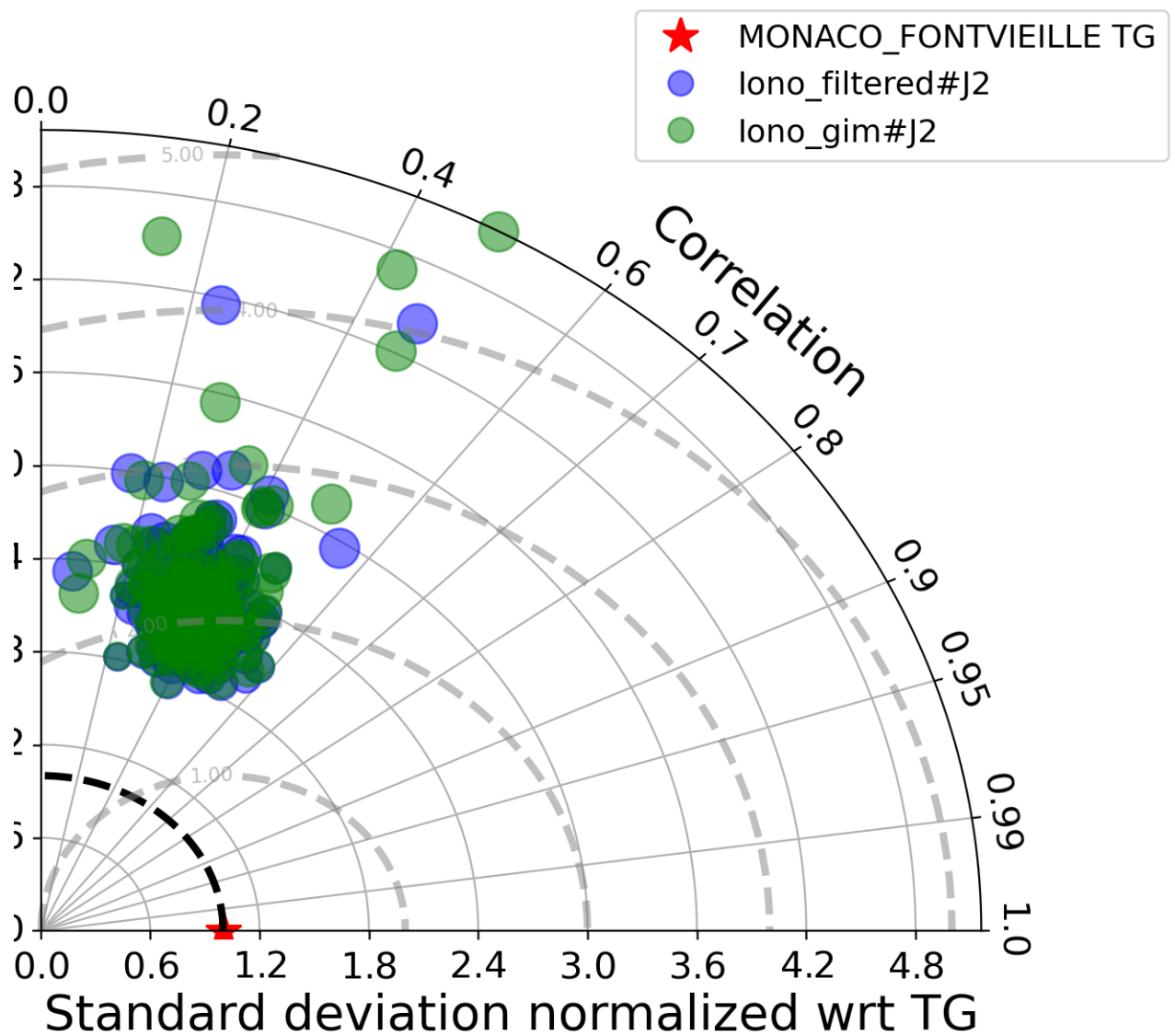


FIGURE 102 – Taylor diagram

6.7.9 Mean statistics table of products comparison with MONACO_FONTVIEILLE 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#J2	89.875	0.373	0.105	0.098
lono_gim#J2	91.852	0.369	0.106	0.099

FIGURE 103 – 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 107 point.

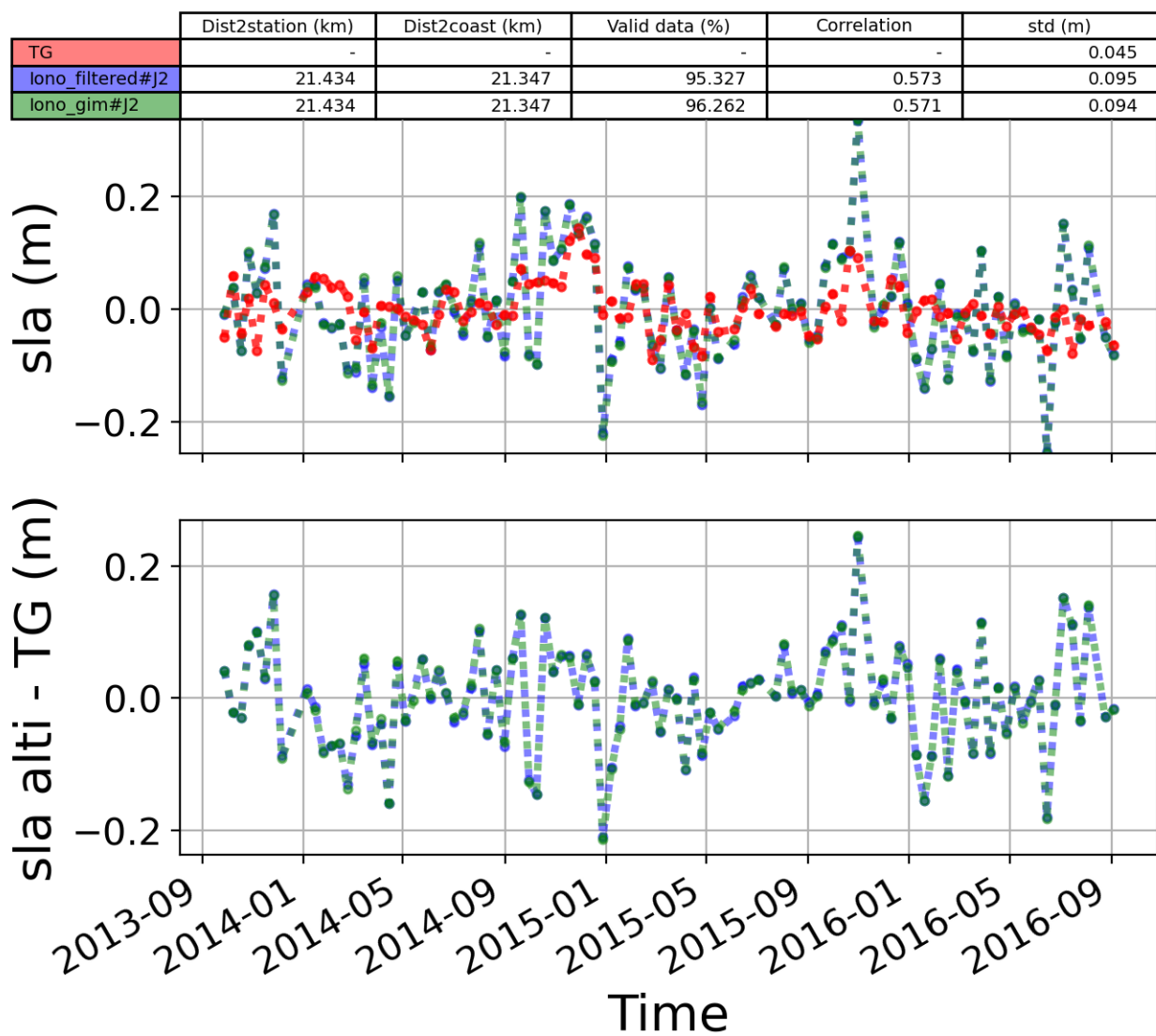


FIGURE 104 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

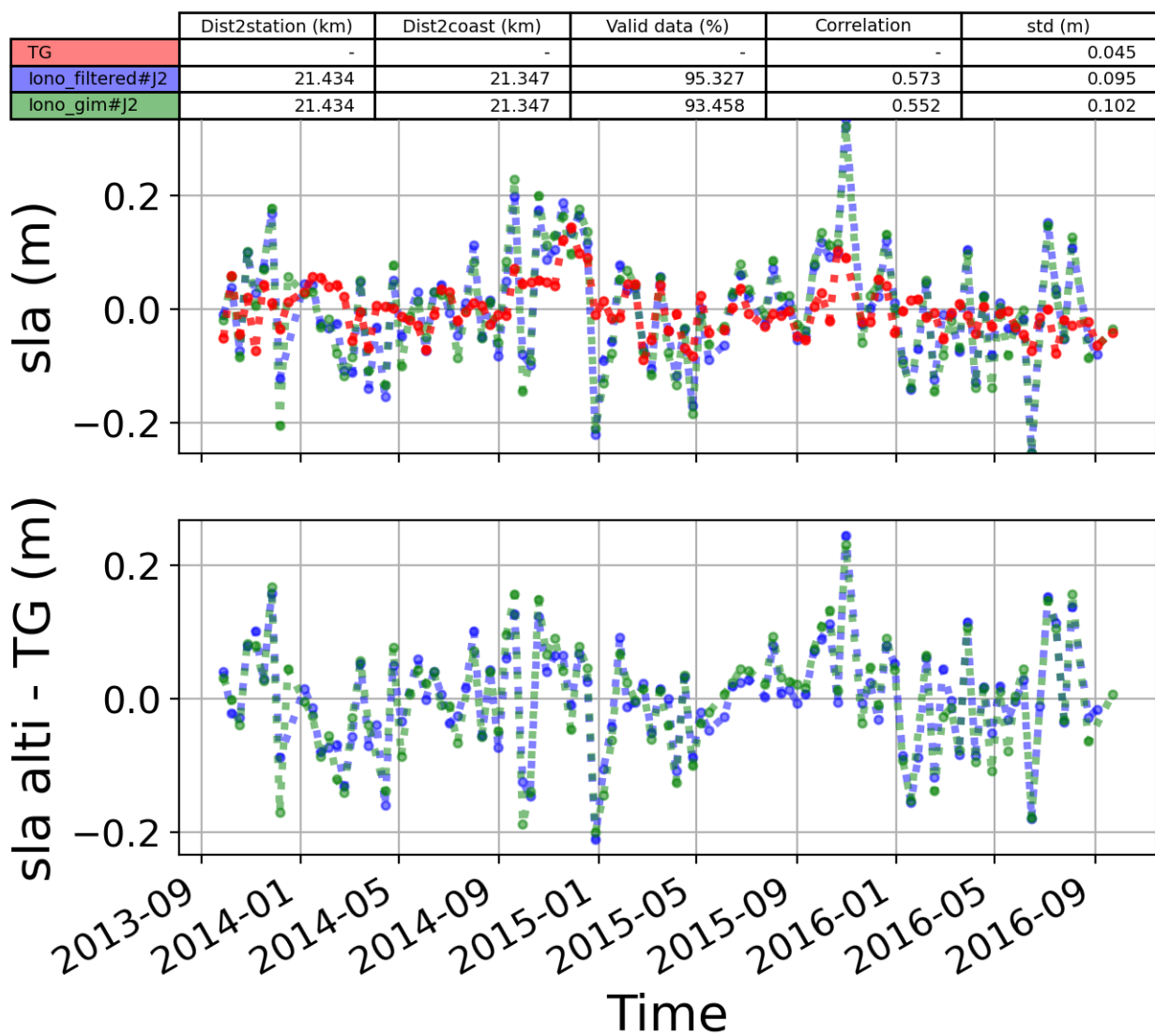


FIGURE 105 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.8 Station : Erdemli

- Nearest track to Erdemli station is the track number track68
- The area of interest is limited by :
 - A circle which it's center is the Erdemli tide gauge station location and has a Raduis of 40 Km

6.8.1 correlation visualization in maps view % Erdemli tide gauge

Correlation Altimetry data with respect to Erdemli Tide gauge data

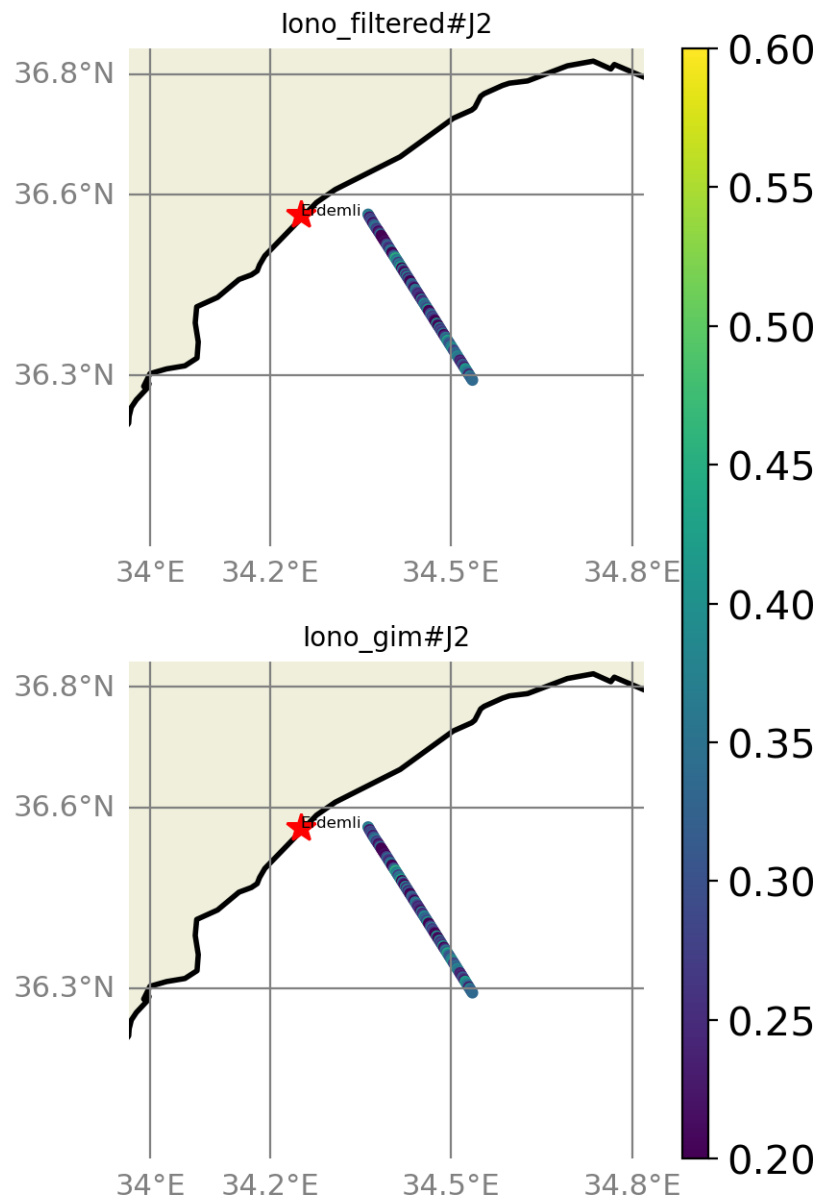


FIGURE 106 – correlation visualization in maps view % Erdemli tide gauge

6.8.2 rmsd visualization in maps view % Erdemli tide gauge

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

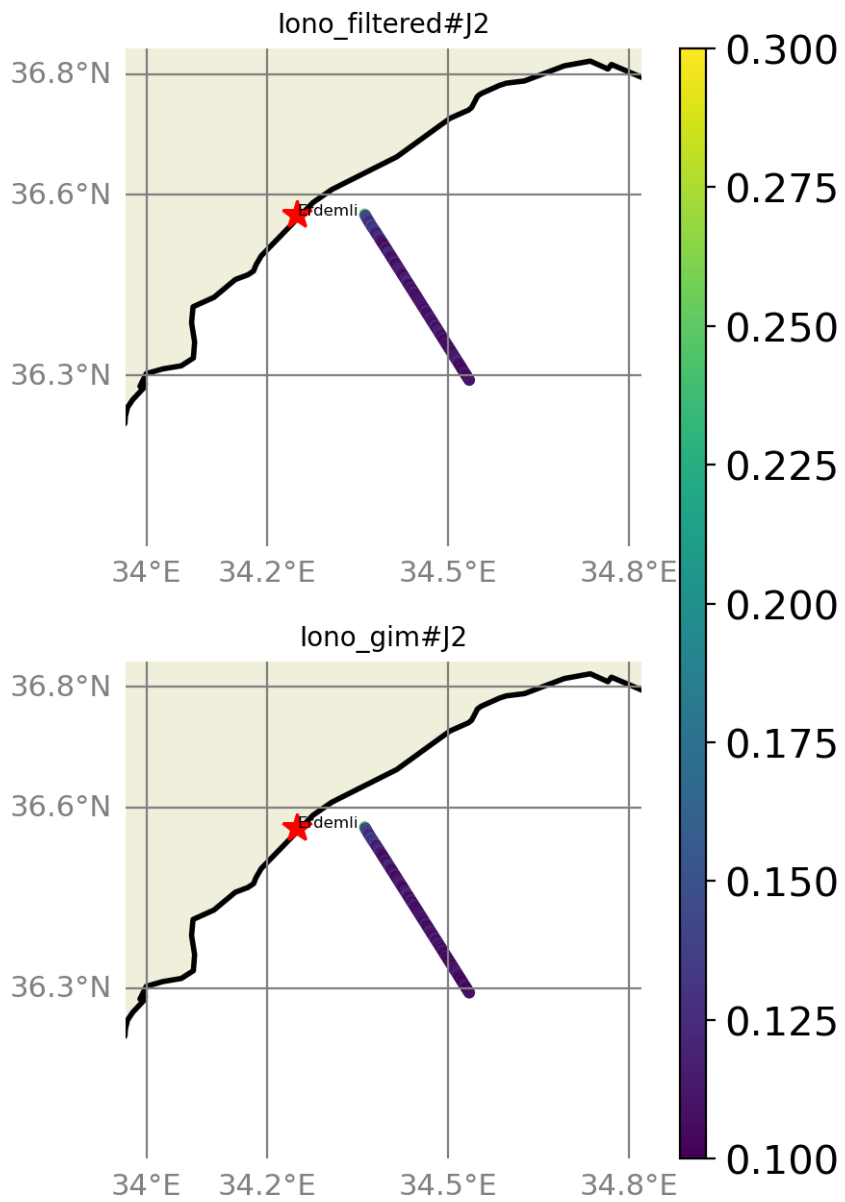


FIGURE 107 – rmsd visualization in maps view % Erdemli tide gauge

6.8.3 std visualization in maps view % Erdemli tide gauge

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

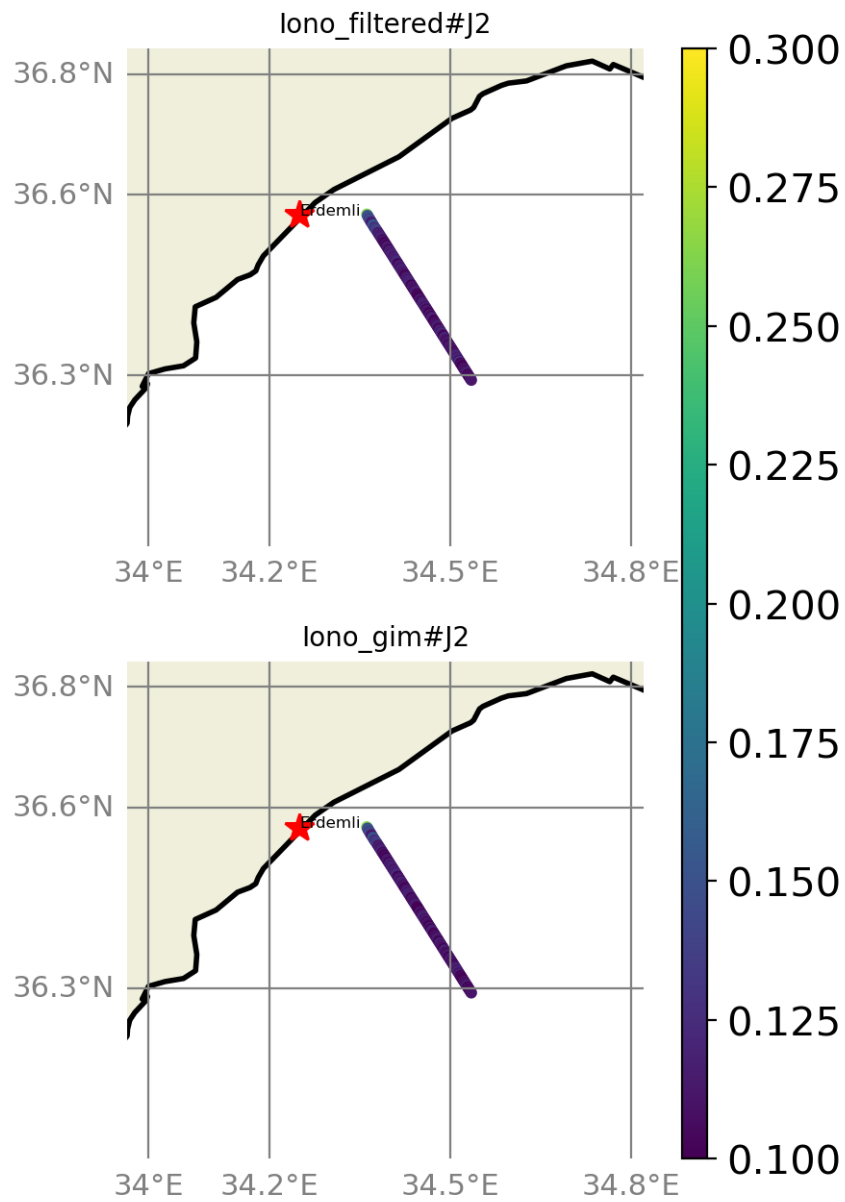


FIGURE 108 – std visualization in maps view % Erdemli tide gauge

6.8.4 valid_data_percent visualization in maps view % Erdemli tide gauge

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

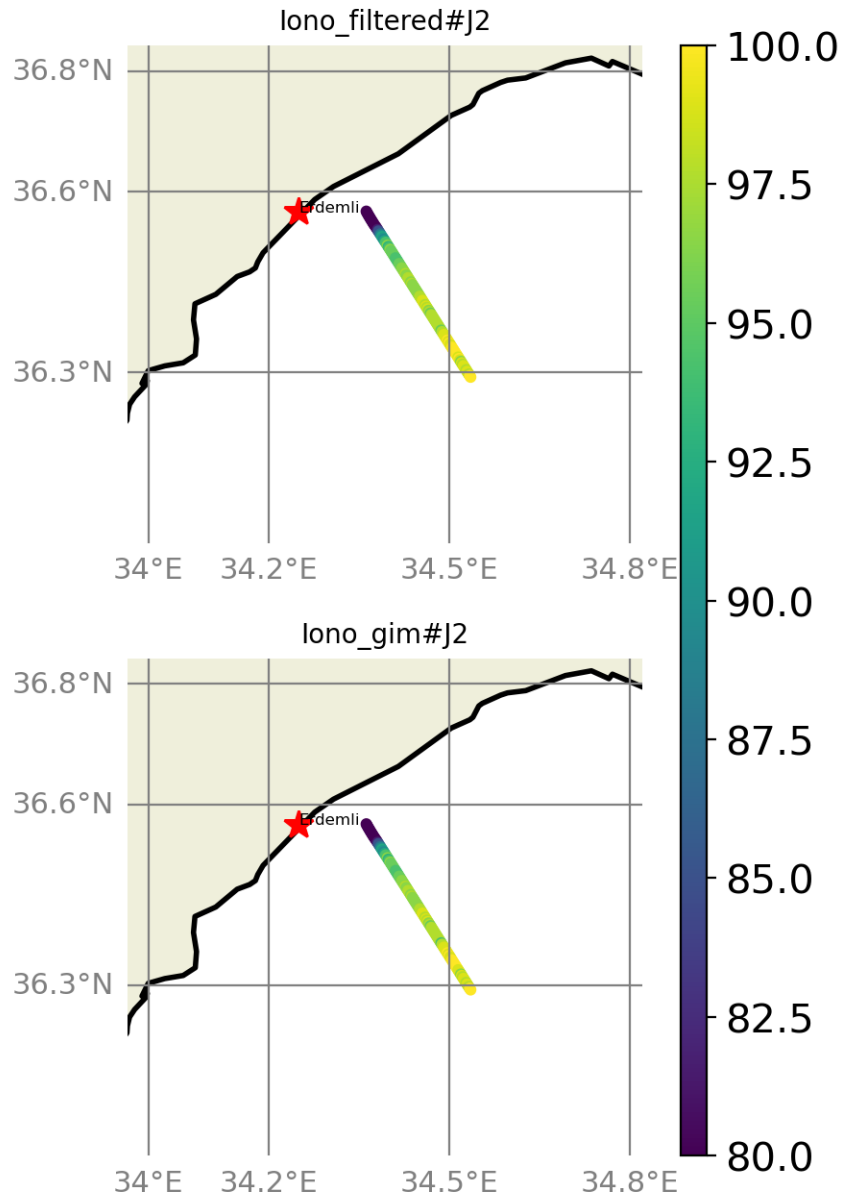


FIGURE 109 – valid_data_percent visualization in maps view % Erdemli tide gauge

6.8.5 Valid data (%) in function of distance to coast/Erdemli 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. $maxNB = 87$ 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.

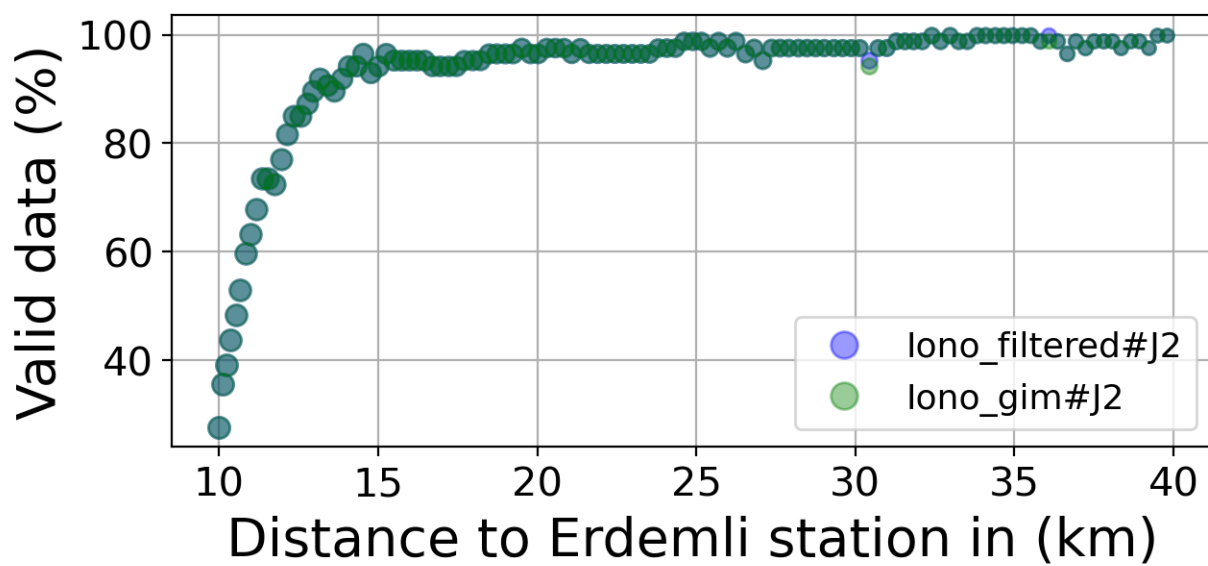
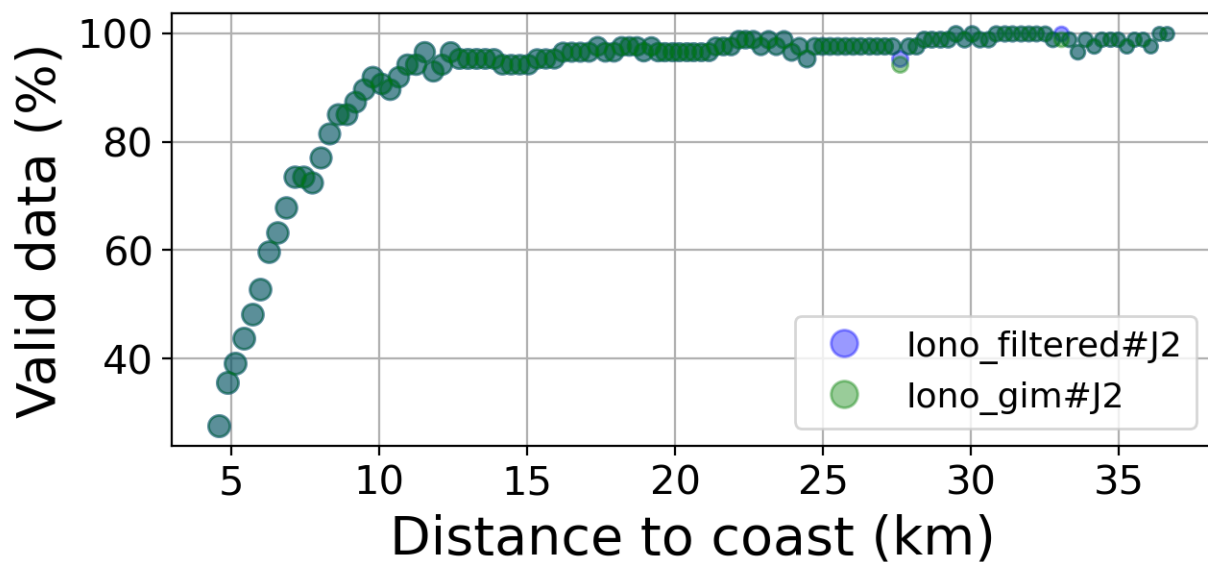


FIGURE 110 – Valid data (%) in function of distance to coast/Erdemli station

6.8.6 Std in function of distance to coast/Erdeмли station

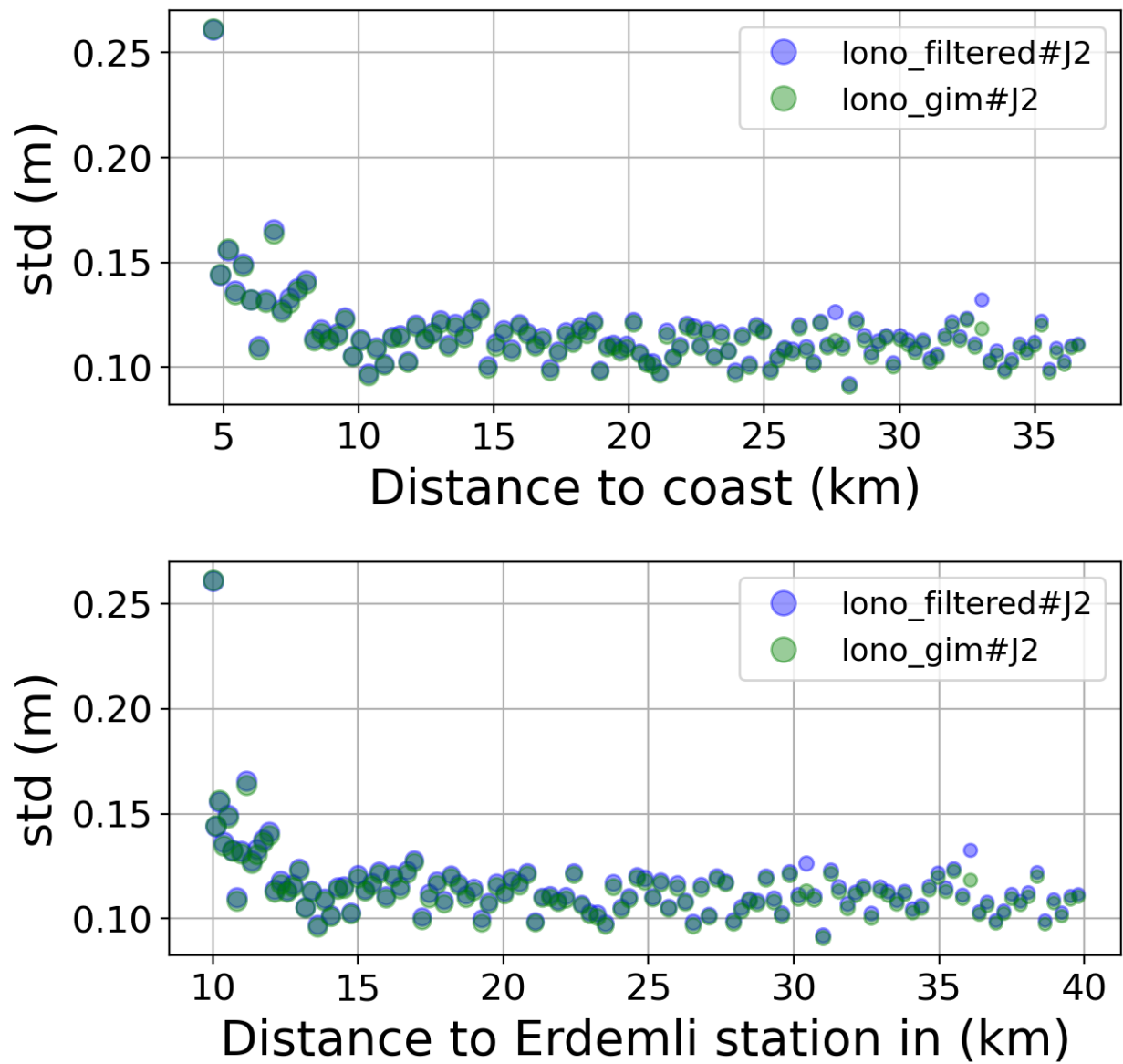


FIGURE 111 – Std in function of the distance to the coast/Erdeмли station

6.8.7 Correlation in function of distance to coast/Erdemli station

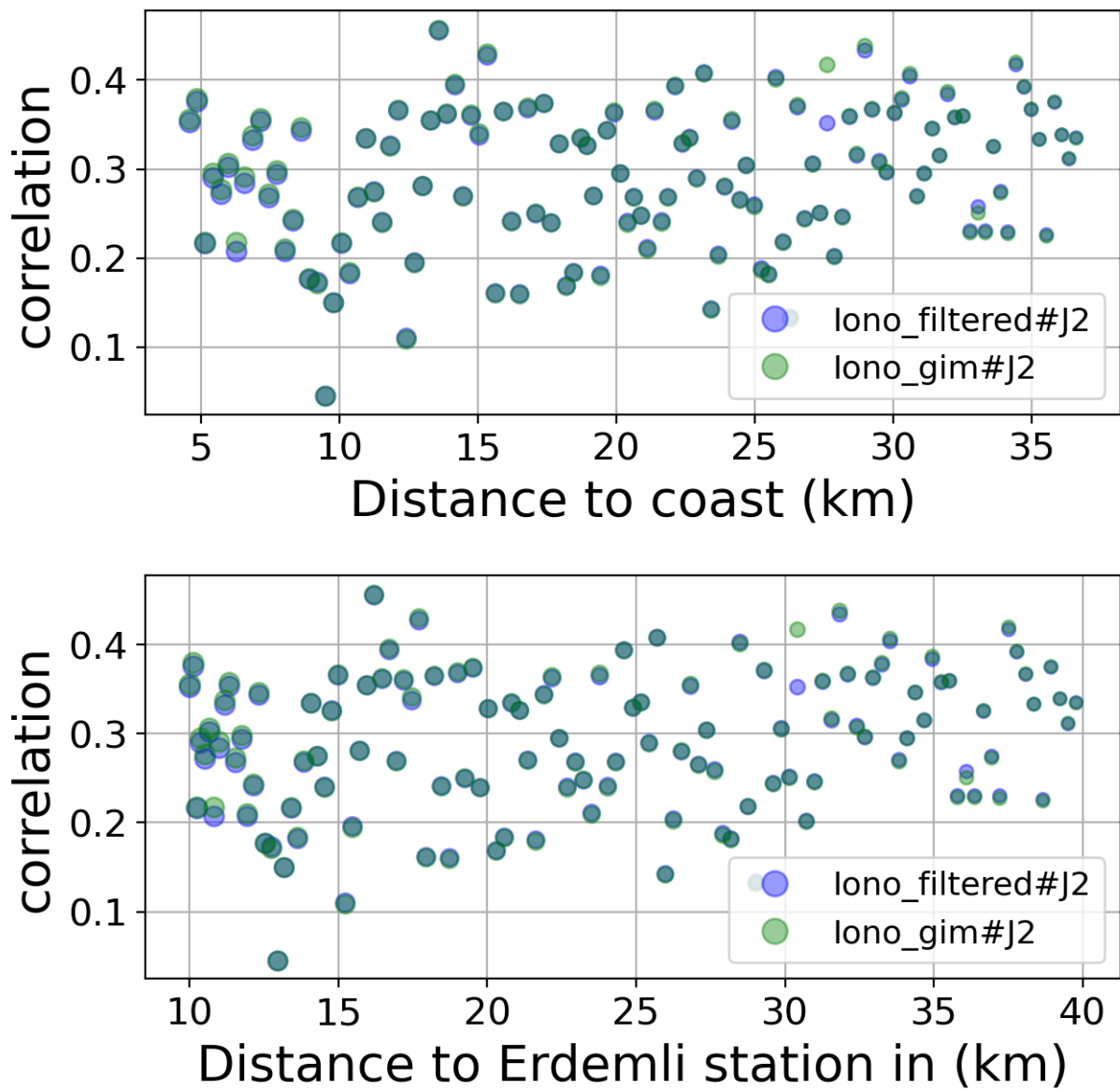


FIGURE 112 – Correlation in function of the distance to the coast/Erdemli station

6.8.8 Taylor Diagram

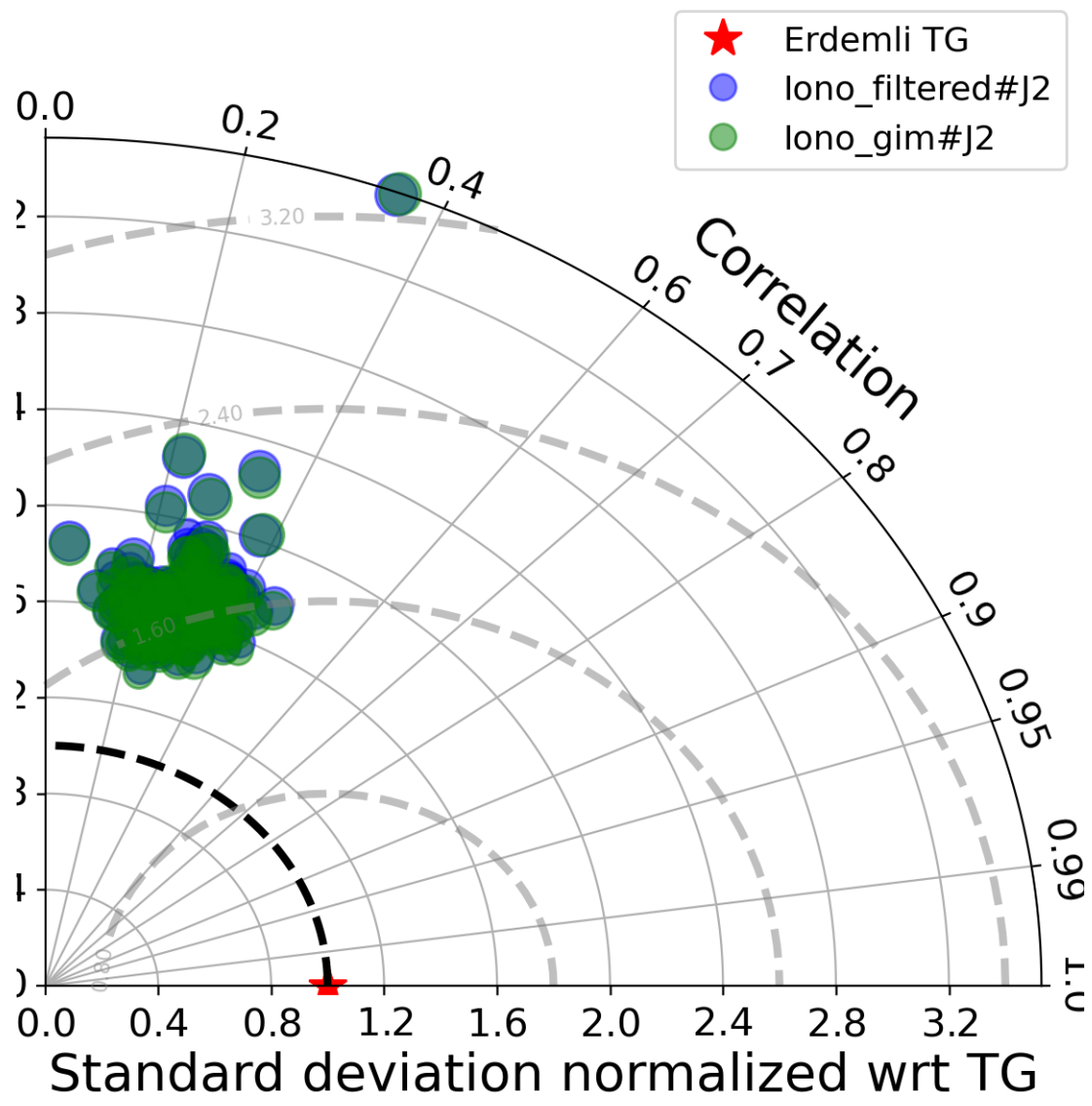


FIGURE 113 – Taylor diagram

6.8.9 Mean statistics table of products comparison with Erdemli 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#J2	92.237	0.291	0.116	0.116
lono_gim#J2	92.217	0.292	0.114	0.115

FIGURE 114 – 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 87 point.

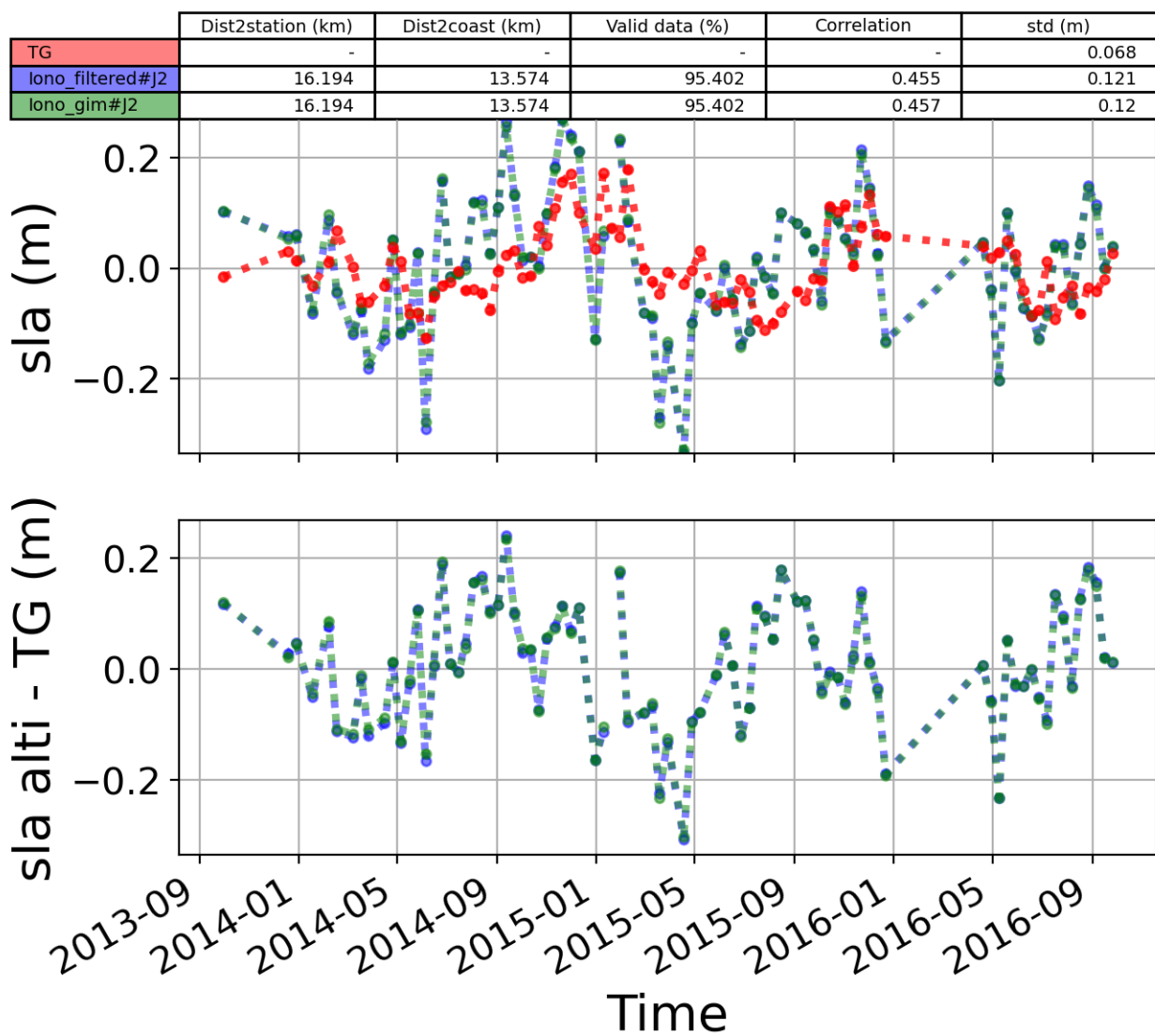


FIGURE 115 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.9 Station : Almeria

- Nearest track to Almeria station is the track number track96
- The area of interest is limited by :
 - A circle which it's center is the Almeria tide gauge station location and has a Raduis of 40 Km

6.9.1 correlation visualization in maps view % Almeria tide gauge

Correlation Altimetry data with respect to Almeria Tide gauge data

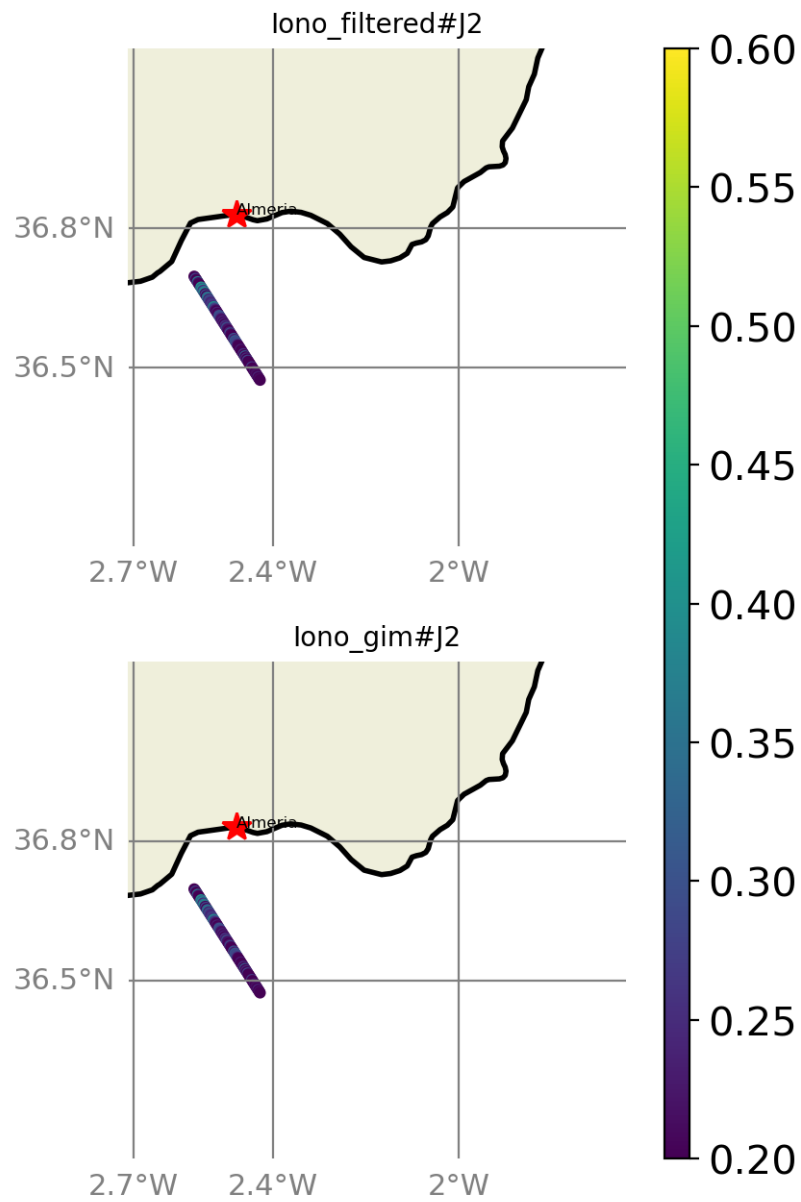


FIGURE 116 – correlation visualization in maps view % Almeria tide gauge

6.9.2 rmsd visualization in maps view % Almeria tide gauge

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

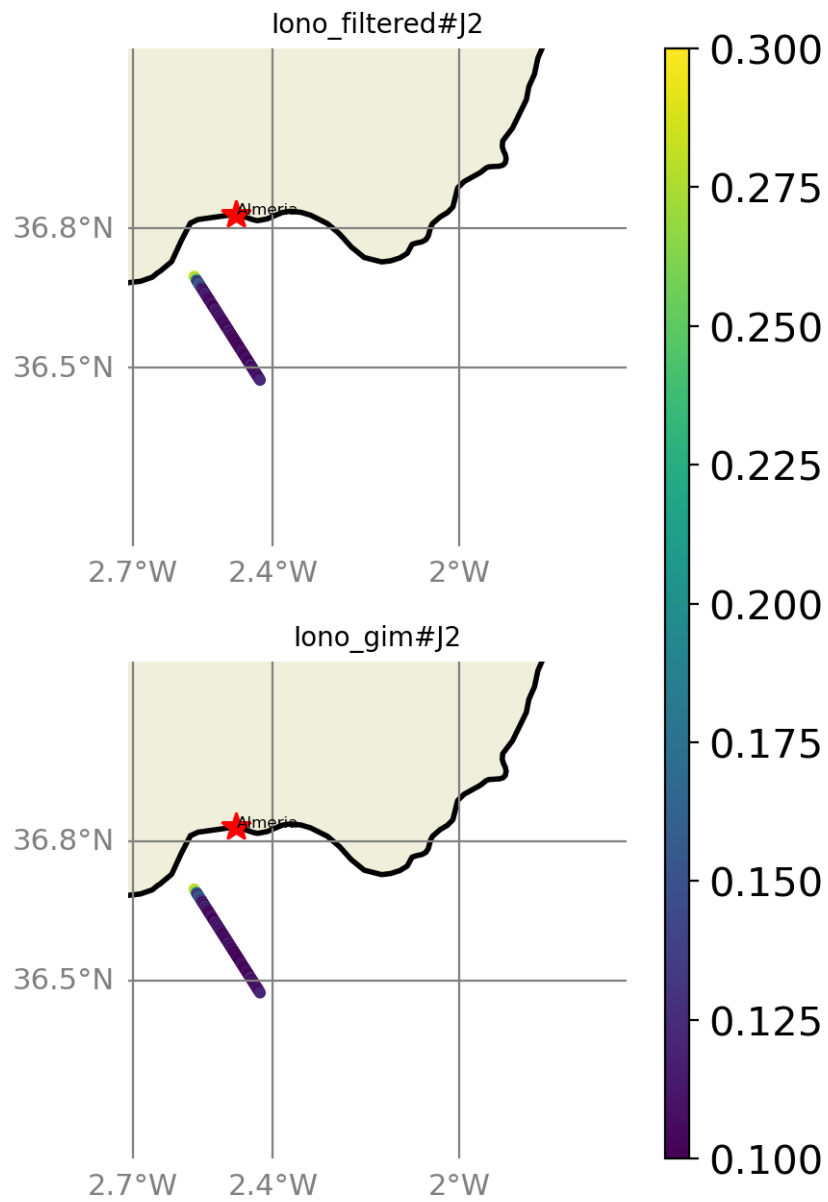


FIGURE 117 – rmsd visualization in maps view % Almeria tide gauge

6.9.3 std visualization in maps view % Almeria tide gauge

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

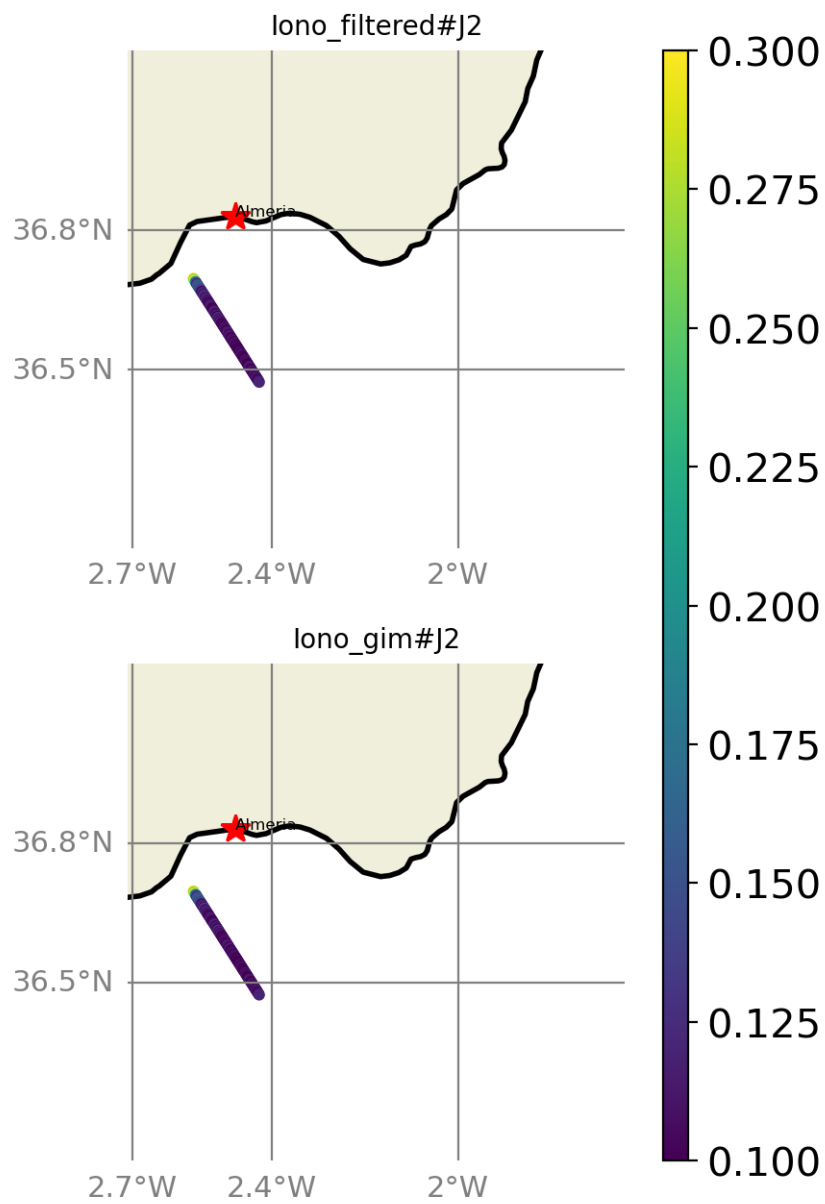


FIGURE 118 – std visualization in maps view % Almeria tide gauge

6.9.4 valid_data_percent visualization in maps view % Almeria tide gauge

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

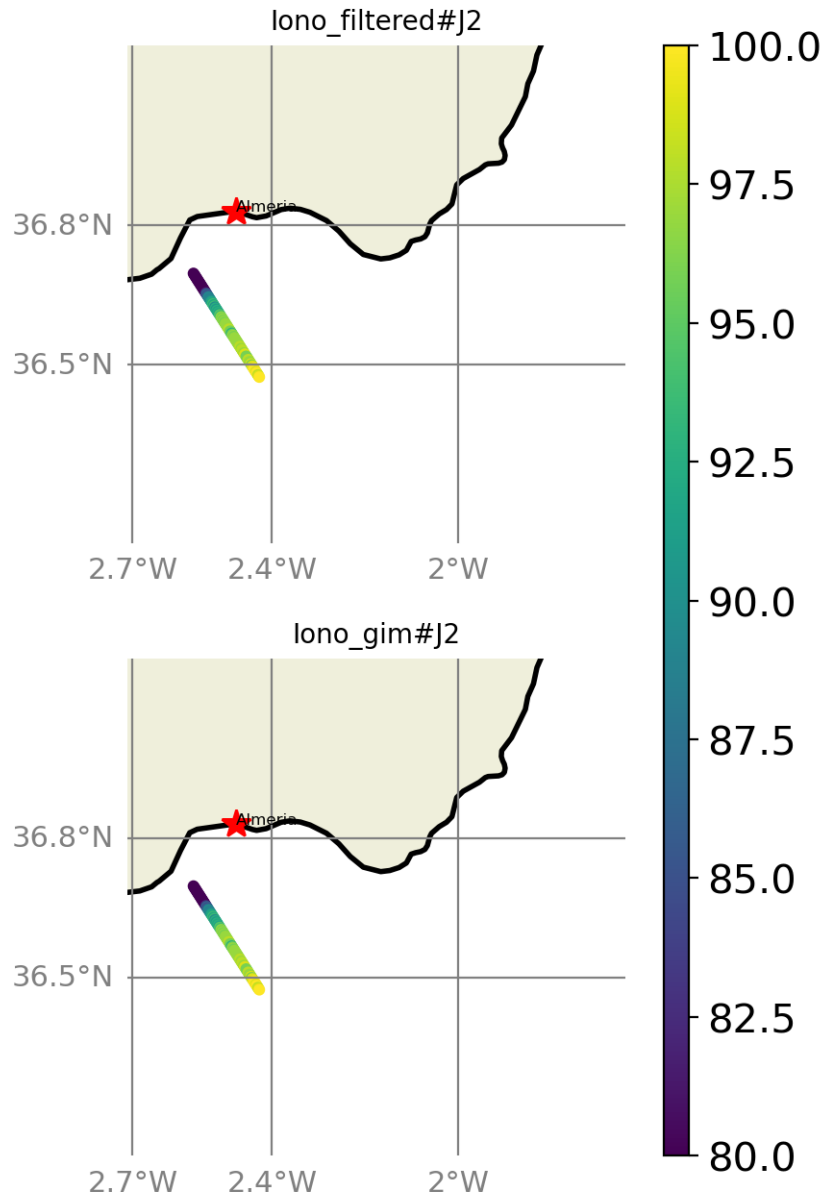


FIGURE 119 – valid_data_percent visualization in maps view % Almeria tide gauge

6.9.5 Valid data (%) in function of distance to coast/Almeria 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. $maxNB = 97$ 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.

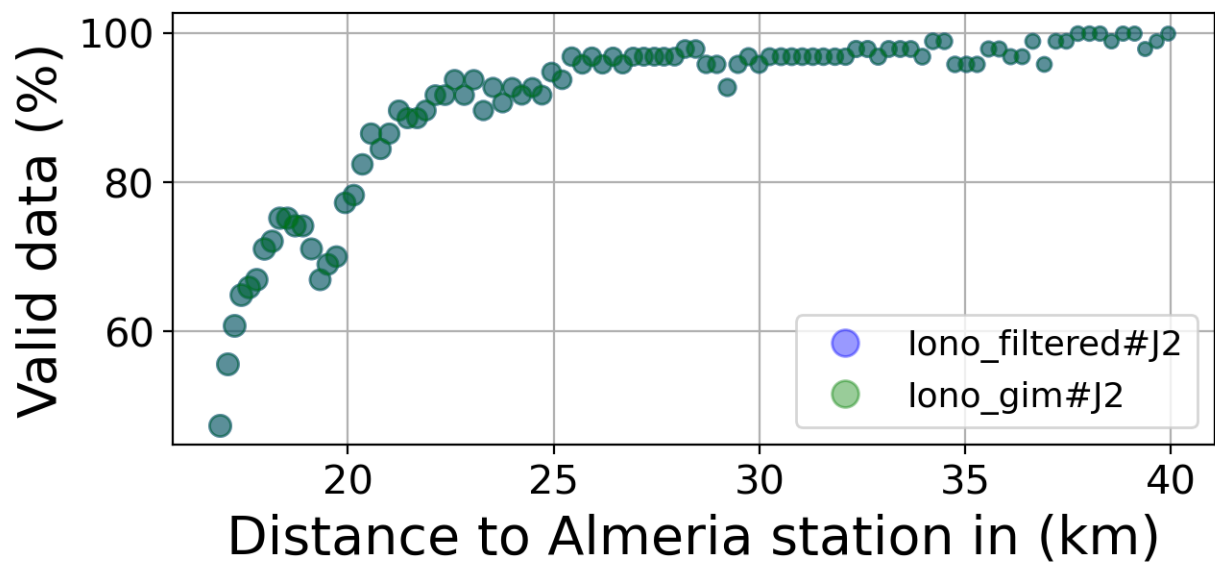
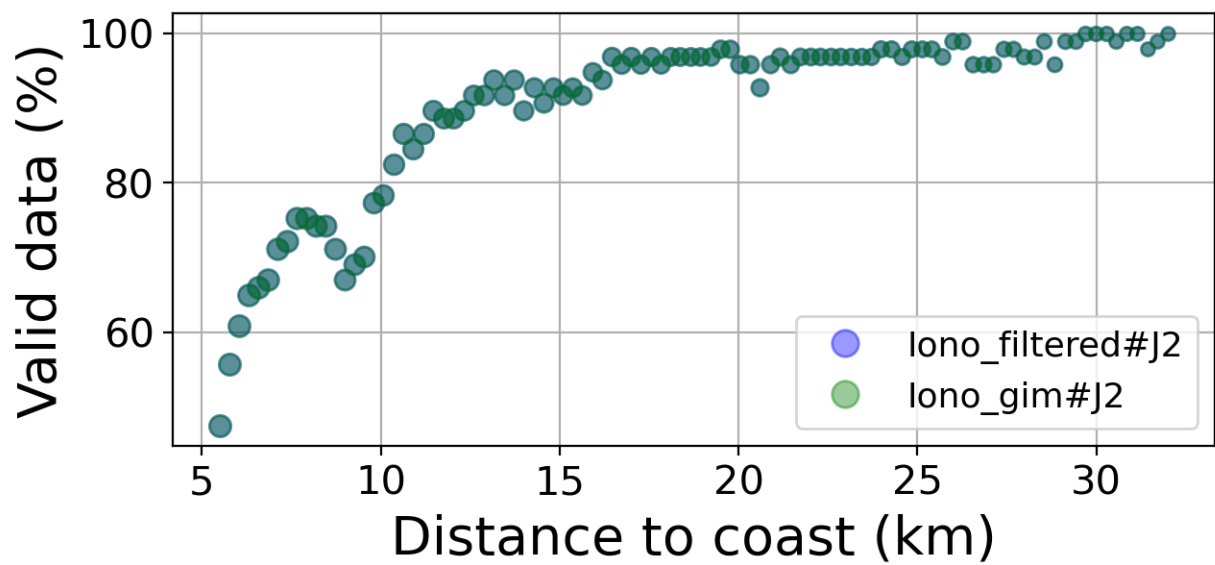


FIGURE 120 – Valid data (%) in function of distance to coast/Almeria station

6.9.6 Std in function of distance to coast/Almeria station

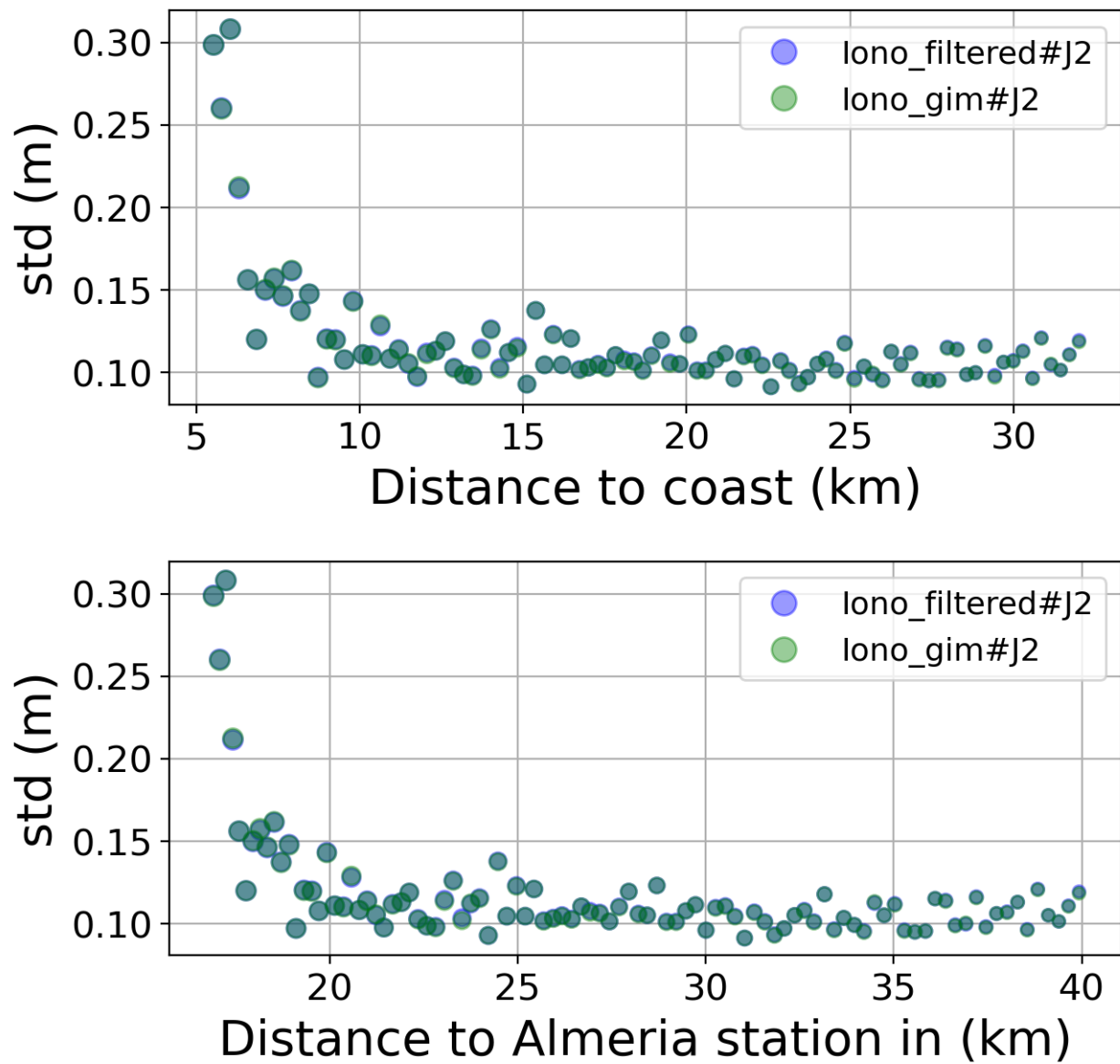


FIGURE 121 – Std in function of the distance to the coast/Almeria station

6.9.7 Correlation in function of distance to coast/Almeria station

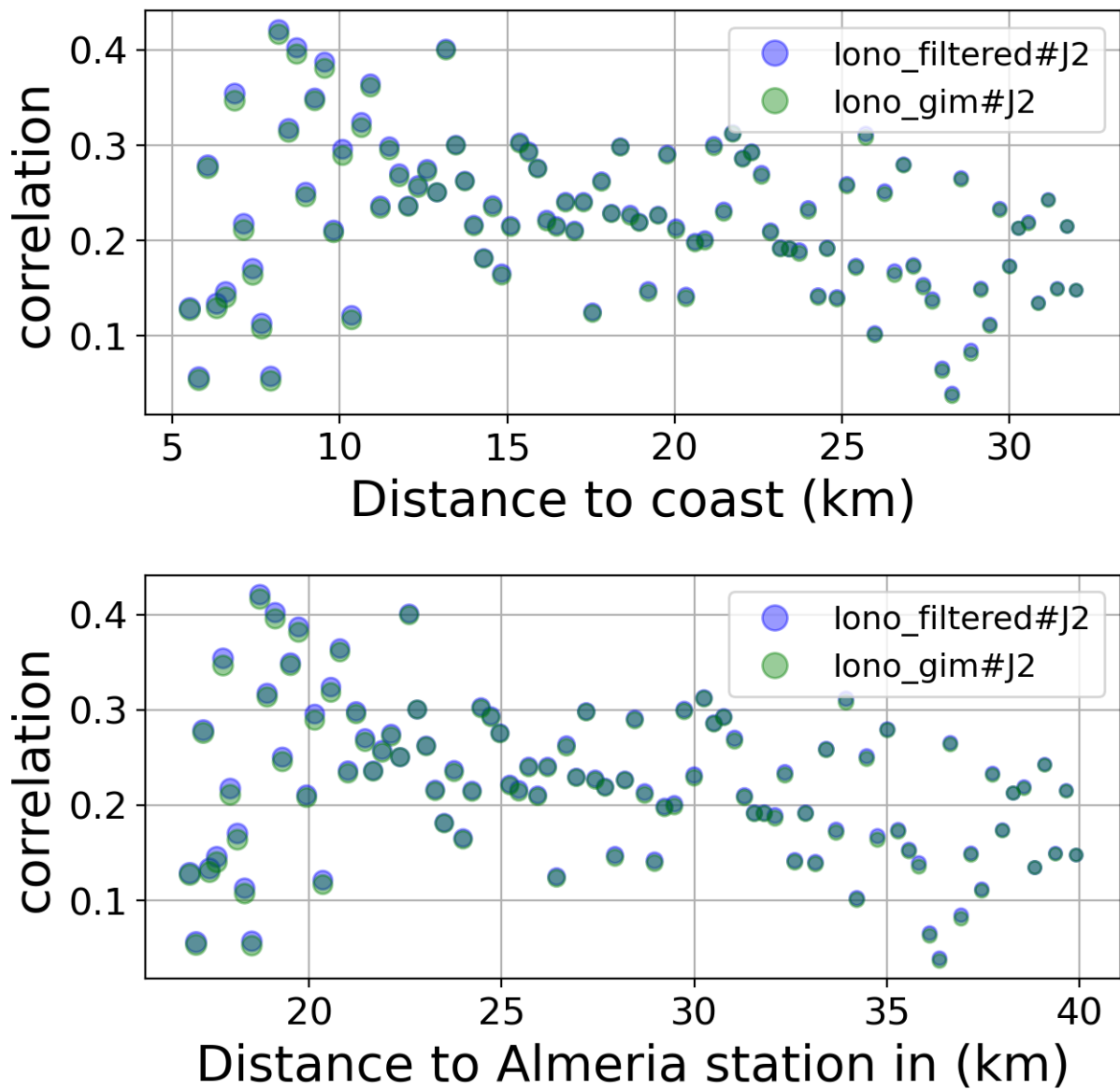


FIGURE 122 – Correlation in function of the distance to the coast/Almeria station

6.9.8 Taylor Diagram

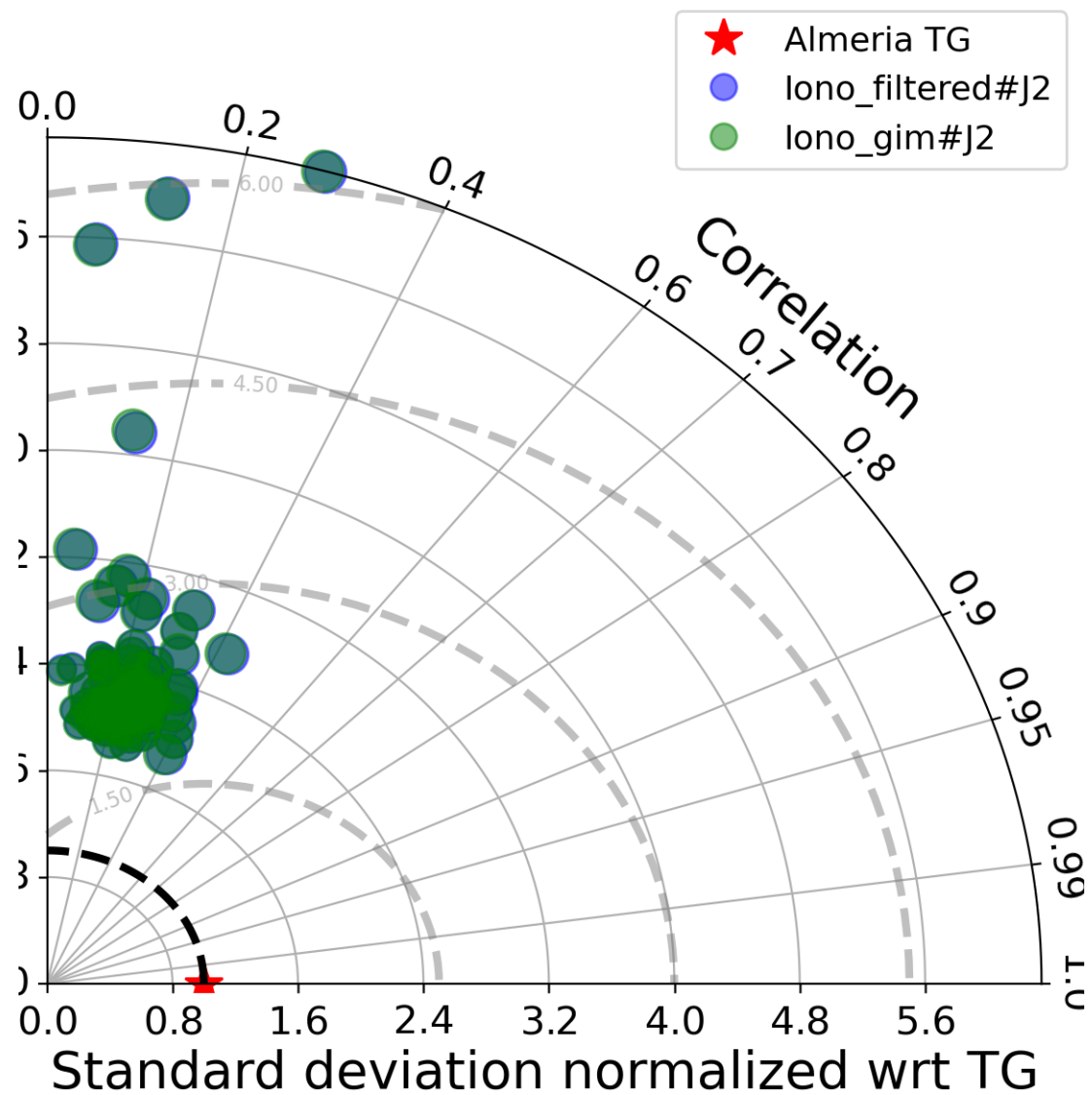


FIGURE 123 – Taylor diagram

6.9.9 Mean statistics table of products comparison with Almeria 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#J2	90.442	0.223	0.118	0.118
lono_gim#J2	90.442	0.22	0.118	0.118

FIGURE 124 – 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 97 point.

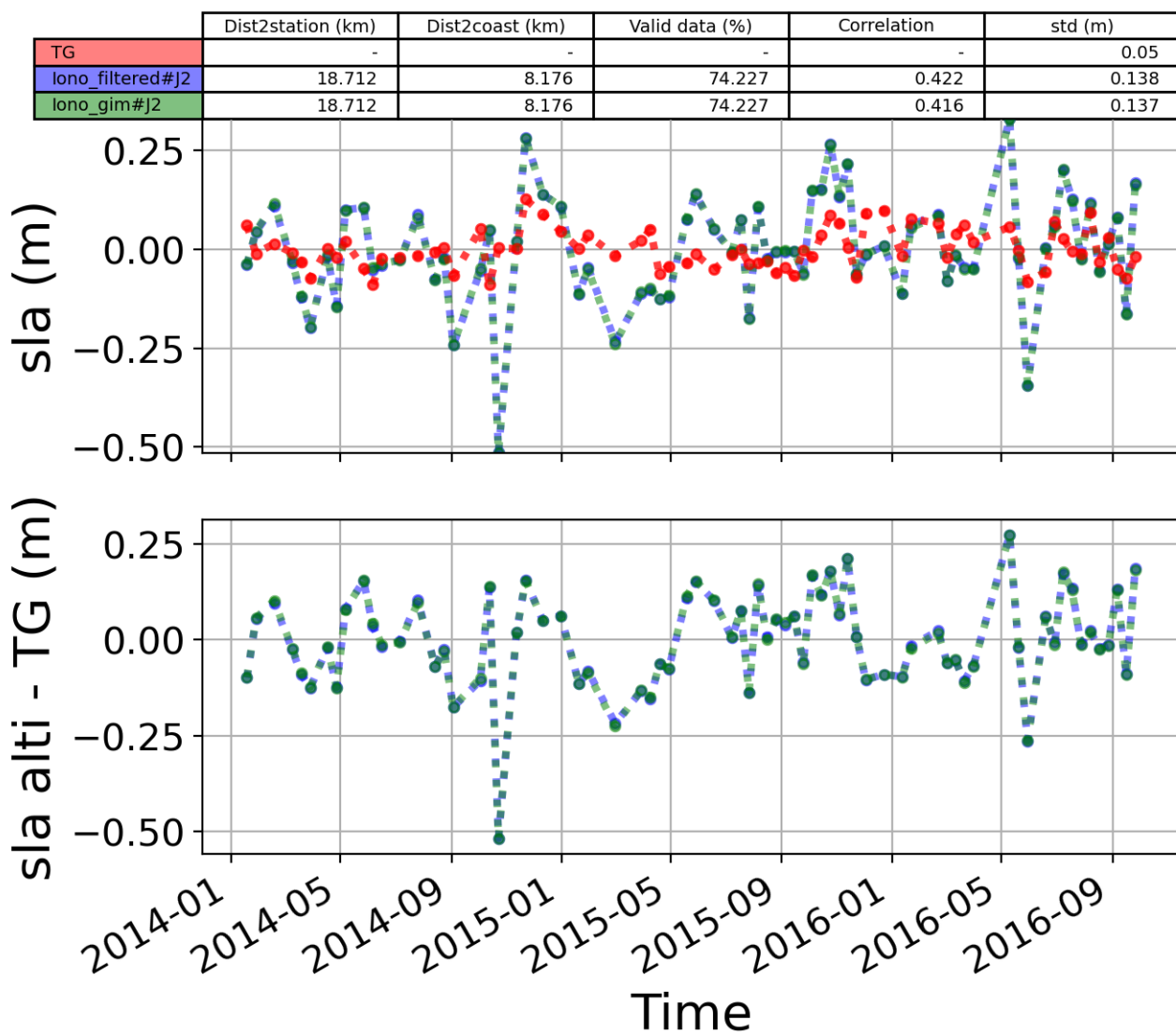


FIGURE 125 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

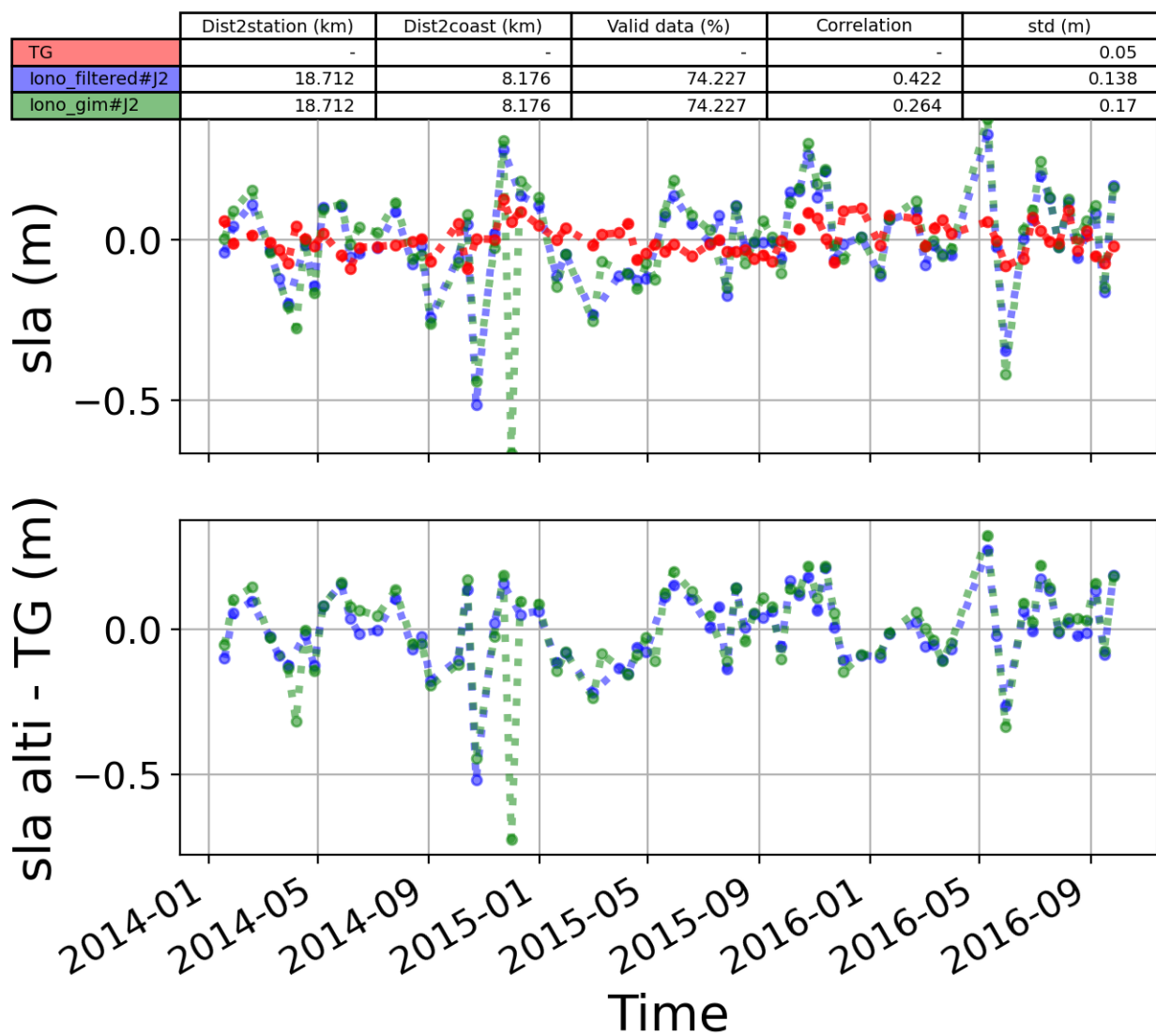


FIGURE 126 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

6.10 Station : Civitavecchia

- Nearest track to Civitavecchia station is the track number track161
- The area of interest is limited by :
 - A circle which it's center is the Civitavecchia tide gauge station location and has a Raduis of 40 Km

6.10.1 correlation visualization in maps view % Civitavecchia tide gauge

Correlation Altimetry data with respect to Civitavecchia Tide gauge data

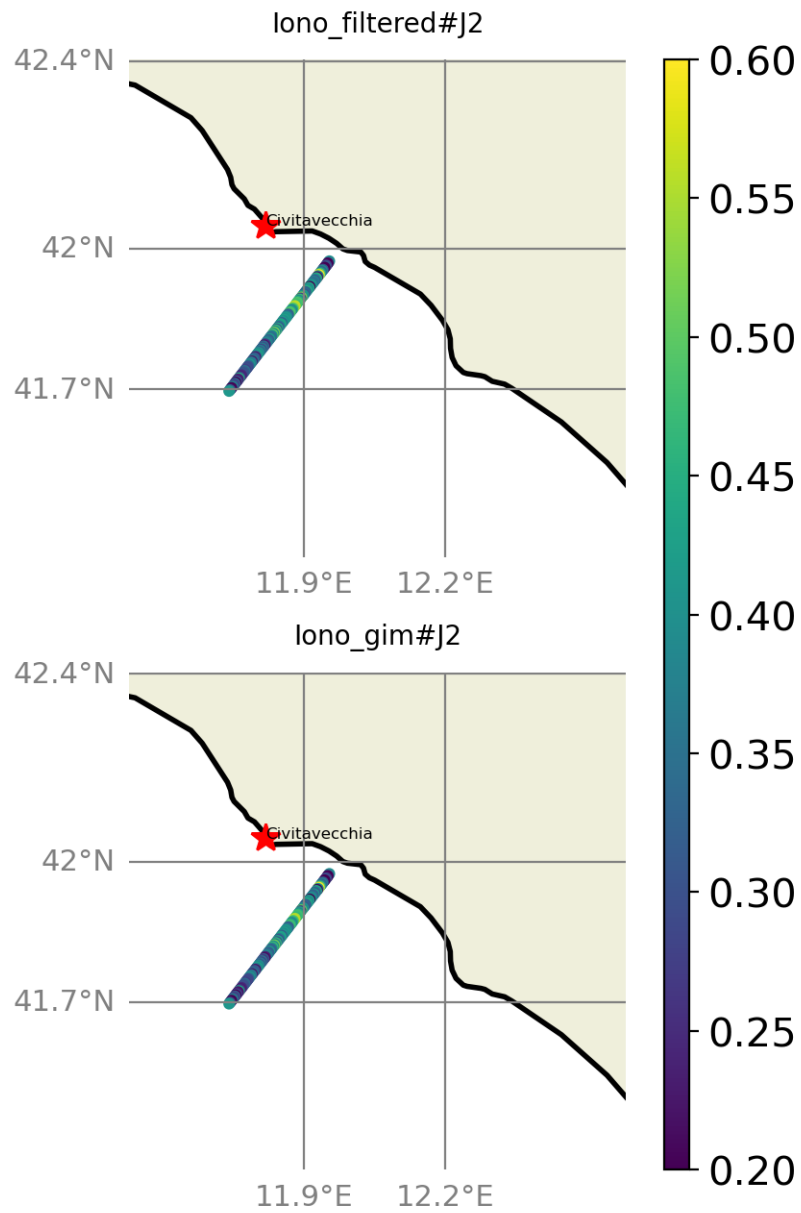


FIGURE 127 – correlation visualization in maps view % Civitavecchia tide gauge

6.10.2 rmsd visualization in maps view % Civitavecchia tide gauge

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

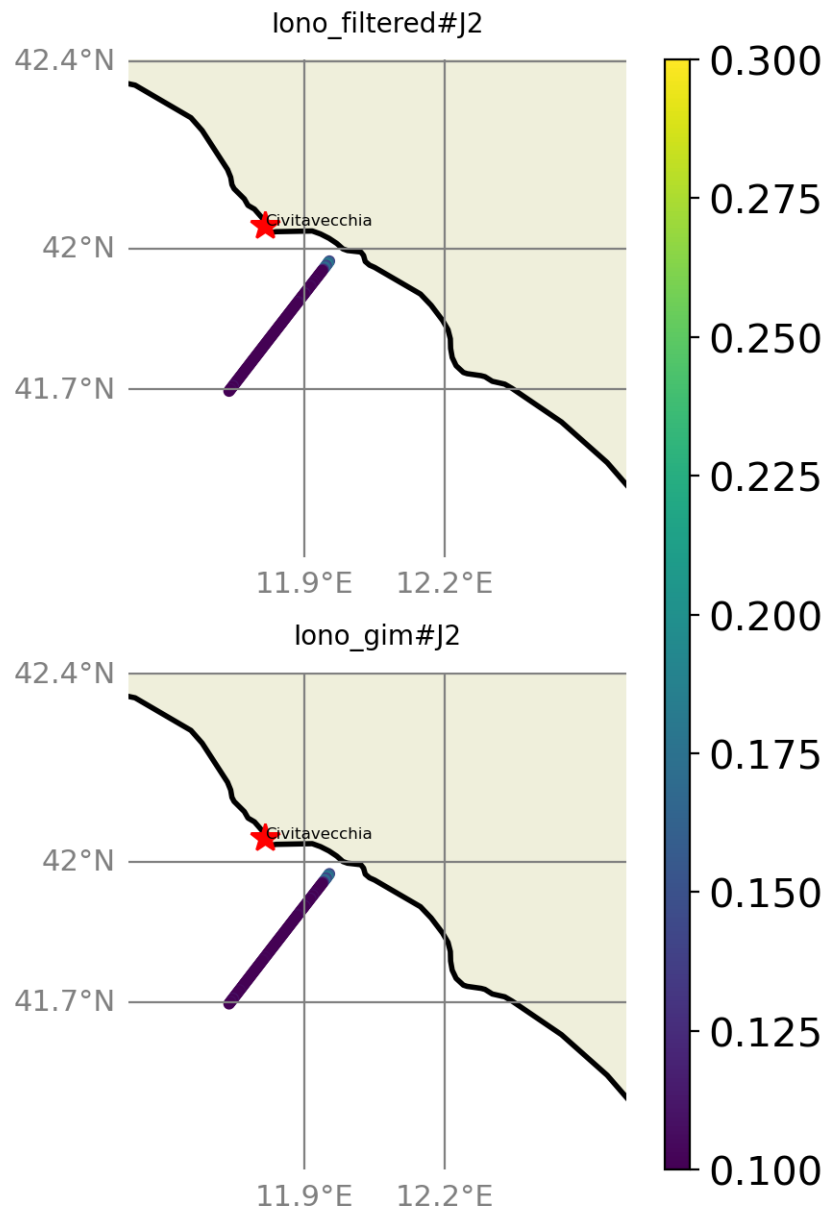


FIGURE 128 – rmsd visualization in maps view % Civitavecchia tide gauge

6.10.3 std visualization in maps view % Civitavecchia tide gauge

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

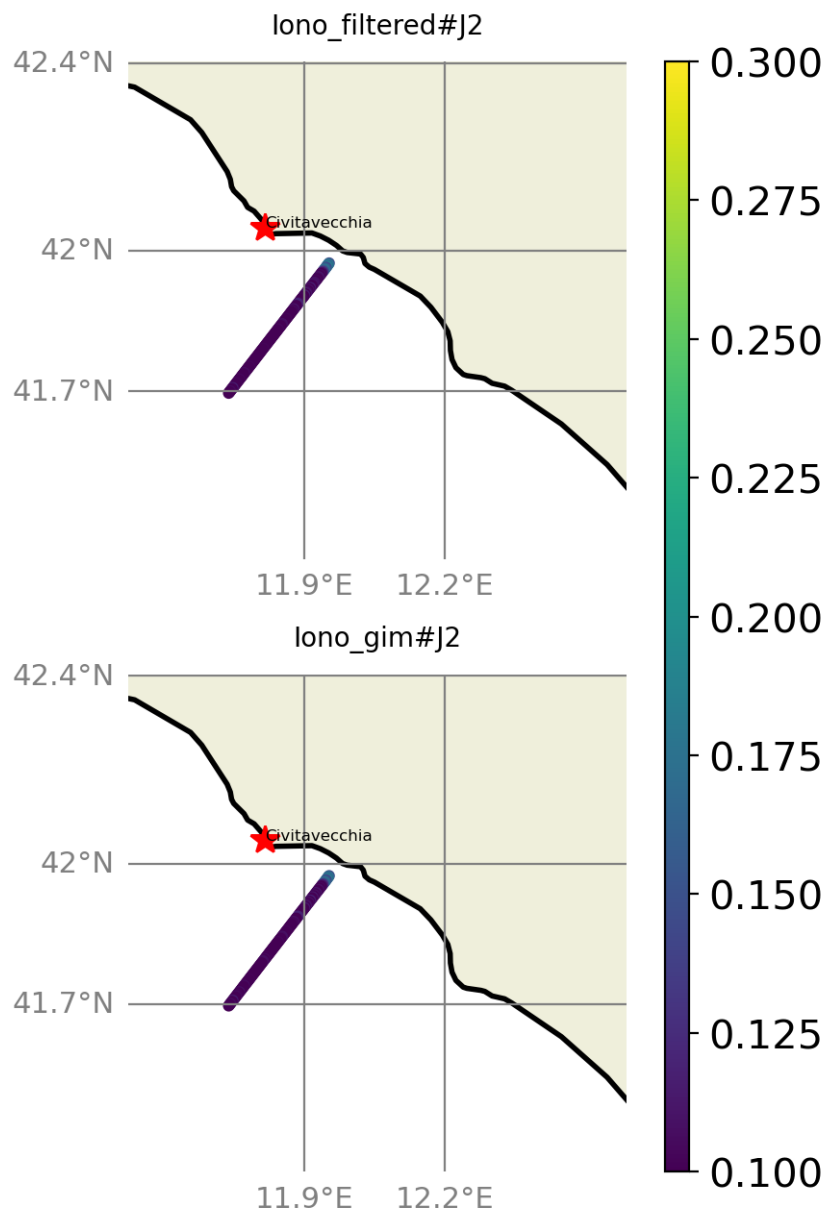


FIGURE 129 – std visualization in maps view % Civitavecchia tide gauge

6.10.4 valid_data_percent visualization in maps view % Civitavecchia tide gauge

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

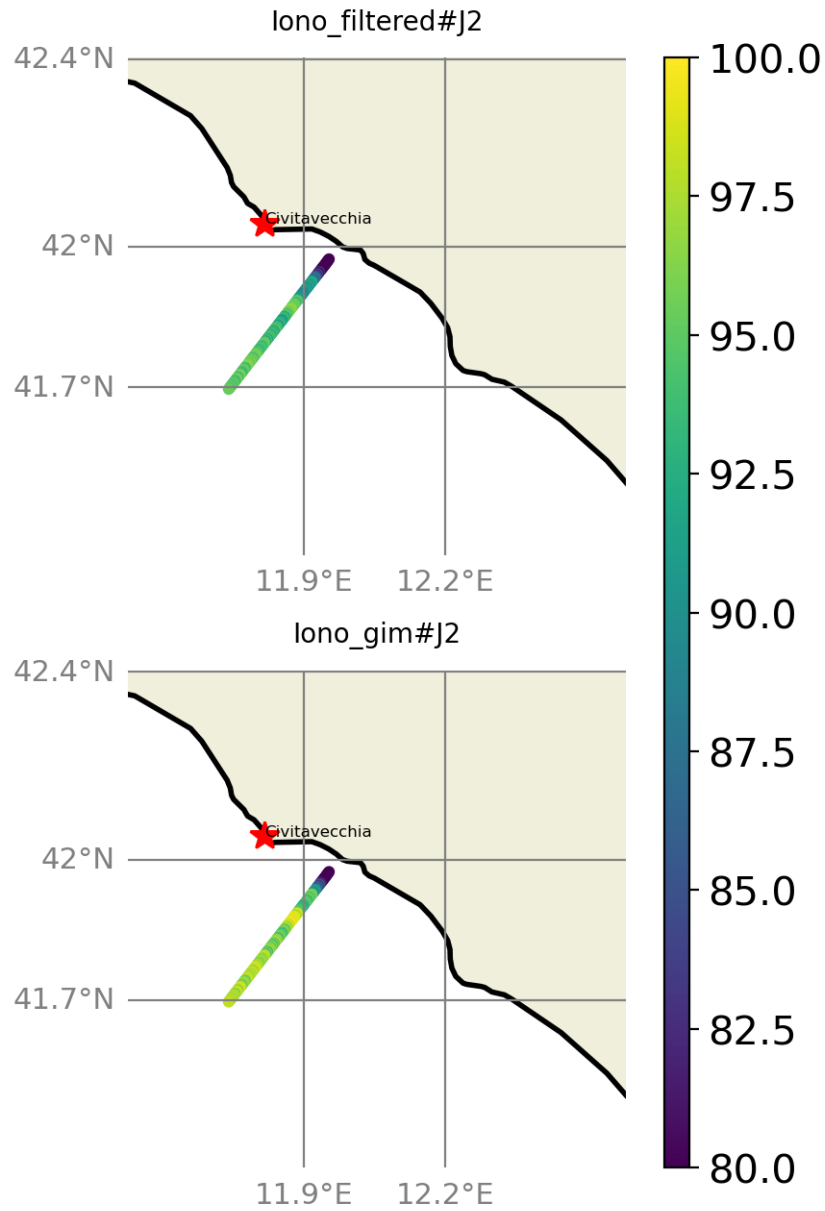


FIGURE 130 – valid_data_percent visualization in maps view % Civitavecchia tide gauge

6.10.5 Valid data (%) in function of distance to coast/Civitavecchia 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. $maxNB = 107$ 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.

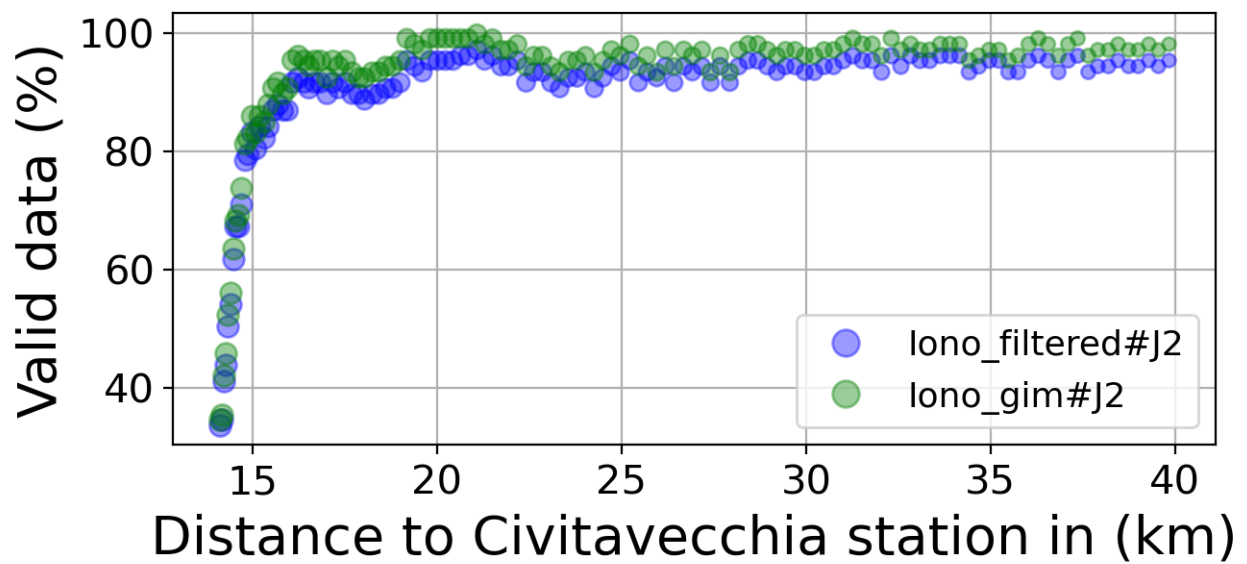
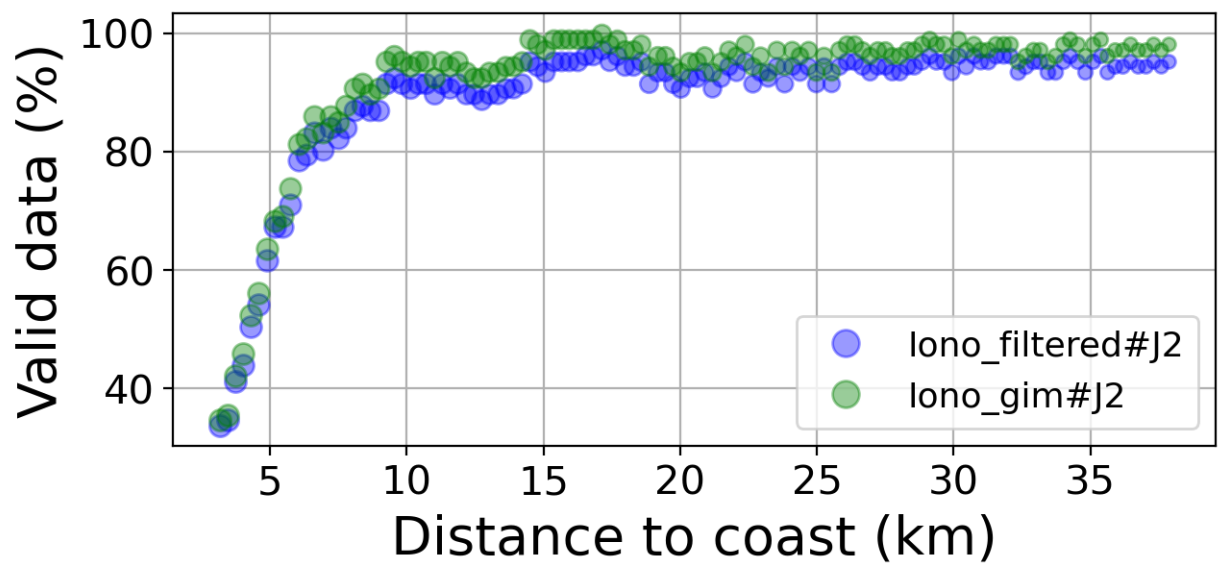


FIGURE 131 – Valid data (%) in function of distance to coast/Civitavecchia station

6.10.6 Std in function of distance to coast/Civitavecchia station

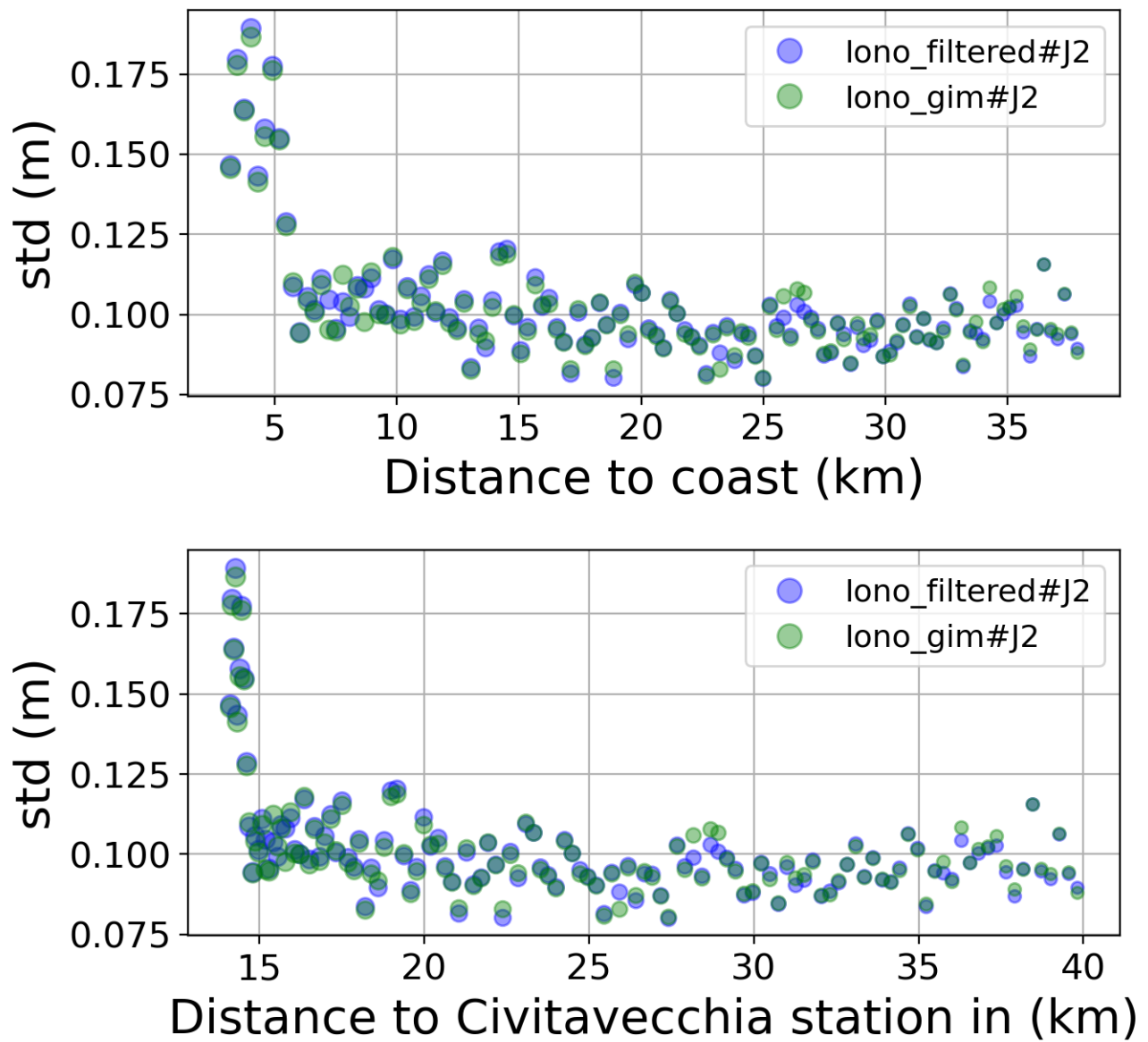


FIGURE 132 – Std in function of the distance to the coast/Civitavecchia station

6.10.7 Correlation in function of distance to coast/Civitavecchia station

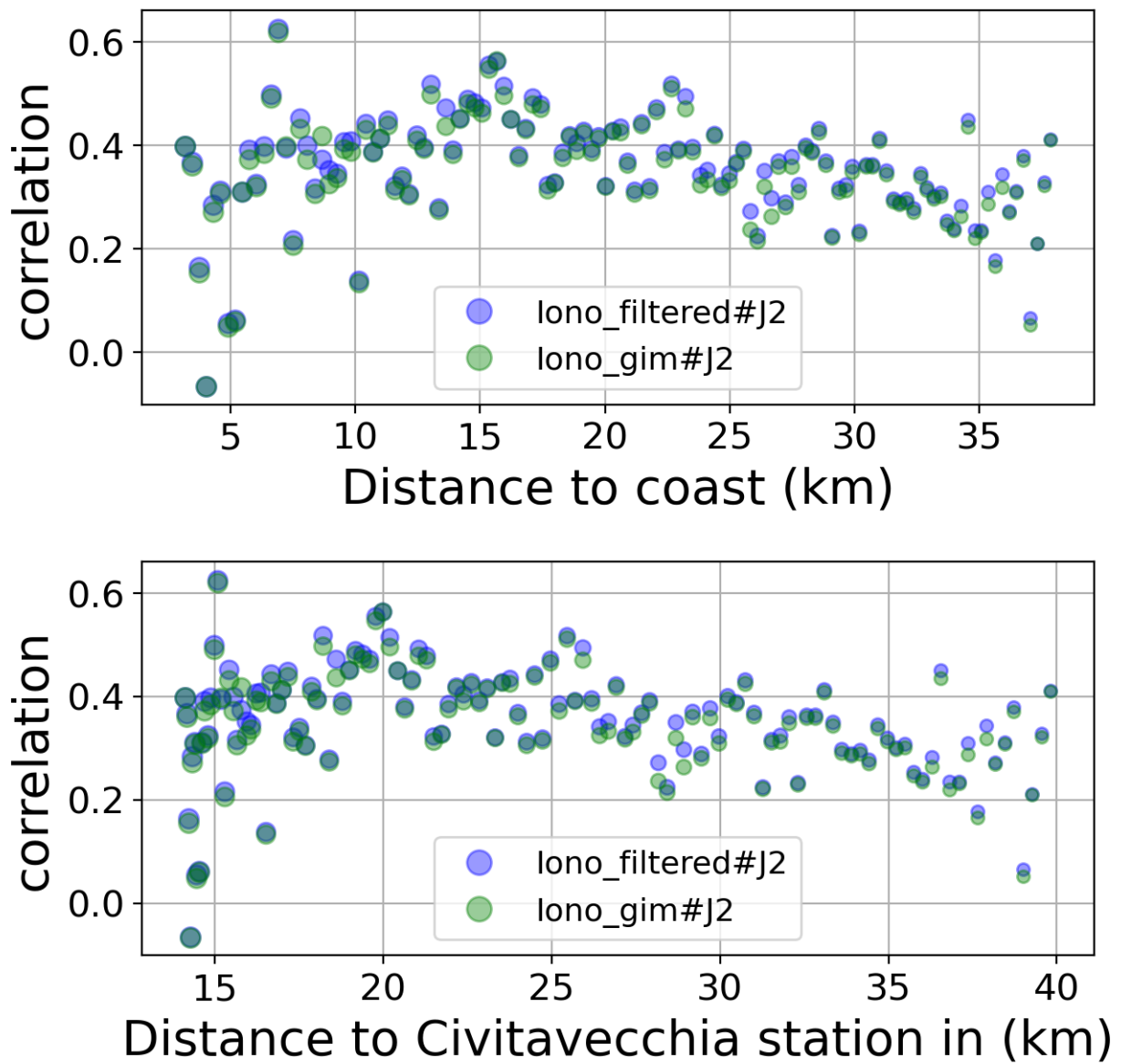


FIGURE 133 – Correlation in function of the distance to the coast/Civitavecchia station

6.10.8 Taylor Diagram

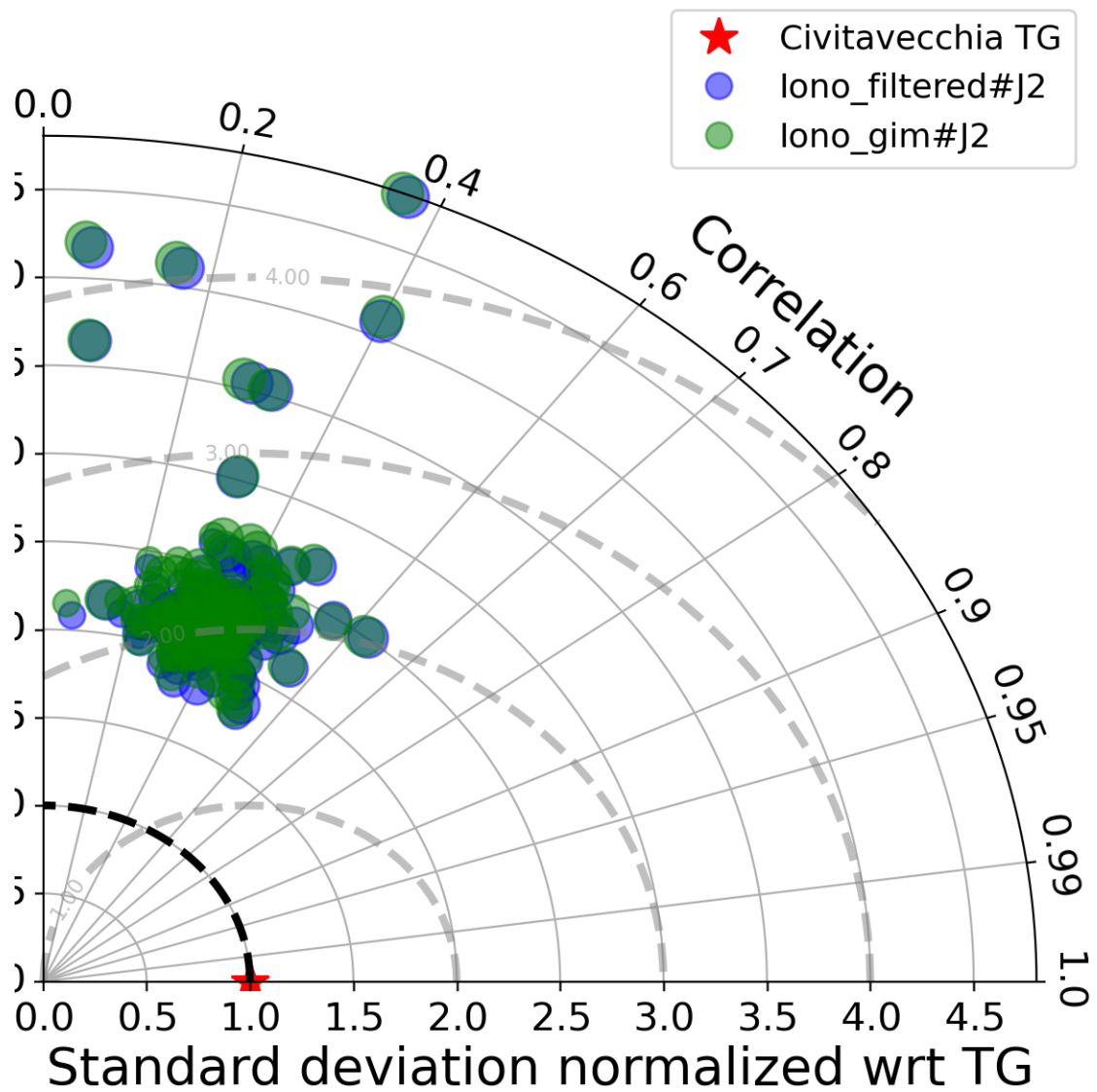


FIGURE 134 – Taylor diagram

6.10.9 Mean statistics table of products comparison with Civitavecchia 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#J2	89.484	0.356	0.102	0.096
lono_gim#J2	92.265	0.347	0.102	0.096

FIGURE 135 – 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 107 point.

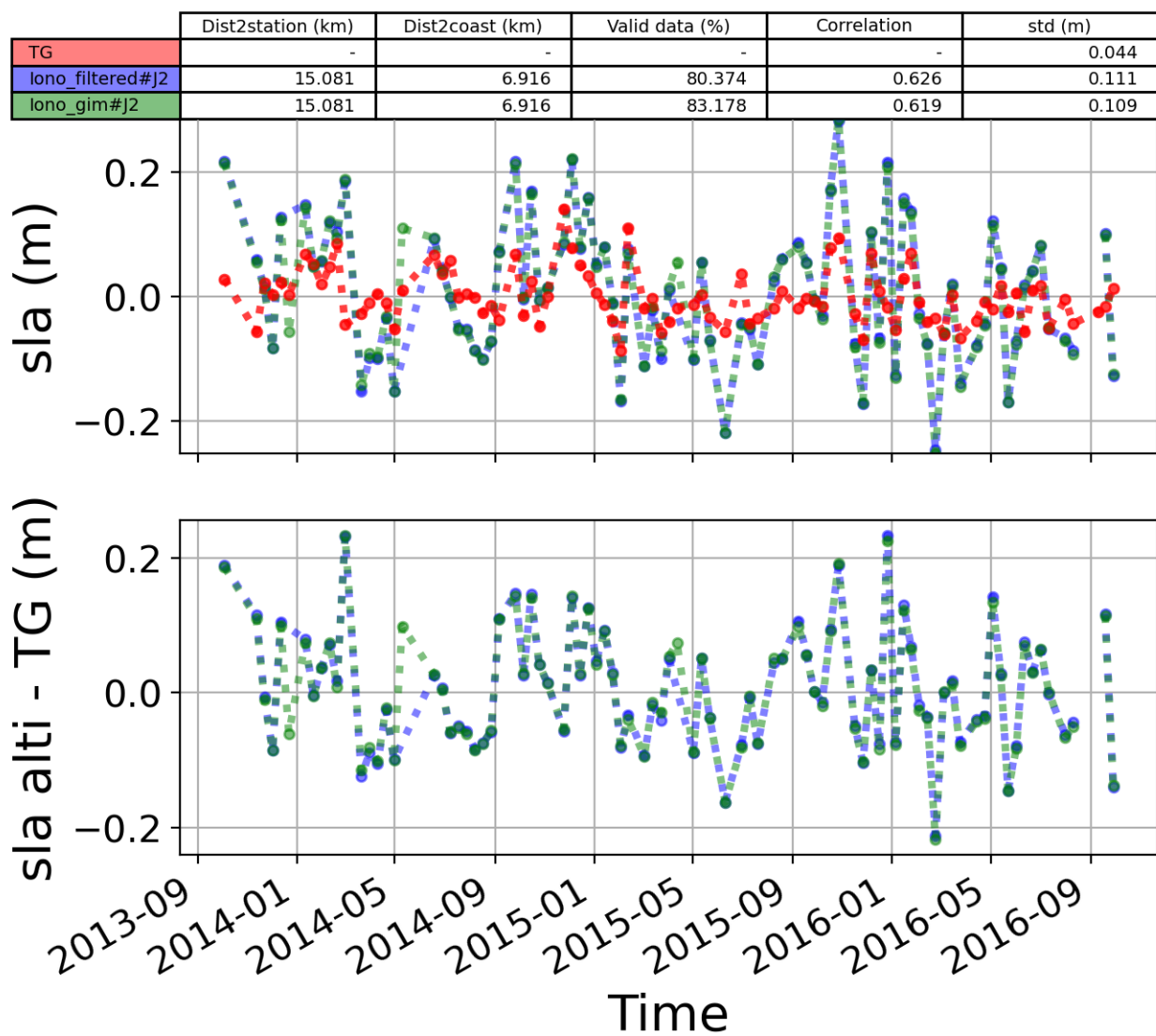


FIGURE 136 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.11 Station : FOS-SUR-MER

- Nearest track to FOS-SUR-MER station is the track number track187
- The area of interest is limited by :
 - A circle which it's center is the FOS-SUR-MER tide gauge station location and has a Raduis of 40 Km

6.11.1 correlation visualization in maps view % FOS-SUR-MER tide gauge

Correlation Altimetry data with respect to FOS-SUR-MER Tide gauge data

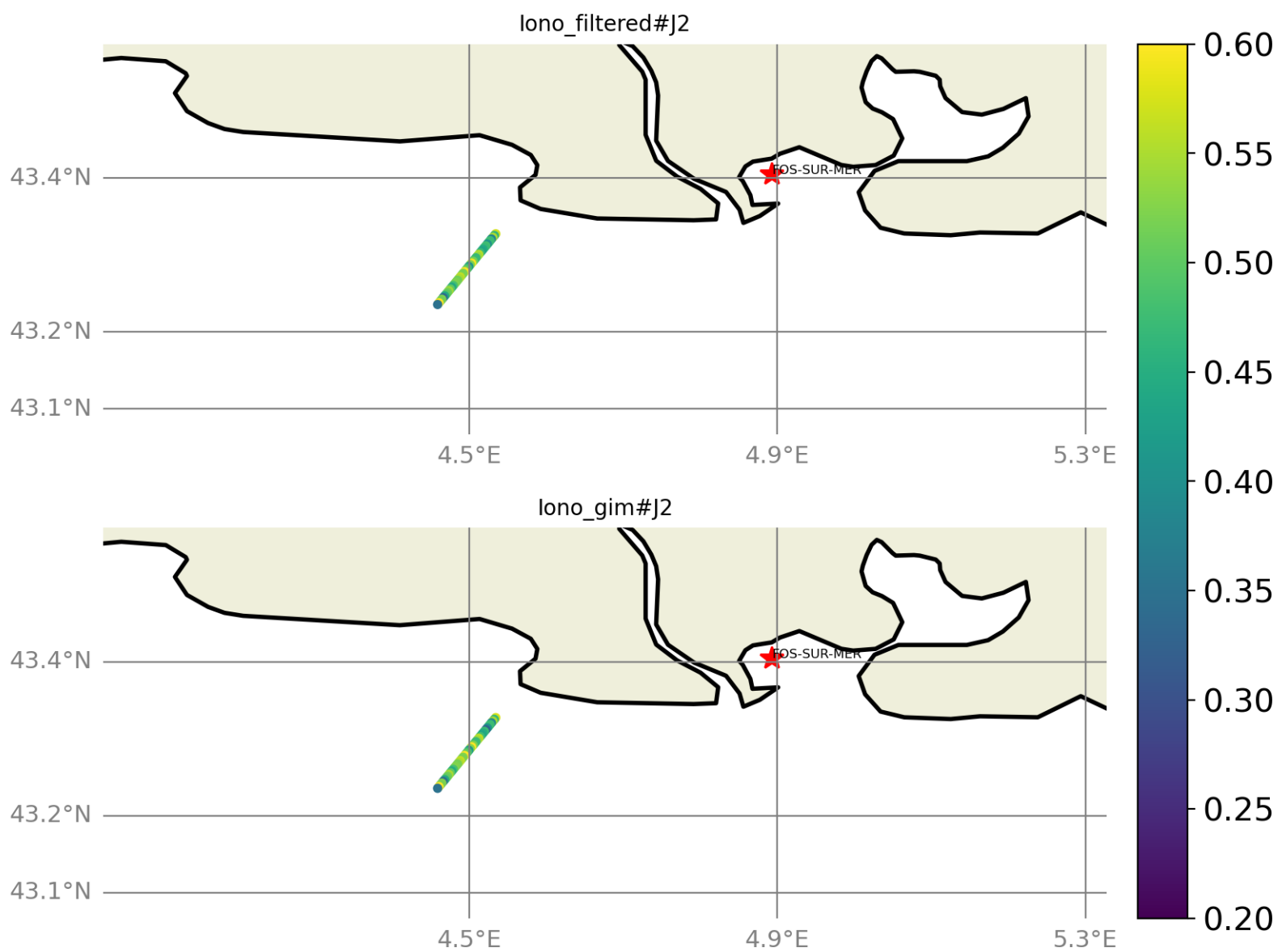


FIGURE 137 – correlation visualization in maps view % FOS-SUR-MER tide gauge

6.11.2 rmsd visualization in maps view % FOS-SUR-MER tide gauge

Rmsd (m) Altimetry data with respect to FOS-SUR-MER Tide gauge data

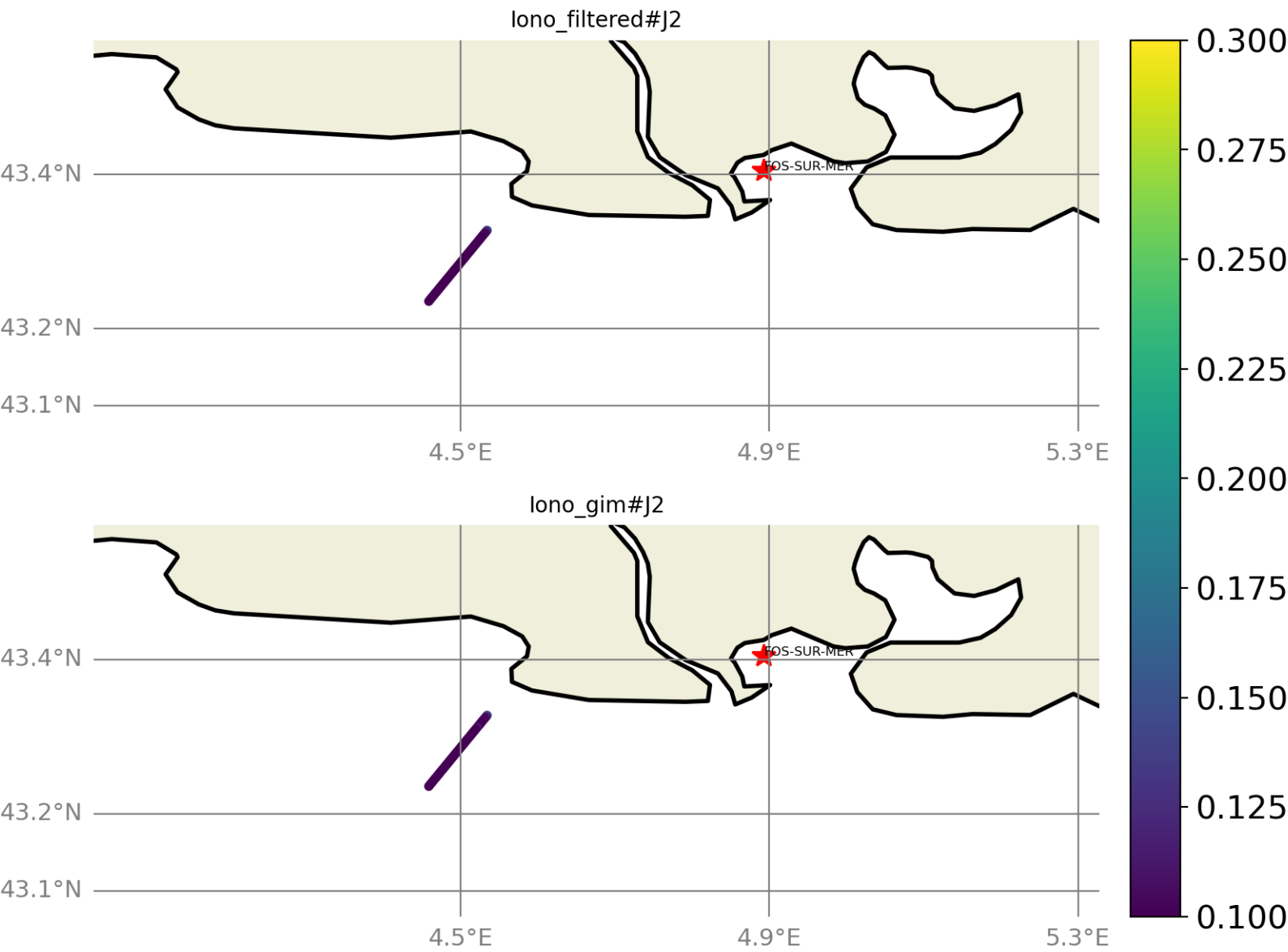


FIGURE 138 – rmsd visualization in maps view % FOS-SUR-MER tide gauge

6.11.3 std visualization in maps view % FOS-SUR-MER tide gauge

Std (m) Altimetry data with respect to FOS-SUR-MER Tide gauge data

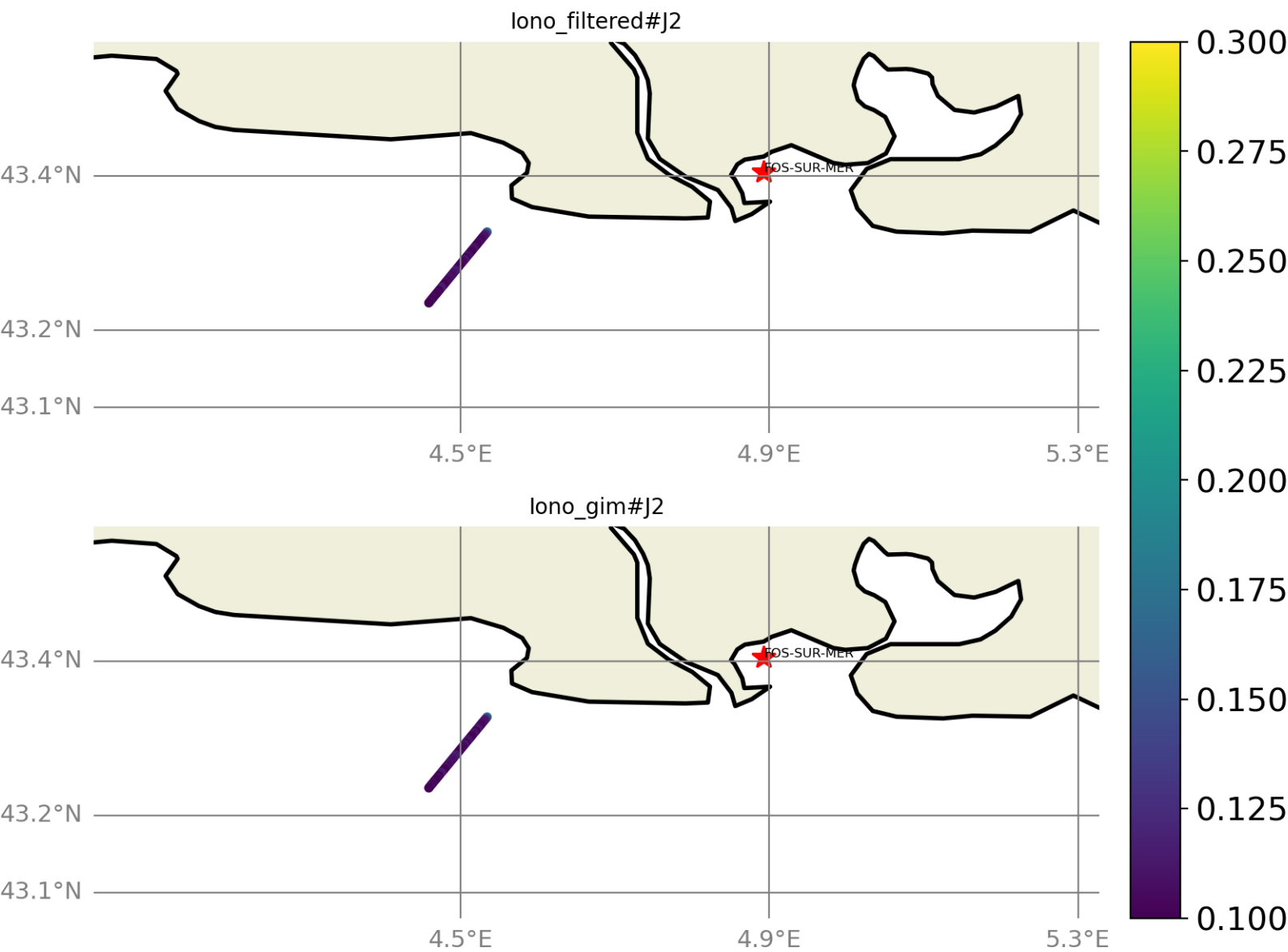


FIGURE 139 – std visualization in maps view % FOS-SUR-MER tide gauge

6.11.4 valid_data_percent visualization in maps view % FOS-SUR-MER tide gauge

Valid_Data_Percent (%) Altimetry data with respect to FOS-SUR-MER Tide gauge data

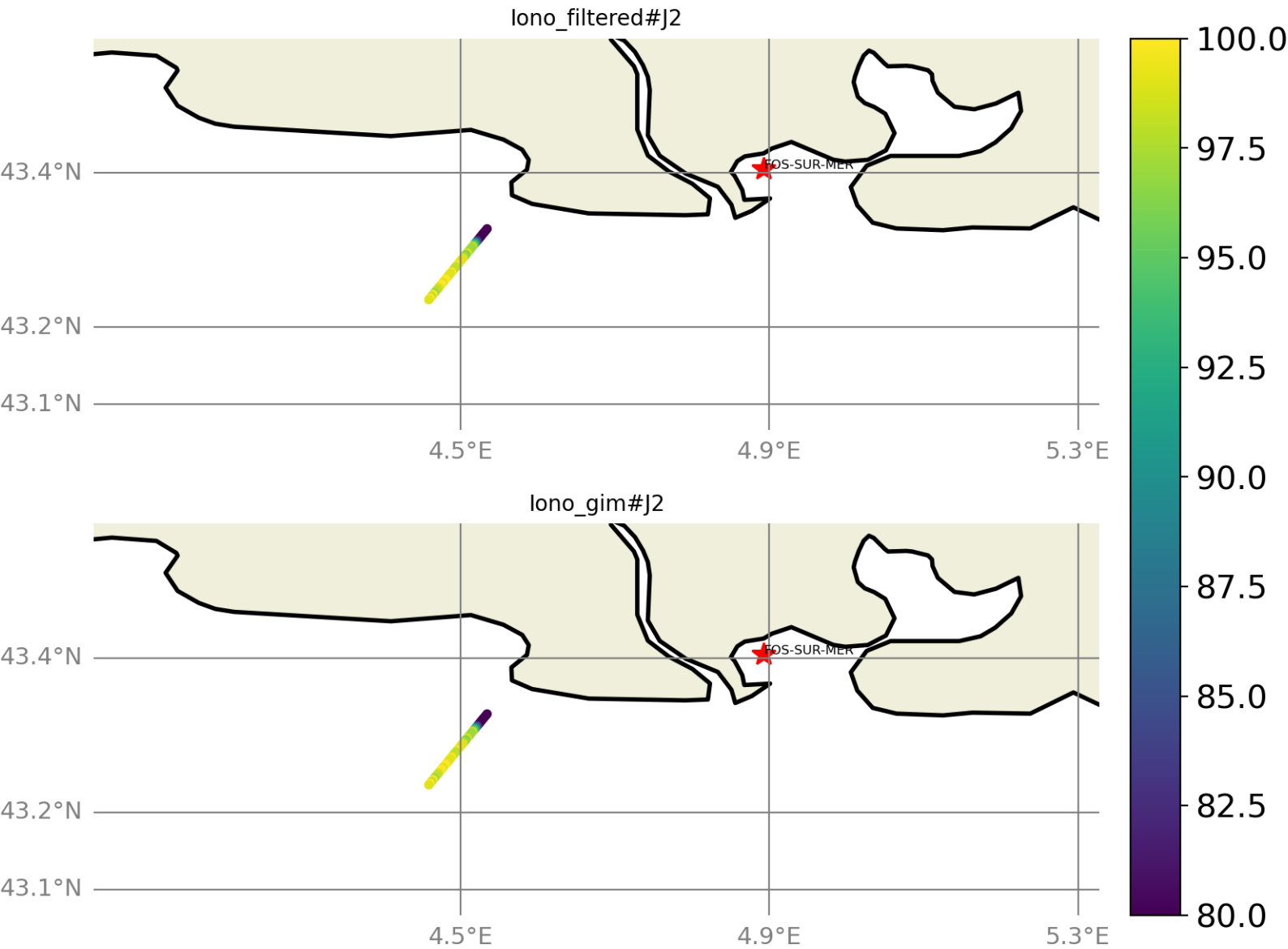


FIGURE 140 – valid_data_percent visualization in maps view % FOS-SUR-MER tide gauge

6.11.5 Valid data (%) in function of distance to coast/FOS-SUR-MER 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. $maxNB = 103$ 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.

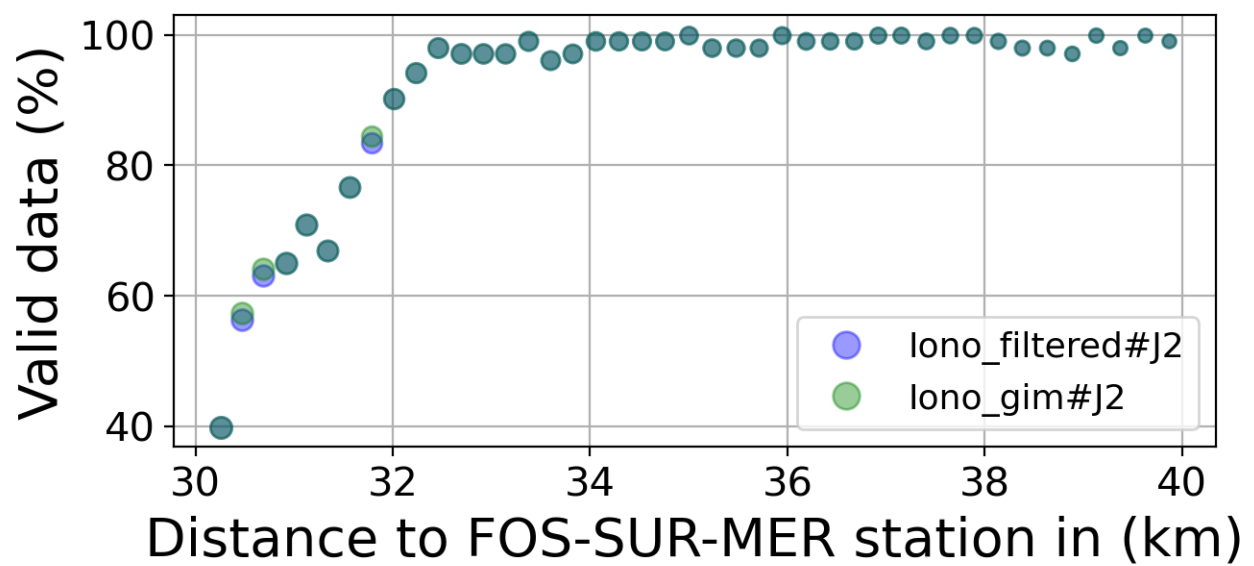
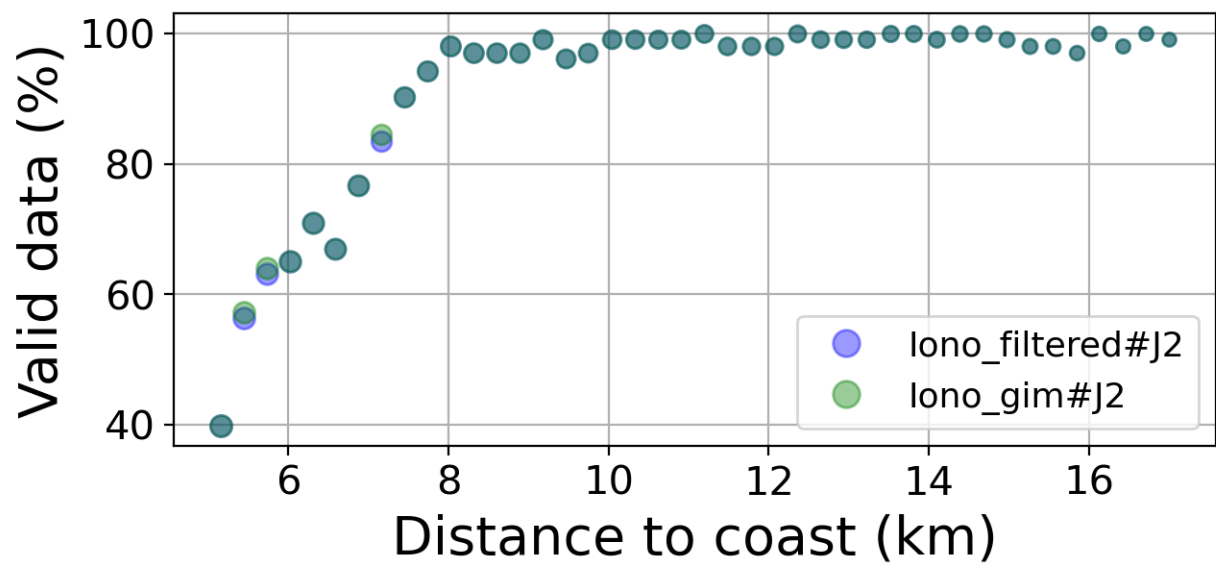


FIGURE 141 – Valid data (%) in function of distance to coast/FOS-SUR-MER station

6.11.6 Std in function of distance to coast/FOS-SUR-MER station

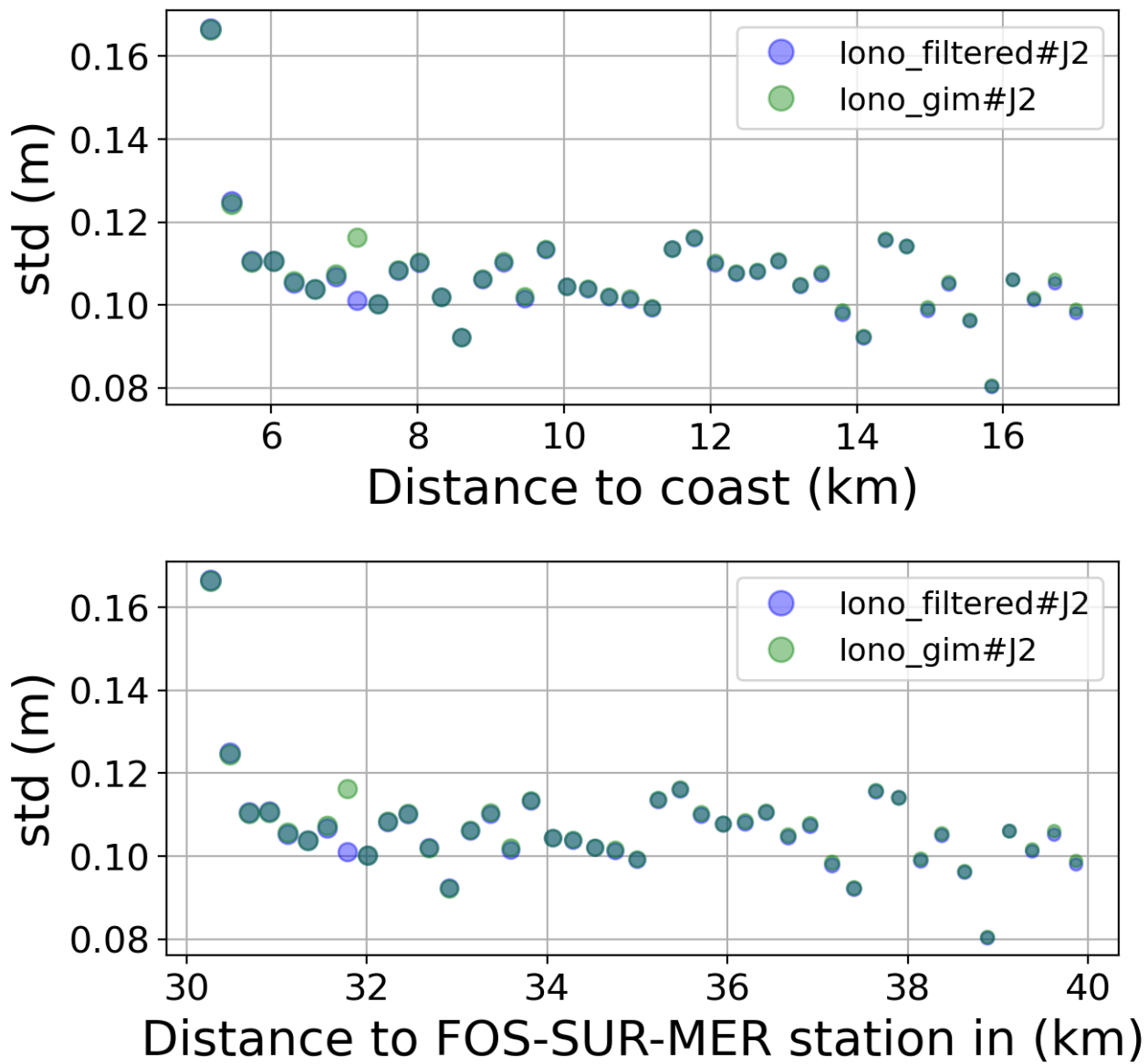


FIGURE 142 – Std in function of the distance to the coast/FOS-SUR-MER station

6.11.7 Correlation in function of distance to coast/FOS-SUR-MER station

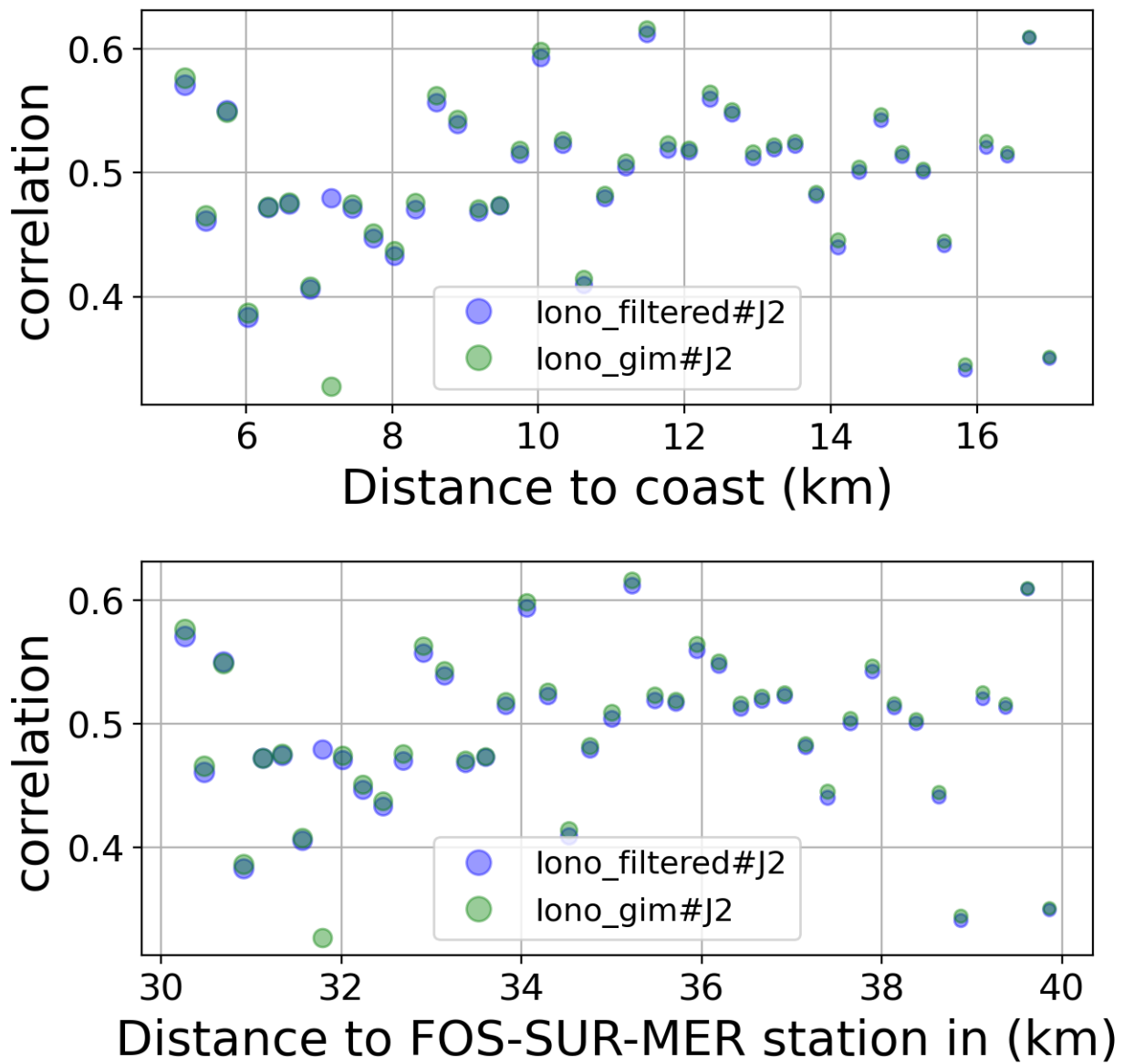


FIGURE 143 – Correlation in function of the distance to the coast/FOS-SUR-MER station

6.11.8 Taylor Diagram

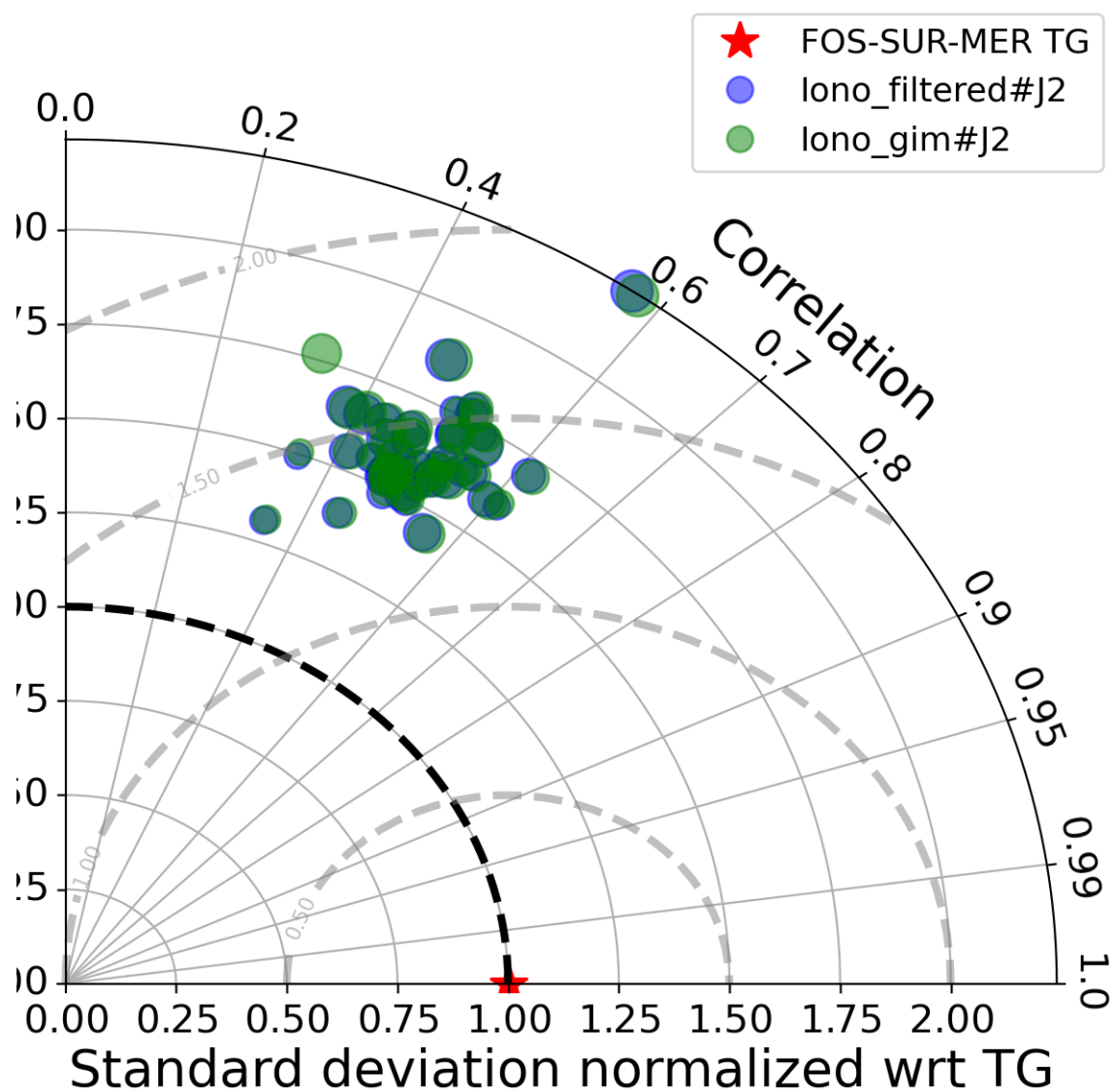


FIGURE 144 – Taylor diagram

6.11.9 Mean statistics table of products comparison with FOS-SUR-MER 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#J2	92.002	0.494	0.107	0.094
lono_gim#J2	92.071	0.494	0.107	0.094

FIGURE 145 – Mean statistics table of the common points in the altimetry products

6.11.10 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.

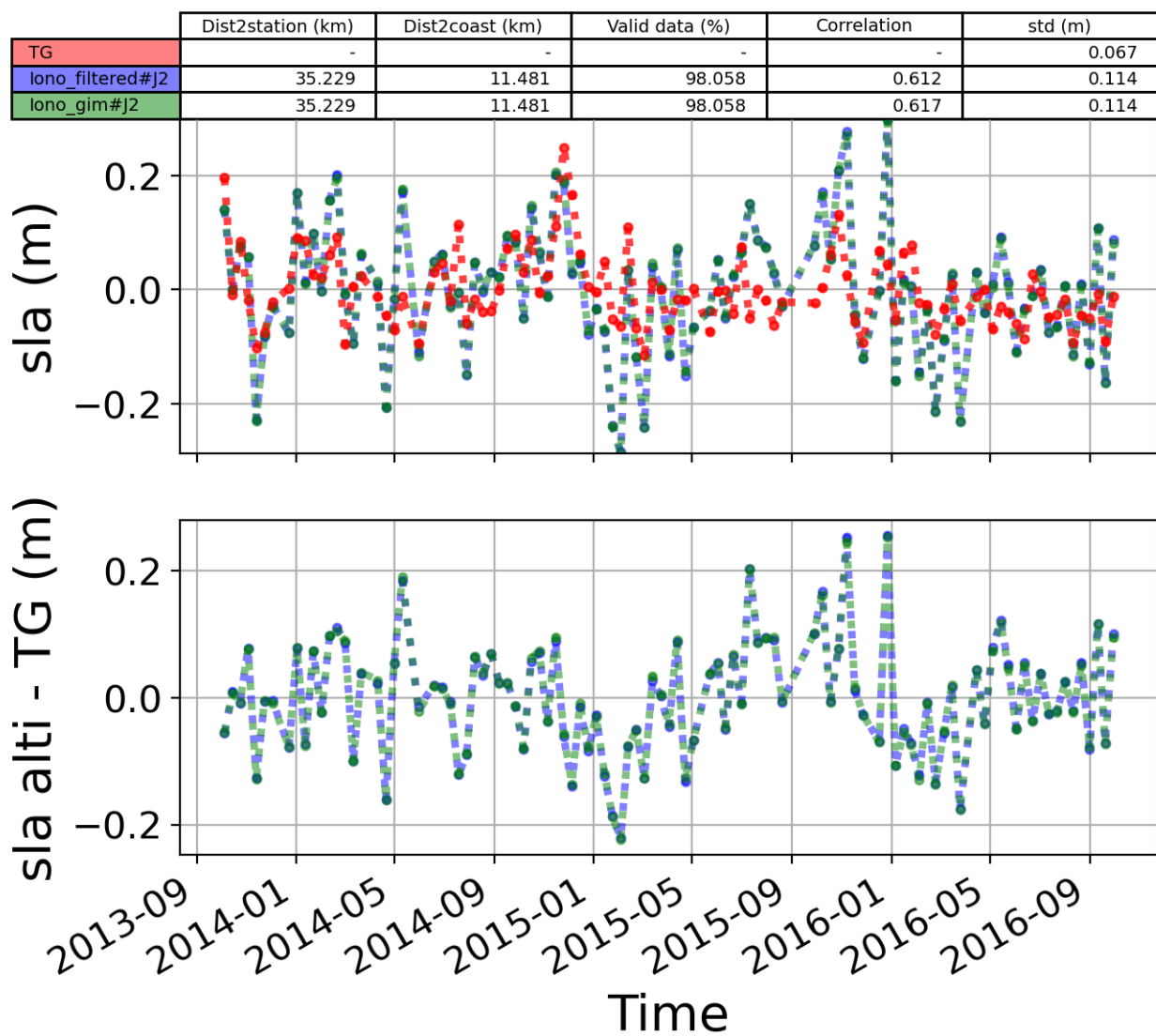


FIGURE 146 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie