Diagtool Report

Round Robin (GT cotier) : Tide. Medsea. J2. fes14b struct vs fes14b unstruct vs fes14b unstruct reg vs EOT20.

11 juillet 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 Tide used to calculate the sea level anomaly. Each version has been compared with a reference version. In this case the Fes14b_struct 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 :
- Git changeset number : 3b970d7-2022-07-05

2 Processing

2.1 sla formula

2.1.1 fes14b_struct product ' sla

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

2.1.2 fes14b_unstruct product ' sla

sla = ORBIT.ALTI.POE_GDR_E -
RANGE.ALTI -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALTI.NON_PARAMETRIC -
IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -
DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
tide_FES2014b_unstruct -
LOAD_TIDE.MODEL.FES14B -
SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -
POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017

2.1.3 fes14b_unstruct_reg product ' sla

sla = ORBIT.ALTI.POE_GDR_E -
RANGE.ALTI -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALTI.NON_PARAMETRIC -
IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -
DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
tide_RegAT -
LOAD_TIDE.MODEL.FES14B -
SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -
POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017

2.1.4 EOT20 product ' sla

sla = ORBIT.ALTI.POE_GDR_E -
RANGE.ALTI -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALTI.NON_PARAMETRIC -

IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -
DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
tide_EOT20 -
LOAD_TIDE.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 satelitte 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 threashold of 1 m.
- Each sla time-serie has been filtred by a window of $[-4\sigma, 4\sigma]$, where σ is the standard deviation of the sla time serie

3 Spatial coherence analysis

3.1 sla

3.1.1 sla 's count

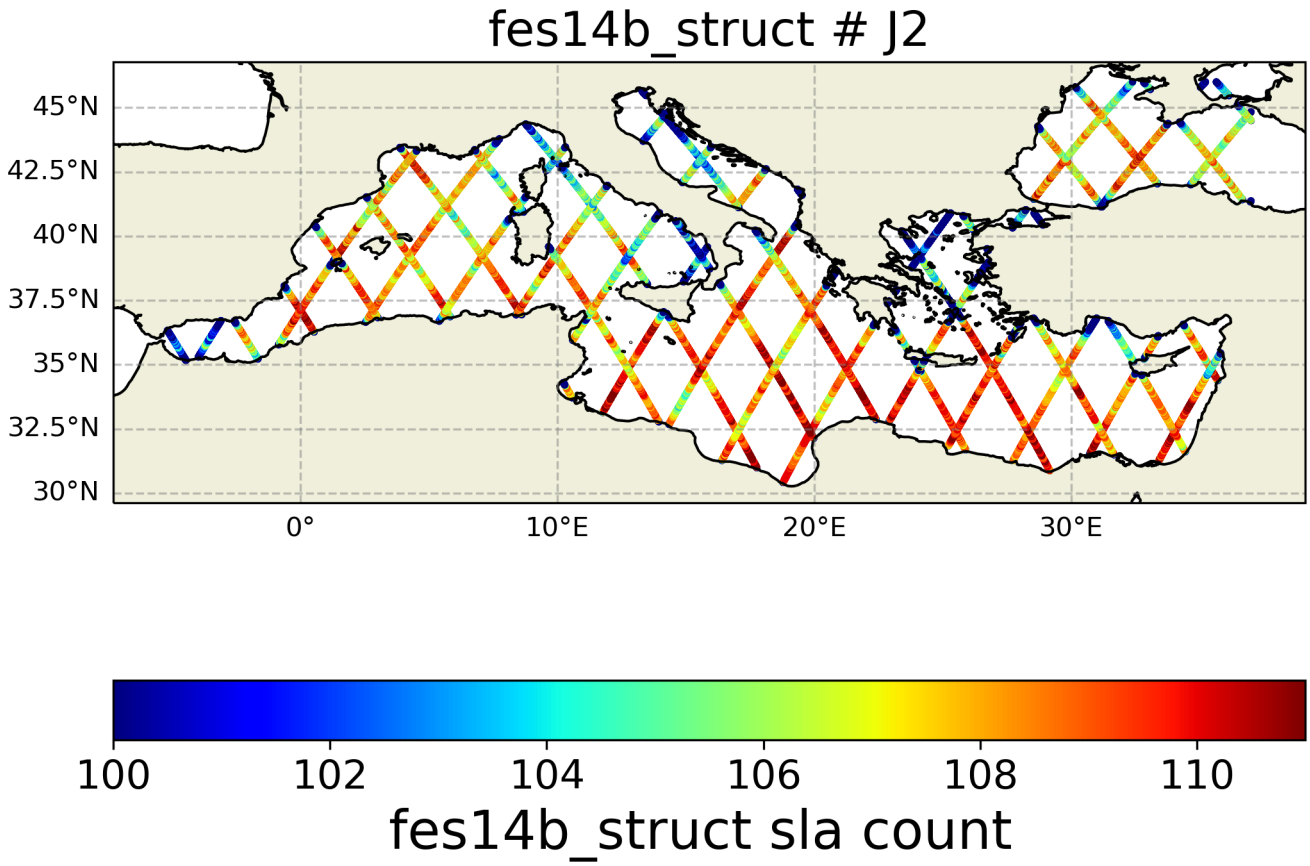

FIGURE 1 – Spatial coherence analysis of the count of the fes14b_struct version of sla variable

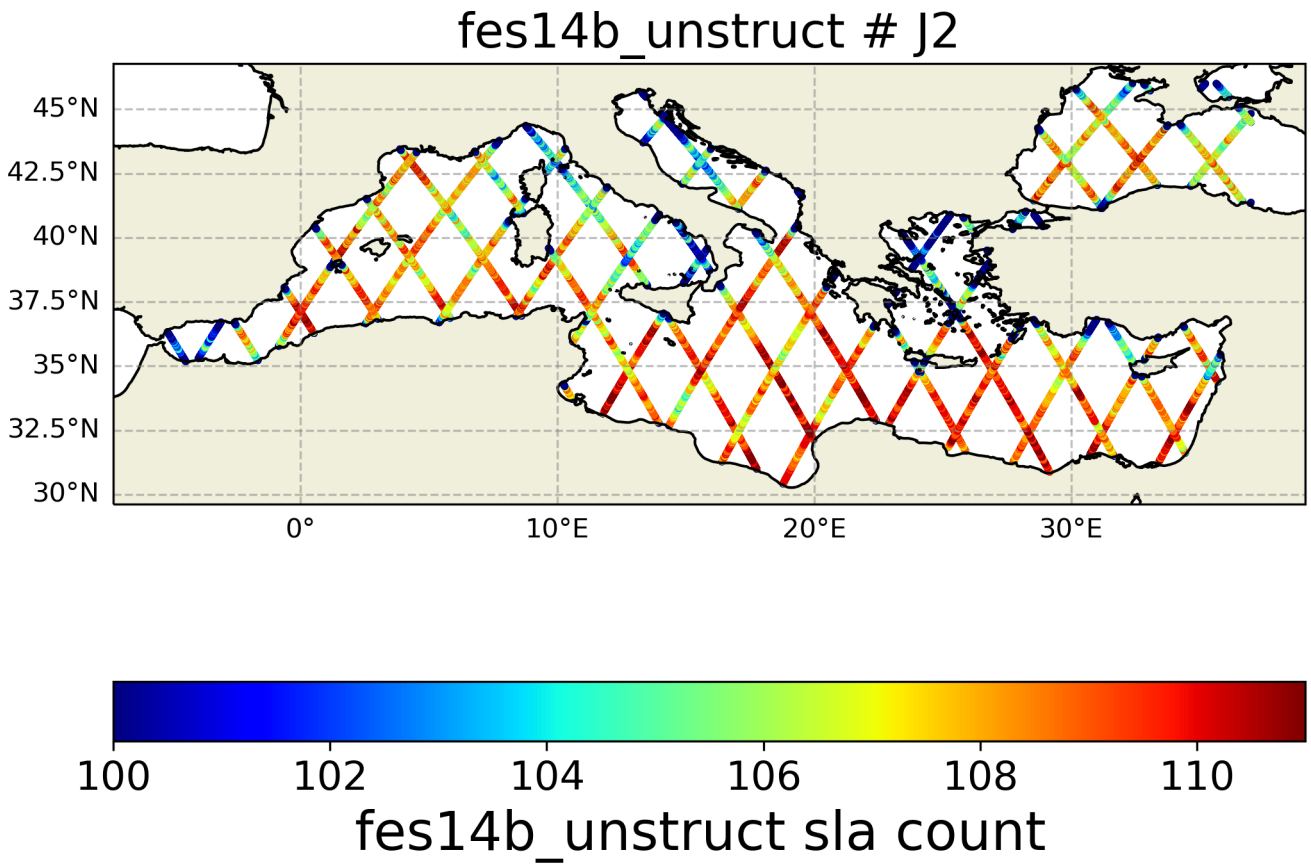

FIGURE 2 – Spatial coherence analysis of the count of the fes14b_unstruct version of sla variable

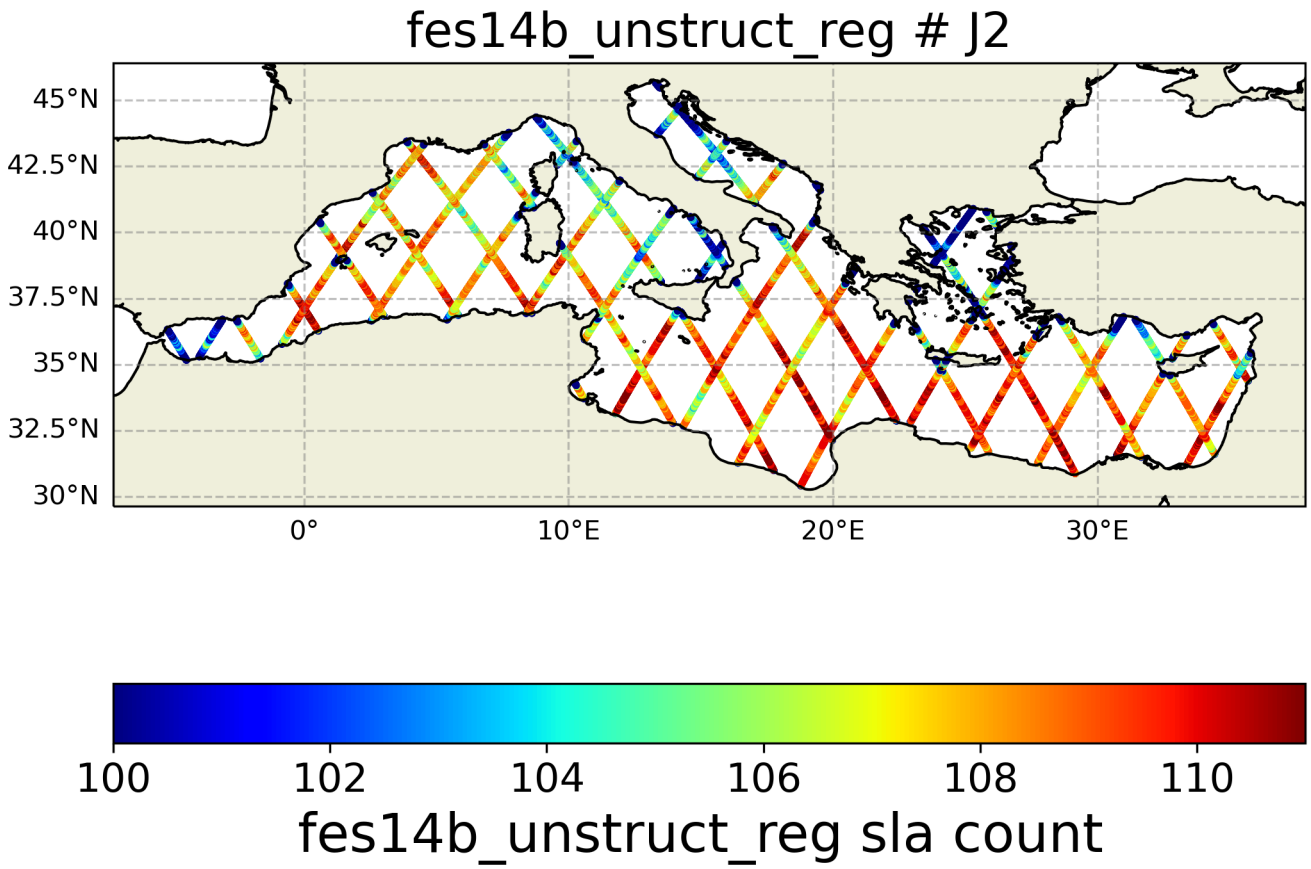

FIGURE 3 – Spatial coherence analysis of the count of the fes14b_unstruct_reg version of sla variable

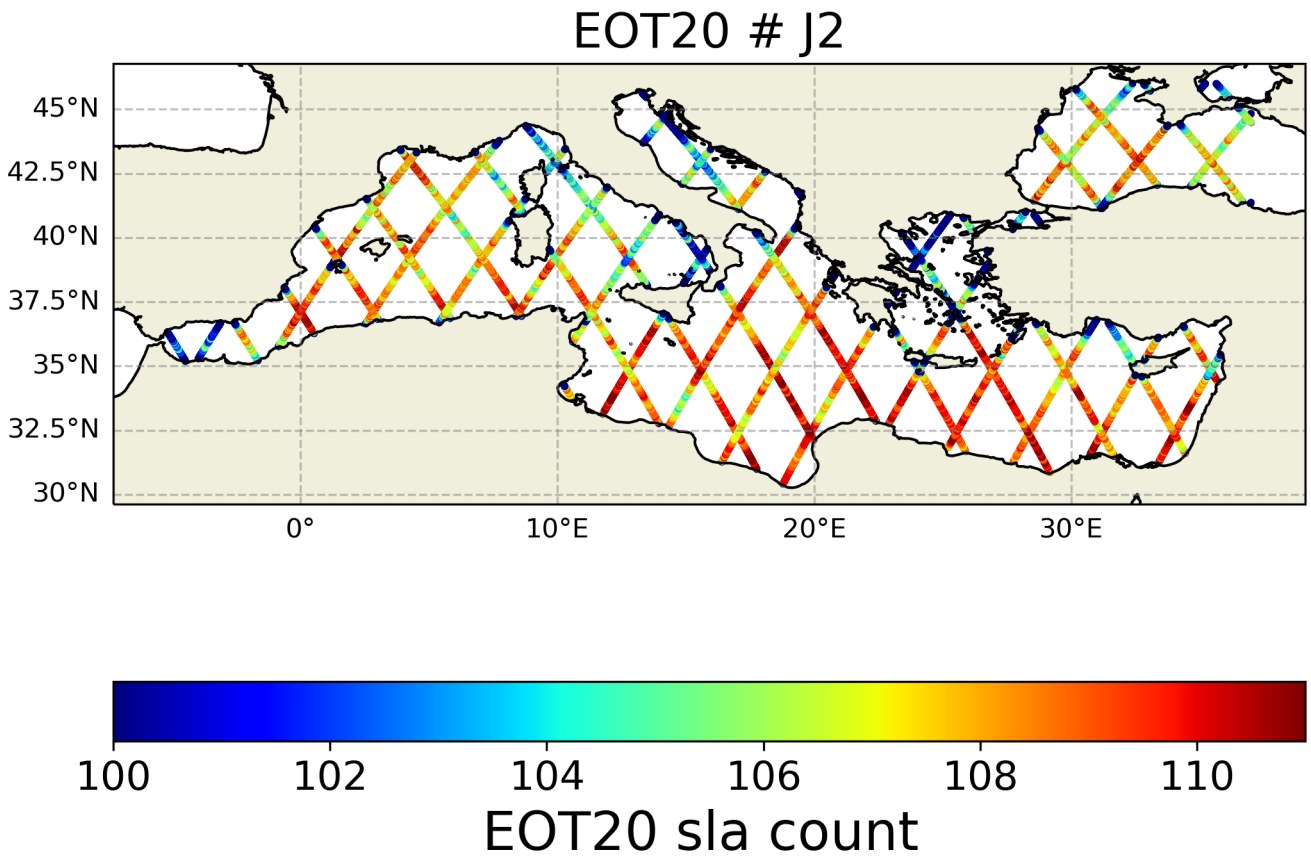

Figure 4 – Spatial coherence analysis of the count of the EOT20 version of sla variable

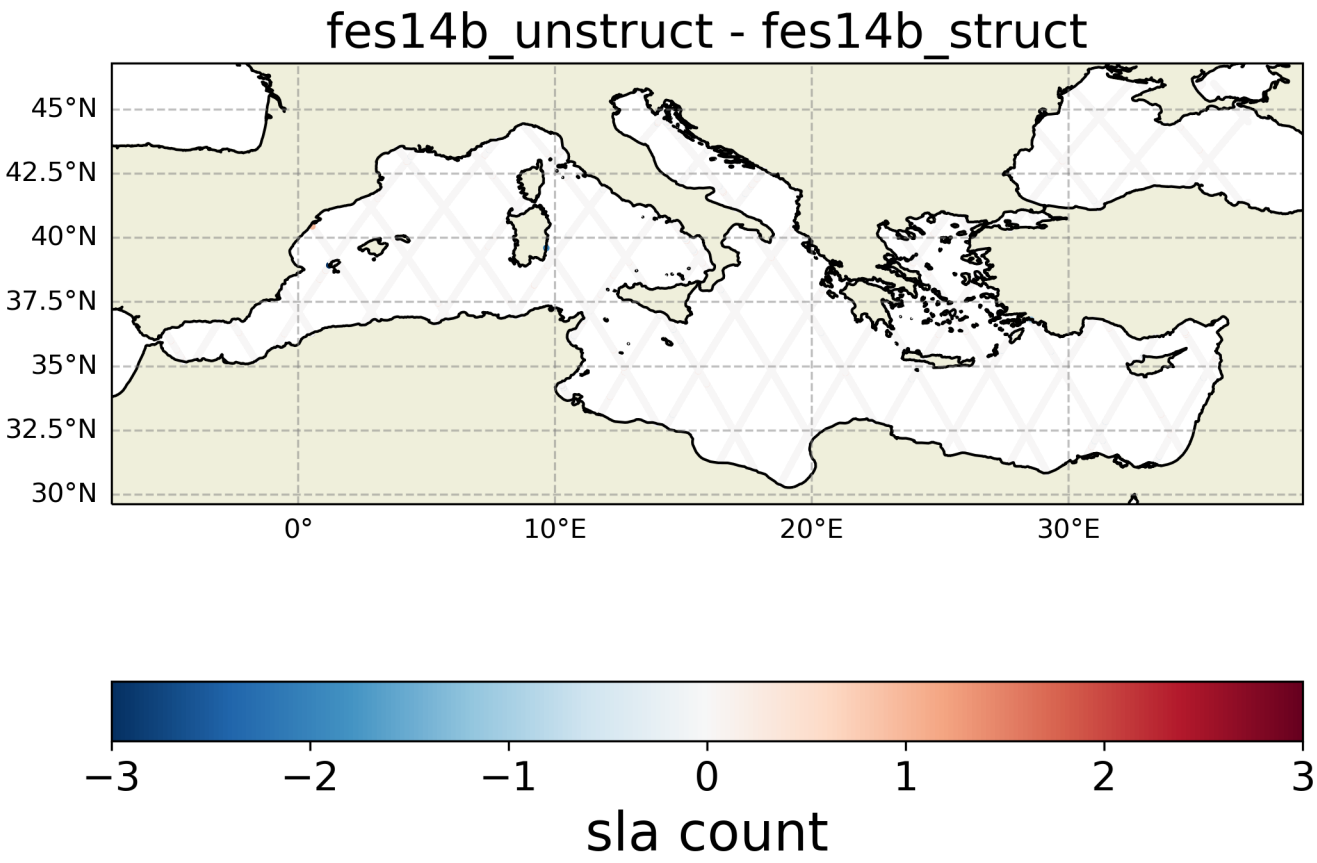

Figure 5 – Spatial coherence analysis of the Difference in sla 's count between fes14b_unstruct and fes14b_struct

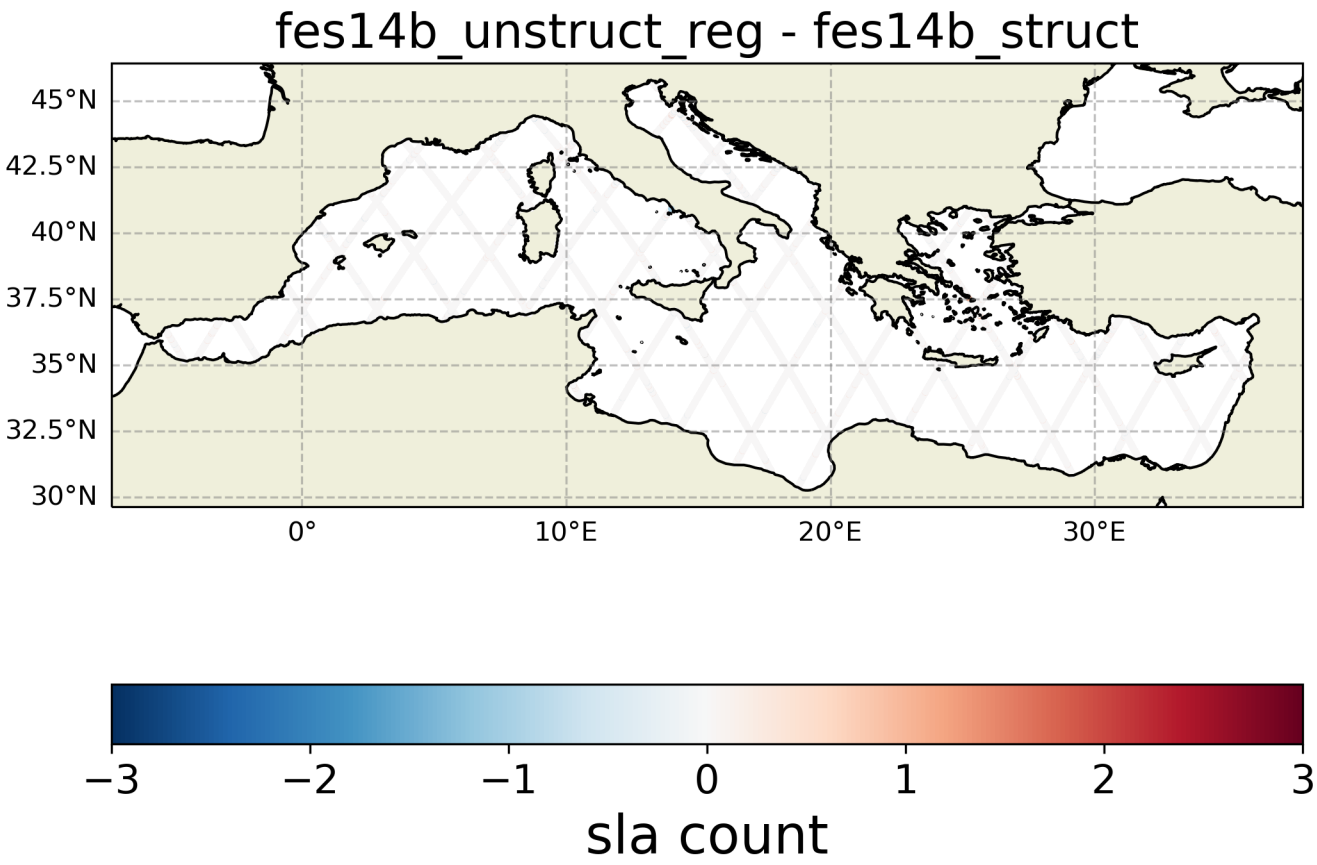

Figure 6 – Spatial coherence analysis of the Difference in sla 's count between fes14b_unstruct_reg and fes14b_struct

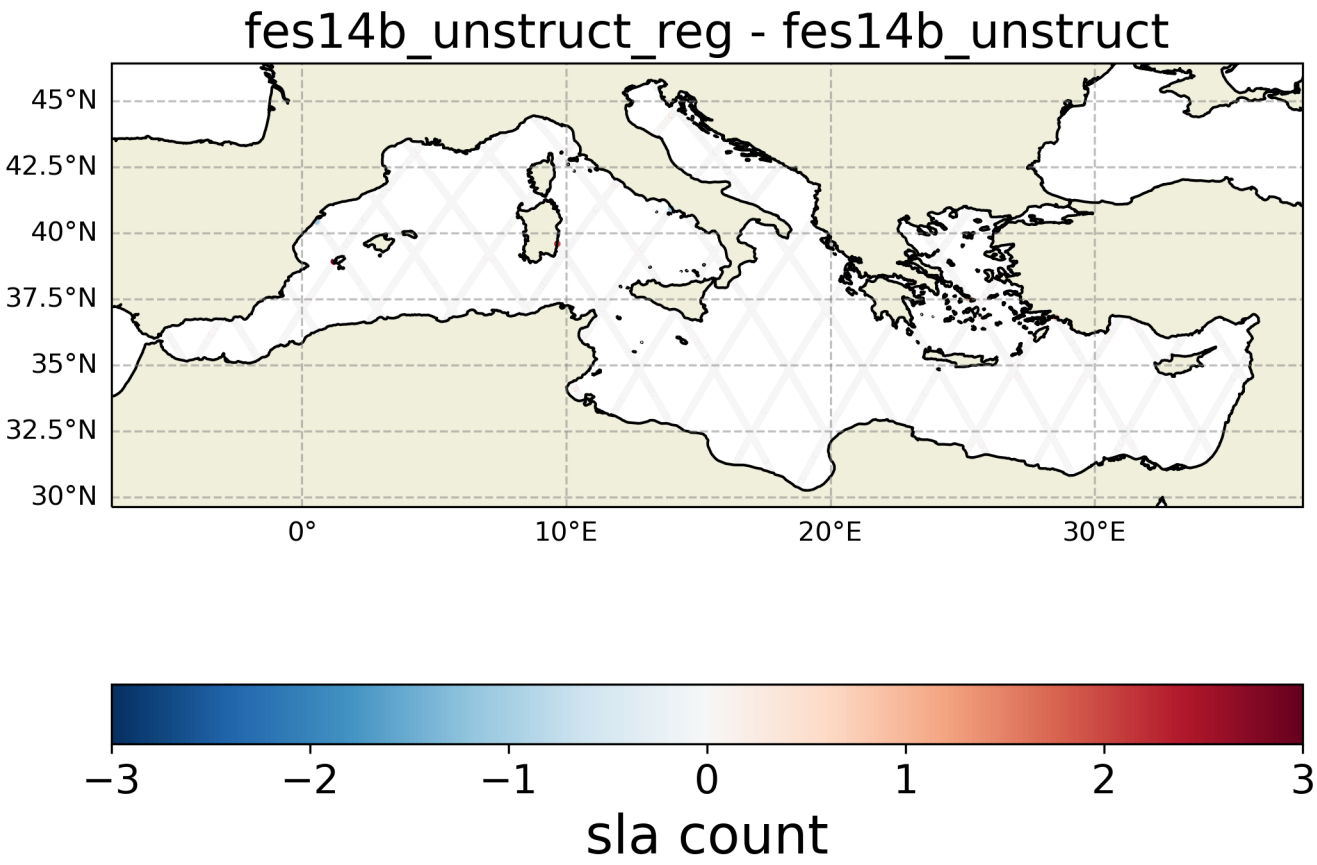

Figure 7 – Spatial coherence analysis of the Difference in sla 's count between fes14b_unstruct_reg and fes14b_unstruct

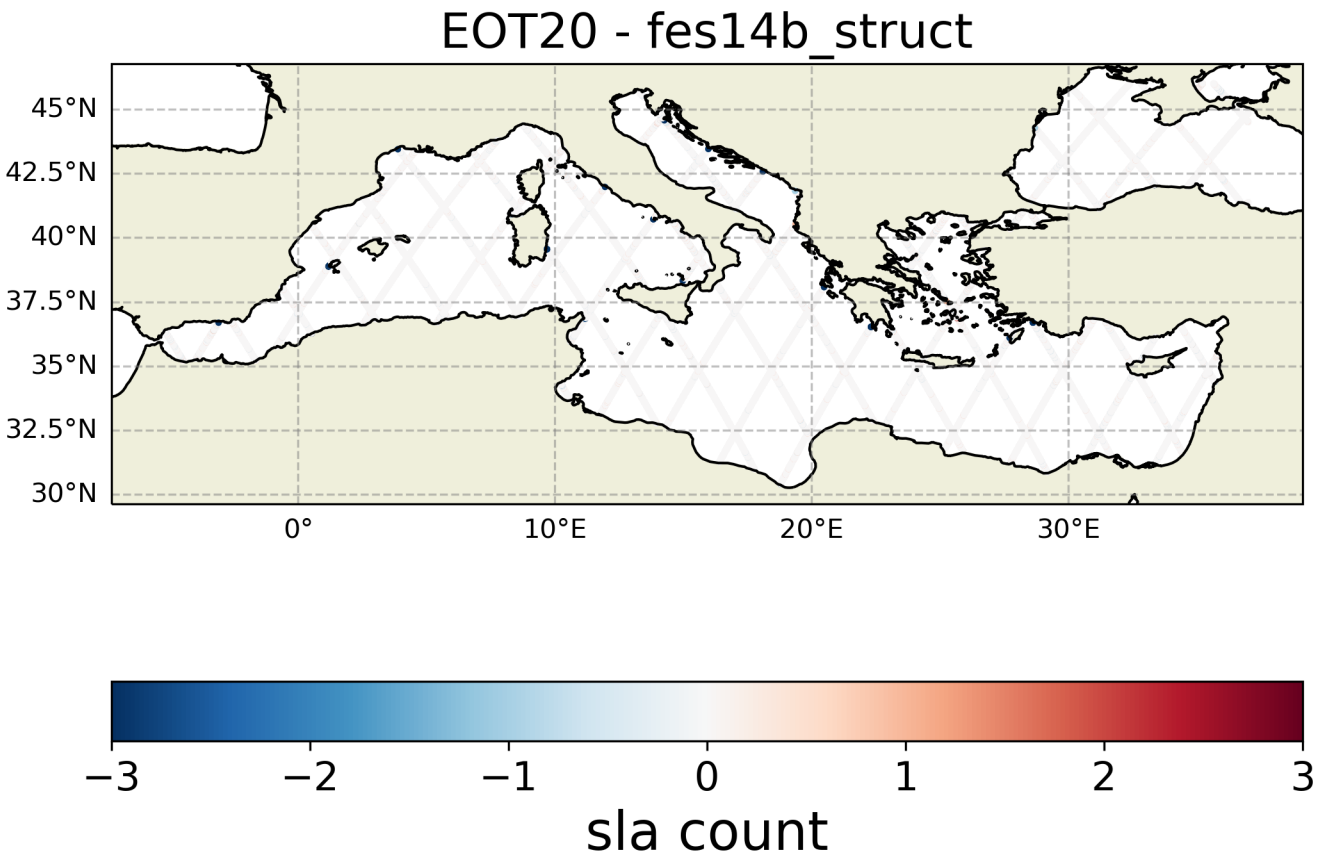

FIGURE 8 – Spatial coherence analysis of the Difference in sla 's count between EOT20 and fes14b_struct

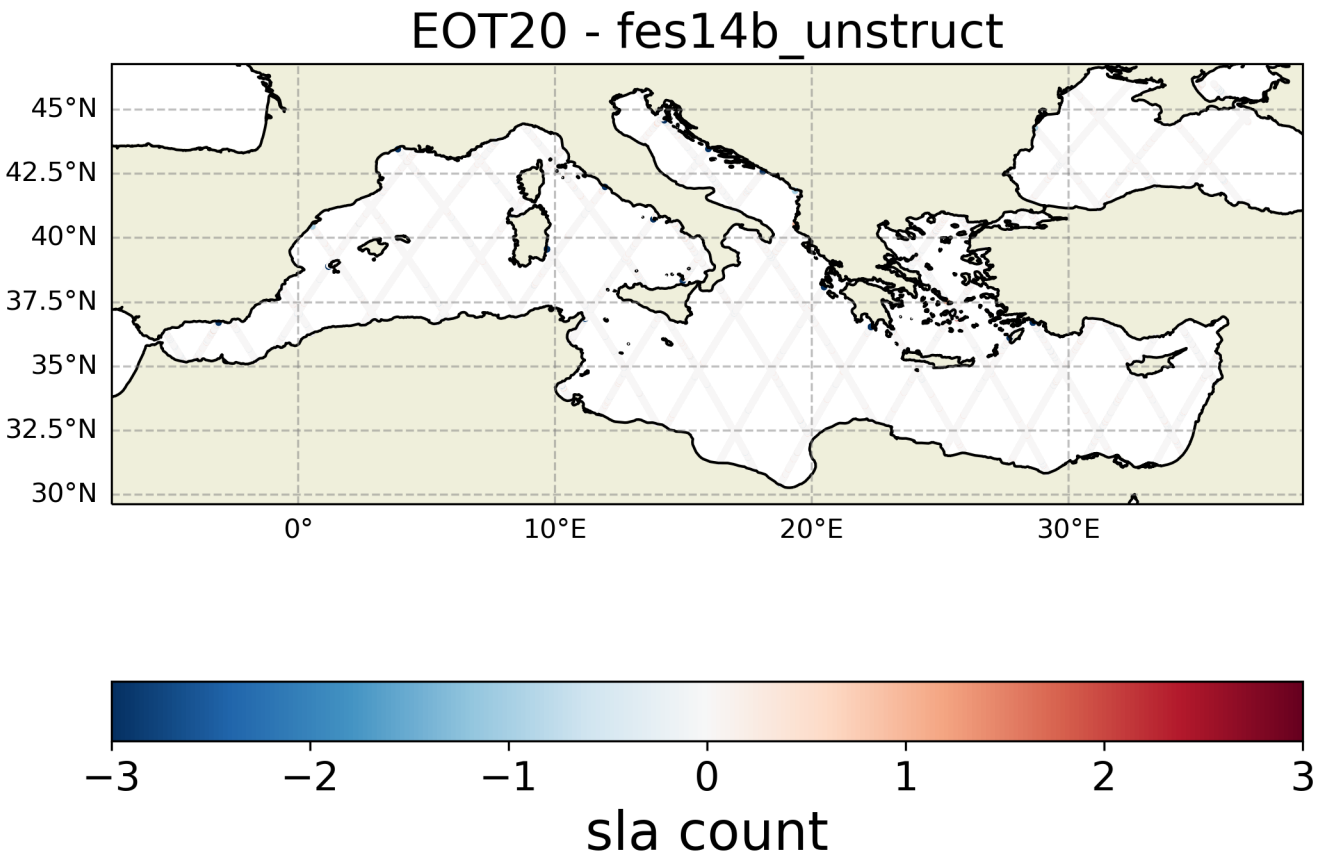

Figure 9 – Spatial coherence analysis of the Difference in sla 's count between EOT20 and fes14b_unstruct

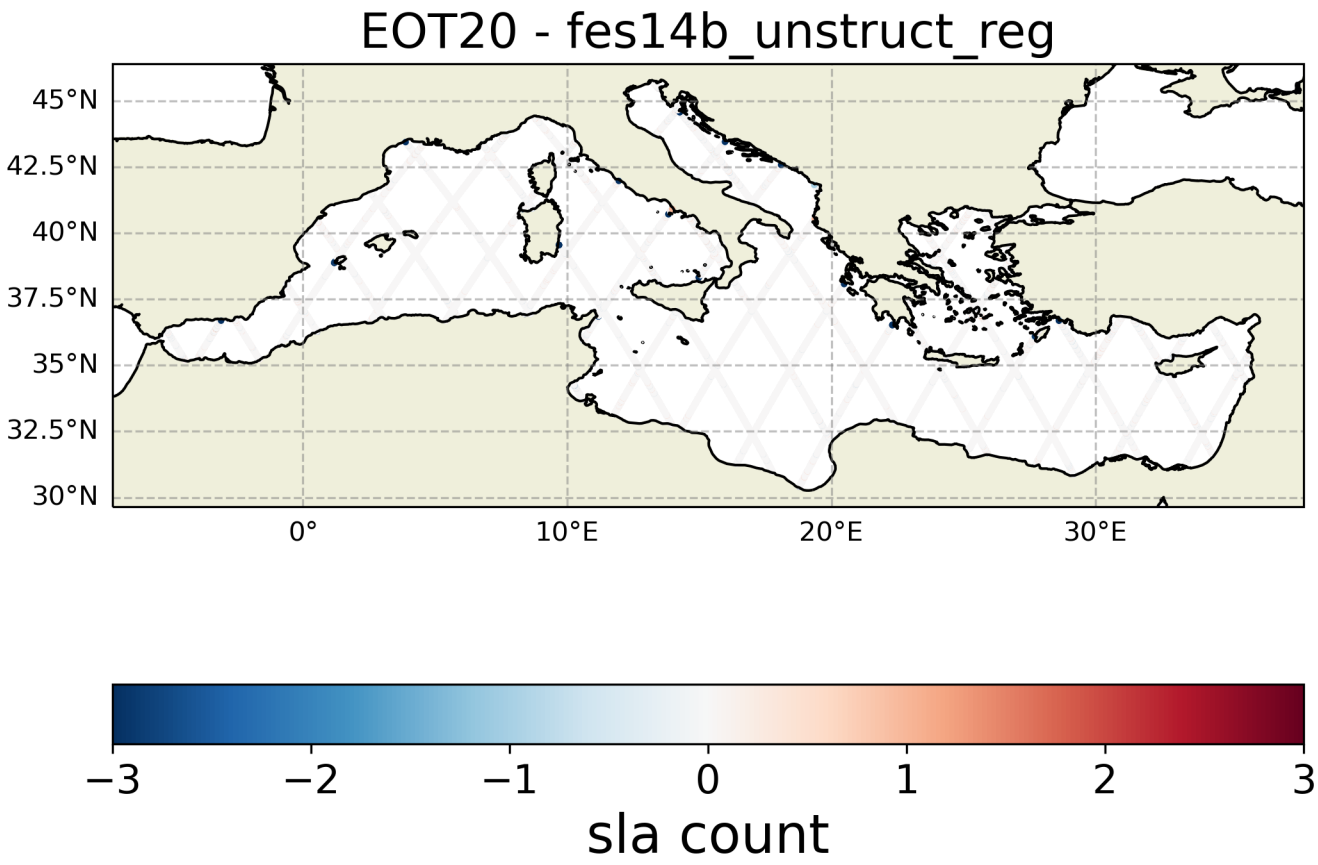

Figure 10 – Spatial coherence analysis of the Difference in sla 's count between EOT20 and fes14b_unstruct_reg

3.1.2 sla 's std

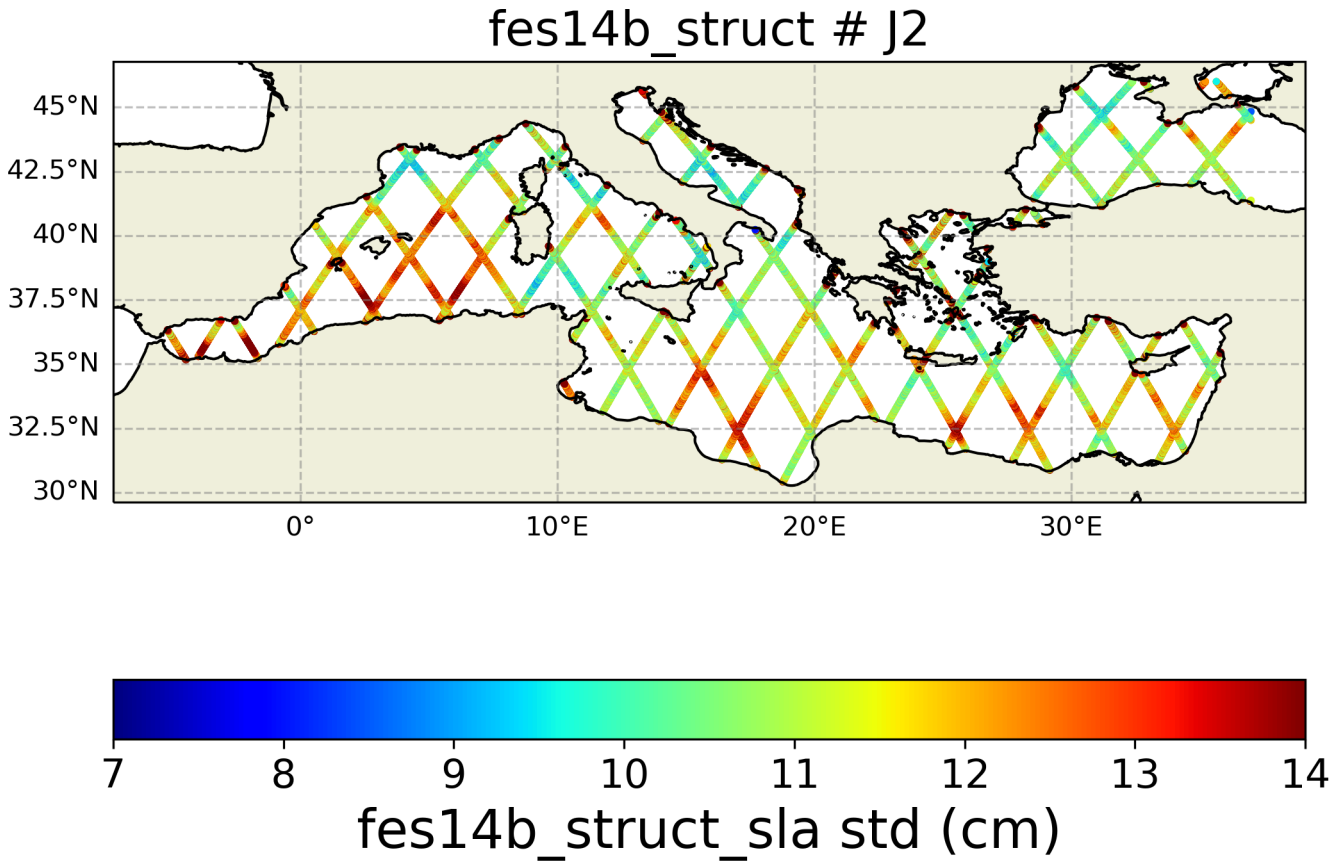

FIGURE 11 – Spatial coherence analysis of the std of the fes14b_struct version of sla variable

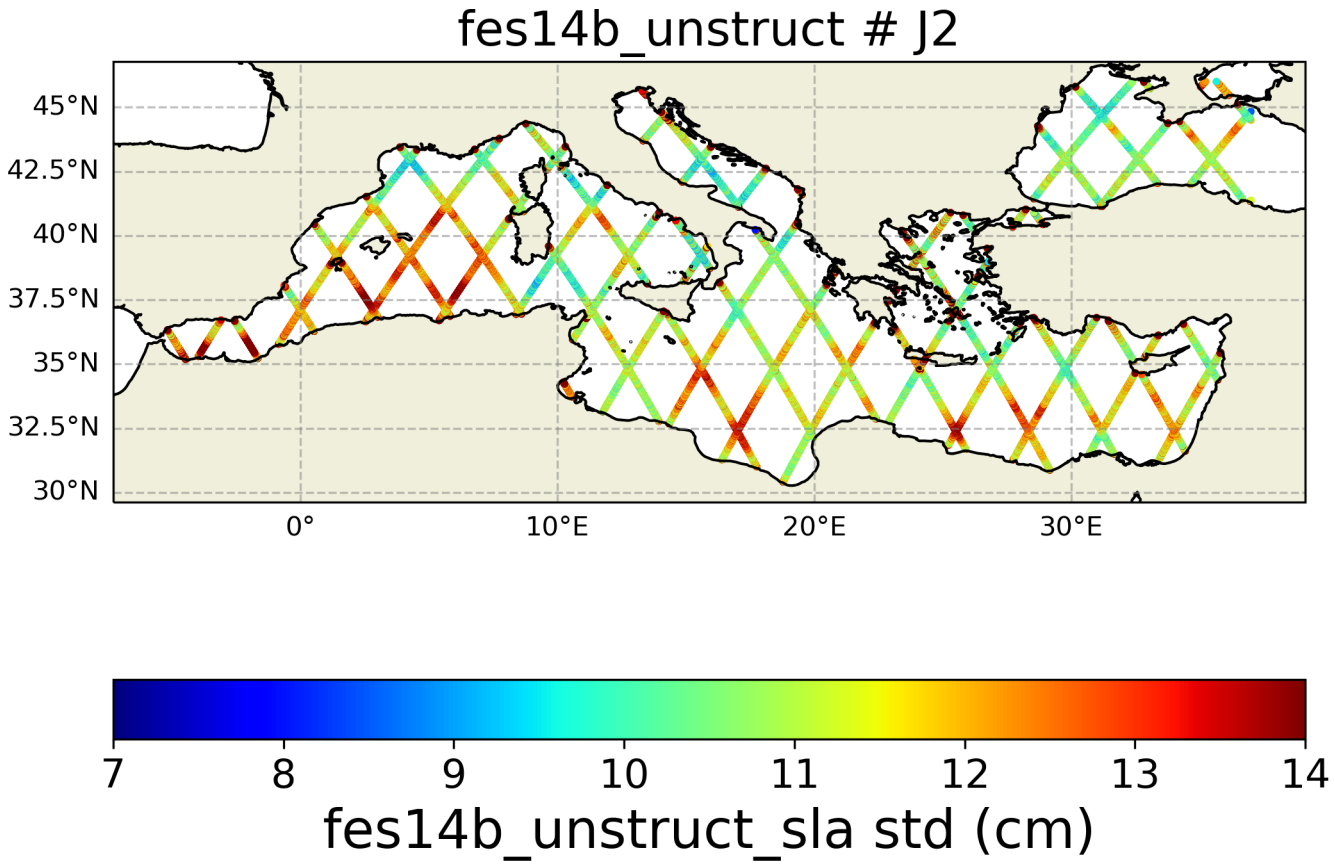

FIGURE 12 – Spatial coherence analysis of the std of the fes14b_unstruct version of sla variable

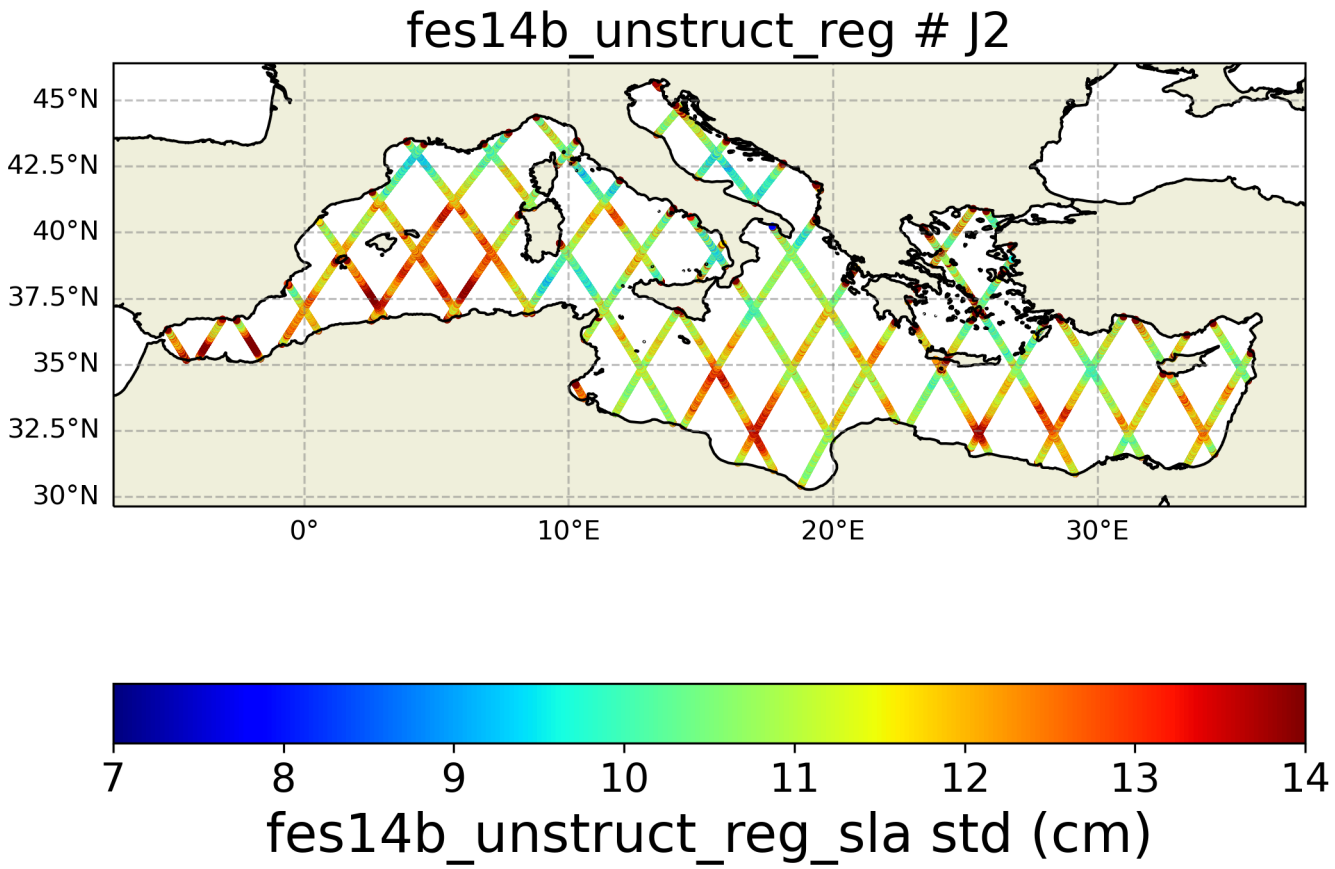

FIGURE 13 – Spatial coherence analysis of the std of the fes14b_unstruct_reg version of sla variable

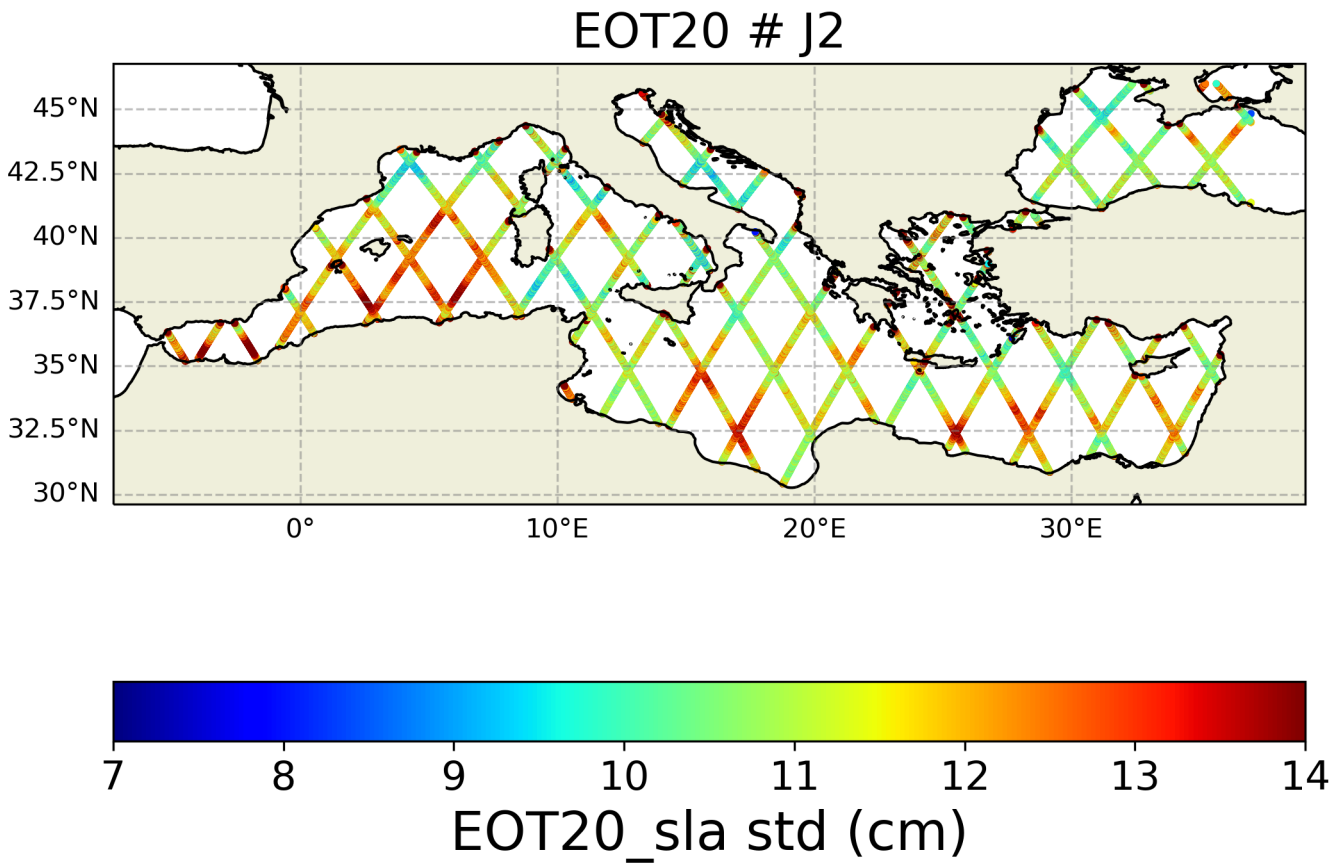

FIGURE 14 – Spatial coherence analysis of the std of the EOT20 version of sla variable

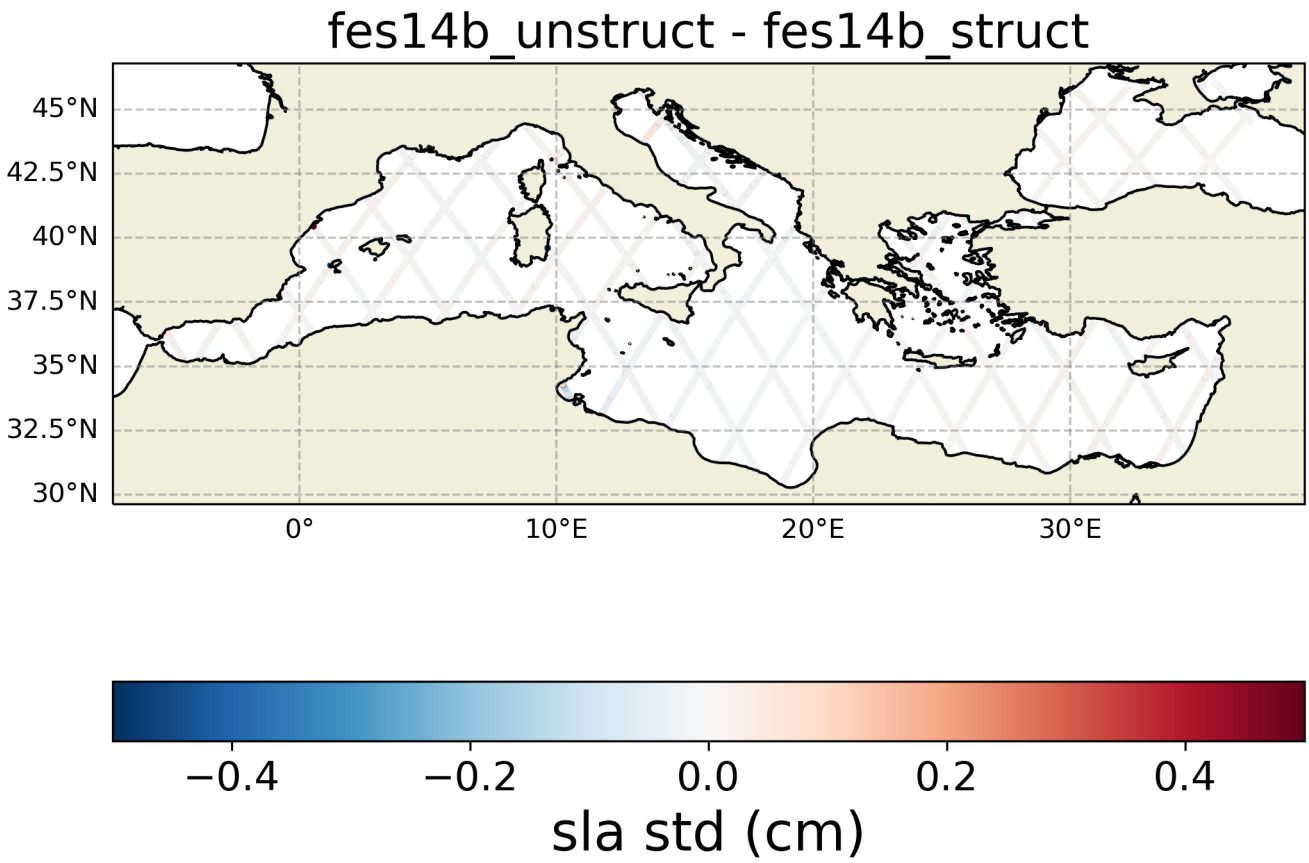

Figure 15 – Spatial coherence analysis of the Difference in sla 's std between fes14b_unstruct and fes14b_struct

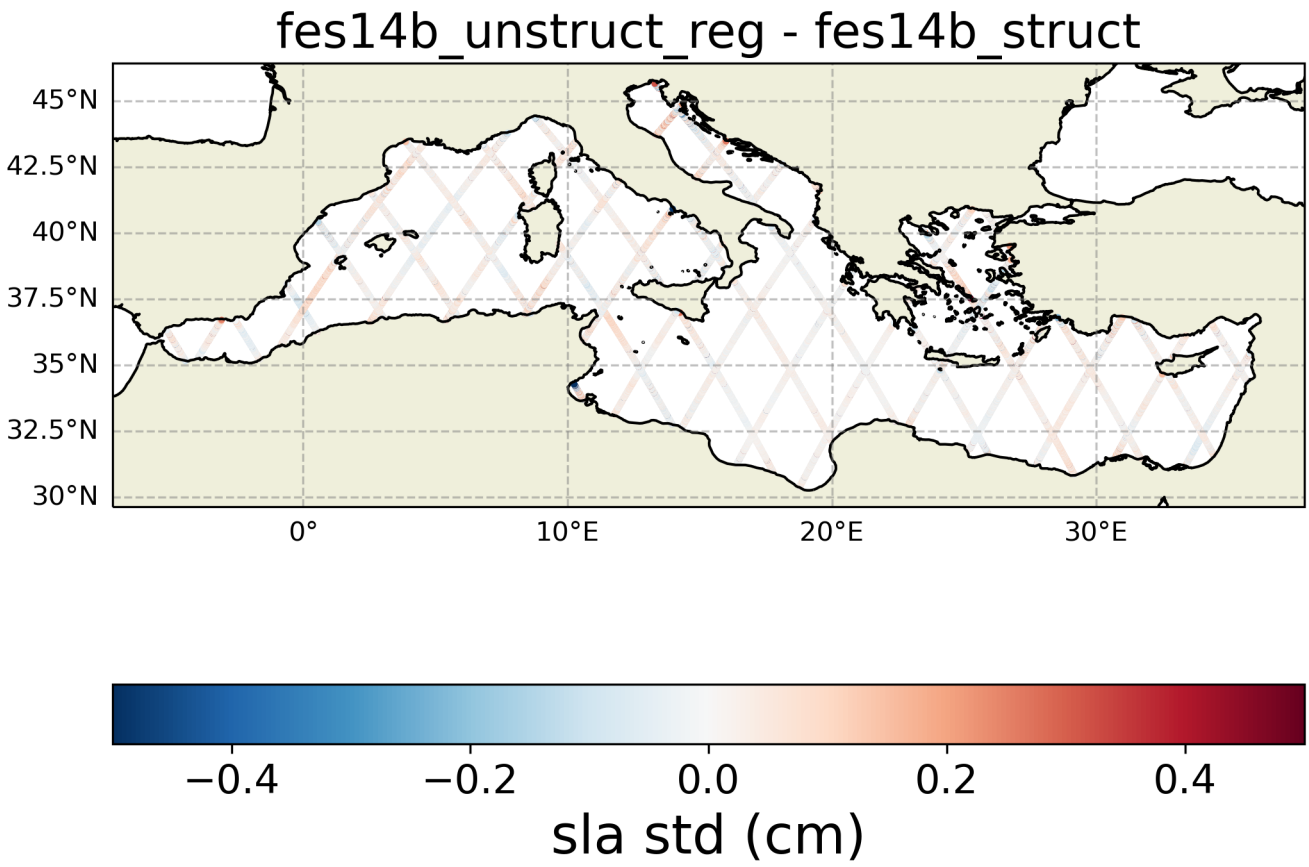

FIGURE 16 – Spatial coherence analysis of the Difference in sla 's std between fes14b_unstruct_reg and fes14b_struct

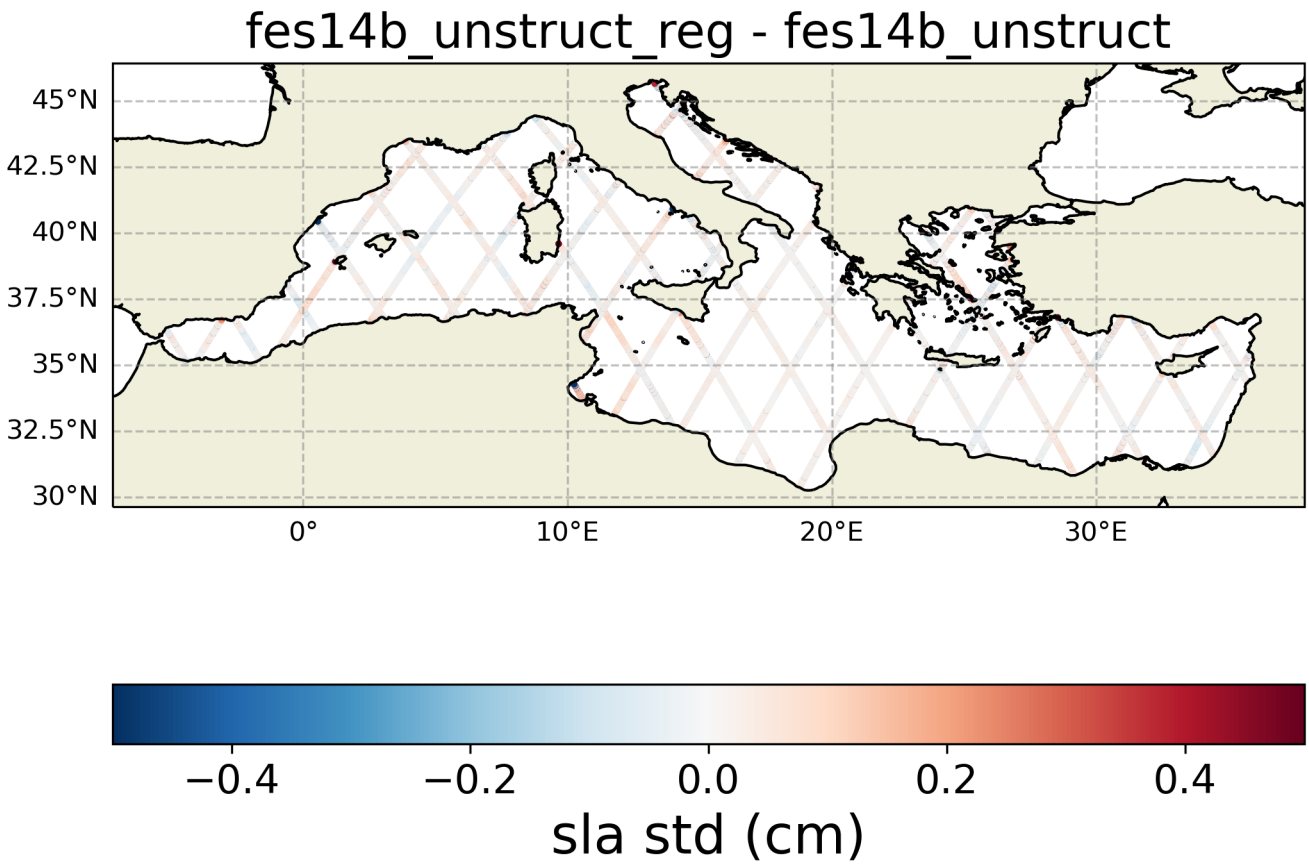

FIGURE 17 – Spatial coherence analysis of the Difference in sla 's std between fes14b_unstruct_reg and fes14b_unstruct

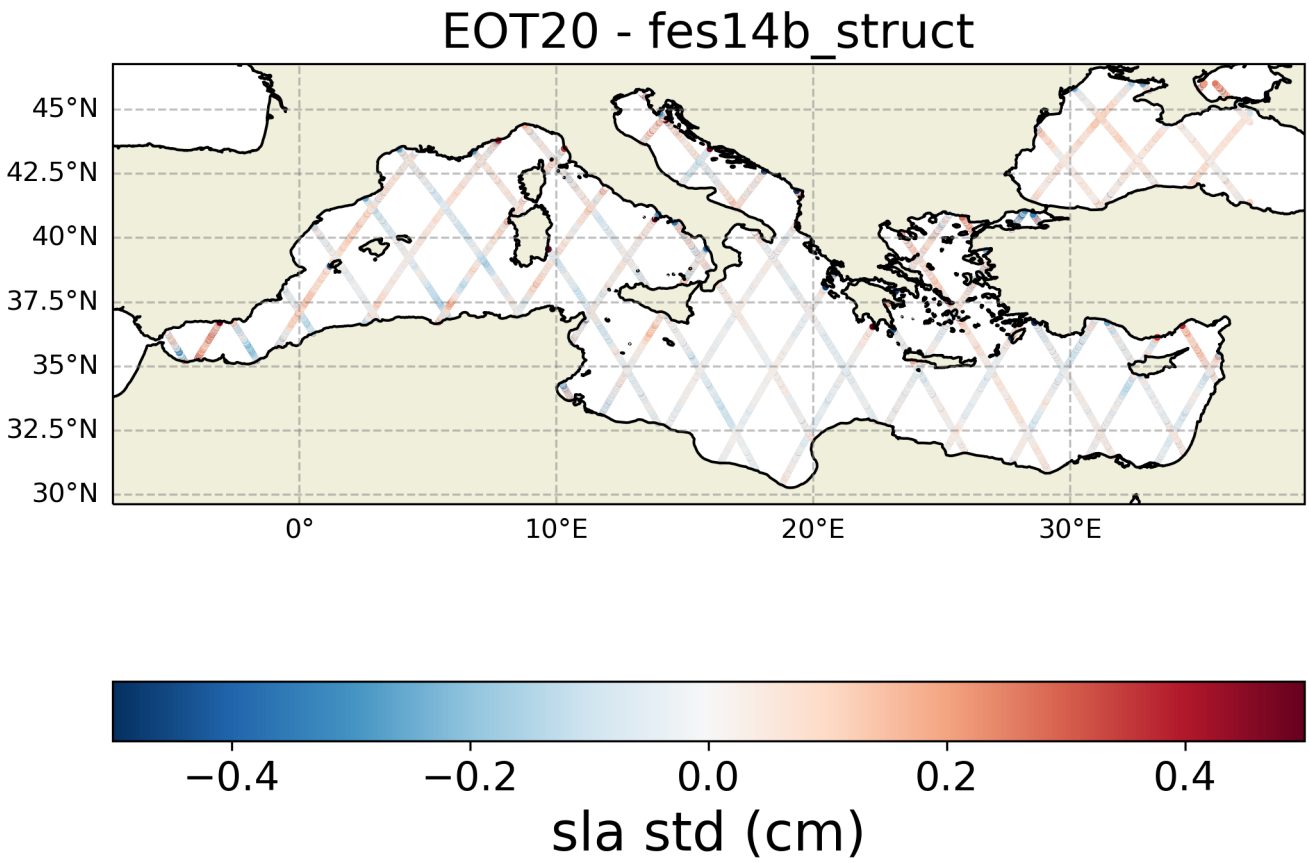

FIGURE 18 – Spatial coherence analysis of the Difference in sla 's std between EOT20 and fes14b_struct

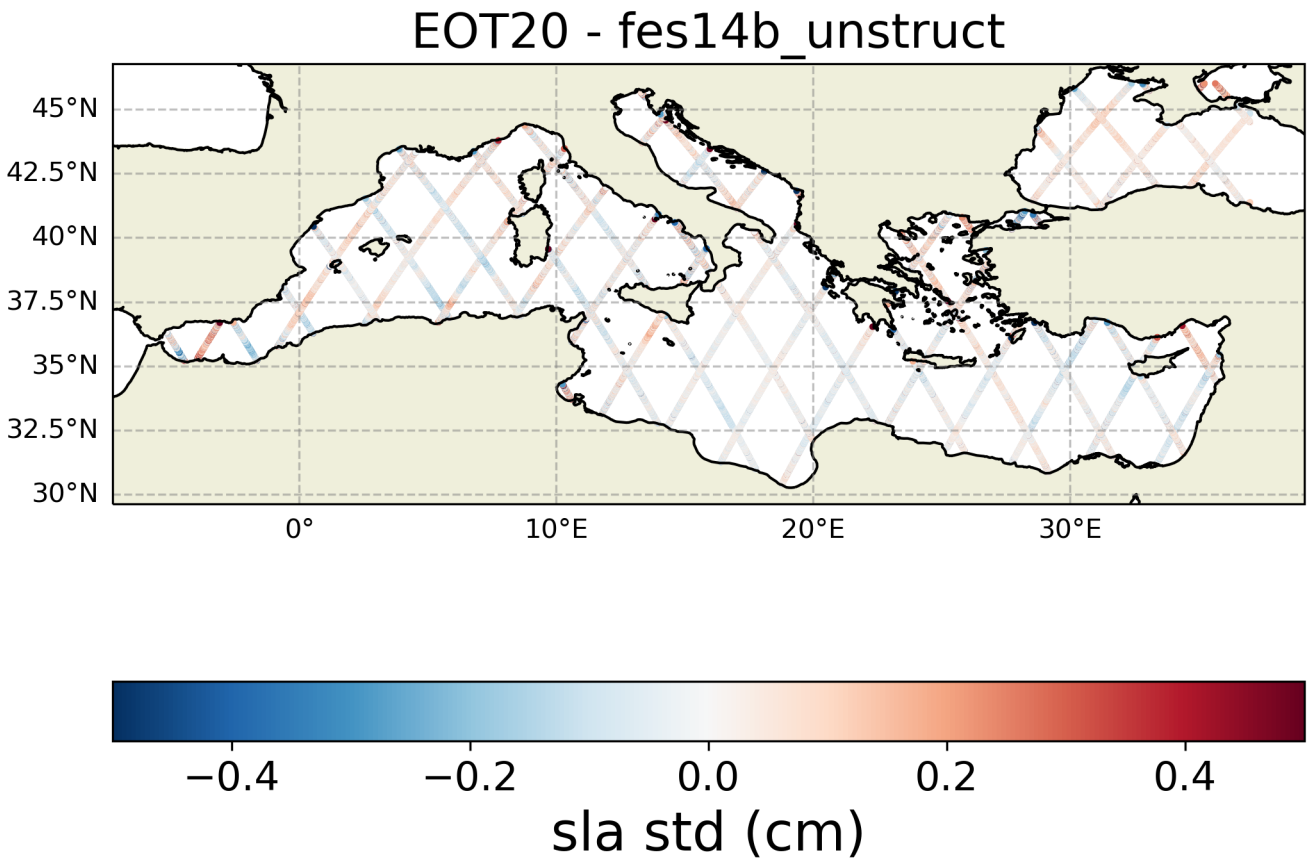

FIGURE 19 – Spatial coherence analysis of the Difference in sla 's std between EOT20 and fes14b_unstruct

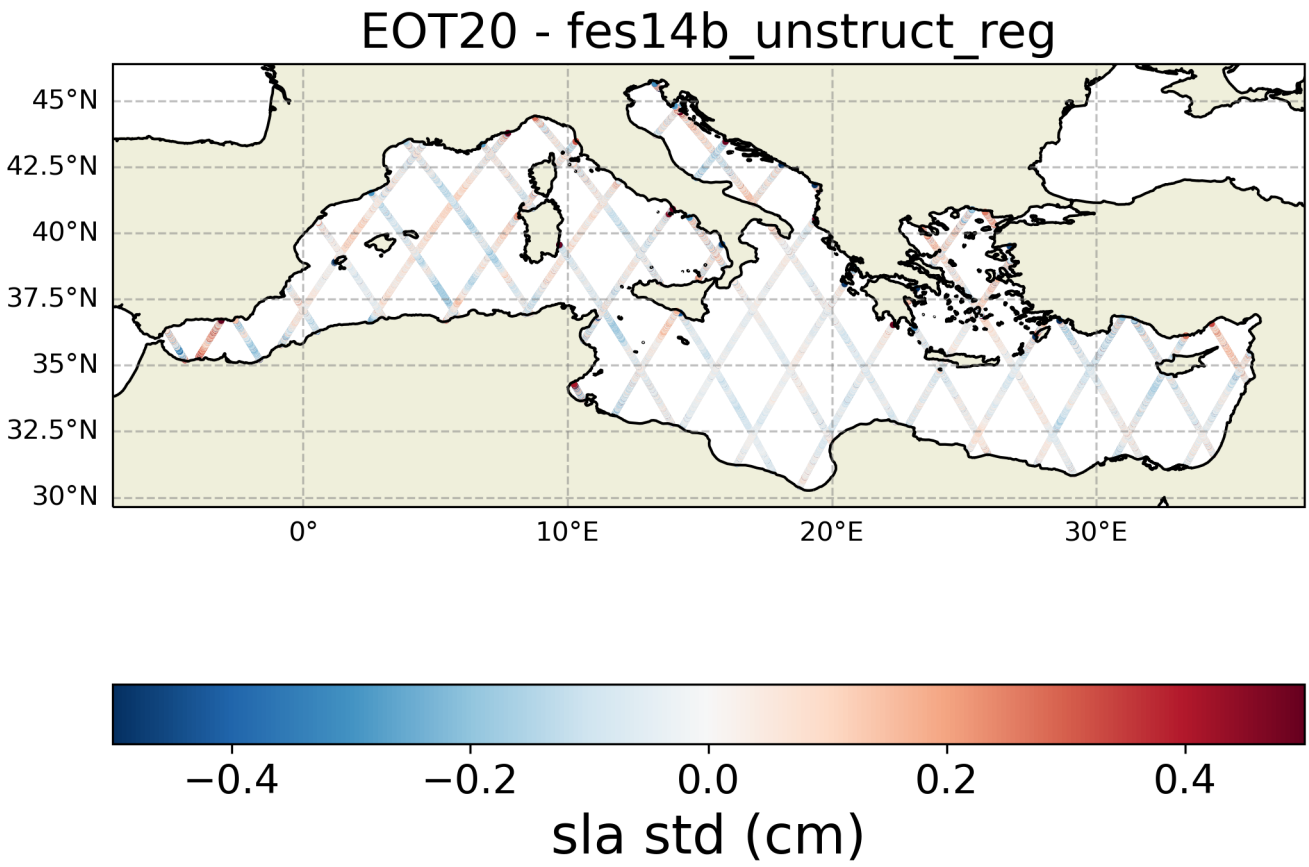

FIGURE 20 – Spatial coherence analysis of the Difference in sla 's std between EOT20 and fes14b_unstruct_reg

3.1.3 sla 's mean

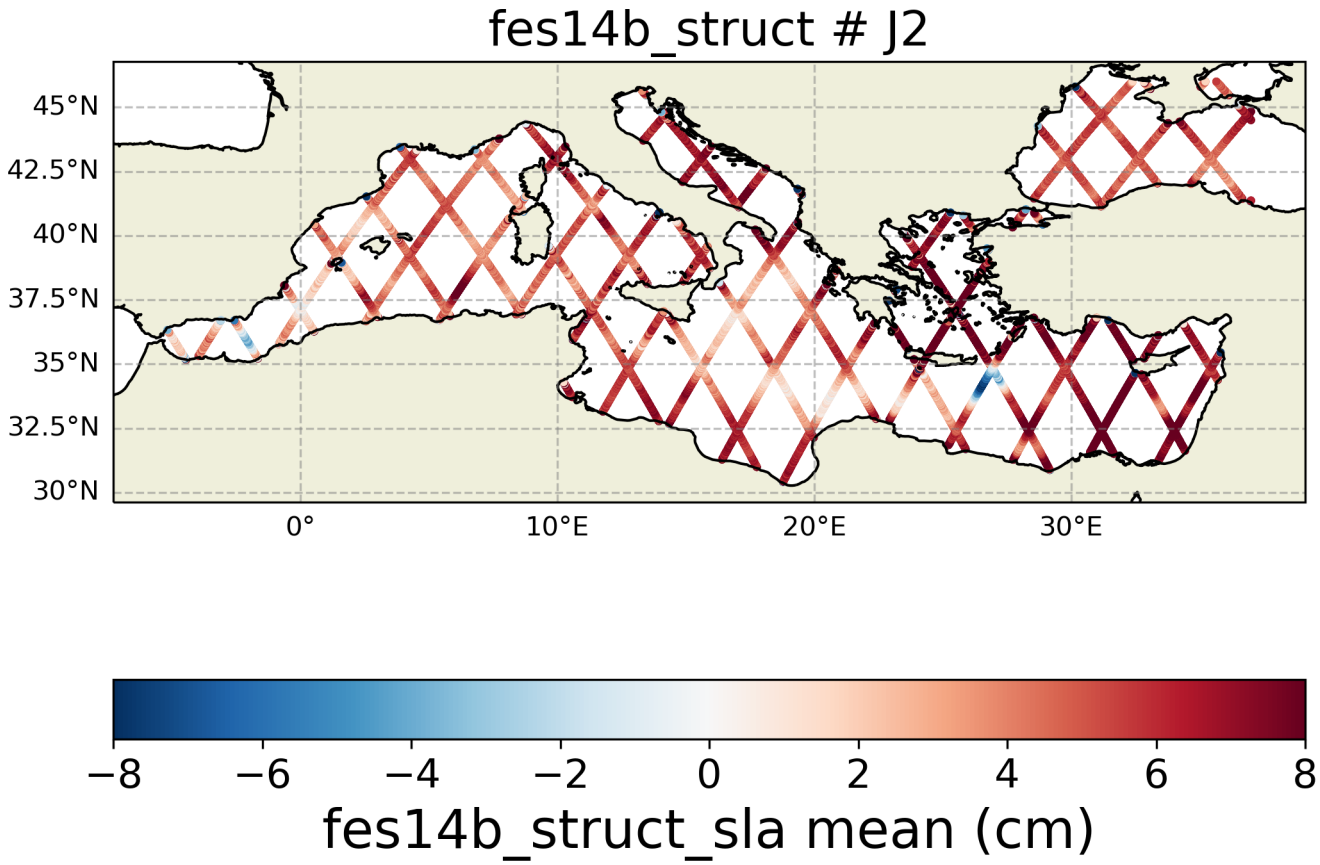

FIGURE 21 – Spatial coherence analysis of the mean of the fes14b_struct version of sla variable

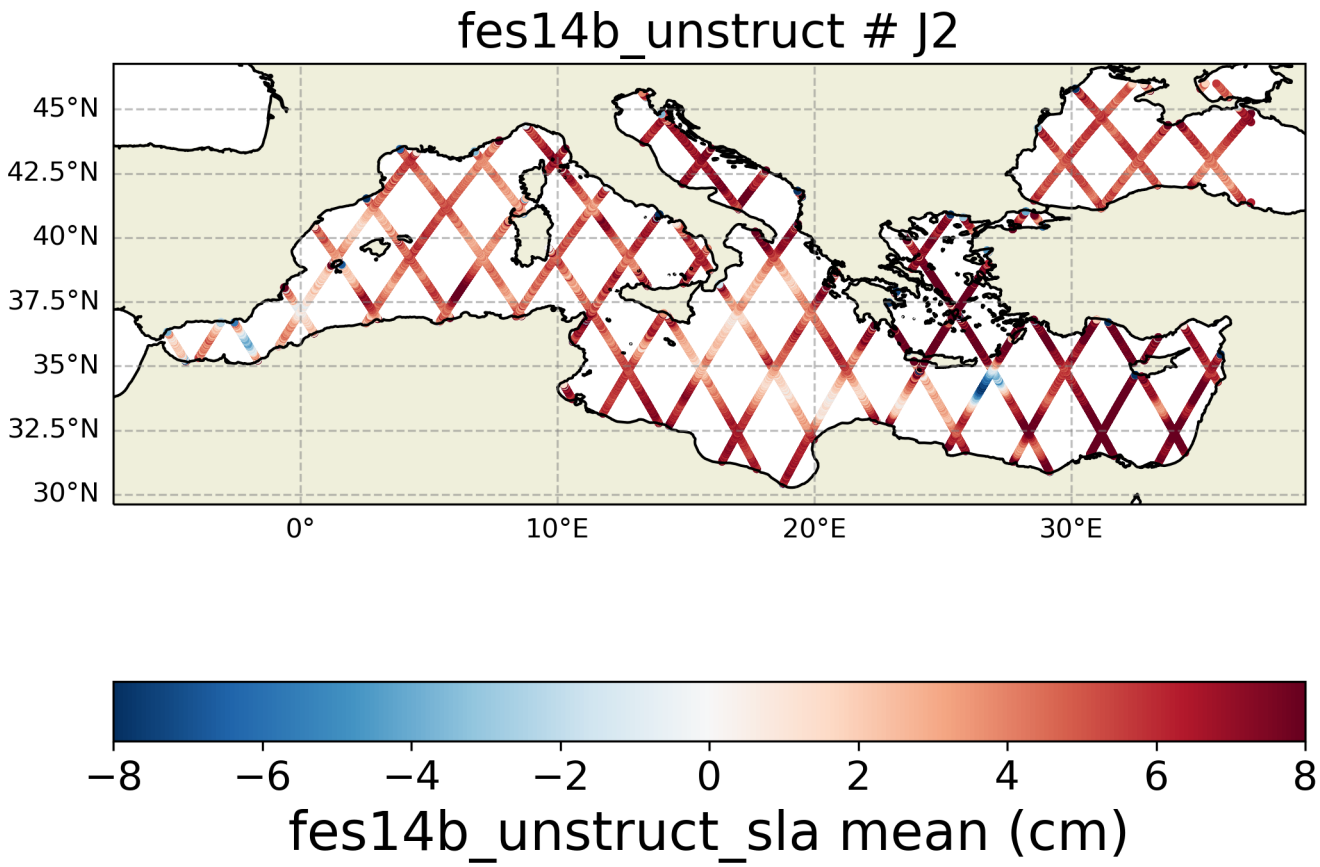

FIGURE 22 – Spatial coherence analysis of the mean of the fes14b_unstruct version of sla variable

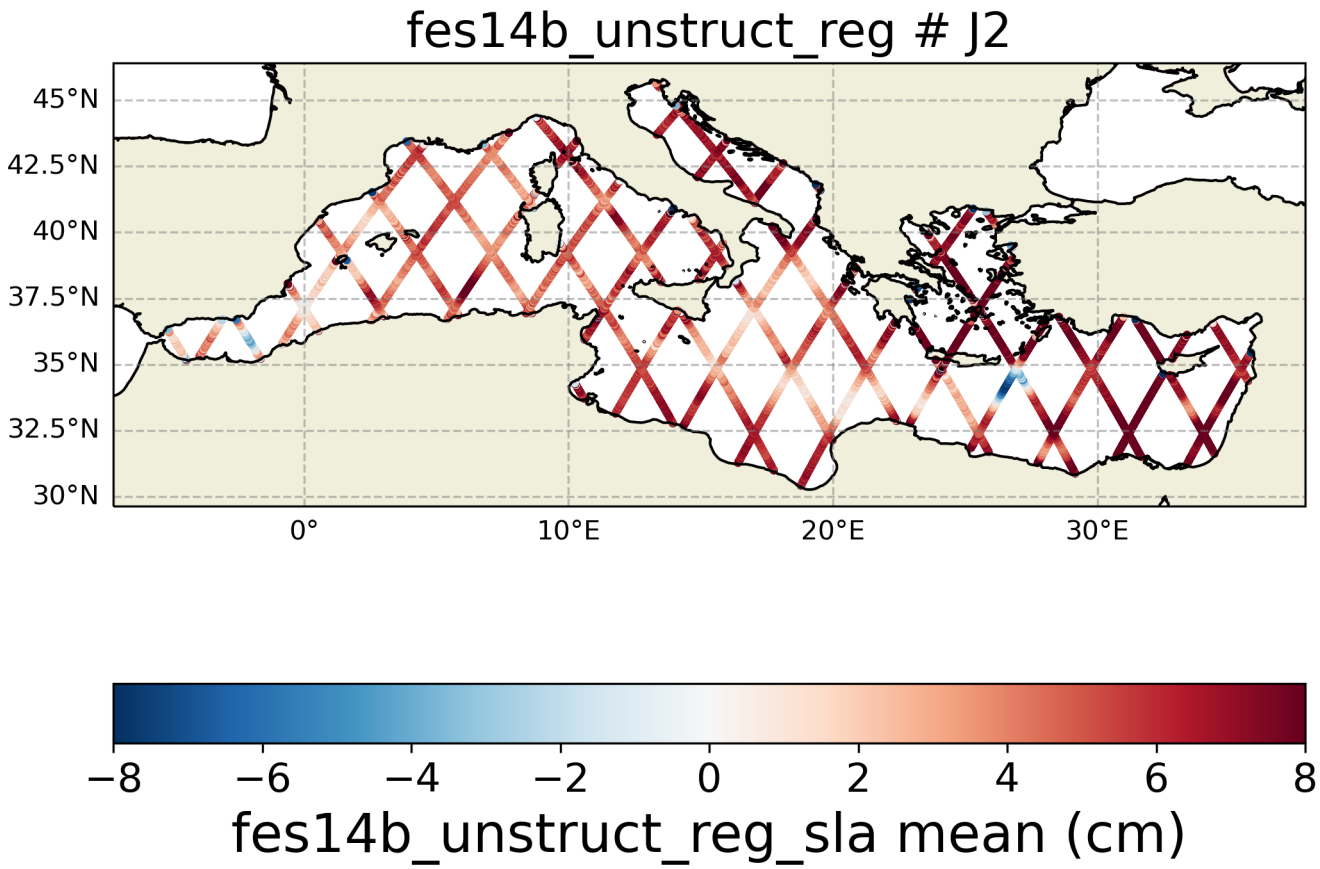

FIGURE 23 – Spatial coherence analysis of the mean of the fes14b_unstruct_reg version of sla variable

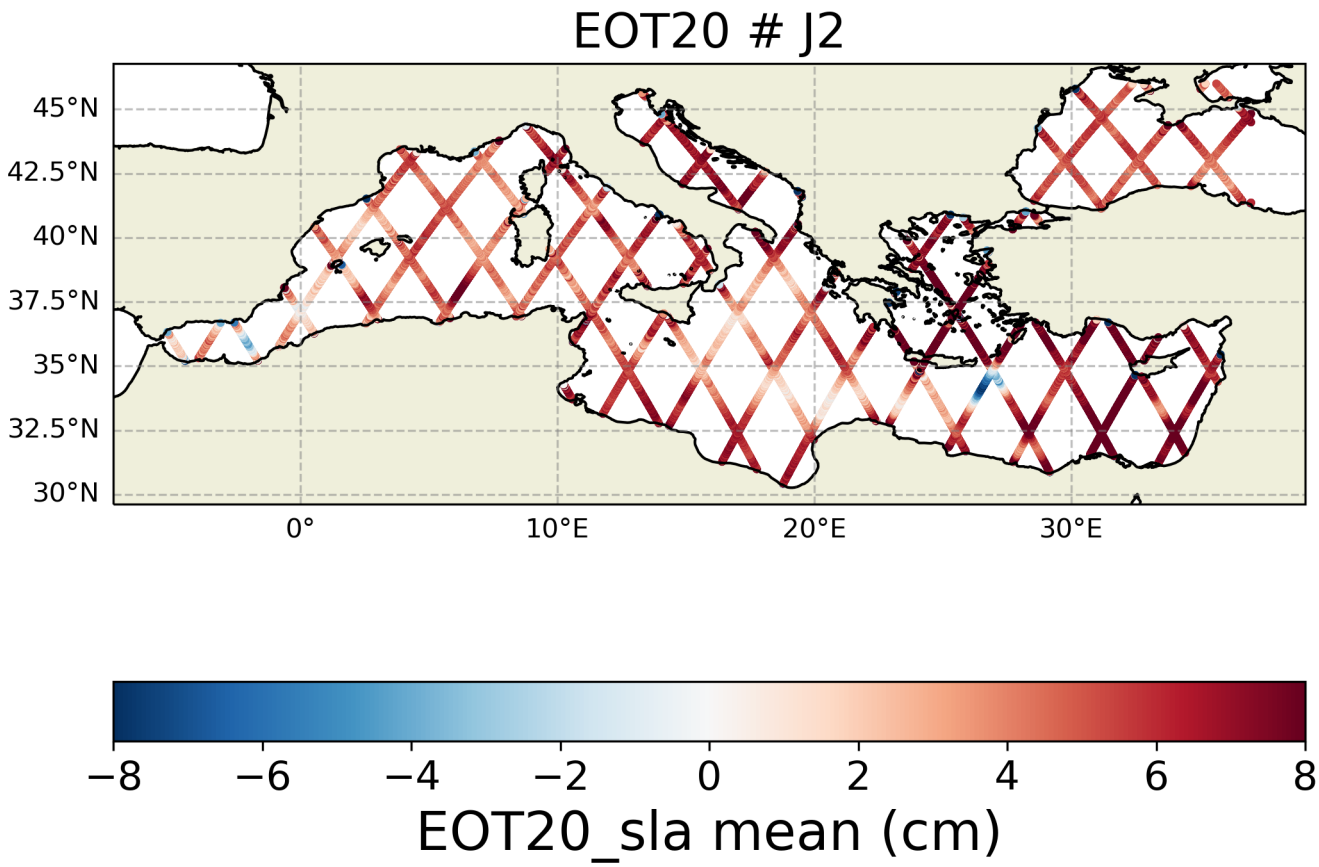

FIGURE 24 – Spatial coherence analysis of the mean of the EOT20 version of sla variable

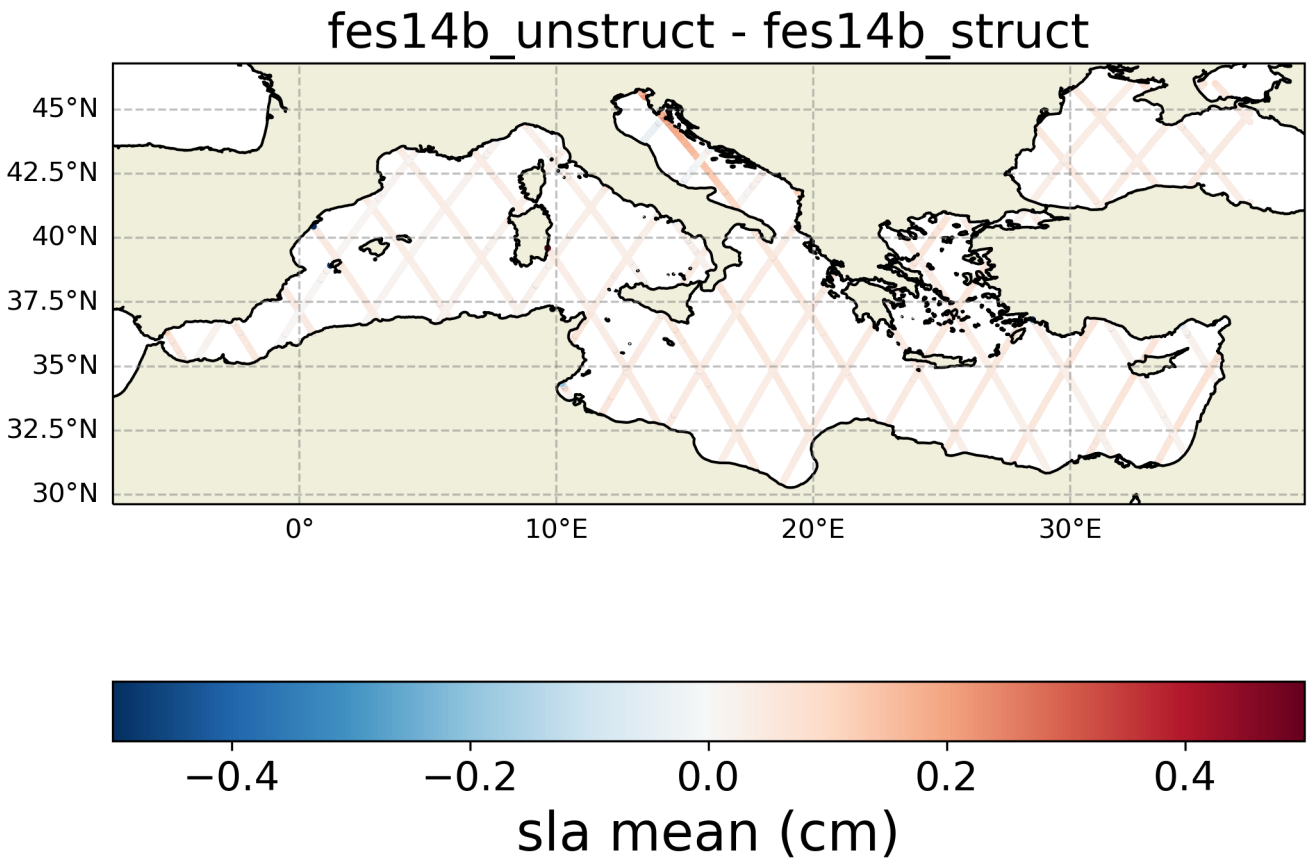

FIGURE 25 – Spatial coherence analysis of the Difference in sla 's mean between fes14b_unstruct and fes14b_struct

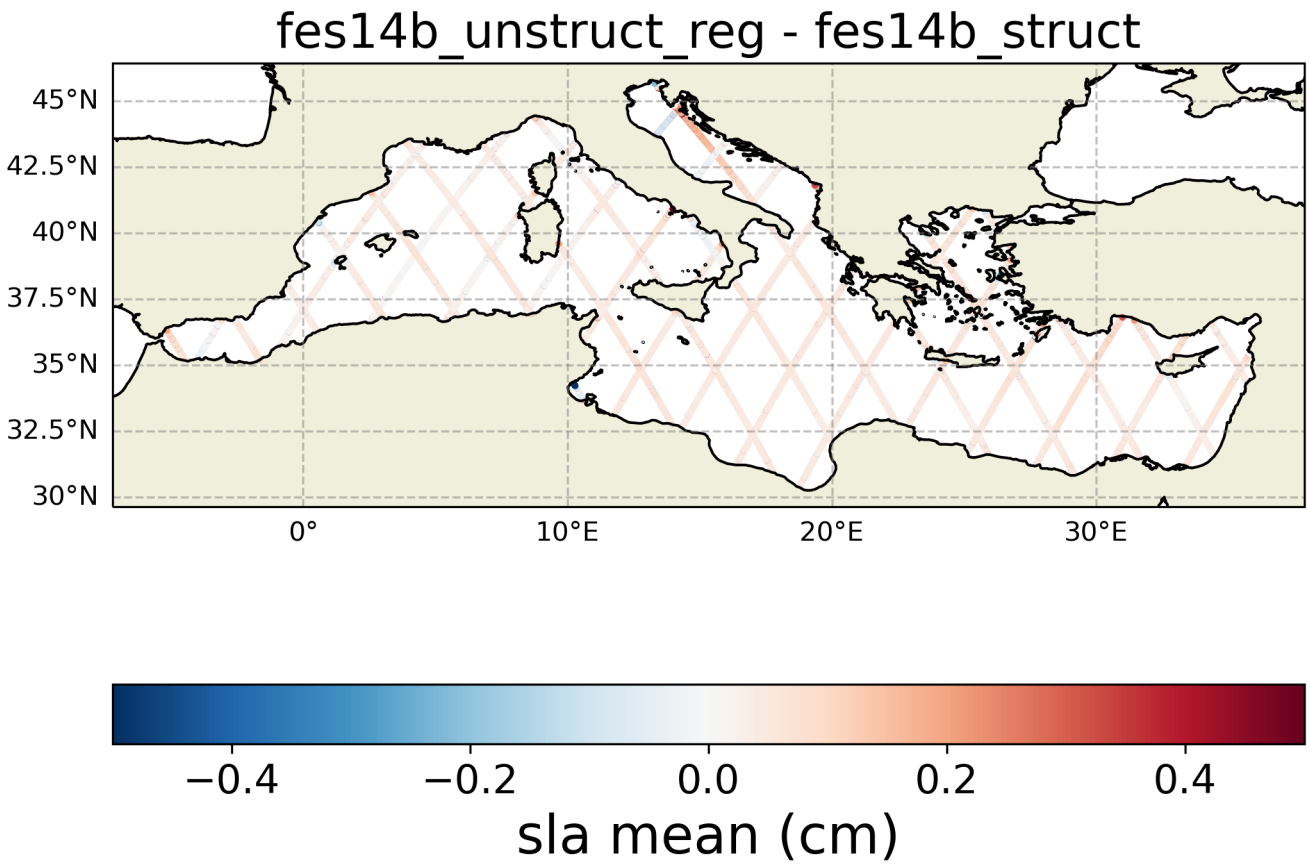

FIGURE 26 – Spatial coherence analysis of the Difference in sla 's mean between fes14b_unstruct_reg and fes14b_struct

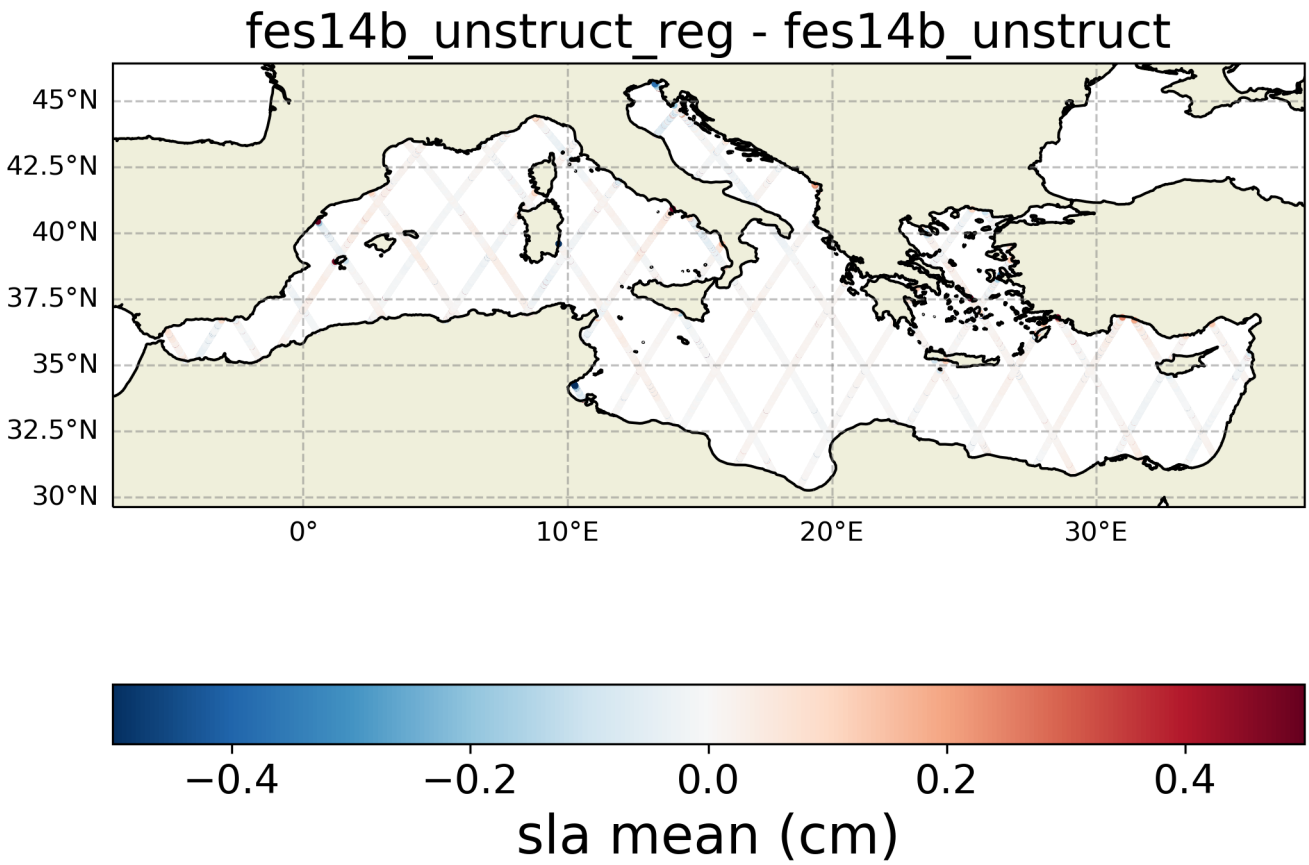

FIGURE 27 – Spatial coherence analysis of the Difference in sla 's mean between fes14b_unstruct_reg and fes14b_unstruct

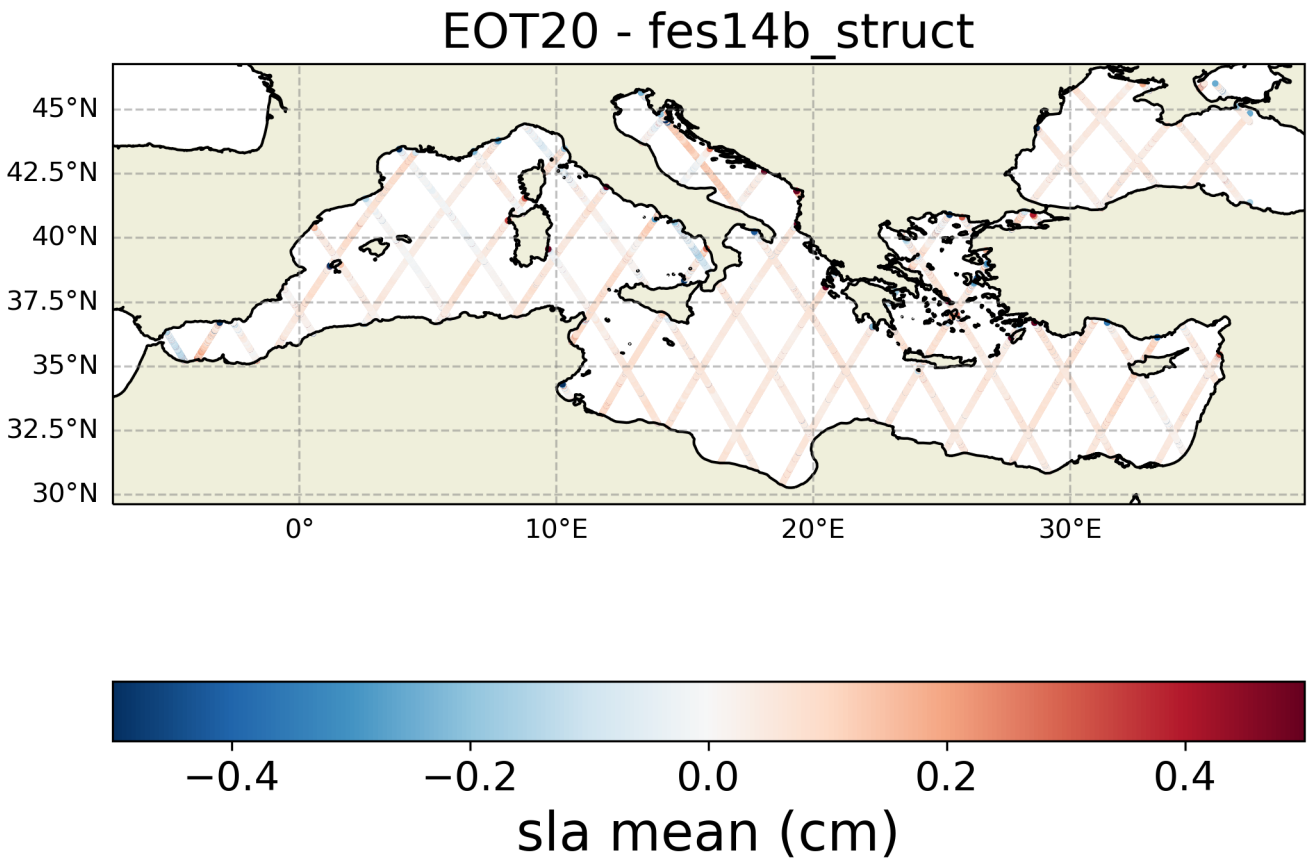

FIGURE 28 – Spatial coherence analysis of the Difference in sla 's mean between EOT20 and fes14b_struct

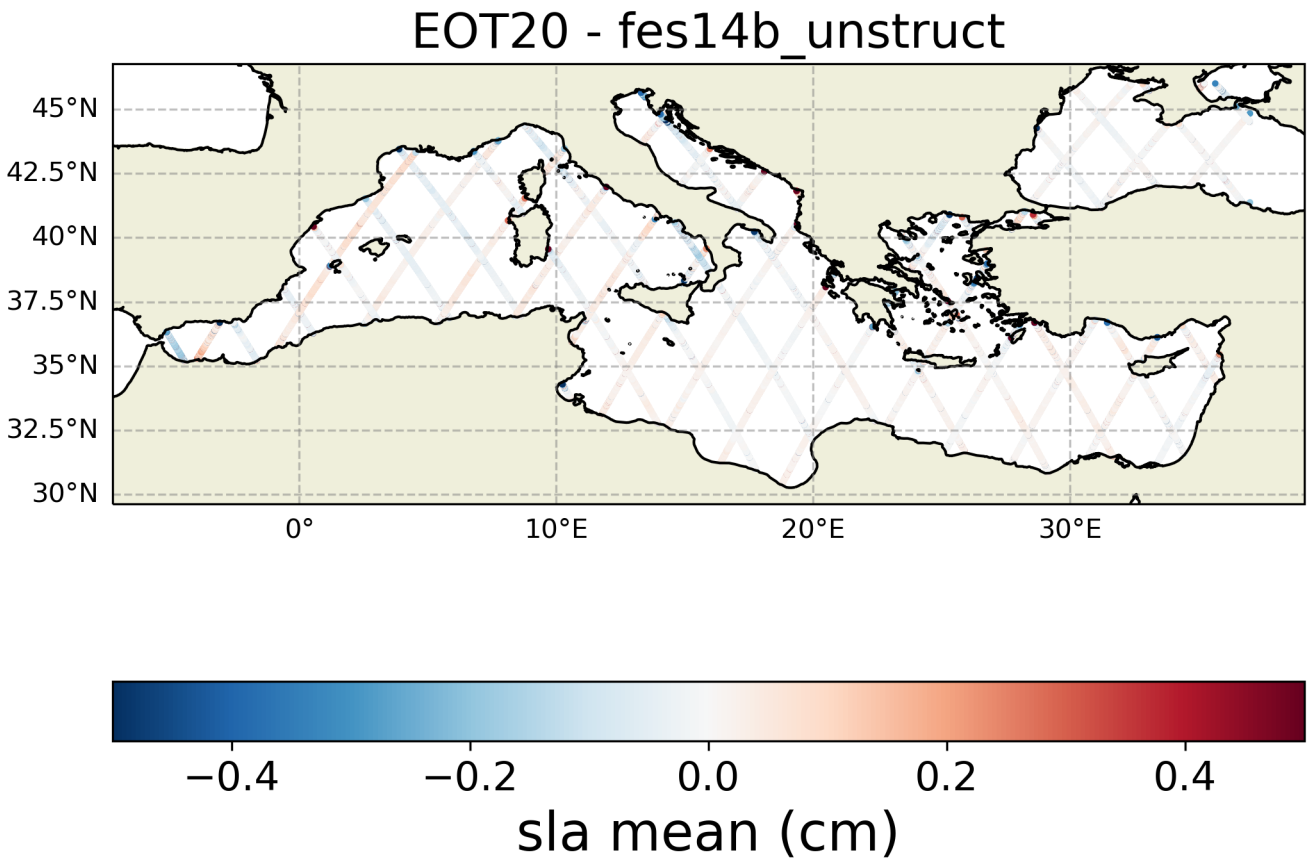

FIGURE 29 – Spatial coherence analysis of the Difference in sla 's mean between EOT20 and fes14b_unstruct

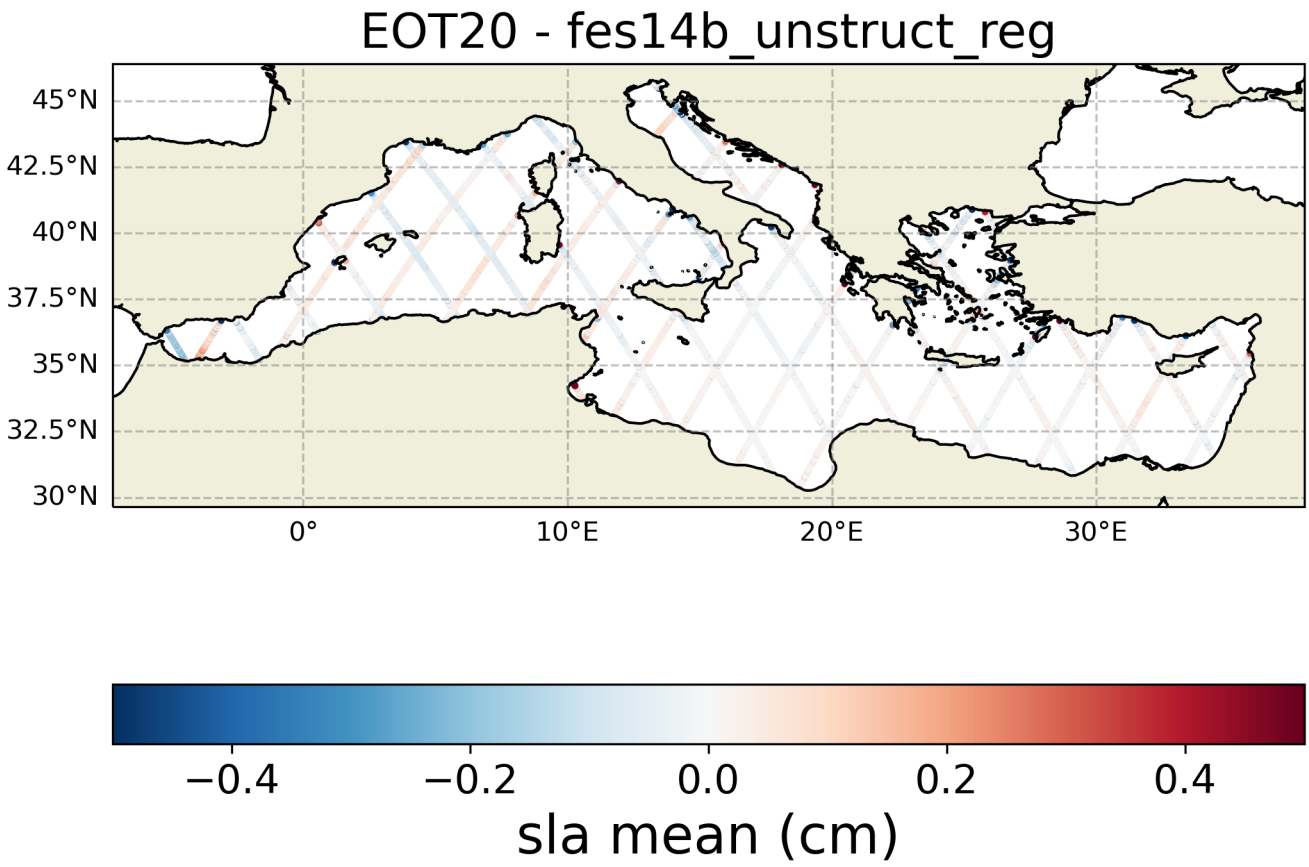

FIGURE 30 – Spatial coherence analysis of the Difference in sla 's mean between EOT20 and fes14b_unstruct_reg

3.2 Tide

3.2.1 Tide 's count

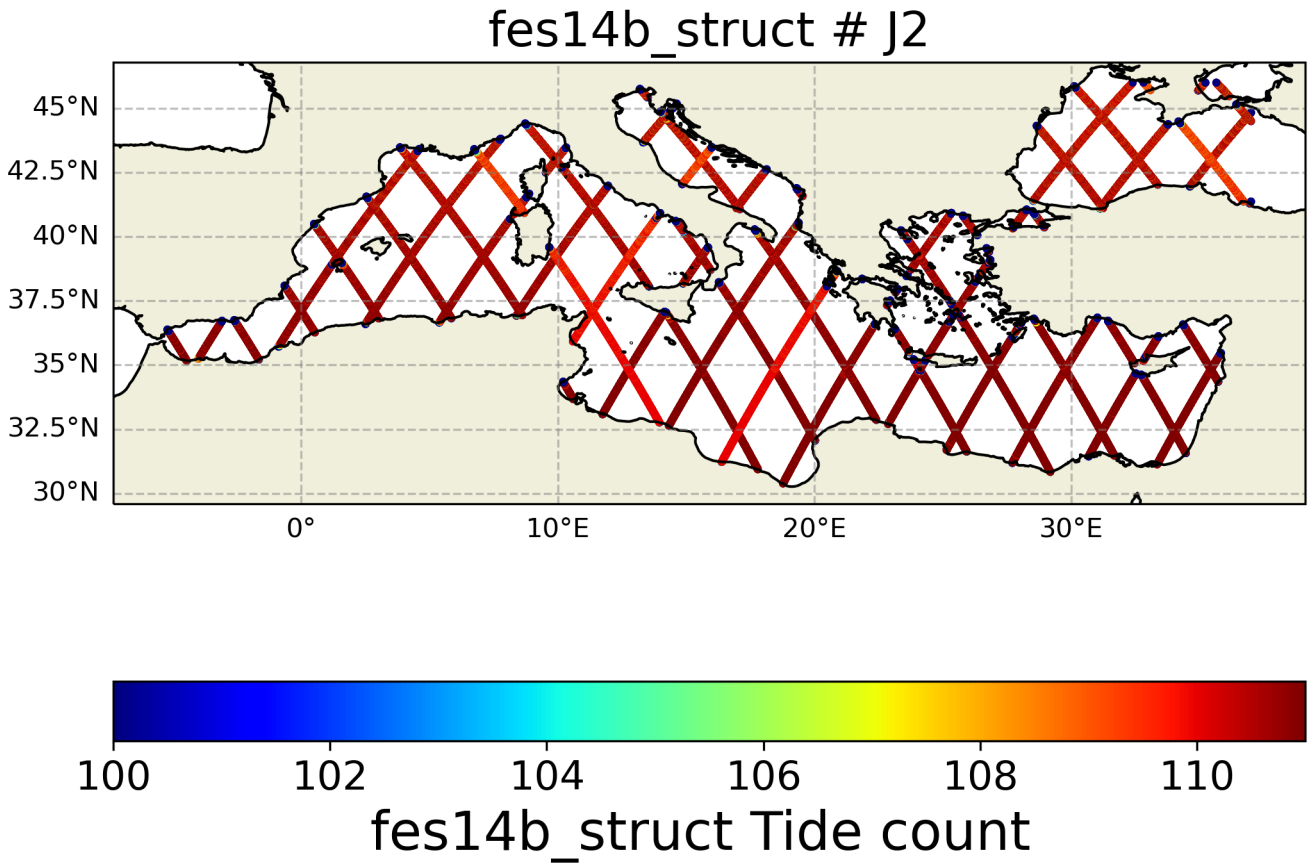

FIGURE 31 – Spatial coherence analysis of the count of the fes14b_struct version of Tide variable

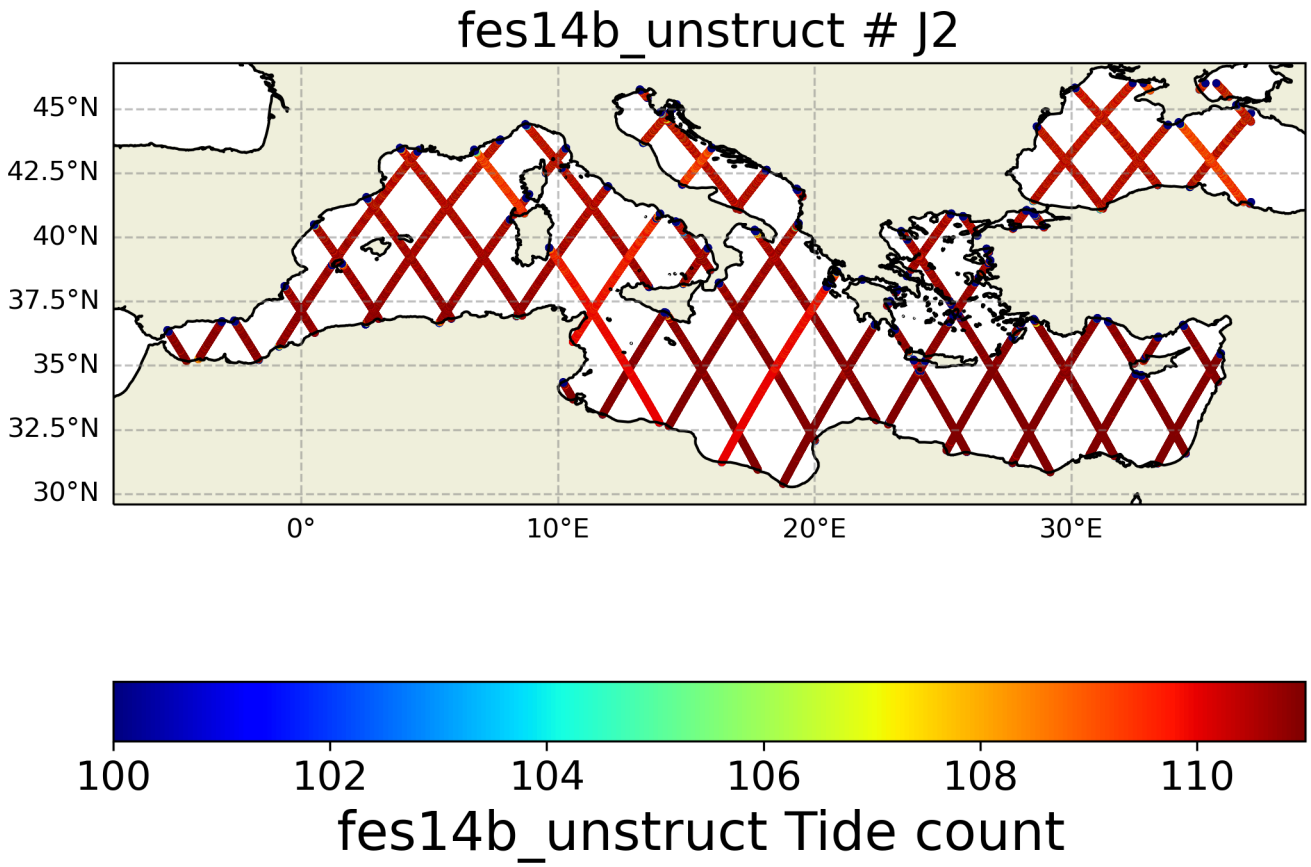

FIGURE 32 – Spatial coherence analysis of the count of the fes14b_unstruct version of Tide variable

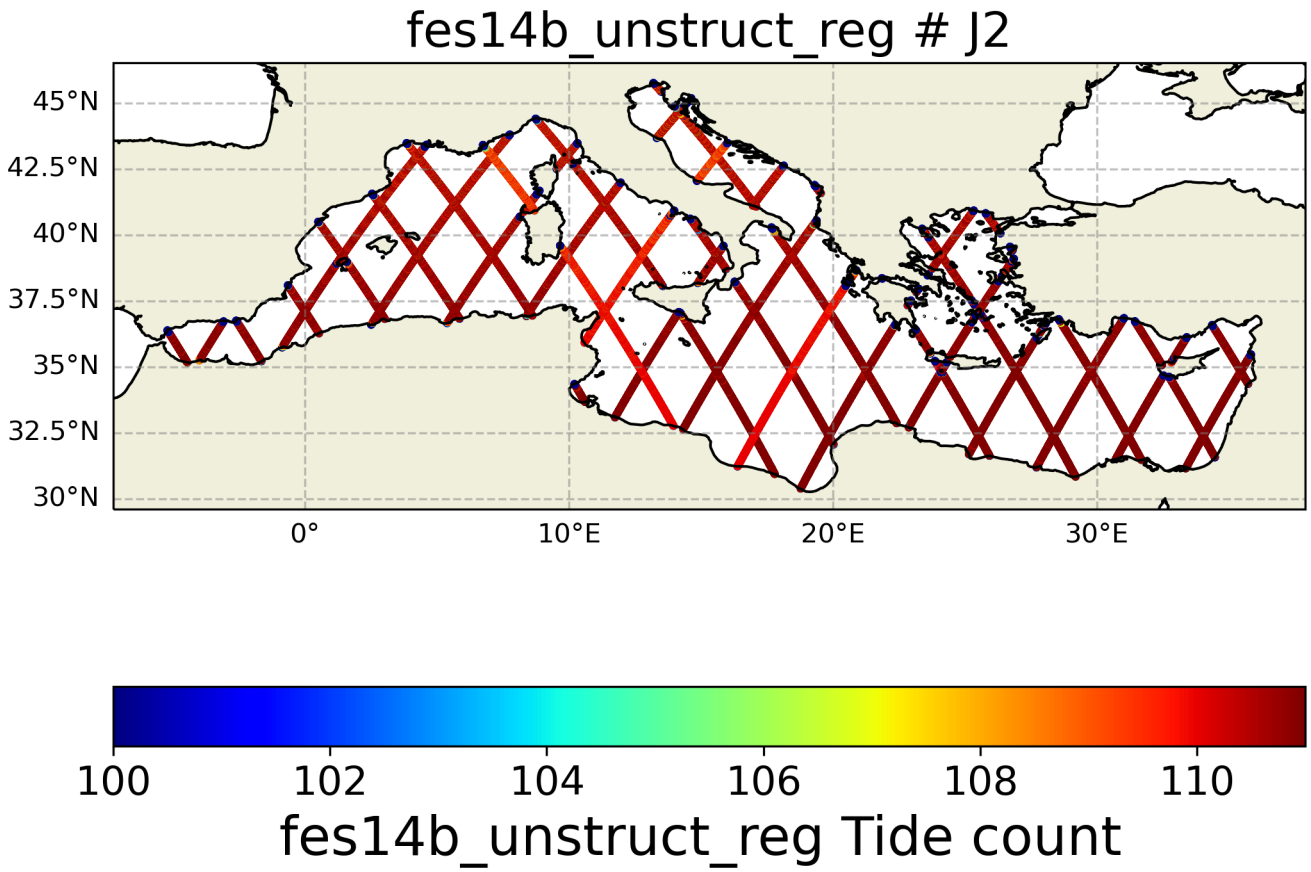

FIGURE 33 – Spatial coherence analysis of the count of the fes14b_unstruct_reg version of Tide variable

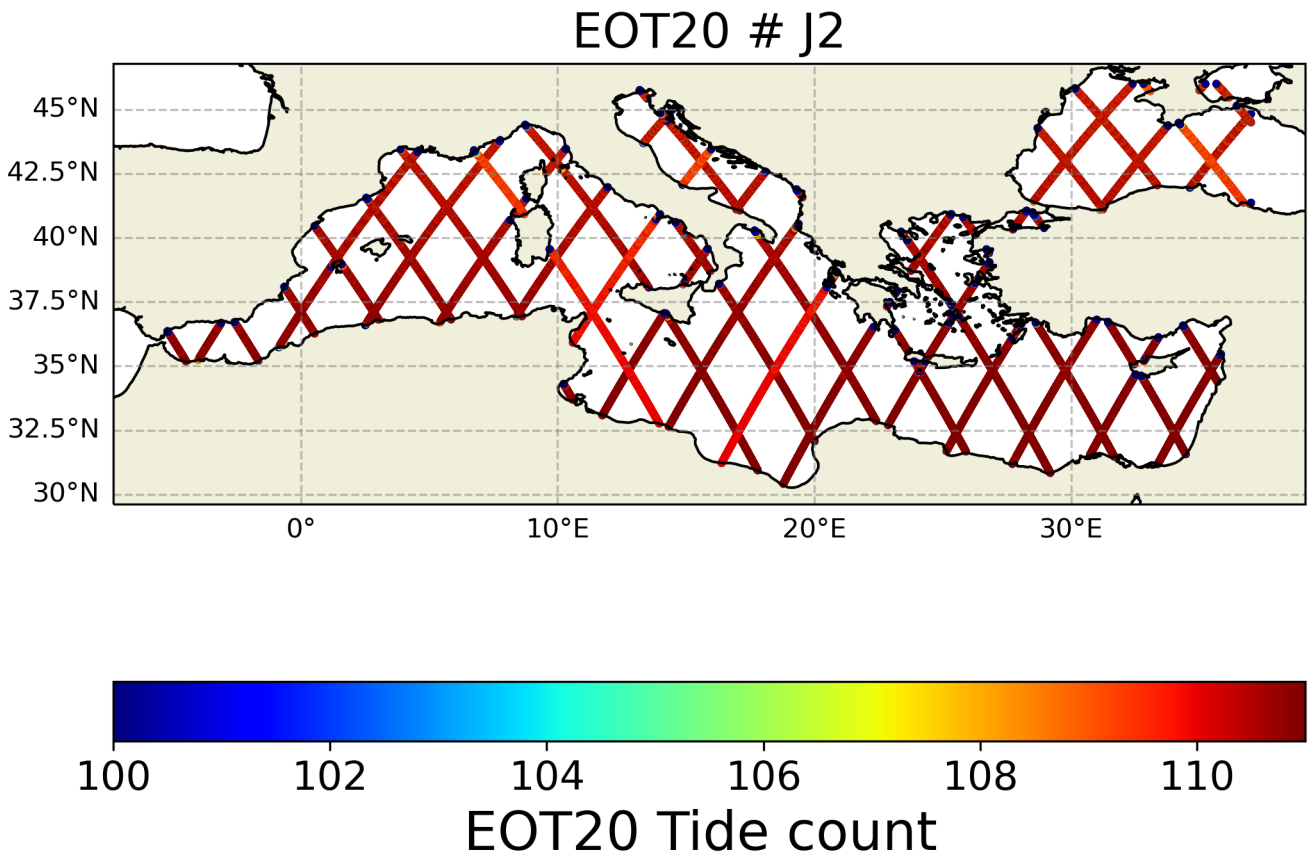

FIGURE 34 – Spatial coherence analysis of the count of the EOT20 version of Tide variable

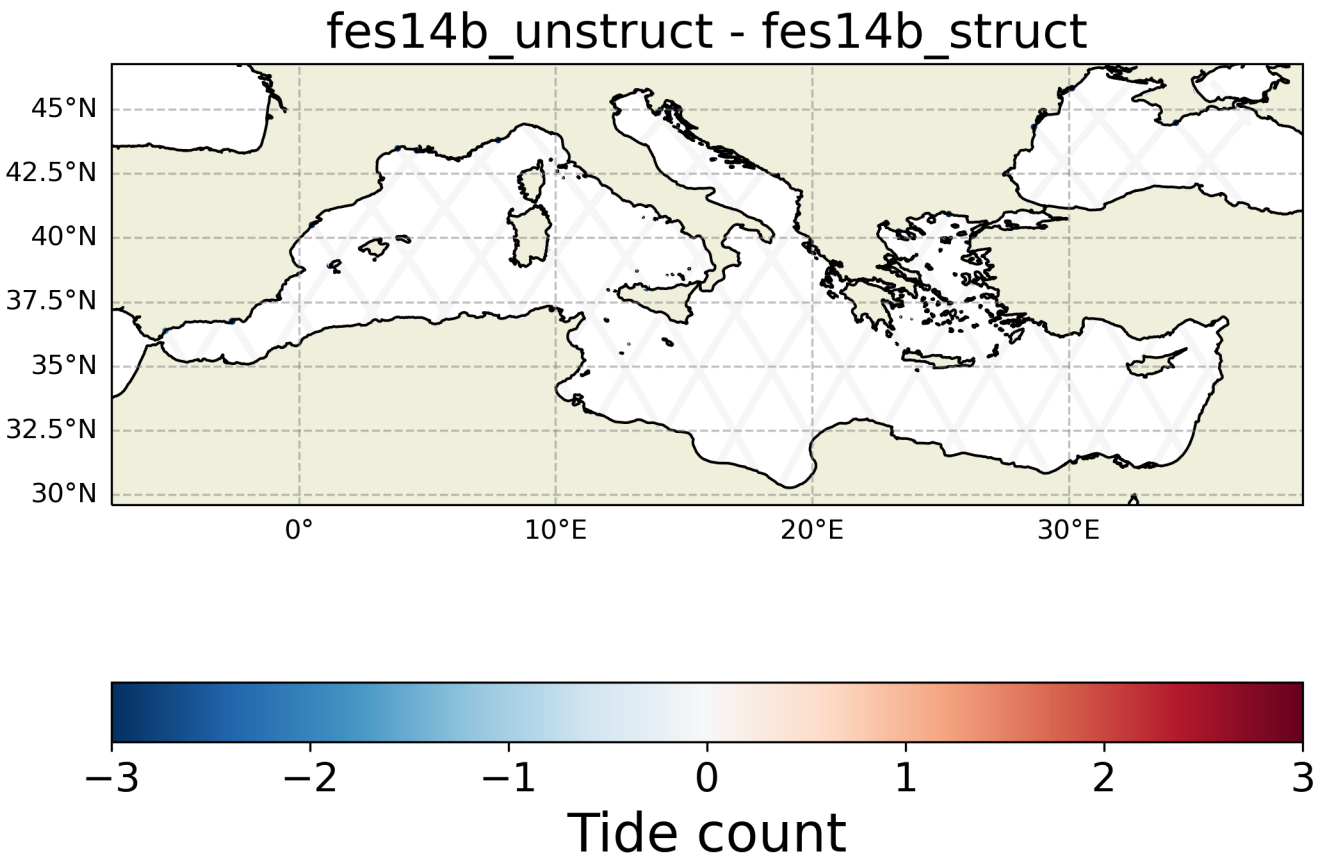

FIGURE 35 – Spatial coherence analysis of the Difference in Tide 's count between fes14b_unstruct and fes14b_struct

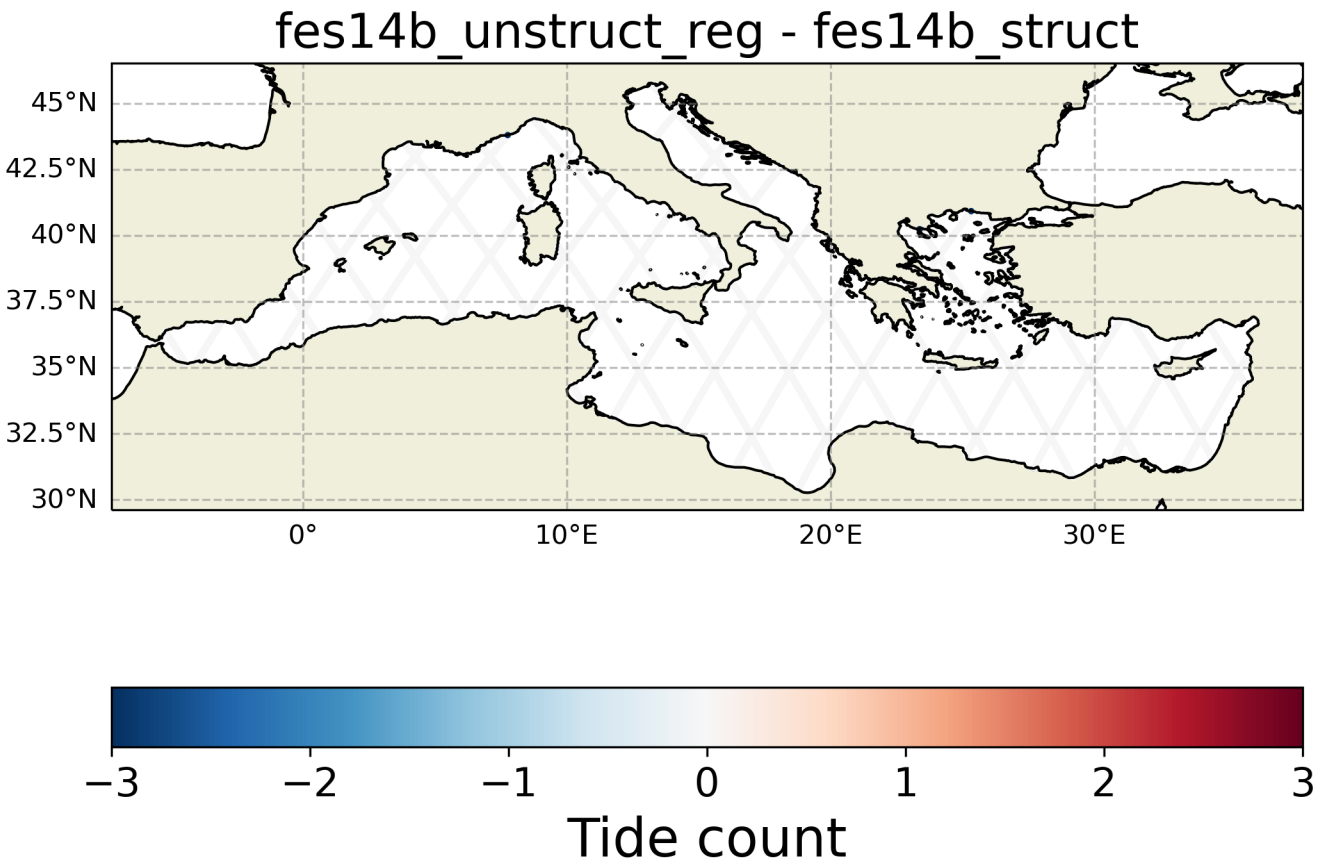

FIGURE 36 – Spatial coherence analysis of the Difference in Tide 's count between fes14b_unstruct_reg and fes14b_struct

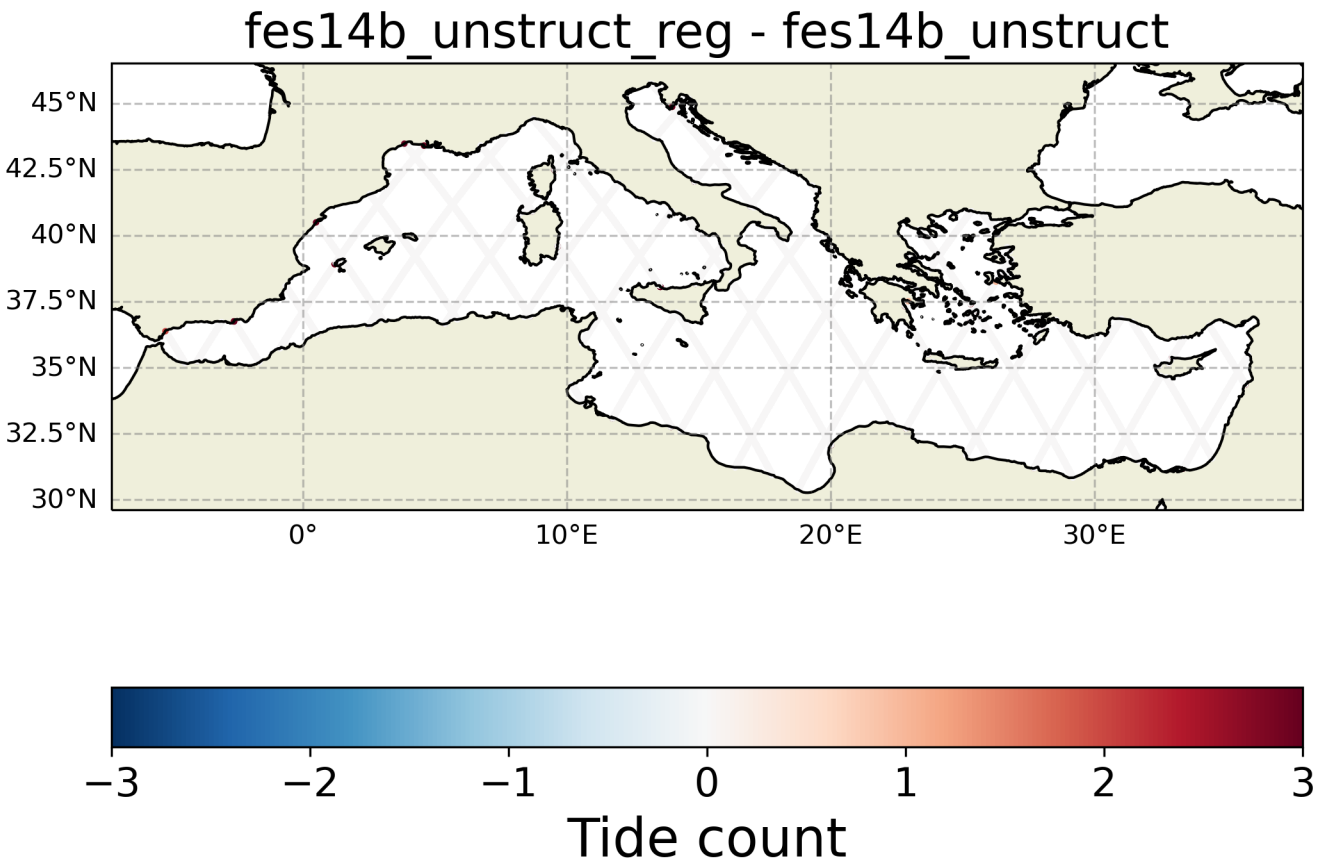

FIGURE 37 – Spatial coherence analysis of the Difference in Tide 's count between fes14b_unstruct_reg and fes14b_unstruct

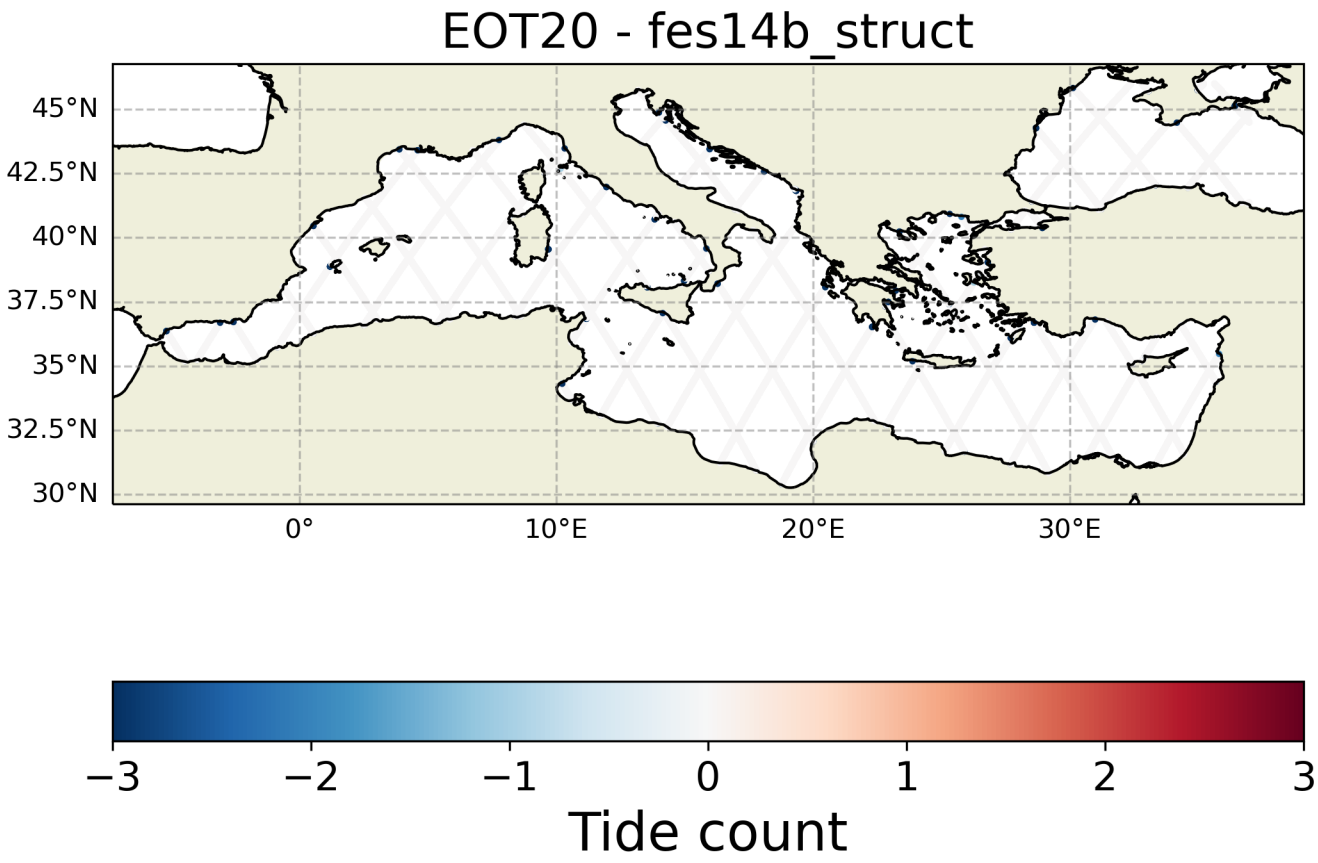

Figure 38 – Spatial coherence analysis of the Difference in Tide 's count between EOT20 and fes14b_struct

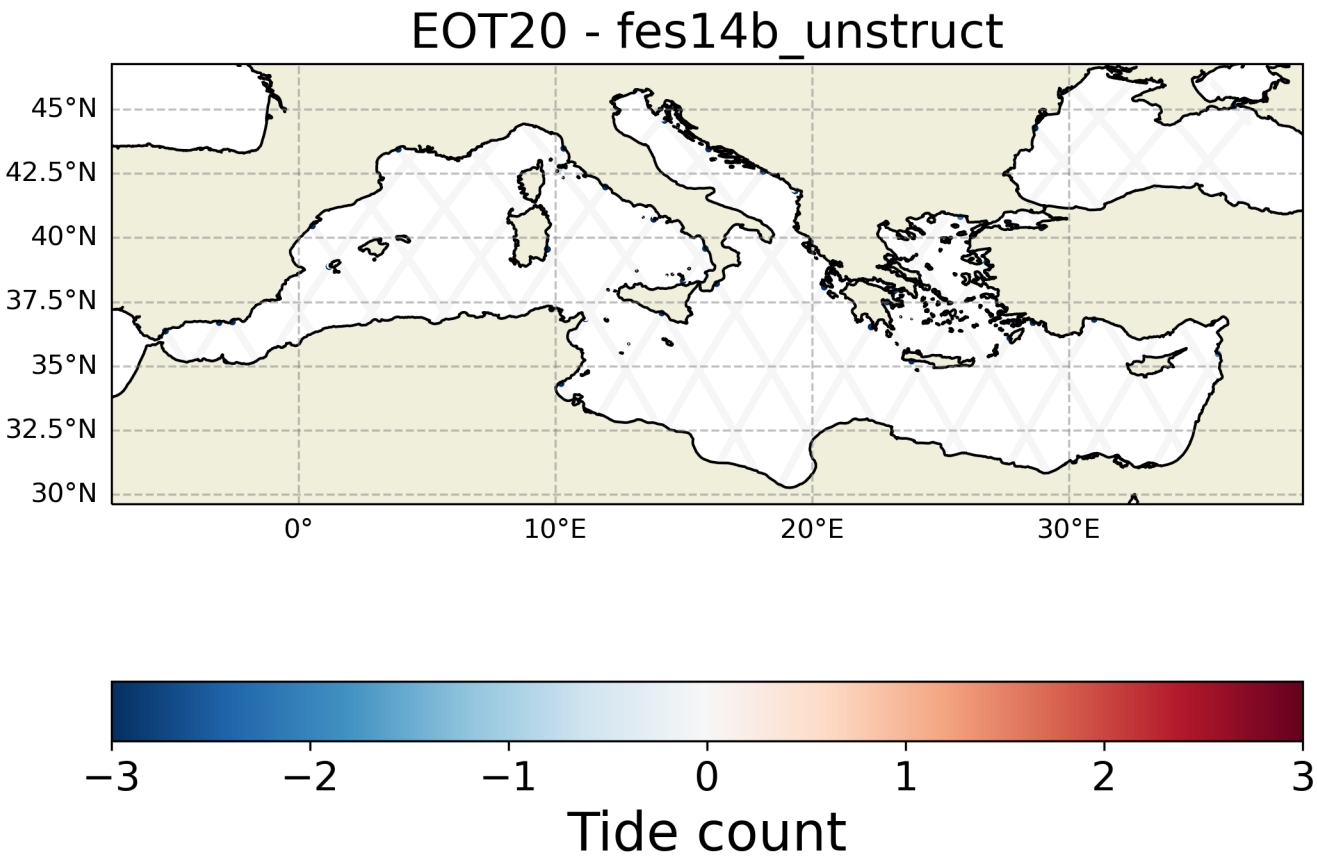

Figure 39 – Spatial coherence analysis of the Difference in Tide 's count between EOT20 and fes14b_unstruct

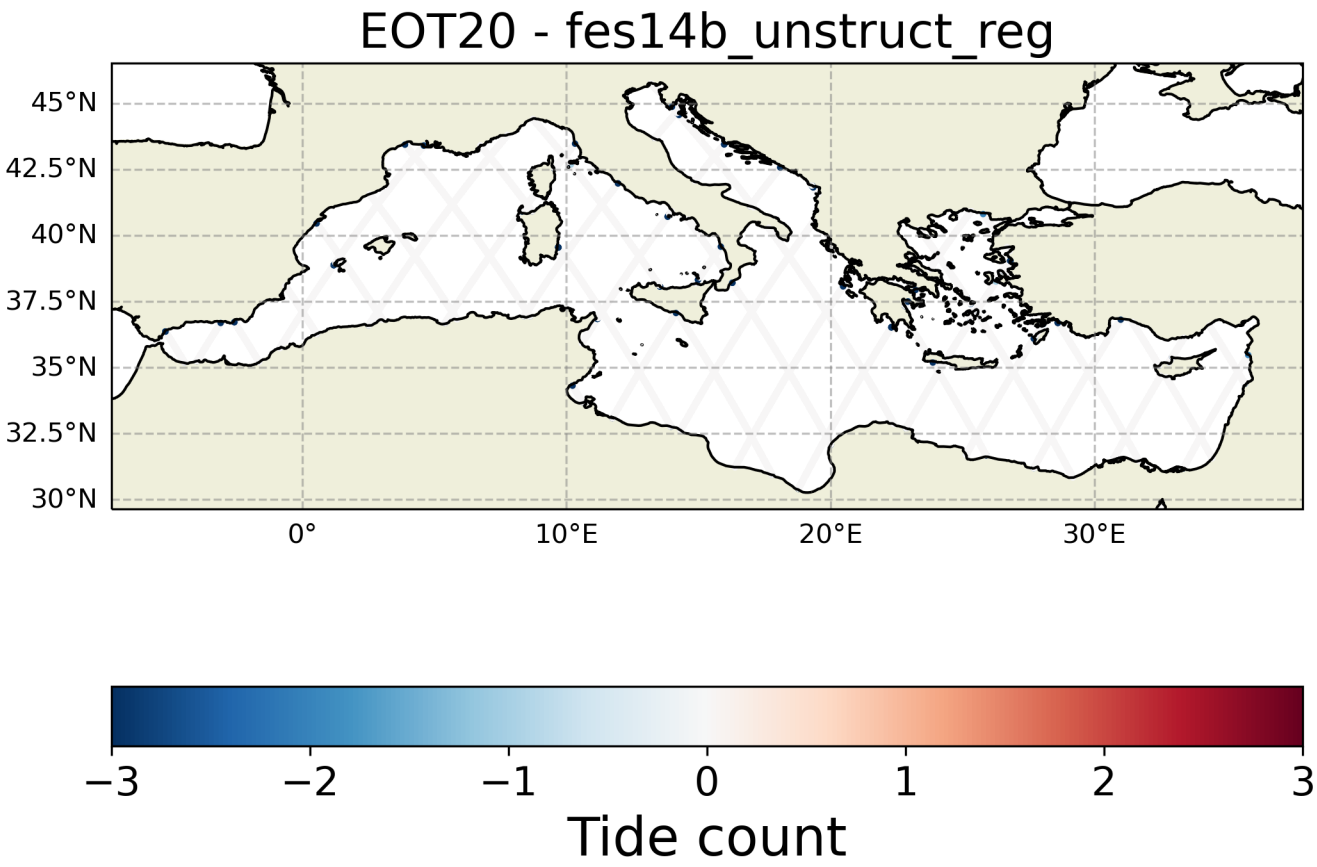

Figure 40 – Spatial coherence analysis of the Difference in Tide 's count between EOT20 and fes14b_unstruct_reg

3.2.2 Tide 's std

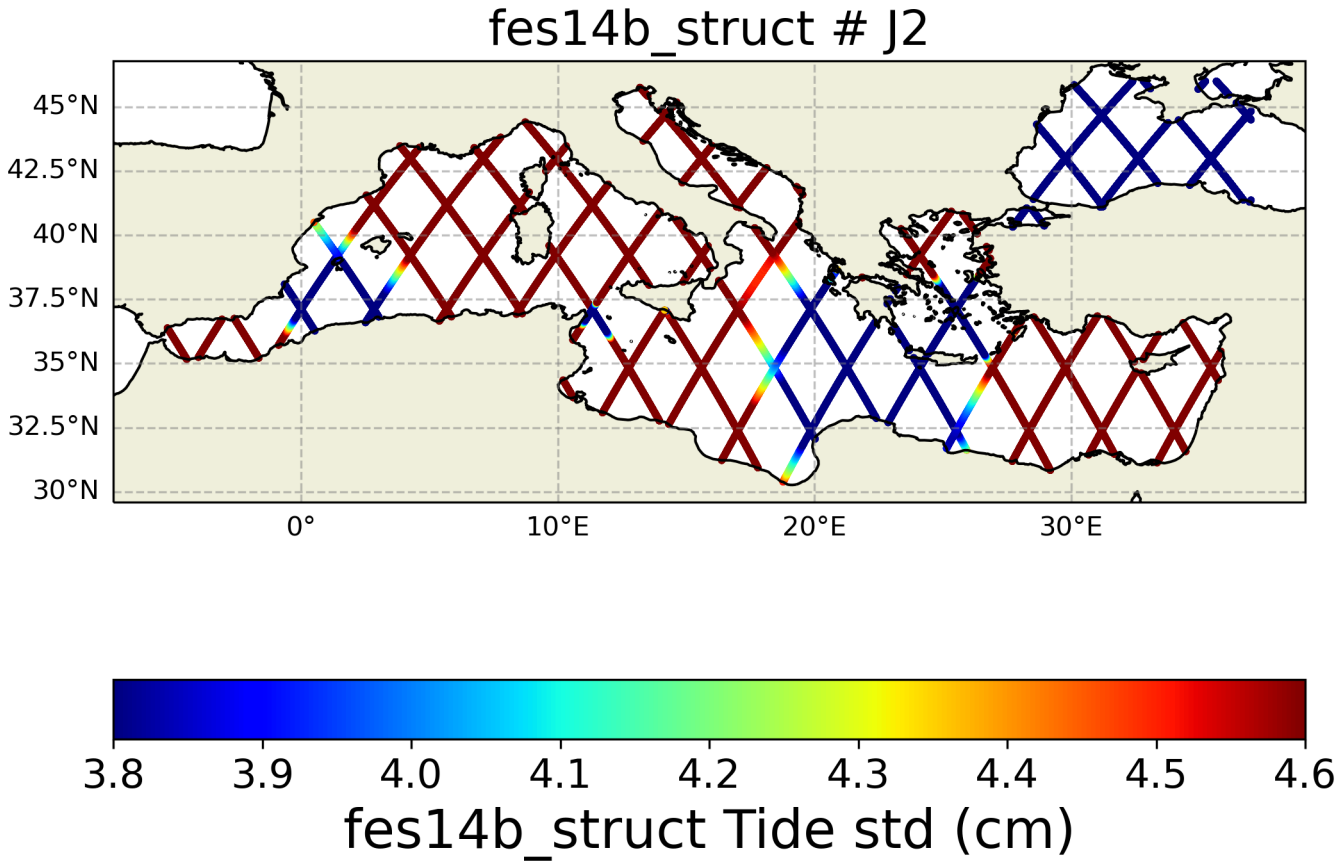

FIGURE 41 – Spatial coherence analysis of the std of the fes14b_struct version of Tide variable

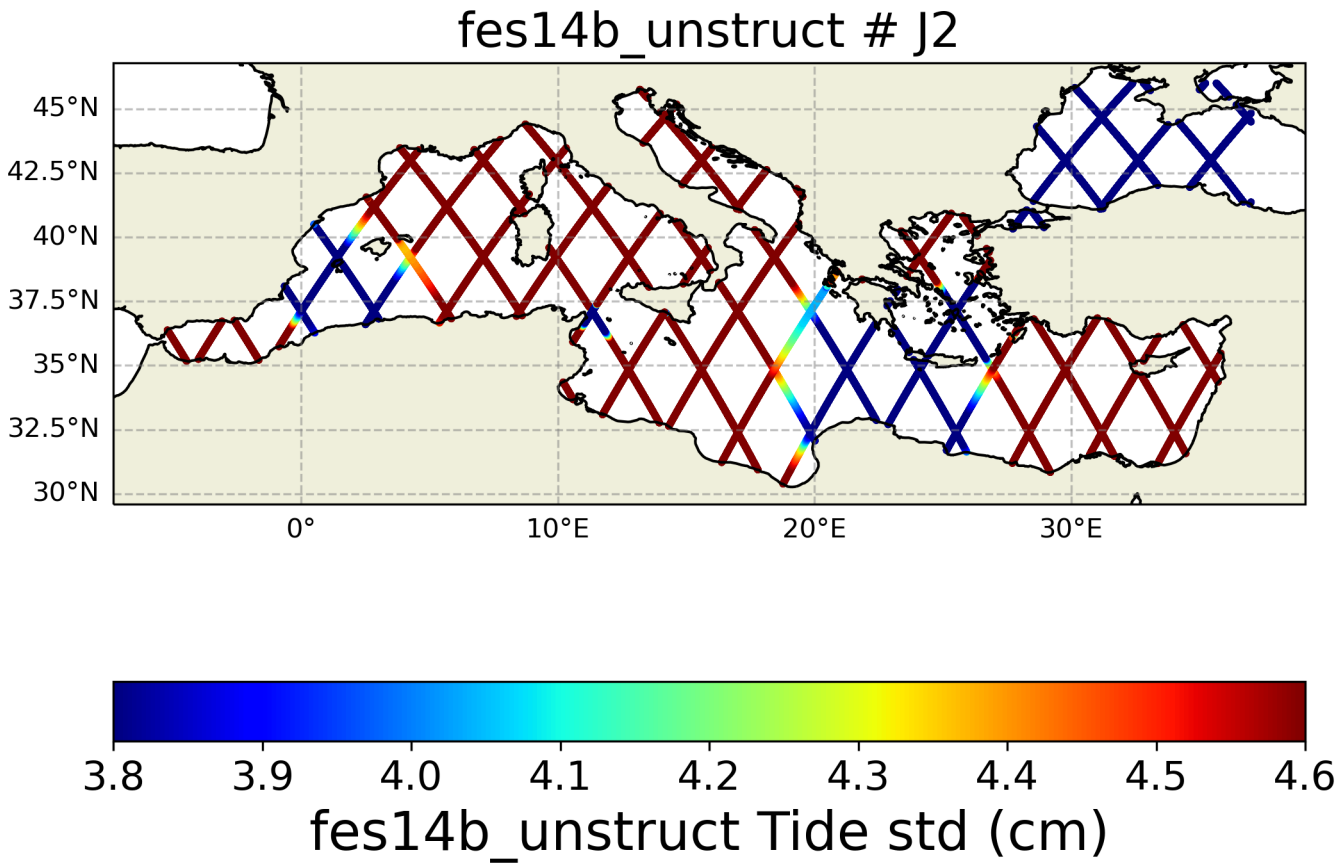

FIGURE 42 – Spatial coherence analysis of the std of the fes14b_unstruct version of Tide variable

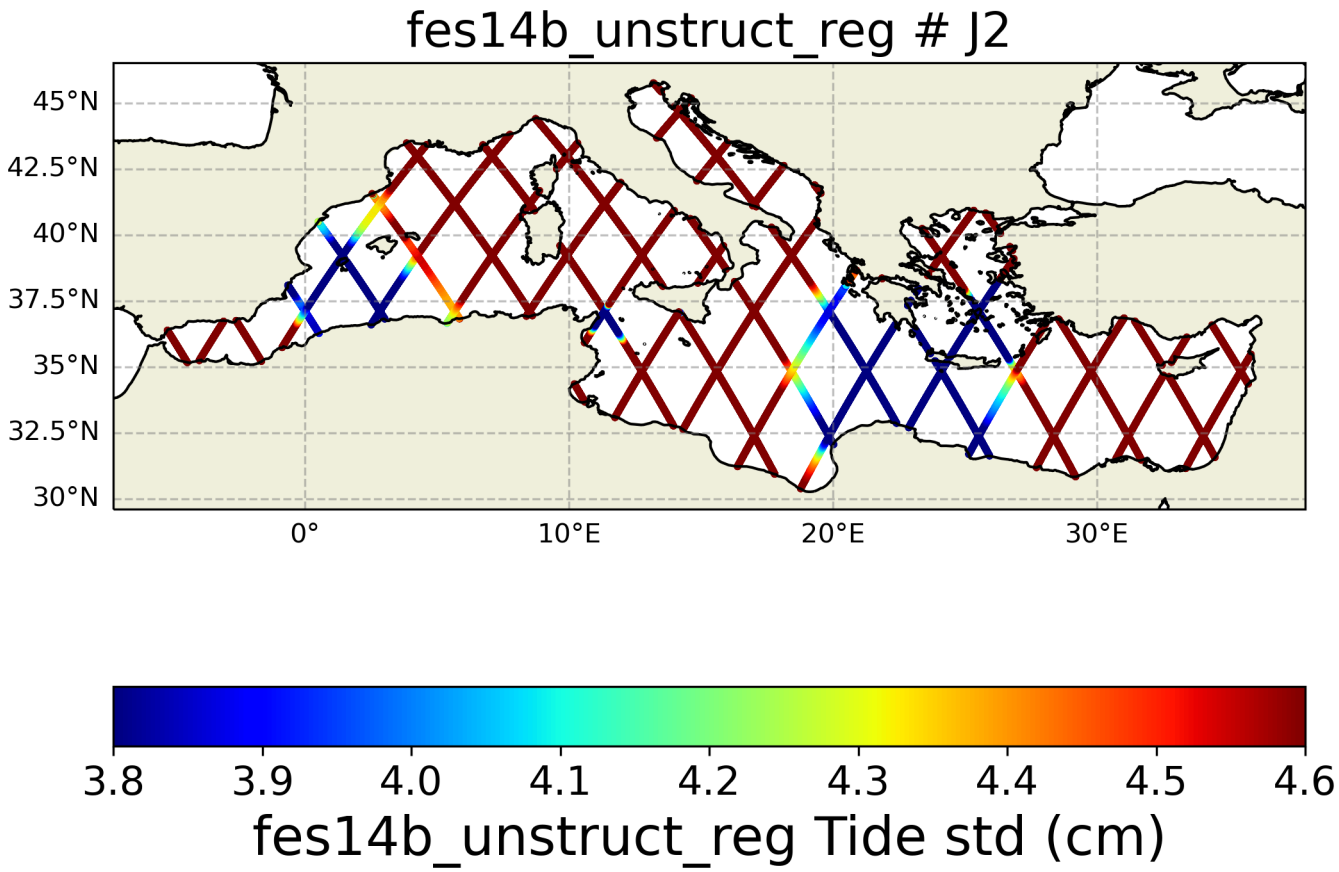

FIGURE 43 – Spatial coherence analysis of the std of the fes14b_unstruct_reg version of Tide variable

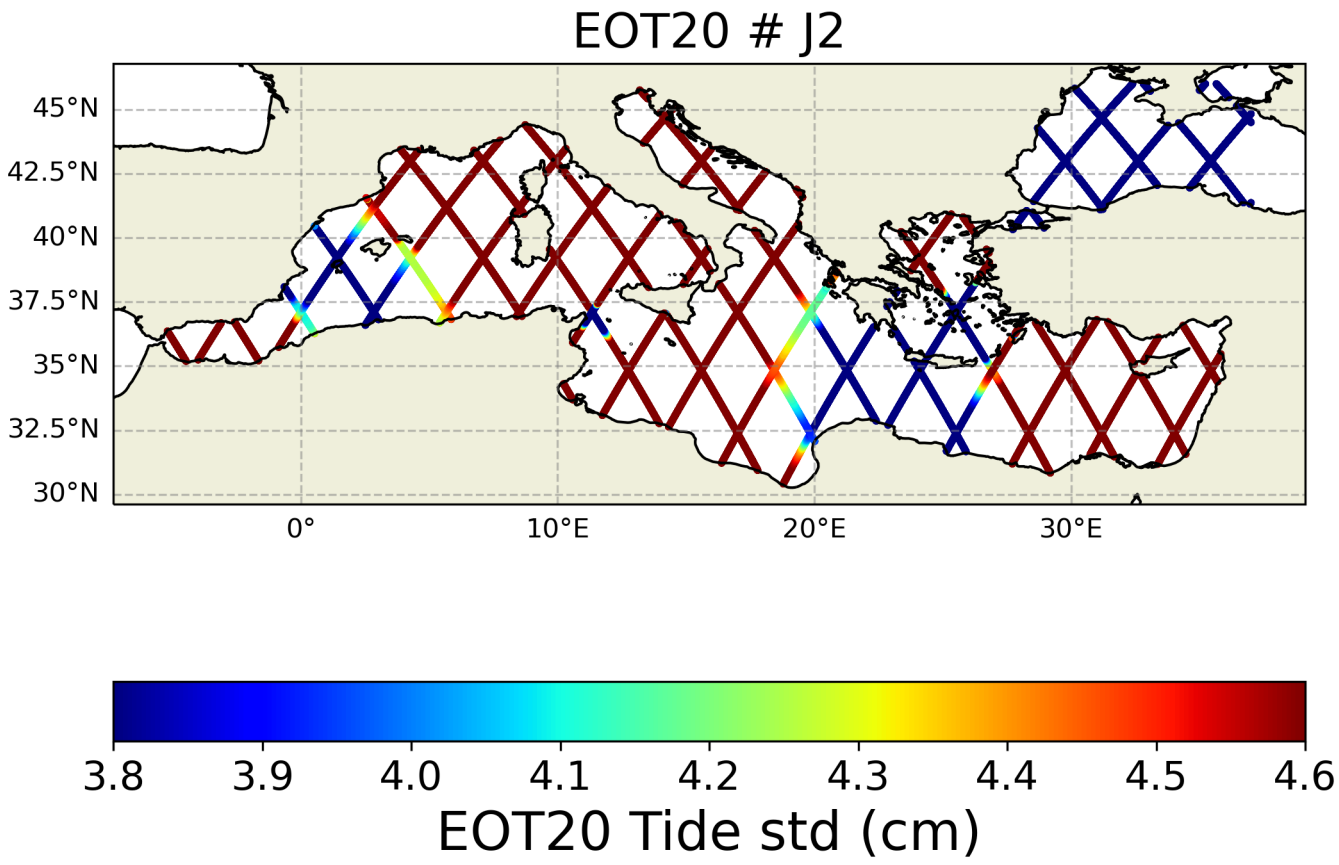

Figure 44 – Spatial coherence analysis of the std of the EOT20 version of Tide variable

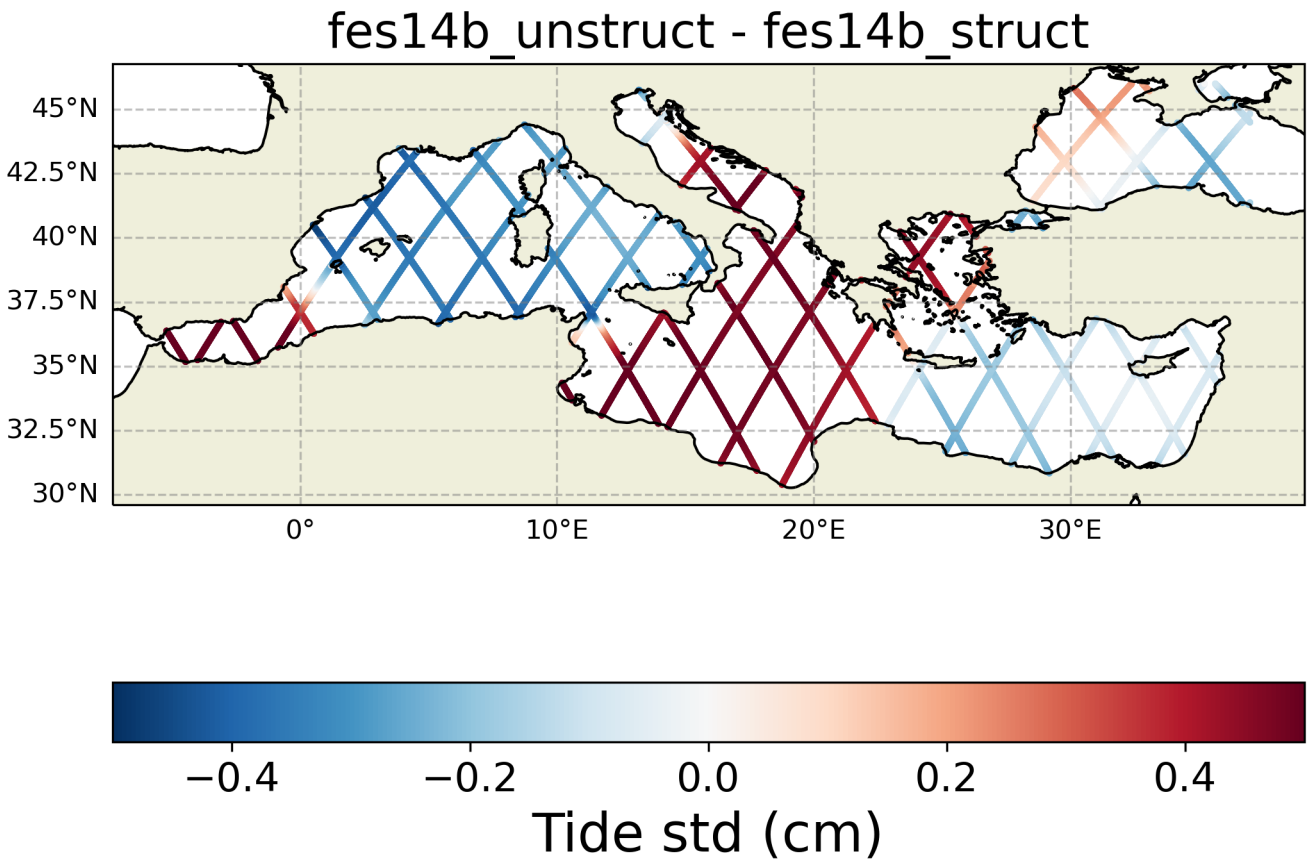

FIGURE 45 – Spatial coherence analysis of the Difference in Tide 's std between fes14b_unstruct and fes14b_struct

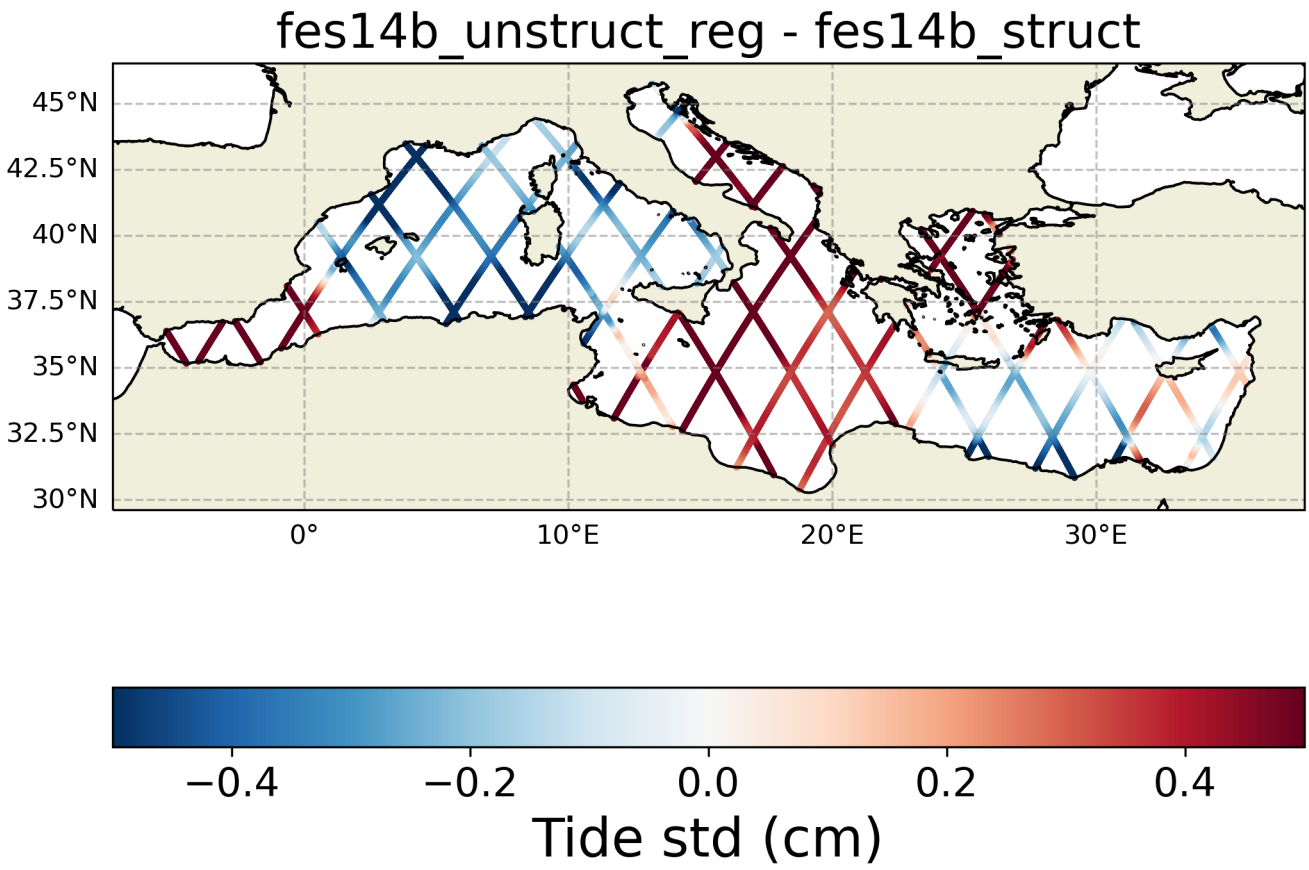

FIGURE 46 – Spatial coherence analysis of the Difference in Tide 's std between fes14b_unstruct_reg and fes14b_struct

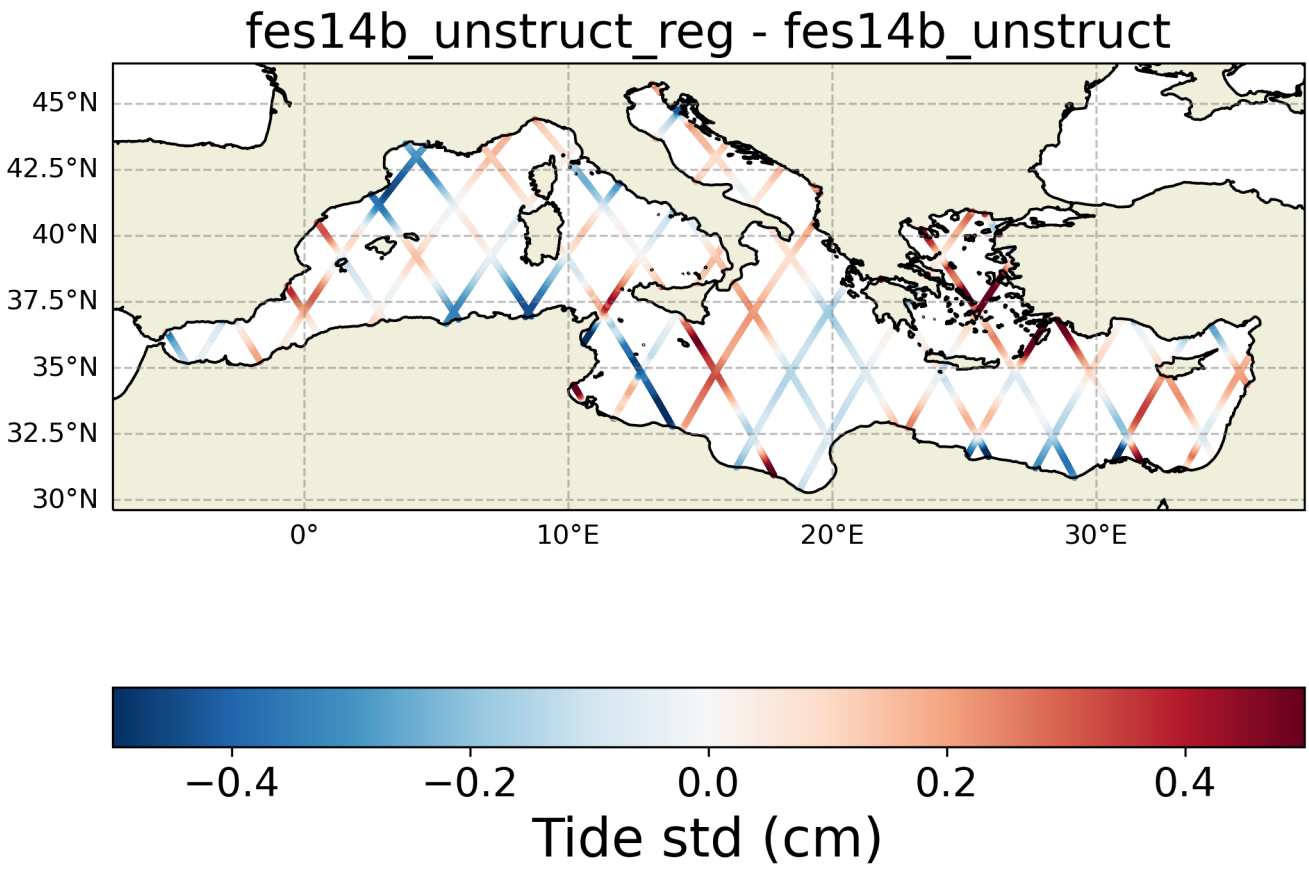

FIGURE 47 – Spatial coherence analysis of the Difference in Tide 's std between fes14b_unstruct_reg and fes14b_unstruct

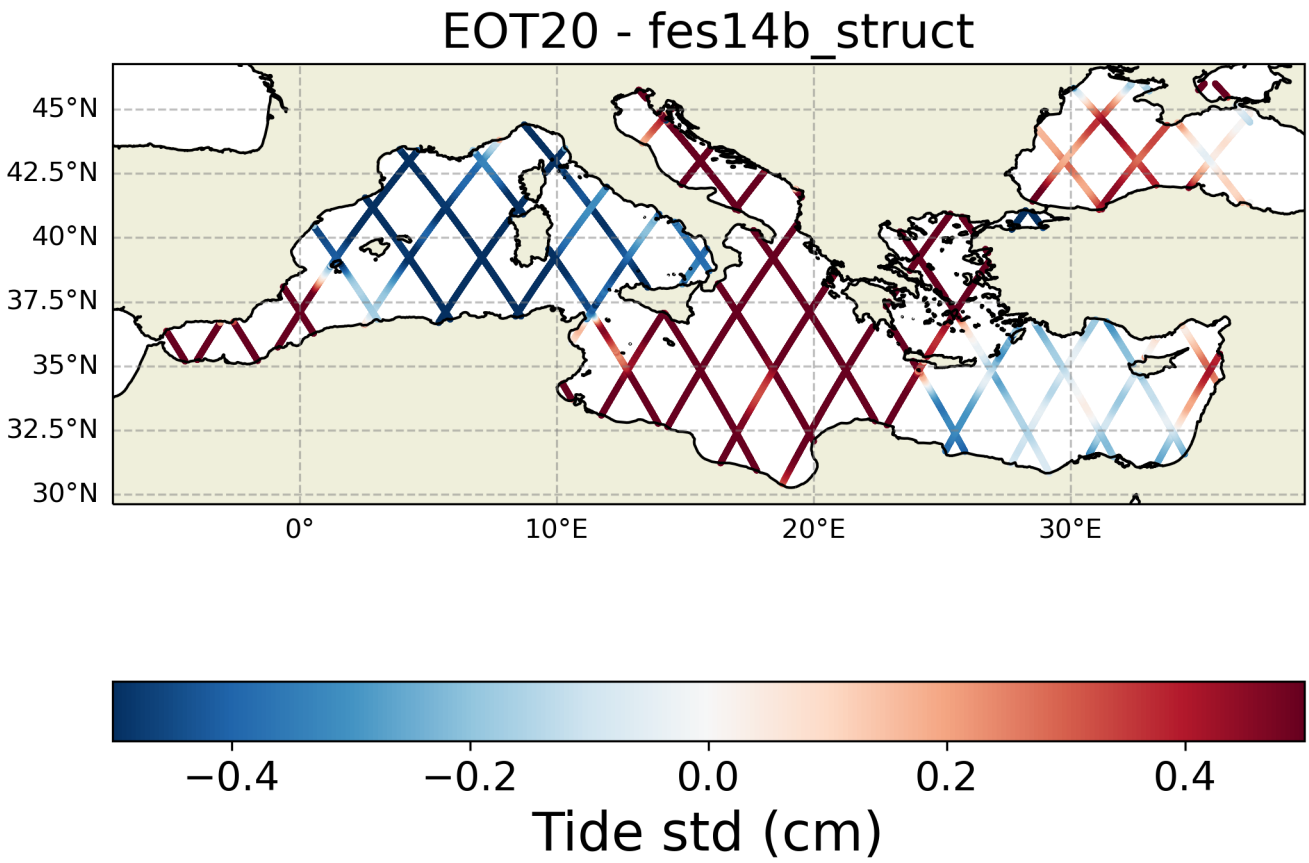

FIGURE 48 – Spatial coherence analysis of the Difference in Tide 's std between EOT20 and fes14b_struct

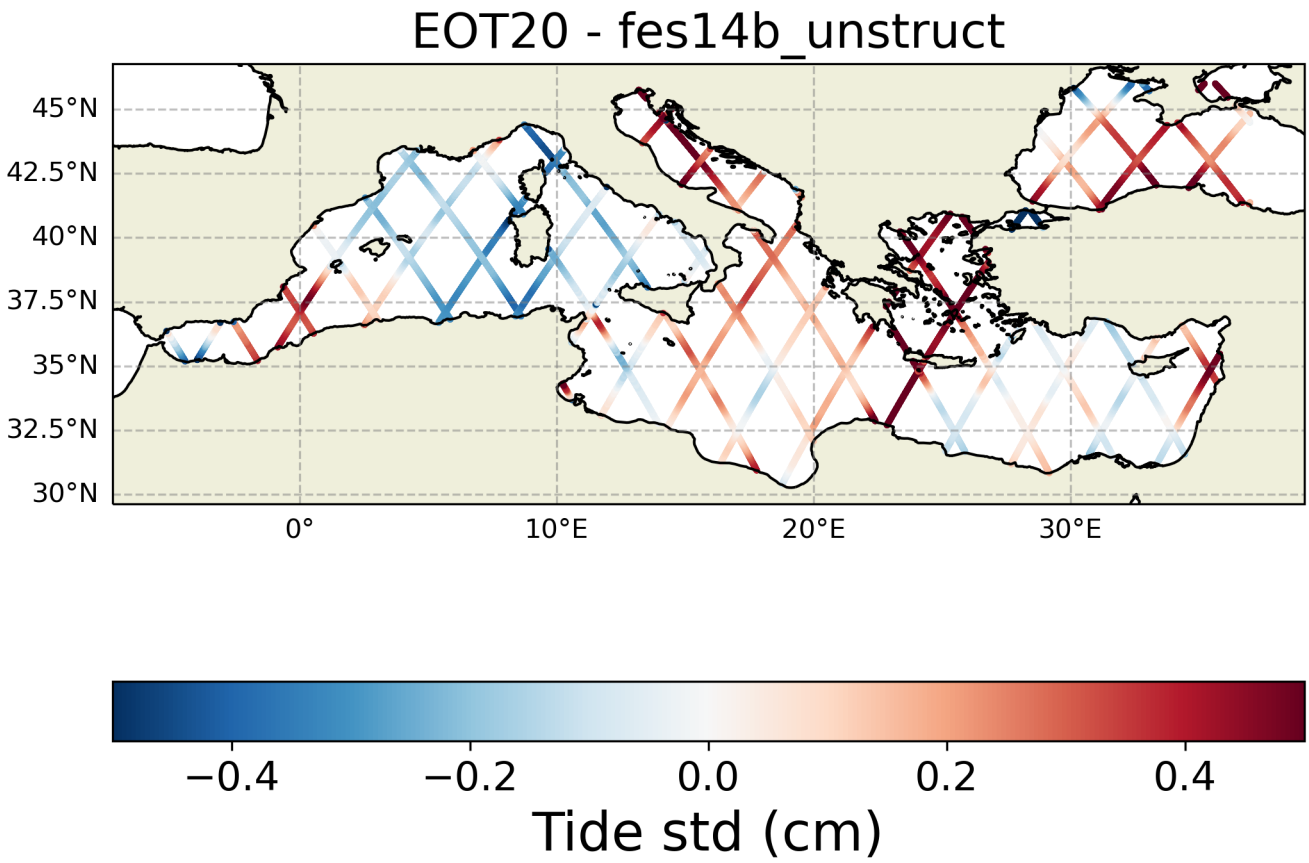

Figure 49 – Spatial coherence analysis of the Difference in Tide 's std between EOT20 and fes14b_unstruct

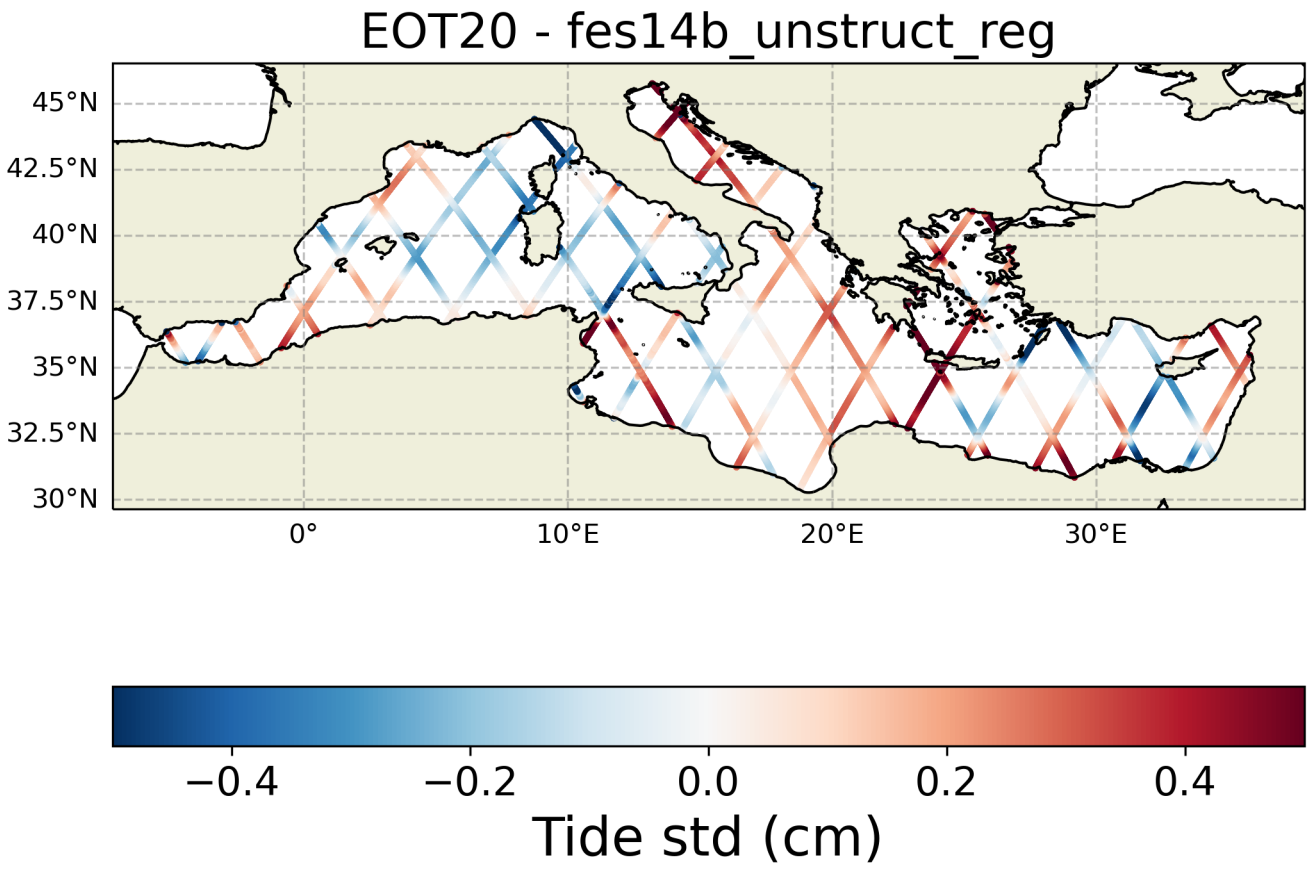

FIGURE 50 – Spatial coherence analysis of the Difference in Tide 's std between EOT20 and fes14b_unstruct_reg

3.2.3 Tide 's mean

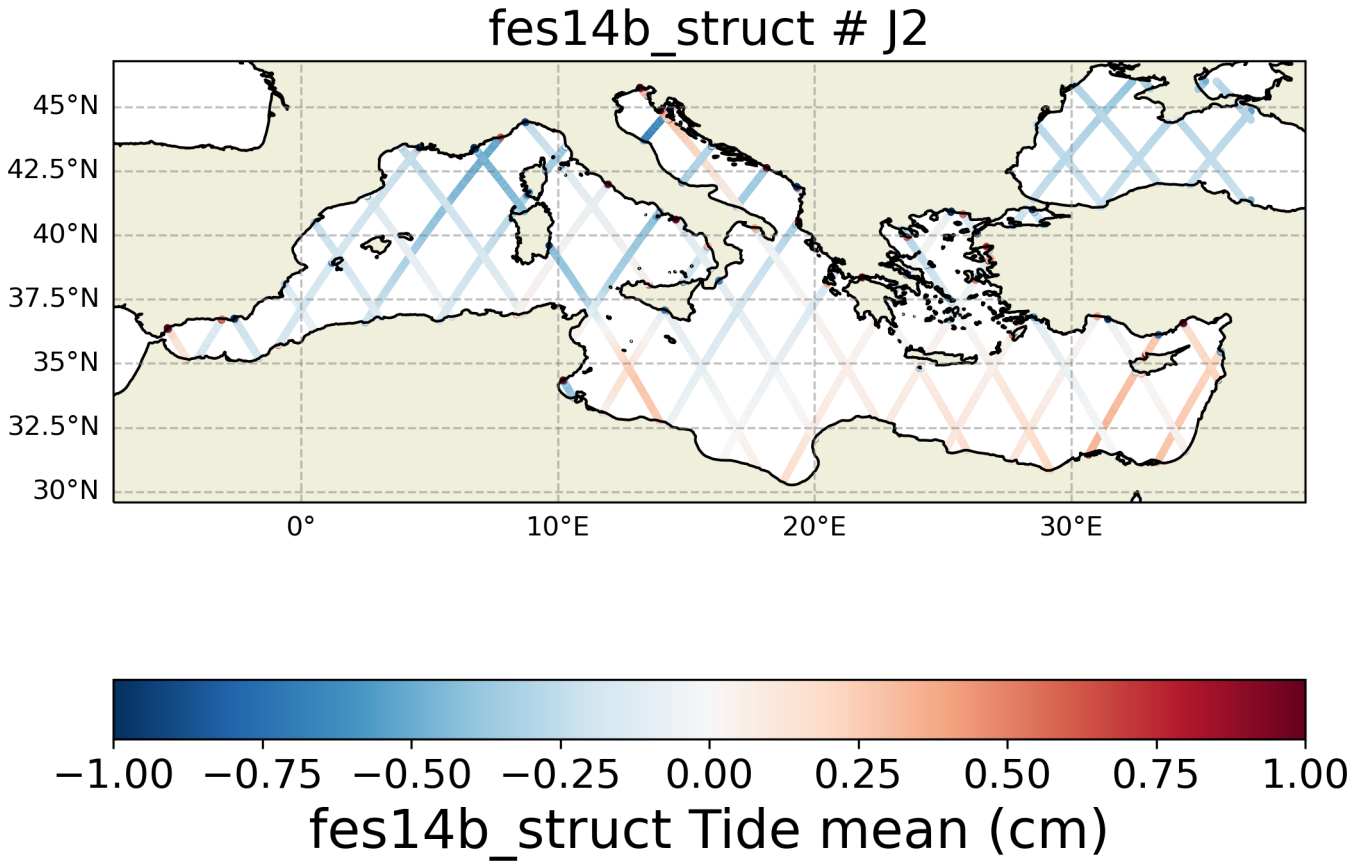

FIGURE 51 – Spatial coherence analysis of the mean of the fes14b_struct version of Tide variable

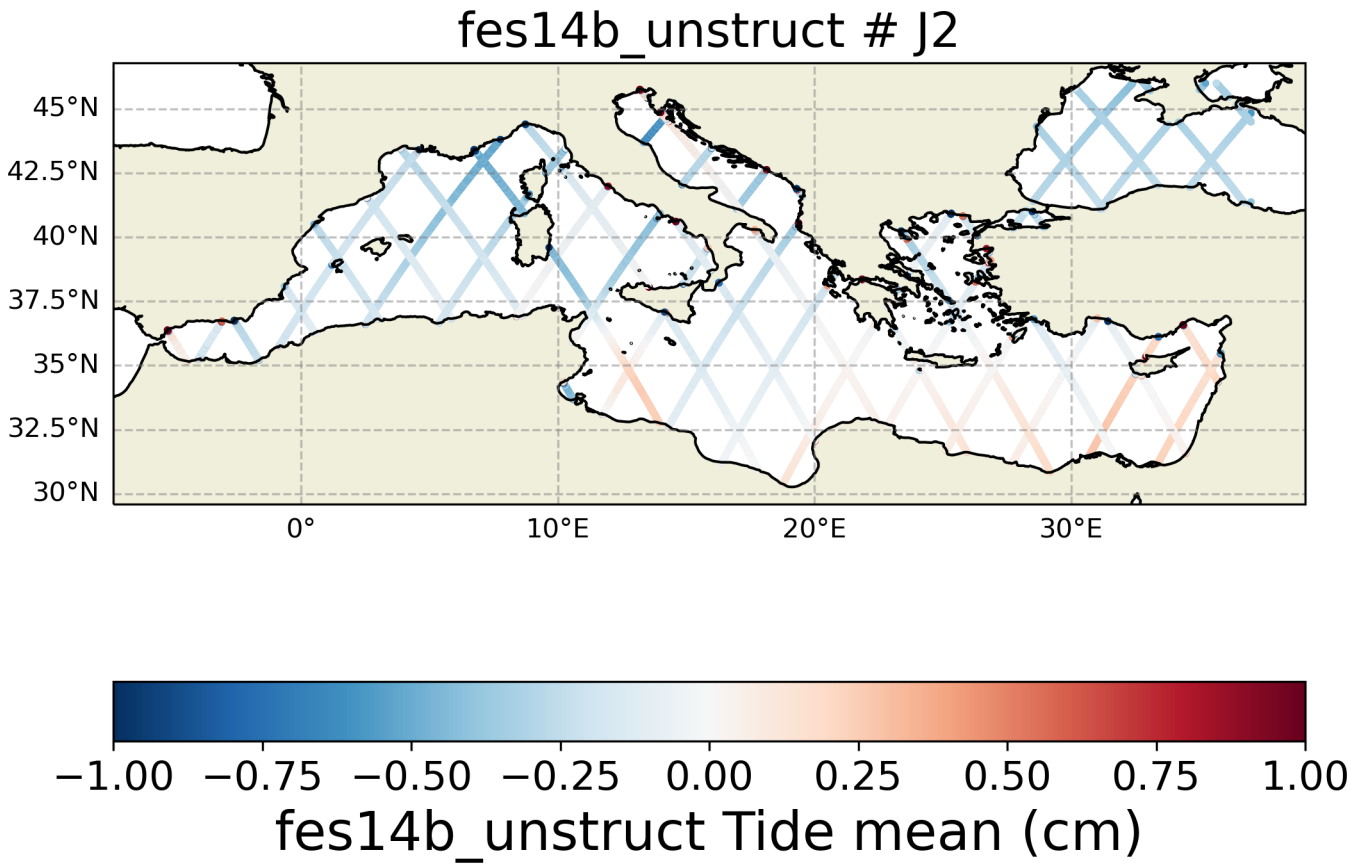

FIGURE 52 – Spatial coherence analysis of the mean of the fes14b_unstruct version of Tide variable

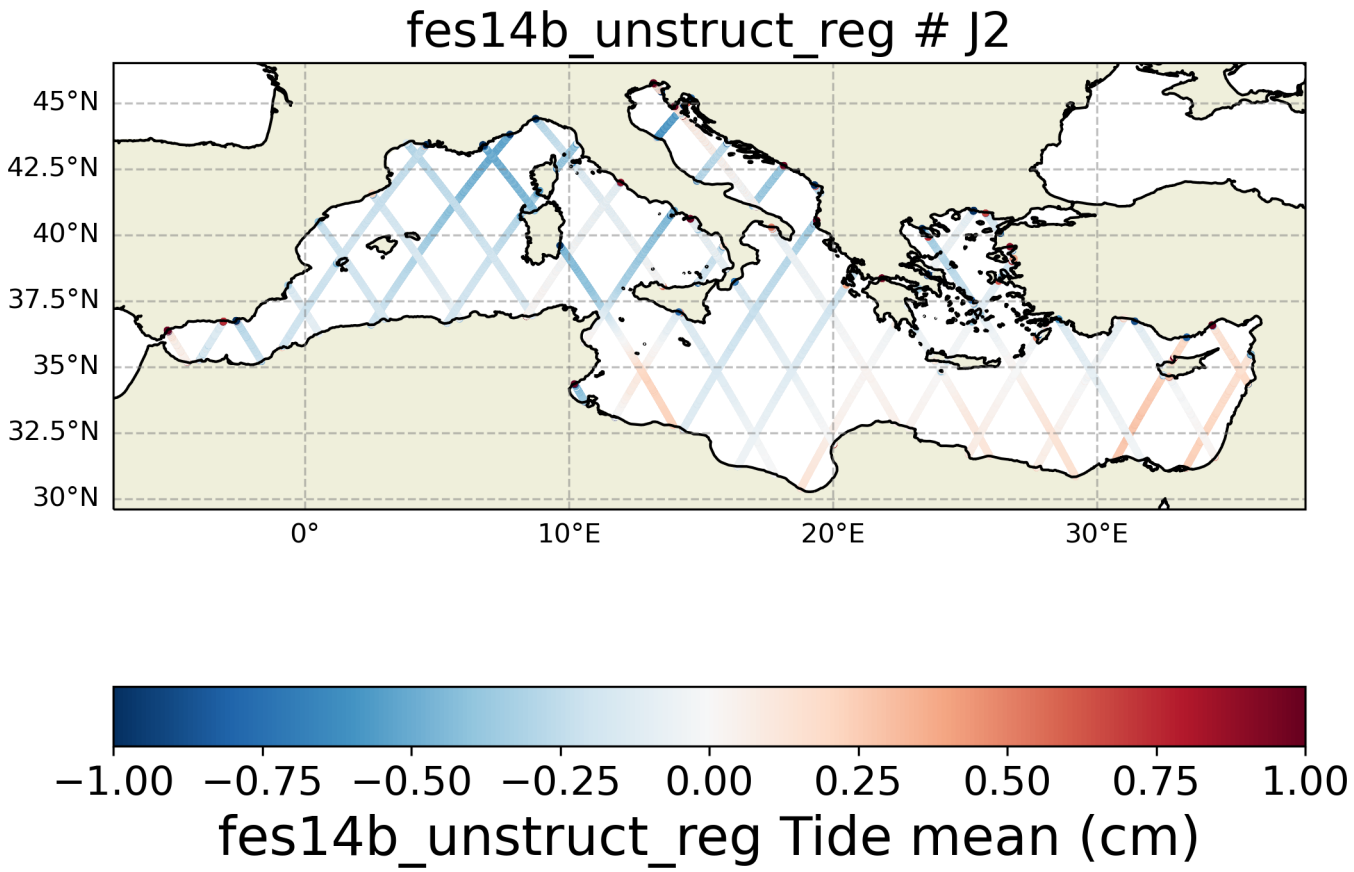

FIGURE 53 – Spatial coherence analysis of the mean of the fes14b_unstruct_reg version of Tide variable

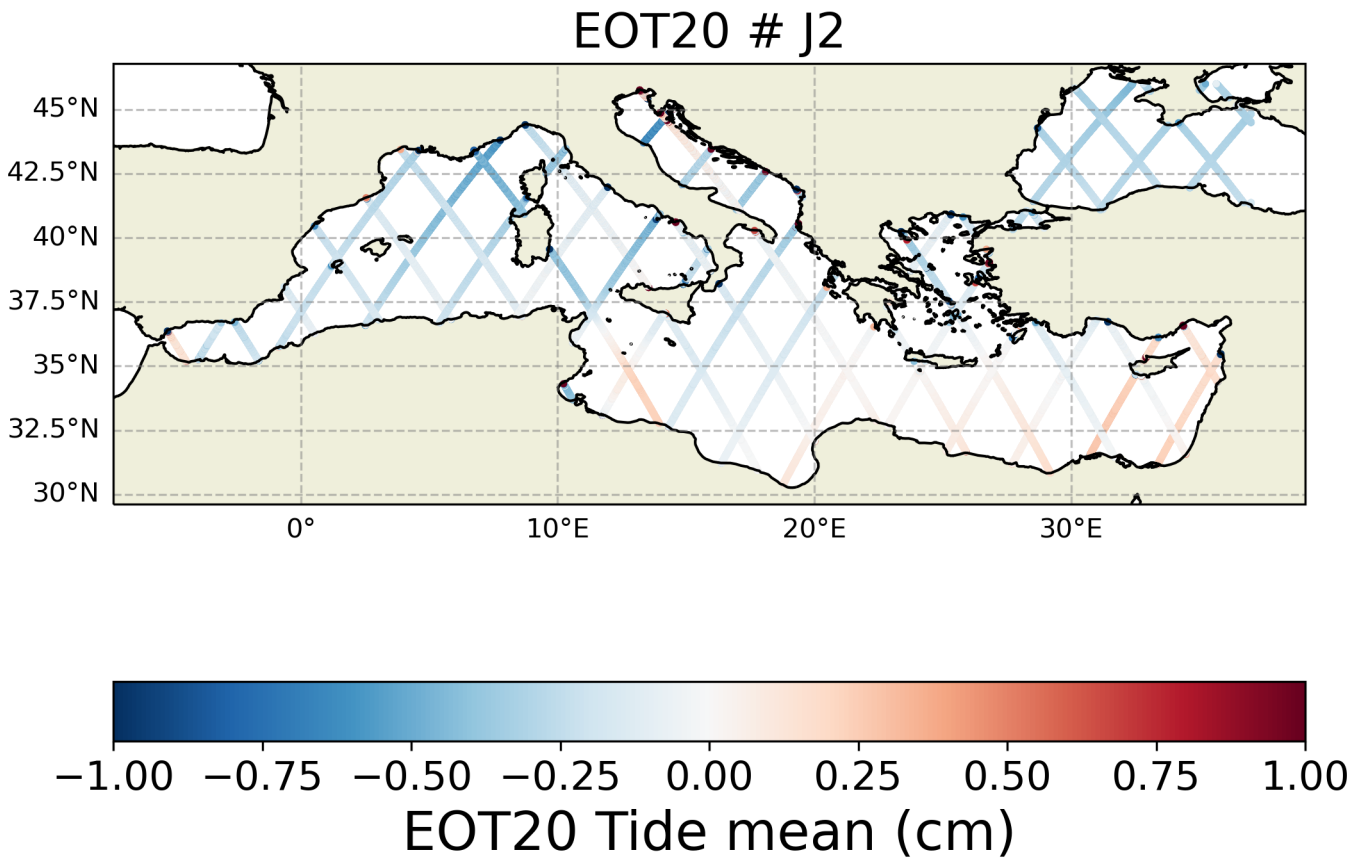

FIGURE 54 – Spatial coherence analysis of the mean of the EOT20 version of Tide variable

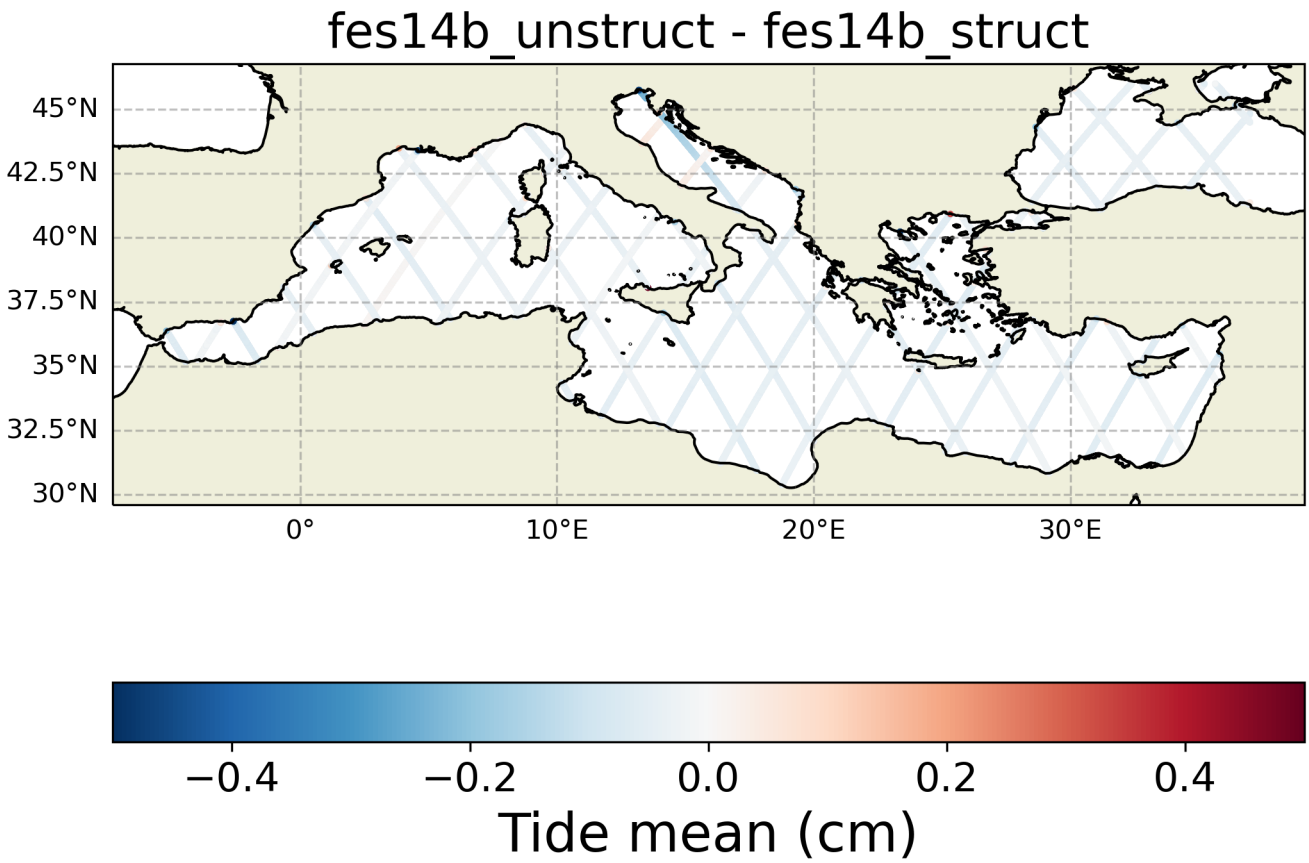

FIGURE 55 – Spatial coherence analysis of the Difference in Tide 's mean between fes14b_unstruct and fes14b_struct

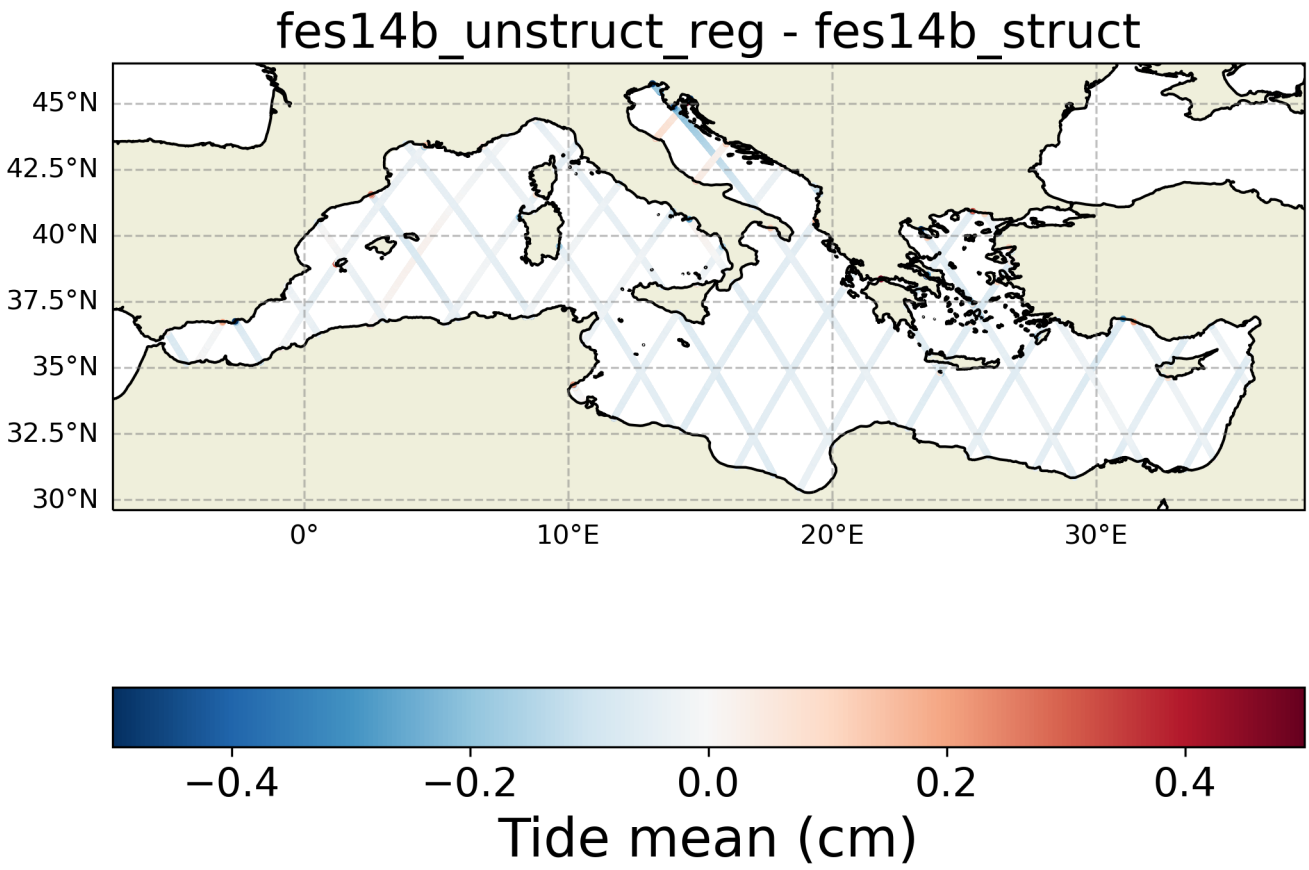

FIGURE 56 – Spatial coherence analysis of the Difference in Tide 's mean between fes14b_unstruct_reg and fes14b_struct

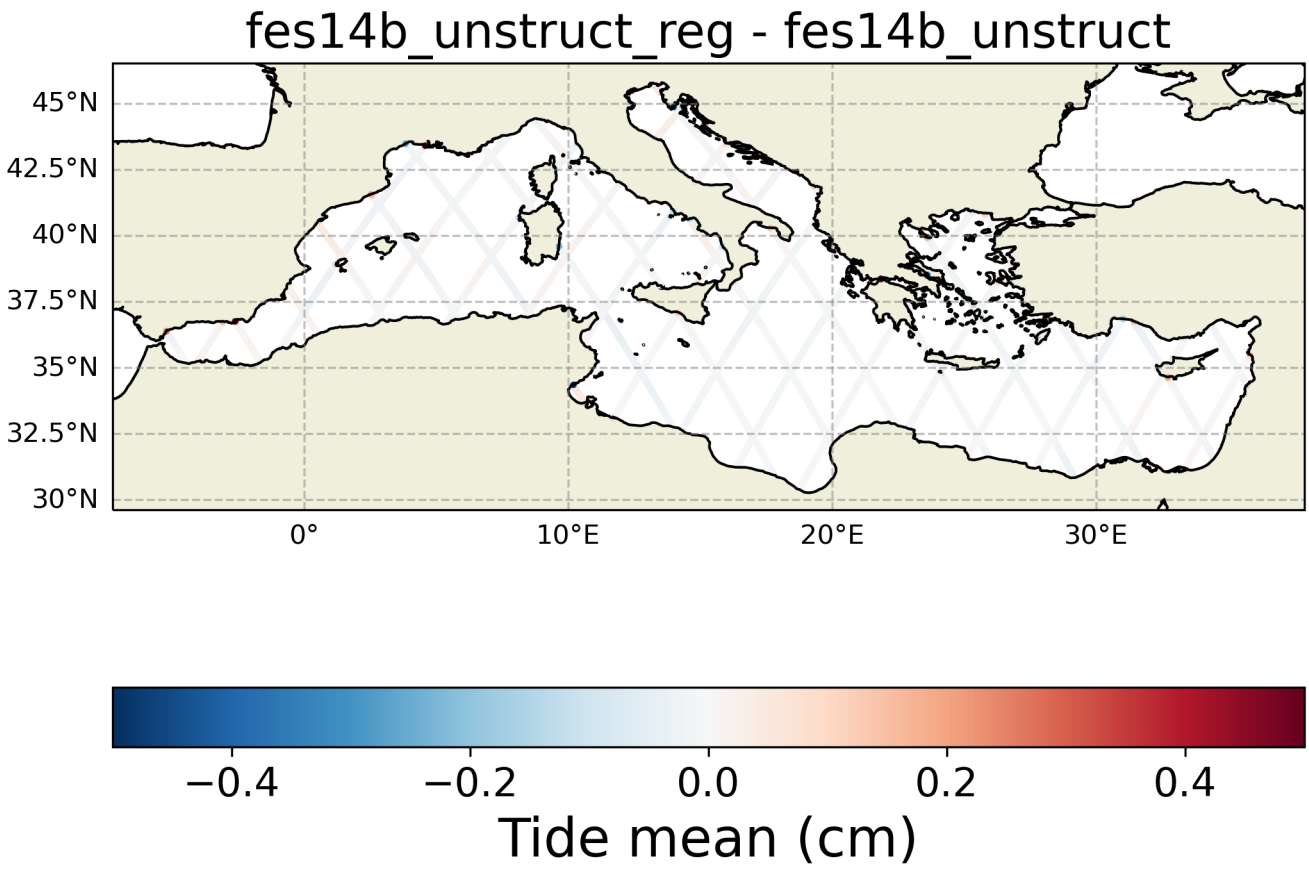

FIGURE 57 – Spatial coherence analysis of the Difference in Tide 's mean between fes14b_unstruct_reg and fes14b_unstruct

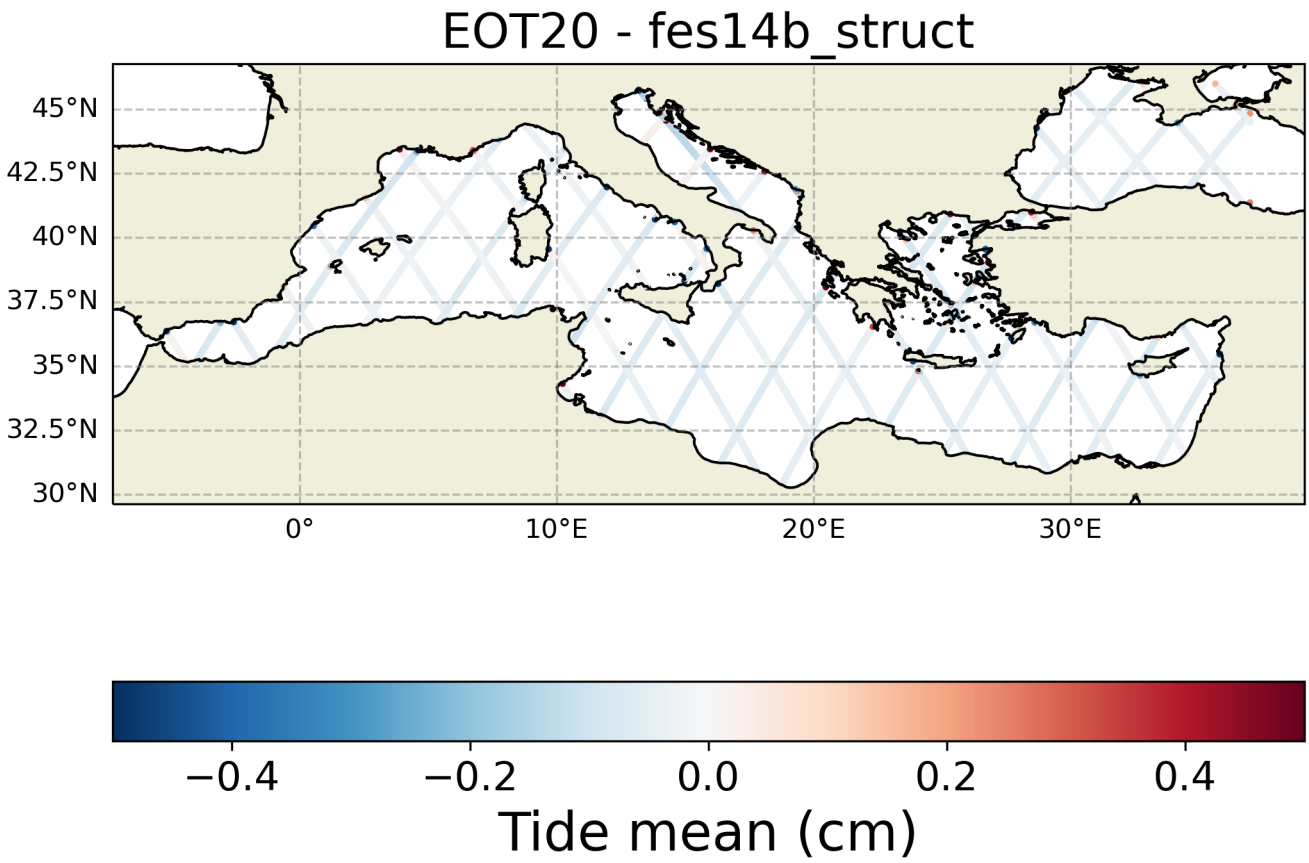

Figure 58 – Spatial coherence analysis of the Difference in Tide 's mean between EOT20 and fes14b_struct

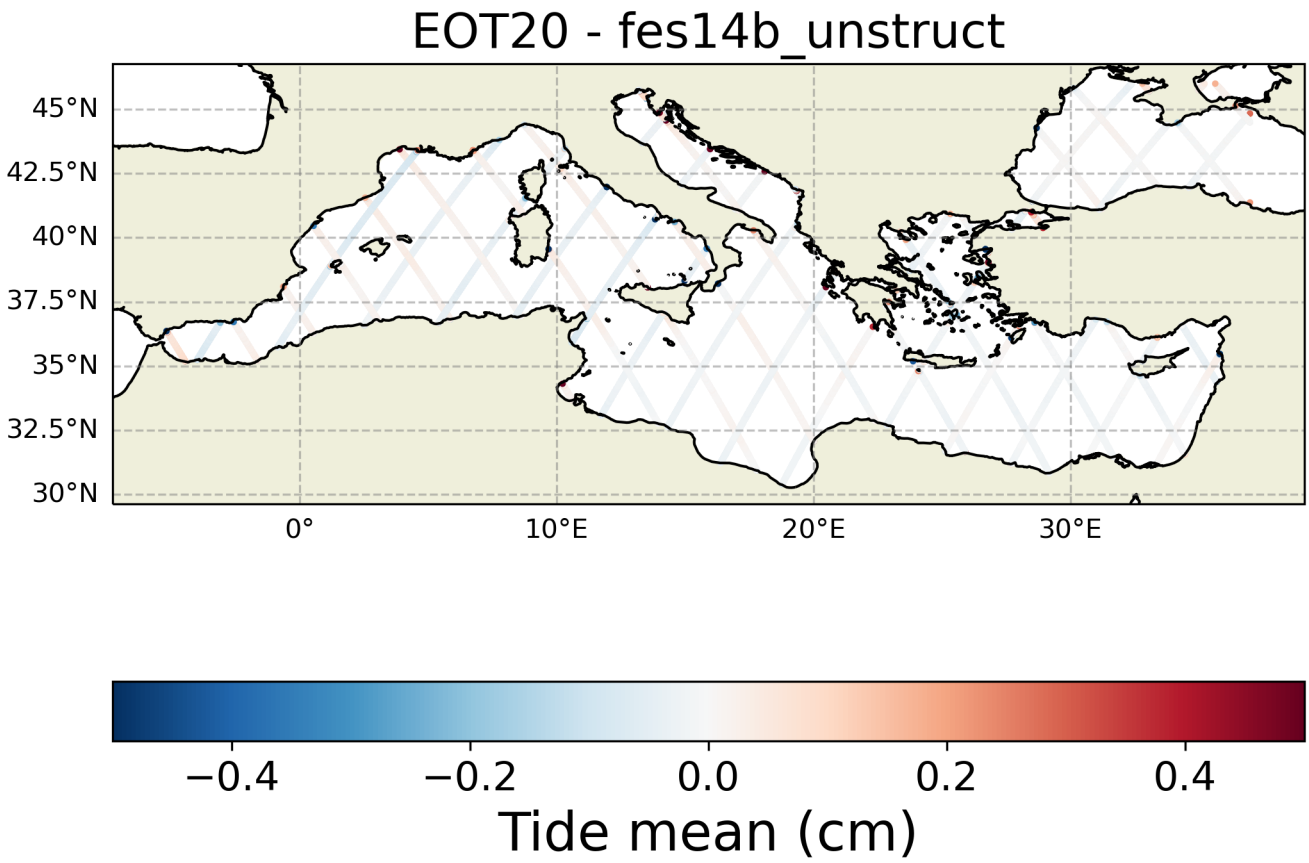

Figure 59 – Spatial coherence analysis of the Difference in Tide 's mean between EOT20 and fes14b_unstruct

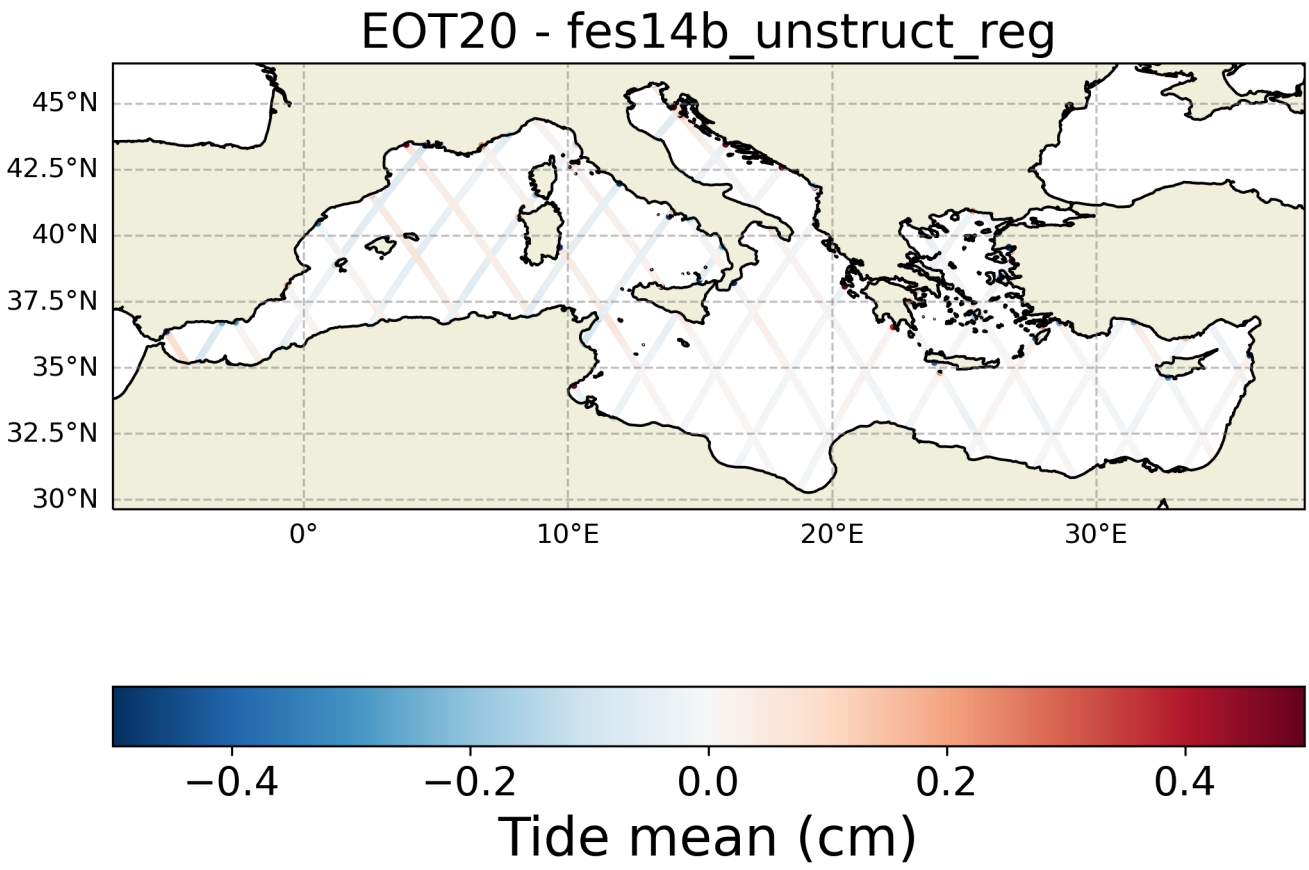

Figure 60 – Spatial coherence analysis of the Difference in Tide 's mean between EOT20 and fes14b_unstruct_reg

4 Histograms

4.1 Tide

	min (cm)	max (cm)	mean (cm)	std (cm)
fes14b_struct	-82.06	78.84	-0.114	7.292
fes14b_unstruct	-82.349	78.635	-0.139	7.361
fes14b_unstruct_reg	-79.128	80.353	-0.118	7.873
EOT20	-78.855	78.814	-0.141	7.332

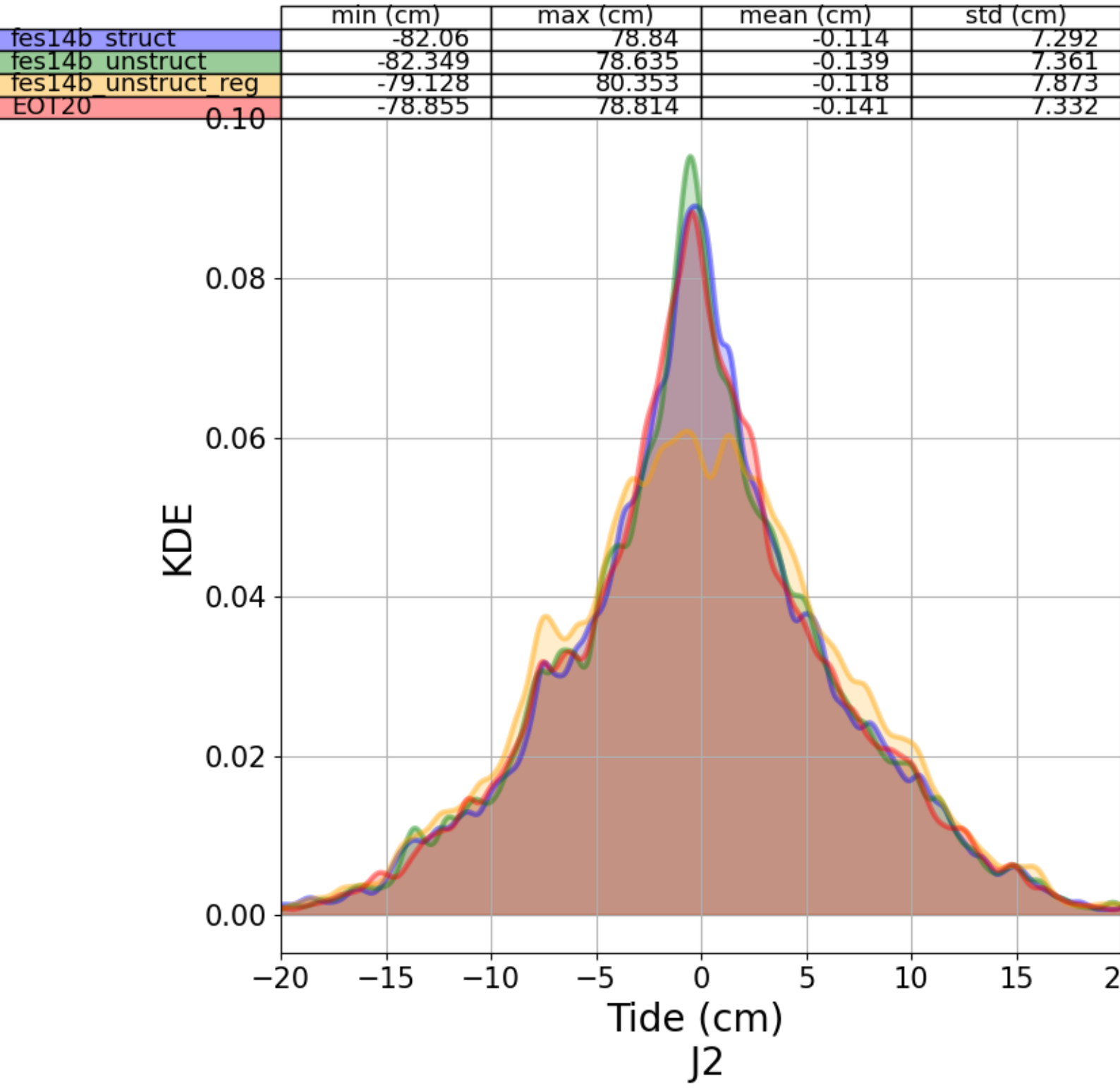

FIGURE 61 – Histogram of each of Tide version

	min (cm)	max (cm)	mean (cm)	std (
14b_unstruct - fes14b_struct	-3.578	4.118	-0.035	
14b_unstruct_reg - fes14b_struct	-16.48	16.508	-0.04	
T20 - fes14b_struct	-9.069	6.976	-0.043	
14b_unstruct_reg - fes14b_unstruct	-15.645	15.743	-0.004	
T20 - fes14b_unstruct	-9.607	7.512	-0.007	
T20 - fes14b_unstruct_reg	-11.713	11.693	-0.004	

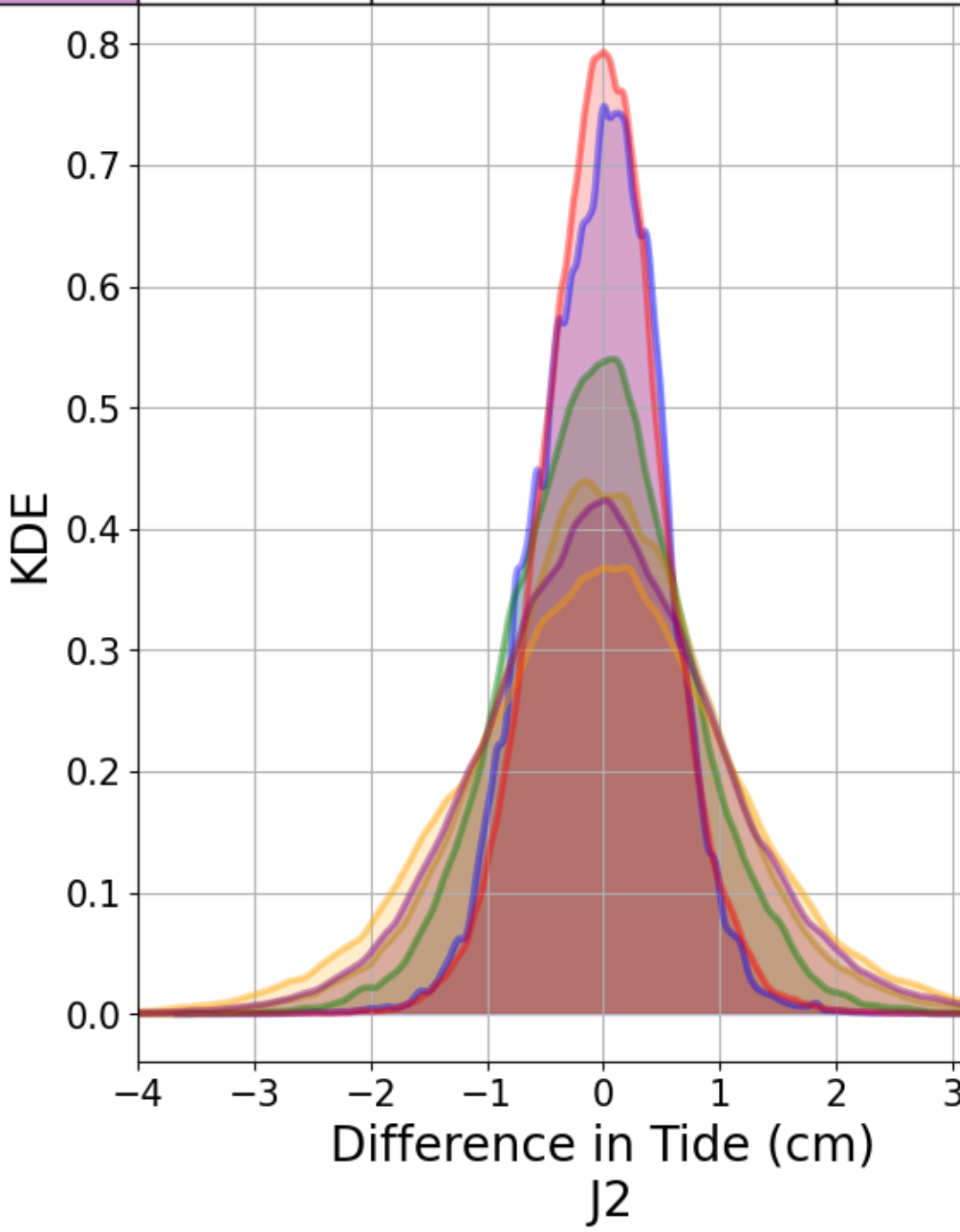

FIGURE 62 – Histograms of difference of each Tide version and reference one

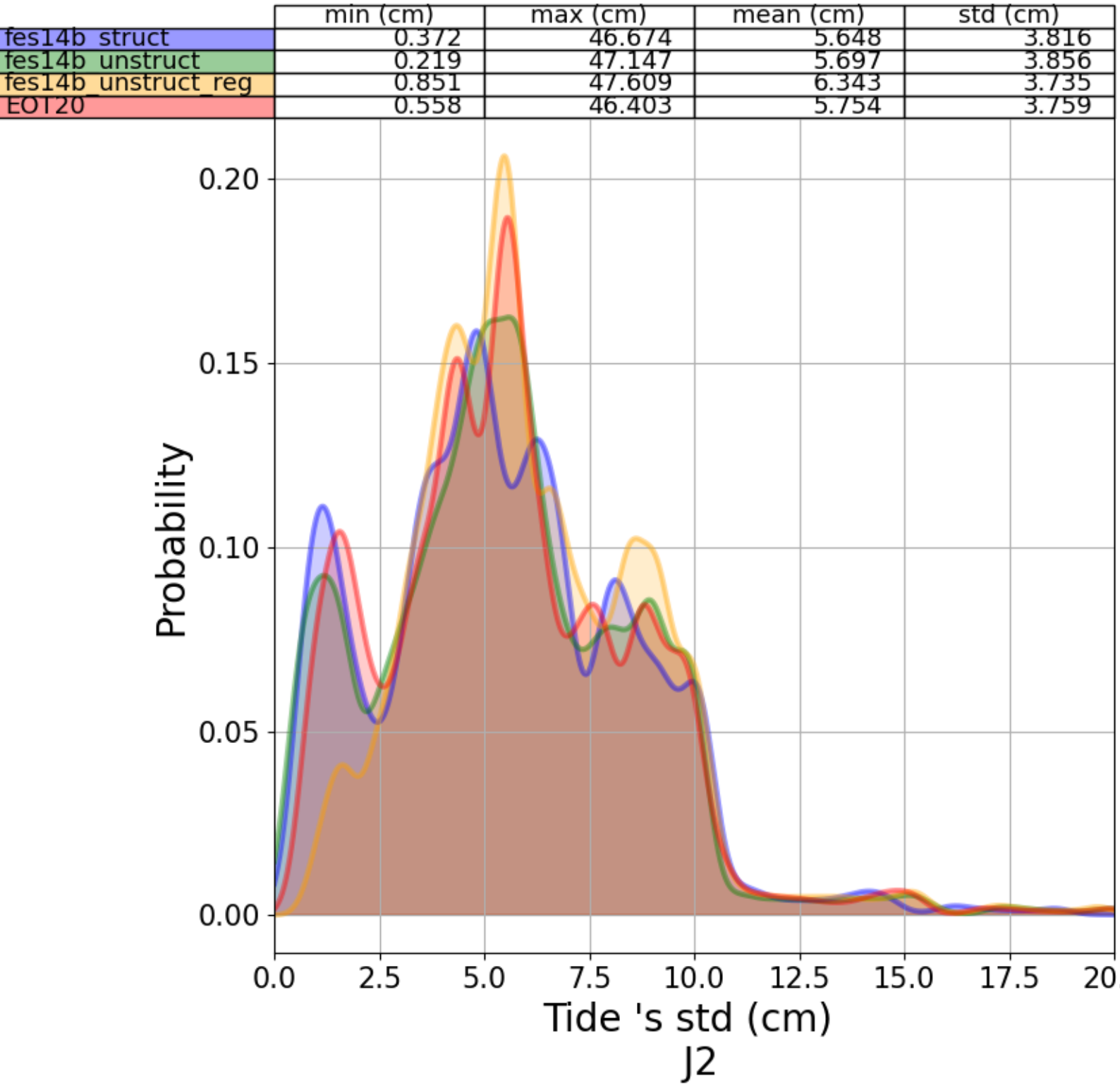

Figure 63 – Histograms of the standard deviation of each Tide version

4.2 sla

	min (cm)	max (cm)	mean (cm)	std (cm)
fes14b_struct	7.322	42.587	11.497	1.759
fes14b_unstruct	7.31	42.6	11.496	1.747
fes14b_unstruct_reg	7.124	42.65	11.586	1.788
EOT20	6.519	42.307	11.486	1.701

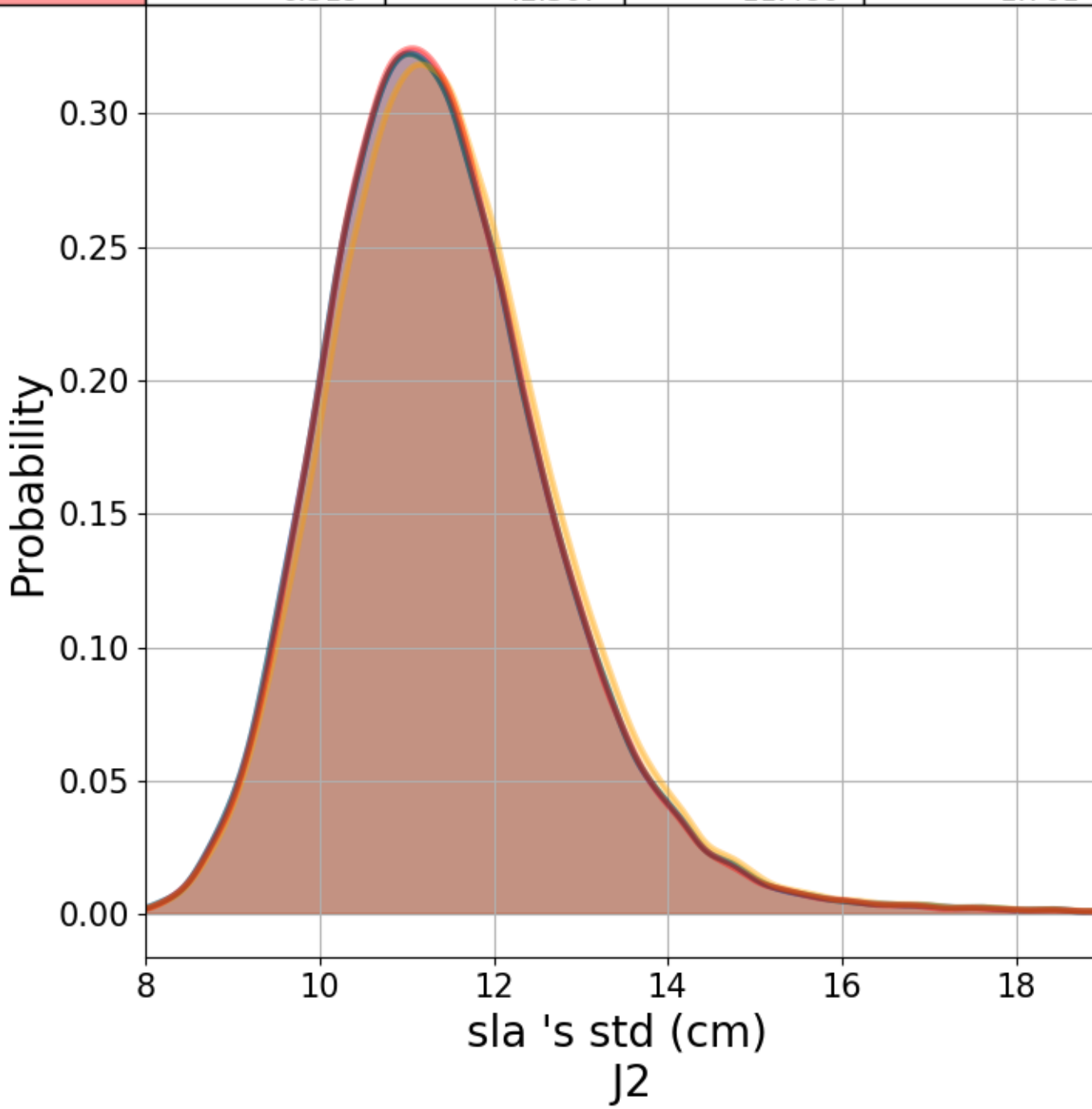

FIGURE 64 – Histograms of the standard deviation of each sla version

5 Along-track analysis

5.1 Tide

5.1.1 Tide 's count

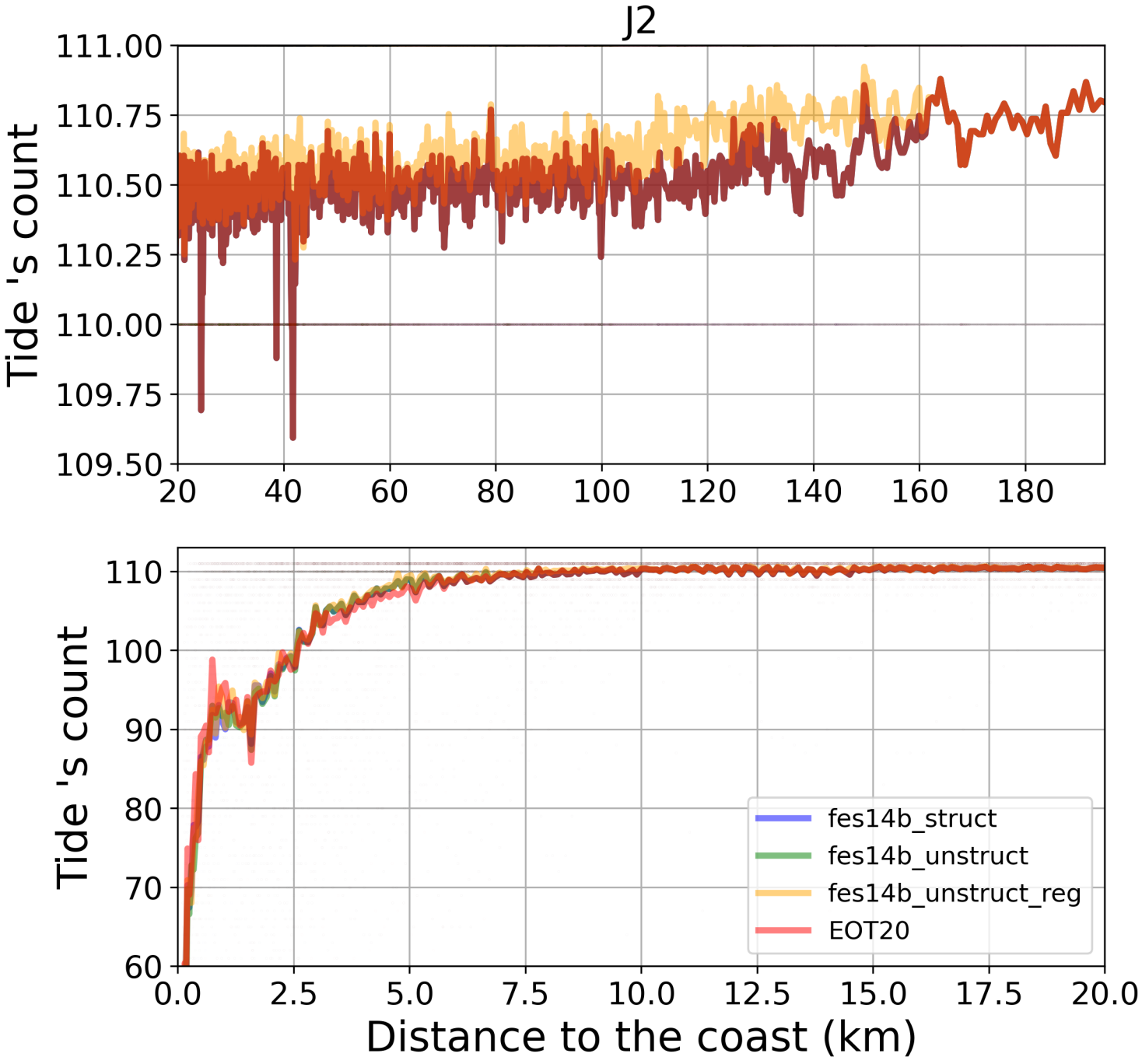

Figure 65 – Along-track analysis of Tide 's count

5.1.2 Tide 's std

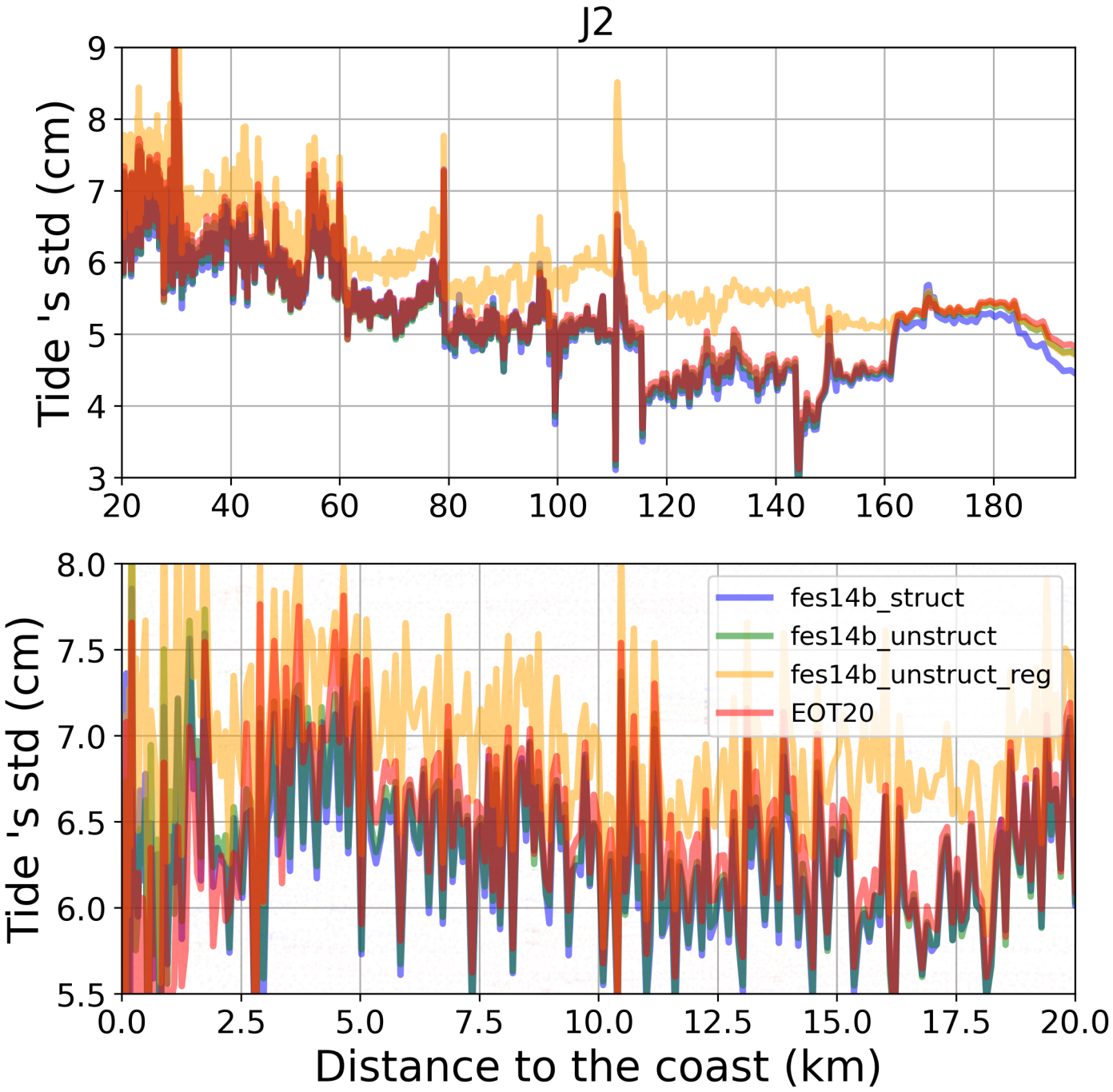

FIGURE 66 – Along-track analysis of Tide 's std

5.1.3 Tide 's mean

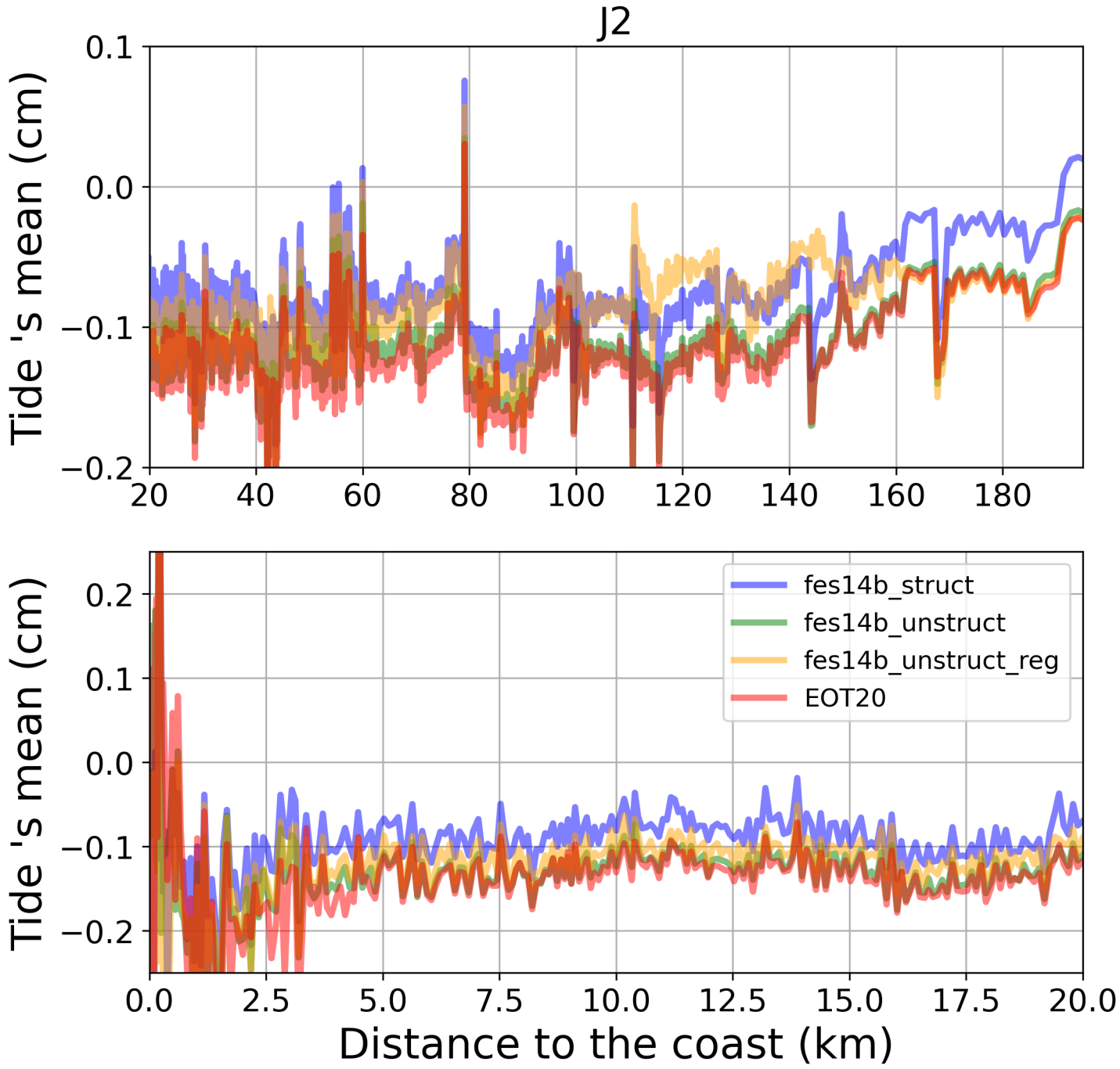

FIGURE 67 – Along-track analysis of Tide 's mean

5.2 sla

5.2.1 sla 's count

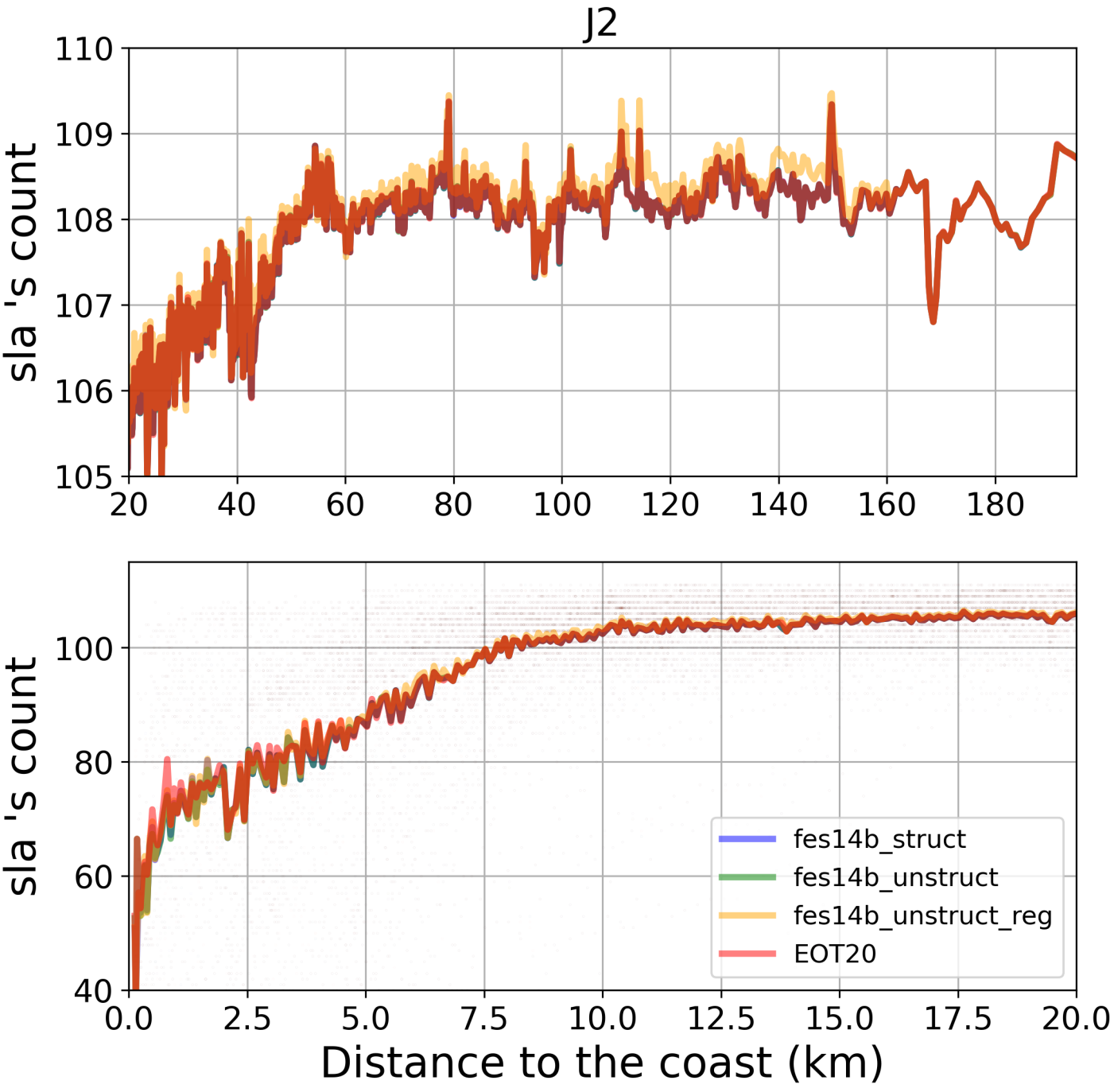

FIGURE 68 – Along-track analysis of sla 's count

5.2.2 sla 's std

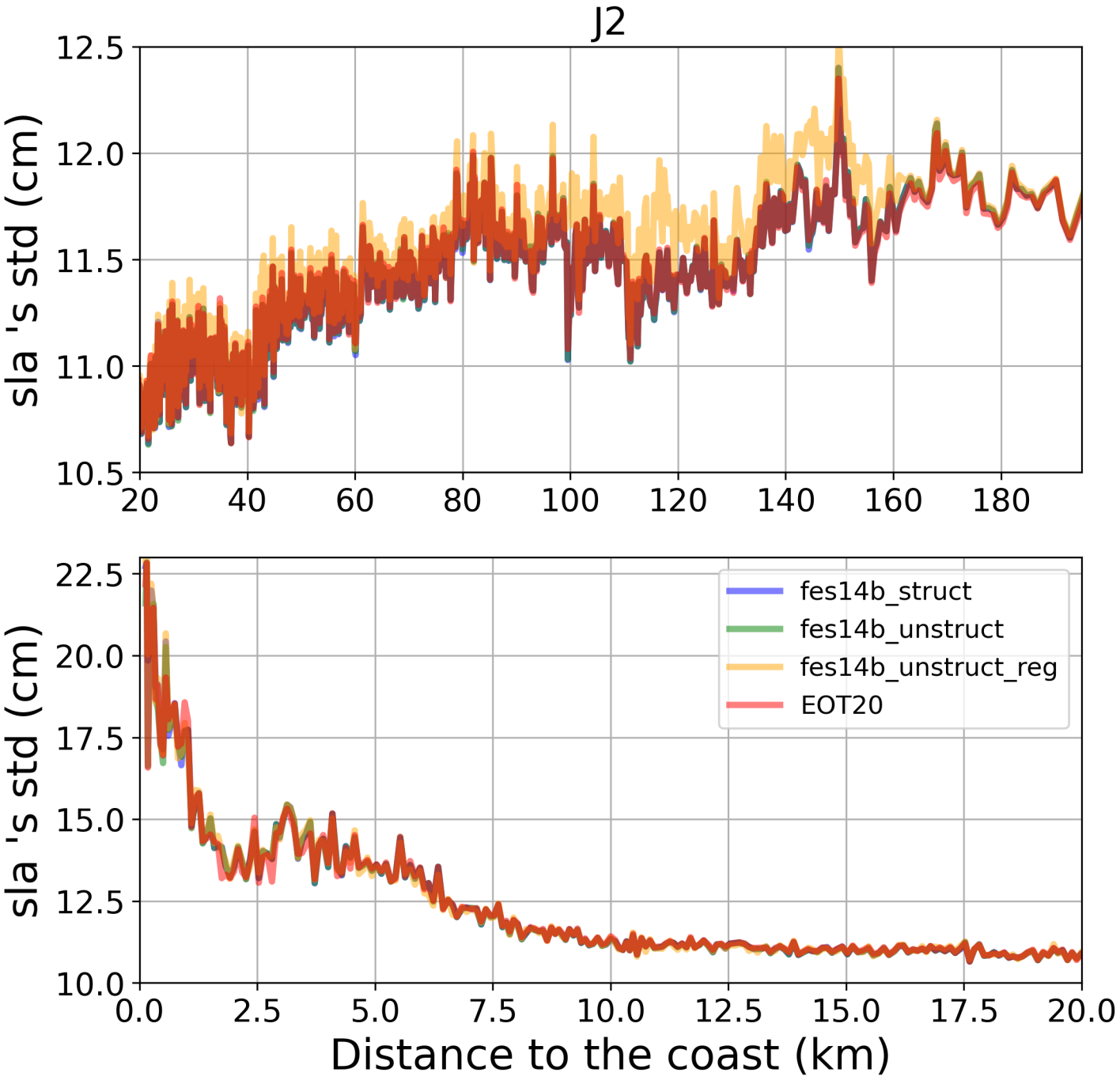

FIGURE 69 – Along-track analysis of sla 's std

5.2.3 sla 's mean

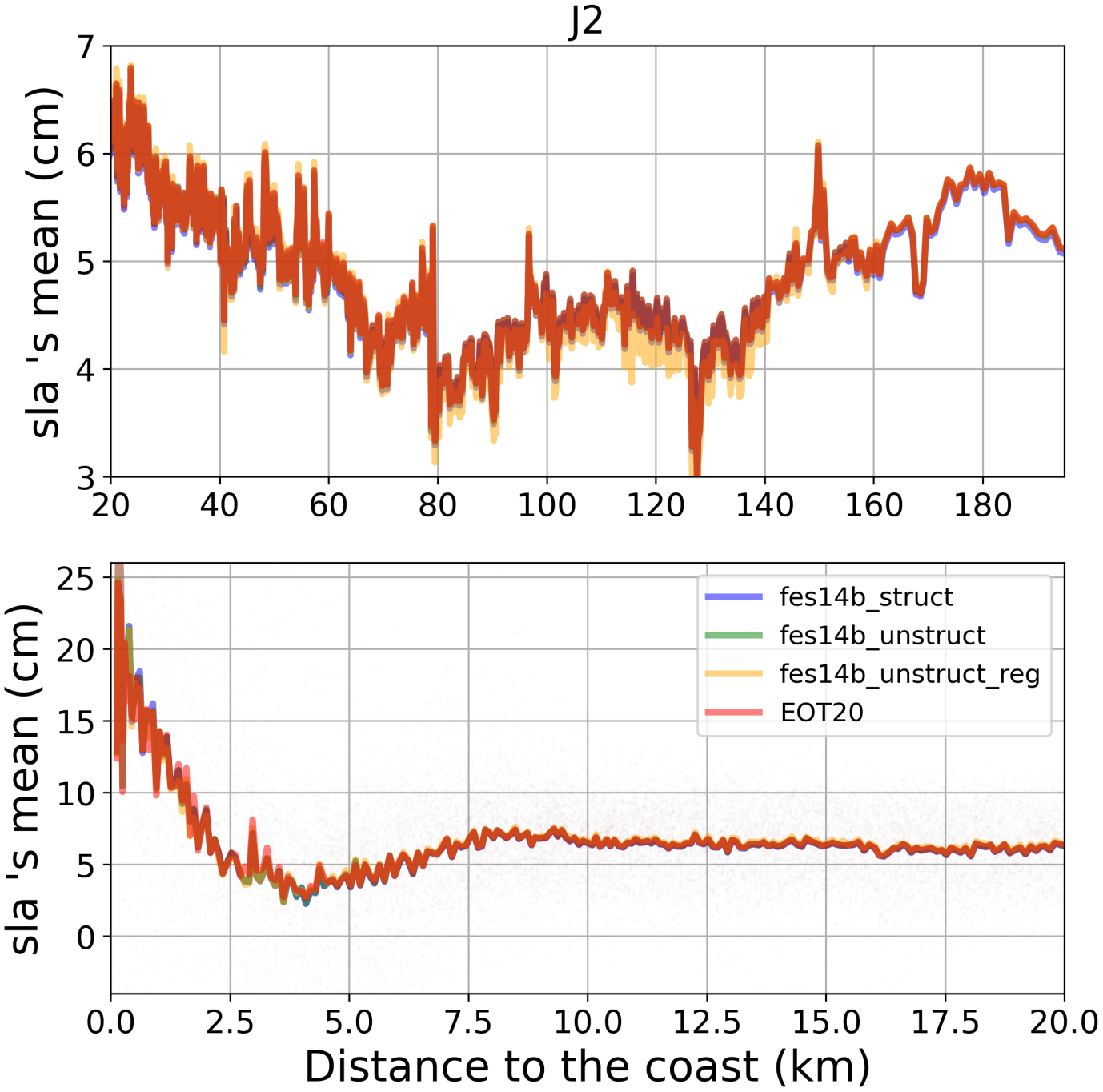

FIGURE 70 – Along-track analysis of sla 's mean

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 Raduis of 40 Km
  - Maximum distance to the coast : 20 Km

6.1.1 correlation visualization in maps view % SETE tide gauge

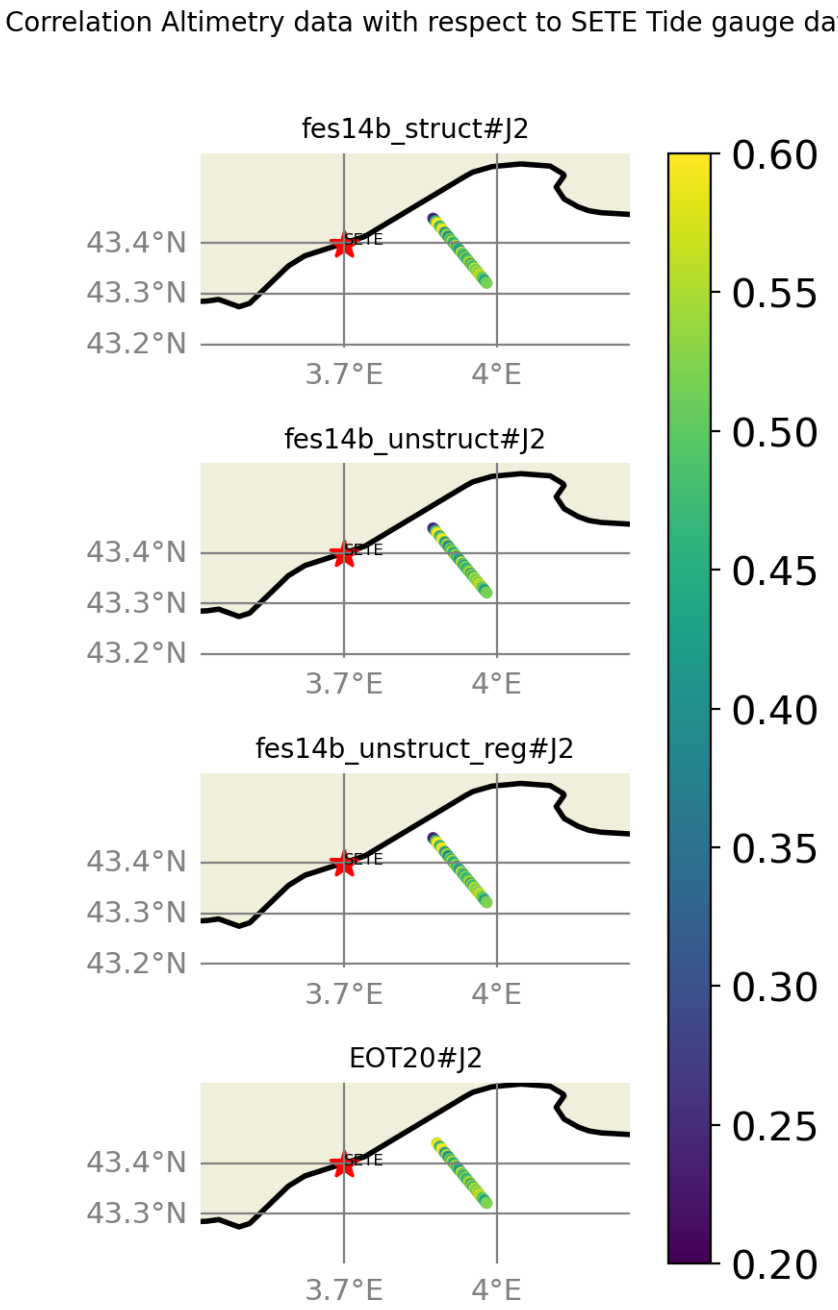

FIGURE 71 – correlation visualization in maps view % SETE tide gauge

6.1.2 rmsd visualization in maps view % SETE tide gauge

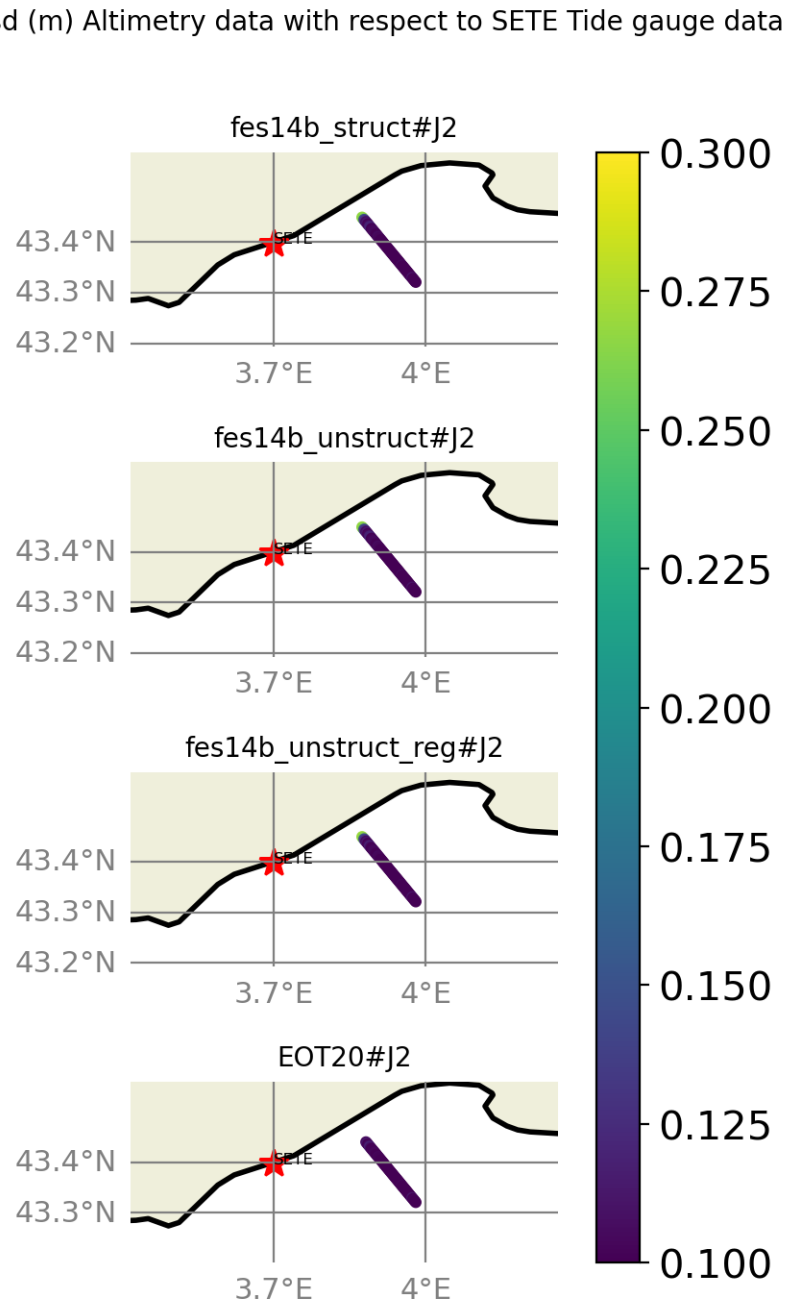

FIGURE 72 – rmsd visualization in maps view % SETE tide gauge

6.1.3 std visualization in maps view % SETE tide gauge

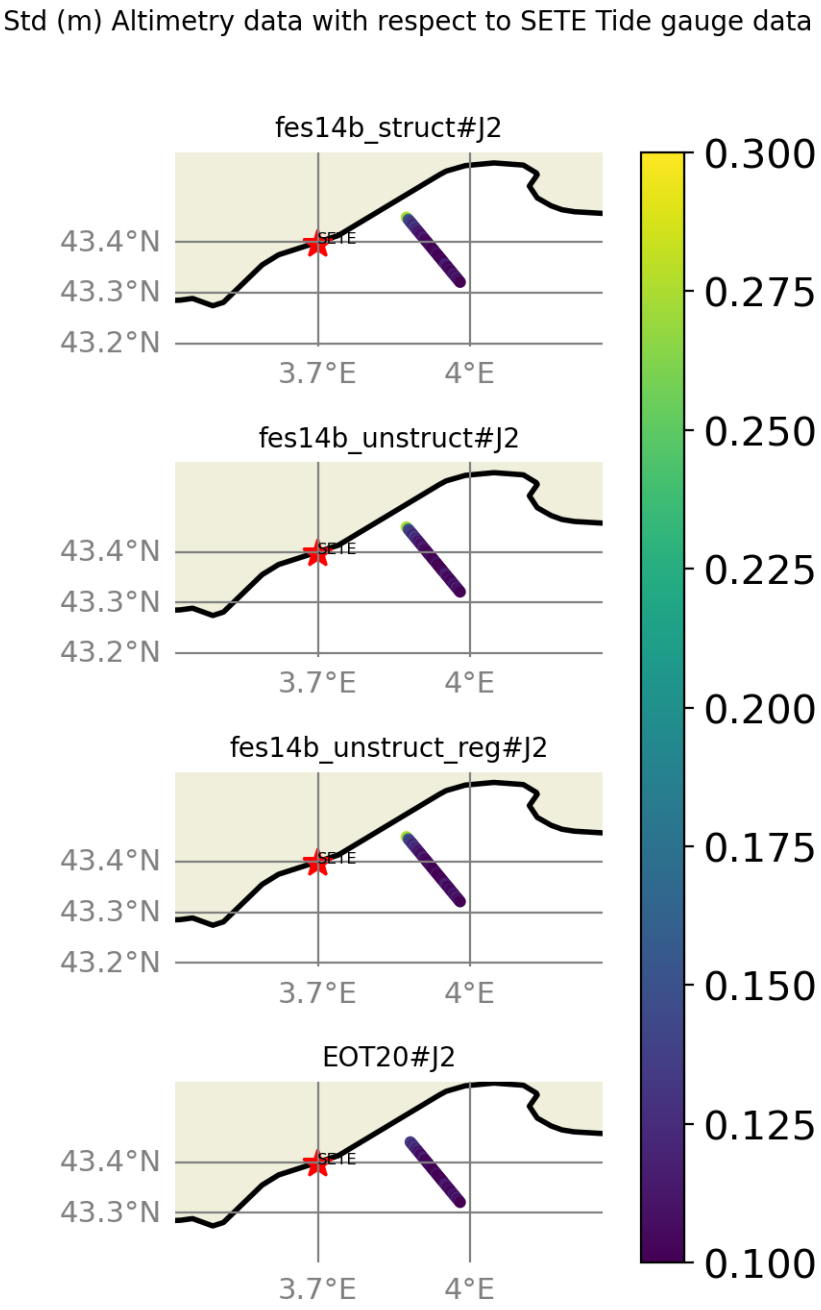

Figure 73 – std visualization in maps view % SETE tide gauge

6.1.4 valid_data_percent visualization in maps view % SETE tide gauge

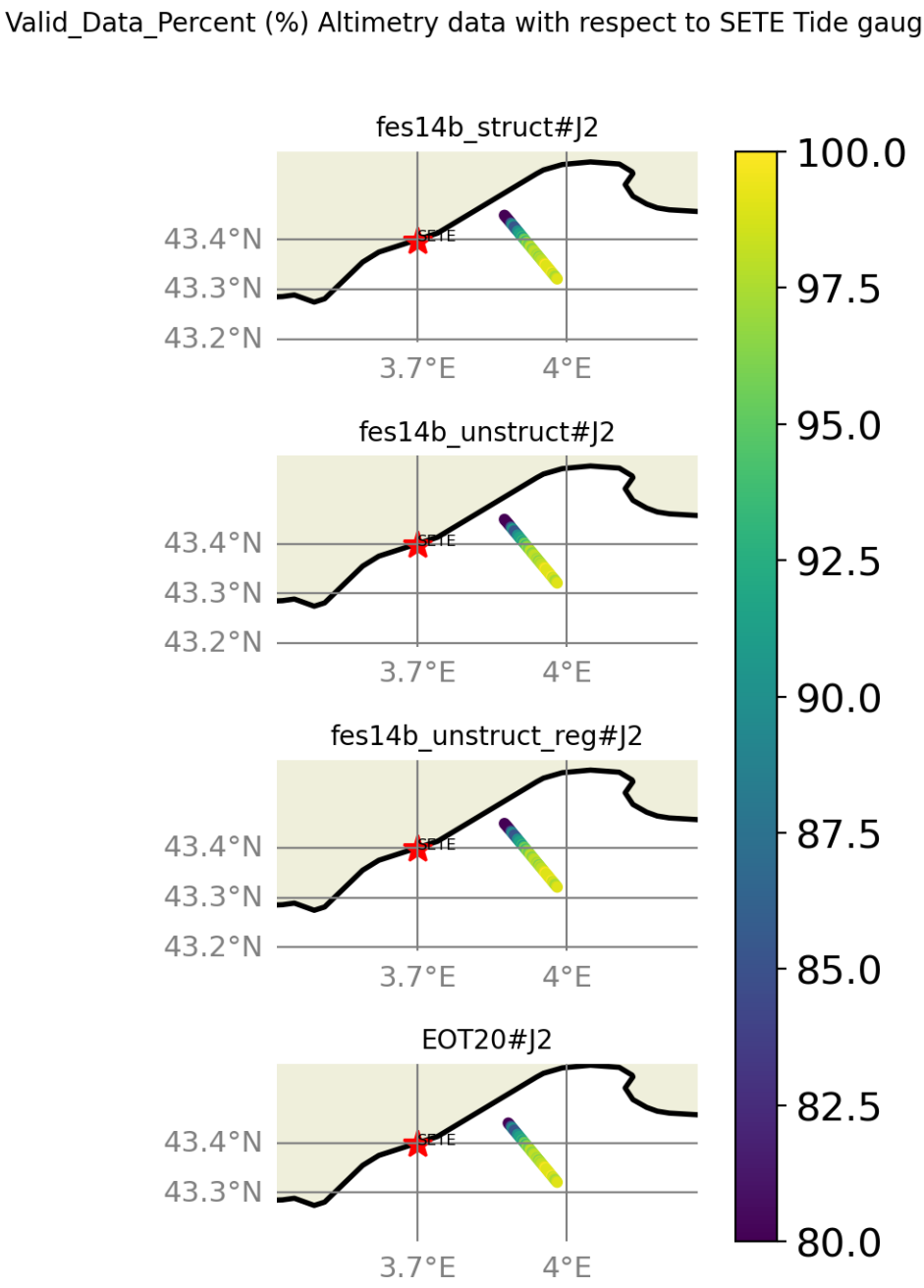

FIGURE 74 – valid_data_percent visualization in maps view % SETE tide gauge

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 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. $maxNB = 106$ 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 serie.

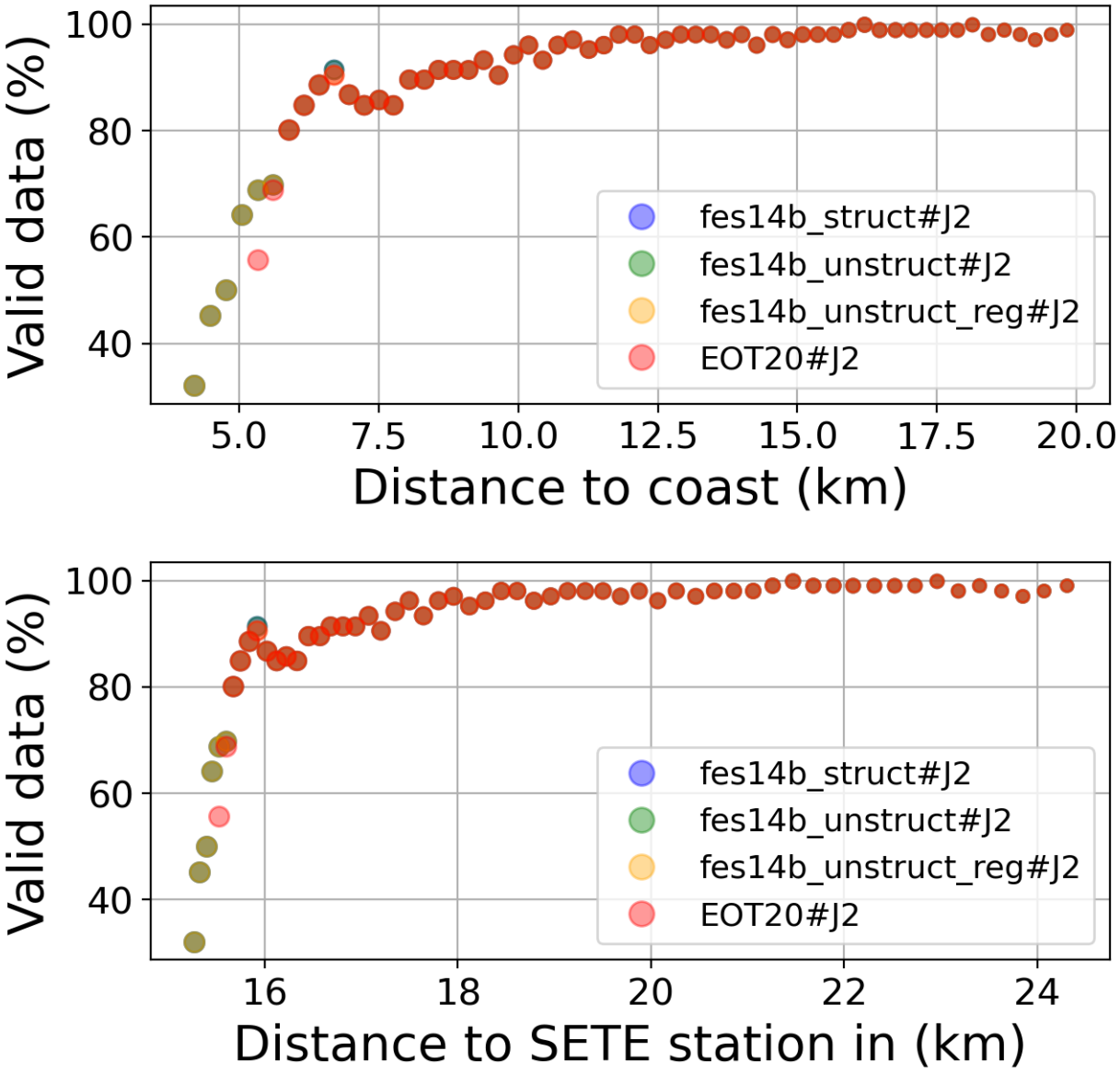

Figure 75 – Valid data (%) in function of distance to coast/SETE station

6.1.6 Std in function of distance to coast/SETE station

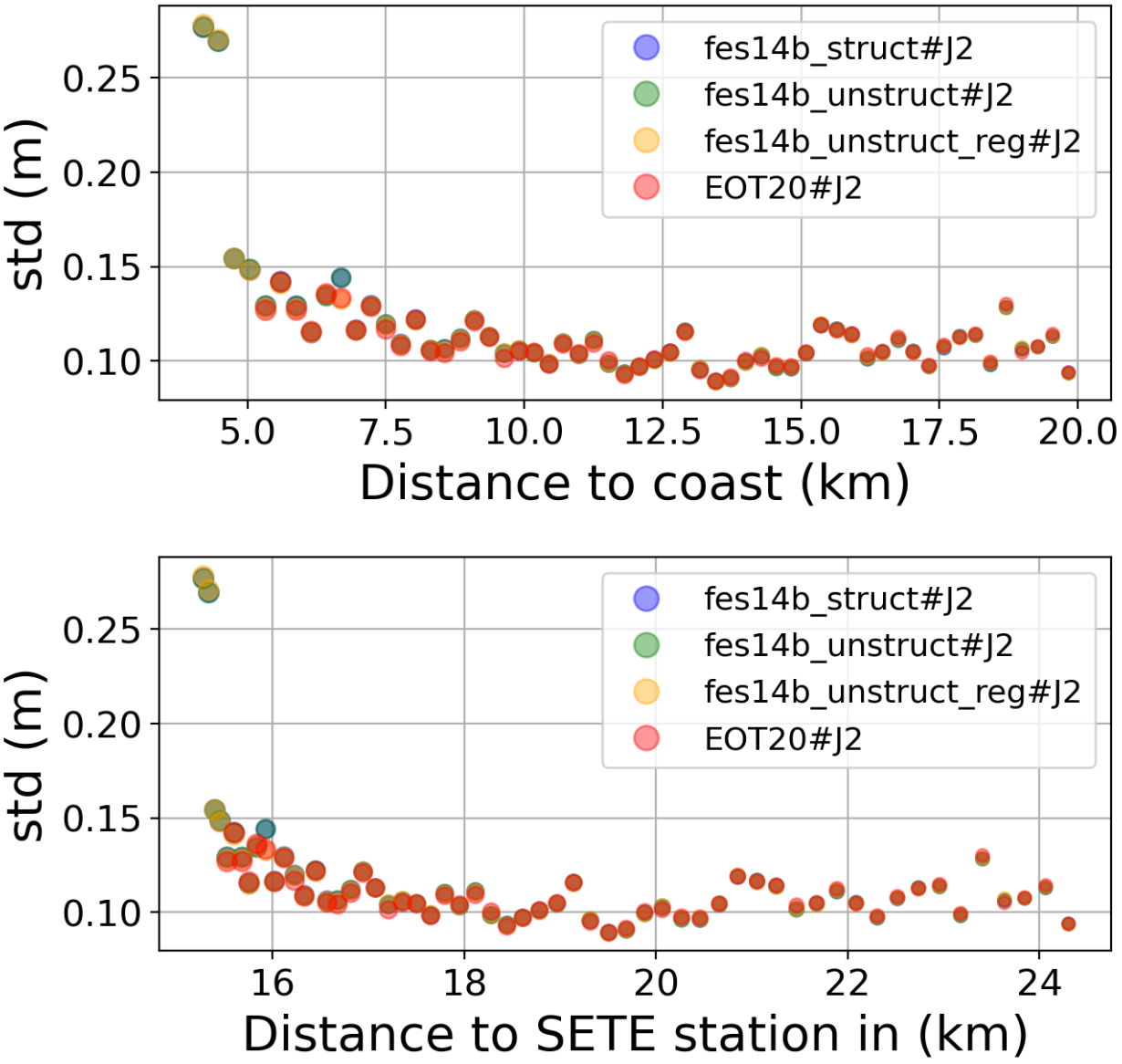

FIGURE 76 – Std in function of the distance to the coast/SETE station

6.1.7 Correlation in function of distance to coast/SETE station

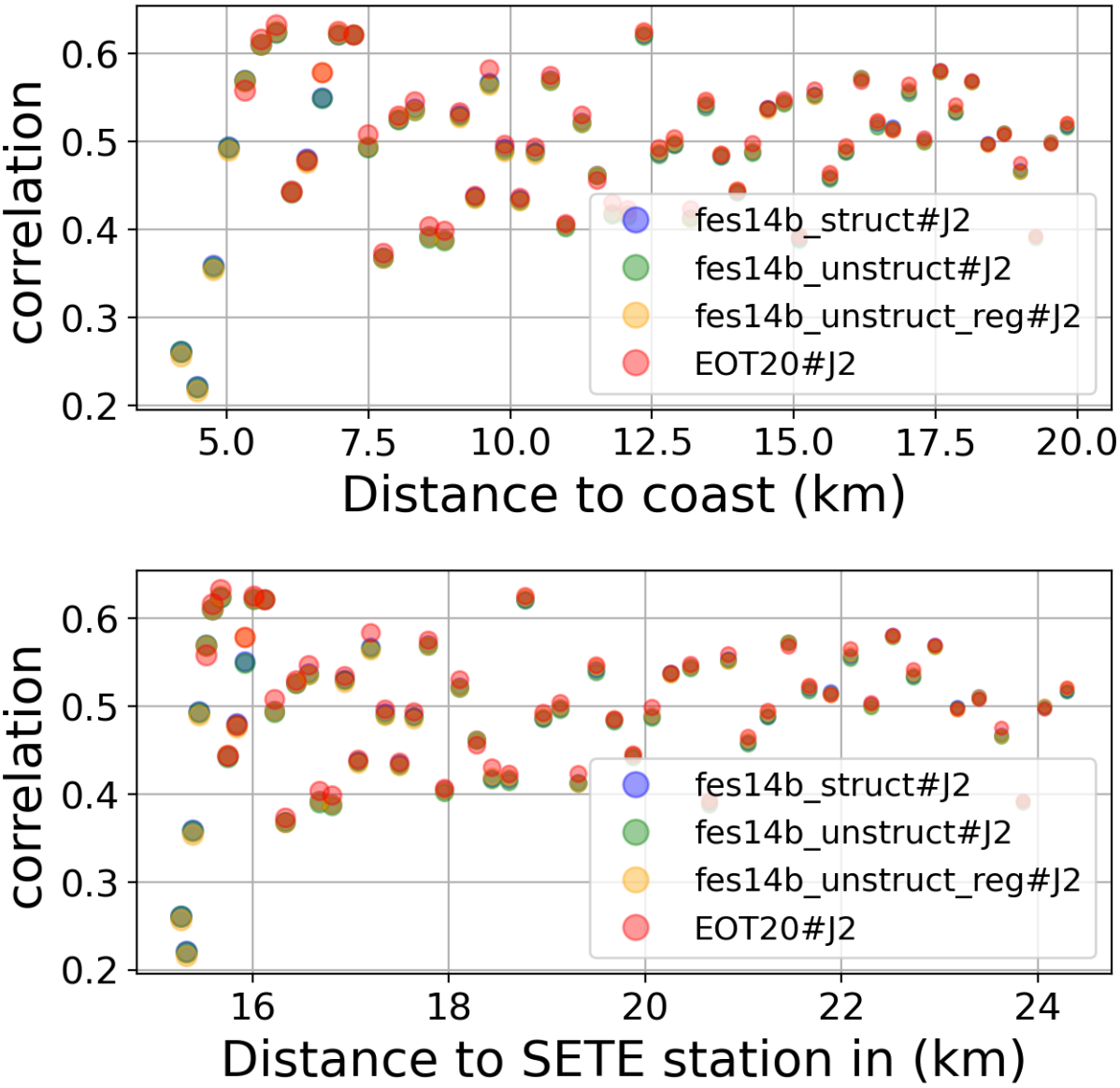

FIGURE 77 – Correlation in function of the distance to the coast/SETE station

6.1.8 Taylor Diagram

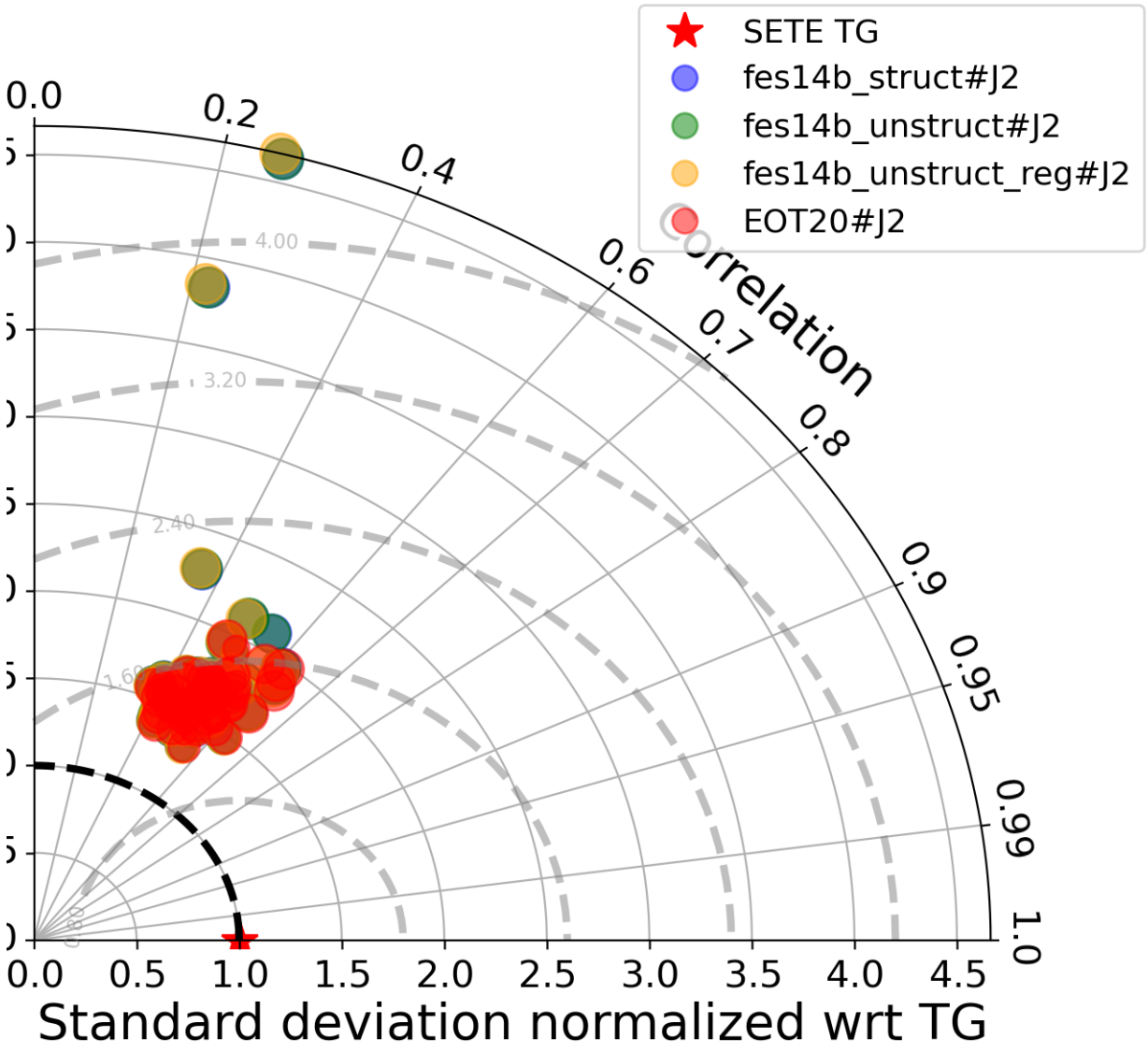

FIGURE 78 – Taylor diagram

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)
fes14b_struct#J2	94.095	0.503	0.11	0.096
fes14b_unstruct#J2	94.095	0.502	0.11	0.096
fes14b_unstruct_reg#J2	94.078	0.504	0.11	0.096
EOT20#J2	93.816	0.508	0.11	0.095

FIGURE 79 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.069
fes14b_struct#J2	15.675	5.875	80.189	0.625	0.129
fes14b_unstruct#J2	15.675	5.875	80.189	0.623	0.129
fes14b_unstruct_reg#J2	15.675	5.875	80.189	0.626	0.128
EOT20#J2	15.675	5.875	80.189	0.633	0.127

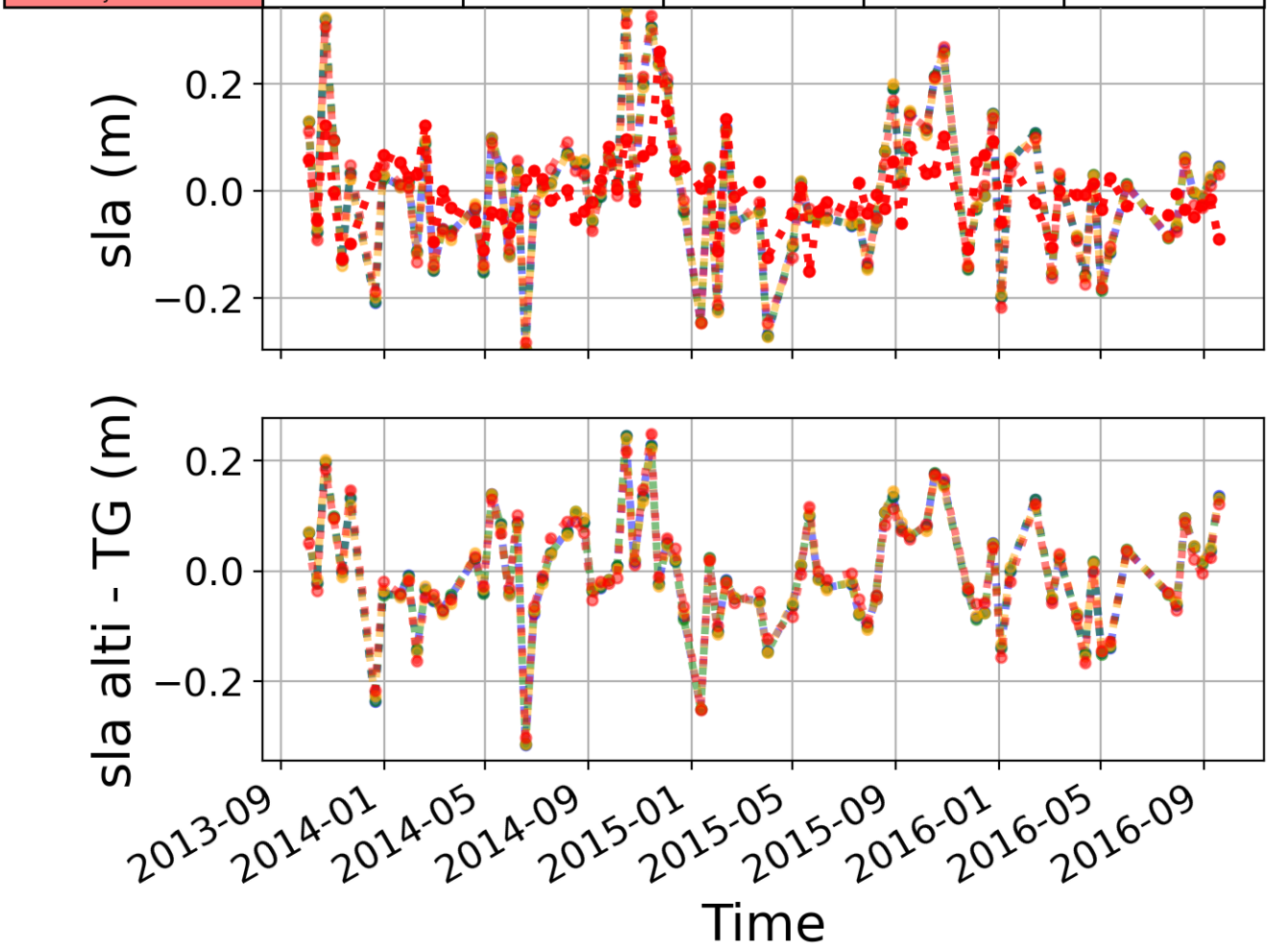

FIGURE 80 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

6.2 Station : Mentes

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

6.2.1 correlation visualization in maps view % Mentes tide gauge

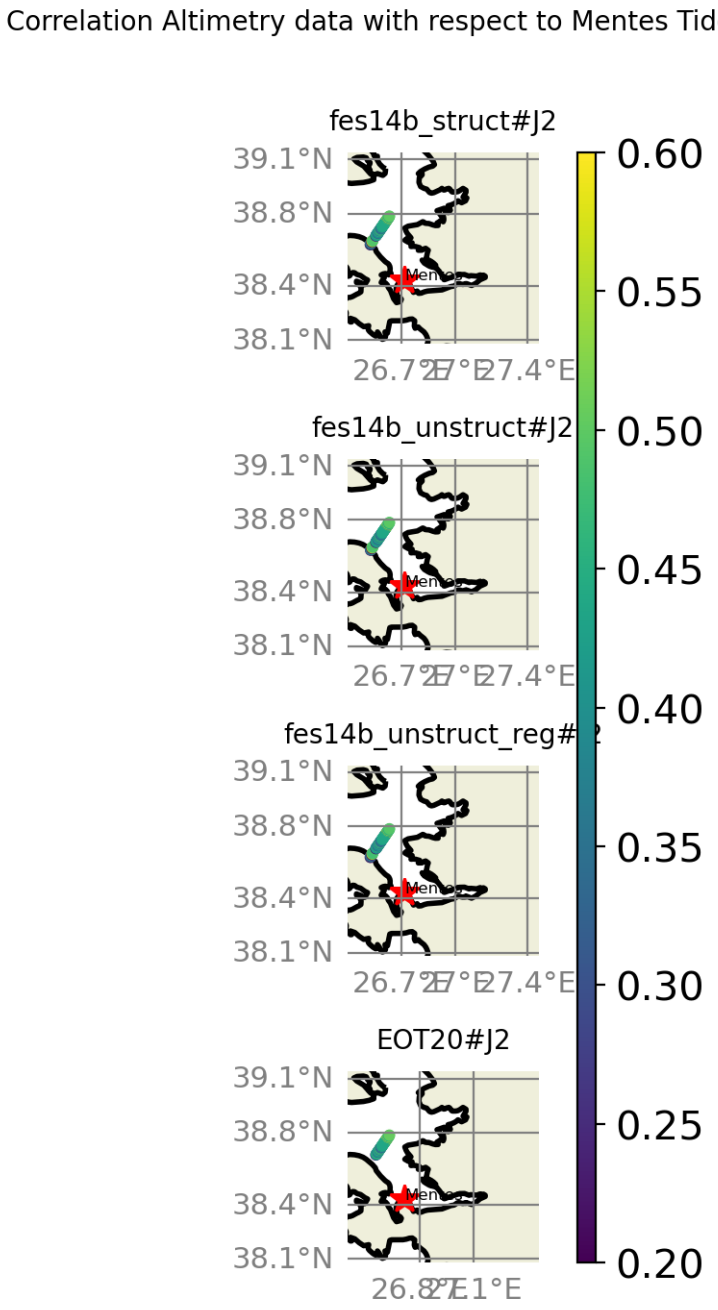

FIGURE 81 – correlation visualization in maps view % Mentes tide gauge

6.2.2 rmsd visualization in maps view % Mentes tide gauge

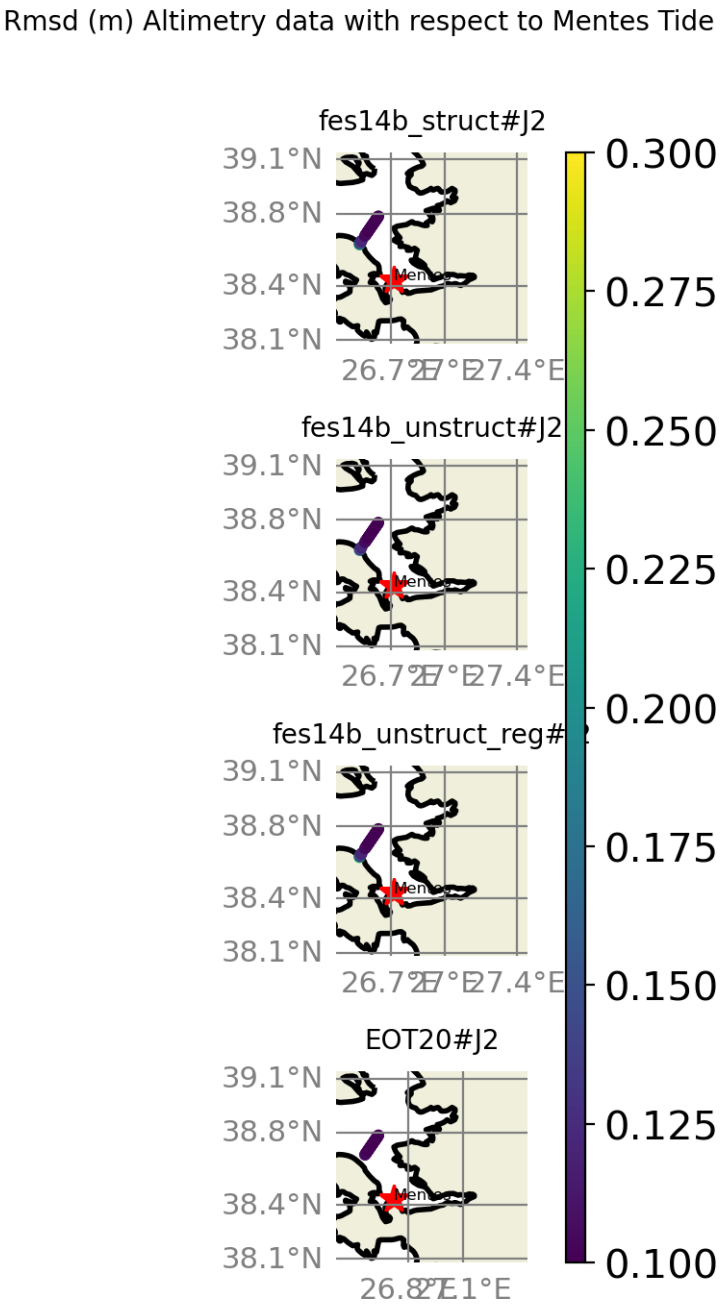

Figure 82 – rmsd visualization in maps view % Mentes tide gauge

6.2.3 std visualization in maps view % Mentes tide gauge

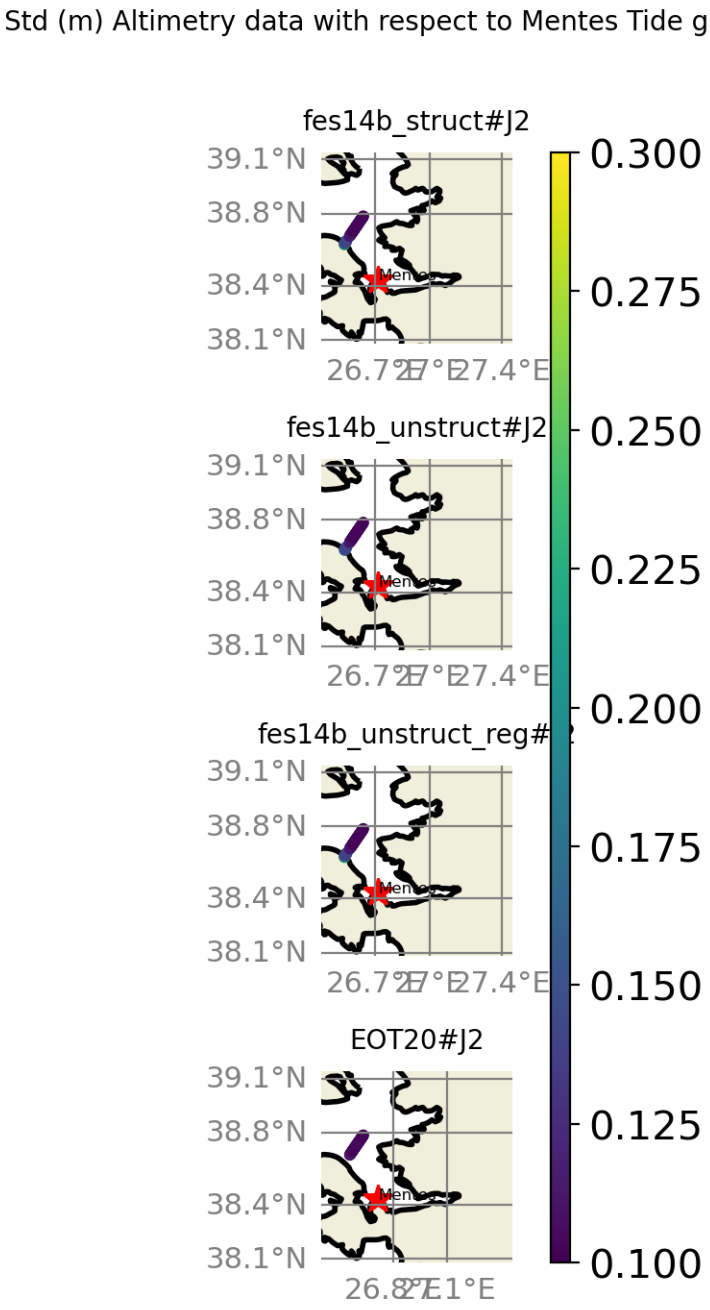

FIGURE 83 – std visualization in maps view % Mentes tide gauge

6.2.4 valid_data_percent visualization in maps view % Mentes tide gauge

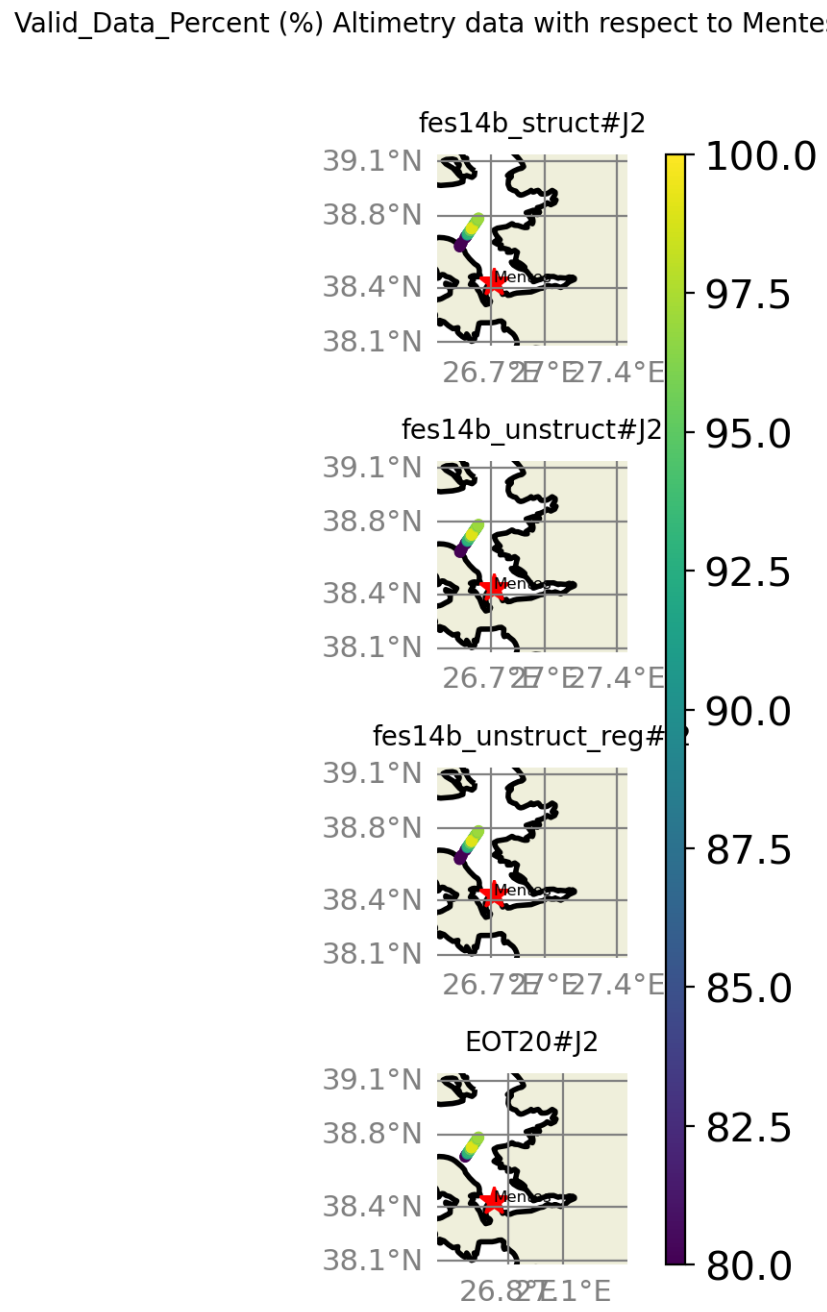

FIGURE 84 – valid_data_percent visualization in maps view % Mentes tide gauge

6.2.5 Valid data (%) in function of distance to coast/Mentes 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.

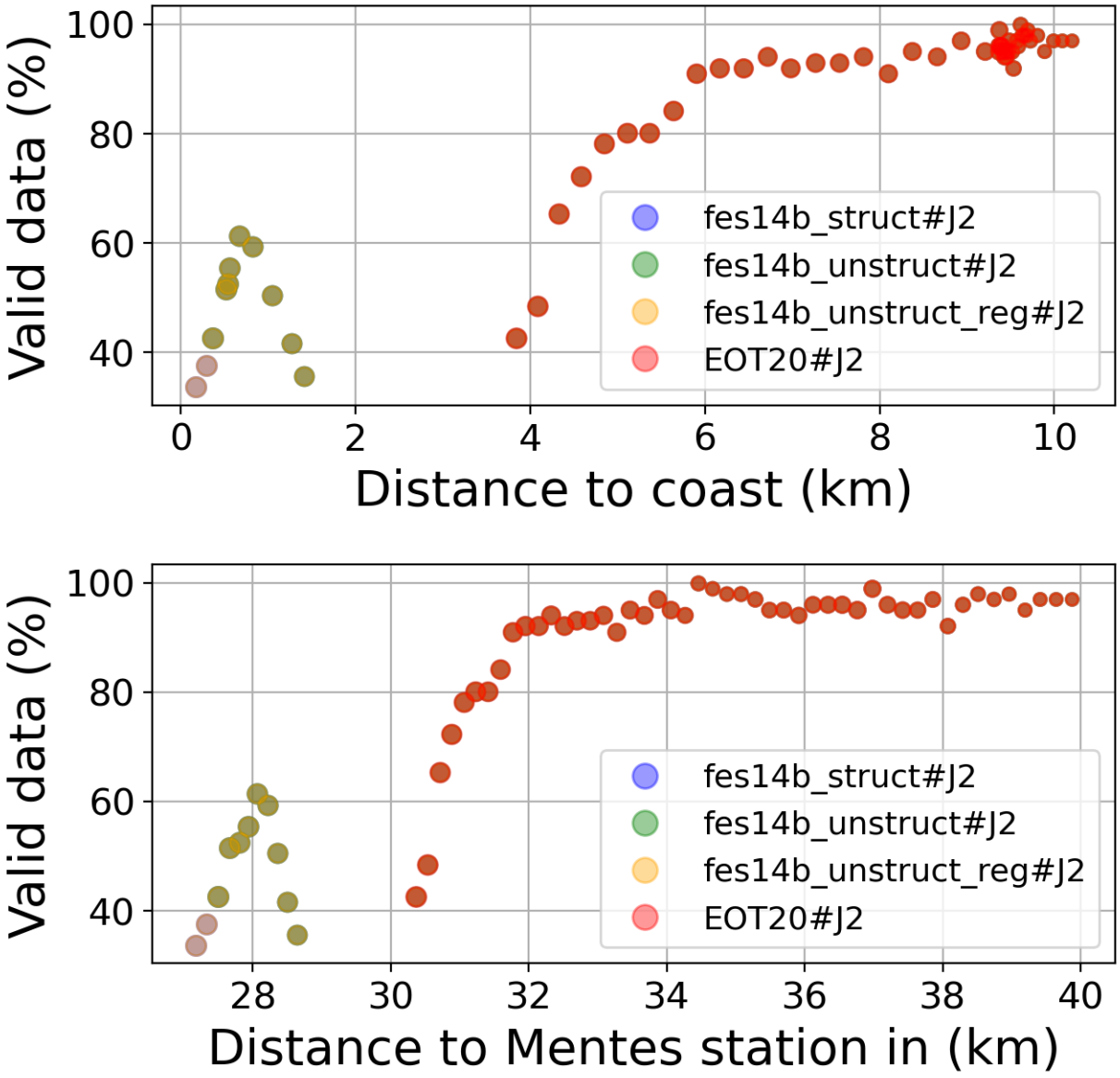

FIGURE 85 – Valid data (%) in function of distance to coast/Mentes station

6.2.6 Std in function of distance to coast/Mentes station

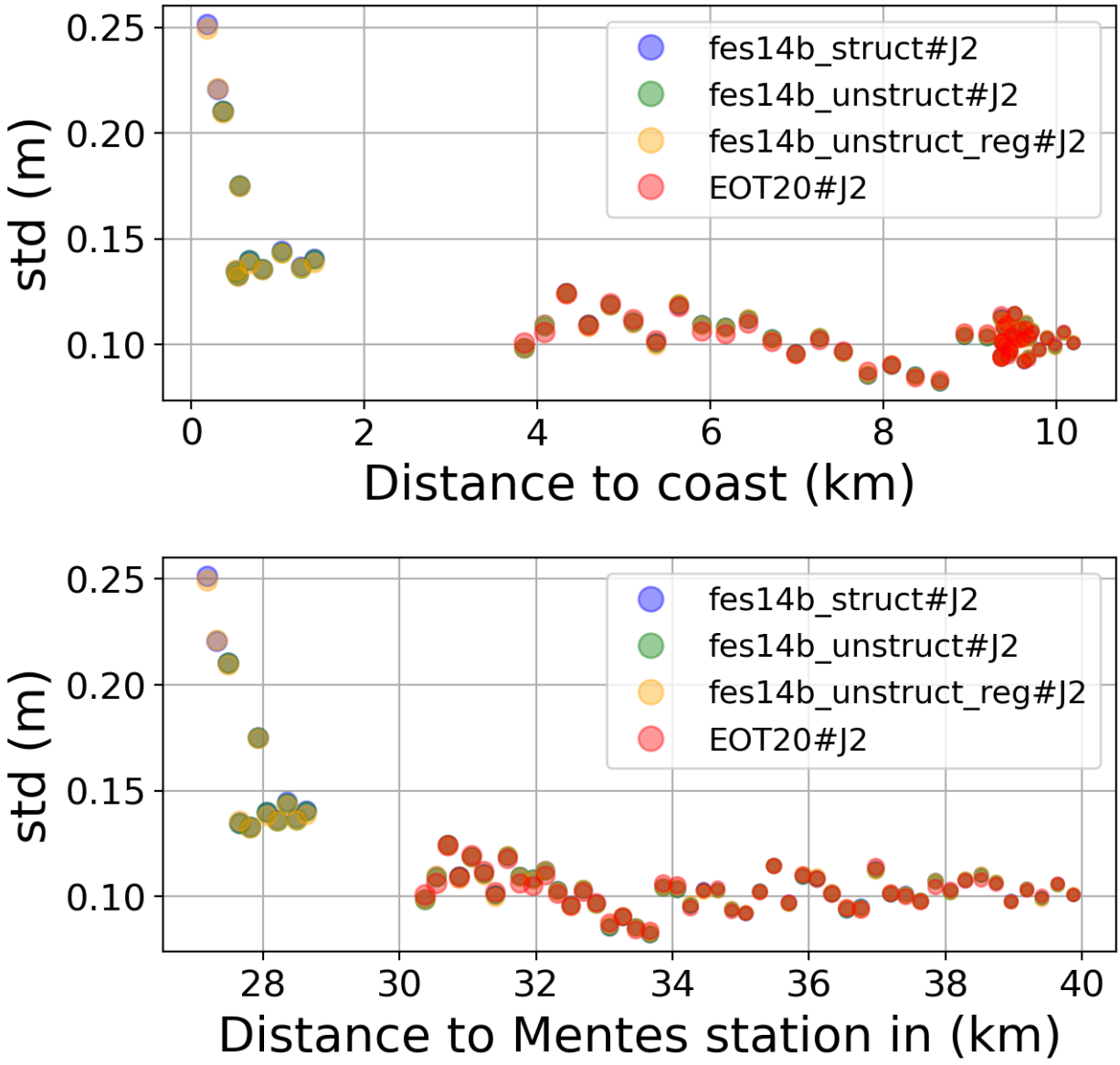

FIGURE 86 – Std in function of the distance to the coast/Mentes station

6.2.7 Correlation in function of distance to coast/Mentes station

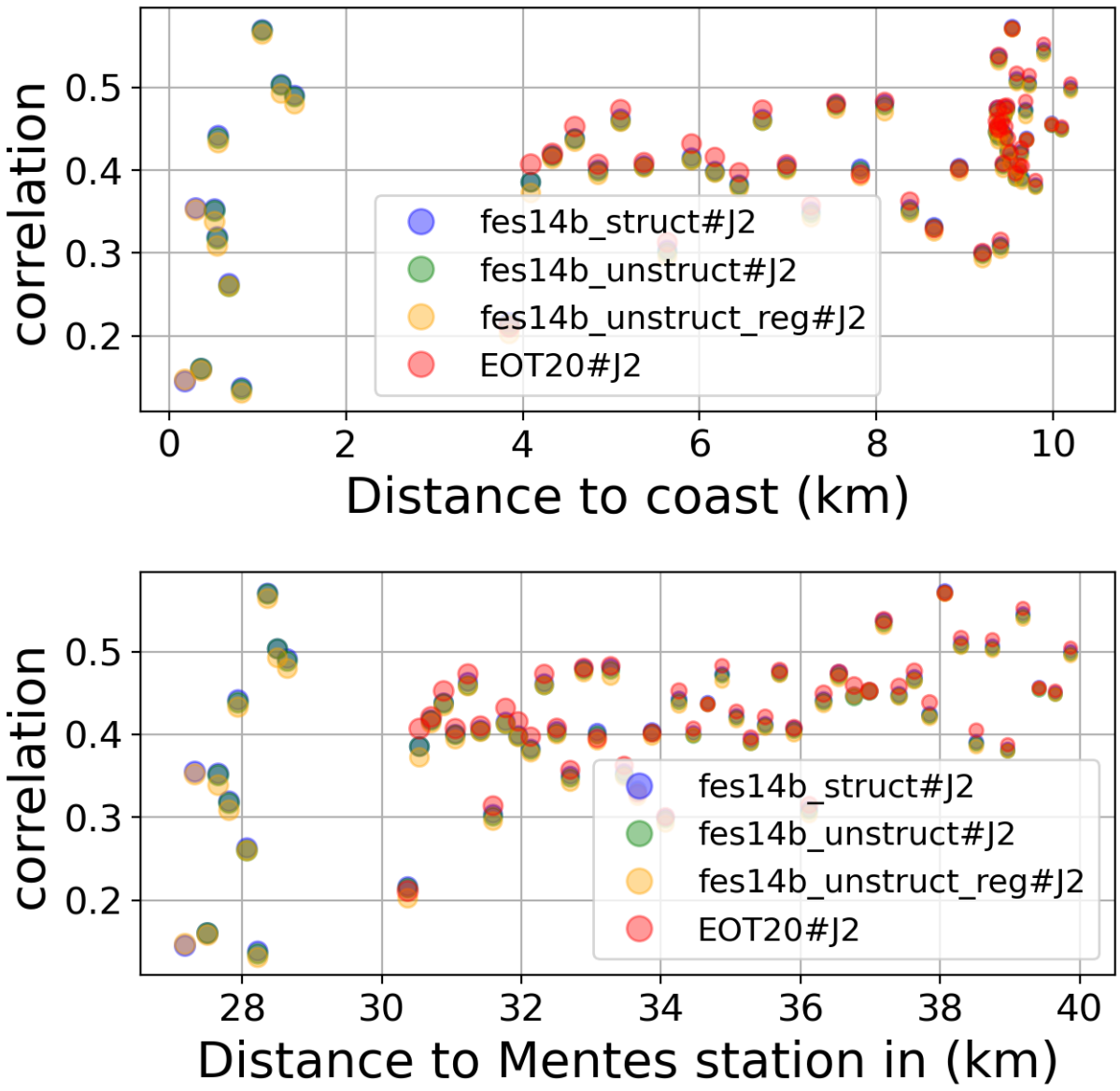

FIGURE 87 – Correlation in function of the distance to the coast/Mentes station

6.2.8 Taylor Diagram

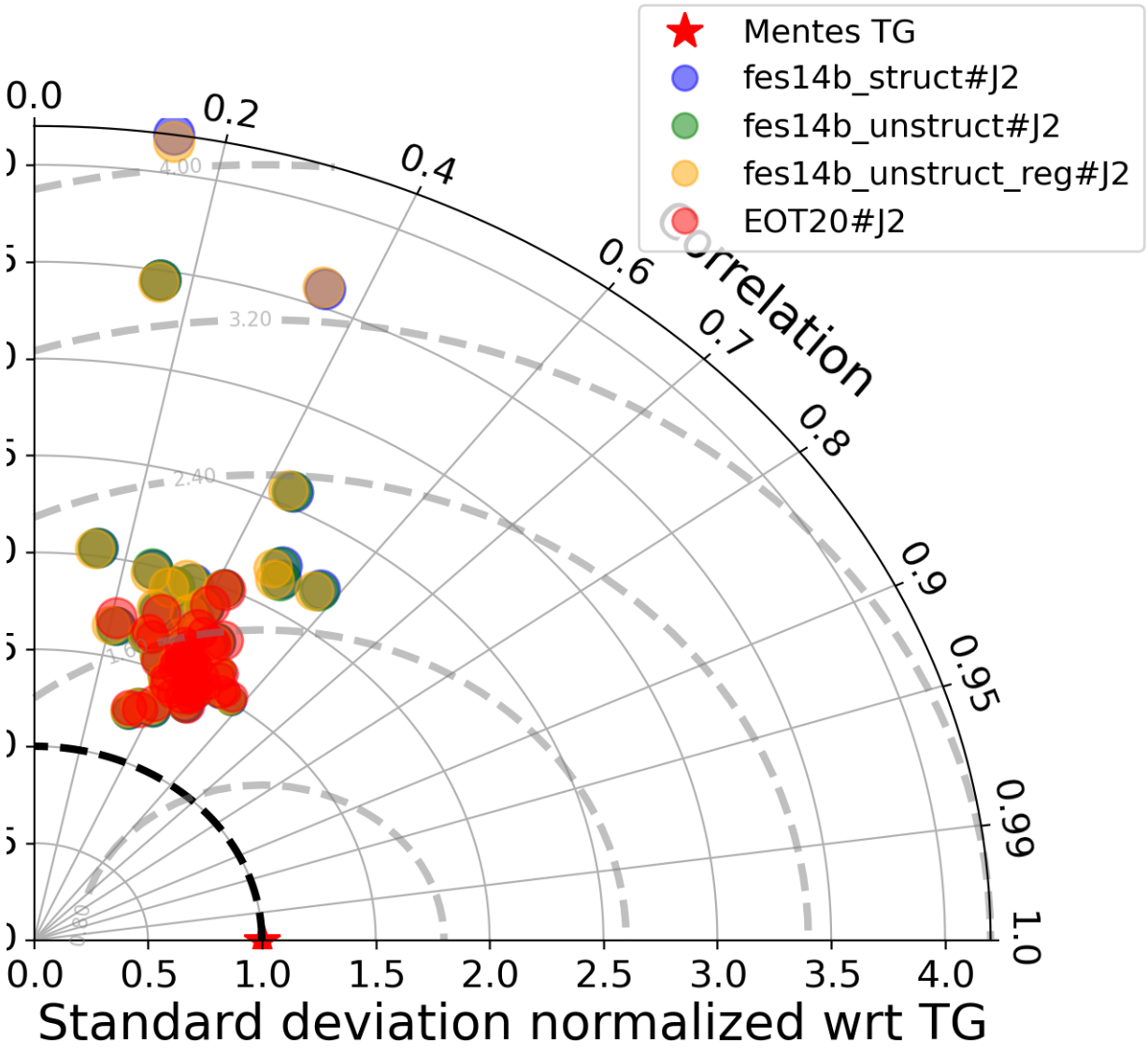

Figure 88 – Taylor diagram

6.2.9 Mean statistics table of products comparison with Mentes 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)
fes14b_struct#J2	91.007	0.425	0.103	0.096
fes14b_unstruct#J2	91.007	0.423	0.103	0.096
fes14b_unstruct_reg#J2	91.007	0.42	0.103	0.096
EOT20#J2	91.007	0.431	0.103	0.095

FIGURE 89 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.068
fes14b_struct#J2	38.066	9.526	92.079	0.573	0.103
fes14b_unstruct#J2	38.066	9.526	92.079	0.571	0.102
fes14b_unstruct_reg#J2	38.066	9.526	92.079	0.57	0.102
EOT20#J2	38.066	9.526	92.079	0.571	0.104

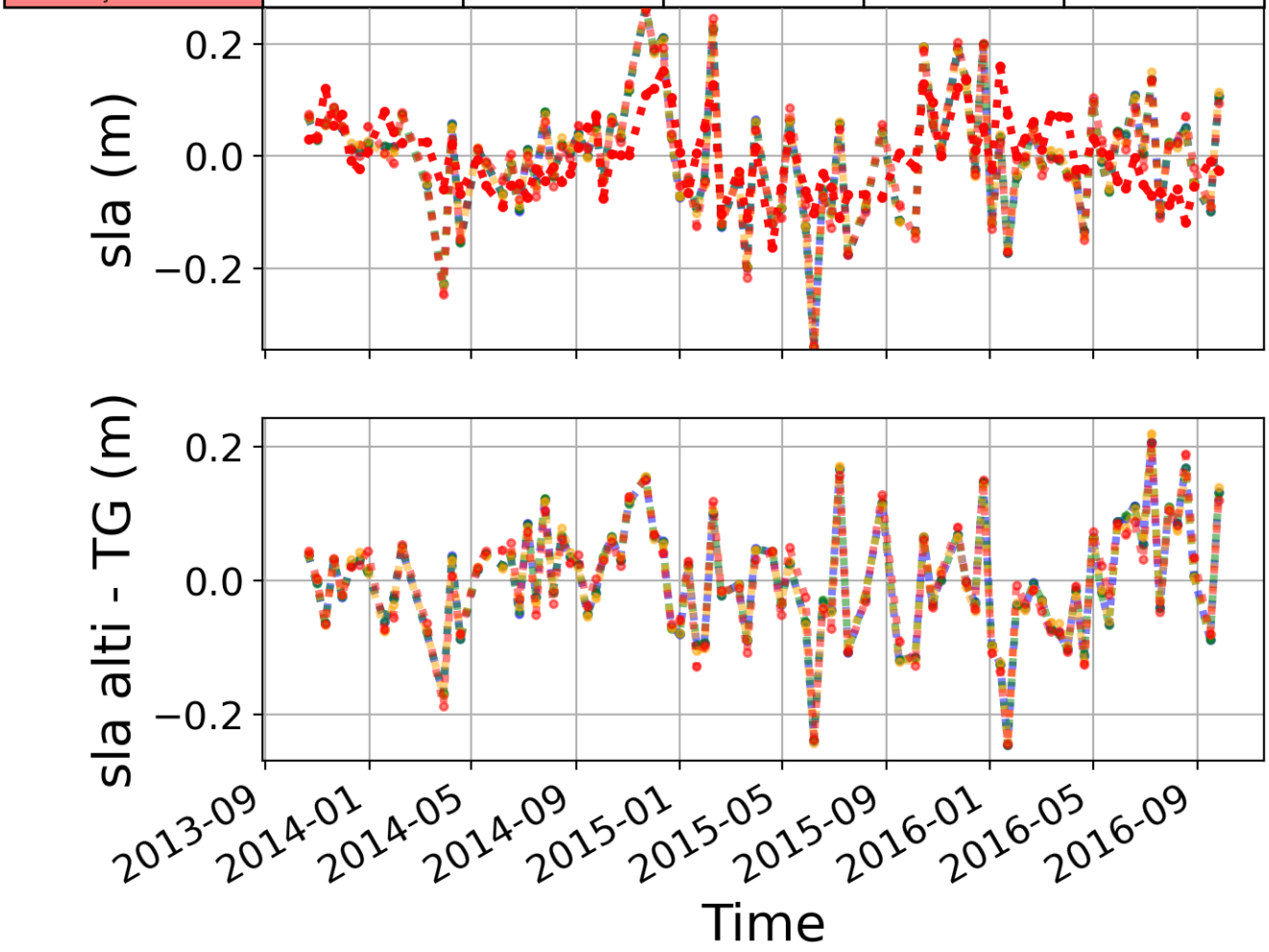

FIGURE 90 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.068
fes14b_struct#J2	38.066	9.526	92.079	0.573	0.103
fes14b_unstruct#J2	38.066	9.526	92.079	0.571	0.102
fes14b_unstruct_reg#J2	38.066	9.526	92.079	0.57	0.102
EOT20#J2	38.066	9.526	92.079	0.571	0.104

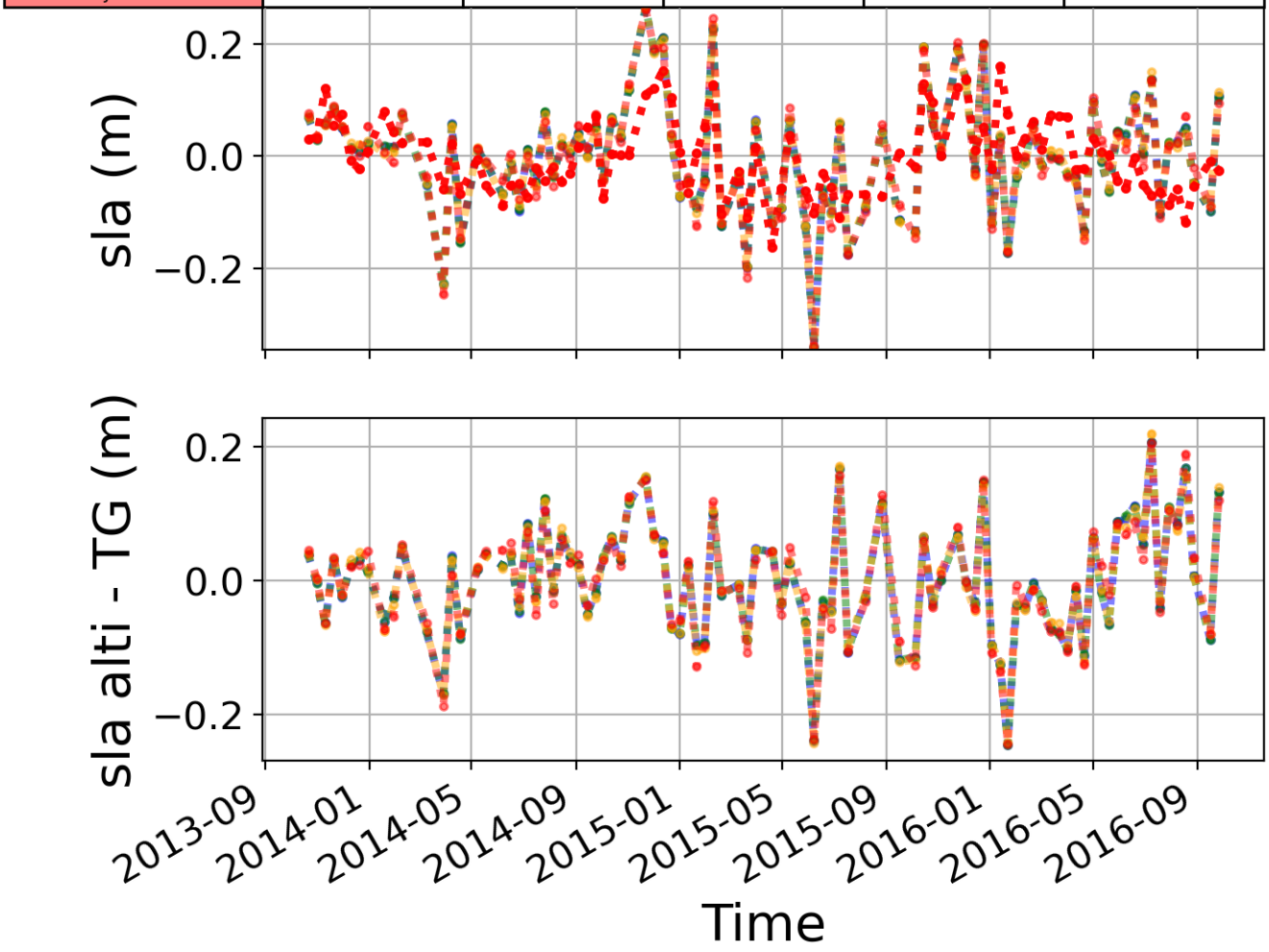

FIGURE 91 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

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 Raduis 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

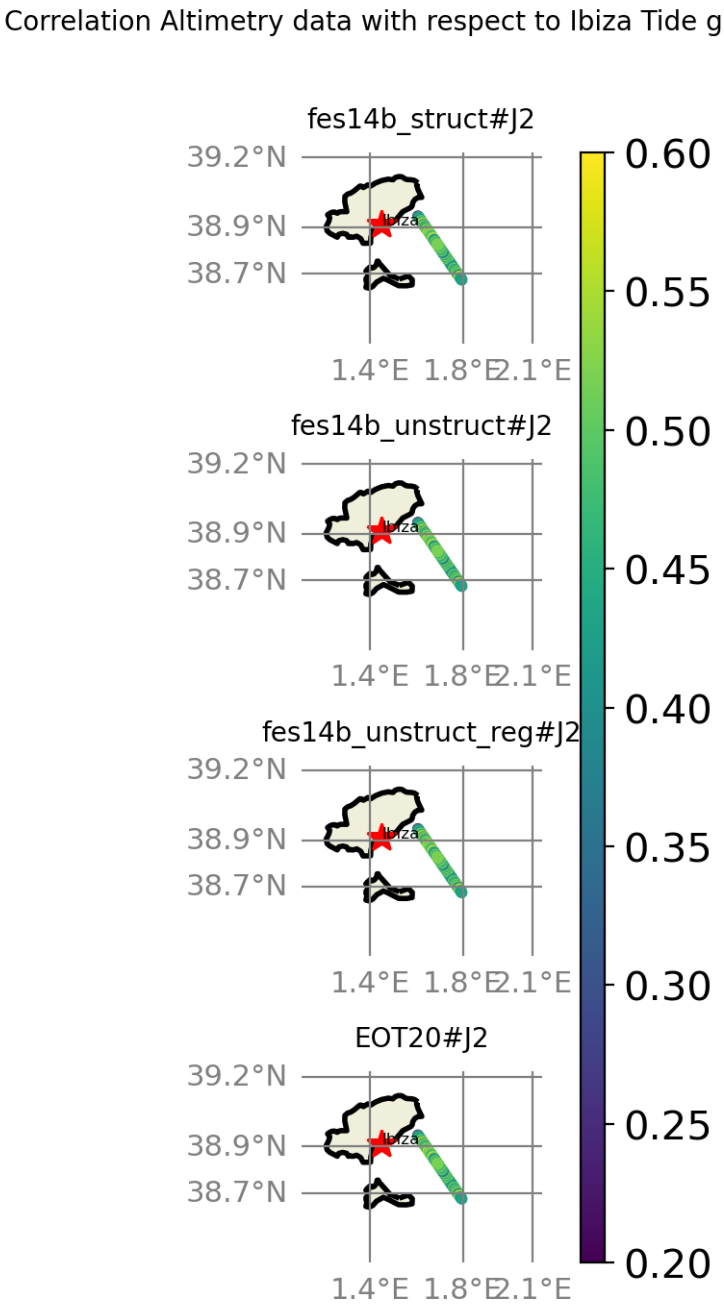

FIGURE 92 – correlation visualization in maps view % Ibiza tide gauge

6.3.2 rmsd visualization in maps view % Ibiza tide gauge

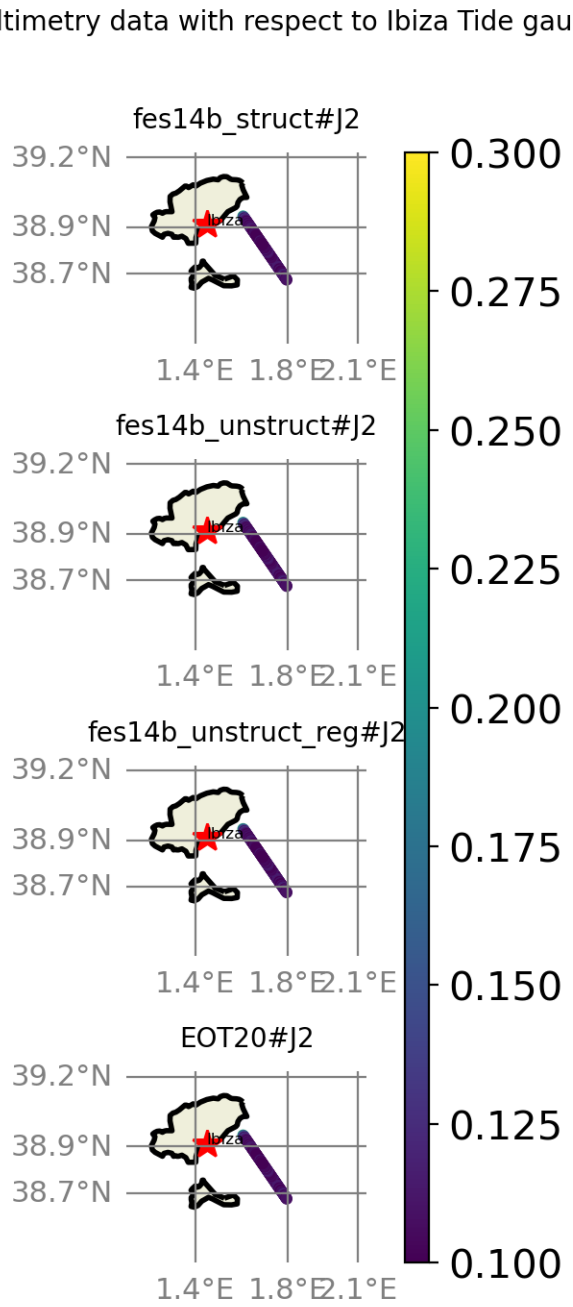

FIGURE 93 – rmsd visualization in maps view % Ibiza tide gauge

6.3.3 std visualization in maps view % Ibiza tide gauge

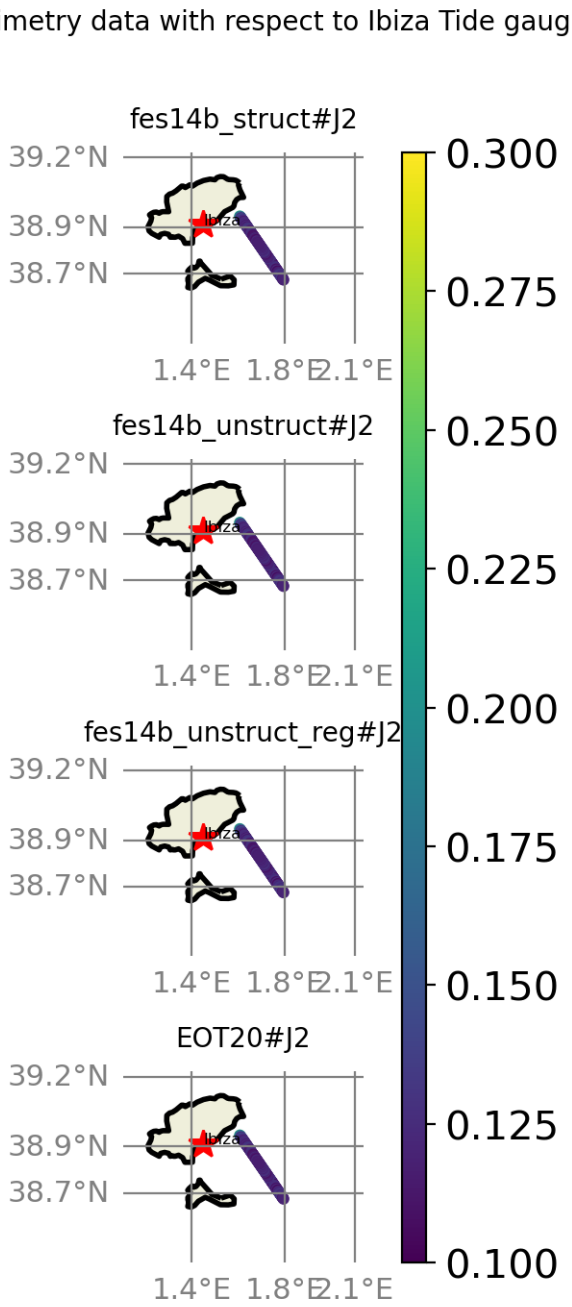

FIGURE 94 – std visualization in maps view % Ibiza tide gauge

6.3.4 valid_data_percent visualization in maps view % Ibiza tide gauge

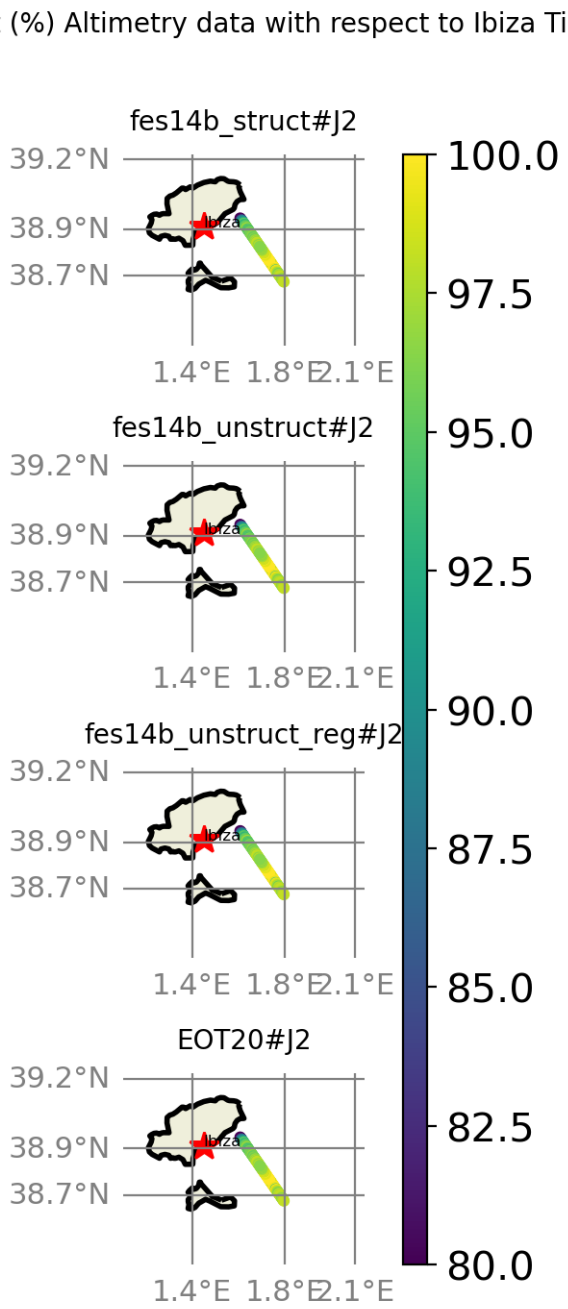

FIGURE 95 – valid_data_percent visualization in maps view % Ibiza tide gauge

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.

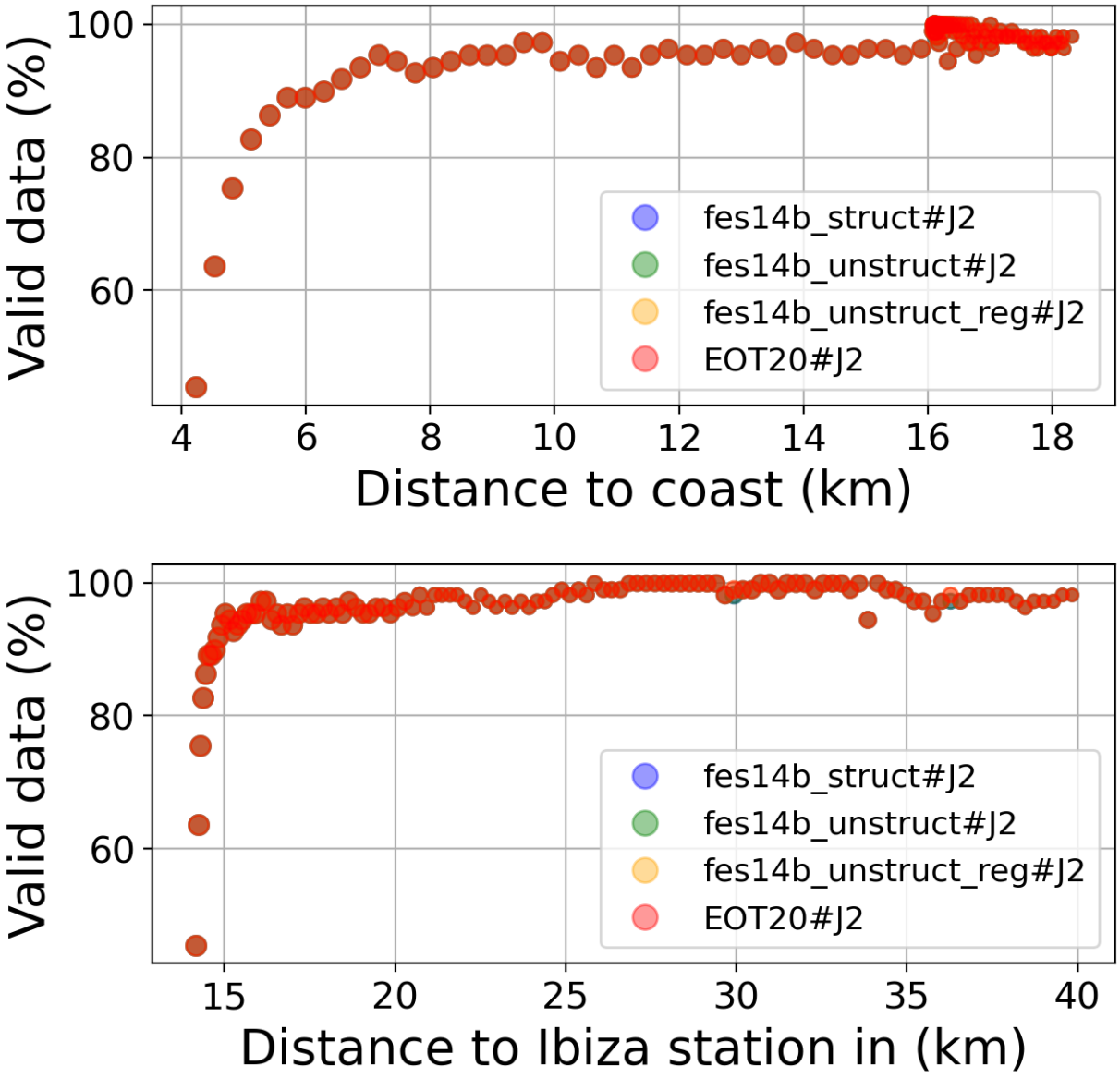

Figure 96 – Valid data (%) in function of distance to coast/Ibiza station

6.3.6 Std in function of distance to coast/Ibiza station

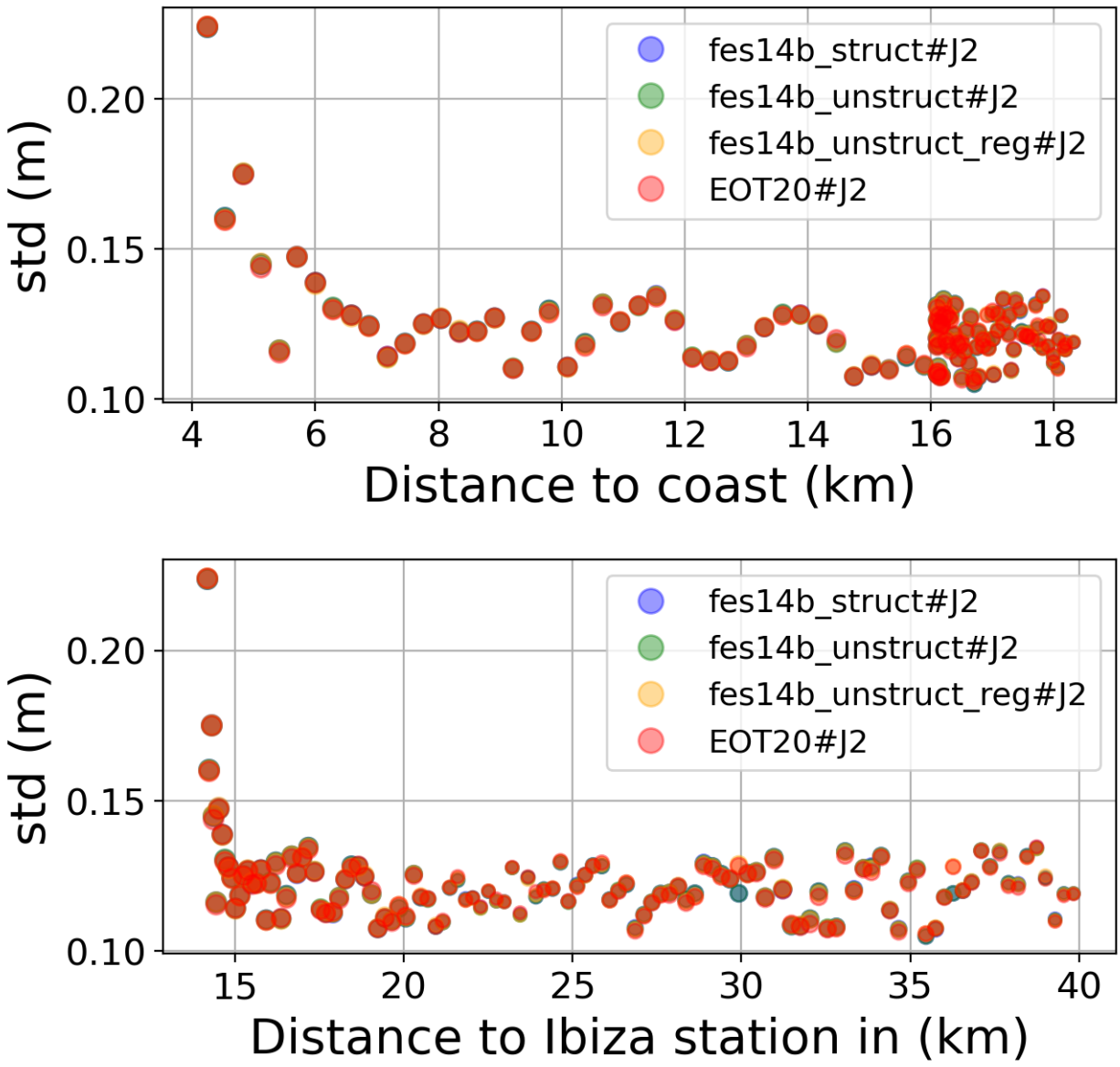

FIGURE 97 – Std in function of the distance to the coast/Ibiza station

6.3.7 Correlation in function of distance to coast/Ibiza station

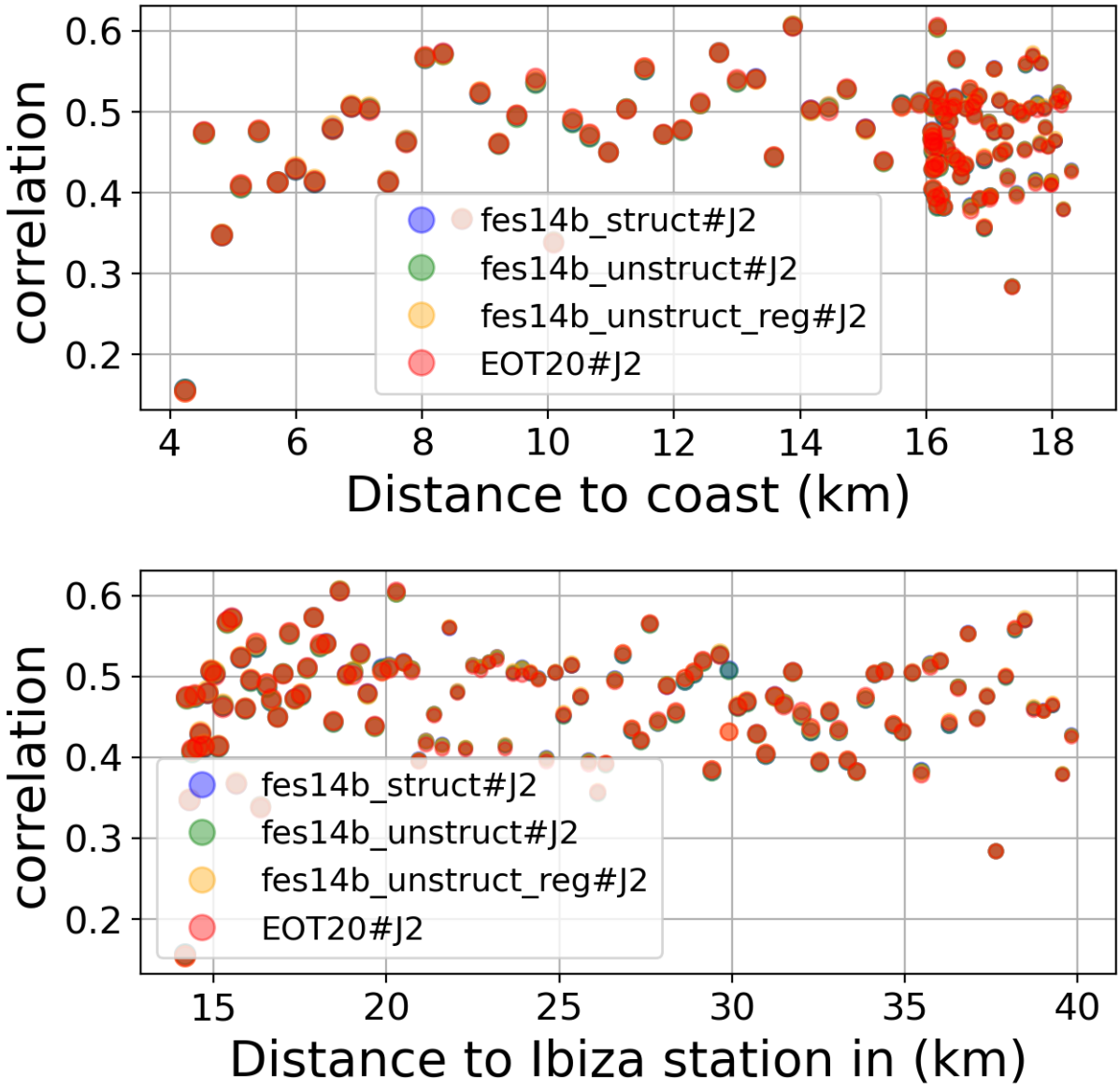

Figure 98 – Correlation in function of the distance to the coast/Ibiza station

6.3.8 Taylor Diagram

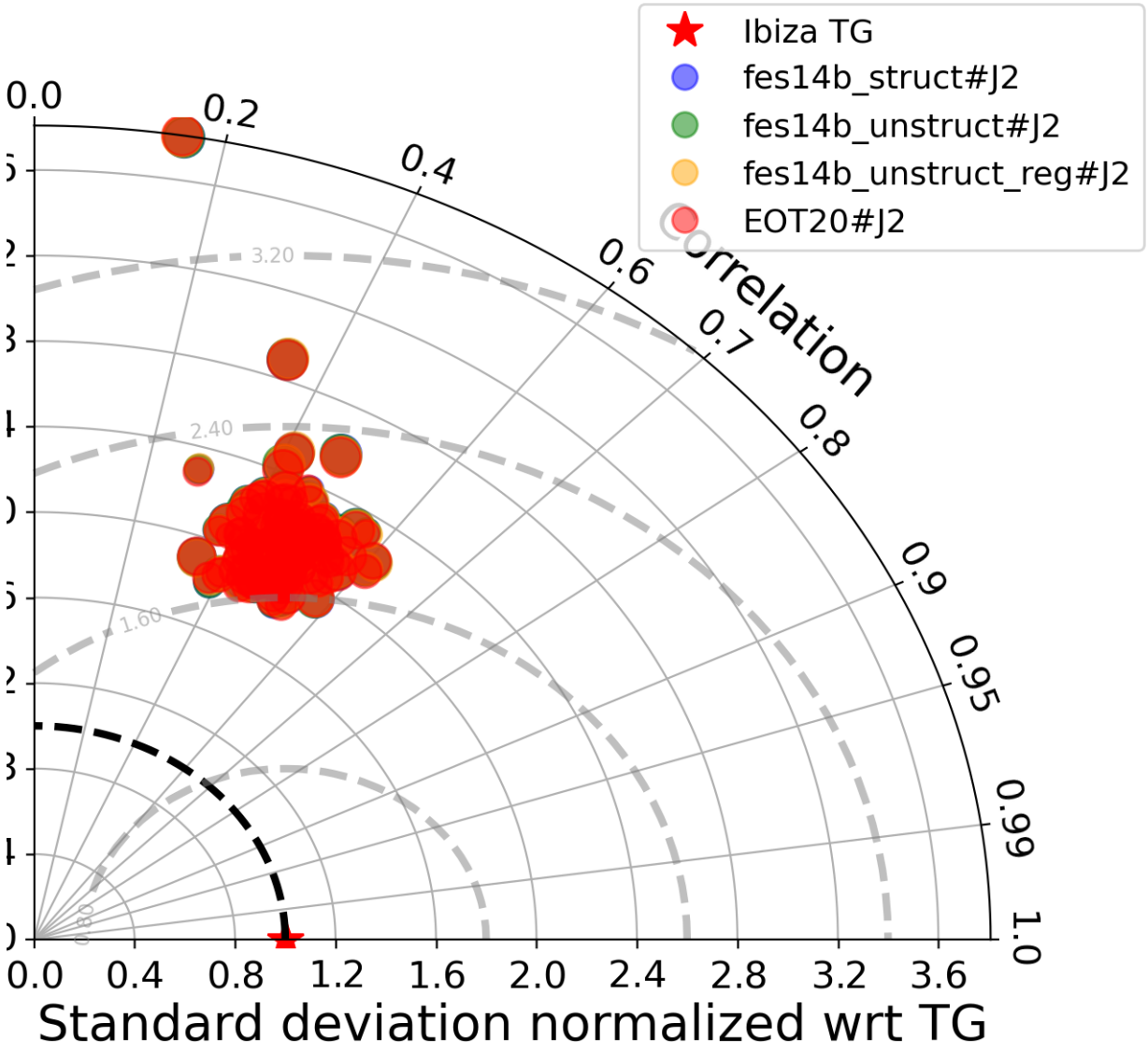

Figure 99 – Taylor diagram

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)
fes14b_struct#J2	96.157	0.47	0.123	0.109
fes14b_unstruct#J2	96.157	0.47	0.123	0.109
fes14b_unstruct_reg#J2	96.173	0.47	0.123	0.109
EOT20#J2	96.173	0.469	0.123	0.109

FIGURE 100 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.058
fes14b_struct#J2	18.643	13.873	97.273	0.606	0.128
fes14b_unstruct#J2	18.643	13.873	97.273	0.606	0.128
fes14b_unstruct_reg#J2	18.643	13.873	97.273	0.608	0.128
EOT20#J2	18.643	13.873	97.273	0.605	0.129

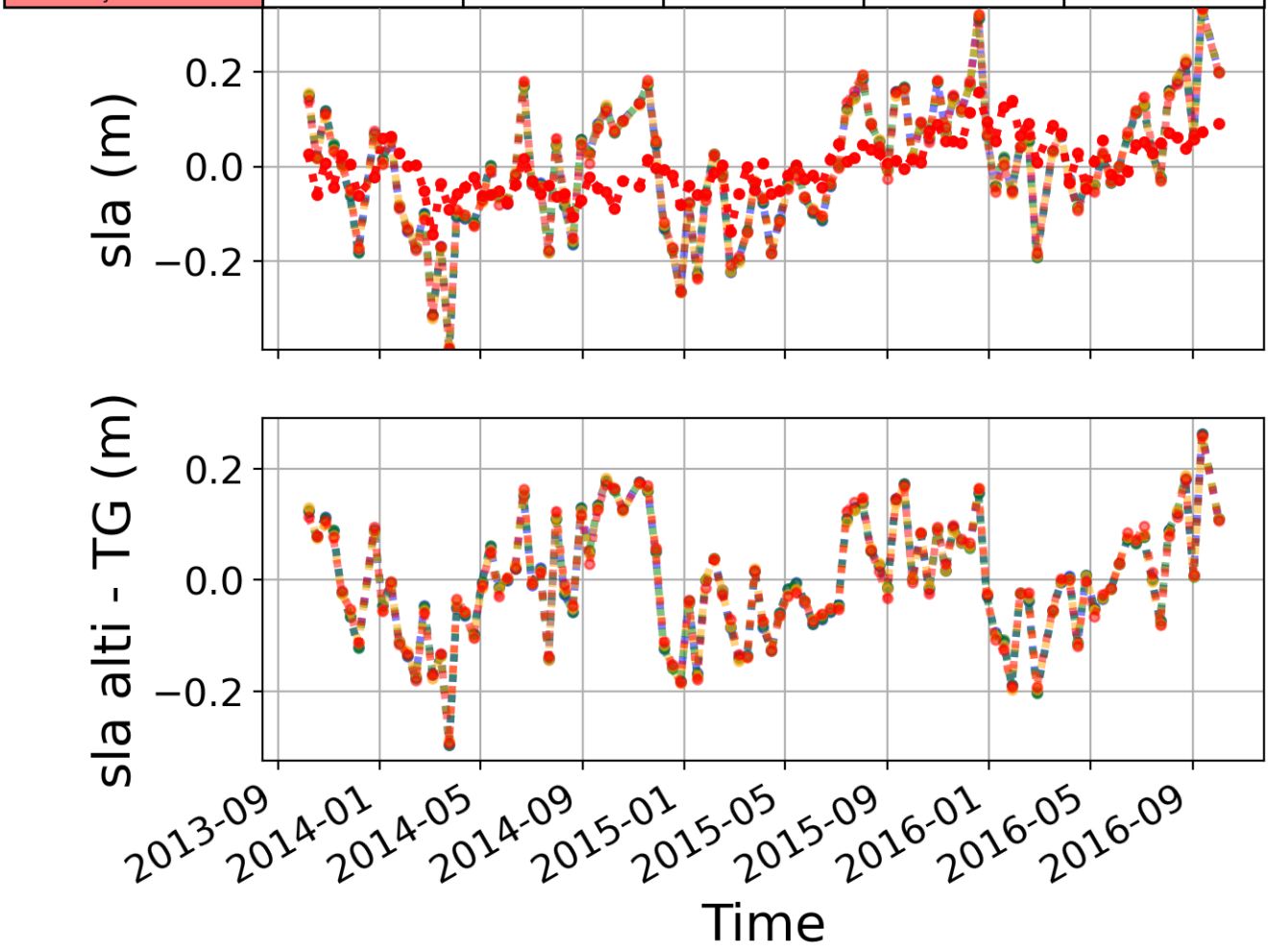

FIGURE 101 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.058
fes14b_struct#J2	20.278	16.17	97.273	0.604	0.126
fes14b_unstruct#J2	20.278	16.17	97.273	0.603	0.126
fes14b_unstruct_reg#J2	20.278	16.17	97.273	0.605	0.126
EOT20#J2	20.278	16.17	97.273	0.607	0.125

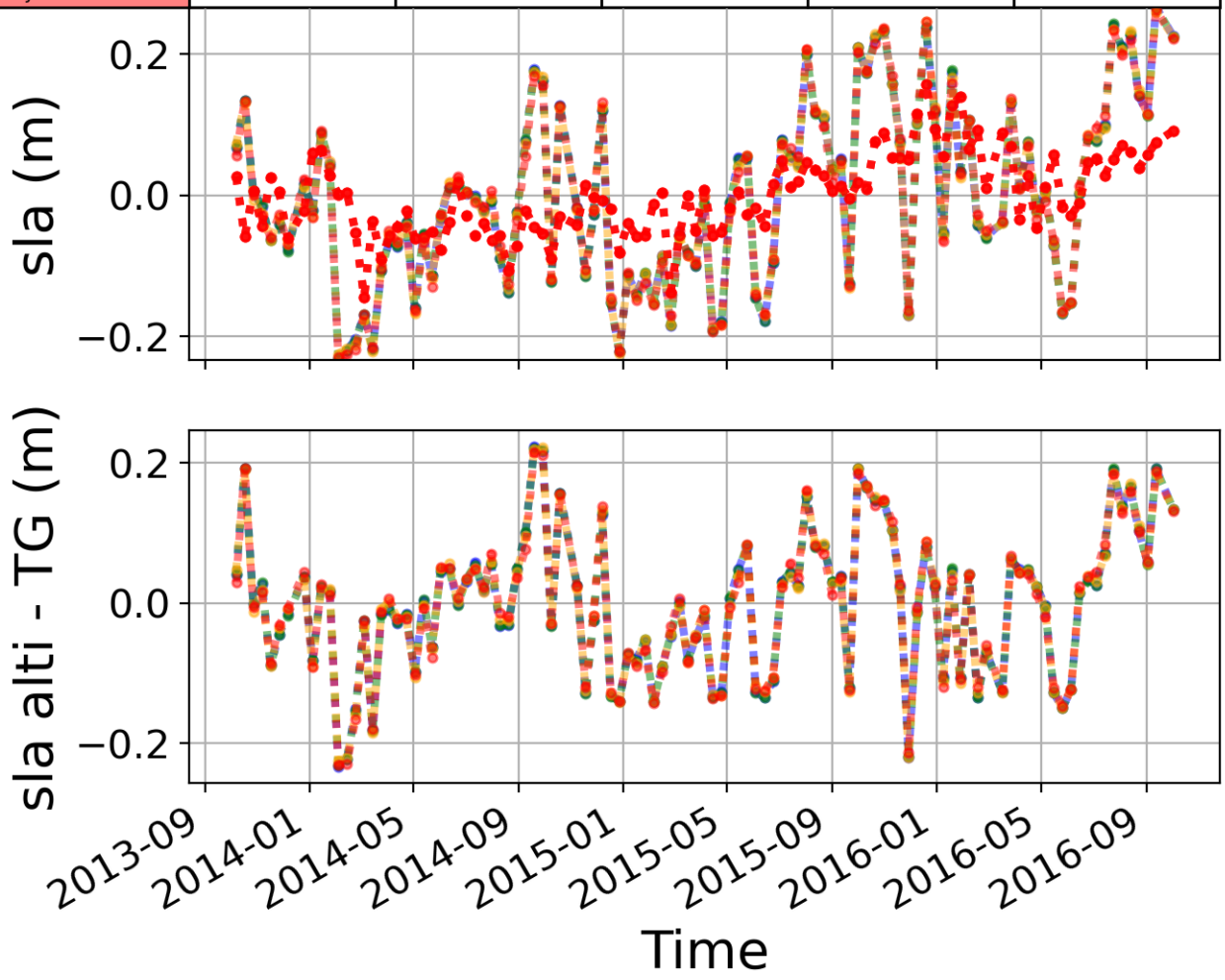

FIGURE 102 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

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 Raduis of 40 Km
  - Maximum distance to the coast : 20 Km

6.4.1 correlation visualization in maps view % LA_FIGUEIRETTE tide gauge

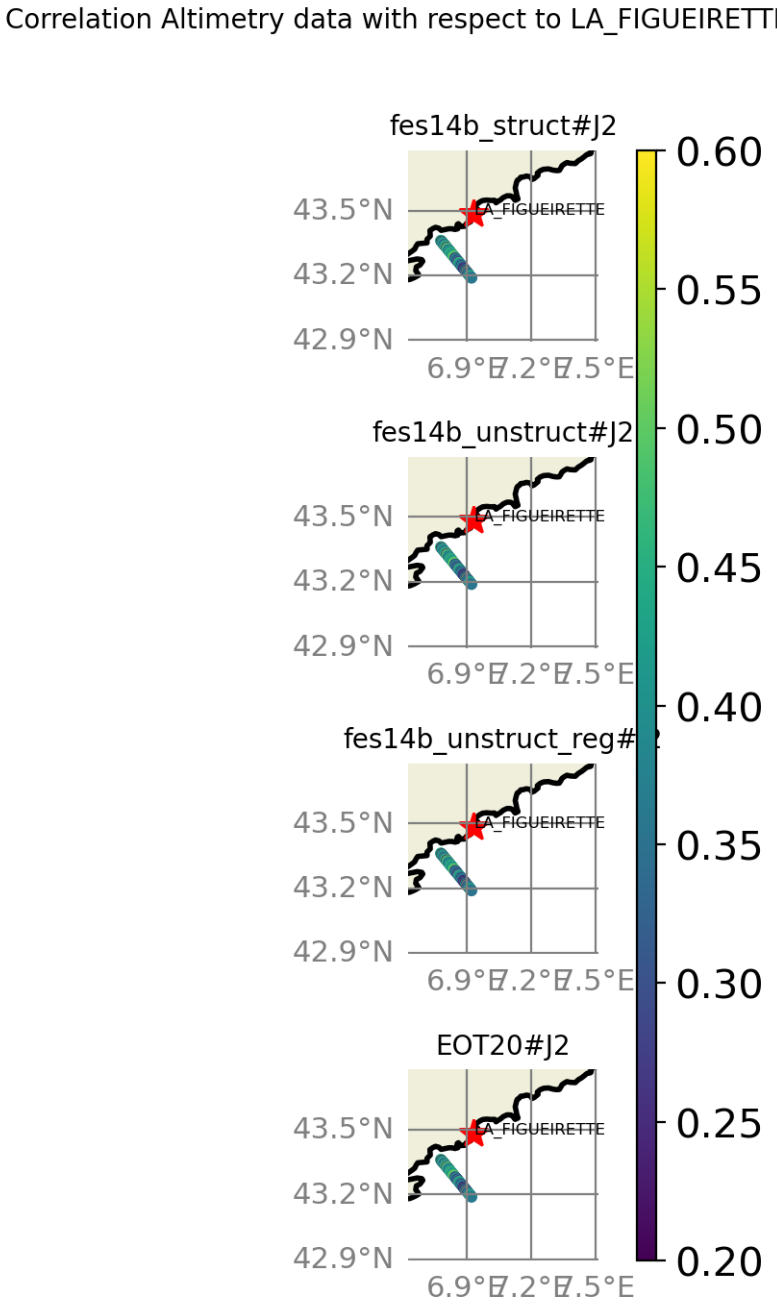

Figure 103 – correlation visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.2 rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge

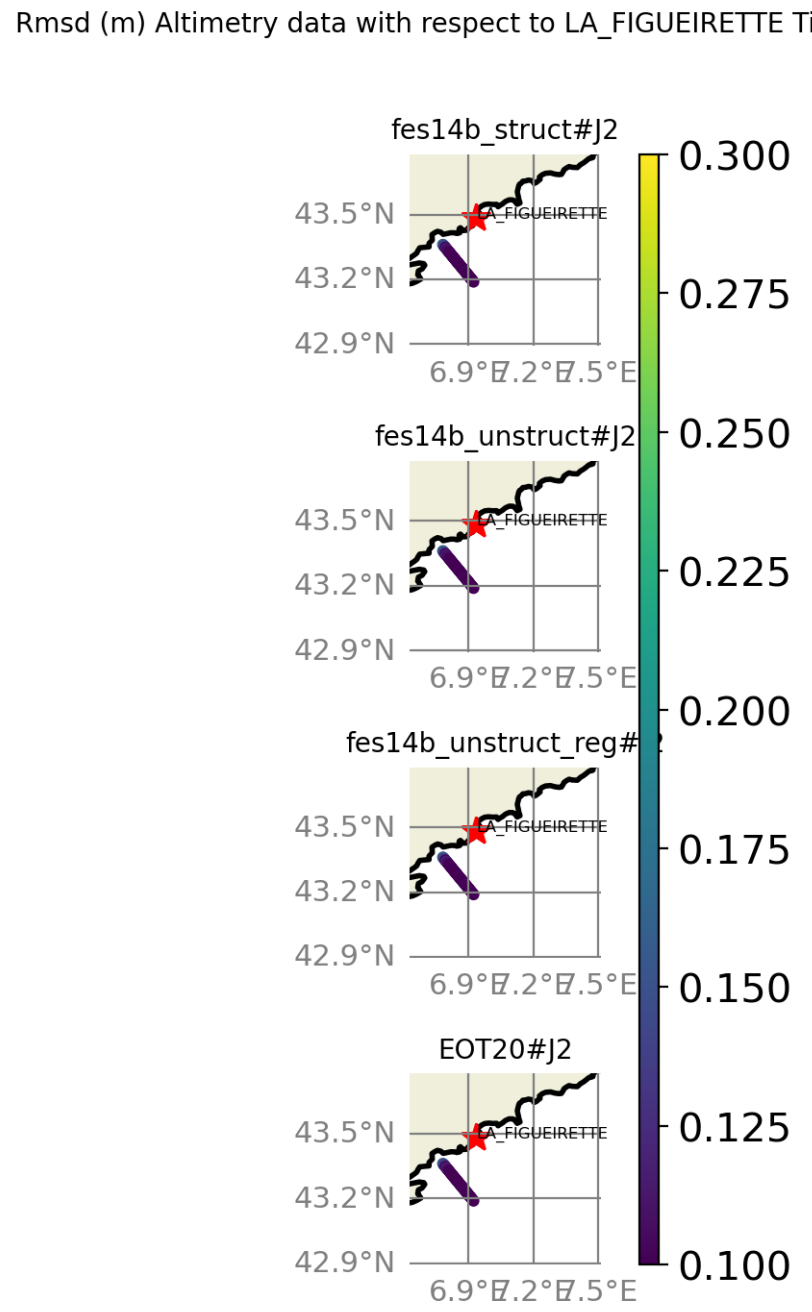

Figure 104 – rmsd visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.3 std visualization in maps view % LA_FIGUEIRETTE tide gauge

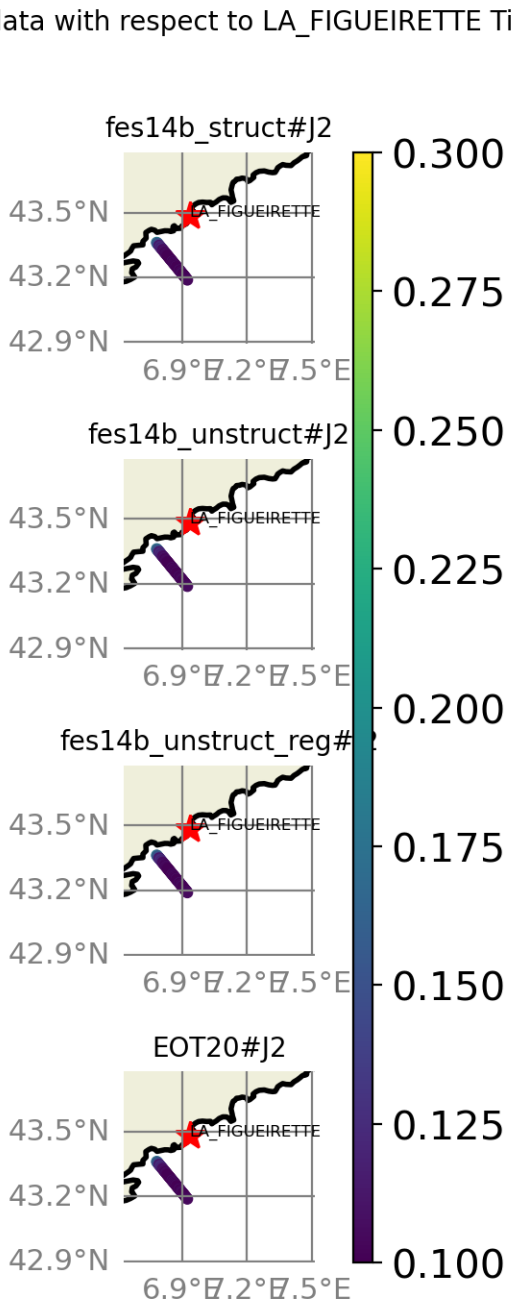

Figure 105 – std visualization in maps view % LA_FIGUEIRETTE tide gauge

6.4.4 valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge

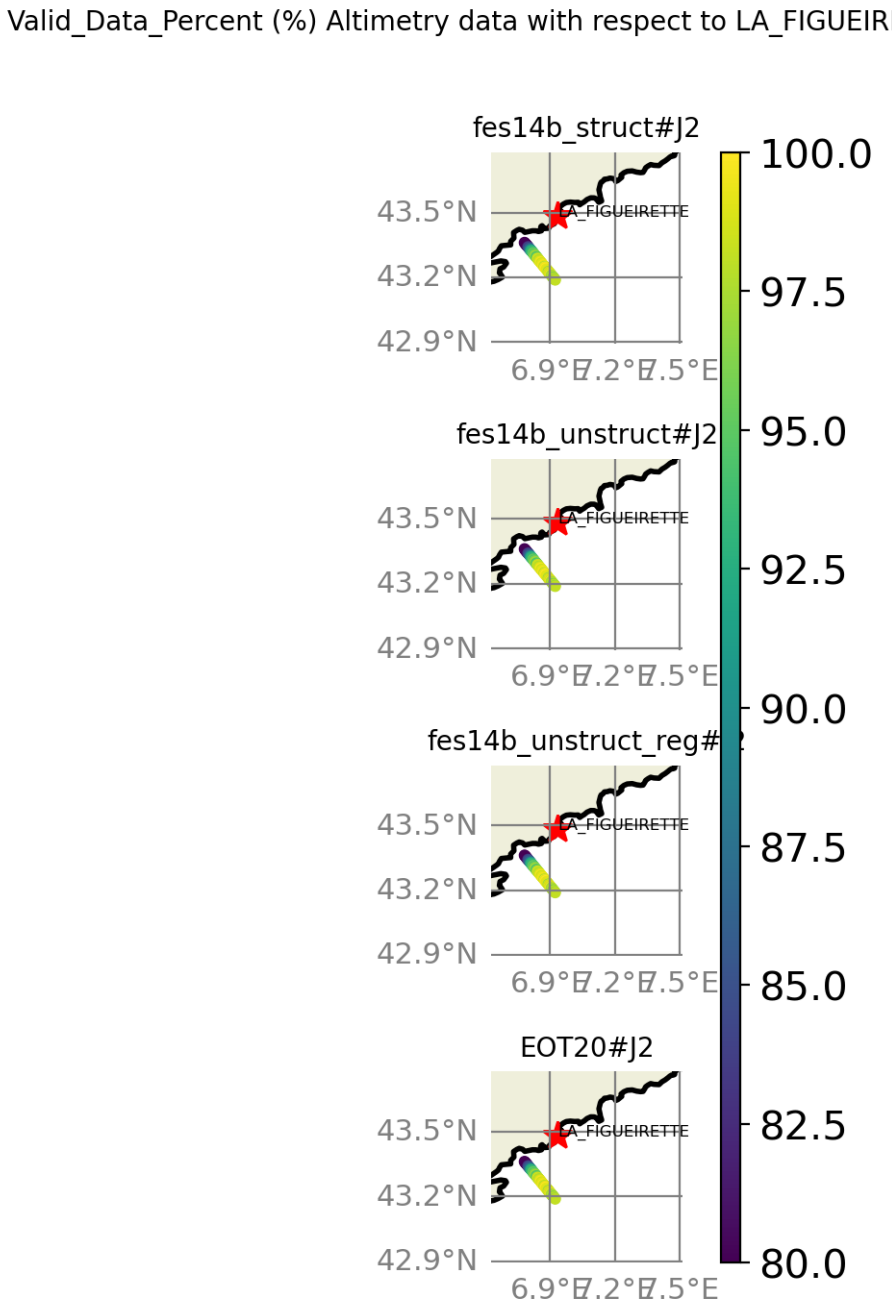

FIGURE 106 – valid_data_percent visualization in maps view % LA_FIGUEIRETTE tide gauge

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.

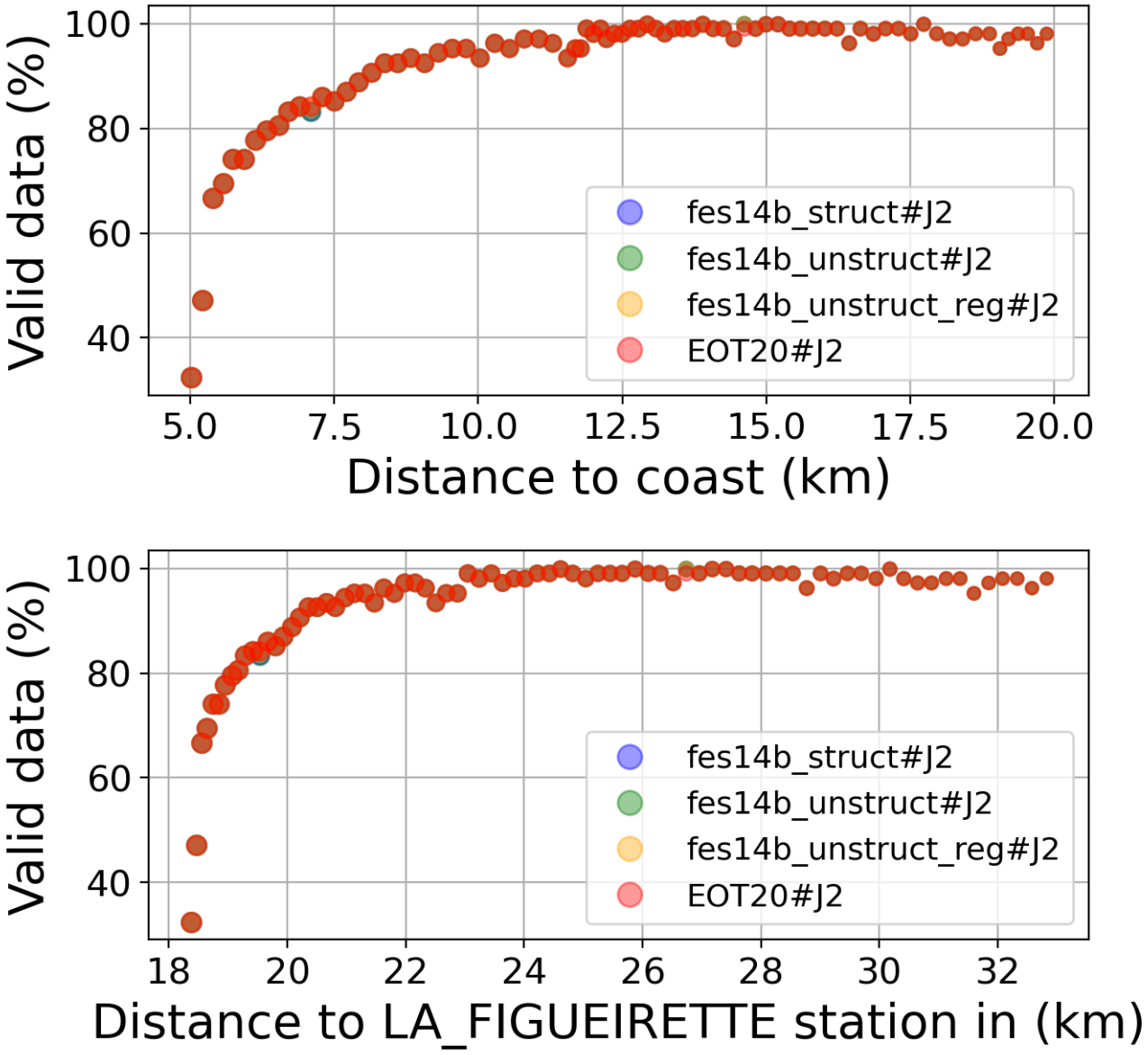

Figure 107 – Valid data (%) in function of distance to coast/LA_FIGUEIRETTE station

6.4.6 Std in function of distance to coast/LA_FIGUEIRETTE station

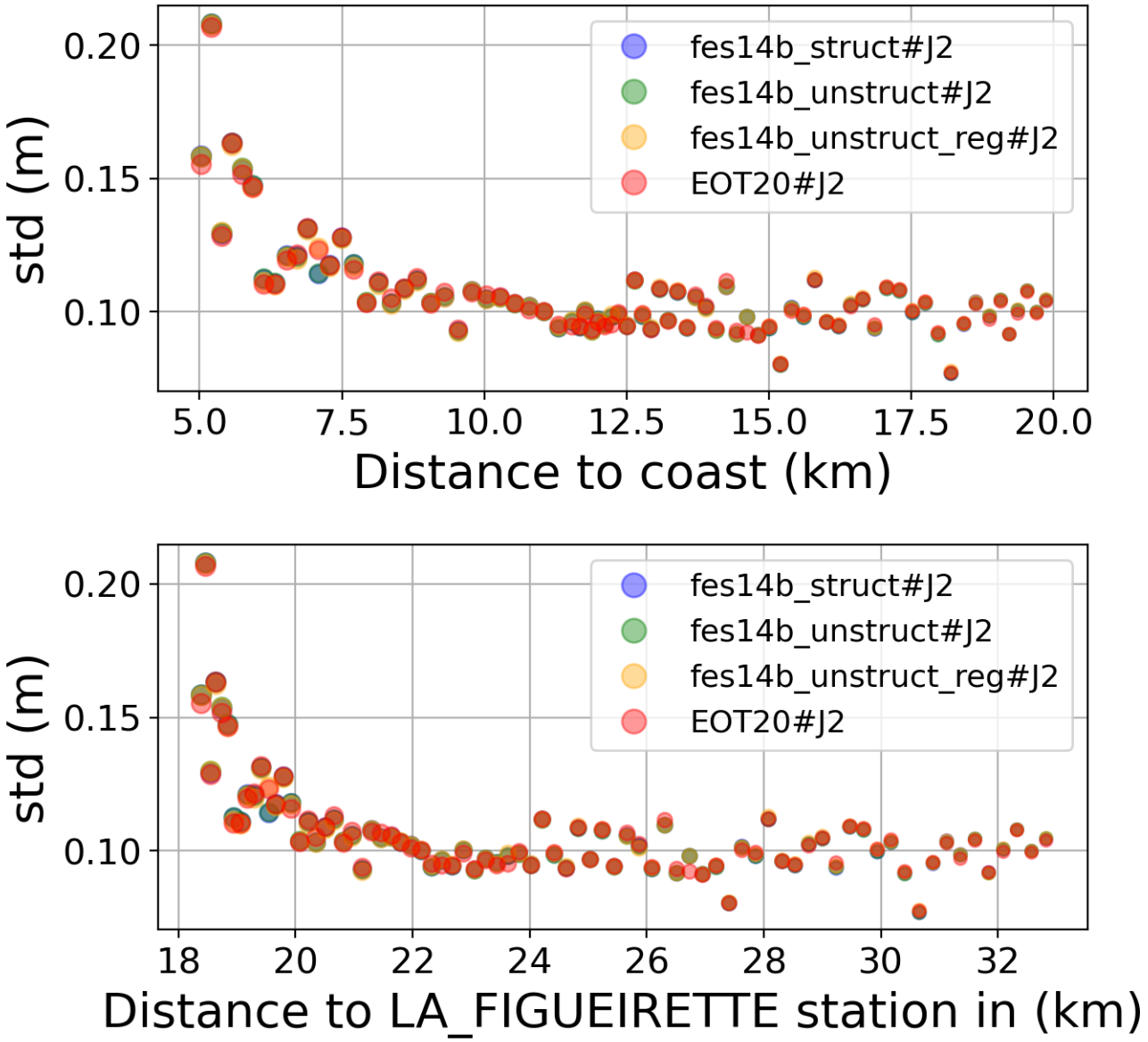

FIGURE 108 – Std in function of the distance to the coast/LA_FIGUEIRETTE station

6.4.7 Correlation in function of distance to coast/LA_FIGUEIRETTE station

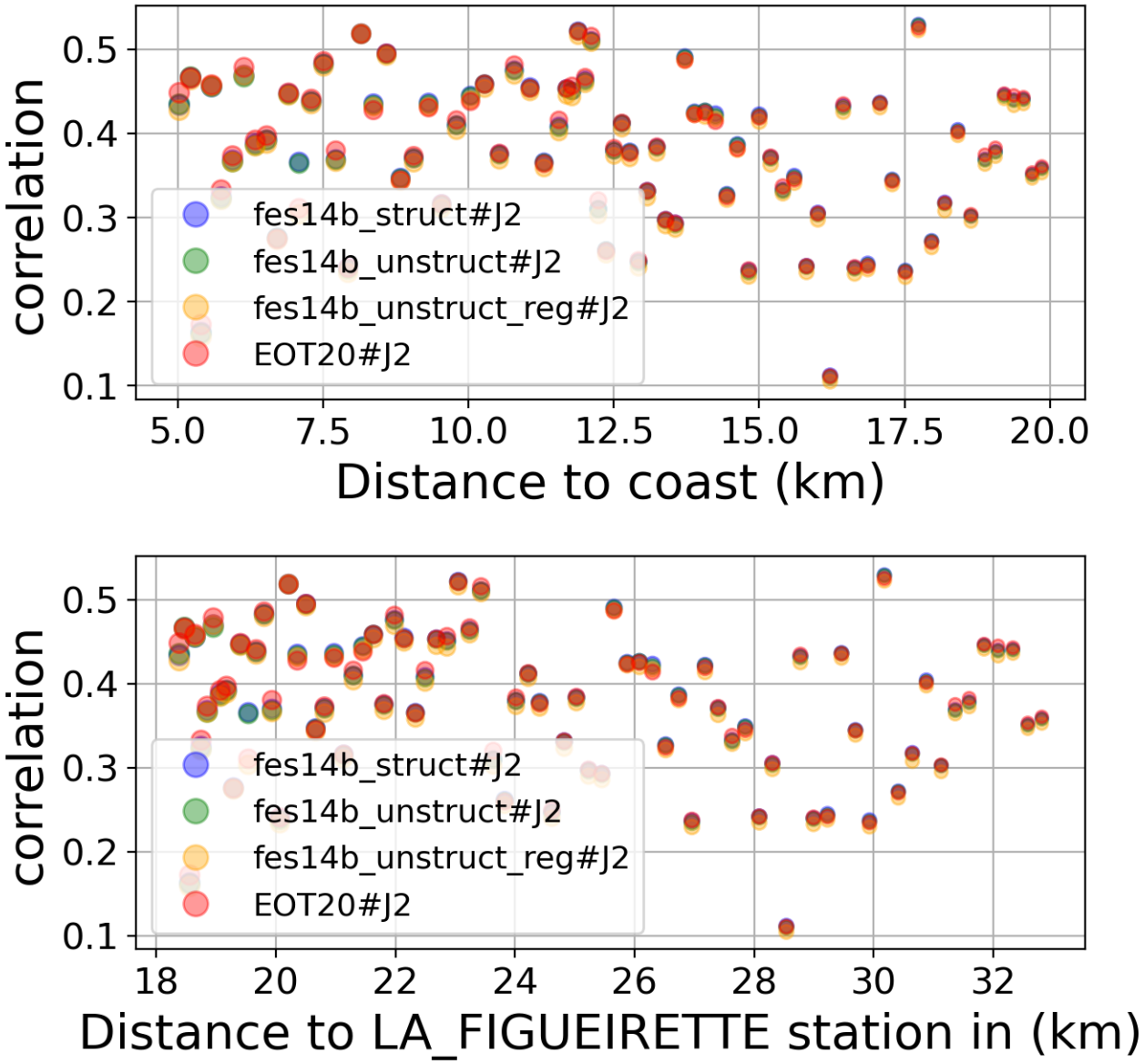

FIGURE 109 – Correlation in function of the distance to the coast/LA_FIGUEIRETTE station

6.4.8 Taylor Diagram

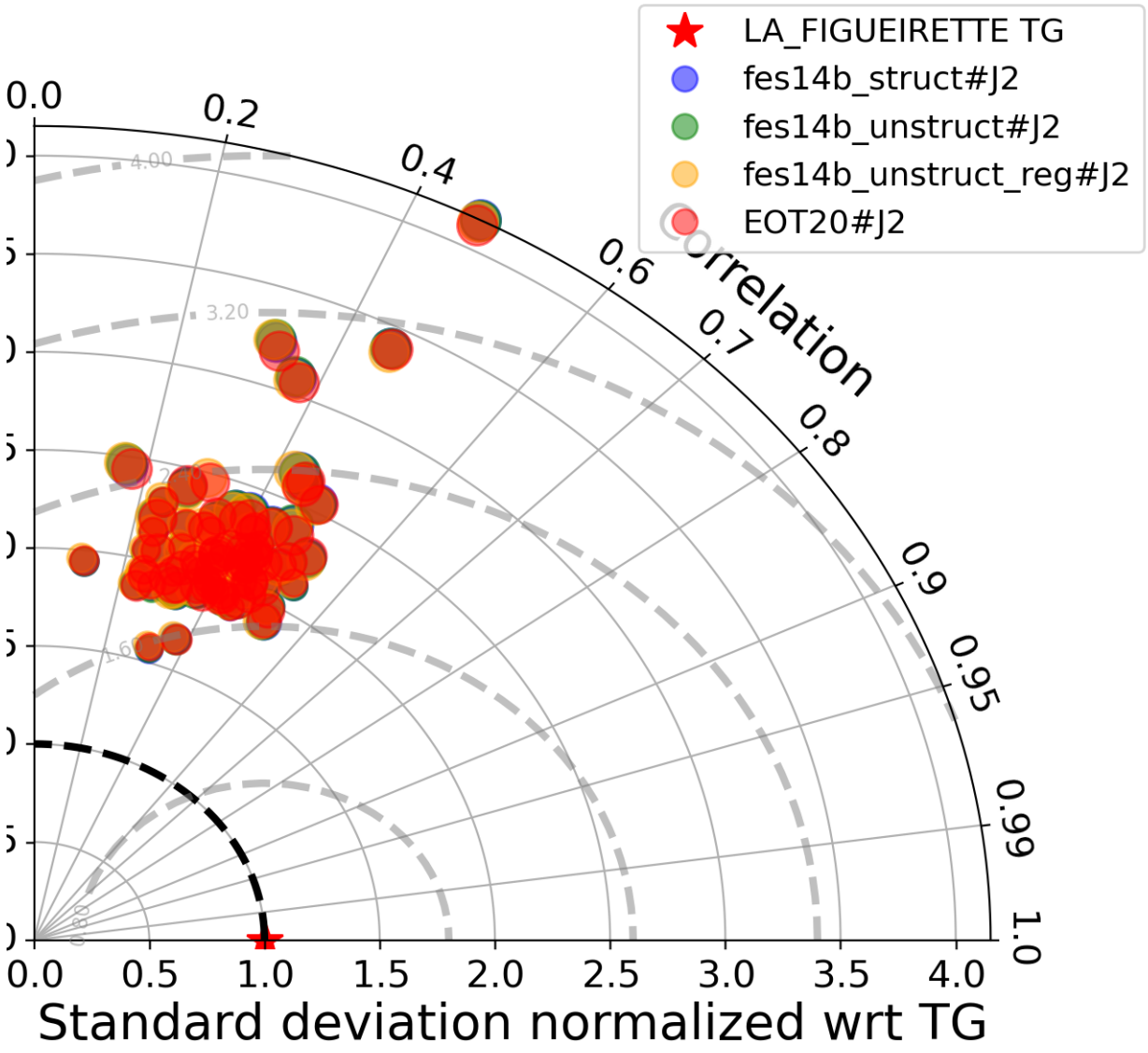

Figure 110 – Taylor diagram

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)
fes14b_struct#J2	92.842	0.379	0.107	0.1
fes14b_unstruct#J2	92.842	0.377	0.107	0.1
fes14b_unstruct_reg#J2	92.854	0.372	0.107	0.1
EOT20#J2	92.842	0.379	0.107	0.099

FIGURE 111 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.049
fes14b_struct#J2	30.165	17.733	100.0	0.53	0.103
fes14b_unstruct#J2	30.165	17.733	100.0	0.529	0.103
fes14b_unstruct_reg#J2	30.165	17.733	100.0	0.523	0.104
EOT20#J2	30.165	17.733	100.0	0.526	0.104

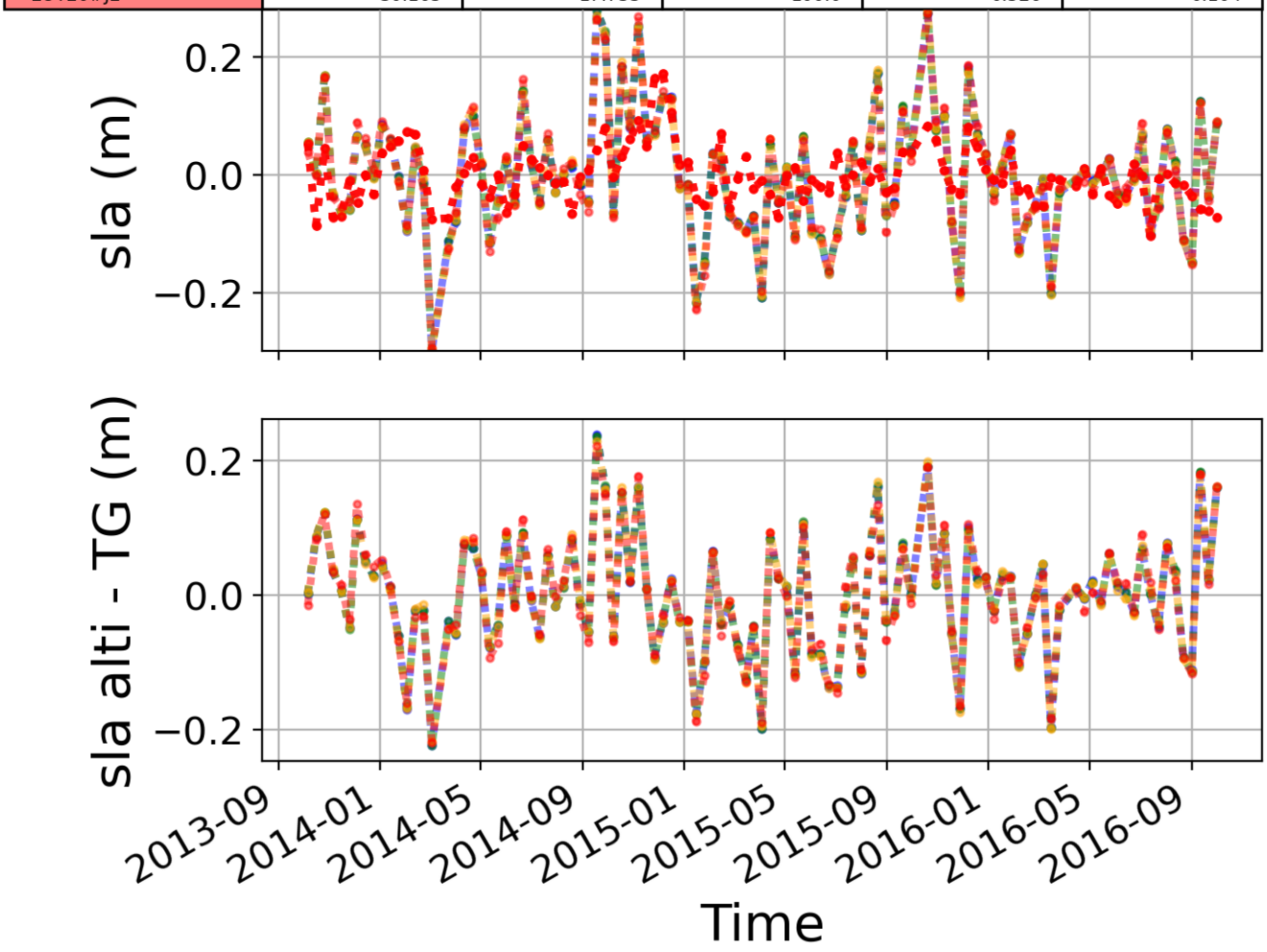

FIGURE 112 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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

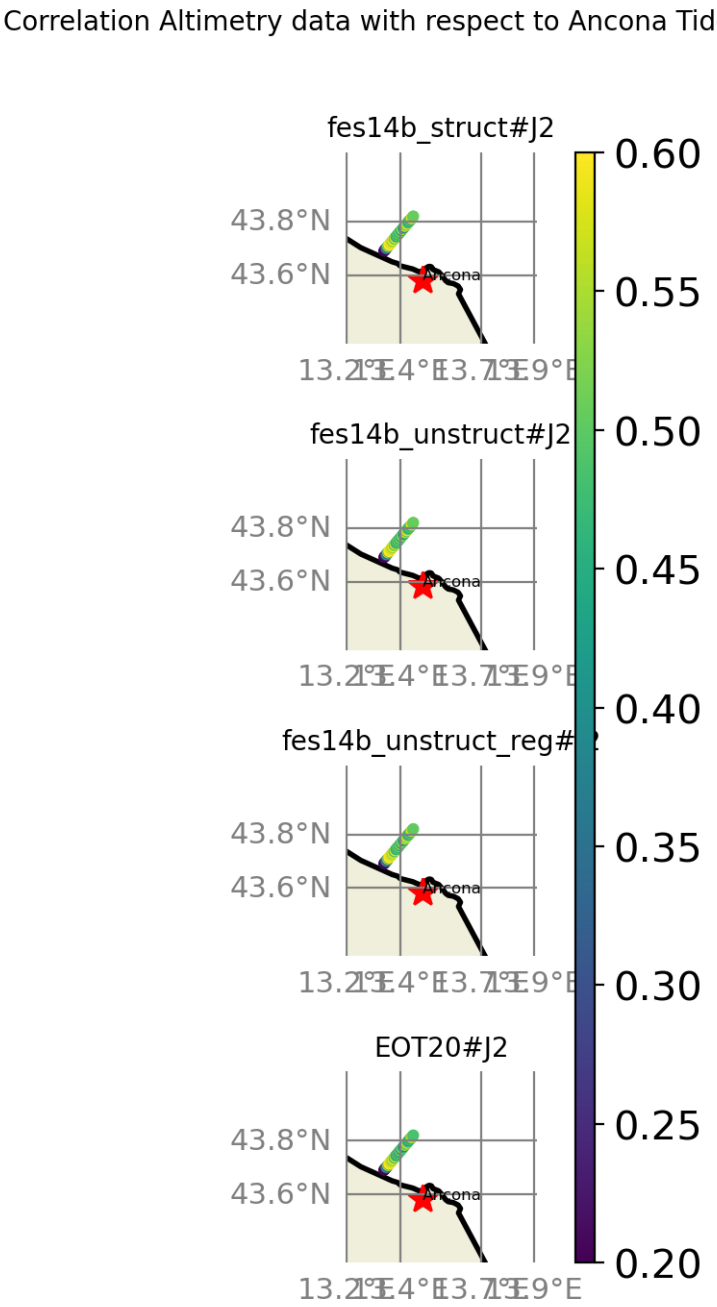

FIGURE 113 – correlation visualization in maps view % Ancona tide gauge

6.5.2 rmsd visualization in maps view % Ancona tide gauge

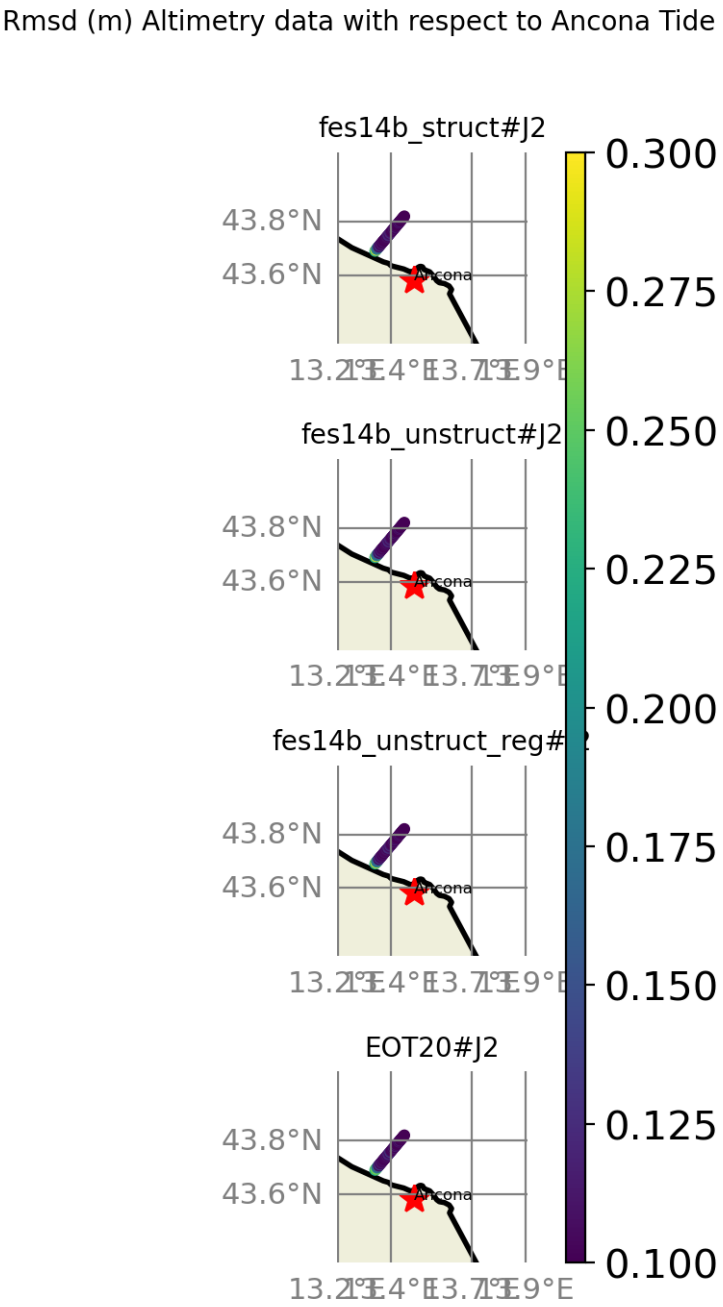

FIGURE 114 – rmsd visualization in maps view % Ancona tide gauge

6.5.3 std visualization in maps view % Ancona tide gauge

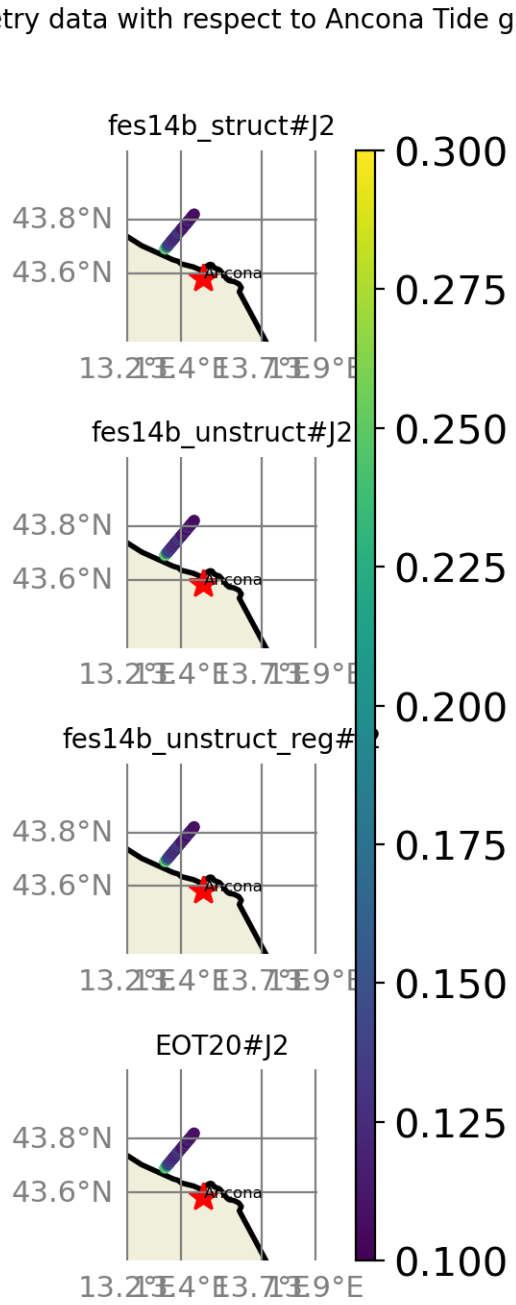

FIGURE 115 – std visualization in maps view % Ancona tide gauge

6.5.4 valid_data_percent visualization in maps view % Ancona tide gauge

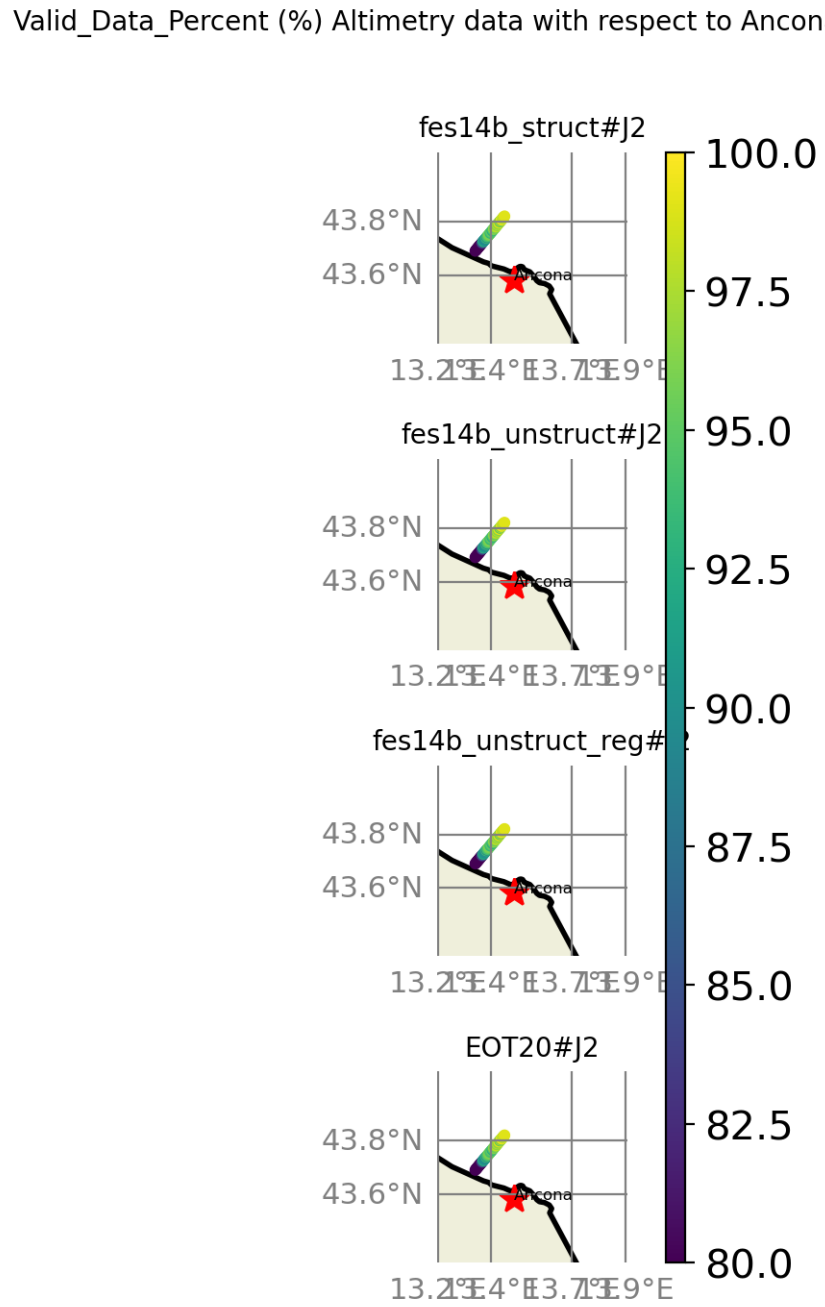

FIGURE 116 – valid_data_percent visualization in maps view % Ancona tide gauge

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 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. $maxNB = 100$ 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 serie.

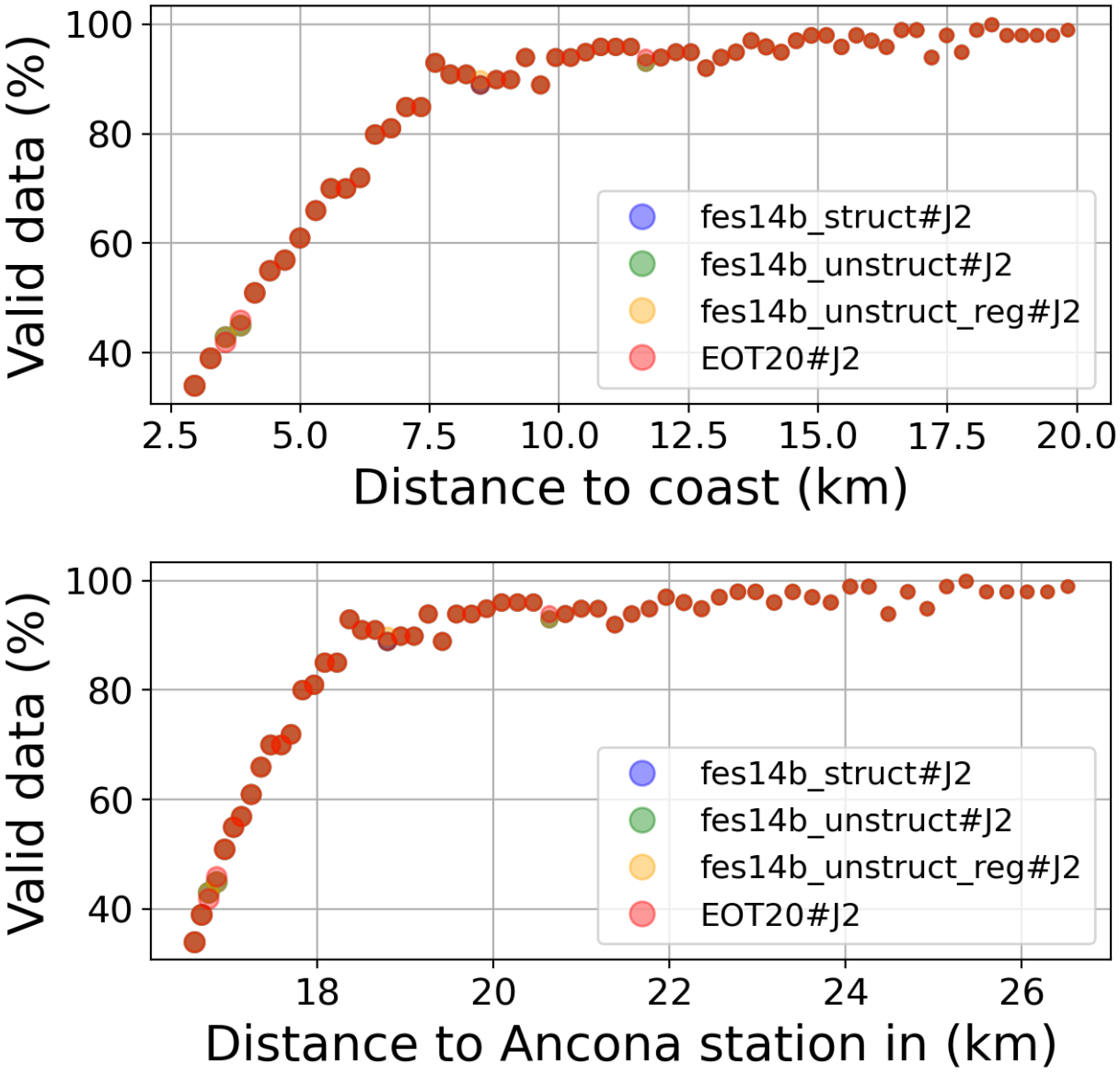

FIGURE 117 – Valid data (%) in function of distance to coast/Ancona station

6.5.6 Std in function of distance to coast/Ancona station

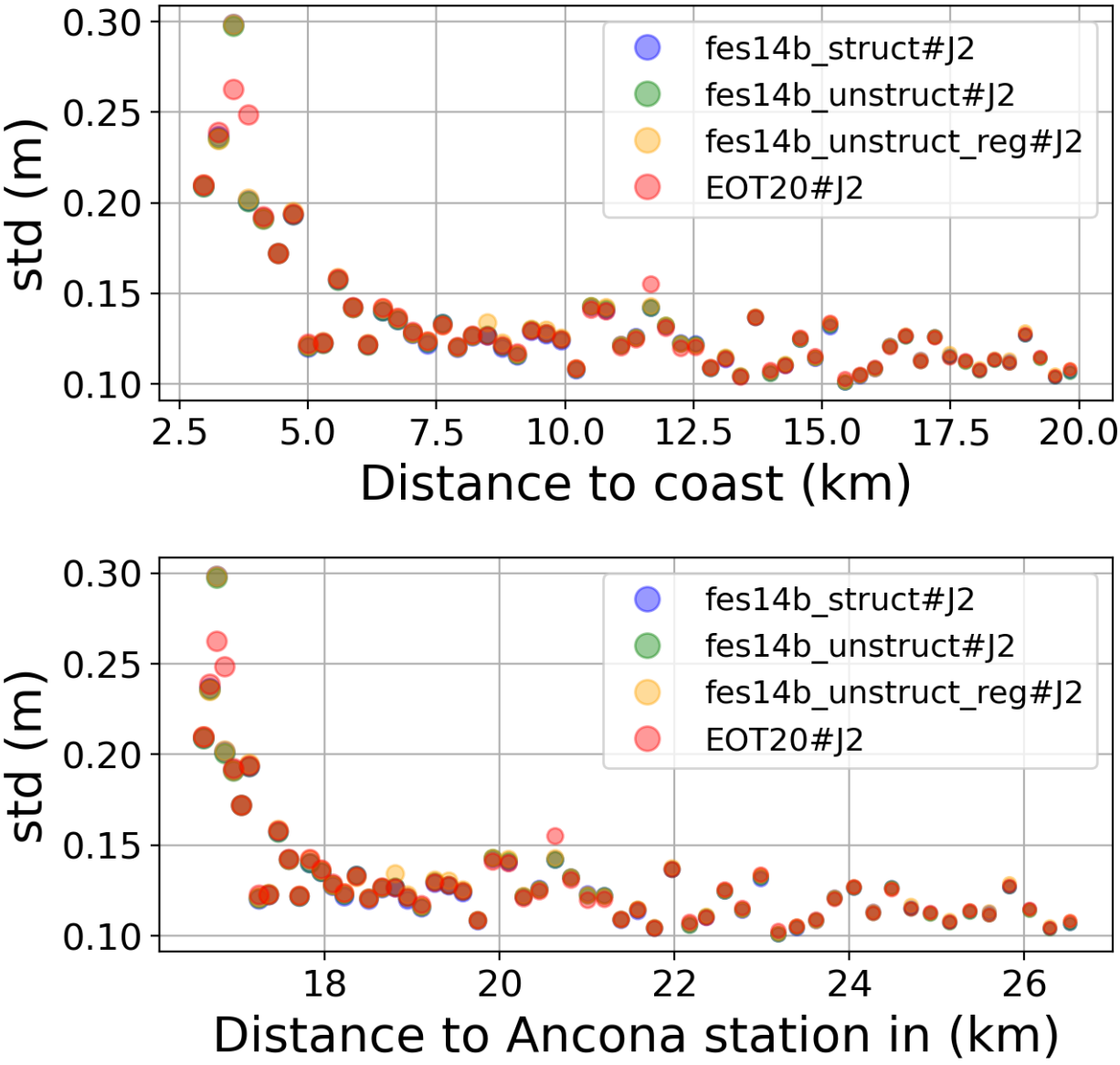

FIGURE 118 – Std in function of the distance to the coast/Ancona station

6.5.7 Correlation in function of distance to coast/Ancona station

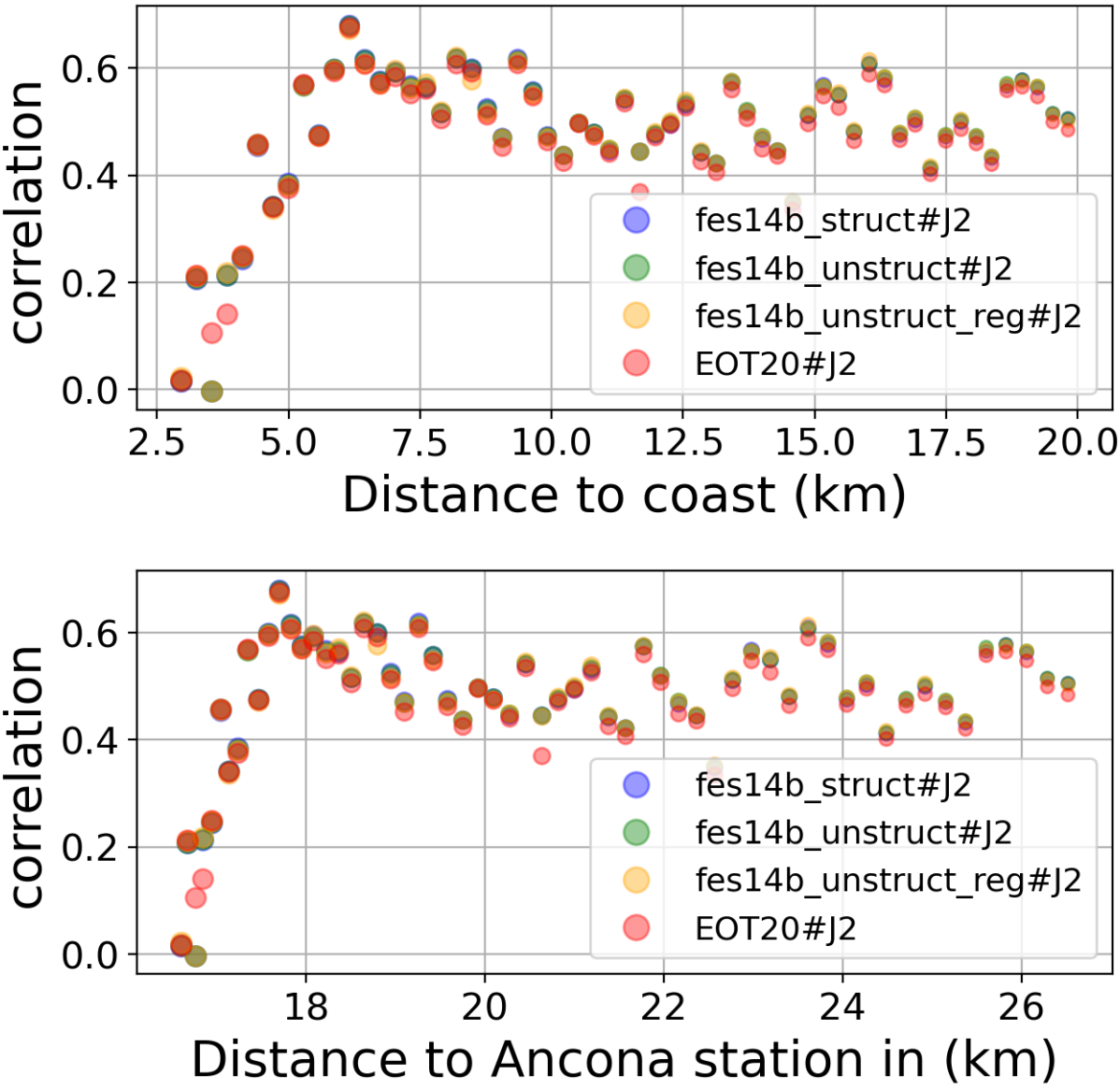

FIGURE 119 – Correlation in function of the distance to the coast/Ancona station

6.5.8 Taylor Diagram

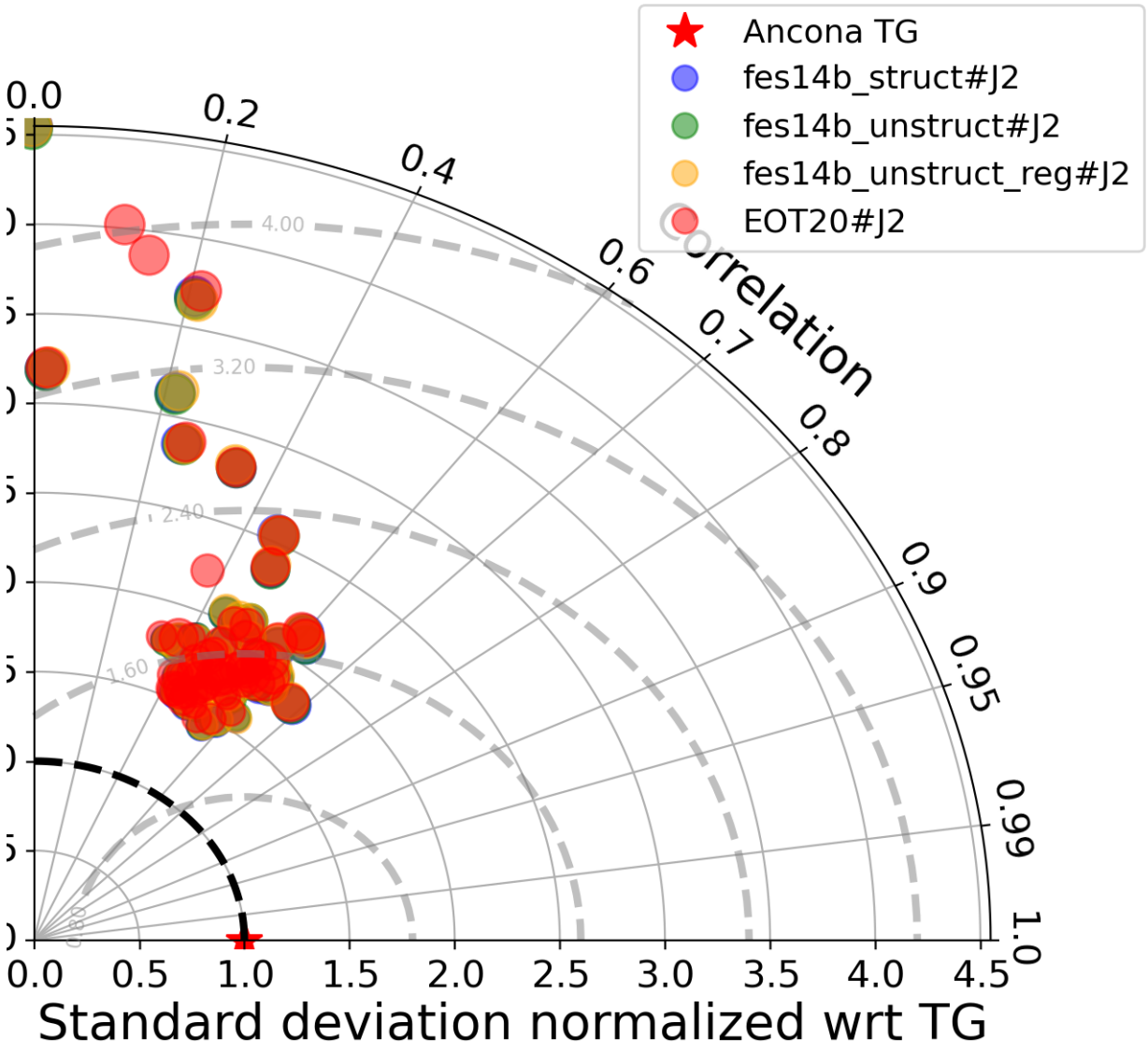

Figure 120 – Taylor diagram

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)
fes14b_struct#J2	86.322	0.481	0.133	0.117
fes14b_unstruct#J2	86.322	0.481	0.133	0.117
fes14b_unstruct_reg#J2	86.339	0.481	0.134	0.118
EOT20#J2	86.339	0.471	0.134	0.119

FIGURE 121 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.068
fes14b_struct#J2	17.701	6.154	72.0	0.681	0.122
fes14b_unstruct#J2	17.701	6.154	72.0	0.679	0.122
fes14b_unstruct_reg#J2	17.701	6.154	72.0	0.672	0.122
EOT20#J2	17.701	6.154	72.0	0.676	0.122

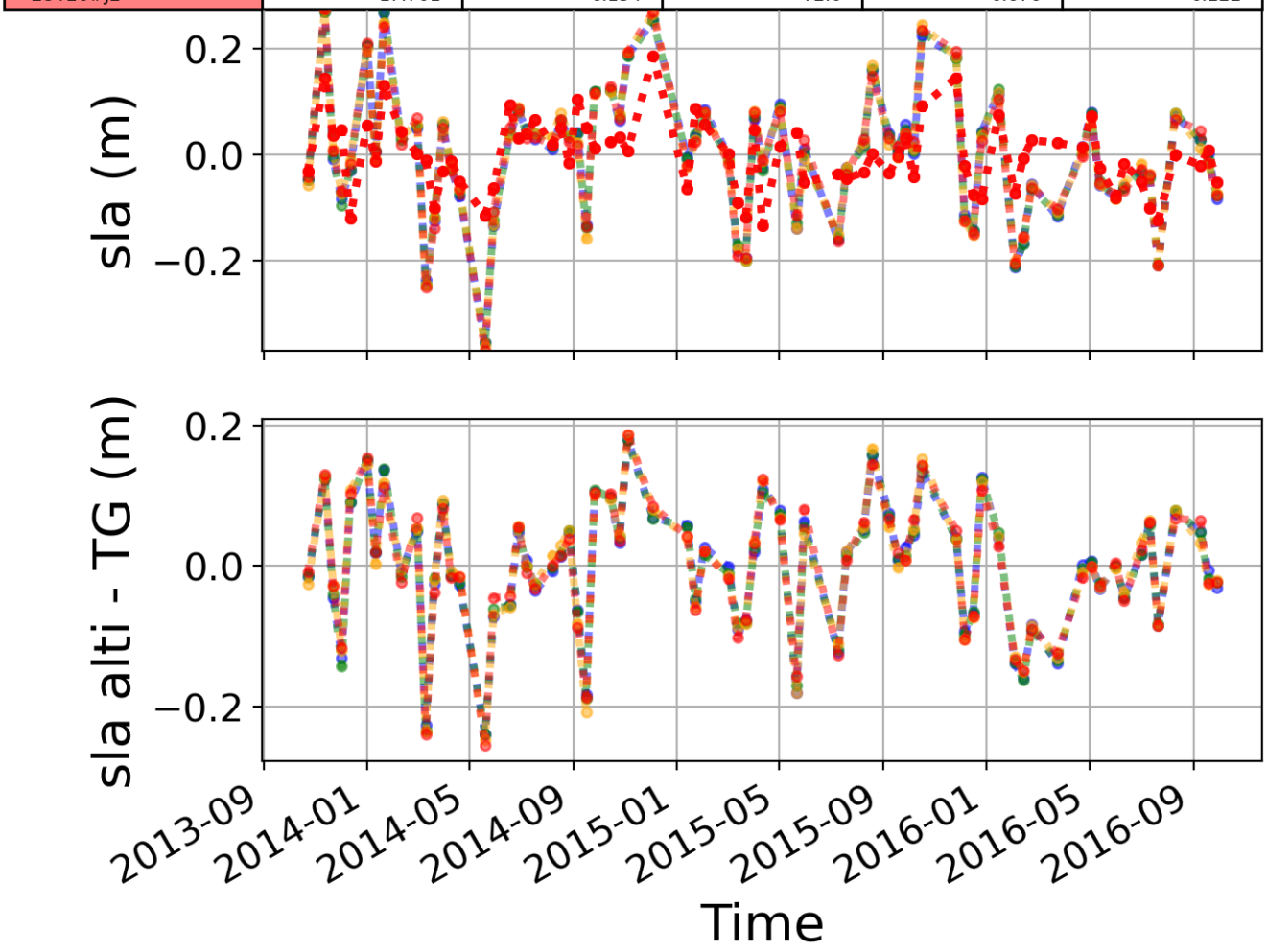

Figure 122 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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 Raduis of 40 Km
  - Maximum distance to the coast : 20 Km

6.6.1 correlation visualization in maps view % Livourne tide gauge

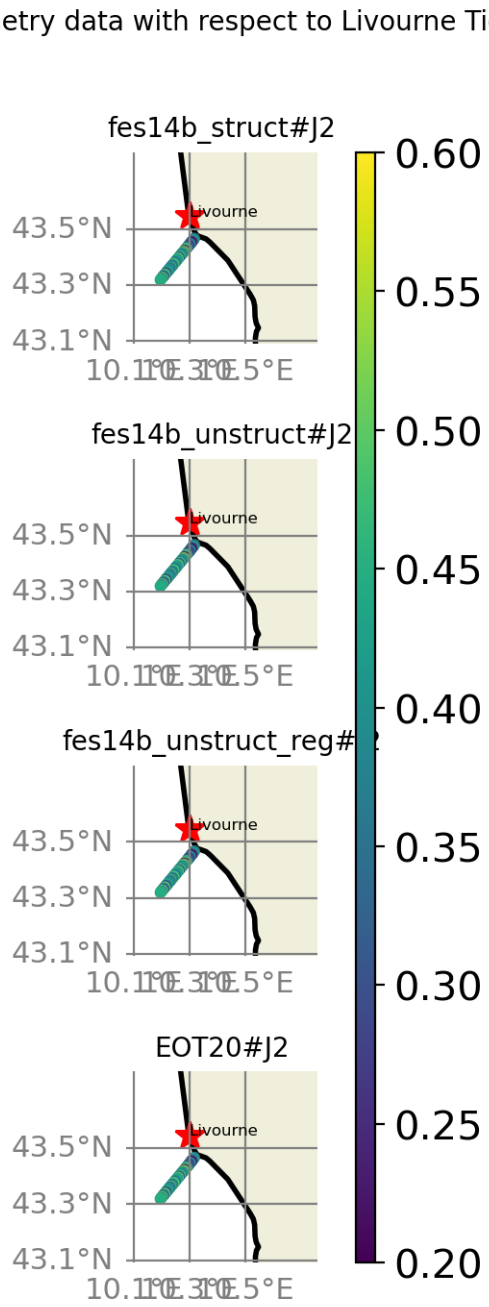

FIGURE 123 – correlation visualization in maps view % Livourne tide gauge

6.6.2 rmsd visualization in maps view % Livourne tide gauge

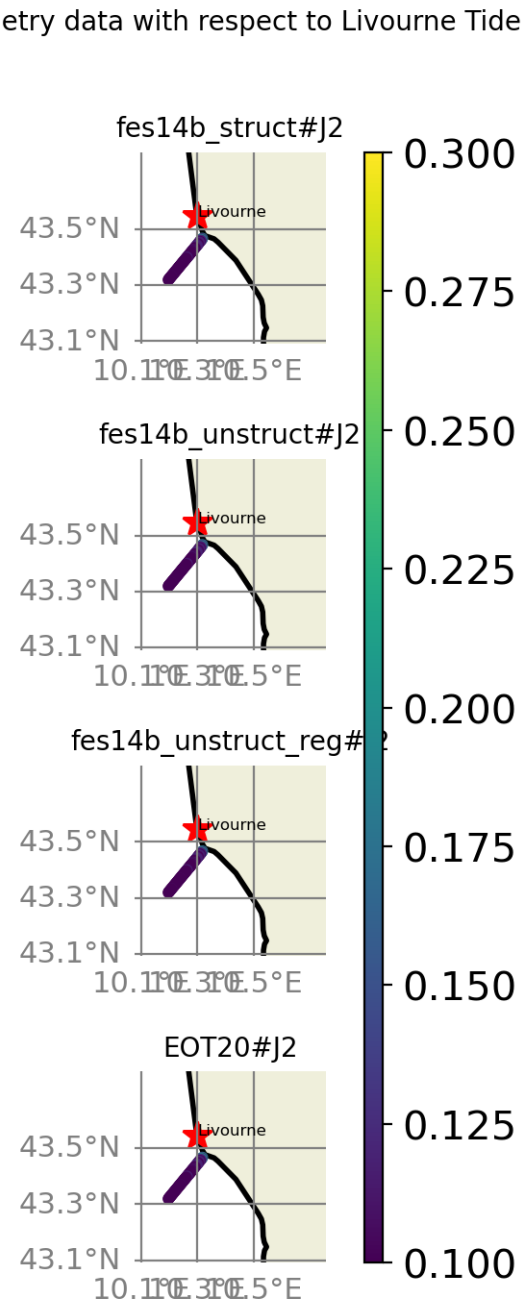

Figure 124 – rmsd visualization in maps view % Livourne tide gauge

6.6.3 std visualization in maps view % Livourne tide gauge

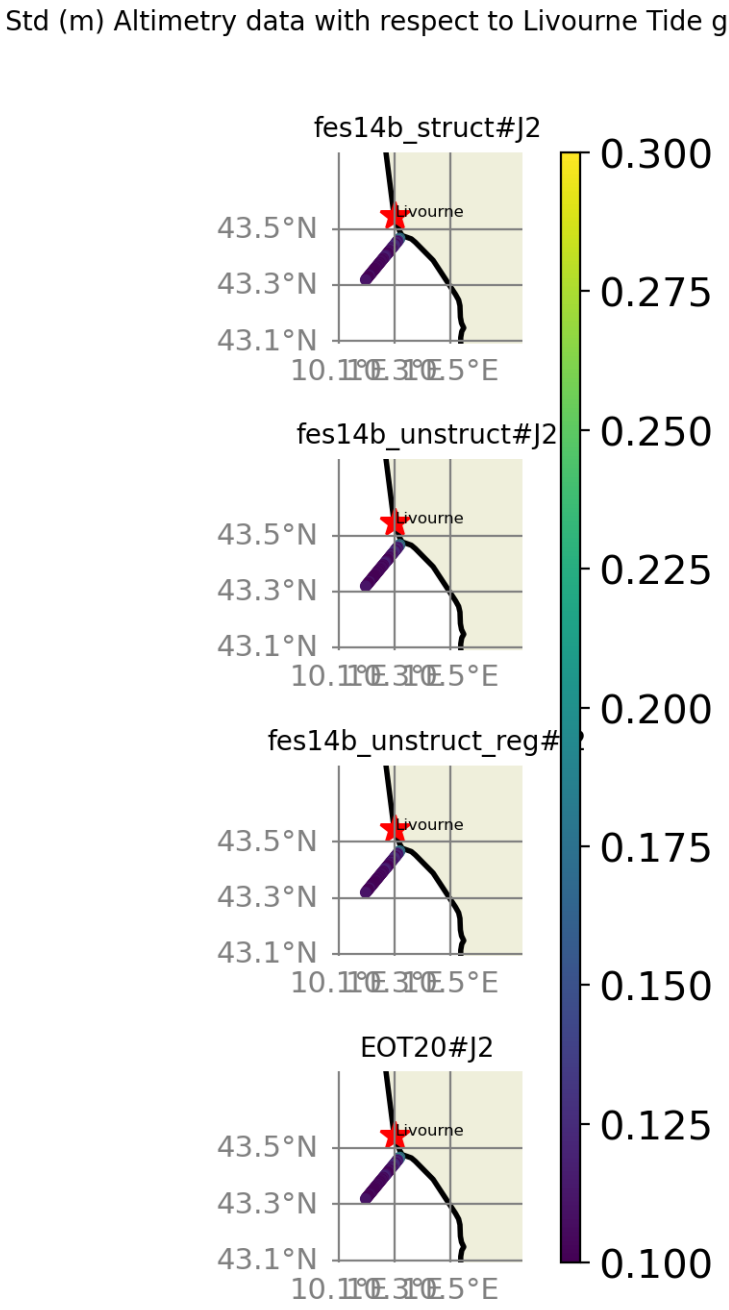

Figure 125 – std visualization in maps view % Livourne tide gauge

6.6.4 valid_data_percent visualization in maps view % Livourne tide gauge

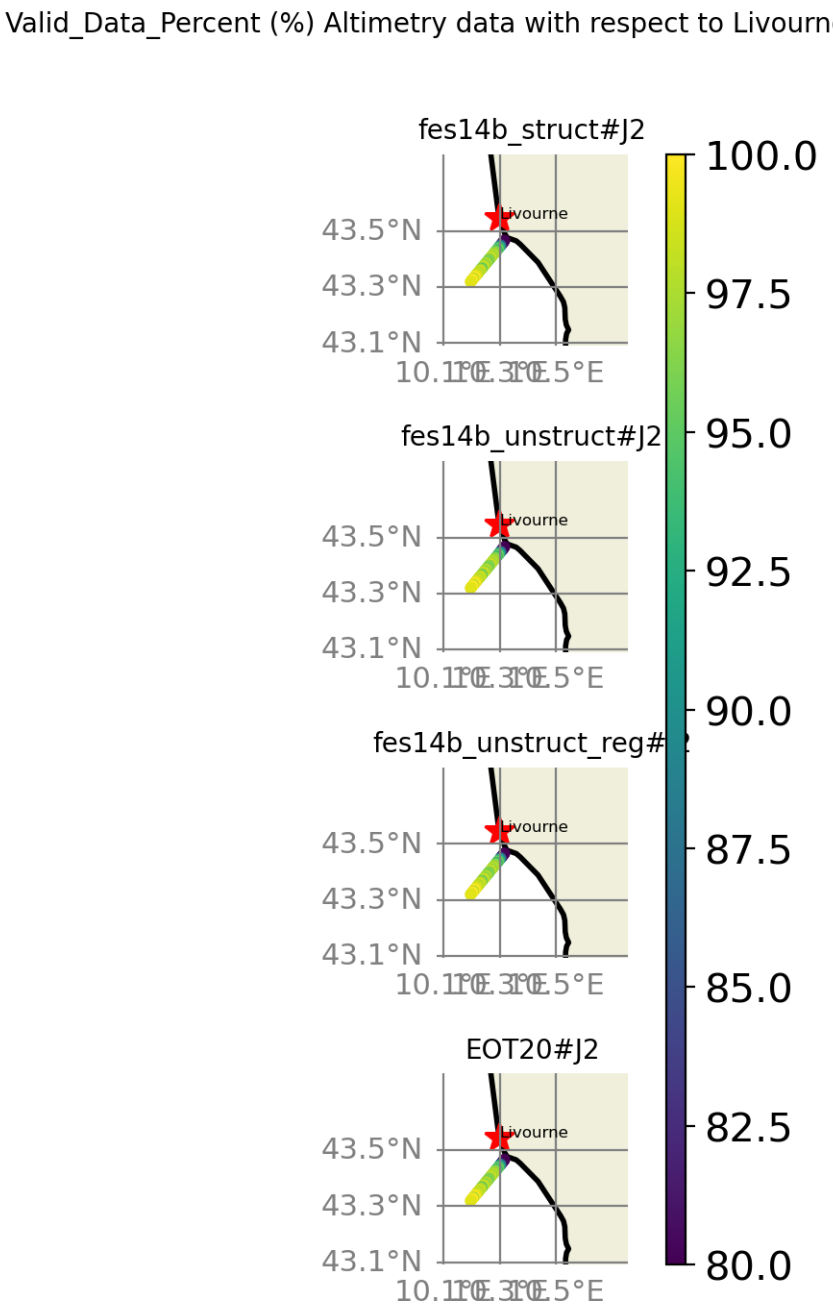

FIGURE 126 – valid_data_percent visualization in maps view % Livourne tide gauge

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.

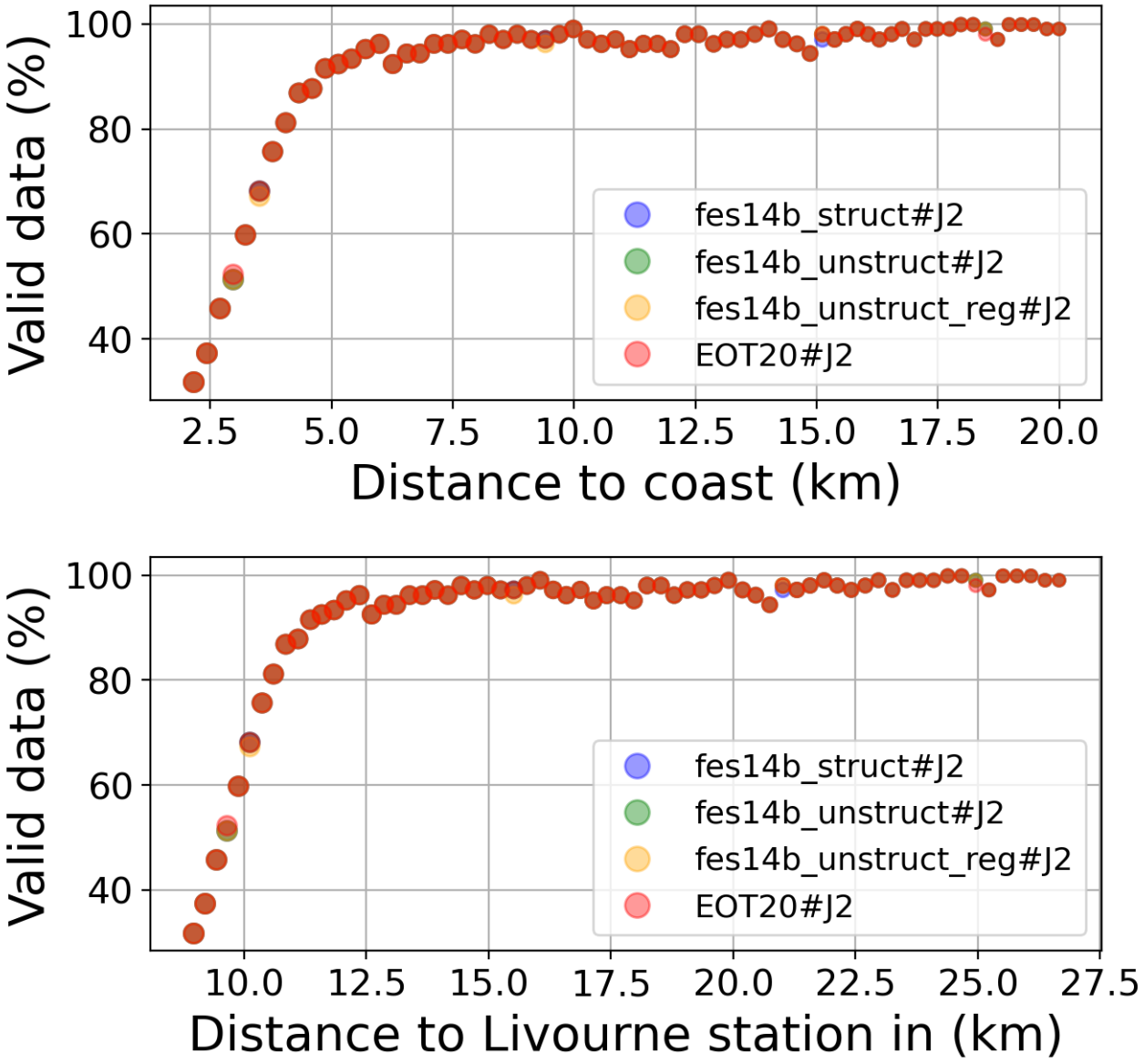

FIGURE 127 – Valid data (%) in function of distance to coast/Livourne station

6.6.6 Std in function of distance to coast/Livourne station

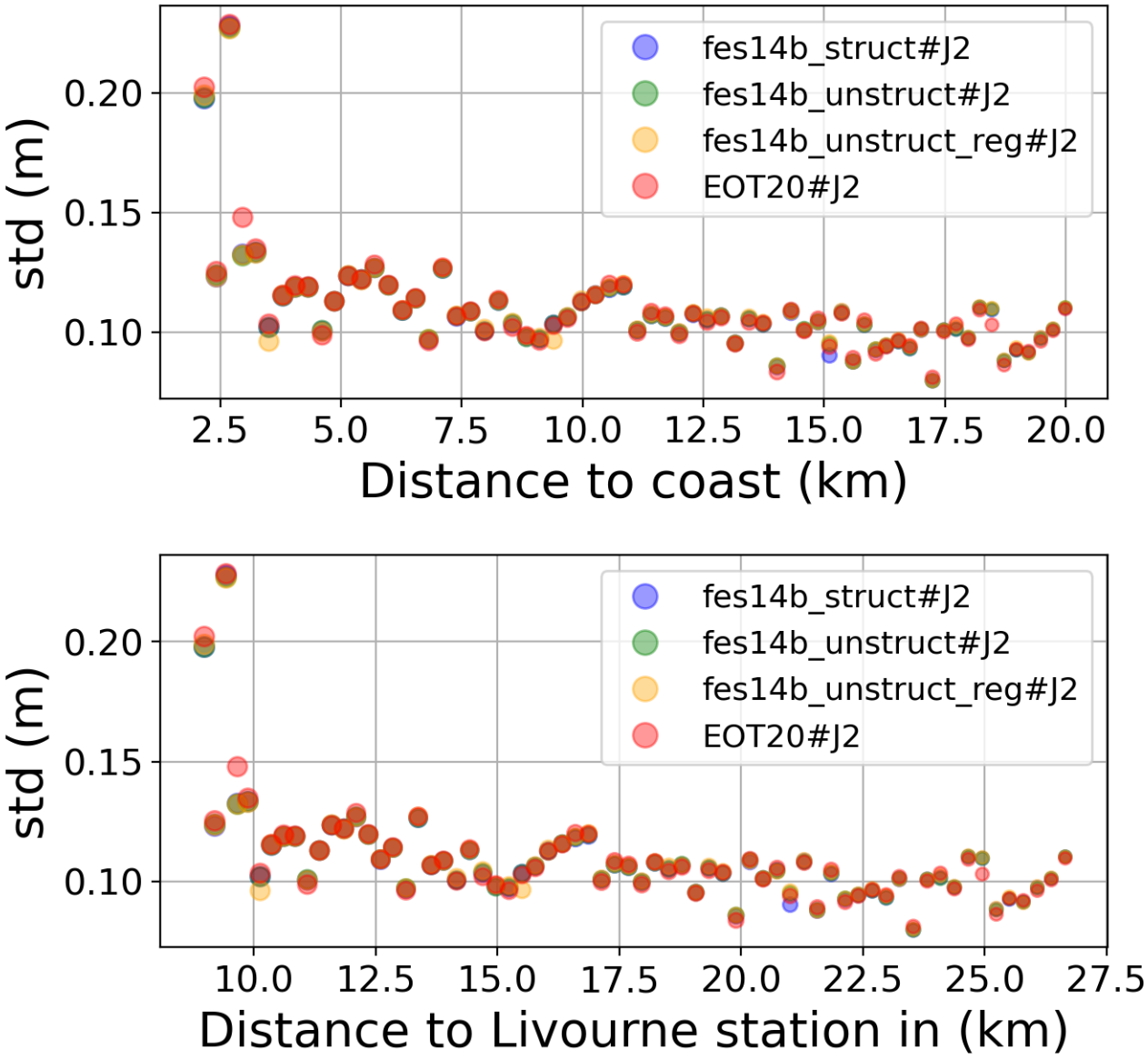

FIGURE 128 – Std in function of the distance to the coast/Livourne station

6.6.7 Correlation in function of distance to coast/Livourne station

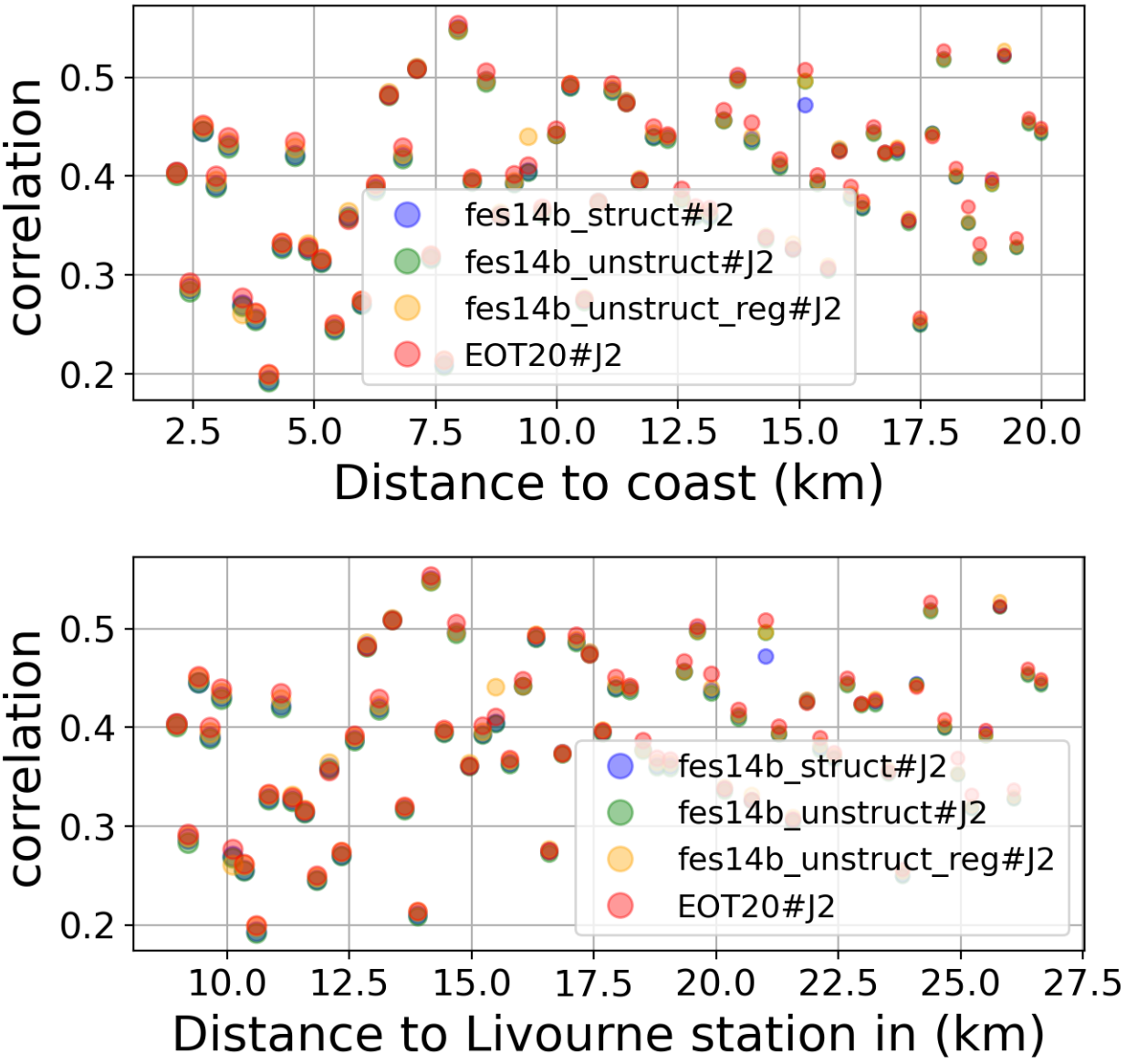

FIGURE 129 – Correlation in function of the distance to the coast/Livourne station

6.6.8 Taylor Diagram

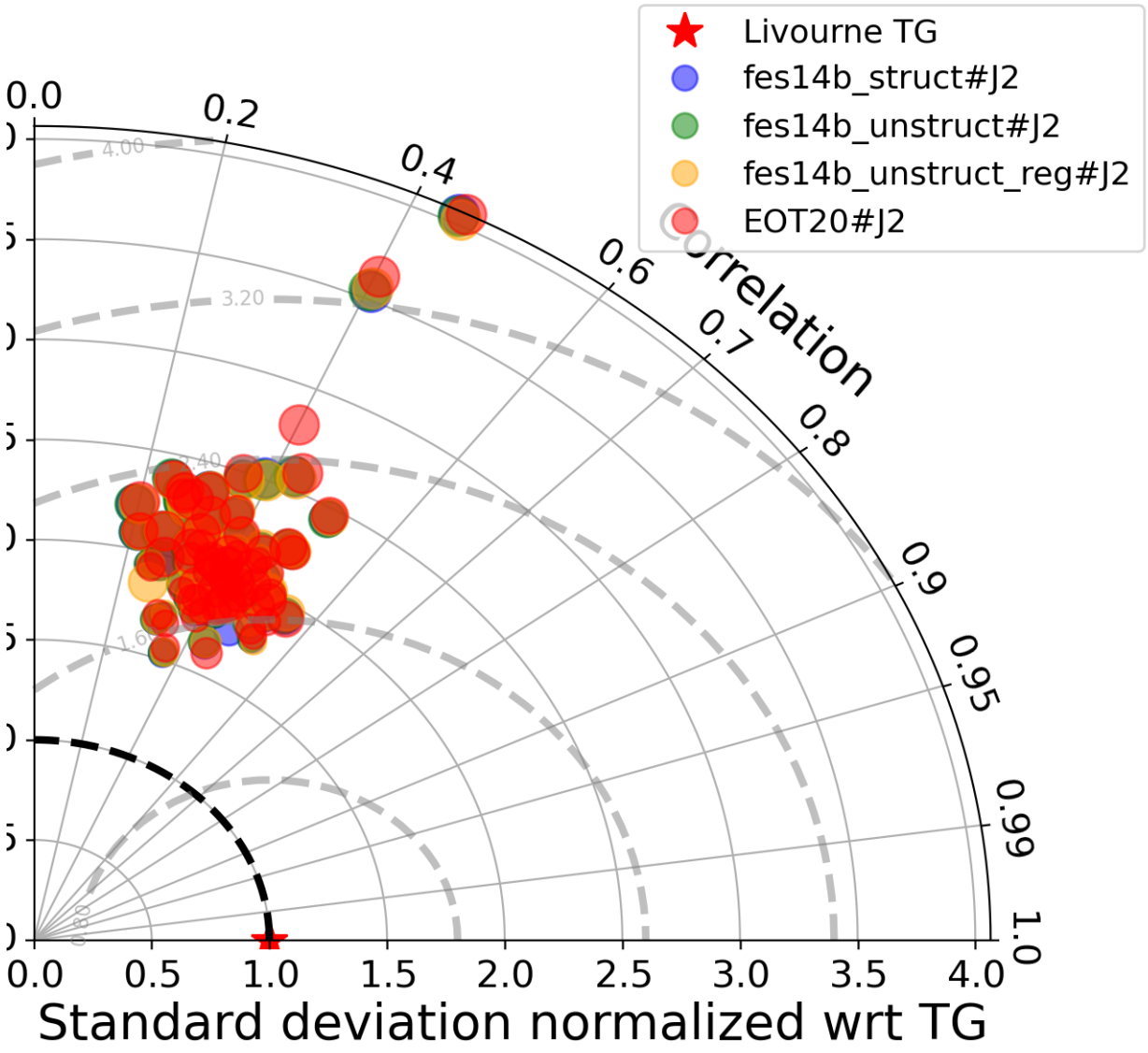

Figure 130 – Taylor diagram

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)
fes14b_struct#J2	92.035	0.389	0.109	0.101
fes14b_unstruct#J2	92.049	0.388	0.109	0.101
fes14b_unstruct_reg#J2	92.021	0.392	0.109	0.101
EOT20#J2	92.049	0.394	0.11	0.101

FIGURE 131 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.052
fes14b_struct#J2	14.158	7.959	96.262	0.549	0.101
fes14b_unstruct#J2	14.158	7.959	96.262	0.548	0.101
fes14b_unstruct_reg#J2	14.158	7.959	96.262	0.549	0.102
EOT20#J2	14.158	7.959	96.262	0.554	0.1

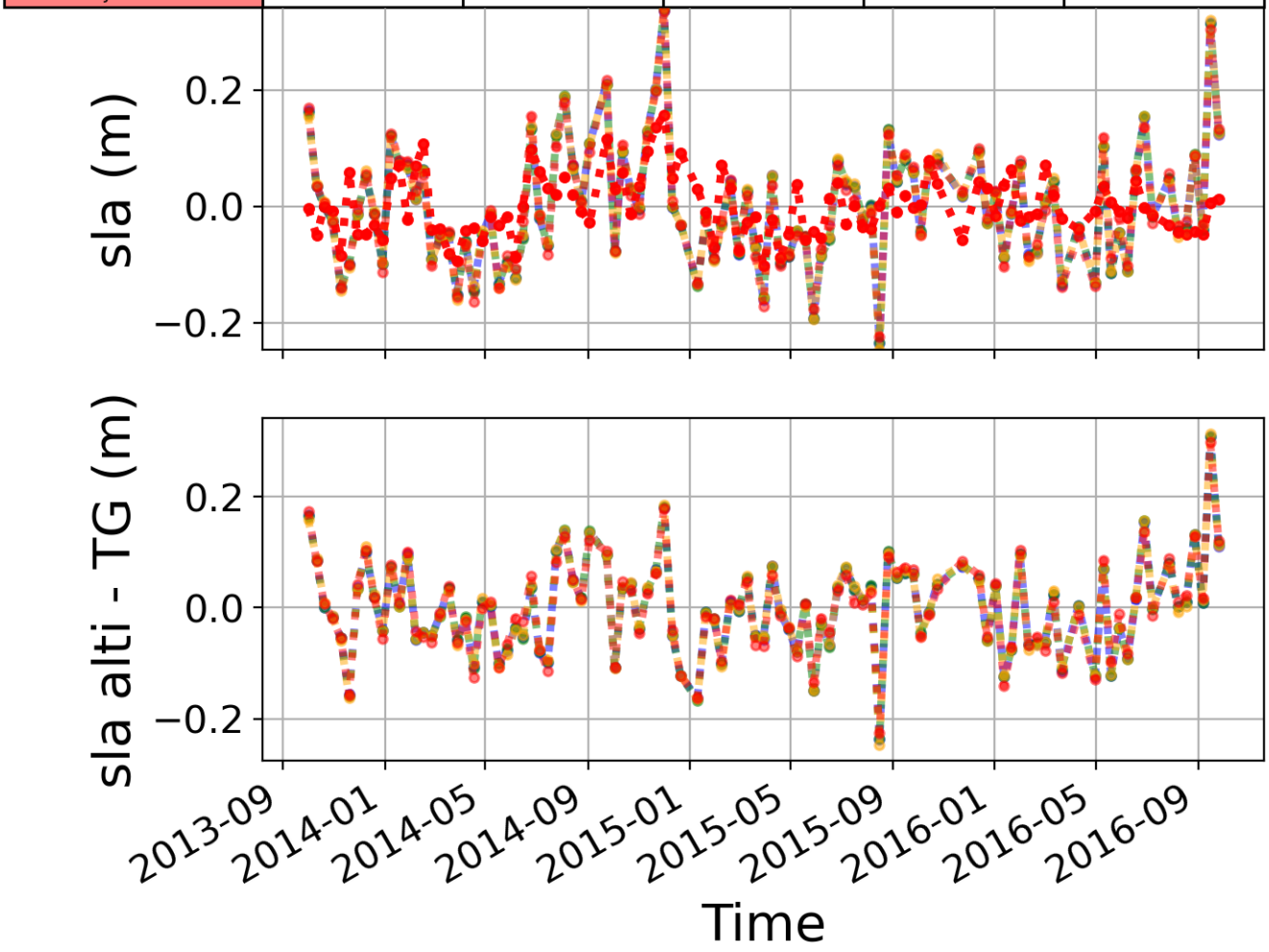

FIGURE 132 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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 Raduis of 40 Km

6.7.1 correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge

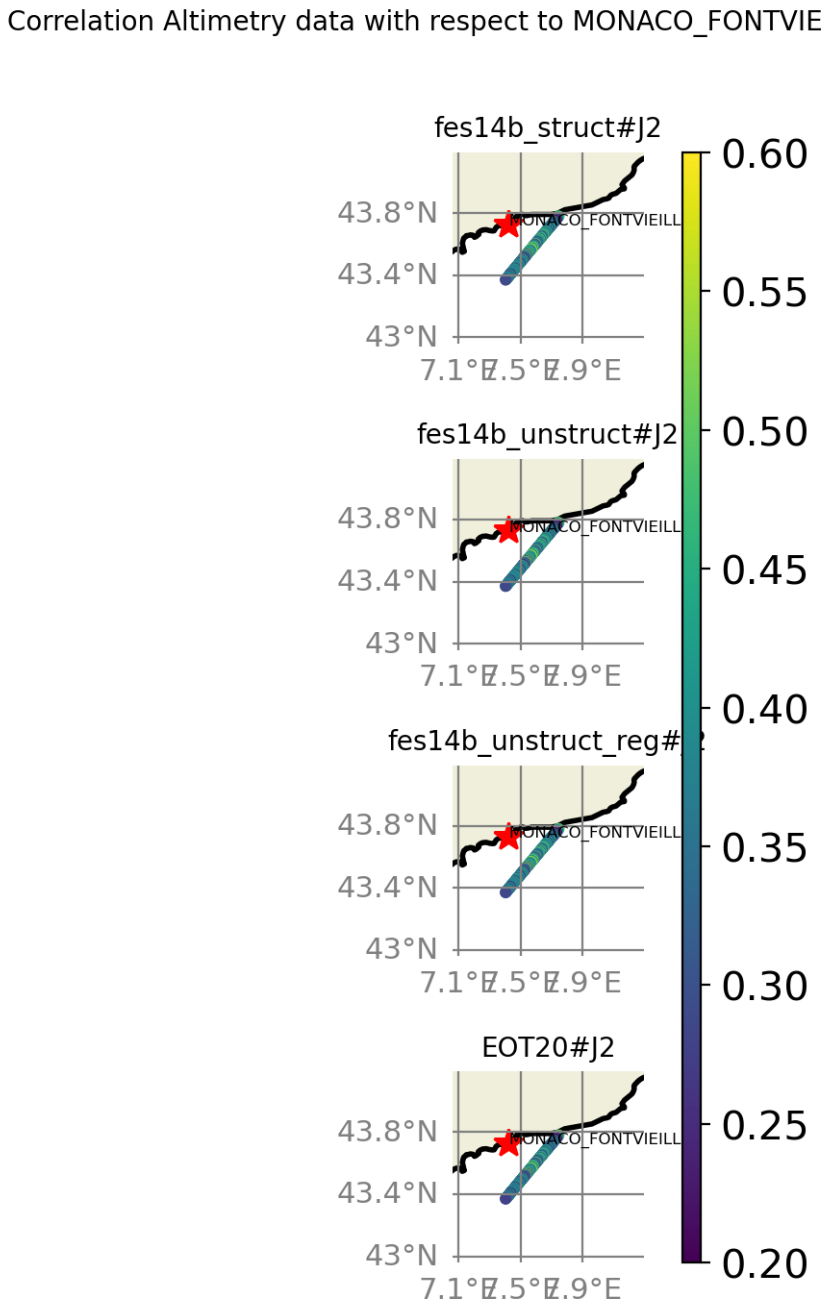

Figure 133 – correlation visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.2 rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge

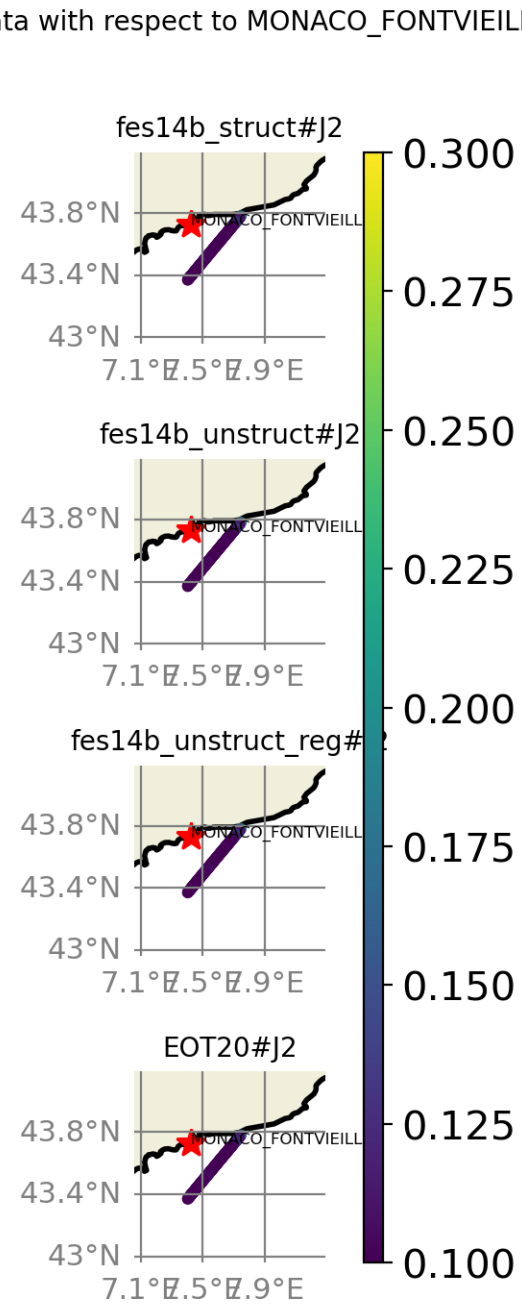

FIGURE 134 – rmsd visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.3 std visualization in maps view % MONACO_FONTVIEILLE tide gauge

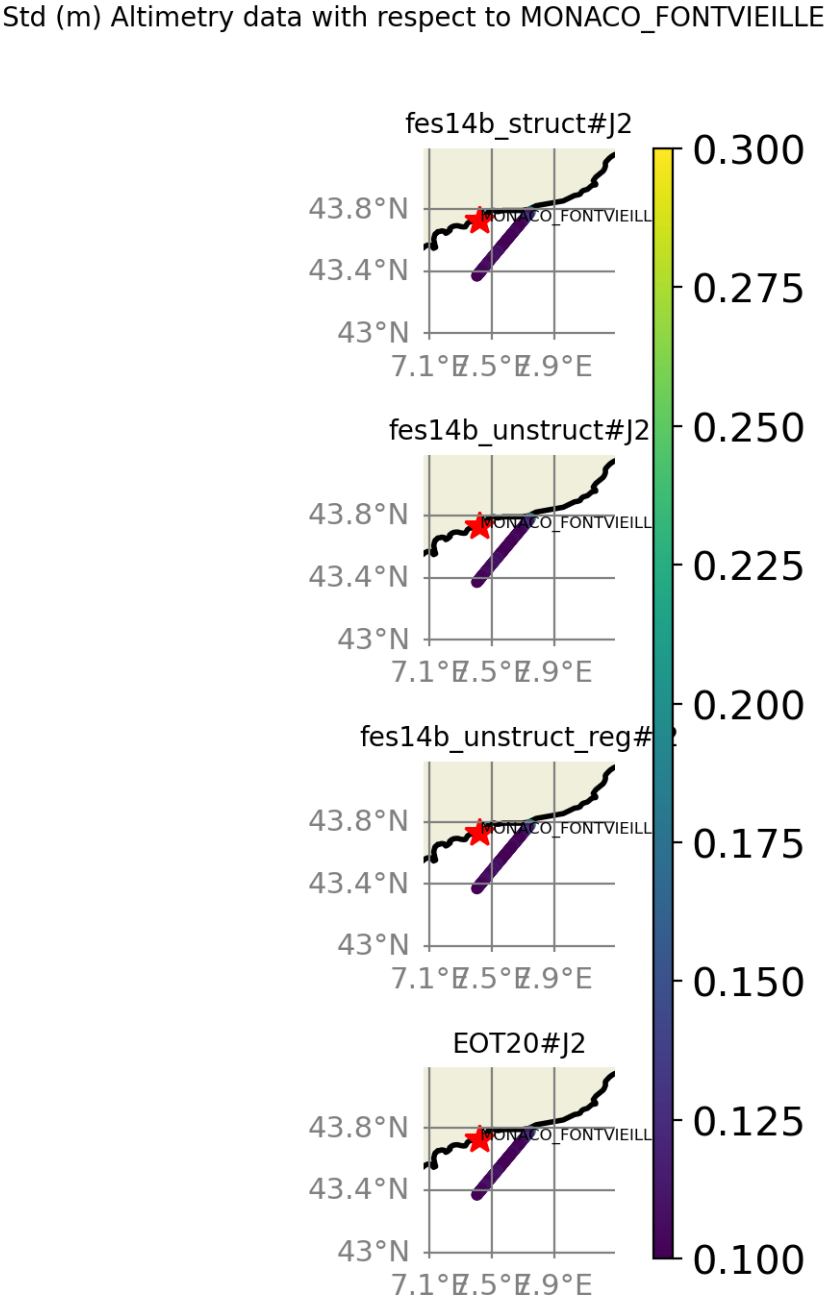

Figure 135 – std visualization in maps view % MONACO_FONTVIEILLE tide gauge

6.7.4 valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge

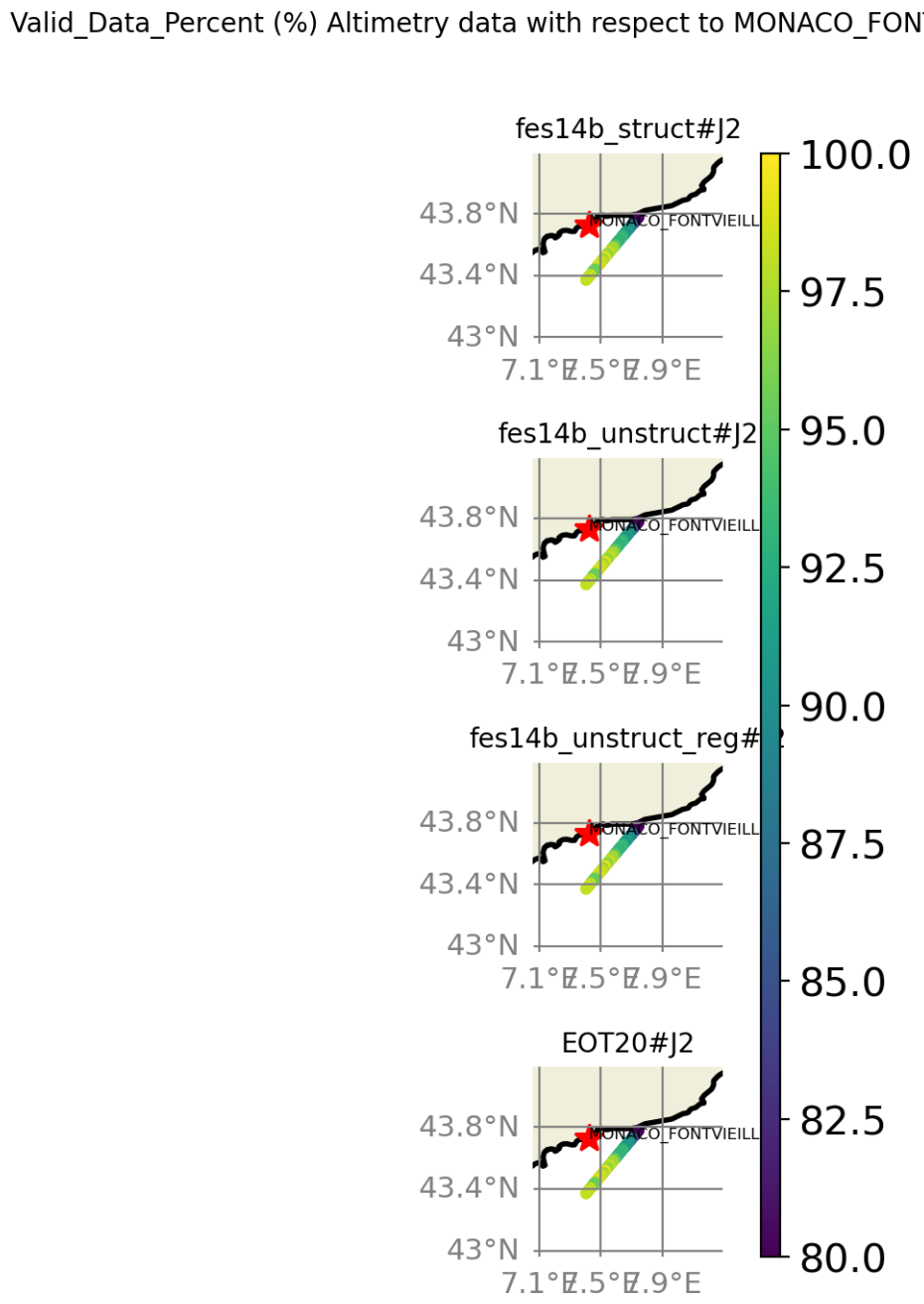

FIGURE 136 – valid_data_percent visualization in maps view % MONACO_FONTVIEILLE tide gauge

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.

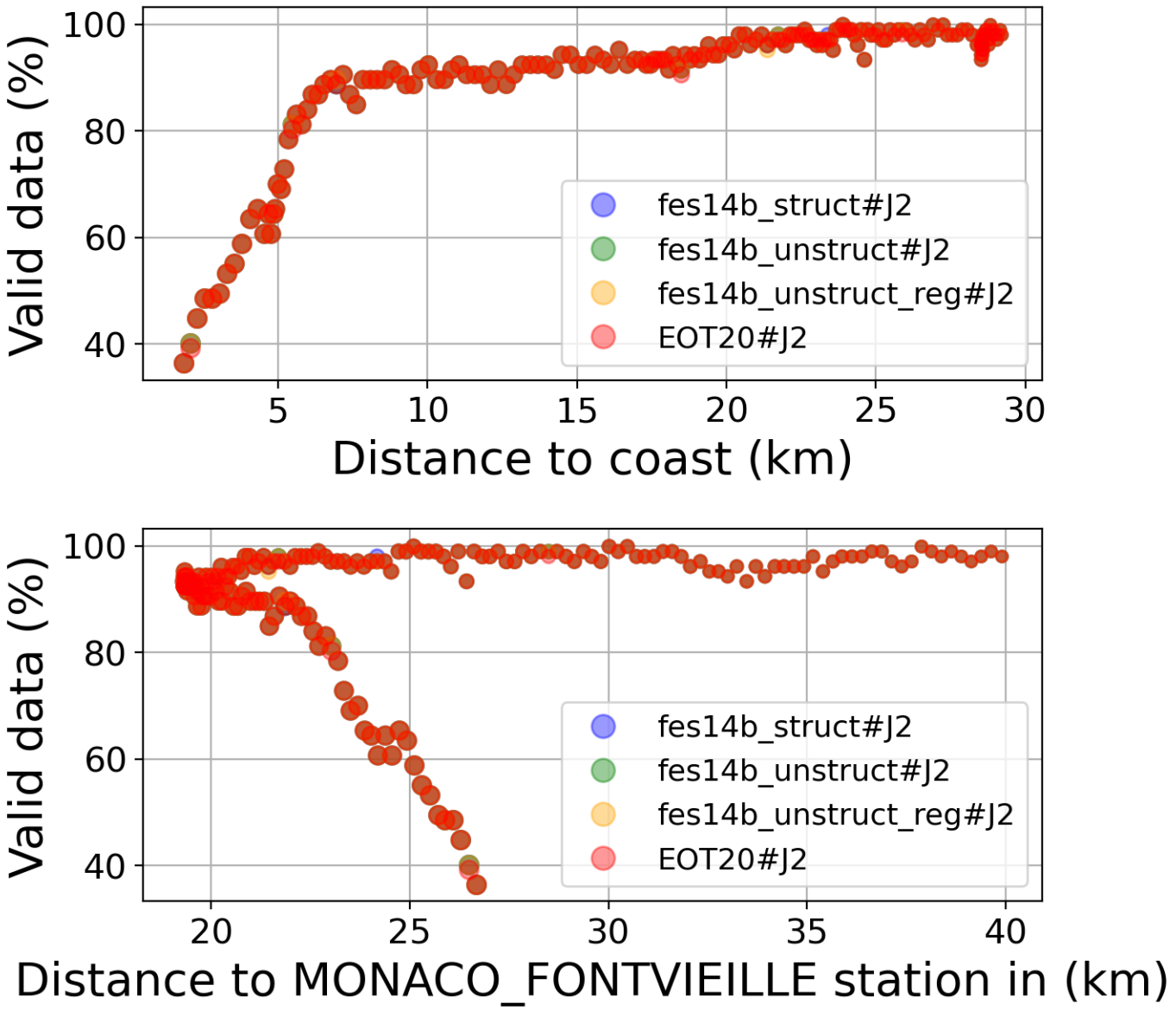

FIGURE 137 – Valid data (%) in function of distance to coast/MONACO_FONTVIEILLE station

6.7.6 Std in function of distance to coast/MONACO_FONTVIEILLE station

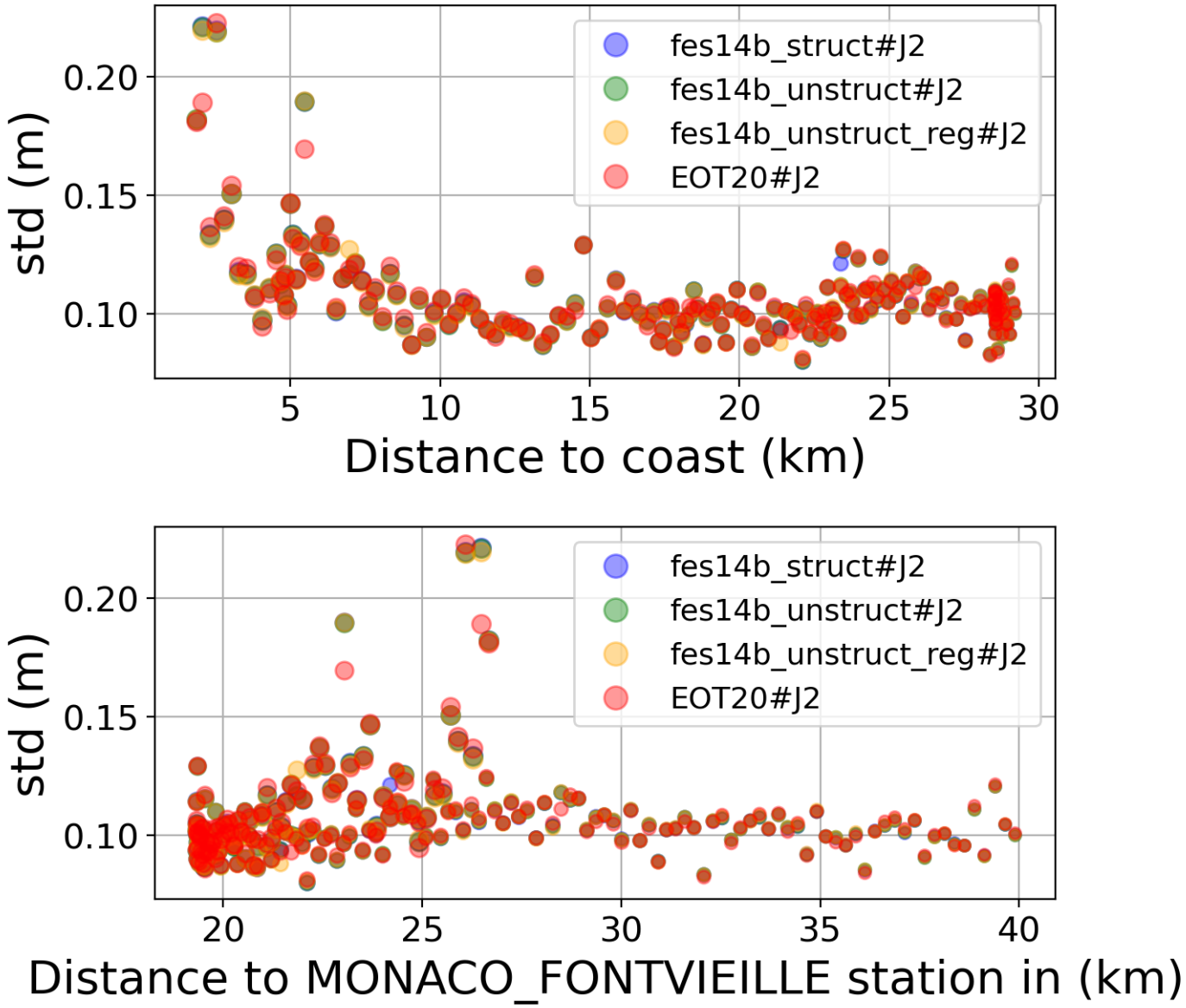

FIGURE 138 – Std in function of the distance to the coast/MONACO_FONTVIEILLE station

6.7.7 Correlation in function of distance to coast/MONACO_FONTVIEILLE station

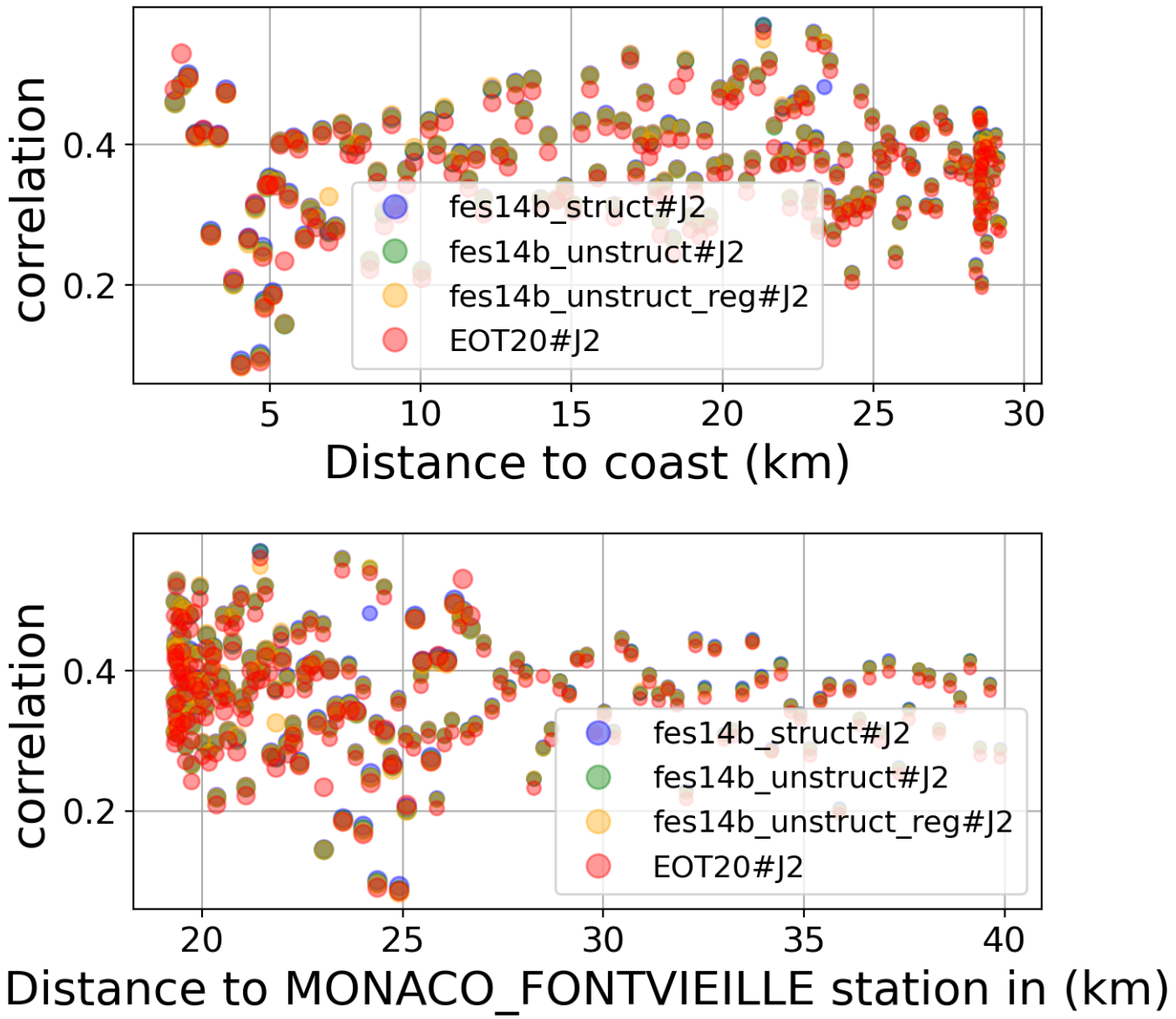

FIGURE 139 – Correlation in function of the distance to the coast/MONACO_FONTVIEILLE station

6.7.8 Taylor Diagram

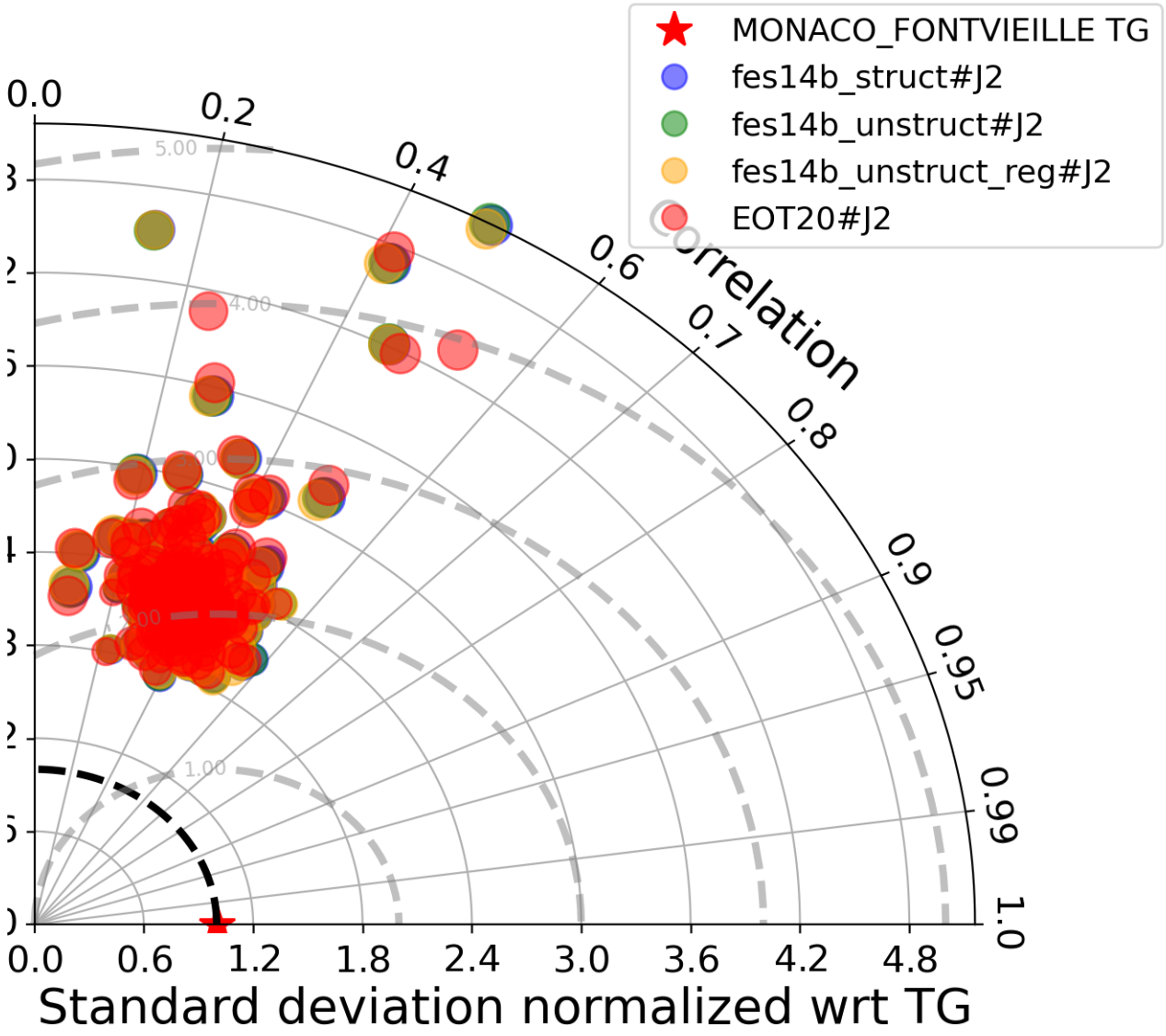

Figure 140 – Taylor diagram

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)
fes14b_struct#J2	91.015	0.371	0.107	0.1
fes14b_unstruct#J2	91.01	0.369	0.107	0.1
fes14b_unstruct_reg#J2	91.01	0.37	0.107	0.1
EOT20#J2	90.984	0.361	0.107	0.1

FIGURE 141 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.045
fes14b_struct#J2	21.434	21.347	96.262	0.571	0.094
fes14b_unstruct#J2	21.434	21.347	96.262	0.57	0.094
fes14b_unstruct_reg#J2	21.434	21.347	95.327	0.549	0.088
EOT20#J2	21.434	21.347	96.262	0.561	0.093

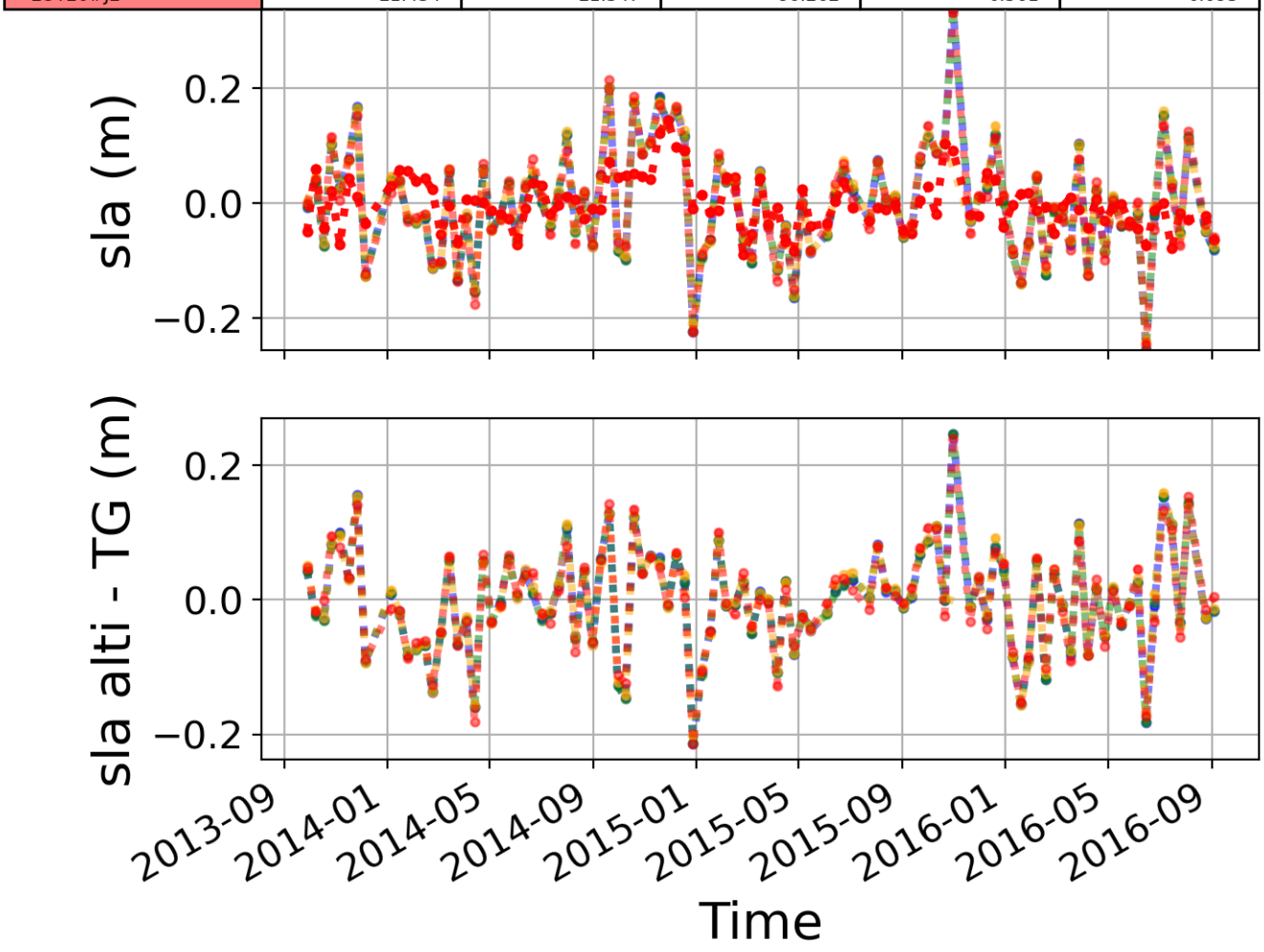

Figure 142 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.046
fes14b_struct#J2	23.494	23.011	96.262	0.561	0.093
fes14b_unstruct#J2	23.494	23.011	96.262	0.559	0.093
fes14b_unstruct_reg#J2	23.494	23.011	96.262	0.559	0.093
EOT20#J2	23.494	23.011	96.262	0.543	0.094

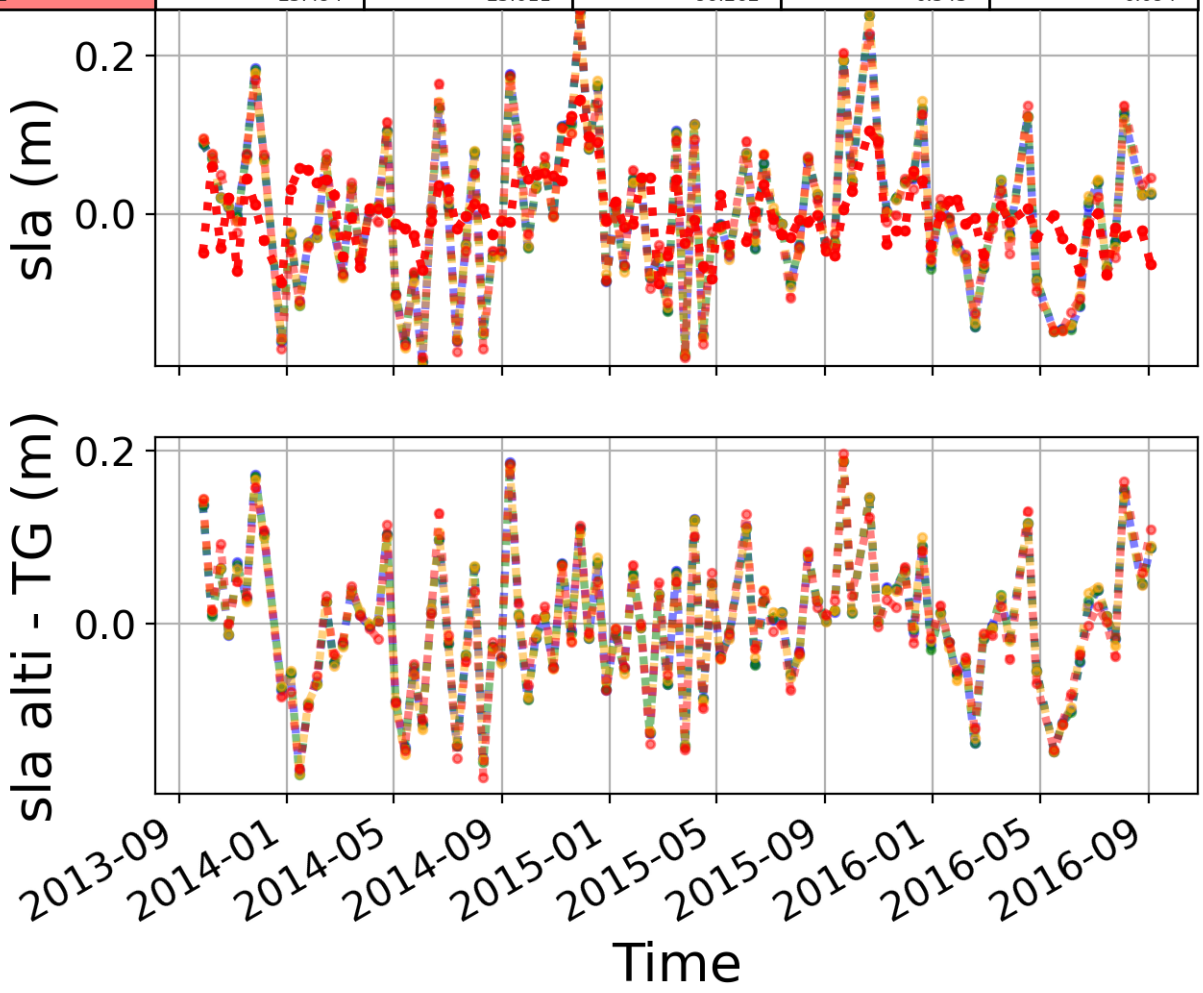

FIGURE 143 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie

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

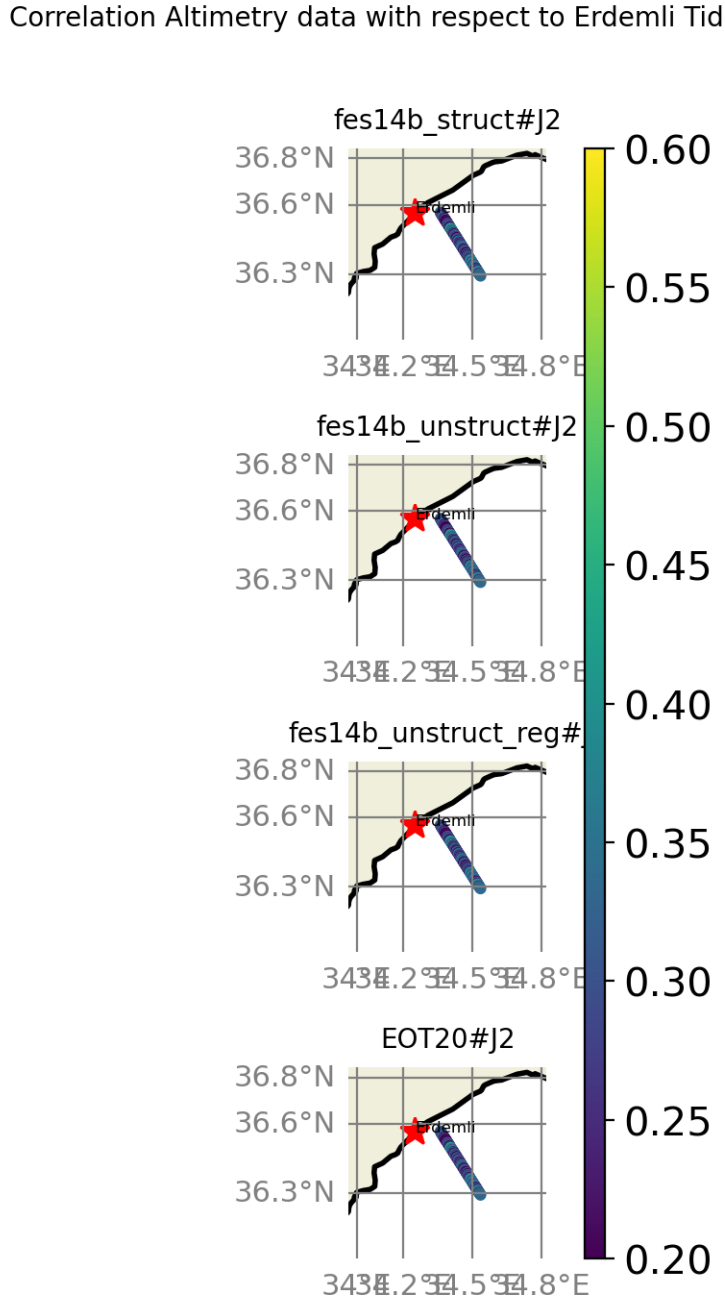

Figure 144 – correlation visualization in maps view % Erdemli tide gauge

6.8.2 rmsd visualization in maps view % Erdemli tide gauge

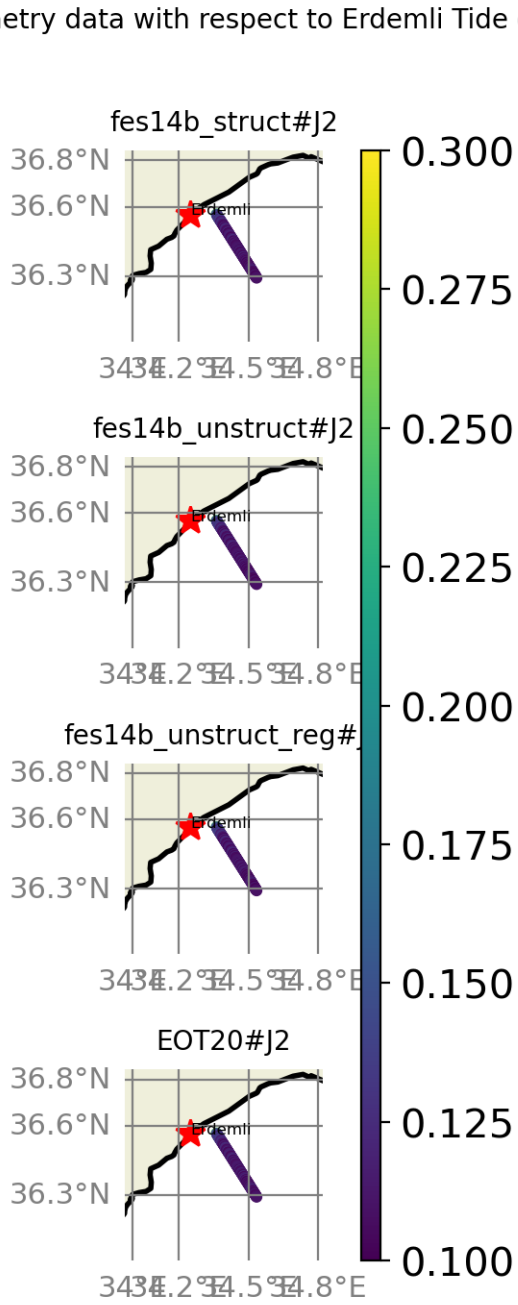

Figure 145 – rmsd visualization in maps view % Erdemli tide gauge

6.8.3 std visualization in maps view % Erdemli tide gauge

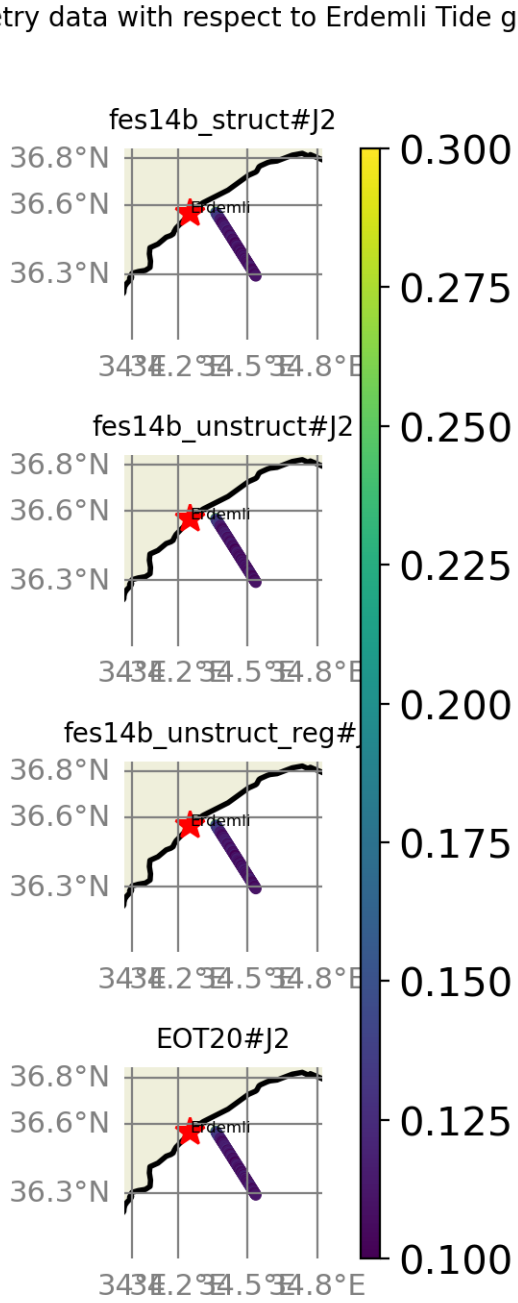

Figure 146 – std visualization in maps view % Erdemli tide gauge

6.8.4 valid_data_percent visualization in maps view % Erdemli tide gauge

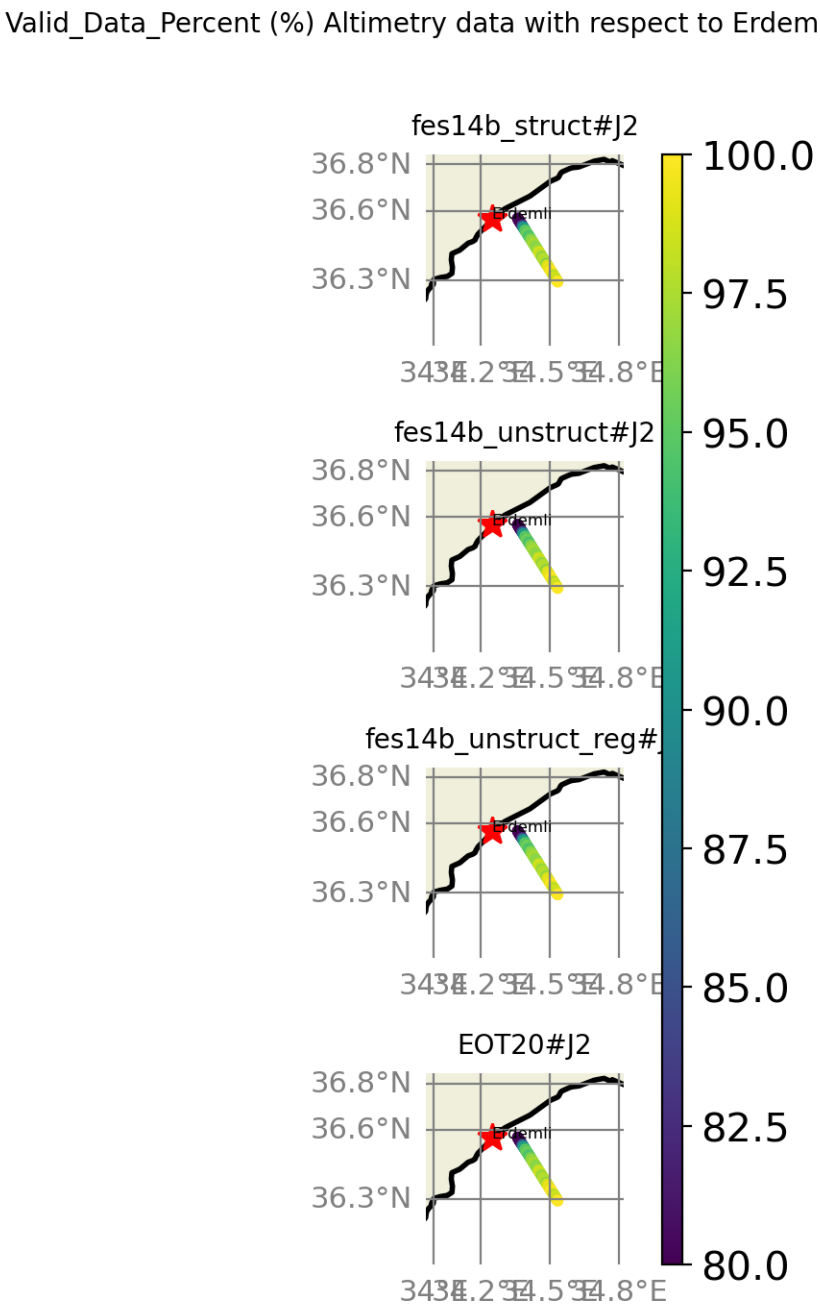

FIGURE 147 – valid_data_percent visualization in maps view % Erdemli tide gauge

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.

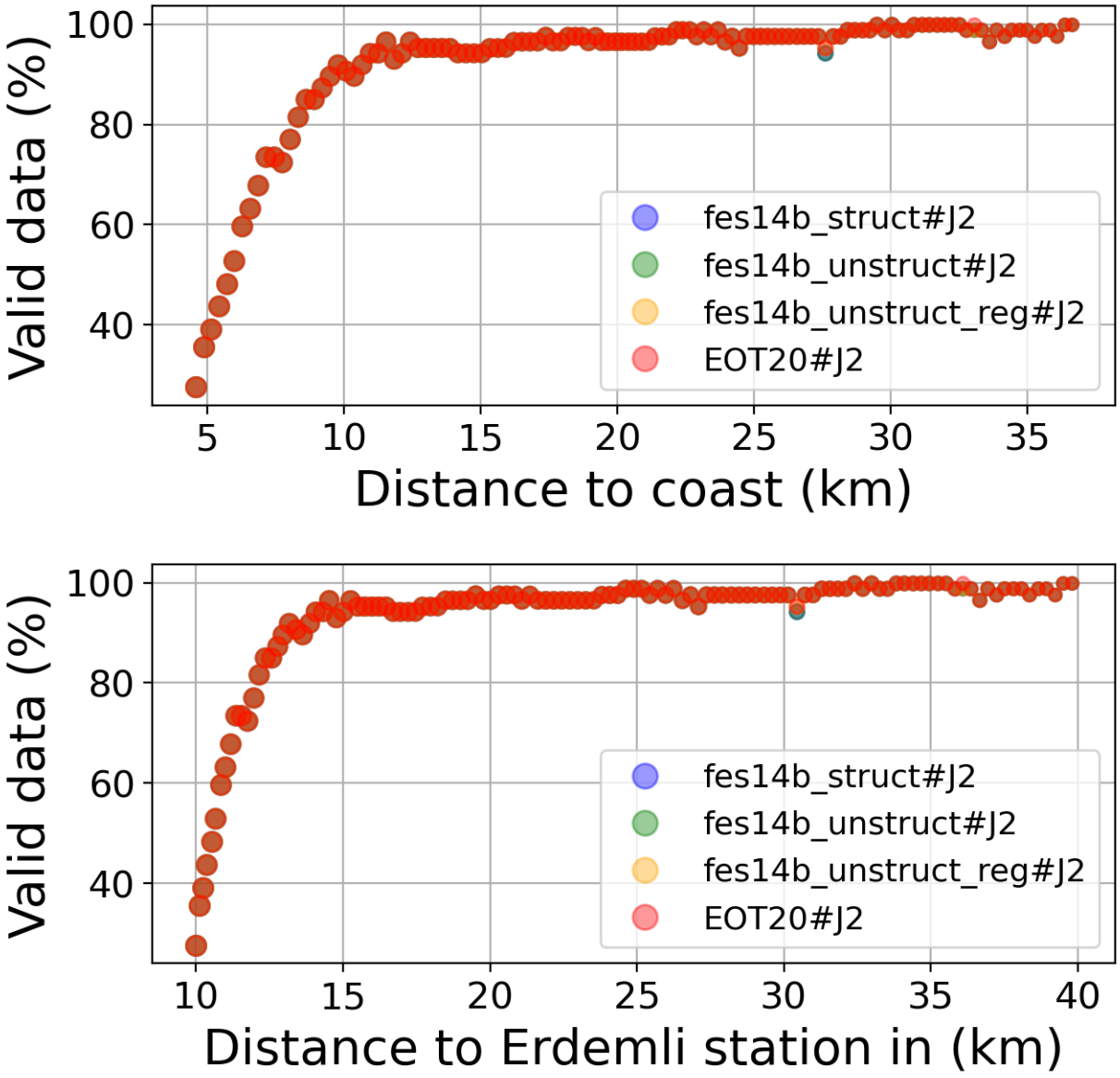

FIGURE 148 – Valid data (%) in function of distance to coast/Erdemli station

6.8.6 Std in function of distance to coast/Erdemli station

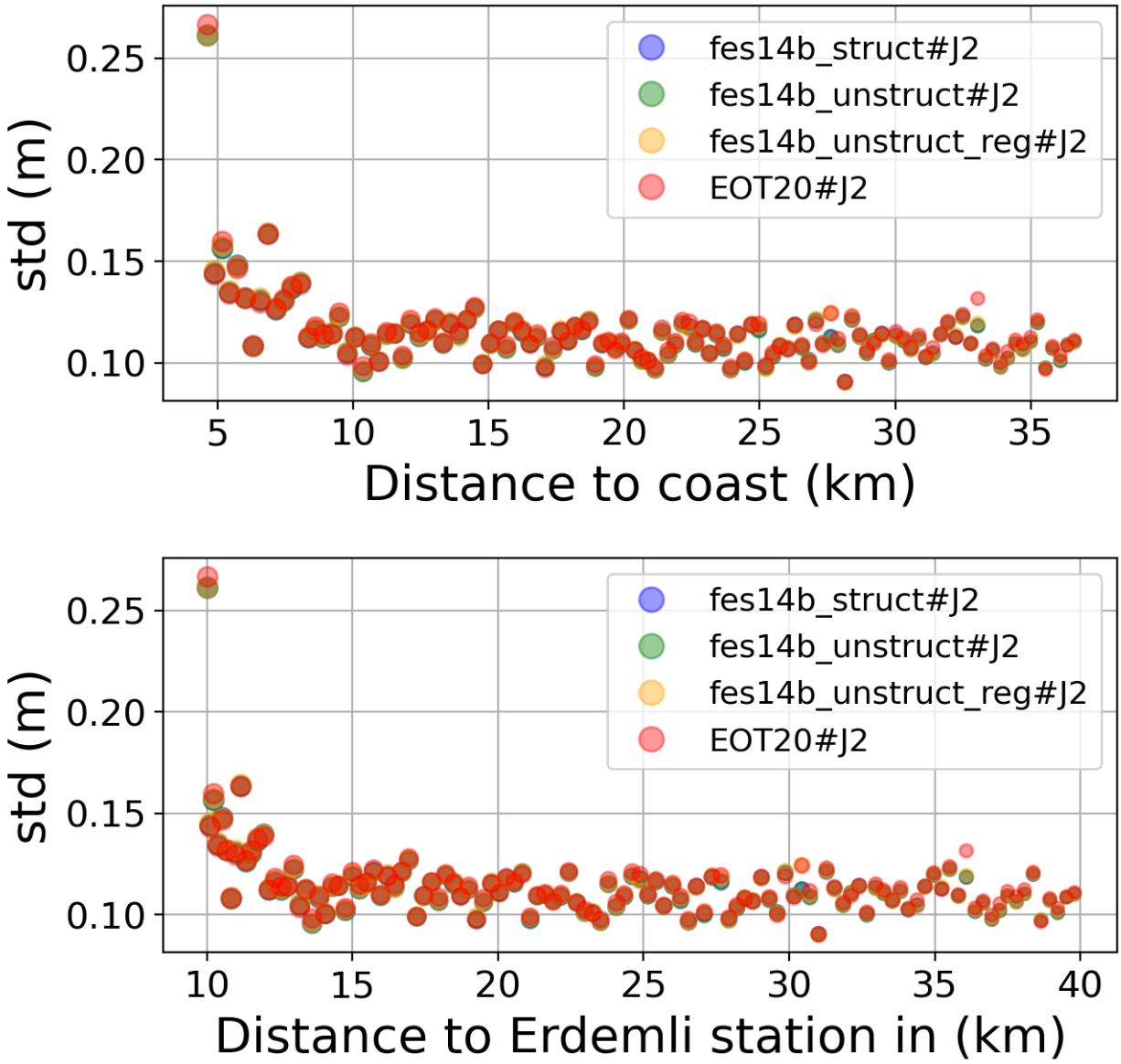

Figure 149 – Std in function of the distance to the coast/Erdemli station

6.8.7 Correlation in function of distance to coast/Erdemli station

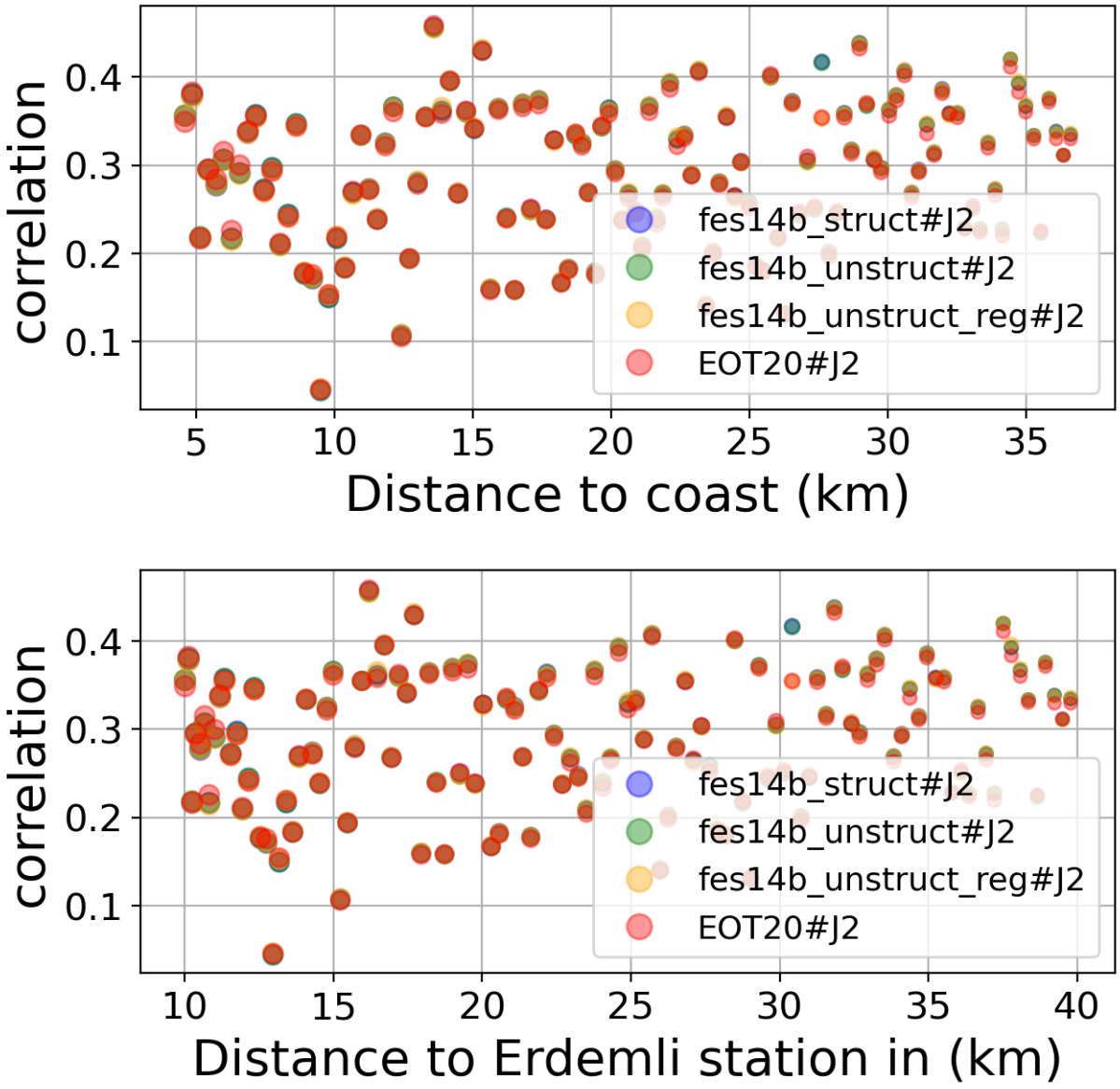

FIGURE 150 – Correlation in function of the distance to the coast/Erdemli station

6.8.8 Taylor Diagram

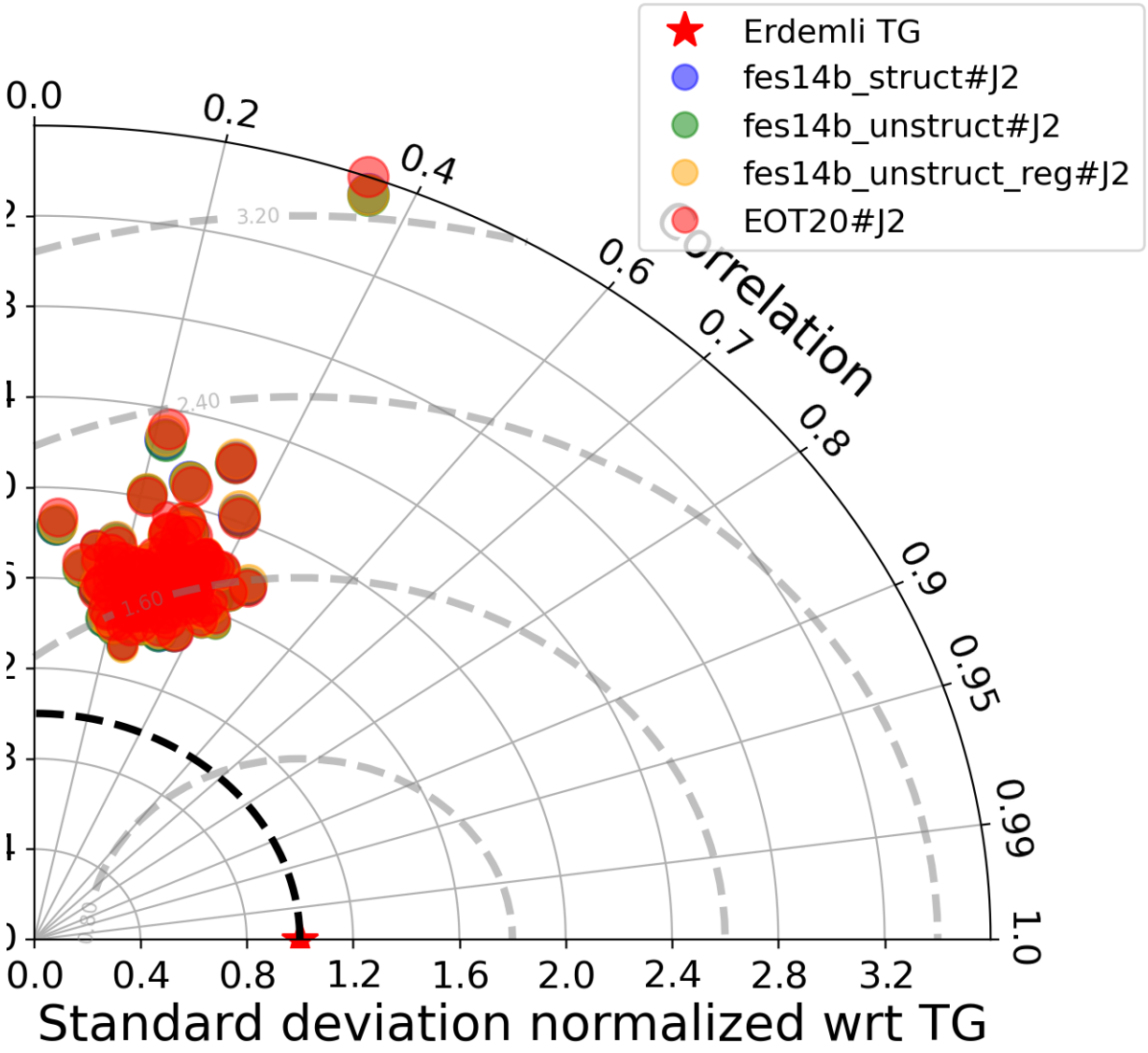

Figure 151 – Taylor diagram

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)
fes14b_struct#J2	92.217	0.292	0.114	0.115
fes14b_unstruct#J2	92.217	0.291	0.114	0.115
fes14b_unstruct_reg#J2	92.227	0.292	0.115	0.115
EOT20#J2	92.237	0.29	0.115	0.116

FIGURE 152 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.068
fes14b_struct#J2	16.194	13.574	95.402	0.457	0.12
fes14b_unstruct#J2	16.194	13.574	95.402	0.456	0.119
fes14b_unstruct_reg#J2	16.194	13.574	95.402	0.455	0.12
EOT20#J2	16.194	13.574	95.402	0.459	0.119

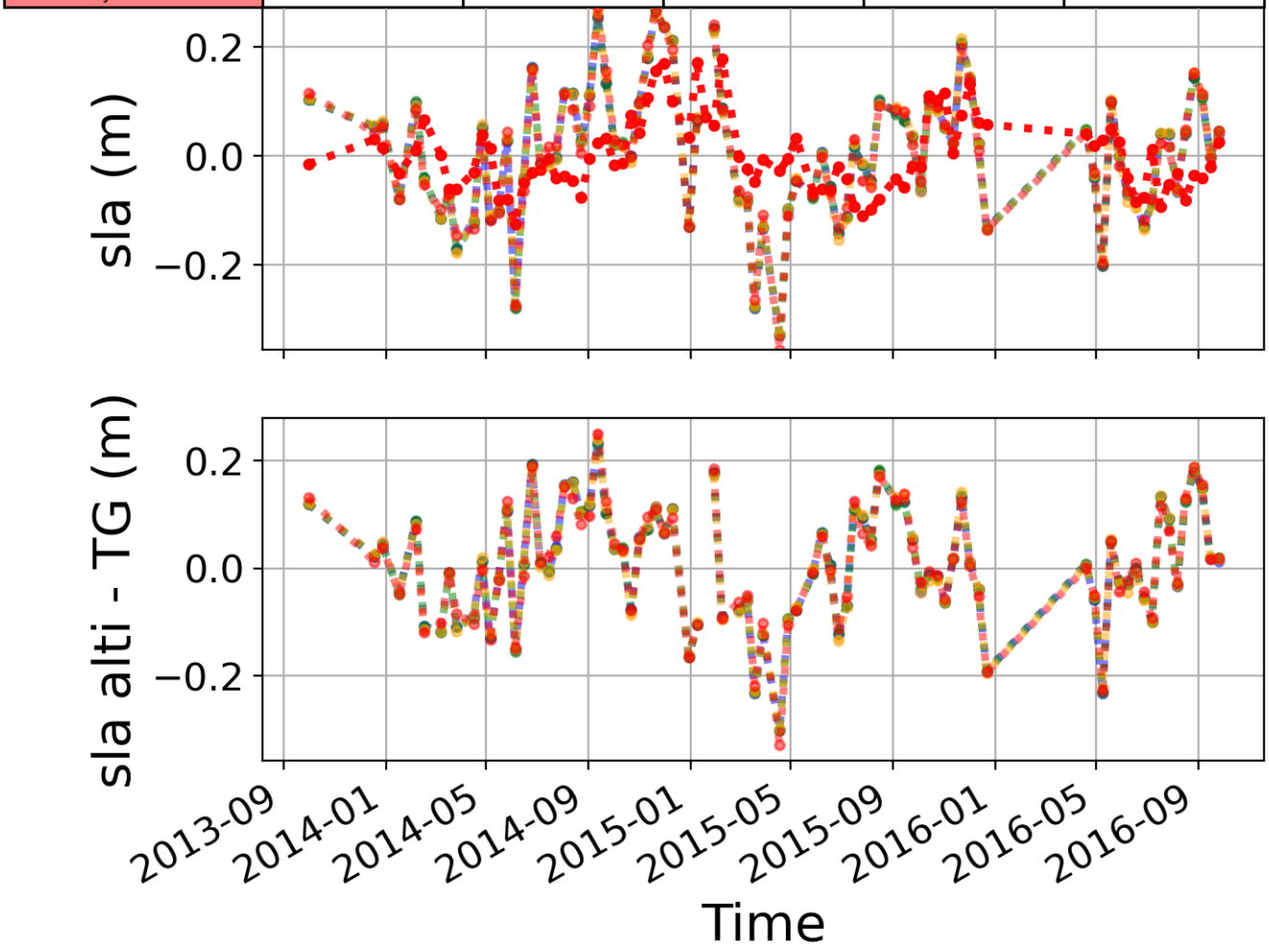

FIGURE 153 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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

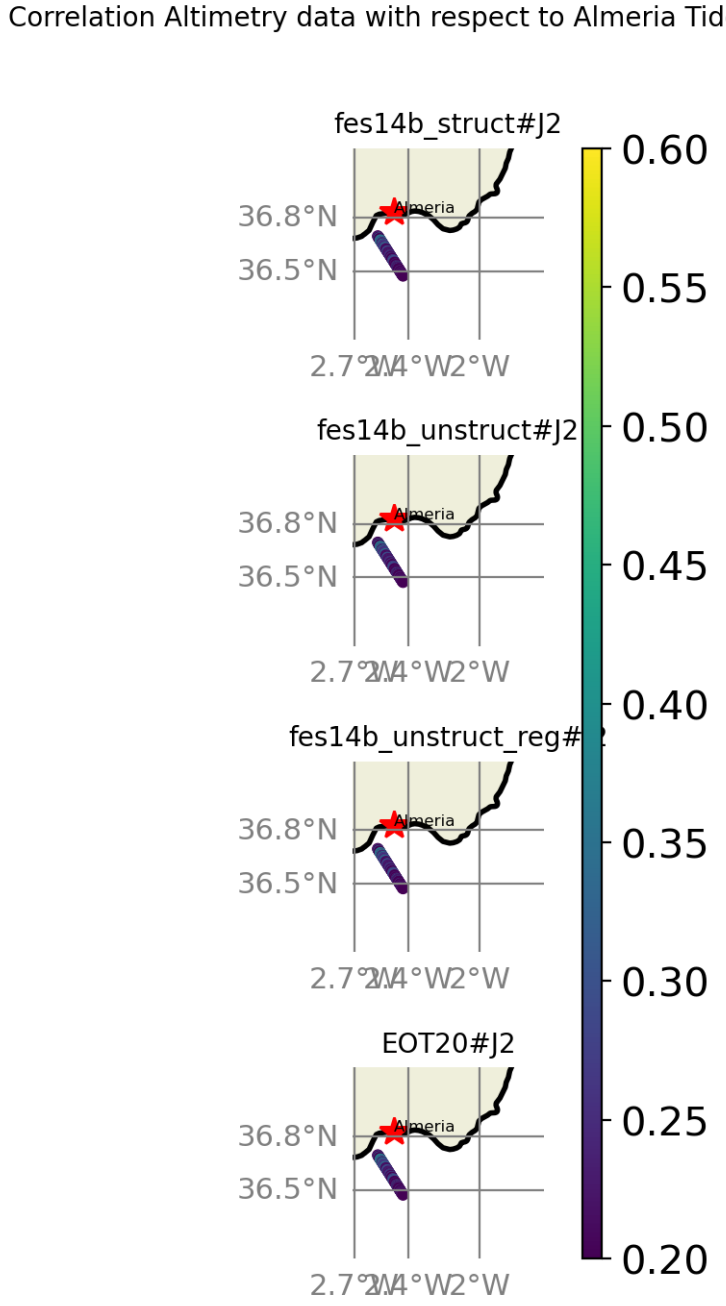

FIGURE 154 – correlation visualization in maps view % Almeria tide gauge

6.9.2 rmsd visualization in maps view % Almeria tide gauge

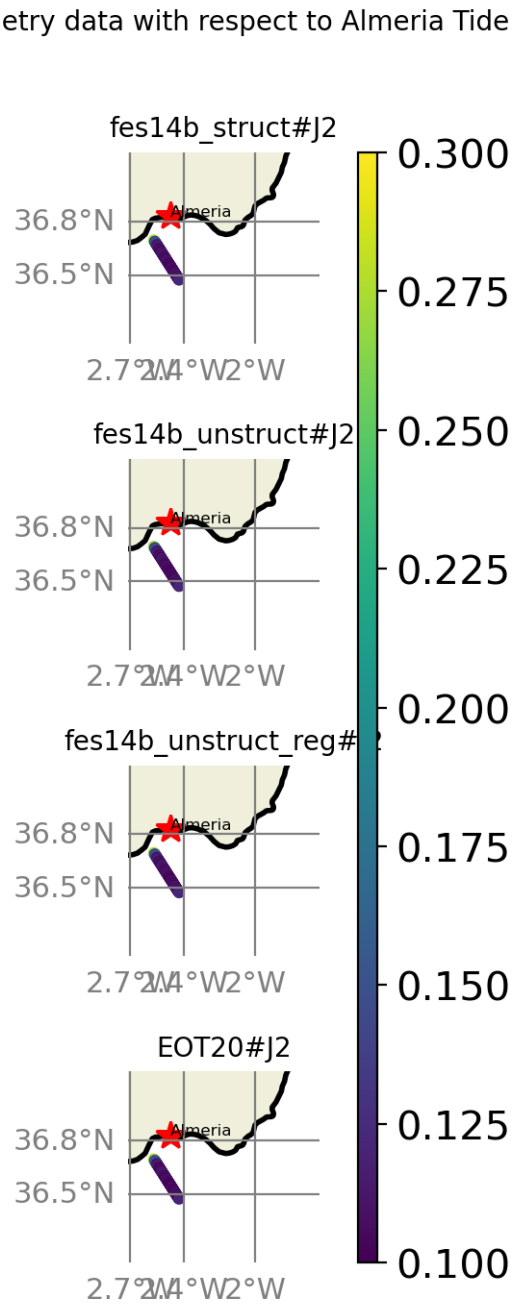

FIGURE 155 – rmsd visualization in maps view % Almeria tide gauge

6.9.3 std visualization in maps view % Almeria tide gauge

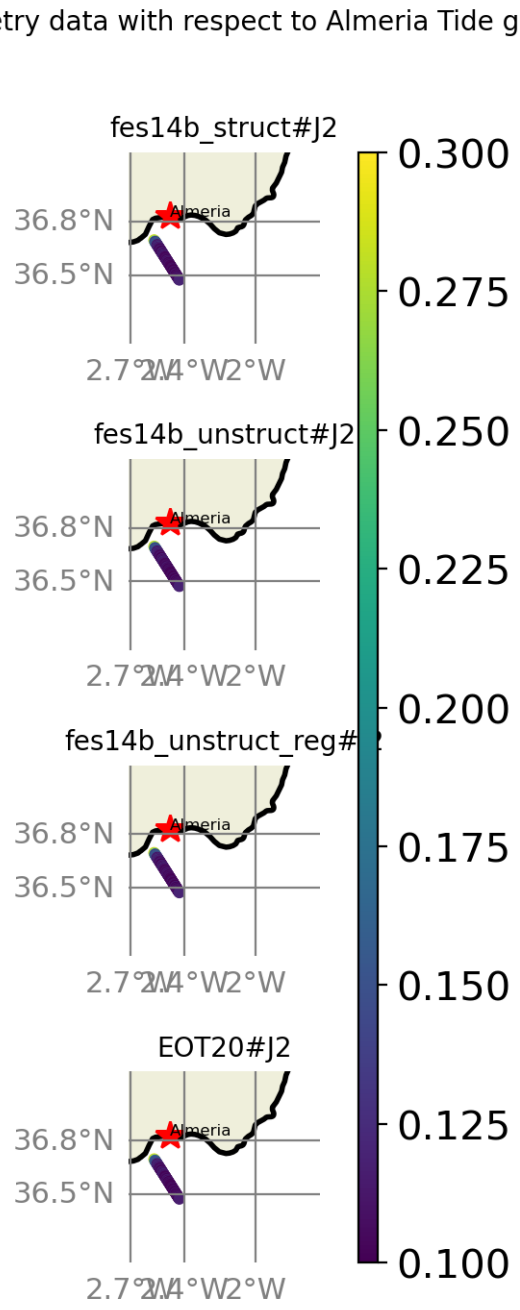

Figure 156 – std visualization in maps view % Almeria tide gauge

6.9.4 valid_data_percent visualization in maps view % Almeria tide gauge

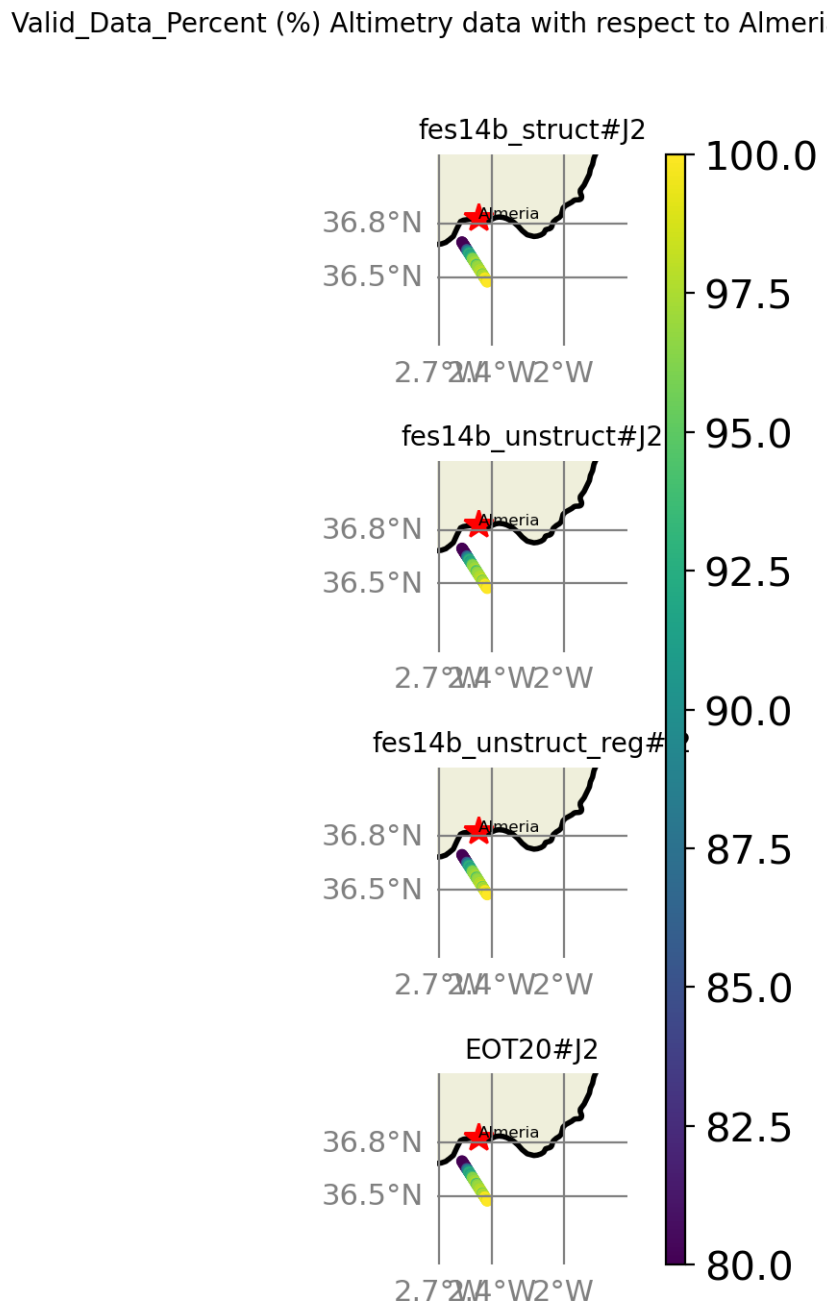

FIGURE 157 – valid_data_percent visualization in maps view % Almeria tide gauge

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.

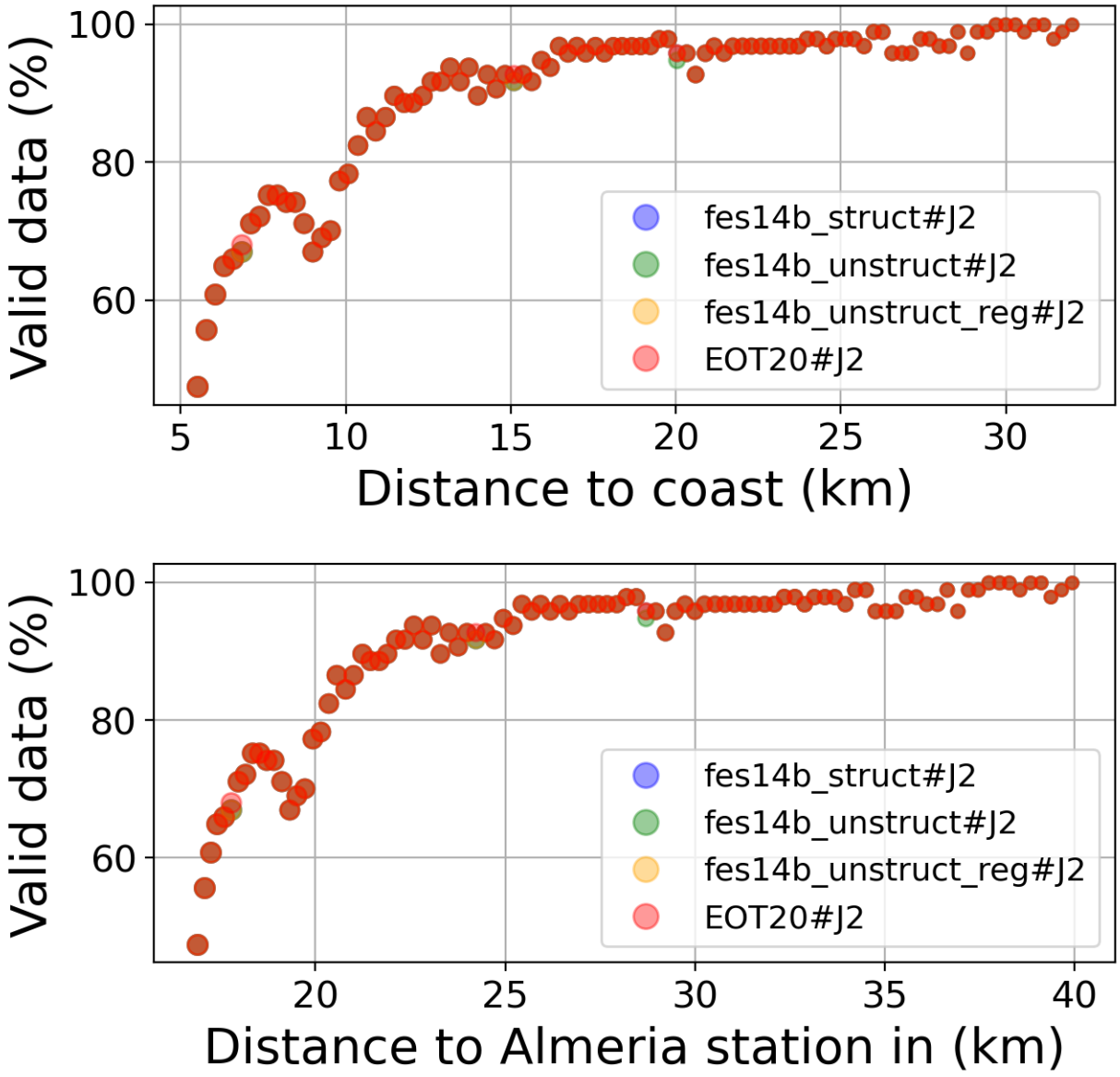

FIGURE 158 – Valid data (%) in function of distance to coast/Almeria station

6.9.6 Std in function of distance to coast/Almeria station

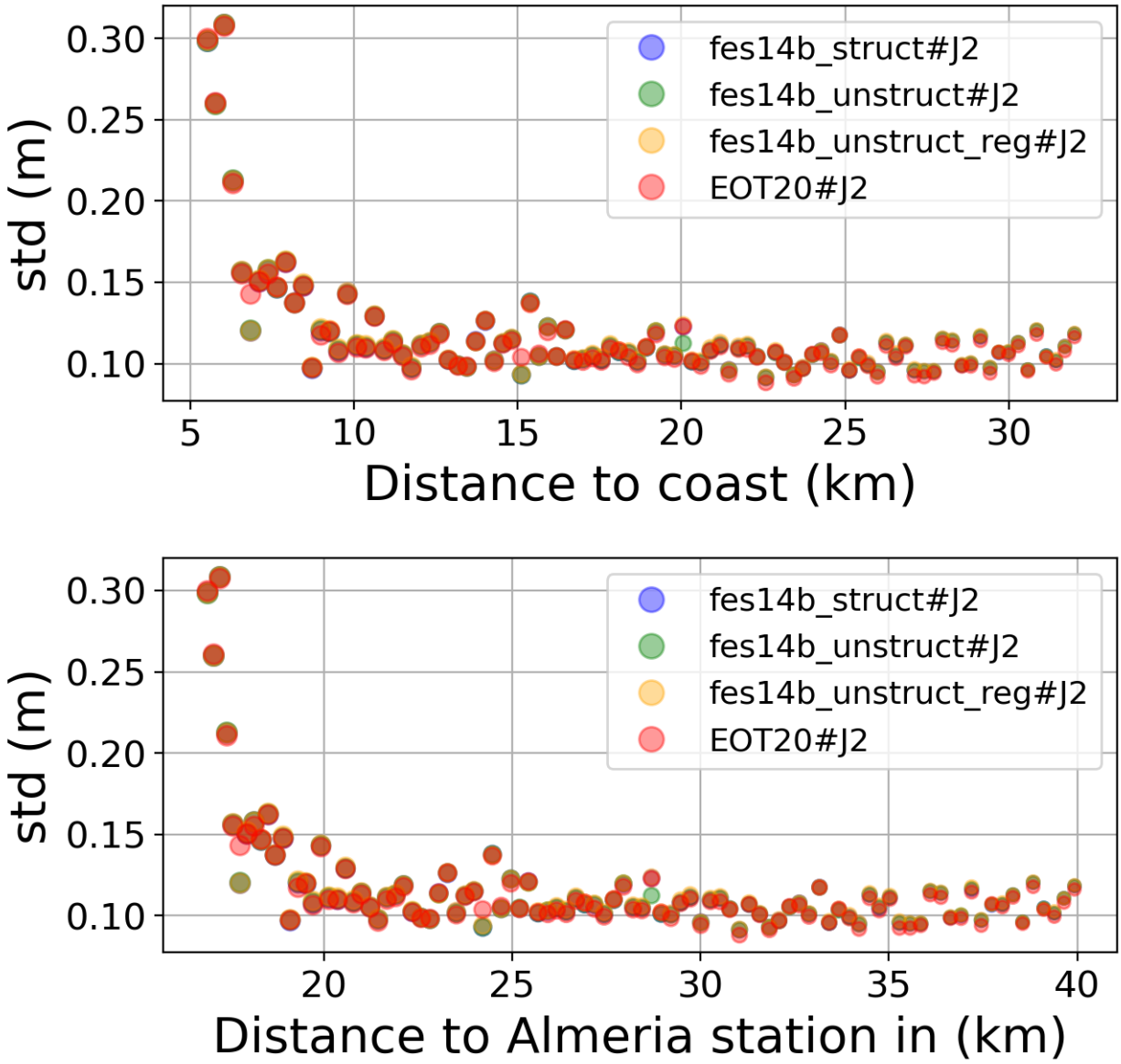

FIGURE 159 – Std in function of the distance to the coast/Almeria station

6.9.7 Correlation in function of distance to coast/Almeria station

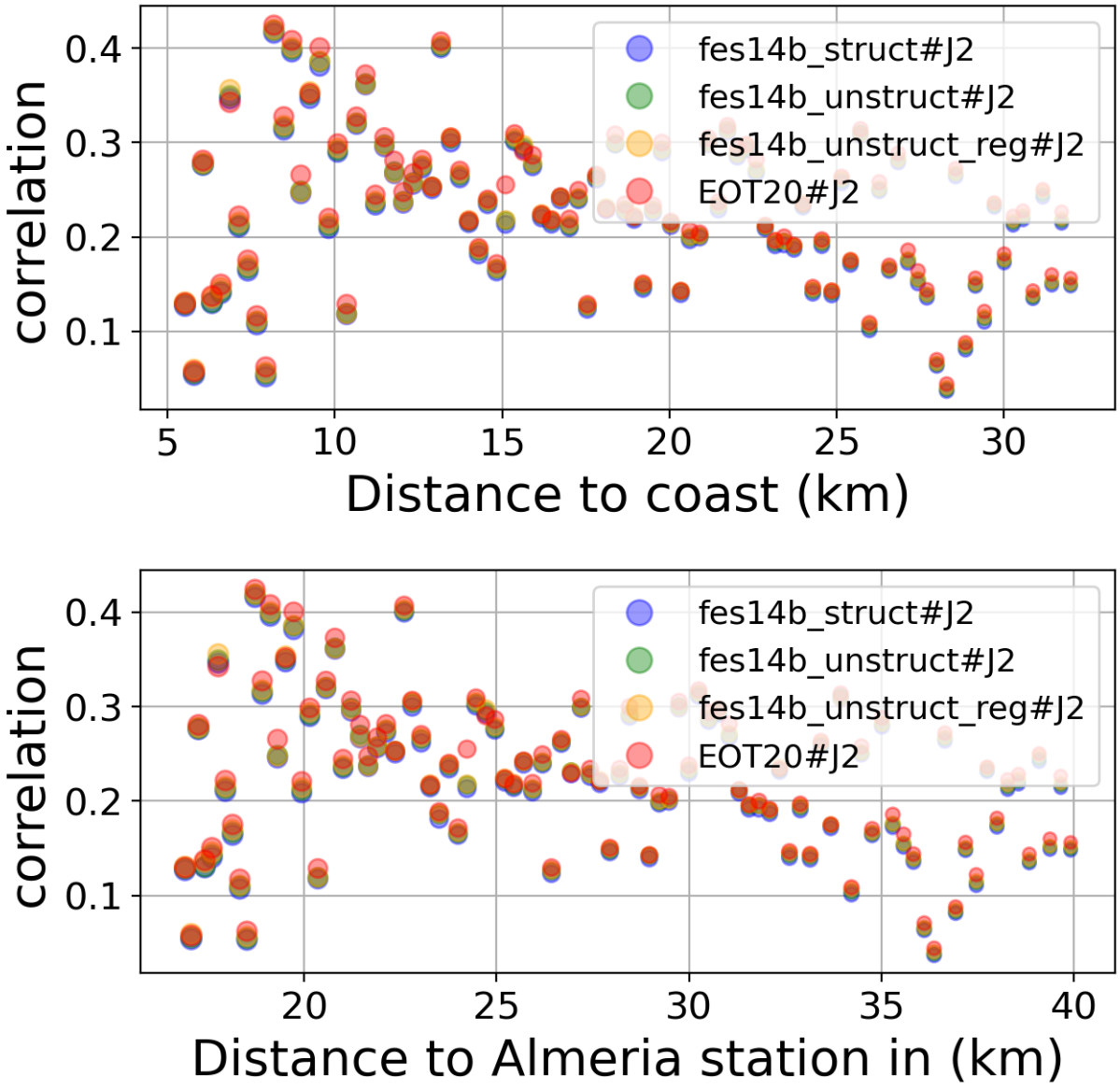

FIGURE 160 – Correlation in function of the distance to the coast/Almeria station

6.9.8 Taylor Diagram

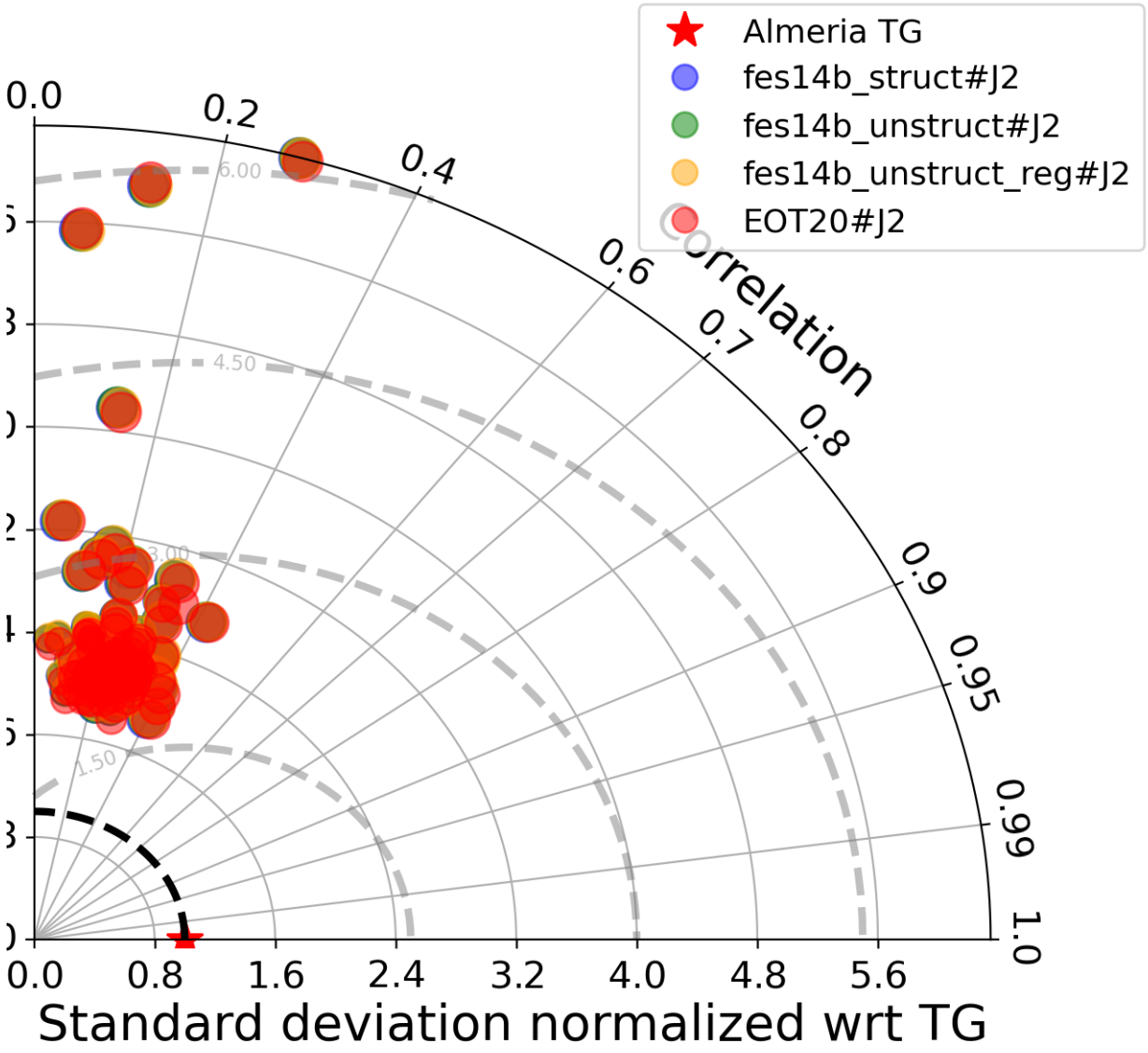

Figure 161 – Taylor diagram

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)
fes14b_struct#J2	90.442	0.22	0.118	0.118
fes14b_unstruct#J2	90.432	0.223	0.118	0.118
fes14b_unstruct_reg#J2	90.442	0.224	0.119	0.118
EOT20#J2	90.464	0.229	0.117	0.117

FIGURE 162 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.05
fes14b_struct#J2	18.712	8.176	74.227	0.416	0.137
fes14b_unstruct#J2	18.712	8.176	74.227	0.419	0.138
fes14b_unstruct_reg#J2	18.712	8.176	74.227	0.42	0.138
EOT20#J2	18.712	8.176	74.227	0.425	0.138

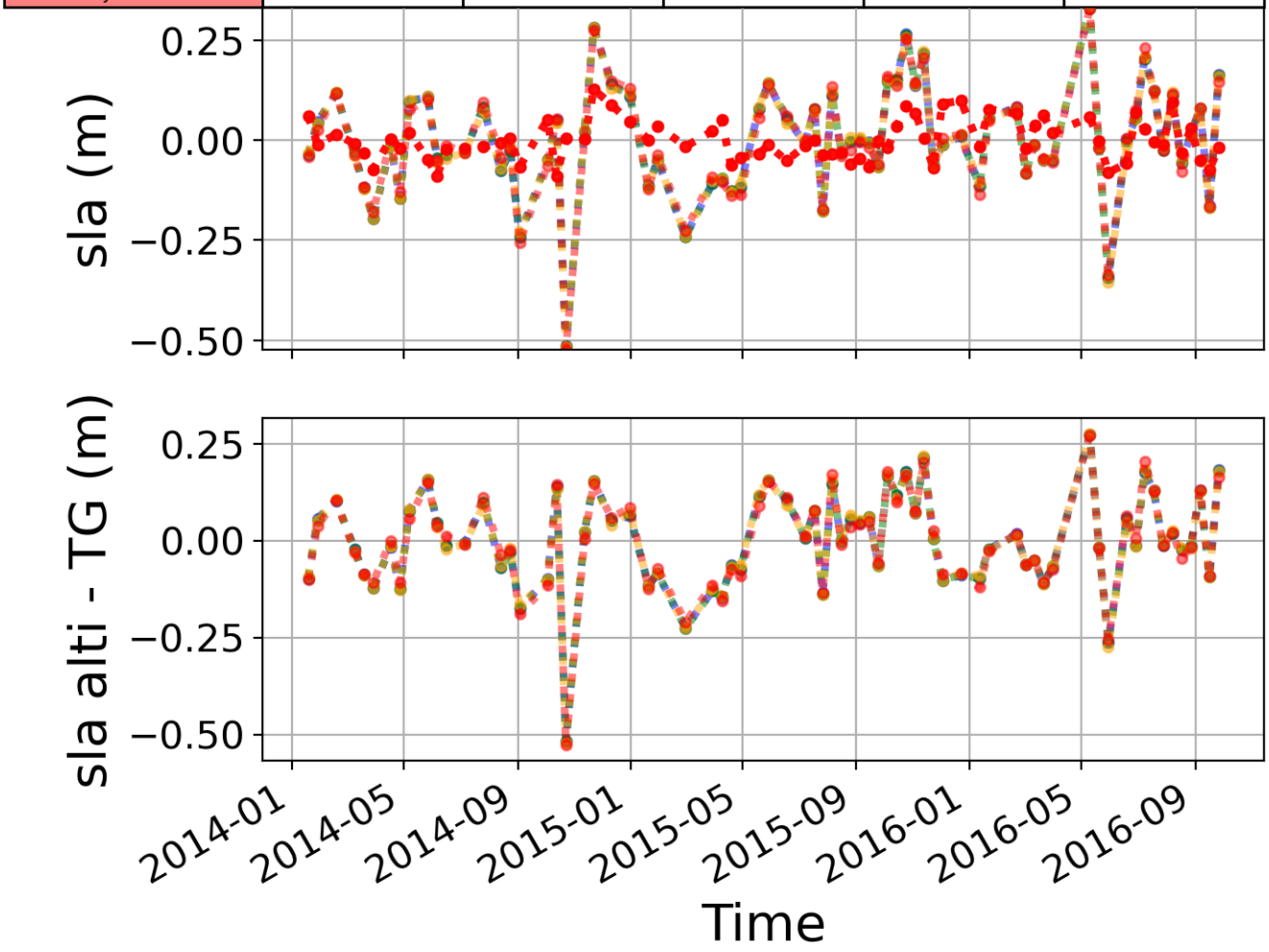

FIGURE 163 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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

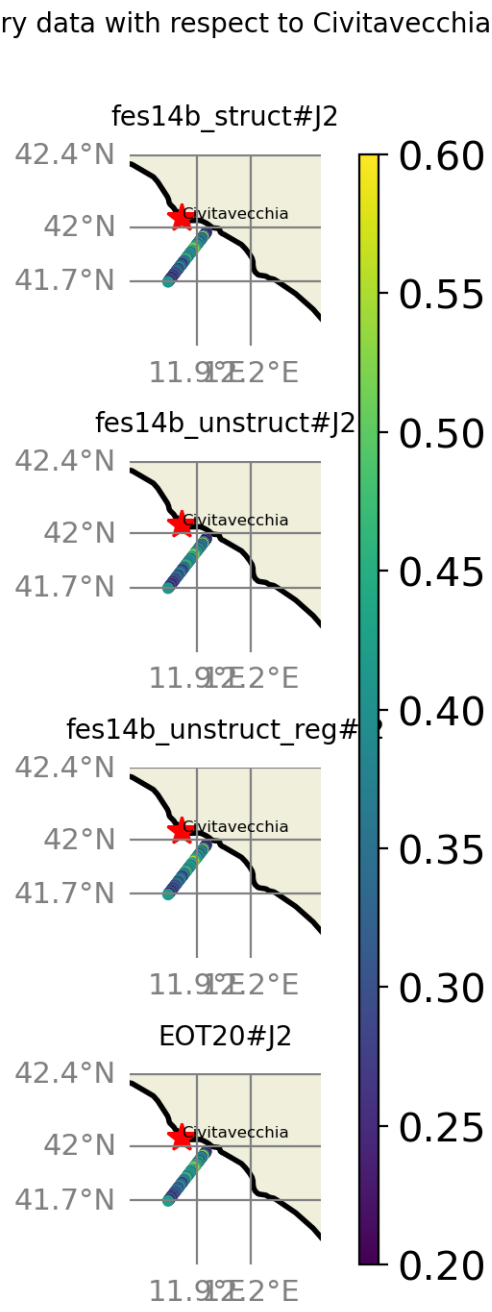

FIGURE 164 – correlation visualization in maps view % Civitavecchia tide gauge

6.10.2 rmsd visualization in maps view % Civitavecchia tide gauge

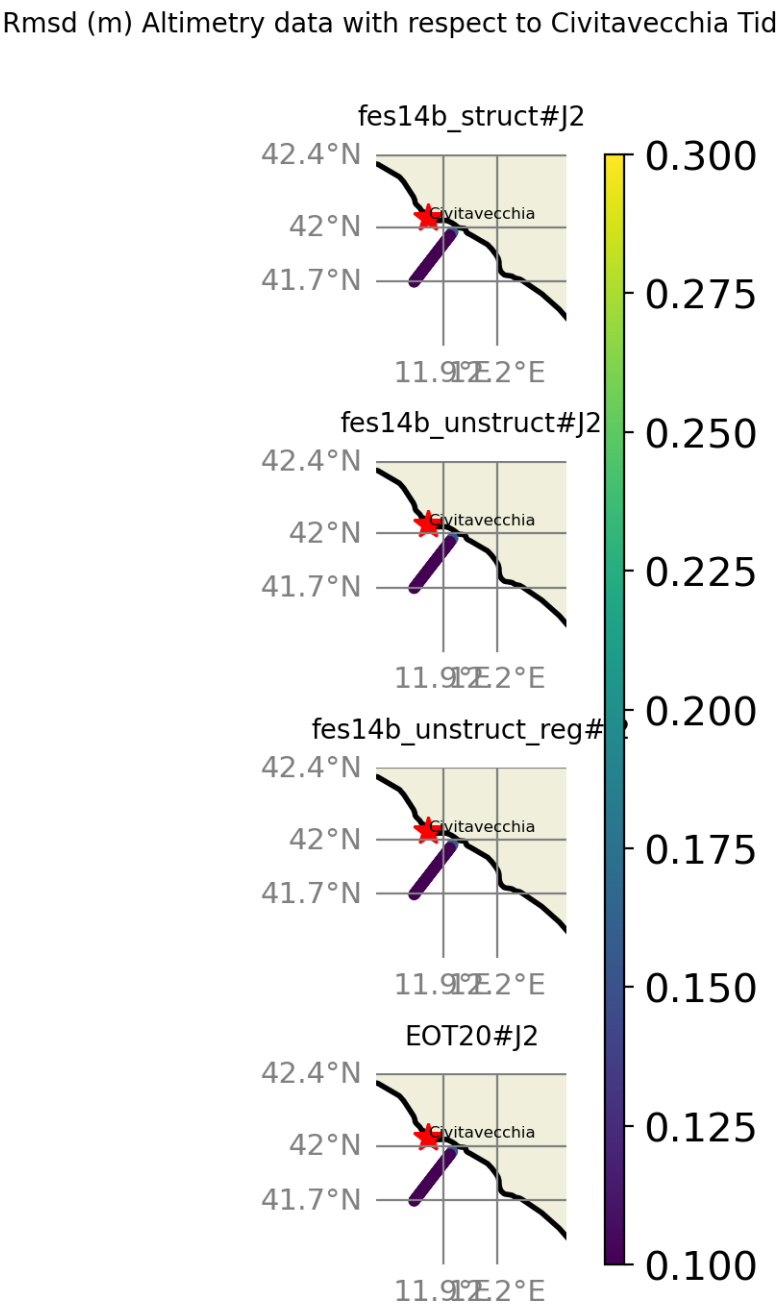

FIGURE 165 – rmsd visualization in maps view % Civitavecchia tide gauge

6.10.3 std visualization in maps view % Civitavecchia tide gauge

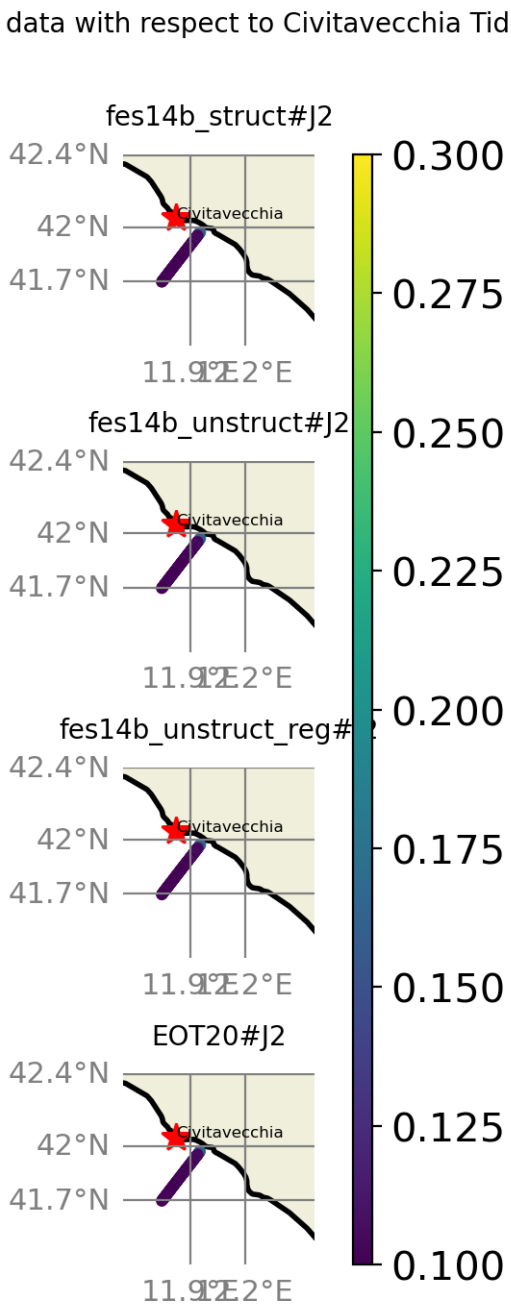

Figure 166 – std visualization in maps view % Civitavecchia tide gauge

6.10.4 valid_data_percent visualization in maps view % Civitavecchia tide gauge

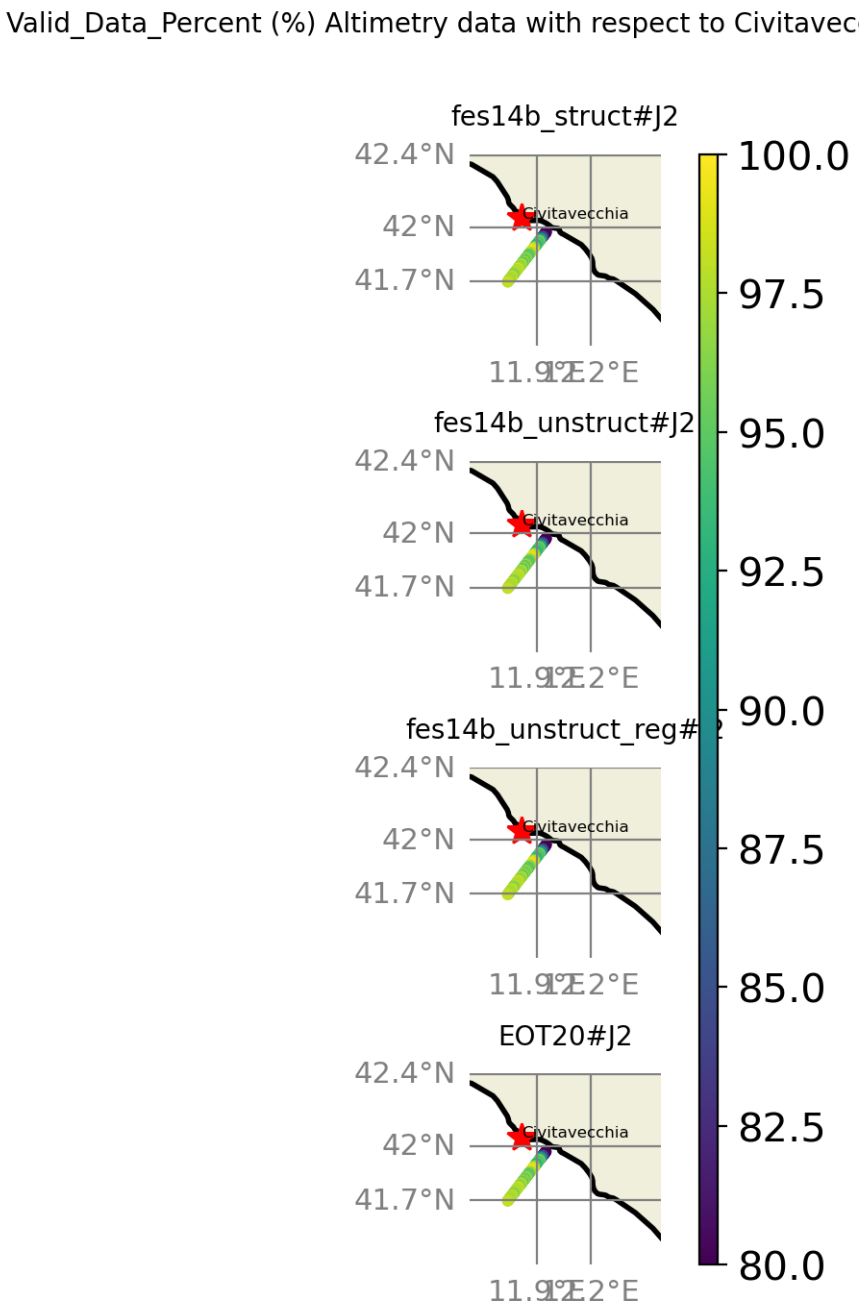

FIGURE 167 – valid_data_percent visualization in maps view % Civitavecchia tide gauge

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.

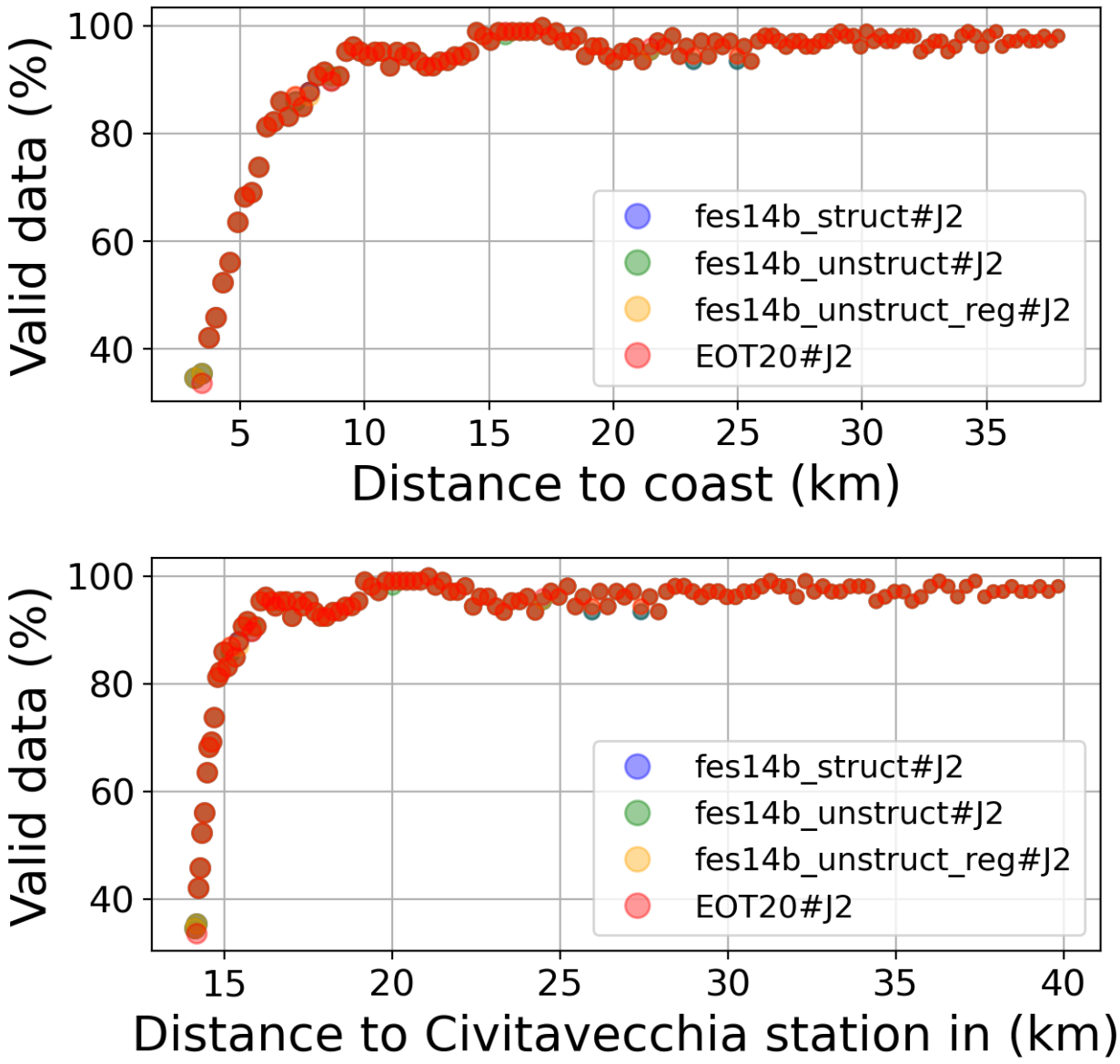

FIGURE 168 – Valid data (%) in function of distance to coast/Civitavecchia station

6.10.6 Std in function of distance to coast/Civitavecchia station

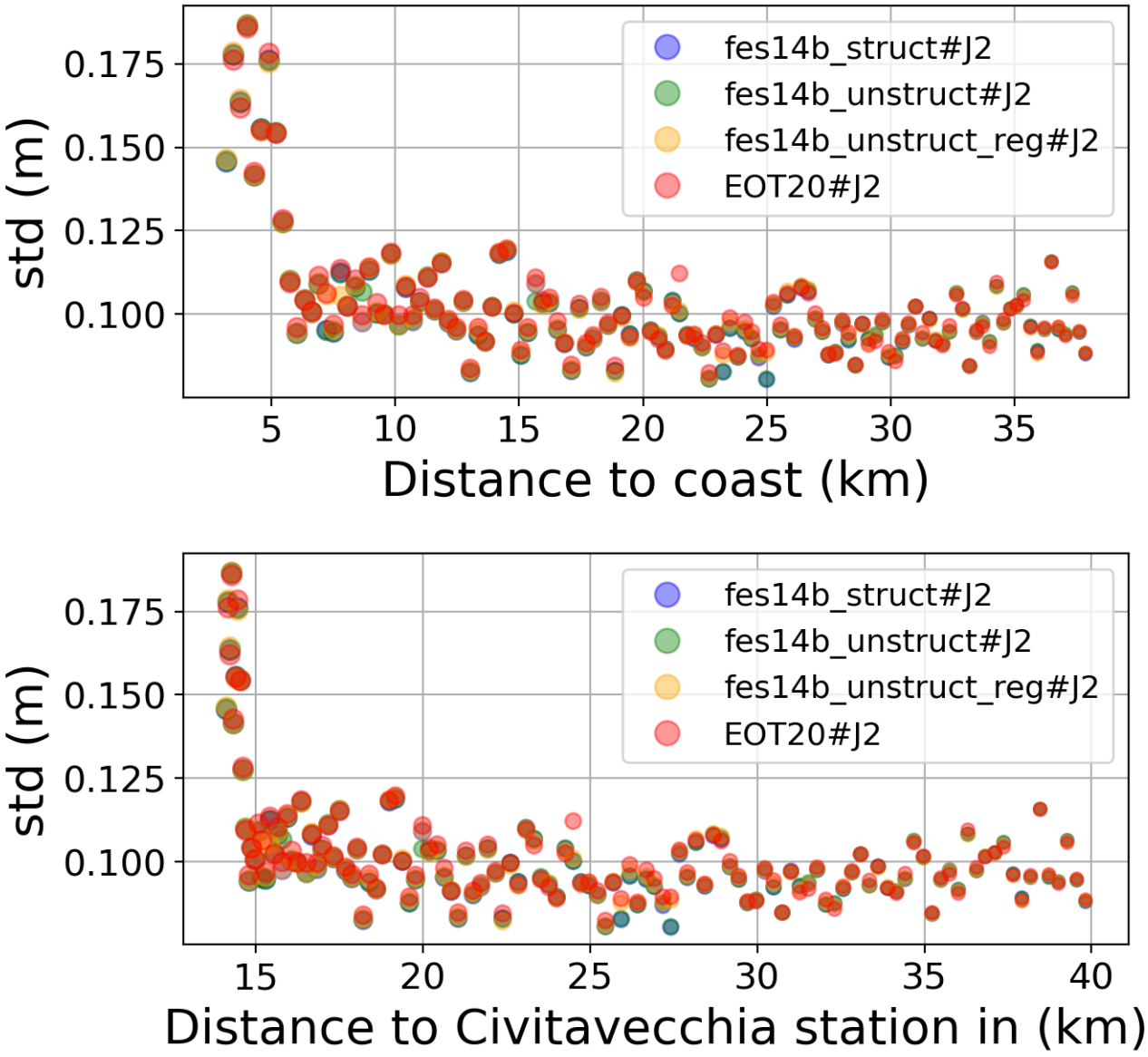

FIGURE 169 – Std in function of the distance to the coast/Civitavecchia station

6.10.7 Correlation in function of distance to coast/Civitavecchia station

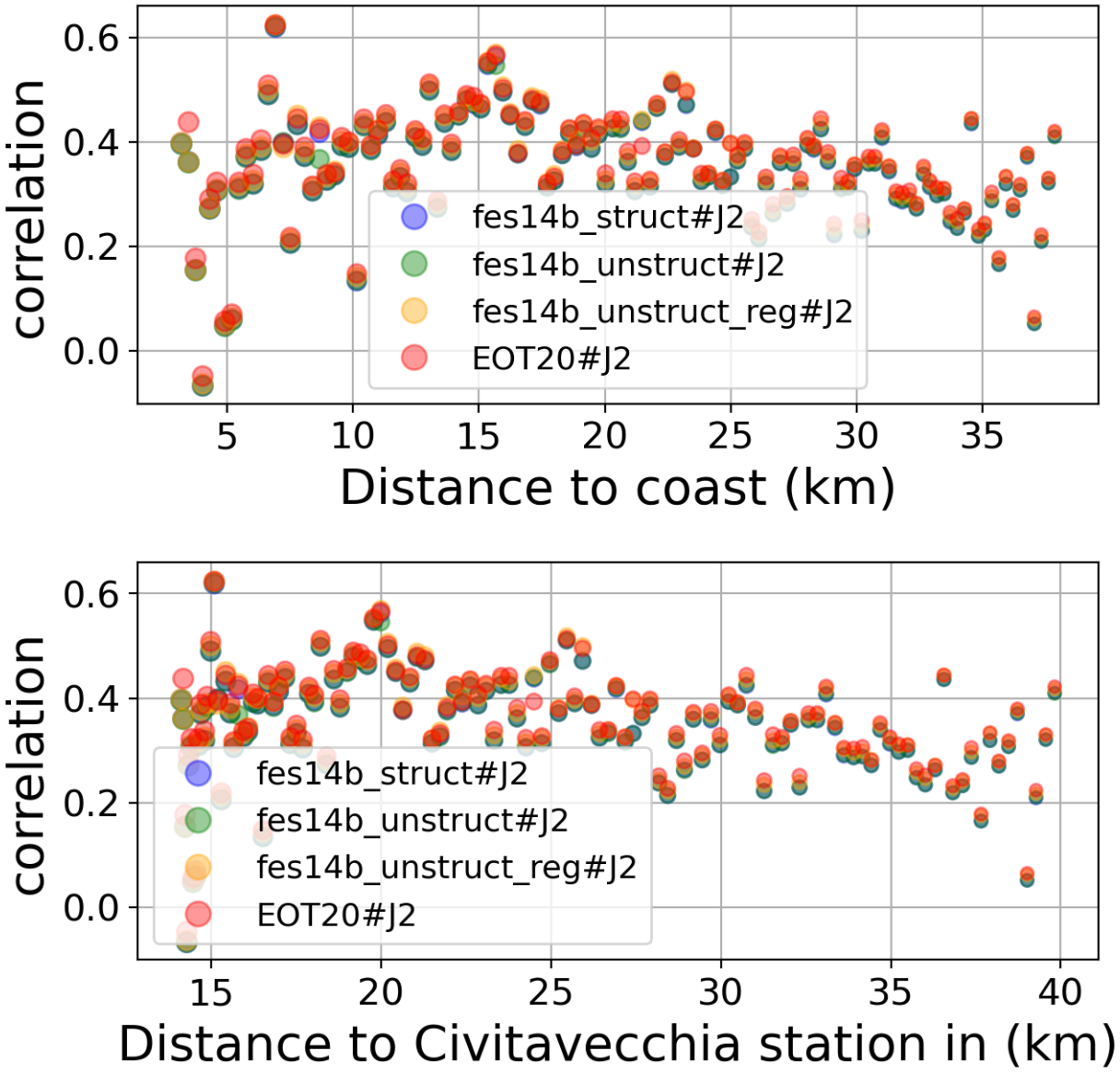

FIGURE 170 – Correlation in function of the distance to the coast/Civitavecchia station

6.10.8 Taylor Diagram

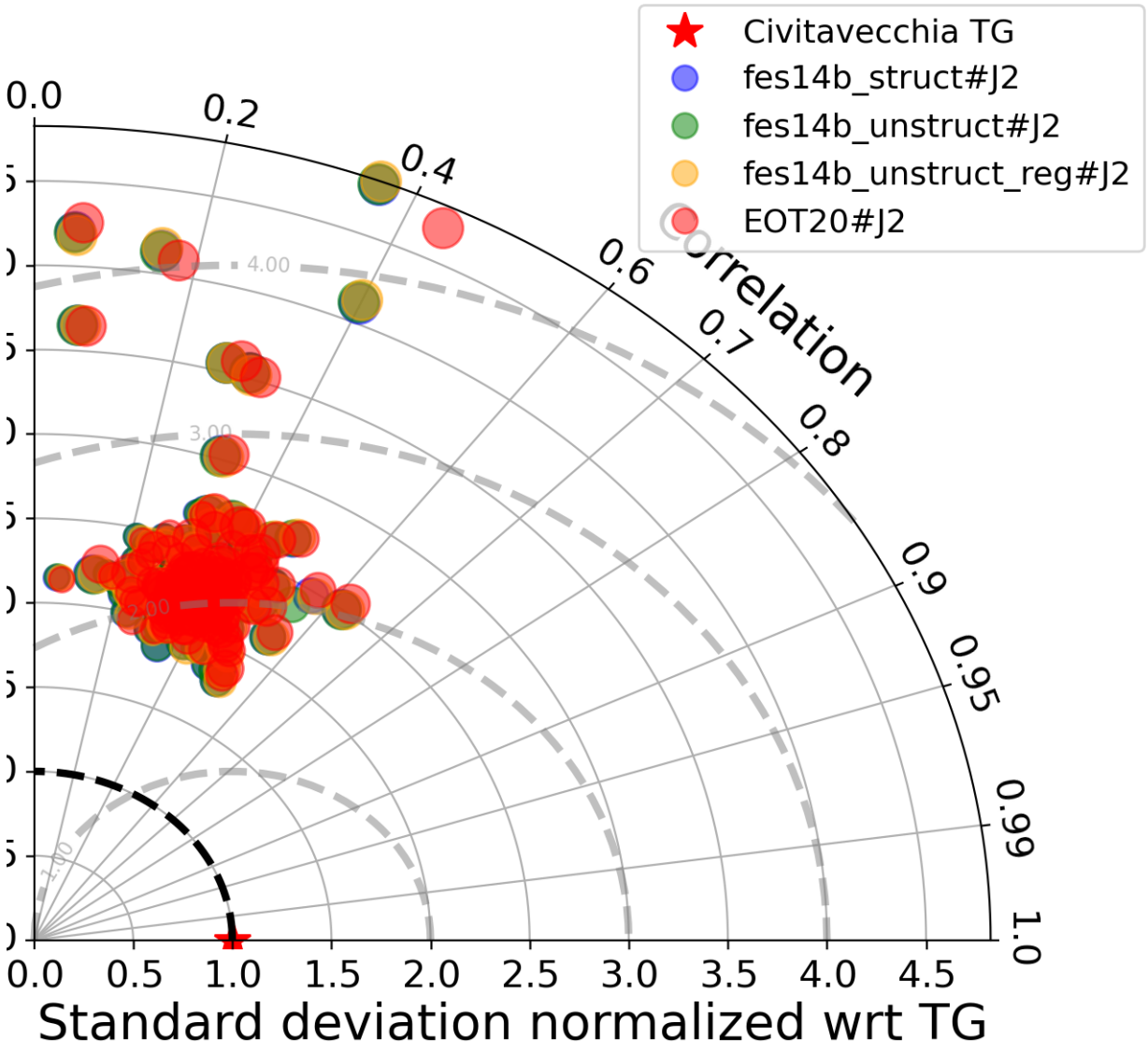

Figure 171 – Taylor diagram

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)
fes14b_struct#J2	92.738	0.347	0.102	0.096
fes14b_unstruct#J2	92.738	0.346	0.102	0.096
fes14b_unstruct_reg#J2	92.753	0.356	0.102	0.096
EOT20#J2	92.753	0.36	0.103	0.096

FIGURE 172 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.044
fes14b_struct#J2	15.081	6.916	83.178	0.619	0.109
fes14b_unstruct#J2	15.081	6.916	83.178	0.621	0.109
fes14b_unstruct_reg#J2	15.081	6.916	83.178	0.625	0.109
EOT20#J2	15.081	6.916	83.178	0.624	0.112

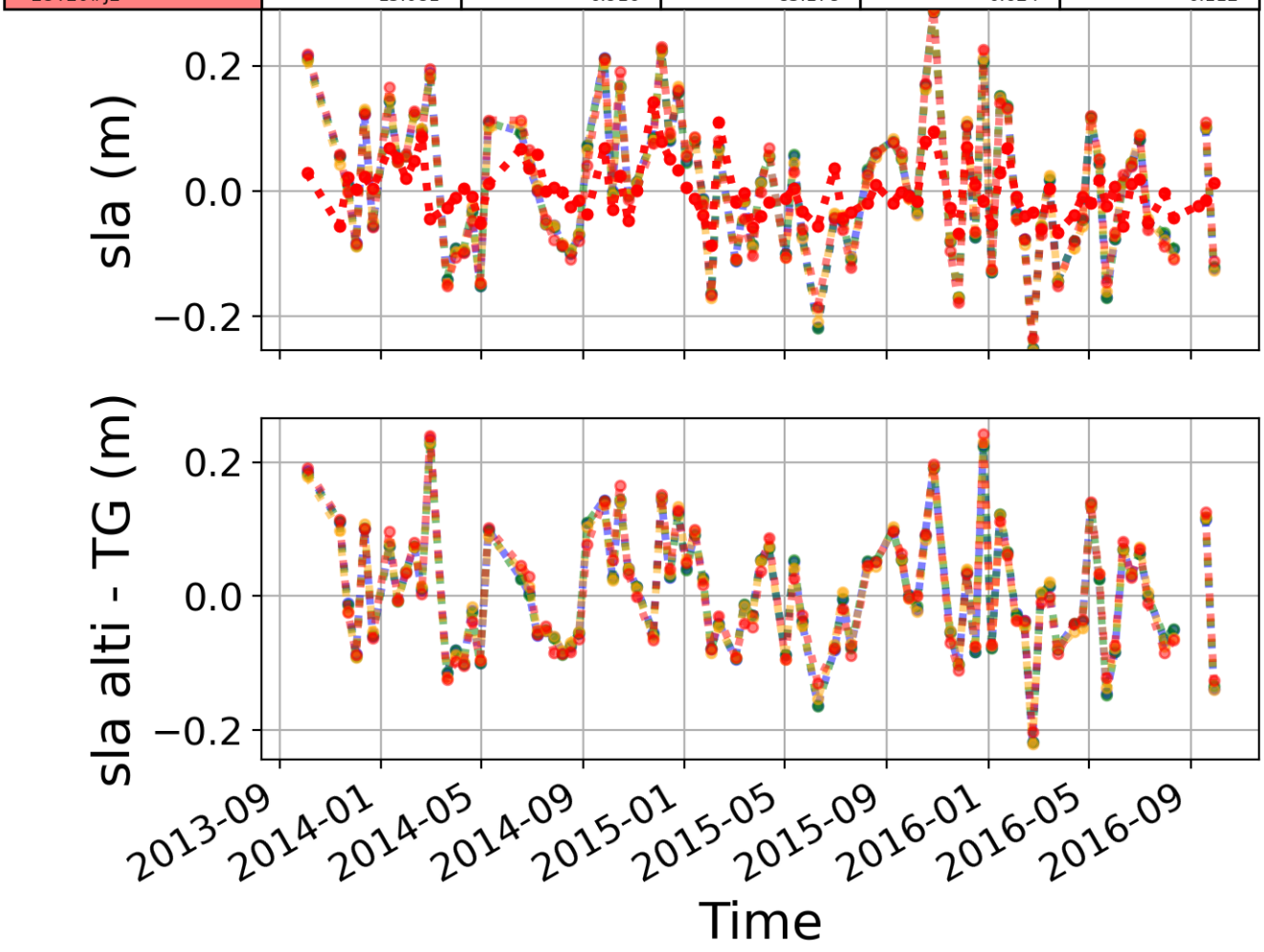

FIGURE 173 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

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

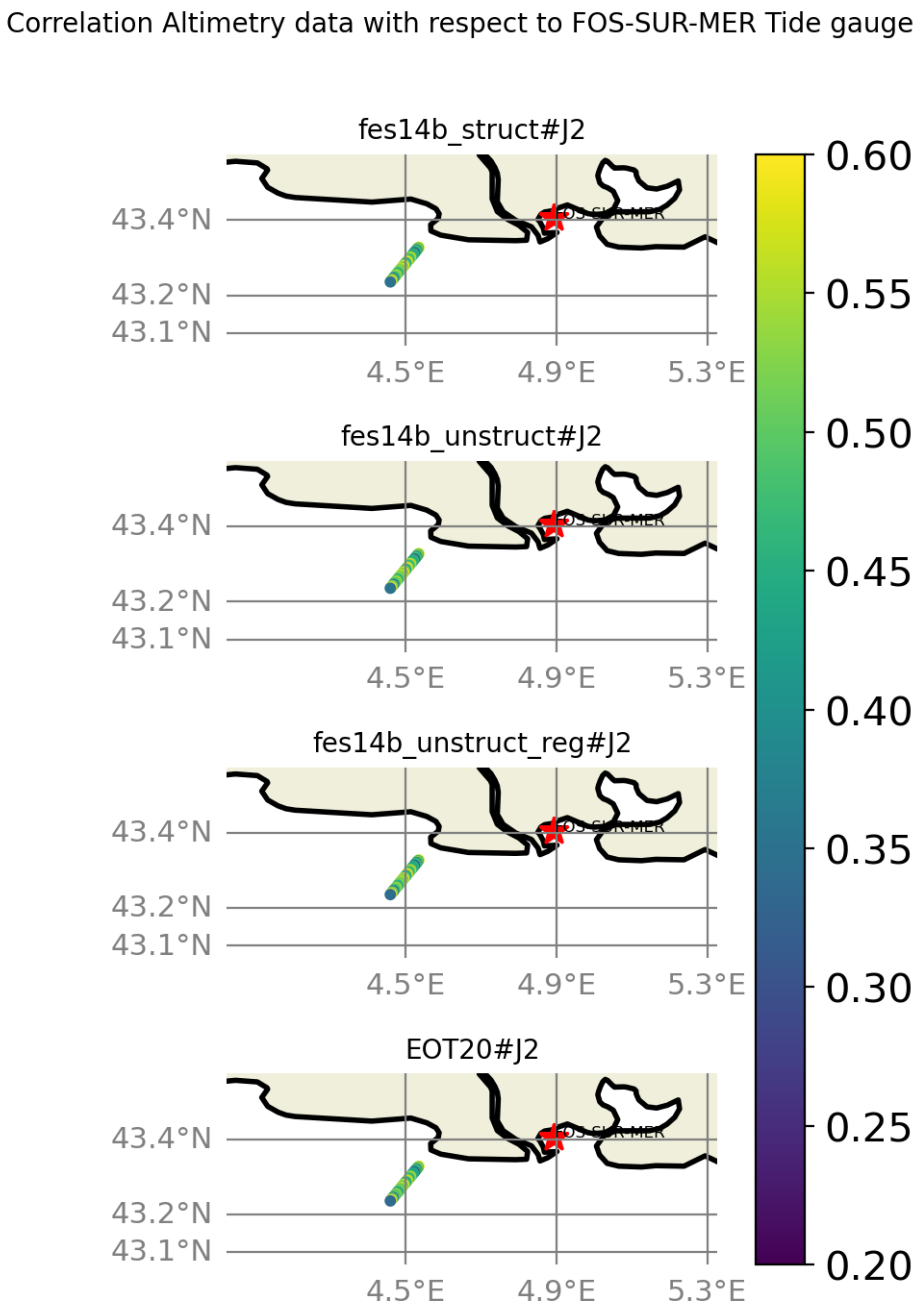

Figure 174 – correlation visualization in maps view % FOS-SUR-MER tide gauge

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

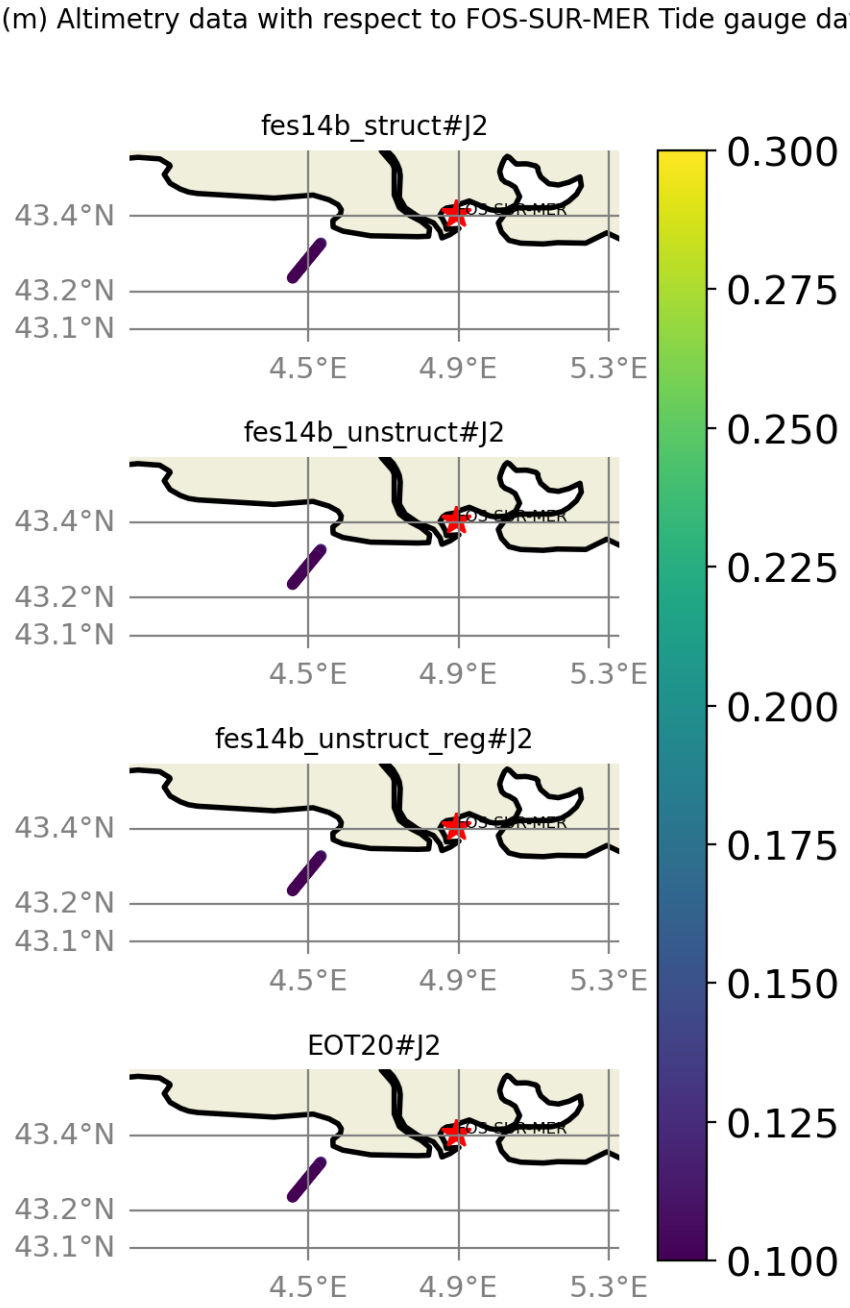

FIGURE 175 – rmsd visualization in maps view % FOS-SUR-MER tide gauge

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

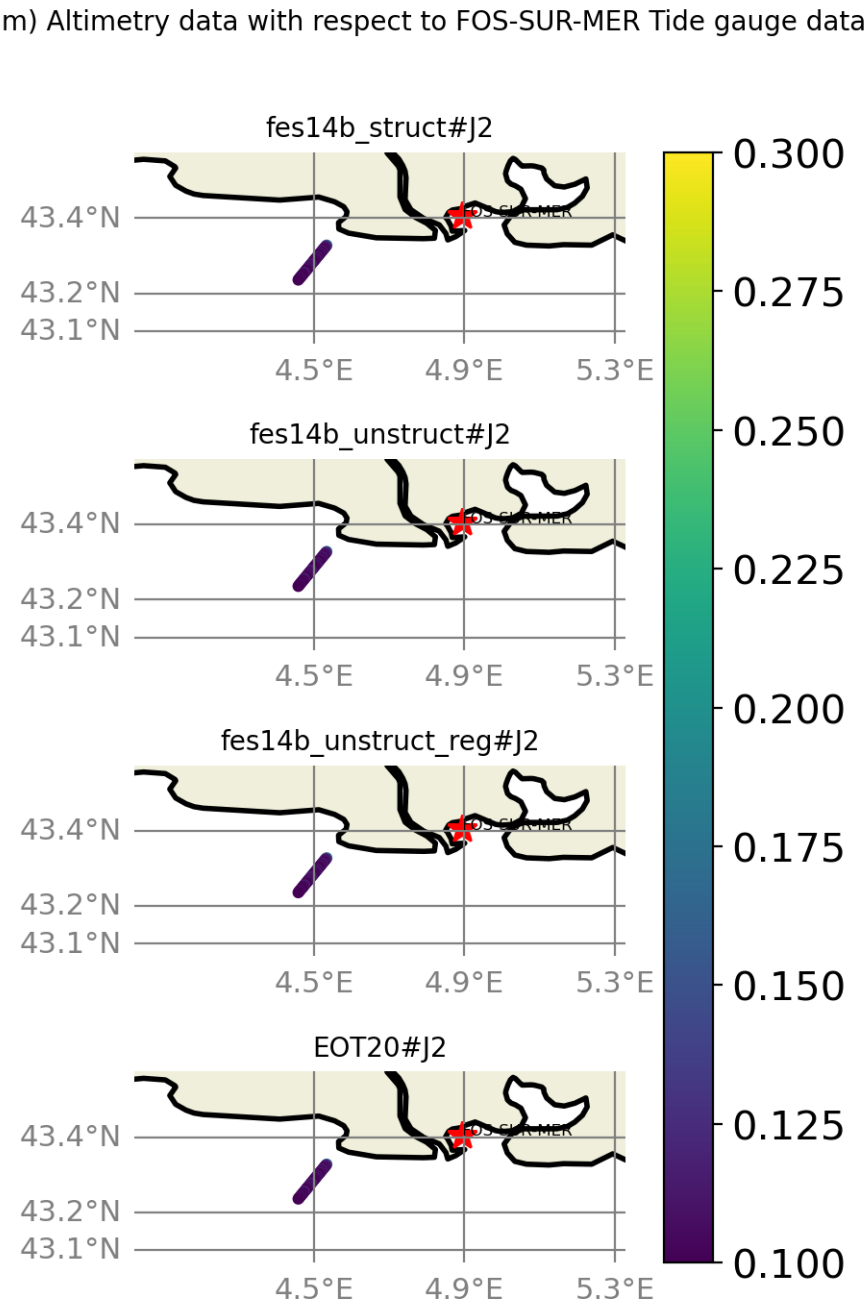

Figure 176 – std visualization in maps view % FOS-SUR-MER tide gauge

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

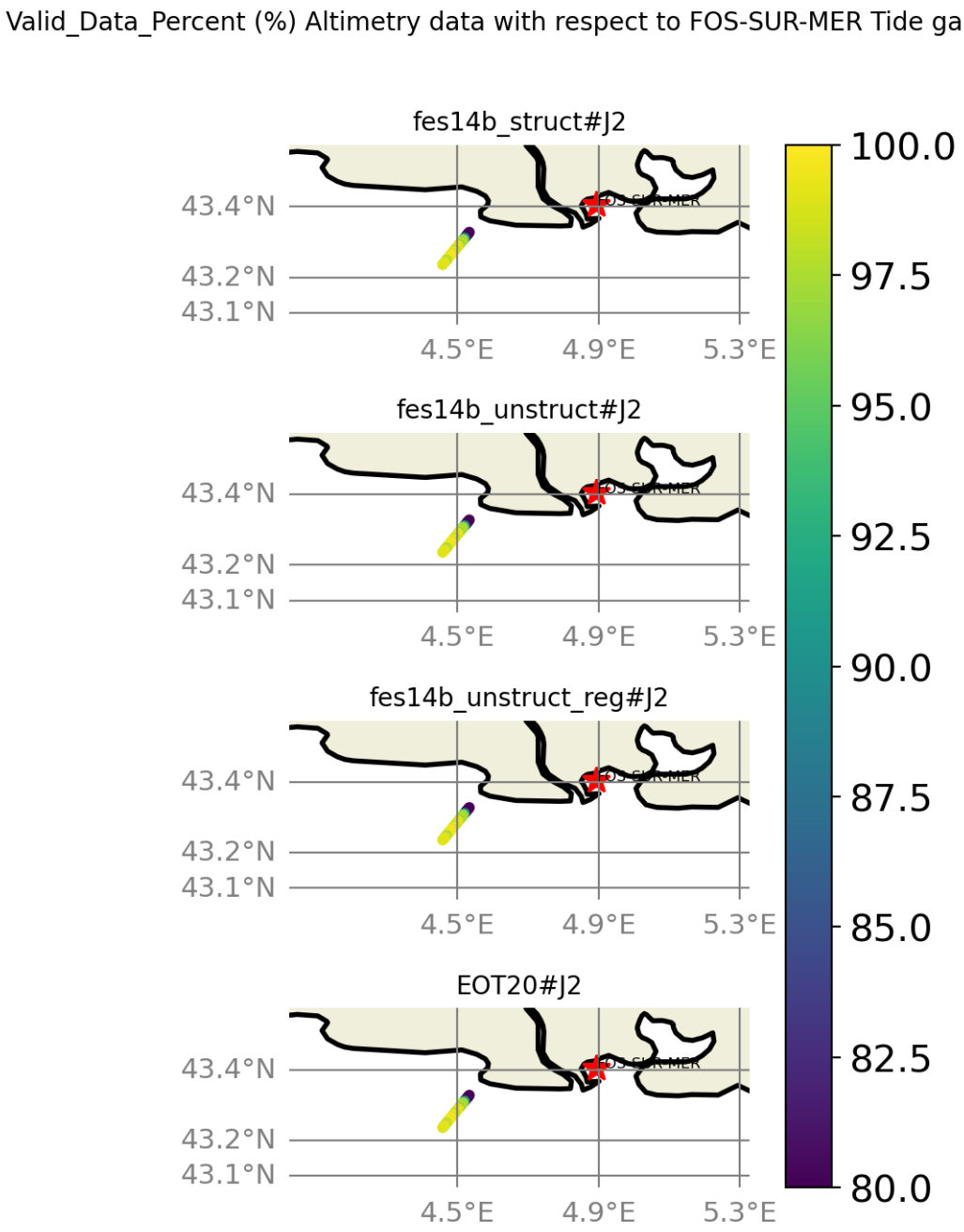

FIGURE 177 – valid_data_percent visualization in maps view % FOS-SUR-MER tide gauge

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 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.

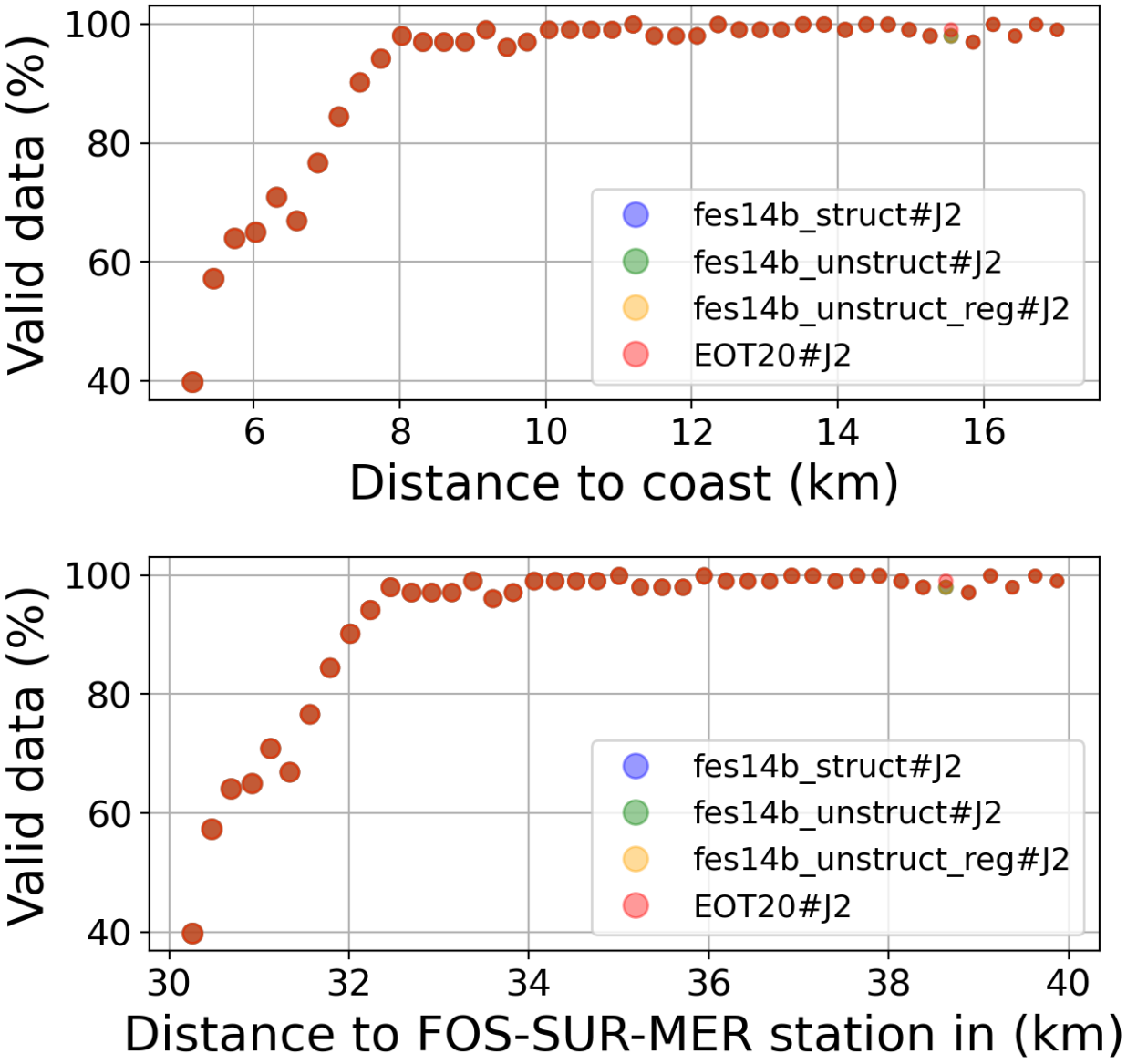

Figure 178 – Valid data (%) in function of distance to coast/FOS-SUR-MER station

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

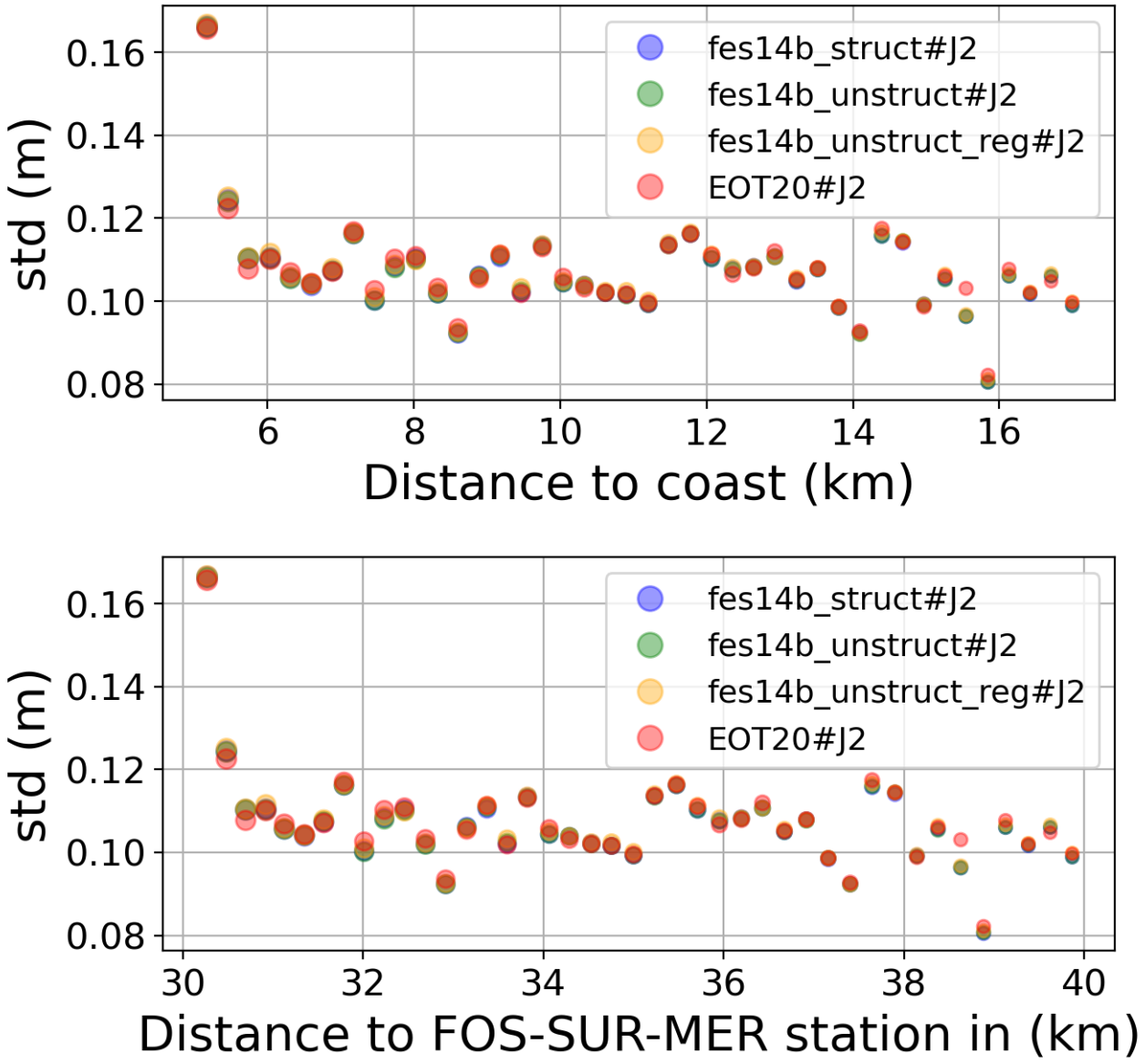

FIGURE 179 – Std in function of the distance to the coast/FOS-SUR-MER station

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

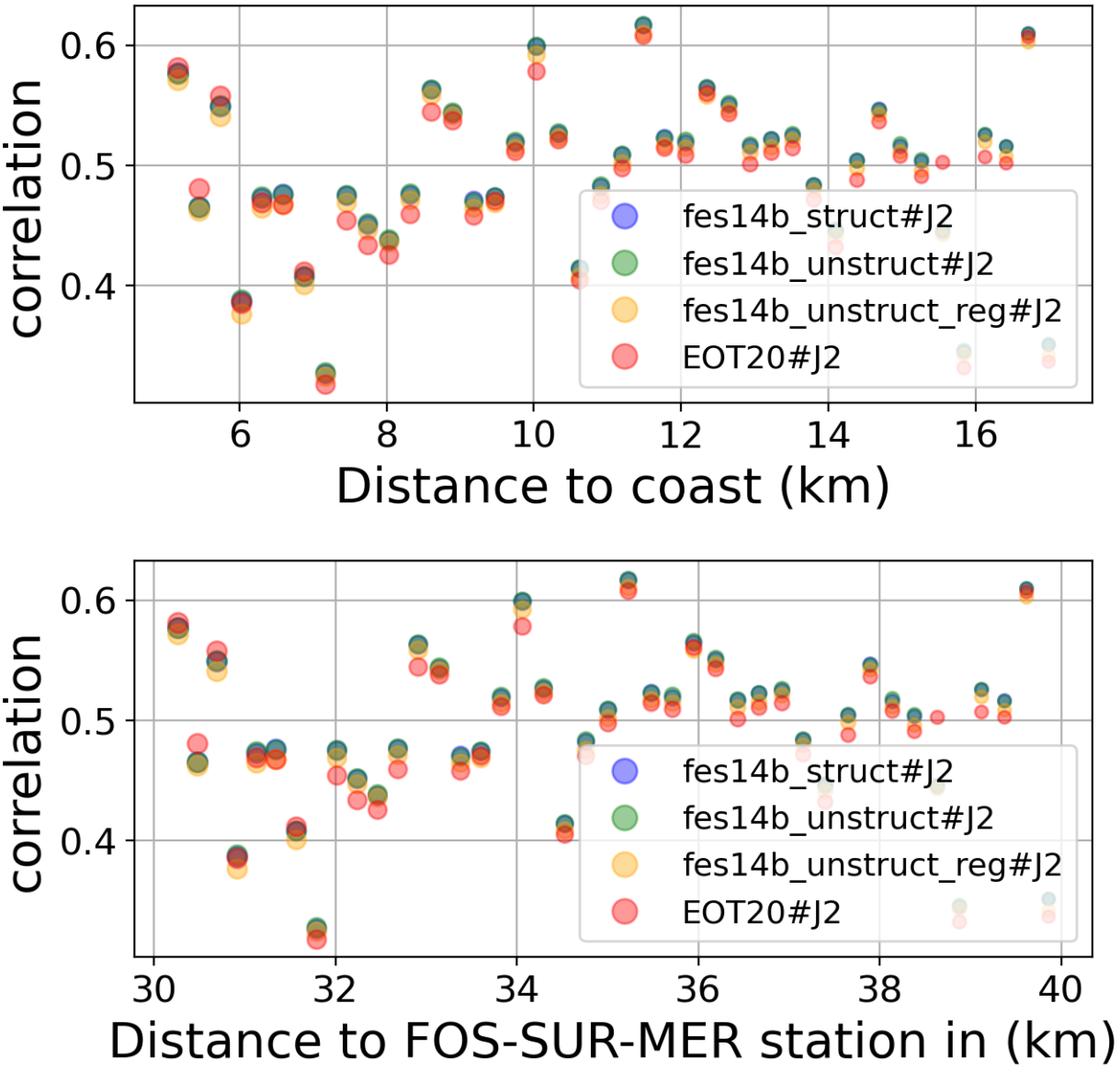

Figure 180 – Correlation in function of the distance to the coast/FOS-SUR-MER station

6.11.8 Taylor Diagram

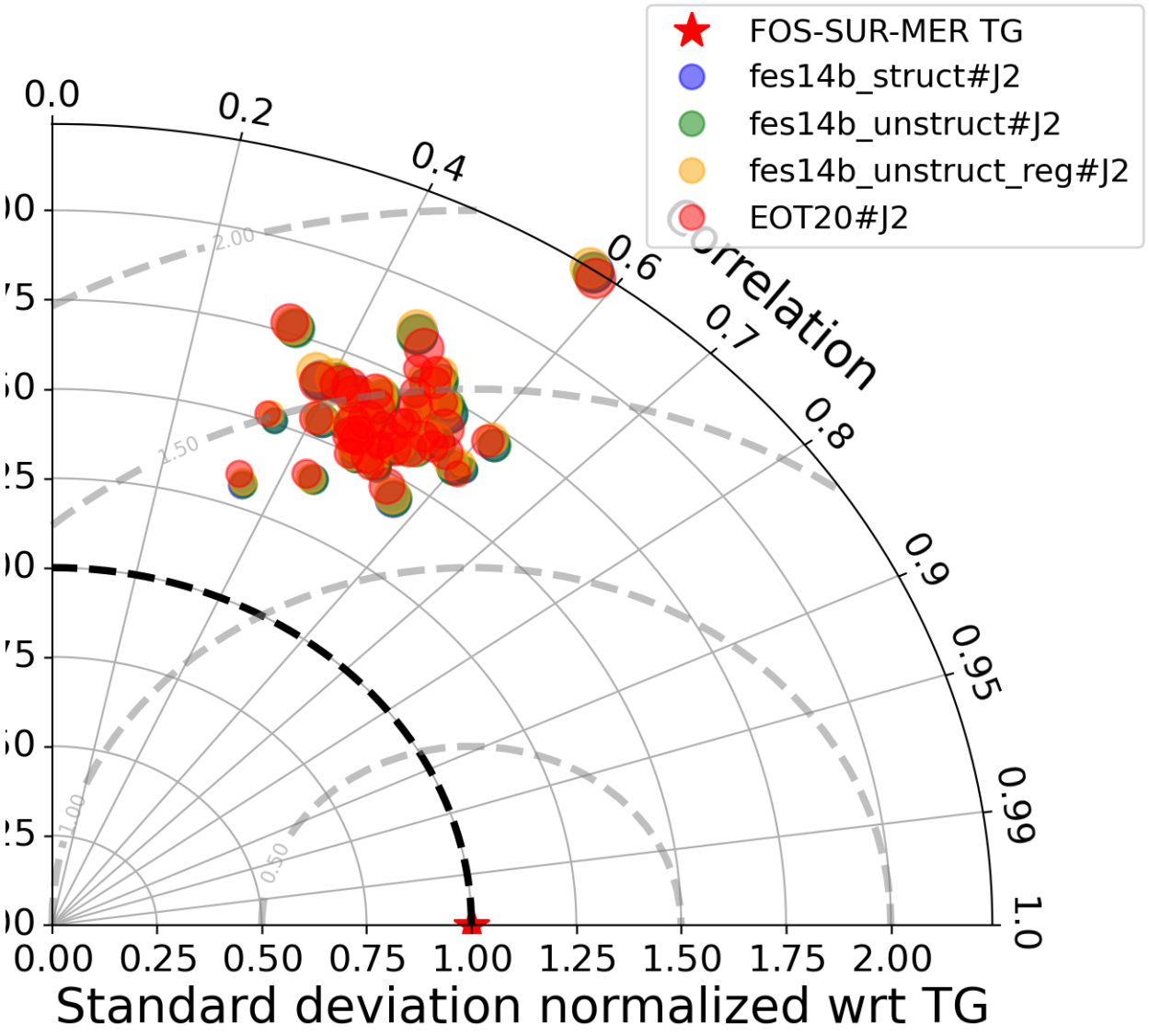

Figure 181 – Taylor diagram

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)
fes14b_struct#J2	92.071	0.494	0.107	0.094
fes14b_unstruct#J2	92.071	0.495	0.107	0.094
fes14b_unstruct_reg#J2	92.071	0.488	0.108	0.095
EOT20#J2	92.094	0.486	0.108	0.095

FIGURE 182 – 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.

	Dist2station (km)	Dist2coast (km)	Valid data (%)	Correlation	std (m)
TG	-	-	-	-	0.067
fes14b_struct#J2	35.229	11.481	98.058	0.617	0.114
fes14b_unstruct#J2	35.229	11.481	98.058	0.618	0.114
fes14b_unstruct_reg#J2	35.229	11.481	98.058	0.61	0.114
EOT20#J2	35.229	11.481	98.058	0.608	0.114

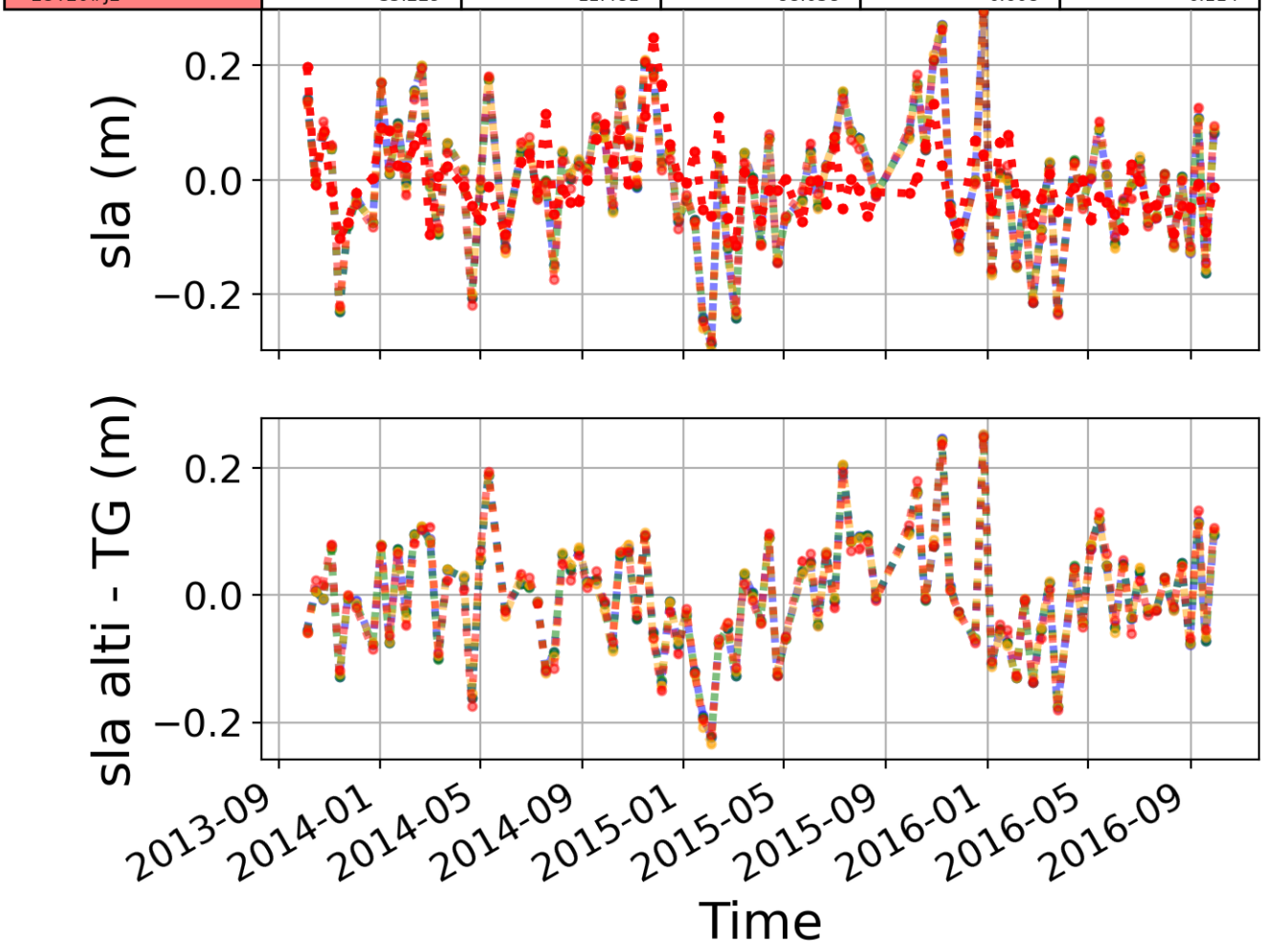

FIGURE 183 – The 1st most correlated sla altimetry Time serie with tide gauge sla time serie

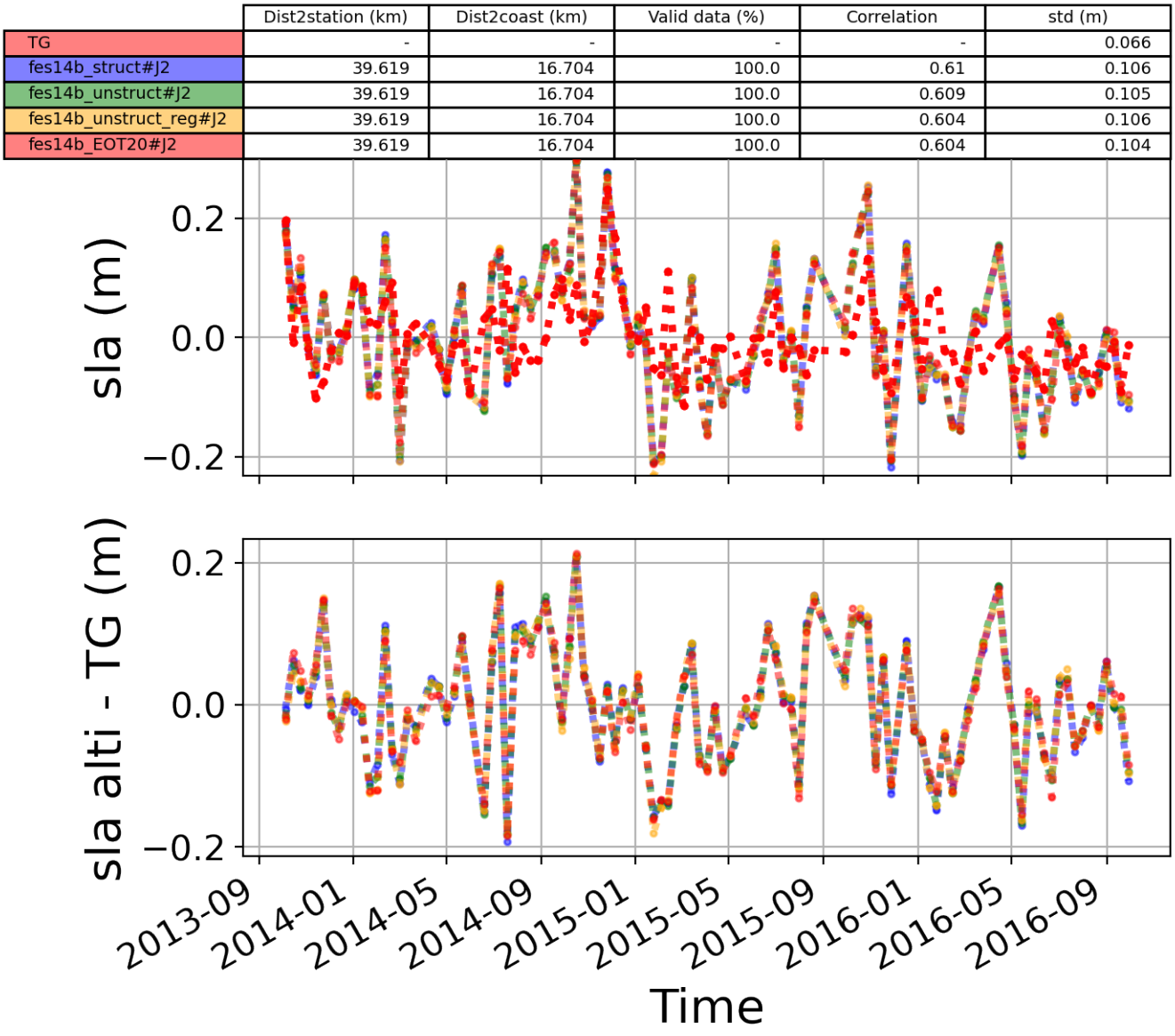

FIGURE 184 – The 2nd most correlated sla altimetry Time serie with tide gauge sla time serie