

DIAGTOOL REPORT



**Round Robin (GT cotier) : Tide. global. J2. fes14b
struct vs fes14b unstruct 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 global
- 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.ALT.PO_E_GDR_E -
RANGE.ALT -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALT.NON_PARAMETRIC -
IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -
DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
OCEAN_TIDE_HEIGHT.MODEL.FES14B -
SOLID_EARTH_TIDE_HEIGHT.MODEL.CARTWRIGHT_TAYLER_71 -
POLE_TIDE_HEIGHT.MODEL.DESAI_2015_MPL2017

2.1.2 fes14b_unstruct product ' sla

sla = ORBIT.ALT.PO_E_GDR_E -
RANGE.ALT -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALT.NON_PARAMETRIC -
IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -
DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
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 EOT20 product ' sla

sla = ORBIT.ALT.PO_E_GDR_E -
RANGE.ALT -
MEAN_SEA_SURFACE.MODEL.CNESCLS15 -
SEA_STATE_BIAS.ALT.NON_PARAMETRIC -
IONOSPHERIC_CORRECTION.MODEL.GIM -
WET_TROPOSPHERIC_CORRECTION.RAD -
DRY_TROPOSPHERIC_CORRECTION.MODEL.ECMWF_GAUSS -

DYNAMICAL_ATMOSPHERIC_CORRECTION.MODEL.MOG2D_HR -
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 satellite times it's velocity.

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

2.3 Filtering

- The sla has been filtered by a threshold of 3 m.
- Each sla time-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 Tide

3.1.1 Tide 's count

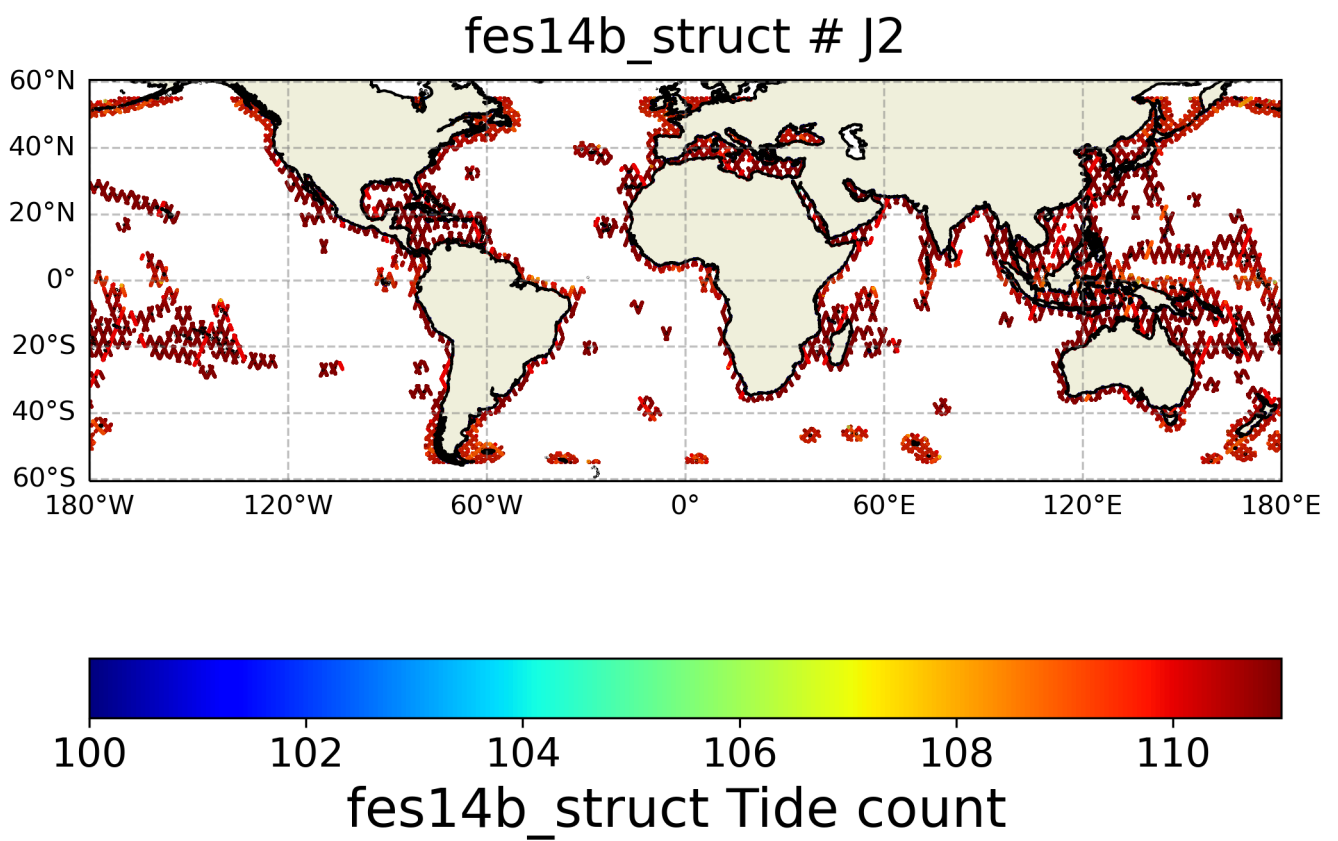


FIGURE 1 – Spatial coherence analysis of the count of the fes14b_struct version of Tide variable

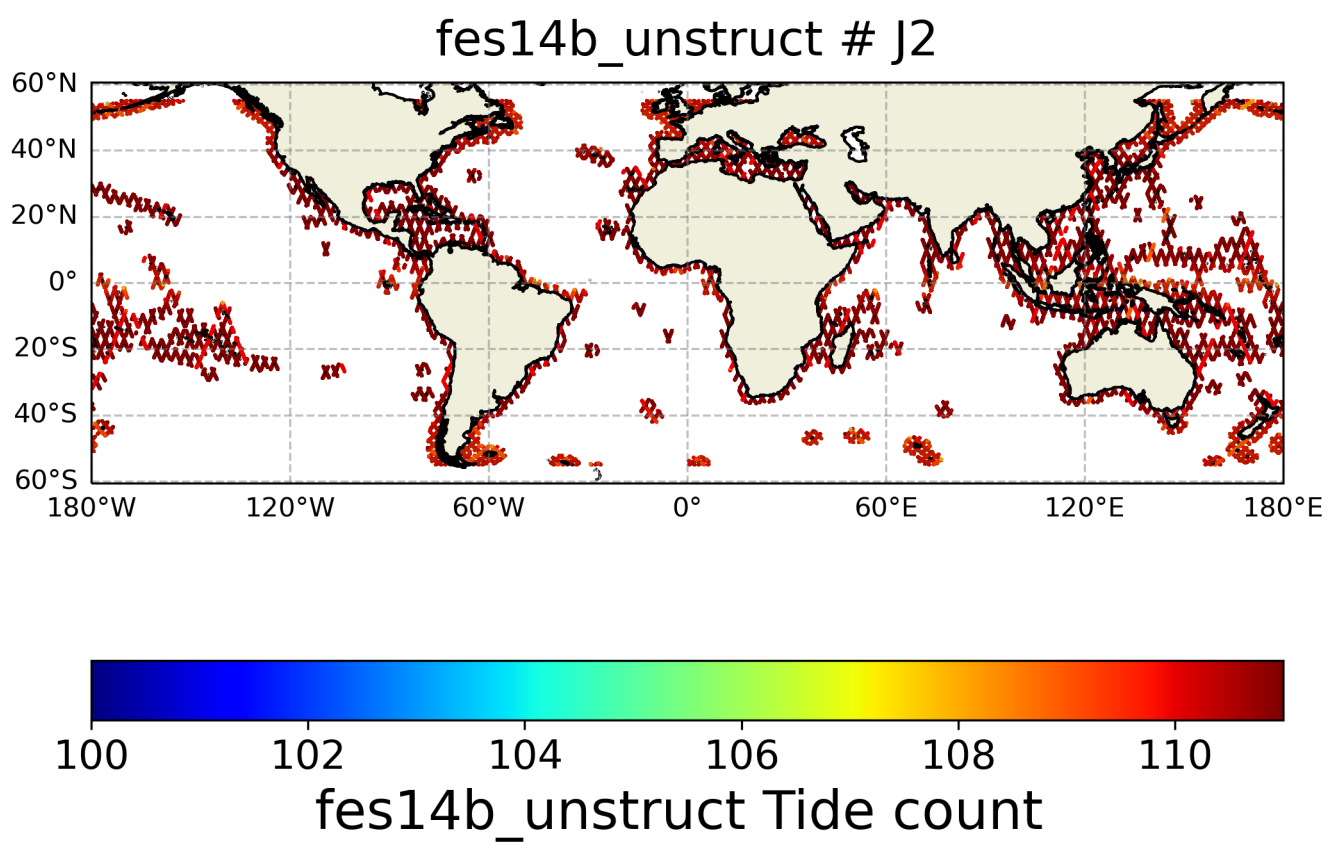


FIGURE 2 – Spatial coherence analysis of the count of the fes14b_unstruct version of Tide variable

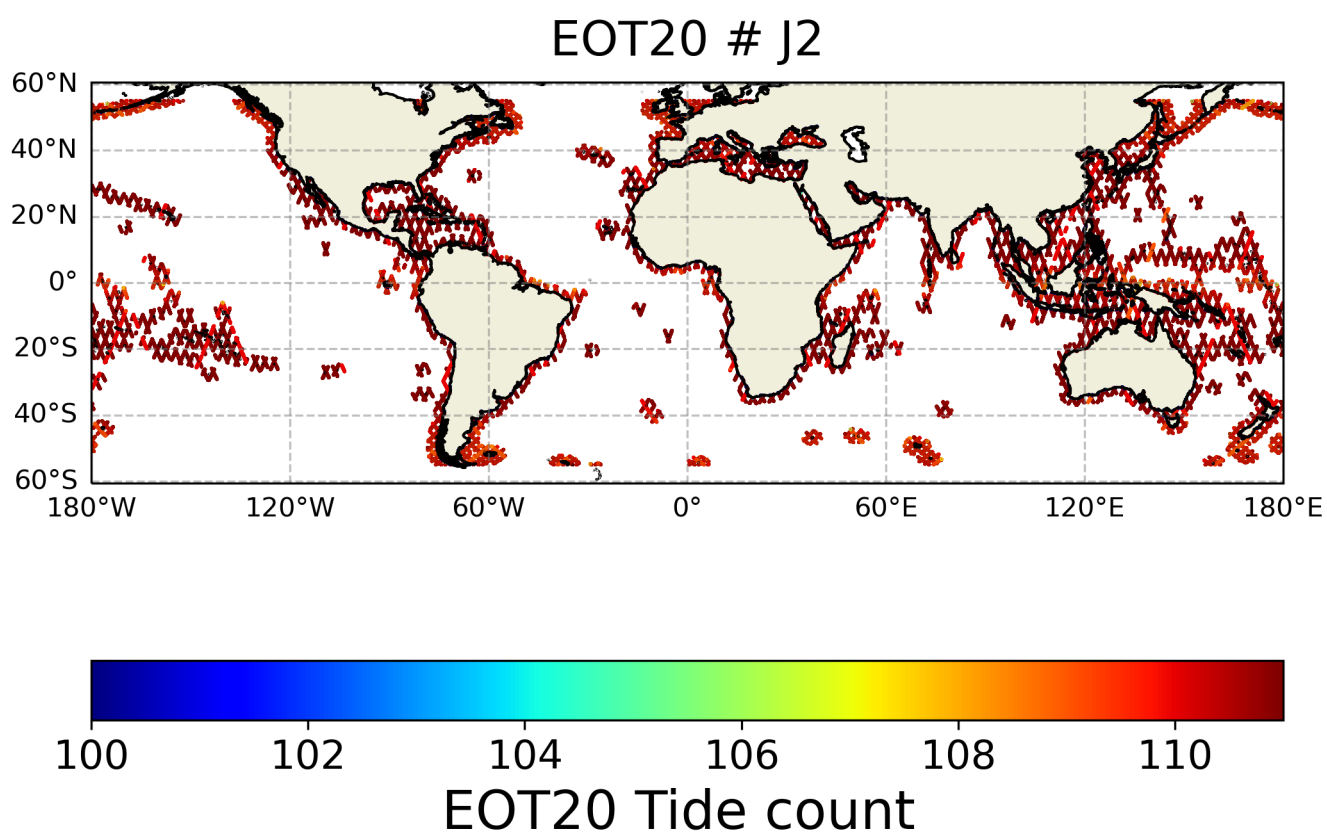


FIGURE 3 – Spatial coherence analysis of the count of the EOT20 version of Tide variable

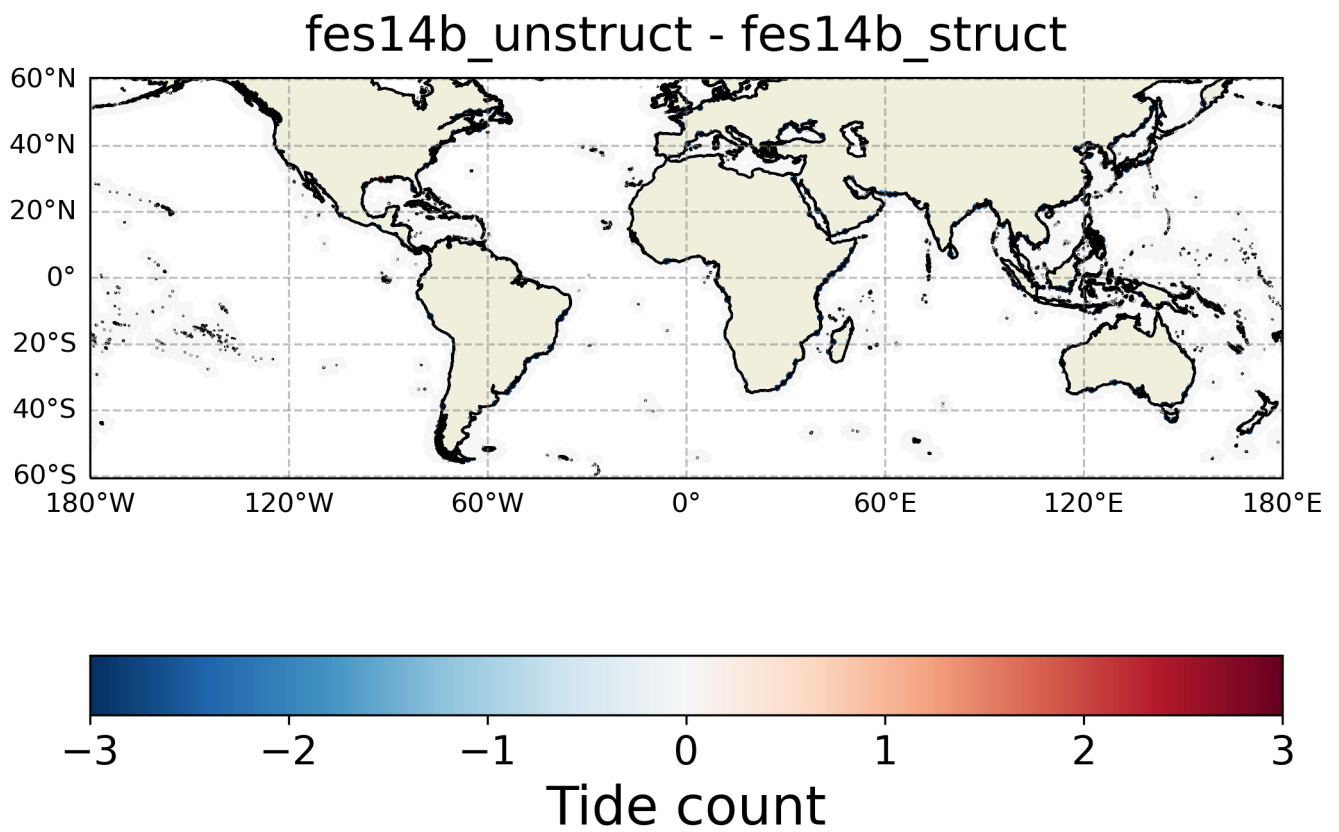


FIGURE 4 – Spatial coherence analysis of the Difference in Tide 's count between fes14b_unstruct and fes14b_struct

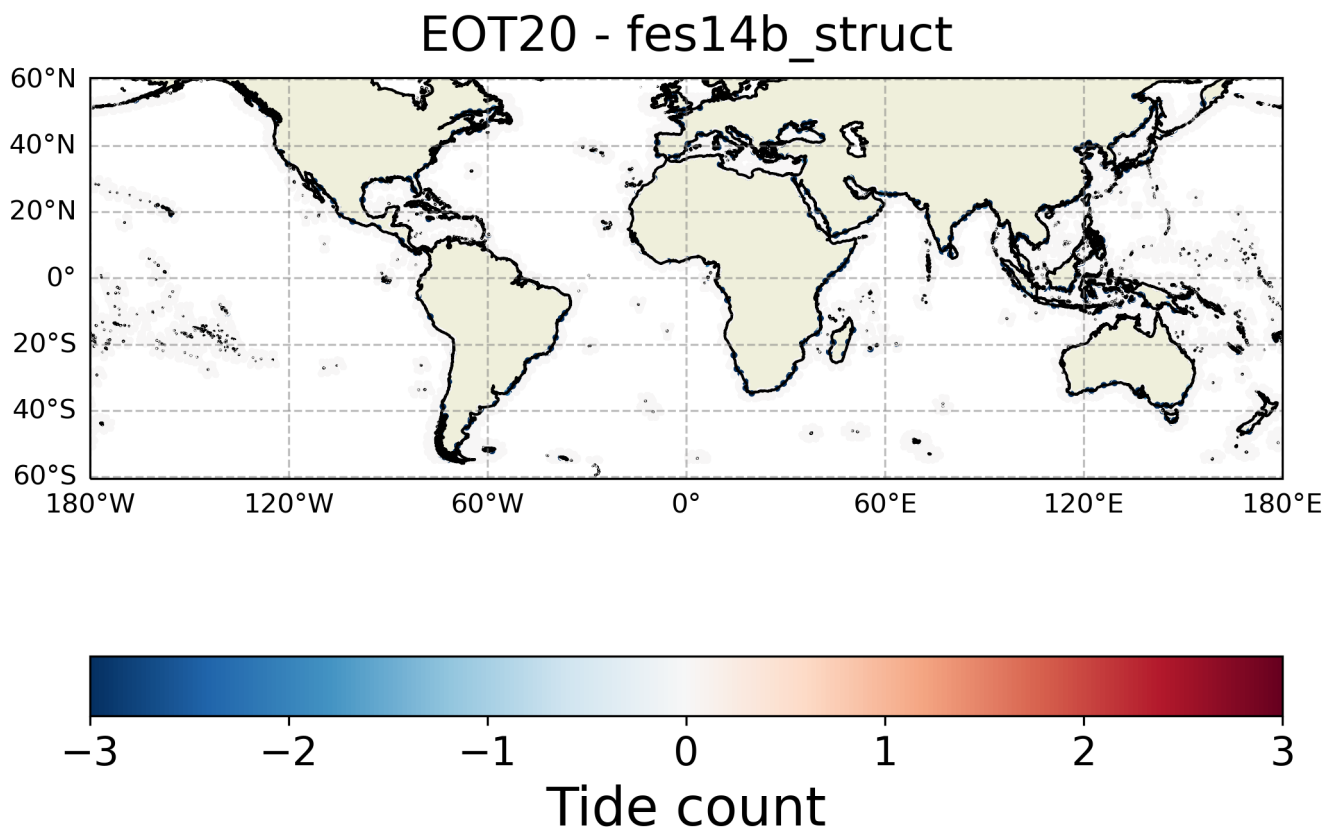


FIGURE 5 – Spatial coherence analysis of the Difference in Tide 's count between EOT20 and fes14b_struct

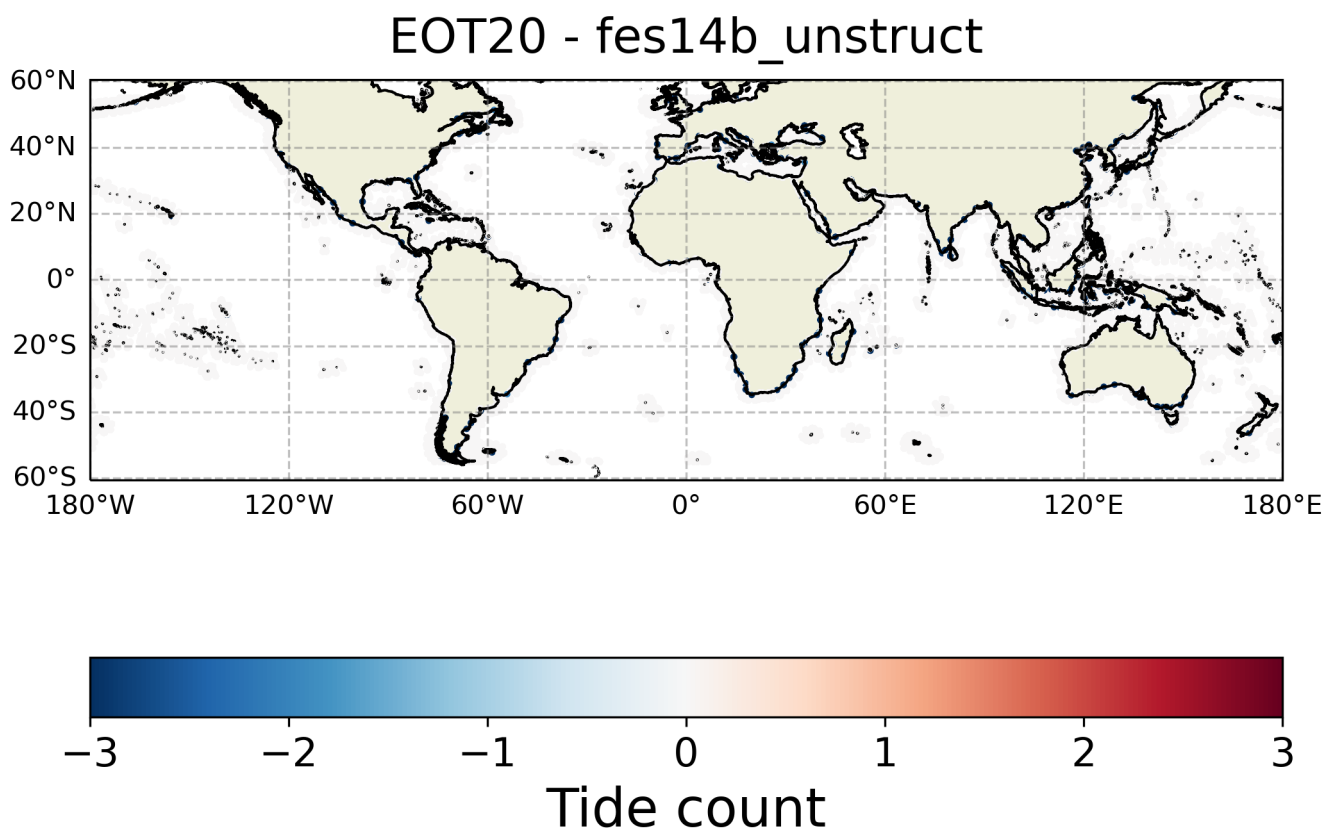


FIGURE 6 – Spatial coherence analysis of the Difference in Tide 's count between EOT20 and fes14b_unstruct

3.1.2 Tide's std

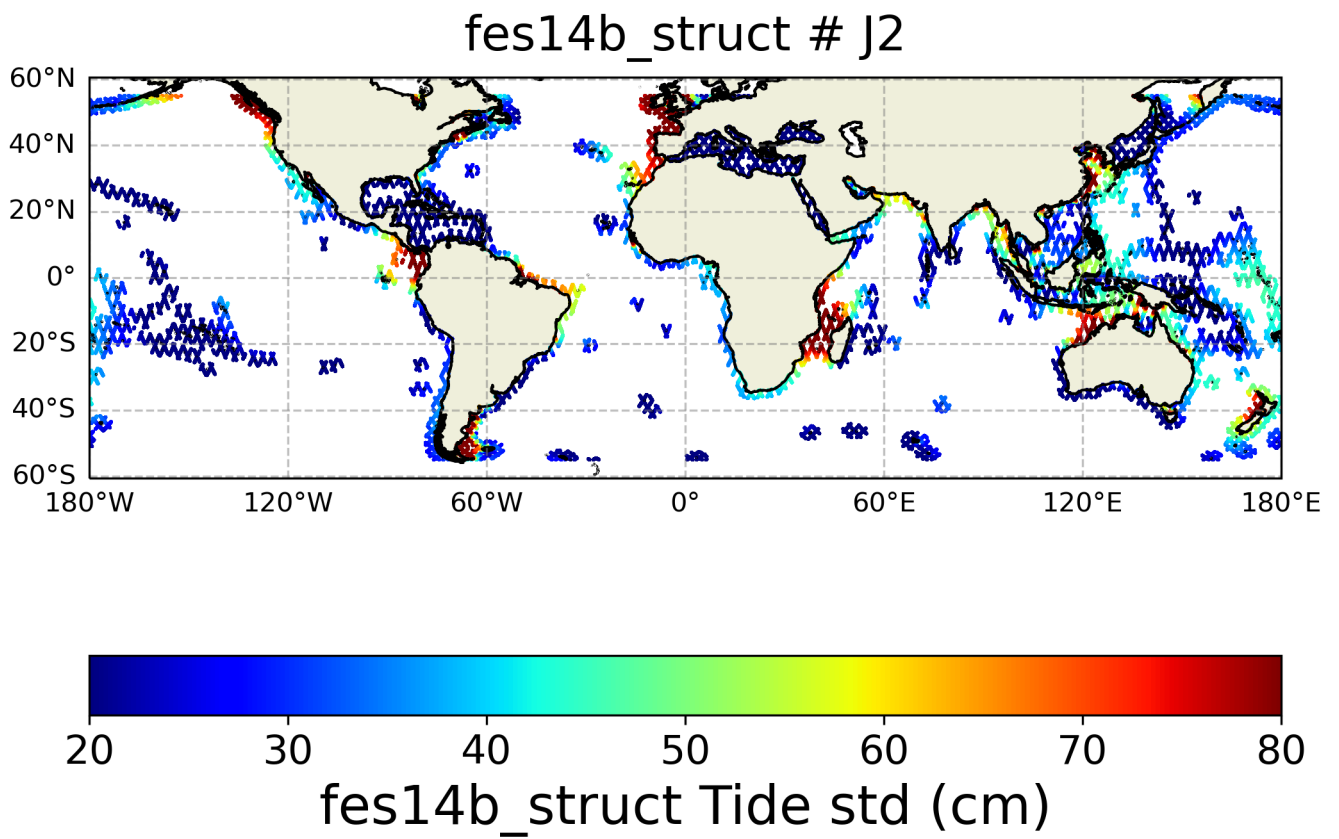


FIGURE 7 – Spatial coherence analysis of the std of the fes14b_struct version of Tide variable

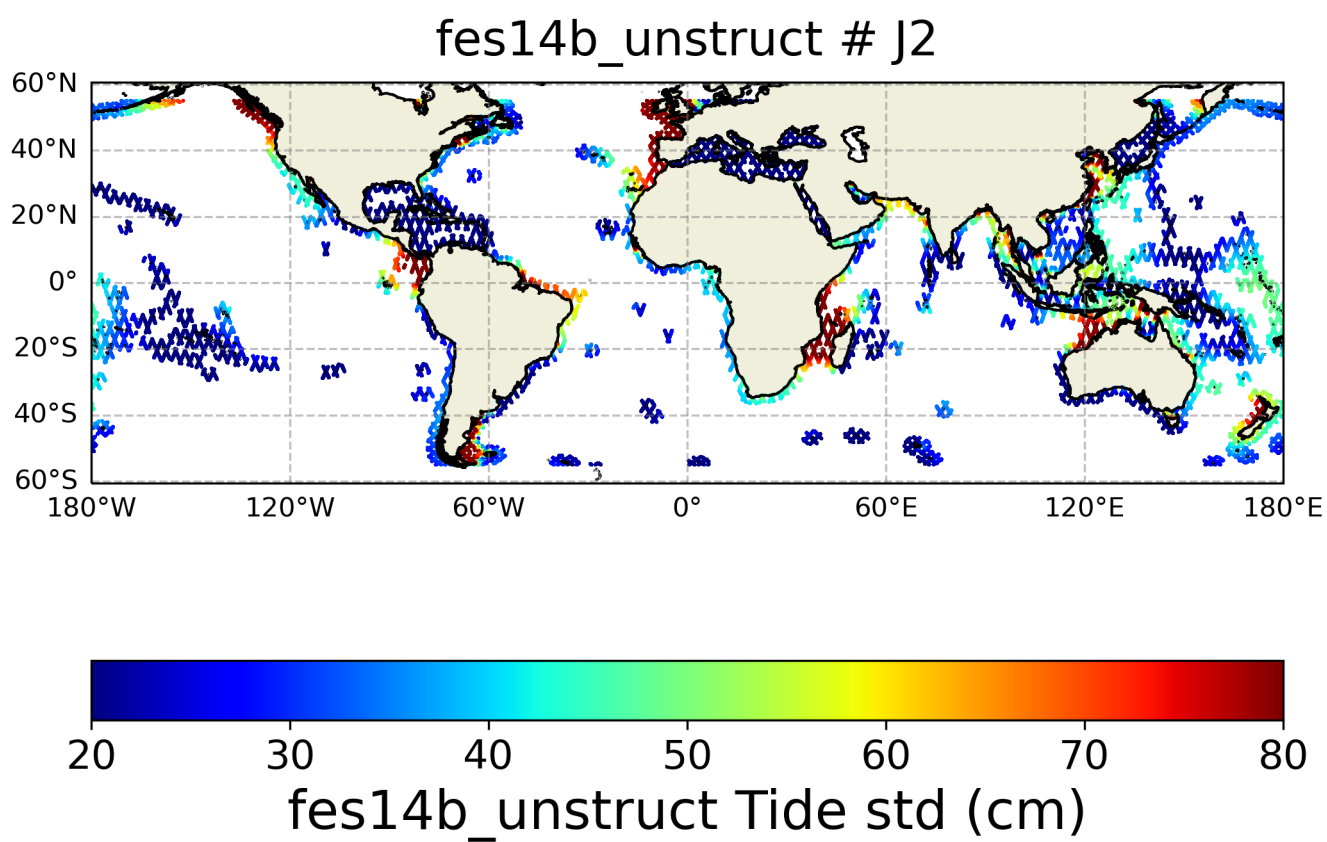


FIGURE 8 – Spatial coherence analysis of the std of the fes14b_unstruct version of Tide variable

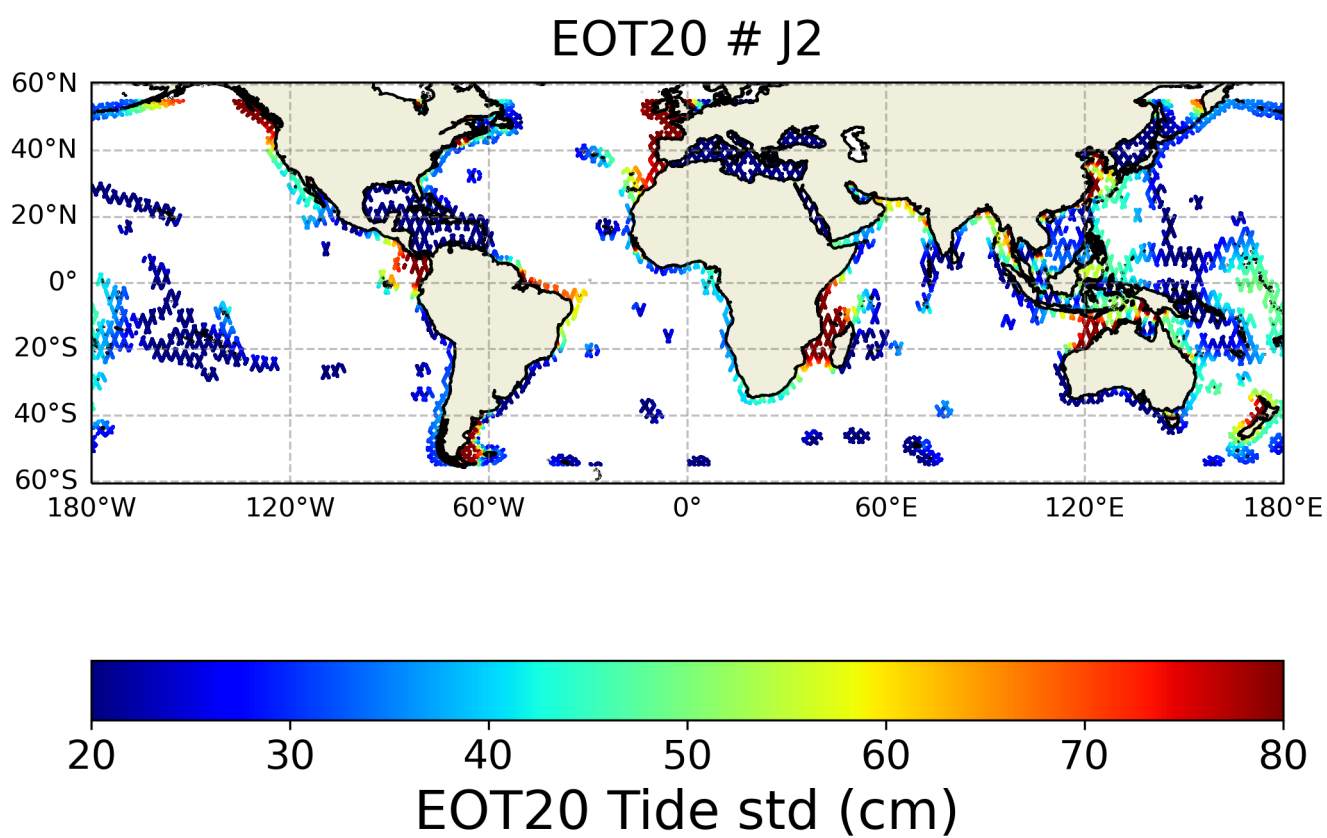


FIGURE 9 – Spatial coherence analysis of the std of the EOT20 version of Tide variable

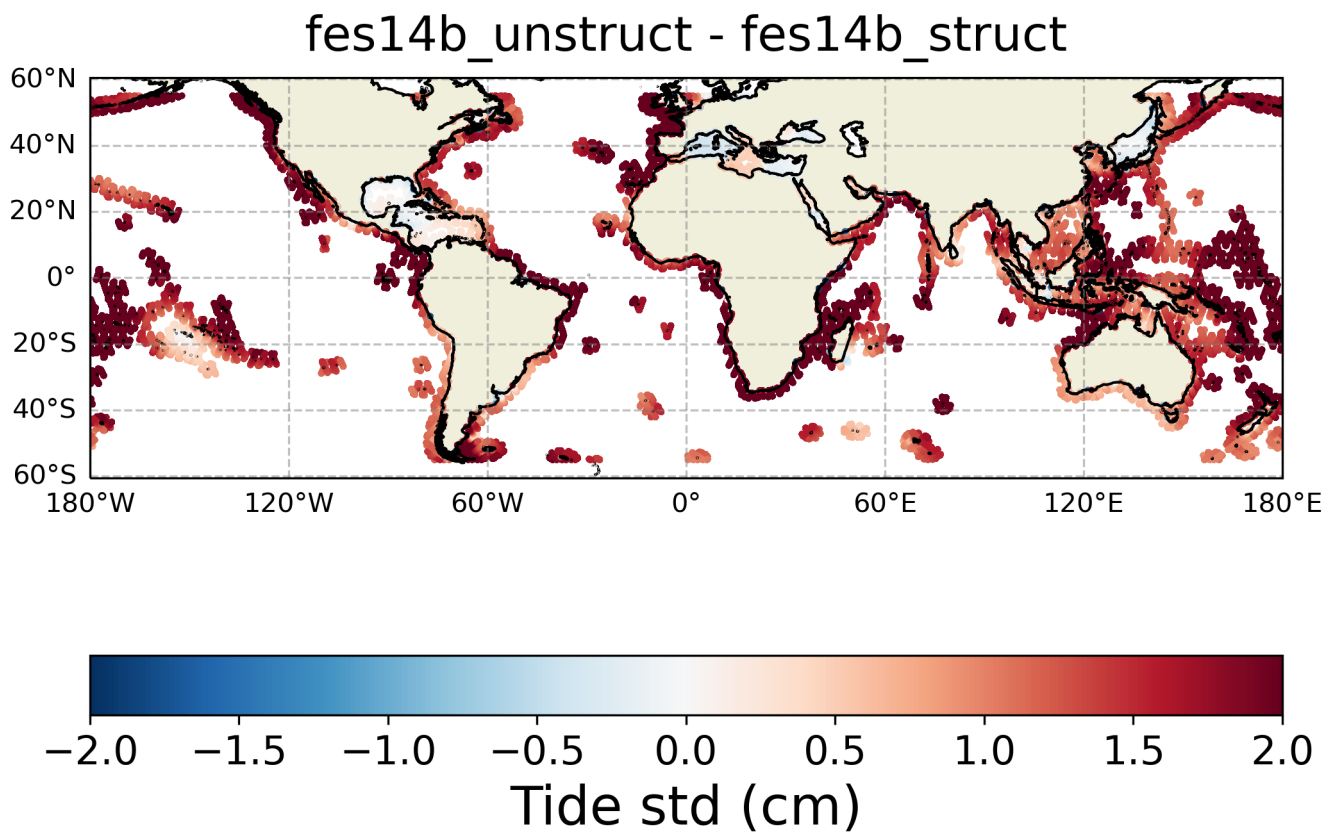


FIGURE 10 – Spatial coherence analysis of the Difference in Tide 's std between fes14b_unstruct and fes14b_struct

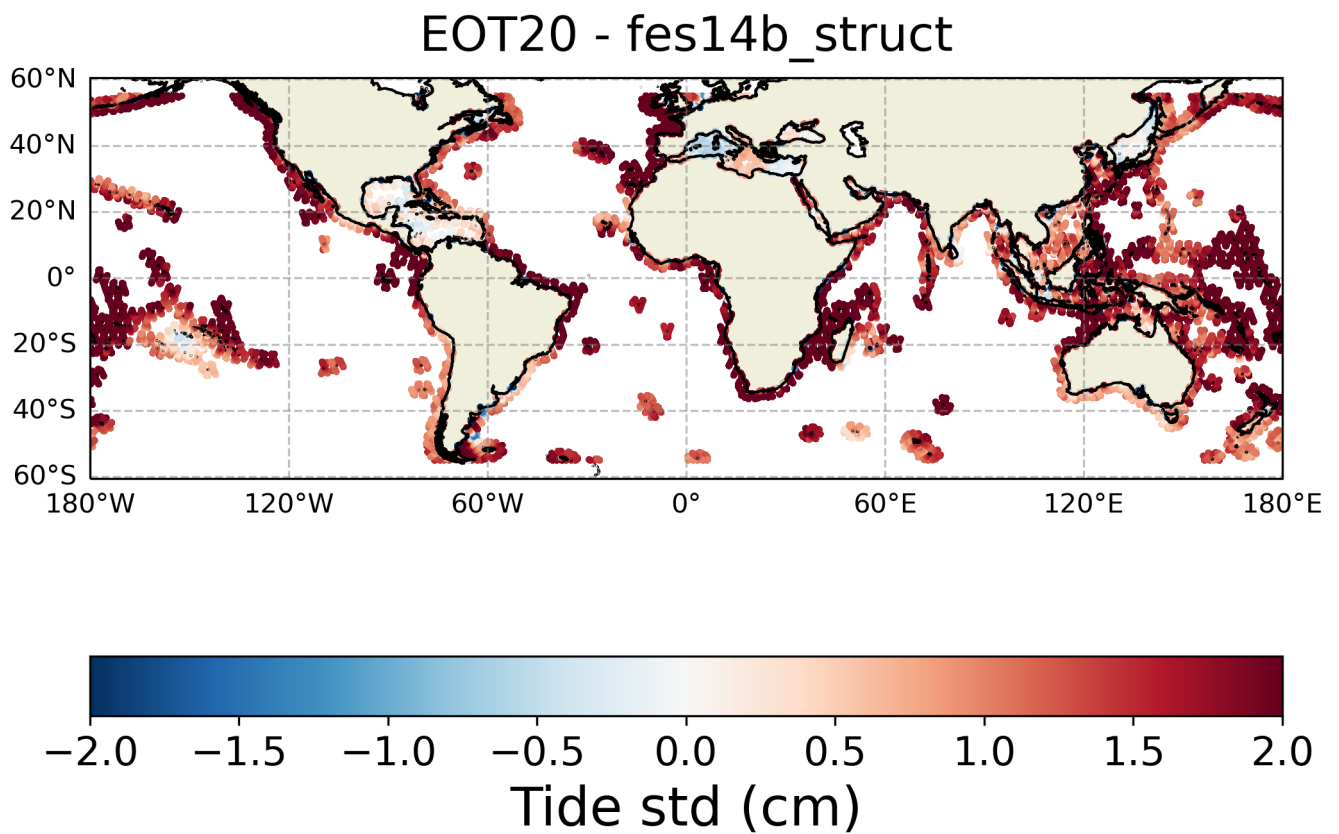


FIGURE 11 – Spatial coherence analysis of the Difference in Tide 's std between EOT20 and fes14b_struct

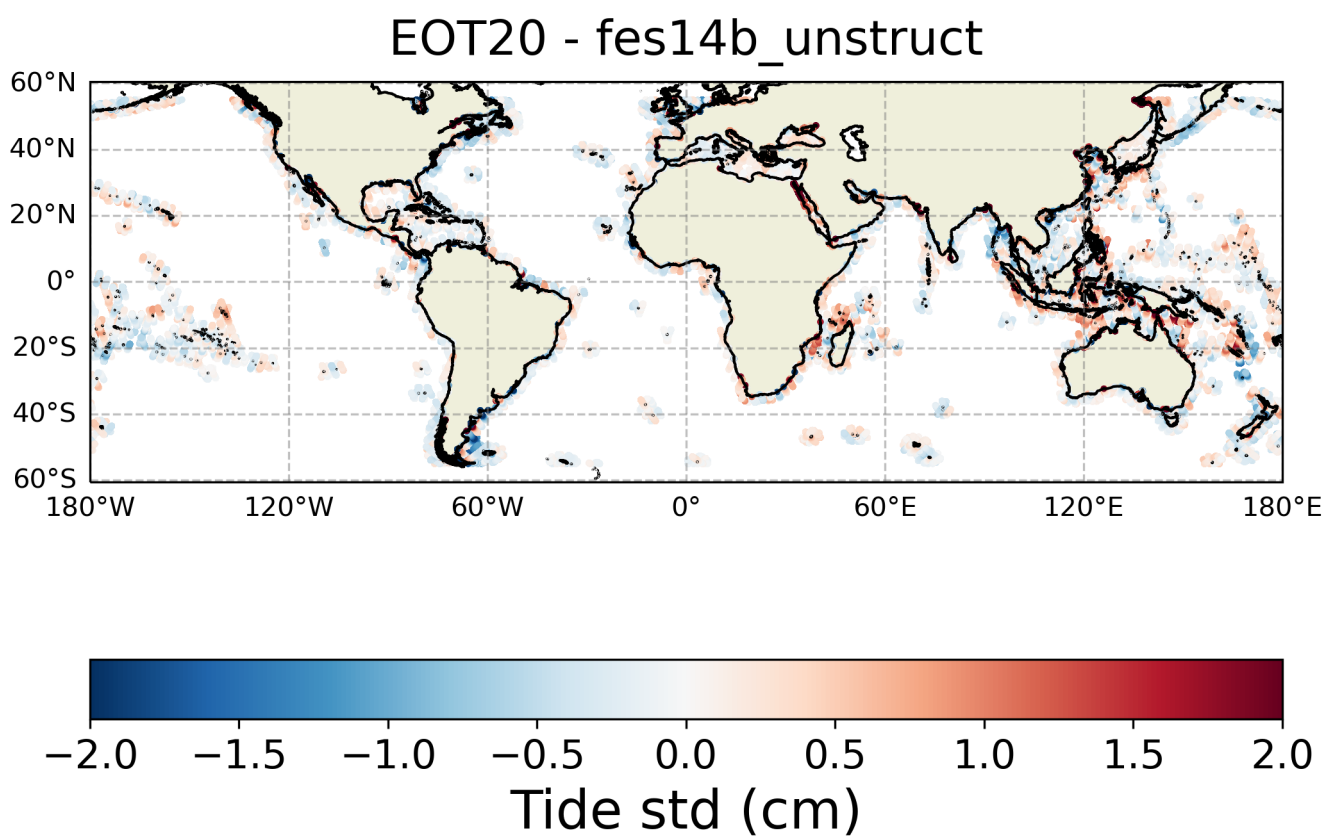


FIGURE 12 – Spatial coherence analysis of the Difference in Tide 's std between EOT20 and fes14b_unstruct

3.1.3 Tide's mean

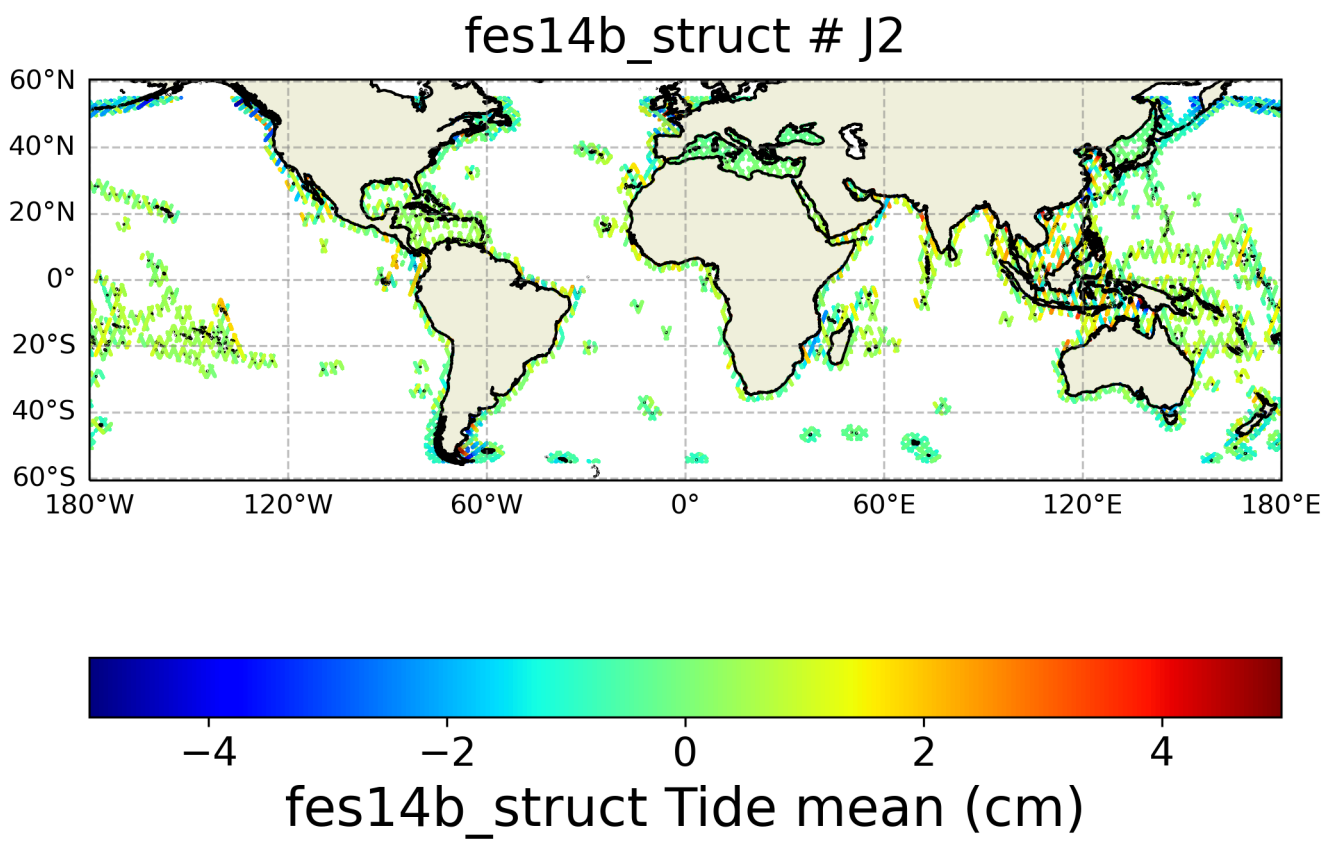


FIGURE 13 – Spatial coherence analysis of the mean of the fes14b_struct version of Tide variable

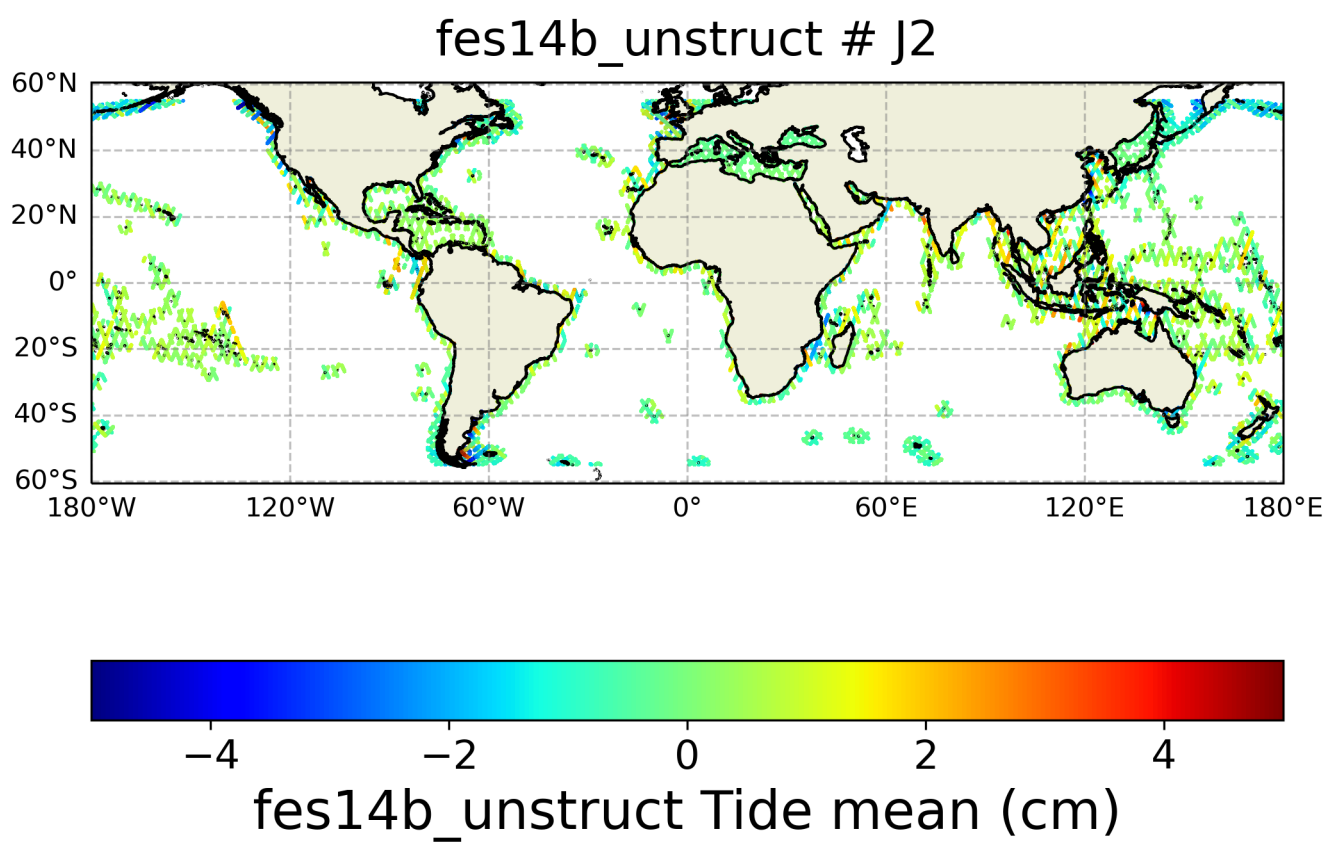


FIGURE 14 – Spatial coherence analysis of the mean of the fes14b_unstruct version of Tide variable

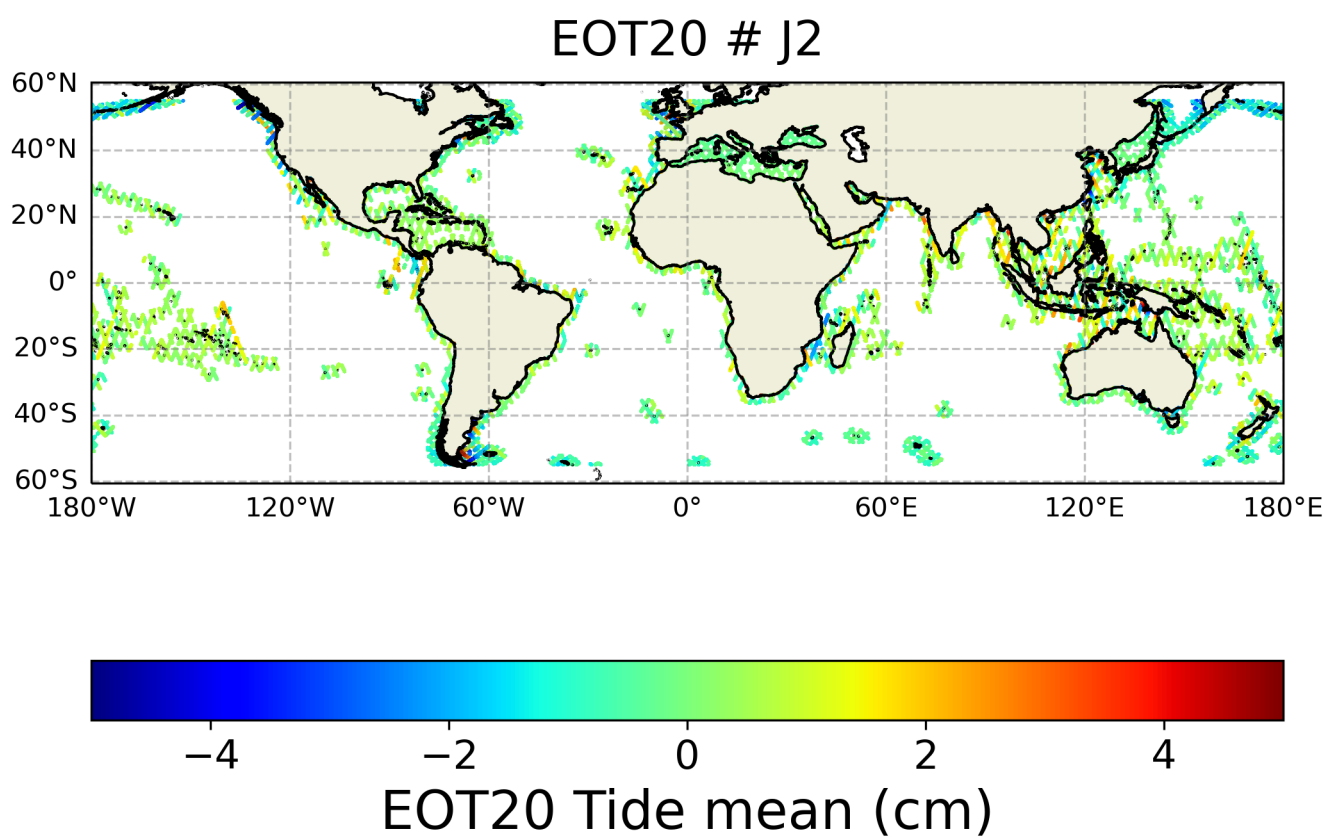


FIGURE 15 – Spatial coherence analysis of the mean of the EOT20 version of Tide variable

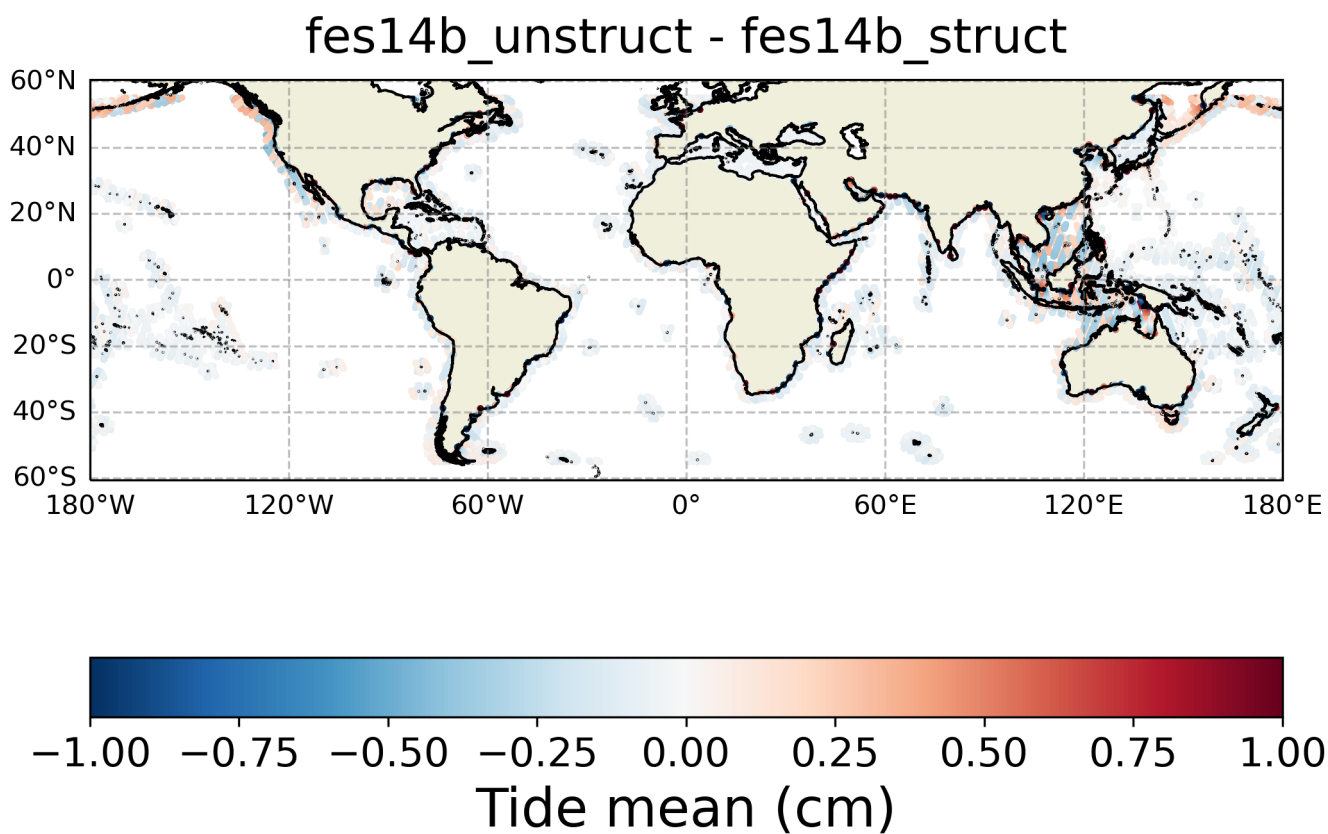


FIGURE 16 – Spatial coherence analysis of the Difference in Tide 's mean between fes14b_unstruct and fes14b_struct

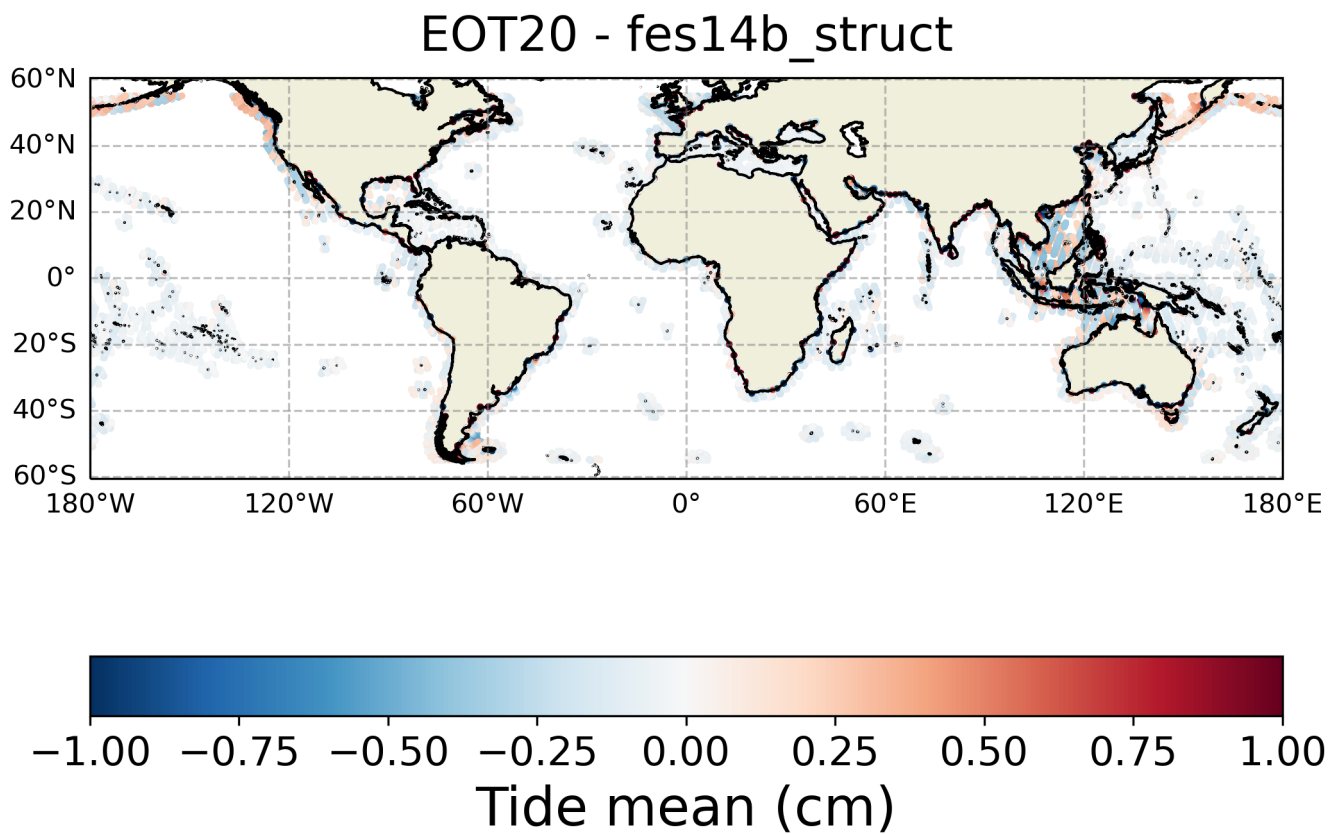


FIGURE 17 – Spatial coherence analysis of the Difference in Tide 's mean between EOT20 and fes14b_struct

EOT20 - fes14b_unstruct

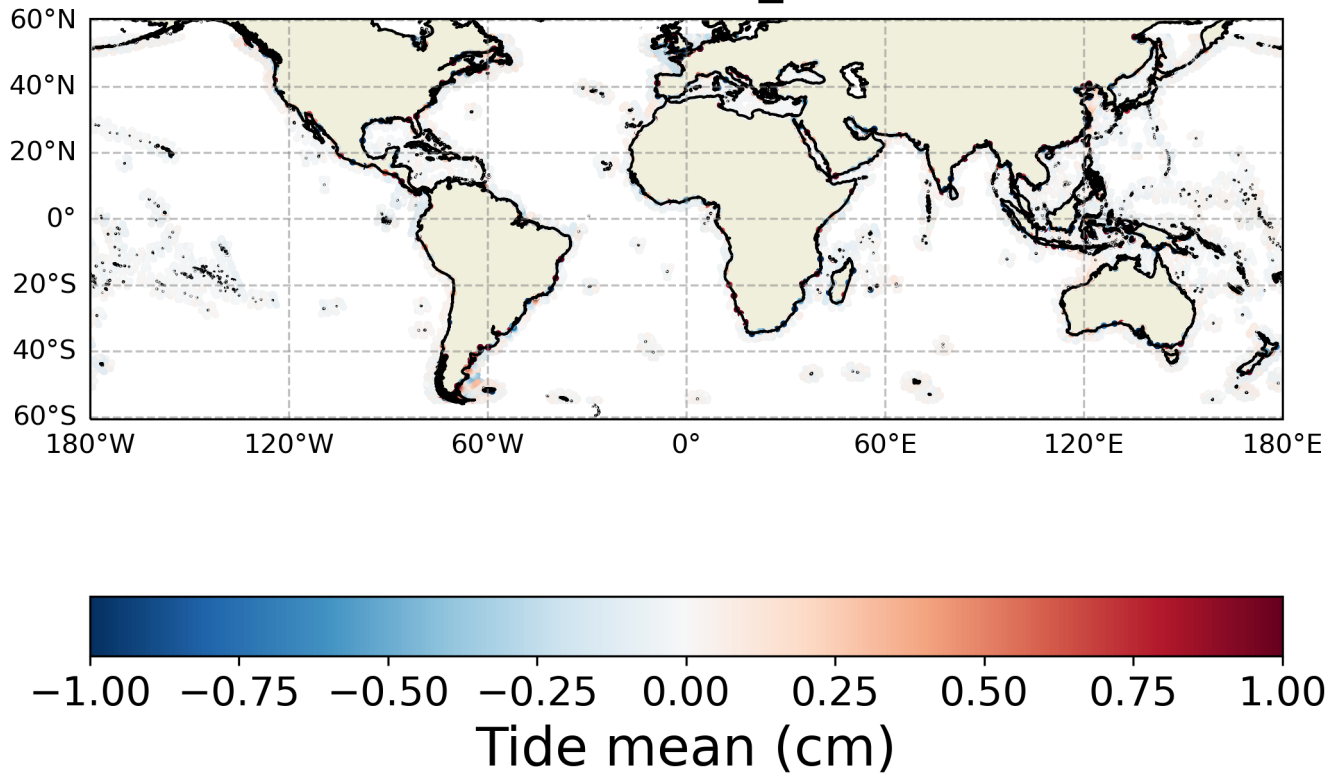


FIGURE 18 – Spatial coherence analysis of the Difference in Tide 's mean between EOT20 and fes14b_unstruct

3.2 sla

3.2.1 sla's count

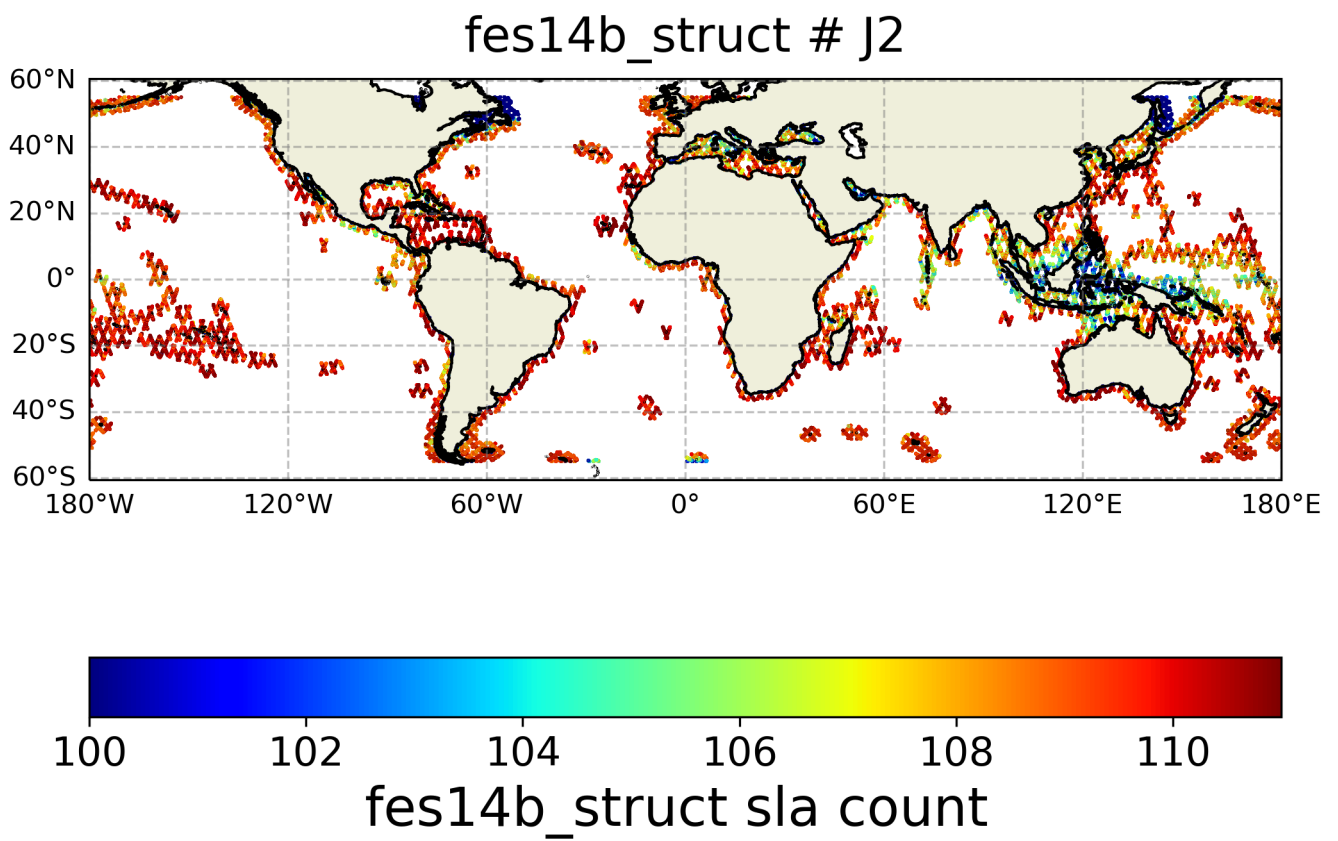


FIGURE 19 – Spatial coherence analysis of the count of the fes14b_struct version of sla variable

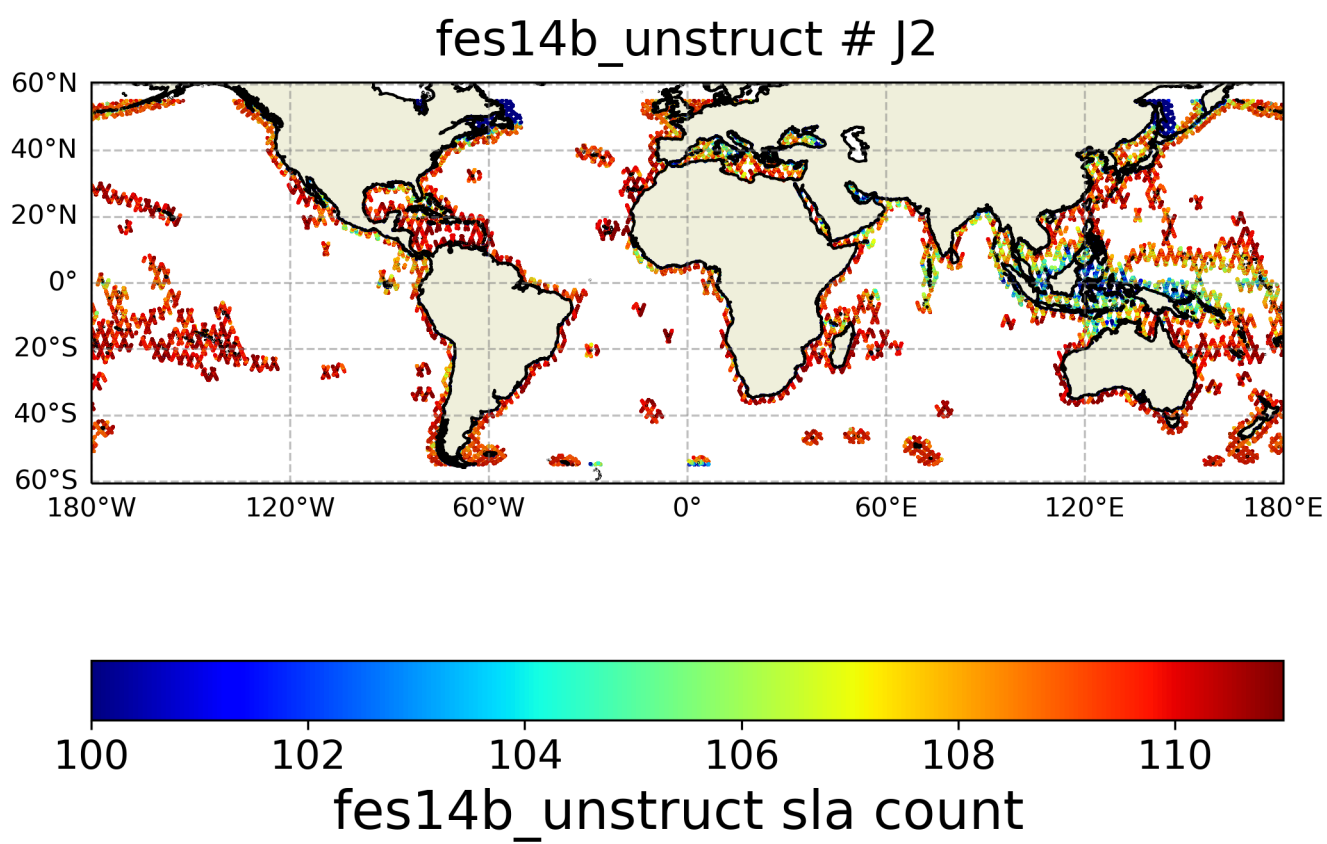


FIGURE 20 – Spatial coherence analysis of the count of the fes14b_unstruct version of sla variable

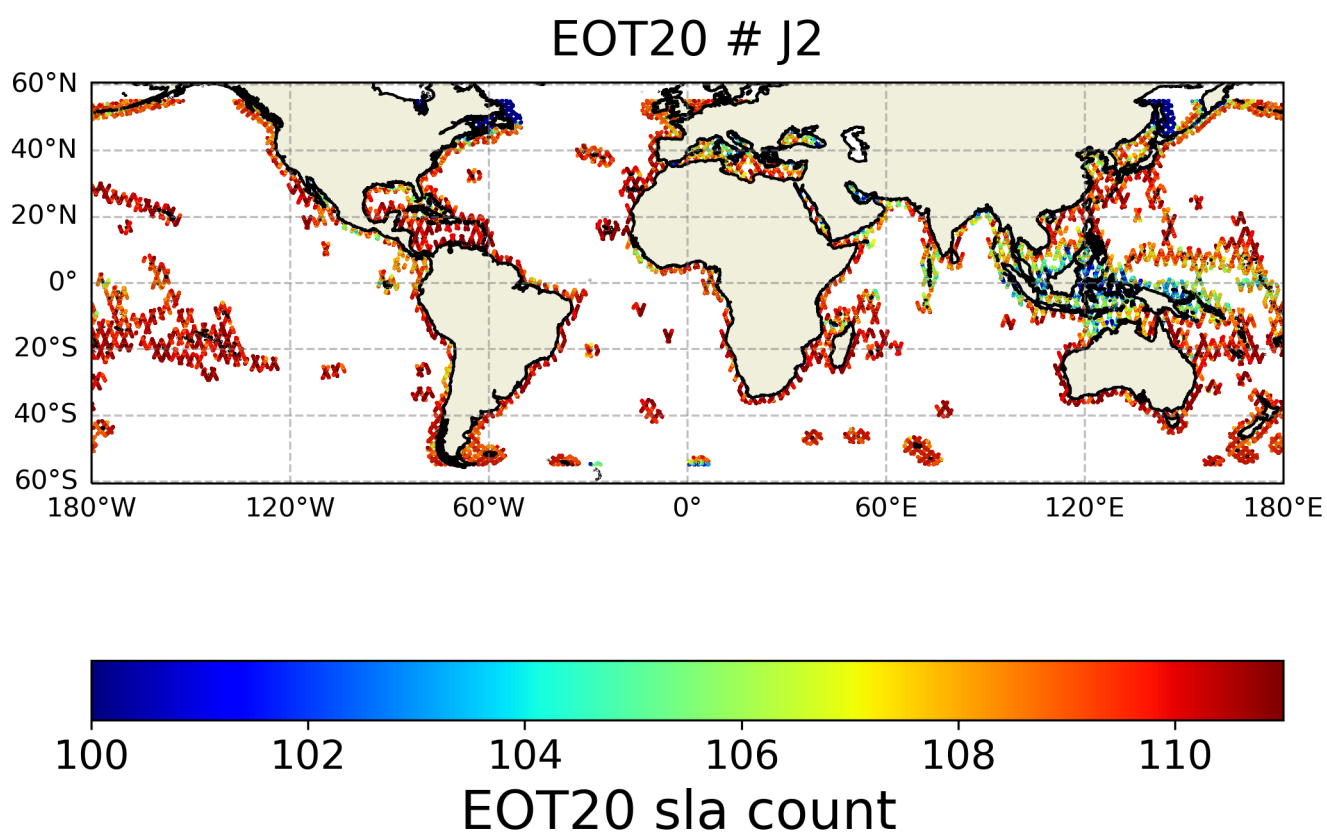


FIGURE 21 – Spatial coherence analysis of the count of the EOT20 version of sla variable

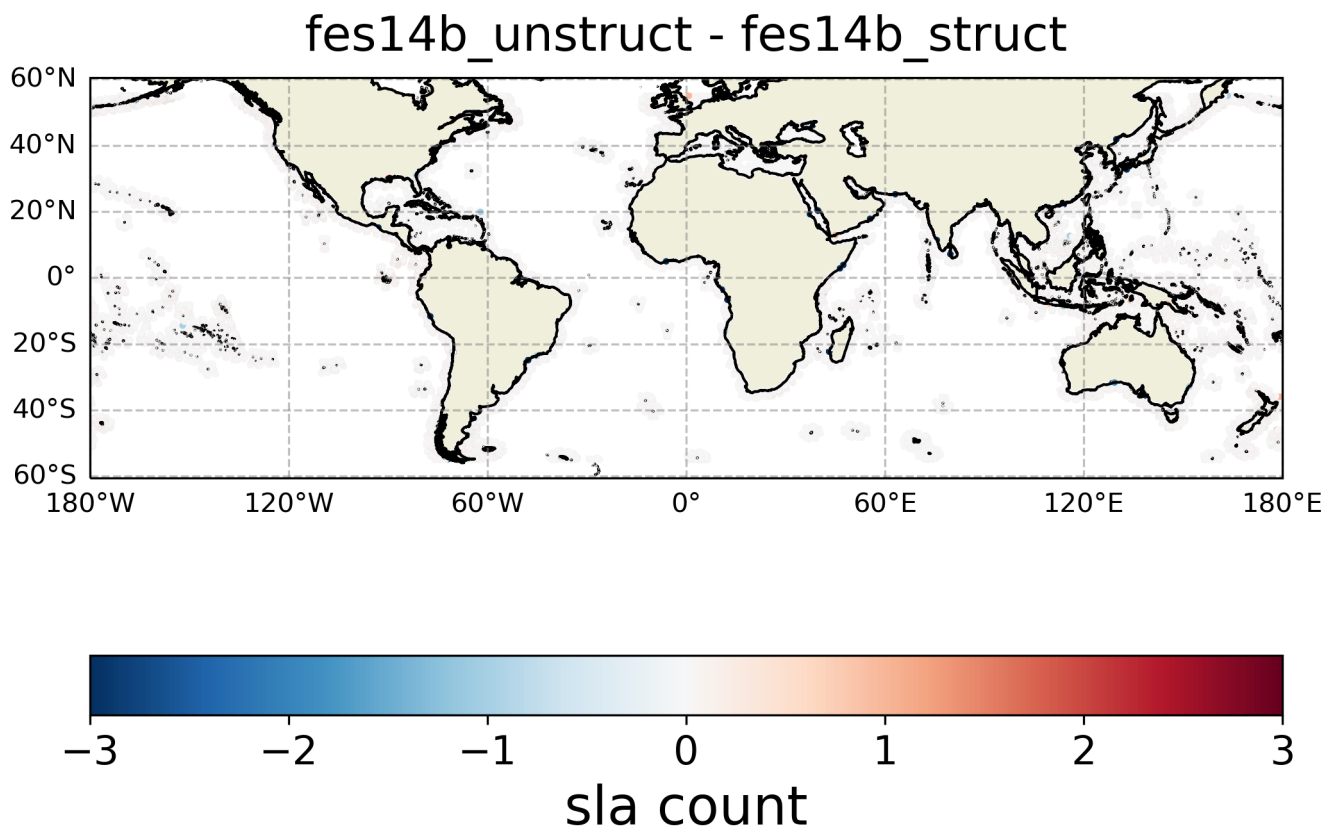


FIGURE 22 – Spatial coherence analysis of the Difference in sla 's count between fes14b_unstruct and fes14b_struct

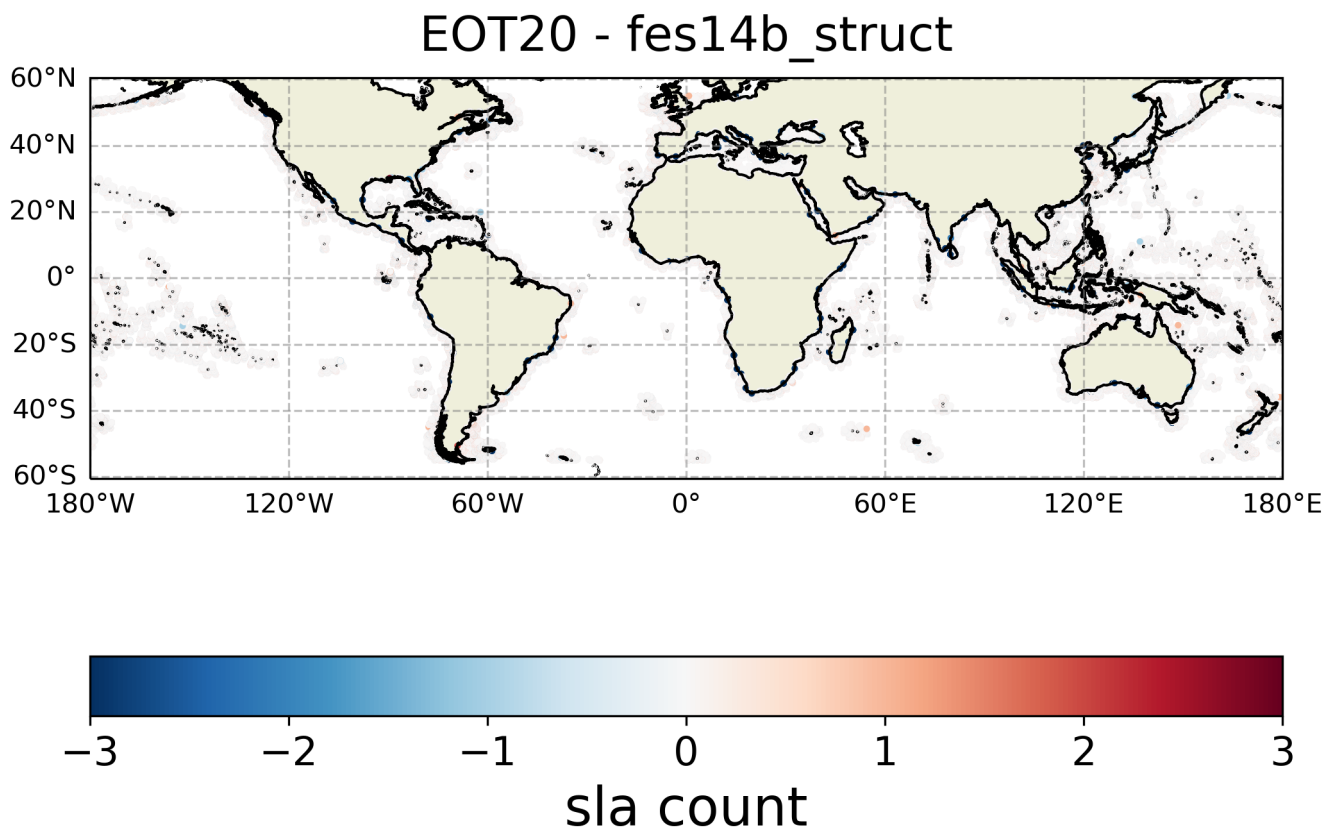


FIGURE 23 – Spatial coherence analysis of the Difference in sla 's count between EOT20 and fes14b_struct

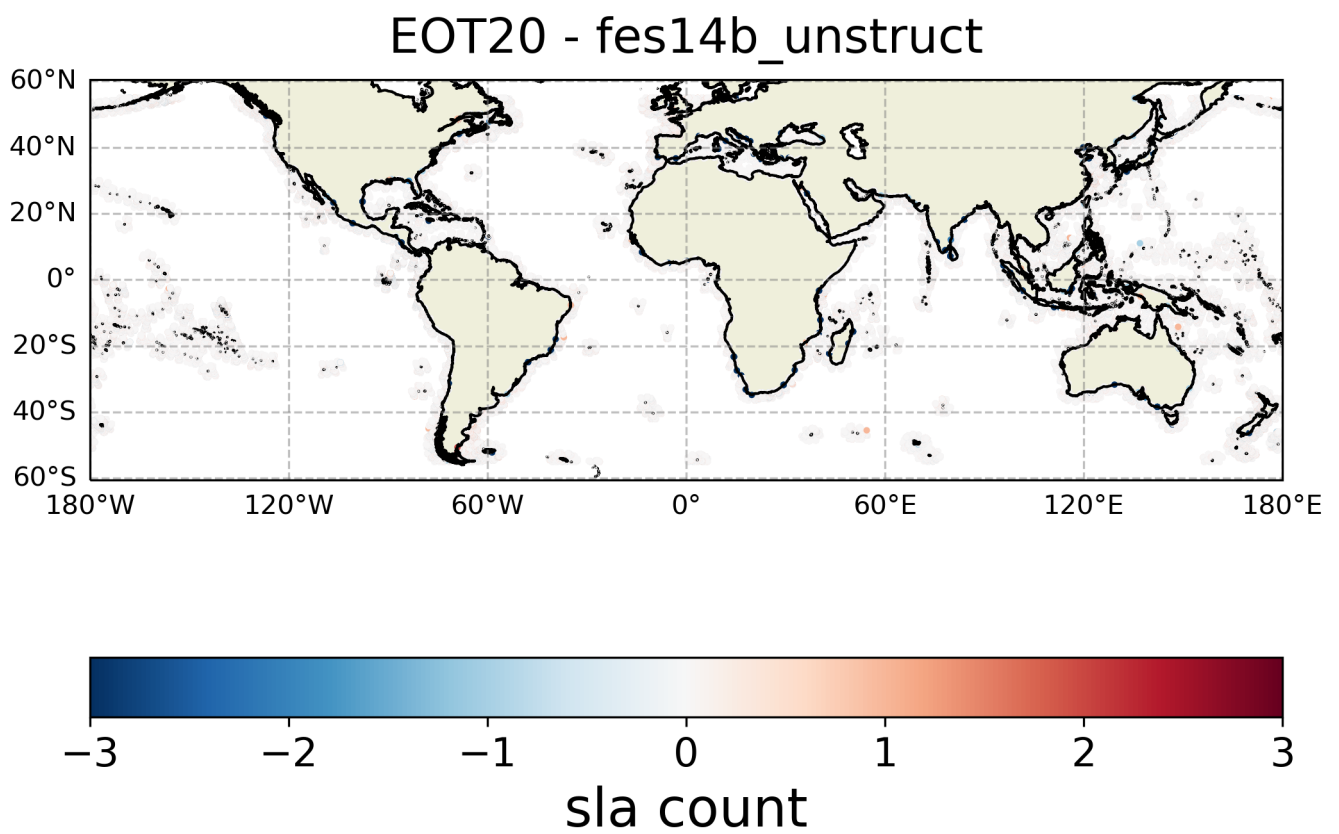


FIGURE 24 – Spatial coherence analysis of the Difference in sla 's count between EOT20 and fes14b_unstruct

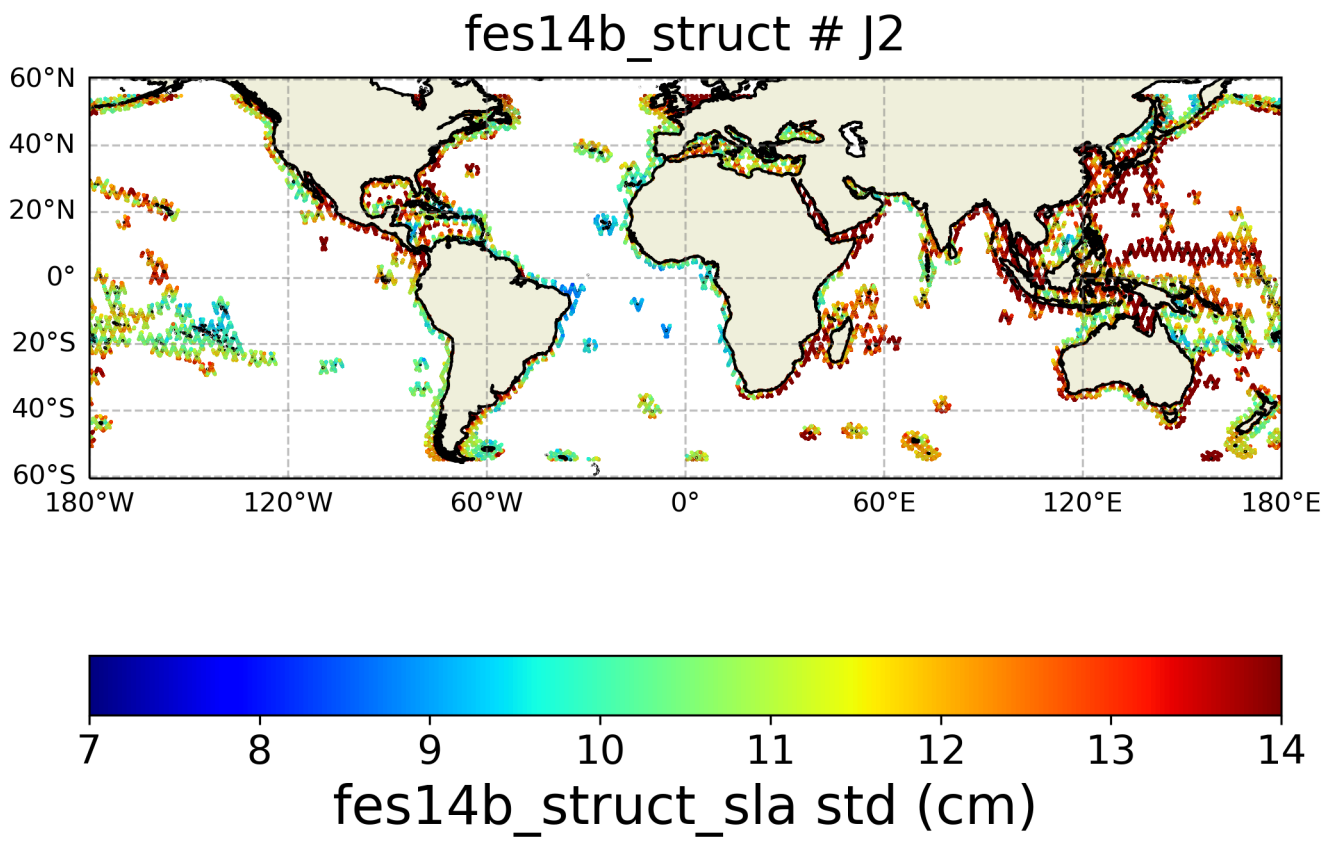


FIGURE 25 – Spatial coherence analysis of the std of the fes14b_struct version of sla variable

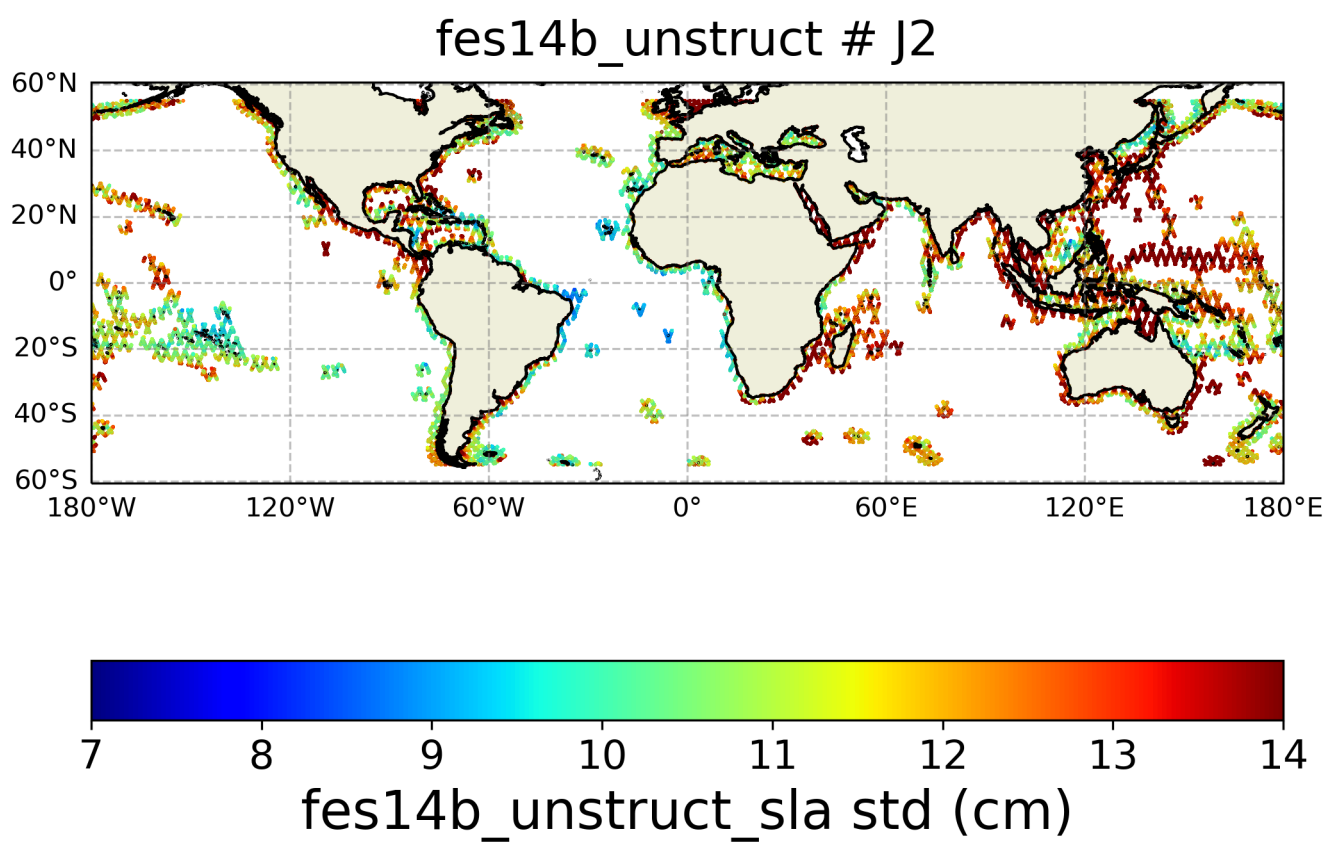


FIGURE 26 – Spatial coherence analysis of the std of the fes14b_unstruct version of sla variable

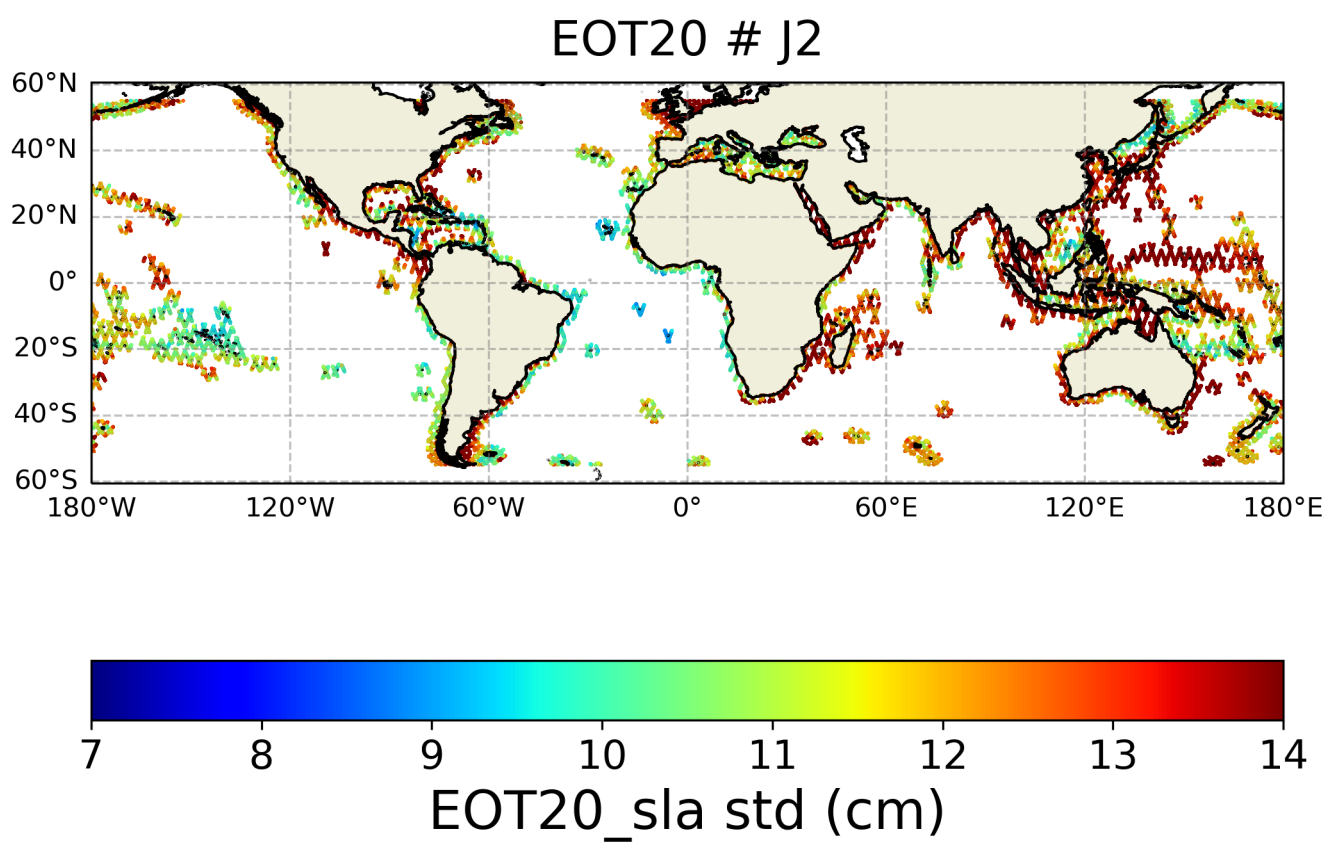


FIGURE 27 – Spatial coherence analysis of the std of the EOT20 version of sla variable

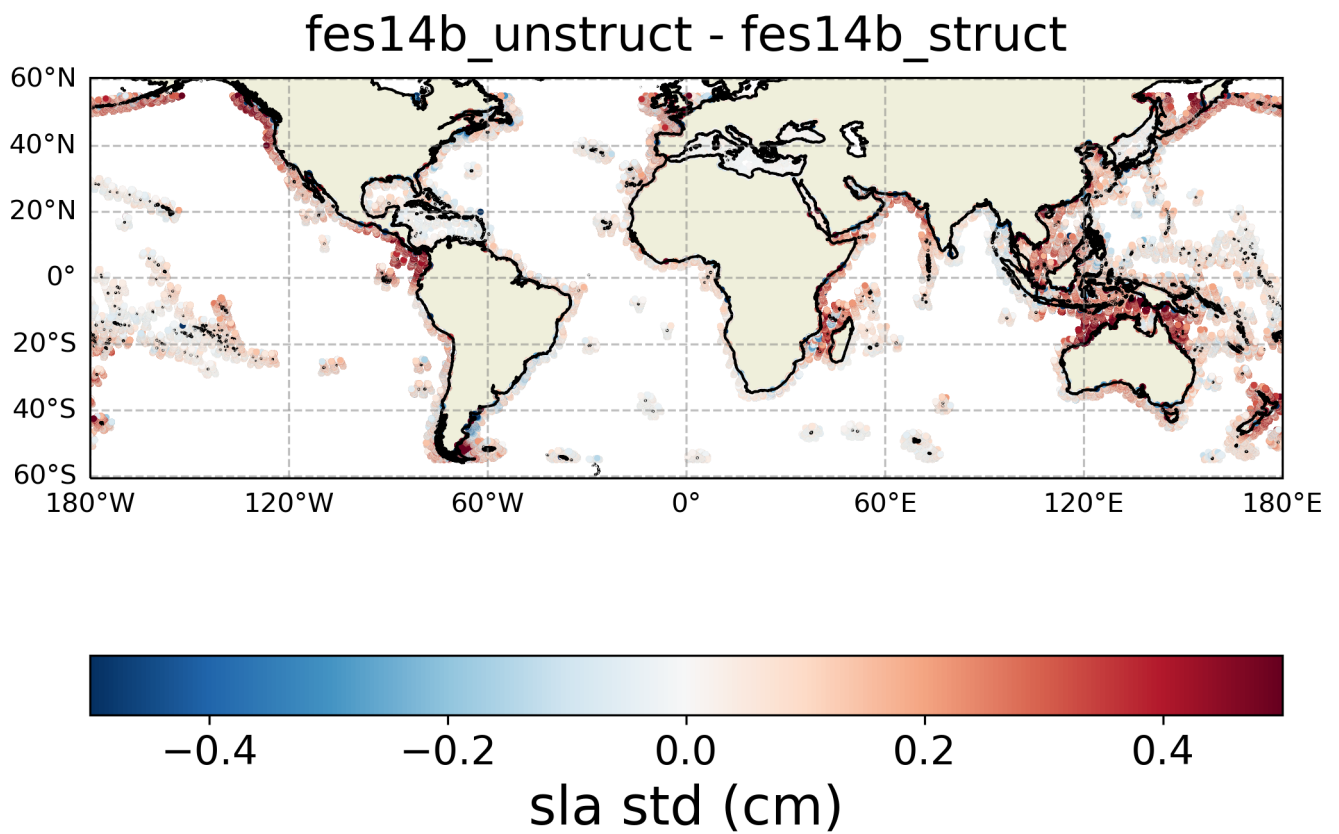


FIGURE 28 – Spatial coherence analysis of the Difference in sla 's std between fes14b_unstruct and fes14b_struct

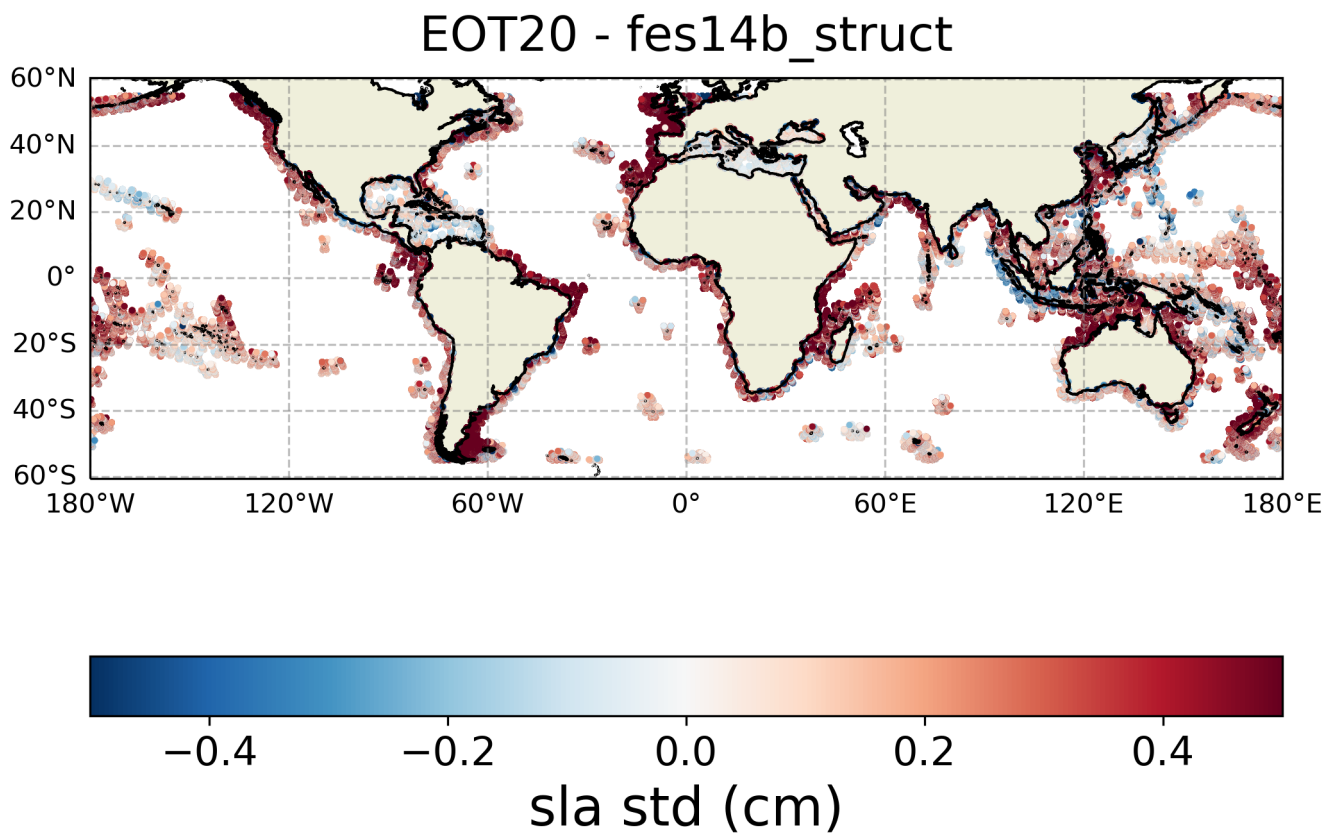


FIGURE 29 – Spatial coherence analysis of the Difference in sla 's std between EOT20 and fes14b_struct

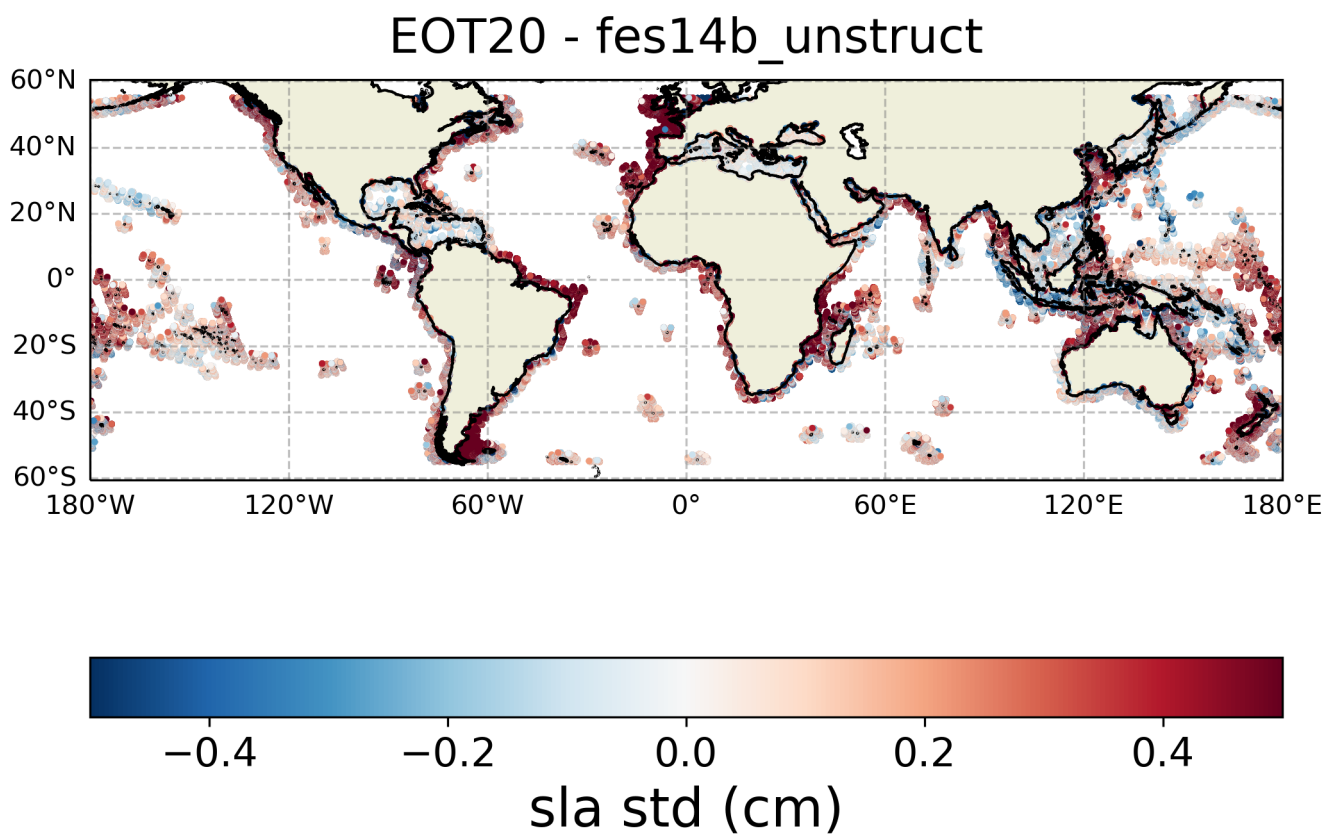


FIGURE 30 – Spatial coherence analysis of the Difference in sla 's std between EOT20 and fes14b_unstruct

3.2.3 sla's mean

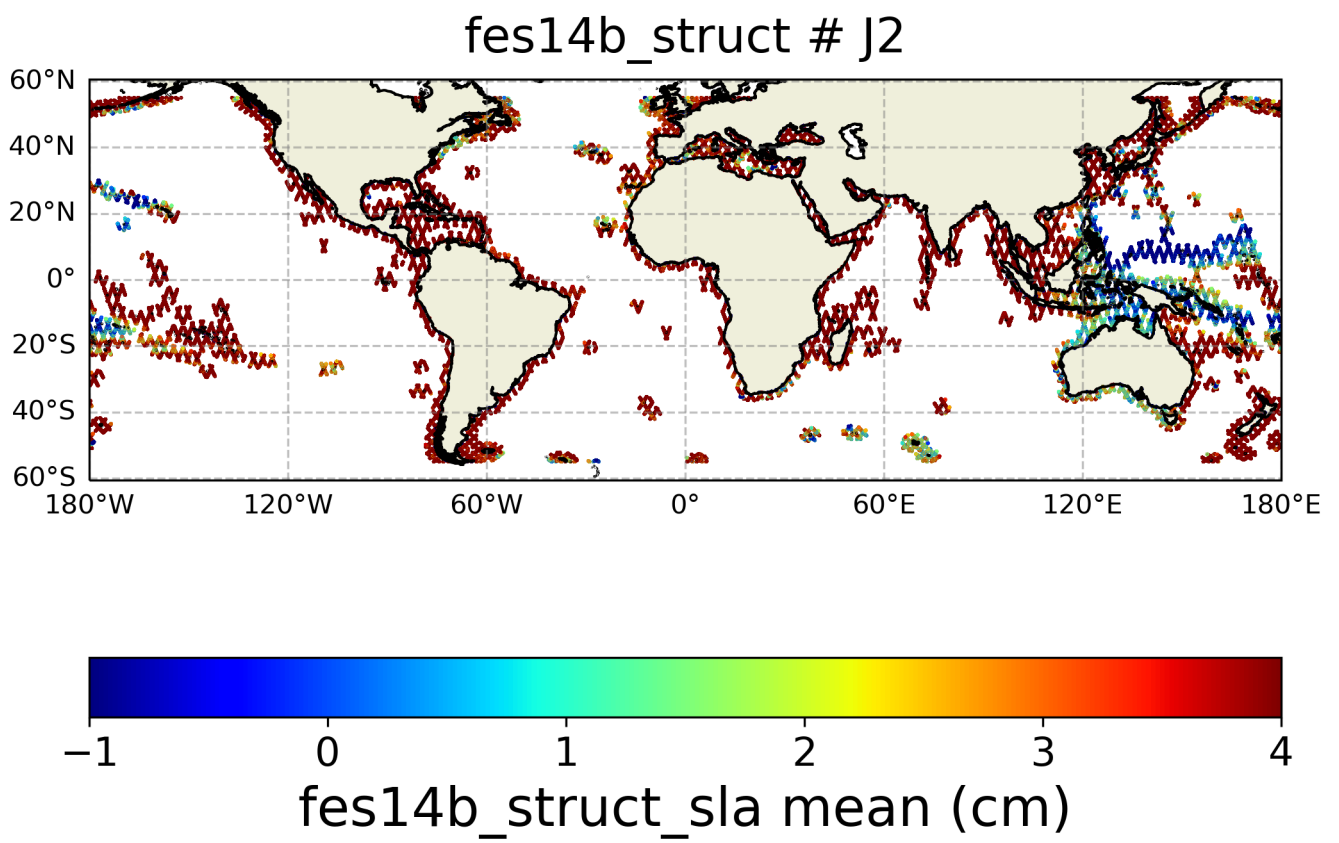


FIGURE 31 – Spatial coherence analysis of the mean of the fes14b_struct version of sla variable

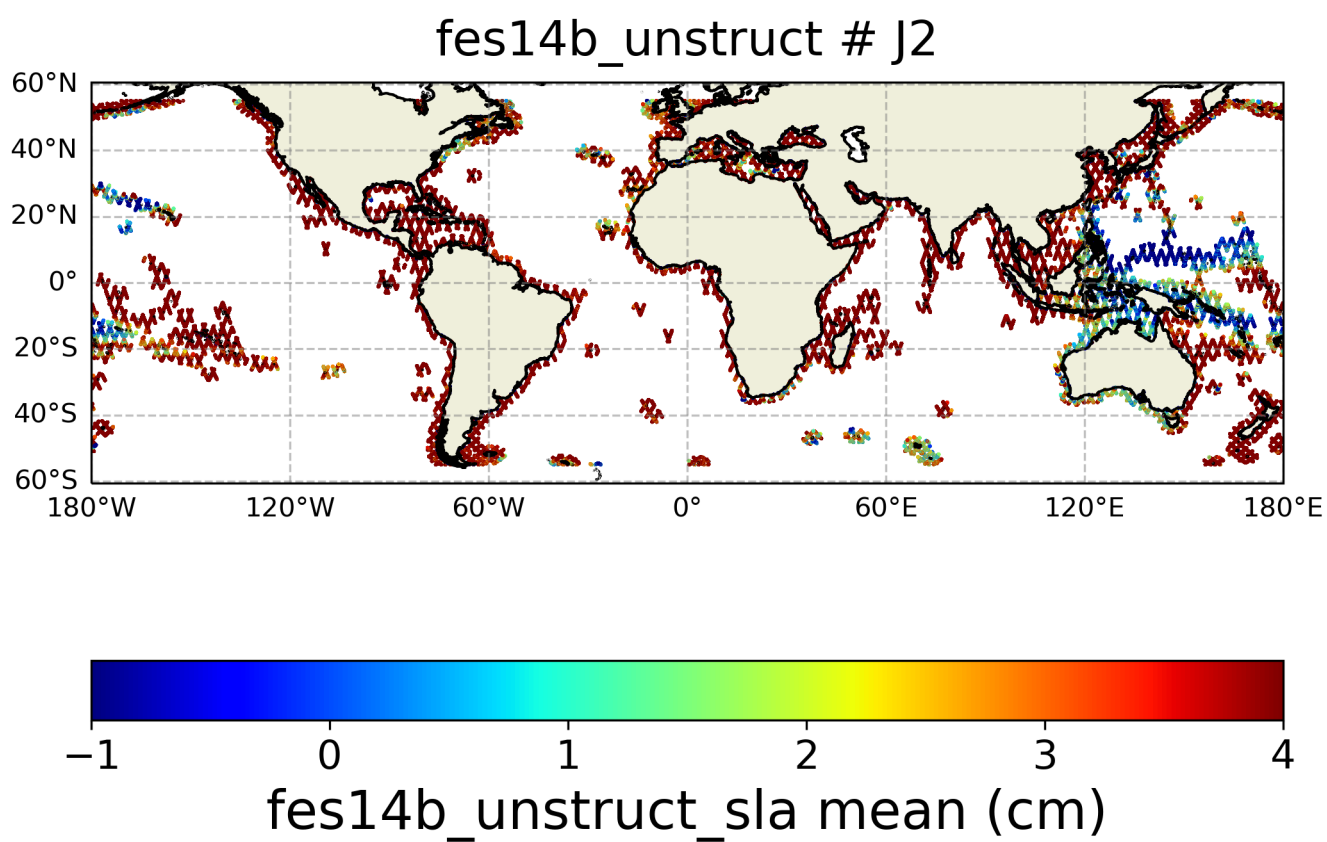


FIGURE 32 – Spatial coherence analysis of the mean of the fes14b_unstruct version of sla variable

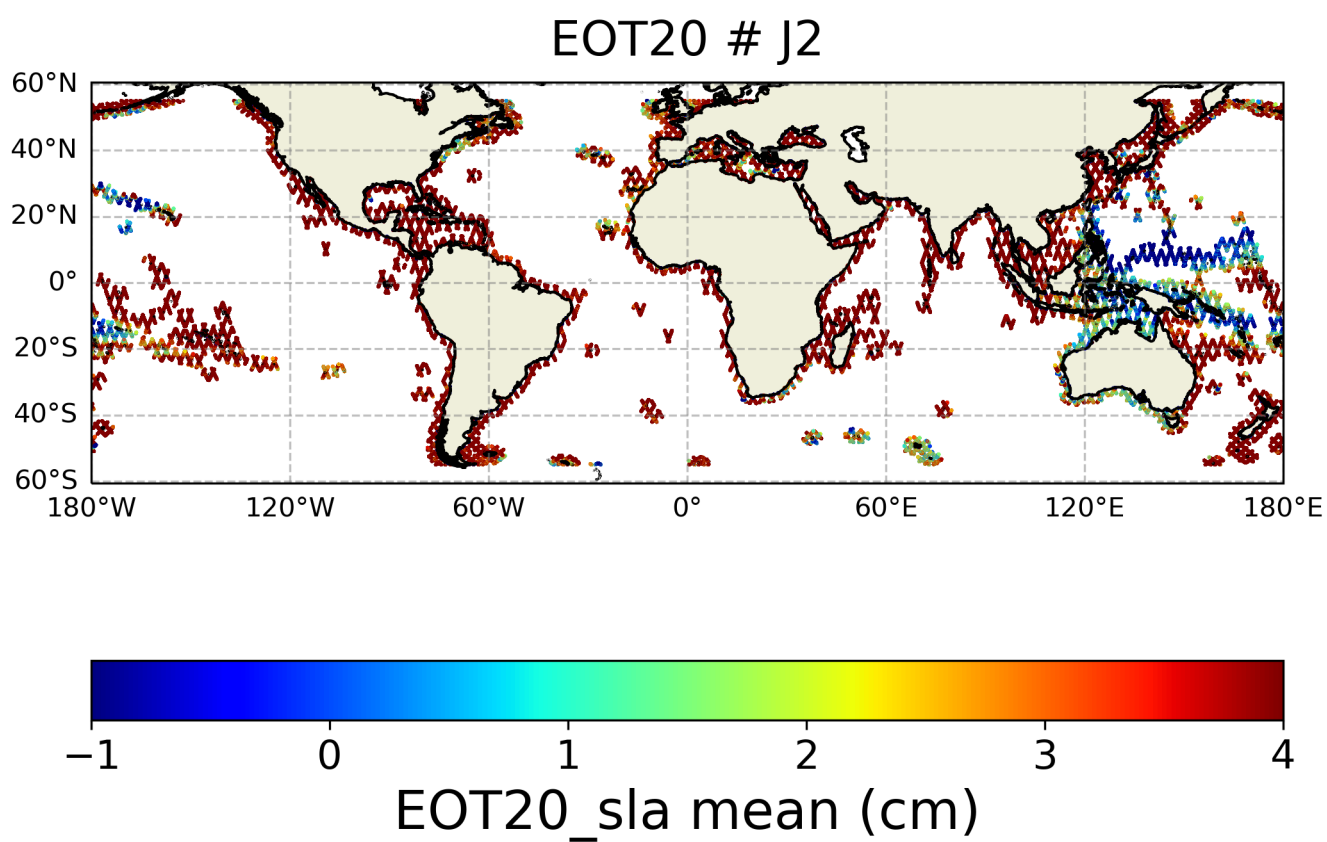


FIGURE 33 – Spatial coherence analysis of the mean of the EOT20 version of sla variable

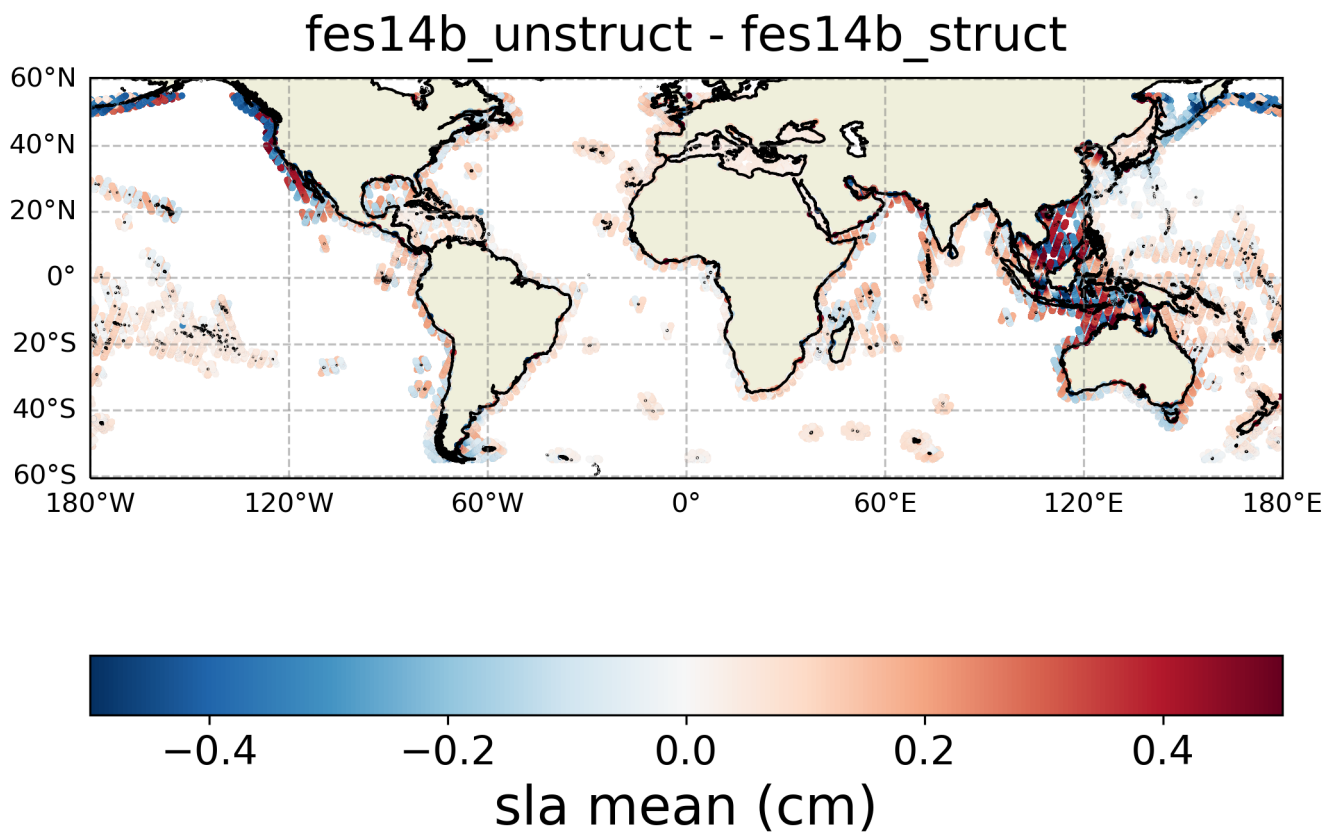


FIGURE 34 – Spatial coherence analysis of the Difference in sla 's mean between fes14b_unstruct and fes14b_struct

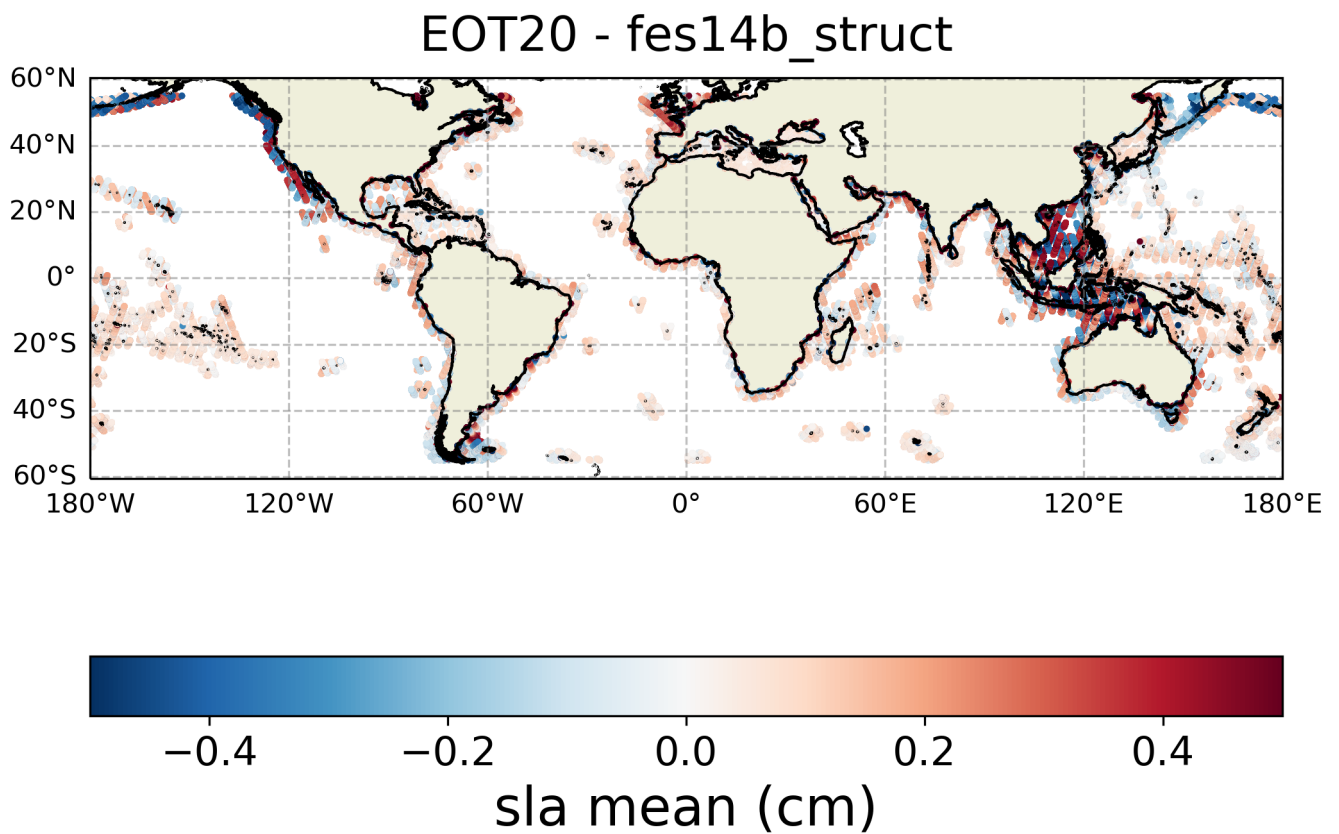


FIGURE 35 – Spatial coherence analysis of the Difference in sla 's mean between EOT20 and fes14b_struct

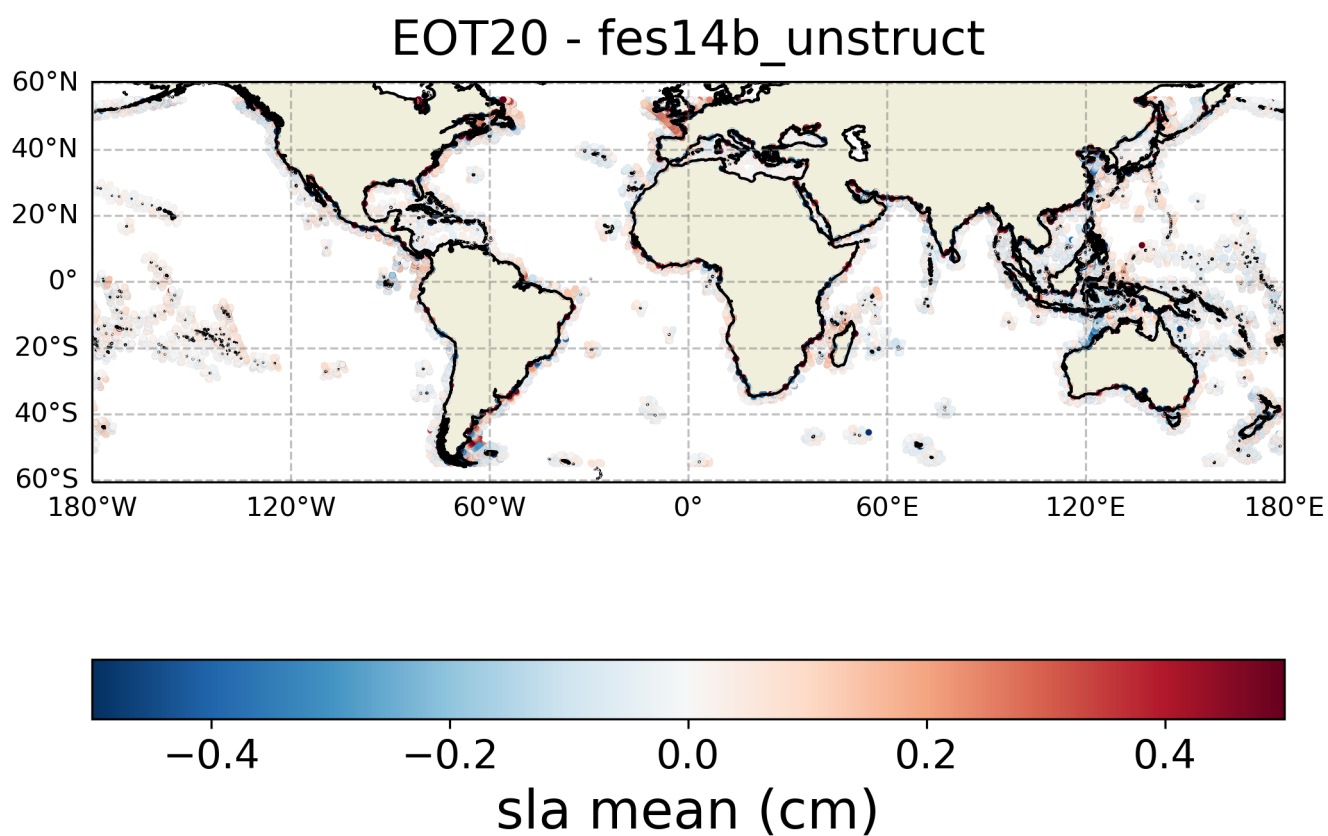


FIGURE 36 – Spatial coherence analysis of the Difference in sla 's mean between EOT20 and fes14b_unstruct

4 Histograms

4.1 Tide

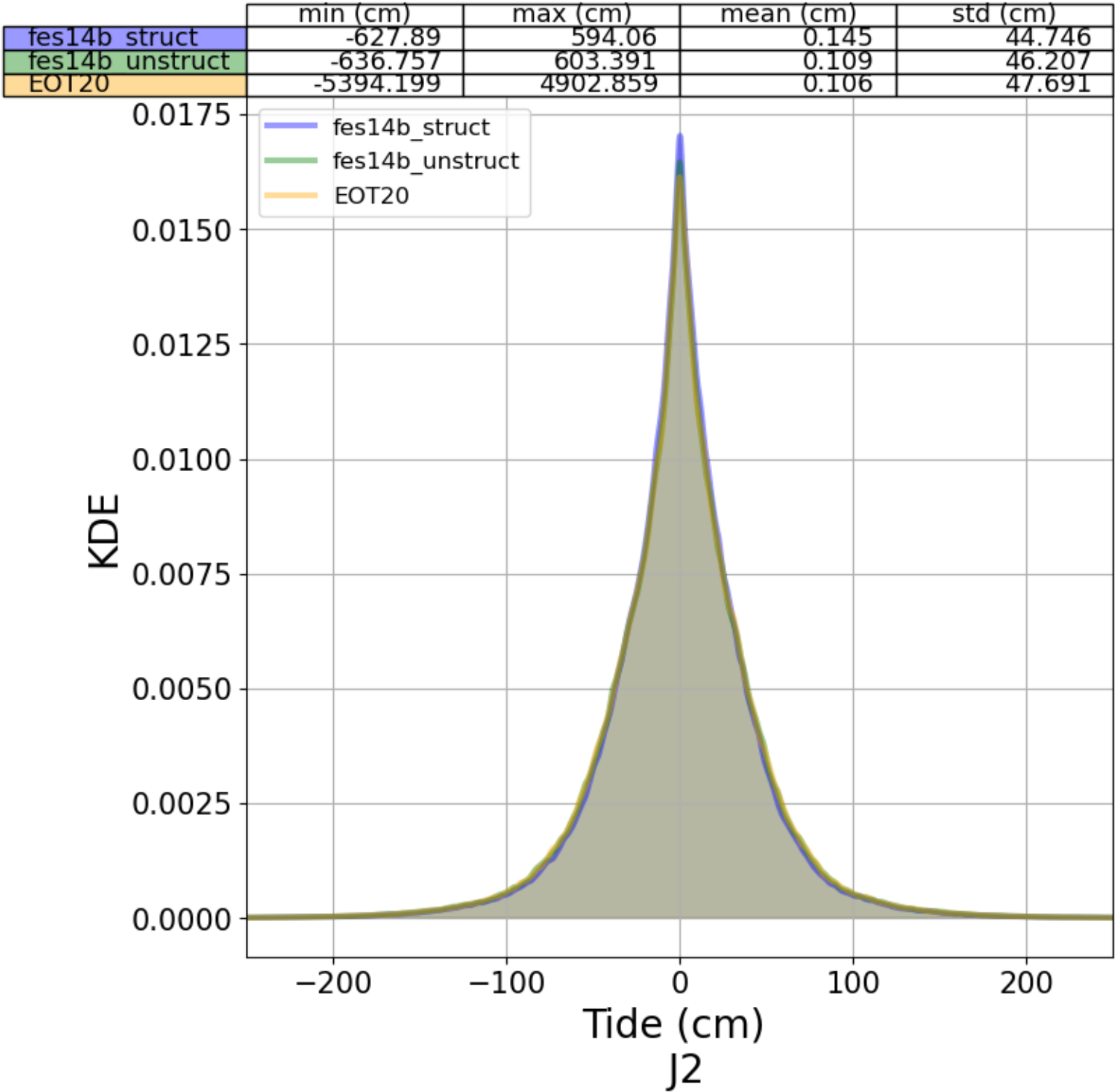


FIGURE 37 – Histogram of each of Tide version

	min (cm)	max (cm)	mean (cm)	std (cm)
fes14b unstruct - fes14b struct	-35.639	32.663	-0.036	2.30
EOT20 - fes14b struct	-5448.885	5001.349	-0.038	12.55
EOT20 - fes14b unstruct	-5449.326	5005.7	-0.002	12.44

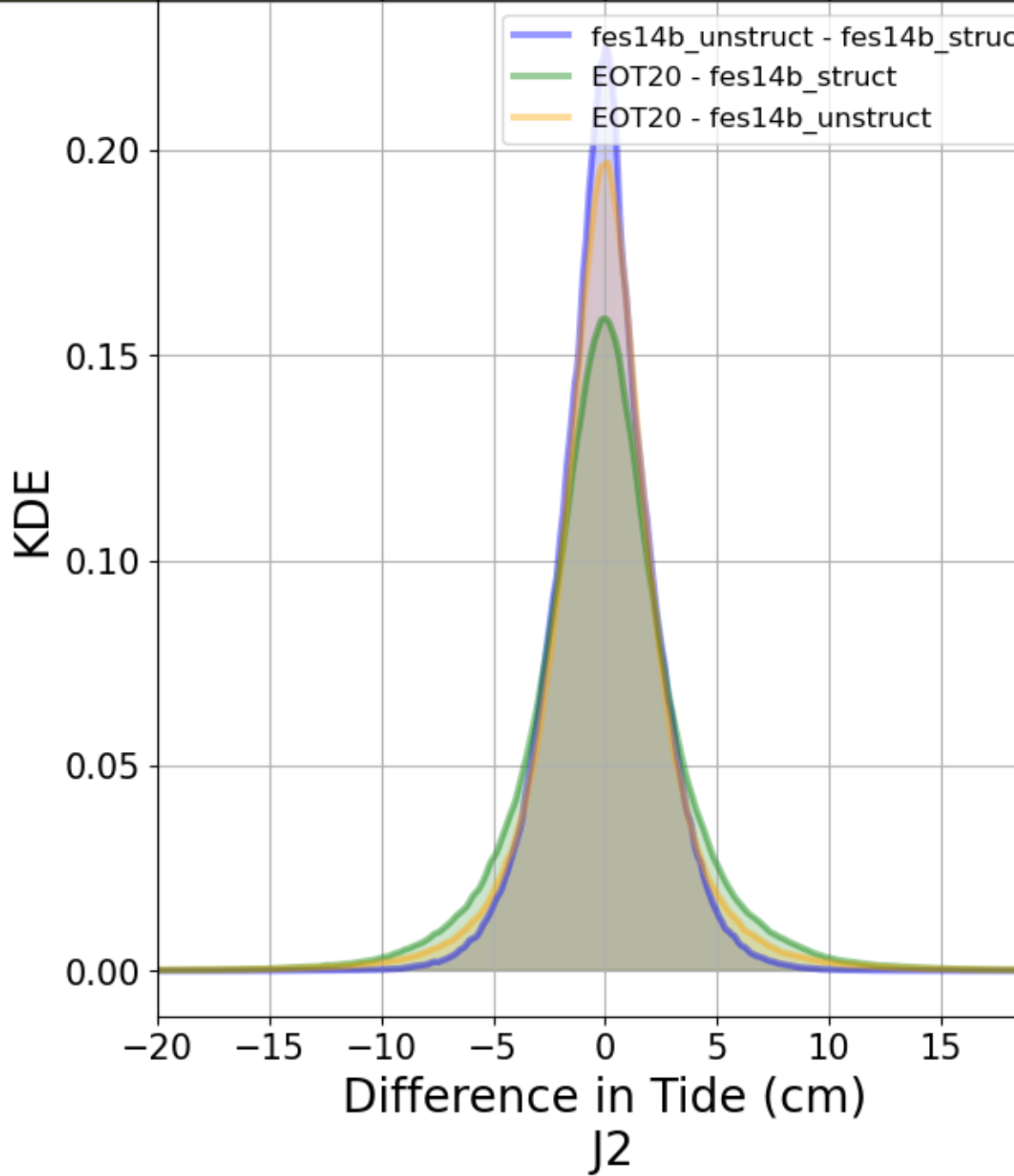


FIGURE 38 – Histograms of difference of each Tide version and reference one

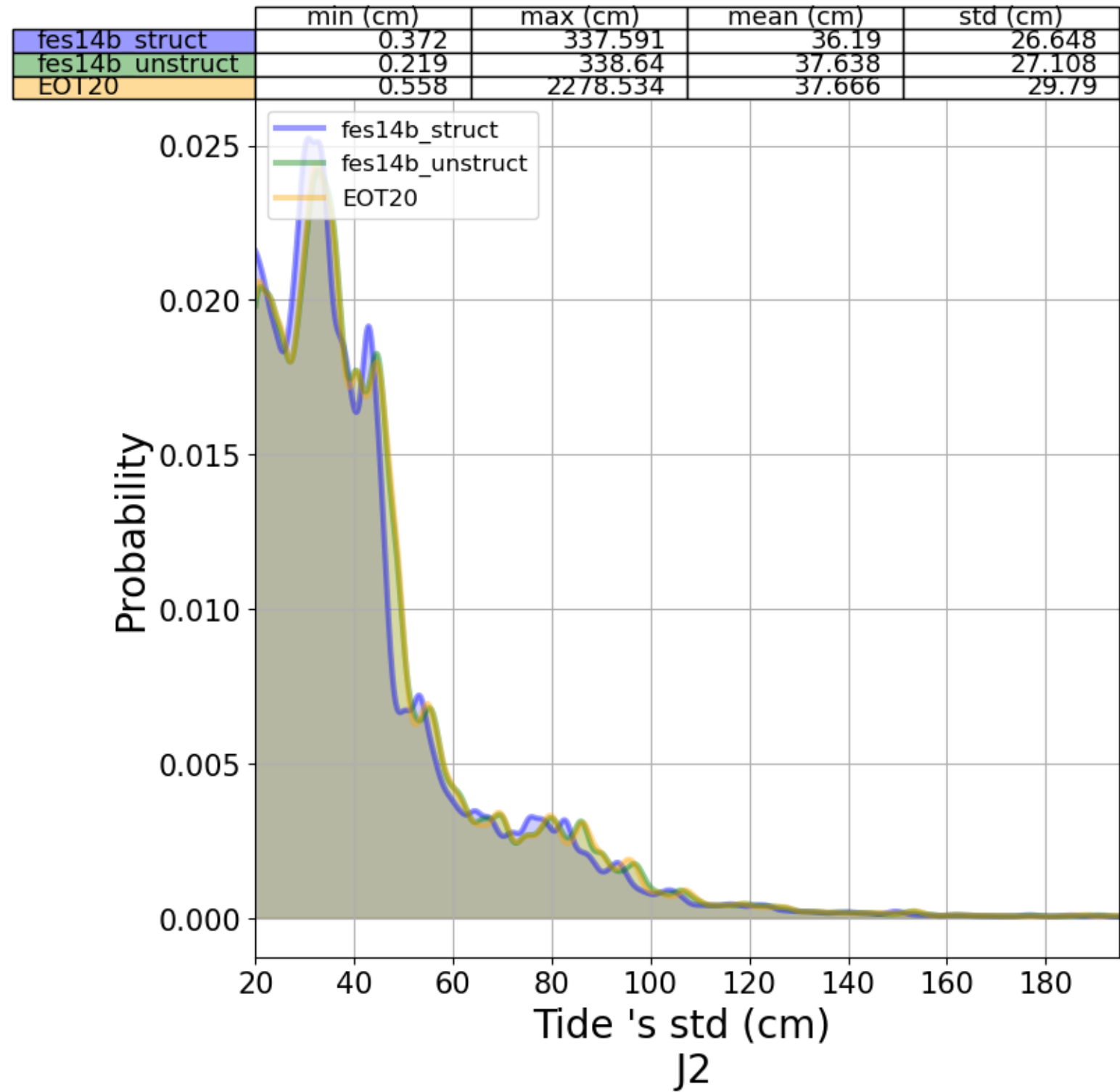


FIGURE 39 – Histograms of the standard deviation of each Tide version

4.2 sla

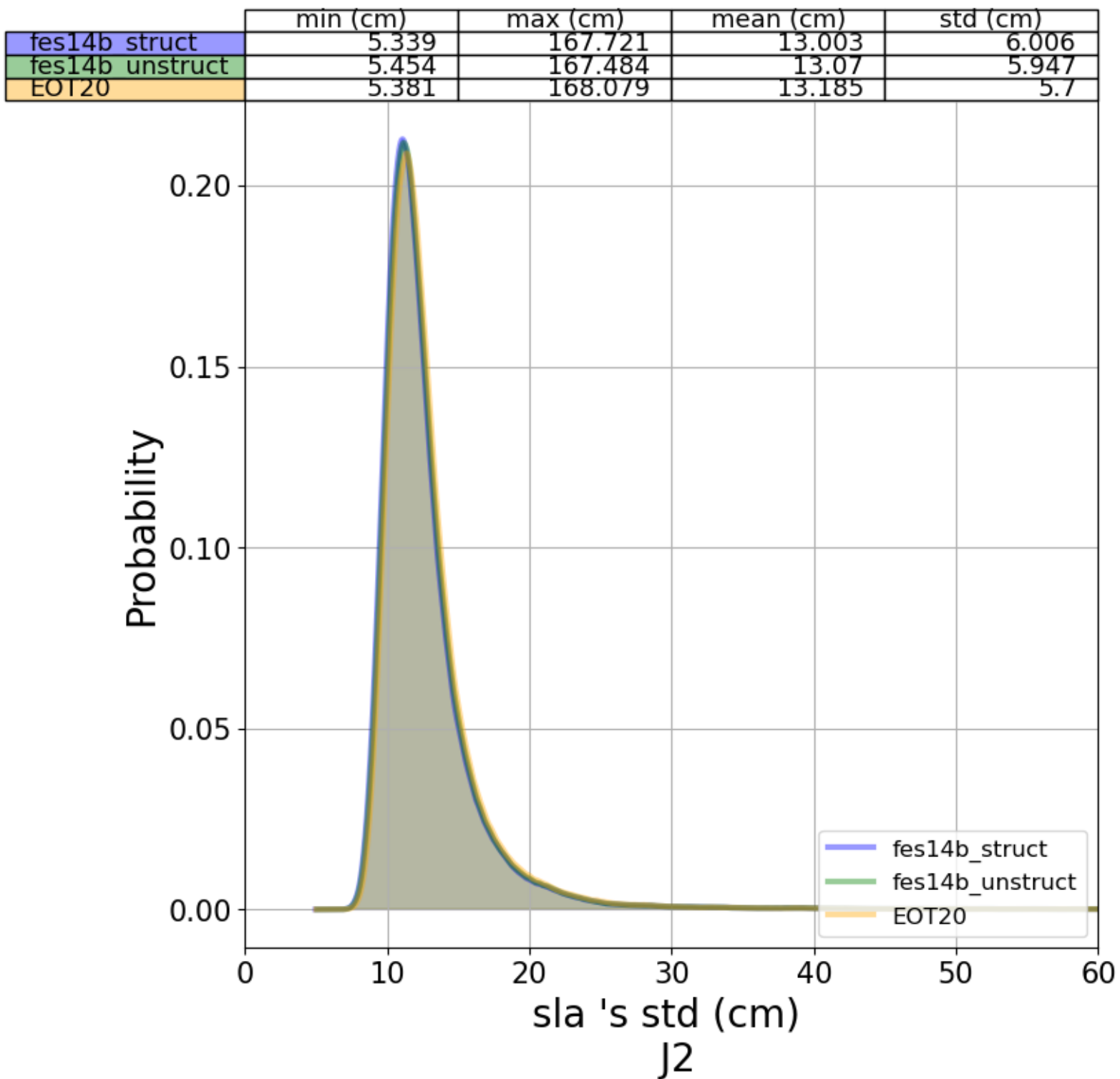


FIGURE 40 – Histograms of the standard deviation of each sla version

5 Along-track analysis

5.1 Tide

5.1.1 Tide 's count

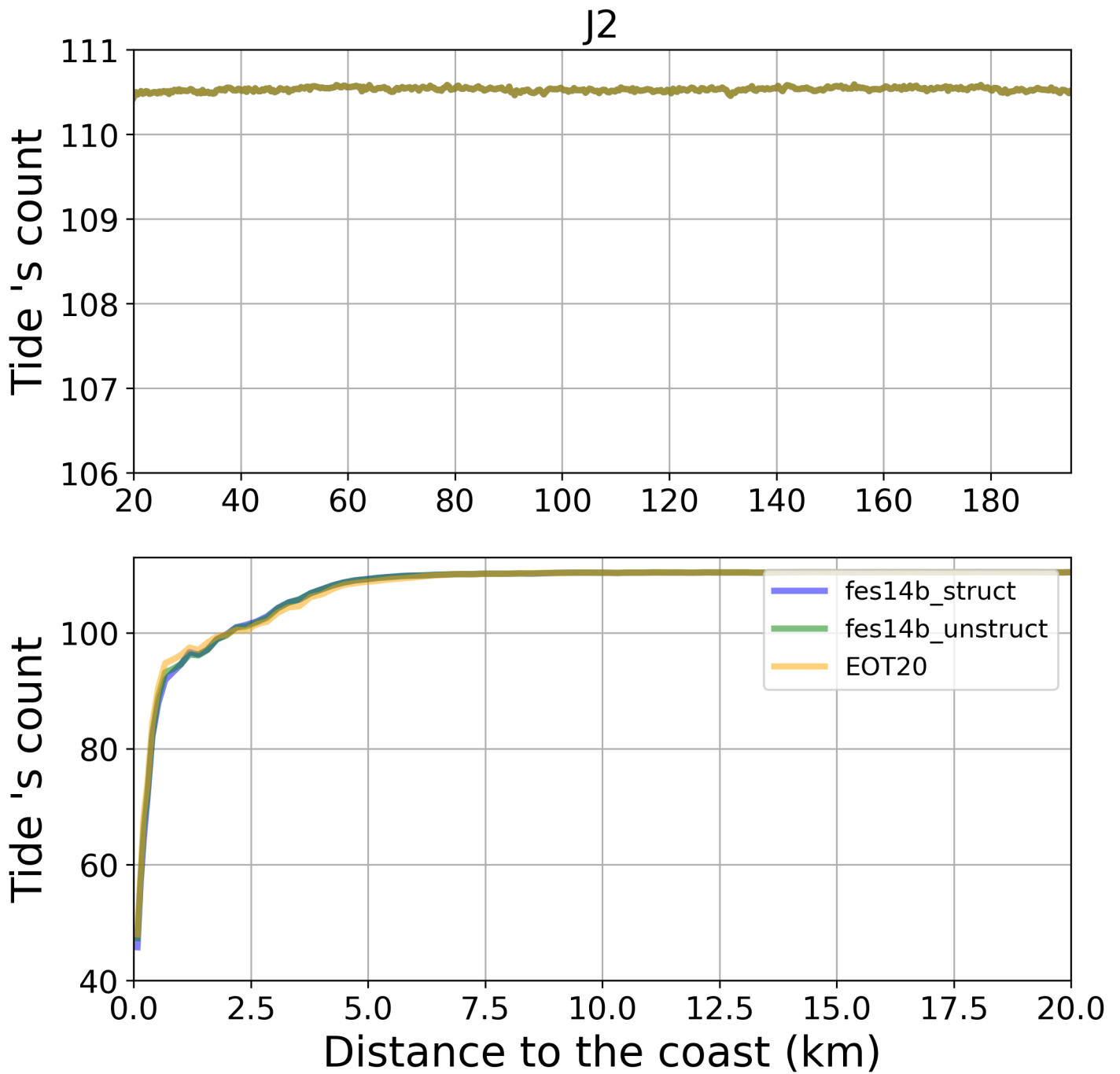


FIGURE 41 – Along-track analysis of Tide 's count

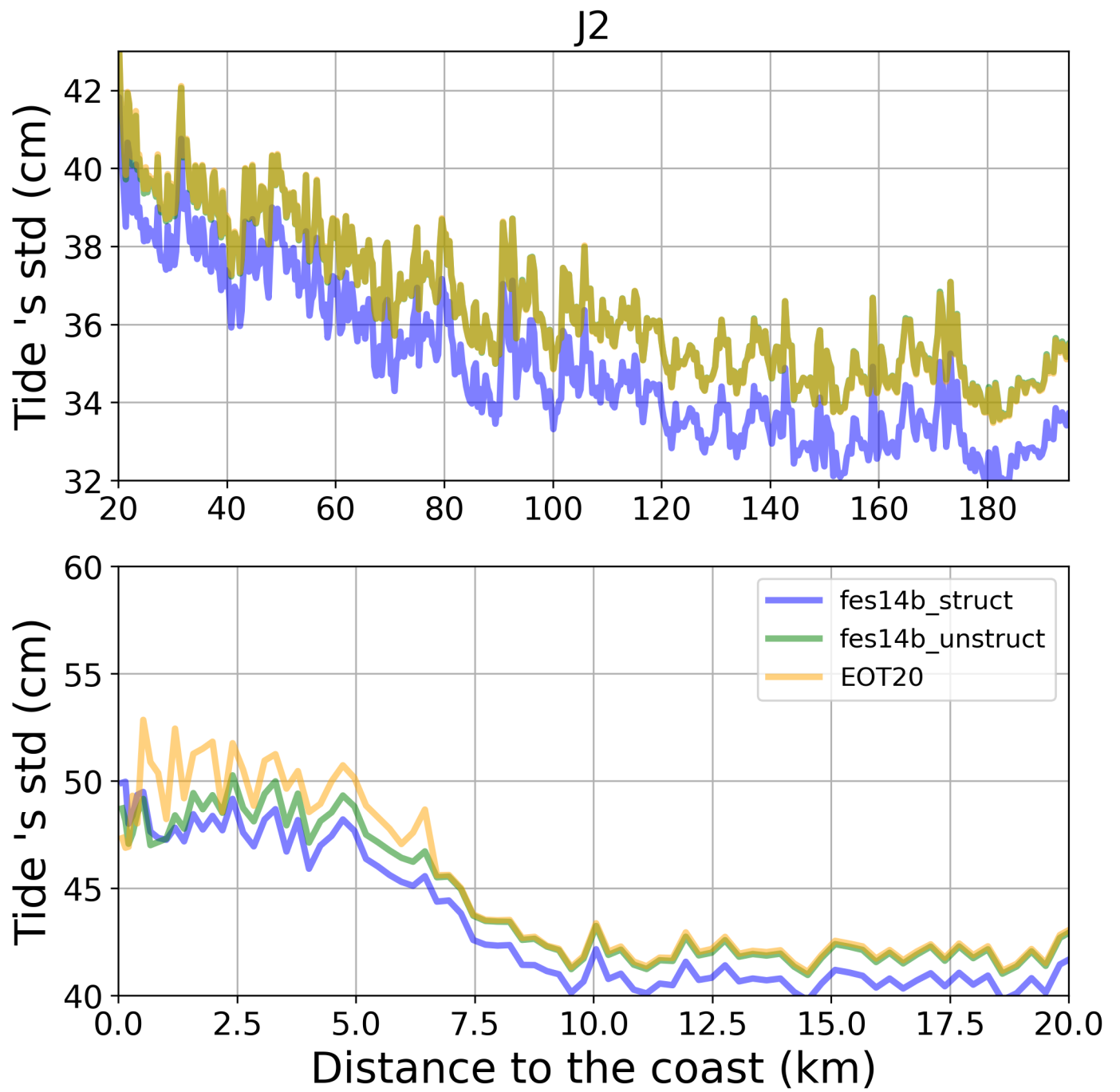


FIGURE 42 – Along-track analysis of Tide 's std

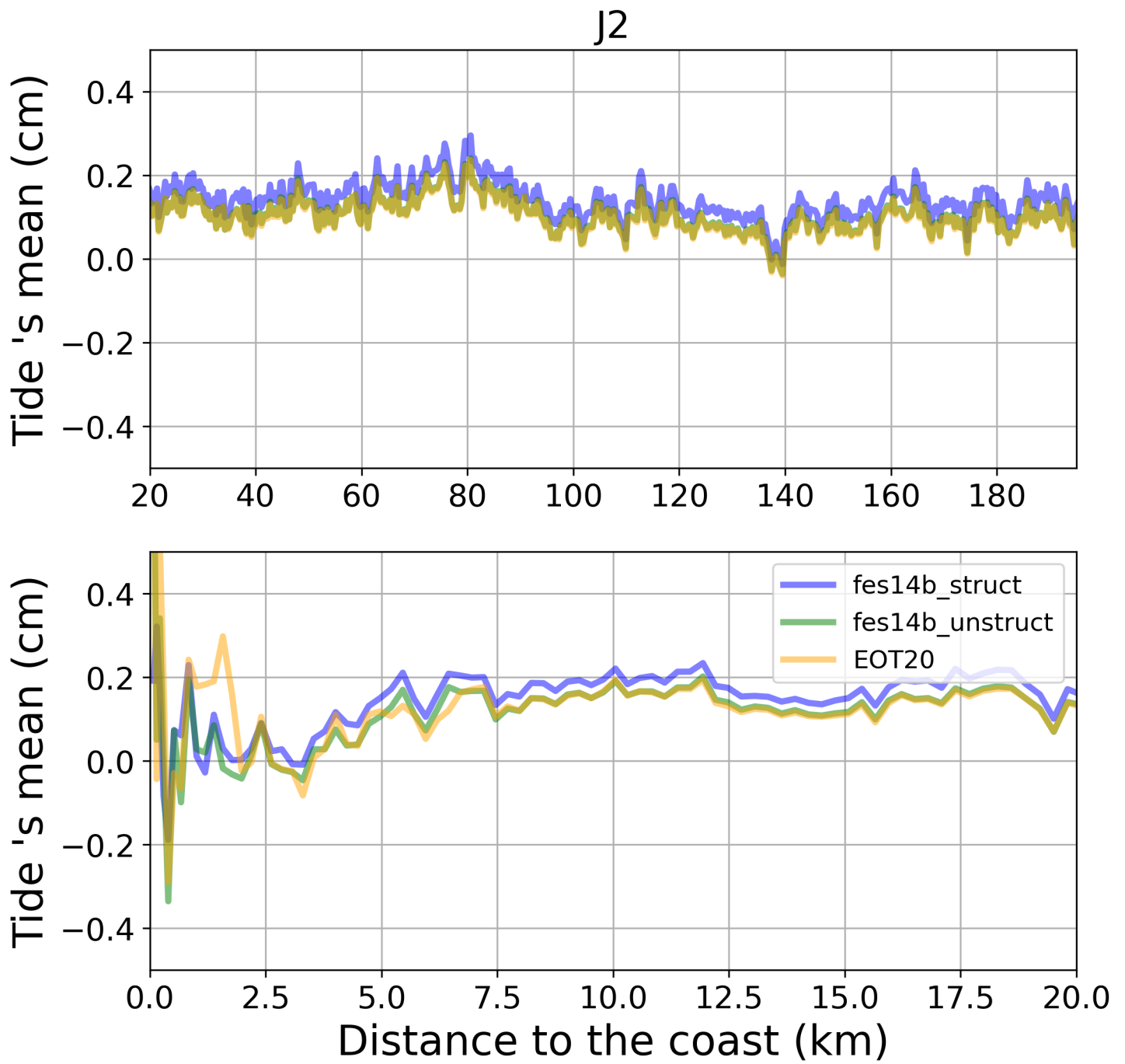


FIGURE 43 – Along-track analysis of Tide 's mean

5.2 sla

5.2.1 sla 's count

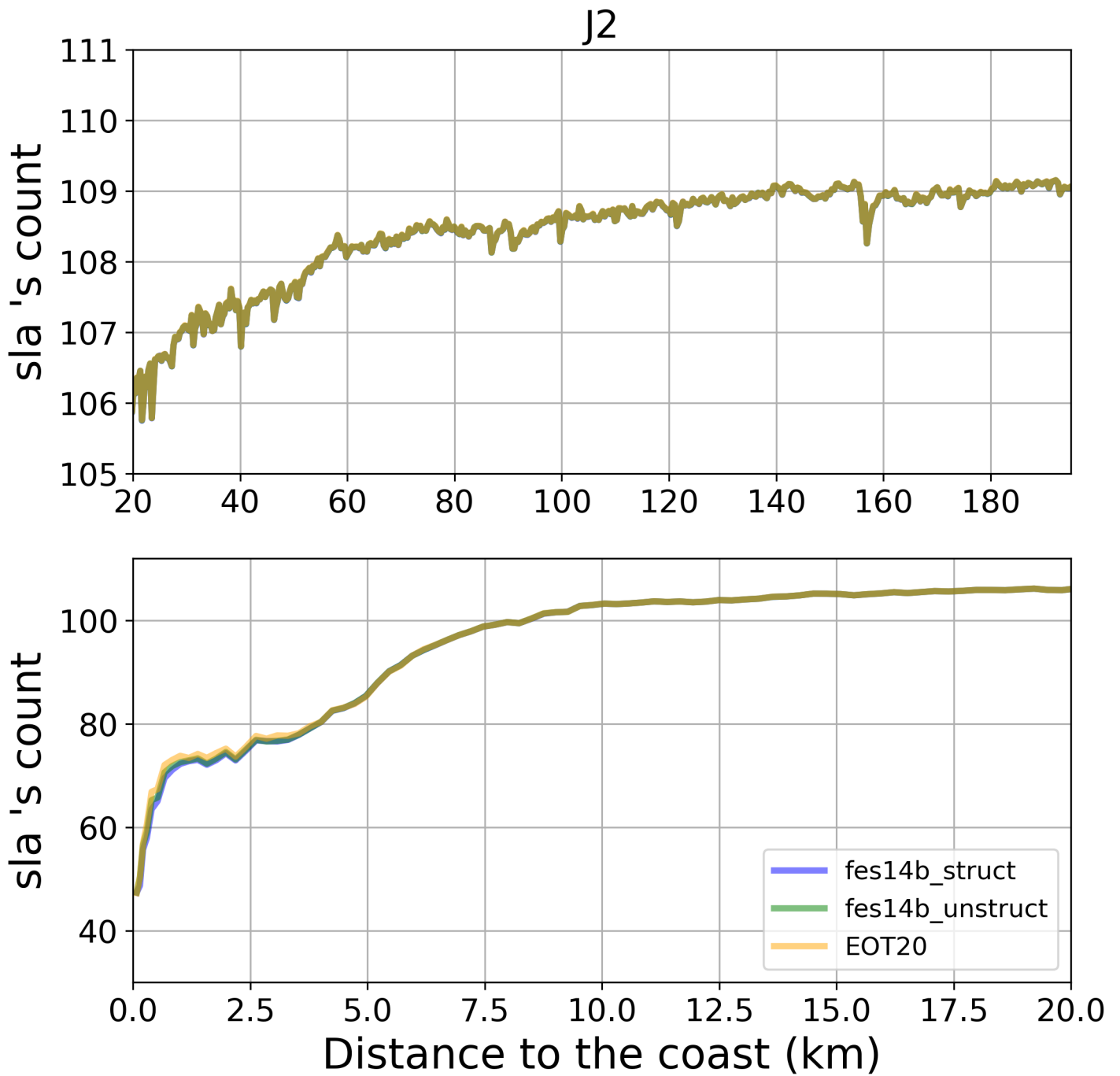


FIGURE 44 – Along-track analysis of sla 's count

J2

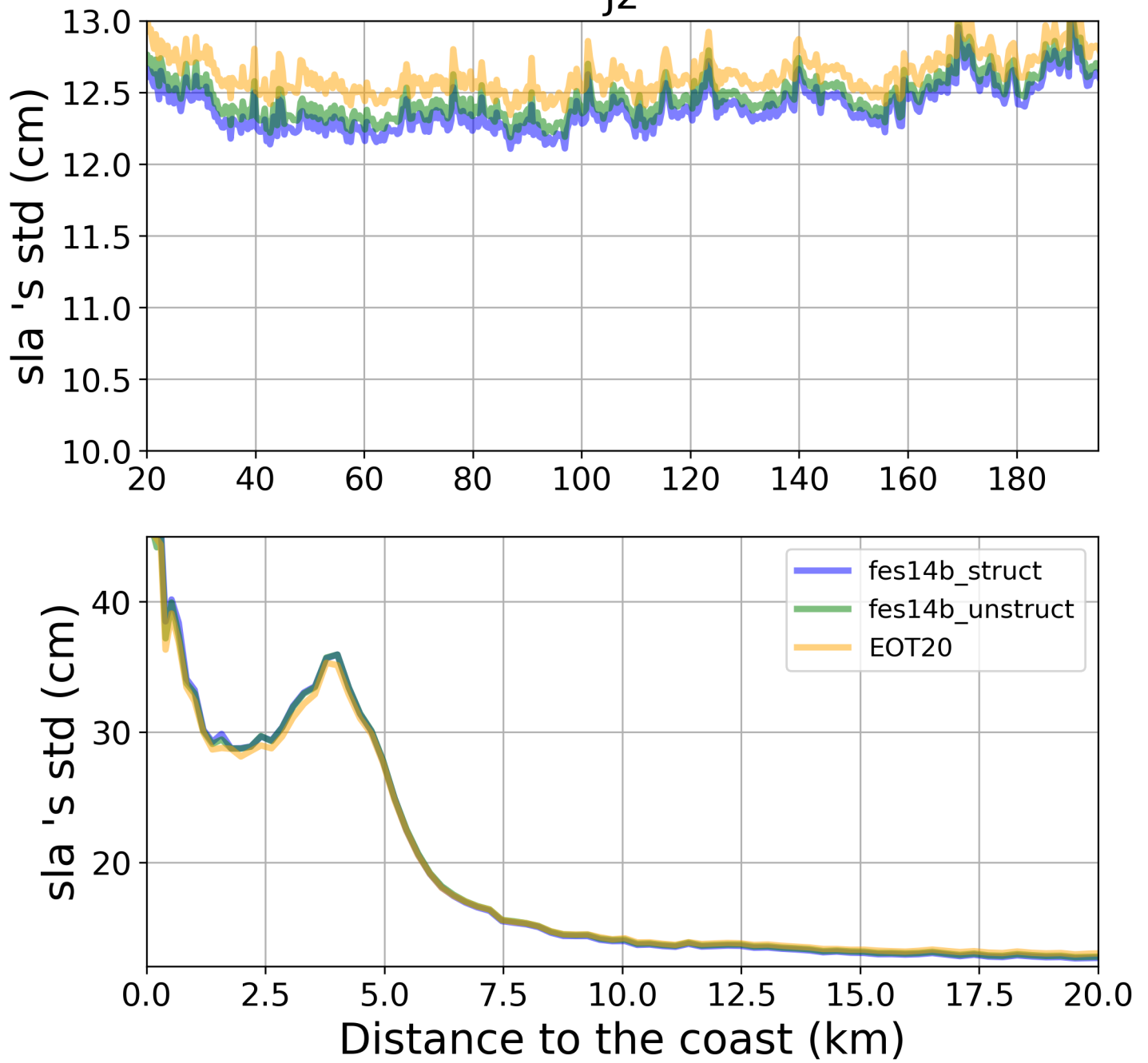


FIGURE 45 – Along-track analysis of sla 's std

J2

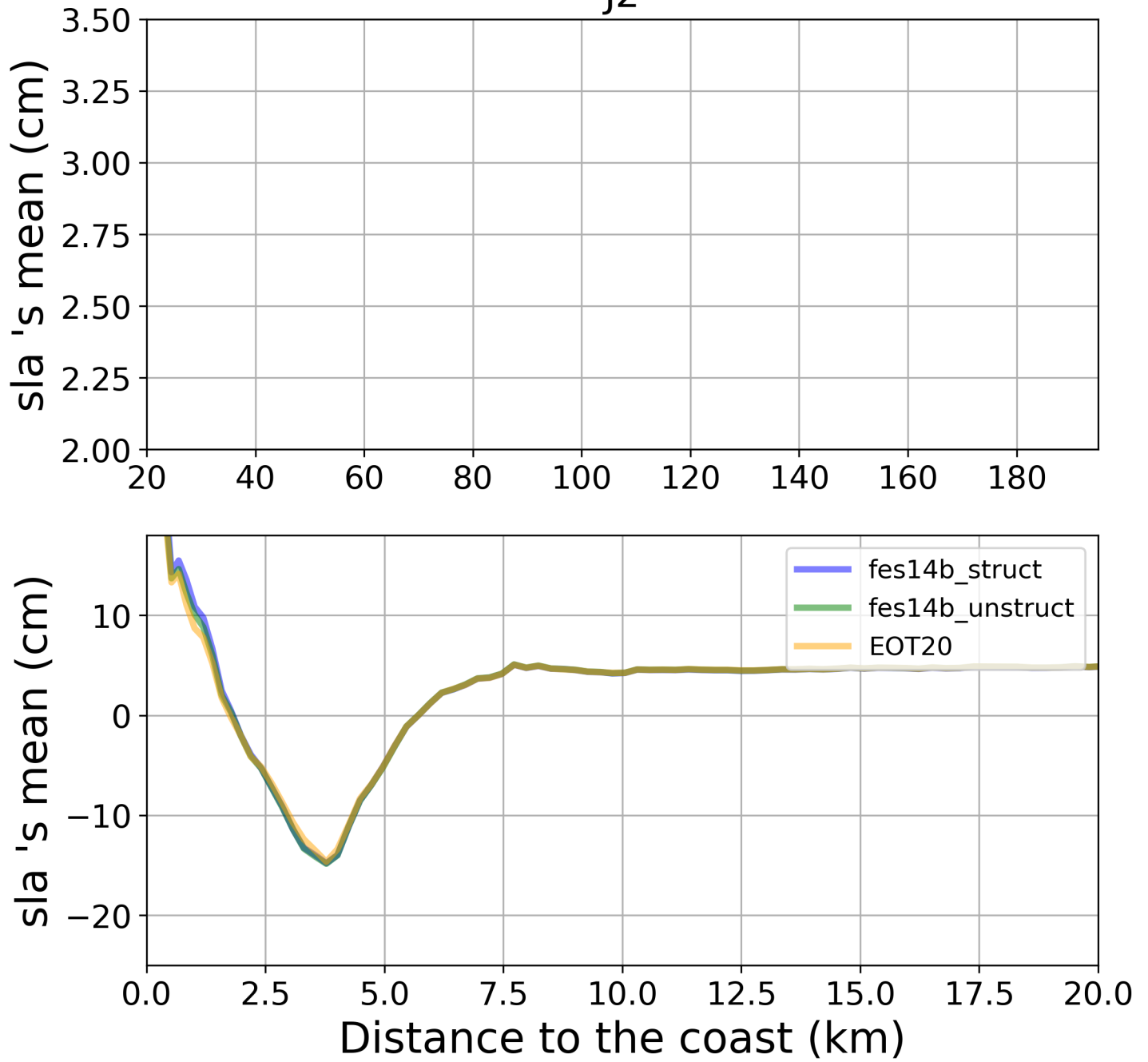


FIGURE 46 – Along-track analysis of sla 's mean