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

11 avril 2022

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Table des figures

1   General description

- — Figures and notes have been included in this report to evaluate different altimetry products.
- — In order to test different version of the Ionospheric correction used to calculate the sea level anomaly. Each version has been compared with a reference version. In this case the Iono_gim is the reference one.
- — The sea level anomaly has been calculated using each version of the variable and has been compared to the sea level anomaly calculated using the reference version.
- — The region of study is global
- — Mission : J2
- — Git last tag : 0.7 Appliquer le flag à l'adaptive
- — Git changeset number : b8633aa-2022-04-11

2   Processing

2.1   sla formula

2.1.1   Iono_filtered product ' sla

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

2.1.2 Iono_gim product ' sla

sla = ORBIT.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

2.2 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 3 m.
— Each sla time-serie has been filtred by a window of $[-4\sigma, 4\sigma]$, where σ is the standard deviation of the sla time serie

3 Spatial coherence analysis
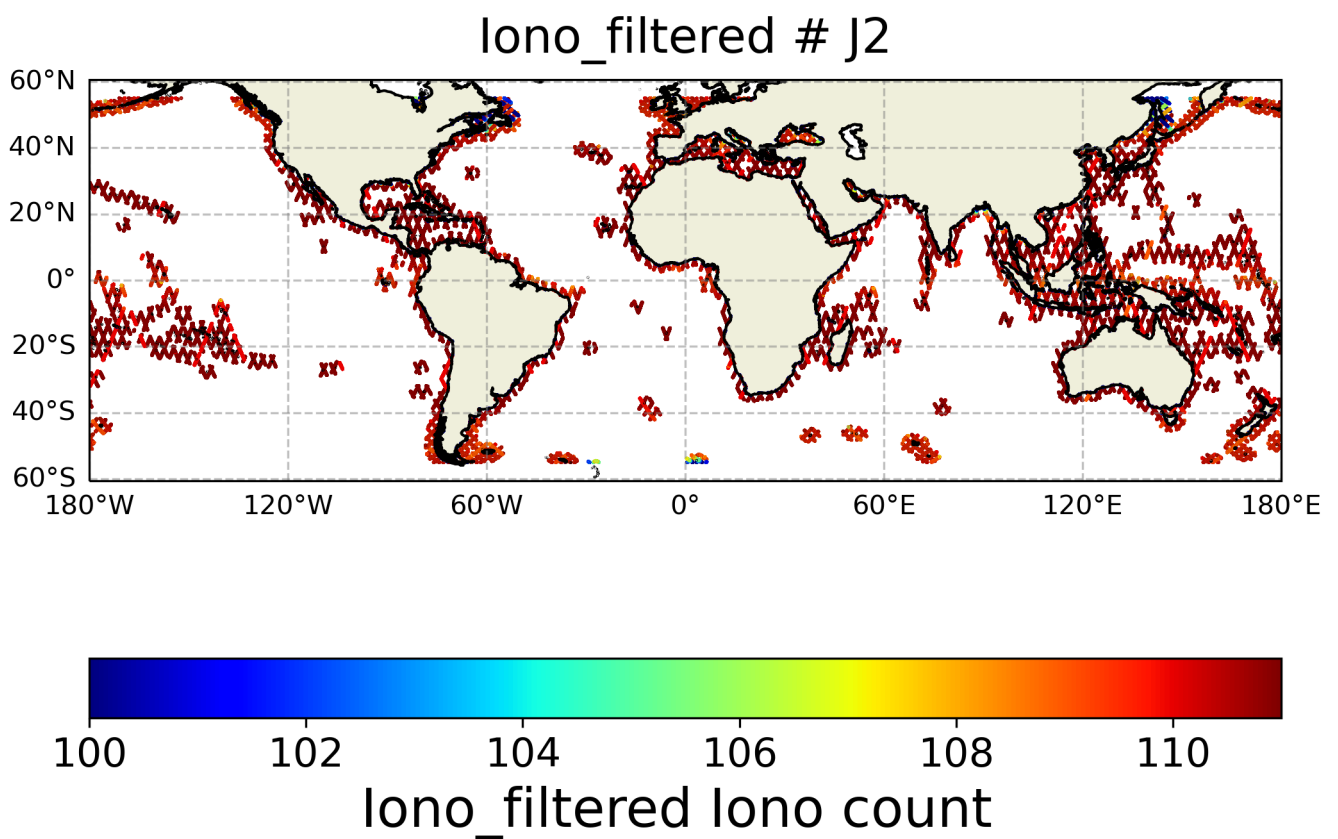
3.1 Iono

3.1.1 Iono 's count

FIGURE 1 – Spatial coherence analysis of the count of the Iono_filtered version of Iono variable
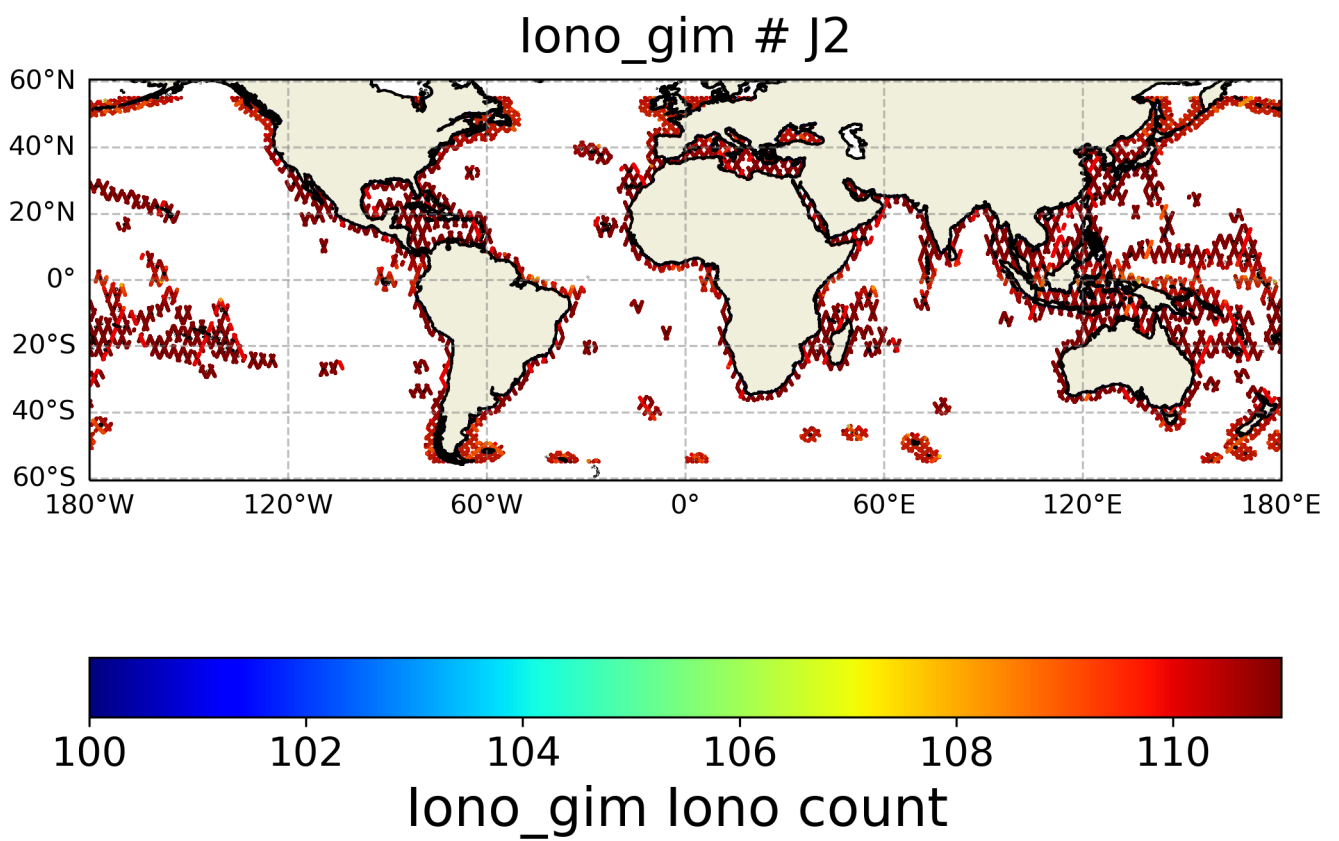
FIGURE 2 – Spatial coherence analysis of the count of the Iono_gim version of Iono variable
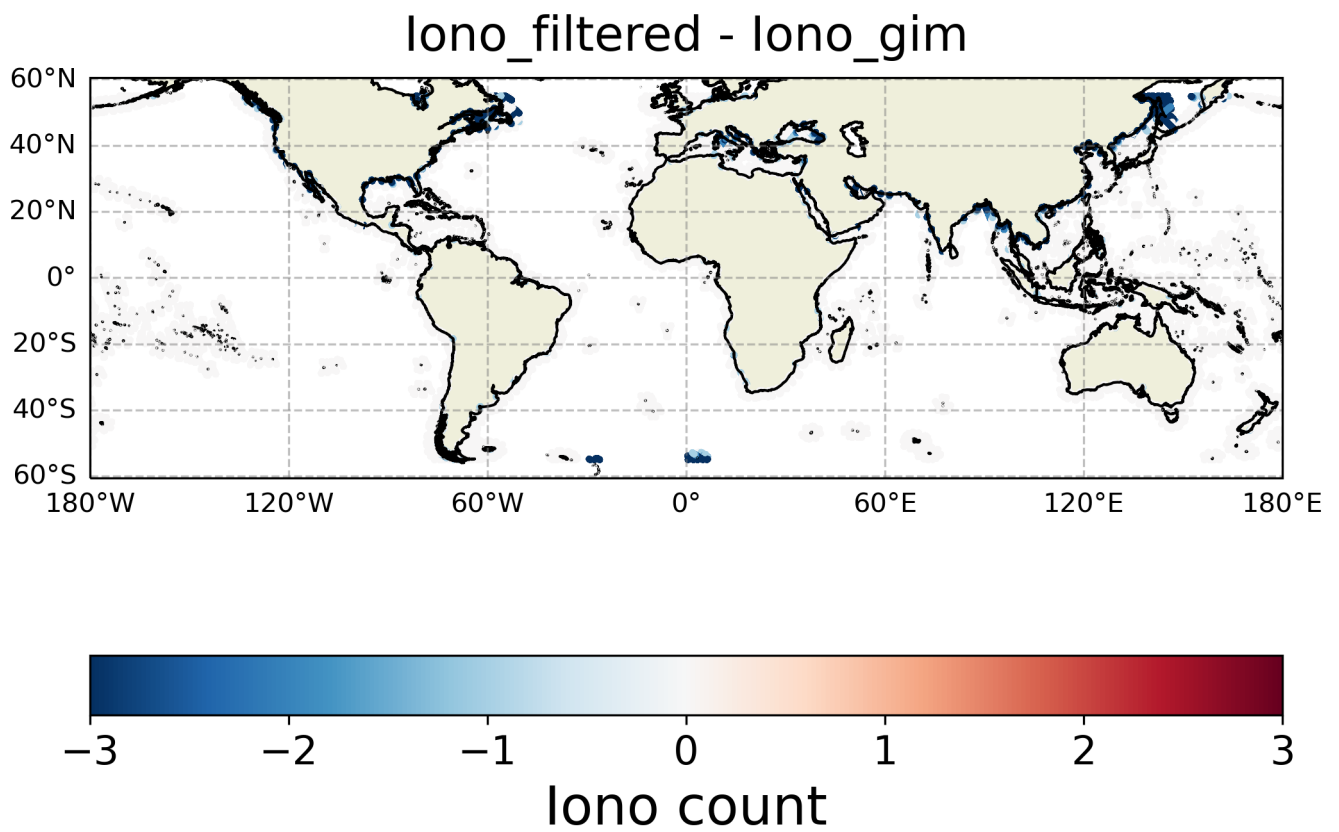
FIGURE 3 – Spatial coherence analysis of the Difference in Iono 's count between Iono_filtered and Iono_gim
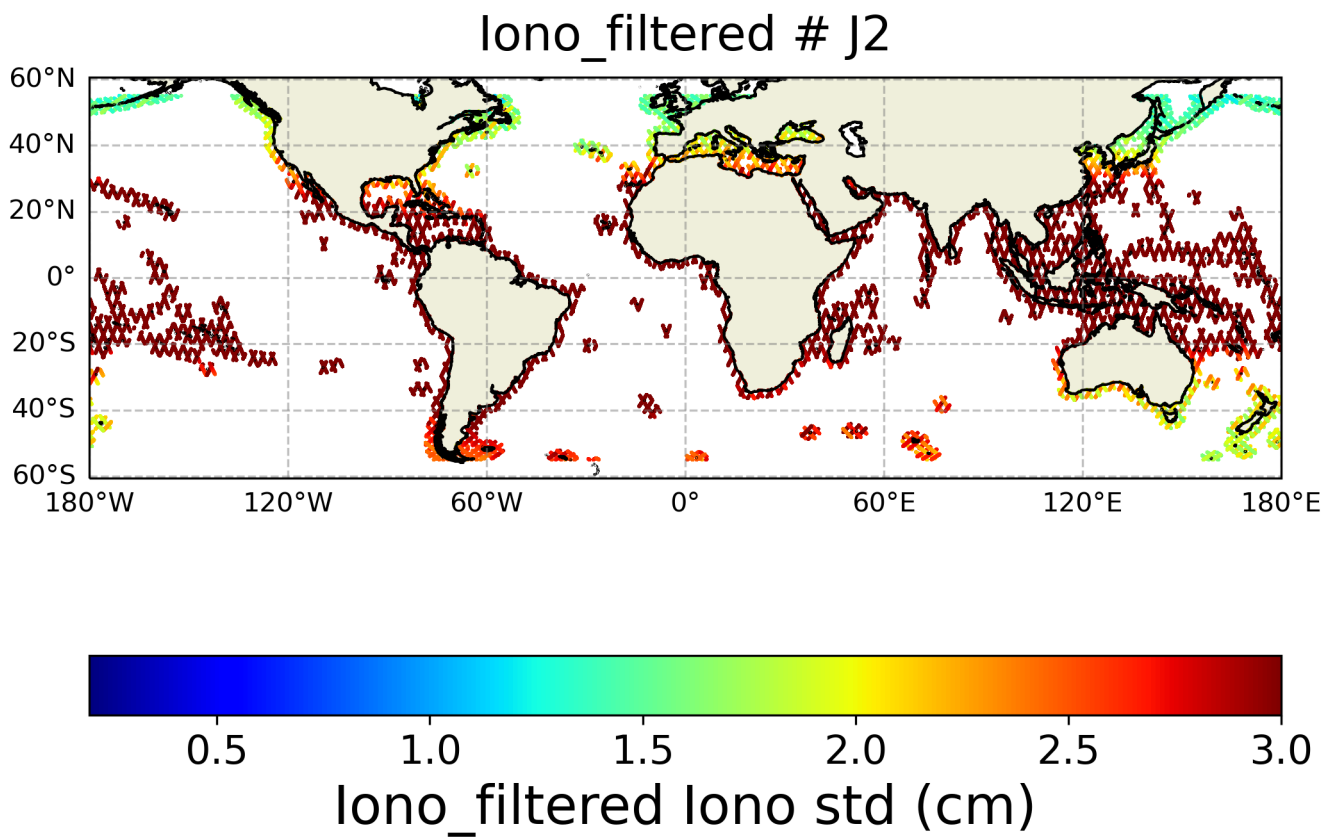
3.1.2   Iono 's std

FIGURE 4 – Spatial coherence analysis of the std of the Iono_filtered version of Iono variable
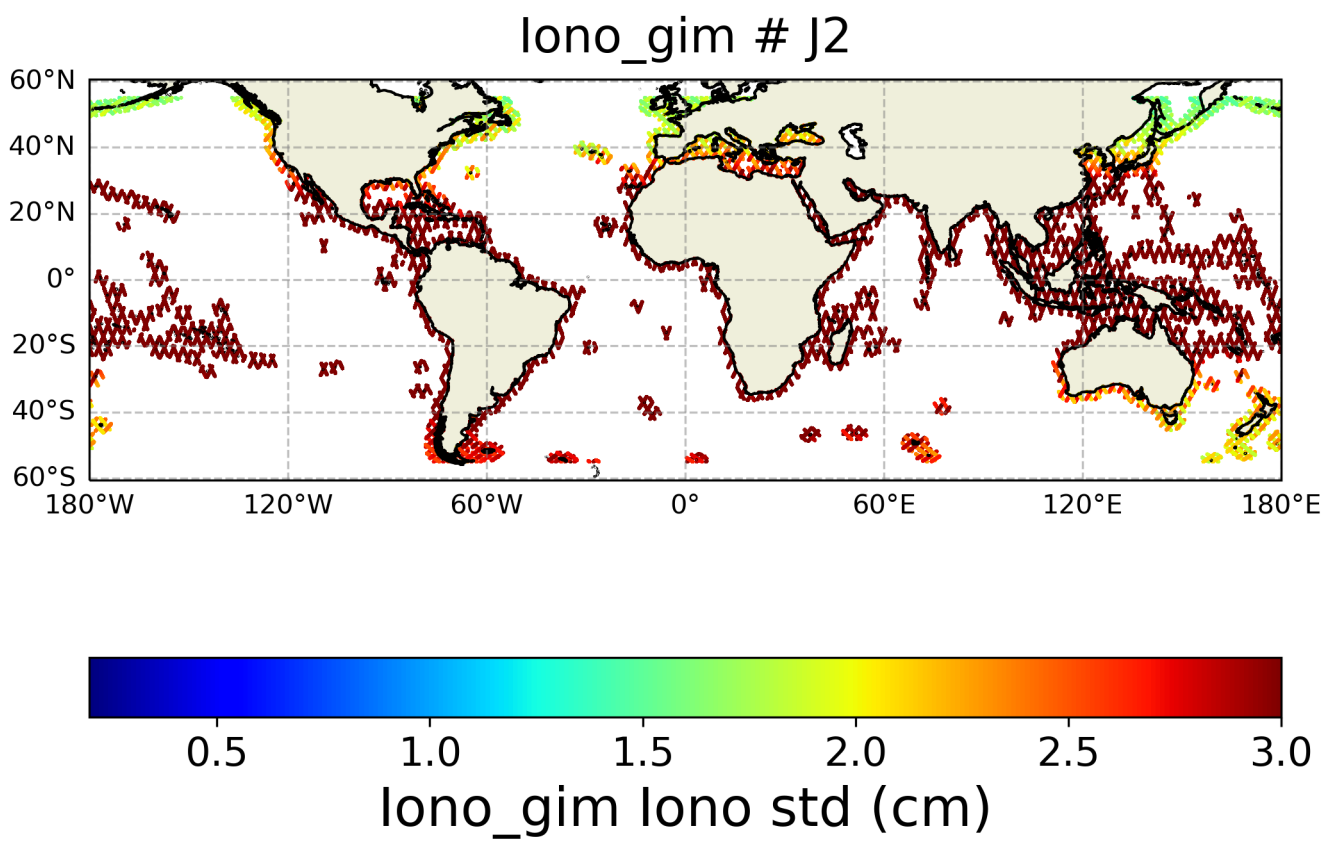
FIGURE 5 – Spatial coherence analysis of the std of the Iono_gim version of Iono variable
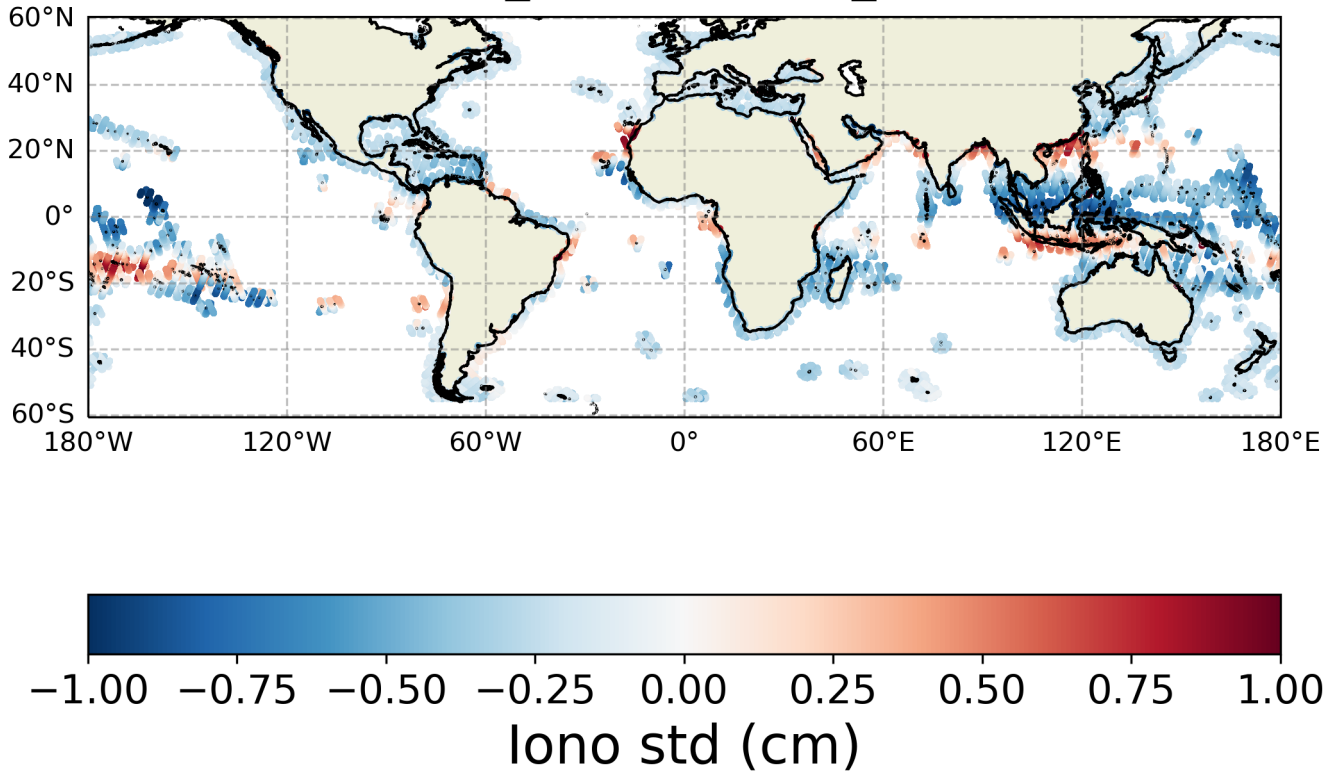
FIGURE 6 – Spatial coherence analysis of the Difference in Iono 's std between Iono_filtered and Iono_gim
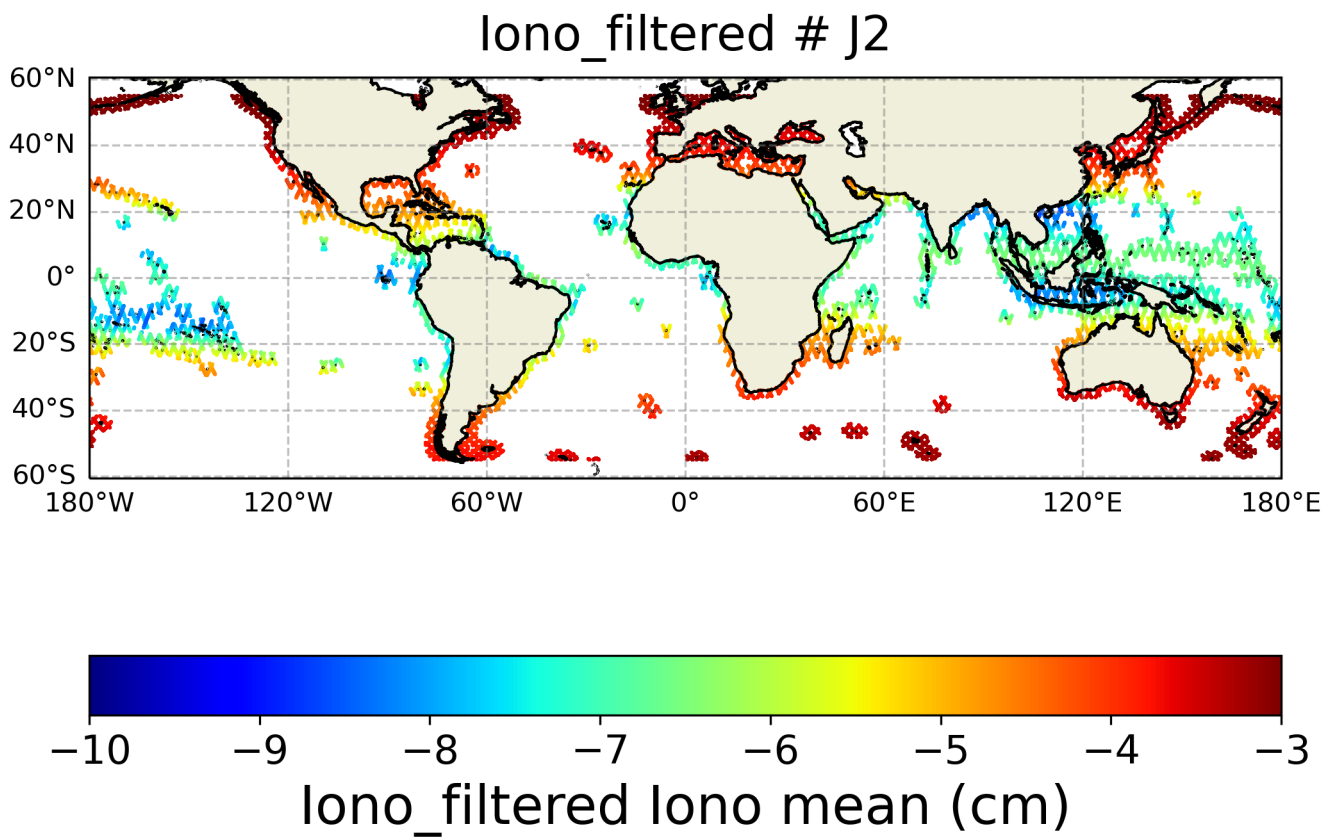
3.1.3 Iono 's mean

FIGURE 7 – Spatial coherence analysis of the mean of the Iono_filtered version of Iono variable
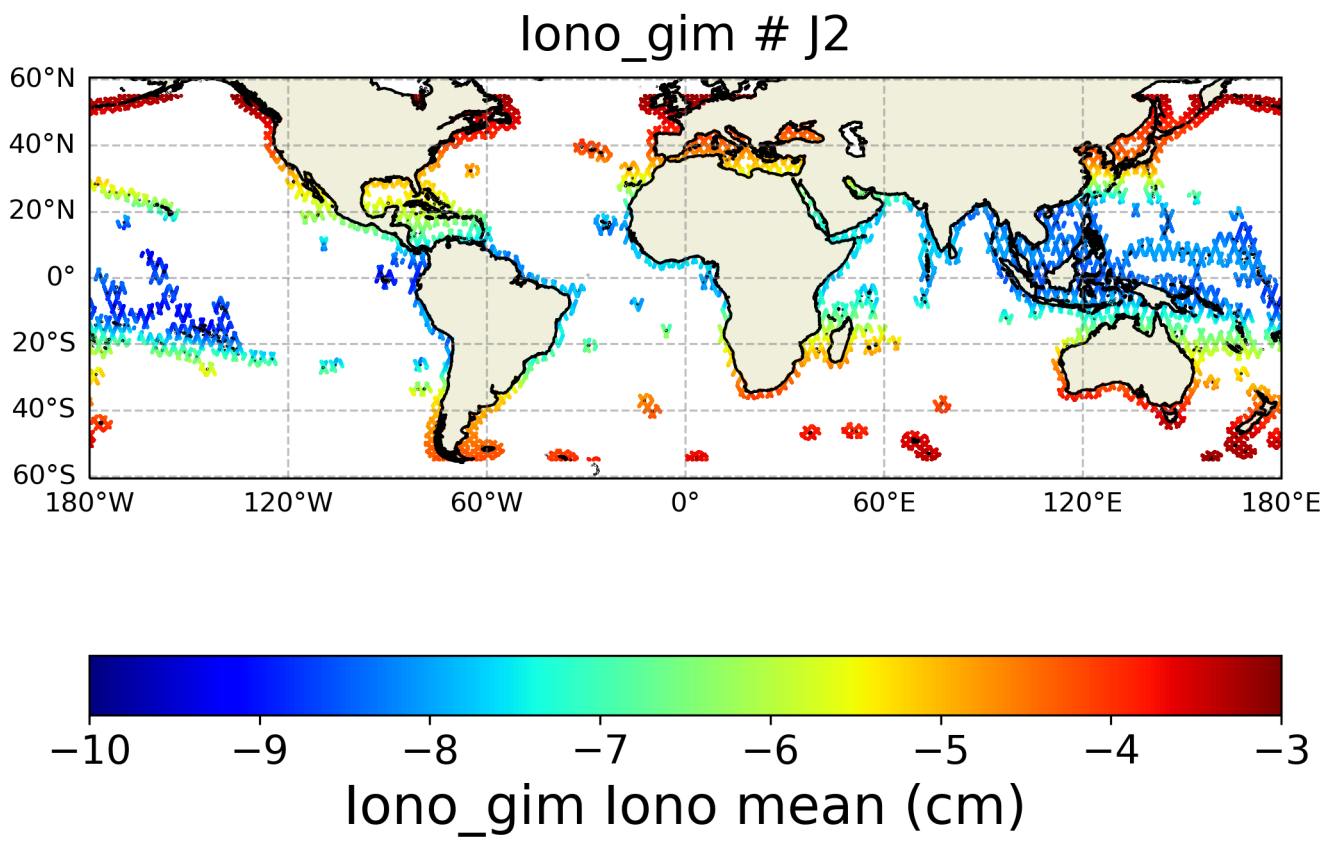
FIGURE 8 – Spatial coherence analysis of the mean of the Iono_gim version of Iono variable
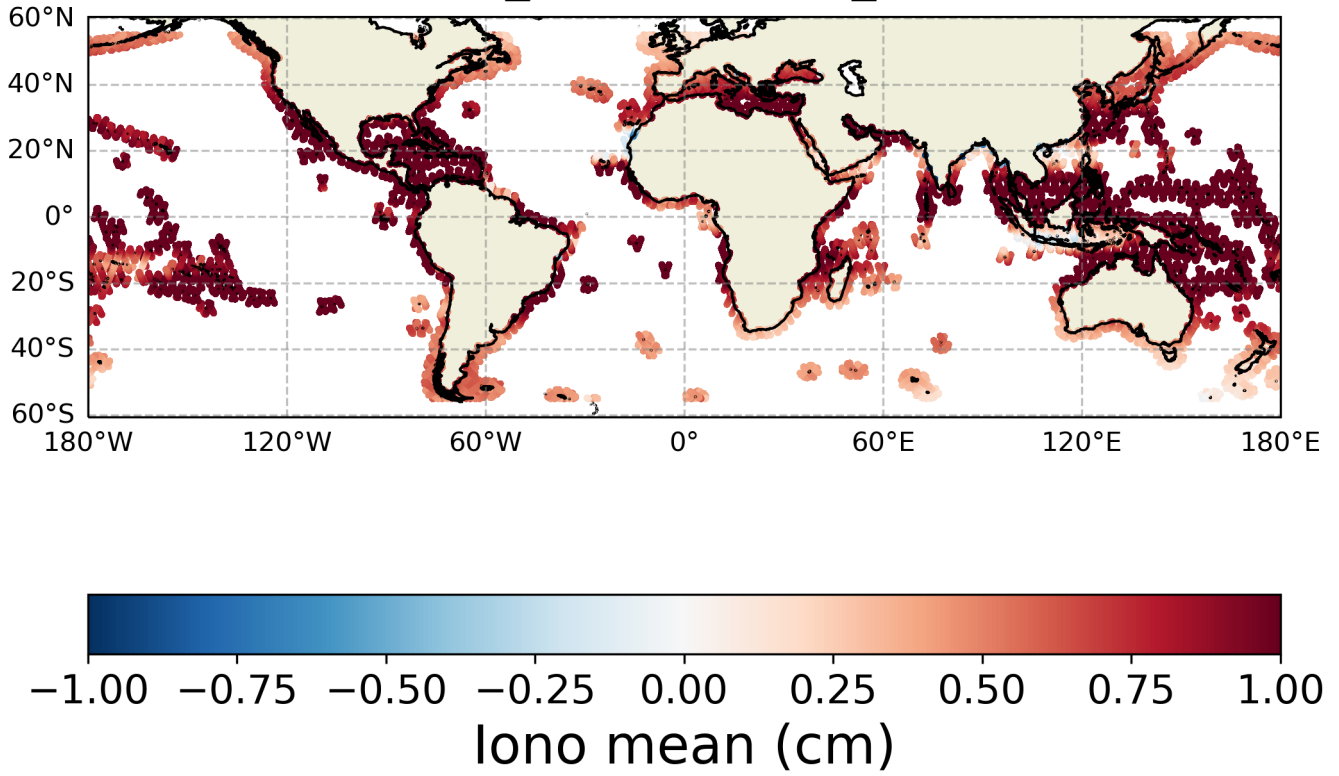
FIGURE 9 – Spatial coherence analysis of the Difference in Iono 's mean between Iono_filtered and Iono_gim
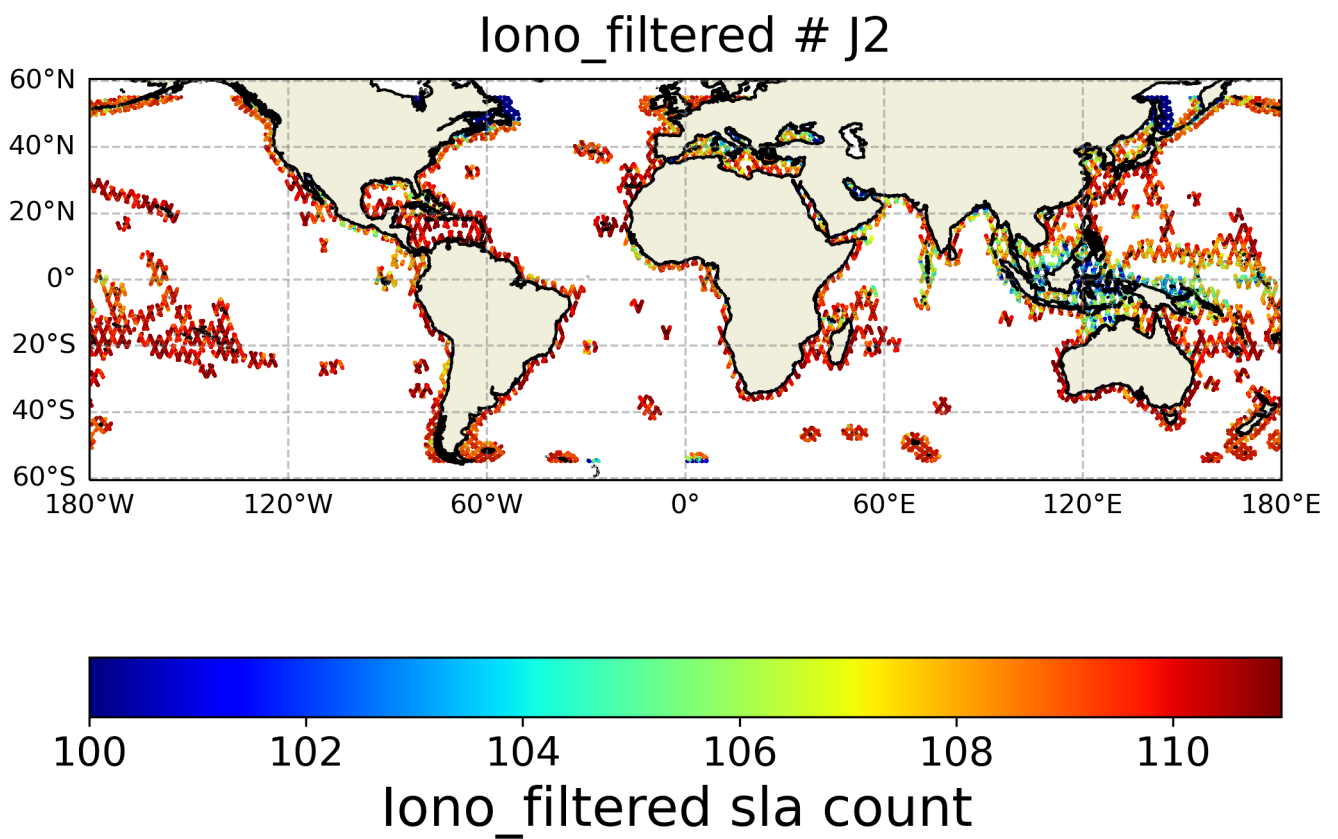
3.2 sla

3.2.1 sla 's count

FIGURE 10 – Spatial coherence analysis of the count of the Iono_filtered version of sla variable
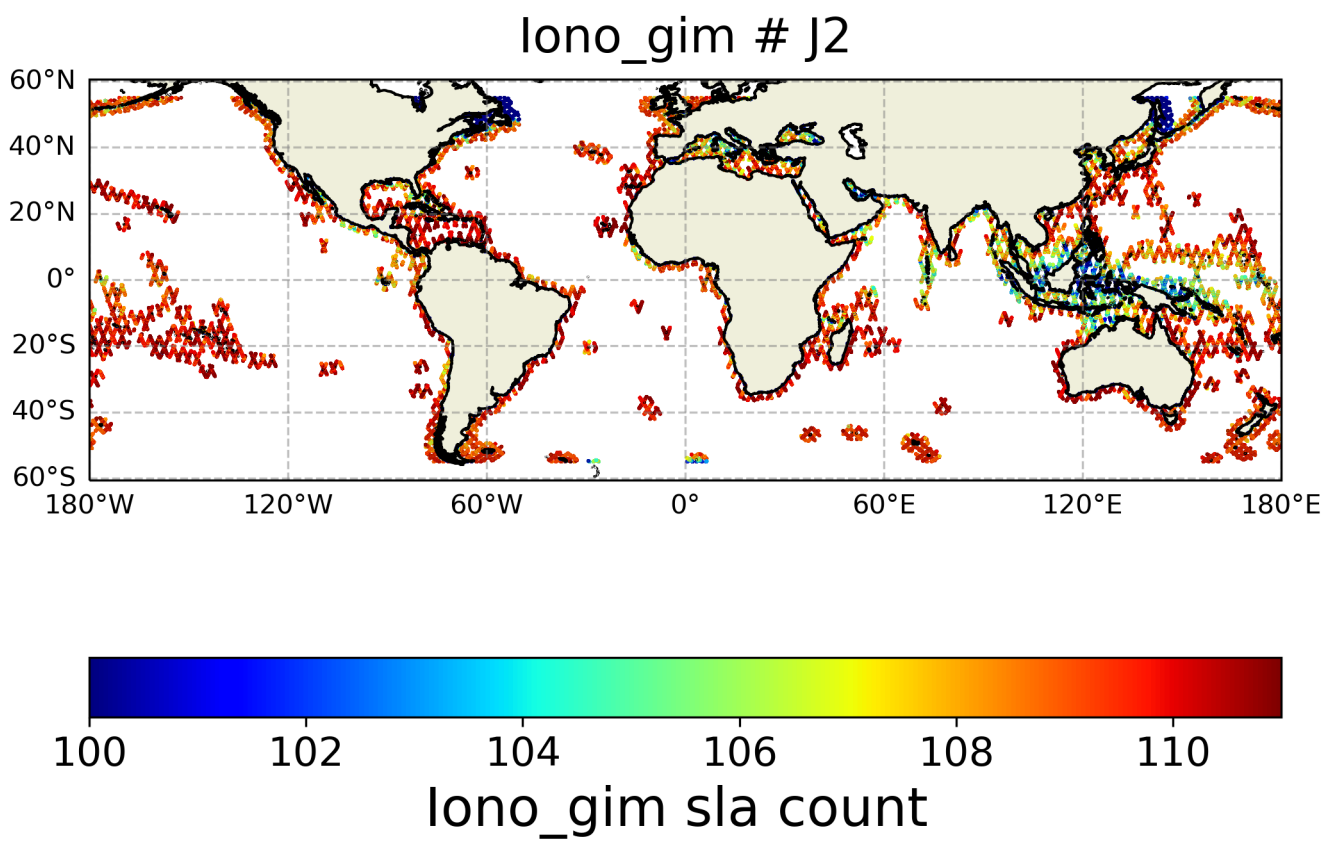
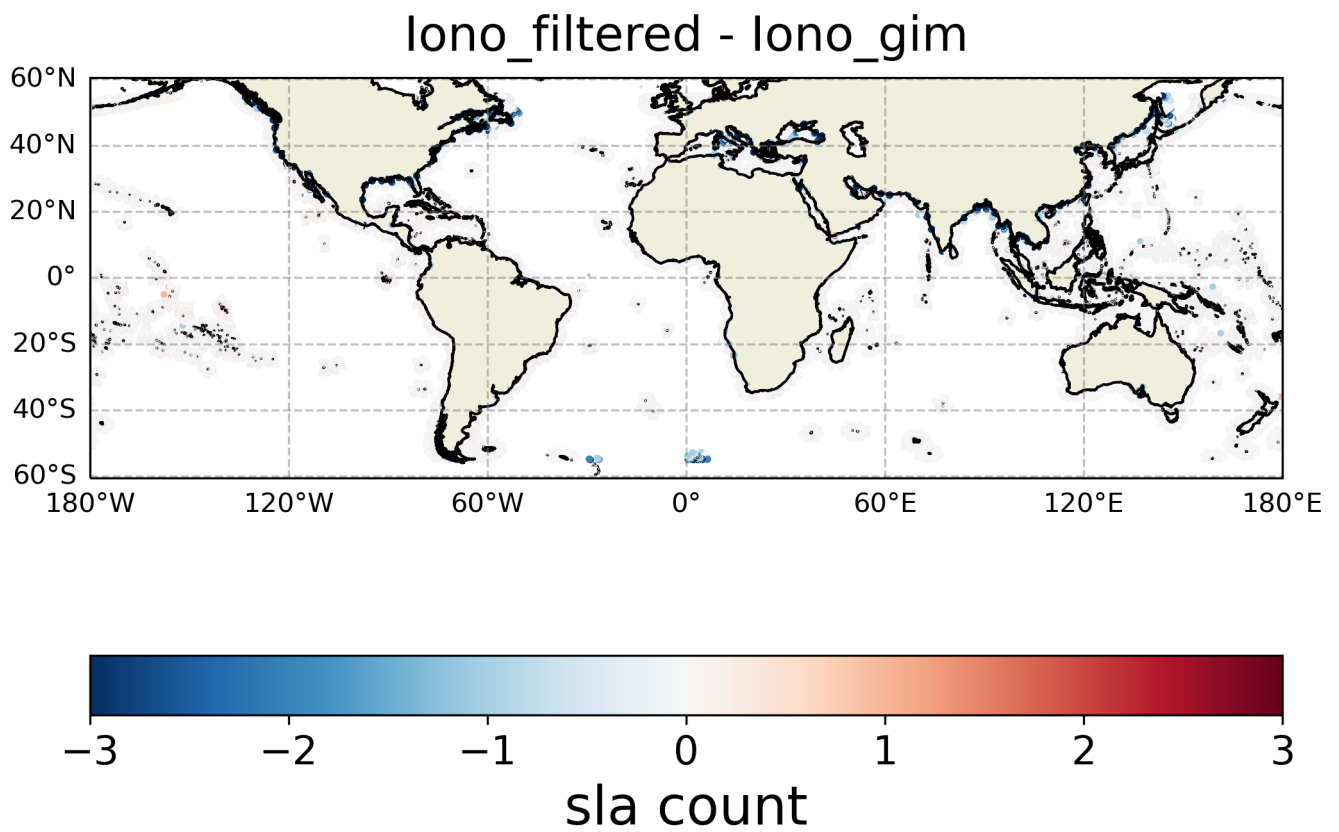FIGURE 11 – Spatial coherence analysis of the count of the Iono_gim version of sla variable

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

3.2.2 sla 's std
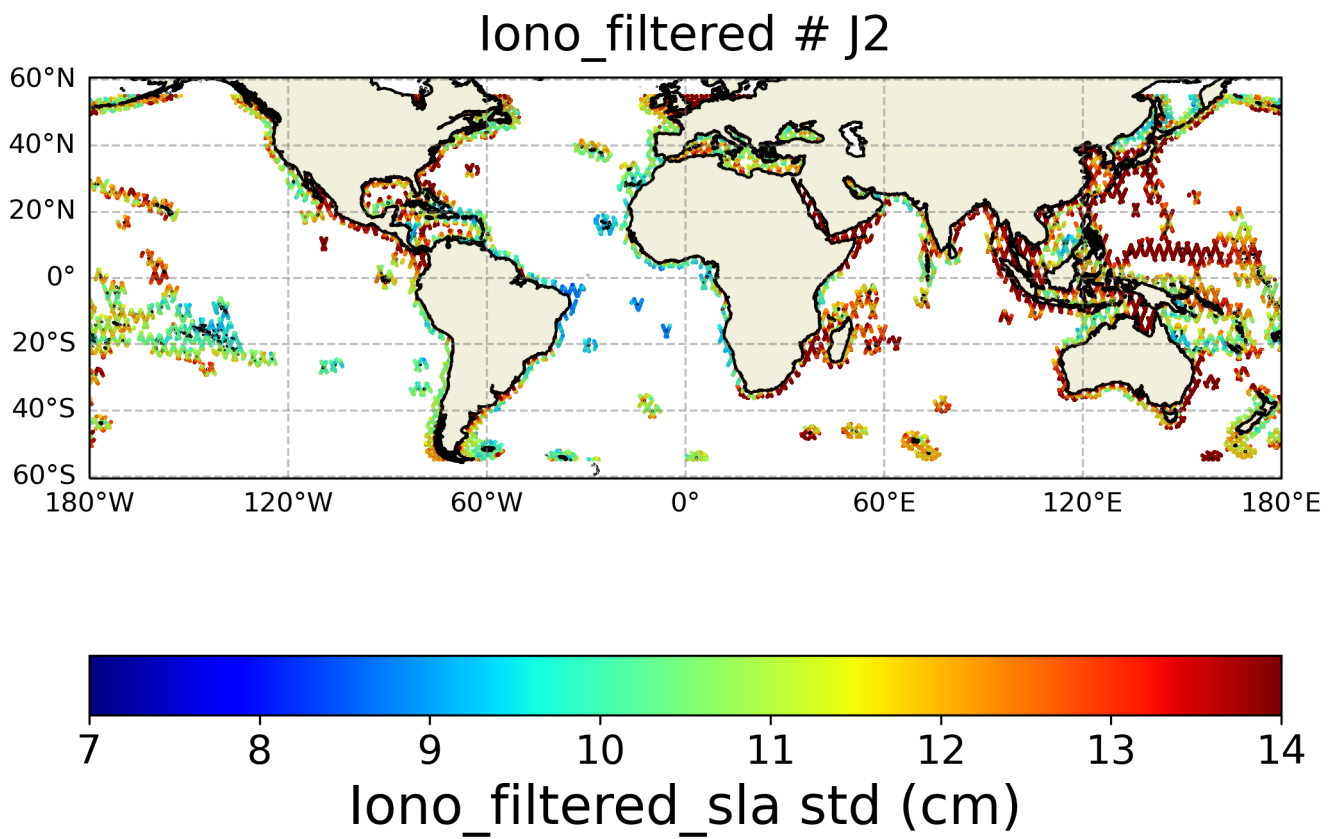
Iono_filtered # J2

FIGURE 13 – Spatial coherence analysis of the std of the Iono_filtered version of sla variable
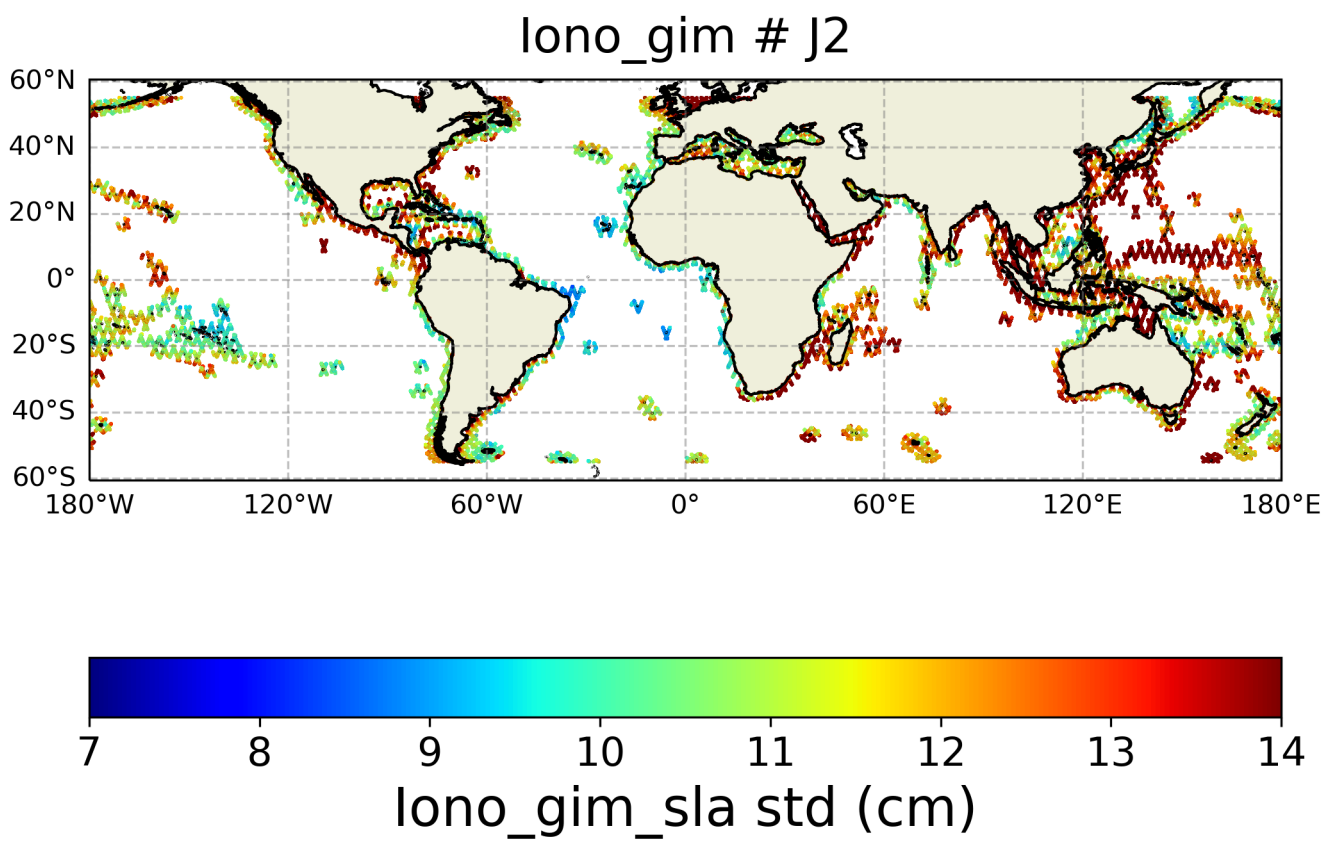
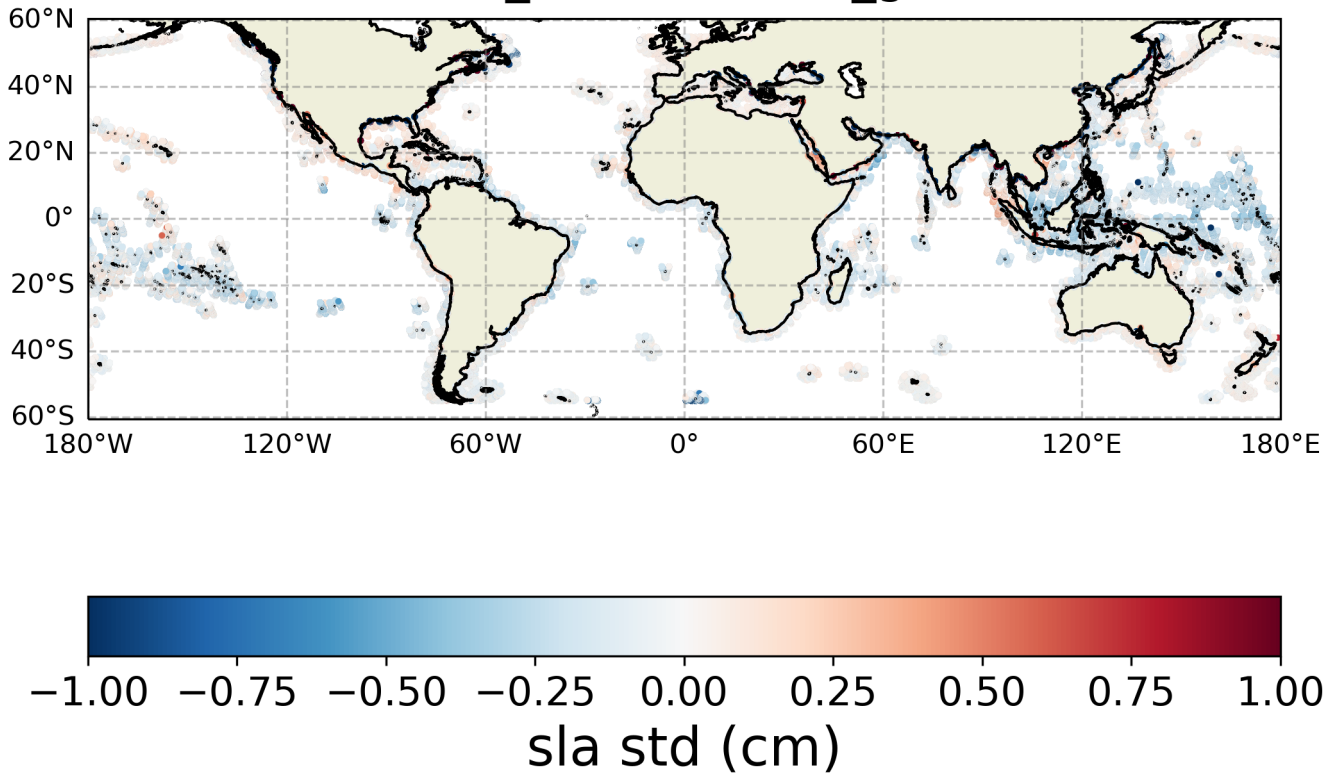FIGURE 14 – Spatial coherence analysis of the std of the Iono_gim version of sla variable

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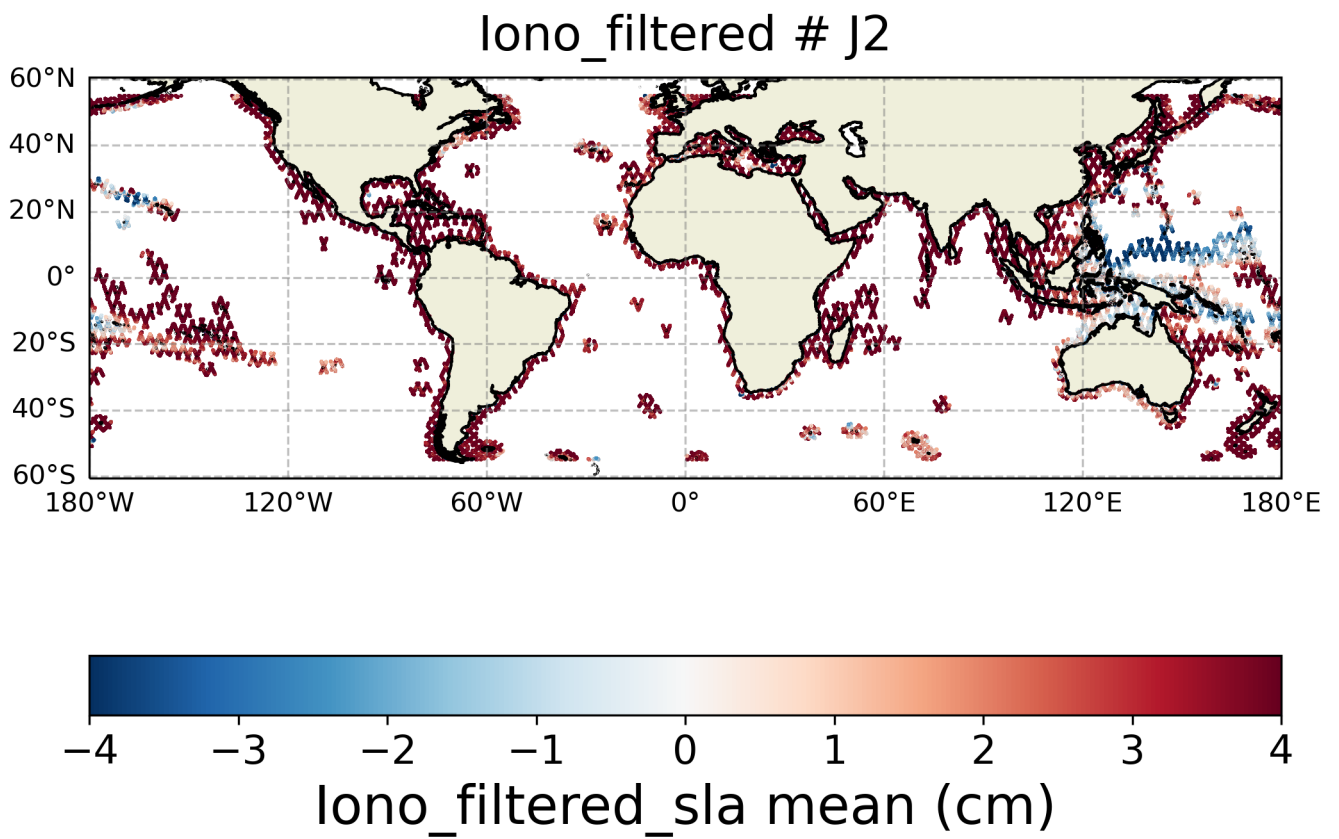
3.2.3 sla 's mean

FIGURE 16 – Spatial coherence analysis of the mean of the Iono_filtered version of sla variable
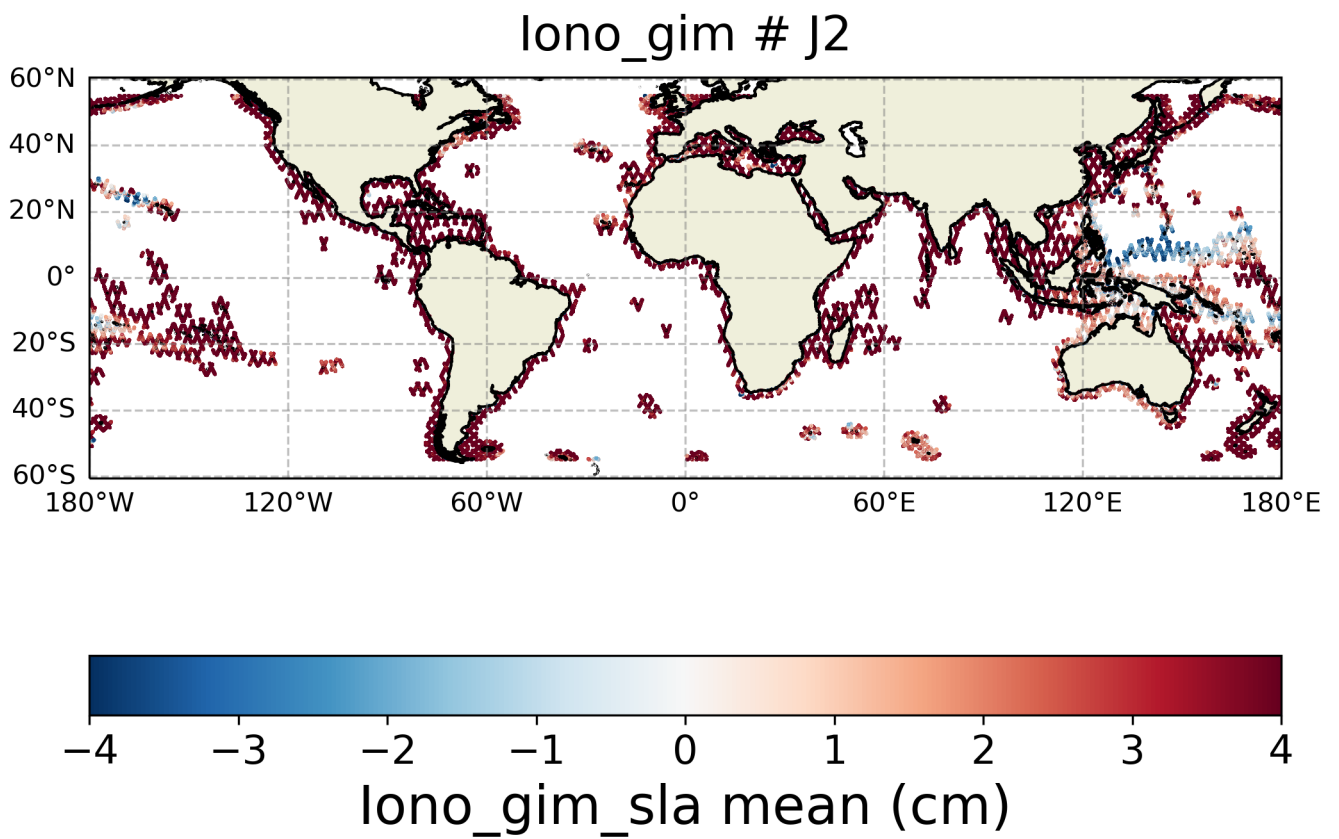
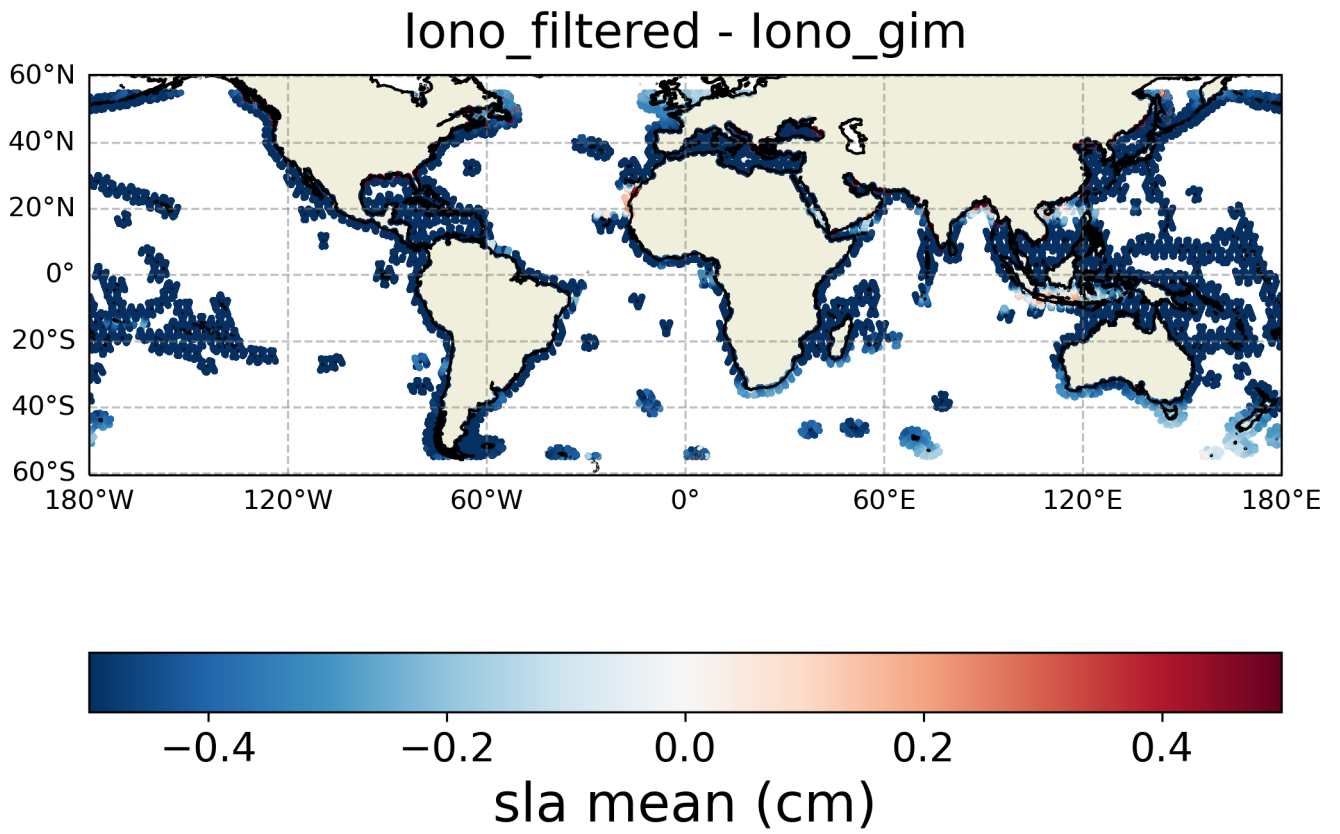FIGURE 17 – Spatial coherence analysis of the mean of the Iono_gim version of sla variable

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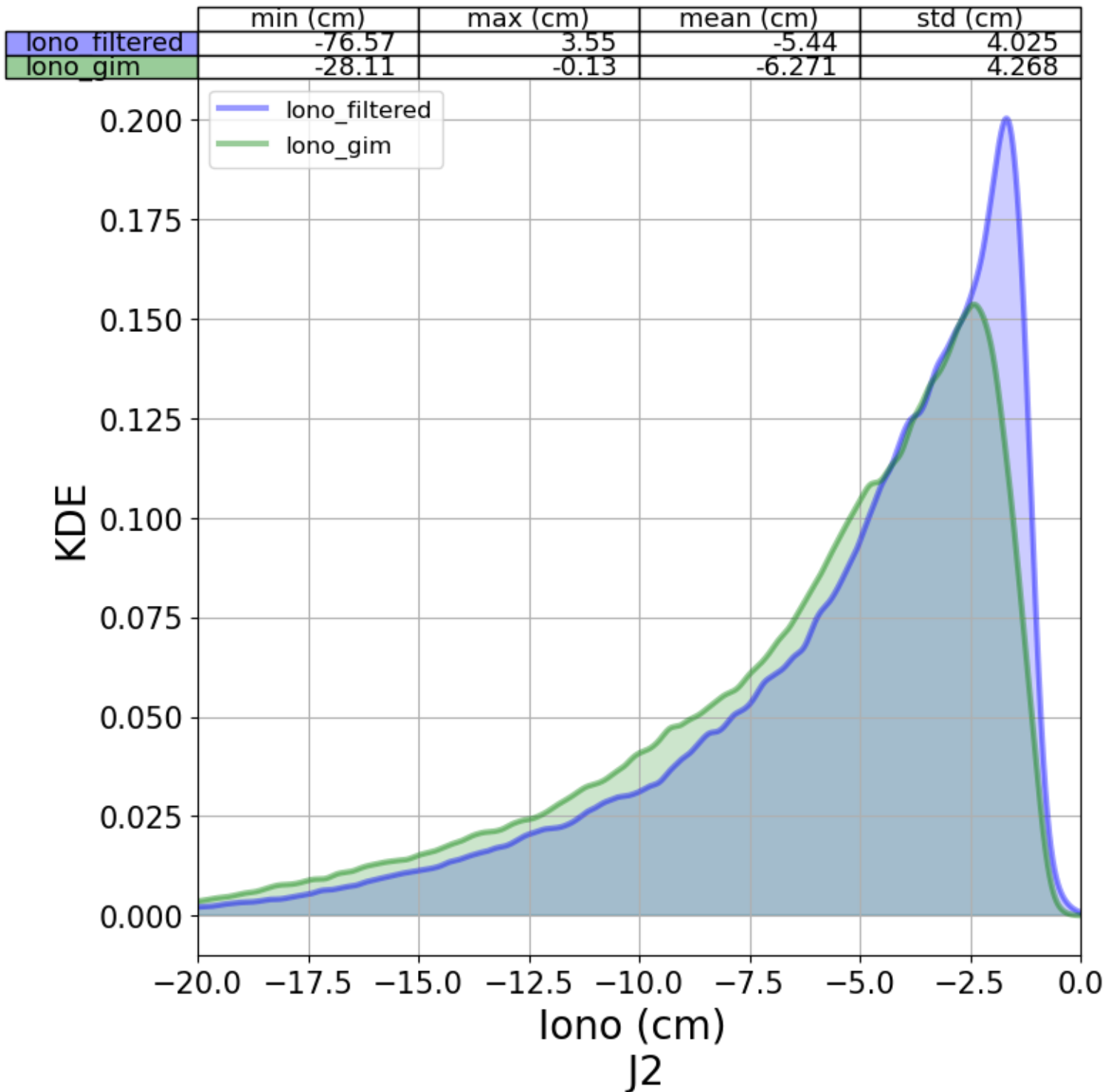
4 Histograms

4.1 Iono

	min (cm)	max (cm)	mean (cm)	std (cm)
Iono_filtered	-76.57	3.55	-5.44	4.025
Iono_gim	-28.11	-0.13	-6.271	4.268

FIGURE 19 – Histogram of each of Iono version

Iono_filtered - Iono_gim	min (cm)	max (cm)	mean (cm)	std (cm)
	-74.01	11.74	0.841	1.067
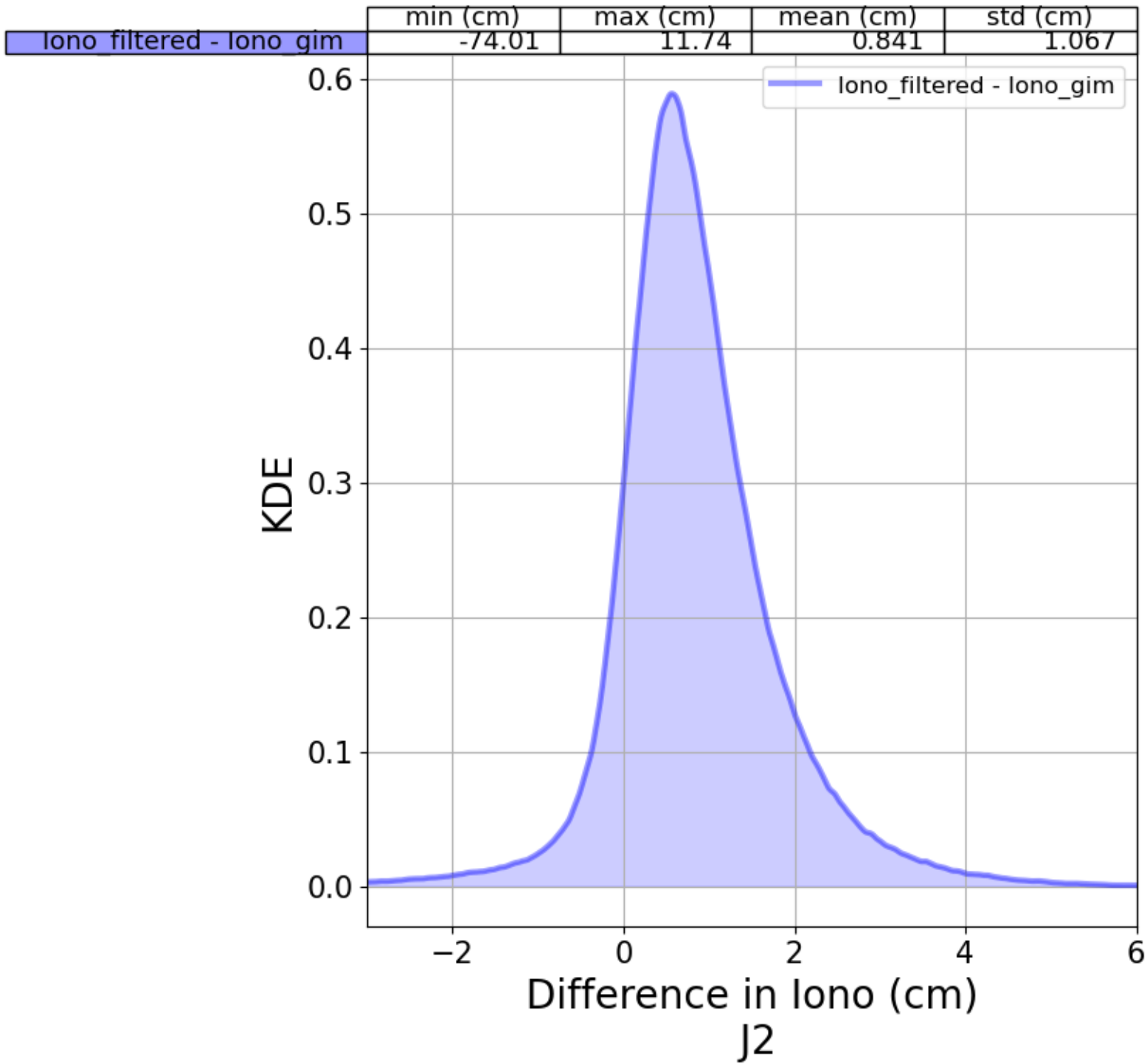
FIGURE 20 – Histograms of difference of each Iono version and reference one

	min (cm)	max (cm)	mean (cm)	std (cm)
Iono_filtered	0.883	12.951	3.471	1.253
Iono_gim	1.032	6.661	3.684	1.212
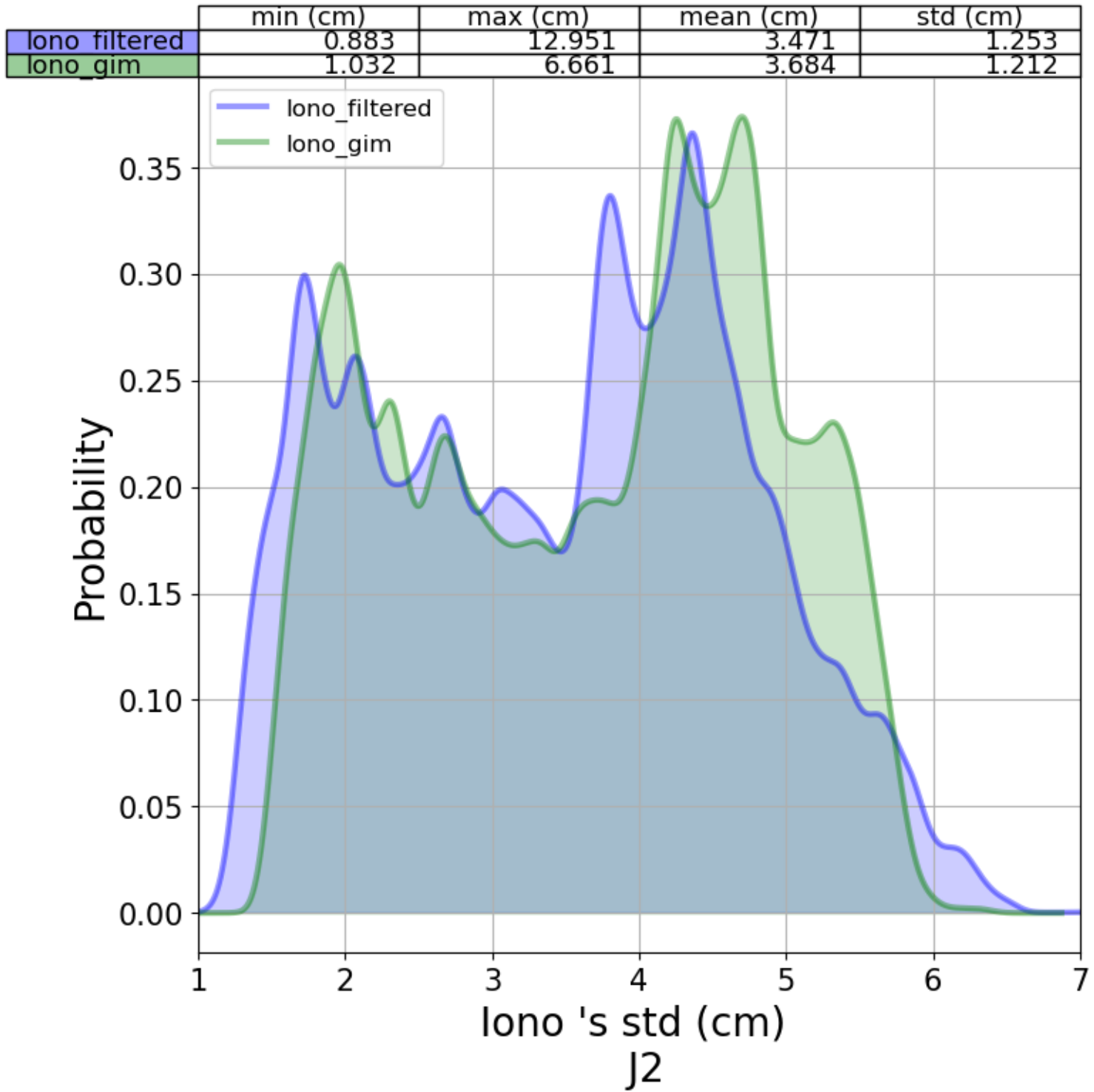
FIGURE 21 – Histograms of the standard deviation of each Iono version

4.2 sla

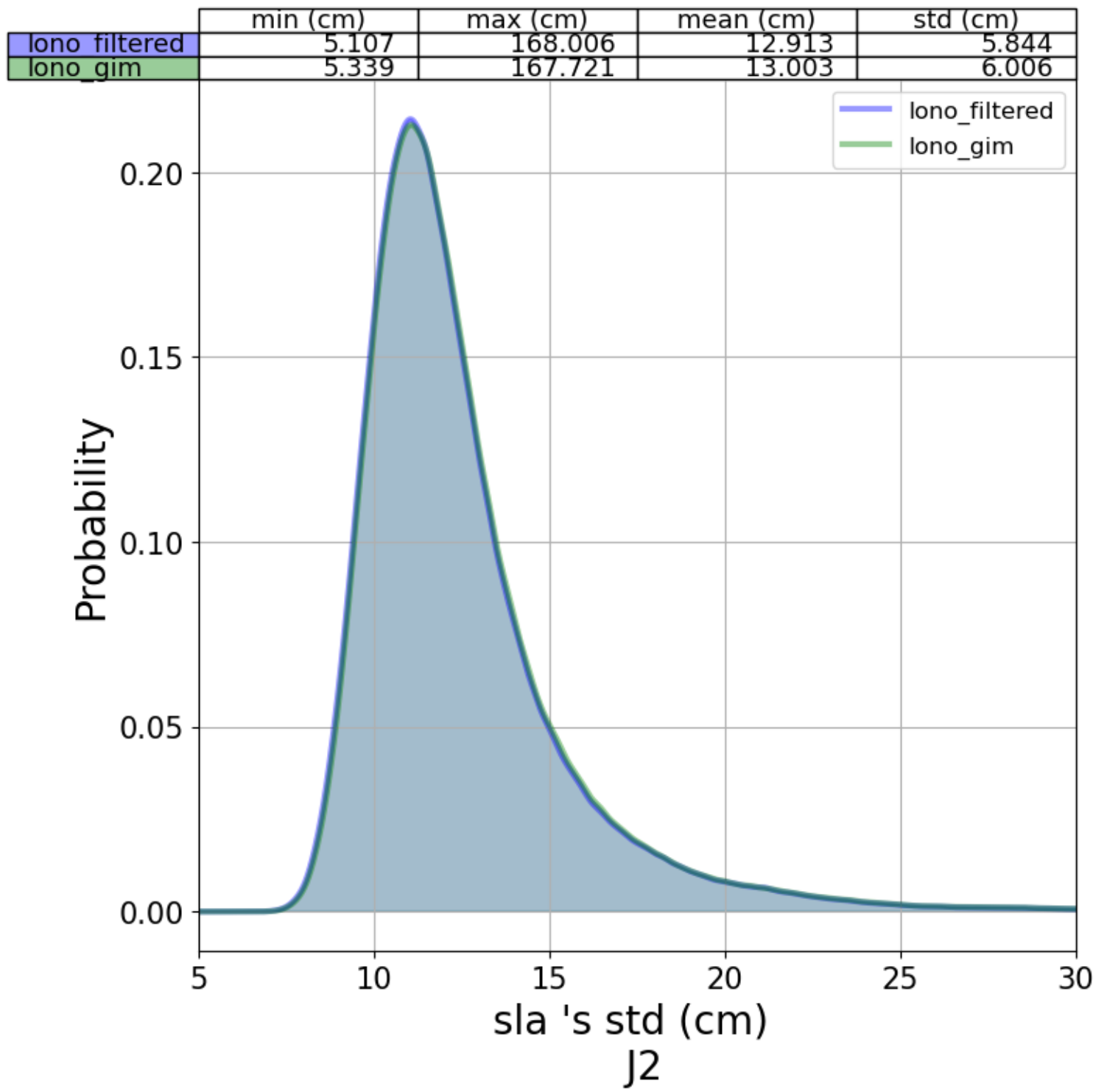|	min (cm)	max (cm)	mean (cm)	std (cm)
Iono_filtered	5.107	168.006	12.913	5.844
Iono_gim	5.339	167.721	13.003	6.006

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

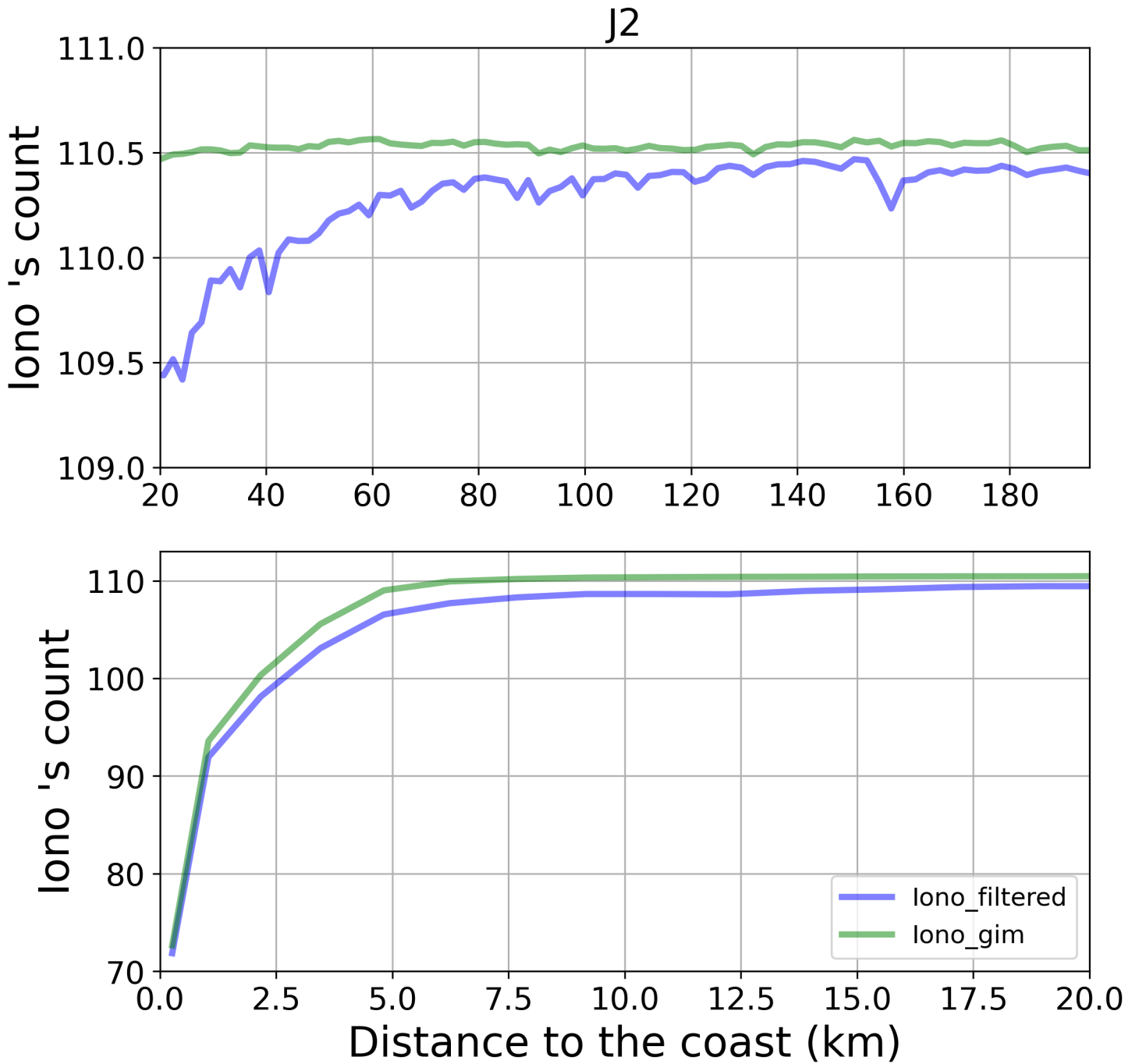# 5 Along-track analysis

5.1 Iono

5.1.1 Iono 's count

FIGURE 23 – Along-track analysis of Iono 's count
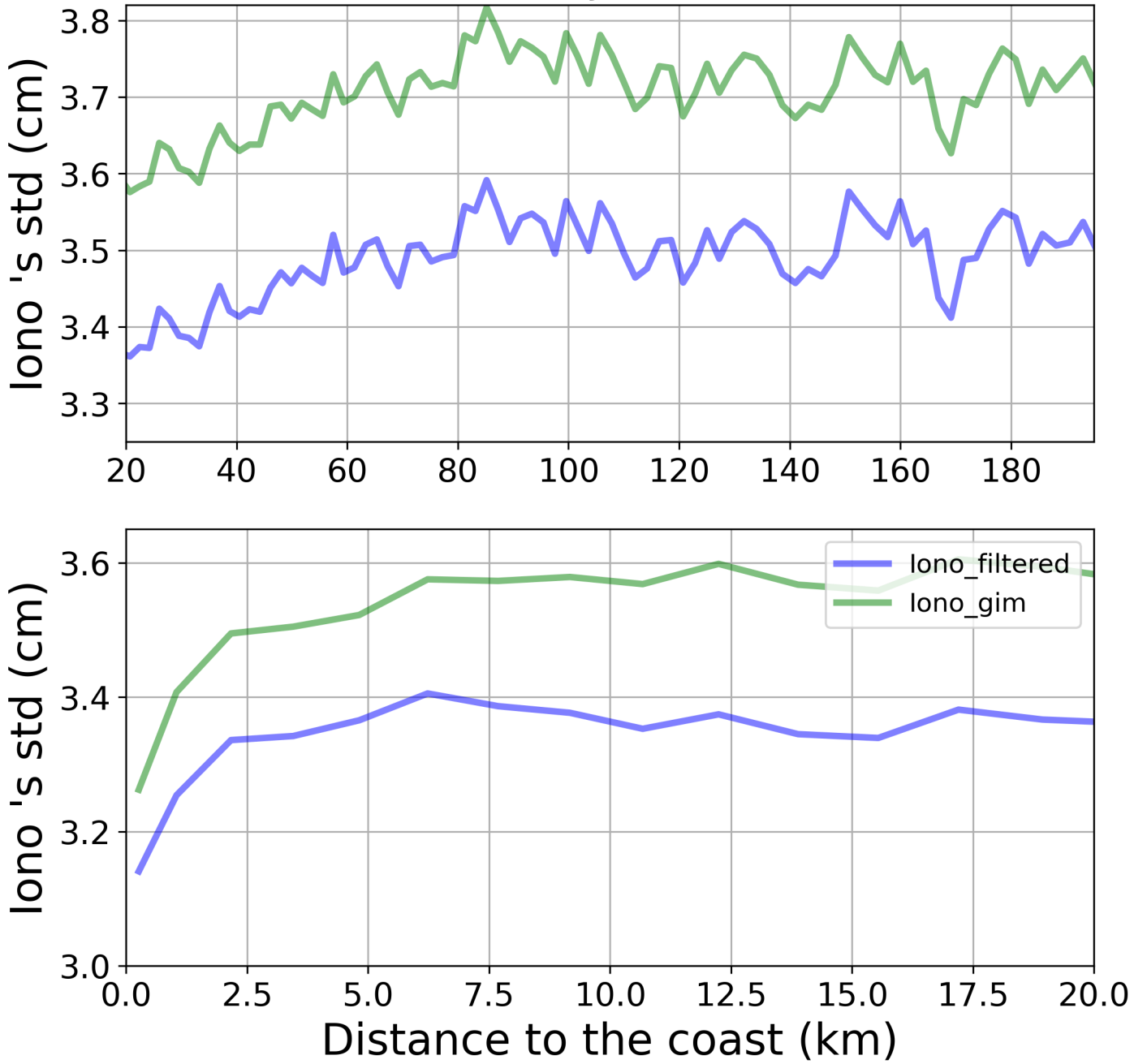
Figure 24 – Along-track analysis of Iono 's std
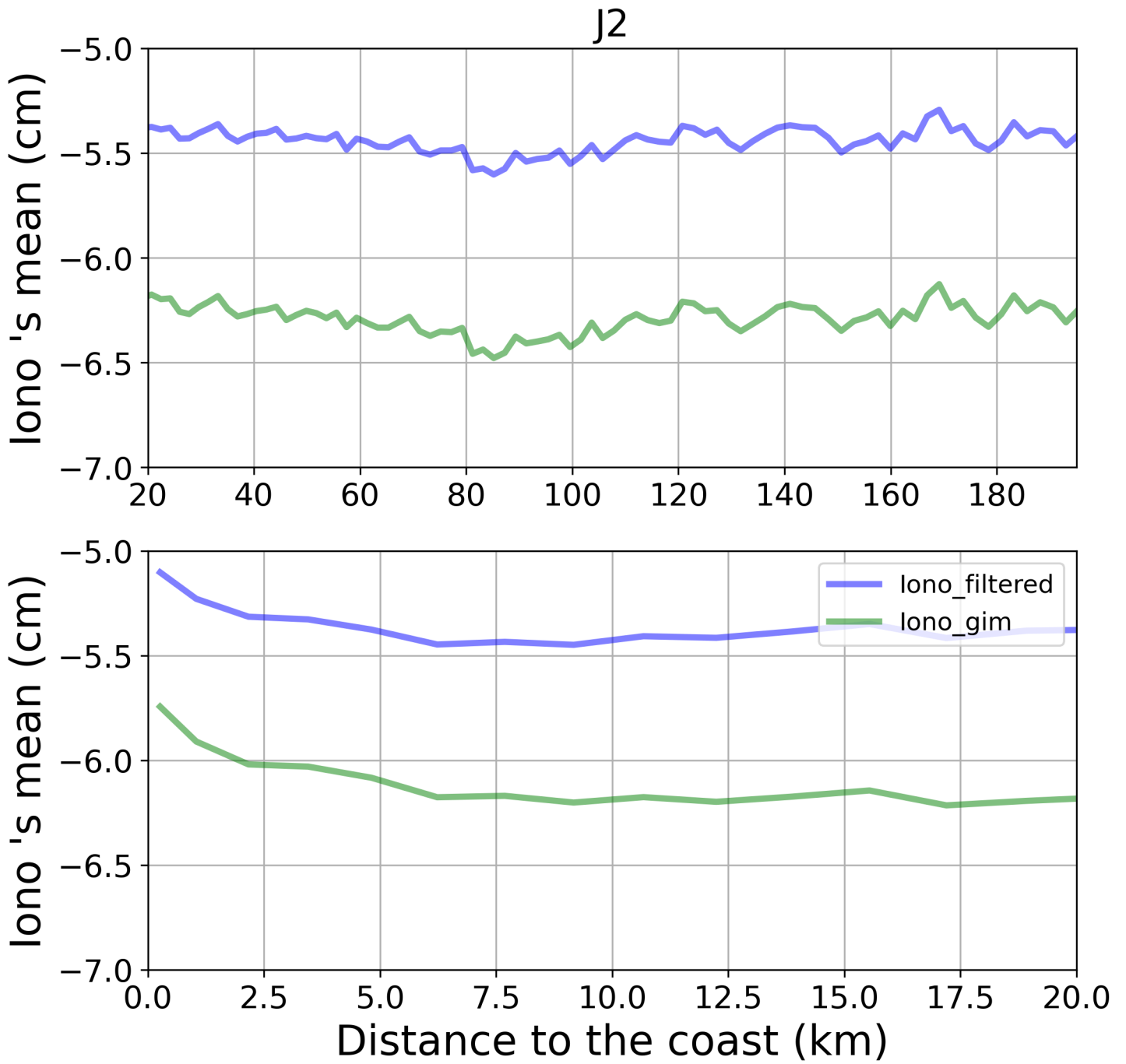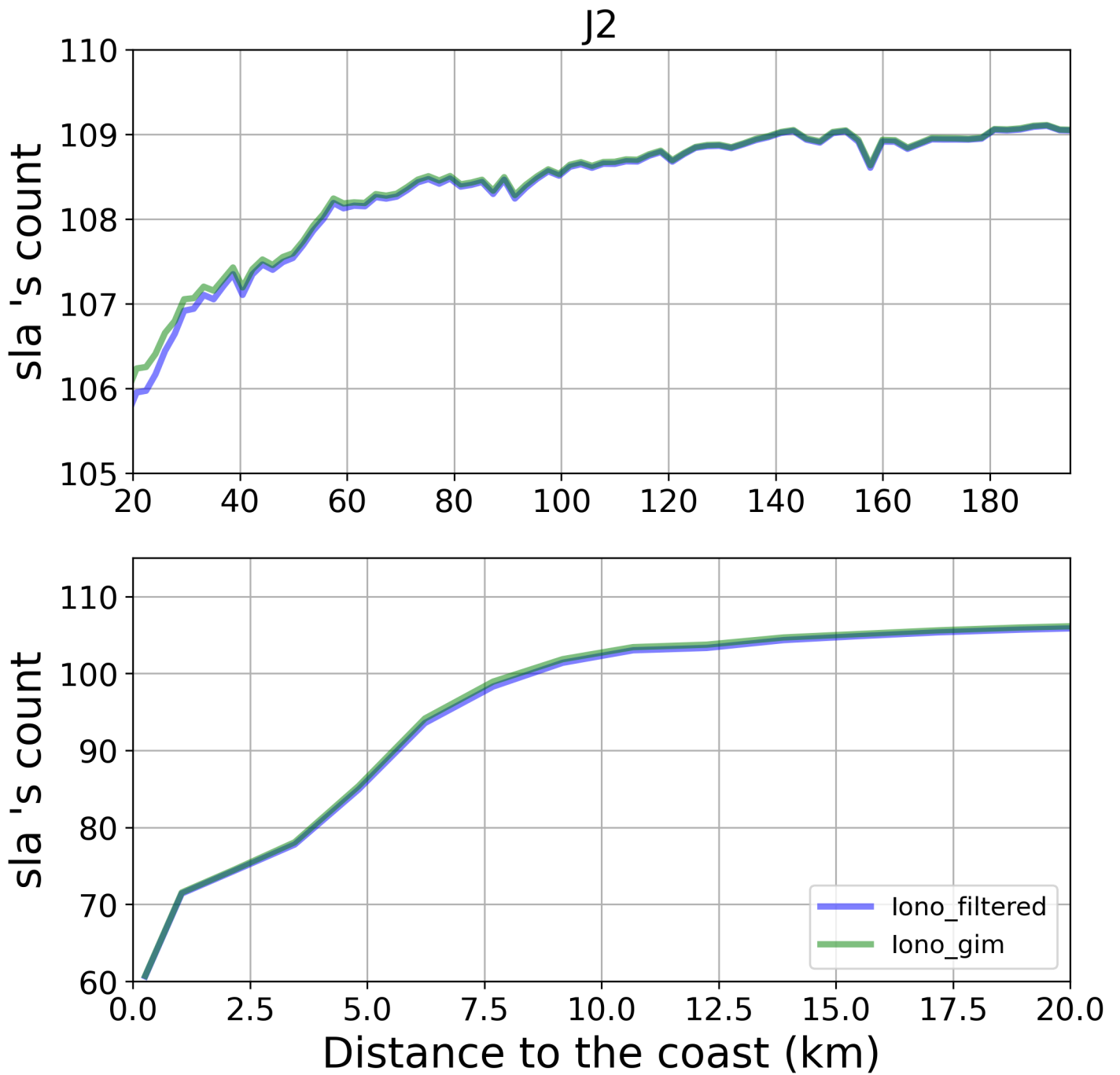
FIGURE 25 – Along-track analysis of Iono 's mean
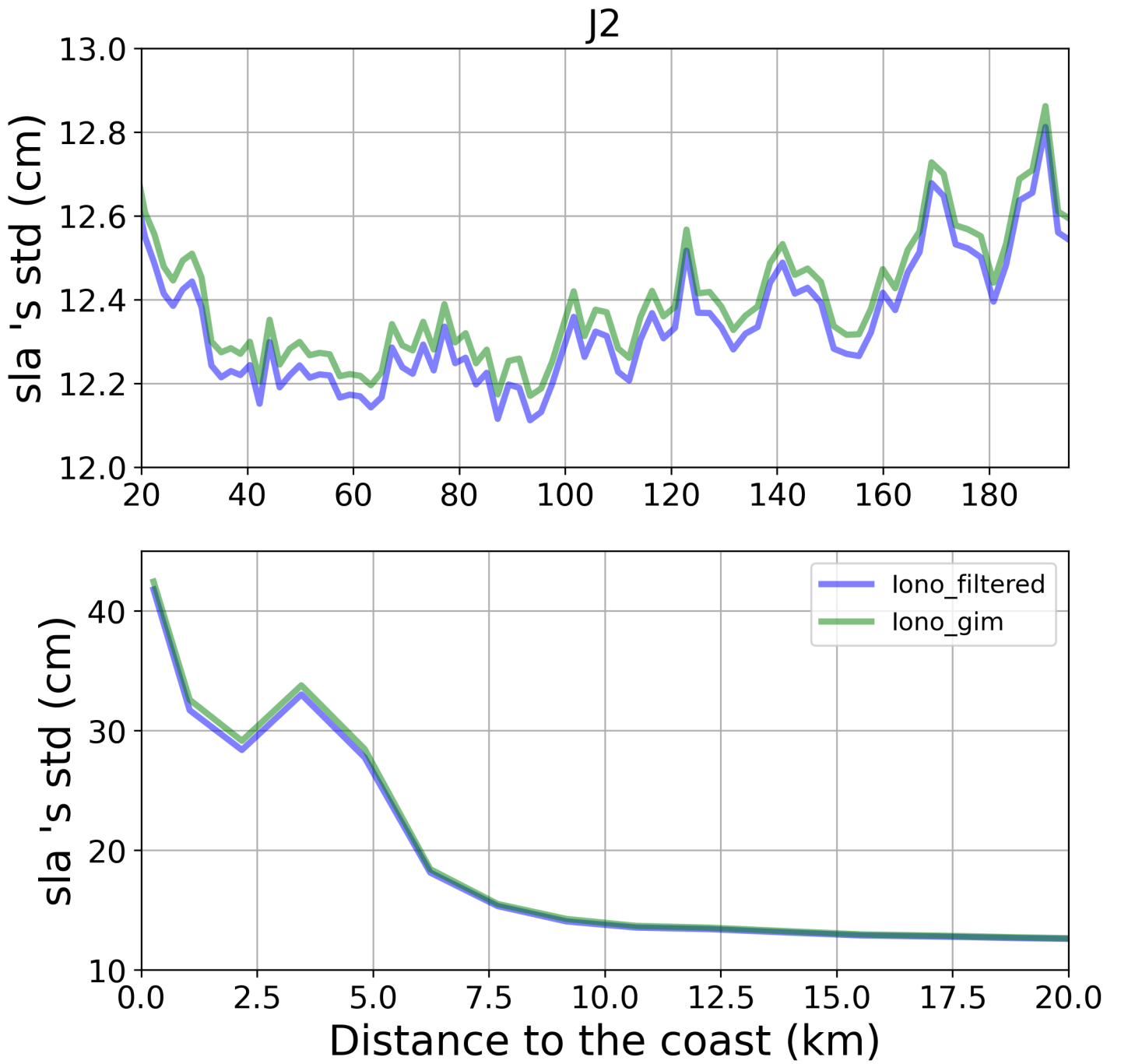
5.2 sla

5.2.1 sla 's count

FIGURE 26 – Along-track analysis of sla 's count
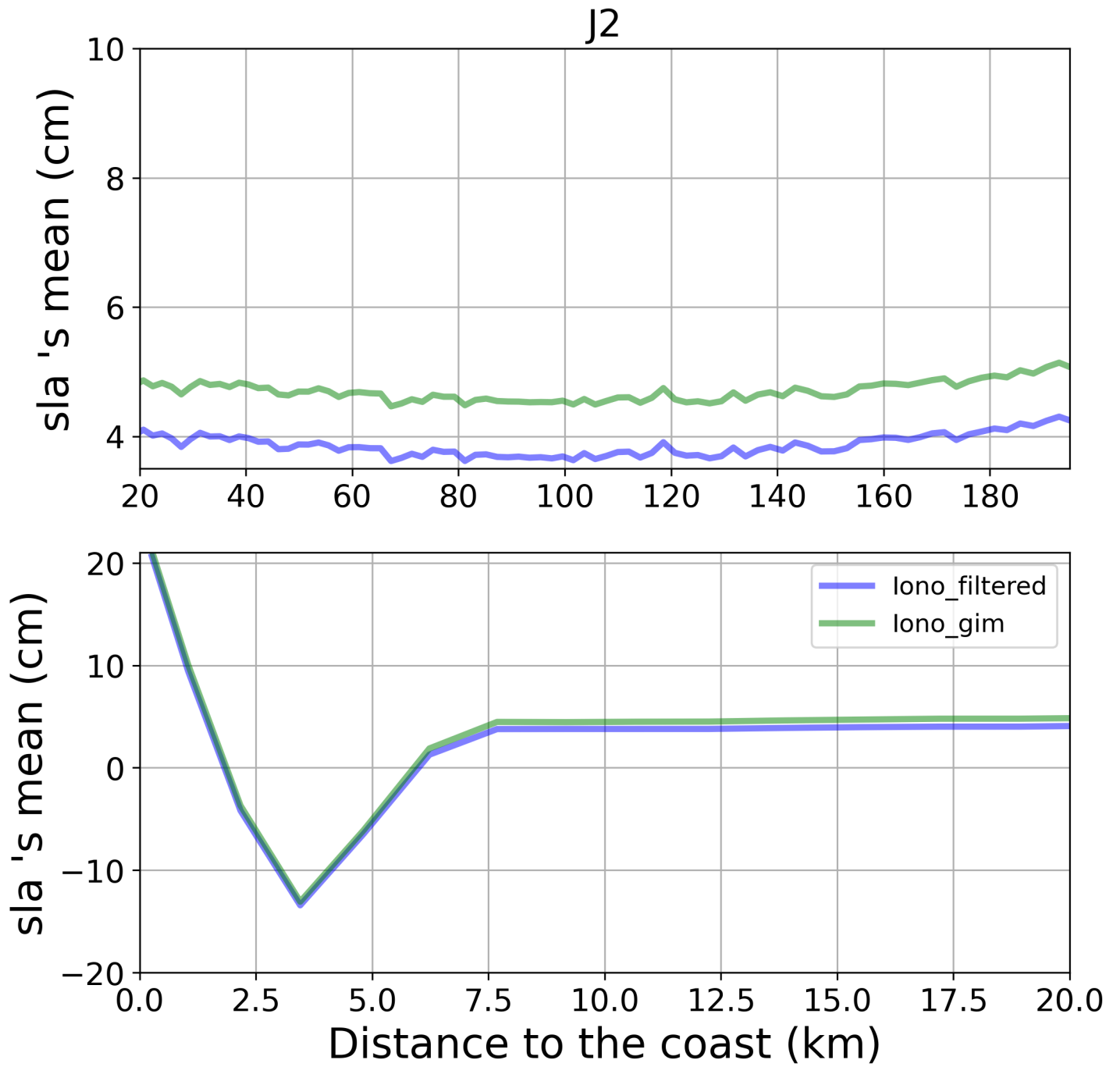
FIGURE 27 – Along-track analysis of sla 's std

5.2.3 sla 's mean

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