

# Coastal wet tropospheric correction: GPD vs RWT

Study variable	<b>GPD</b>
Reference variable	<b>RWT</b>
Missions	Envisat ( <i>en</i> )
Period	[19259, 22209]

Creation date : 2011/08/30

## Contents

<b>A001</b>	<b>4</b>
<b>A002</b>	<b>5</b>
<b>A003</b>	<b>6</b>
<b>A004</b>	<b>8</b>
<b>A101</b>	<b>9</b>
<b>A102</b>	<b>10</b>
<b>A103</b>	<b>11</b>
<b>A104</b>	<b>12</b>
<b>A201</b>	<b>13</b>
<b>A202</b>	<b>18</b>
<b>A203</b>	<b>20</b>
<b>A204</b>	<b>23</b>
<b>A205</b>	<b>25</b>
<b>A206</b>	<b>27</b>
<b>A207</b>	<b>30</b>

<b>A208</b>	<b>31</b>
<b>A209</b>	<b>32</b>
<b>C001</b>	<b>33</b>
<b>C002</b>	<b>34</b>
<b>C003</b>	<b>35</b>
<b>C004</b>	<b>36</b>

## Study overview

In this study, the wet tropospheric correction computed by the University of Porto, Faculty of science in the scope of the Sea level CCI project (WP2710) has been compared with the radiometric correction to calculate the Envisat sea-level height (SSH).

The impact of using these wet tropospheric corrections on the SSH computation has been analyzed for Envisat mission from September 2002 (cycle 10) to October 2010 (Cycle 93).

The major aim of WP2710 is to provide a wet tropospheric correction for the coastal zone, applicable to all missions, fully compatible with respect to the microwave radiometer (MWR) based correction that shall be adopted in the open ocean, and ensuring its continuity and consistency in the open ocean/coastal transition zone. It has been produced by the university of Porto, Faculty of science (J. Fernandes).

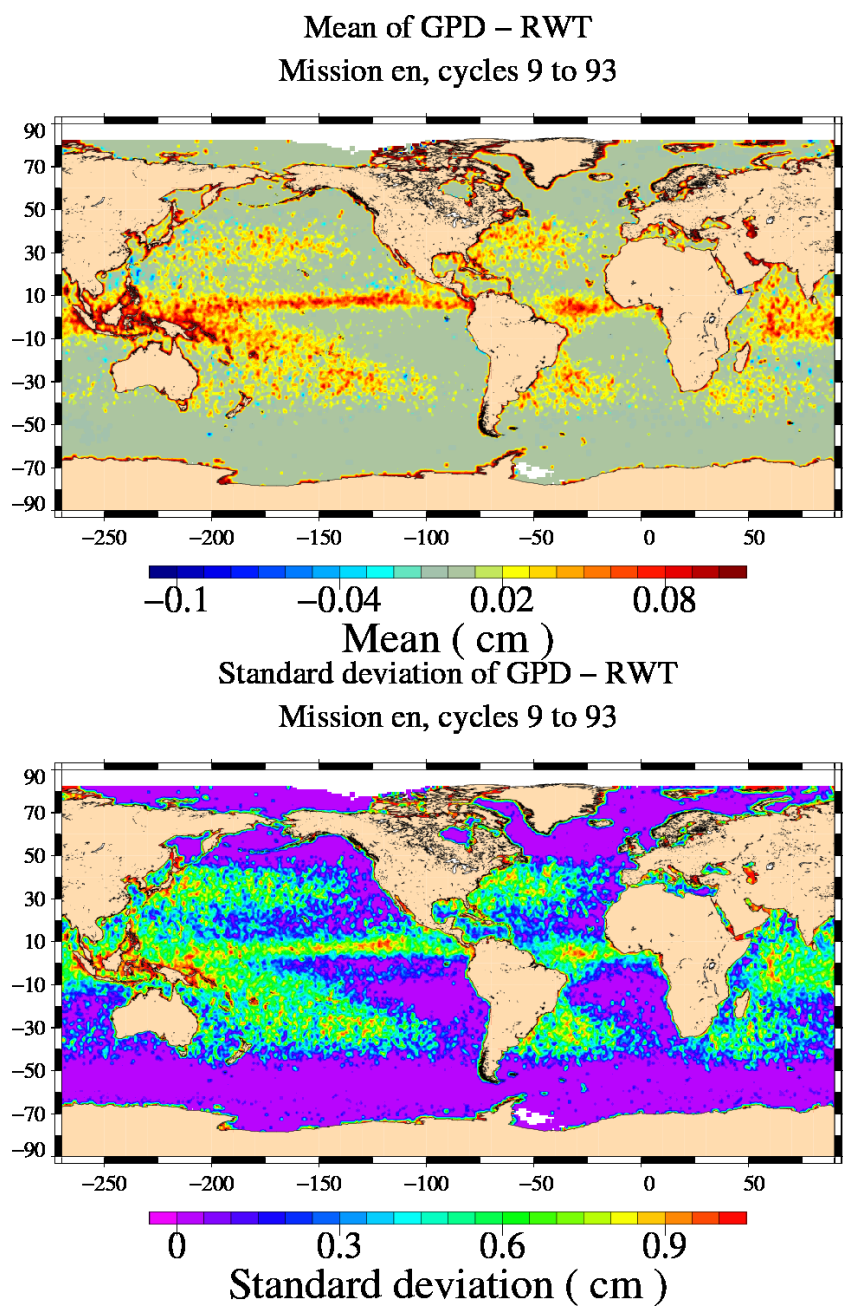
This study has been performed on points where the studied correction is a valid estimate (GPD flag=1) and on non corrupted ocean points where it equals the radiometric correction (GPD flag=0).

For Envisat mission, the reference correction is the radiometric wet tropospheric correction present in GDR products.

All the validation diagnostics displayed in this report have been performed in agreement with the Sea-Level CCI Product Validation Plan (PVP).

Diagnostic A001 (mission en)	
Name : Temporal evolution of differences between both altimetric components	
Input data : Along-track altimetric components	
Description : The temporal evolution of global statistics (mean, variance, slope) of differences between 2 different standards of a same altimetric component (sea surface height correction, altimeter parameter, orbit) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) . These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.	
<div><div><div>Mean of GPD - RWT Mission en, cycles 9 to 93</div><div><div>20406080</div><div>Mean = 0.04304Slope = 0.0141 mm/yr</div><div>0.080.070.060.050.04</div><div>2004200620082010</div></div></div><div><div>Standard deviation of GPD - RWT Mission en, cycles 9 to 93</div><div><div>20406080</div><div>Mean = 0.6946</div><div>1.00.90.80.70.6</div><div>2004200620082010</div></div></div></div>	

<b>Diagnostic A002 (mission en)</b>
<b>Name :</b> Map of differences between both altimetric components over all the period
<b>Input data :</b> Along-track altimetric components
<b>Description :</b> The map of global statistics (mean, standard deviation) of differences between 2 different standards of a same altimetric component (sea surface height correction, altimeter parameter, orbit) are calculated over a given period which is the longer as possible to have obtain reliable statically results. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

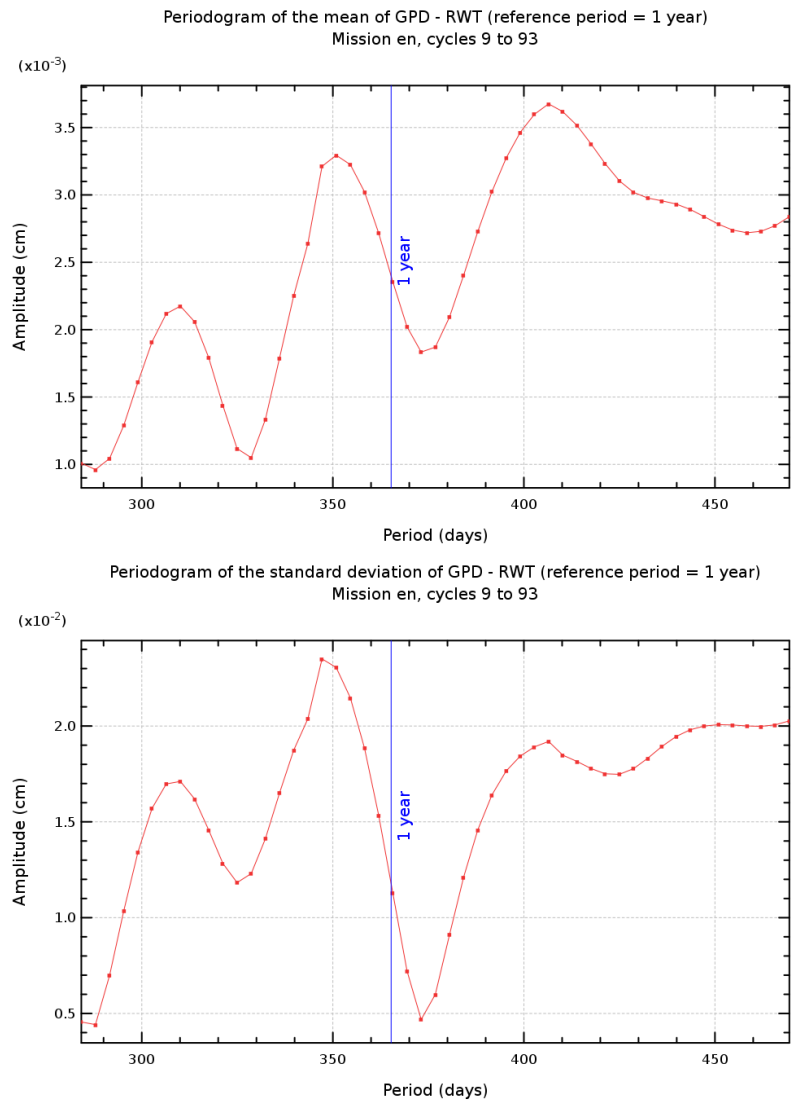


Diagnostic A003\_a (mission en)

**Name :** Periodogram derived from temporal evolution of altimetric component differences

**Input data :** Along-track altimetric components

**Description :** The periodogram derived from temporal and global altimetric component differences is calculated from cycle by cycle monitoring of altimetric component differences (derived from diagnostic A001). It is calculated from the mean or the variance differences. The Periodogram can be calculated for all the periods, but it can be focused on a dedicated period.



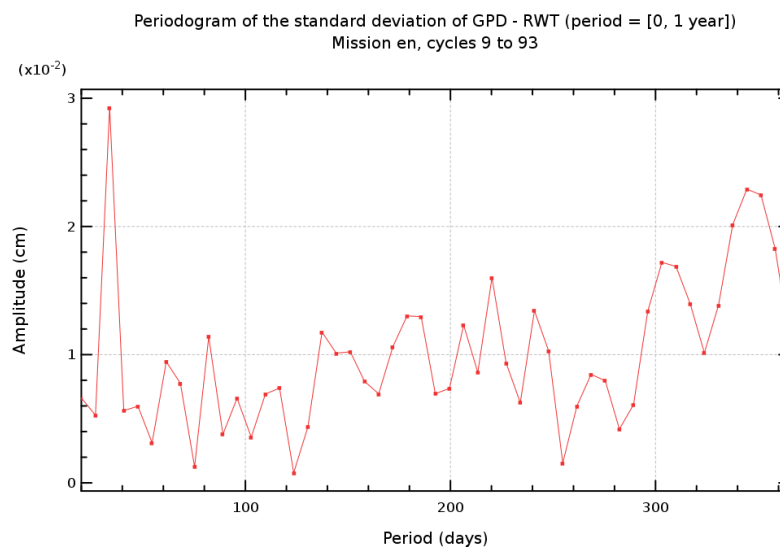
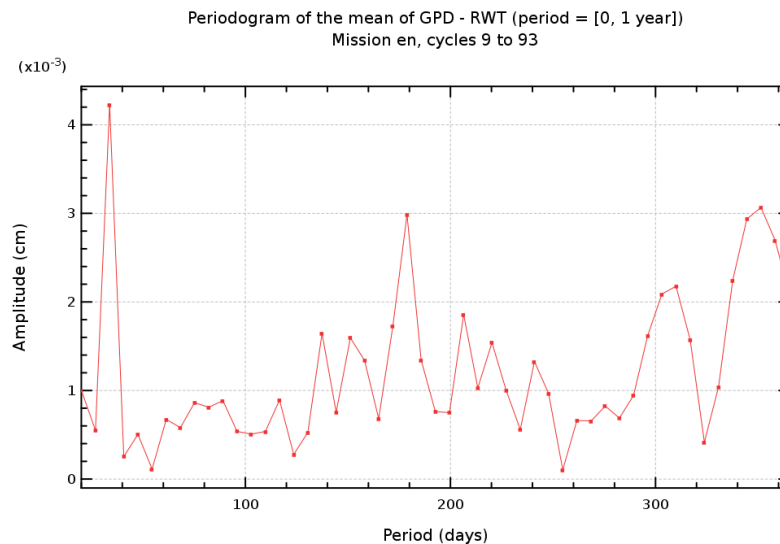
## Diagnostic A003\_b (mission en)

**Name :** Periodogram derived from temporal evolution of altimetric component differences

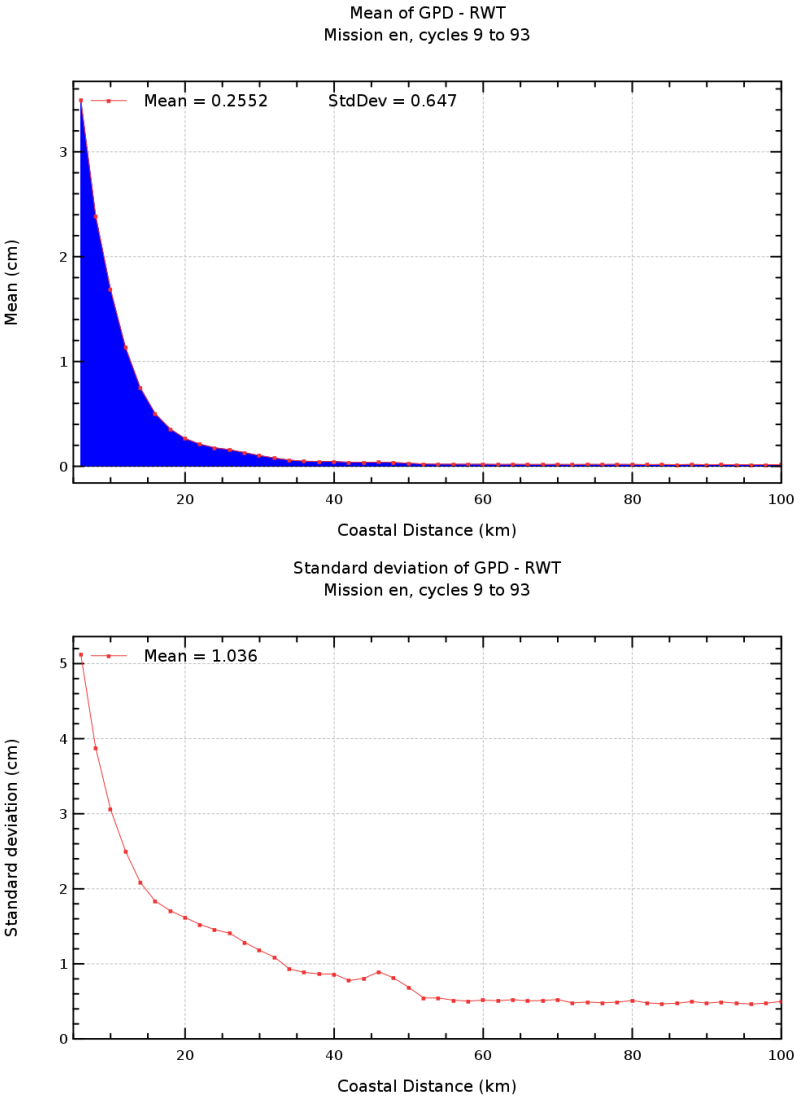
**Input data :** Along-track altimetric components

**Description :** The periodogram derived from temporal and global altimetric component differences is calculated from cycle by cycle monitoring of altimetric component differences (derived from diagnostic A001). It is calculated from the mean or the variance differences. The Periodogram can be calculated for all the periods, but it can be focused on a dedicated period.

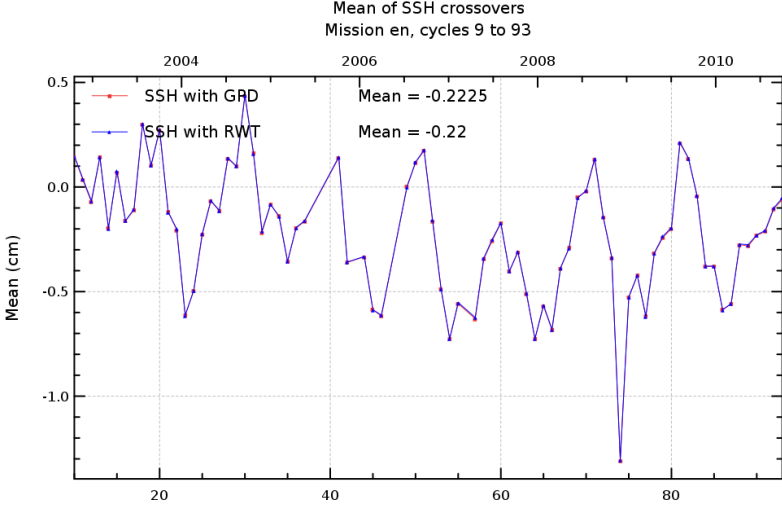
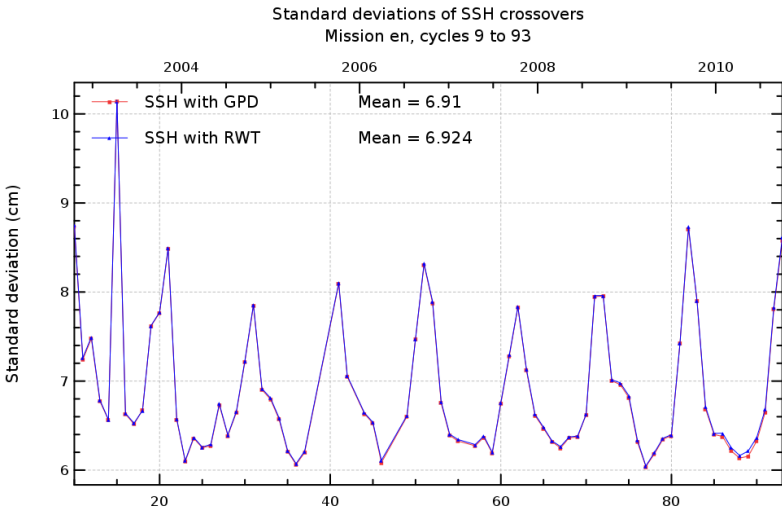
Diagnostic type : Global internal analyses



Diagnostic A004 (mission en)	
Name : Altimetric component differences versus coastal distances	
Input data : Along-track altimetric components	
Description : Mean and standard deviation of the differences between 2 different standards of a same altimetric component (sea surface height correction, altimeter parameter, orbit) are computed and plotted in function of coastal distances between 0 and 100 km.	





Diagnostic A101 (mission en)	
Name : Temporal evolution of SSH crossovers	
Input data : Sea Surface Height (SSH) crossovers	
<p><b>Description :</b> The temporal evolution of global statistics (mean, standard deviation) of SSH differences are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SSH calculation. SSH crossovers are the differences between ascending and descending passes for time differences between both passes lower than 10 days (in order to reduce the effect of the oceanic variability).</p>	
<div><div><div>Mean of SSH crossovers Mission en, cycles 9 to 93</div><div></div></div><div><div>Standard deviations of SSH crossovers Mission en, cycles 9 to 93</div><div></div></div></div>	

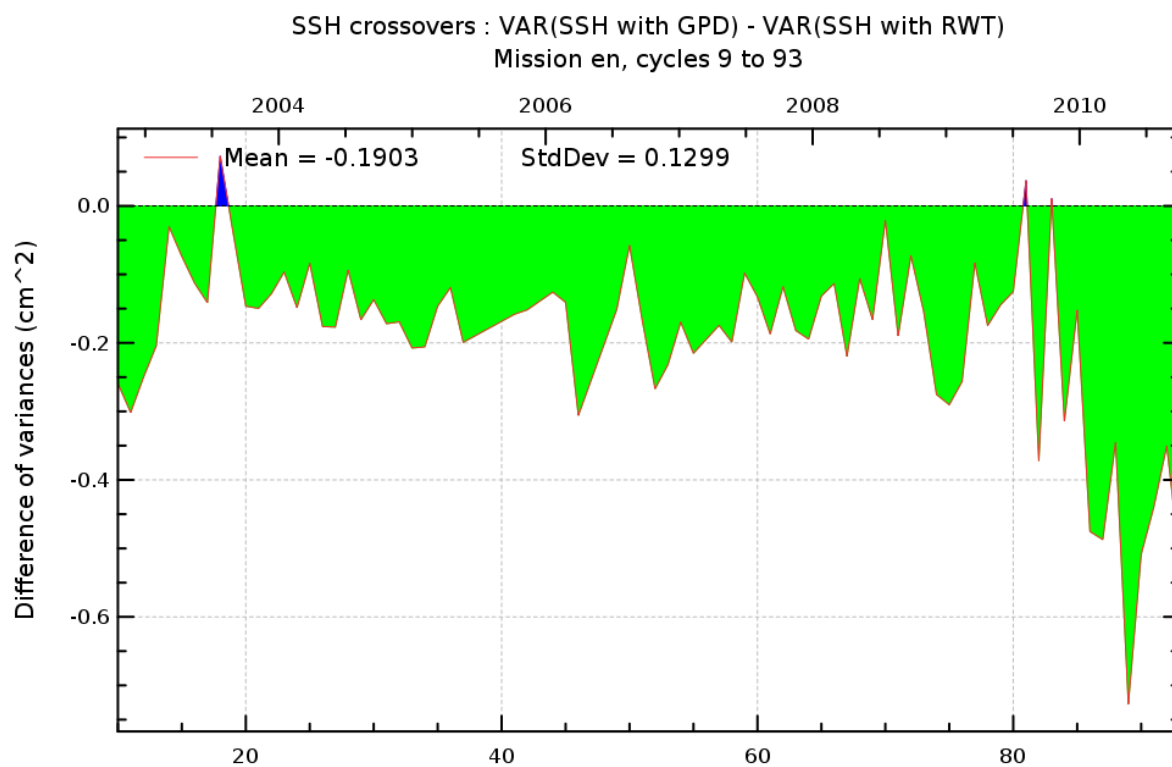
**Diagnostic A102 (mission en)**

**Name :** Differences between temporal evolution of SSH crossovers

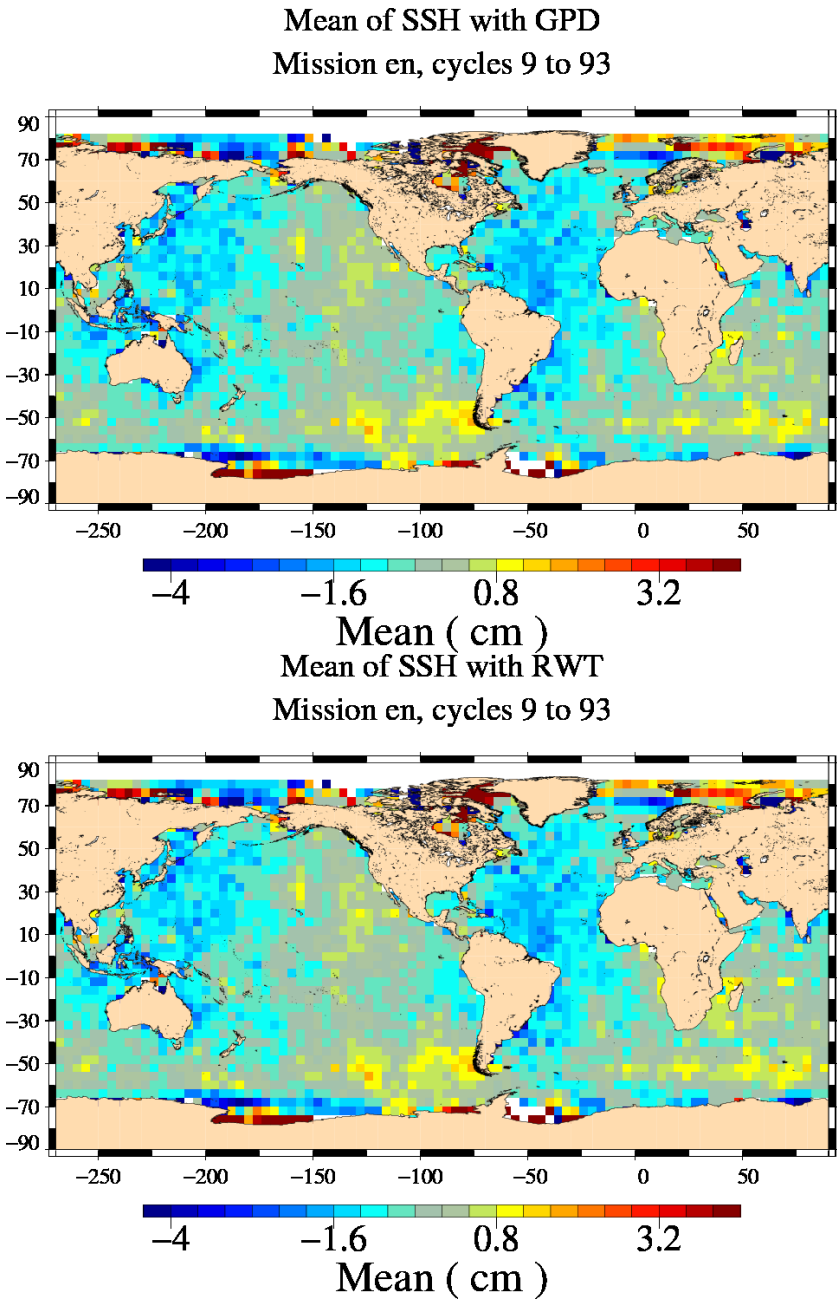
**Input data :** Sea Surface Height (SSH) crossovers

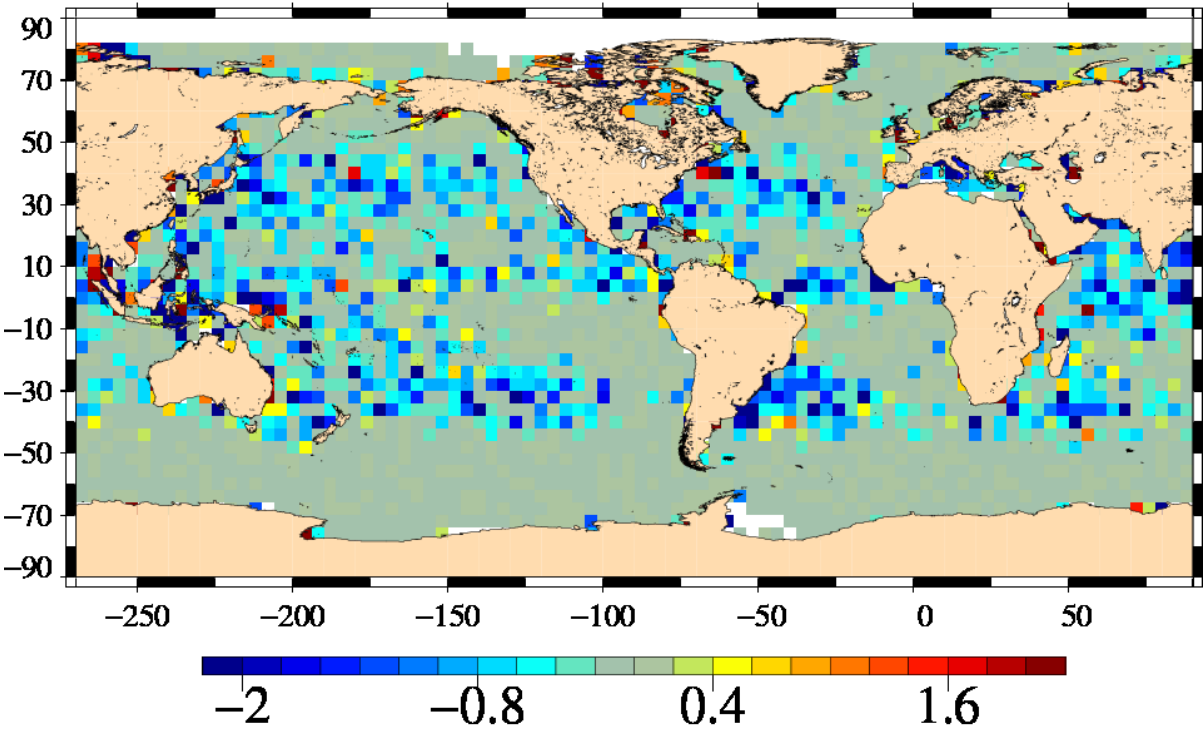
**Description :** The difference of temporal evolution between the global statistics (mean, standard deviation) of SSH differences are calculated using successively both altimetric components in the SSH calculation. SSH crossovers are the differences between ascending and descending passes for time differences between both passes lower than 10 days (in order to reduce the effect of the oceanic variability).

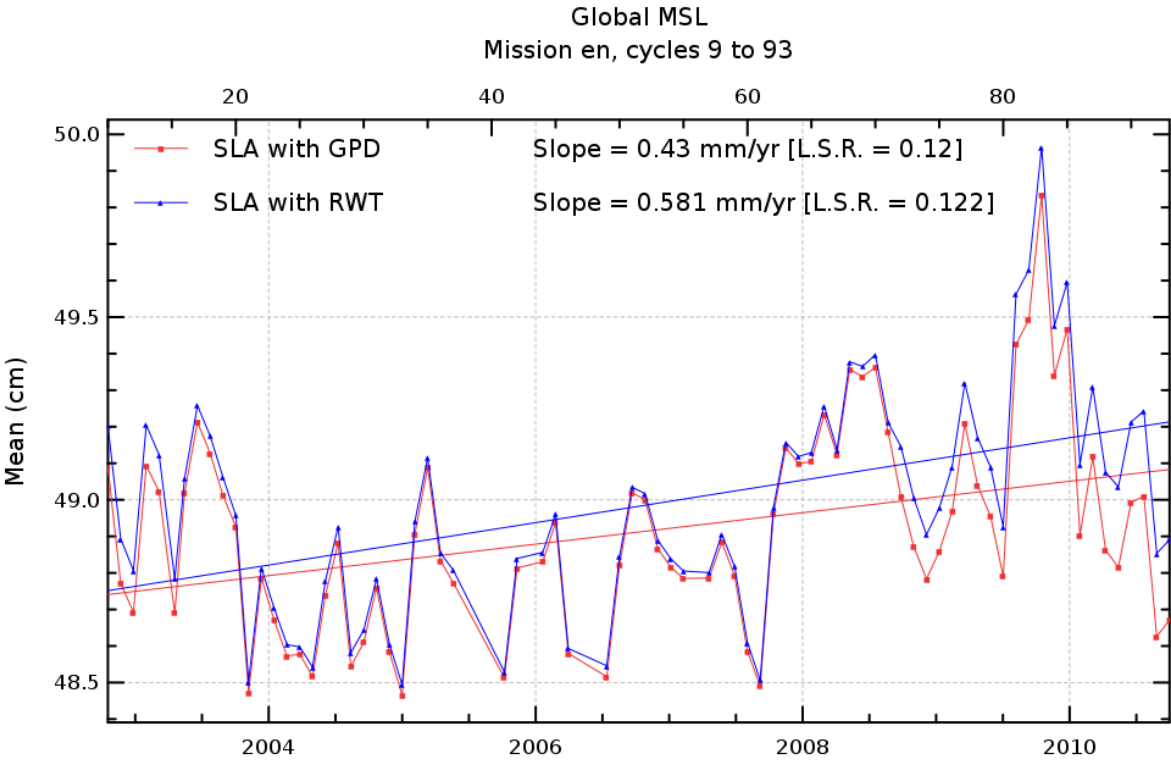
Diagnostic type : Global internal analyses



Diagnostic A103 (mission en)	
Name :	Map of SSH crossovers
Input data :	Sea Surface Height (SSH) crossovers
Description :	The differences between maps of SSH crossovers differences (mean, variance) are calculated using successively both altimetric components in the SSH calculation. SSH crossovers are the differences between ascending and descending passes for time differences between both passes lower than 10 days (in order to reduce the effect of the oceanic variability).



Diagnostic type : Global internal analyses	Diagnostic A104 (mission en)	
	Name : Differences between maps of SSH crossovers	
	Input data : Sea Surface Height (SSH) crossovers	
	Description : The differences between maps of SSH crossovers (derived from diagnostic A103) are calculated from the SSH crossover differences (mean, standard deviation) using successively both altimetric components in the SSH calculation. SSH crossovers are the differences between ascending and descending passes for time differences between both passes lower than 10 days (in order to reduce the effect of the oceanic variability).	
	<div>VAR(SSH with GPD) – VAR(SSH with RWT)</div> <div>Mission en, cycles 9 to 93</div>  <div>SSH crossovers : difference of variances ( cm^2 )</div>	

Diagnostic type : Global internal analyses	Diagnostic A201 a (mission en)	
	Name : Temporal evolution of Sea Level Anomaly (SLA)	
	Input data : Along track SLA	
	<p>Description : The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) , or separating North and South hemispheres.</p>	
	<div>Global MSL Mission en, cycles 9 to 93</div> 	

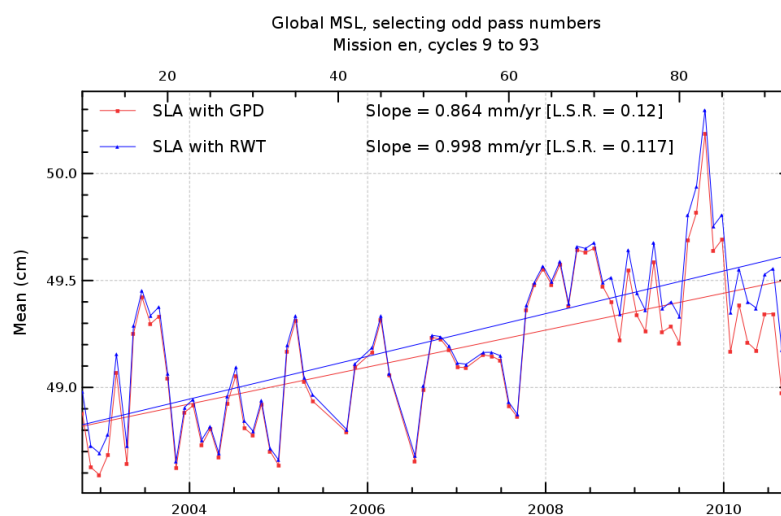
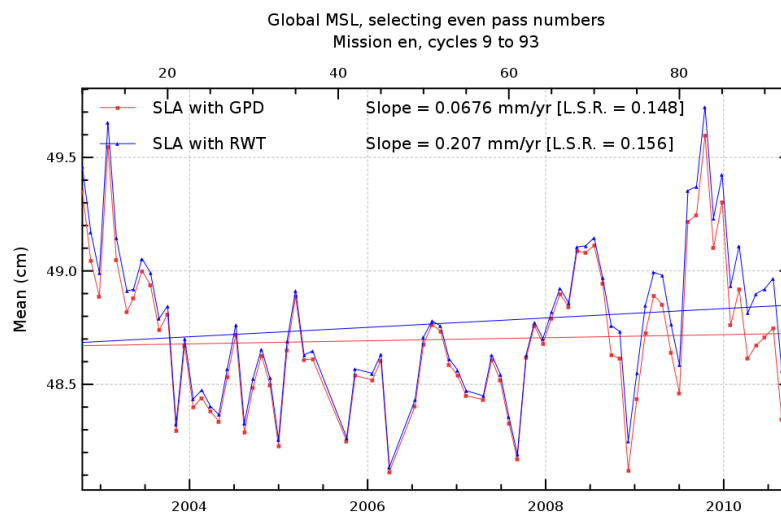
## Diagnostic A201\_b (mission en)

**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) , or separating North and South hemispheres.

Diagnostic type : Global internal analyses



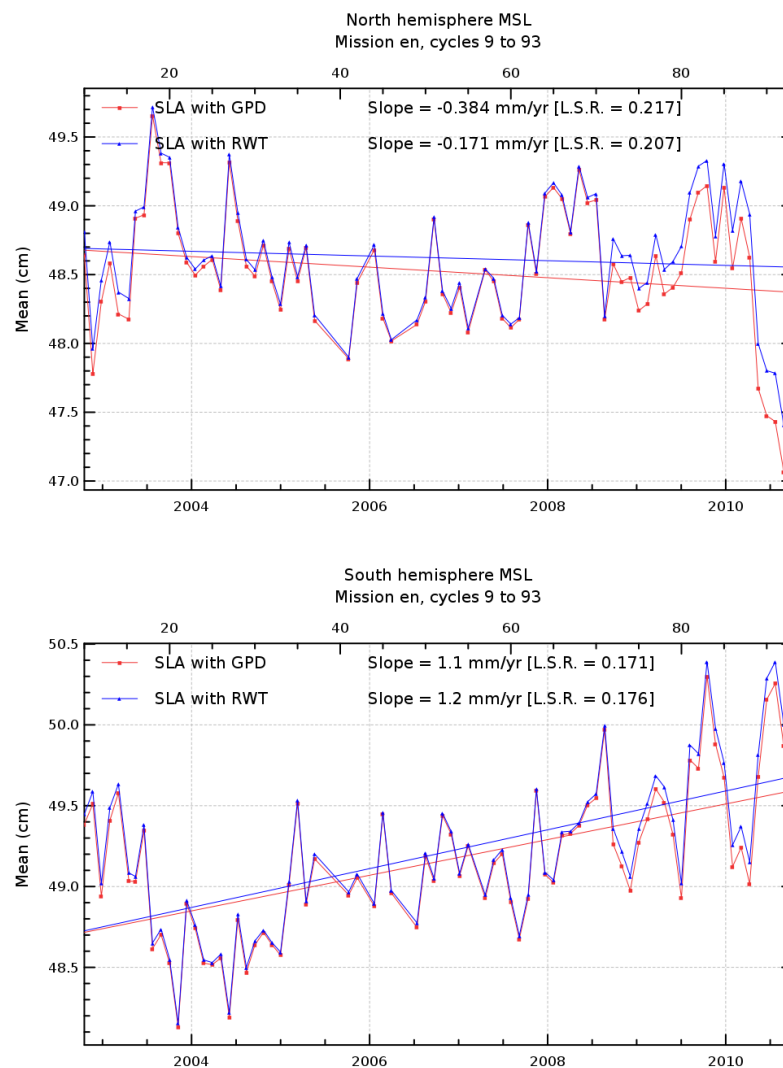
## Diagnostic A201\_c (mission en)

**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) , or separating North and South hemispheres.

Diagnostic type : Global internal analyses



## Diagnostic A201\_d (mission en)

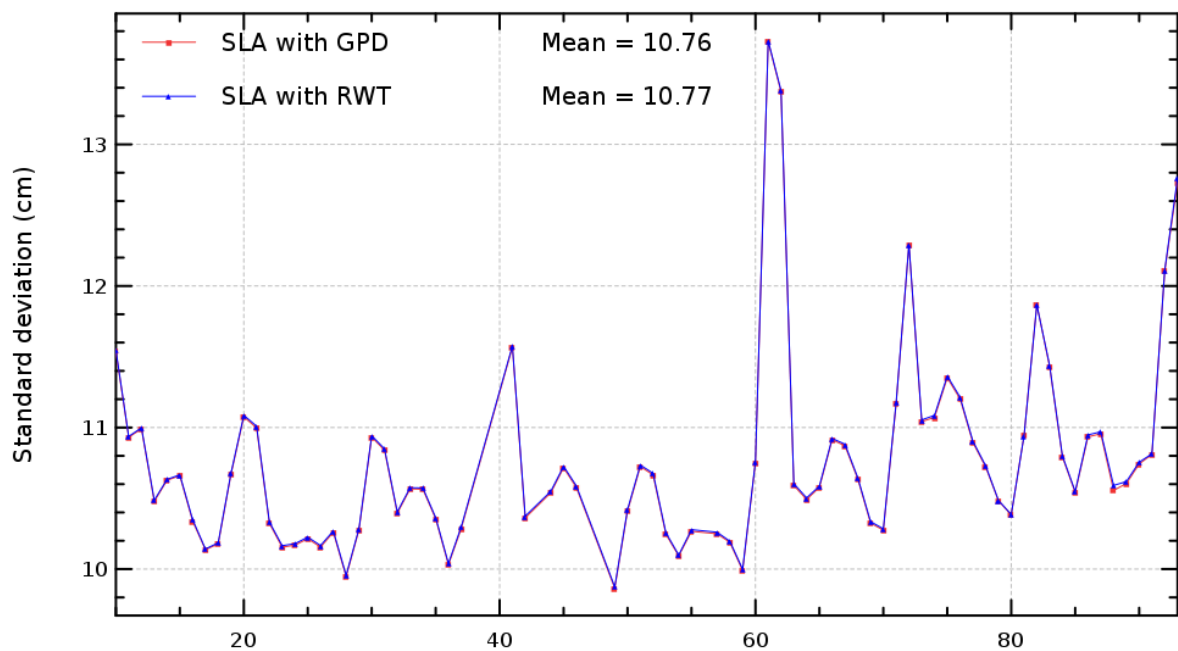
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) , or separating North and South hemispheres.

Diagnostic type : Global internal analyses

Global MSL  
Mission en, cycles 9 to 93





## Diagnostic A201\_e (mission en)

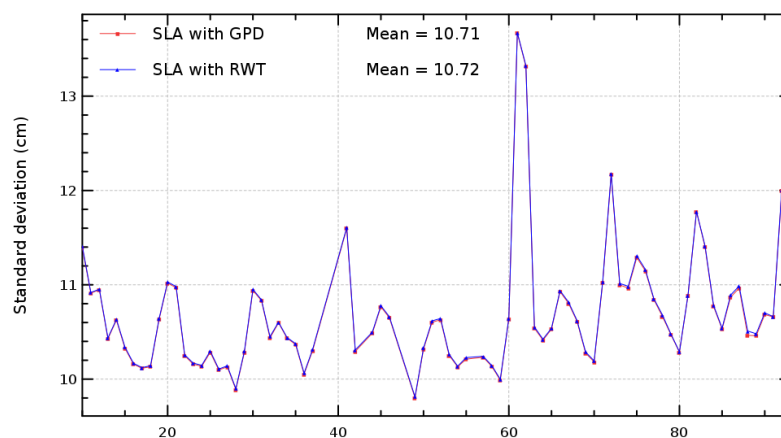
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

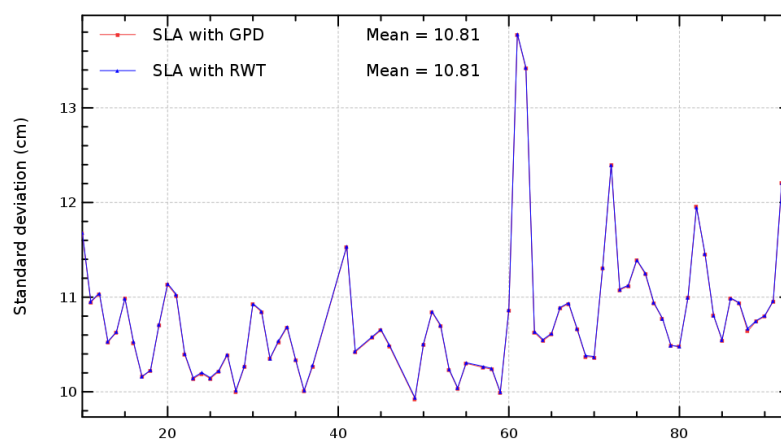
**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) , or separating North and South hemispheres.

Diagnostic type : Global internal analyses

Global MSL, selecting even pass numbers  
Mission en, cycles 9 to 93



Global MSL, selecting odd pass numbers  
Mission en, cycles 9 to 93



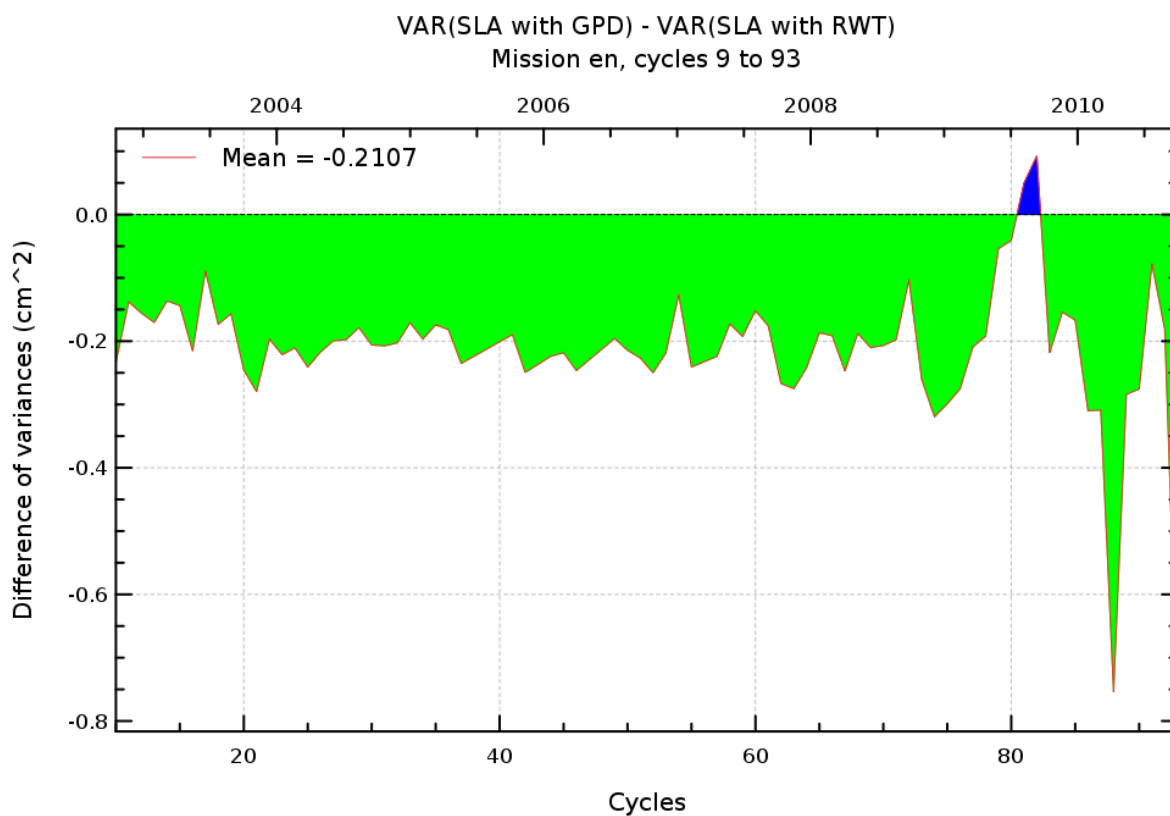
**Diagnostic A202\_a (mission en)**

**Name :** Differences between temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The differences between temporal evolution of SLA are calculated from statistics derived from diagnostic A201 (mean, variance) using 2 different components in the SLA calculation. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) or separating North and South hemispheres.

Diagnostic type : Global internal analyses



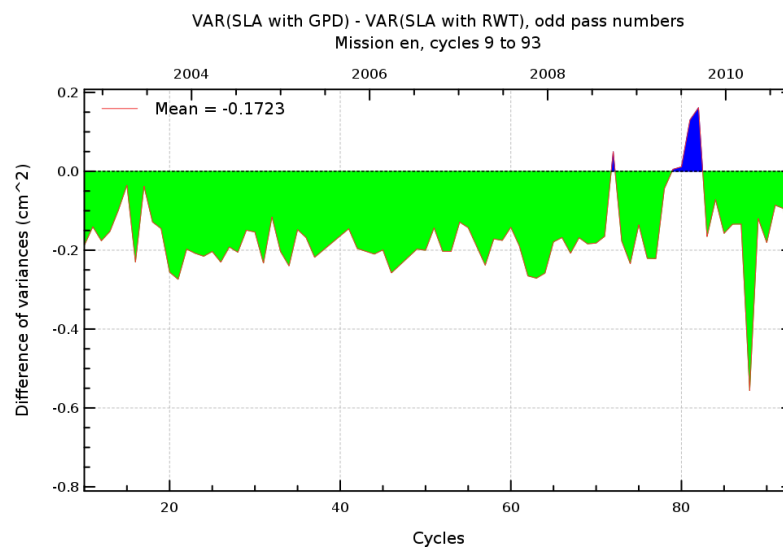
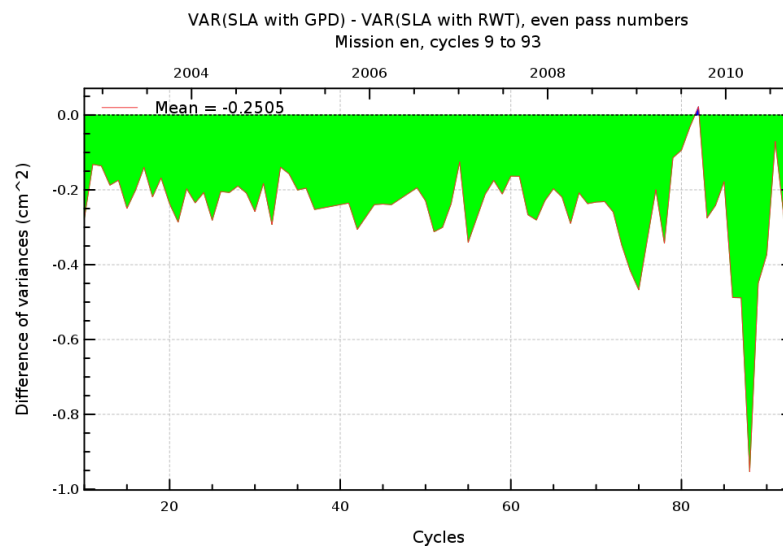
## Diagnostic A202\_b (mission en)

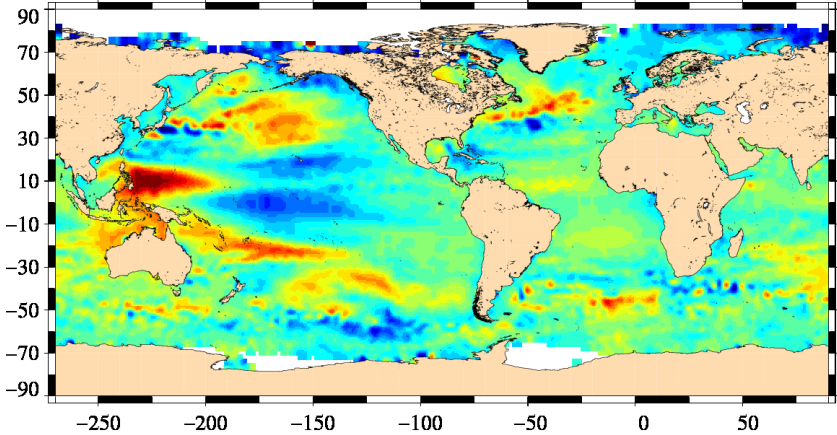
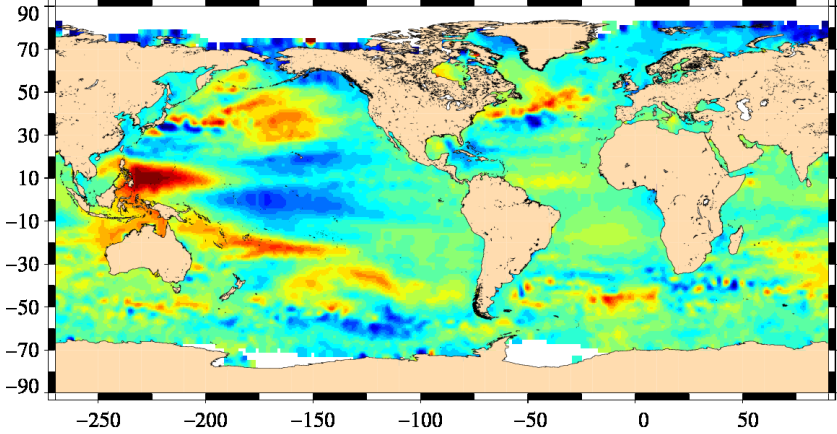
**Name :** Differences between temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The differences between temporal evolution of SLA are calculated from statistics derived from diagnostic A201 (mean, variance) using 2 different components in the SLA calculation. They are calculated globally, but also separating ascending and descending passes (except for SLA Grids) or separating North and South hemispheres.

Diagnostic type : Global internal analyses



Diagnostic type : Global internal analyses	Diagnostic A203_a (mission en)	
	Name : Map of Sea Level Anomaly (SLA) over all the period	
	Input data : Along track SLA	
	Description : The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.	
	<div>SLA with GPD trends</div> <div>Mission en, cycles 9 to 93</div> <div></div> <div>-20.91784 -8.31349 4.29087 16.89522</div> <div>Trends (mm/yr)</div> <div>SLA with RWT trends</div> <div>Mission en, cycles 9 to 93</div> <div></div> <div>-20.69048 -8.16493 4.36063 16.88619</div> <div>Trends (mm/yr)</div>	

## Diagnostic A203\_b (mission en)

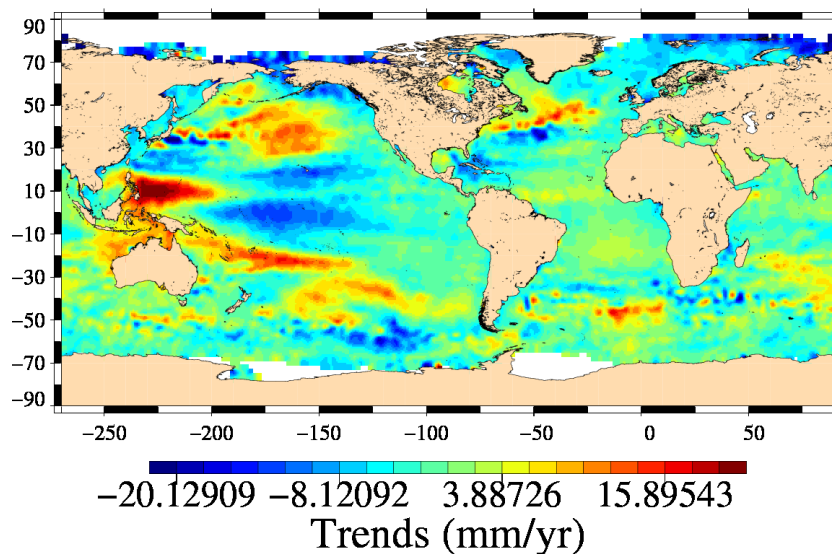
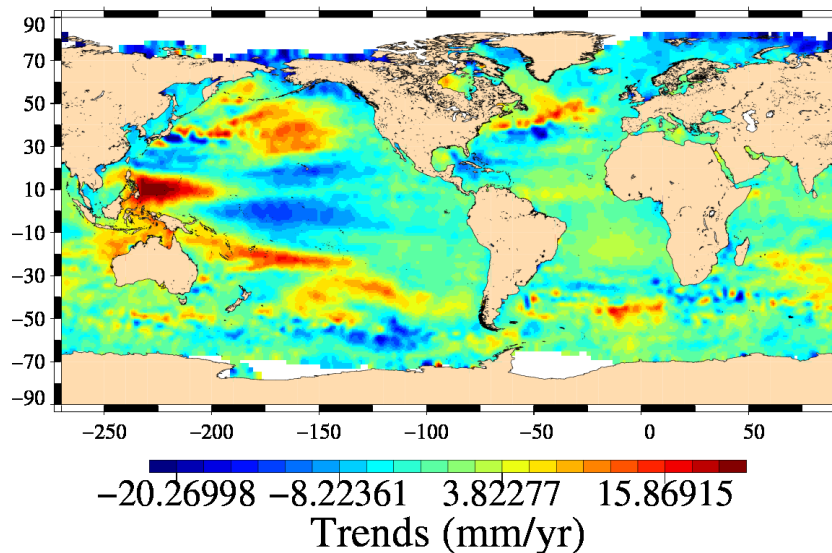
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

SLA with GPD trends : even pass numbers  
Mission en, cycles 9 to 93



## Diagnostic A203\_c (mission en)

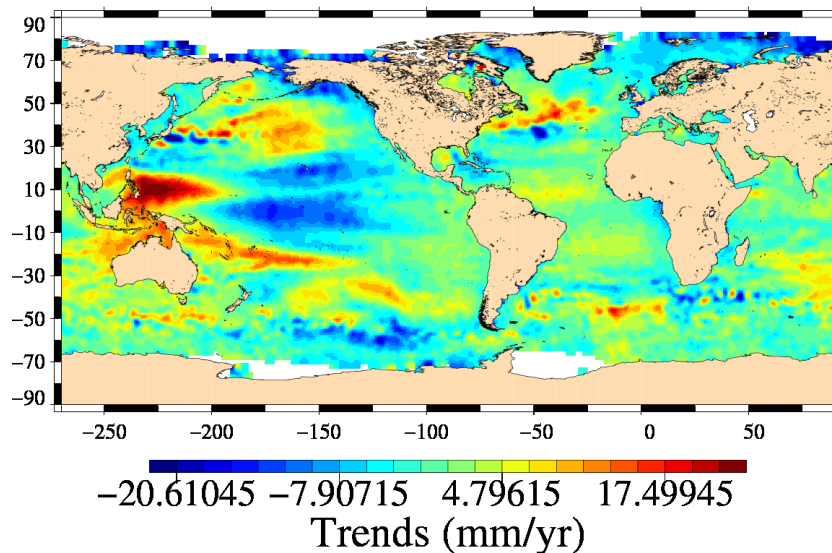
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

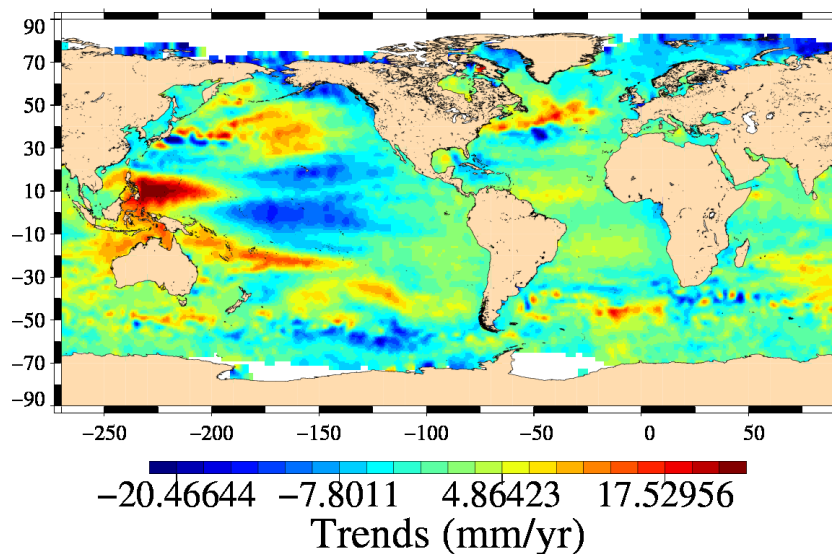
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

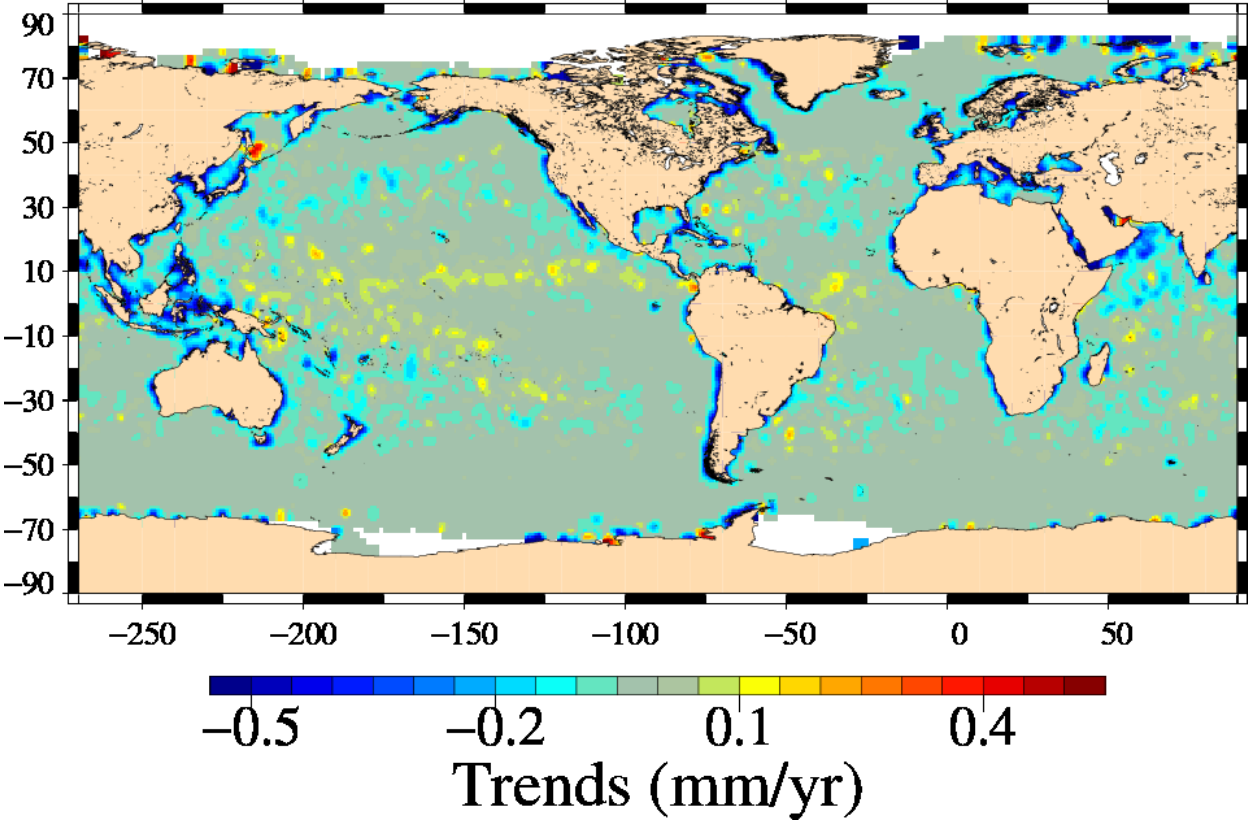
Diagnostic type : Global internal analyses

SLA with GPD trends : odd pass numbers  
Mission en, cycles 9 to 93



SLA with RWT trends : odd pass numbers  
Mission en, cycles 9 to 93



Diagnostic type : Global internal analyses	Diagnostic A204_a (mission en)	
	Name : Differences between maps of SLA	
	Input data : Along track SLA	
	Description : The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except for SLA Grids).	
	<div>SLA with GPD trends – SLA with RWT trends</div> <div>Mission en, cycles 9 to 93</div> 	



## Diagnostic A204\_b (mission en)

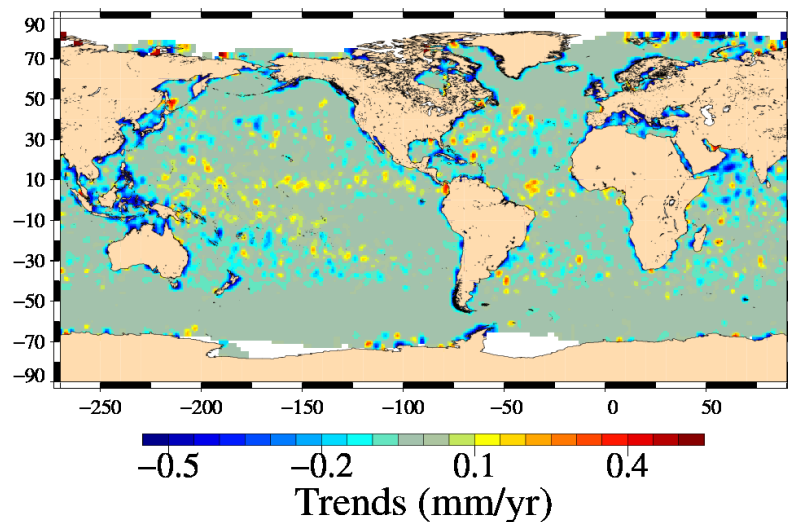
**Name :** Differences between maps of SLA

**Input data :** Along track SLA

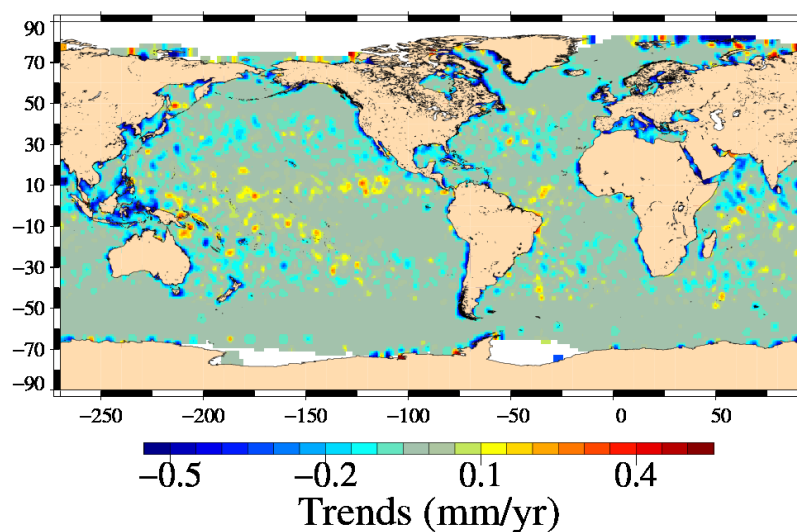
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except for SLA Grids).

Diagnostic type : Global internal analyses

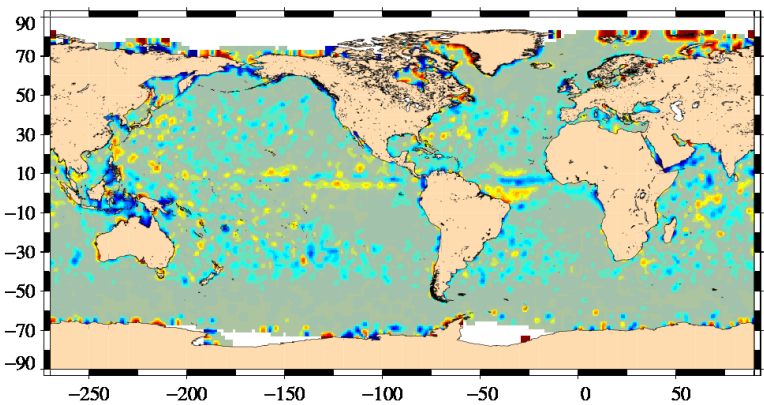
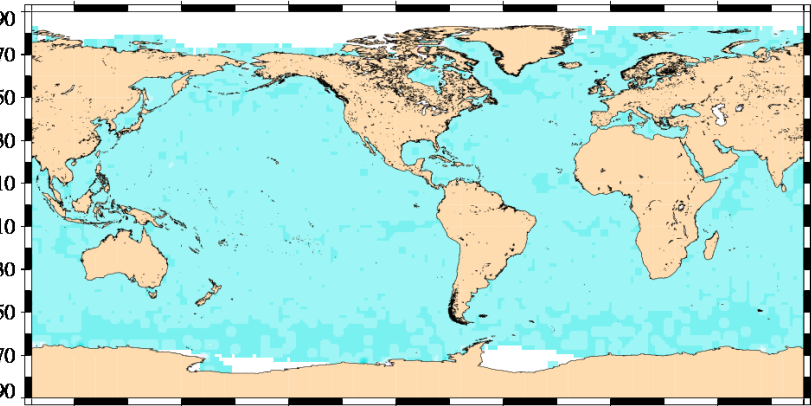
SLA with GPD trends – SLA with RWT trends : even pass numbers  
Mission en, cycles 9 to 93



SLA with GPD trends – SLA with RWT trends : odd pass numbers  
Mission en, cycles 9 to 93





Diagnostic type : Global internal analyses	Diagnostic A205_a (mission en)	
	Name : Differences between maps of SLA (2)	
	Input data : Along track SLA	
	Description : The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except for SLA Grids).	
	<div>SLA with GPD amplitude – SLA with RWT amplitude : annual signal Mission en, cycles 9 to 93</div> <div><p>A global map showing the difference in SLA amplitude between GPD and RWT altimetry. The map covers latitudes from -90 to 90 and longitudes from -250 to 50. A color scale at the bottom indicates values from -0.1 to 0.08 cm, with colors ranging from dark blue (negative) to red (positive). The map shows significant spatial variability, with higher positive differences (red/orange) in the North Atlantic and lower differences (blue) in the Pacific and Indian Oceans.</p><p>Amplitude (cm)</p></div> <div>SLA with GPD phase – SLA with RWT phase : annual signal Mission en, cycles 9 to 93</div> <div><p>A global map showing the difference in SLA phase between GPD and RWT altimetry. The map covers latitudes from -90 to 90 and longitudes from -250 to 50. A color scale at the bottom indicates values from -180 to 144 degrees, with colors ranging from dark purple (negative) to light blue (positive). The map shows a more uniform distribution of phase differences compared to the amplitude map, with some localized variations.</p><p>Phase (degree)</p></div>	

## Diagnostic A205\_b (mission en)

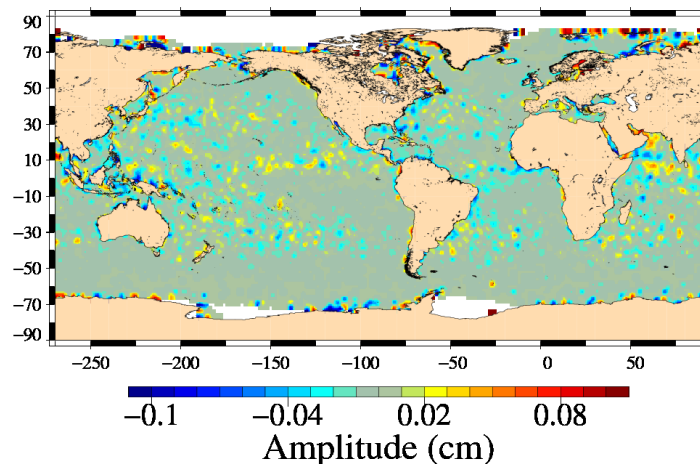
**Name :** Differences between maps of SLA (2)

**Input data :** Along track SLA

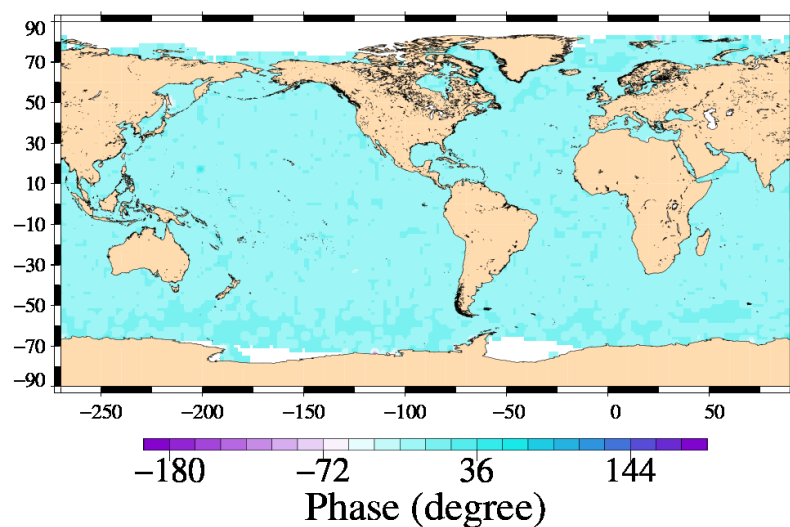
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except for SLA Grids).

Diagnostic type : Global internal analyses

SLA with GPD amplitude – SLA with RWT amplitude : semi-annual signal  
Mission en, cycles 9 to 93



SLA with GPD phase – SLA with RWT phase : semi-annual signal  
Mission en, cycles 9 to 93

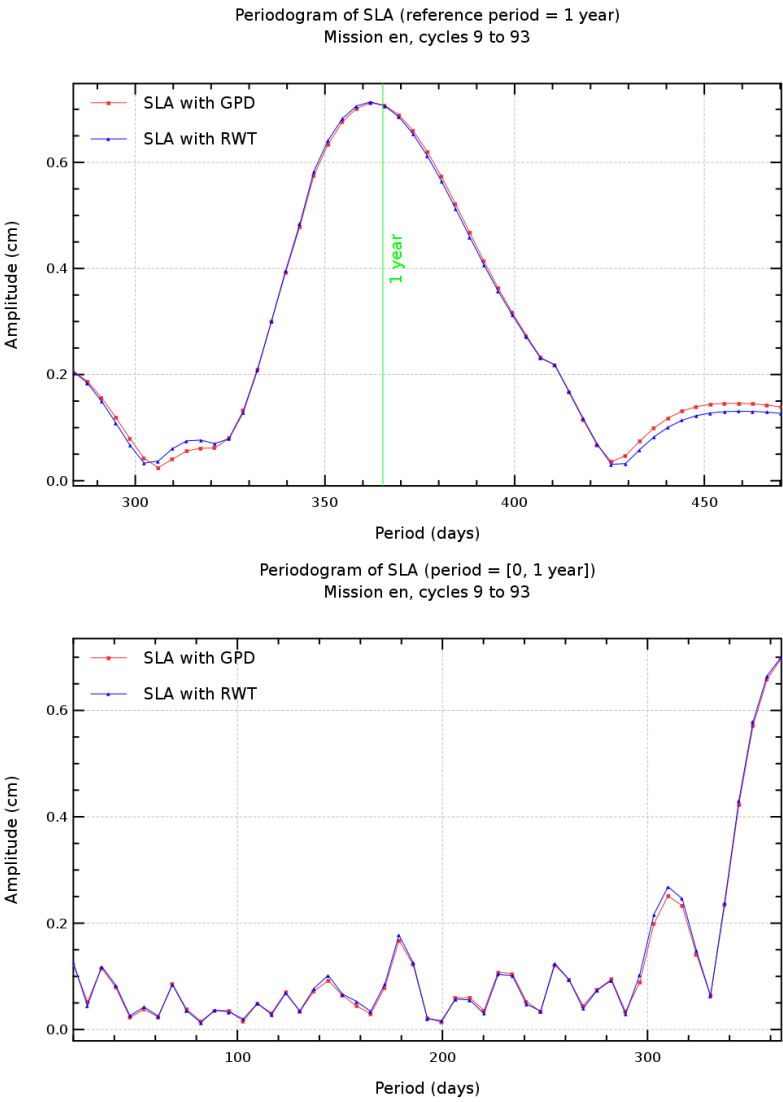


Diagnostic A206\_a (mission en)

**Name :** Periodogram derived from temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The periodogram derived from temporal evolution of SLA (global, northern or southern hemisphere) can be done over all periods or focusing on particular periods, such as annual, semi annual or 60 day signal. Therefore mean of SLA differences are computed (every day or cycle), and time data series are plotted as a periodogram.



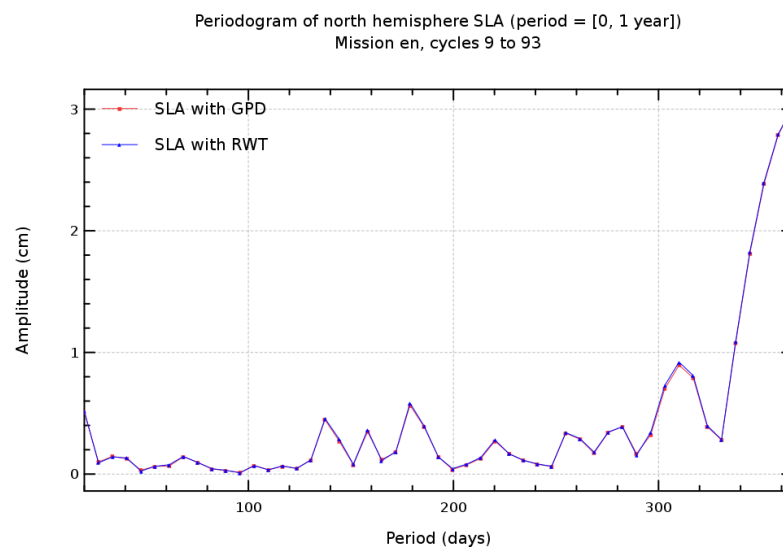
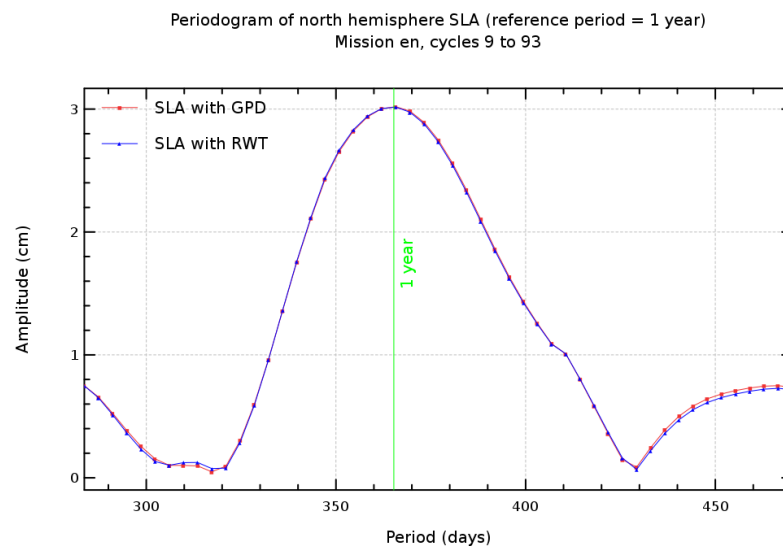
## Diagnostic A206\_b (mission en)

**Name :** Periodogram derived from temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

**Description :** The periodogram derived from temporal evolution of SLA (global, northern or southern hemisphere) can be done over all periods or focusing on particular periods, such as annual, semi annual or 60 day signal. Therefore mean of SLA differences are computed (every day or cycle), and time data series are plotted as a periodogram.

Diagnostic type : Global internal analyses



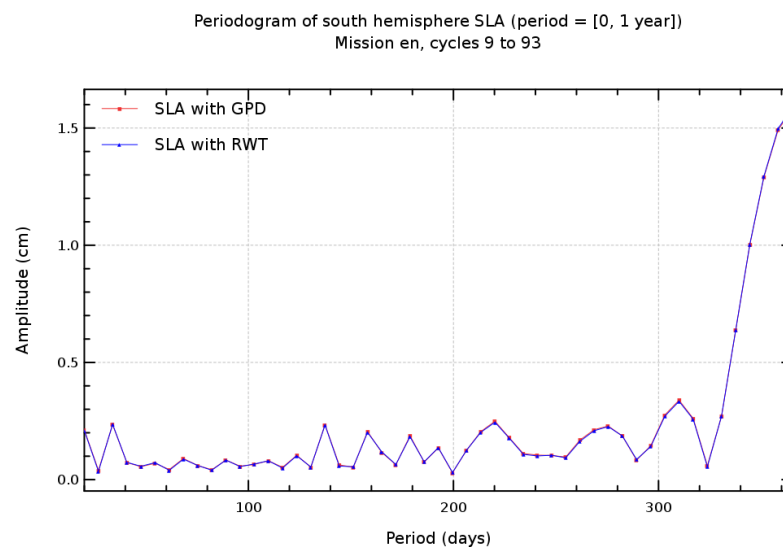
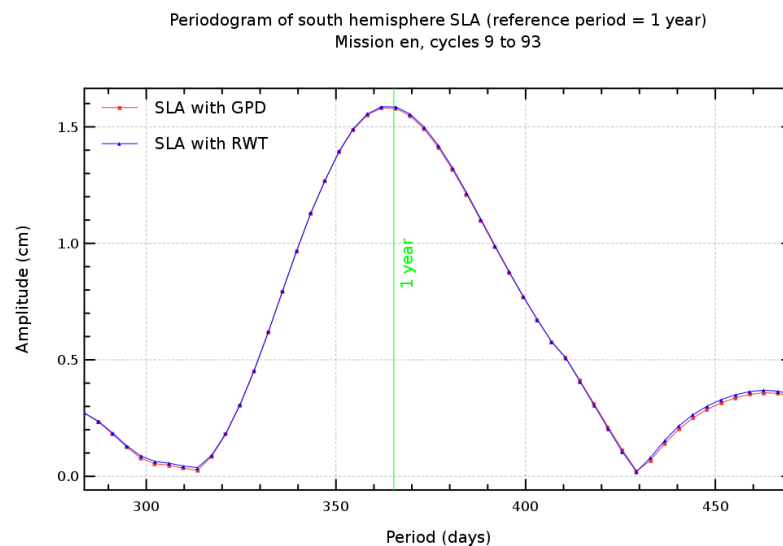
## Diagnostic A206\_c (mission en)

**Name :** Periodogram derived from temporal evolution of Sea Level Anomaly (SLA)

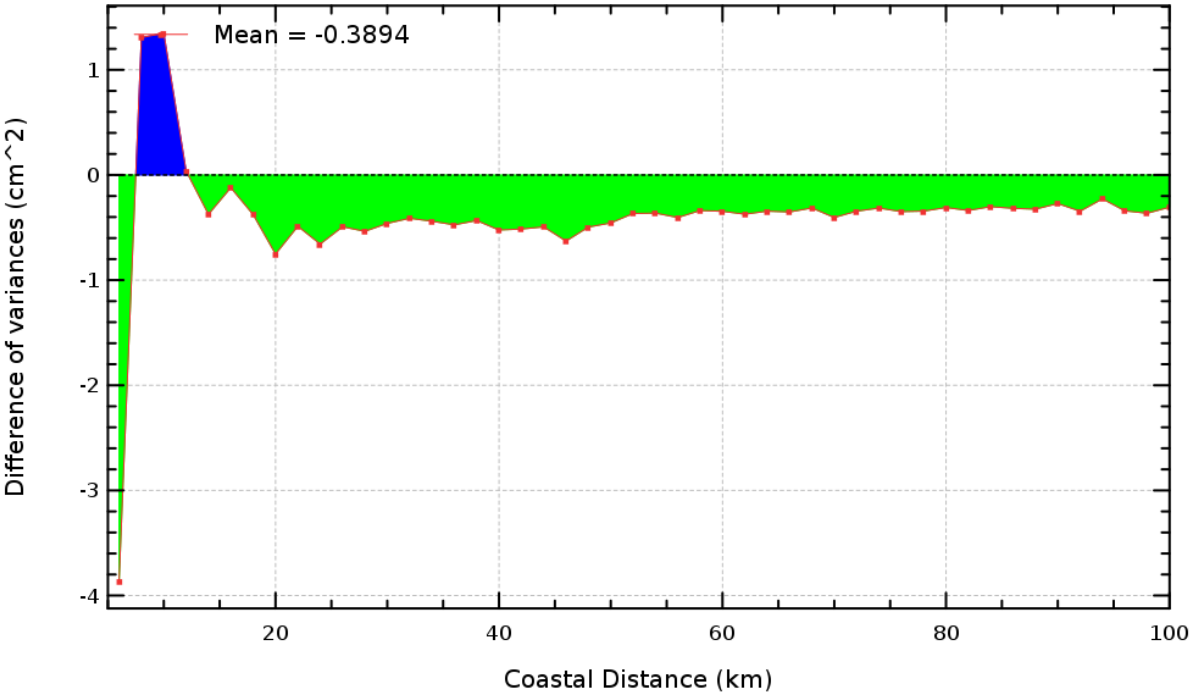
**Input data :** Along track SLA

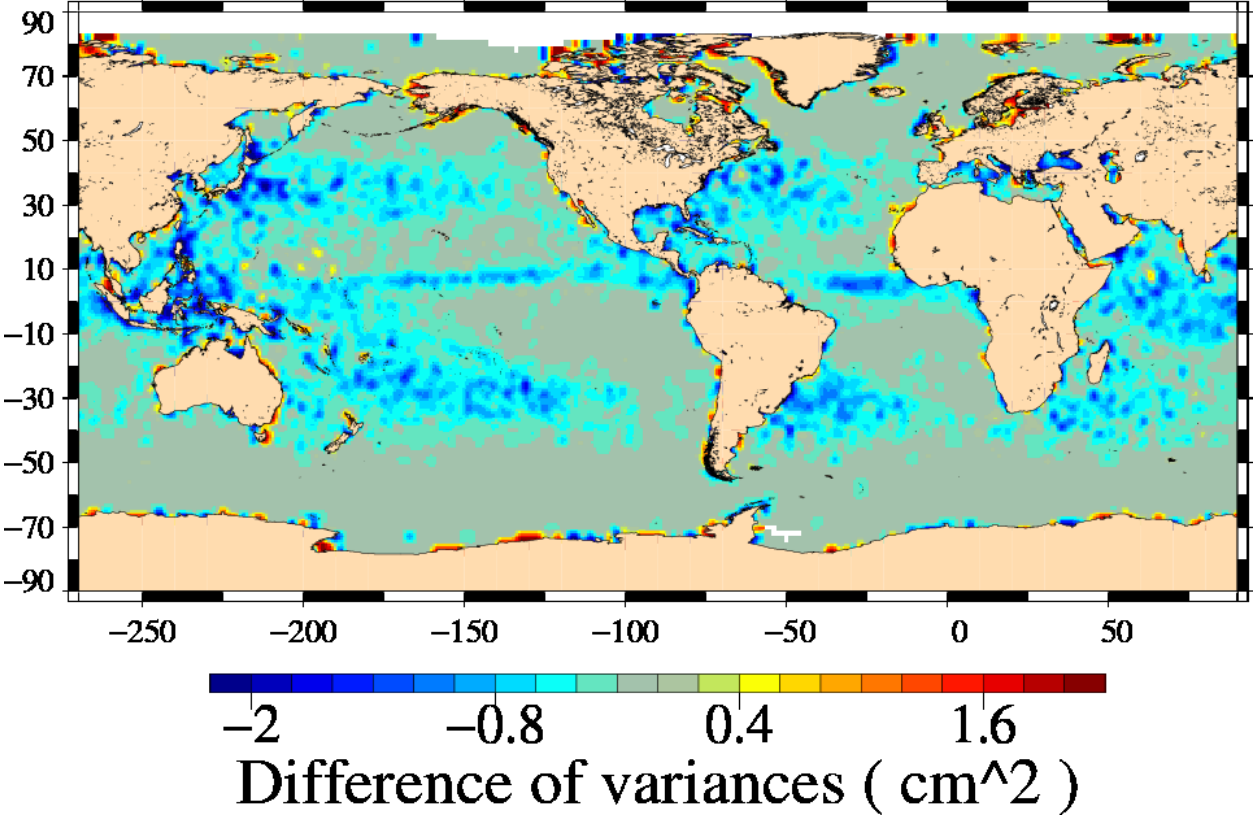
**Description :** The periodogram derived from temporal evolution of SLA (global, northern or southern hemisphere) can be done over all periods or focusing on particular periods, such as annual, semi annual or 60 day signal. Therefore mean of SLA differences are computed (every day or cycle), and time data series are plotted as a periodogram.

Diagnostic type : Global internal analyses



Diagnostic type : Global internal analyses	Diagnostic A207 (mission en)																																																																								
	Name : Sea Level Anomaly (SLA) versus coastal distance																																																																								
	Input data : Along track SLA																																																																								
	Description : Mean and standard deviation of SLA - computed by using successively both altimetric components - are plotted in function of coastal distances between 0 and 100 km.																																																																								
	<div><div>Global MSL Mission en, cycles 9 to 93</div><div><p>This graph plots the mean Sea Level Anomaly (SLA) in centimeters against coastal distance in kilometers from 0 to 100 km. Two data series are shown: 'SLA with GPD' (red line with square markers) and 'SLA with RWT' (blue line with triangle markers). Both series start at approximately 45.5 cm at 0 km, rise sharply to about 49.5 cm by 20 km, and then fluctuate slightly around 49 cm. The GPD series has a mean of 48.97 and a standard deviation of 0.8955. The RWT series has a mean of 49.13 and a standard deviation of 0.5454.</p><table border="1"><thead><tr><th>Coastal Distance (km)</th><th>SLA with GPD (cm)</th><th>SLA with RWT (cm)</th></tr></thead><tbody><tr><td>0</td><td>45.5</td><td>45.5</td></tr><tr><td>10</td><td>47.5</td><td>47.5</td></tr><tr><td>20</td><td>49.0</td><td>49.0</td></tr><tr><td>30</td><td>49.2</td><td>49.2</td></tr><tr><td>40</td><td>49.1</td><td>49.1</td></tr><tr><td>50</td><td>49.0</td><td>49.0</td></tr><tr><td>60</td><td>49.1</td><td>49.1</td></tr><tr><td>70</td><td>49.0</td><td>49.0</td></tr><tr><td>80</td><td>49.1</td><td>49.1</td></tr><tr><td>90</td><td>49.0</td><td>49.0</td></tr><tr><td>100</td><td>49.1</td><td>49.1</td></tr></tbody></table></div><div><div>Global MSL Mission en, cycles 9 to 93</div><div><p>This graph plots the standard deviation of the Sea Level Anomaly (SLA) in centimeters against coastal distance in kilometers from 0 to 100 km. Two data series are shown: 'SLA with GPD' (red line with square markers) and 'SLA with RWT' (blue line with triangle markers). Both series start at approximately 21 cm at 0 km and decrease steadily to about 10 cm by 100 km. The GPD series has a mean standard deviation of 12.27, and the RWT series has a mean standard deviation of 12.29.</p><table border="1"><thead><tr><th>Coastal Distance (km)</th><th>SLA with GPD (cm)</th><th>SLA with RWT (cm)</th></tr></thead><tbody><tr><td>0</td><td>21.0</td><td>21.0</td></tr><tr><td>10</td><td>18.0</td><td>18.0</td></tr><tr><td>20</td><td>15.0</td><td>15.0</td></tr><tr><td>30</td><td>13.5</td><td>13.5</td></tr><tr><td>40</td><td>12.5</td><td>12.5</td></tr><tr><td>50</td><td>11.5</td><td>11.5</td></tr><tr><td>60</td><td>11.0</td><td>11.0</td></tr><tr><td>70</td><td>10.5</td><td>10.5</td></tr><tr><td>80</td><td>10.2</td><td>10.2</td></tr><tr><td>90</td><td>10.1</td><td>10.1</td></tr><tr><td>100</td><td>10.0</td><td>10.0</td></tr></tbody></table></div></div></div>		Coastal Distance (km)	SLA with GPD (cm)	SLA with RWT (cm)	0	45.5	45.5	10	47.5	47.5	20	49.0	49.0	30	49.2	49.2	40	49.1	49.1	50	49.0	49.0	60	49.1	49.1	70	49.0	49.0	80	49.1	49.1	90	49.0	49.0	100	49.1	49.1	Coastal Distance (km)	SLA with GPD (cm)	SLA with RWT (cm)	0	21.0	21.0	10	18.0	18.0	20	15.0	15.0	30	13.5	13.5	40	12.5	12.5	50	11.5	11.5	60	11.0	11.0	70	10.5	10.5	80	10.2	10.2	90	10.1	10.1	100	10.0
Coastal Distance (km)	SLA with GPD (cm)	SLA with RWT (cm)																																																																							
0	45.5	45.5																																																																							
10	47.5	47.5																																																																							
20	49.0	49.0																																																																							
30	49.2	49.2																																																																							
40	49.1	49.1																																																																							
50	49.0	49.0																																																																							
60	49.1	49.1																																																																							
70	49.0	49.0																																																																							
80	49.1	49.1																																																																							
90	49.0	49.0																																																																							
100	49.1	49.1																																																																							
Coastal Distance (km)	SLA with GPD (cm)	SLA with RWT (cm)																																																																							
0	21.0	21.0																																																																							
10	18.0	18.0																																																																							
20	15.0	15.0																																																																							
30	13.5	13.5																																																																							
40	12.5	12.5																																																																							
50	11.5	11.5																																																																							
60	11.0	11.0																																																																							
70	10.5	10.5																																																																							
80	10.2	10.2																																																																							
90	10.1	10.1																																																																							
100	10.0	10.0																																																																							

Diagnostic type : Global internal analyses	Diagnostic A208 (mission en)
	Name : Sea Level Anomaly (SLA) differences versus coastal distance
	Input data : Along track SLA
	Description : The differences of SLA variances - computed by using successively both altimetric components - are plotted in function of coastal distances between 0 and 100 km.
	<div>VAR(SLA with GPD) - VAR(SLA with RWT) Mission en, cycles 9 to 93</div> 

Diagnostic type : Global internal analyses	Diagnostic A209 (mission en)
	Name : Differences between maps of SLA (3)
	Input data : Along track SLA
	Description : The differences between maps of SLA are calculated from the SLA differences (mean, standard deviation) using successively both altimetric components in the SLA calculation.
	<div>VAR(SLA with GPD) – VAR(SLA with RWT) Mission en, cycles 9 to 93</div>  <p>90 70 50 30 10 -10 -30 -50 -70 -90</p> <p>-250 -200 -150 -100 -50 0 50</p> <p>-2 -0.8 0.4 1.6</p> <p>Difference of variances ( cm<sup>2</sup> )</p>



Diagnostic type : Altimetry and in-situ data comparison	Diagnostic C001 (mission en)						
	Name : Temporal evolution of SSH differences between tide gauges and altimetry measurements						
	Input data : Tide gauges SSH measurements						
	Description : The temporal evolution of global statistics (mean, variance, slope) of SSH differences between tide gauges and altimeter measurements are calculated from a cyclic way (altimeter repetitivity) using successively both altimetric components in SSH calculation. The altimetric and tide gauges data are colocated with criteria of maximum of correlation, and tide gauges used are derived from global networks (GLOSS/CLIVAR, REFMAR).						
	<div>SLA differences : altimetry measurements - tide gauges Mission en, cycles 9 to 93</div> <p>The graph displays the temporal evolution of Sea Level Anomaly (SLA) differences between altimetry measurements and tide gauge (T.G.) measurements from 2004 to 2010. The y-axis represents SLA differences in centimeters, ranging from -1 to 2. The x-axis shows years from 2004 to 2010. Two data series are plotted: 'SLA with GPD - T. G.' (red line with square markers) and 'SLA with RWT - T. G.' (blue line with triangle markers). Both series exhibit high-frequency variability. Two linear regression lines are shown: a red line for the GPD series with a slope of -0.925 mm/yr, and a blue line for the RWT series with a slope of -0.778 mm/yr. The RWT series generally shows smaller differences than the GPD series.</p> <table><caption>Summary of SLA Differences Data</caption><tr><th>Series</th><th>Slope (mm/yr)</th></tr><tr><td>SLA with GPD - T. G.</td><td>-0.925</td></tr><tr><td>SLA with RWT - T. G.</td><td>-0.778</td></tr></table>		Series	Slope (mm/yr)	SLA with GPD - T. G.	-0.925	SLA with RWT - T. G.
Series	Slope (mm/yr)						
SLA with GPD - T. G.	-0.925						
SLA with RWT - T. G.	-0.778						

**Diagnostic C002 (mission en)**

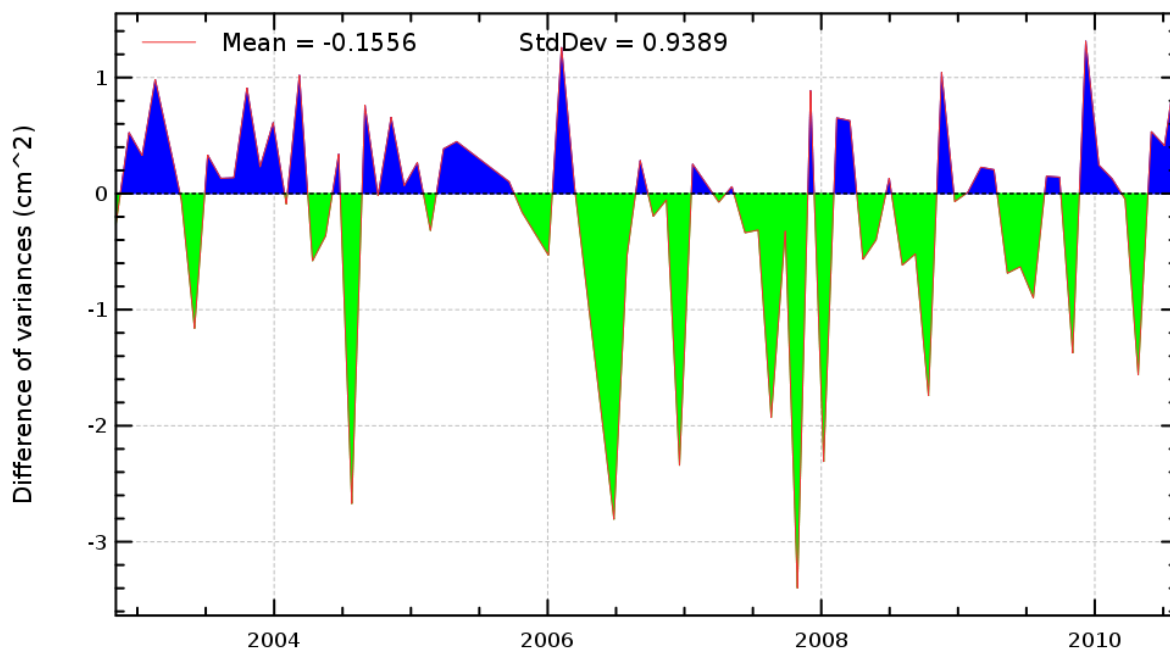
**Name :** Differences of temporal evolution of SSH differences between tide gauges and altimetry measurements

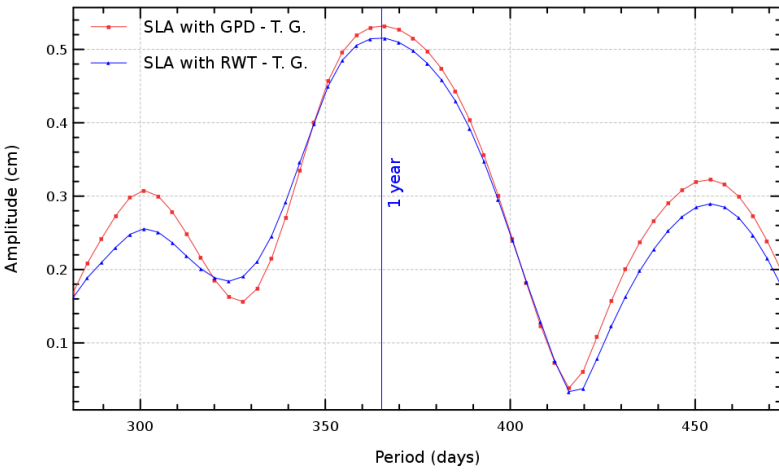
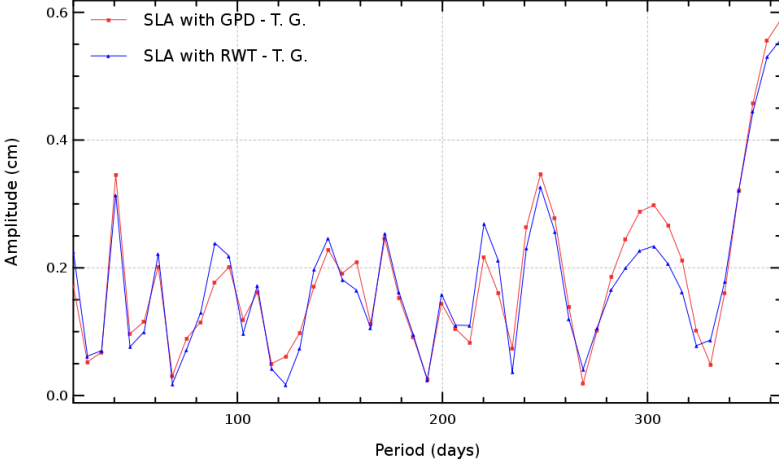
**Input data :** Tide gauges SSH measurements

**Description :** The difference between temporal evolution of global statistics of differences between tide gauge and altimeter data differences are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in altimetric SSH calculation. The altimetric and tide gauges data are collocated with criteria of maximum of correlation, and tide gauges used are derived from global networks as GLOSS/CLIVAR.

Diagnostic type : Altimetry and in-situ data comparison

Difference of variances :  $\text{VAR}(\text{SLA with GPD} - \text{T. G.}) - \text{VAR}(\text{SLA with RWT} - \text{T. G.})$   
Mission en, cycles 9 to 93



Diagnostic C003 (mission en)	
Name : Periodogram derived from temporal evolution of SSH differences between tide gauges and altimetry	
Input data : Tide gauges SSH measurements	
Description : The periodogram derived from temporal evolution of altimetric and tide gauges SSH differences is calculated using successively both altimetric components in the altimetric SSH. The periodogram is calculated from the mean or variance statistics and it can be displayed for all the whole time period or a dedicated one	
<div>Periodogram of SLA differences : altimetry mesurements - tide gauges (ref. period = 1 year) Mission en, cycles 9 to 93</div>  <div>Periodogram of SLA differences : altimetry mesurements - tide gauges (period = [0, 1 year]) Mission en, cycles 9 to 93</div> 	

**Diagnostic C004 (mission en)**

**Name :** Histograms of differences between tide gauges and altimeter SSH differences

**Input data :** Tide gauges SSH measurements

**Description :** The difference of histograms between altimeter and tide gauge SSH differences is computed from the elementary statistics (mean, variance) at each tide gauge using successively both altimetric components in the altimetry SSH.

Diagnostic type : Altimetry and in-situ data comparison

Histogram of the difference of variances :  $\text{VAR}(\text{SLA with GPD} - \text{T. G.}) - \text{VAR}(\text{SLA with RWT} - \text{T. G.})$   
Mission en, cycles 9 to 93

