

Ionospheric correction: GIM Reprocessed

Study variable	Reprocessed GIM ionospheric correction
Reference variable	CNES/AVISO GIM ionospheric correction
Missions	Envisat (<i>en</i>)
Period	[19259, 22234]

Creation date : 2011/05/04

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Study overview

In this study, a reprocessed GIM correction has been compared to the ionospheric correction used in CNES/AVISO product to calculate the Envisat sea-level height (SSH).

The impact of using these both ionospheric corrections on the SSH calculation has been analyzed for Envisat mission from September 2002 (cycle 9) to October 2010 (cycle 94).

The reprocessed GIM correction corresponds to a reprocessed version of the GIM correction (GIM GDR product Level 2) taking into account homogeneous solar activity coefficients. Indeed, until recently, they were updated only every two years which had introduced jumps in the temporal series.

The reference ionospheric correction is the classical GIM model for comparison between corrections. As done in CNES/AVISO products, for SSH or SLA (Sea Level Anomaly), an hybrid correction is used, combining the Bi-frequency ionospheric correction (until cycle 65) and the GIM model correction (after cycle 65).

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

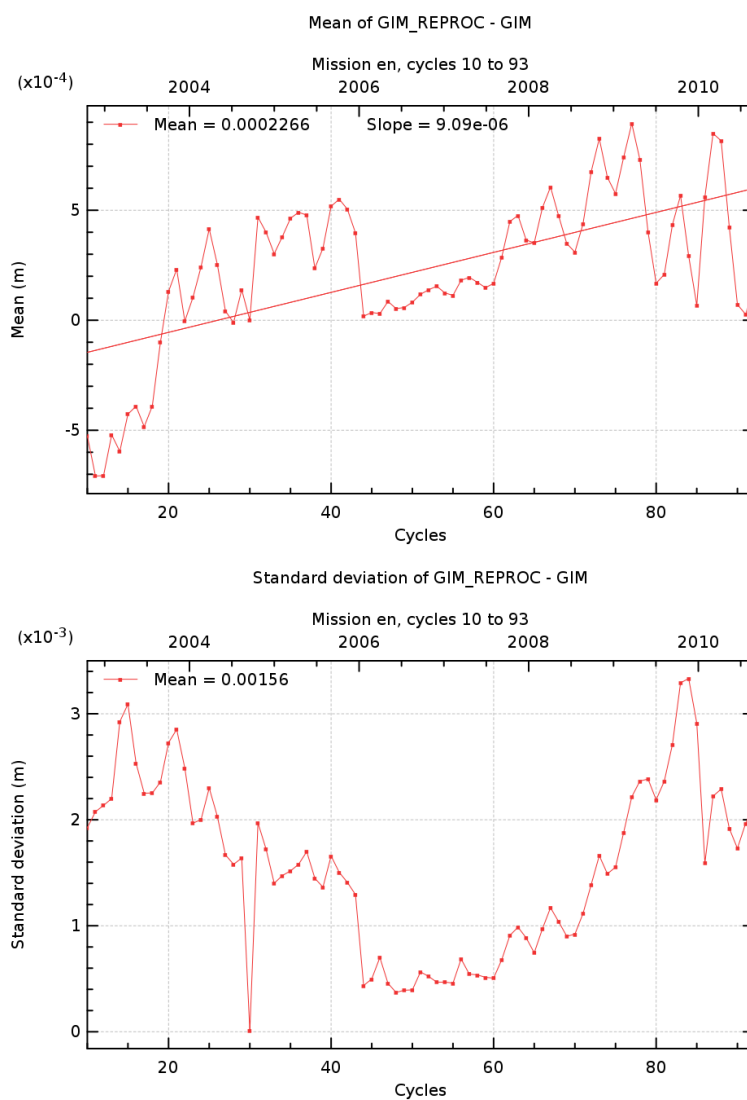
Diagnostic A001 (mission en)

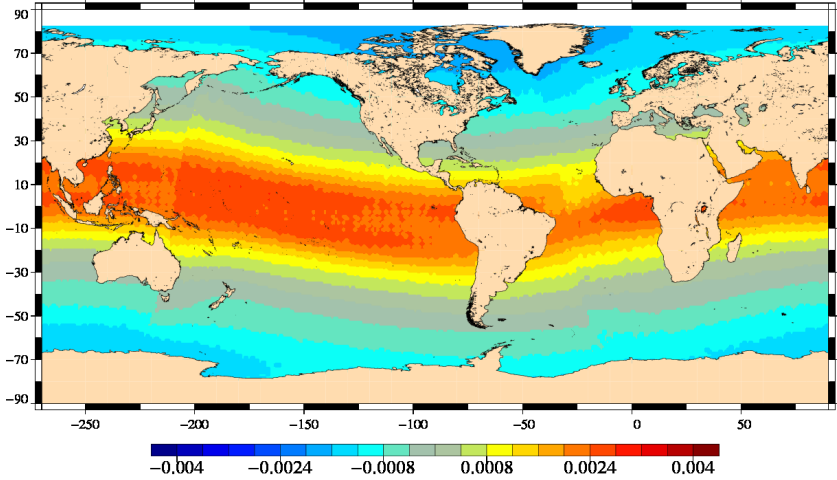
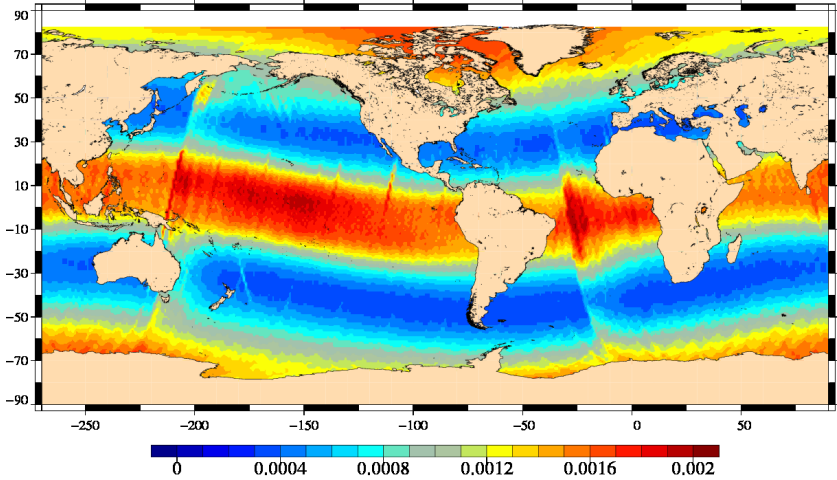
Name : Temporal evolution of differences between both altimetric components

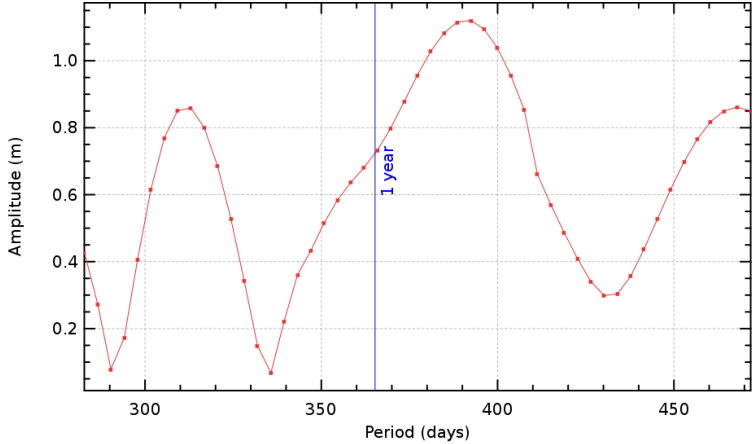
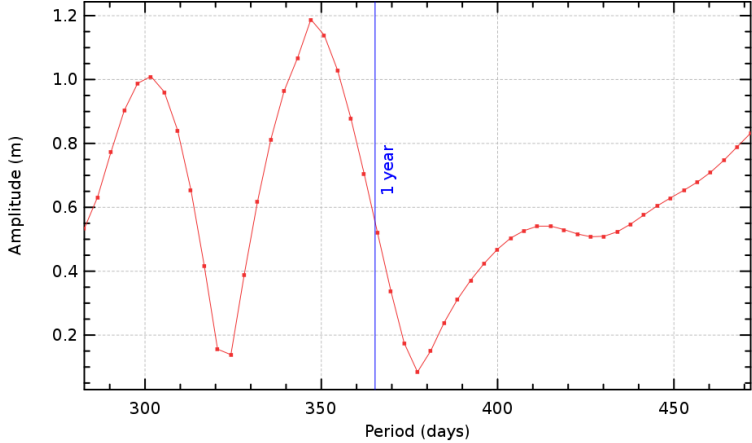
Input data : Along-track altimetric components

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.

Diagnostic type : Global internal analyses



Diagnostic A002 (mission en)	
Name : Map of differences between both altimetric components over all the period	
Input data : Along-track altimetric components	
Description : 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.	
<div><div><div>Mean of GIM_REPROC – GIM Mission en, cycles 10 to 93</div><div>Mean (m) Standard deviation of GIM_REPROC – GIM Mission en, cycles 10 to 93</div><div>Standard deviation (m)</div></div></div>	

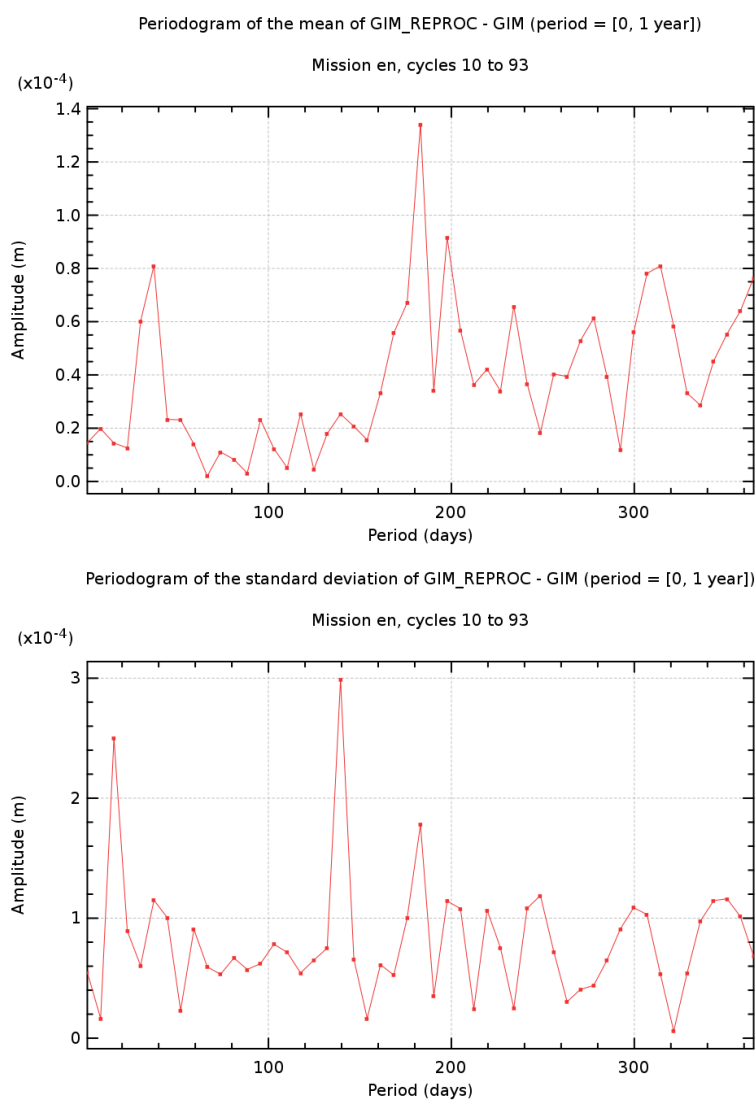
Diagnostic A003_a (mission en)	
Name : Periodogram derived from temporal evolution of altimetric component differences	
Input data : Along-track altimetric components	
<p>Description : The periodogram derived from temporal and global altimetric component differences is calculated from cycle by cycle 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.</p>	
<div><p>Periodogram of the mean of GIM_REPROC - GIM (reference period = 1 year)</p><p>Mission en, cycles 10 to 93</p><p>(x10⁻⁴)</p><p>Amplitude (m)</p><p>Period (days)</p><p>Periodogram of the standard deviation of GIM_REPROC - GIM (reference period = 1 year)</p><p>Mission en, cycles 10 to 93</p><p>(x10⁻⁴)</p><p>Amplitude (m)</p><p>Period (days)</p></div>	

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.



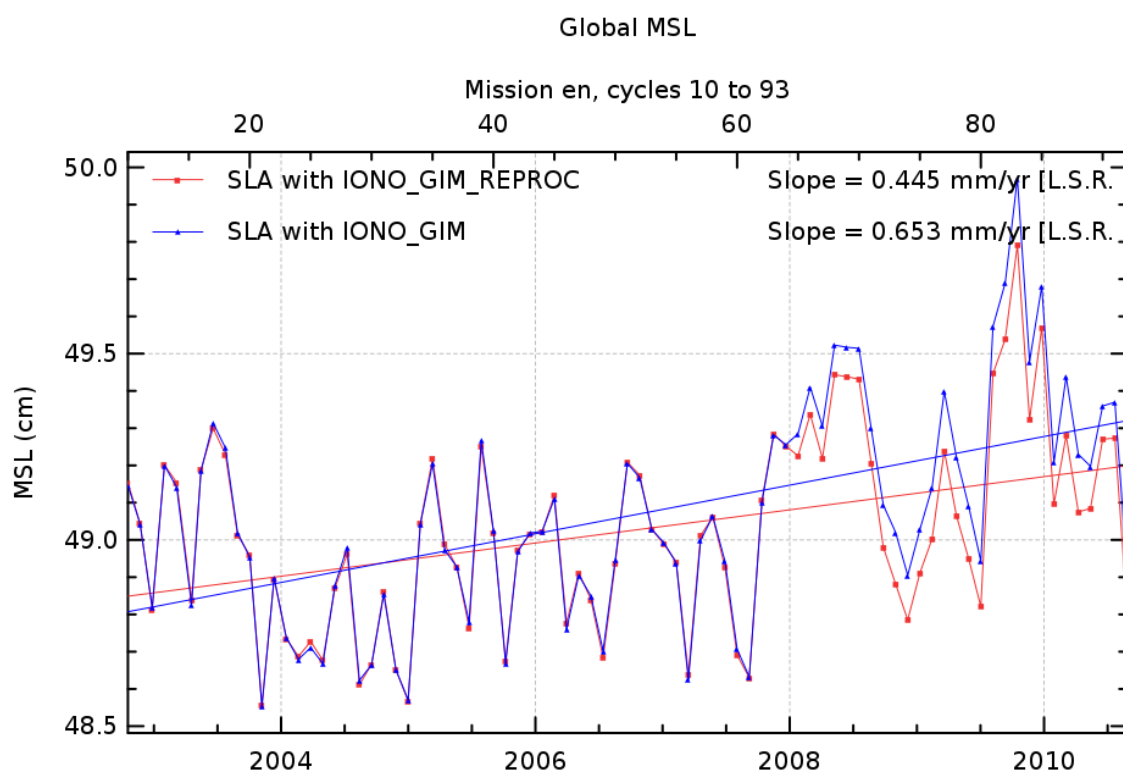
Diagnostic A201 a (mission en)

Name : Temporal evolution of Sea Level Anomaly (SLA)

Input data : Along track SLA / SLA Grids combined between all missions

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



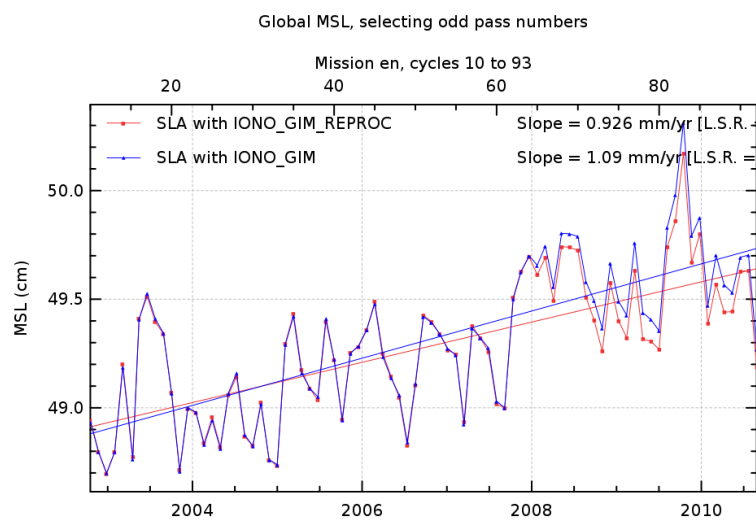
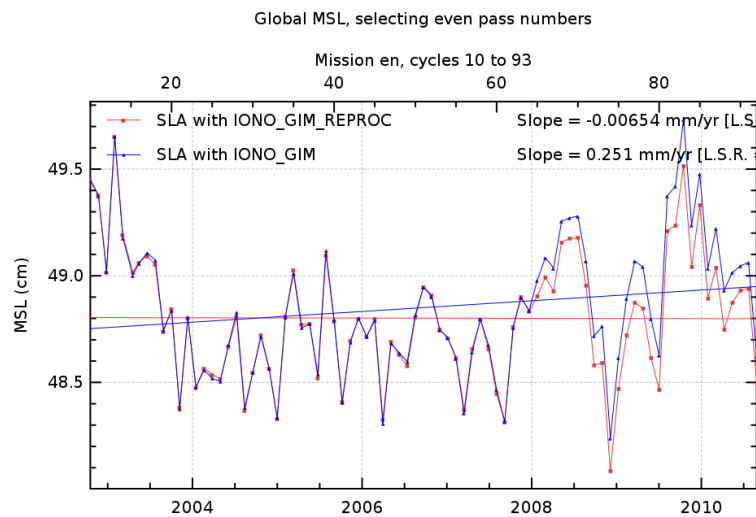
Diagnostic A201_b (mission en)

Name : Temporal evolution of Sea Level Anomaly (SLA)

Input data : Along track SLA / SLA Grids combined between all missions

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



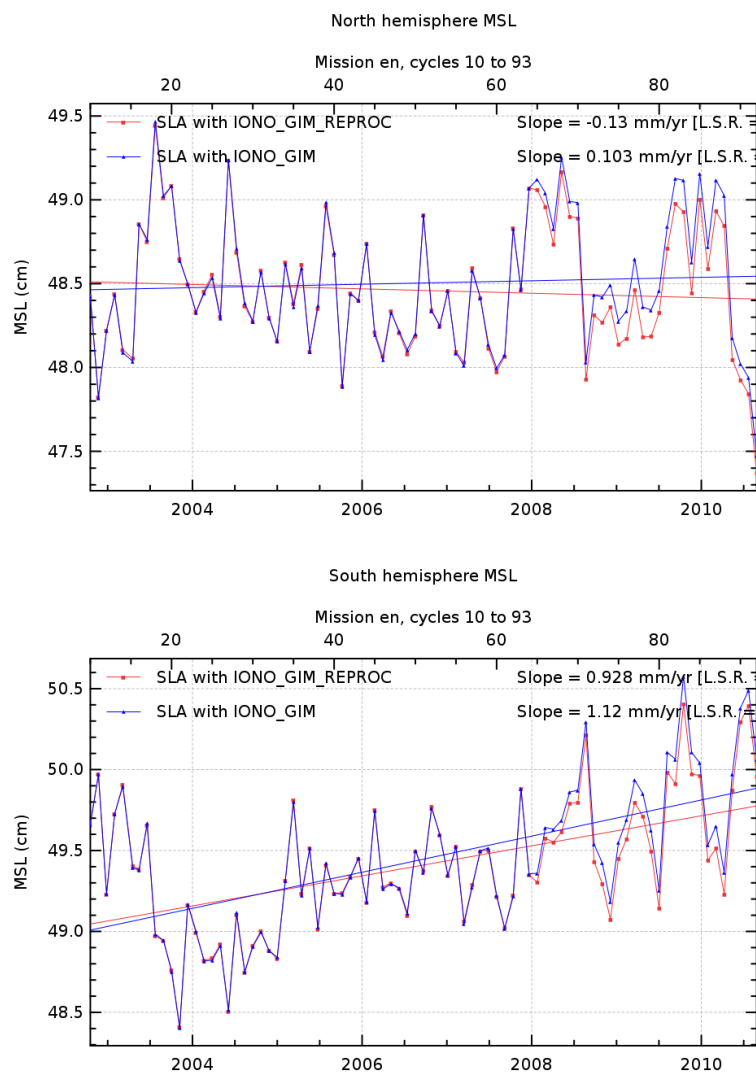
Diagnostic A201_c (mission en)

Name : Temporal evolution of Sea Level Anomaly (SLA)

Input data : Along track SLA / SLA Grids combined between all missions

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



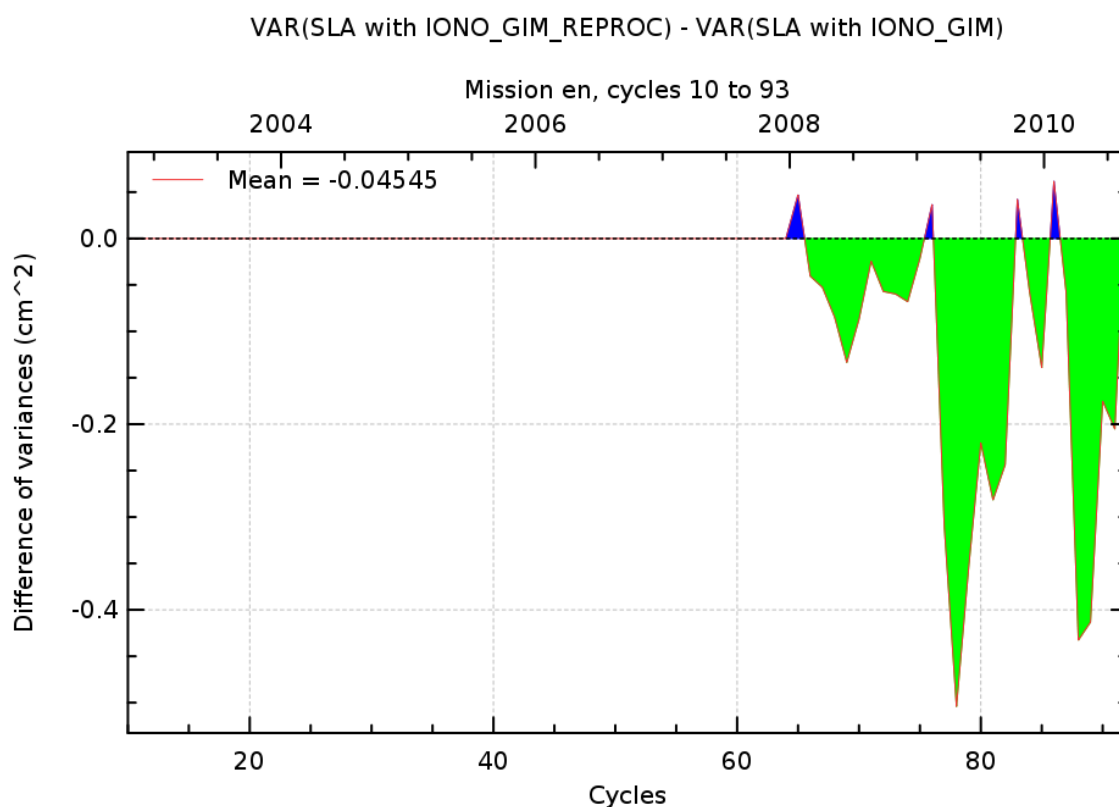
Diagnostic A202_a (mission en)

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

Input data : Along track SLA / SLA Grids combined between all missions

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



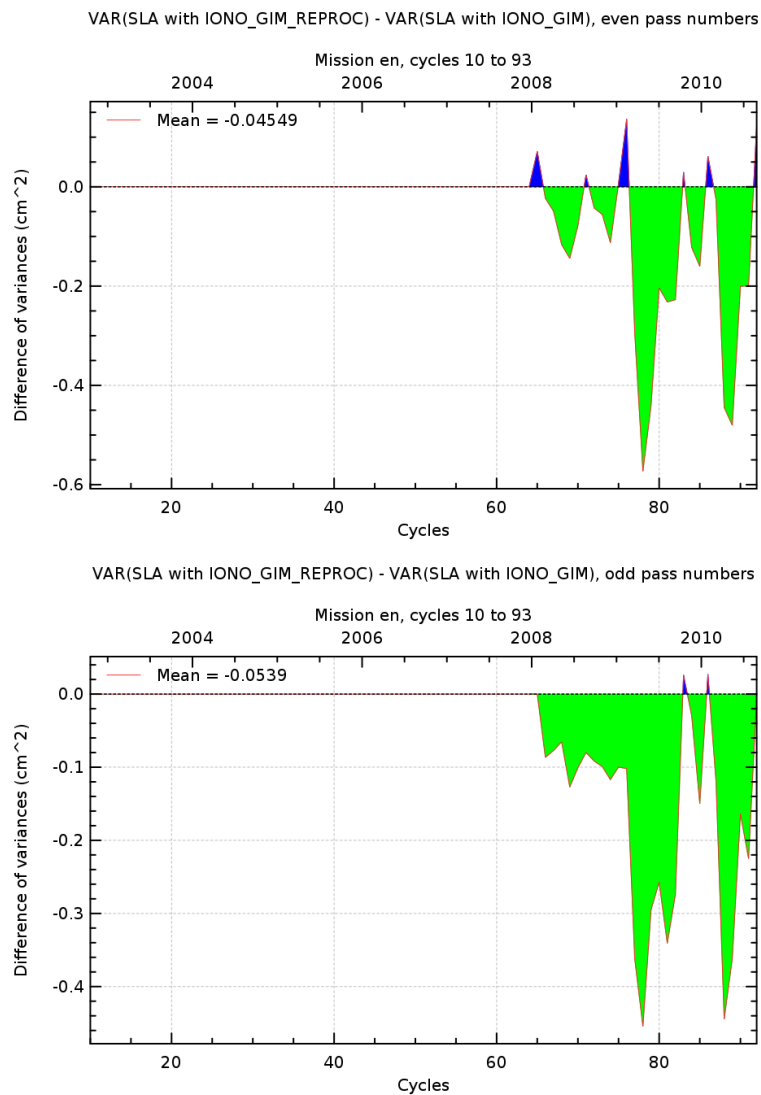
Diagnostic A202_b (mission en)

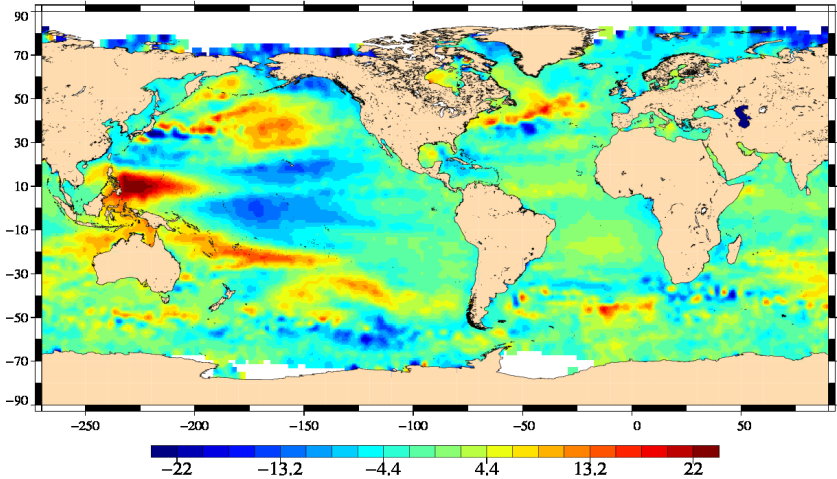
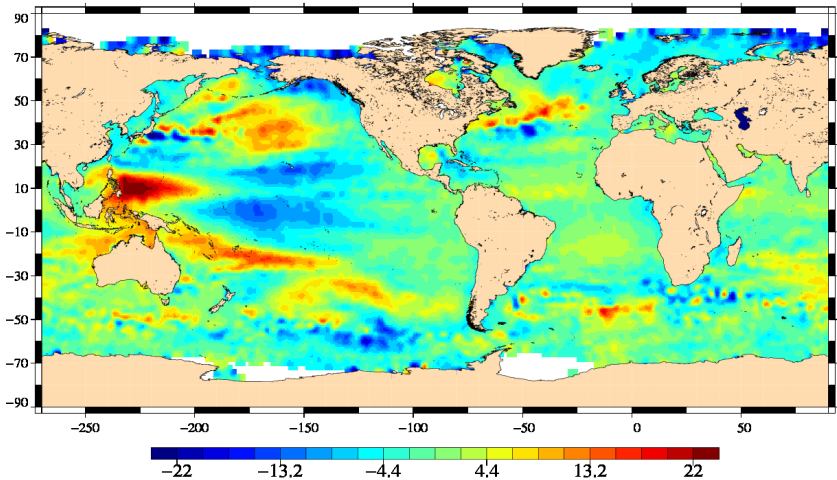
Name : Differences of temporal evolution of Sea Level Anomaly (SLA)

Input data : Along track SLA / SLA Grids combined between all missions

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 / SLA Grids combined between all missions	
	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 IONO_GIM_REPROC : trends Mission en, cycles 10 to 93</div>  <div>Trends (mm/yr) SLA with IONO_GIM : trends Mission en, cycles 10 to 93</div> 	

Diagnostic A203_b (mission en)

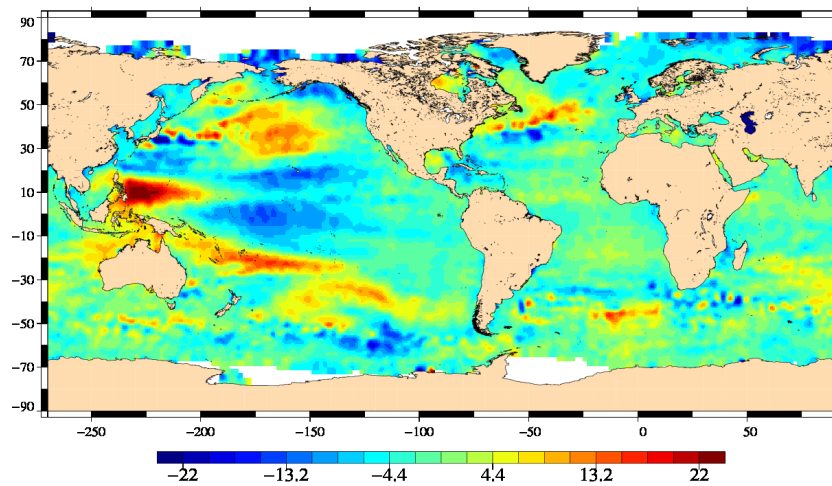
Name : Map of Sea Level Anomaly (SLA) over all the period

Input data : Along track SLA / SLA Grids combined between all missions

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.

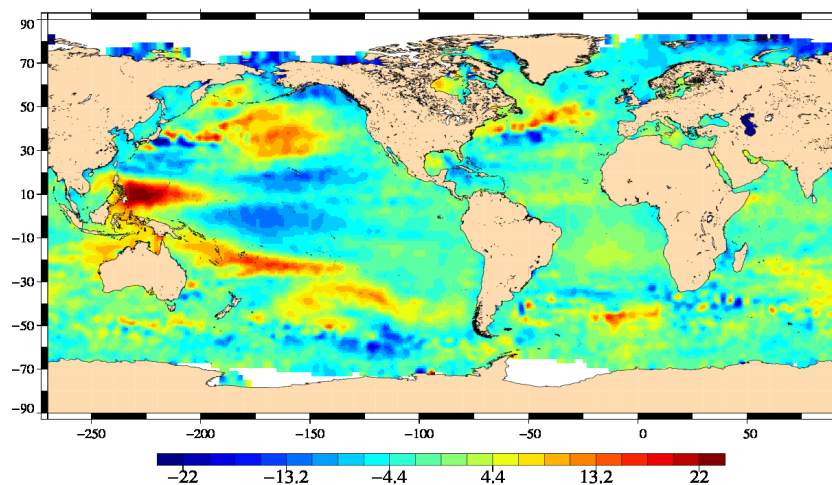
Diagnostic type : Global internal analyses

SLA with IONO_GIM_REPROC : trends, even pass numbers
Mission en, cycles 10 to 93



Trends (mm/yr)

SLA with IONO_GIM : trends, even pass numbers
Mission en, cycles 10 to 93



Trends (mm/yr)

Diagnostic A203_c (mission en)

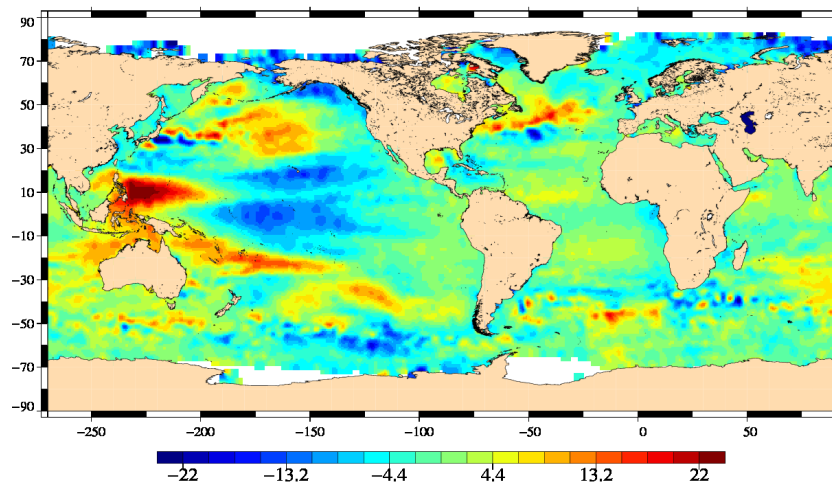
Name : Map of Sea Level Anomaly (SLA) over all the period

Input data : Along track SLA / SLA Grids combined between all missions

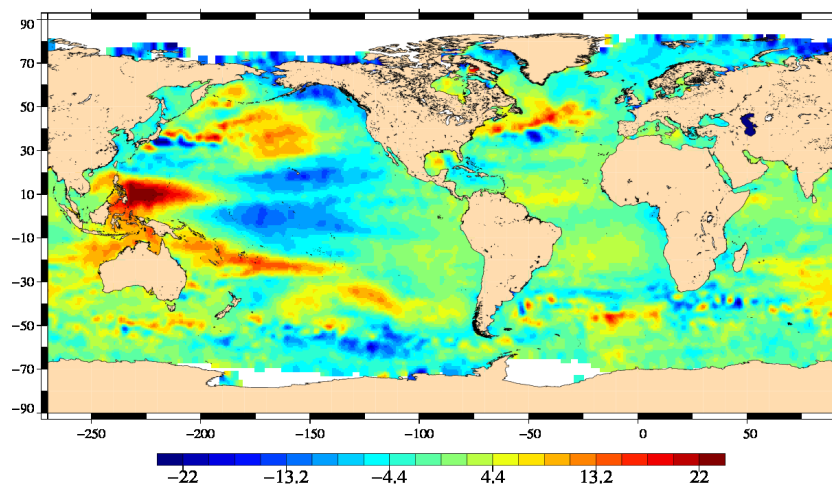
Description : The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

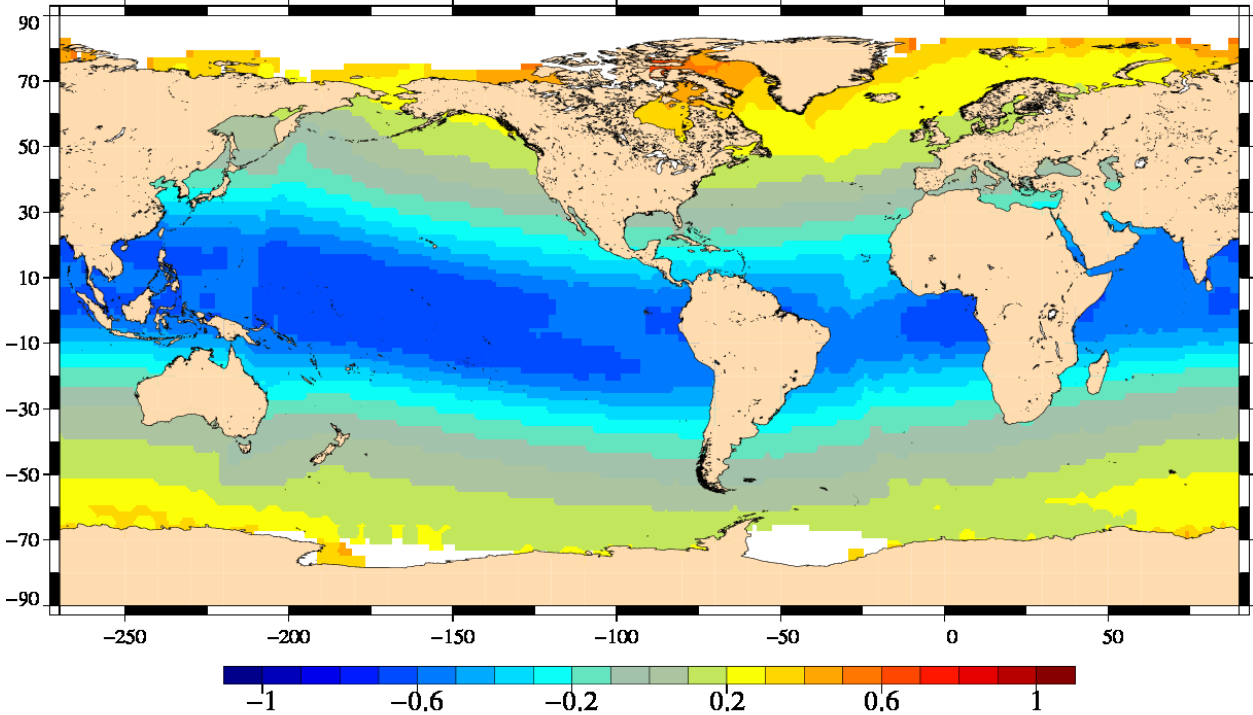
SLA with IONO_GIM_REPROC : trends, odd pass numbers
Mission en, cycles 10 to 93



Trends (mm/yr)
SLA with IONO_GIM : trends, odd pass numbers
Mission en, cycles 10 to 93



Trends (mm/yr)

Diagnostic type : Global internal analyses	<div>Diagnostic A204_a (mission en)</div>
	<div>Name : Differences between maps of SLA</div>
	<div>Input data : Along track SLA / SLA Grids combined between all missions</div>
	<div>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>
	<div><div>SLA with IONO_GIM_REPROC – SLA with IONO_GIM : trends</div><div>Mission en, cycles 10 to 93</div><div>Trends (mm/yr)</div></div>

Diagnostic A204_b (mission en)

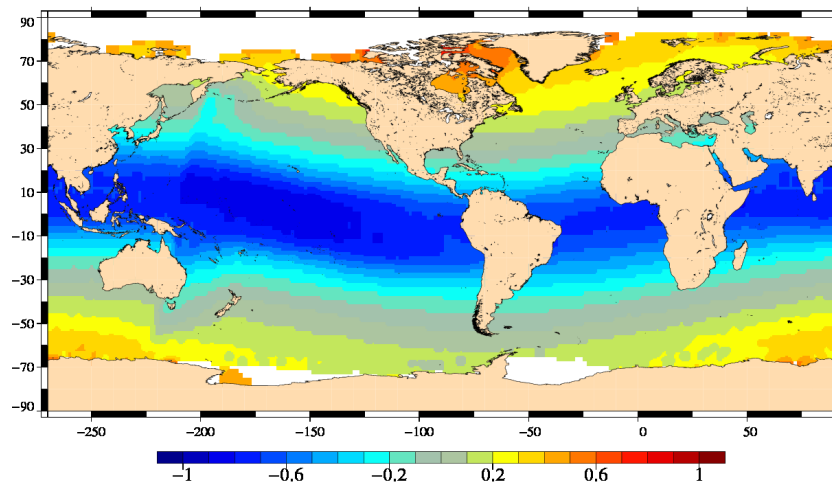
Name : Differences between maps of SLA

Input data : Along track SLA / SLA Grids combined between all missions

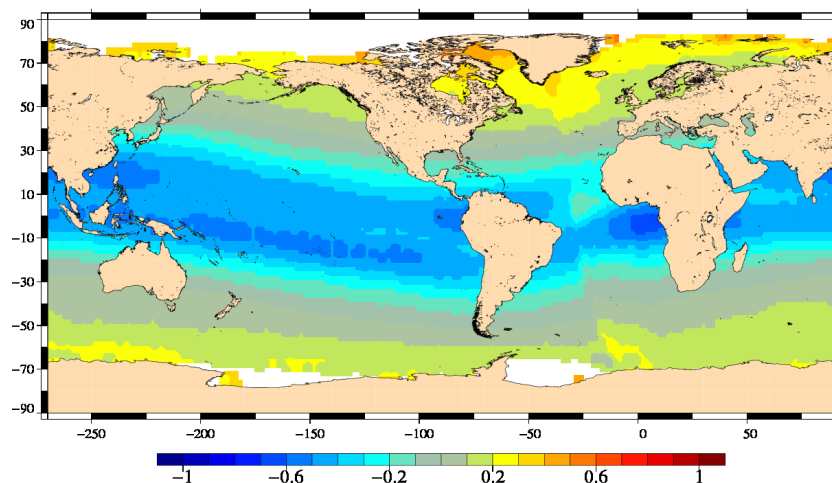
Description : The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

Diagnostic type : Global internal analyses

SLA with IONO_GIM_REPROC – SLA with IONO_GIM : trends, even pass numbers
Mission en, cycles 10 to 93



Trends (mm/yr)
SLA with IONO_GIM_REPROC – SLA with IONO_GIM : trends, odd pass numbers
Mission en, cycles 10 to 93



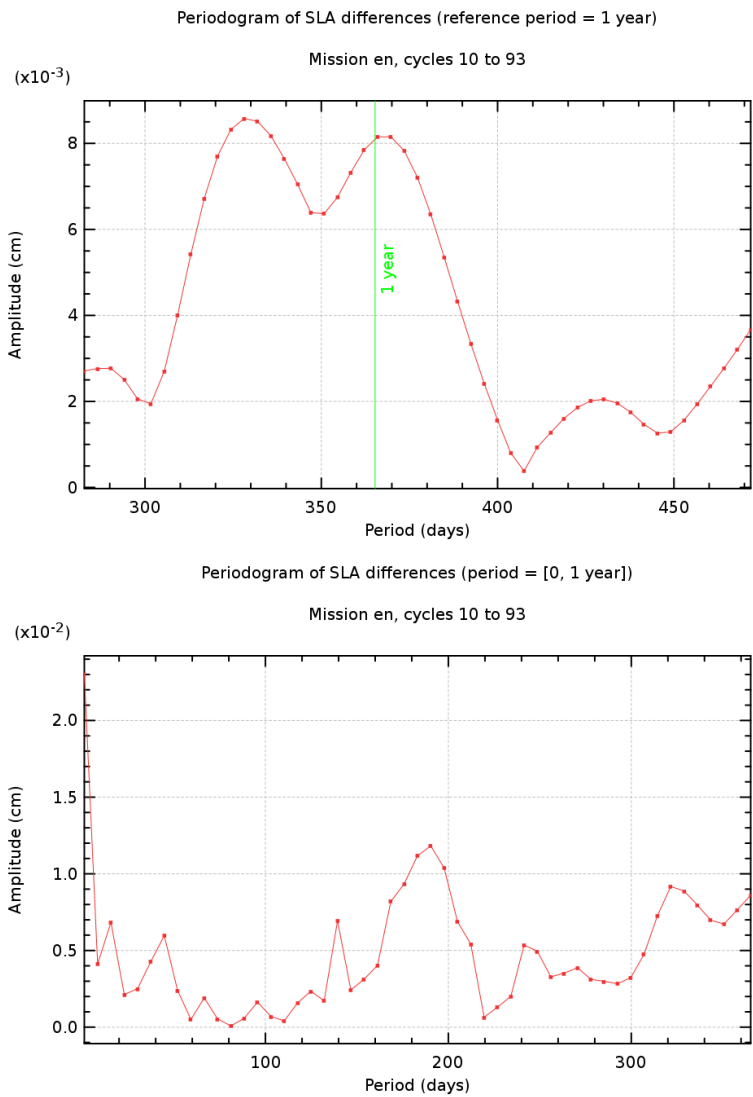
Trends (mm/yr)

Diagnostic A206_a (mission en)

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

Input data : Along track SLA / SLA Grids combined between all missions

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 / SLA Grids combined between all missions

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

