

# Tidal models comparison : DTU10 versus GOT4V7

Study variable	<b>DTU10 Tidal Model</b>
Reference variable	<b>GOT4V7 Tidal Model</b>
Missions	Envisat ( <i>en</i> ), Jason-1 ( <i>j1</i> )
Period	[19007, 22280]

Creation date : 2011/09/14

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## Study overview

In this study, the tide model DTU10 has been compared to the model GOT 4.7 for high latitudes ( $>50^{\circ}\text{N}$ ).

The DTU tide model is produced by Danmarks Tekniske Universitet. The DTU10 stands for global ocean tide model derived at DTU Space in 2010 using response method for residual analysis of multi-missions altimeter data. The extended global tidal model FES2004 (Finite Element Solutions) was used as a reference model. The model is an empirical ocean tide model which means that it does not include tidal currents, but it includes load tide effects. The model GOT is described in Ray, R. (1999) : "A global ocean tide model from Topex/Poseidon altimetry: GOT 99.2." NASA Tech Memo 209478: 58 pages.

The impact of using these both tidal models on the SSH calculation has been analyzed for Envisat and Jason-1 missions.

- for Jason-1 : from January 2002 (cycle 1) to December 2010 (Cycle 330)
- for Envisat : from September 2002 (cycle 10) to October 2010 (Cycle 93)

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 DTU10 - GOT4V7 Mission en, cycles 9 to 94</div><div><div>20406080</div><div>Mean = 0.05593Slope = -0.114 mm/yr</div><div>0.40.20.0-0.2-0.4-0.6</div><div>2004200620082010</div></div></div><div><div>Standard deviation of DTU10 - GOT4V7 Mission en, cycles 9 to 94</div><div><div>20406080</div><div>Mean = 8.316</div><div>9876</div><div>2004200620082010</div></div></div></div>	



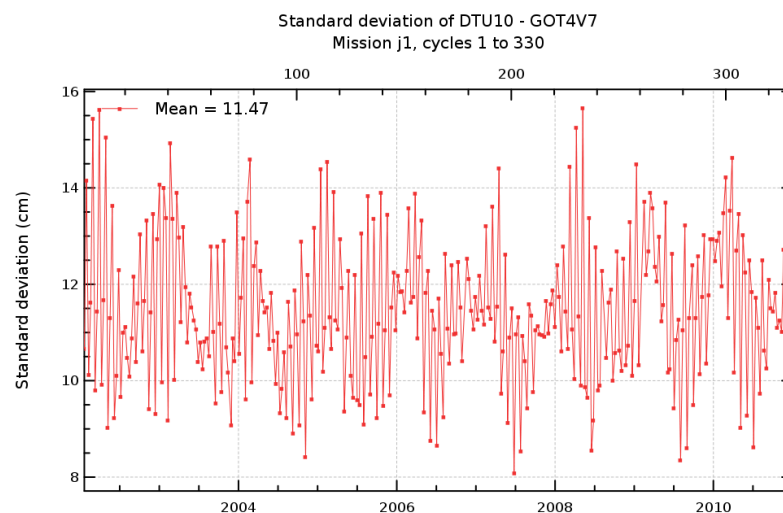
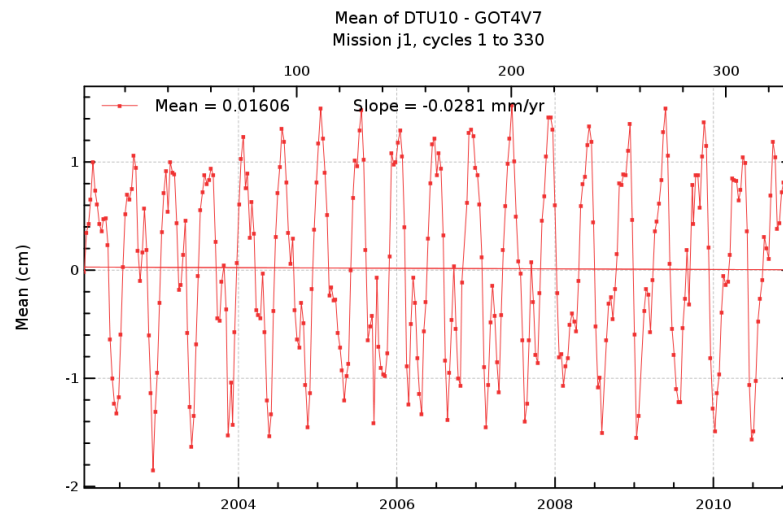
## Diagnostic A001 (mission j1)

**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

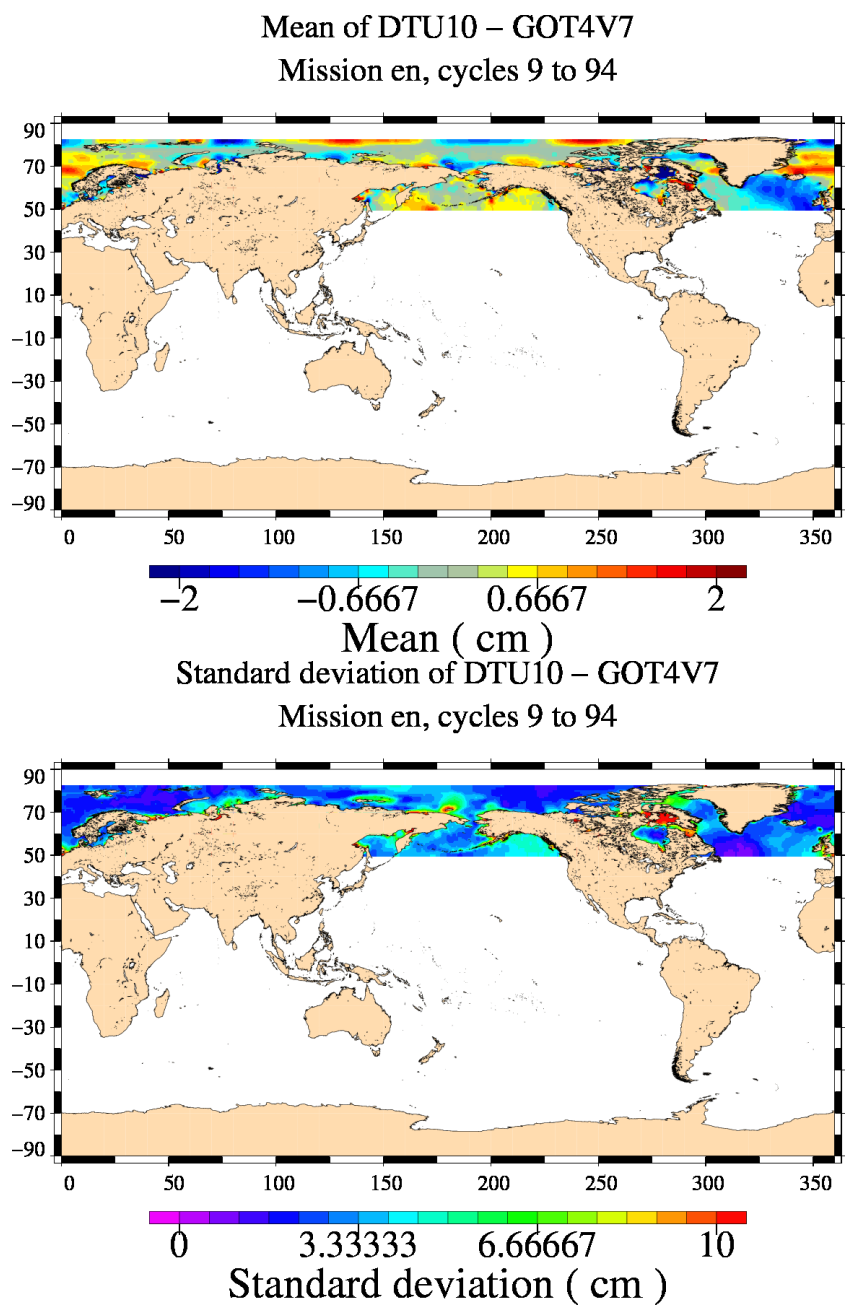


Diagnostic A002\_a (mission en)

**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.



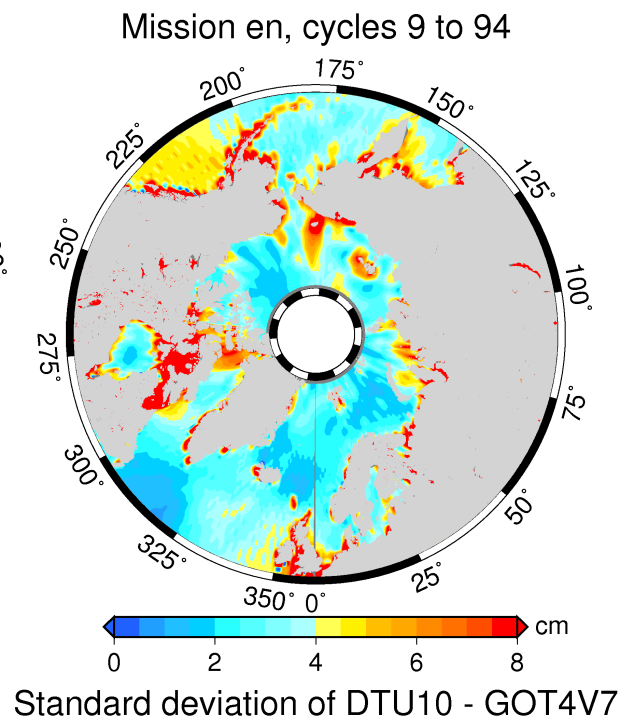
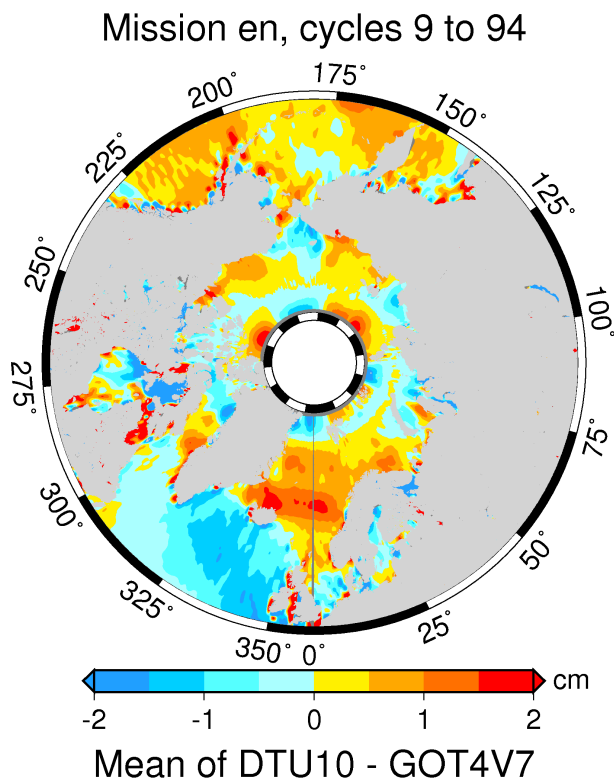
## Diagnostic A002\_b (mission en)

**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.

Diagnostic type : Global internal analyses



## Diagnostic A002\_a (mission j1)

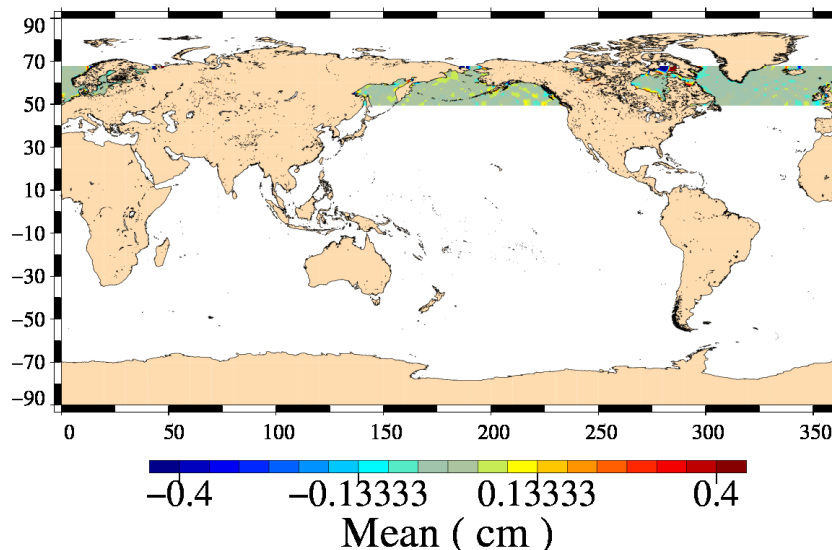
**Name :** Map of differences between both altimetric components over all the period

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

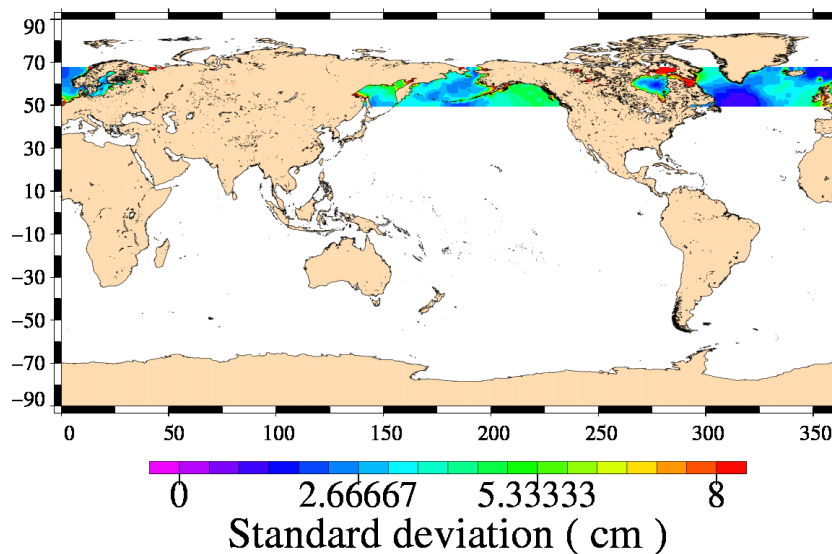
**Description :** The map of global statistics (mean, standard deviation) of differences between 2 different standards of a same altimetric component (sea surface height correction, altimeter parameter, orbit) are calculated over a given period which is the longer as possible to have obtain reliable statically results. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

Mean of DTU10 – GOT4V7  
Mission j1, cycles 1 to 330



Standard deviation of DTU10 – GOT4V7  
Mission j1, cycles 1 to 330



## Diagnostic A002\_b (mission j1)

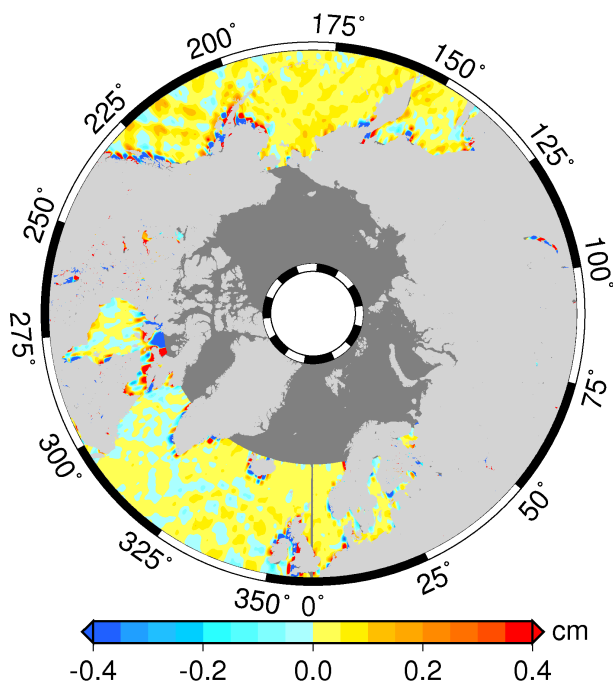
**Name :** Map of differences between both altimetric components over all the period

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

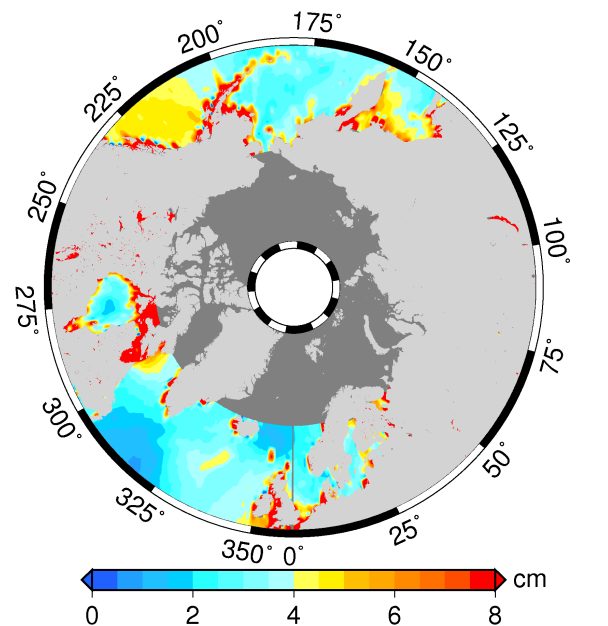
**Description :** The map of global statistics (mean, standard deviation) of differences between 2 different standards of a same altimetric component (sea surface height correction, altimeter parameter, orbit) are calculated over a given period which is the longer as possible to have obtain reliable statically results. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

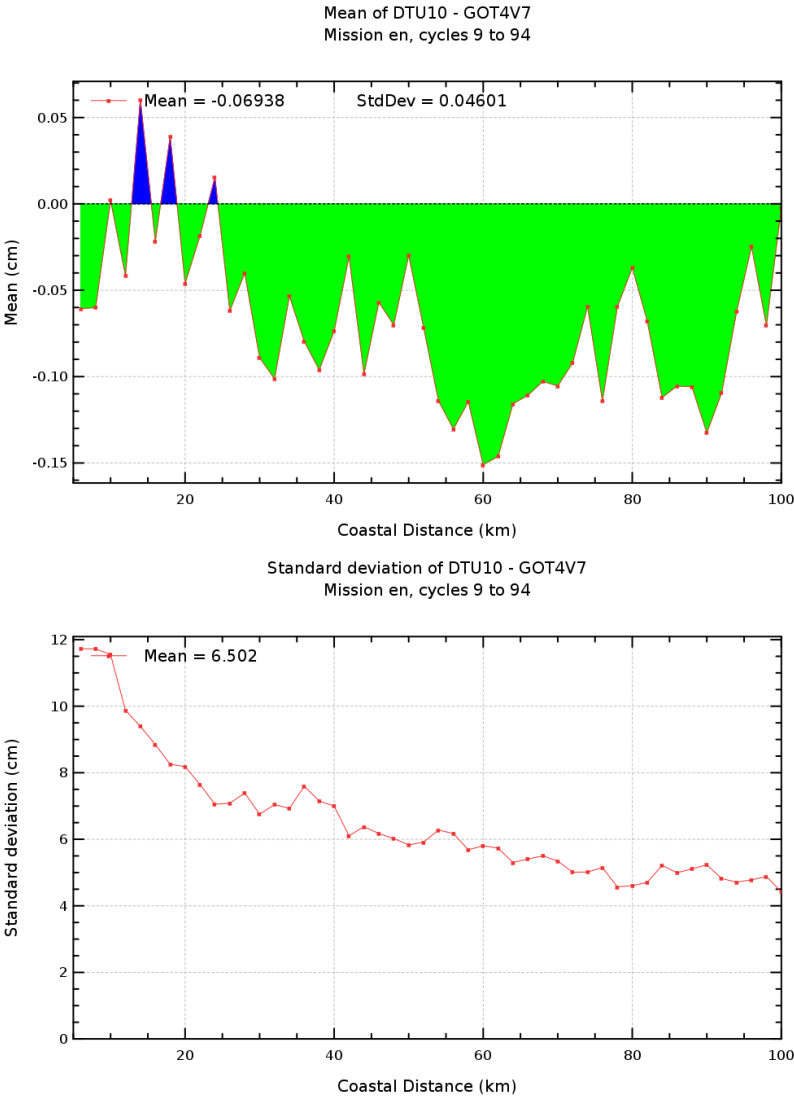
Mission j1, cycles 1 to 330



Mission j1, cycles 1 to 330



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.	



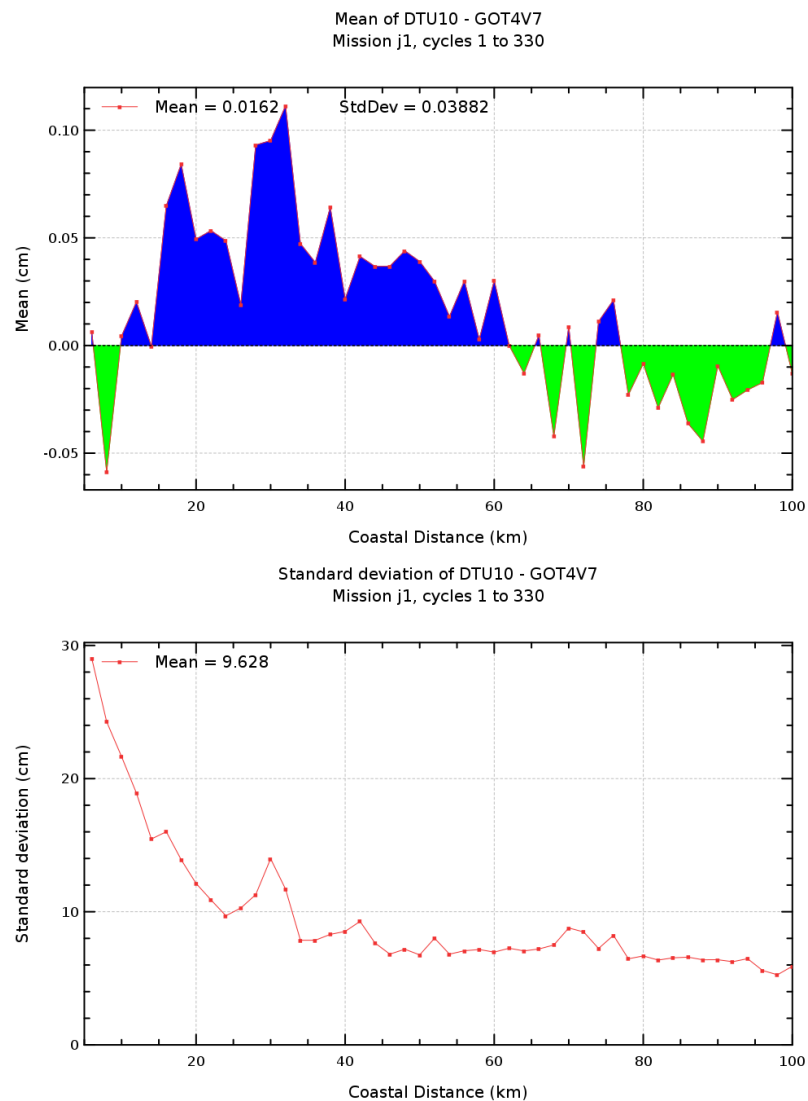
## Diagnostic A004 (mission j1)

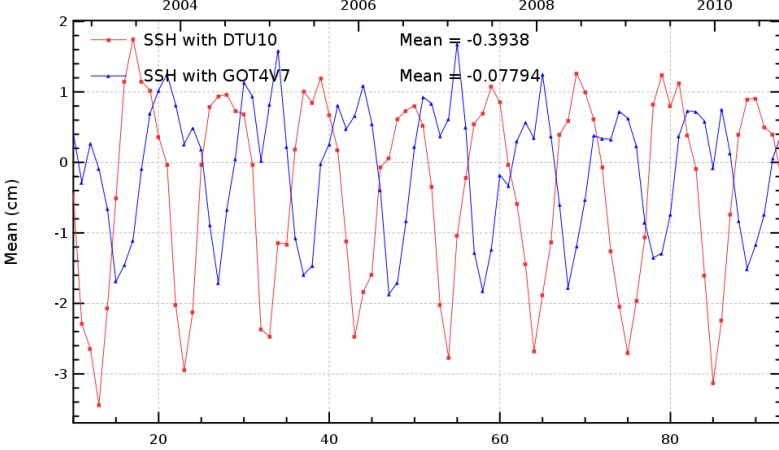
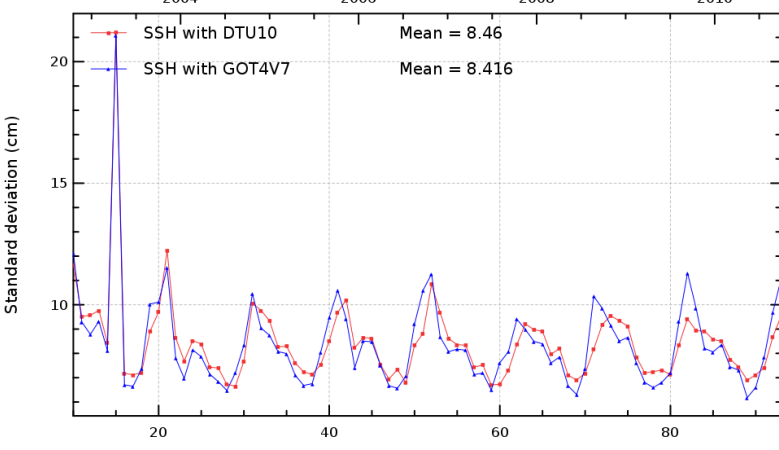
**Name :** Altimetric component differences versus coastal distances

**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 type : Global internal analyses



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 94</div><div></div></div><div><div>Standard deviations of SSH crossovers Mission en, cycles 9 to 94</div><div></div></div></div>	



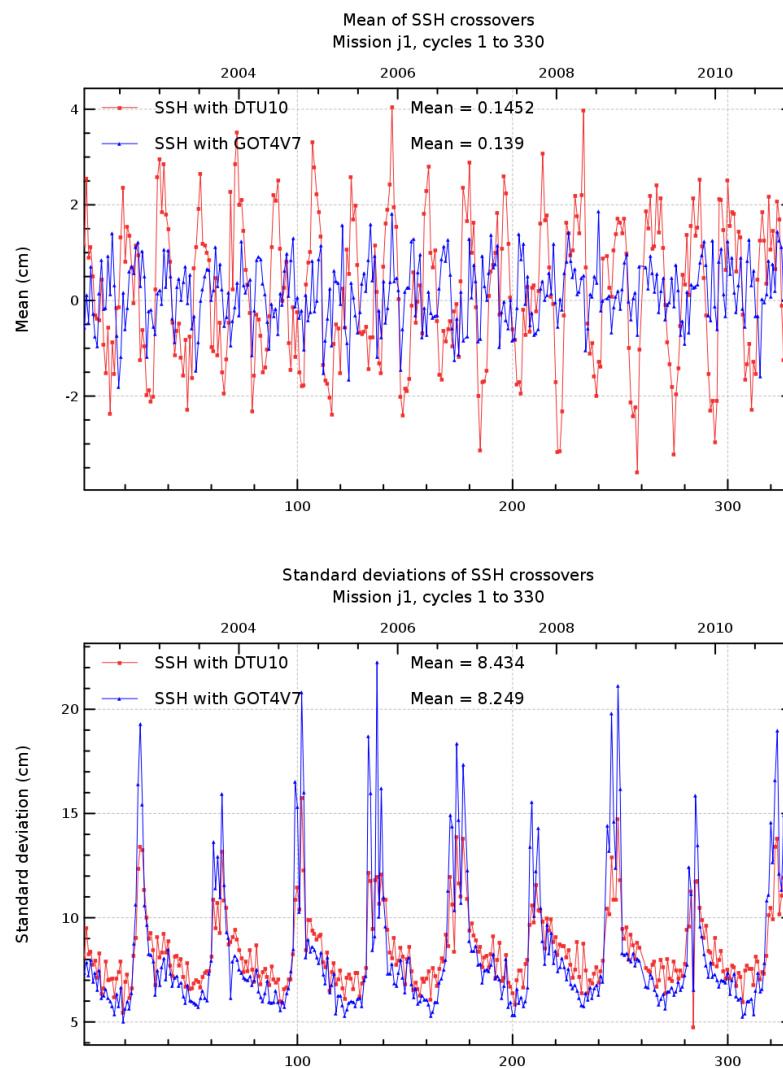
## Diagnostic A101 (mission j1)

**Name :** Temporal evolution of SSH crossovers

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

**Description :** 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).

Diagnostic type : Global internal analyses



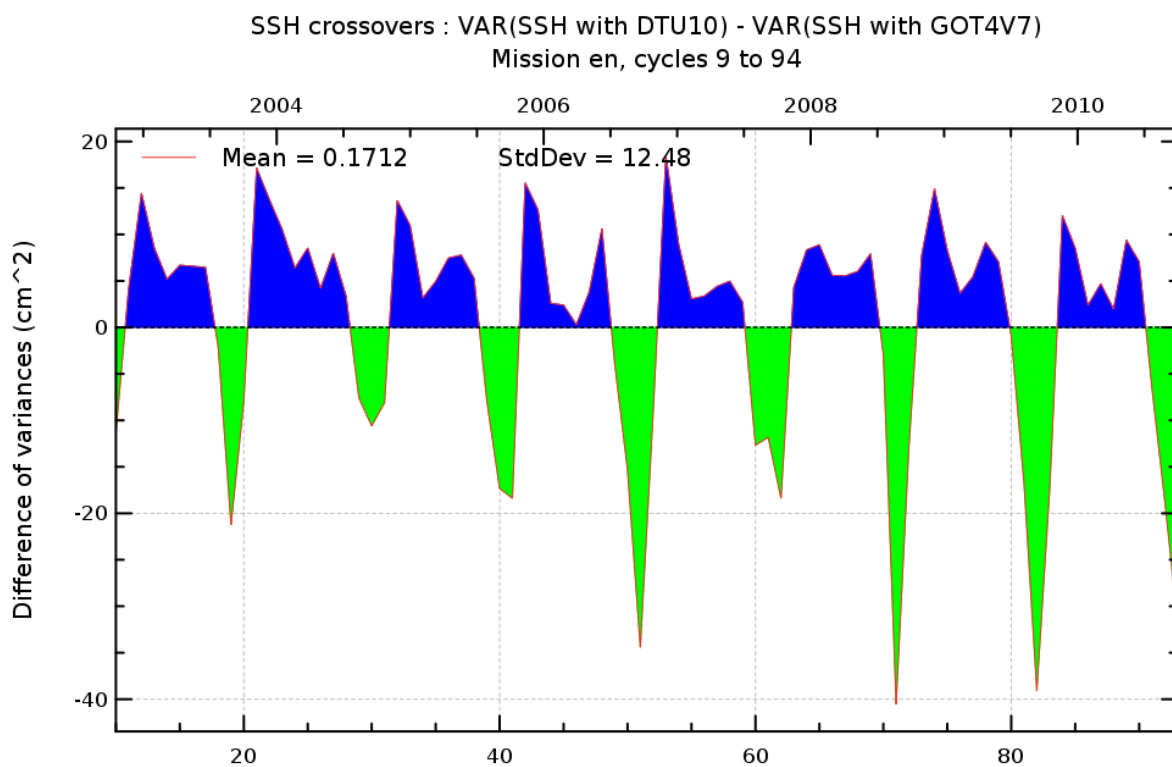
**Diagnostic A102 (mission en)**

**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



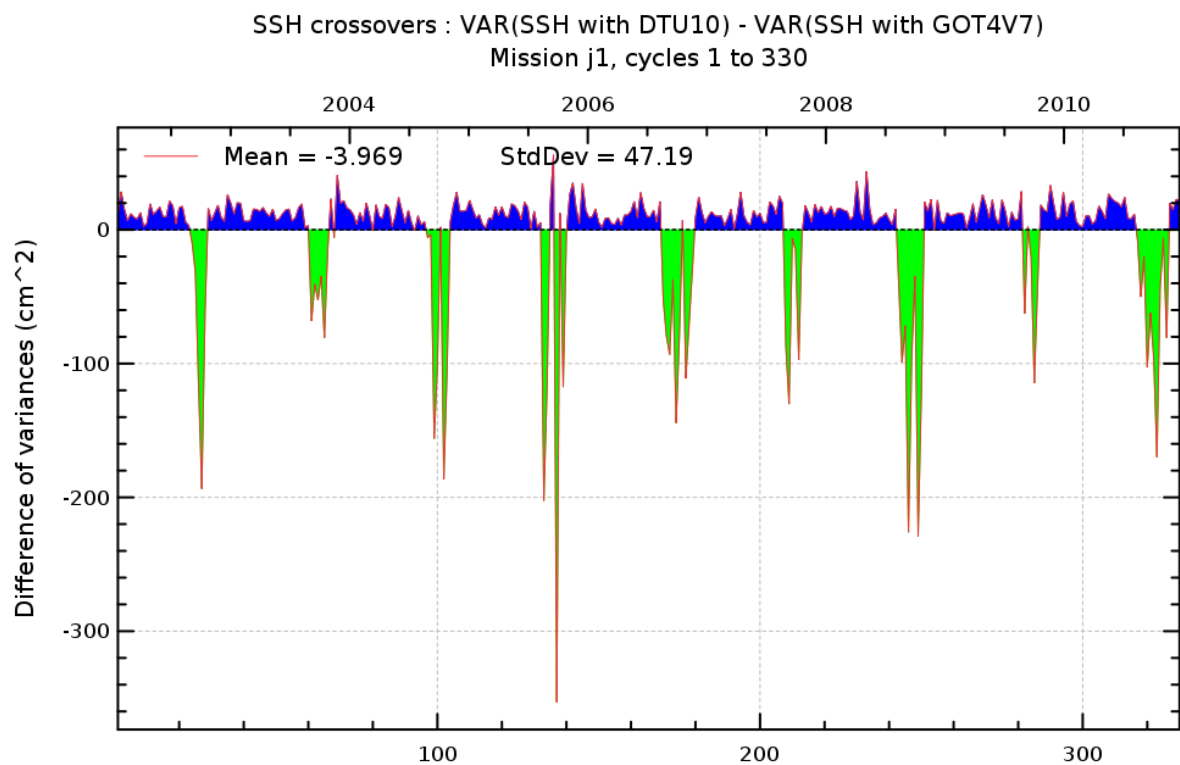
## Diagnostic A102 (mission j1)

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

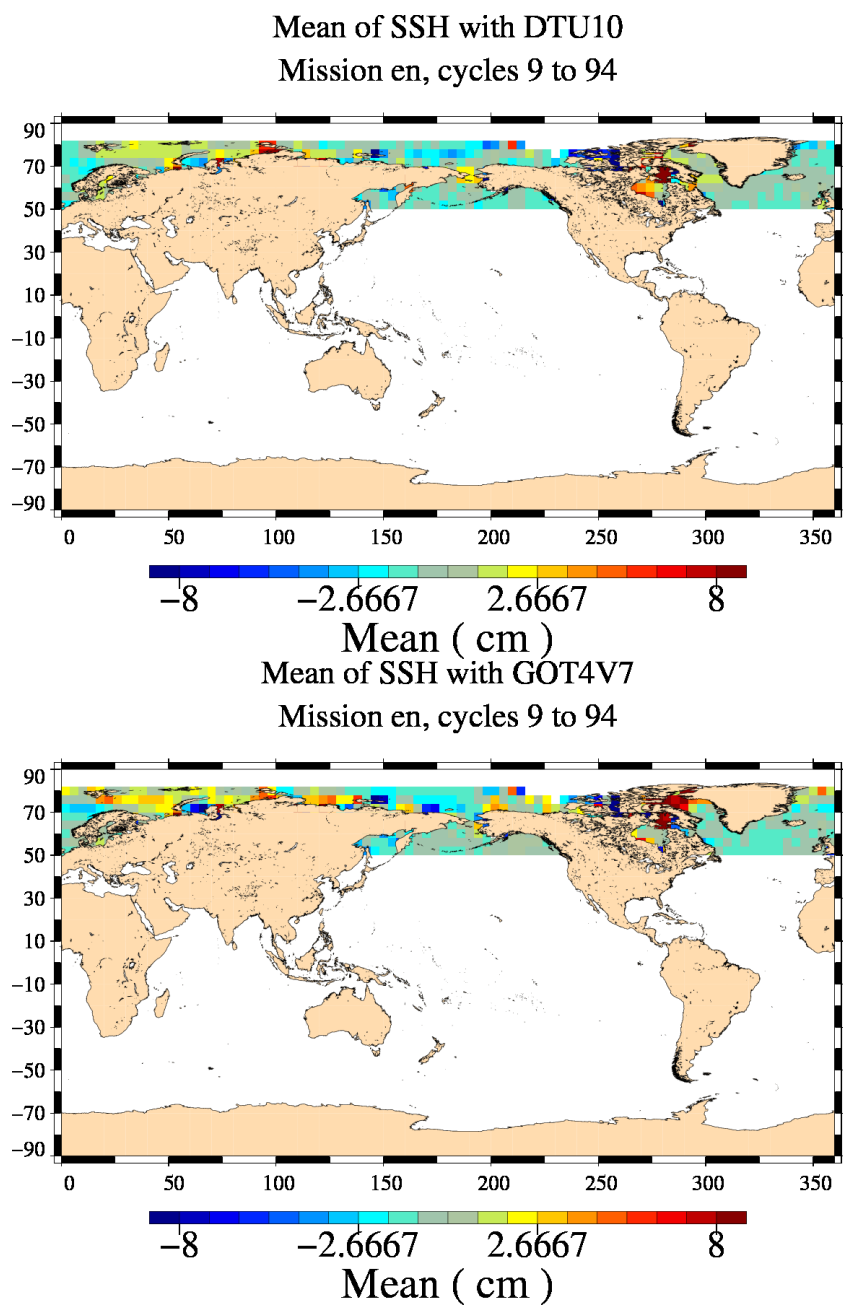
**Input data :** Sea Surface Height (SSH) crossovers

**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 a (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).	



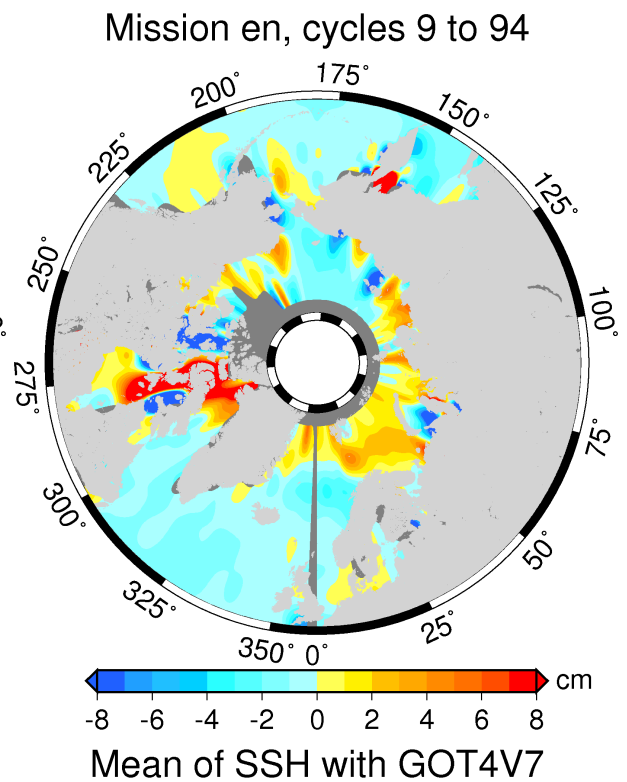
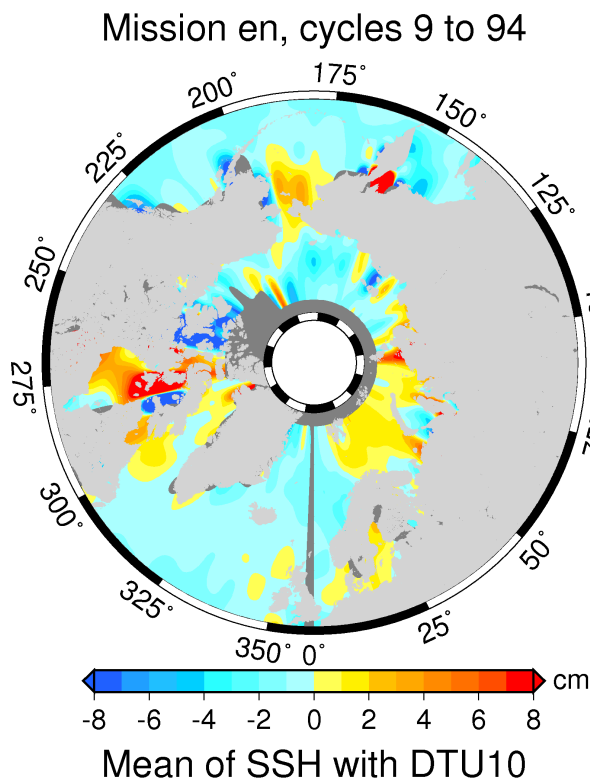
## Diagnostic A103\_b (mission en)

**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 A103\_a (mission j1)

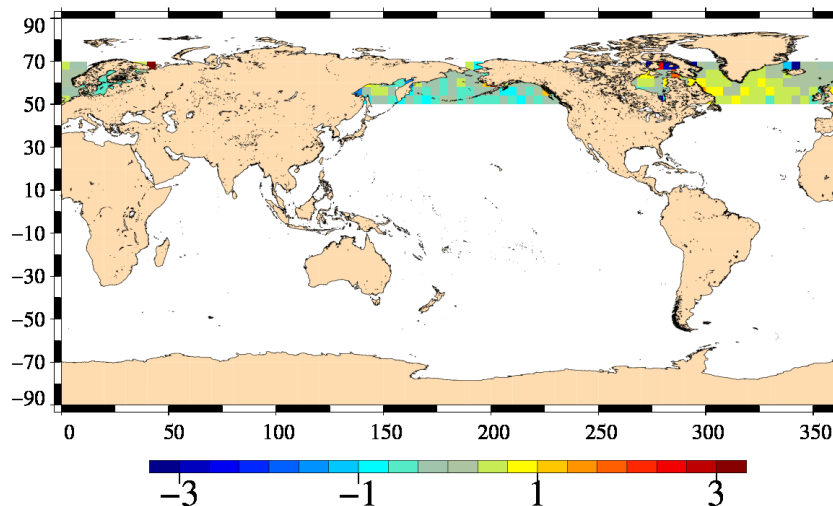
**Name :** Map of SSH crossovers

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

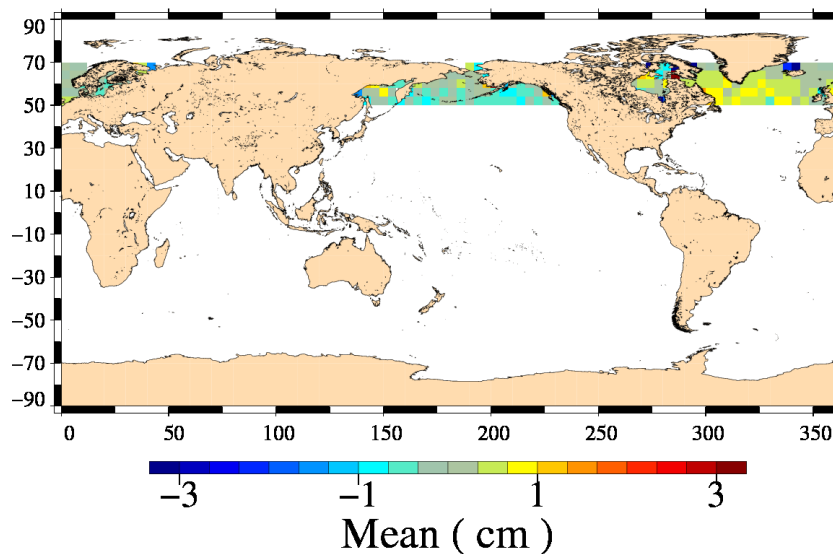
**Description :** The differences between maps of SSH crossovers differences (mean, variance) are calculated using successively both altimetric components in the SSH calculation. SSH crossovers are the differences between ascending and descending passes for time differences between both passes lower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

Diagnostic type : Global internal analyses

Mean of SSH with DTU10  
Mission j1, cycles 1 to 330



Mean ( cm )  
Mean of SSH with GOT4V7  
Mission j1, cycles 1 to 330



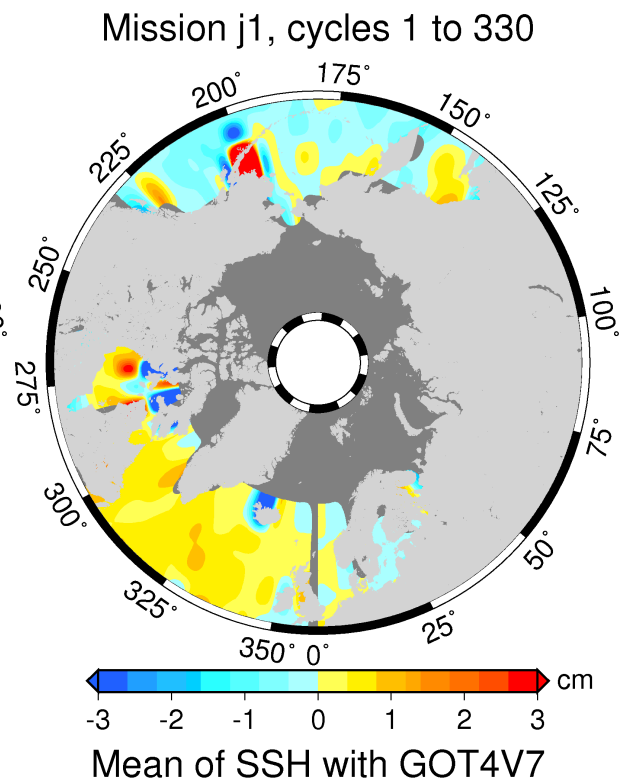
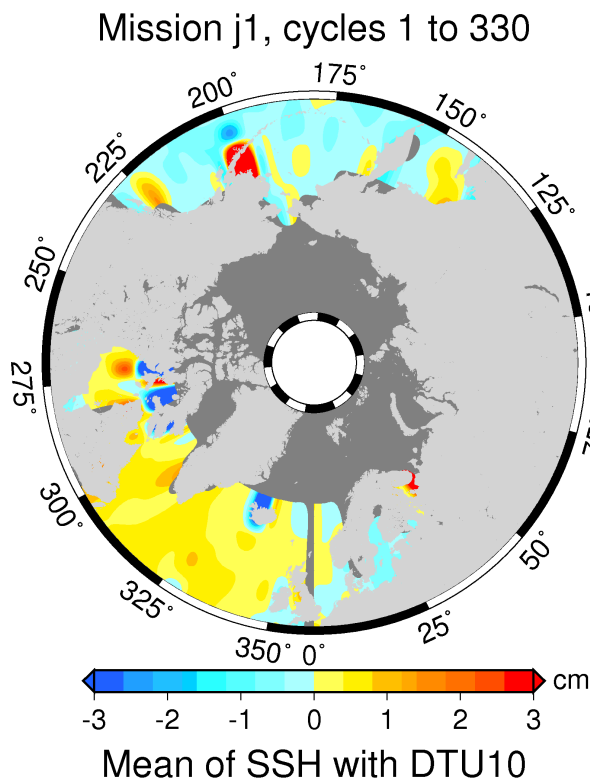
## Diagnostic A103\_b (mission j1)

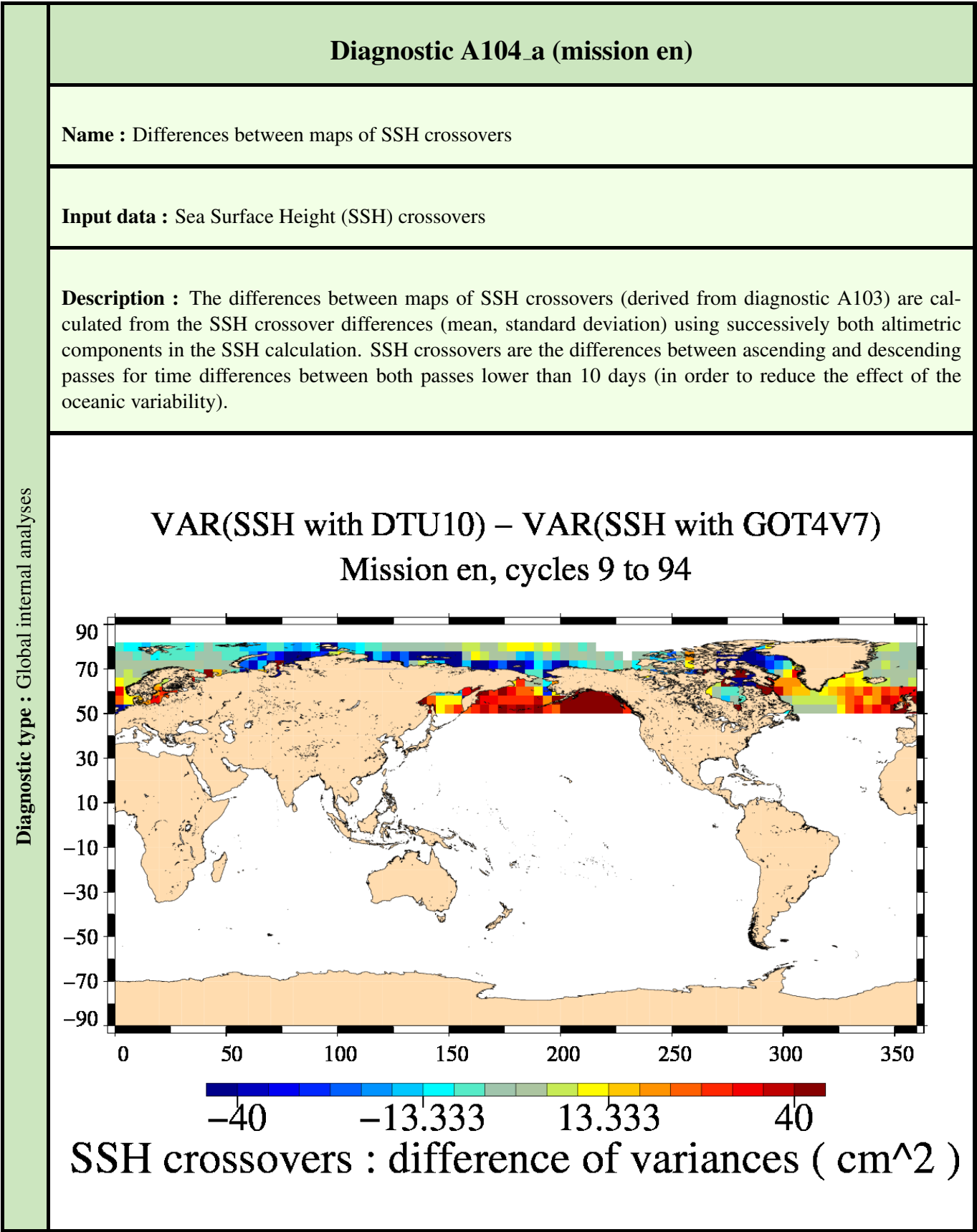
**Name :** Map of SSH crossovers

**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







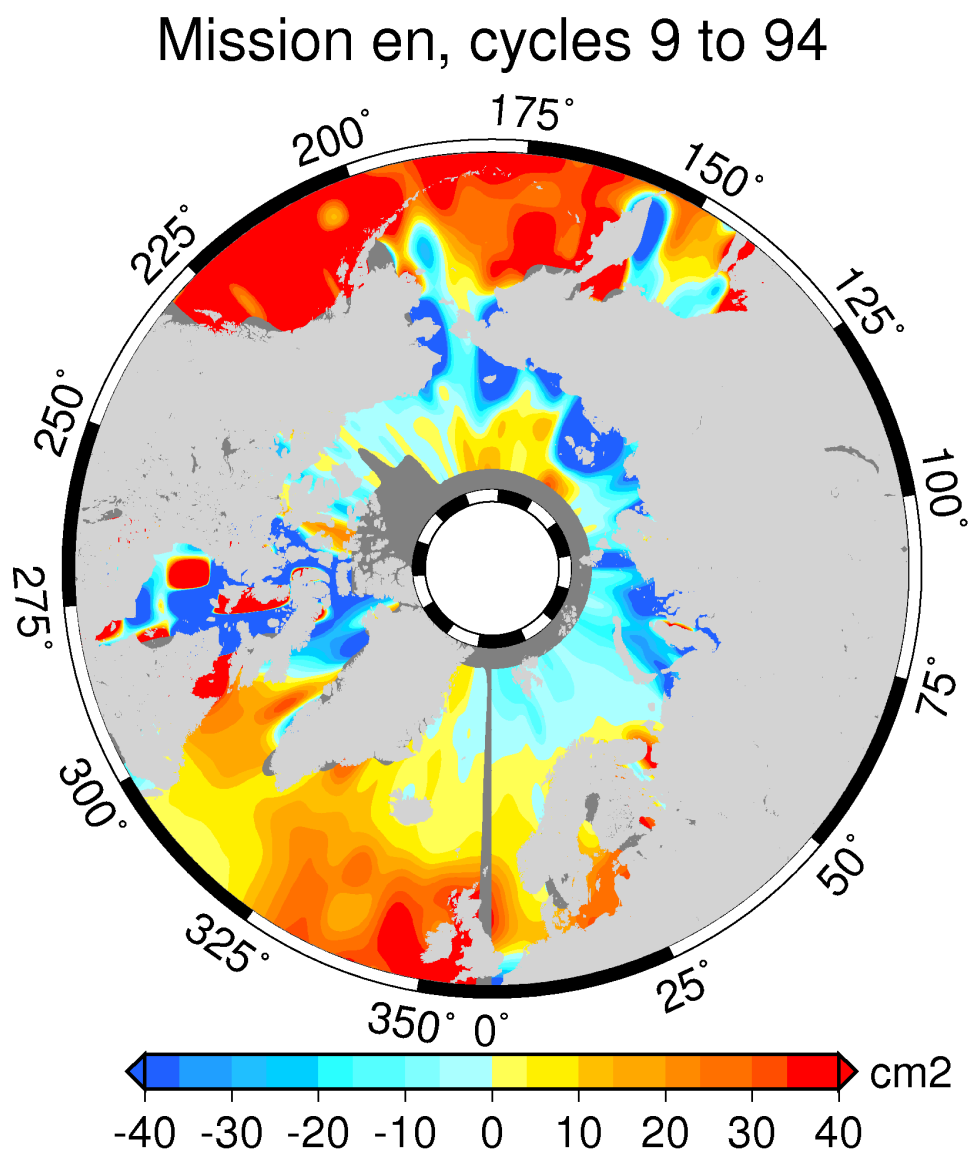
## Diagnostic A104.b (mission en)

**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).

Diagnostic type : Global internal analyses



$\Delta R(\text{SSH with DTU10}) - \text{VAR}(\text{SSH with GOT4V7})$

## Diagnostic A104\_a (mission j1)

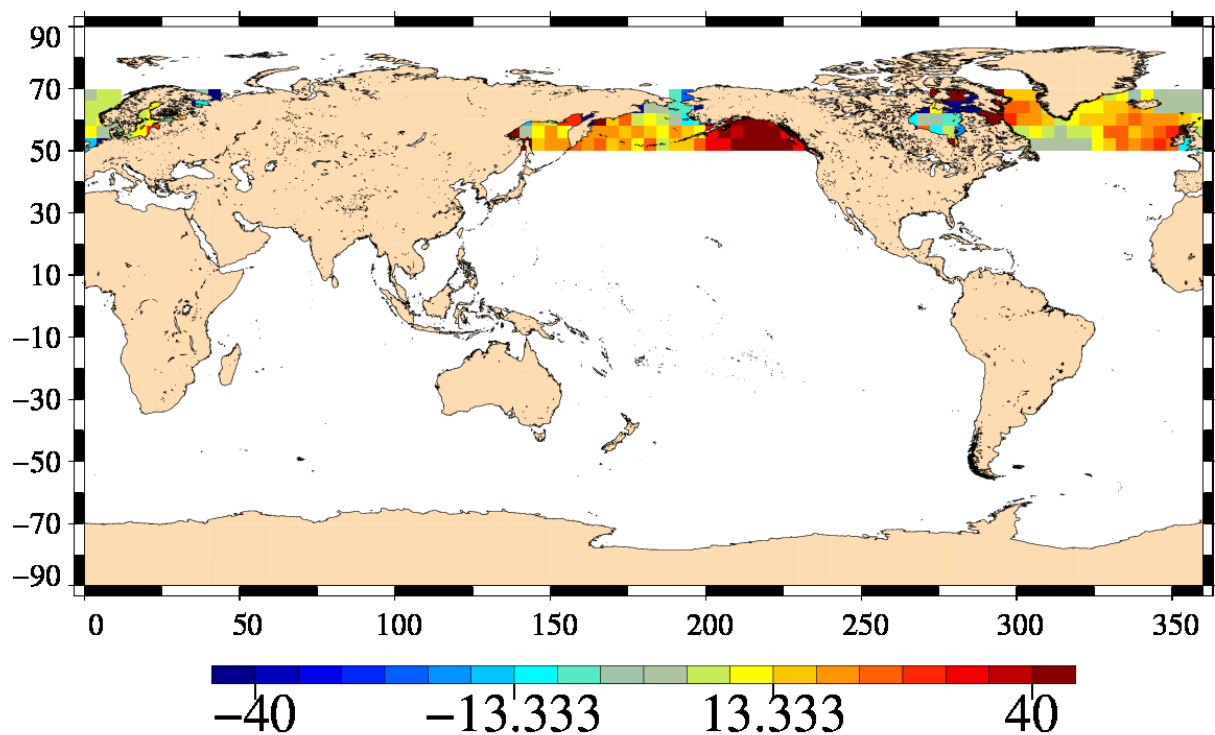
**Name :** Differences between maps of SSH crossovers

**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).

Diagnostic type : Global internal analyses

### VAR(SSH with DTU10) – VAR(SSH with GOT4V7) Mission j1, cycles 1 to 330



SSH crossovers : difference of variances ( cm<sup>2</sup> )

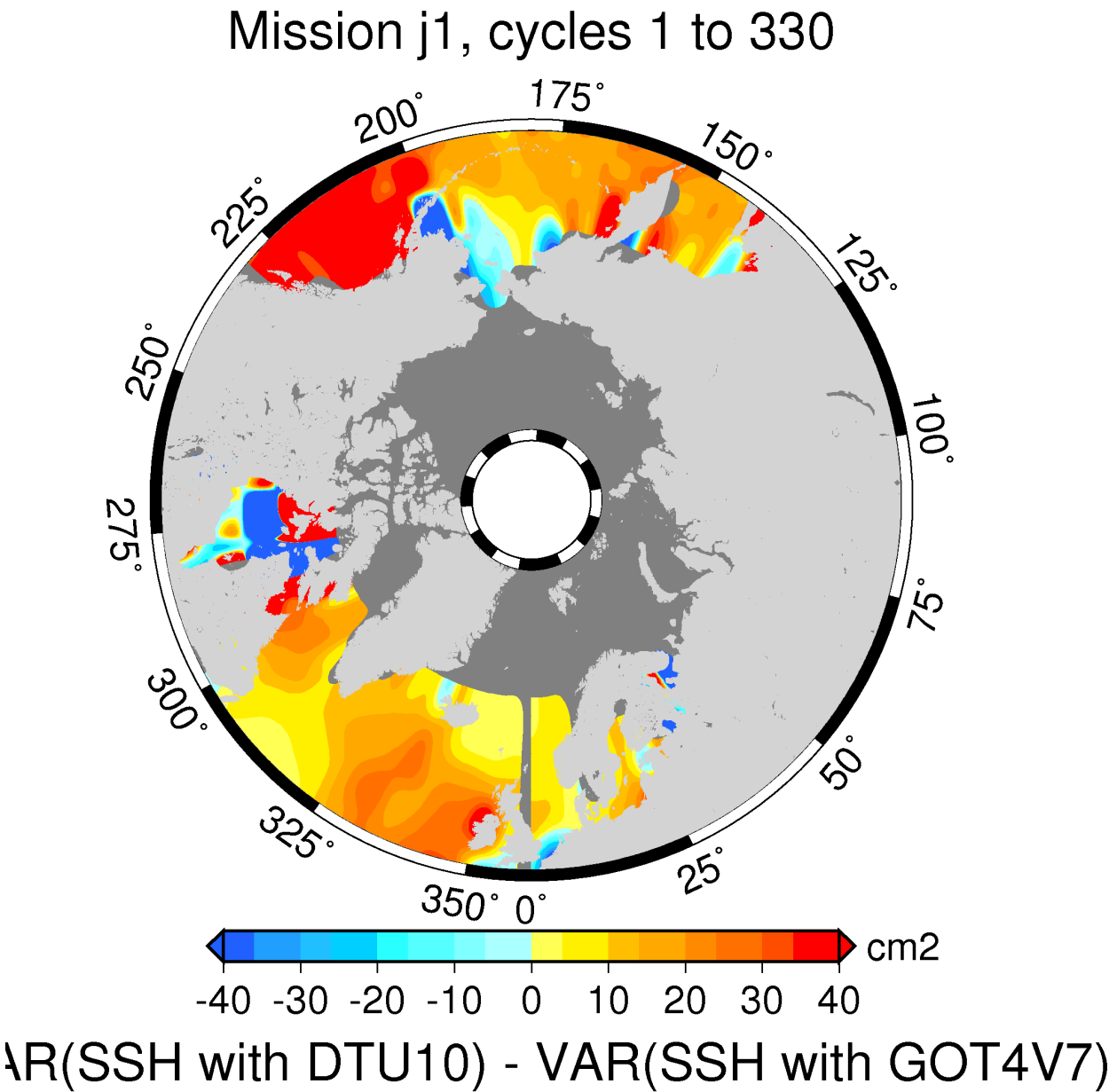
Diagnostic A104\_b (mission j1)

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).

Diagnostic type : Global internal analyses



Diagnostic type : Global internal analyses	Diagnostic A201 a (mission en)	
	Name : Temporal evolution of Sea Level Anomaly (SLA)	
	Input data : Along track SLA	
	<p><b>Description :</b> 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 94</div> <p>Legend: SLA with DTU10 (red line), SLA with GOT4V7 (blue line)</p> <p>Slope = -3.24 mm/yr [L.S.R. = 0.524] Slope = -3.22 mm/yr [L.S.R. = 0.515]</p> <p>Y-axis: Mean (cm) X-axis: Mission en, cycles 9 to 94</p>	

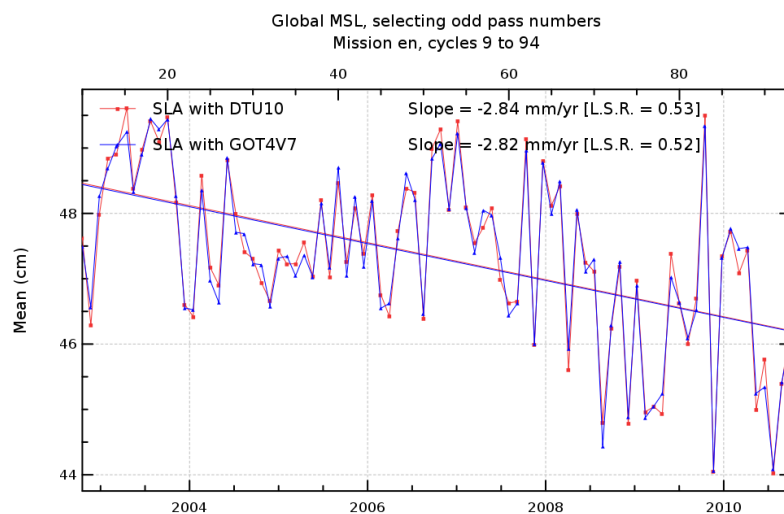
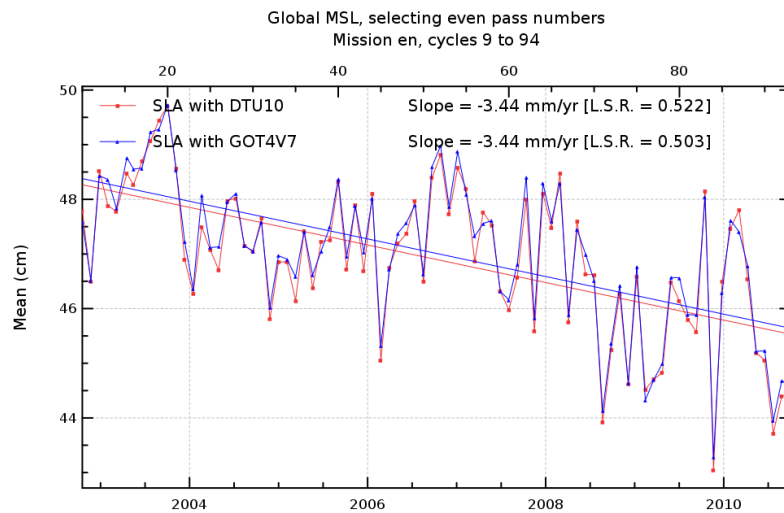
## Diagnostic A201\_b (mission en)

**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)

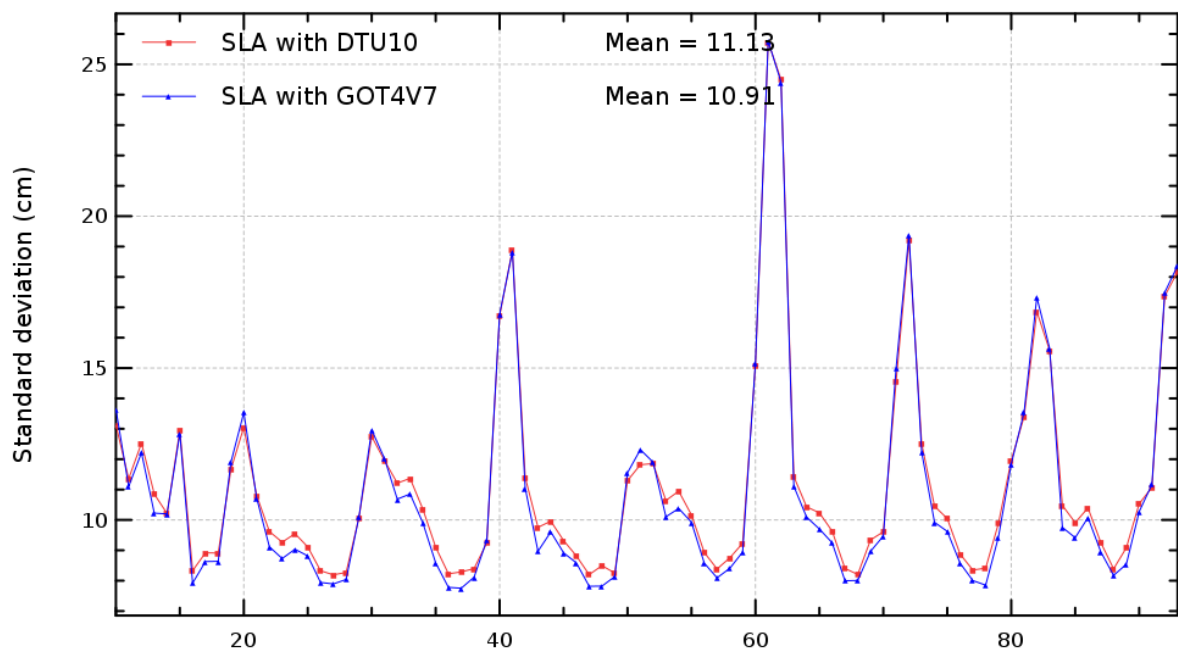
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**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

Global MSL  
Mission en, cycles 9 to 94



## Diagnostic A201\_d (mission en)

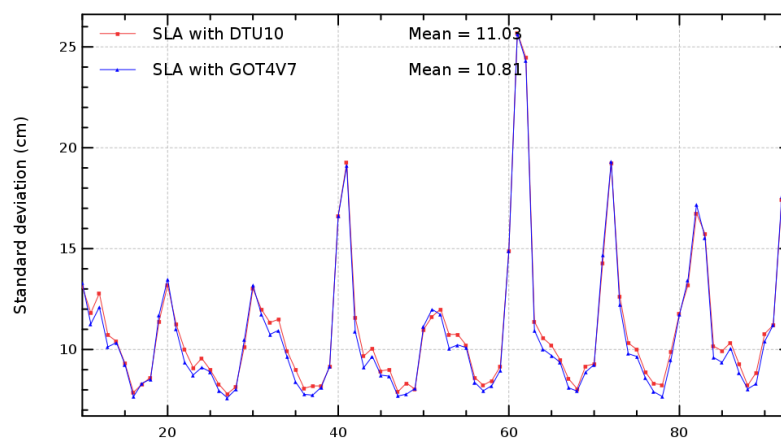
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

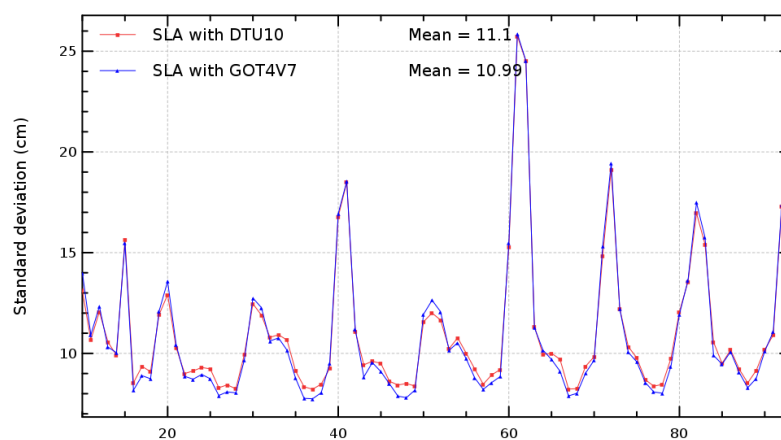
**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements 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, selecting even pass numbers  
Mission en, cycles 9 to 94



Global MSL, selecting odd pass numbers  
Mission en, cycles 9 to 94



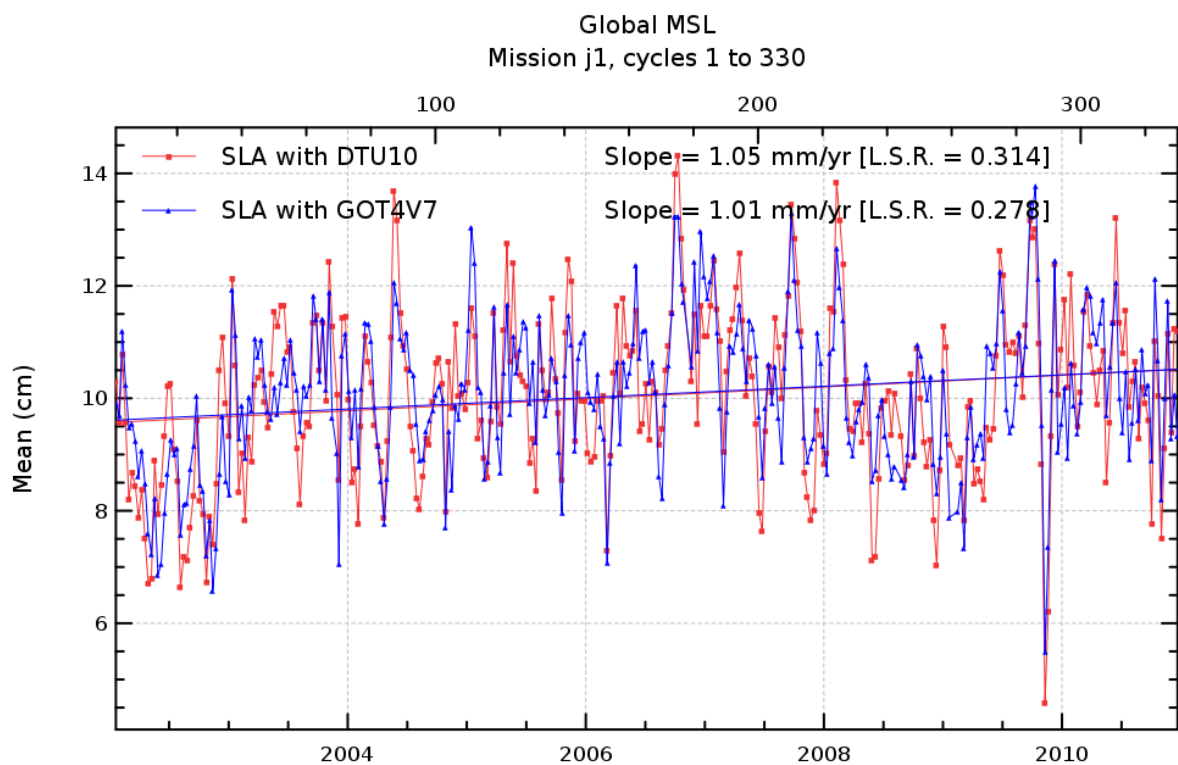
## Diagnostic A201\_a (mission j1)

**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





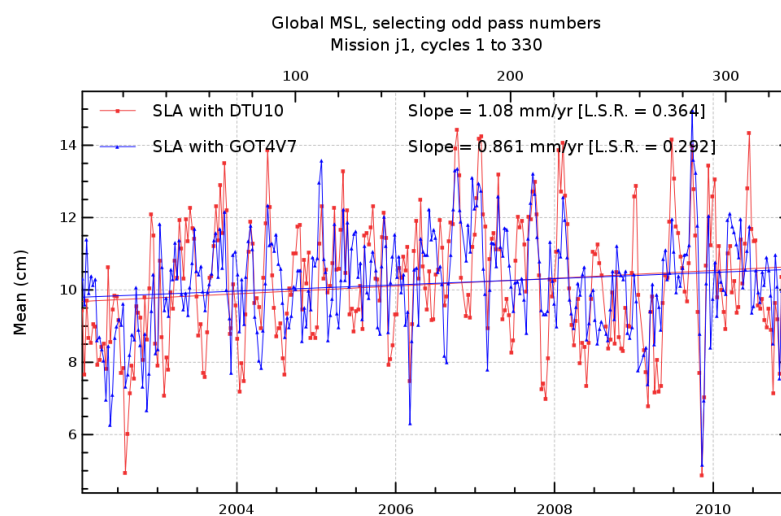
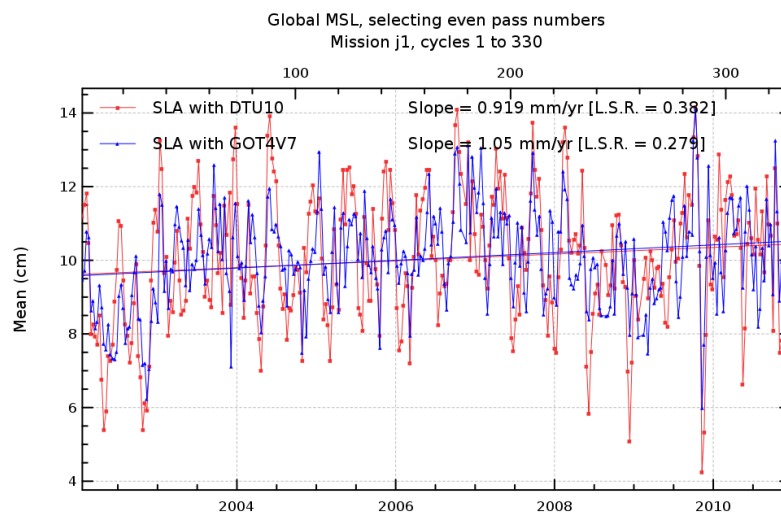
## Diagnostic A201\_b (mission j1)

**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 j1)

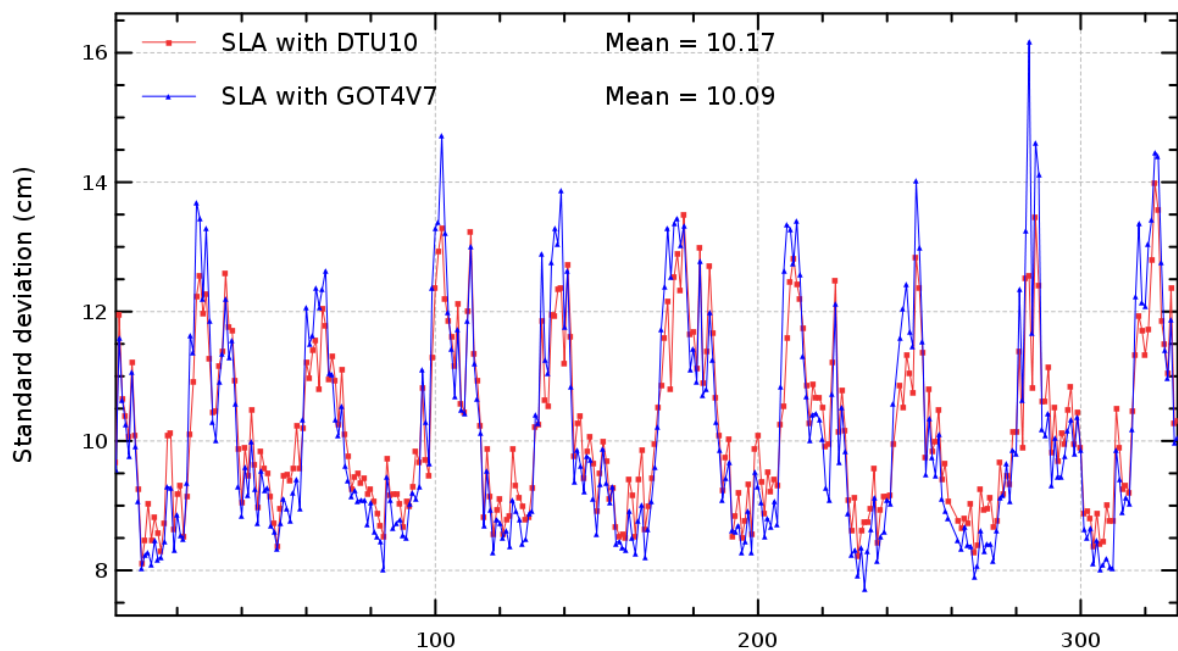
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**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 j1, cycles 1 to 330



## Diagnostic A201\_d (mission j1)

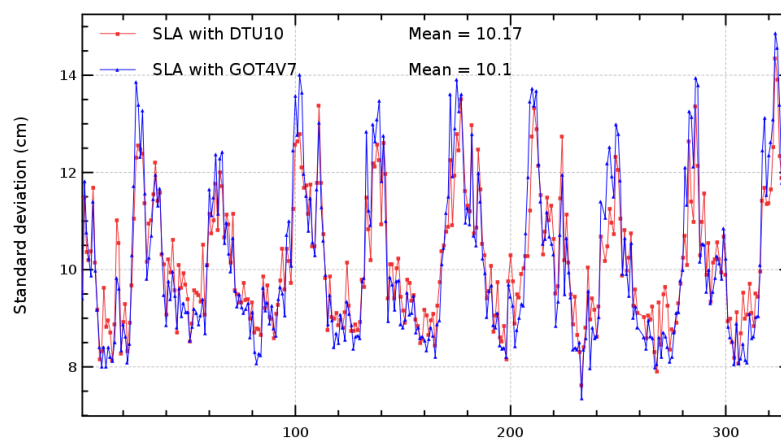
**Name :** Temporal evolution of Sea Level Anomaly (SLA)

**Input data :** Along track SLA

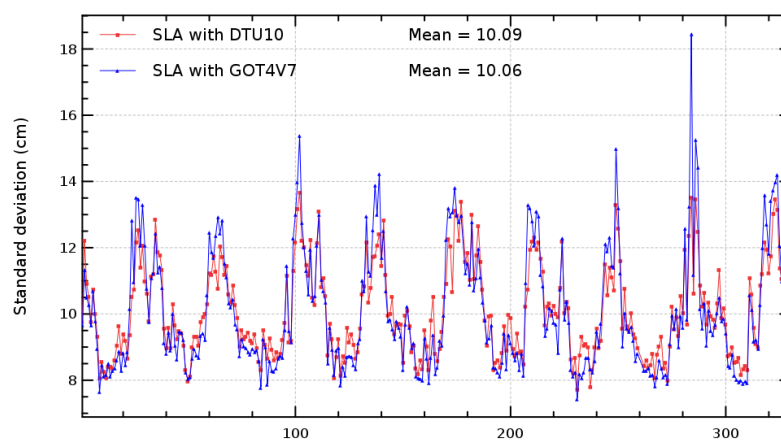
**Description :** The temporal evolution of SLA statistics (mean, standard deviation) are calculated from a cyclic way (altimeter repetivity, daily, weekly, monthly) using successively both altimetric components in the SLA calculation. These statistics are calculated from 1 Hz altimetric measurements 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 j1, cycles 1 to 330



Global MSL, selecting odd pass numbers  
Mission j1, cycles 1 to 330



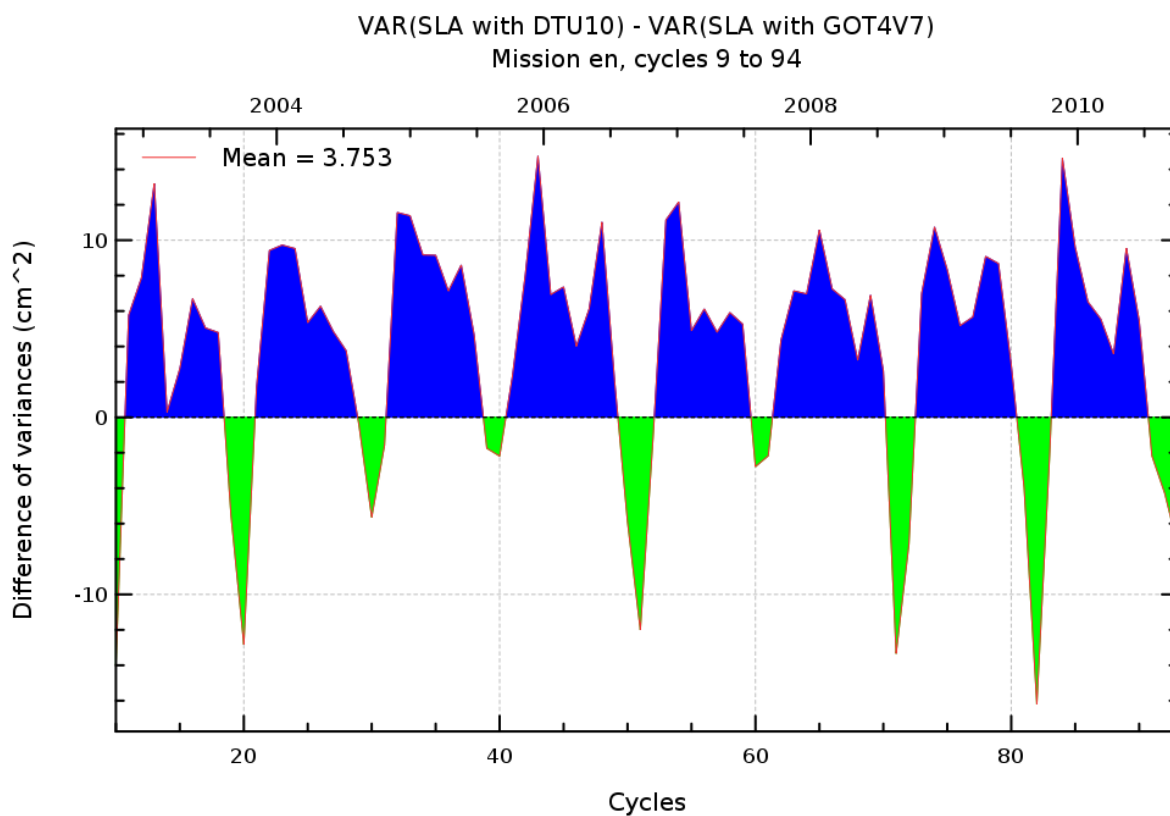
**Diagnostic A202\_a (mission en)**

**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



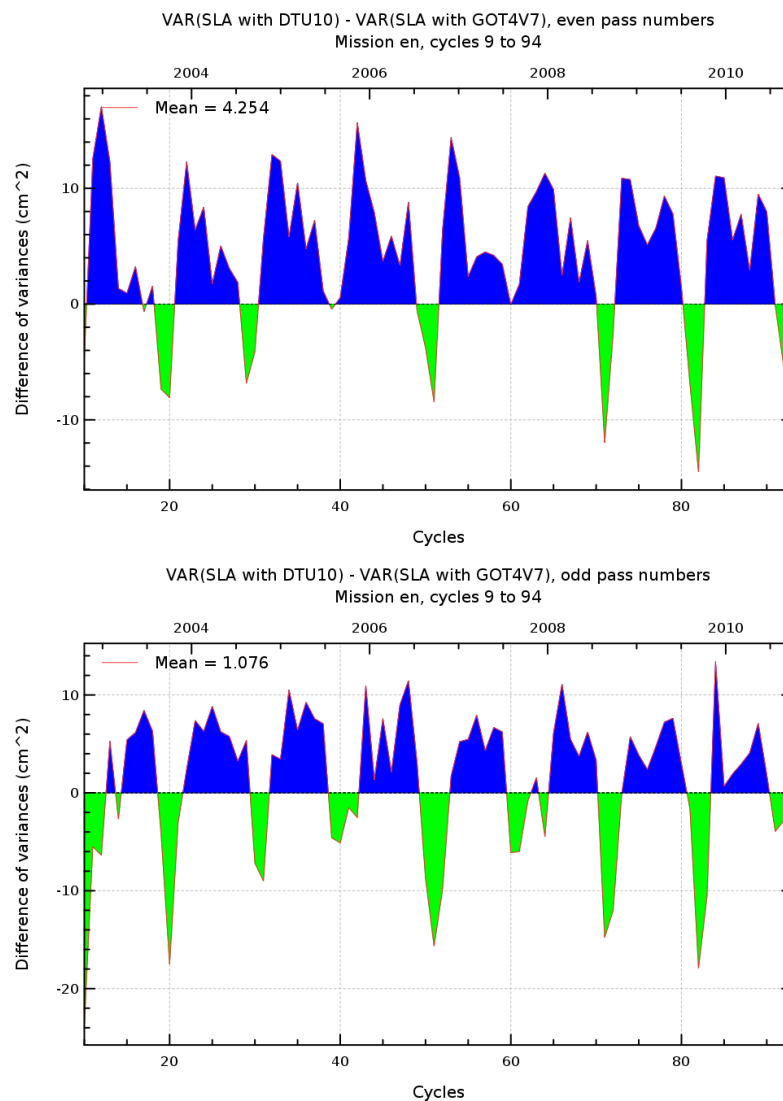
## Diagnostic A202\_b (mission en)

**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



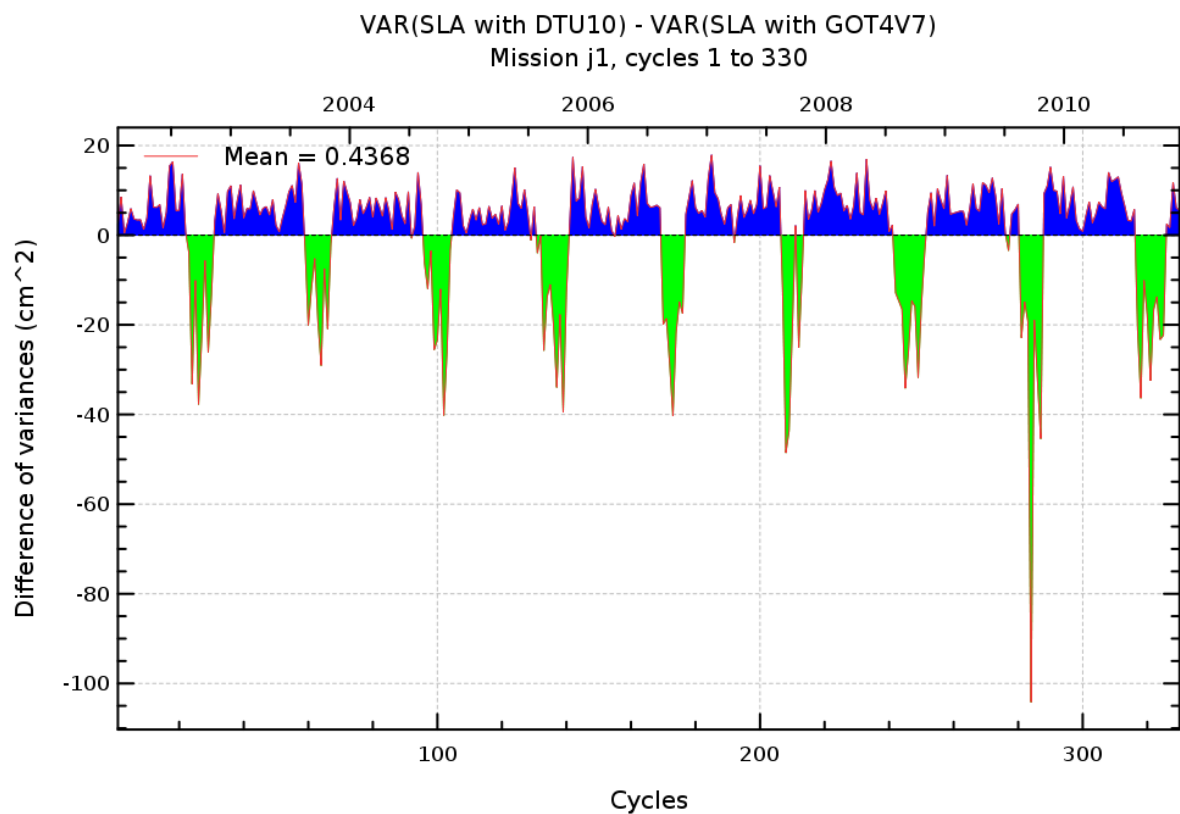
## Diagnostic A202\_a (mission j1)

**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



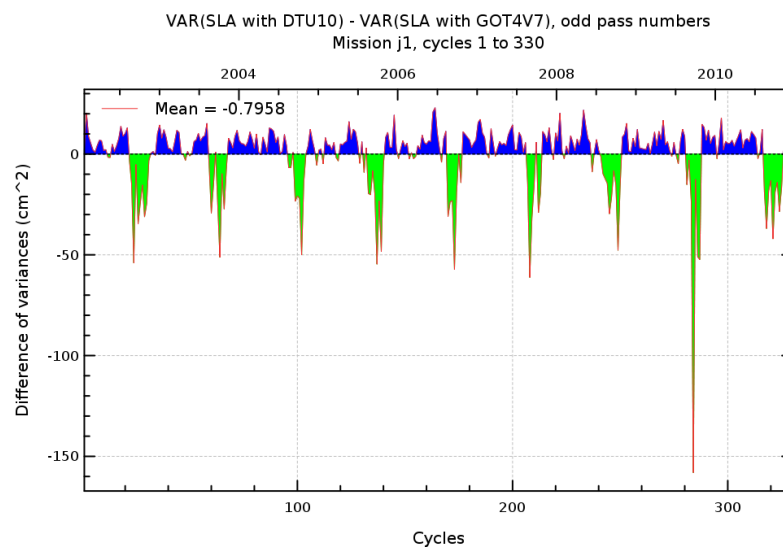
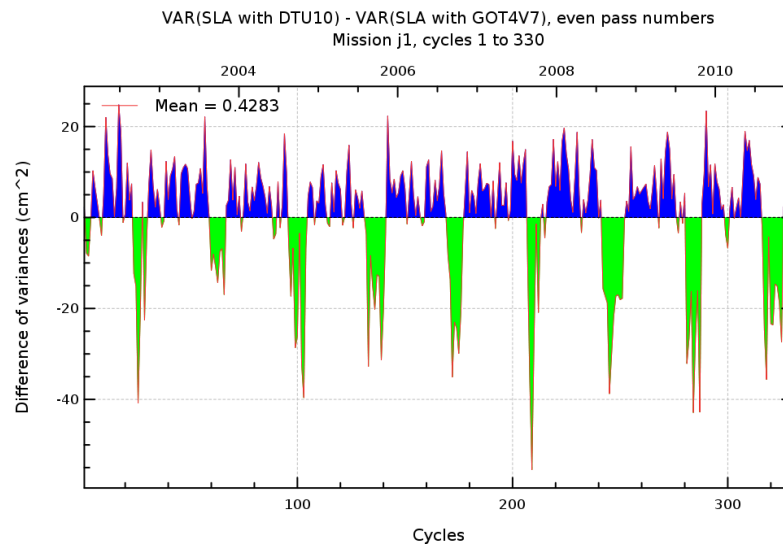
## Diagnostic A202\_b (mission j1)

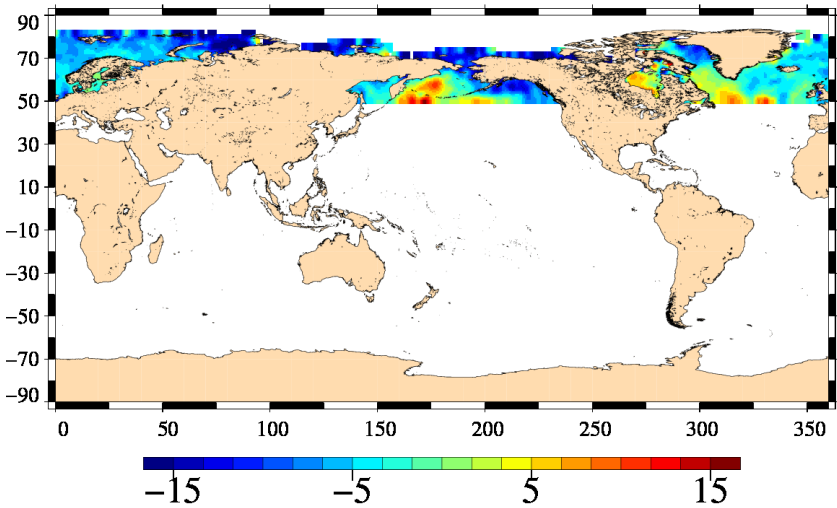
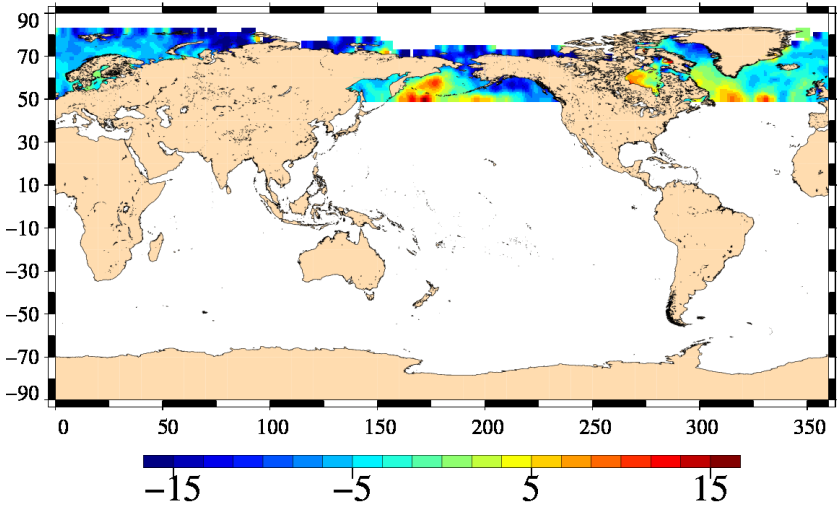
**Name :** Differences between temporal evolution of Sea Level Anomaly (SLA)

**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 DTU10 trends Mission en, cycles 9 to 94</div>  <div>Trends (mm/yr)</div> <div>SLA with GOT4V7 trends Mission en, cycles 9 to 94</div>  <div>Trends (mm/yr)</div>	



## Diagnostic A203\_b (mission en)

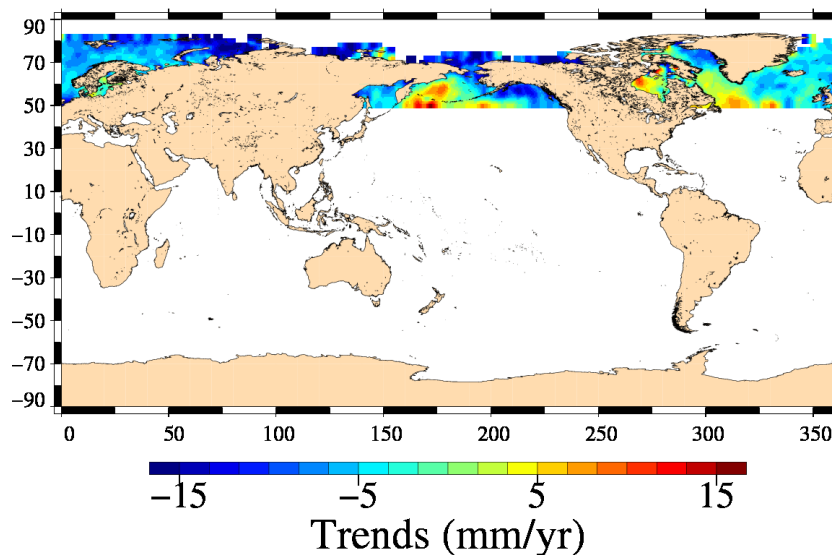
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

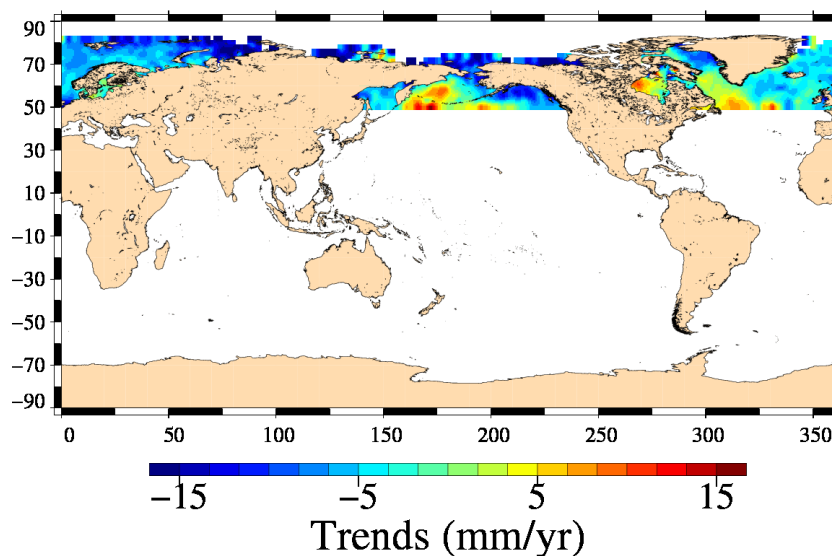
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

SLA with DTU10 trends : even pass numbers  
Mission en, cycles 9 to 94



SLA with GOT4V7 trends : even pass numbers  
Mission en, cycles 9 to 94



## Diagnostic A203\_c (mission en)

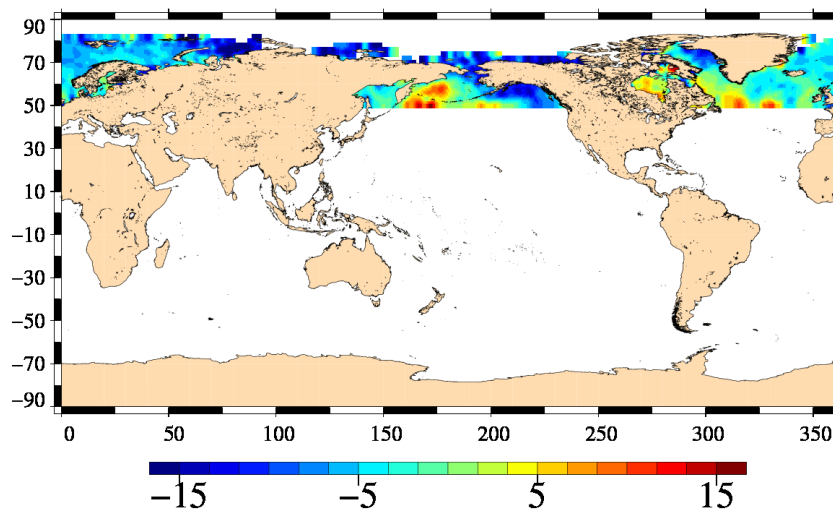
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

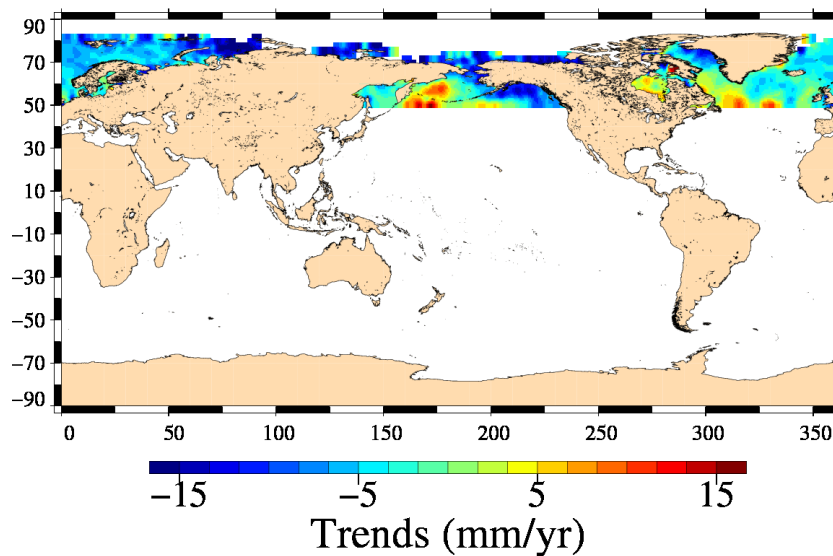
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

SLA with DTU10 trends : odd pass numbers  
Mission en, cycles 9 to 94



Trends (mm/yr)  
SLA with GOT4V7 trends : odd pass numbers  
Mission en, cycles 9 to 94



## Diagnostic A203\_a (mission j1)

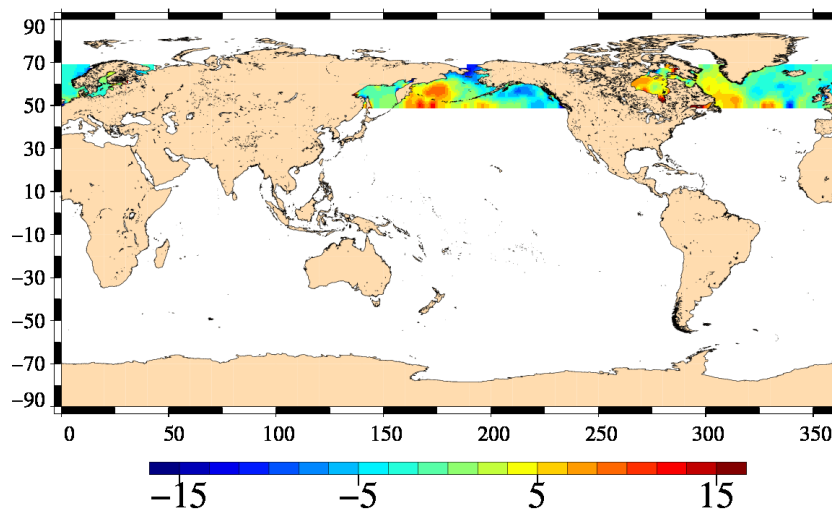
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

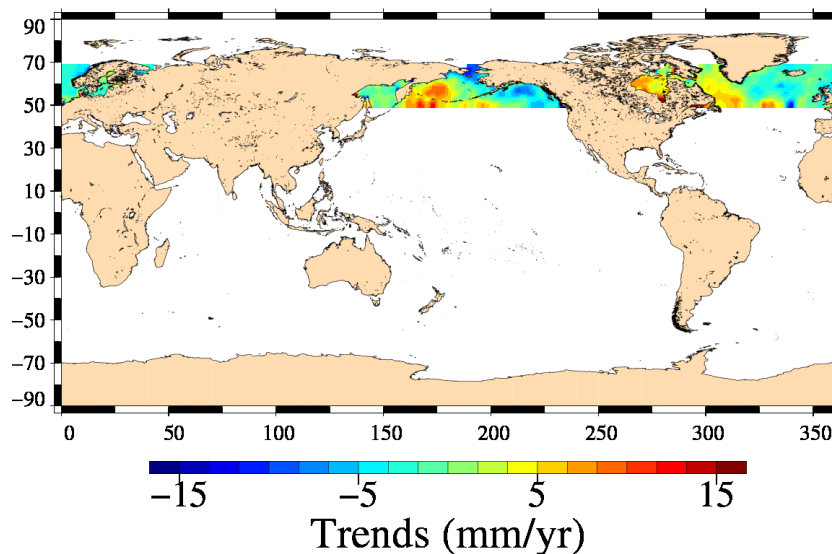
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

SLA with DTU10 trends  
Mission j1, cycles 1 to 330



Trends (mm/yr)  
SLA with GOT4V7 trends  
Mission j1, cycles 1 to 330



## Diagnostic A203\_b (mission j1)

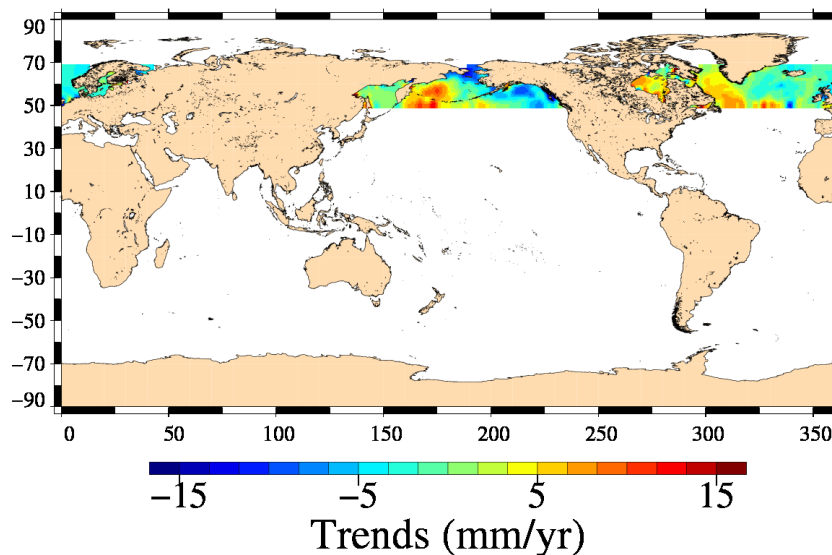
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

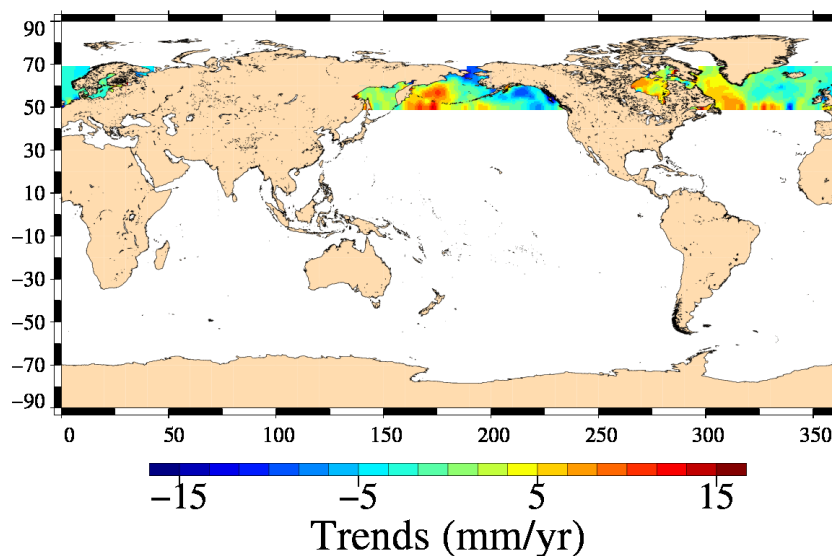
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

Diagnostic type : Global internal analyses

SLA with DTU10 trends : even pass numbers  
Mission j1, cycles 1 to 330



SLA with GOT4V7 trends : even pass numbers  
Mission j1, cycles 1 to 330



## Diagnostic A203\_c (mission j1)

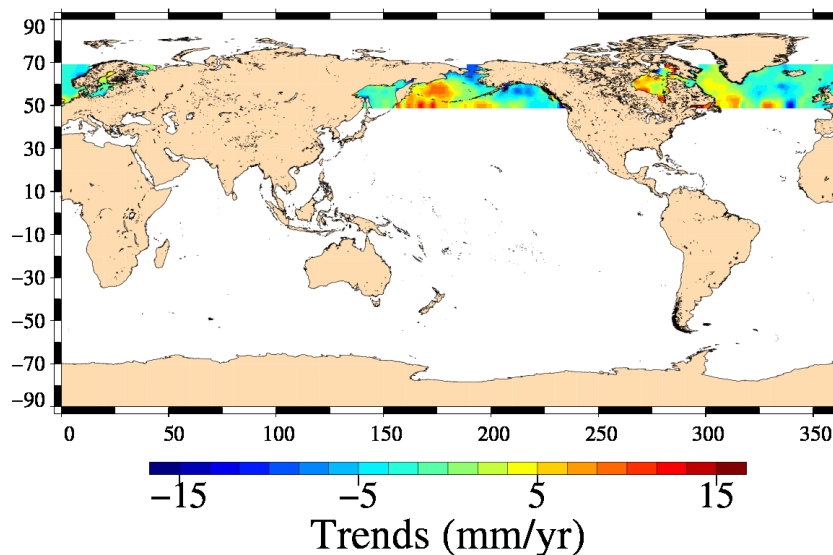
**Name :** Map of Sea Level Anomaly (SLA) over all the period

**Input data :** Along track SLA

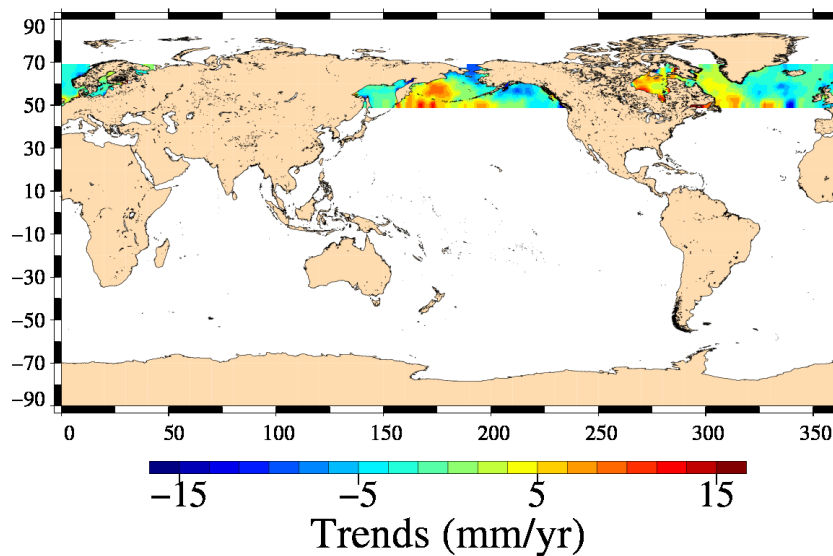
**Description :** The map of global statistics (mean, standard deviation) of SLA are calculated using successively both altimetric components in the SLA calculation over a large period. These statistics are calculated from 1 Hz altimetric measurements after removing spurious sea level measurements.

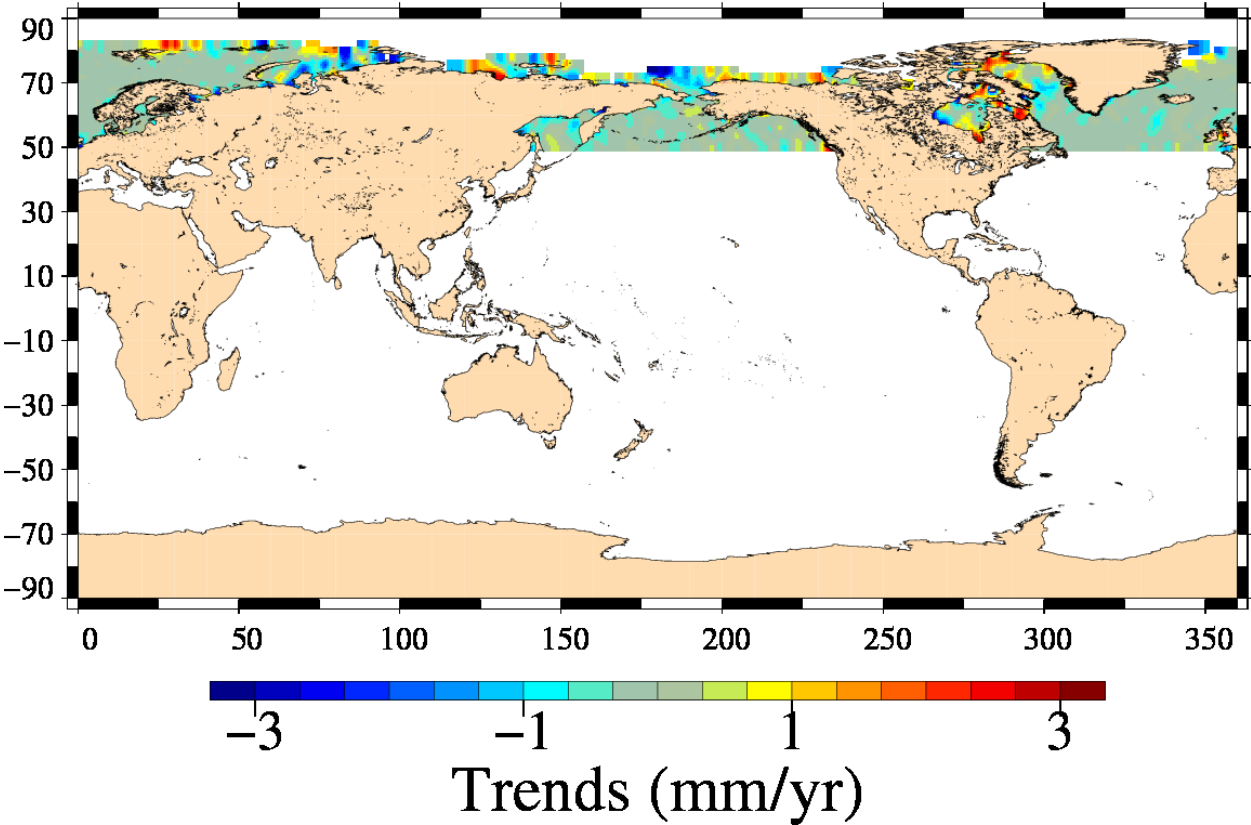
Diagnostic type : Global internal analyses

SLA with DTU10 trends : odd pass numbers  
Mission j1, cycles 1 to 330



SLA with GOT4V7 trends : odd pass numbers  
Mission j1, cycles 1 to 330



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 DTU10 trends – SLA with GOT4V7 trends</div> <div>Mission en, cycles 9 to 94</div> 	

## Diagnostic A204.b (mission en)

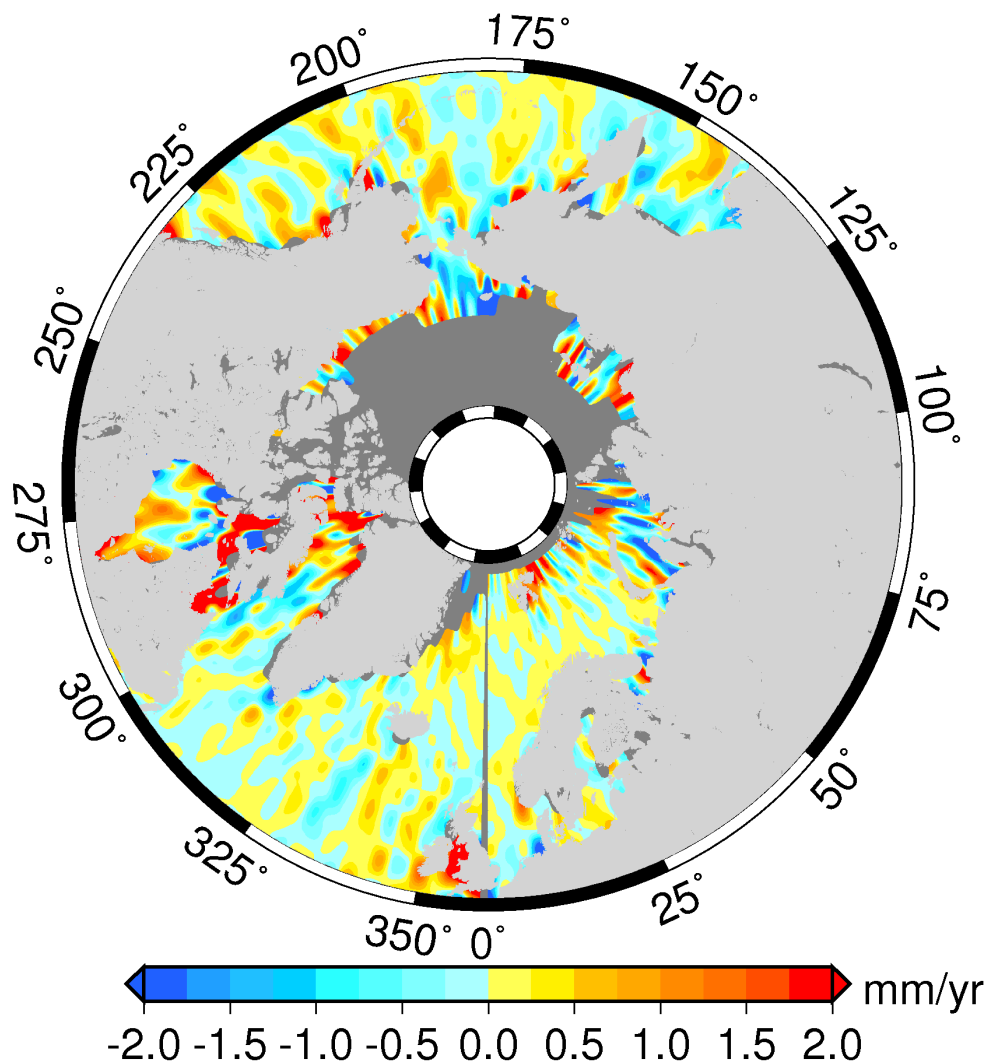
**Name :** Differences between maps of SLA

**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

Mission en, cycles 9 to 94



A with DTU10 trends - SLA with GOT4V7 trends



## Diagnostic A204\_c (mission en)

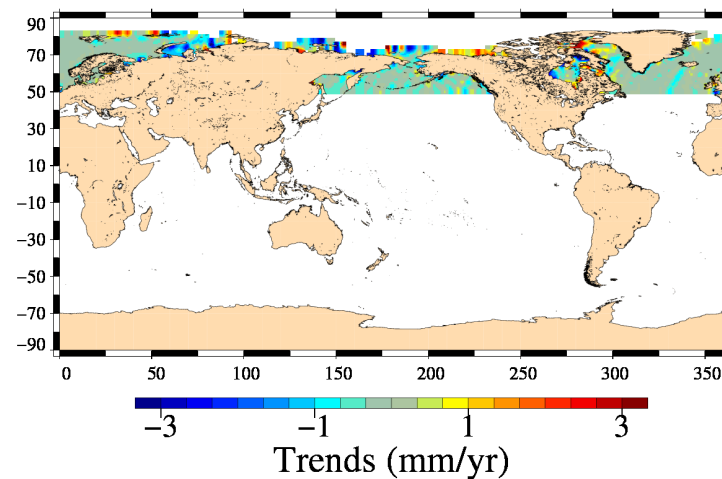
**Name :** Differences between maps of SLA

**Input data :** Along track SLA

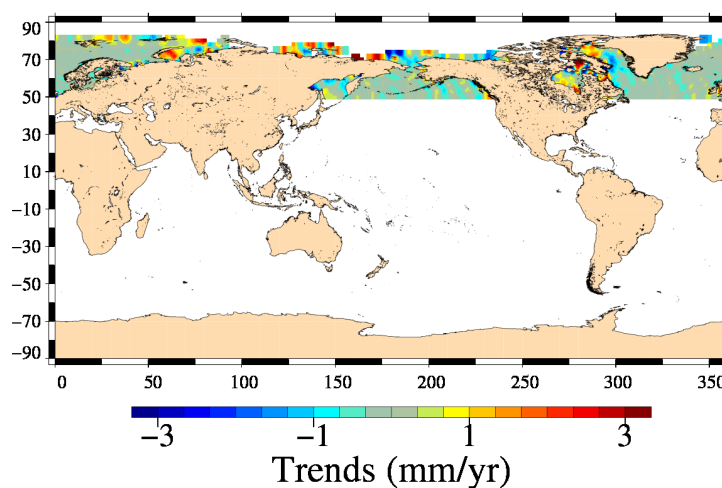
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

Diagnostic type : Global internal analyses

SLA with DTU10 trends – SLA with GOT4V7 trends : even pass numbers  
Mission en, cycles 9 to 94



SLA with DTU10 trends – SLA with GOT4V7 trends : odd pass numbers  
Mission en, cycles 9 to 94





## Diagnostic A204\_a (mission j1)

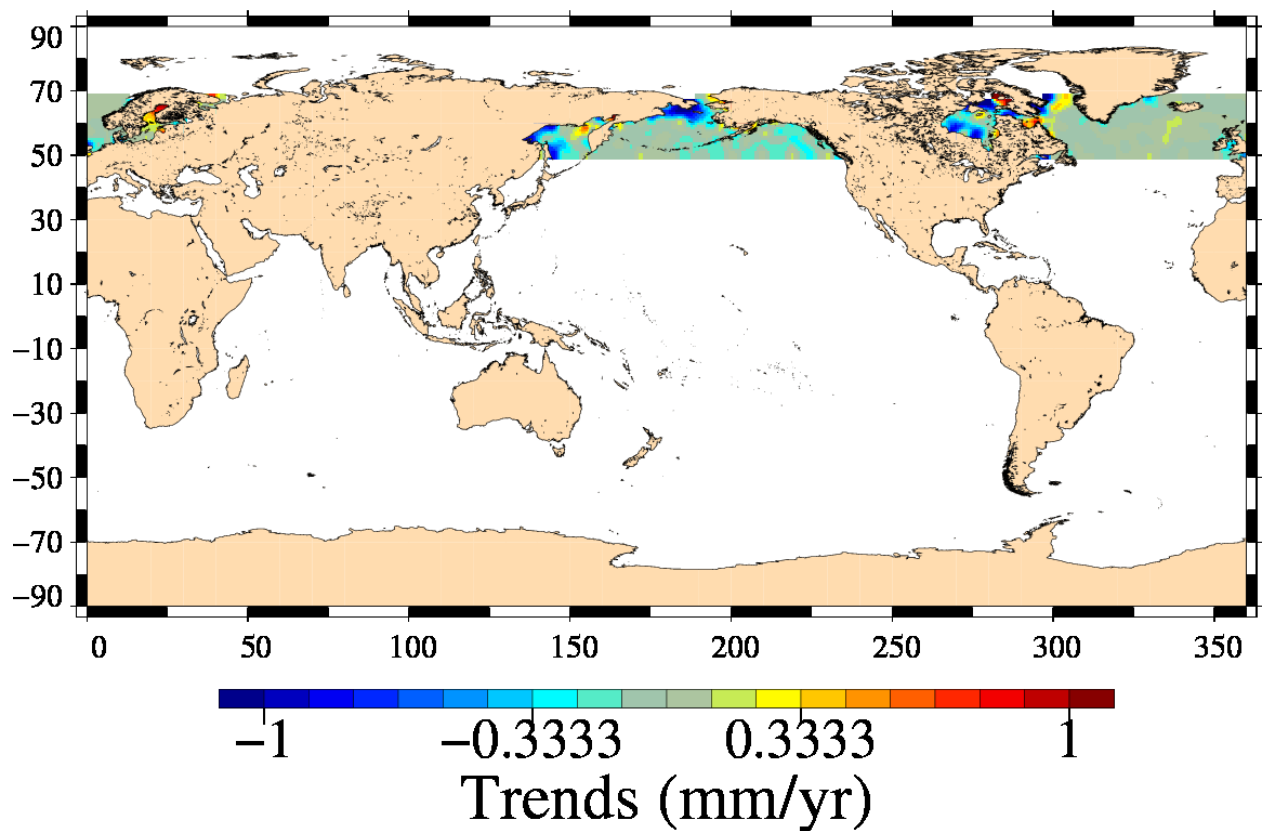
**Name :** Differences between maps of SLA

**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 DTU10 trends – SLA with GOT4V7 trends Mission j1, cycles 1 to 330



## Diagnostic A204\_b (mission j1)

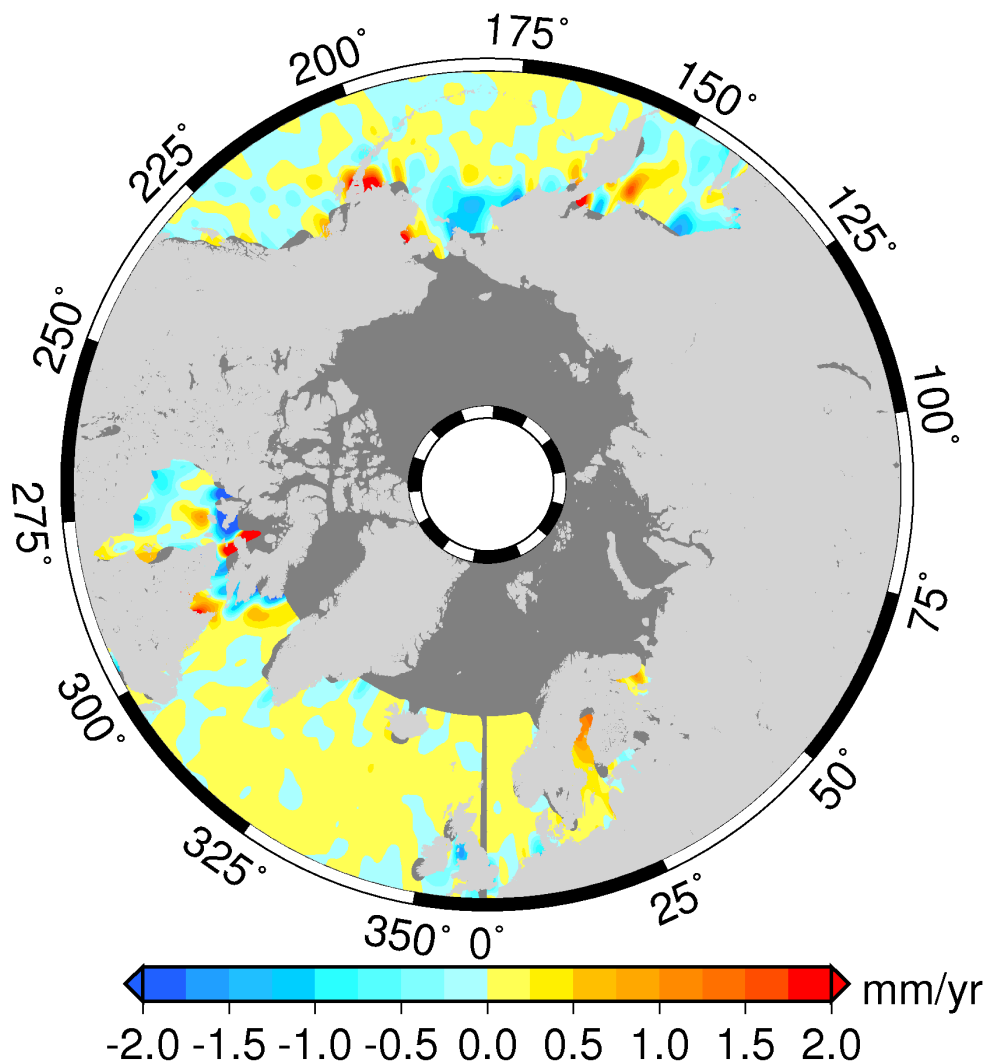
**Name :** Differences between maps of SLA

**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

### Mission j1, cycles 1 to 330



A with DTU10 trends - SLA with GOT4V7 trends

## Diagnostic A204\_c (mission j1)

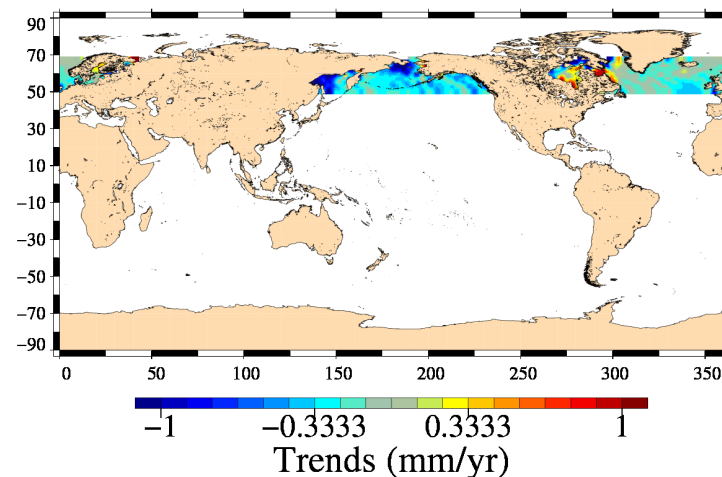
**Name :** Differences between maps of SLA

**Input data :** Along track SLA

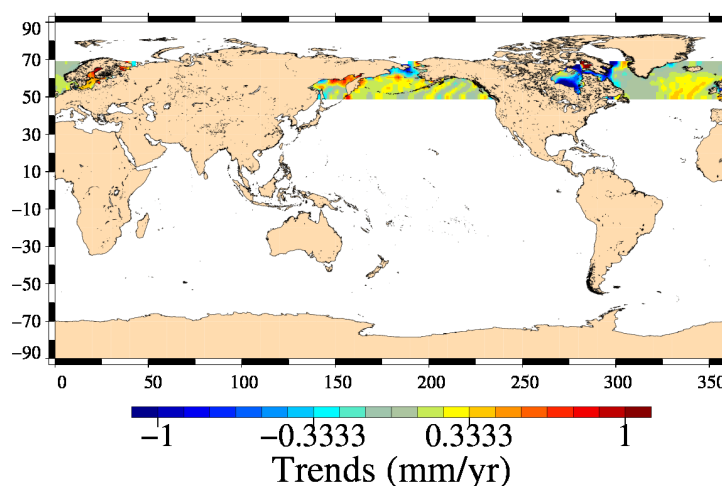
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

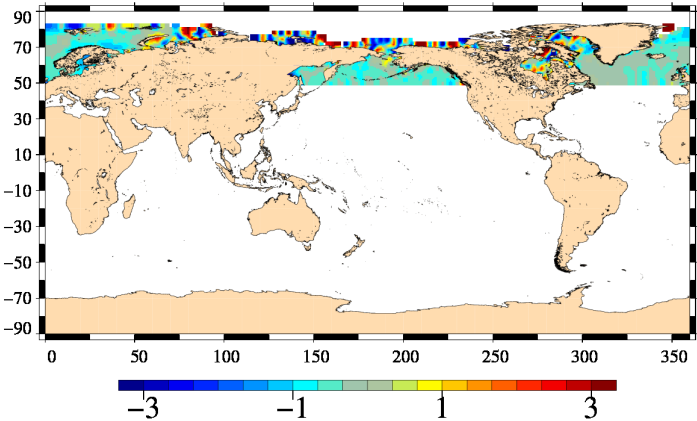
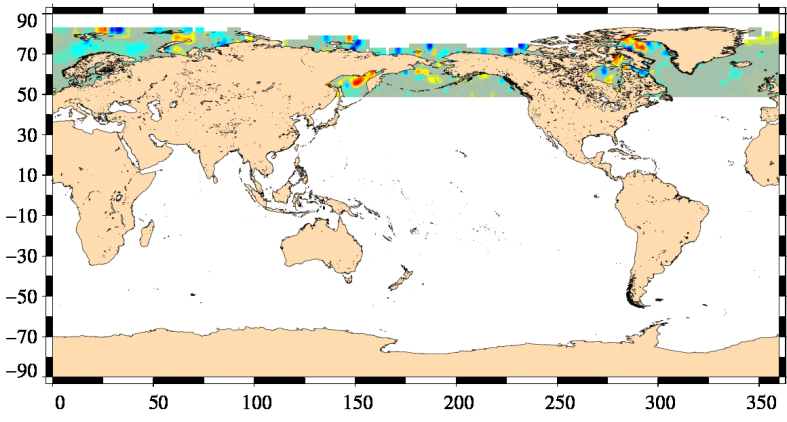
Diagnostic type : Global internal analyses

SLA with DTU10 trends – SLA with GOT4V7 trends : even pass numbers  
Mission j1, cycles 1 to 330



SLA with DTU10 trends – SLA with GOT4V7 trends : odd pass numbers  
Mission j1, cycles 1 to 330



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).	
	<p>SLA with DTU10 amplitude – SLA with GOT4V7 amplitude : annual signal Mission en, cycles 9 to 94</p>  <p>Amplitude (cm)</p> <p>SLA with DTU10 phase – SLA with GOT4V7 phase : annual signal Mission en, cycles 9 to 94</p>  <p>Phase (degree)</p>	

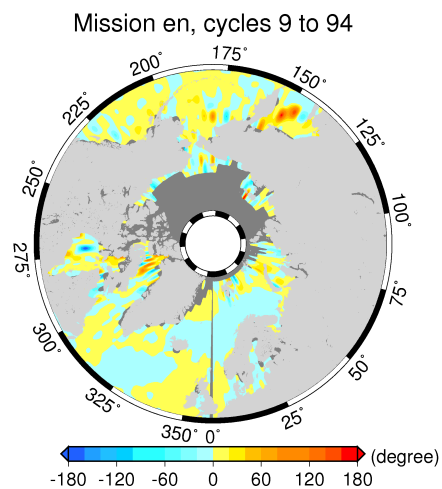
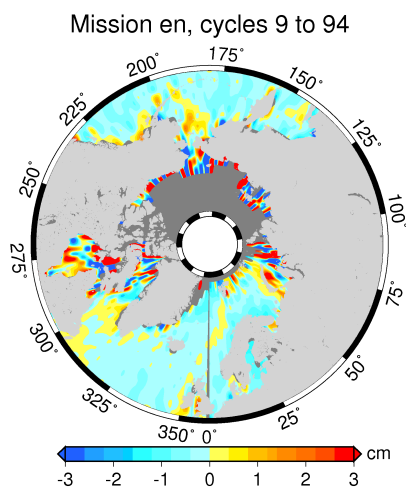
## Diagnostic A205\_b (mission en)

**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



10 amplitude - SLA with GOT4V7 amplitude (annual signal) 10 phase - SLA with GOT4V7 phase (annual signal)

## Diagnostic A205\_c (mission en)

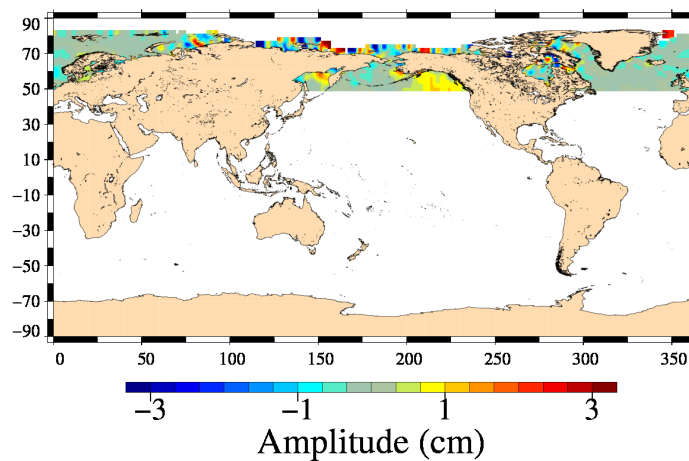
**Name :** Differences between maps of SLA (2)

**Input data :** Along track SLA

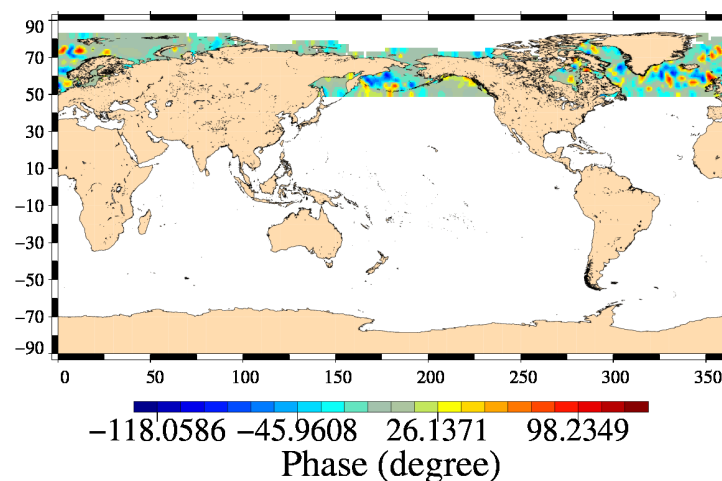
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

Diagnostic type : Global internal analyses

A with DTU10 amplitude – SLA with GOT4V7 amplitude : semi-annual sigr  
Mission en, cycles 9 to 94



SLA with DTU10 phase – SLA with GOT4V7 phase : semi-annual signal  
Mission en, cycles 9 to 94



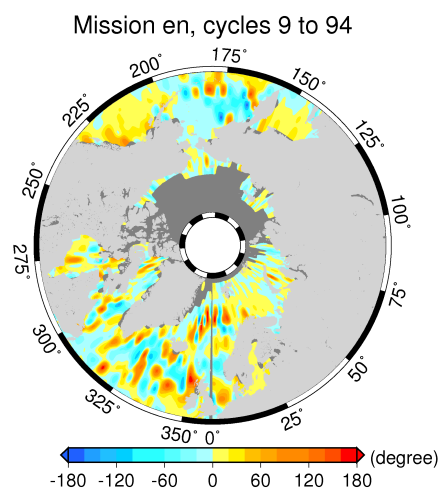
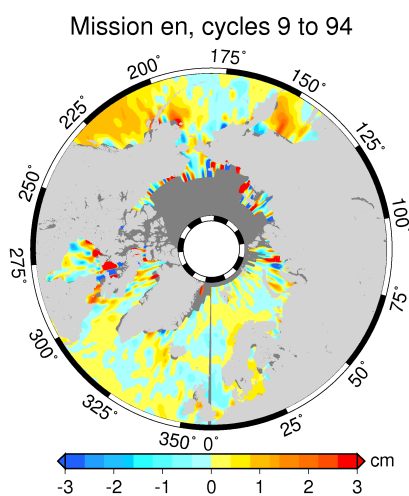
## Diagnostic A205\_d (mission en)

**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



amplitude - SLA with GOT4V7 amplitude (semi-annual : J10 phase - SLA with GOT4V7 phase (semi-annual sign

Diagnostic A205\_a (mission j1)

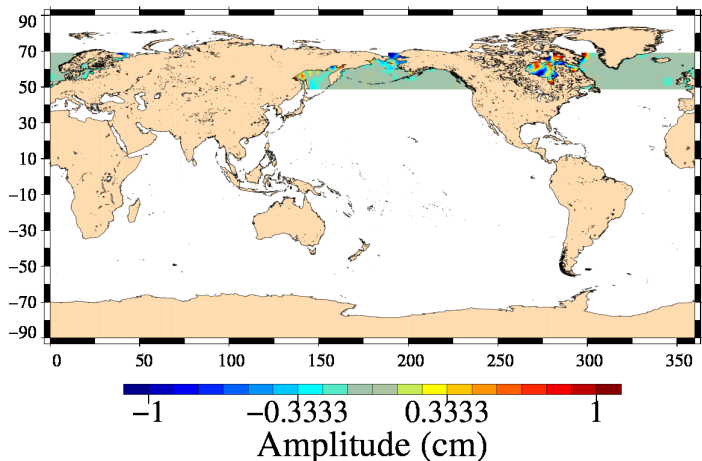
Name : Differences between maps of SLA (2)

Input data : Along track SLA

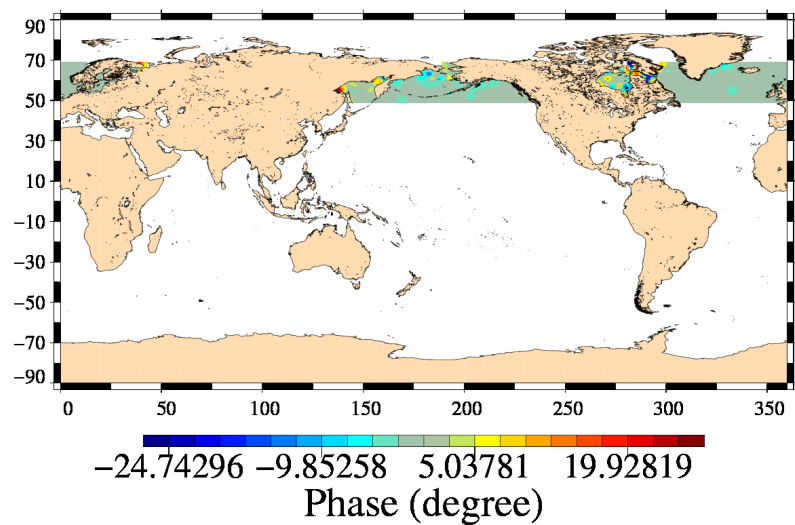
Description : The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

Diagnostic type : Global internal analyses

SLA with DTU10 amplitude – SLA with GOT4V7 amplitude : annual signal  
Mission j1, cycles 1 to 330



SLA with DTU10 phase – SLA with GOT4V7 phase : annual signal  
Mission j1, cycles 1 to 330





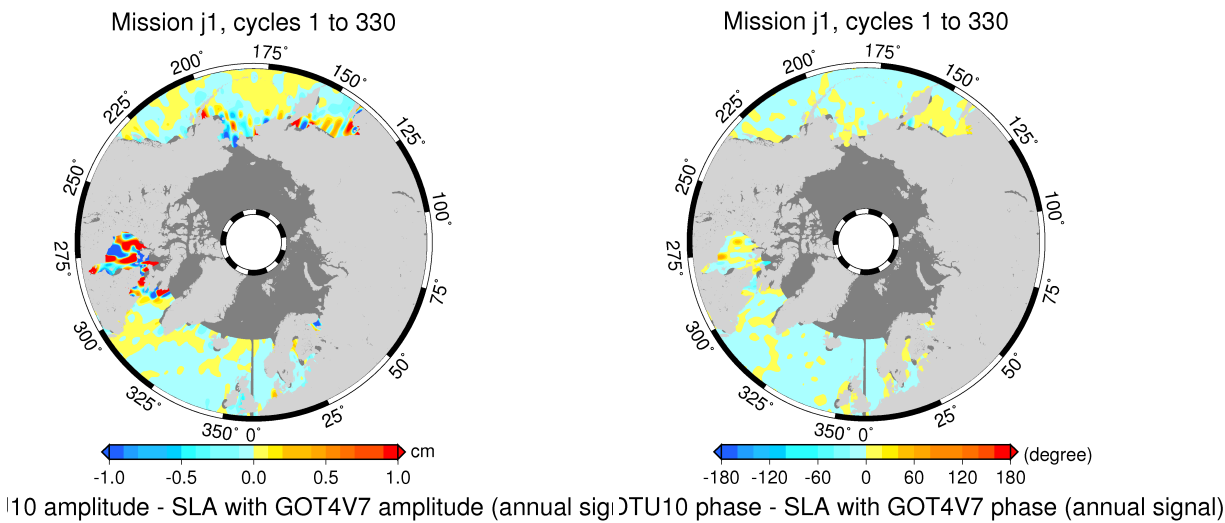
Diagnostic A205\_b (mission j1)

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



## Diagnostic A205\_c (mission j1)

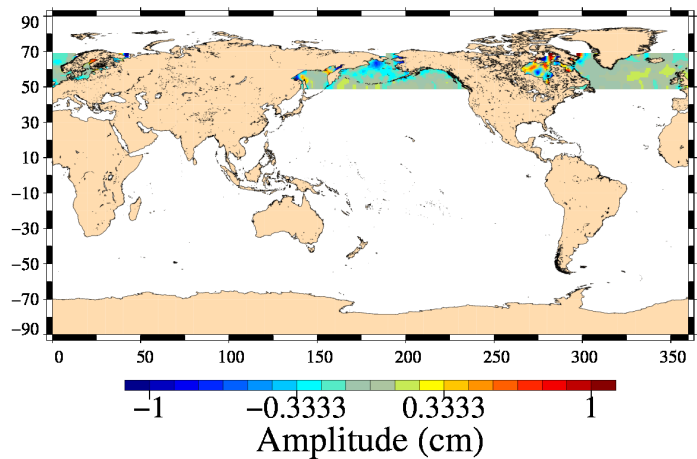
**Name :** Differences between maps of SLA (2)

**Input data :** Along track SLA

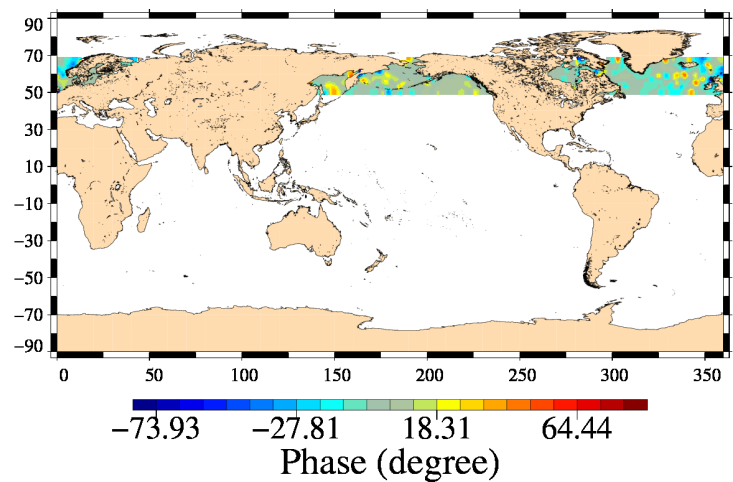
**Description :** The difference of SLA maps (mean, standard deviation, slope) is calculated from maps derived from diagnostic A203 using successively both altimetric components in the SLA calculation over a given period. This can be done globally, or separating in ascending and descending passes (except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

Diagnostic type : Global internal analyses

A with DTU10 amplitude – SLA with GOT4V7 amplitude : semi-annual sigr  
Mission j1, cycles 1 to 330



SLA with DTU10 phase – SLA with GOT4V7 phase : semi-annual signal  
Mission j1, cycles 1 to 330



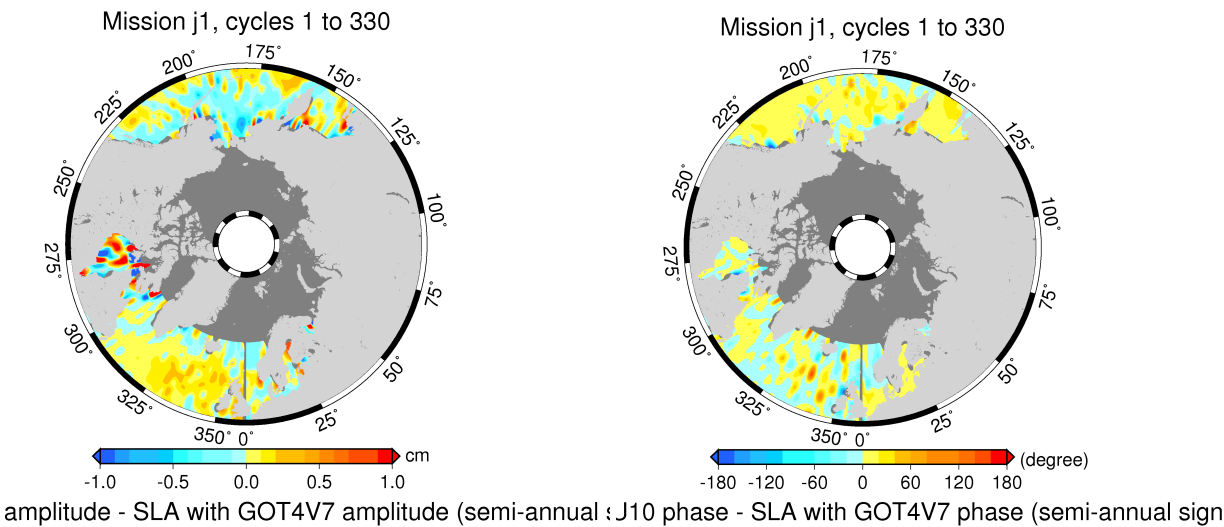
Diagnostic A205\_d (mission j1)

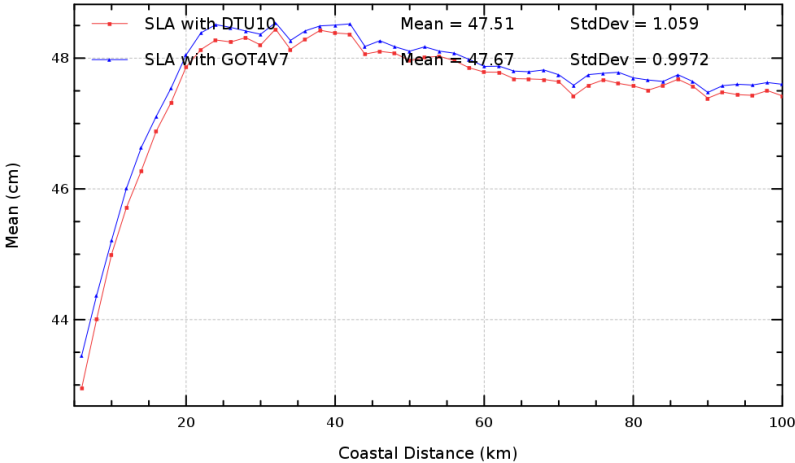
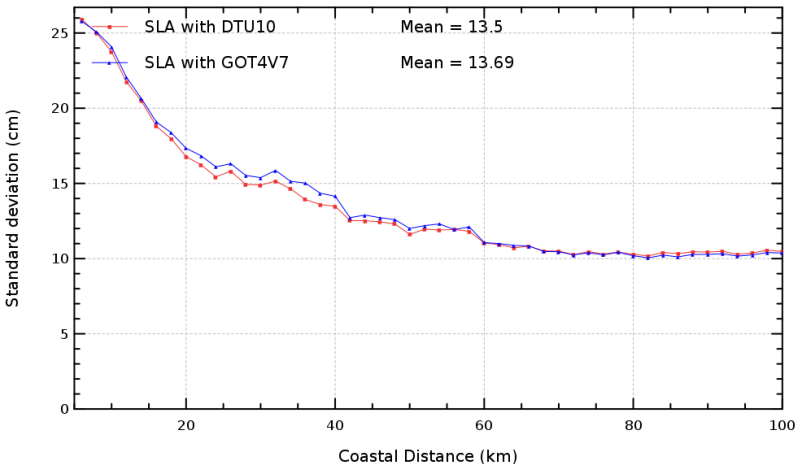
Name : Differences between maps of SLA (2)

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



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 94</div><div><table border="1"><thead><tr><th>Coastal Distance (km)</th><th>SLA with DTU10 (cm)</th><th>SLA with GOT4V7 (cm)</th></tr></thead><tbody><tr><td>0</td><td>43.0</td><td>43.0</td></tr><tr><td>10</td><td>45.5</td><td>45.5</td></tr><tr><td>20</td><td>47.0</td><td>47.0</td></tr><tr><td>30</td><td>47.5</td><td>47.5</td></tr><tr><td>40</td><td>47.5</td><td>47.5</td></tr><tr><td>50</td><td>47.5</td><td>47.5</td></tr><tr><td>60</td><td>47.5</td><td>47.5</td></tr><tr><td>70</td><td>47.5</td><td>47.5</td></tr><tr><td>80</td><td>47.5</td><td>47.5</td></tr><tr><td>90</td><td>47.5</td><td>47.5</td></tr><tr><td>100</td><td>47.5</td><td>47.5</td></tr></tbody></table></div><div><div>Global MSL Mission en, cycles 9 to 94</div><div><table border="1"><thead><tr><th>Coastal Distance (km)</th><th>SLA with DTU10 (cm)</th><th>SLA with GOT4V7 (cm)</th></tr></thead><tbody><tr><td>0</td><td>25.0</td><td>25.0</td></tr><tr><td>10</td><td>20.0</td><td>20.0</td></tr><tr><td>20</td><td>17.0</td><td>17.0</td></tr><tr><td>30</td><td>15.0</td><td>15.0</td></tr><tr><td>40</td><td>13.5</td><td>13.69</td></tr><tr><td>50</td><td>13.5</td><td>13.69</td></tr><tr><td>60</td><td>13.5</td><td>13.69</td></tr><tr><td>70</td><td>13.5</td><td>13.69</td></tr><tr><td>80</td><td>13.5</td><td>13.69</td></tr><tr><td>90</td><td>13.5</td><td>13.69</td></tr><tr><td>100</td><td>13.5</td><td>13.69</td></tr></tbody></table></div></div></div>		Coastal Distance (km)	SLA with DTU10 (cm)	SLA with GOT4V7 (cm)	0	43.0	43.0	10	45.5	45.5	20	47.0	47.0	30	47.5	47.5	40	47.5	47.5	50	47.5	47.5	60	47.5	47.5	70	47.5	47.5	80	47.5	47.5	90	47.5	47.5	100	47.5	47.5	Coastal Distance (km)	SLA with DTU10 (cm)	SLA with GOT4V7 (cm)	0	25.0	25.0	10	20.0	20.0	20	17.0	17.0	30	15.0	15.0	40	13.5	13.69	50	13.5	13.69	60	13.5	13.69	70	13.5	13.69	80	13.5	13.69	90	13.5	13.69	100	13.5
Coastal Distance (km)	SLA with DTU10 (cm)	SLA with GOT4V7 (cm)																																																																							
0	43.0	43.0																																																																							
10	45.5	45.5																																																																							
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40	47.5	47.5																																																																							
50	47.5	47.5																																																																							
60	47.5	47.5																																																																							
70	47.5	47.5																																																																							
80	47.5	47.5																																																																							
90	47.5	47.5																																																																							
100	47.5	47.5																																																																							
Coastal Distance (km)	SLA with DTU10 (cm)	SLA with GOT4V7 (cm)																																																																							
0	25.0	25.0																																																																							
10	20.0	20.0																																																																							
20	17.0	17.0																																																																							
30	15.0	15.0																																																																							
40	13.5	13.69																																																																							
50	13.5	13.69																																																																							
60	13.5	13.69																																																																							
70	13.5	13.69																																																																							
80	13.5	13.69																																																																							
90	13.5	13.69																																																																							
100	13.5	13.69																																																																							

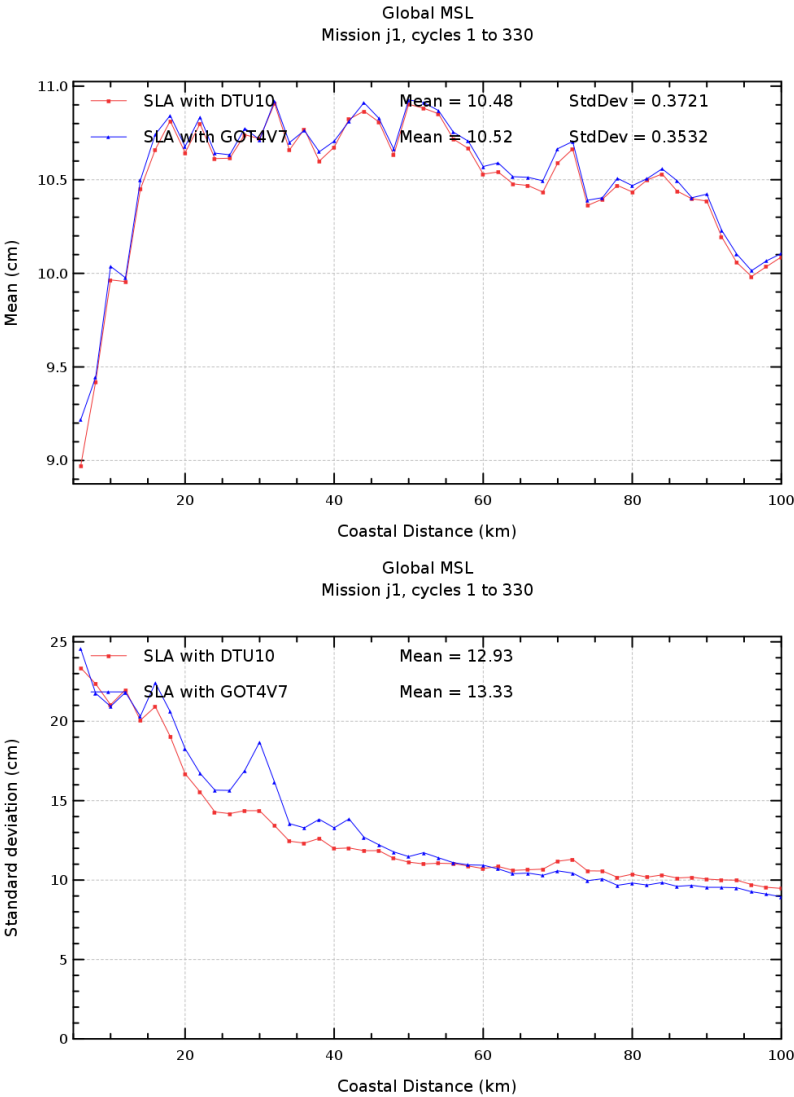
## Diagnostic A207 (mission j1)

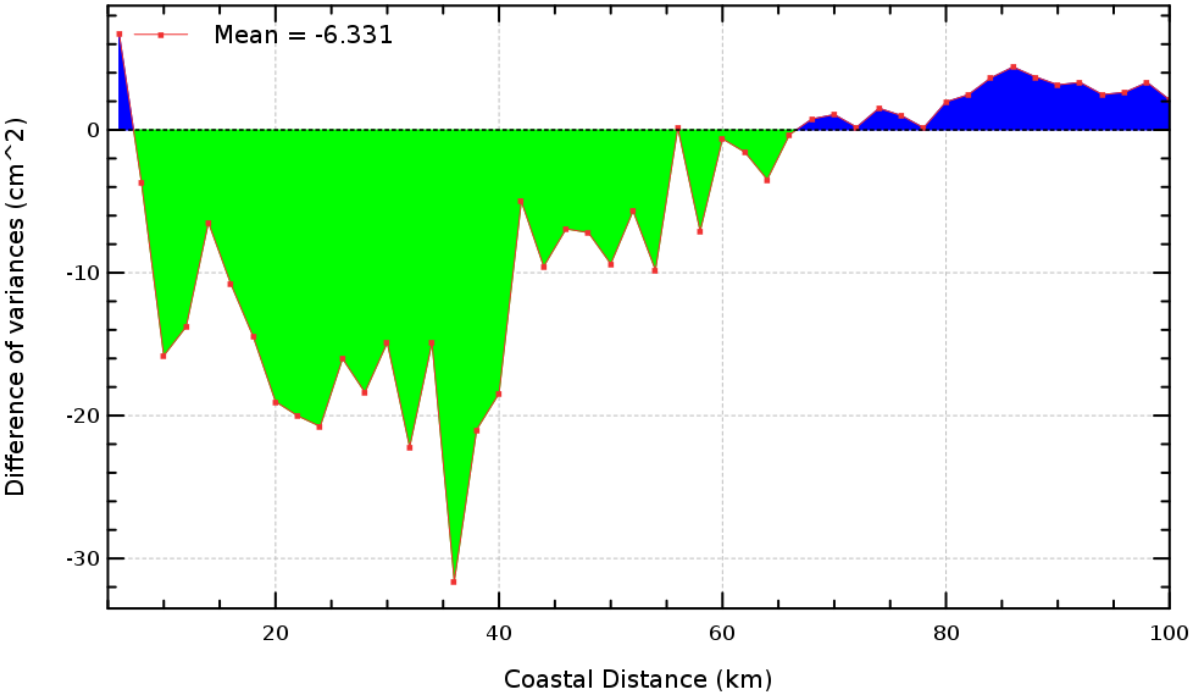
**Name :** Sea Level Anomaly (SLA) versus coastal distance

**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.

Diagnostic type : Global internal analyses



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 DTU10) - VAR(SLA with GOT4V7) Mission en, cycles 9 to 94</div>  <p>The graph displays the difference in Sea Level Anomaly (SLA) variances between two altimetric components, DTU10 and GOT4V7, plotted against coastal distance from 0 to 100 km. The y-axis represents the 'Difference of variances (cm<sup>2</sup>)' ranging from -30 to 0. The x-axis represents 'Coastal Distance (km)'. A red line with markers shows the data, and a blue shaded area represents the variance difference. The mean value is -6.331.</p> <table border="1"><thead><tr><th>Coastal Distance (km)</th><th>Difference of variances (cm<sup>2</sup>)</th></tr></thead><tbody><tr><td>0</td><td>-6.331</td></tr><tr><td>10</td><td>-15</td></tr><tr><td>20</td><td>-20</td></tr><tr><td>30</td><td>-25</td></tr><tr><td>40</td><td>-20</td></tr><tr><td>50</td><td>-10</td></tr><tr><td>60</td><td>-5</td></tr><tr><td>70</td><td>0</td></tr><tr><td>80</td><td>5</td></tr><tr><td>90</td><td>10</td></tr><tr><td>100</td><td>10</td></tr></tbody></table>	Coastal Distance (km)	Difference of variances (cm <sup>2</sup> )	0	-6.331	10	-15	20	-20	30	-25	40	-20	50	-10	60	-5	70	0	80	5	90	10	100
Coastal Distance (km)	Difference of variances (cm <sup>2</sup> )																							
0	-6.331																							
10	-15																							
20	-20																							
30	-25																							
40	-20																							
50	-10																							
60	-5																							
70	0																							
80	5																							
90	10																							
100	10																							

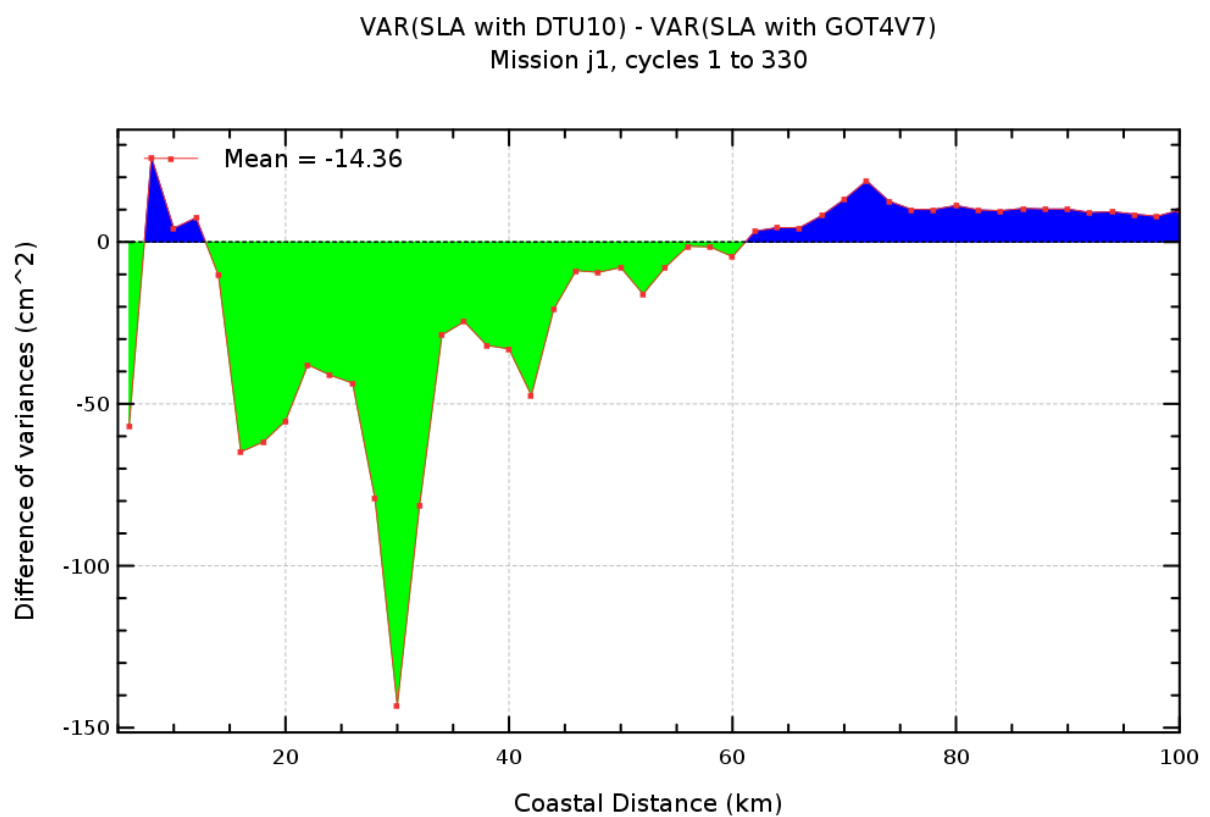
## Diagnostic A208 (mission j1)

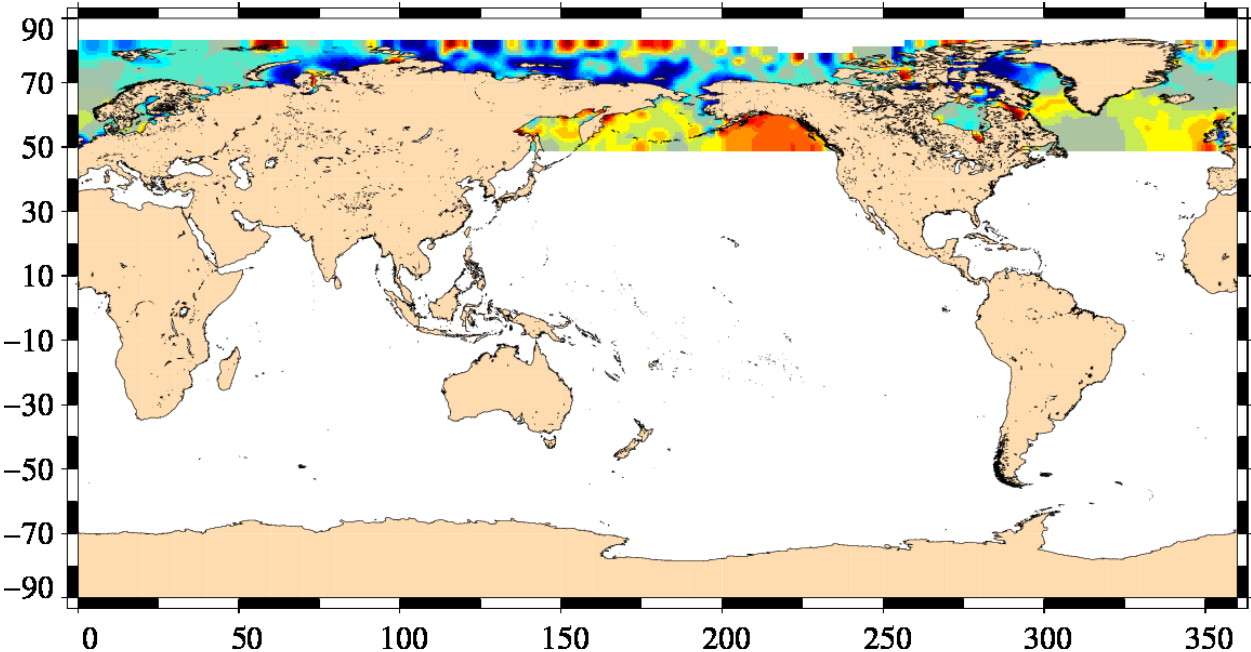
**Name :** Sea Level Anomaly (SLA) differences versus coastal distance

**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.

Diagnostic type : Global internal analyses



Diagnostic type : Global internal analyses	<div>Diagnostic A209_a (mission en)</div>
	<div>Name : Differences between maps of SLA (3)</div>
	<div>Input data : Along track SLA</div>
	<div>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>
	<div><div><div>VAR(SLA with DTU10) – VAR(SLA with GOT4V7)</div><div>Mission en, cycles 9 to 94</div><div><div><div>-30</div><div>-10</div><div>10</div><div>30</div></div><div>Difference of variances ( cm^2 )</div></div></div></div>



## Diagnostic A209\_b (mission en)

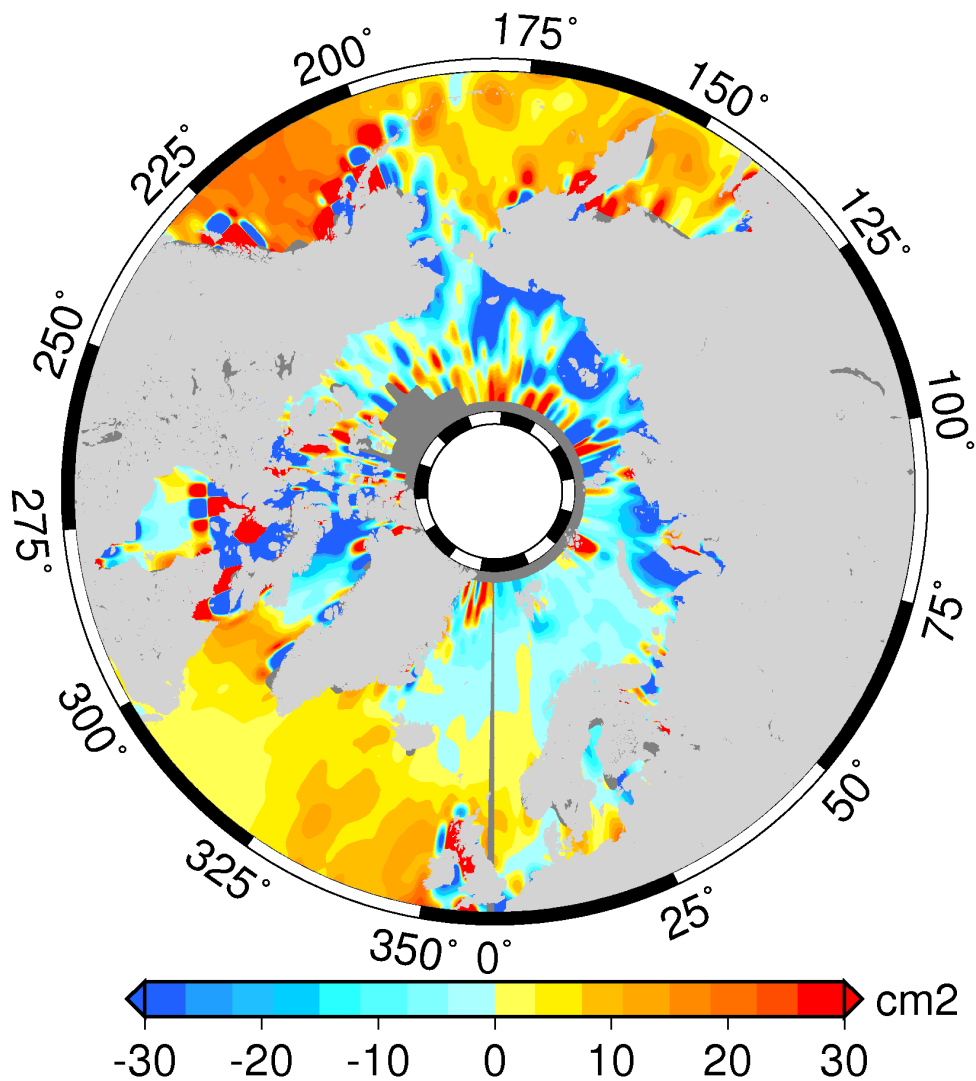
**Name :** Differences between maps of SLA (3)

**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.

Diagnostic type : Global internal analyses

Mission en, cycles 9 to 94



AR(SLA with DTU10) - VAR(SLA with GOT4V7)

## Diagnostic A209\_a (mission j1)

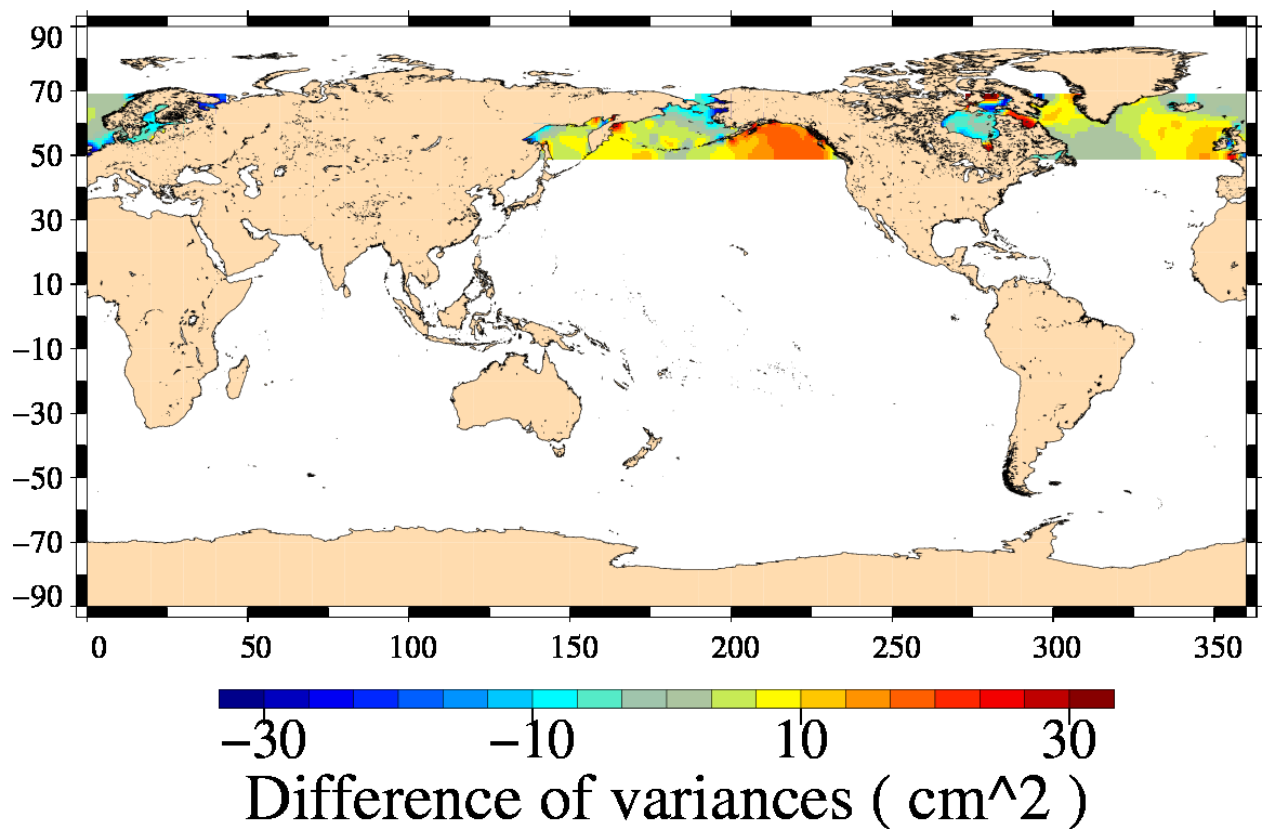
**Name :** Differences between maps of SLA (3)

**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.

Diagnostic type : Global internal analyses

**VAR(SLA with DTU10) – VAR(SLA with GOT4V7)**  
**Mission j1, cycles 1 to 330**



## Diagnostic A209\_b (mission j1)

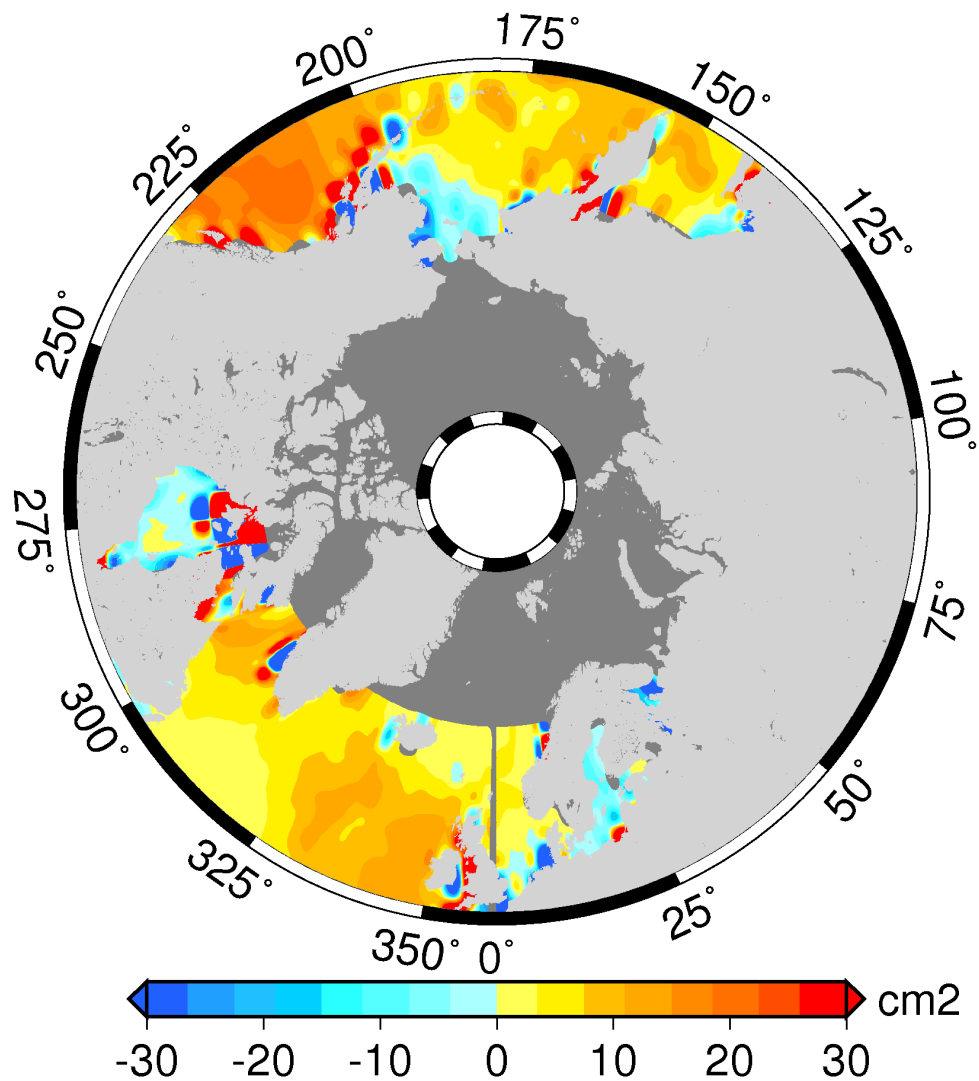
**Name :** Differences between maps of SLA (3)

**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.

Diagnostic type : Global internal analyses

Mission j1, cycles 1 to 330



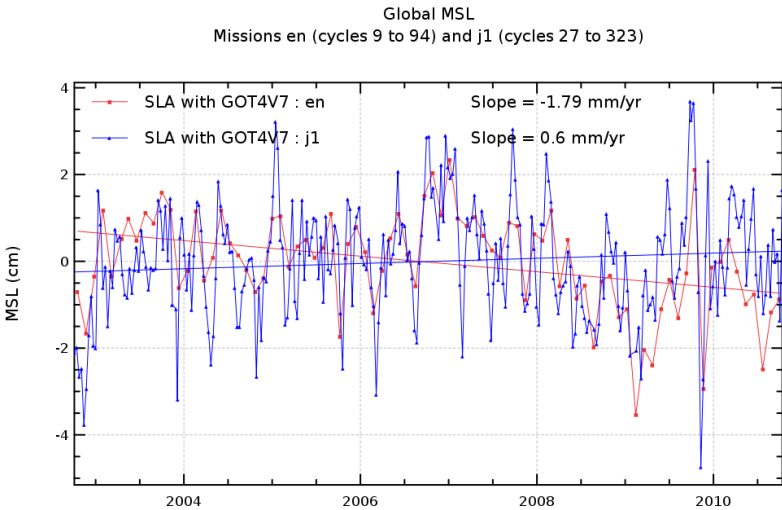
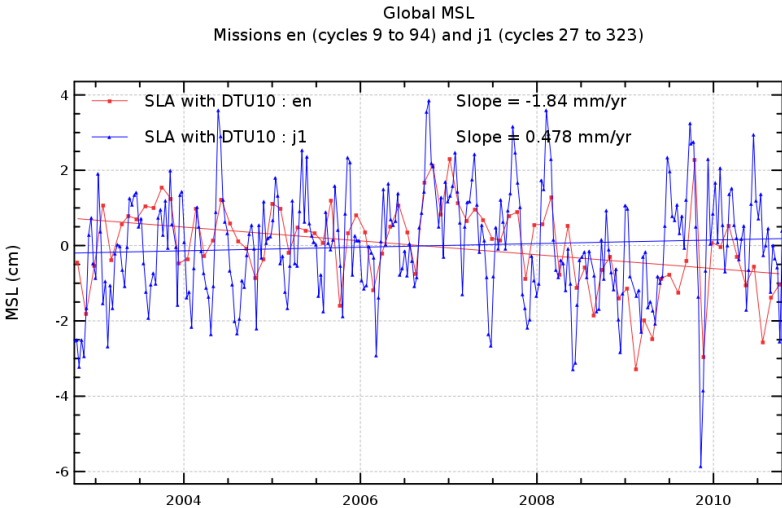
$AR(SLA \text{ with DTU10}) - VAR(SLA \text{ with GOT4V7})$

Diagnostic B201\_a

Name : Temporal evolution of Sea level Anomaly (SLA) for 2 missions over the same period

Input data : Along track SLA

Description : Temporal evolution of SLA statistics (mean, standard deviation) of 2 or more missions are computed over the same period as longest as possible using successively both components in the SLA calculation. This can be done globally, or separating in ascending and descending or in northern and southern hemisphere. In order to assure comparability, statistics are computed using sea level standard calculation (mean per box of 2x2 and weighted by cosine of latitude for the global mean) limited to 66 latitude.



## Diagnostic B201\_b

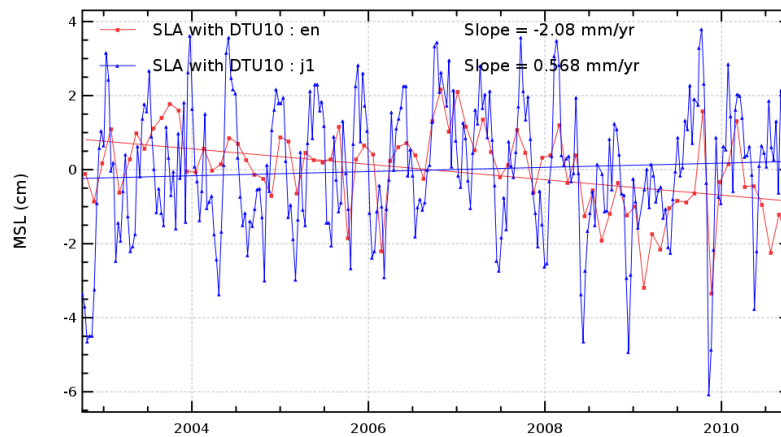
**Name :** Temporal evolution of Sea level Anomaly (SLA) for 2 missions over the same period

**Input data :** Along track SLA

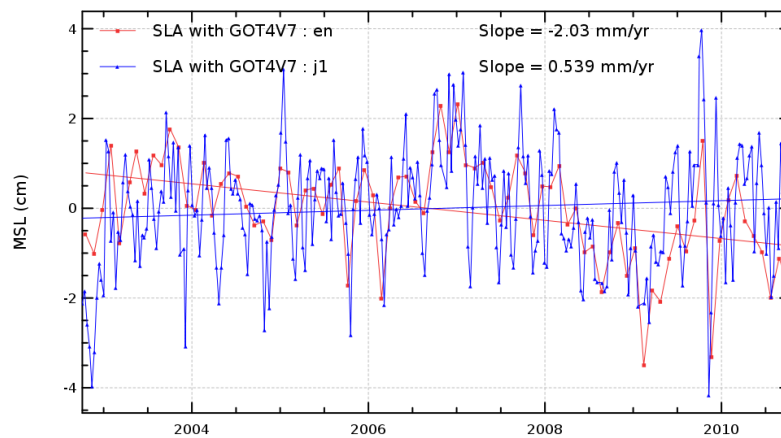
**Description :** Temporal evolution of SLA statistics (mean, standard deviation) of 2 or more missions are computed over the same period as longest as possible using successively both components in the SLA calculation. This can be done globally, or separating in ascending and descending or in northern and southern hemisphere. In order to assure comparability, statistics are computed using sea level standard calculation (mean per box of 2x2 and weighted by cosine of latitude for the global mean) limited to 66 latitude.

Diagnostic type : Global multi-mission comparisons

Global MSL, selecting even pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



Global MSL, selecting even pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



## Diagnostic B201\_c

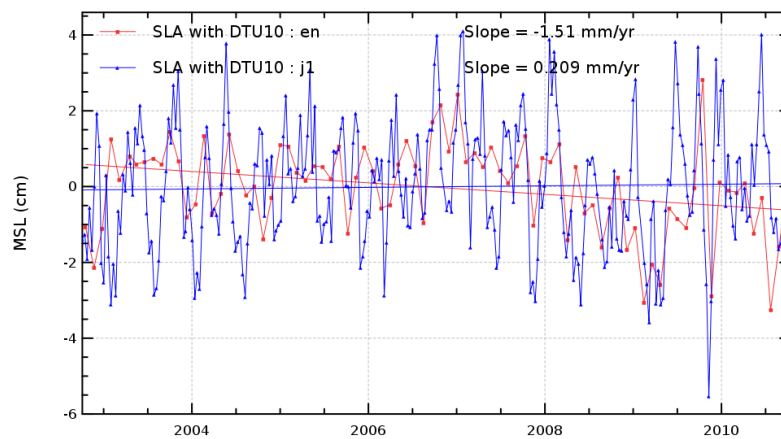
**Name :** Temporal evolution of Sea level Anomaly (SLA) for 2 missions over the same period

**Input data :** Along track SLA

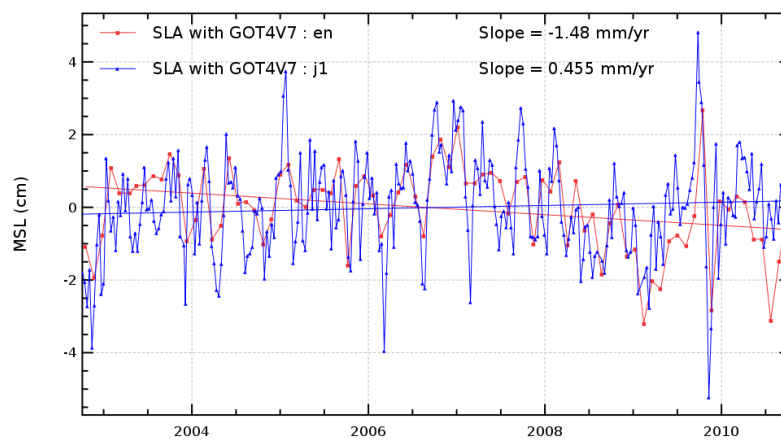
**Description :** Temporal evolution of SLA statistics (mean, standard deviation) of 2 or more missions are computed over the same period as longest as possible using successively both components in the SLA calculation. This can be done globally, or separating in ascending and descending or in northern and southern hemisphere. In order to assure comparability, statistics are computed using sea level standard calculation (mean per box of 2x2 and weighted by cosine of latitude for the global mean) limited to 66 latitude.

Diagnostic type : Global multi-mission comparisons

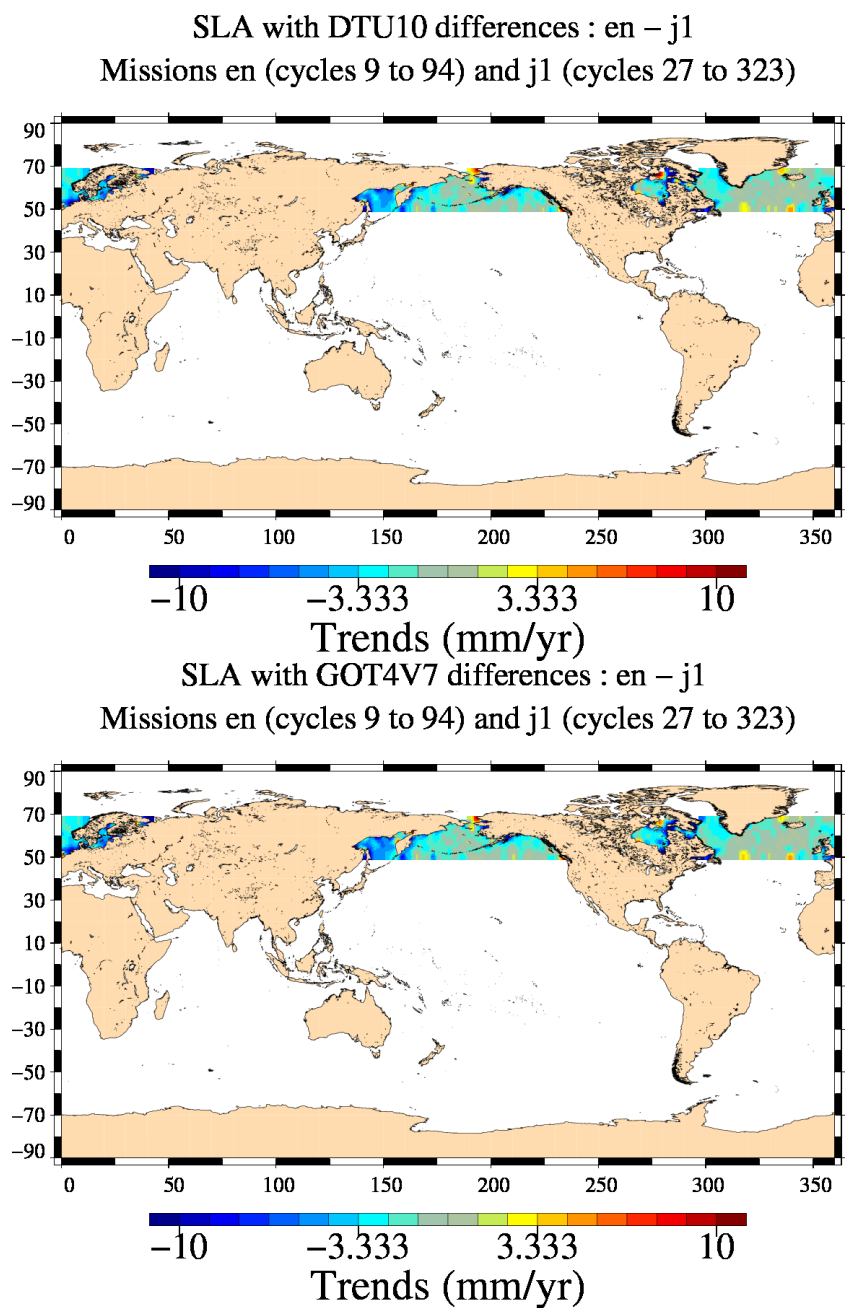
Global MSL, selecting odd pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



Global MSL, selecting odd pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



<b>Diagnostic B202_a</b>
<b>Name :</b> Differences between maps of Sea Level Anomaly (SLA) for 2 missions over the same period
<b>Input data :</b> Along track SLA
<b>Description :</b> The differences between maps of SLA (mean, variance or slope) derived from 2 altimetric missions are computed over the same period (as long as possible) using successively both altimetric components in the SLA calculation. Maps are calculated globally, they can be also calculated separating ascending and descending passes.



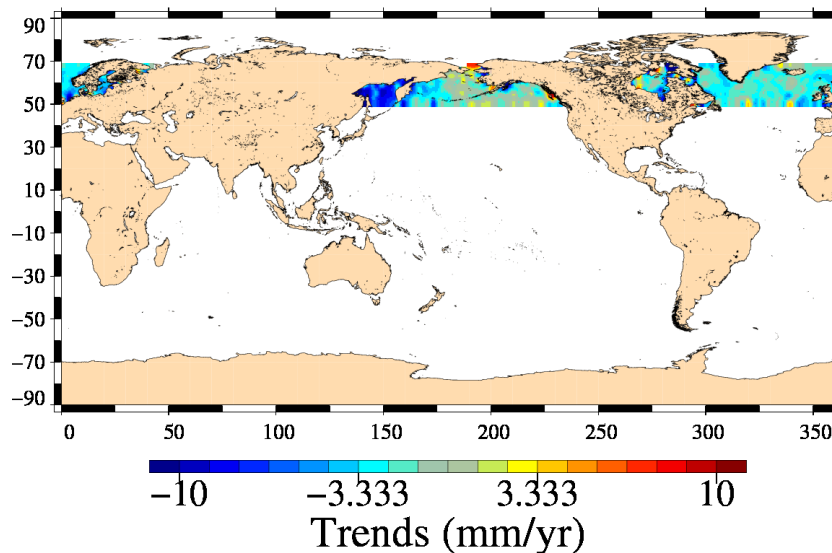
## Diagnostic B202\_b

**Name :** Differences between maps of Sea Level Anomaly (SLA) for 2 missions over the same period

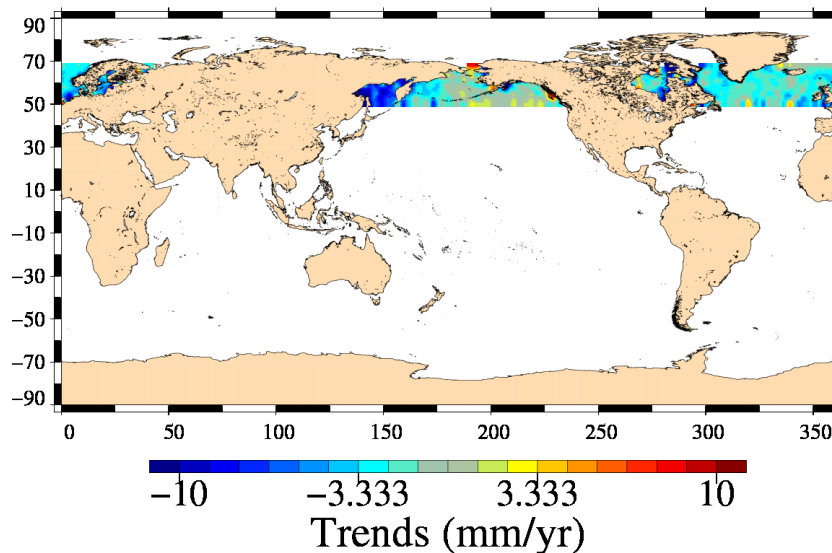
**Input data :** Along track SLA

**Description :** The differences between maps of SLA (mean, variance or slope) derived from 2 altimetric missions are computed over the same period (as long as possible) using successively both altimetric components in the SLA calculation. Maps are calculated globally, they can be also calculated separating ascending and descending passes.

SLA with DTU10 differences : en – j1, even pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



SLA with GOT4V7 differences : en – j1, even pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)





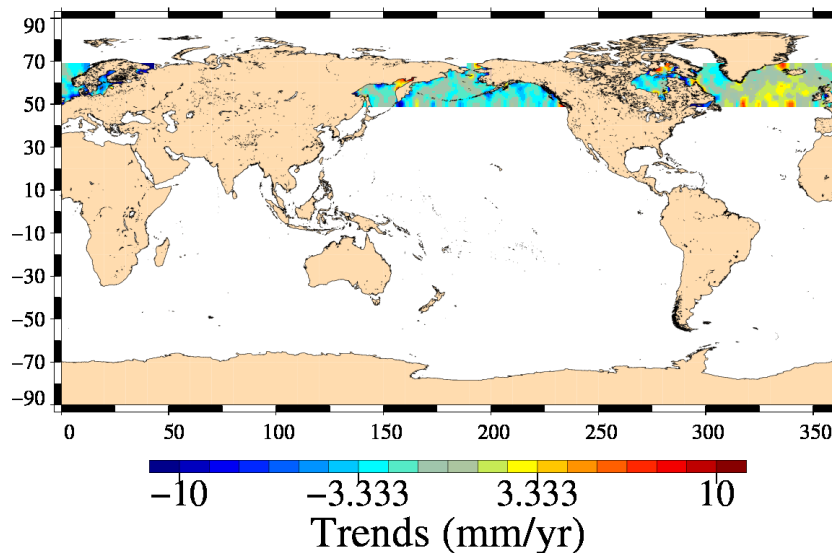
## Diagnostic B202\_c

**Name :** Differences between maps of Sea Level Anomaly (SLA) for 2 missions over the same period

**Input data :** Along track SLA

**Description :** The differences between maps of SLA (mean, variance or slope) derived from 2 altimetric missions are computed over the same period (as long as possible) using successively both altimetric components in the SLA calculation. Maps are calculated globally, they can be also calculated separating ascending and descending passes.

SLA with DTU10 differences : en – j1, odd pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)



SLA with GOT4V7 differences : en – j1, odd pass numbers  
Missions en (cycles 9 to 94) and j1 (cycles 27 to 323)

