



TOPEX/Poseidon MGRD Quality Assessment Report

Cycle 371

09-10-2002 19-10-2002

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SALP-RP-P2-EX-21120-CLS371

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1 Introduction. Document overview

The purpose of this document is to report the major features of the data quality from the Topex/Poseidon mission. The document is associated with data dissemination on a cycle by cycle basis.

The objectives of this document are :

- To provide a data quality assessment
- To provide users with necessary information for data processing
- To report any change likely to impact data quality at any level, from instrument status to software configuration
- To present the major useful results for the current cycle

It is divided into the following topics:

[Cycle overview](#)

[CALVAL main results](#)

2 Cycle overview

2.1 Cycle quality and performances

Data quality for this cycle appears to be nominal. For this cycle, the crossover standard deviation is 6.57 cm rms, and the standard deviation of Sea Level Anomalies (SLA) relative to a Mean Sea Surface is 10.25 cm.

2.2 Warnings and recommendations

- Missing measurements :
15 passes are missing probably due to tape recorder problems.
- Tape recorder failures :
In comparison with past cycles tape recorder has continued to deteriorate in performance. There is a lot of data gaps due to tape recorder anomalies.
- Editing measurements :
Problems in the interpolation of the TMR parameters occur when there are missing measurements (tape recorder failures). As a result 4.55% of the measurements are removed by the TMR correction criterion.

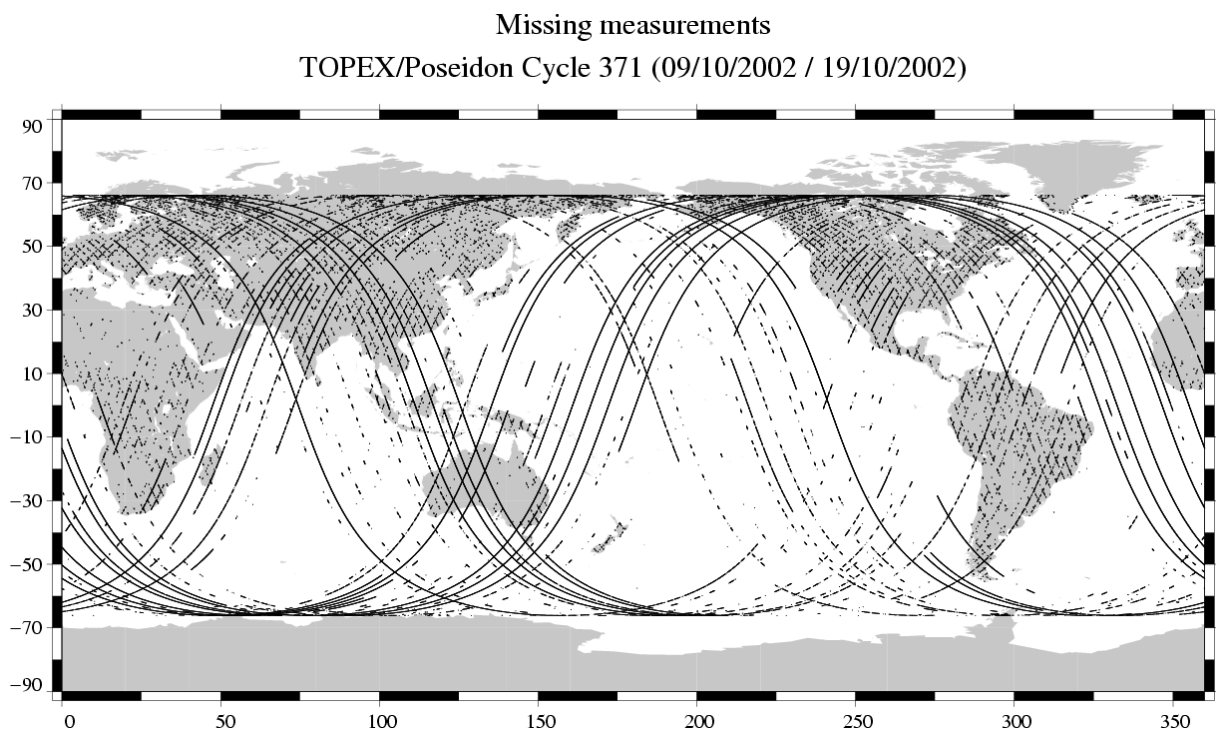
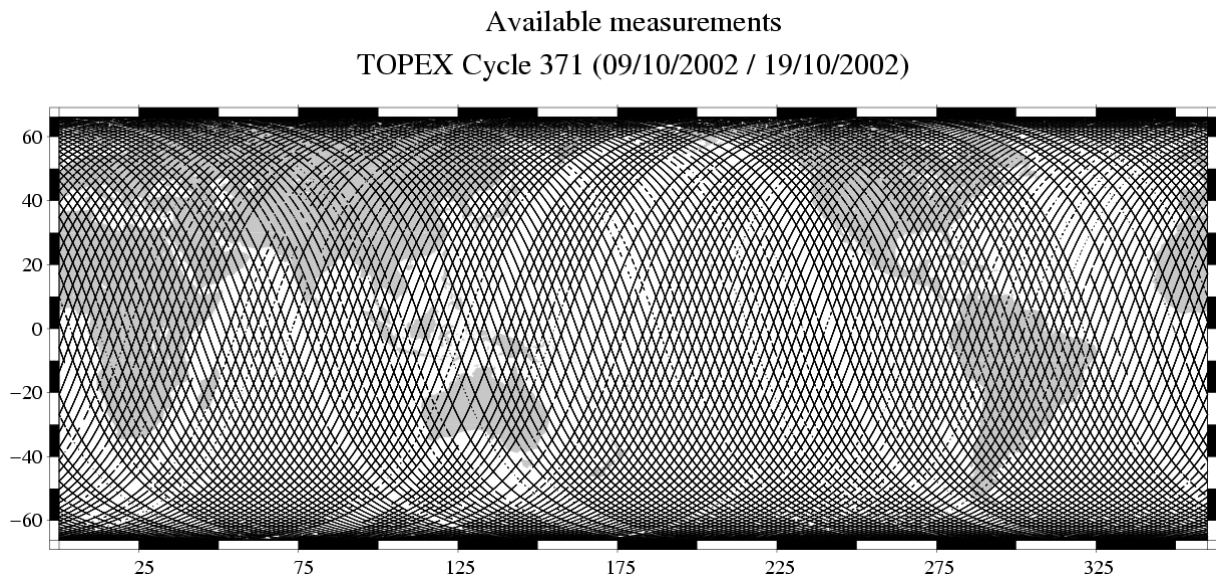
3 CALVAL main results

This section presents results that illustrate data quality during this cycle. These verification products are produced operationally so that they allow systematic monitoring of the main relevant parameters.

3.1 Missing measurements

664376 altimeter measurements are present, and 130103 are missing.

The map below shows all the available measurements for this cycle and illustrates the tape recorder problems. The latter figure shows missing 1Hz measurements in the GDRs, with respect to a 1 Hz sampling of a nominal repeat track.



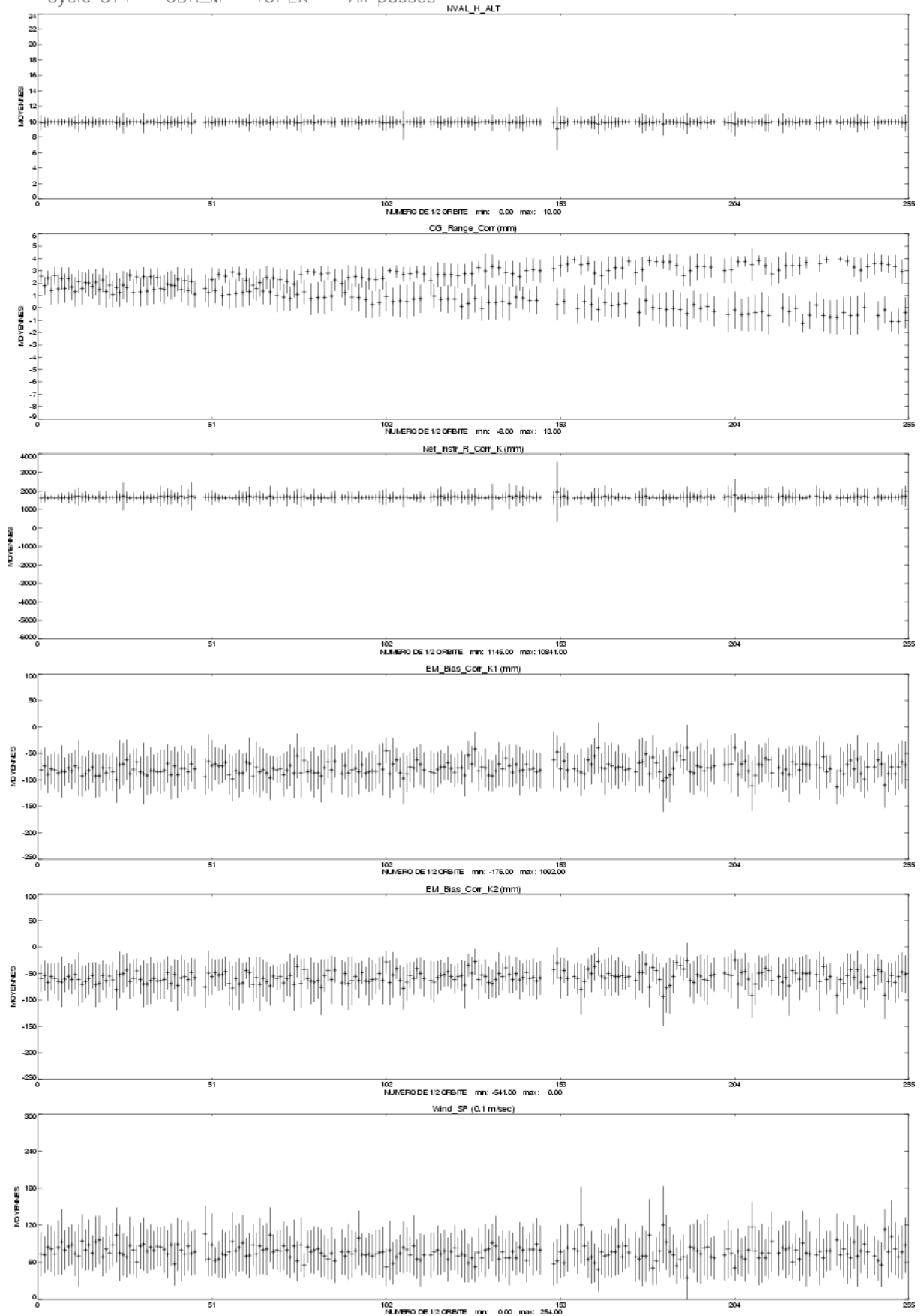
3.2 M-GDR quality flags

The following table indicates the percentage of measurements for which those flags are set.

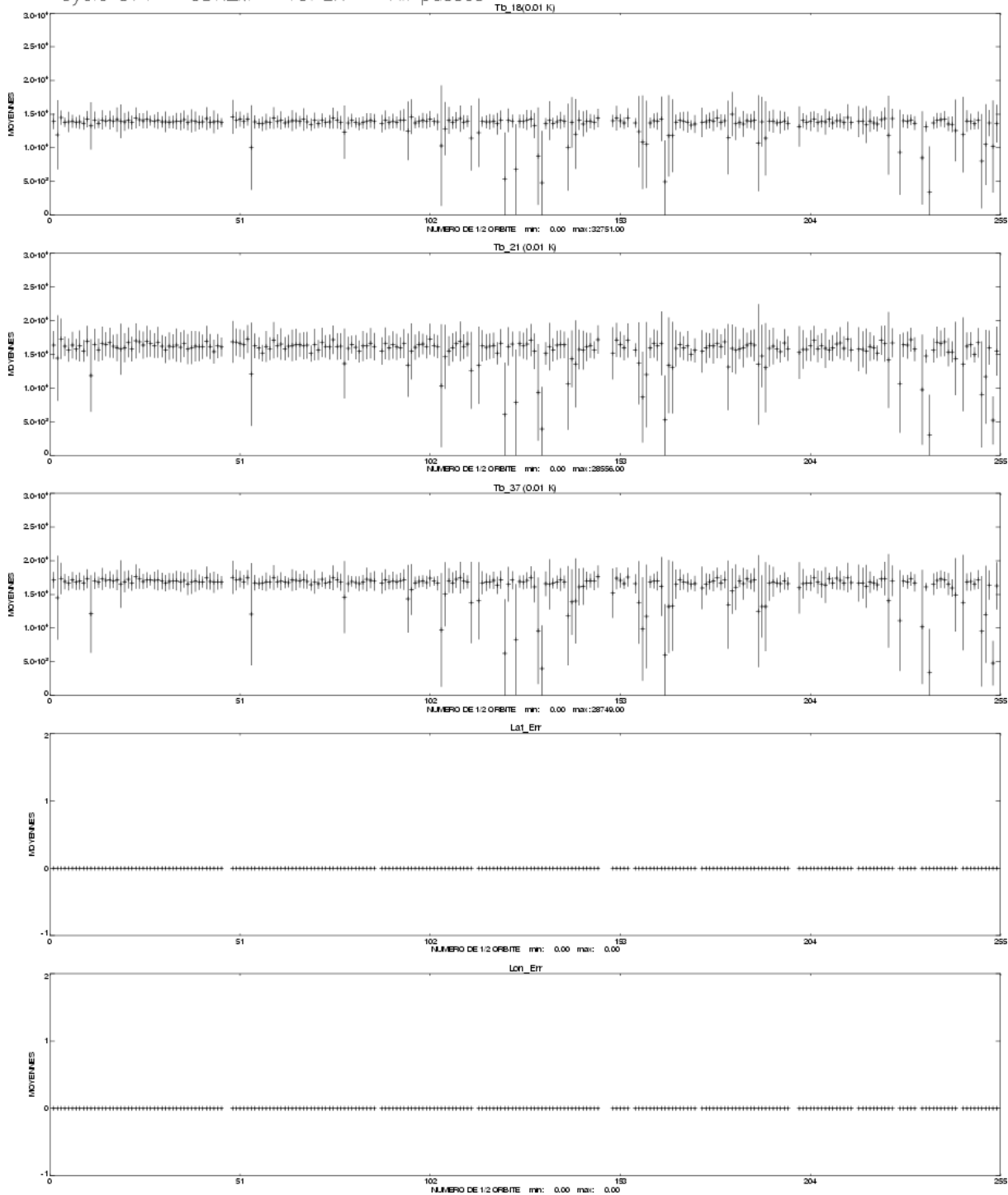
Name	Description	% bad
Geo_Bad_1	altimeter land flag	27.09
Geo_Bad_1	ice flag	8.58
Geo_Bad_1	radiometer land flag	30.41
Alt_Bad_1	conditions 1 altimeter	5.03
Alt_Bad_2	conditions 2 altimeter	4.88
Geo_Bad_2	rain (liquid water in excess)	8.12
Geo_Bad_2	less than 4 points for CSR3.0 tide calculation	0.46
Geo_Bad_2	less than 4 points for FES95.2.1 tide calculation	3.19
TOPEX	TOPEX not valid	0.00
TMR	TMR not valid	0.00
TMR_Bad	Brightness temperatures not valid	6.46
DORIS	DORIS not valid	0.00

3.3 M-GDR parameter plots

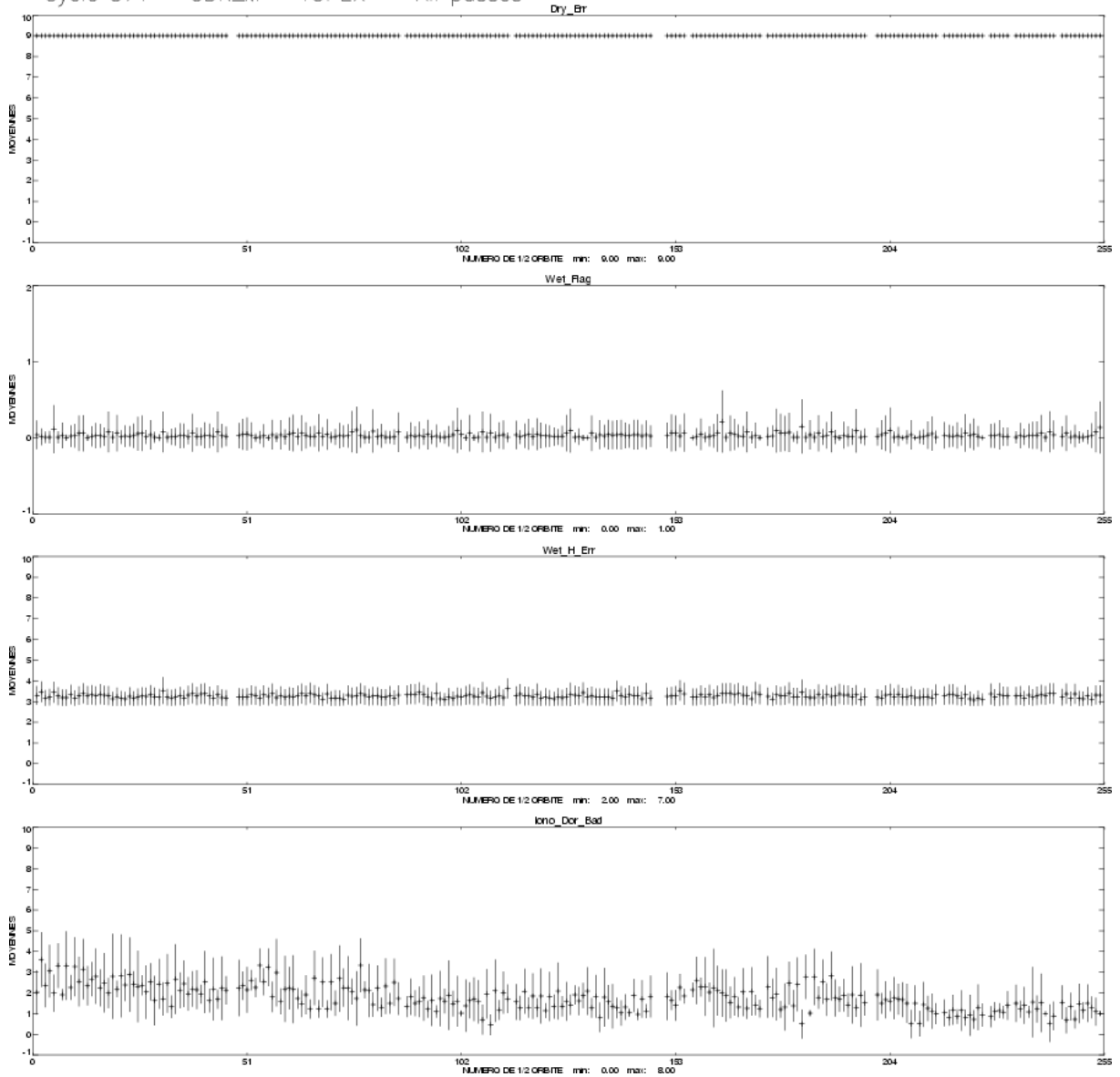
Cycle 371 – GDR_M – TOPEX – All passes –



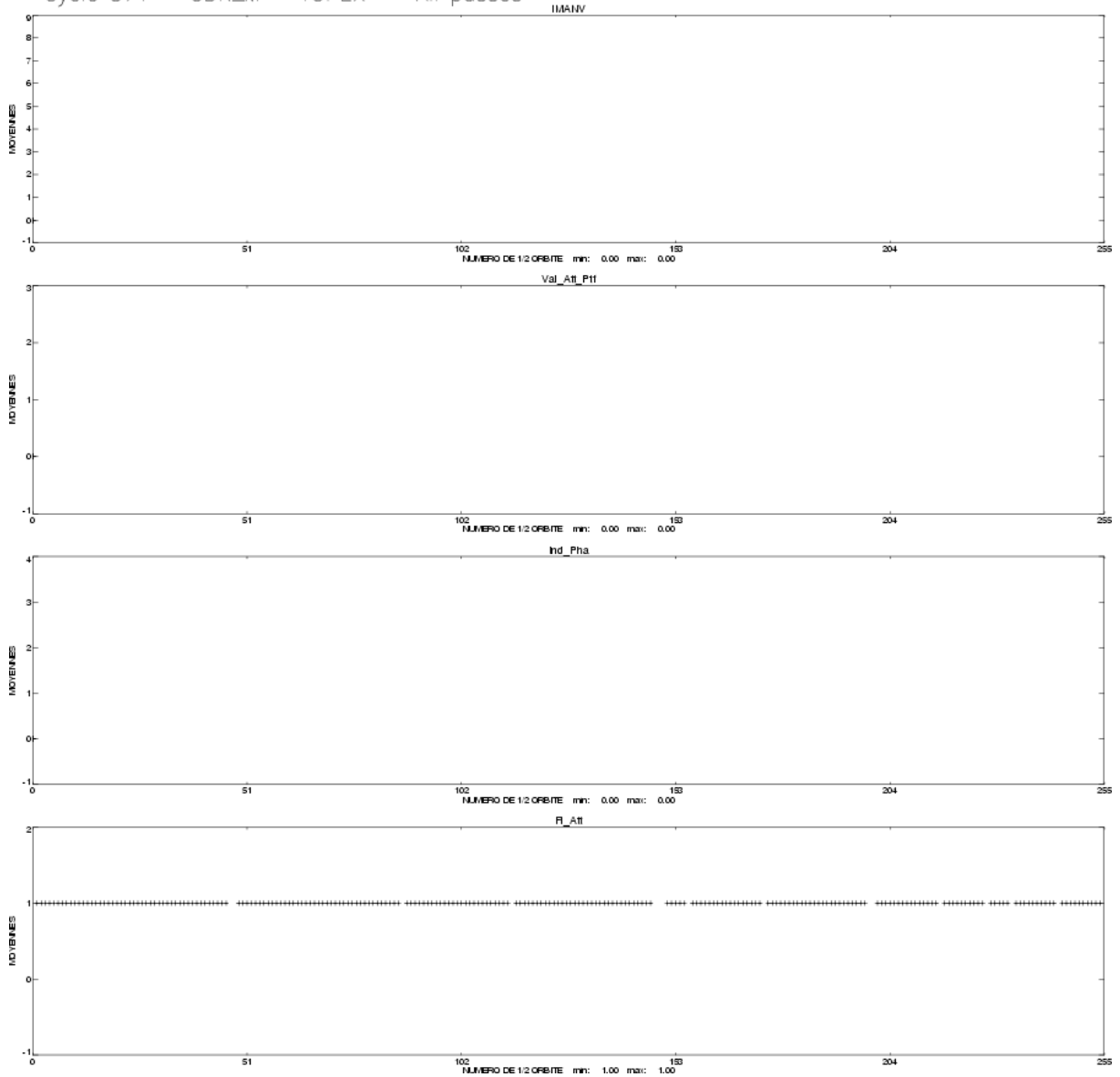
Cycle 371 – GDR_M – TOPEX – All passes –

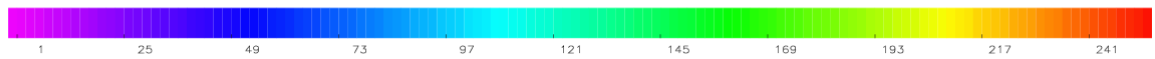
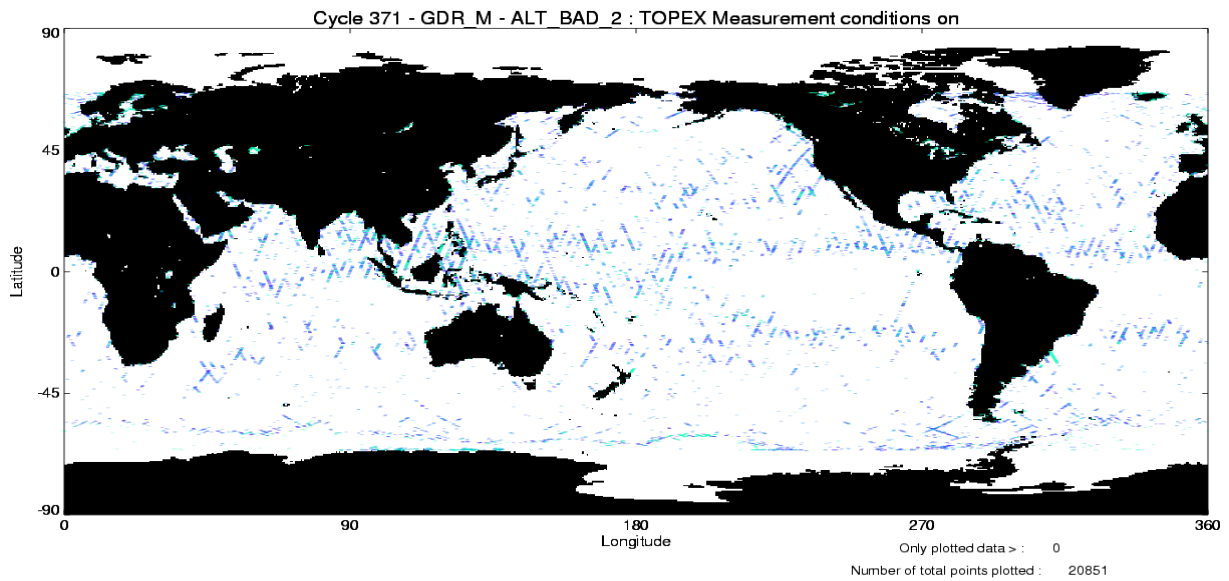
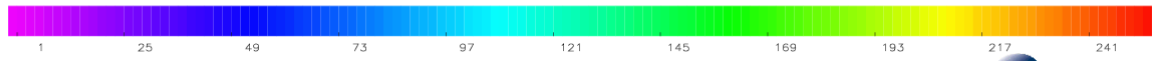
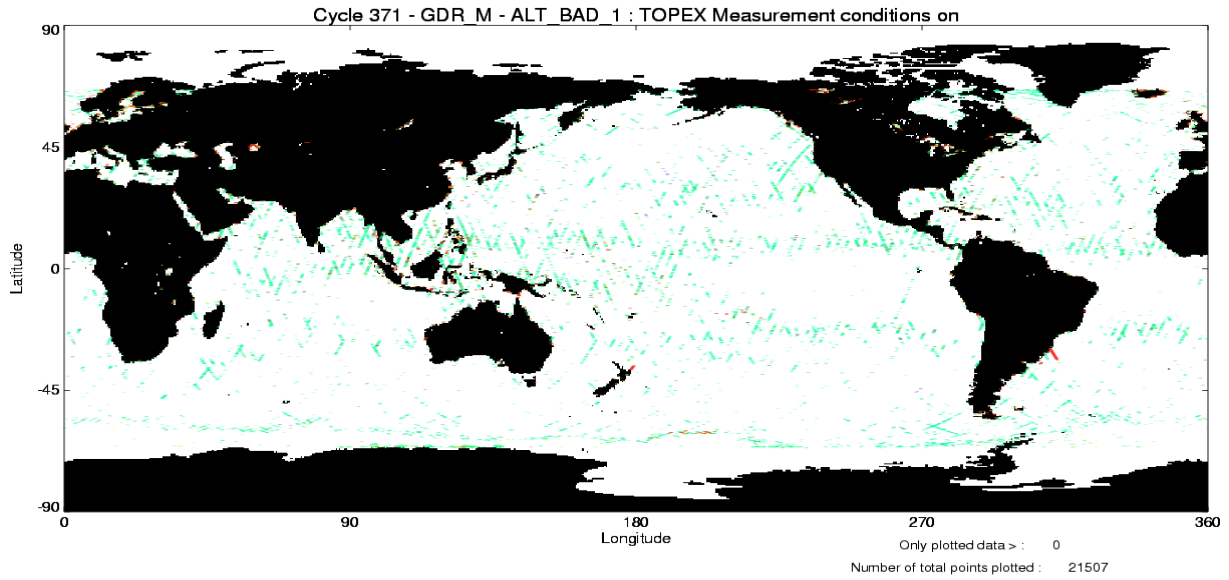


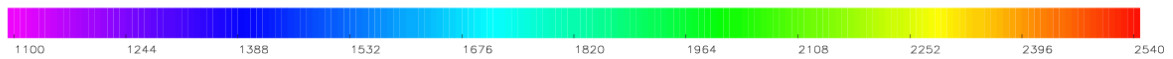
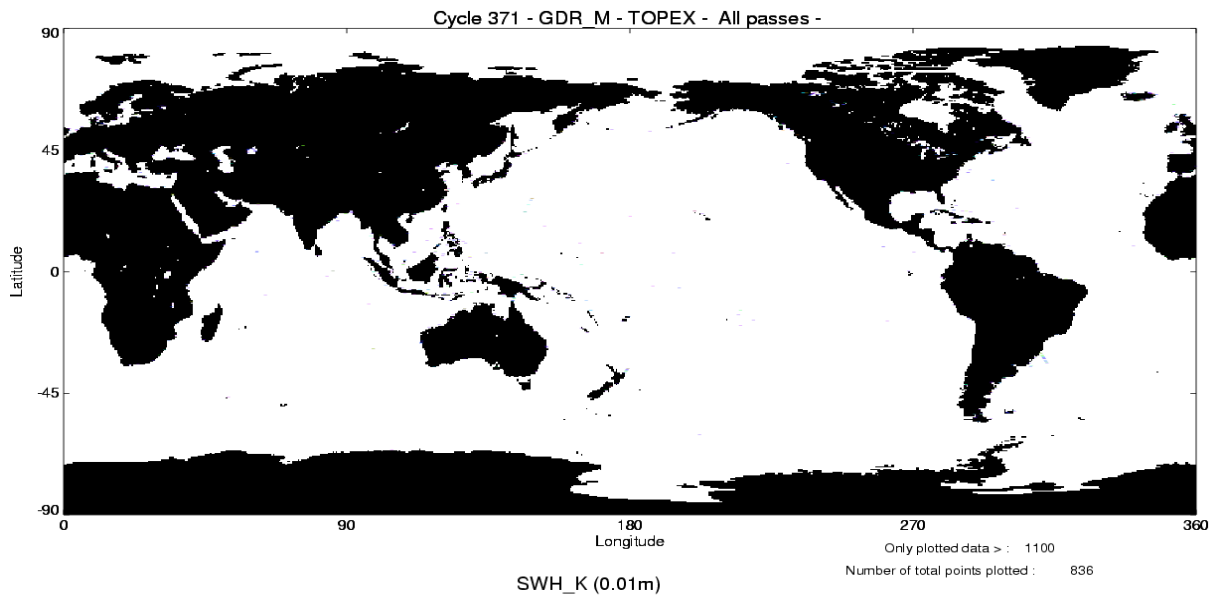
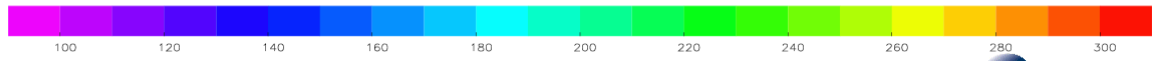
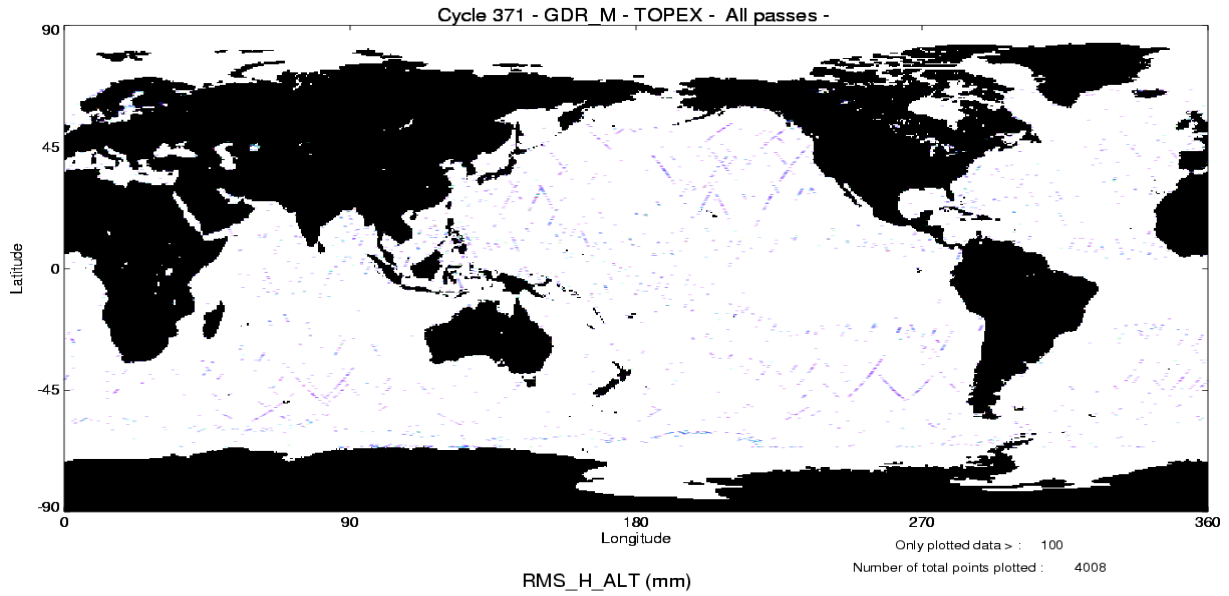
Cycle 371 – GDR_M – TOPEX – All passes –

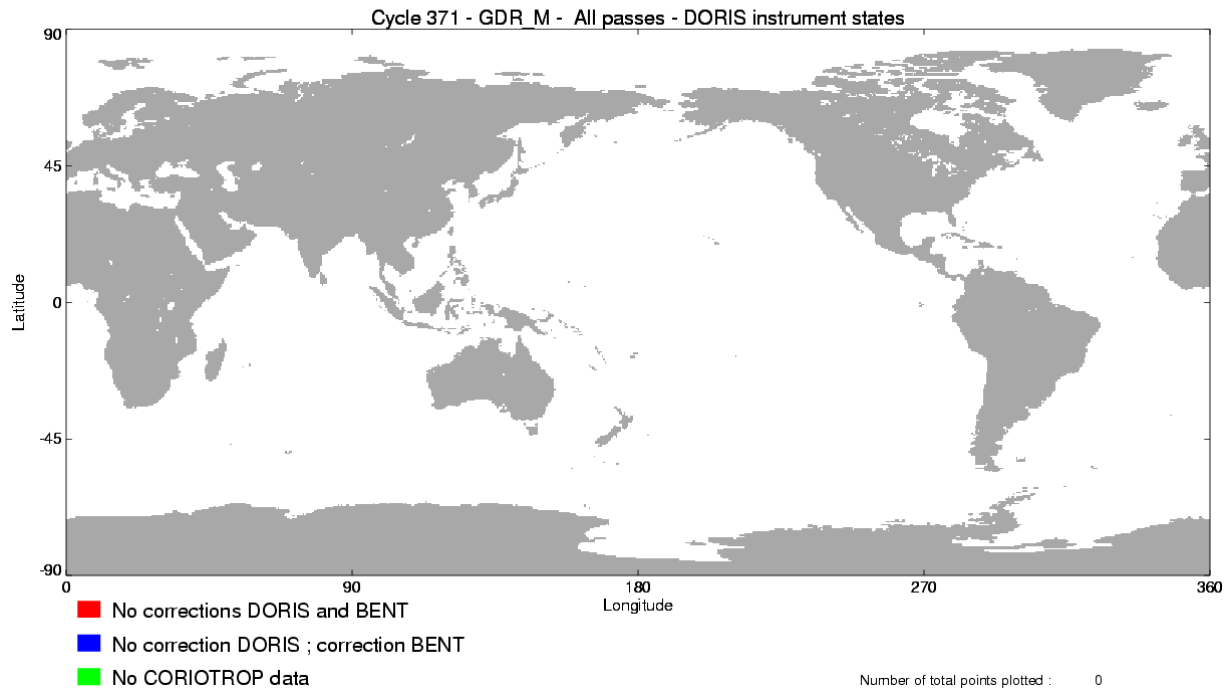


Cycle 371 – GDR_M – TOPEX – All passes –









3.4 Editing

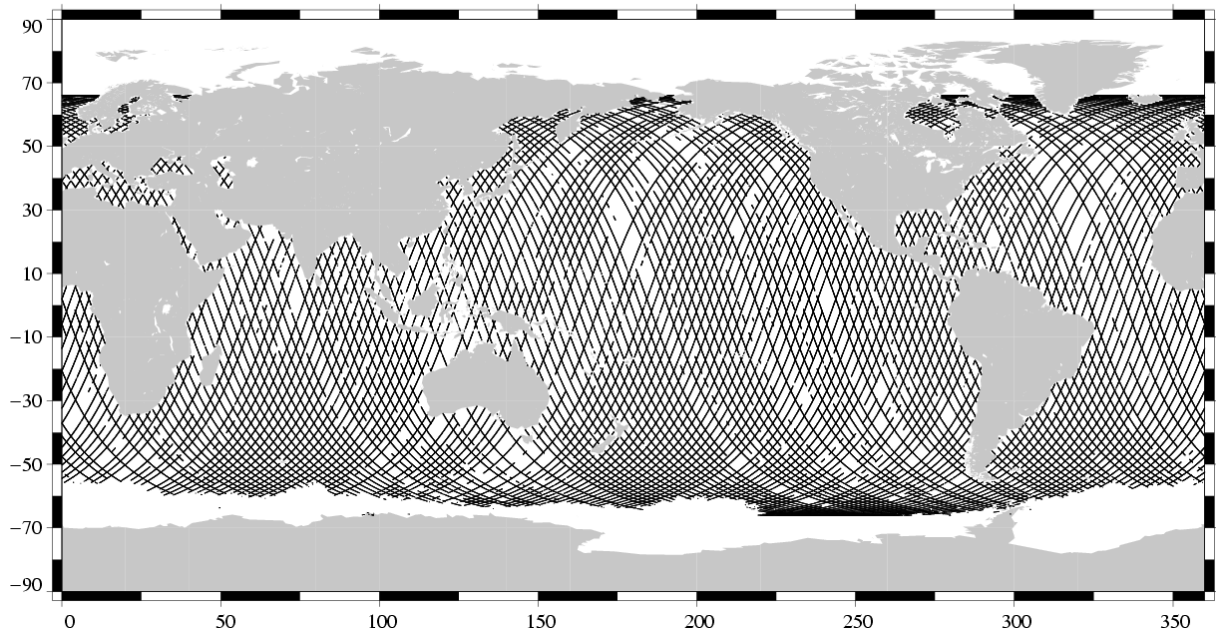
The following table gives for each tested parameter, minimum and maximum thresholds, the number and the percentage of points removed.

As a comparison, the mean percentage over one year (1997) is also given.

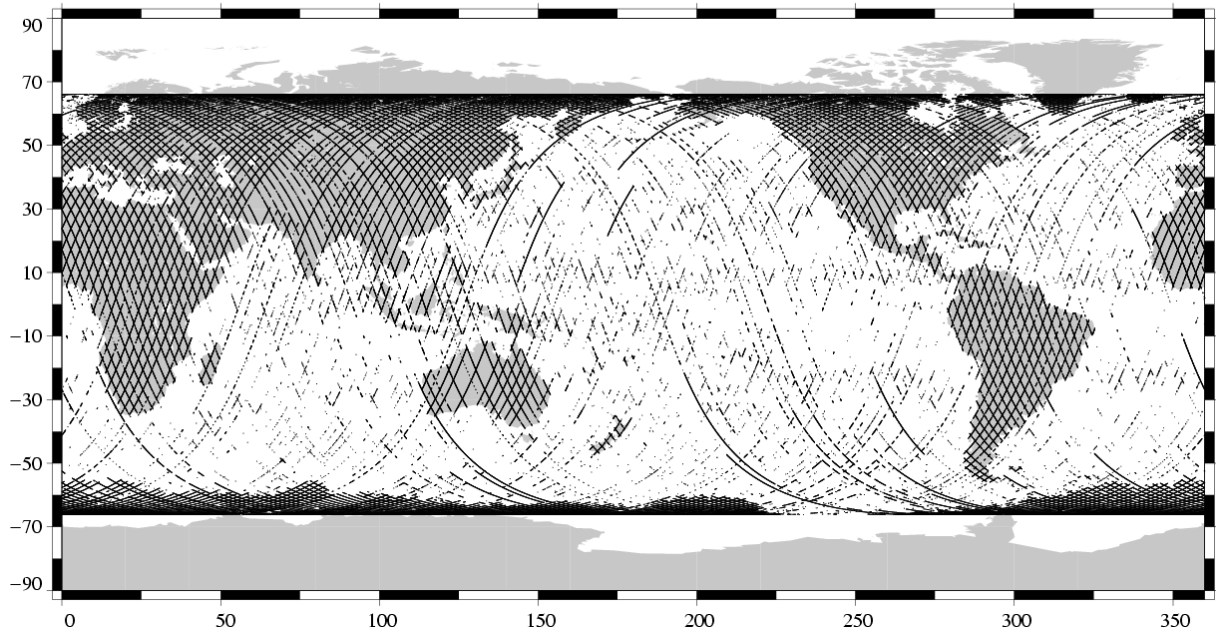
Parameters	Min Thres.	Max Thres.	Unit	Mean % removed in 1997	% removed
Sea surface height	-130.000	100.000	m	1.37	0.64
Number of 20/10Hz valid points Poseidon/TOPEX	5.000	-		1.37	0.83
Std. deviation of range	0.000	0.100	m	1.85	1.63
Off nadir angle from waveform	0.000	0.400	deg	1.36	4.42
Dry tropospheric correction	-2.500	-1.900	m	0.00	0.00
Invert barometer correction	-2.000	2.000	m	0.00	0.00
TMR wet tropospheric correction	-0.500	-0.001	m	0.34	4.55
Ionospheric correction (Poseidon:Doris, TOPEX:Dual)	-0.400	0.040	m	0.00	0.00
Significant wave height	0.000	11.000	m	1.46	0.29
Sea state Bias	-0.500	0.000	m	1.39	0.60
Backscatter coefficient	7.000	30.000	dB	1.44	0.58
Ocean tide height	-5.000	5.000	m	0.01	0.78
Earth tide	-1.000	1.000	m	0.00	0.00
Pole tide	-15.000	15.000	m	0.00	0.00
Spline fitting					0.02

The following three maps are complementary: they show respectively the removed, the selected measurements and the percentage of selected measurements in the editing procedure.

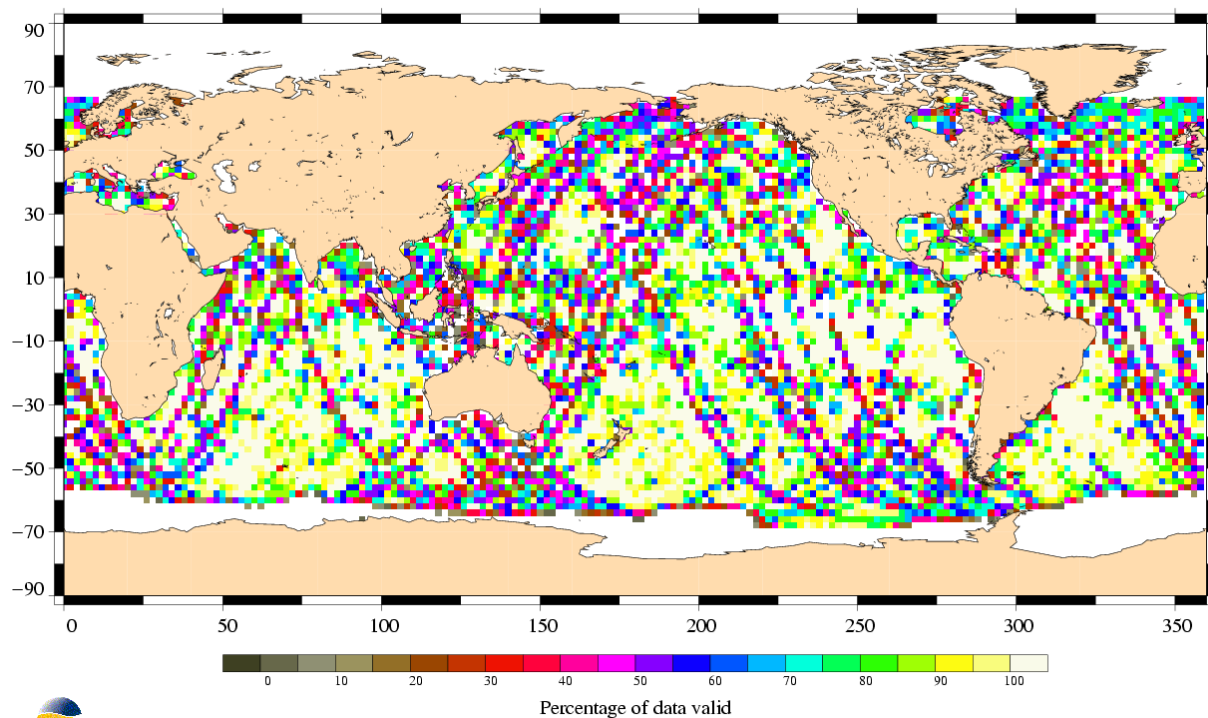
Valid data
TOPEX/Poseidon Cycle 371 (09/10/2002 / 19/10/2002)



Edited measurements
TOPEX Cycle 371 (09/10/2002 / 19/10/2002)

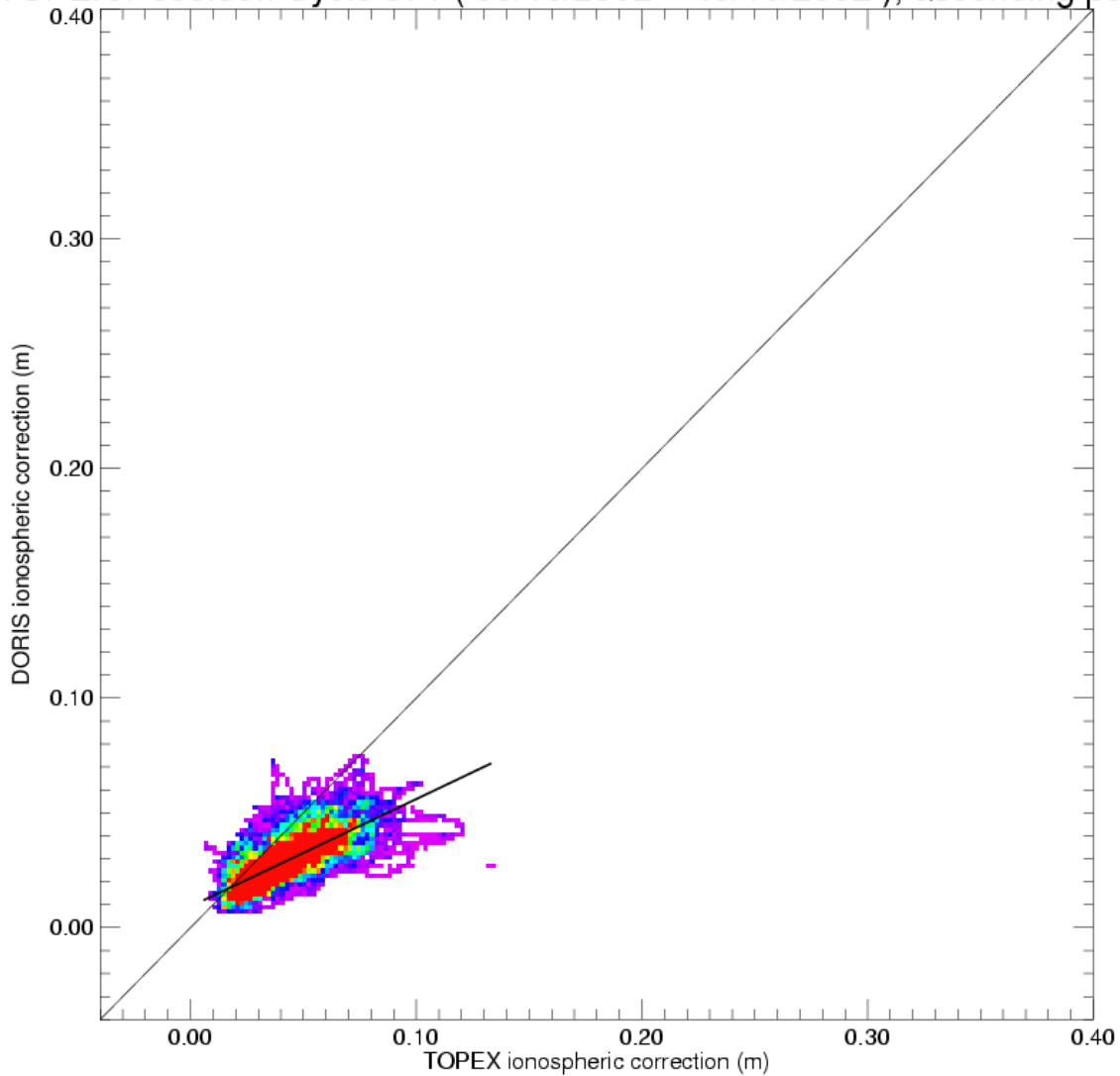


Percentage of valid data relative to the nominal pass
TOPEX/Poseidon Cycle 371 (09/10/2002 / 19/10/2002)

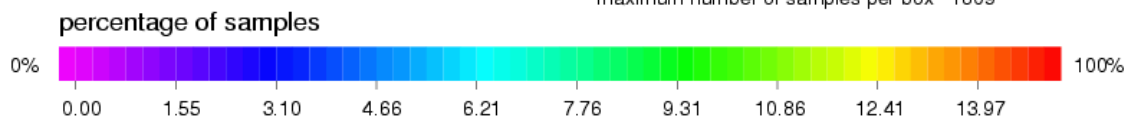


3.5 Ionospheric correction

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), ascending passes



minimum number of samples per box 1
maximum number of samples per box 1809



Statistics Y-X

mean = -0.01283
rms = 0.01700
std = 0.01115

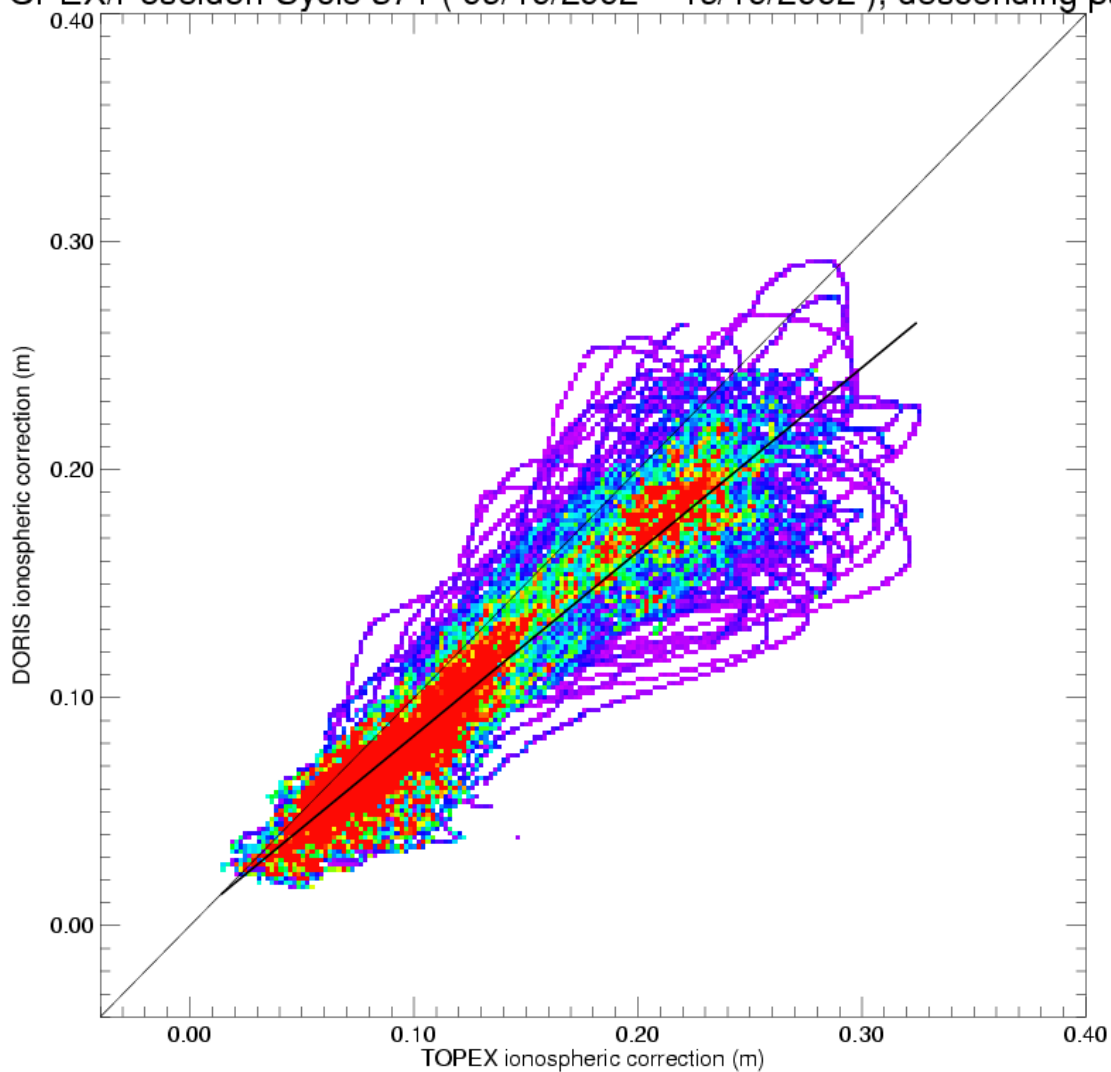
Order 1 fit polynomial

$y = a x + b$
a = 0.46783096
b = 0.00922751

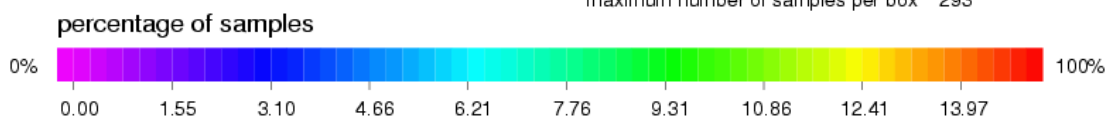
Legend

— Order 1 fit polynomial
— Bisectrix

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 293



Statistics Y-X

mean = -0.02270
 rms = 0.03329
 std = 0.02434

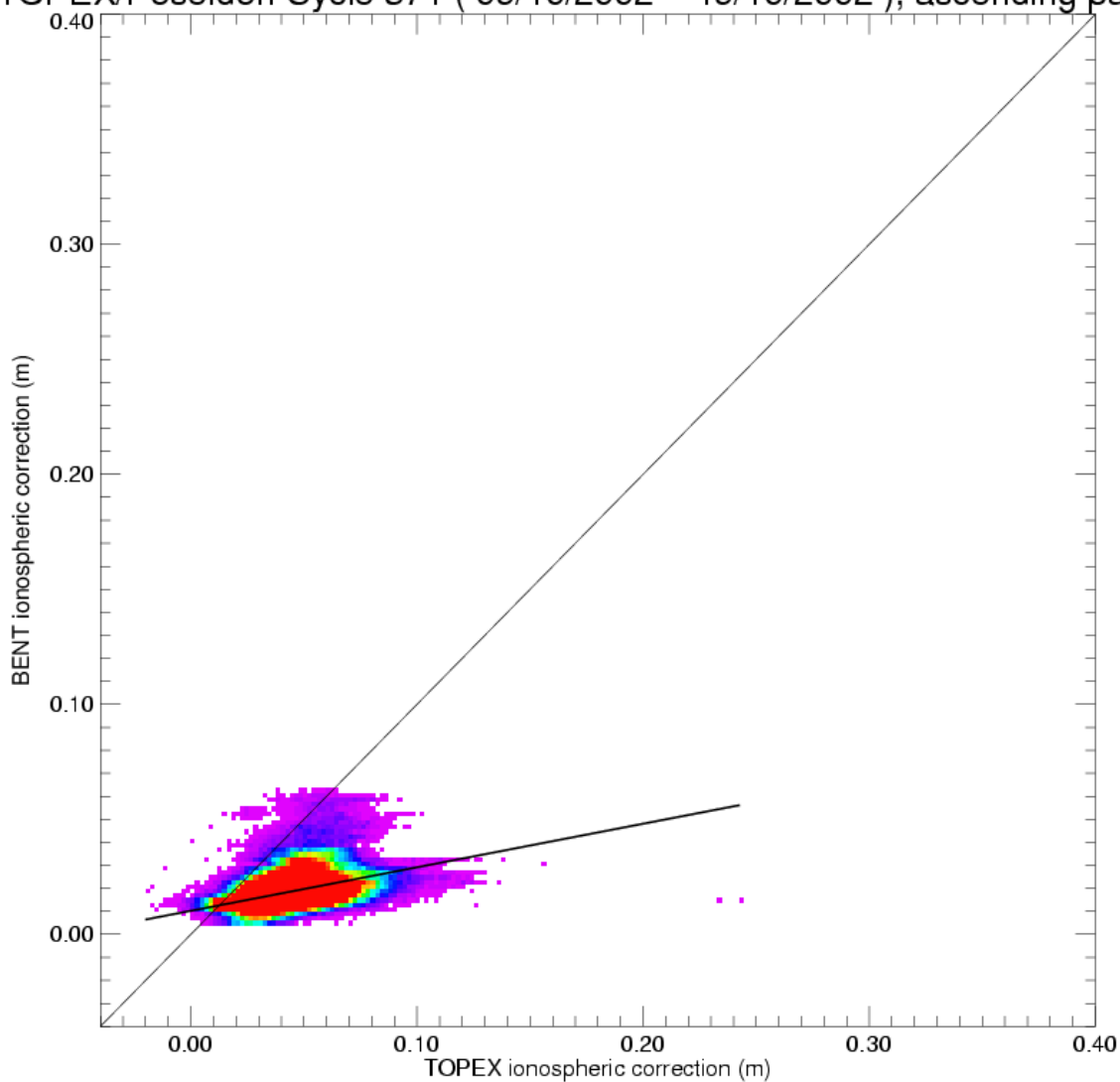
Order 1 fit polynom

$y = a x + b$
 $a = 0.80775201$
 $b = 0.00250489$

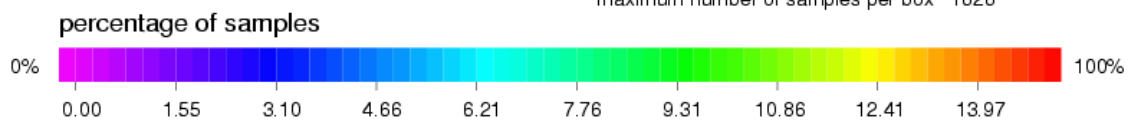
Legend

— Order 1 fit polynom
 - - - Bisectrix

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 1626



Statistics Y-X

mean = -0.02376
 rms = 0.02851
 std = 0.01575

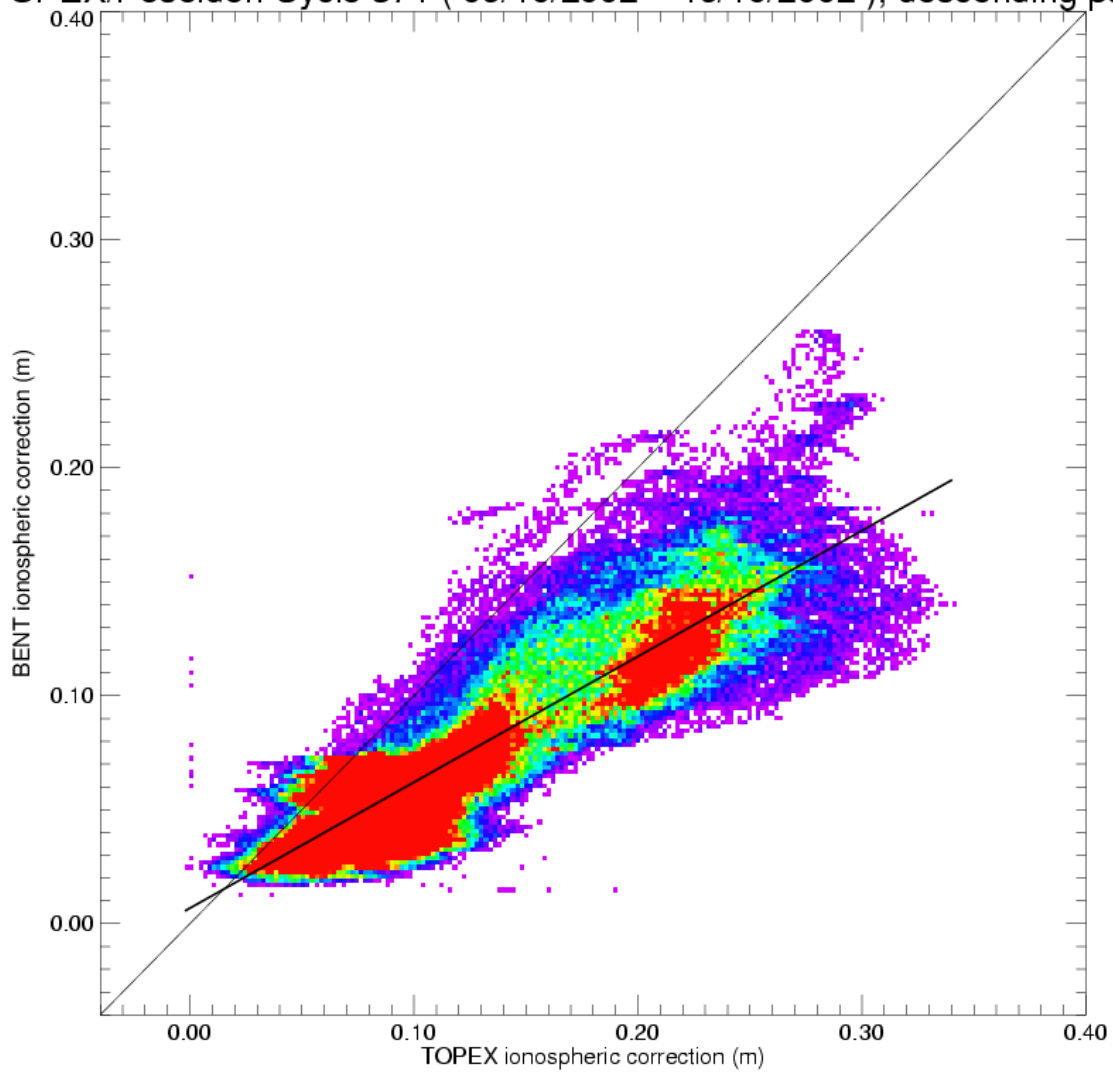
Order 1 fit polynom

$y = a x + b$
 $a = 0.18926241$
 $b = 0.01023091$

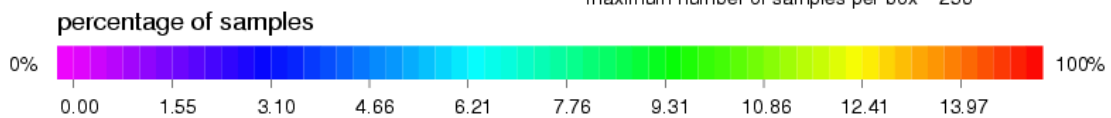
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 256



Statistics Y-X

mean = -0.05211
 rms = 0.06276
 std = 0.03498

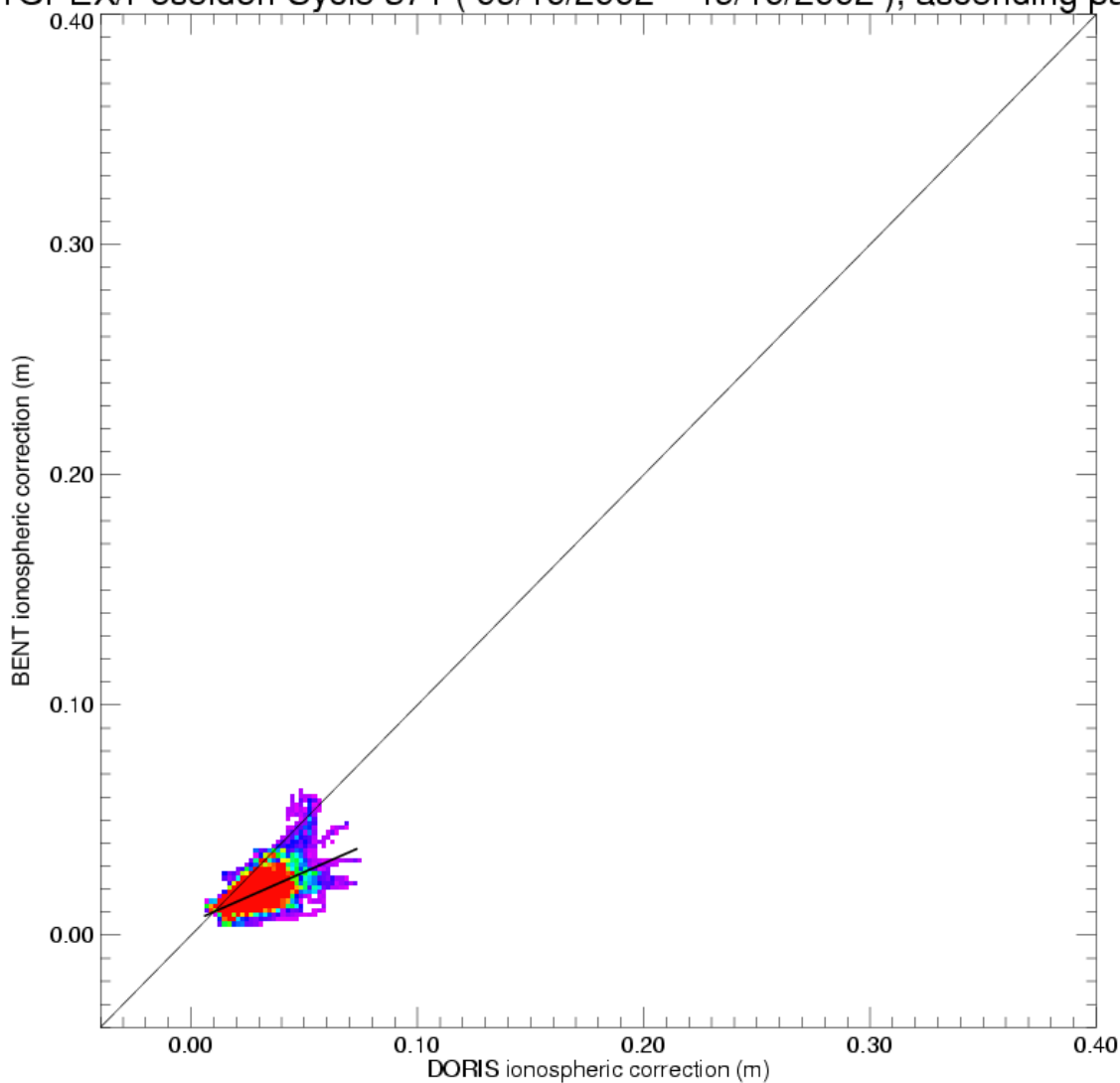
Order 1 fit polynom

$y = a x + b$
 $a = 0.55221379$
 $b = 0.00680688$

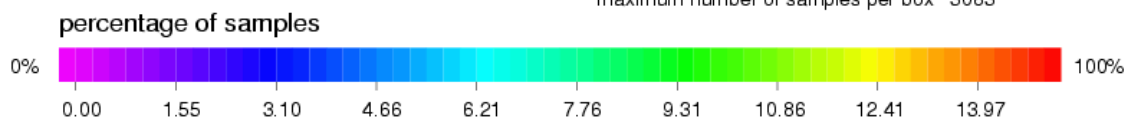
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 3083



Statistics Y-X

mean = -0.01046
 rms = 0.01354
 std = 0.00860

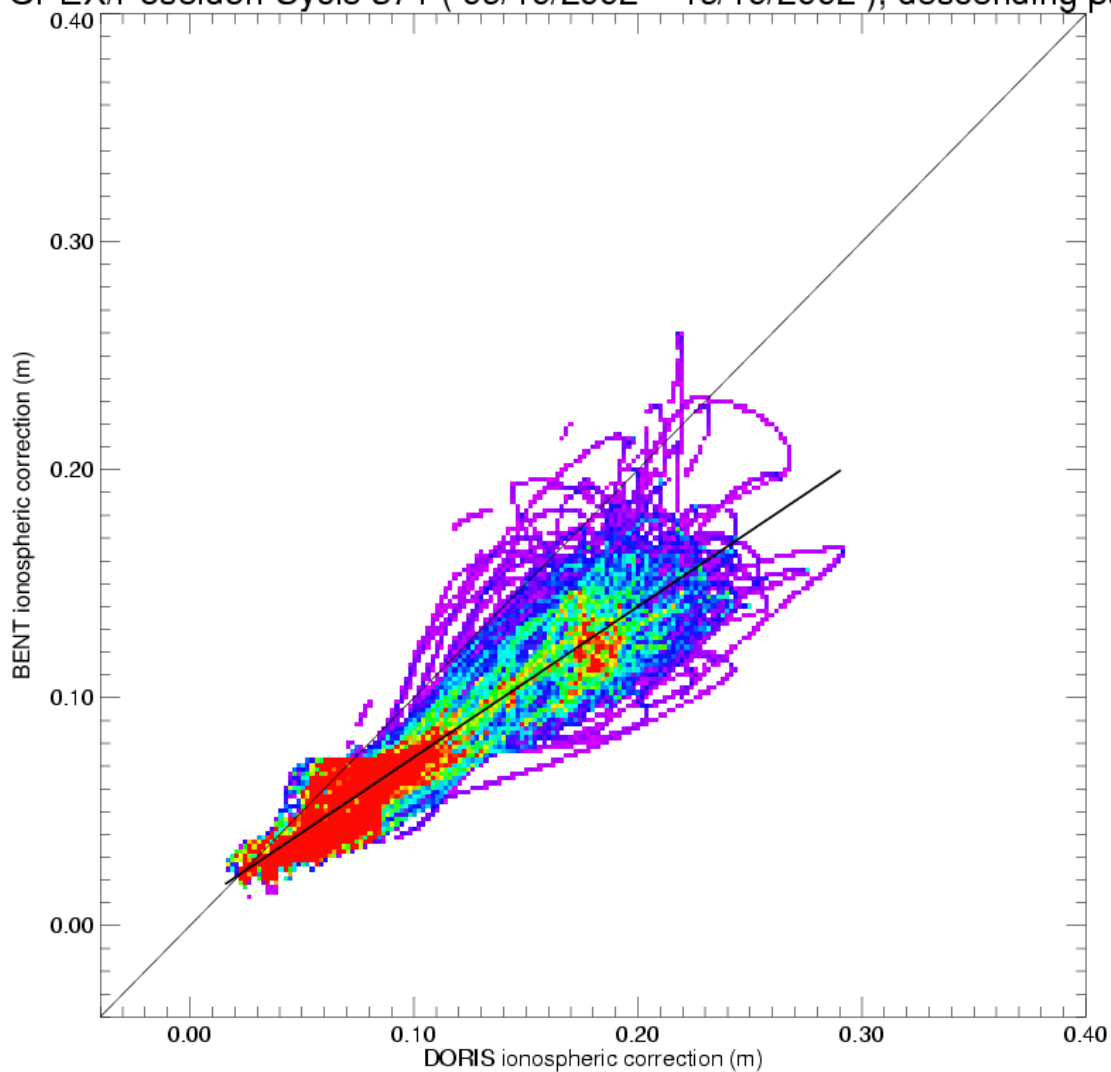
Order 1 fit polynom

$y = a x + b$
 $a = 0.43340325$
 $b = 0.00575974$

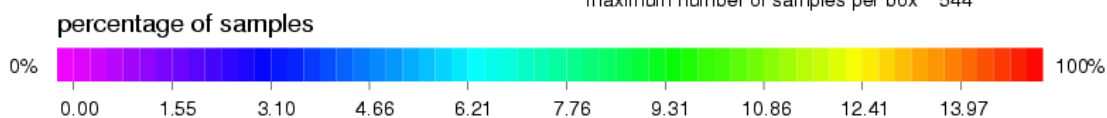
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 371 (09/10/2002 – 19/10/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 544



Statistics Y-X

mean = -0.02894
 rms = 0.03840
 std = 0.02524

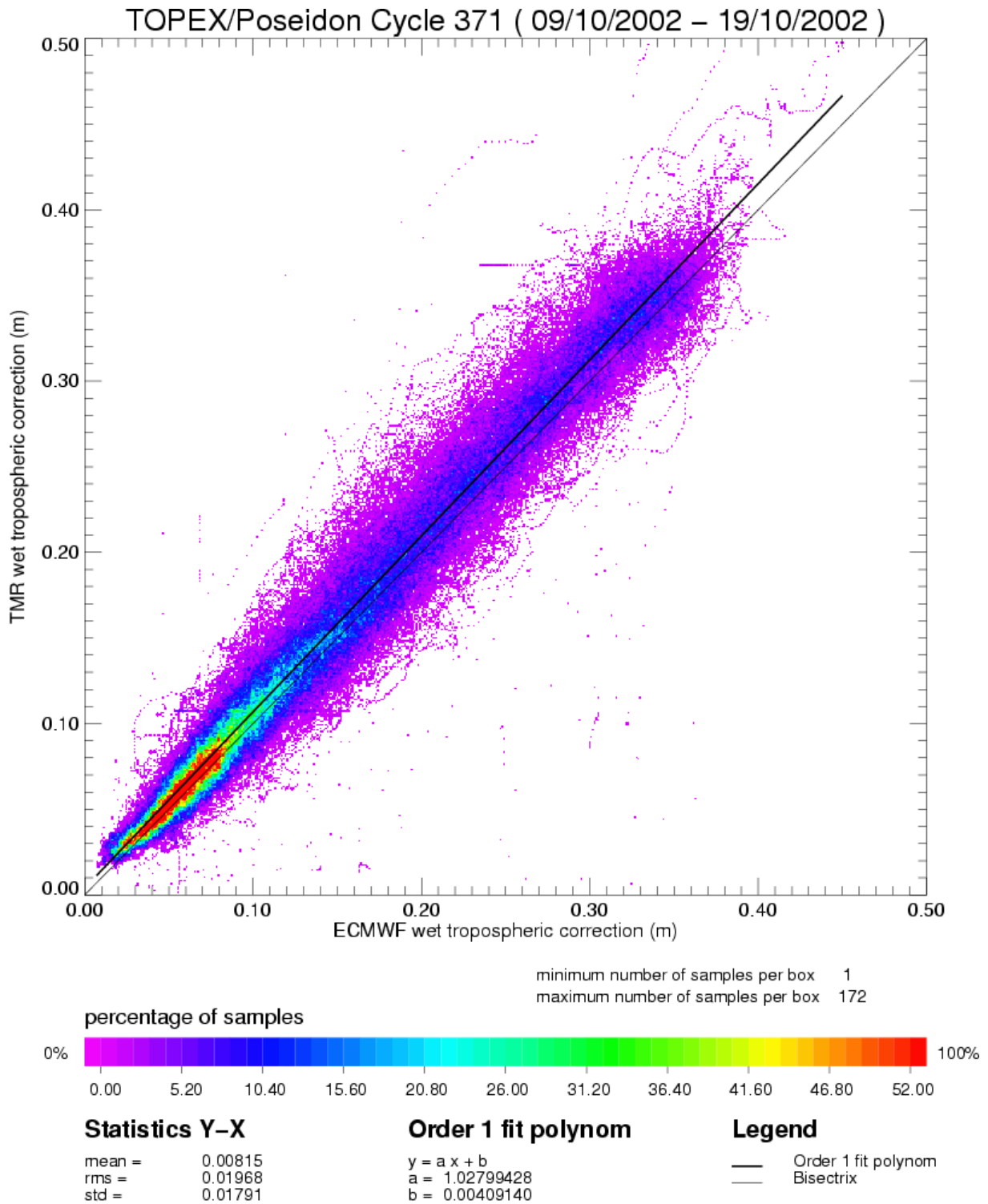
Order 1 fit polynom

$y = a x + b$
 $a = 0.66075003$
 $b = 0.00783973$

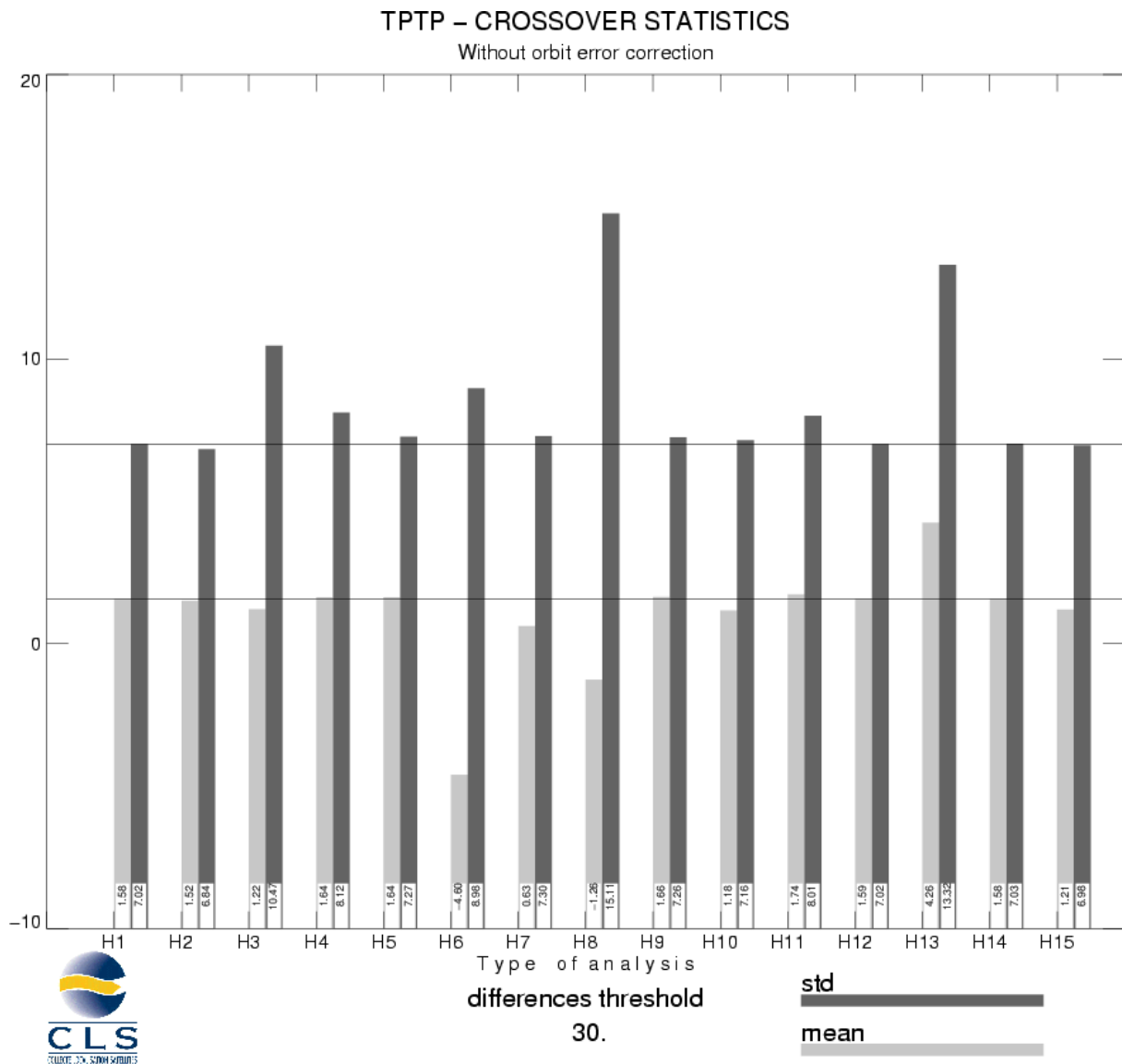
Legend

— Order 1 fit polynom
 - - - Bisectrix

3.6 Wet tropospheric correction



3.7 Crossover statistics



SSH = Corrected sea surface height	SSH with FES95 tide model instead of GOT99
SSH without dry topospheric correction	SSH with CSR3 tide model instead of GOT99
SSH without inverse barometer correction	SSH without BM4 SSB correction
SSH without wet topospheric correction	SSH with BM3 SSB correction instead of BM4 SSB correction
SSH with ECMWF tropo instead of TMR tropo	SSH without solid earth tide correction
SSH without ionospheric correction filtered	SSH without polar tide correction
SSH with DORIS iono correction instead of iono filtered	SSH = Corrected sea surface height with CNES orbit
SSH without GOT99 tide model	

TPTP – CROSSOVER STATISTICS

Without orbit error correction

SSH = Corrected sea surface height

RAPPEL DES SELECTIONS

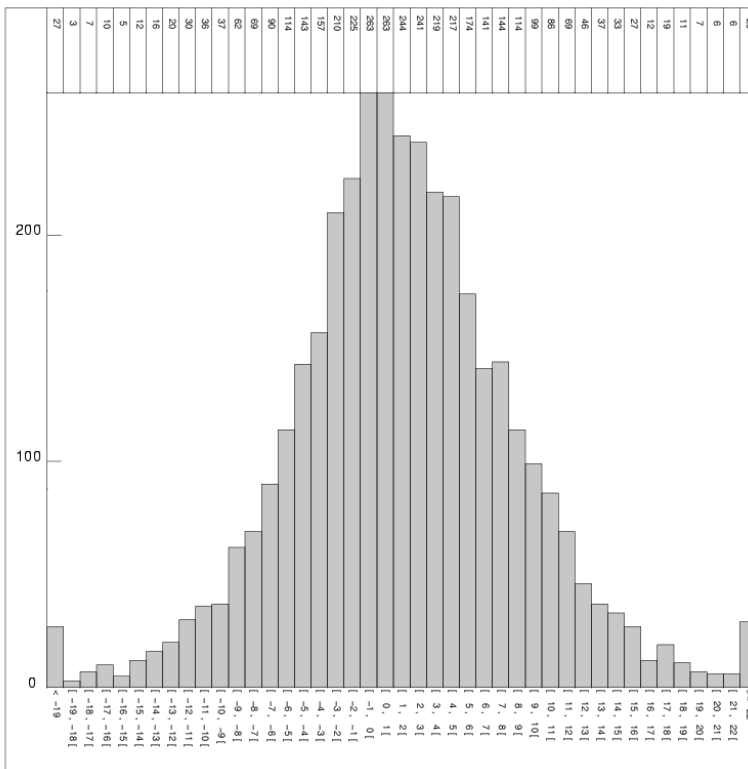
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.8600
 Valeur maximale : 29.9900
 Différence Max – Min: 59.8500
 Nombre de points lus: 3922
 Nombre de points sélectionnés: 3780
 Moyenne : 1.58208
 Ecart-type : 7.02330
 Moyenne Quadratique : 7.19928

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TPTP – CROSSOVER STATISTICS

With orbit error correction

SSH = Corrected sea surface height

RAPPEL DES SELECTIONS

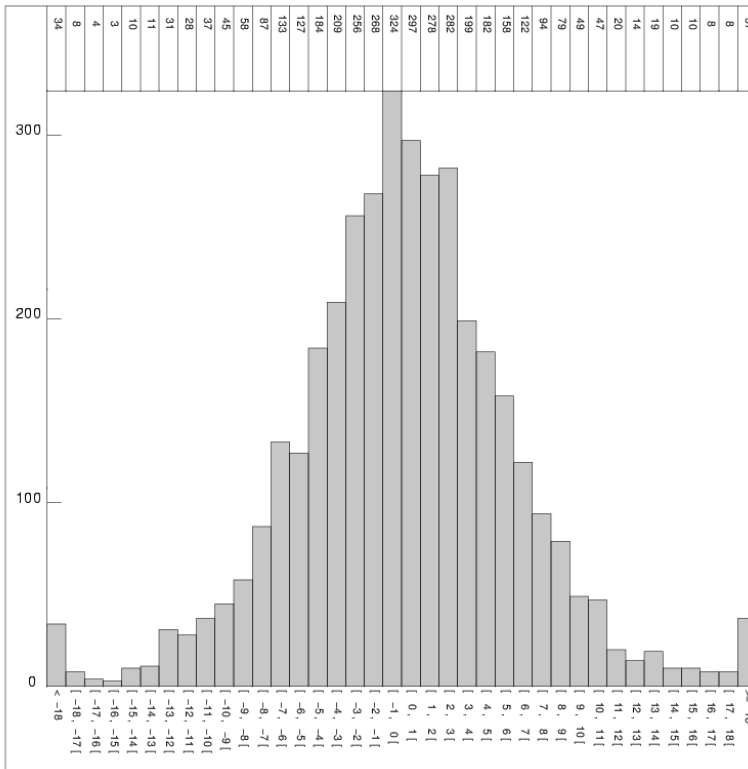
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.5100
 Valeur maximale : 28.8900
 Différence Max – Min: 58.4000
 Nombre de points lus: 3922
 Nombre de points sélectionnés: 3770
 Moyenne : 0.121244
 Ecart-type : 6.25519
 Moyenne Quadratique : 6.25636

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TPTP – CROSSOVER STATISTICS
SSH, BATHY < -1000 m, VAR_OCE < 20 cm, LAT [-50°, +50]
SSH = Corrected sea surface height before orbit error

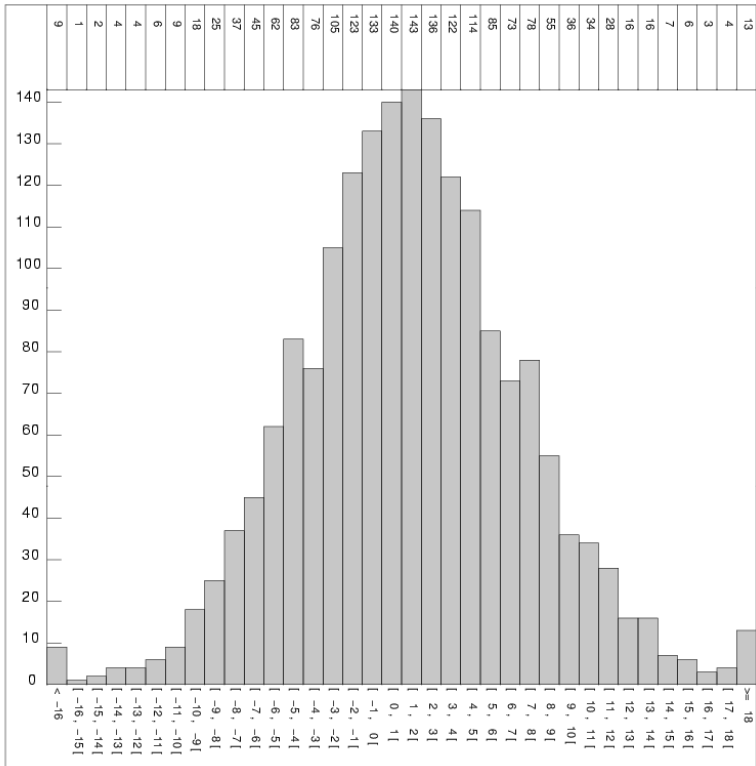
RAPPEL DES SELECTIONS

Type de points de croisement: TPTP
 Zone géographique (deg): -50 / 50 , 0 / 360
 Seuil sur les écarts d'analyse : aucun
 Selection(s) sur les champs :
 CL Arc 1 : =BATHY
 CL Arc 2 : =BATHY
 Seuil Min : aucun
 Seuil Max : -100000.00
 CL Arc 1 : =VAR_OCE
 CL Arc 2 : =VAR_OCE
 Seuil Min : aucun
 Seuil Max : 20.000000
 [...]
 Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.7200
 Valeur maximale : 30.6100
 Différence Max – Min: 60.3300
 Nombre de points lus: 2042
 Nombre de points selectionnes: 1851
 Moyenne : 1.43366
 Ecart-type : 5.82216
 Moyenne Quadratique : 5.99607

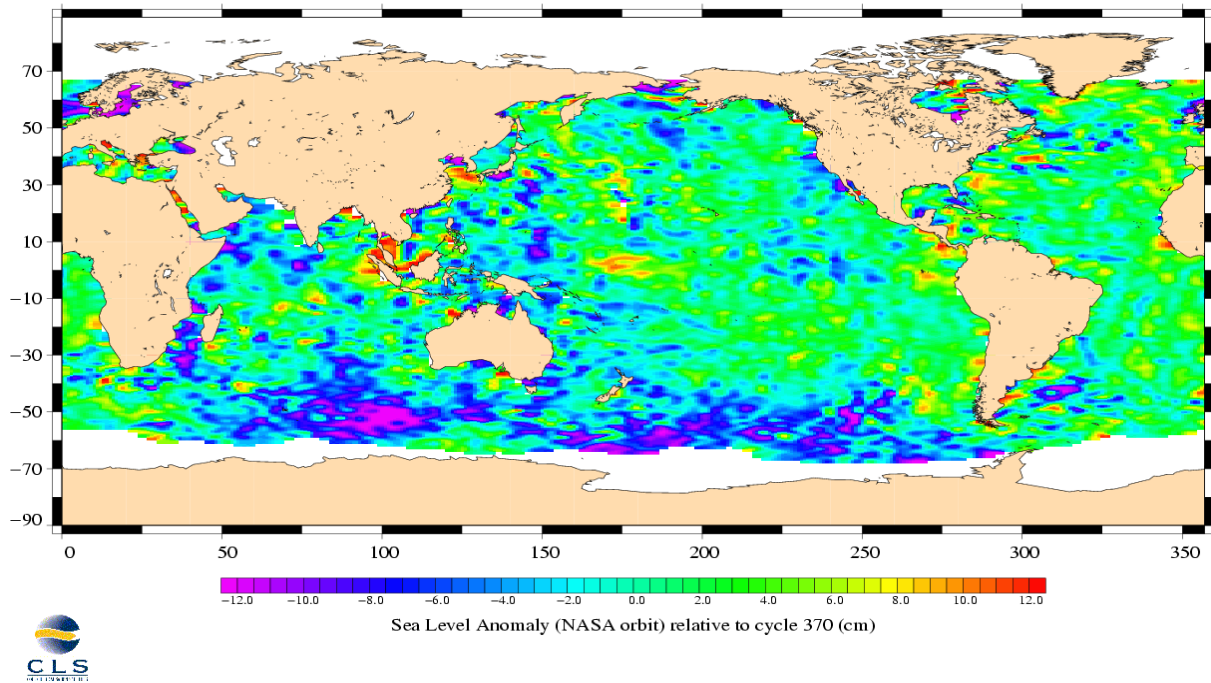
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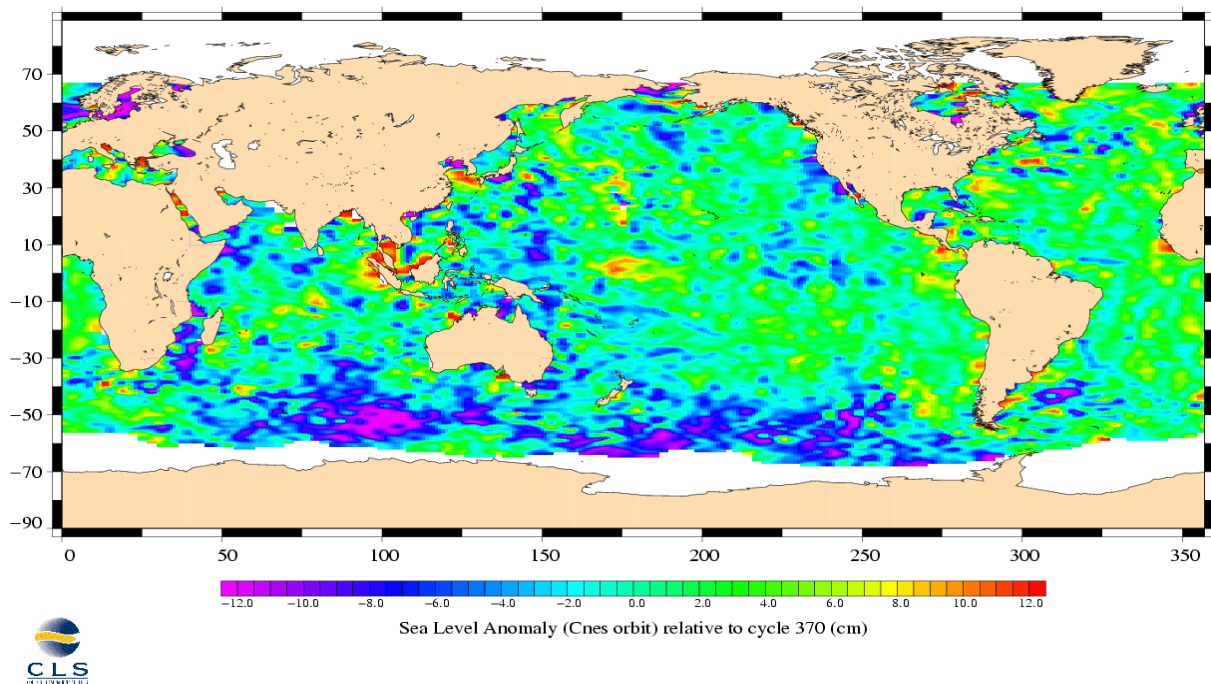
3.8 SSH variability

3.8.1 Sea Level Anomaly

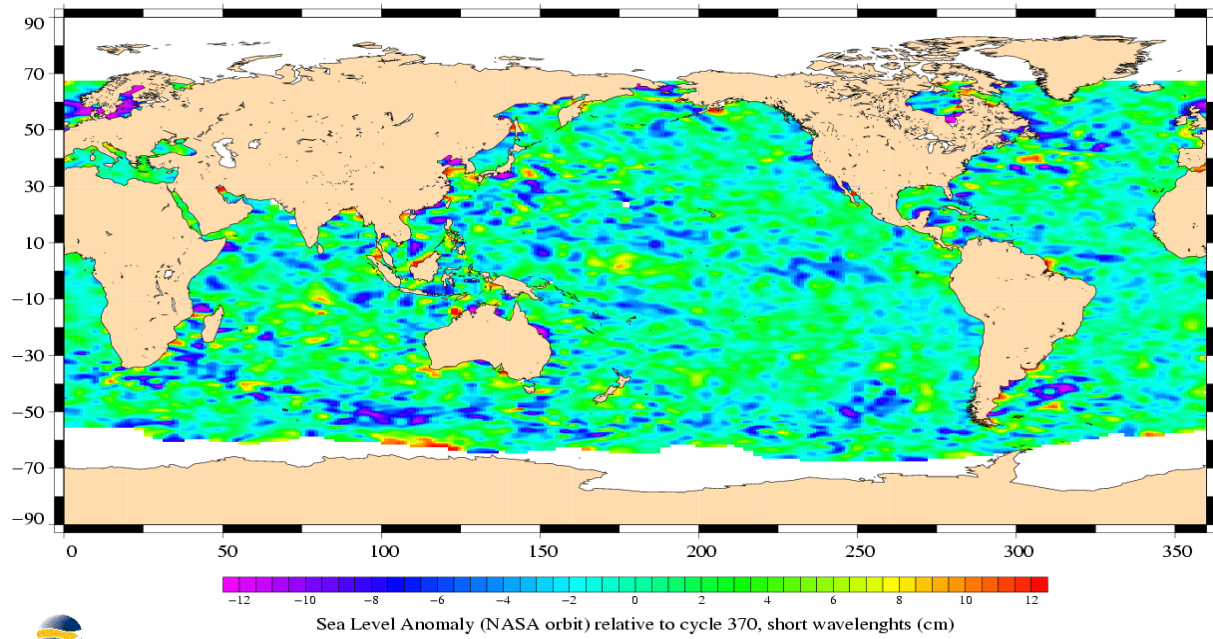
TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002



TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002



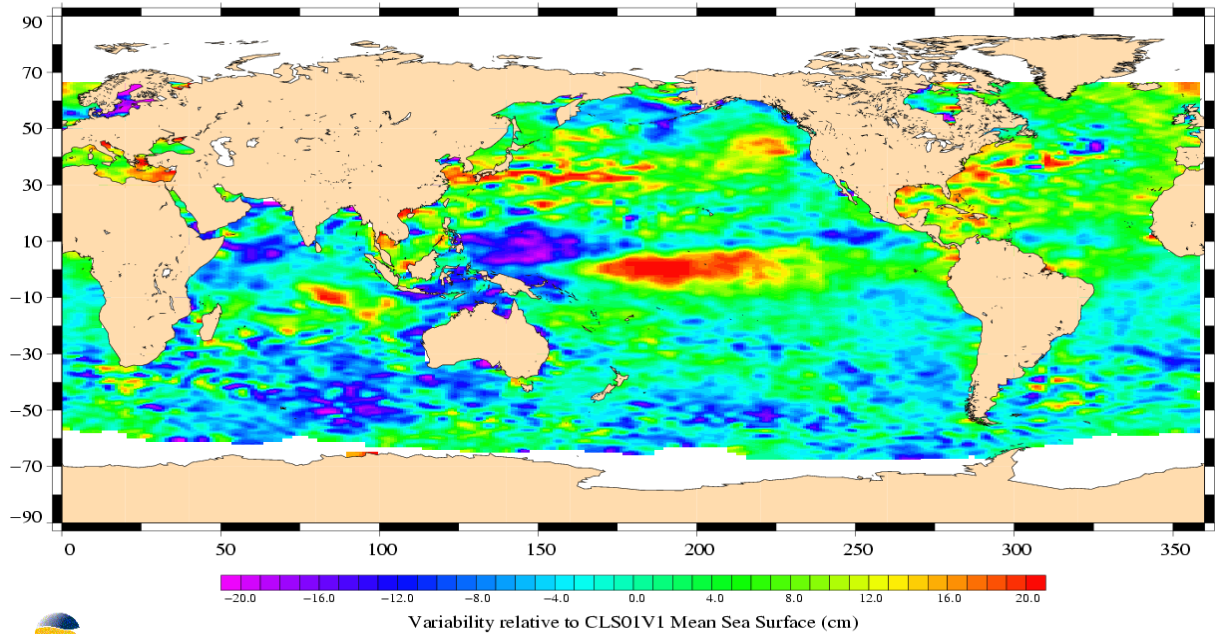
TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002



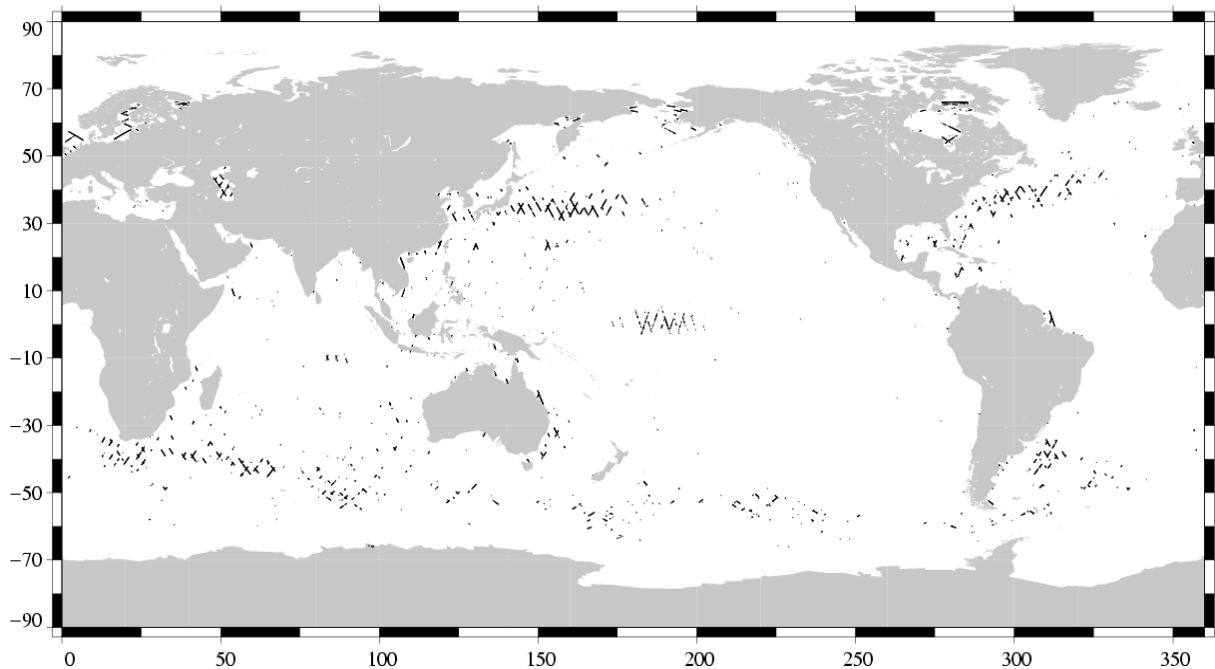
3.8.2 Comparison to a precise Mean Sea Surface

The CLS (2001) MSS model is used as a reference to compute SLA. The two following maps respectively show the map of Topex SLA relative to the MSS and differences higher than a 30 cm threshold (after centering the data). The latter figure shows that higher differences are located in high ocean variability areas, as expected.

TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002

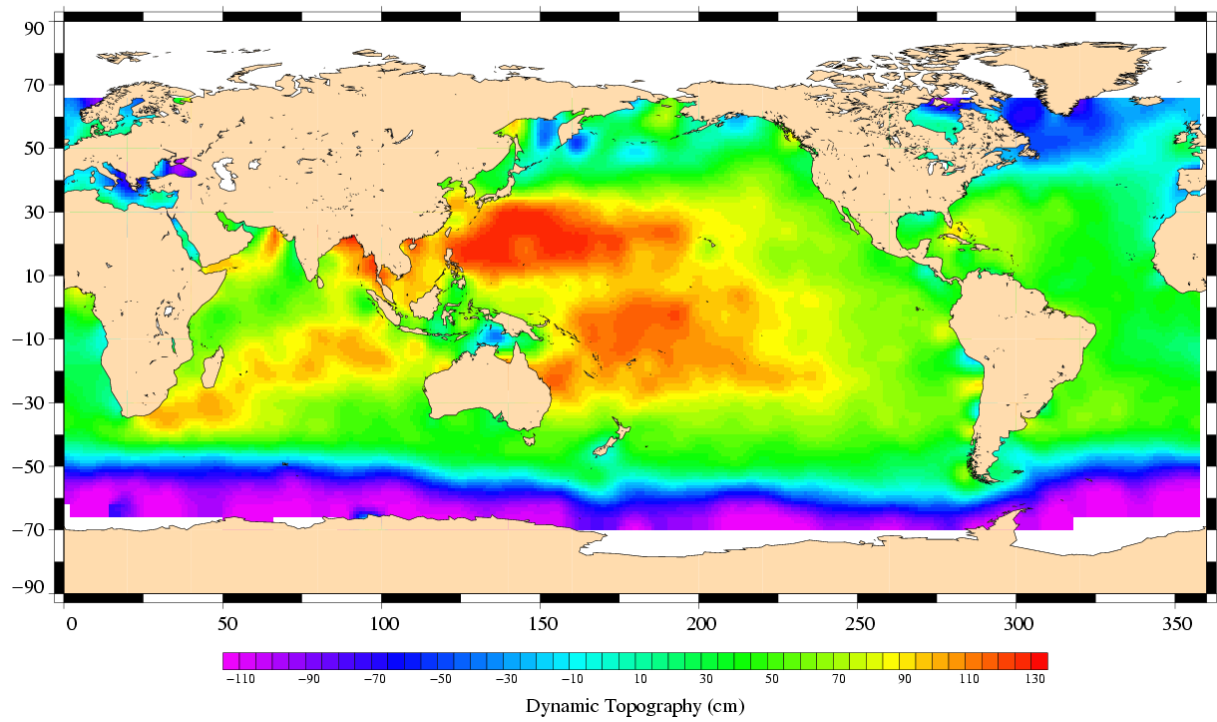


(SSH – MSS) differences greater than 0.3 m
TOPEX/Poseidon Cycle 371 (09/10/2002 / 19/10/2002)



3.9 Dynamic topography

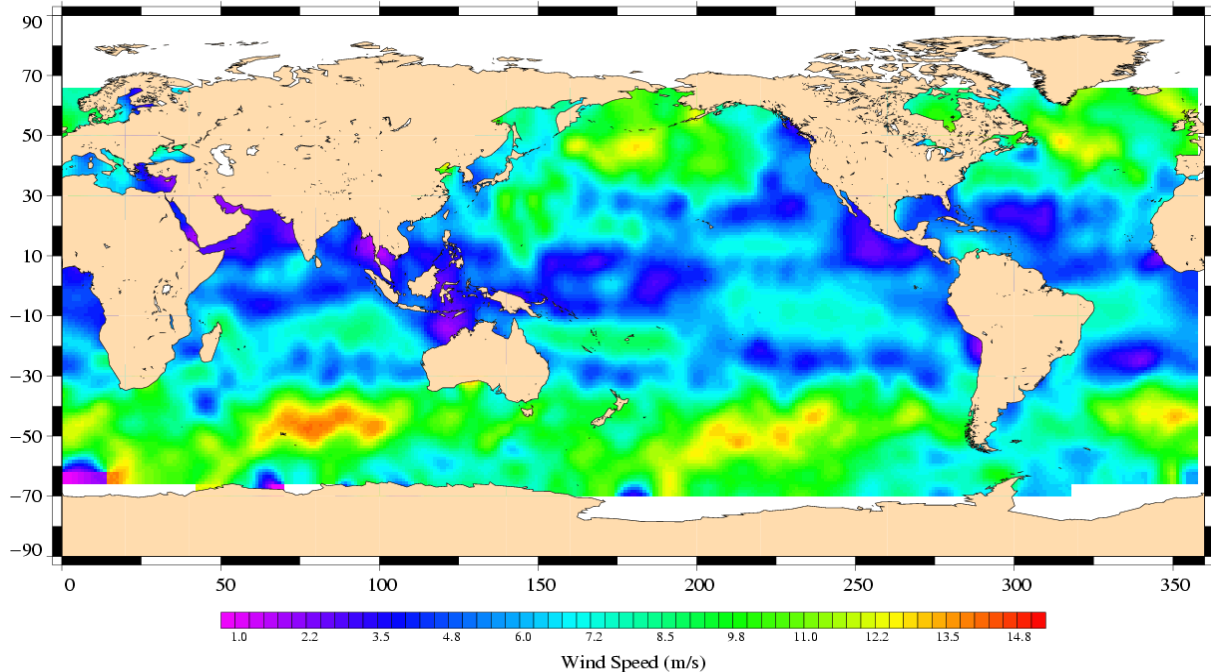
TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002



3.10 Wind and wave maps

These two figures show wind and wave estimations derived from 10 days of altimeter measurements.

TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002



TOPEX/Poseidon, cycle 371
Period : 09/10/2002 – 19/10/2002

