



TOPEX/Poseidon MGRD Quality Assessment Report

Cycle 366

23-08-2002 31-08-2002

Prepared by :	C. Schgounn, CLS G. Pontonnier, CLS M. Ablain, CLS	
Accepted by :	J. Dorandeu, CLS	
Quality visa :	M. Destouesse, CLS	
Approved by :	N. Picot, CNES	



SALP-RP-P2-EX-21120-CLS366

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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

The crossover standard deviation is 6.14 cm rms, and the standard deviation of Sea Level Anomalies (SLA) relative to a Mean Sea Surface is 9.46 cm.

Compared to the whole TOPEX/Poseidon data set, these values are low. This may be explained by a lower number of crossovers due to tape recorder problems.

2.2 Warnings and recommendations

- Starting on August 15, a six-maneuver sequence was conducted over a period of about 30 days to move T/P to the new Tandem Mission orbit on the new ground track at one half the TOPEX/Jason track spacing to the West of Jason :
 - Cycle 365 - pass 110 was the last regular TOPEX pass
 - Cycle 368 - pass 172 and later are on the final fixed tandem mission ground track

No nominal track is available during this period. Thus the maps of the missing 1Hz measurements and the sea level anomaly are not present in this report.

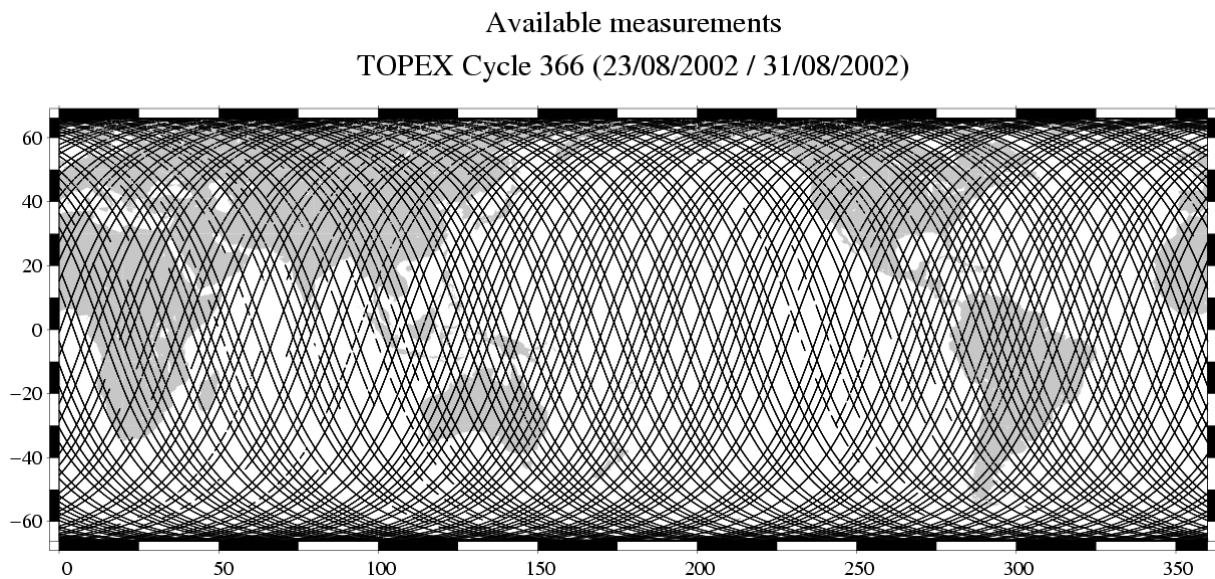
- TOPEX/Poseidon Tandem Mission Orbit Maneuvers : The third maneuver of this orbit transfer campaign occurs on Friday morning, 23 August.
- Missing measurements :
Passes 1 to 61 are excluded due to NASA latitude and longitude locations not available.
Pass 93 is missing due to a tape recorder problem.
- Editing measurements :
Problems in the interpolation of the TMR parameters occur when there are missing measurements (tape recorder failures). As a result some passes (61 to 119) are partially 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

543155 altimeter measurements are present. It is not possible to compute the missing 1Hz measurements map through cycles 365-368 because the satellite is not on a repeat cycle orbit. The following map shows all the available measurements for cycle 366 and illustrates the tape recorder problems.



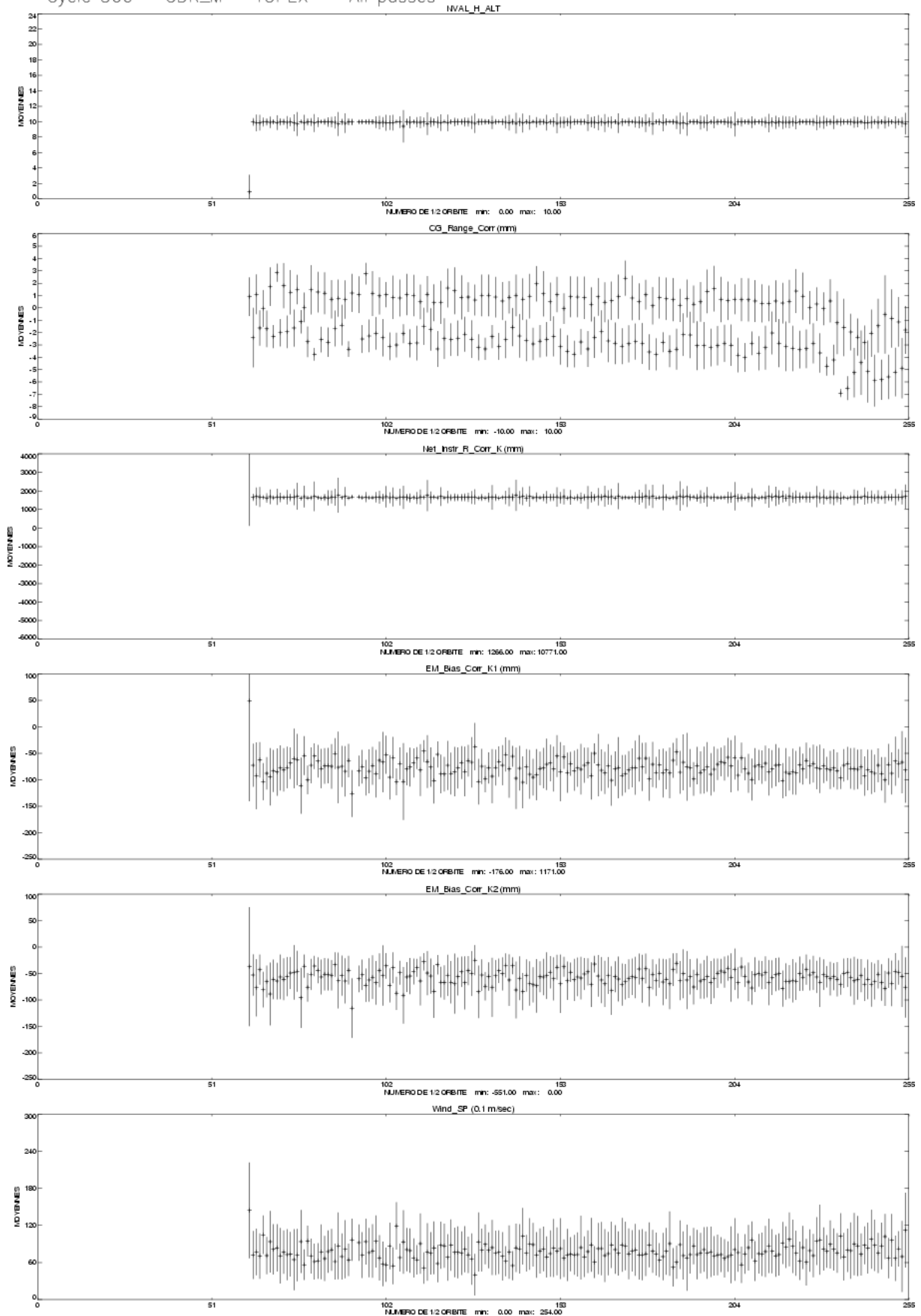
3.2 M-GDR quality flags

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

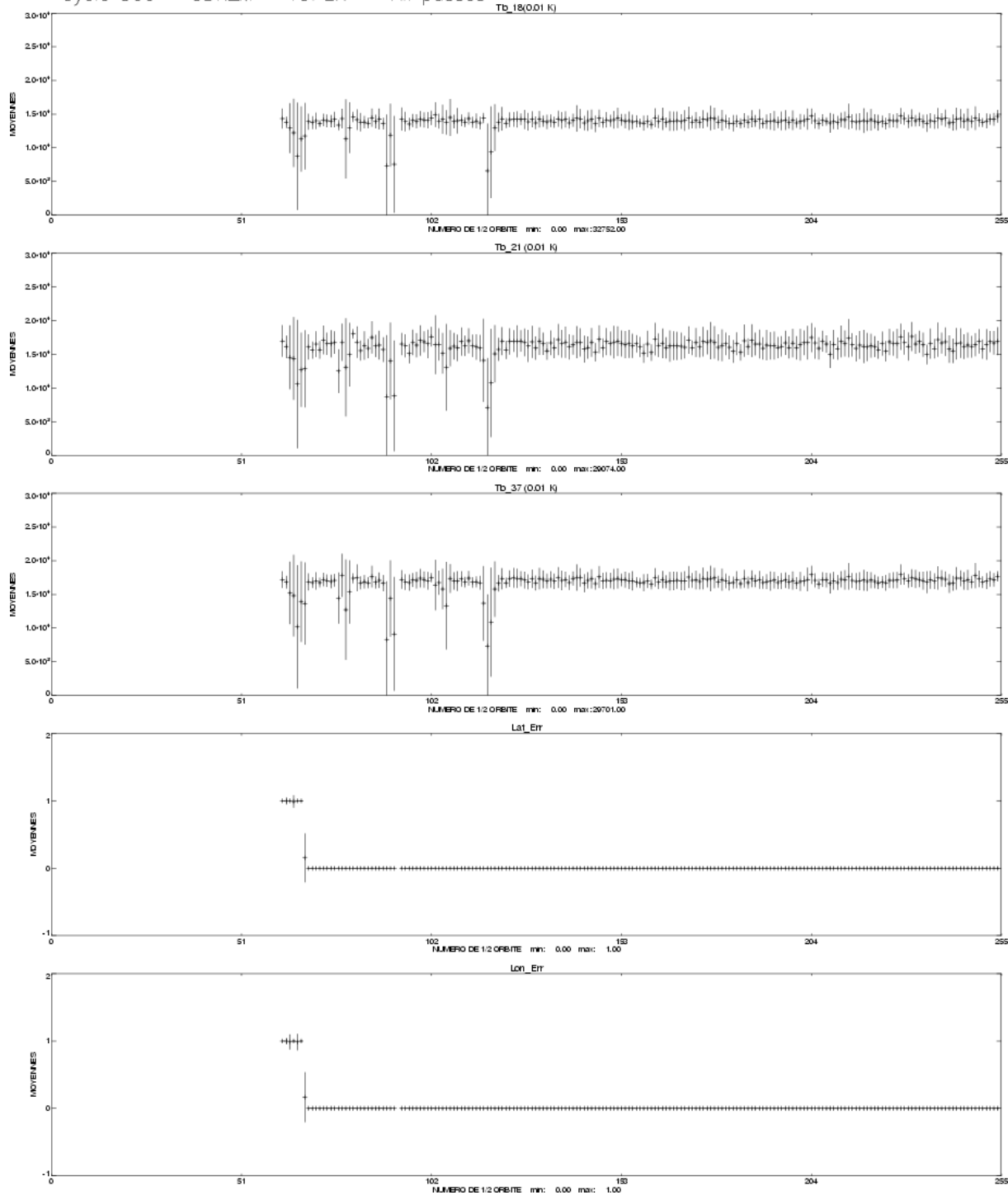
Name	Description	% bad
Geo_Bad_1	altimeter land flag	26.05
Geo_Bad_1	ice flag	9.00
Geo_Bad_1	radiometer land flag	27.81
Alt_Bad_1	conditions 1 altimeter	5.34
Alt_Bad_2	conditions 2 altimeter	5.18
Geo_Bad_2	rain (liquid water in excess)	4.87
Geo_Bad_2	less than 4 points for CSR3.0 tide calculation	0.46
Geo_Bad_2	less than 4 points for FES95.2.1 tide calculation	3.26
TOPEX	TOPEX not valid	0.00
TMR	TMR not valid	0.00
TMR_Bad	Brightness temperatures not valid	2.37
DORIS	DORIS not valid	0.00

3.3 M-GDR parameter plots

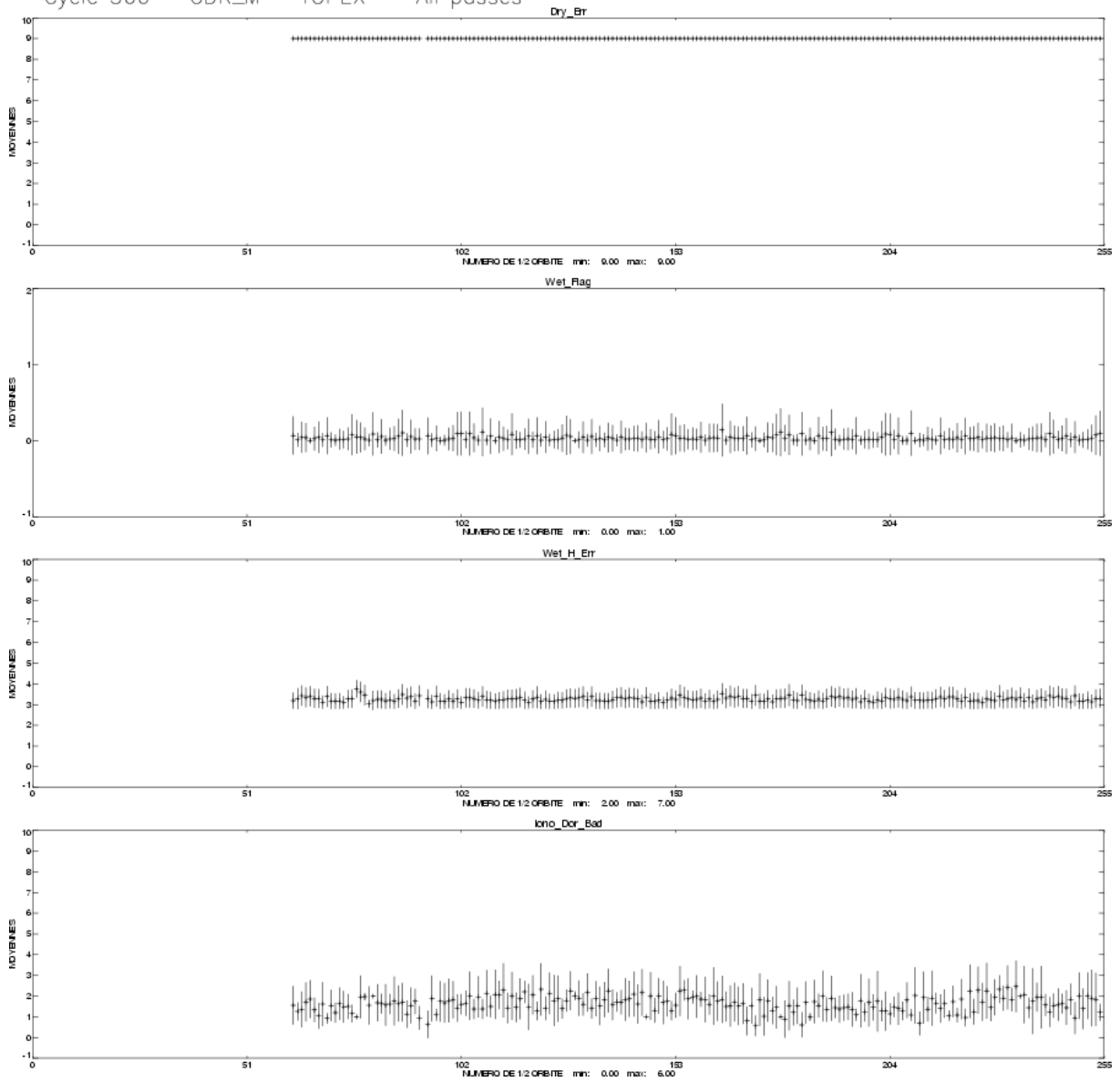
Cycle 366 – GDR_M – TOPEX – All passes –



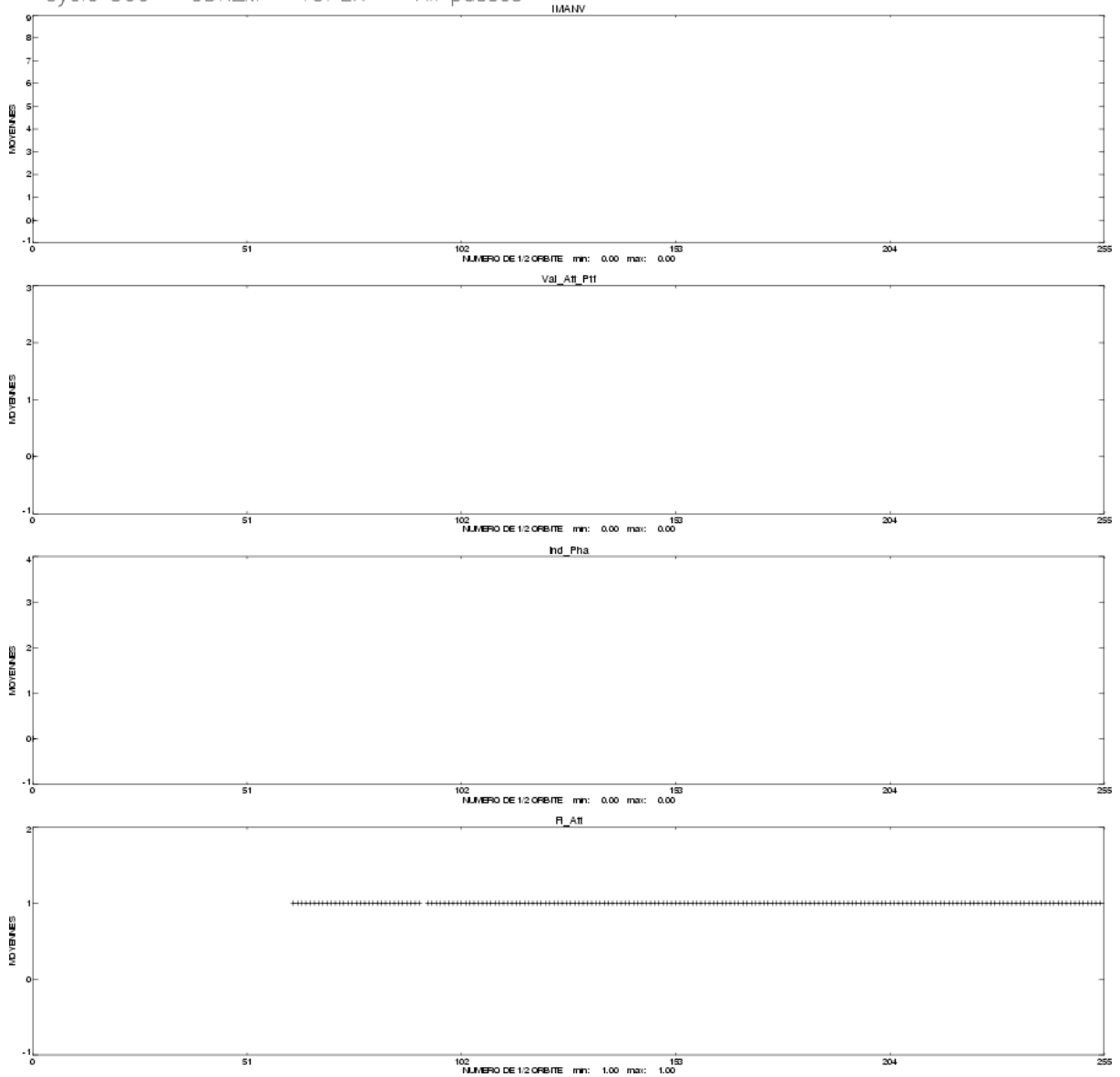
Cycle 366 – GDR_M – TOPEX – All passes –

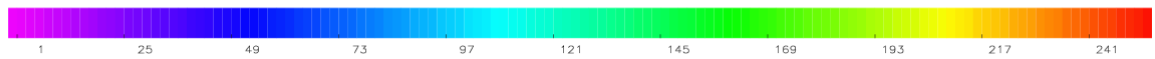
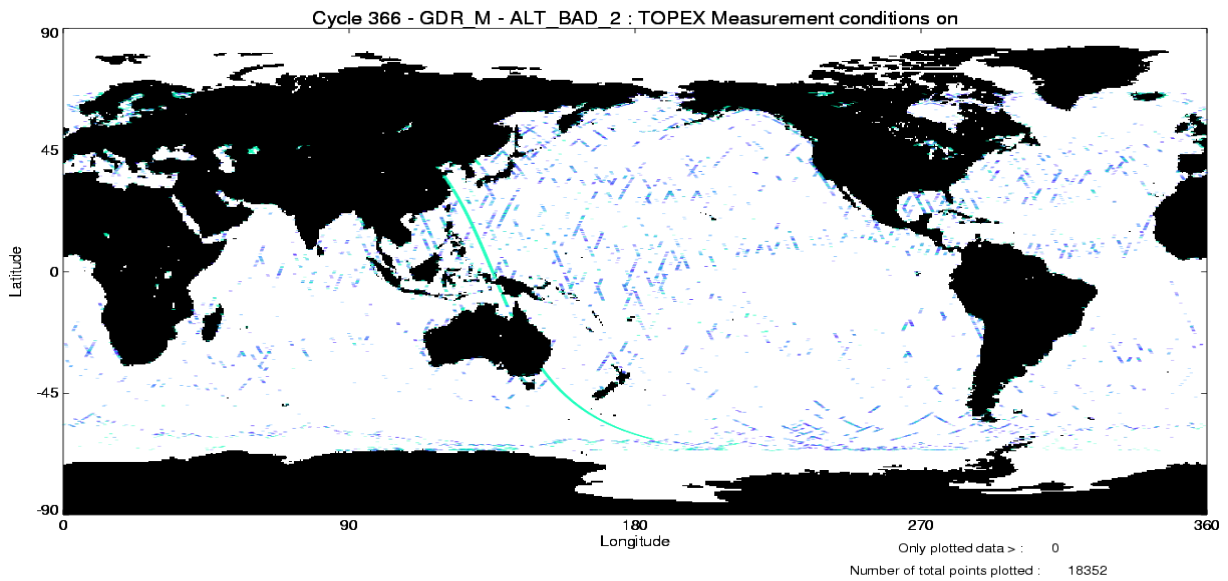
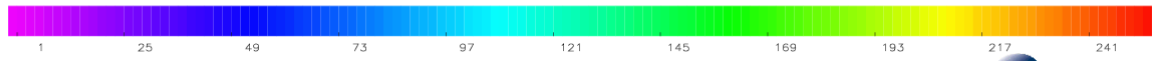
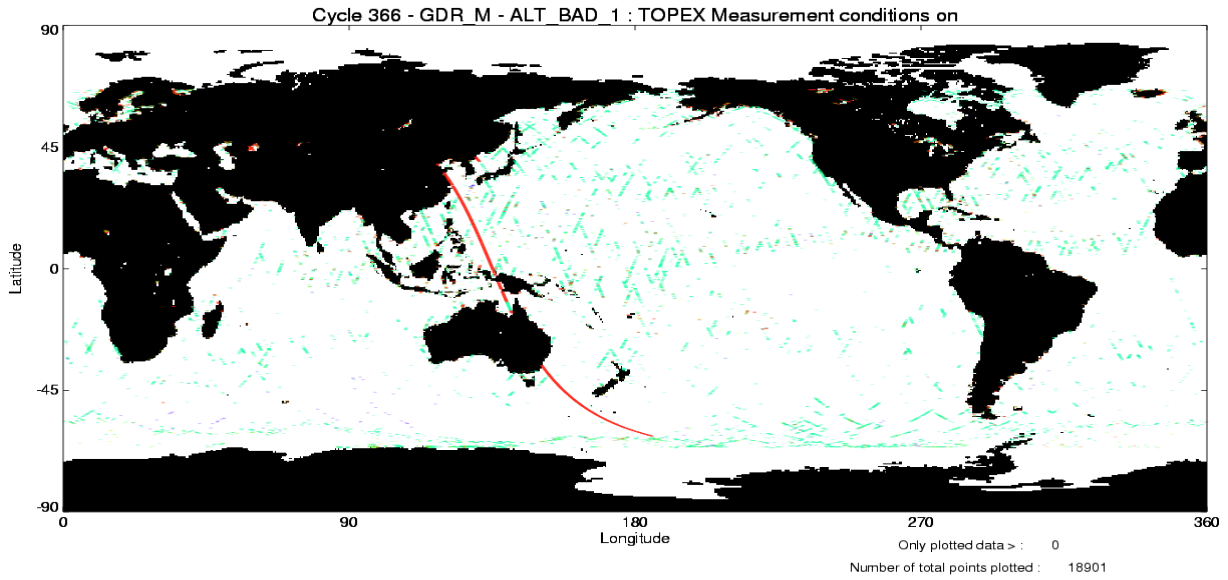


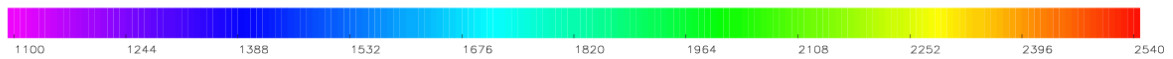
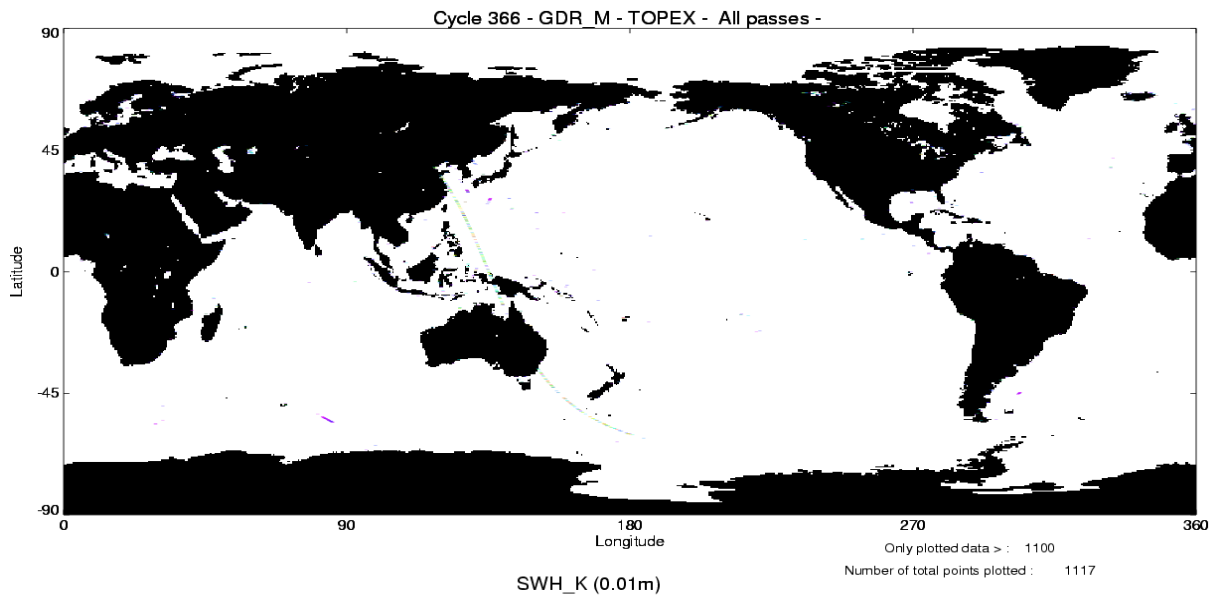
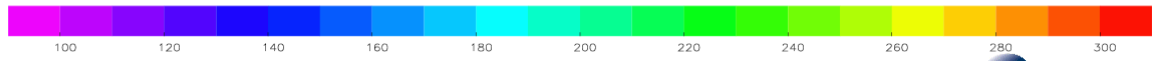
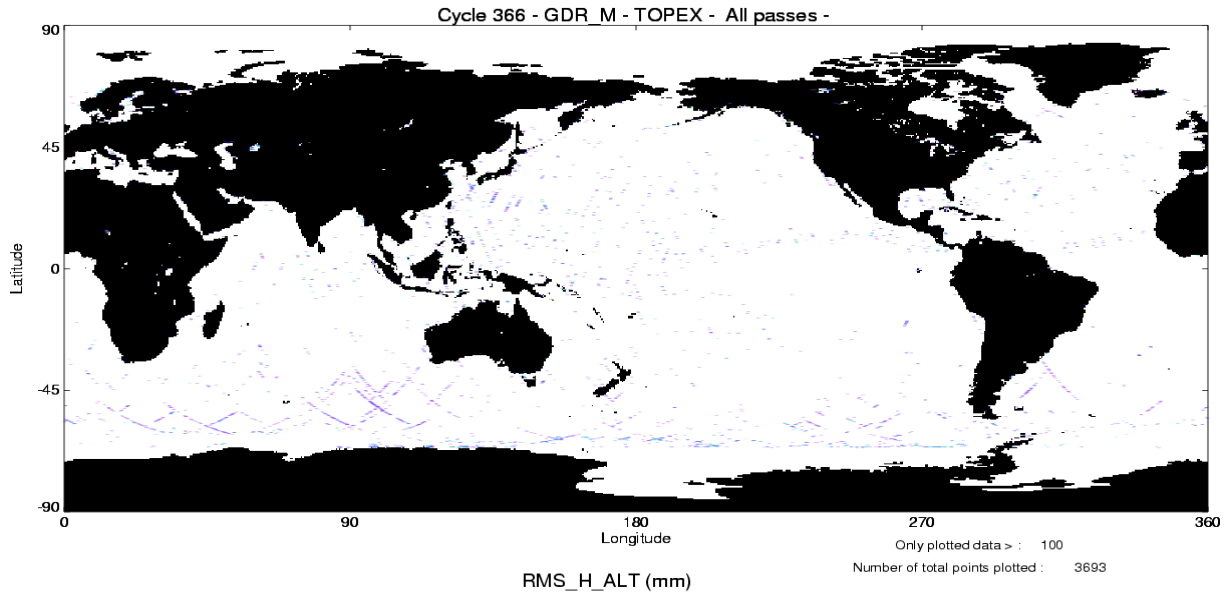
Cycle 366 – GDR_M – TOPEX – All passes –

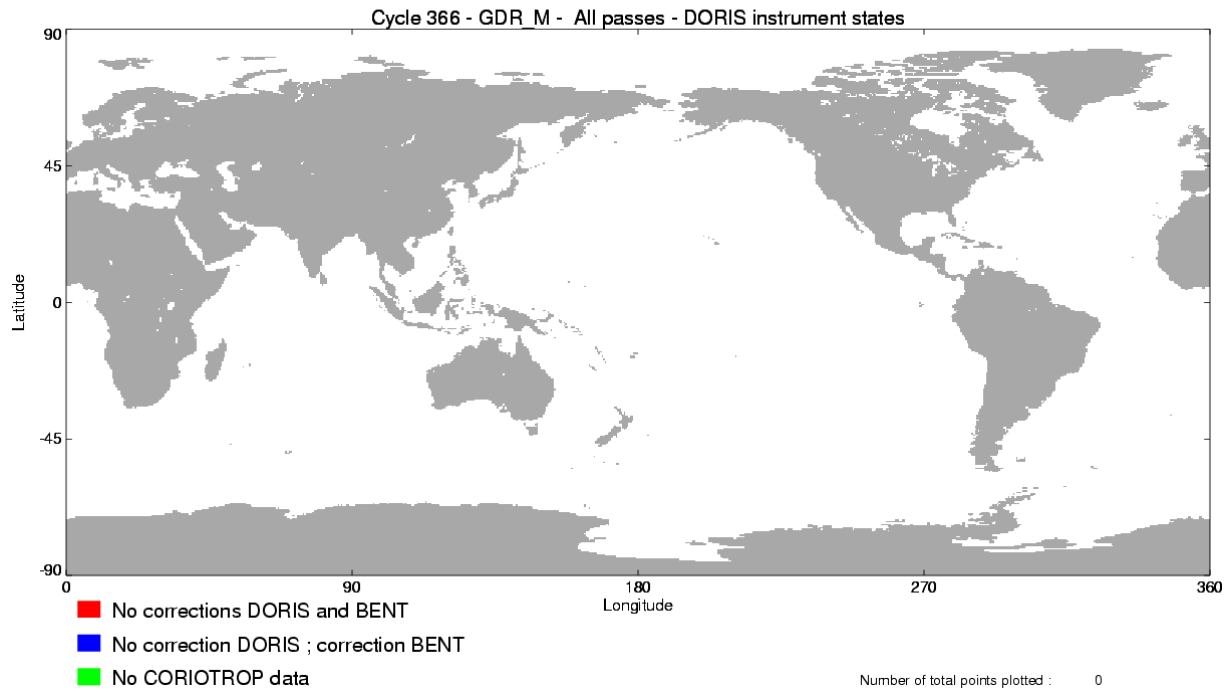


Cycle 366 – GDR_M – TOPEX – All passes –









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.

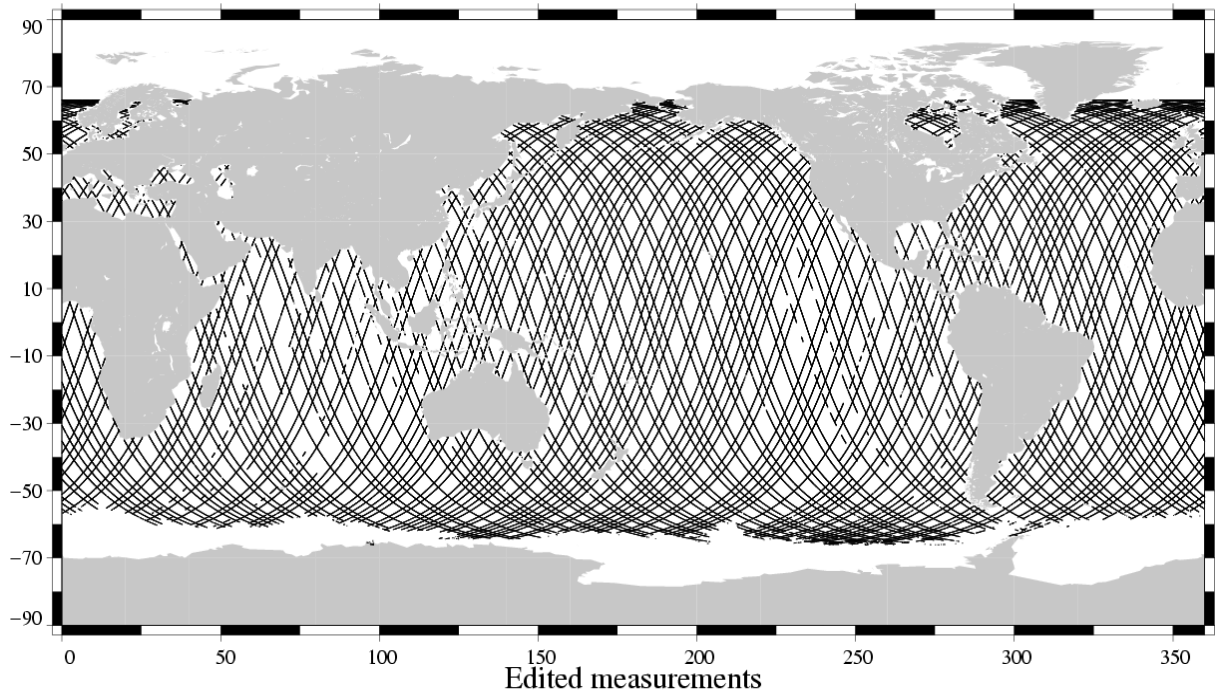
Parameters	Min Thres.	Max Thres.	Unit	Mean % removed in 1997	% removed
Sea surface height	-130.000	100.000	m	1.37	0.91
Number of 20/10Hz valid points Poseidon/TOPEX	5.000	-		1.37	1.08
Std. deviation of range	0.000	0.100	m	1.85	1.92
Off nadir angle from waveform	0.000	0.400	deg	1.36	4.07
Dry tropospheric 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	2.55
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	0.38
Sea state Bias	-0.500	0.000	m	1.39	0.88
Backscatter coefficient	7.000	30.000	dB	1.44	0.86
Ocean tide height	-5.000	5.000	m	0.01	0.64
Earth tide	-1.000	1.000	m	0.00	0.00
Pole tide	-15.000	15.000	m	0.00	0.00
Spline fitting					0.01

The following two maps are complementary: they show respectively the removed and the selected measurements in the editing procedure.

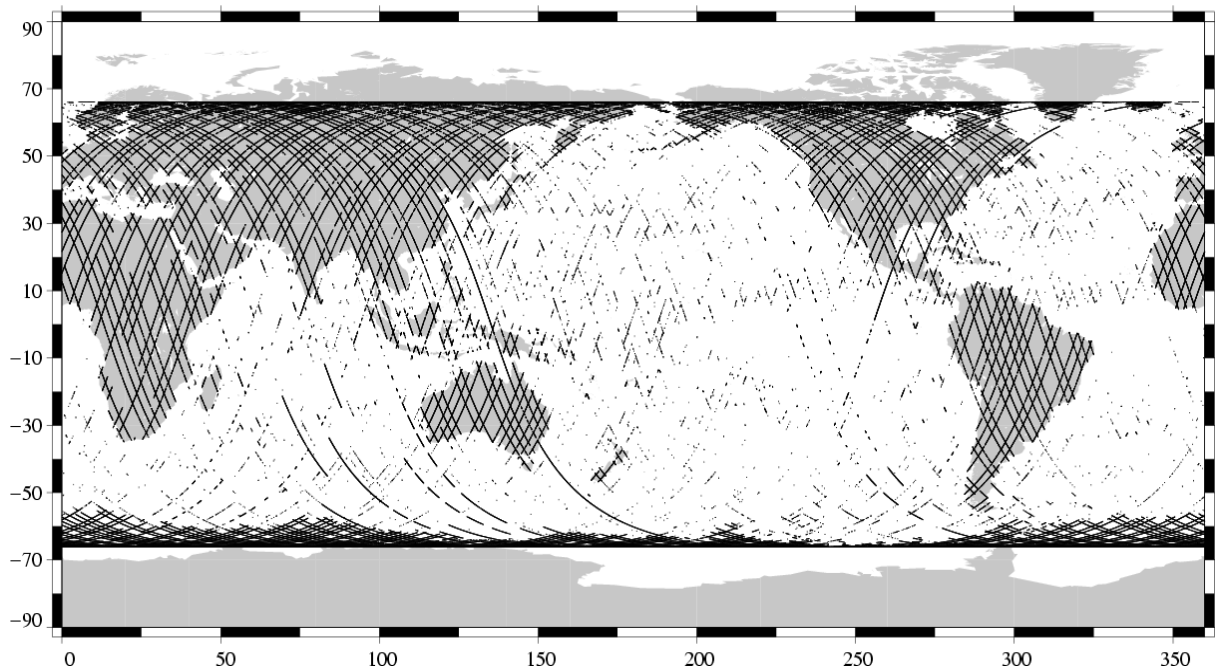
From cycle 365 to 368, the orbit is not on a repeat ground track. Thus it is not possible to use a nominal pass to compute the percentage of available measurements relative to the theory.

Valid data

TOPEX/Poseidon Cycle 366 (23/08/2002 / 31/08/2002)

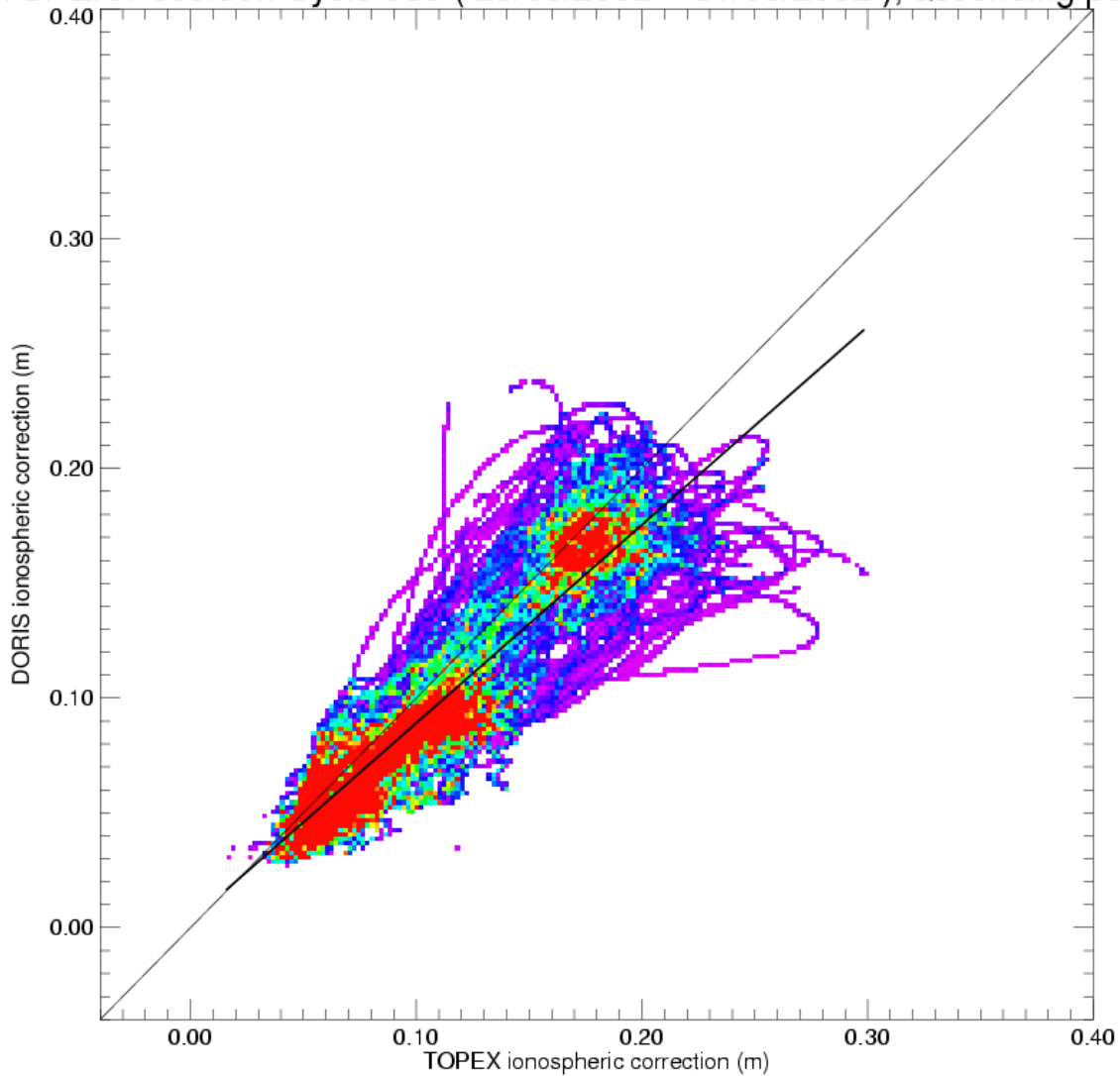


TOPEX Cycle 366 (23/08/2002 / 31/08/2002)

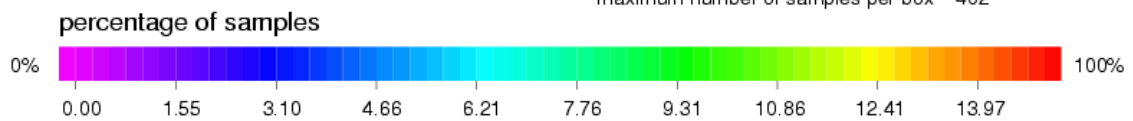


3.5 Ionospheric correction

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), ascending passes



minimum number of samples per box 1
maximum number of samples per box 402



Statistics Y-X

mean = -0.01270
rms = 0.02488
std = 0.02139

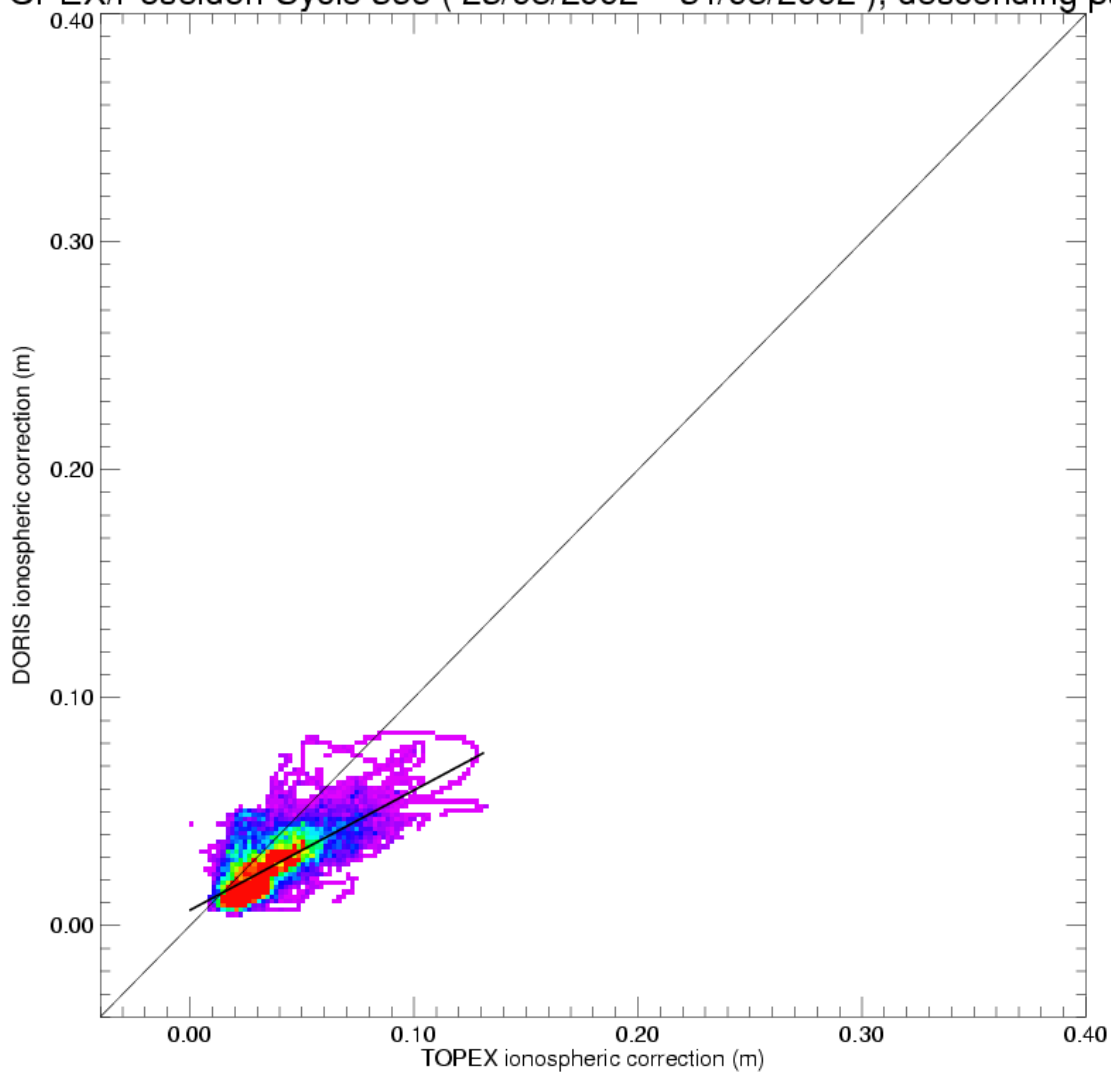
Order 1 fit polynomial

$y = a x + b$
a = 0.86355990
b = 0.00277554

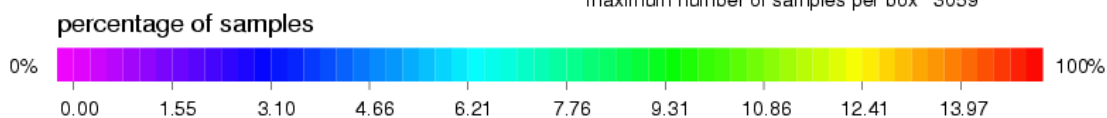
Legend

— Order 1 fit polynomial
— Bisectrix

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 3059



Statistics Y-X

mean = -0.00944
 rms = 0.01512
 std = 0.01181

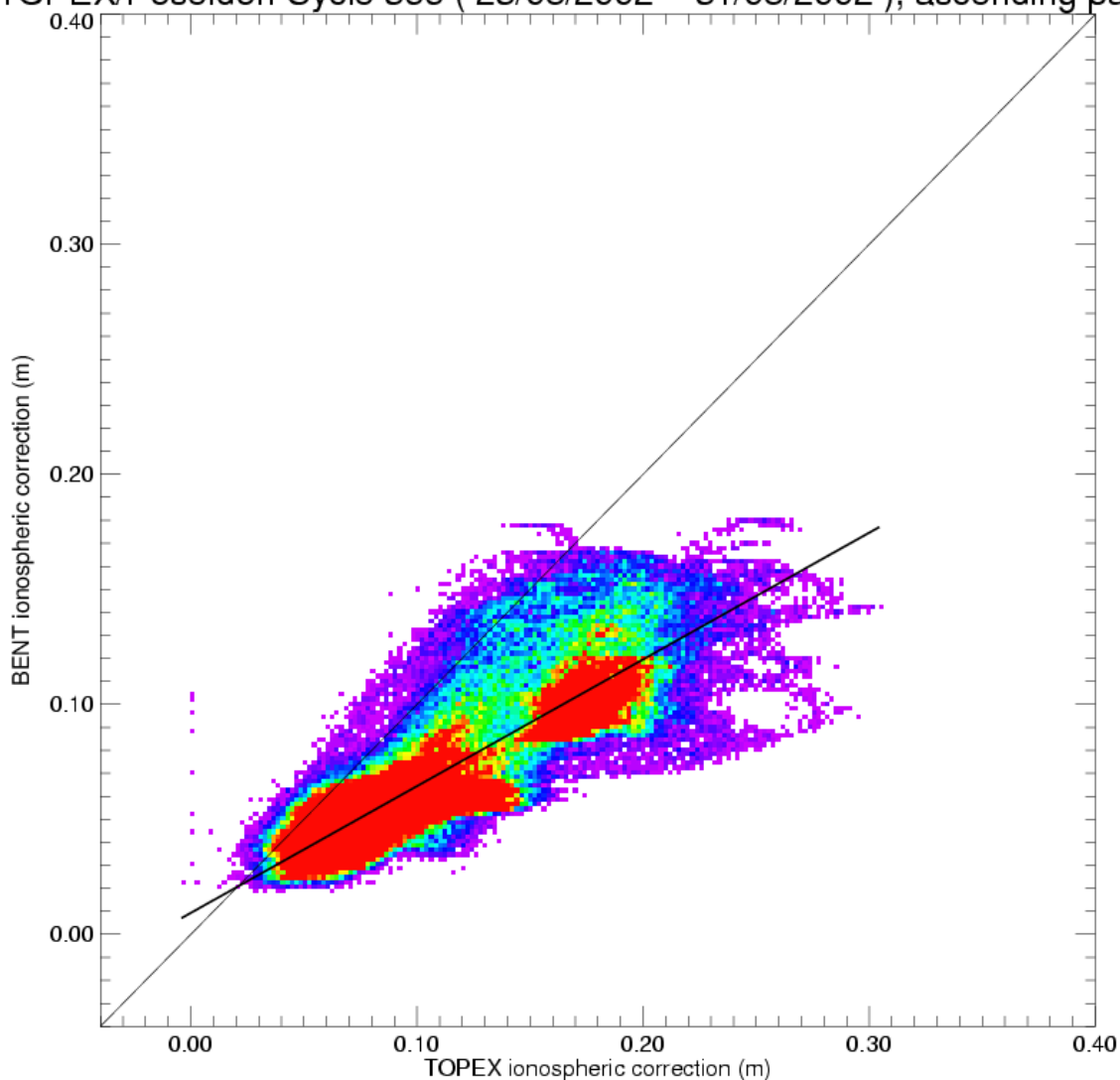
Order 1 fit polynom

$y = a x + b$
 $a = 0.52616578$
 $b = 0.00679351$

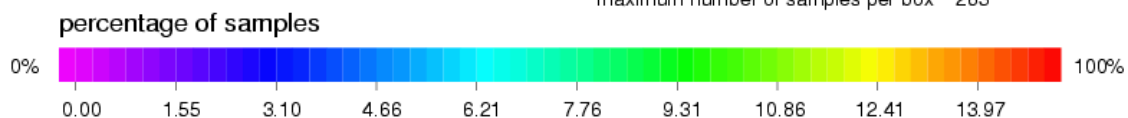
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 263



Statistics Y-X

mean = -0.04178
 rms = 0.05044
 std = 0.02826

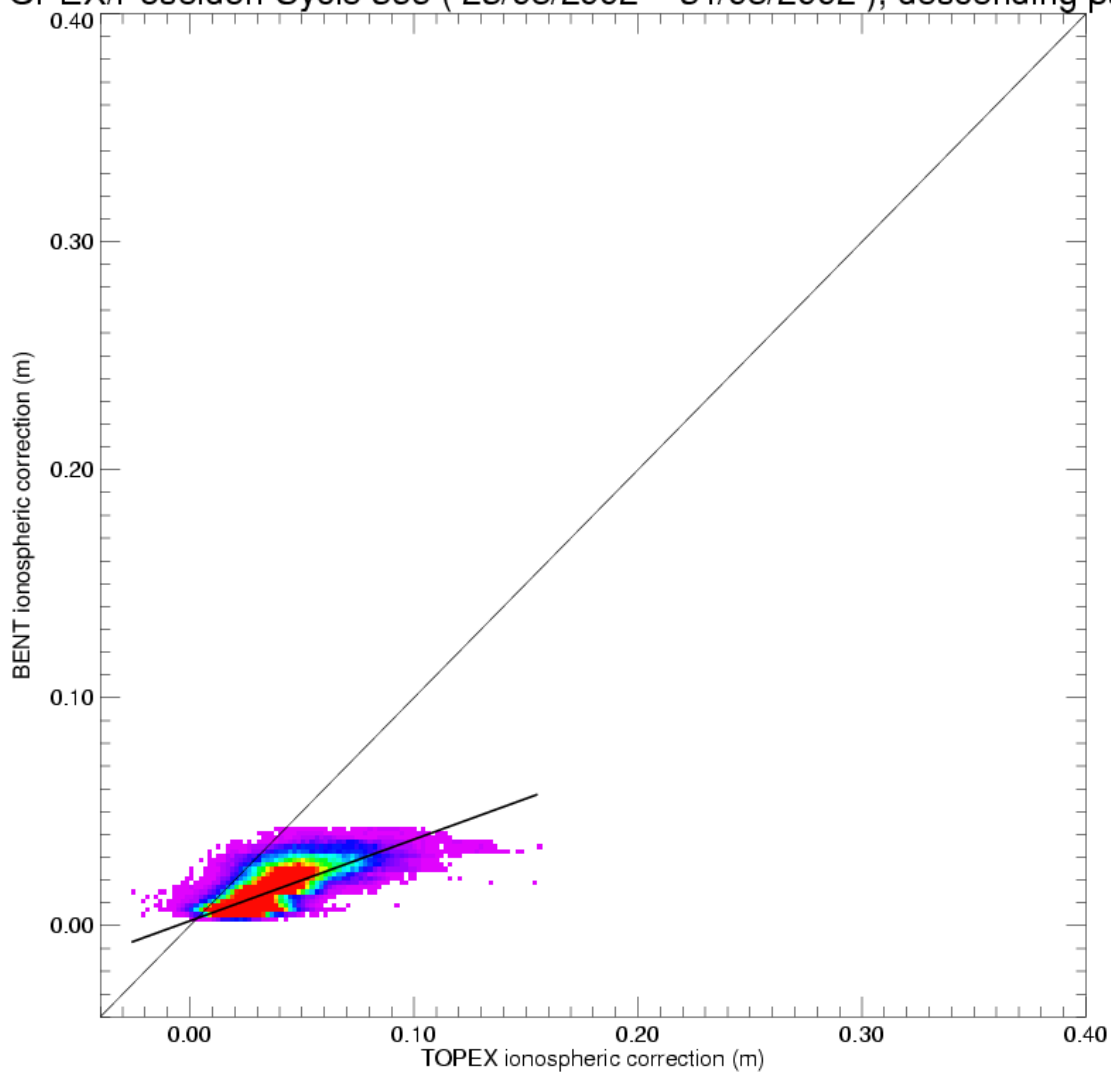
Order 1 fit polynom

$y = a x + b$
 $a = 0.55102319$
 $b = 0.00933614$

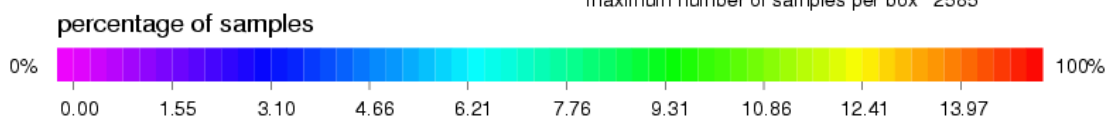
Legend

— Order 1 fit polynom
 - - - Bisectrix

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 2585



Statistics Y-X

mean = -0.02024
 rms = 0.02386
 std = 0.01263

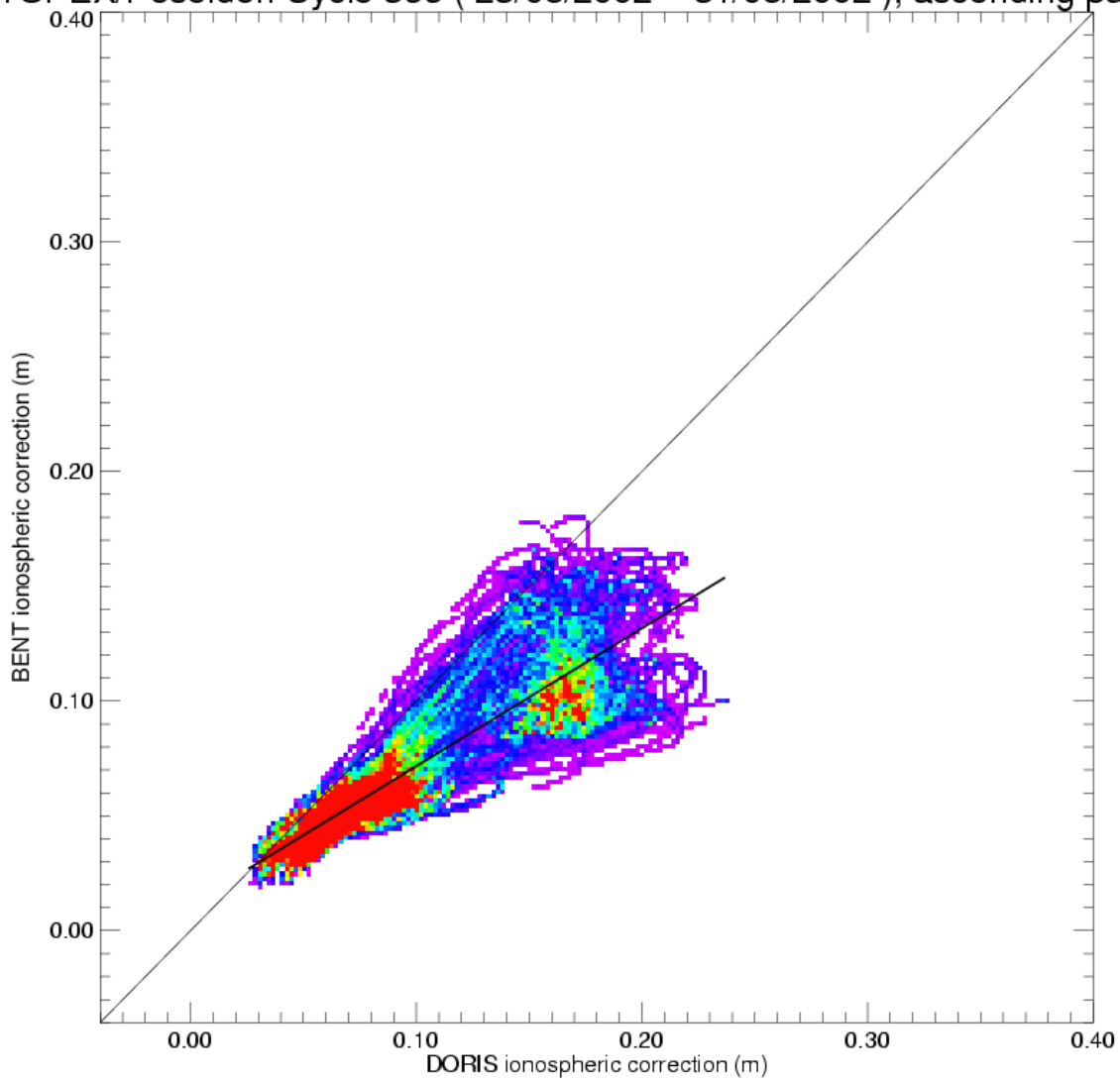
Order 1 fit polynom

$y = a x + b$
 $a = 0.35756528$
 $b = 0.00209229$

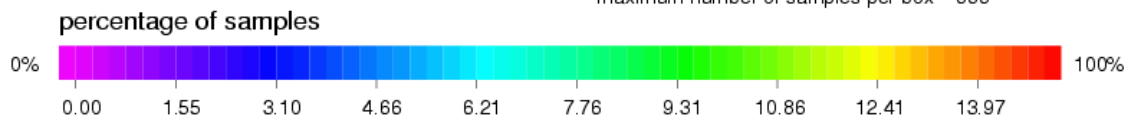
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 666



Statistics Y-X

mean = -0.02863
 rms = 0.03771
 std = 0.02454

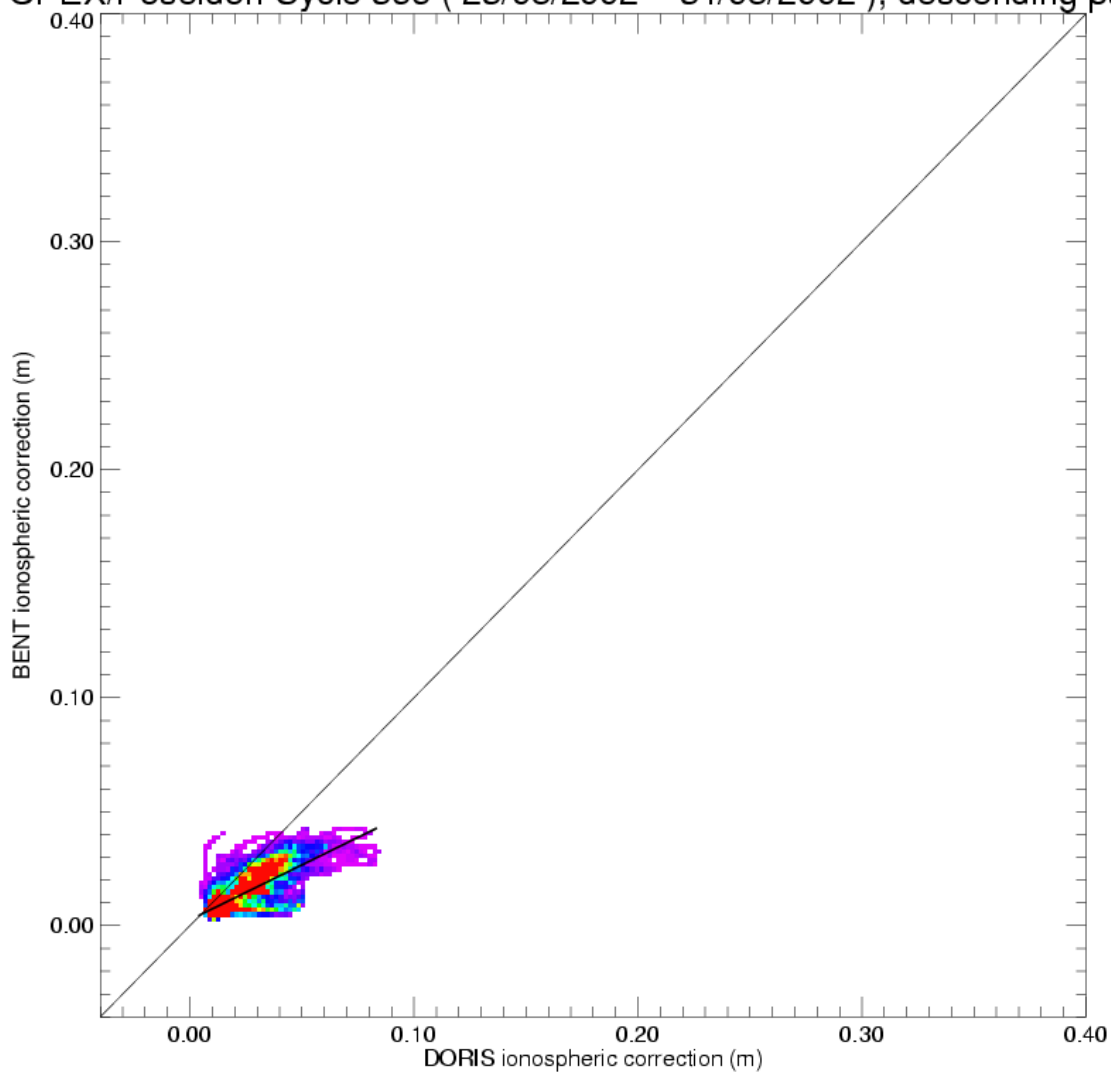
Order 1 fit polynom

$y = a x + b$
 $a = 0.60089922$
 $b = 0.01155809$

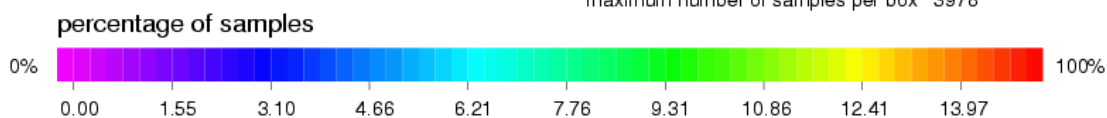
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 366 (23/08/2002 – 31/08/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 3978



Statistics Y-X

mean = -0.01031
 rms = 0.01358
 std = 0.00884

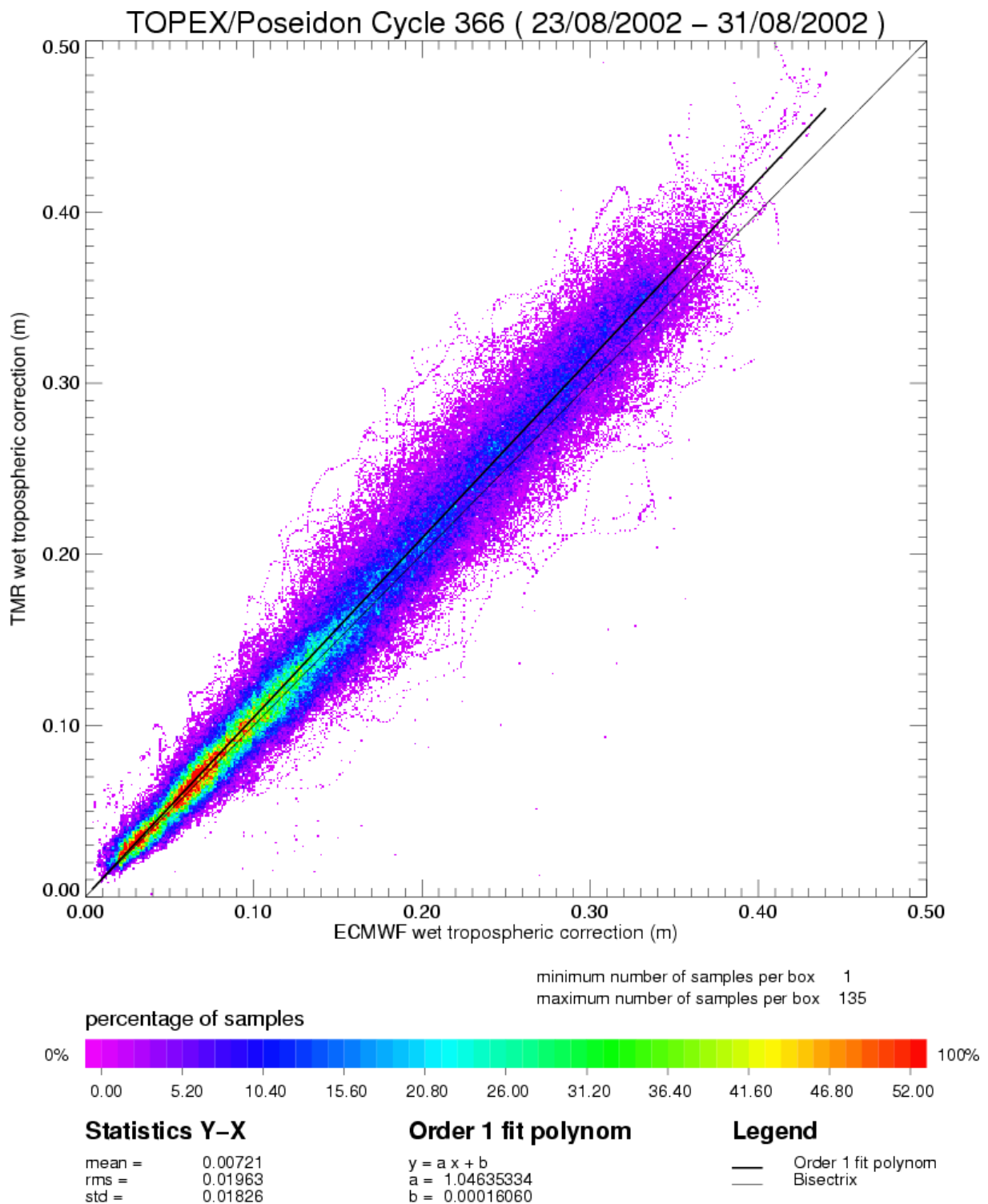
Order 1 fit polynom

$y = a x + b$
 $a = 0.48229796$
 $b = 0.00254671$

Legend

— Order 1 fit polynom
 — Bisectrix

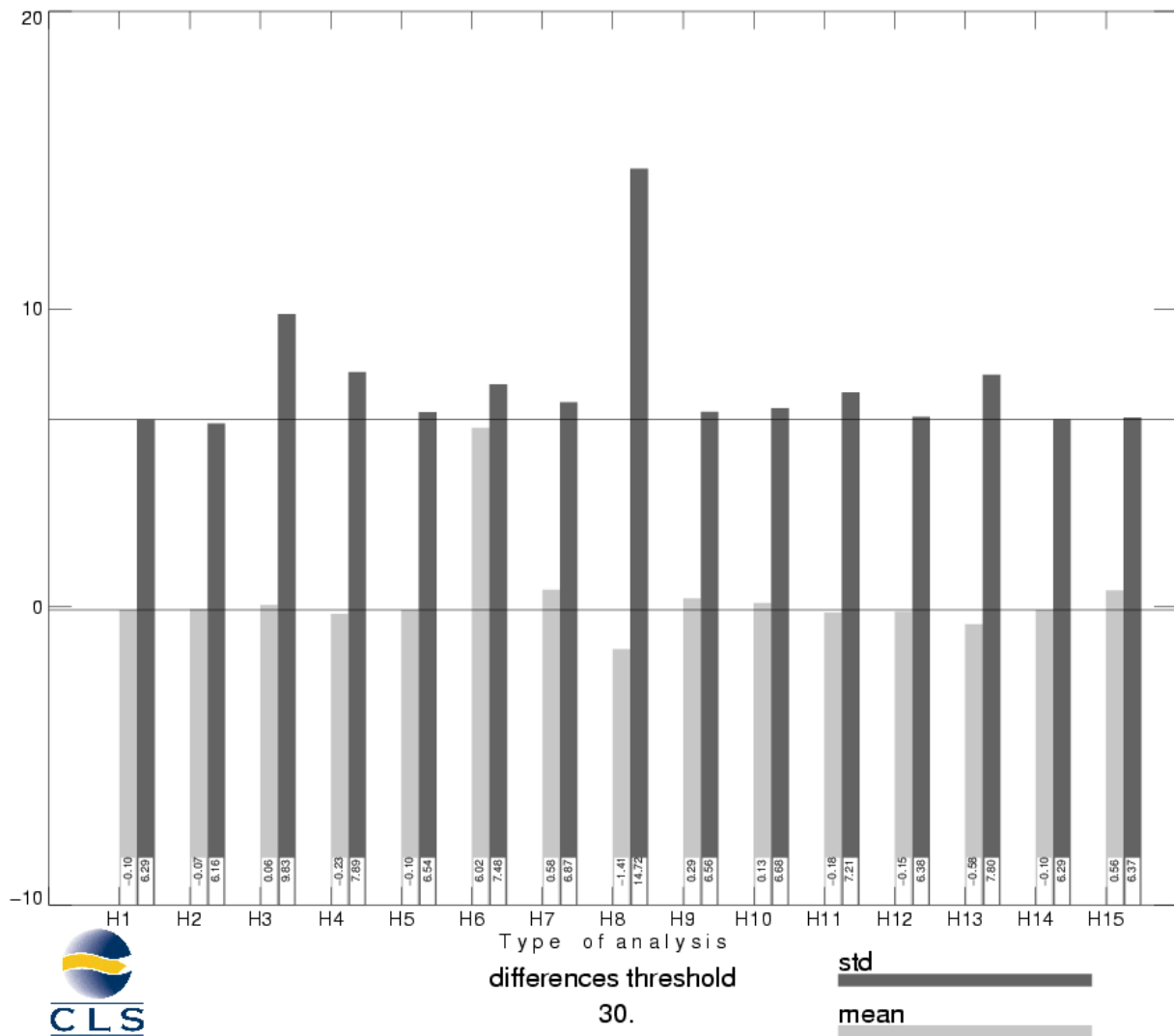
3.6 Wet tropospheric correction



3.7 Crossover statistics

TPTP – CROSSOVER STATISTICS

Without orbit error correction



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

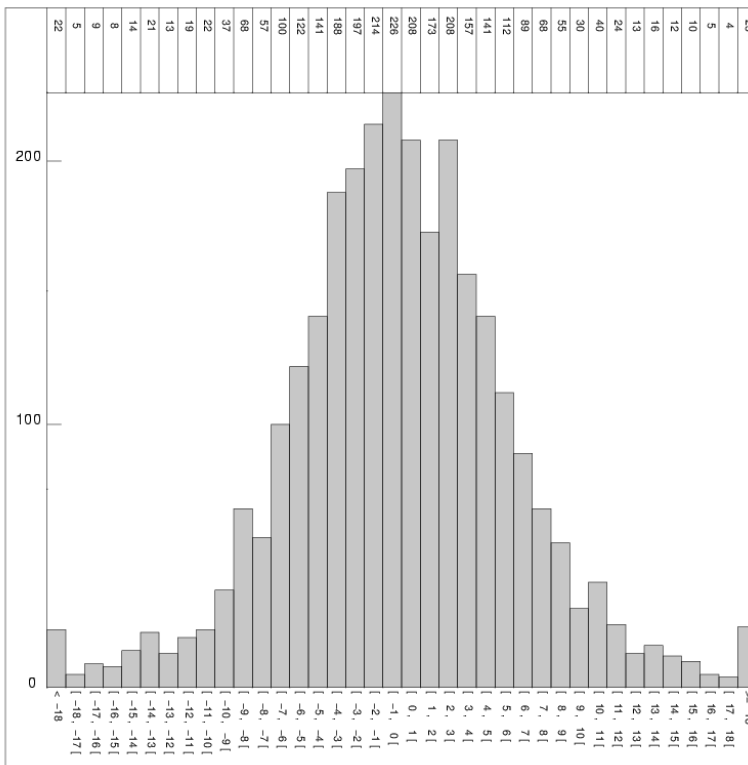
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.7400
 Valeur maximale : 28.8300
 Différence Max – Min: 58.5700
 Nombre de points lus: 2956
 Nombre de points sélectionnés: 2871
 Moyenne : -0.0988580
 Écart-type : 6.28717
 Moyenne Quadratique : 6.28794

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TPTP – CROSSOVER STATISTICS

With orbit error correction

SSH = Corrected sea surface height

RAPPEL DES SELECTIONS

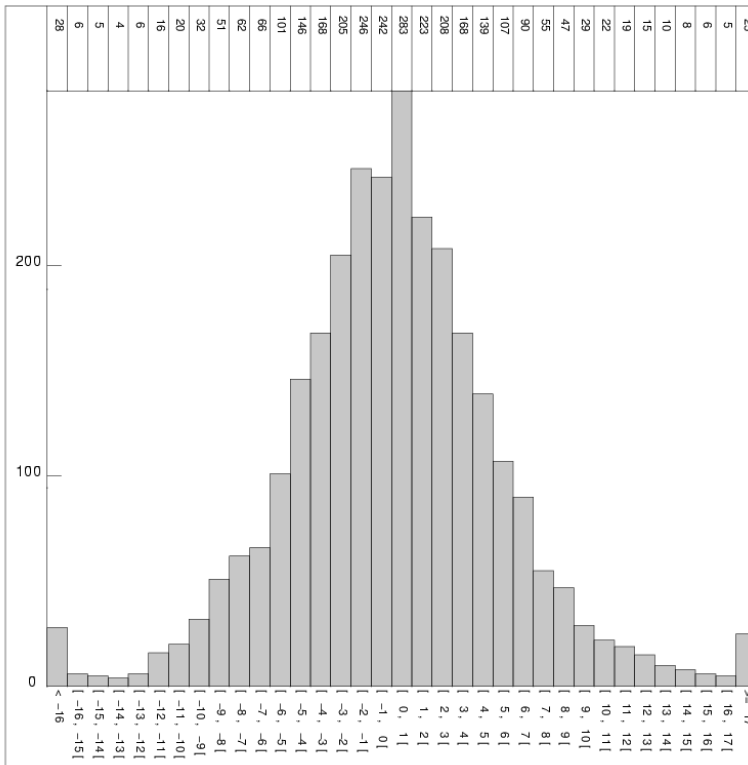
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -28.9500
 Valeur maximale : 29.9900
 Différence Max – Min: 58.9400
 Nombre de points lus: 2956
 Nombre de points sélectionnés: 2863
 Moyenne : 0.138893
 Écart-type : 5.68576
 Moyenne Quadratique : 5.68746

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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

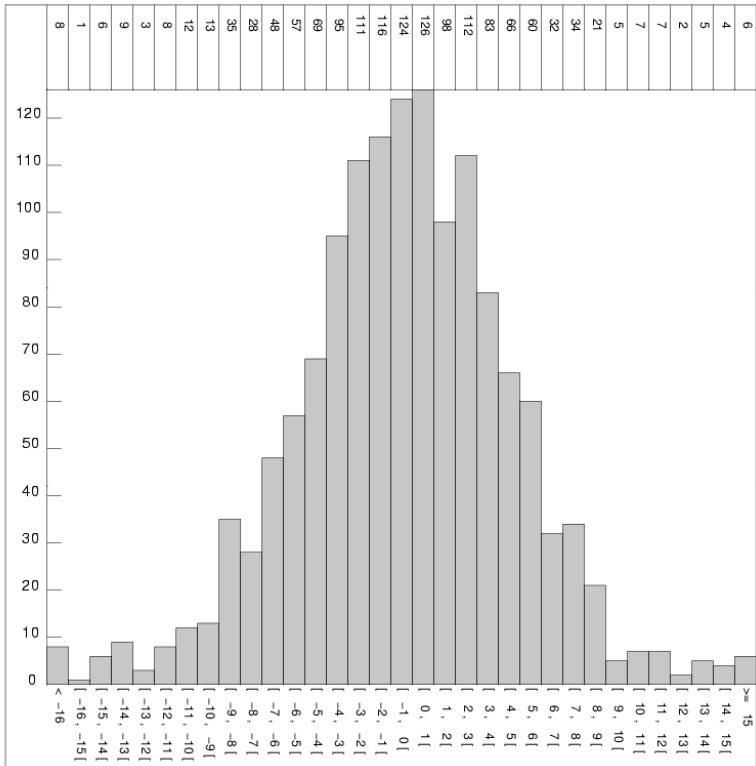
RAPPEL DES SELECTIONS

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 : -32.7400
 Valeur maximale : 31.7000
 Différence Max – Min: 64.4400
 Nombre de points lus: 1566
 Nombre de points sélectionnés: 1411
 Moyenne : -0.391269
 Ecart-type : 5.26840
 Moyenne Quadratique : 5.28291

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3.8 SSH variability

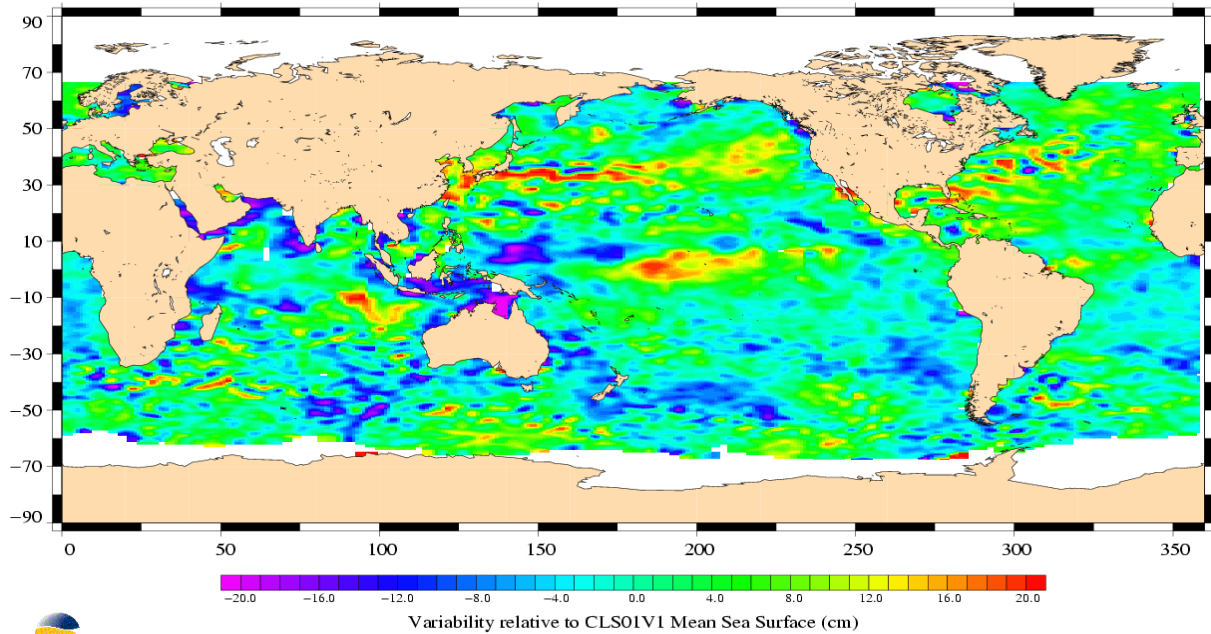
3.8.1 Sea Level Anomaly

It is not possible to compute the sea level anomaly maps through cycles 365-368 because the satellite is not on a repeat cycle orbit.

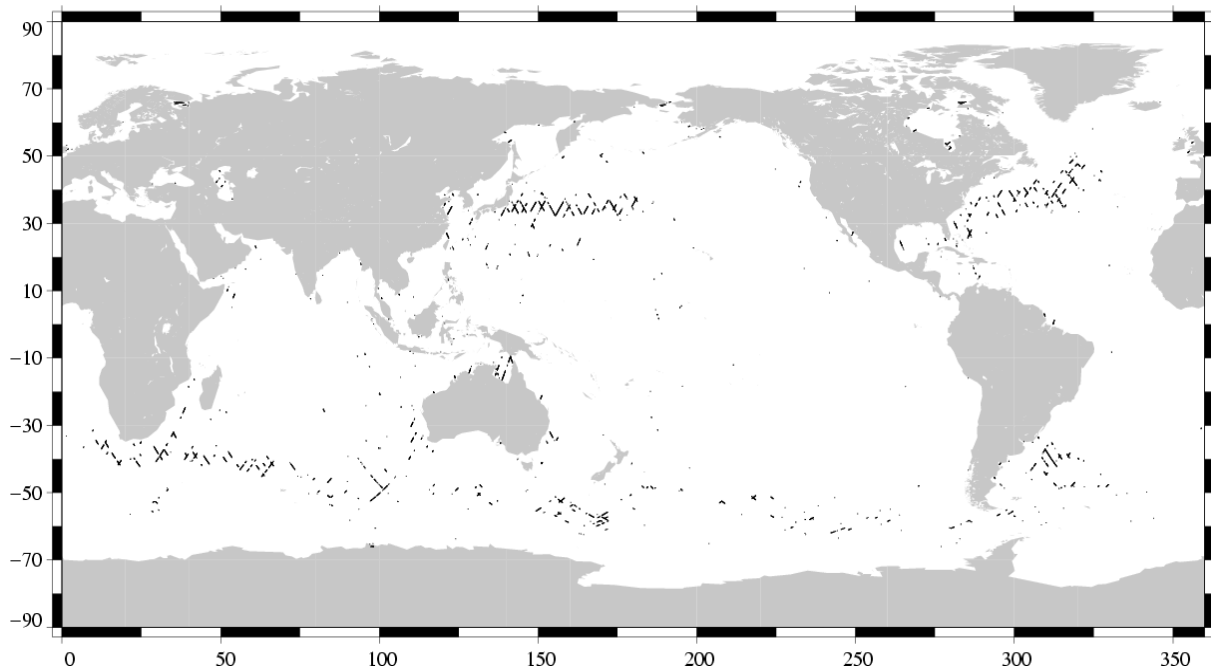
3.8.2 Comparison to a precise Mean Sea Surface

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 apart from isolated measurements, higher differences are located in high ocean variability areas, as expected.

TOPEX/Poseidon, cycle 366
Period : 23/08/2002 – 31/08/2002

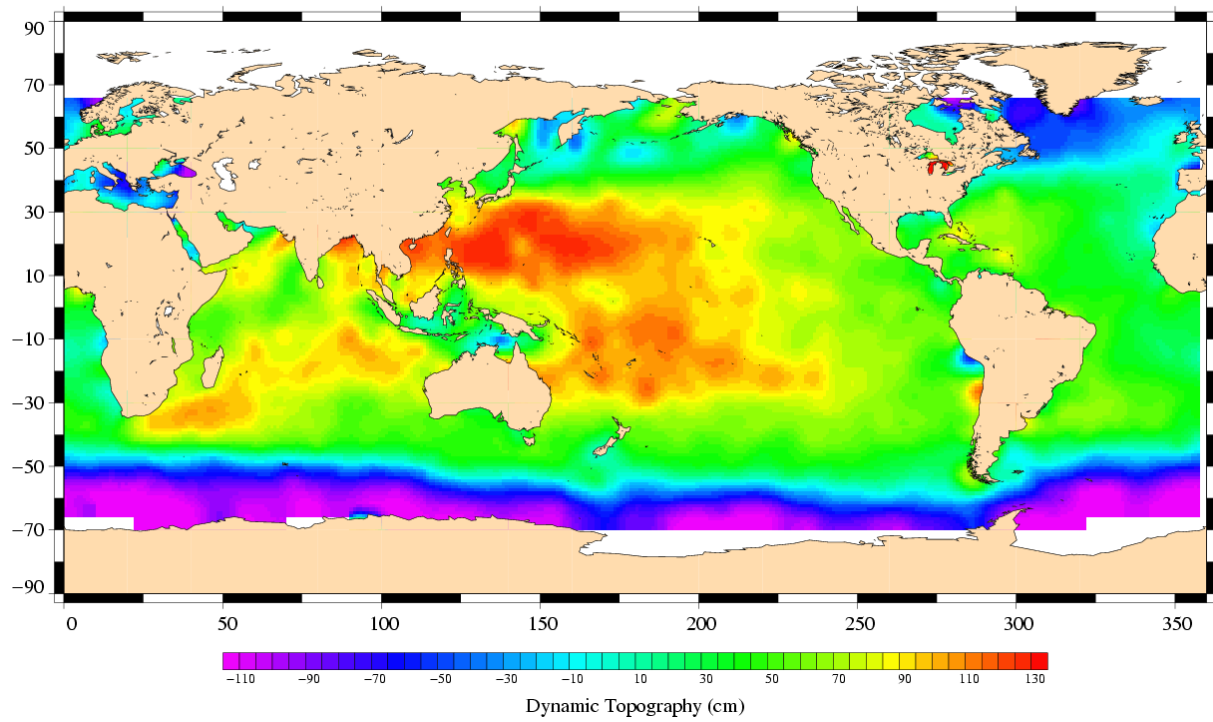


(SSH – MSS) differences greater than 0.3 m
TOPEX/Poseidon Cycle 366 (23/08/2002 / 31/08/2002)



3.9 Dynamic topography

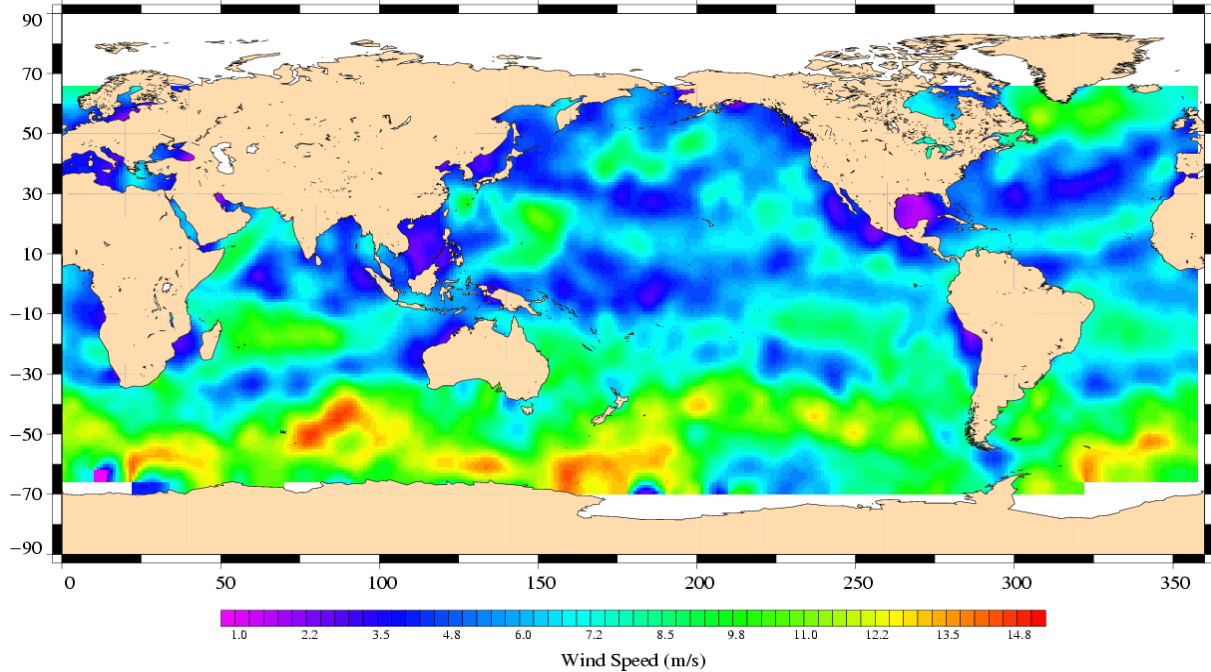
TOPEX/Poseidon, cycle 366
Period : 23/08/2002 – 31/08/2002



3.10 Wind and wave maps

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

TOPEX/Poseidon, cycle 366
Period : 23/08/2002 – 31/08/2002



TOPEX/Poseidon, cycle 366
Period : 23/08/2002 – 31/08/2002

