



TOPEX/Poseidon MGRD Quality Assessment Report

Cycle 370

30-09-2002 09-10-2002

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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 6.63 cm rms, and the standard deviation of Sea Level Anomalies (SLA) relative to a Mean Sea Surface is 9.81 cm.

2.2 Warnings and recommendations

- Missing measurements :
Passes 94 to 97 are missing probably due to tape recorder problems.
- Tape recorder failures :
As observed in the past cycle there is some data gaps due to tape recorder anomalies. Several tests have been planned during this cycle to resolve the rapidly progressive data degradation observed on tape recorder.
- Editing measurements :
Problems in the interpolation of the TMR parameters occur when there are missing measurements (tape recorder failures). As a result 3.61% of the measurements are removed by the TMR correction criterion.

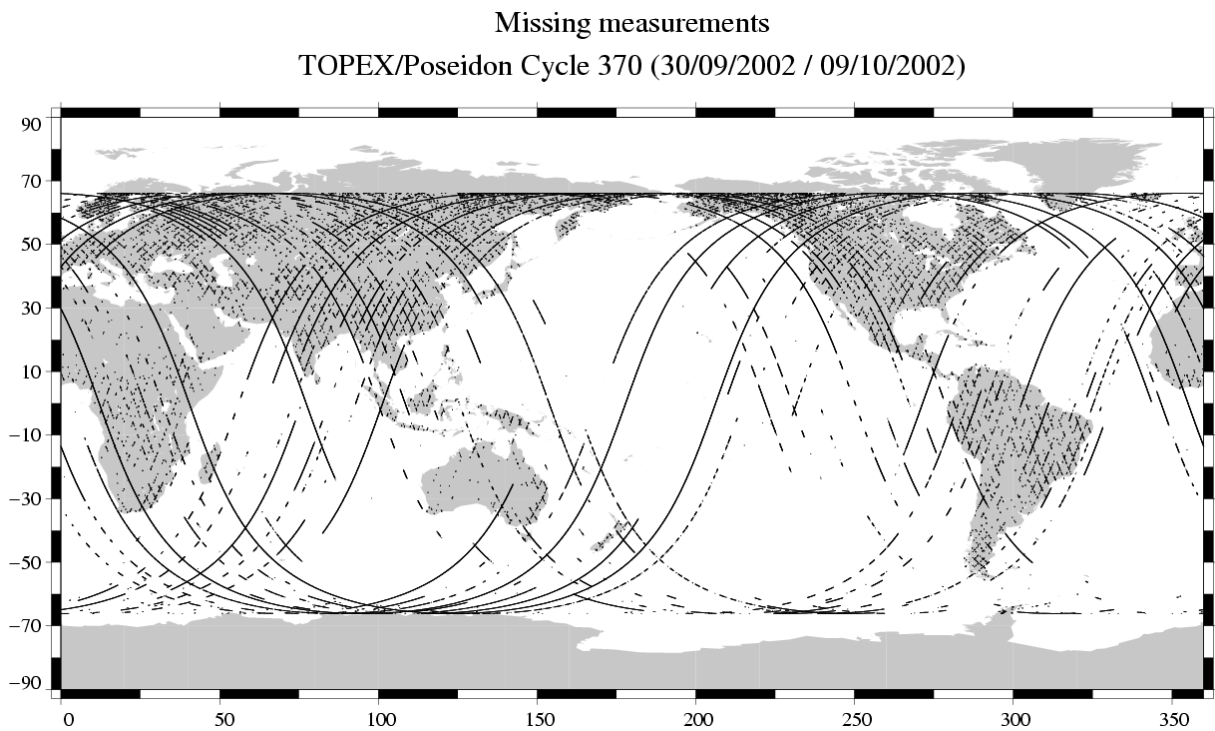
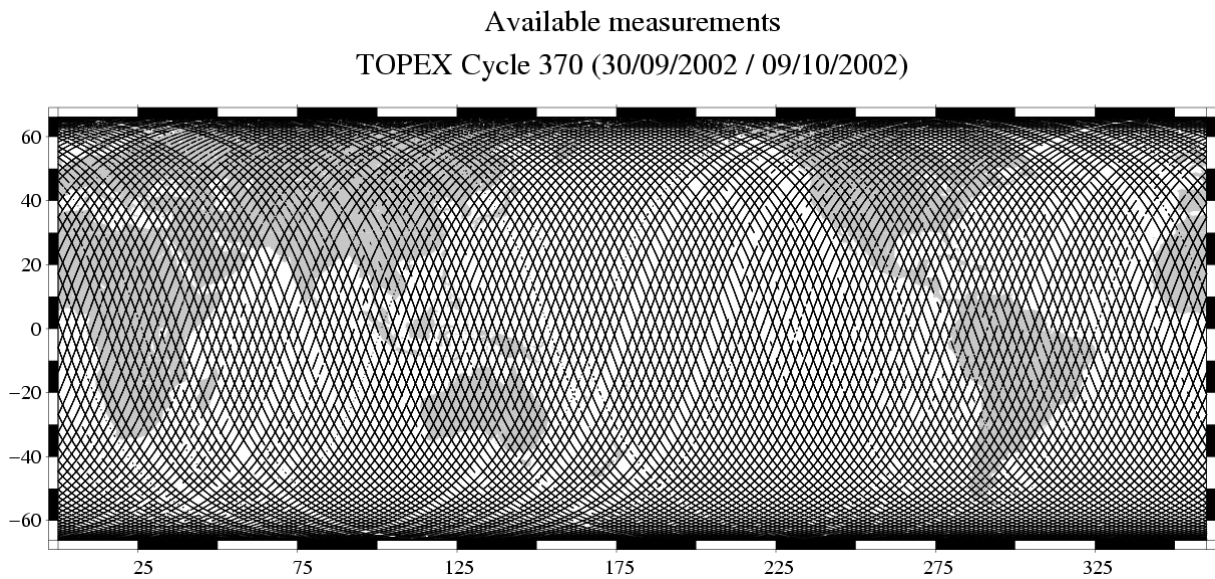
3 CALVAL main results

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

697551 altimeter measurements are present, and 96946 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.



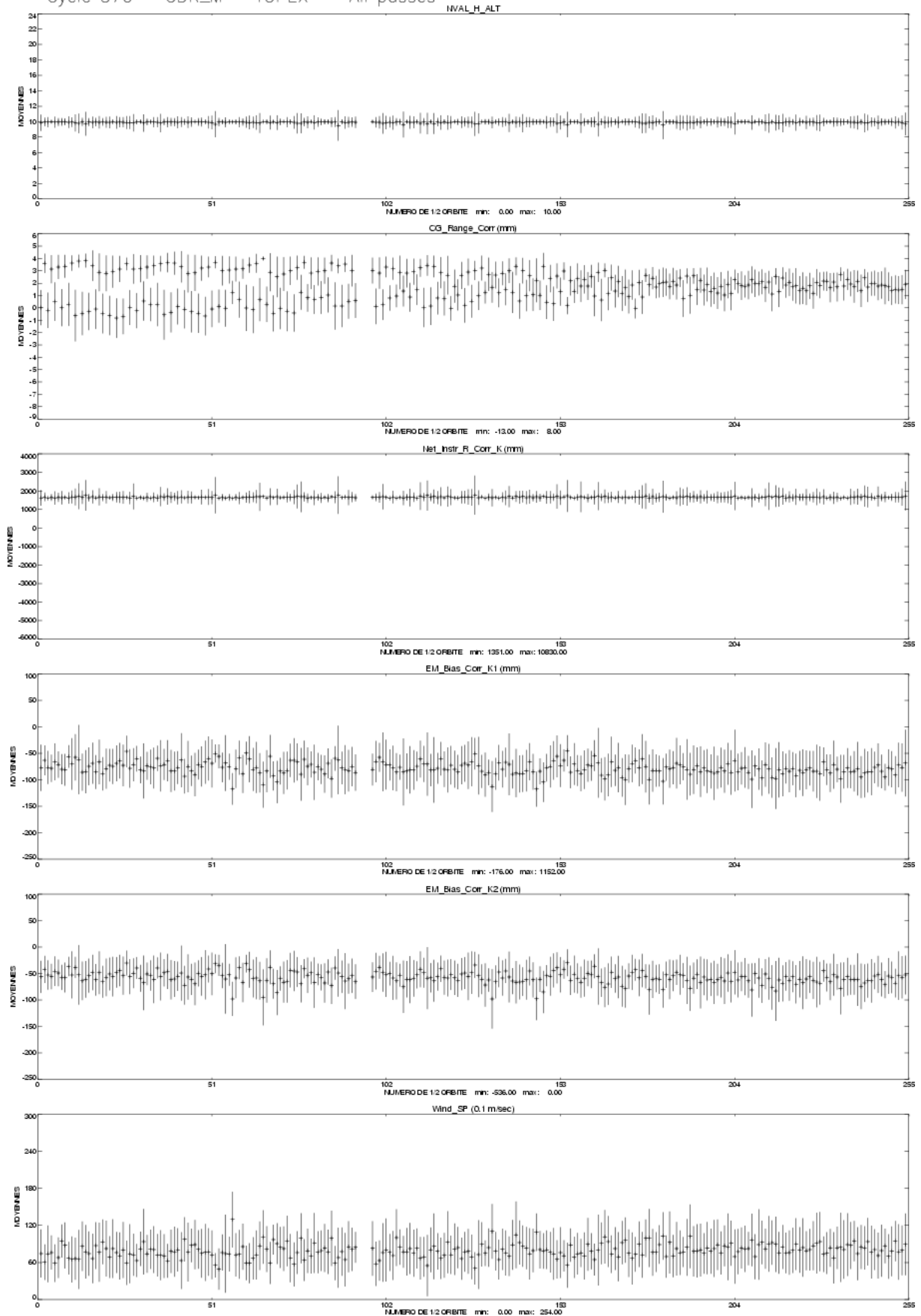
3.2 M-GDR quality flags

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

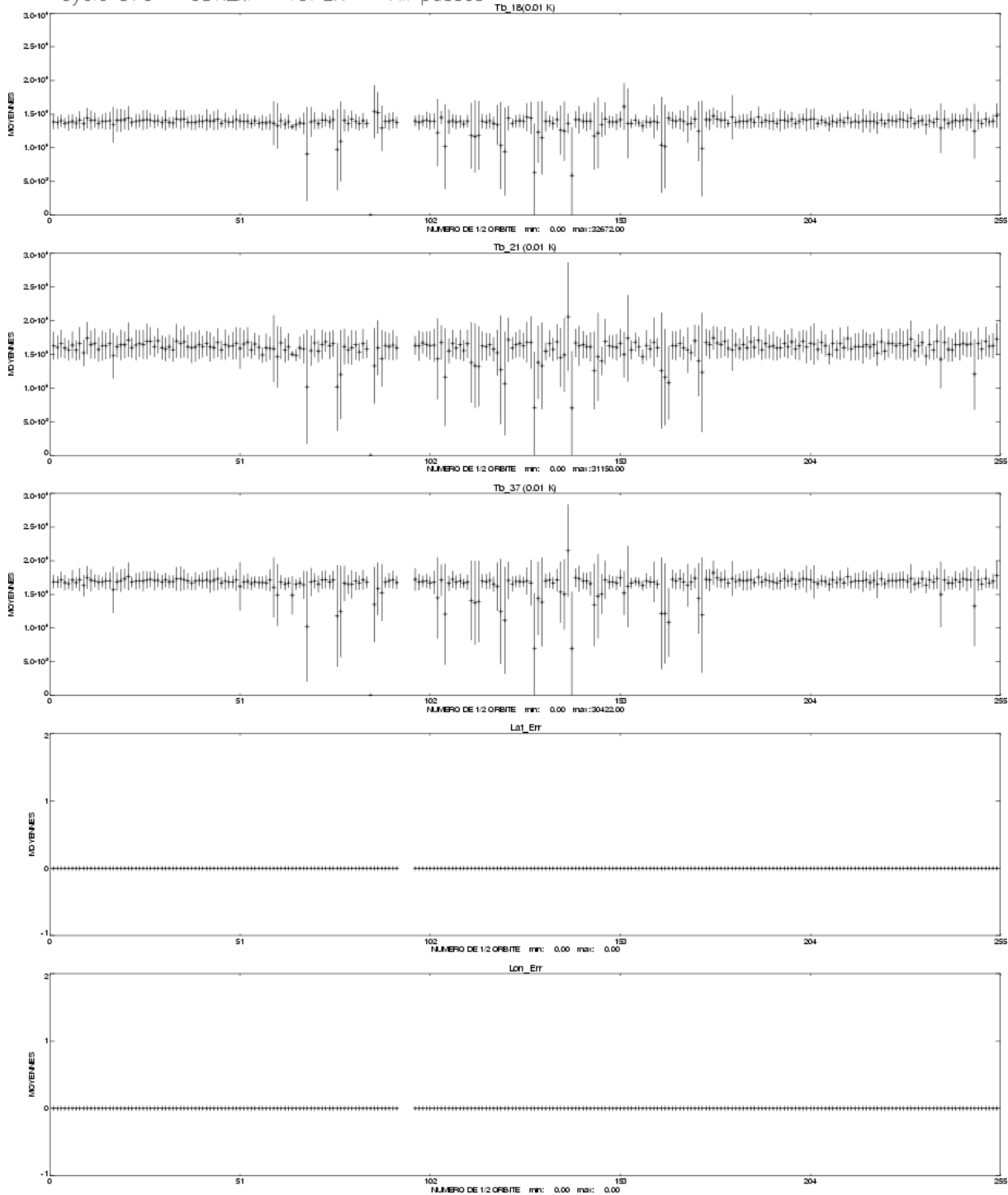
Name	Description	% bad
Geo_Bad_1	altimeter land flag	26.19
Geo_Bad_1	ice flag	8.86
Geo_Bad_1	radiometer land flag	28.38
Alt_Bad_1	conditions 1 altimeter	5.05
Alt_Bad_2	conditions 2 altimeter	4.93
Geo_Bad_2	rain (liquid water in excess)	6.19
Geo_Bad_2	less than 4 points for CSR3.0 tide calculation	0.44
Geo_Bad_2	less than 4 points for FES95.2.1 tide calculation	3.14
TOPEX	TOPEX not valid	0.00
TMR	TMR not valid	0.00
TMR_Bad	Brightness temperatures not valid	4.54
DORIS	DORIS not valid	0.00

3.3 M-GDR parameter plots

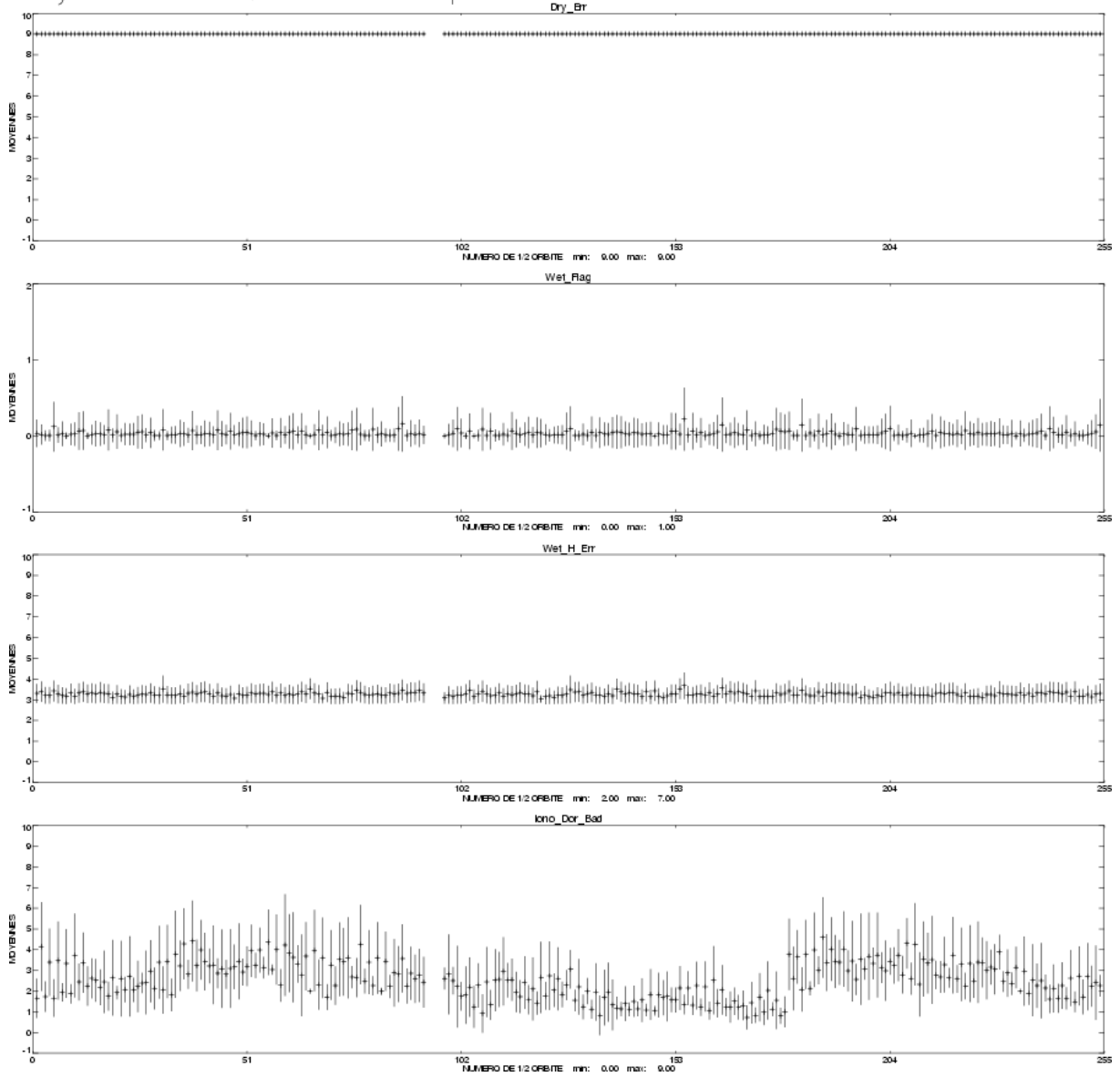
Cycle 370 – GDR_M – TOPEX – All passes –



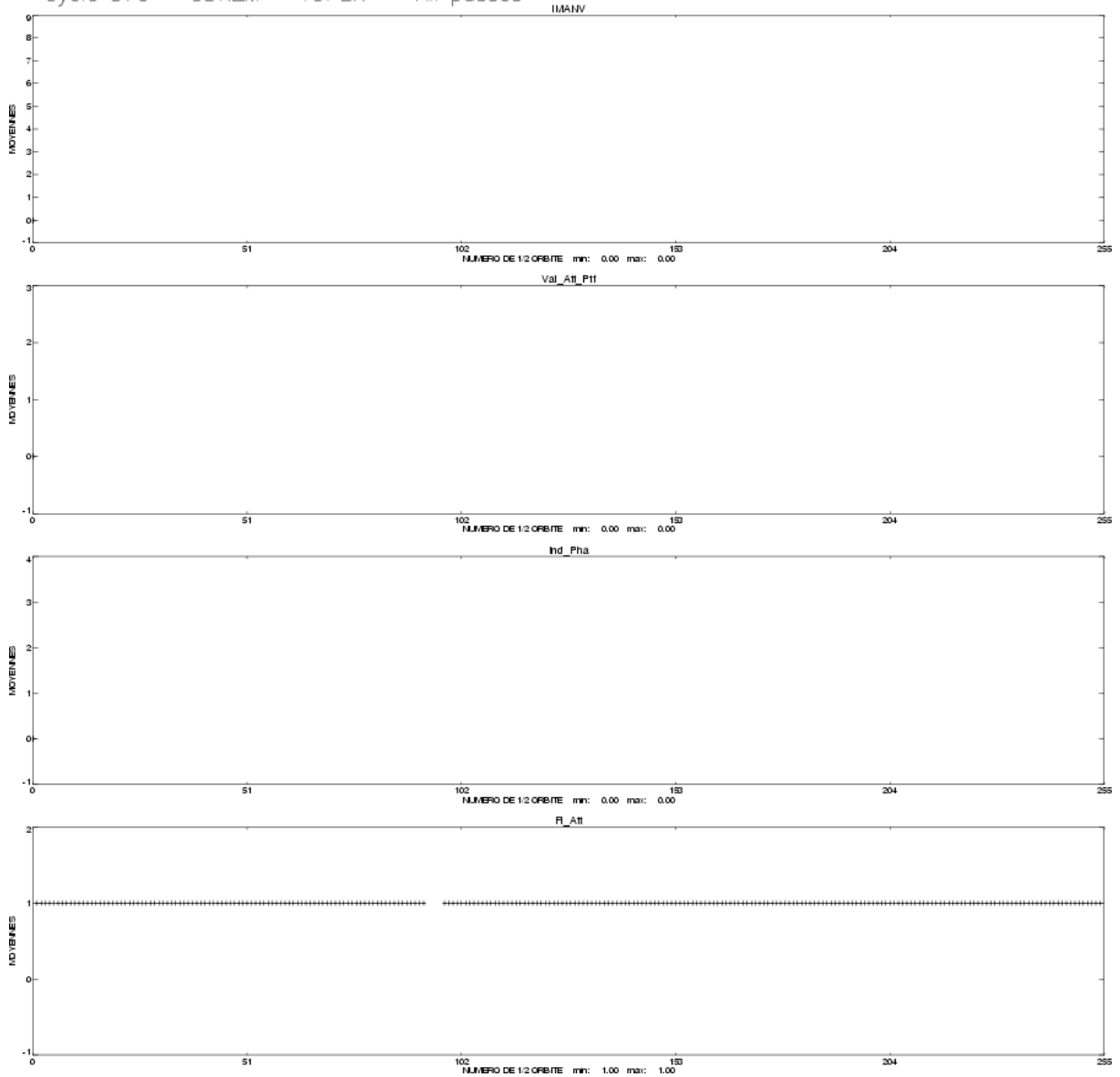
Cycle 370 – GDR_M – TOPEX – All passes –

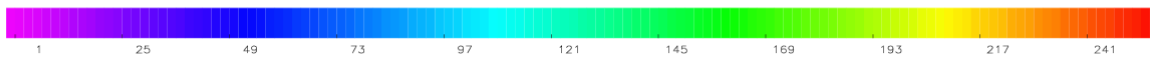
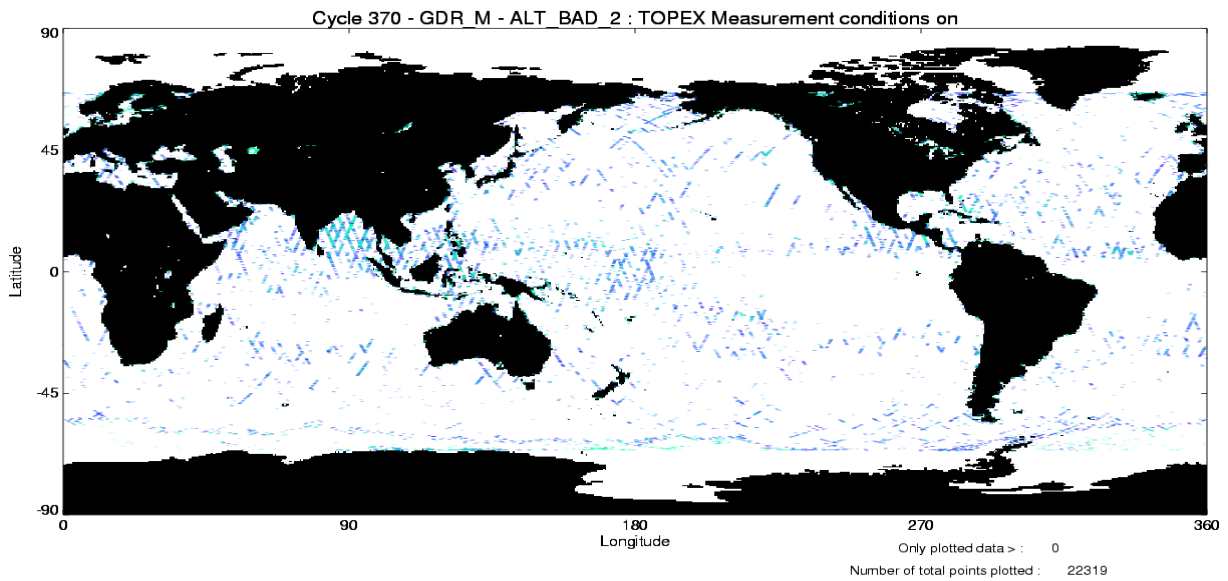
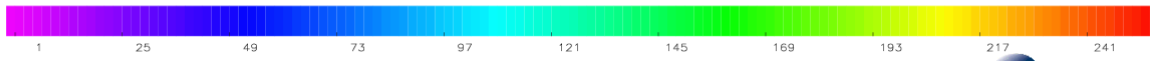
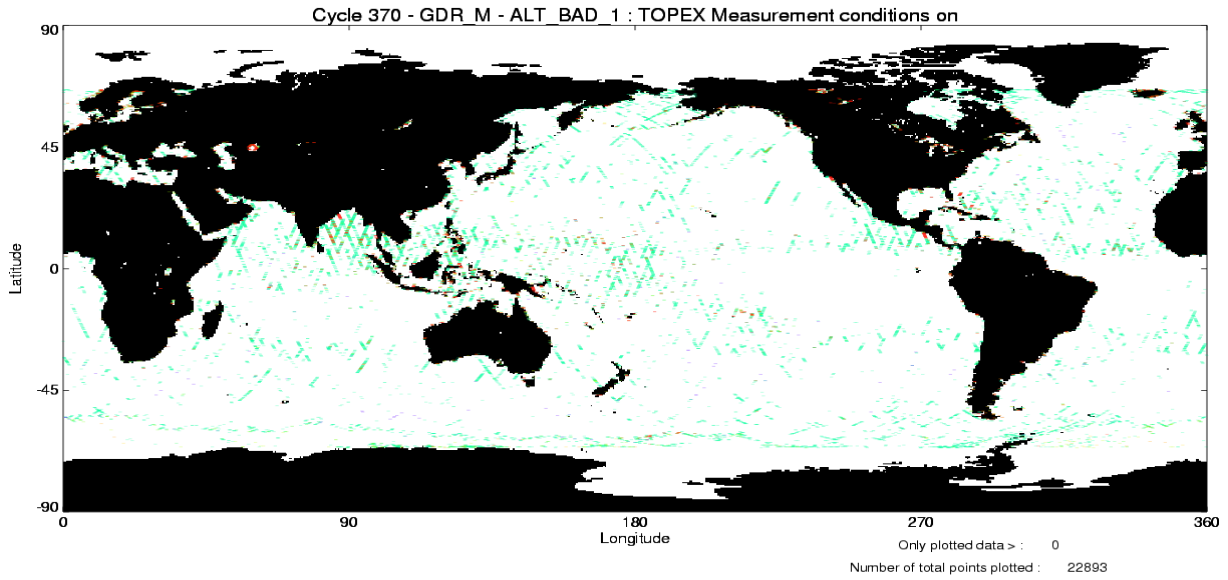


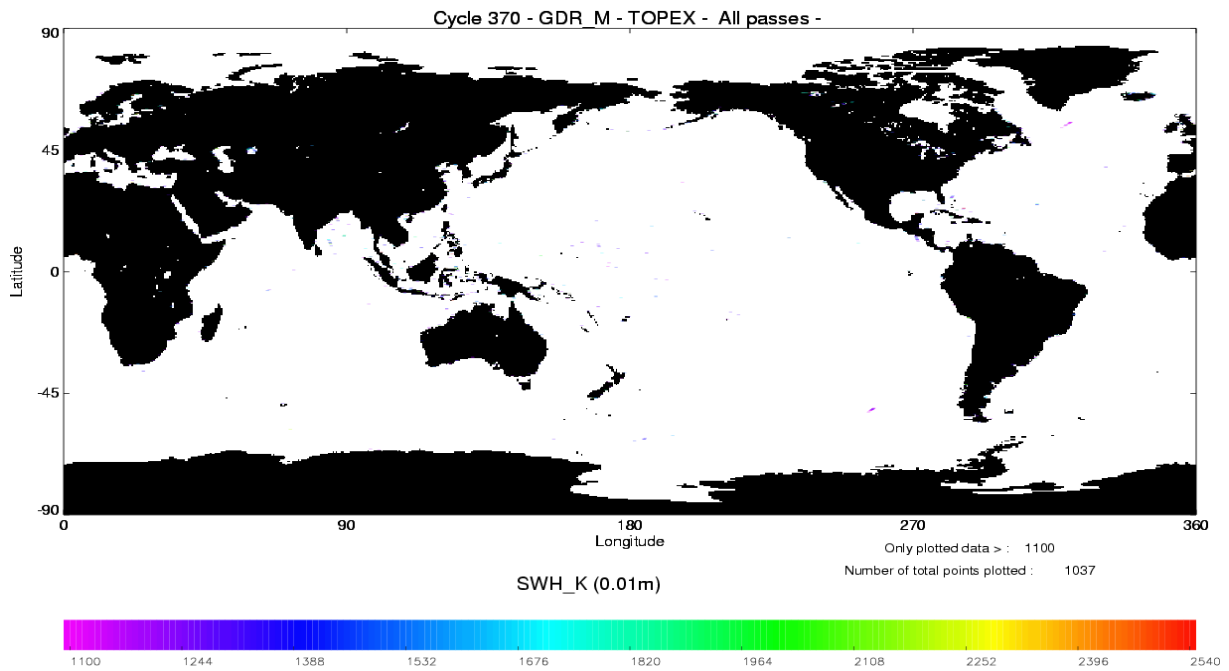
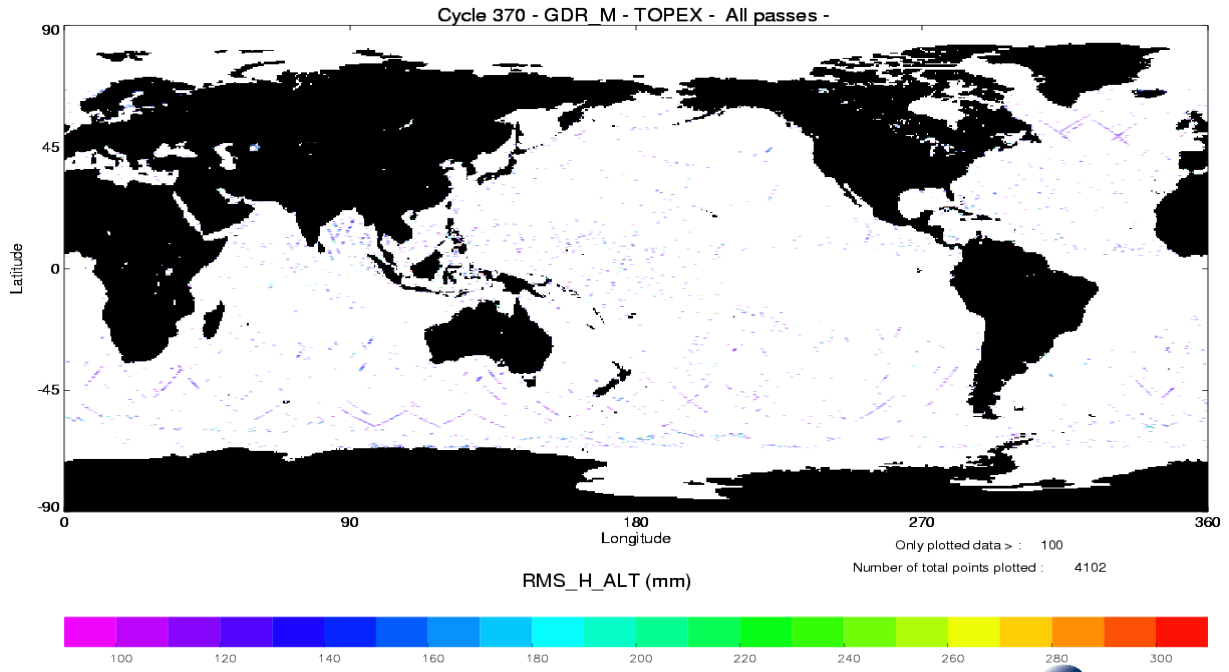
Cycle 370 – GDR_M – TOPEX – All passes –

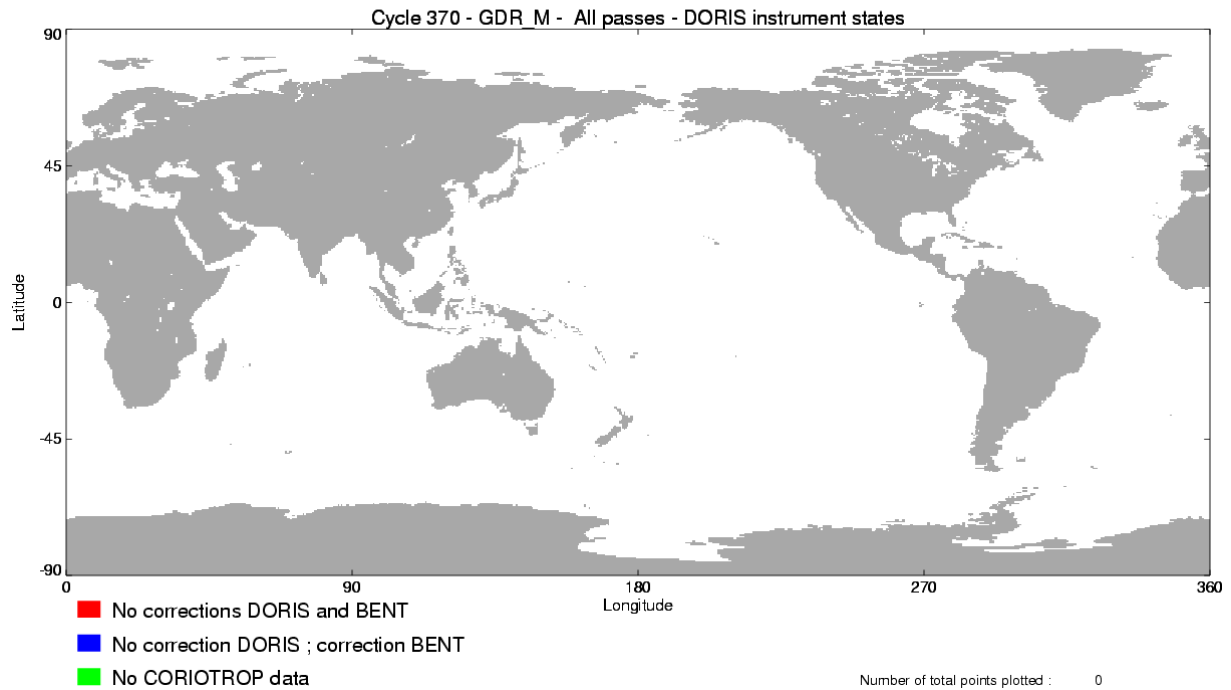


Cycle 370 – GDR_M – TOPEX – All passes –









3.4 Editing

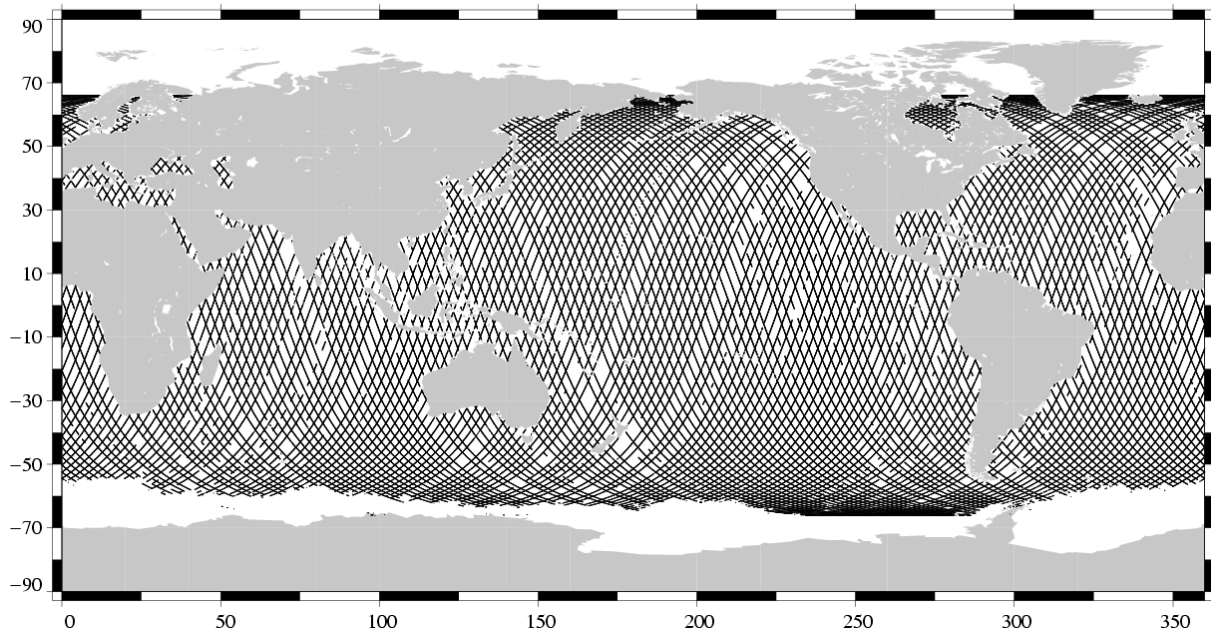
The following table gives for each tested parameter, minimum and maximum thresholds, the number and the percentage of points removed.

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

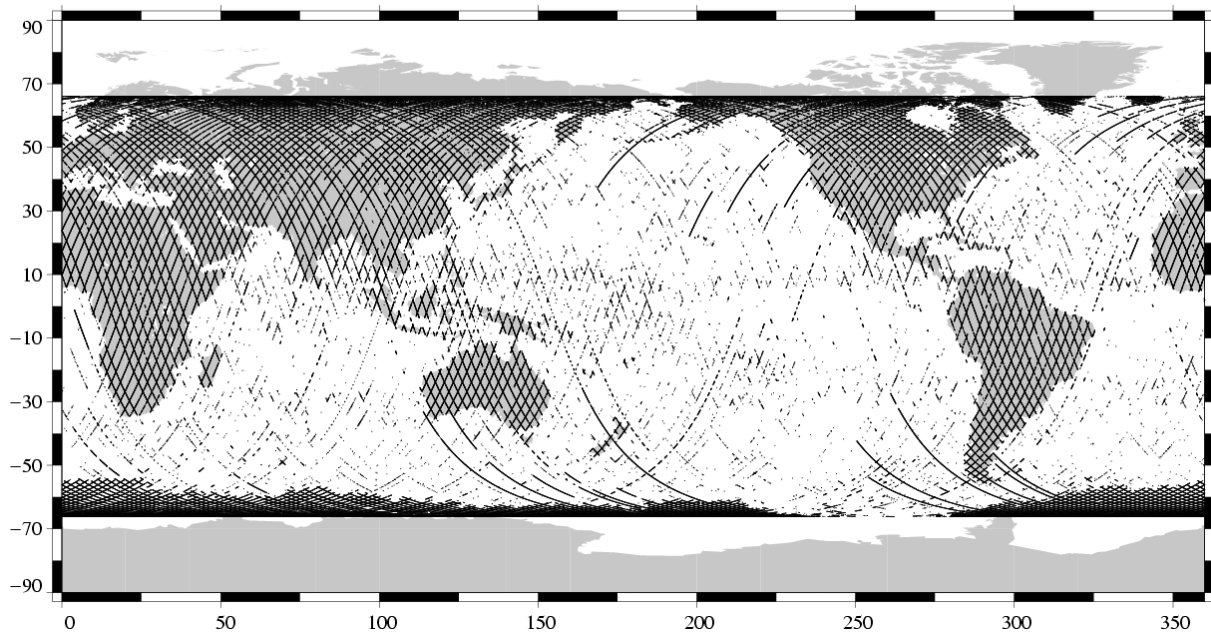
Parameters	Min Thres.	Max Thres.	Unit	Mean % removed in 1997	% removed
Sea surface height	-130.000	100.000	m	1.37	0.70
Number of 20/10Hz valid points Poseidon/TOPEX	5.000	-		1.37	0.95
Std. deviation of range	0.000	0.100	m	1.85	1.71
Off nadir angle from waveform	0.000	0.400	deg	1.36	4.49
Dry tropospheric 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	3.61
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	0.37
Sea state Bias	-0.500	0.000	m	1.39	0.61
Backscatter coefficient	7.000	30.000	dB	1.44	0.51
Ocean tide height	-5.000	5.000	m	0.01	0.88
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 three maps are complementary: they show respectively the removed, the selected measurements and the percentage of selected measurements in the editing procedure.

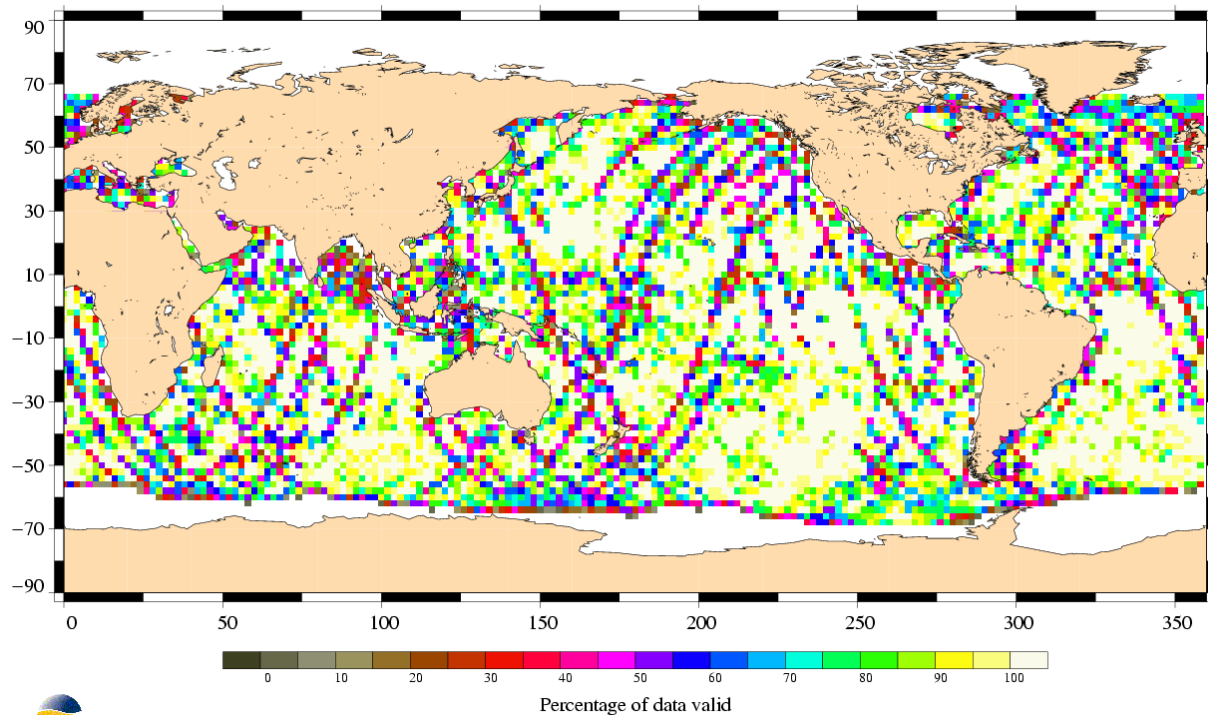
Valid data
TOPEX/Poseidon Cycle 370 (30/09/2002 / 09/10/2002)



Edited measurements
TOPEX Cycle 370 (30/09/2002 / 09/10/2002)

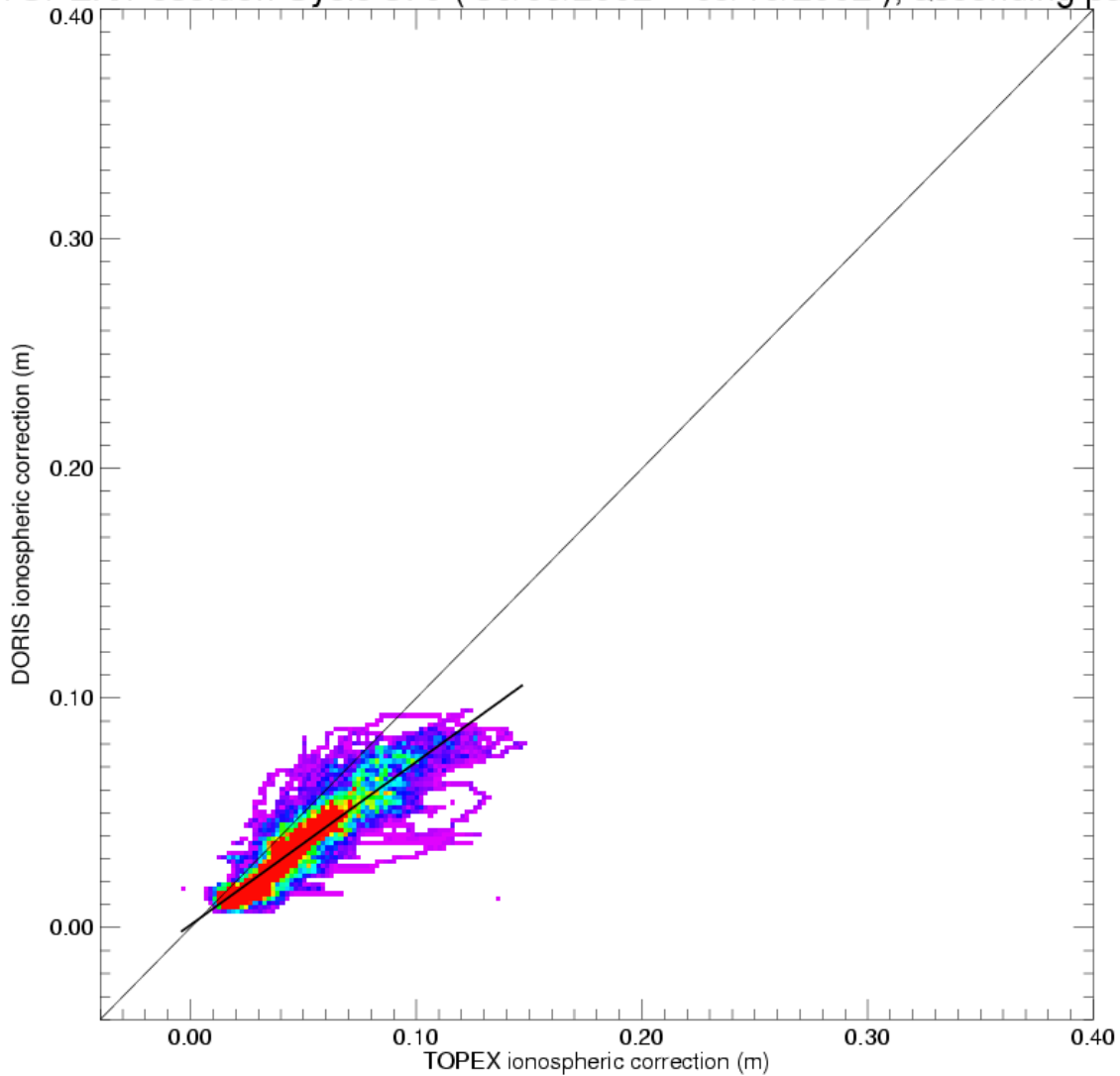


Percentage of valid data relative to the nominal pass
TOPEX/Poseidon Cycle 370 (30/09/2002 / 09/10/2002)

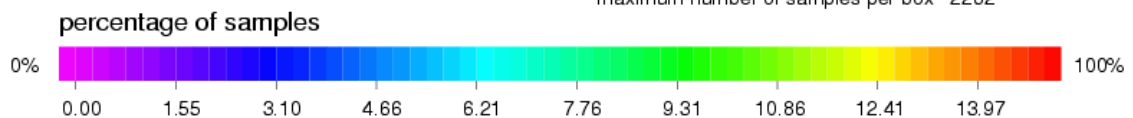


3.5 Ionospheric correction

TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), ascending passes



minimum number of samples per box 1
maximum number of samples per box 2262



Statistics Y-X

mean = -0.01296
rms = 0.01707
std = 0.01111

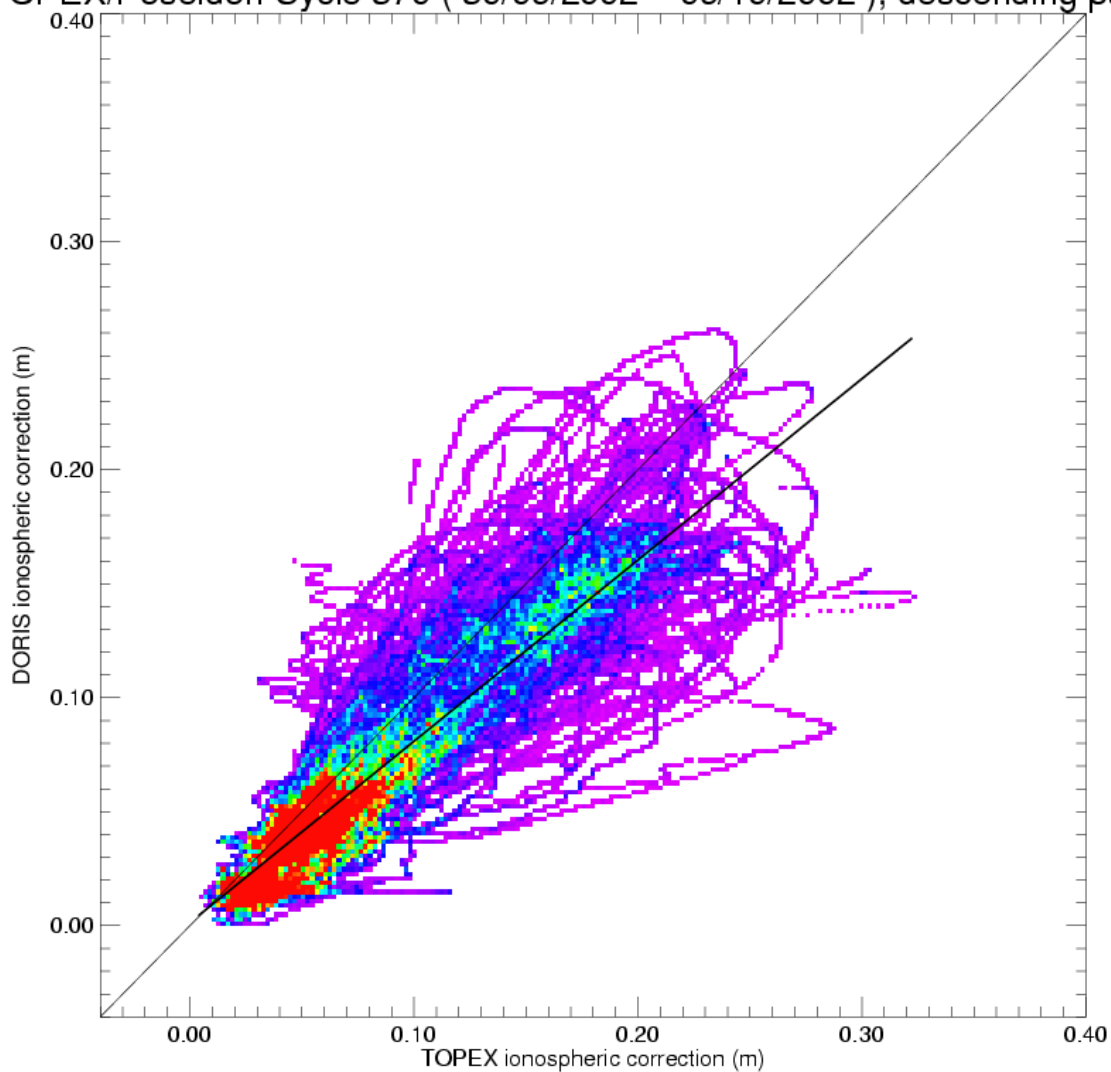
Order 1 fit polynomial

$y = a x + b$
a = 0.71010232
b = 0.00119594

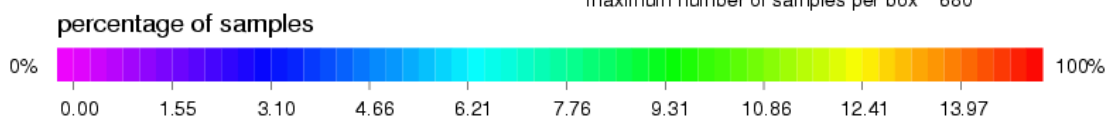
Legend

— Order 1 fit polynomial
— Bisectrix

TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 680



Statistics Y-X

mean = -0.01645
 rms = 0.03033
 std = 0.02548

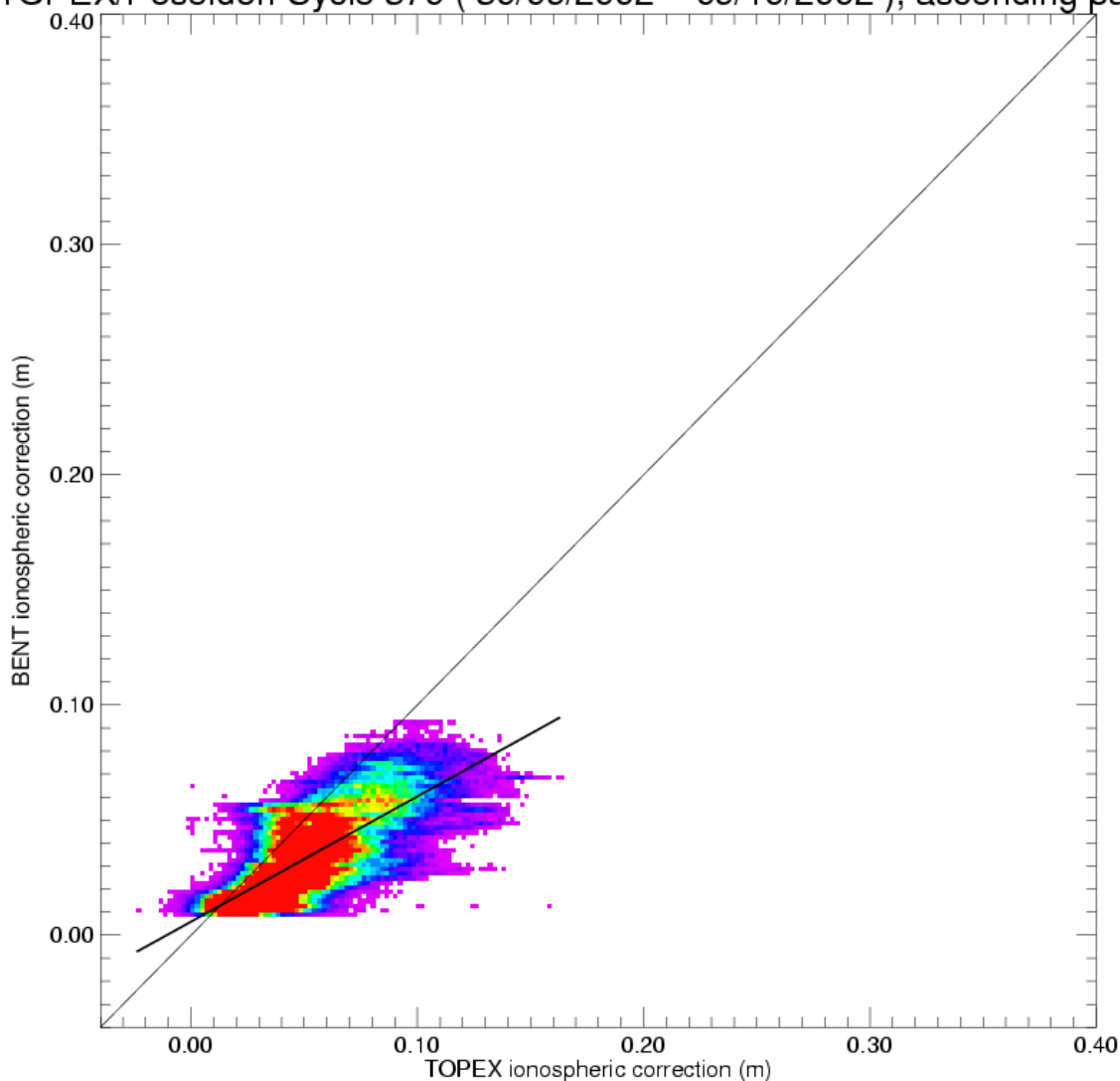
Order 1 fit polynom

$y = a x + b$
 $a = 0.79518396$
 $b = 0.00138860$

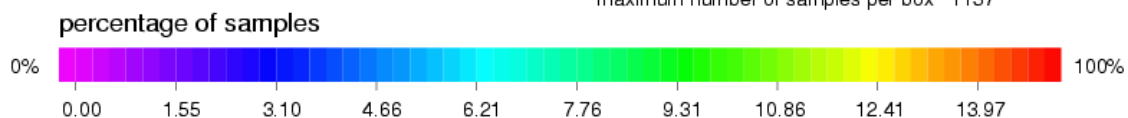
Legend

— Order 1 fit polynom
 - - - Bisectrix

TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 1137



Statistics Y-X

mean = -0.01660
 rms = 0.02345
 std = 0.01656

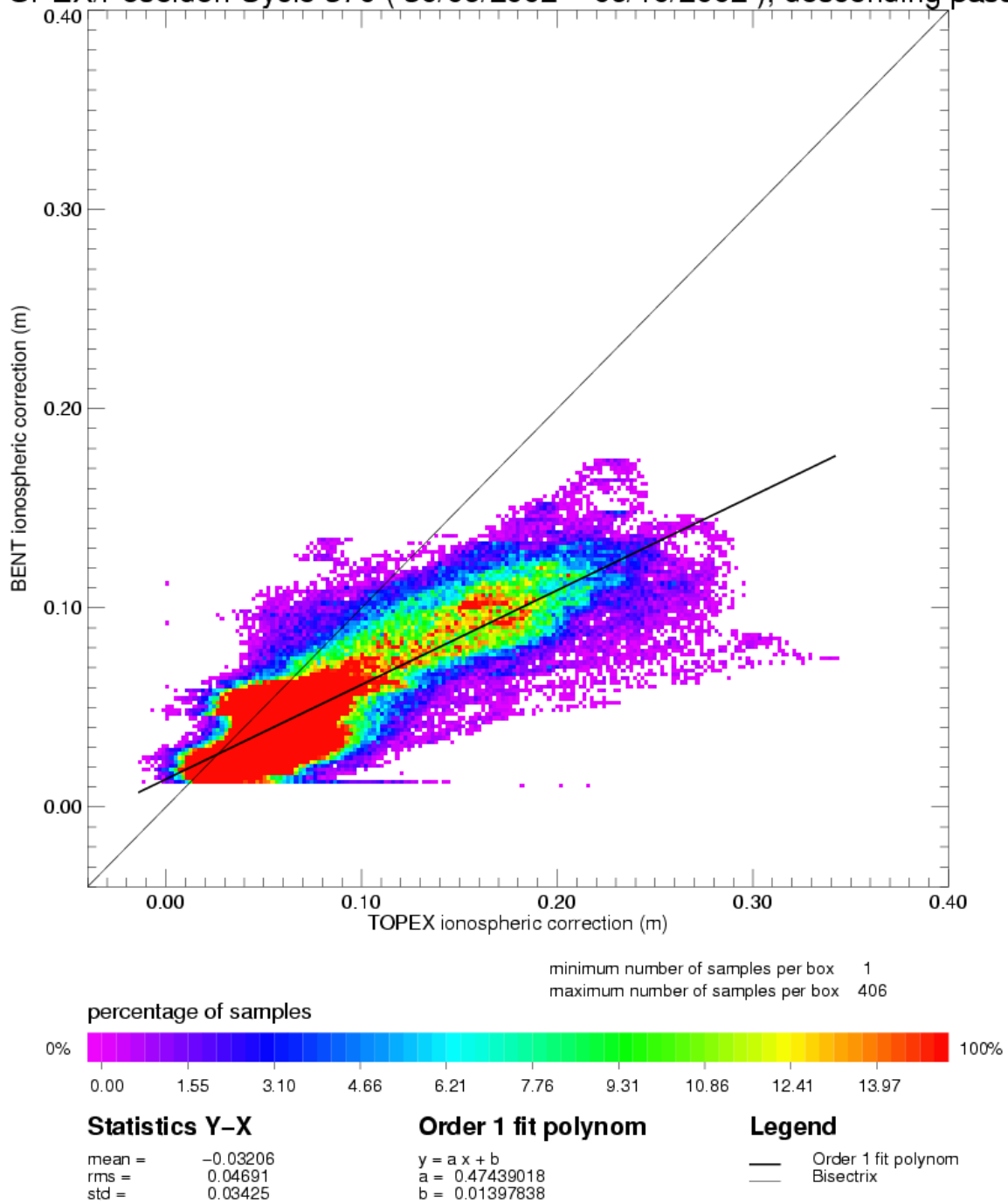
Order 1 fit polynom

$y = a x + b$
 $a = 0.54416788$
 $b = 0.00587379$

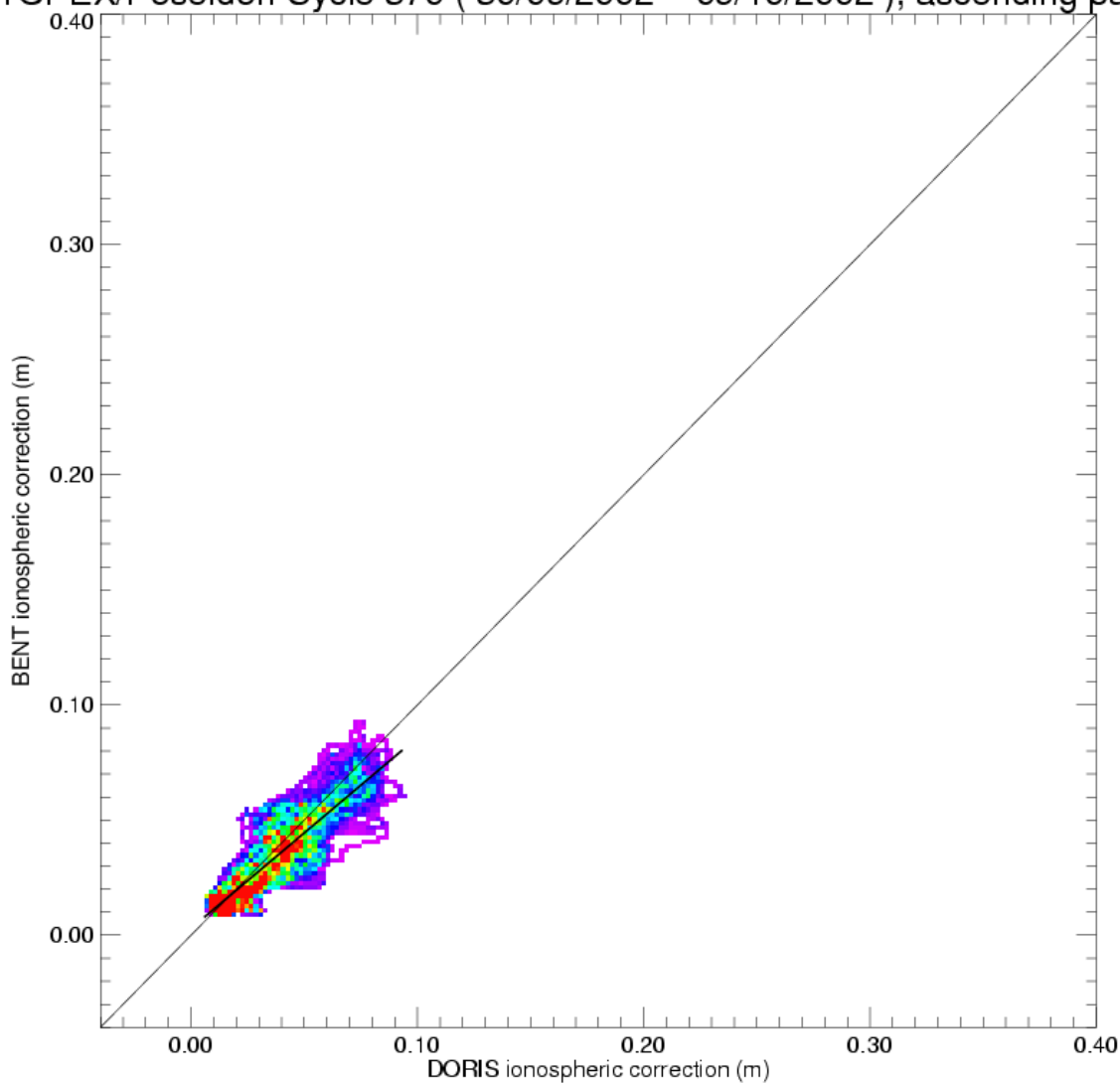
Legend

— Order 1 fit polynom
 — Bisectrix

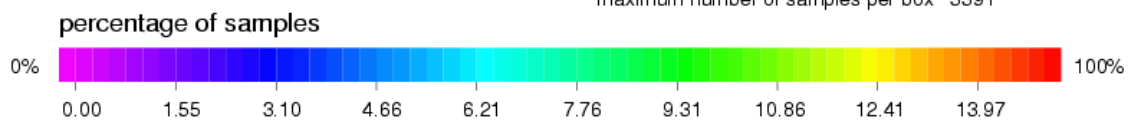
TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), descending passes



TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), ascending passes



minimum number of samples per box 1
 maximum number of samples per box 3391



Statistics Y-X

mean = -0.00317
 rms = 0.00973
 std = 0.00920

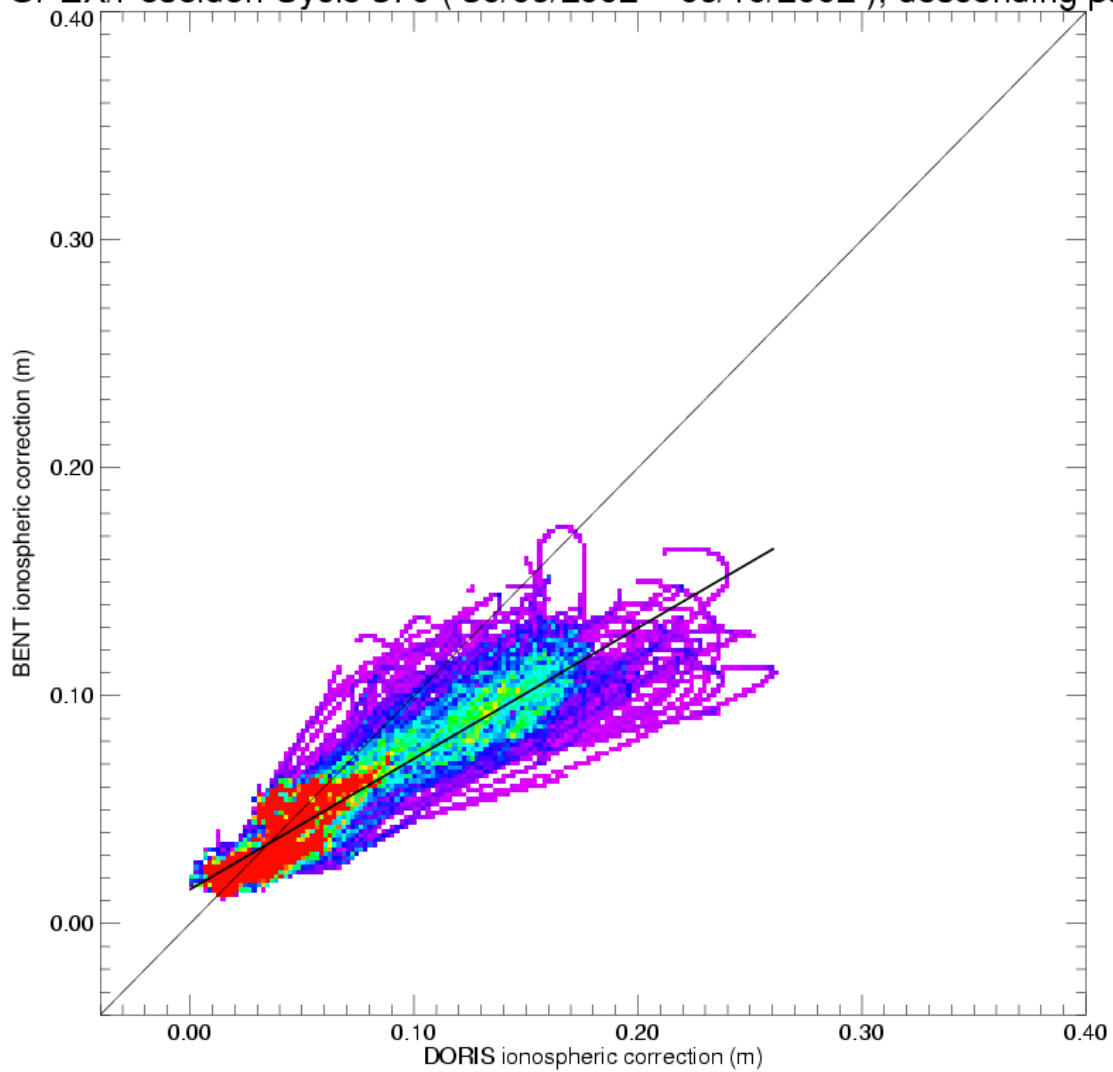
Order 1 fit polynom

$y = a x + b$
 $a = 0.82934409$
 $b = 0.00295230$

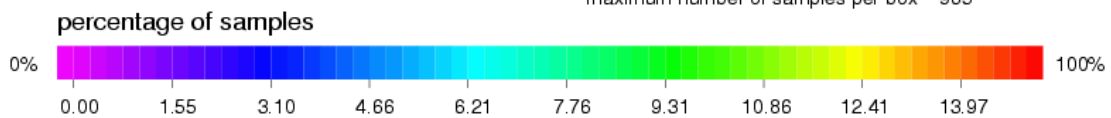
Legend

— Order 1 fit polynom
 — Bisectrix

TOPEX/Poseidon Cycle 370 (30/09/2002 – 09/10/2002), descending passes



minimum number of samples per box 1
 maximum number of samples per box 965



Statistics Y-X

mean = -0.01512
 rms = 0.02930
 std = 0.02510

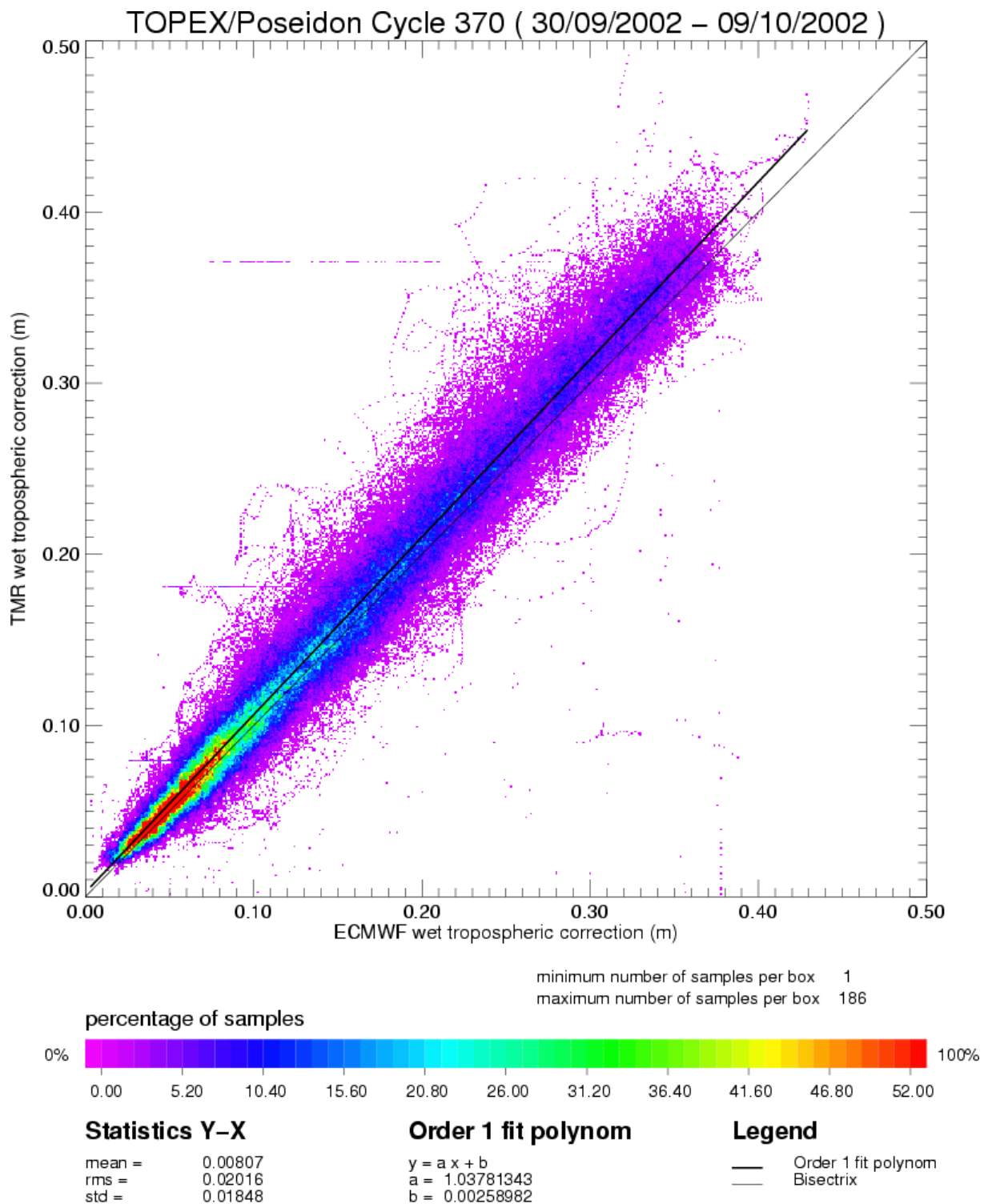
Order 1 fit polynom

$y = a x + b$
 $a = 0.57405394$
 $b = 0.01496944$

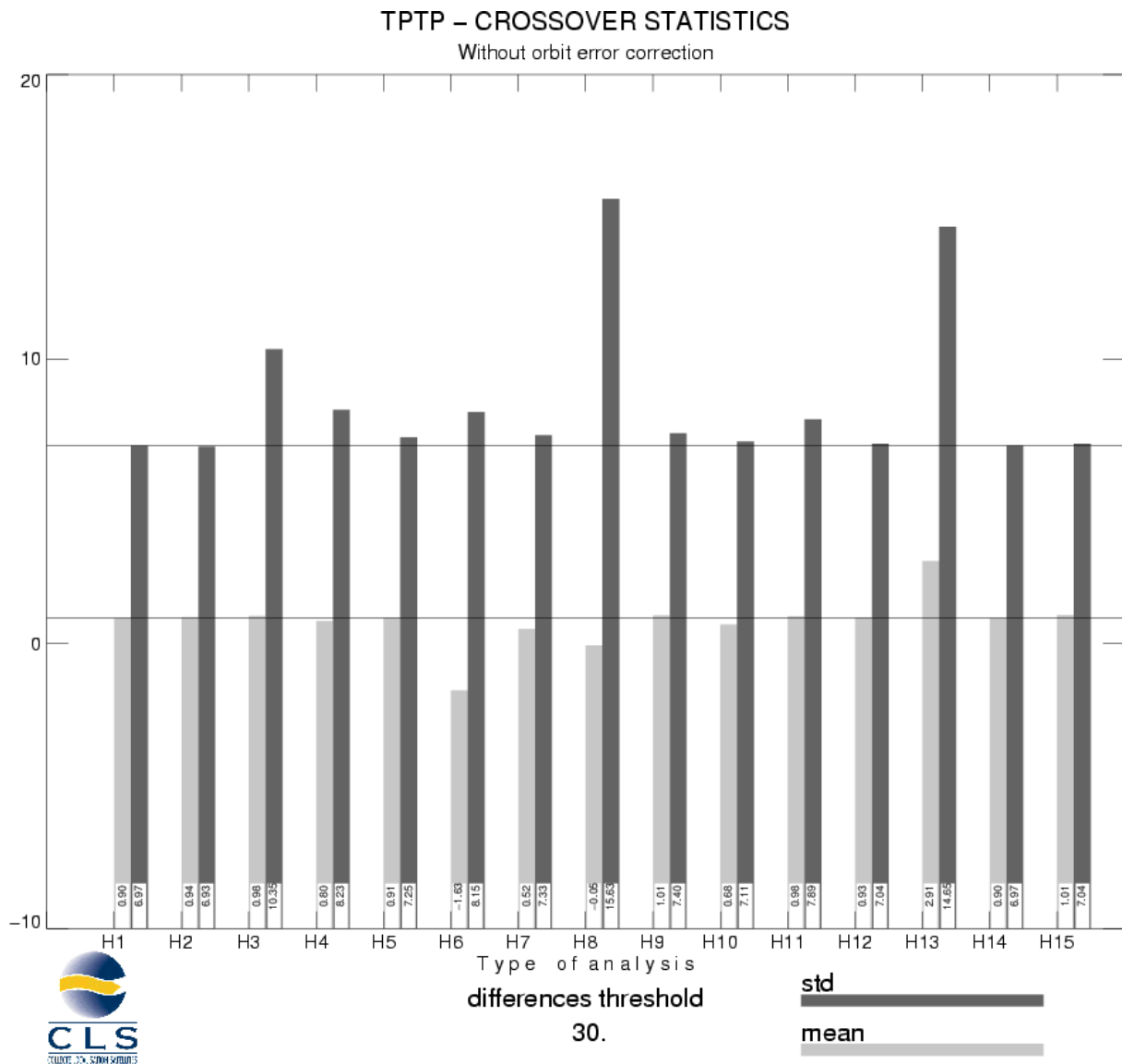
Legend

— 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

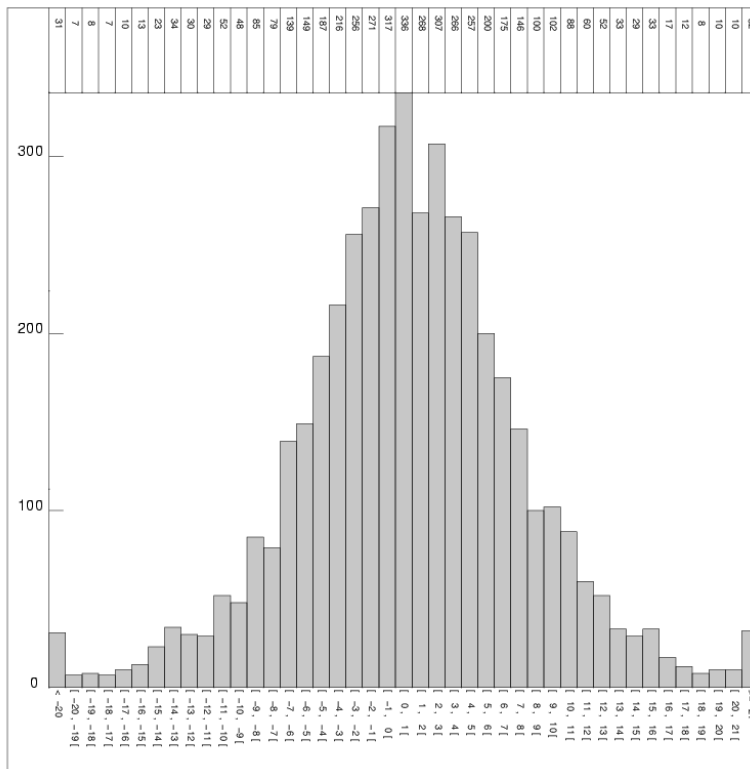
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.4000
 Valeur maximale : 27.6000
 Différence Max – Min: 57.0000
 Nombre de points lus: 4674
 Nombre de points sélectionnés: 4532
 Moyenne : 0.902257
 Ecart-type : 6.96833
 Moyenne Quadratique : 7.02650

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TPTP – CROSSOVER STATISTICS

With orbit error correction

SSH = Corrected sea surface height

RAPPEL DES SELECTIONS

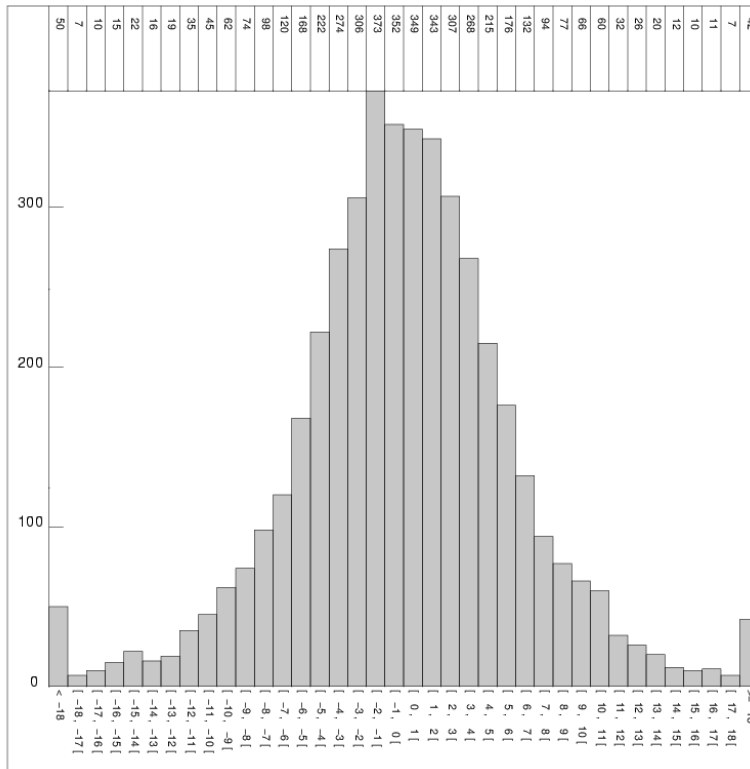
Type de points de croisement: TPTP
 Zone géographique (deg): -90 / 90 , 0 / 360
 Seuil sur les écarts d'analyse 0.00 (moy)
 30.00 (seuil)
 Selection(s) sur les champs :
 CL Arc 1 :=INTERP_SPLN
 CL Arc 2 :=INTERP_SPLN
 Seuil Min +: 0.0000000
 Seuil Max : 0.0000000

Selection(s) sur les écarts :
 Aucune

RESULTATS STATISTIQUES

Valeur minimale : -29.3700
 Valeur maximale : 29.8900
 Différence Max – Min: 59.2600
 Nombre de points lus: 4674
 Nombre de points sélectionnés: 4515
 Moyenne : -0.00919600
 Ecart-type : 6.29981
 Moyenne Quadratique : 6.29982

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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

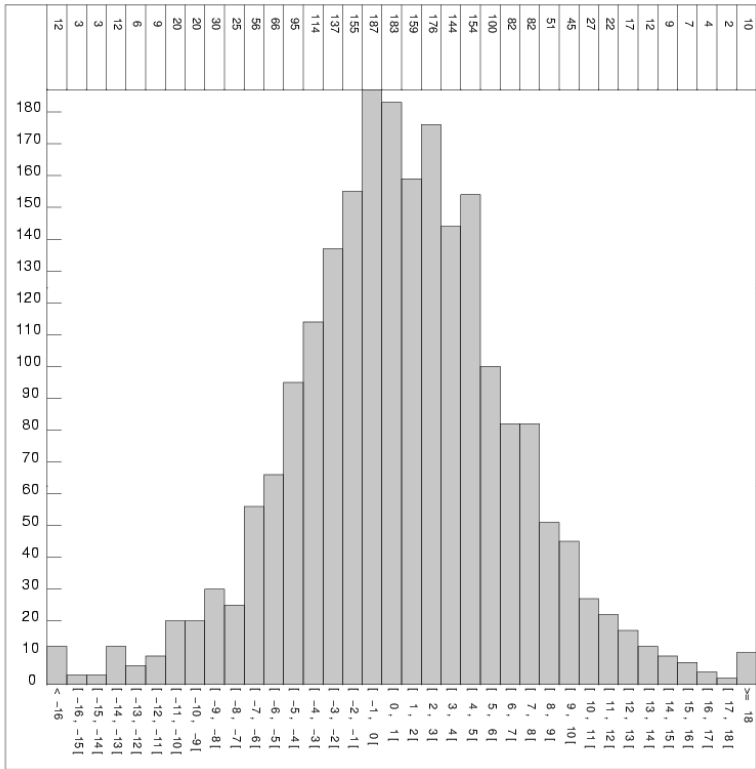
RAPPEL DES SELECTIONS

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 : -40.5100
 Valeur maximale : 36.1600
 Différence Max – Min: 76.6700
 Nombre de points lus: 2455
 Nombre de points selectionnes: 2236
 Moyenne : 0.977379
 Ecart-type : 5.71927
 Moyenne Quadratique : 5.80218

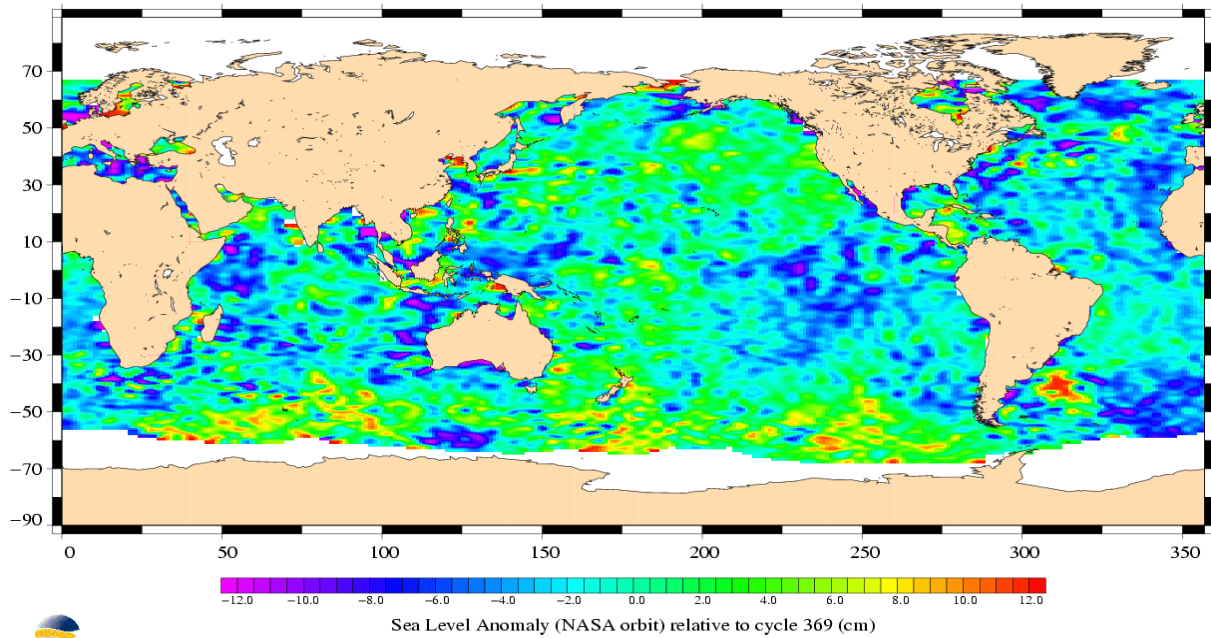
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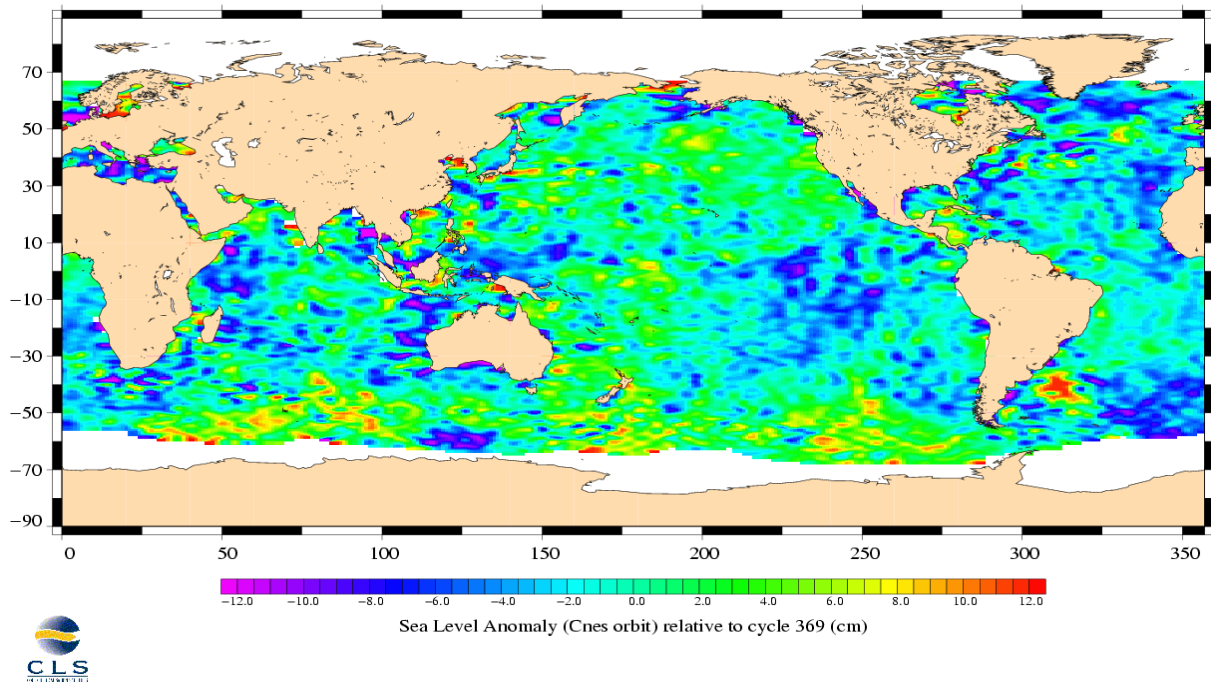
3.8 SSH variability

3.8.1 Sea Level Anomaly

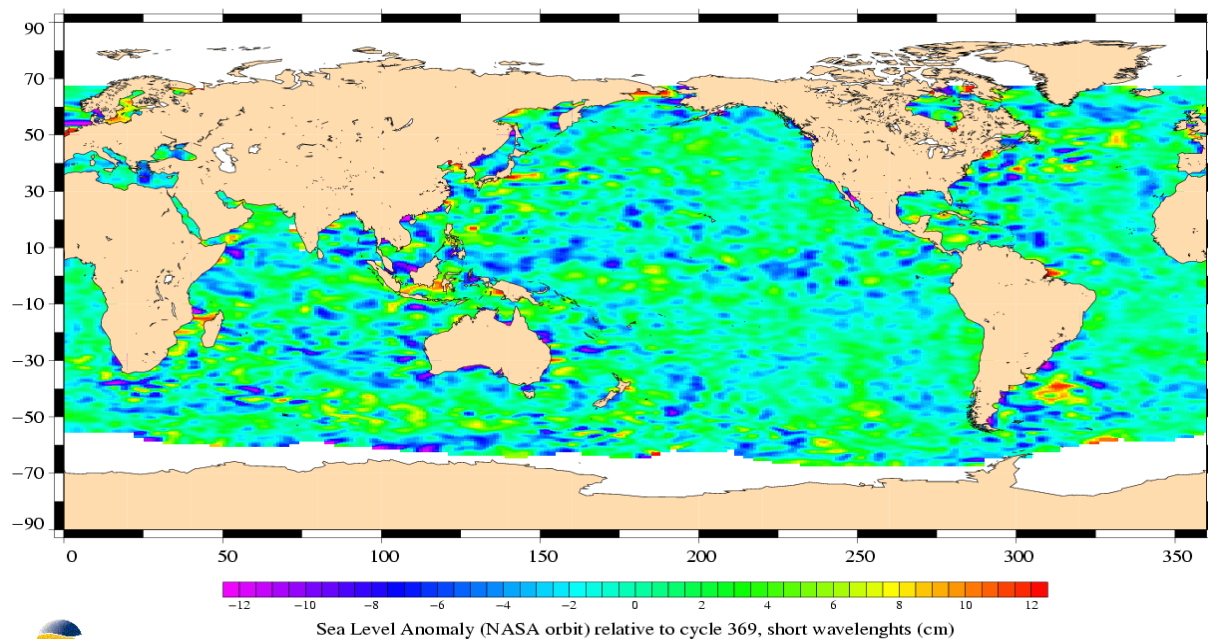
TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002



TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002



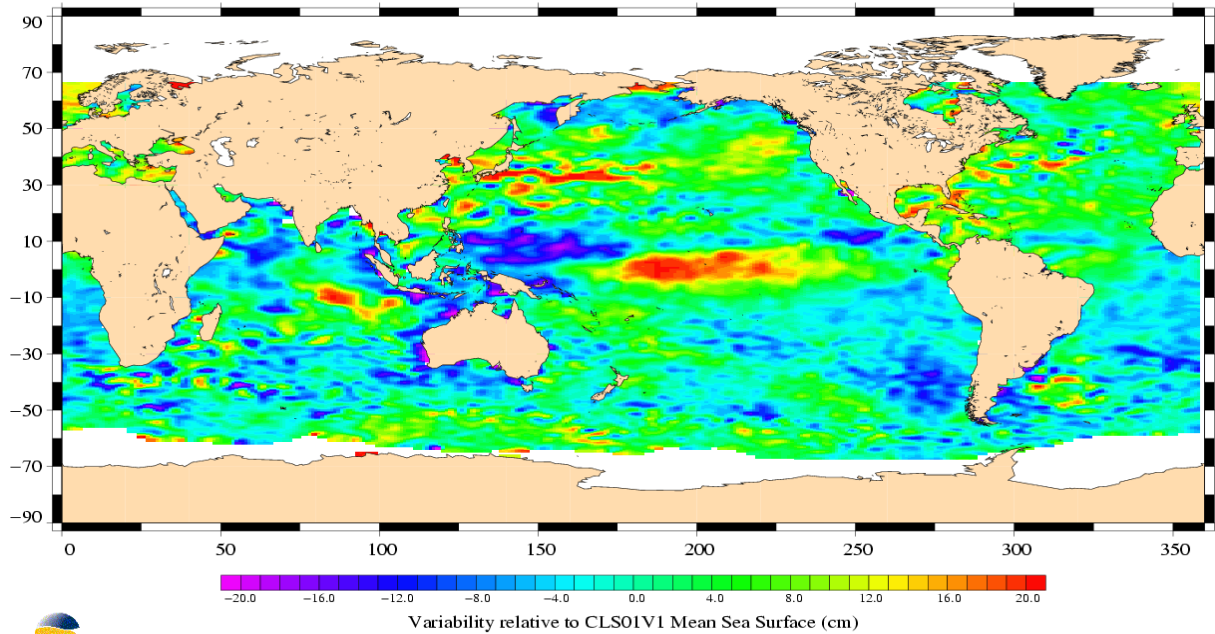
TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002



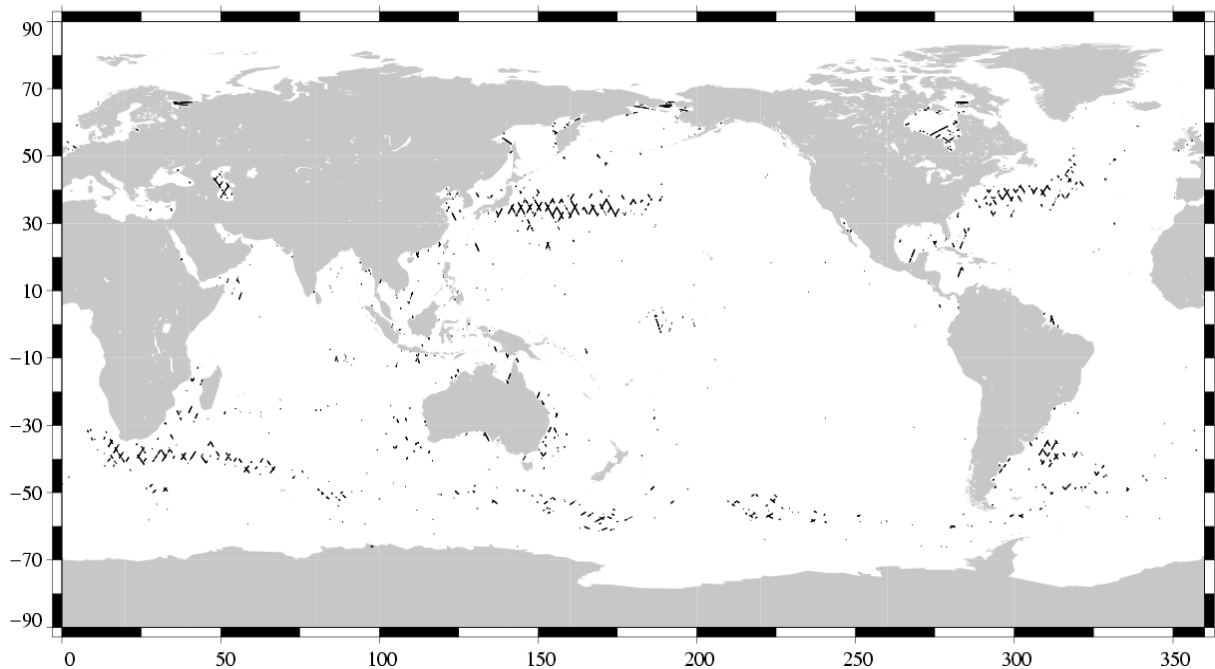
3.8.2 Comparison to a precise Mean Sea Surface

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 370
Period : 30/09/2002 – 09/10/2002

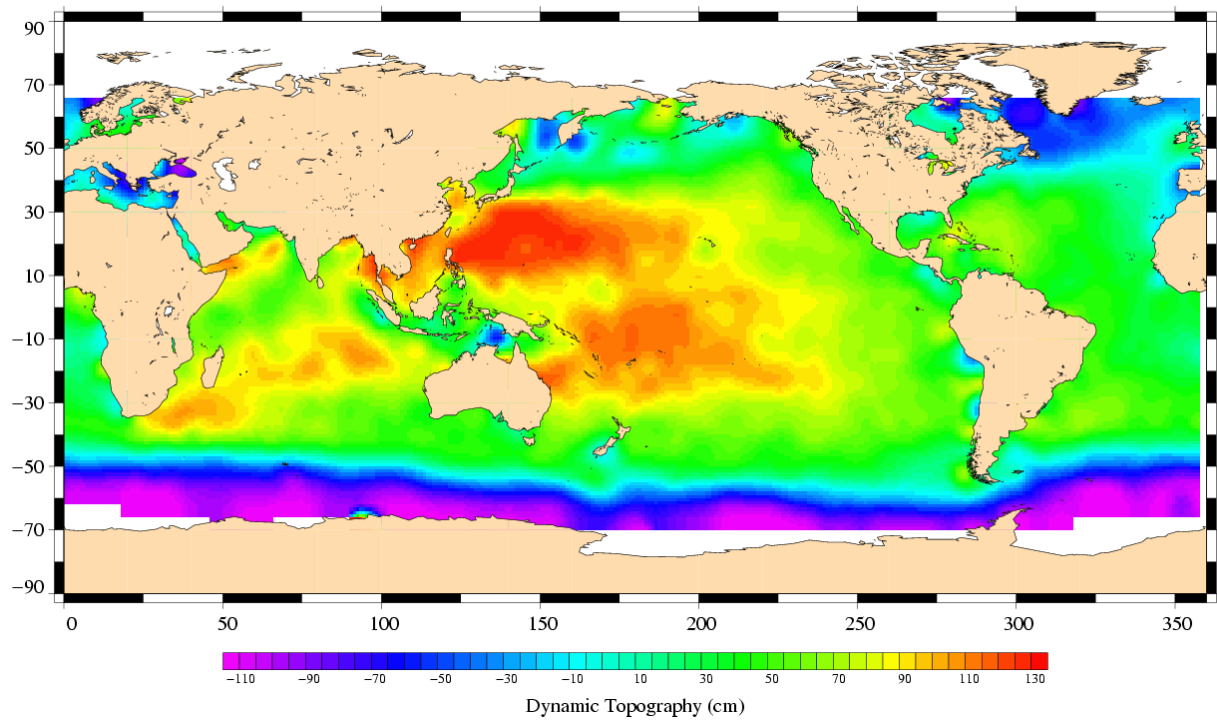


(SSH – MSS) differences greater than 0.3 m
TOPEX/Poseidon Cycle 370 (30/09/2002 / 09/10/2002)



3.9 Dynamic topography

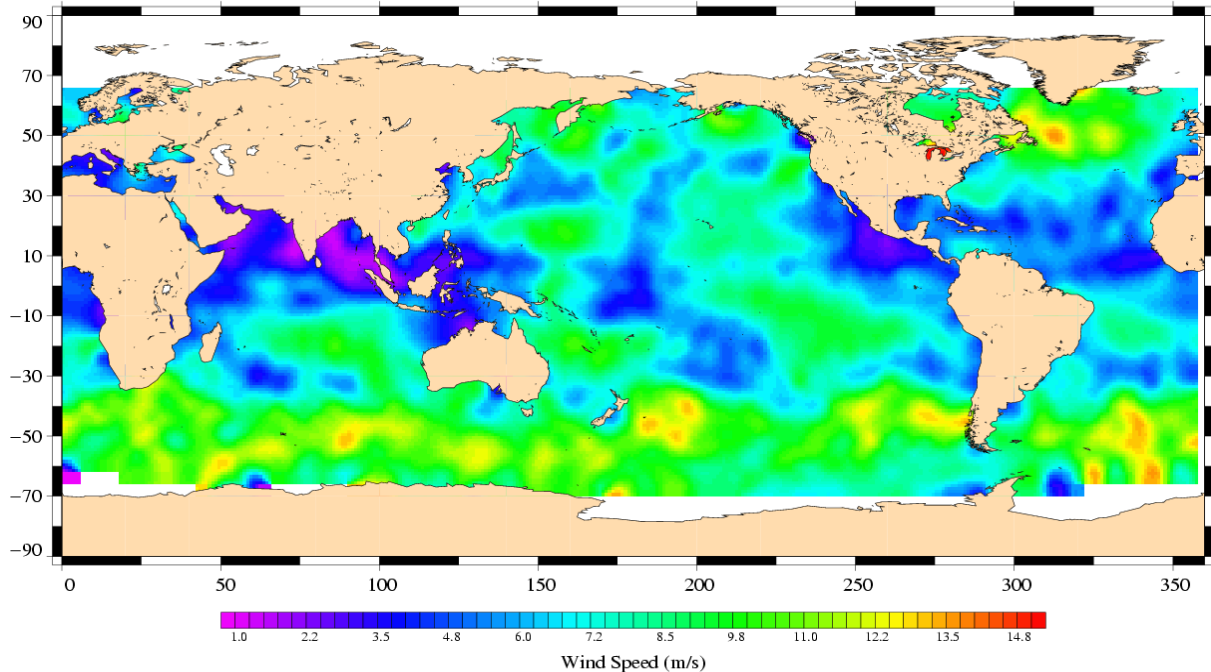
TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002



3.10 Wind and wave maps

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

TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002



TOPEX/Poseidon, cycle 370
Period : 30/09/2002 – 09/10/2002

