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D O C U M E N T

document title/ titre du document

A S A R C Y C L I C R E P O R T  
F E B R U A R Y – M A R C H 2 0 0 4  
C Y C L E S 2 4 & 2 5



S U M M A R Y F O R T H E U S E R S

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prepared by/ <i>préparé par</i>	ASAR Team
reference/ <i>référence</i>	ENVI-CLVL-EOPG-TN-04-0008
issue/ <i>édition</i>	1
revision/ <i>révision</i>	0
date of issue/ <i>date d'édition</i>	16-04-2004
status/ <i>état</i>	
Document type/ <i>type de document</i>	Technical Note
Distribution/ <i>distribution</i>	

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# 1. EXECUTIVE SUMMARY

This document summarises the instrument and product quality status as derived from data acquired during February and March 2004.

No major anomalies have been experienced during this period. The list of unavailability periods is provided in Chapter 2. This chapter provides also information on the low rate BRM mission planning, which has been updated to fully integrate the Global Monitoring Mode.

The attitude stability has been dramatically improved since mid December 2003. The decreasing trend in the Doppler Centroid frequency has been corrected as well as the daily discontinuity at about 15:00 UTC. Details on the Doppler Centroid evolution are provided in Chapter 2.

Radiometric stability is measured by means of ASAR and Radarsat transponders. Detailed results are provided in Chapter 3.

Some updates of auxiliary files have been performed during this period. Details are provided in Chapter 4 and 5.

## 2. INSTRUMENT STATUS

No major anomalies experienced during this period.

### 2.1 UNAVAILABILITIES

Unavailability report reference	Start	Stop	Planned	Description
EN-UNA-2004/0050	4 Feb 2004 02:40:00.000 Orbit = 10092	4 Feb 2004 08:01:00.000 Orbit = 10095	Yes	Planned Instrument Unavailability due to OCM manoeuvre
EN-UNA-2004/0053	9 Feb 2004 03:27:37.000 Orbit = 10164	9 Feb 2004 13:13:07.000 Orbit = 10169	No	Switch-down to heater refuse mode owing to watchdog error on all tiles.
EN-UNA-2004/0059	14 Feb 2004 09:24:34.000 Orbit = 10239	14 Feb 2004 11:06:01.000 Orbit = 10240	Yes	Antenna reset due to average temperature OOLs
EN-UNA-2004/0068	23 Feb 2004 13:04:00.000 Orbit = 10370	23 Feb 2004 13:08:33.000 Orbit = 10370	Yes	ASAR unavailable due to a planned antenna reset
EN-UNA-2004/0079	3 Mar 2004 10:00:57.000 Orbit = 10497	3 Mar 2004 10:06:51.000 Orbit = 10497	Yes	Antenna reset due to average temperature anomaly on tile D2
Unavailability report reference	Start	Stop	Planned	Description
EN-UNA-2004/0086	10 Mar 2004 14:36:27.000 Orbit = 10600	10 Mar 2004 14:40:45.000 Orbit = 10600	Yes	ASAR Antenna reset due to temperature anomalies
EN-UNA-2004/0095	19 Mar 2004 12:03:47.000 Orbit = 10727	19 Mar 2004 15:00:30.000 Orbit = 10729	No	ASAR back to Operations after being in Pre-Op/Refuse Mode due to an RF s/s convertor level error.
EN-UNA-2004/0102	24 Mar 2004 02:45:17.000 Orbit = 10793	24 Mar 2004 05:39:41.000 Orbit = 10795	No	ASAR back to measurement from PREOP/REFUSE (TR parity error)
EN-UNA-2004/0108	7 Apr 2004 02:47:33.000 Orbit = 10993	7 Apr 2004 10:06:06.000 Orbit = 10998	No	All PSUs on tile A4 switched off causing transition to HEATER REFUSE
EN-UNA-2004/0111	14 Apr 2004 02:45:00.000 Orbit = 11094	14 Apr 2004 13:40:00.000 Orbit = 11100	No	Instrument unavailable due to OCM (Manoeuvre).

## 2.1. LOW RATE BACKGROUND REGIONAL MISSION

The BRM was modified to match, as much as possible, polarisation requirements depending on geographical area as well as to improve the distribution between WV and GM passes. The new BRM definition is provided below:

Mode	Where	Swath	Polarisation
Wave	Over the sea (-15 sec from the coast line), including the Mediterranean Sea	IS2	VV
Global Monitoring	Everywhere else	-	HH over the following areas: - Antarctica extended (1) - Arctic (2) - Greenland - Labrador Sea and North of Canada (3)  VV: - Remaining areas

Some implementation problems have been observed since the start of the new BRM planning. In particular, the area East of Greenland and above 70 deg. latitude is still planned as WV rather than GM.

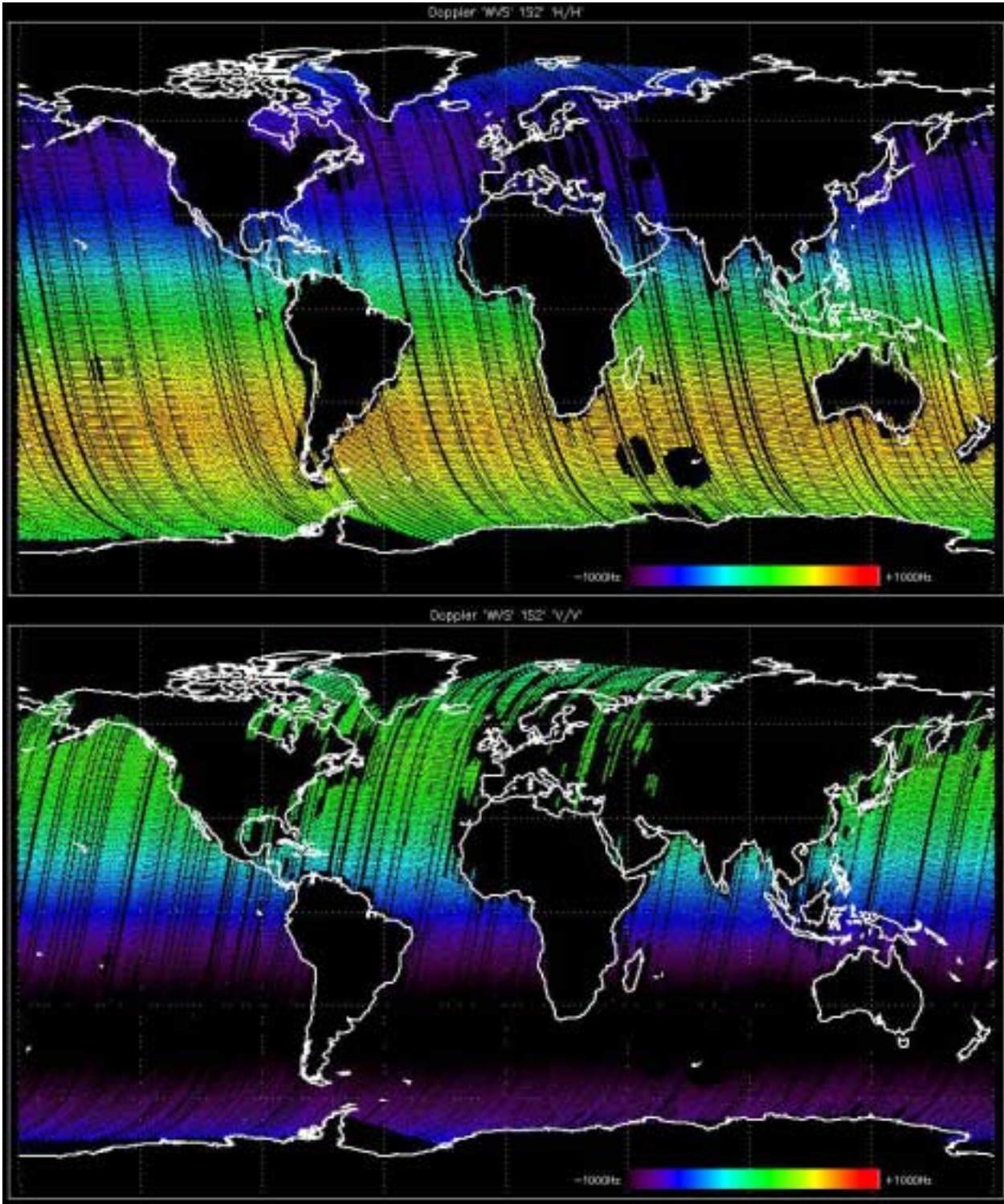
The problem will be corrected on data acquired from 25 April 2004.

## **2. DOPPLER MONITORING**

The continuous decreasing trend in the absolute Doppler Centroid frequency observed since June 2003 has been corrected with the AOCS changes implemented on 11 December 2003.

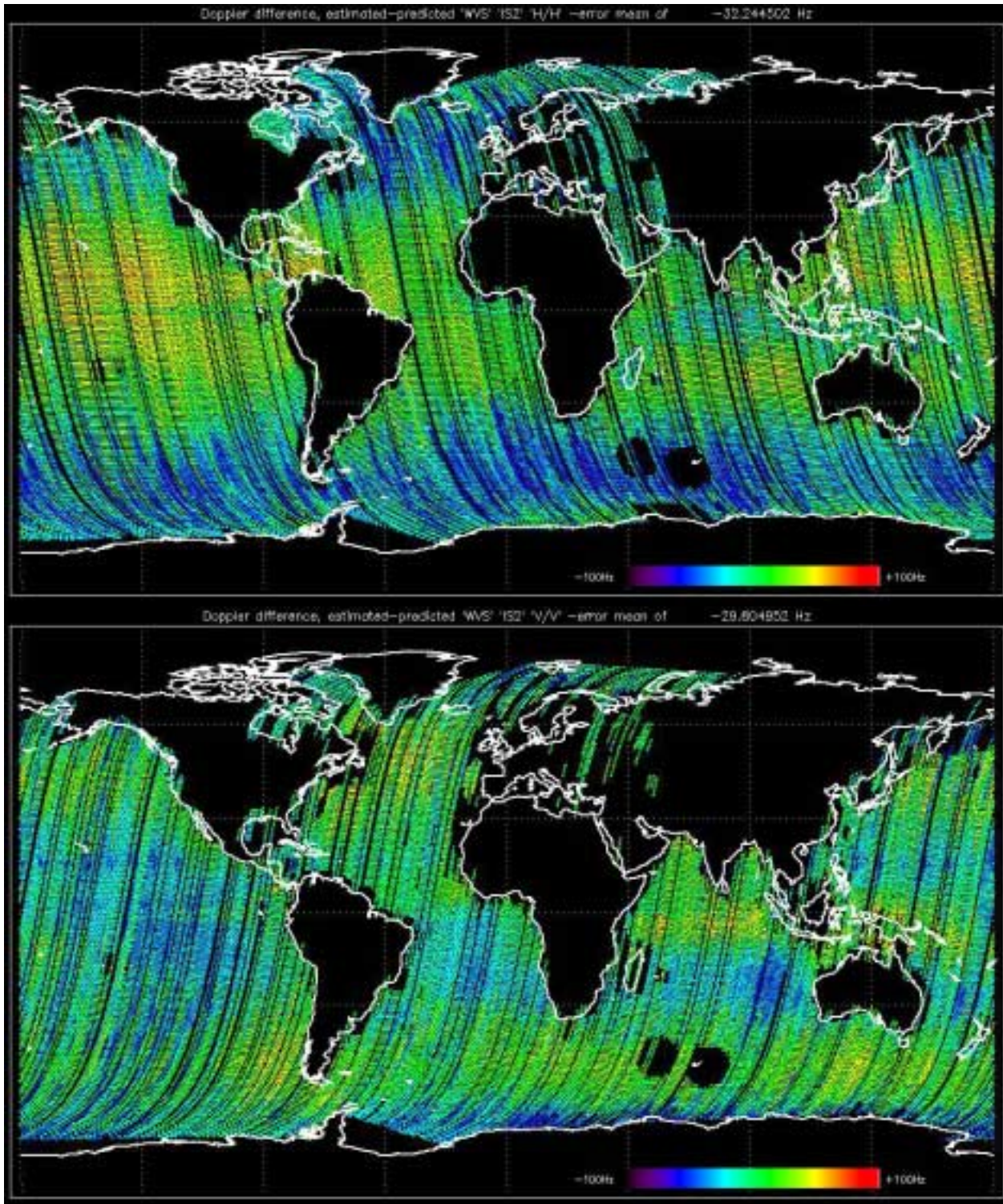
A Doppler discontinuity, previously observed daily at ~ 15:00 hours, has also been removed with the AOCS s/w upgrade.

## 2.1. Absolute WV Doppler Centroid evolution





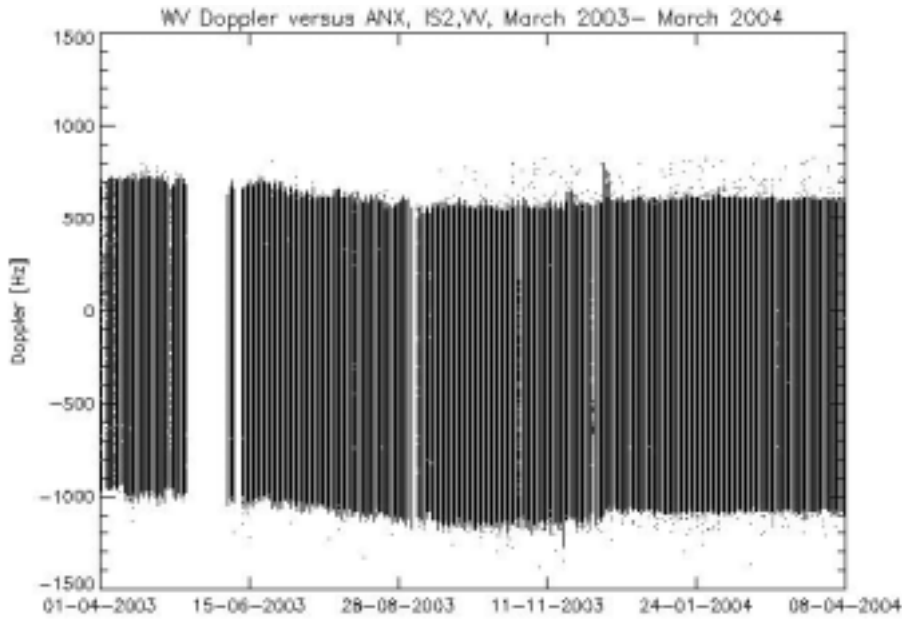
## 2.2. Residual WV Doppler Centroid evolution





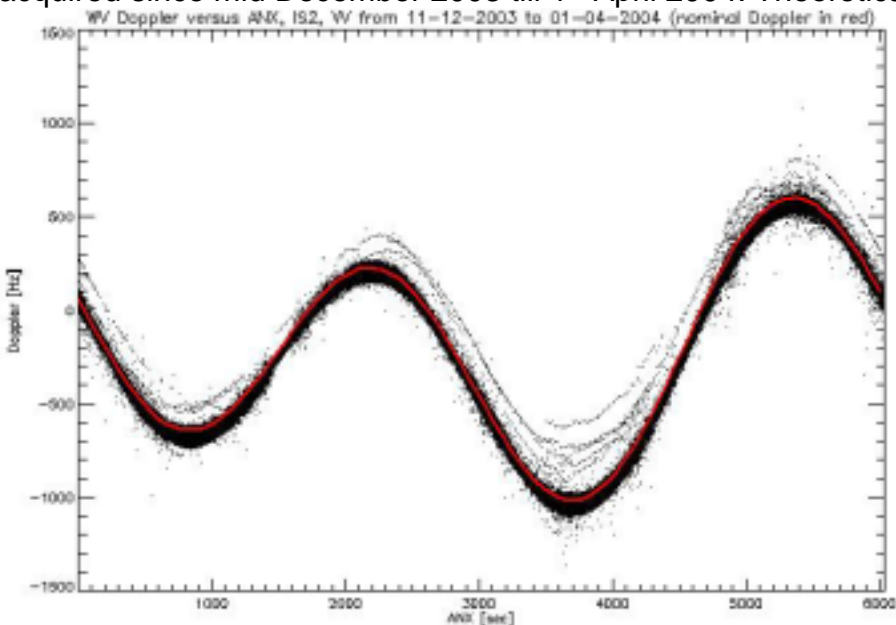
### 2.3. Absolute WV-IS2 Doppler Centroid evolution in time

As observed in the plot below, the decreasing trend in the ASAR Doppler has been corrected with the AOCS s/w upgrade in 11 December 2003. The Doppler has reached a stable level, although with the mean value lower than the mean Doppler early 2003.



### 2.4. Absolute WV-IS2 Doppler Centroid evolution vs ANX

The plot below shows the Doppler evolution (WV, IS2, VV) versus ANX for data acquired since mid December 2003 till 1<sup>st</sup> April 2004. Theoretical Doppler is in red.

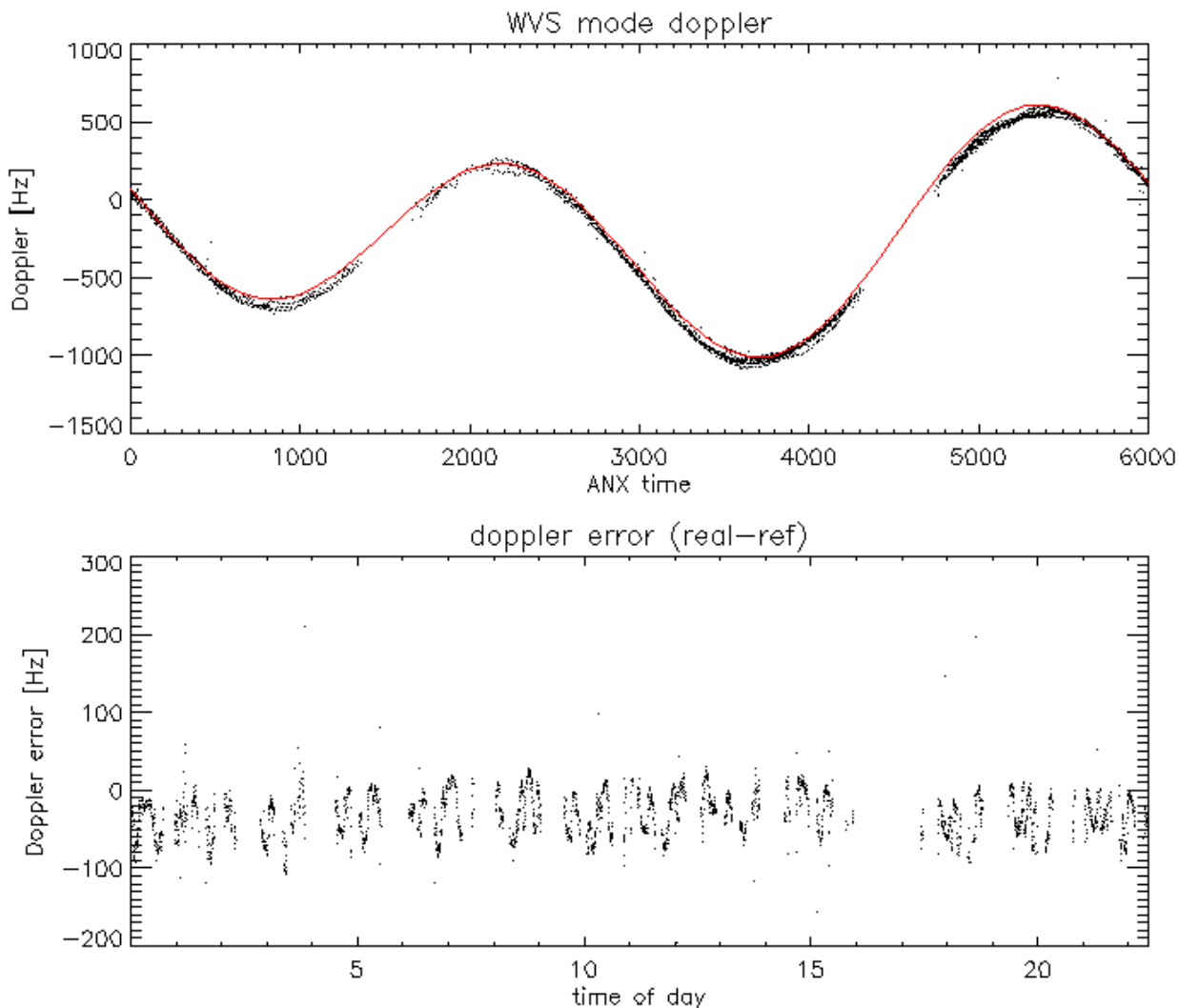


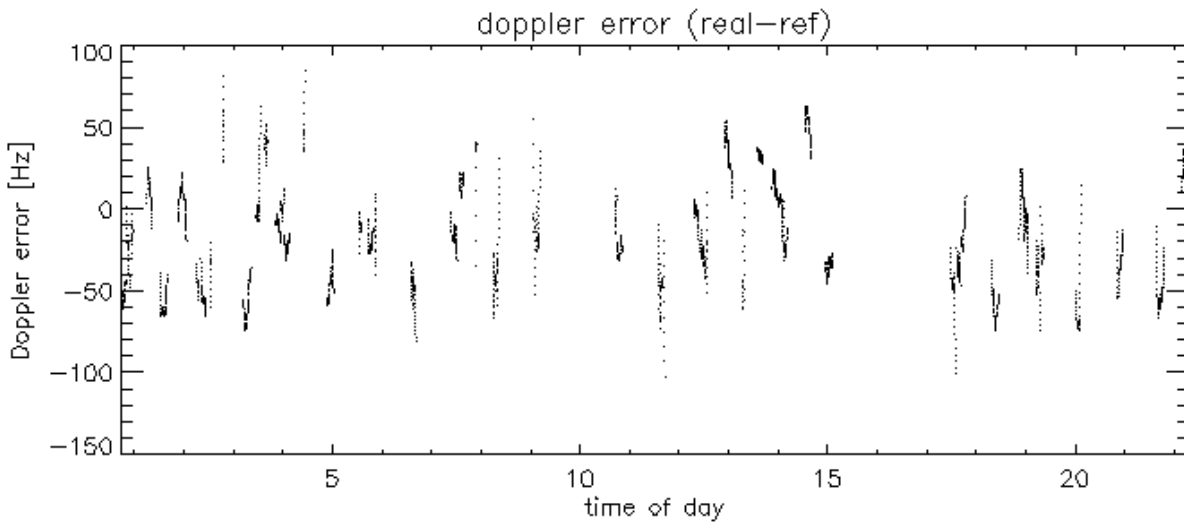
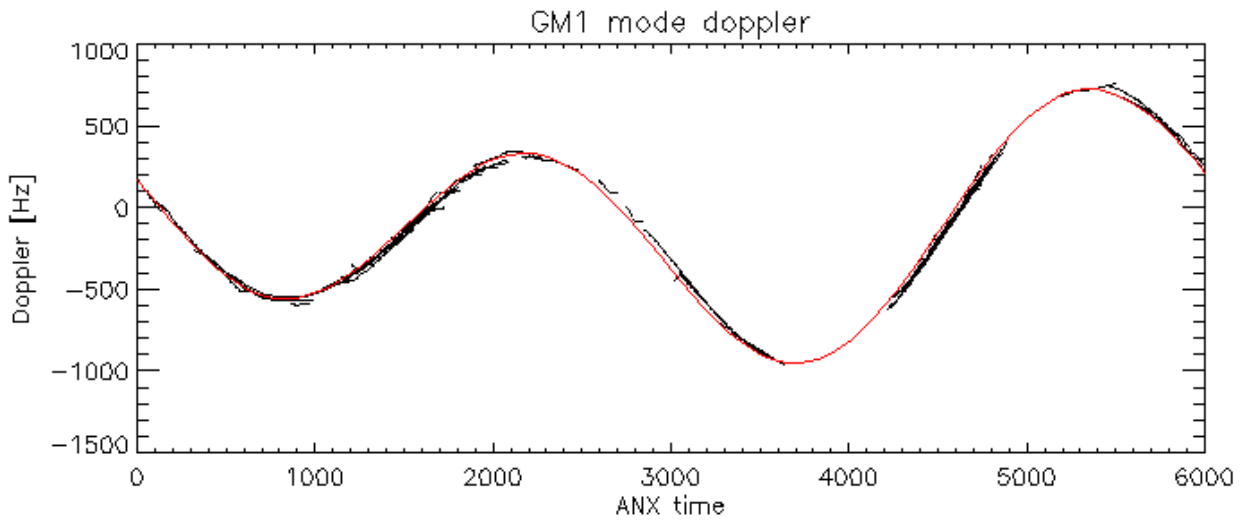
## 2.5. Residual Doppler Centroid evolution vs. time of the day

After the changes in the AOCS software on December 2003, the discontinuity in the ASAR Doppler Centroid frequency, previously observed every day at around 14:00 UTC, has been removed and the constant bias reduced by about 50 Hz.

The plot on the top shows the WV Doppler frequency (top) with respect to the expected frequency (in red) and the residual Doppler (bottom) versus the time of the day (UTC time) for data acquired March 2004.

The plot on the bottom shows the same information but for data acquired in GMM. As it can be observed, the bias is reduced and the discontinuity removed.





### 3. IRF ANALYSIS

The analysis of the impulse response function over the transponders is used to characterize the products in term of spatial resolution and IRF parameters (PSLR, ISLR, SSLR) as well as to monitor the products absolute calibration factor.

ASAR transponders as well as Radarsat transponders are used. The analysis is performed for all the modes, beams and polarisations.

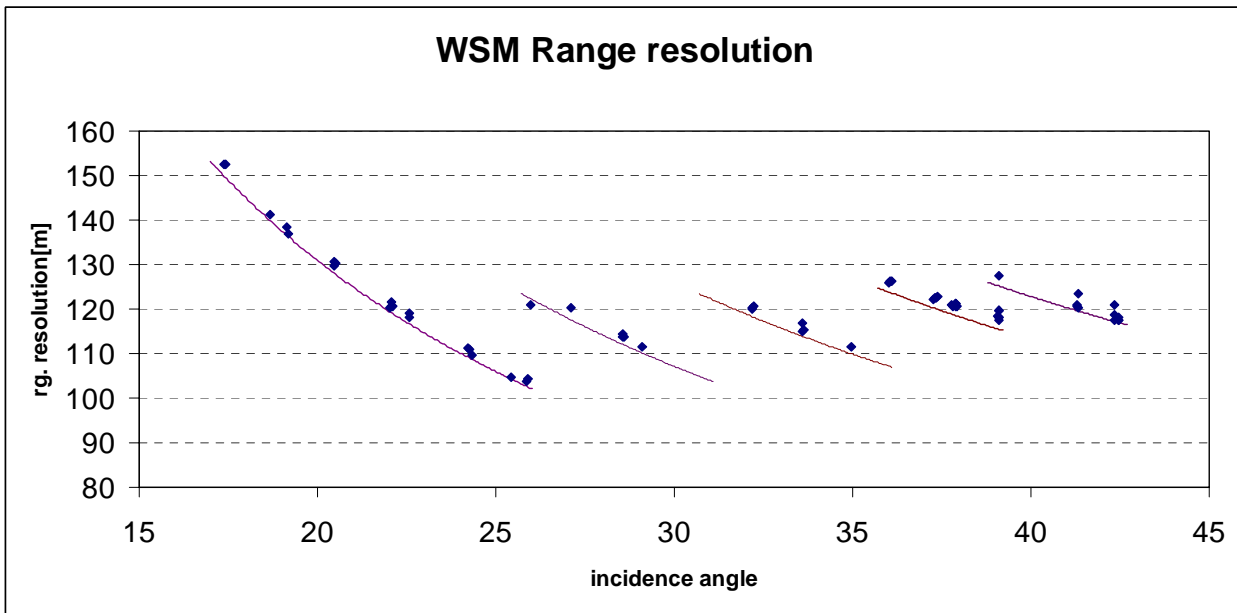
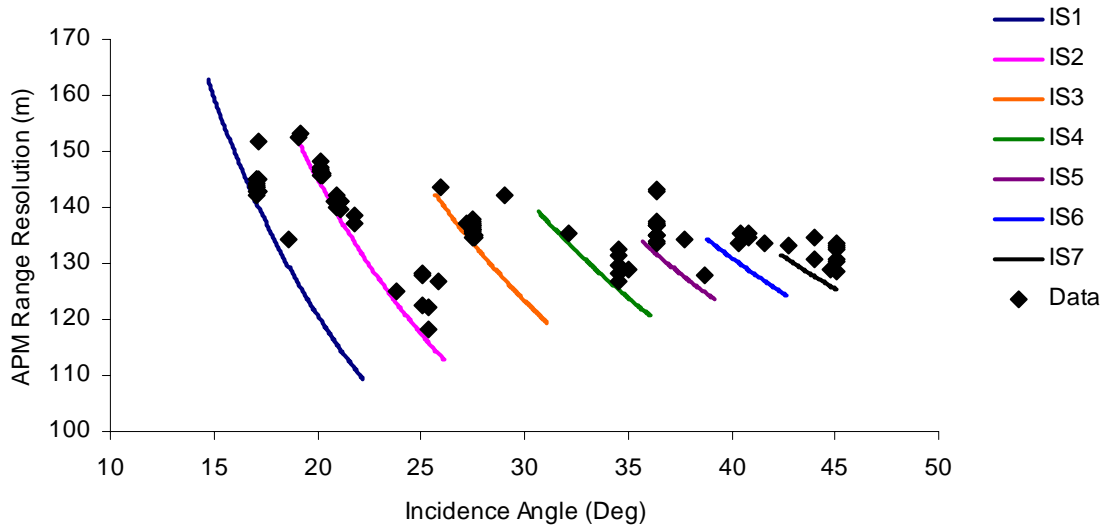
Product Type	Transponder	Relative RCS							
		All Swaths	IS1	IS2	IS3	IS4	IS5	IS6	IS7
IMP	All	0.62±0.94	0.68	0.09	0.81	0.52	1.04	0.56	0.68
	ASAR	0.26±0.41	0.22	0.08	0.10	0.31	0.15	0.59	0.40
	Radarsat	1.01±1.18	1.25	0.15	1.52	0.66	1.95	0.53	0.88
IMS	All	-0.04±0.74							
IMM	All	0.80±0.94							
APP	All	0.63±0.89	0.17	0.47	0.87	0.74	0.34	0.88	0.98
	ASAR	-0.28±0.49	0.07	-0.24	0.47	-0.55	-0.84	-0.28	-0.45
	Radarsat	0.81±0.84	0.18	0.74	0.90	1.24	0.52	1.19	1.14
APS	All	-0.08±0.95							
APM	All	0.36±0.90							

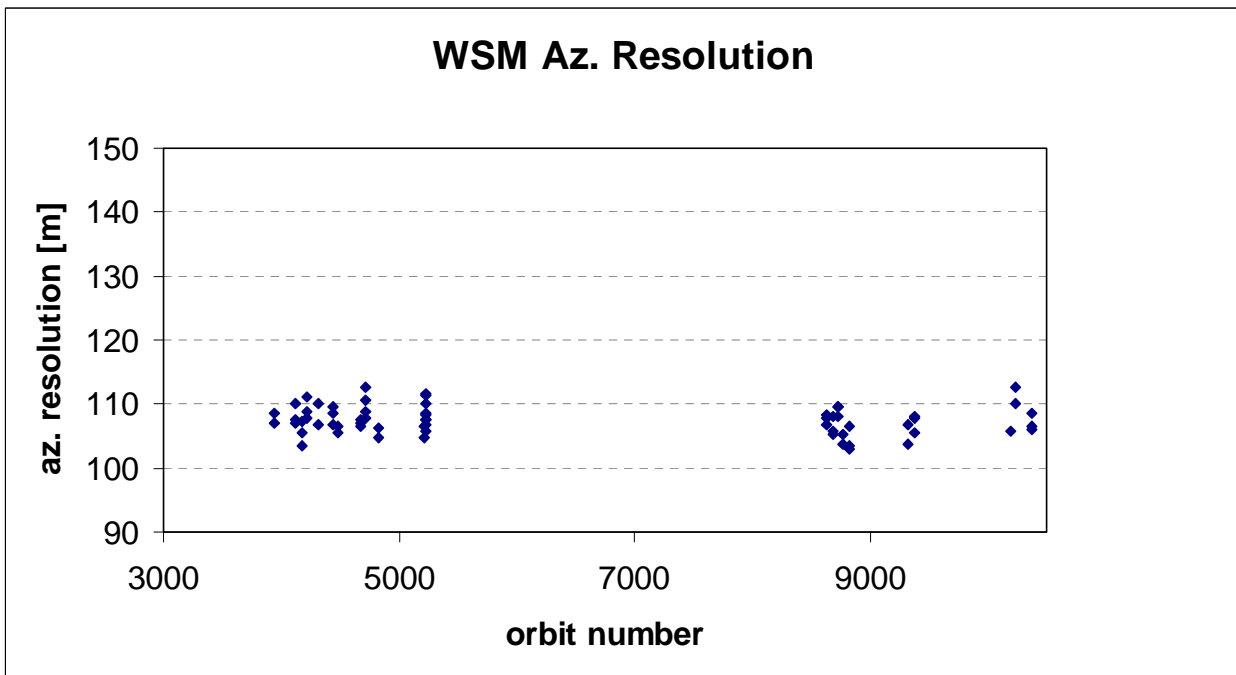
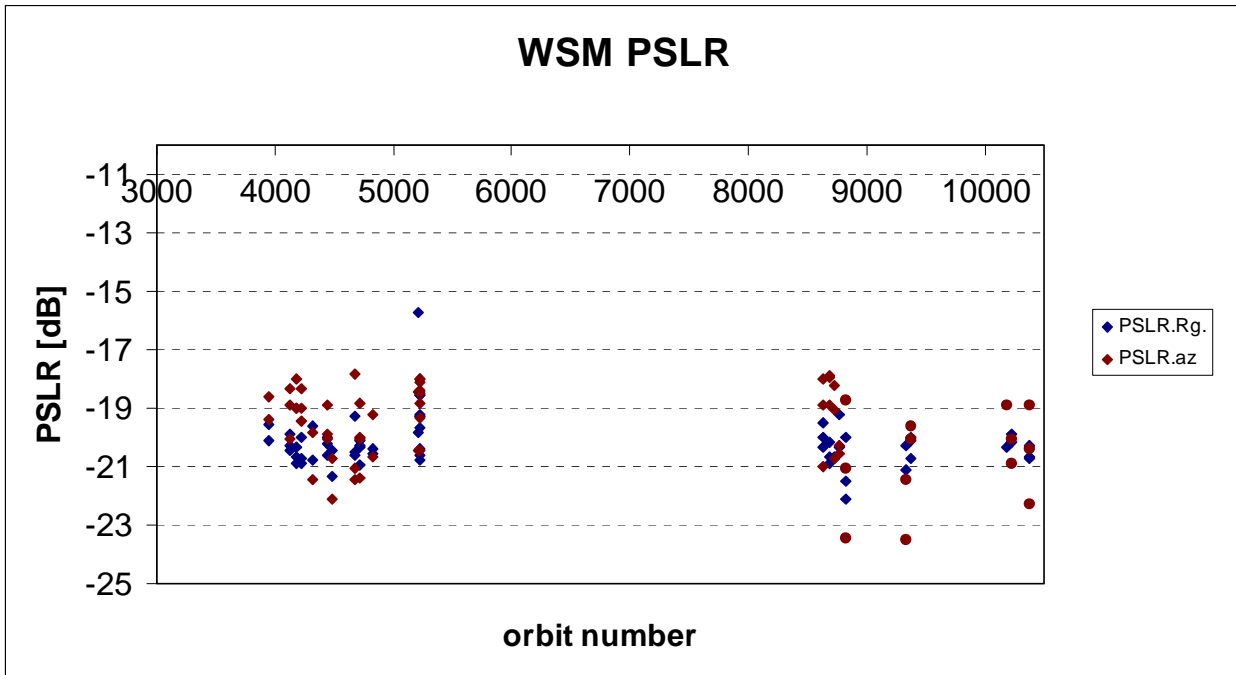
Product Type	Azimuth Res (m)	Range Res (m)	ISLR (dB)	PSLR (dB)	SSLR (dB)	No of Results
IMP	22.07±0.43	Rg.dependent	-13.28±1.37	-16.66±0.87	-22.53±1.82	142
IMG	22.12±0.45	22.7 - 35.4	-13.33±0.75	-16.87±1.05	-23.20±1.57	31
IMS	4.76±0.02 5.57±0.06	9.45±0.07	-14.39±0.27	-19.45±0.67	-28.51±0.79	33
IMM	146.6±3.7	Rg.dependent	-5.86±3.43	-16.00±2.16	-15.30±4.09	65
APP	27.65±0.86	Rg.dependent	-12.17±1.68	-19.00±0.86	-25.72±2.66	290
APG	27.76±0.48	23.2 - 30.3	-13.04±0.44	-19.31±0.85	-27.40±1.64	17
APS	8.42±0.13	4.83±1.76	3.27±2.38	-2.36±1.39	-16.19±4.13	37
APM	143.6±3.8	Rg.dependent	-6.05±6.15	-16.54±1.90	-16.00±6.27	93

Product Type	Range Res [m]	Az. Res [m]	PSLR Rg. [dB]	PSLR Az. [dB]	Relative RCS [dB]
WSM	122.23 (Rg.dependent)	108.51±5.09	-19.99±1.89	-19.38±2.45	-0.20±0.43









## 4. ELEVATION ANTENNA PATTERN MONITORING

Several elevation antenna patterns have been updated. Details are provided in the table below.

Beam	Pol	RECENT ELEVATION ANTENNA PATTERN UPDATES		
SS1	HH	27/08/2003		06/04/2004
SS1	VV	27/08/2003		06/04/2004
IS1	HH		09/12/2003	
IS1	VV		09/12/2003	06/04/2004
IS1	HV			
IS1	VH		09/12/2003	06/04/2004
IS2	HH			06/04/2004
IS2	VV		09/12/2003	06/04/2004
IS2	HV			06/04/2004
IS2	VH			06/04/2004
IS3_SS2	HH	27/08/2003	09/12/2003	
IS3_SS2	VV	27/08/2003		
IS3_SS2	HV			
IS3_SS2	VH			
IS4_SS3	HH			
IS4_SS3	VV			
IS4_SS3	HV			06/04/2004
IS4_SS3	VH			06/04/2004
IS5_SS4	HH	27/08/2003		06/04/2004
IS5_SS4	VV	27/08/2003		
IS5_SS4	HV			06/04/2004
IS5_SS4	VH			06/04/2004
IS6_SS5	HH			
IS6_SS5	VV			
IS6_SS5	HV			06/04/2004
IS6_SS5	VH			06/04/2004
IS7	HH			
IS7	VV			
IS7	HV			
IS7	VH			

## 5. AUXILIARY FILES UPDATES

The most recent updates of auxiliary files are listed below in chronological order:

**[ASA\\_XCA\\_AXVIEC20040406\\_160451\\_20030211\\_000000\\_20041231\\_000000](#)**

Updated elevation patterns for: SS1 HH-VV, IS1 VV-VH, IS2 HH-VV-HV-VH, IS4 HV-VH, IS5 HH-HV-Vh, IS6 HV-VH

**[ASA\\_XCA\\_AXVIEC20040326\\_190217\\_20030211\\_000000\\_20041231\\_000000](#)**

Inserted calibration constant for GMM products: 73.4 dB for HH and 74.0 dB for VV.

**[ASA\\_CON\\_AXVIEC20040322\\_164757\\_20021017\\_130000\\_20041231\\_000000](#)**

Same as last update (20040308): Updated AP Eq. Energy values (different per each polarisation). Changed AP normalisation method from reference energy to equivalent energy. Enable DAR for GM.

**[ASA\\_CON\\_AXVIEC20040308\\_103426\\_20021017\\_130000\\_20041231\\_000000](#)**

Updated AP Eq. Energy values (different per each polarisation). Changed AP normalisation method from reference energy to equivalent energy. Enable DAR for GM.

**[ASA\\_INS\\_AXVIEC20031212\\_122530\\_20020815\\_131000\\_20021017\\_162400](#)**

SWST bias updated.

**[ASA\\_CON\\_AXVIEC20031212\\_122409\\_20021017\\_130000\\_20041231\\_000000](#)**

End validity date extended till 31-12-2004

**[ASA\\_INS\\_AXVIEC20031212\\_105841\\_20021017\\_162400\\_20021030\\_110000](#)**

SWST bias updated

**[ASA\\_CON\\_AXVIEC20031212\\_105603\\_20021017\\_130000\\_20031231\\_000000](#)**

Dates adjusted to previous ASA\_CON\_AX version from 09-09-03.

**[ASA\\_XCA\\_AXVIEC20031209\\_113559\\_20030211\\_000000\\_20041231\\_000000](#)**

End validity time extended until 31 December 2004. Elevation antenna patterns updated for: IS1 VV, IS1 HH, IS1 VH, IS2 VV and SS2\_IS3 HH.

**[ASA\\_INS\\_AXVIEC20031209\\_113421\\_20030211\\_000000\\_20041231\\_000000](#)**

SWST Bias updated. End validity time extended until 31 December 2004.

**[ASA\\_INS\\_AXVIEC20031209\\_113259\\_20021030\\_110000\\_20030211\\_000000](#)**

SWST Bias updated

**[ASA\\_XCH\\_AXVIEC20031209\\_112947\\_20020301\\_000000\\_20041231\\_000000](#)**

End validity time extended until 31 December 2004

**[ASA\\_CON\\_AXVIEC20031209\\_112721\\_20020301\\_000000\\_20041231\\_000000](#)**

End validity time extended until 12 December 2004