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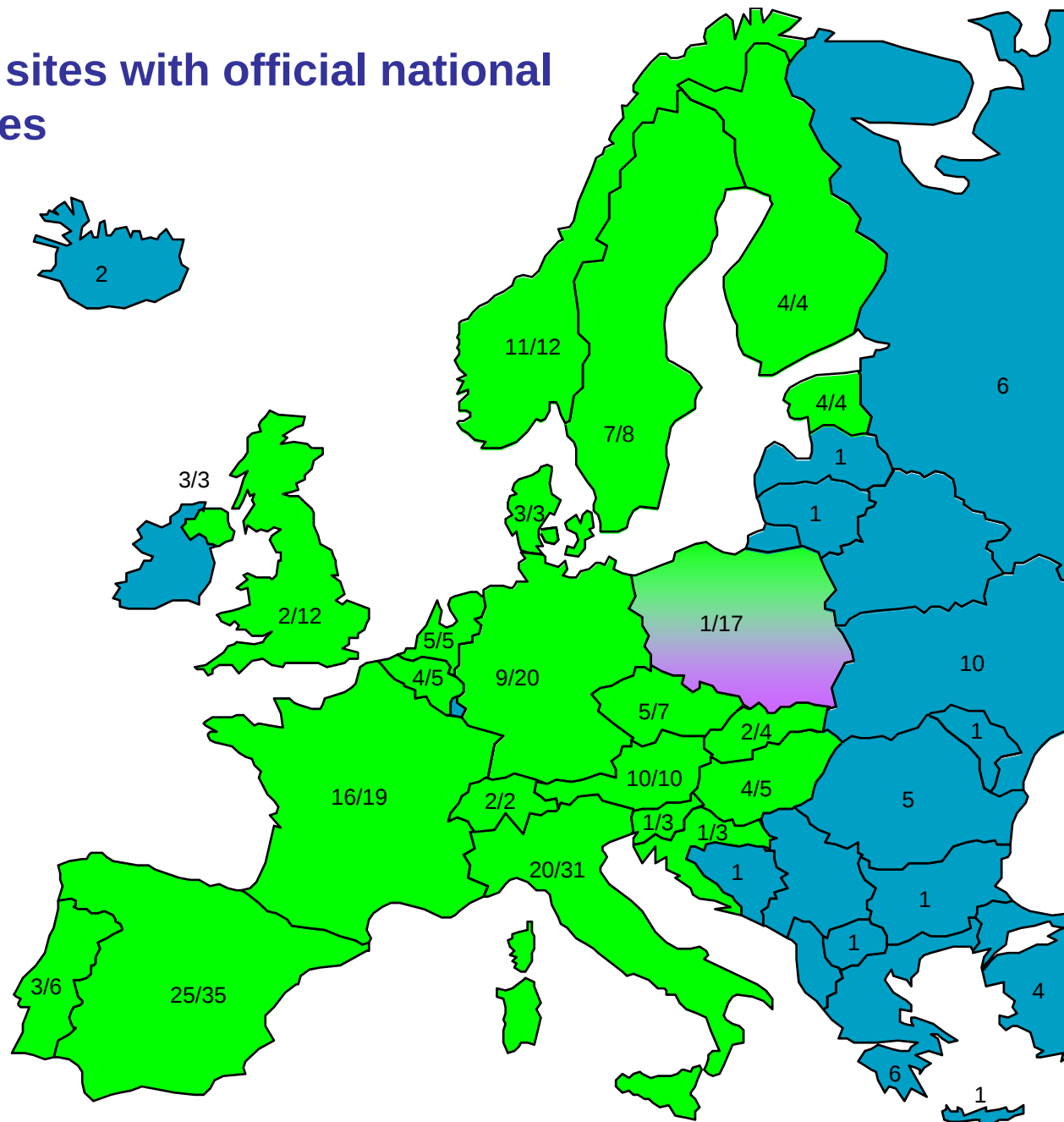
EUREF-TWG Project: Monitoring of official national ETRF coordinates on EPN web

E. Brockmann



Status

- EUREF Symposium in Firenze (May 2009)
 - Presentation + Paper: Pilot Project (15 countries)
 - Resolution No 3
- Padova TWG: 19 countries contributed
- Reminder H. Hornik 13.2. to answer resolutions
 - 15.2. Catalonia contribution to Spanish coordinates
 - 15.2. Poland (but no submission)
 - 18.2. Slovenia
 - 22.2. Estonia
 - 24.2. Norway
 - 3.3. Czech Republic
- All counties agreed to publish their coordinates on the EPN web page



Partly more site
coordinates delivered
(additional national +
outside of the country)

EPN: 1.3.2010



Missing countries (1.3.2010)

Country	(#ETRF/ #EPN)
UKRAINE	(0 / 10)
RUSSIAN FEDERATION	(0 / 6)
GREECE	(0 / 6)
ROMANIA	(0 / 5)
TURKEY	(0 / 4)
GREENLAND	(0 / 4)
ISRAEL	(0 / 2)
ICELAND	(0 / 2)
MOROCCO	(0 / 2)
MOLDOVA, REPUBLIC OF	(0 / 1)
CYPRUS	(0 / 1)
ARMENIA	(0 / 1)
JORDAN	(0 / 1)
MACEDONIA	(0 / 1)
LATVIA	(0 / 1)
BULGARIA	(0 / 1)
BOSNIA AND HERZEGOWINA	(0 / 1)
LITHUANIA	(0 / 1)



Reference solutions

1. for this “call of participation”: ITRF05 densification solution of the EPN
 - published in Dec. 2008
 - data from 0860 – 1355 [same as ITRF2005, Dec. 2005; before Nov. 2006 (week 1400)] **EPN_ITRF_C1355.SNX**
 - based on relative antenna phase center variations
 2. Reference solution with more frequent updates are provided (Kenyeres, 2009); every 15 weeks updates; absolute PCVs; actually combination is week 1555;
EPN_A_ITRF_C1555.SNX
- ITRF2005 -> ETRF2000(R05) transformation
 - only class-A stations are compared

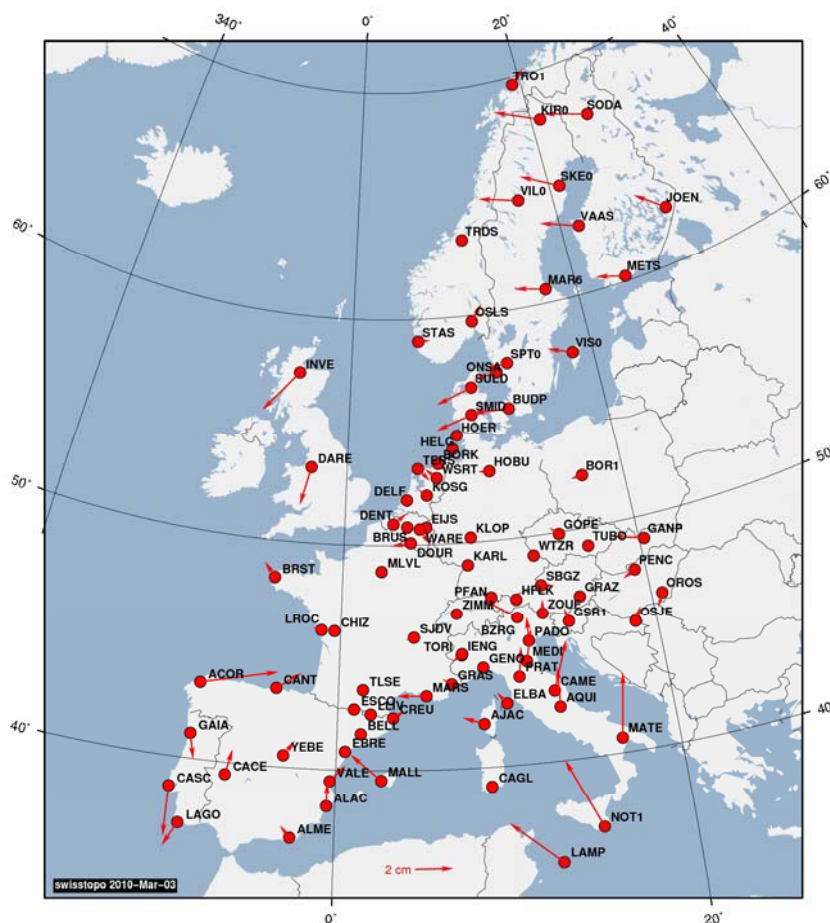


Comparison with 2 EPN reference sol.: Horizontally

EPN_ITRF_C1355.SNX

epoch 2000.0

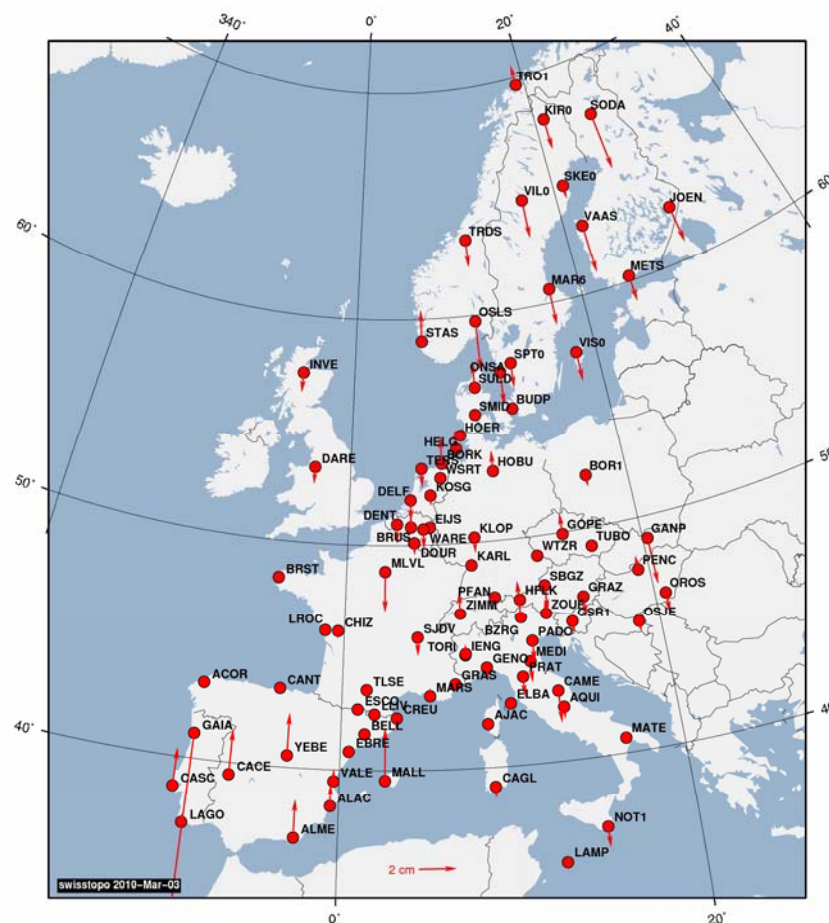
91 stations



EPN_A_ITRF_C1555.SNX

epochs spec. by countries

115 stations



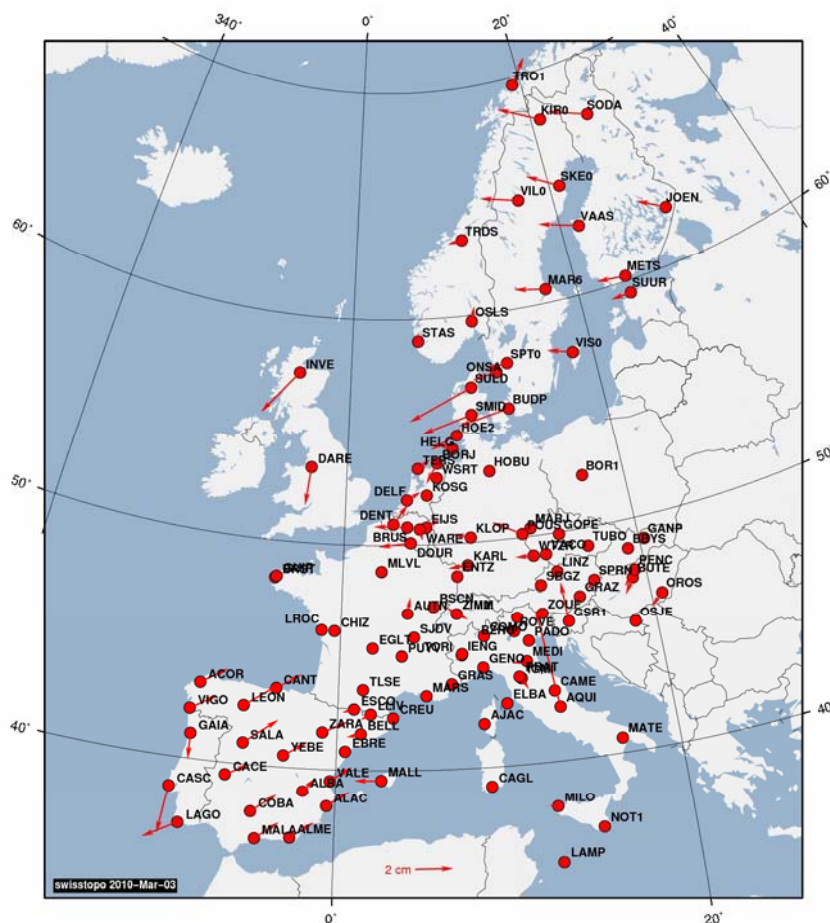


Comparison with 2 EPN reference sol.: Vertically

EPN_ITRF_C1355.SNX

epoch 2000.0

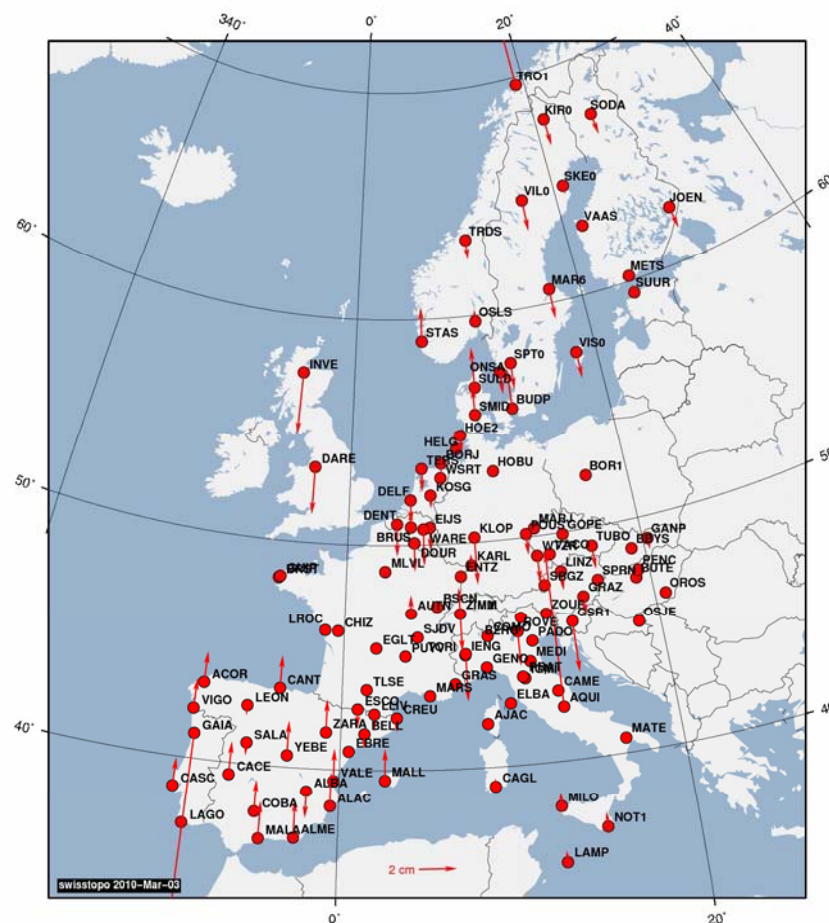
91 stations



EPN_A_ITRF_C1555.SNX

epochs spec. by countries

115 stations





Remarks of the results

- Countries did a great job computing ETRF coordinates for permanent EPN stations !!!
- Generally: No problems detected for the “additional” countries

BUT 2 exceptions

GAIA, Portugal: Antenna height reference problem

AQUI, Italy: Abruzzo earthquake

AQUI

- Combined solution C1555: still class A (till 2009/199, week 1540); Earthquake (2009/029, week 1526); jump setup
- Coordinate differences of more than 10 cm.
- Corrective action: official national coordinates need to be updated.
- Nice example to give from EUREF feedback to the countries!!!



AQUI: Abruzzo Earthquake

dx 1002/2009: 3 cm

dz 1002/2009: 10 cm

EUREF has classified AQUI (L'Aquila, Italy) as a **class A station** which means that it can be used as fiducial station for EUREF densifications.

Latest release

EPN_A_ETRF2000_C1555.SSC - EPN_A_ITSF2005_C1555.SSC (December 10, 2009)

ETRF2000	epoch t_0	Position (m)			Velocity (m/y)		
		X	Y	Z	V_x	V_y	V_z
102/2009 - 199/2009	001/2005	4592507.833 ± 0.001	1089876.108 ± 0.000	4276392.676 ± 0.001	-0.0030 ± 0.0001	-0.0007 ± 0.0001	0.0008 ± 0.0001
316/2006 - 101/2009	001/2005	4592507.860 ± 0.001	1089876.108 ± 0.000	4276392.770 ± 0.001	-0.0030 ± 0.0001	-0.0007 ± 0.0001	0.0008 ± 0.0001
287/2001 - 315/2006	001/2005	4592507.854 ± 0.000	1089876.106 ± 0.000	4276392.766 ± 0.000	-0.0031 ± 0.0001	-0.0006 ± 0.0001	0.0008 ± 0.0001

ITSF2005	epoch t_0	Position (m)			Velocity (m/y)		
		X	Y	Z	V_x	V_y	V_z
102/2009 - 199/2009	001/2005	4592507.547 ± 0.001	1089876.365 ± 0.000	4276392.903 ± 0.001	-0.0176 ± 0.0001	0.0185 ± 0.0001	0.0127 ± 0.0001
316/2006 - 101/2009	001/2005	4592507.574 ± 0.001	1089876.366 ± 0.000	4276392.997 ± 0.001	-0.0176 ± 0.0001	0.0185 ± 0.0001	0.0127 ± 0.0001
287/2001 - 315/2006	001/2005	4592507.568 ± 0.000	1089876.363 ± 0.000	4276392.993 ± 0.000	-0.0176 ± 0.0001	0.0185 ± 0.0001	0.0127 ± 0.0001

Previous releases

EPN_A_ETRF2000_C1540.SSC - EPN_A_ITSF2005_C1540.SSC (August 15, 2009)

EPN_A_ETRF2000_C1525.SSC - EPN_A_ITSF2005_C1525.SSC (September 17, 2009)

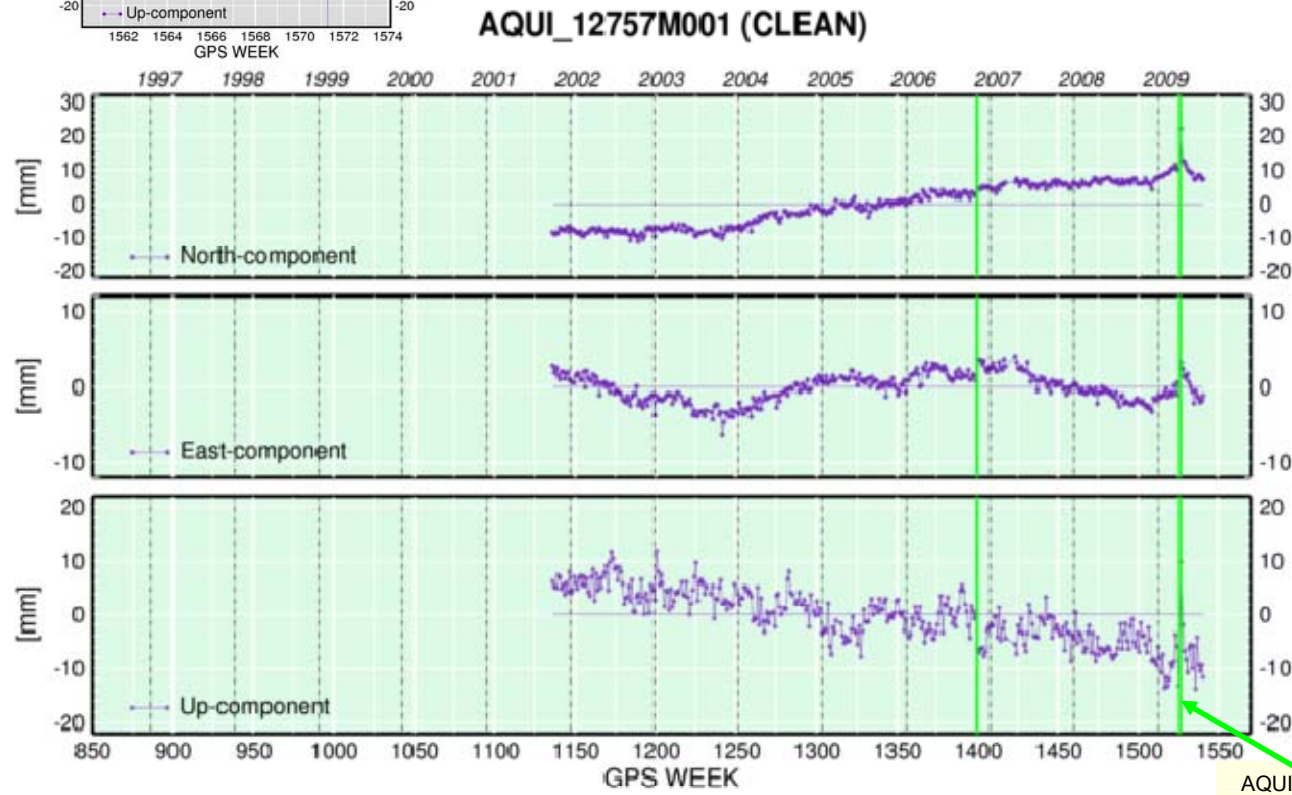
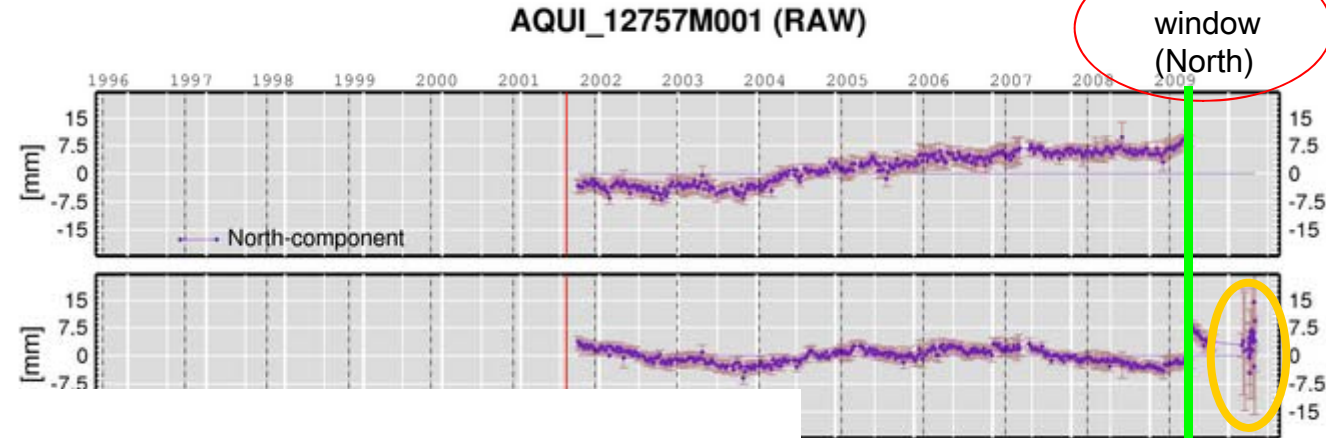
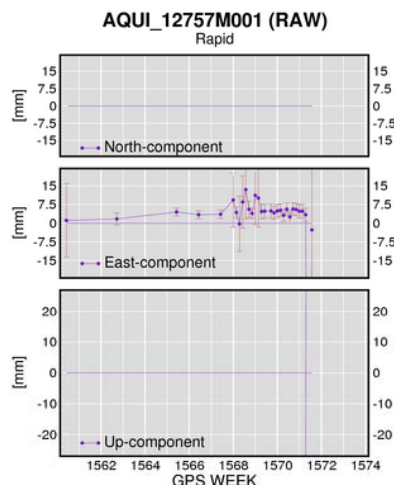
EPN_A_ETRF2000_C1510.SSC - EPN_A_ITSF2005_C1510.SSC (September 17, 2009)

EPN_ETRF_C1355.SSC - EPN_ITSF_C1355.SSC (December 12, 2008) (see [The EUREF Densification of the ITSF2005](#))

ETRF2000	epoch t_0	Position (m)			Velocity (m/y)		
		X	Y	Z	V_x	V_y	V_z
287/2001 - 365/2005	001/2000	4592507.869 ± 0.001	1089876.109 ± 0.000	4276392.762 ± 0.001	-0.0029 ± 0.0002	-0.0006 ± 0.0001	0.0007 ± 0.0002

ITSF2005	epoch t_0	Position (m)			Velocity (m/y)		
		X	Y	Z	V_x	V_y	V_z
287/2001 - 365/2005	001/2000	4592507.656 ± 0.001	1089876.270 ± 0.000	4276392.930 ± 0.001	-0.0174 ± 0.0002	0.0185 ± 0.0001	0.0126 ± 0.0002

Outside window (North)



Not yet in C1555

Outside window (Height)

Tue Feb 23 04:14:43 2010

Inconsistency tables

AQUI	A	1	P	01:287:00000	06:309:00000	P	-	ITRF2005/APCV
AQUI	A	2	P	06:309:00000	09:096:00000	P	-	Abruzzo EQ
AQUI	A	3	P	09:096:00000	09:200:00000	P	-	
AQUI	A	1	P	01:287:00000	09:200:00000	V	-	

EPN_TS

Thu Dec 10 15:47:2009

Monitoring of official national ETRF coordinates on EPN web
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Planned activities



- Resolution 3 regarded as completed (Europe almost covered; bigger part of East Europe missing)
- Preparation to make these “official national ETRF coordinates” and the results of the comparisons on the EPN web page visible ([EPNCB <-> E. Brockmann](#))

http://www.epncb.oma.be/_trackingnetwork/coordinates/stationcoordinates4onestation.php?station=XXXX

1. POSITIONS/VELOCITIES PUBLISHED BY EUREF

2. POSITIONS/VELOCITIES PUBLISHED BY THE IERS

3. POSITION PUBLISHED WEEKLY IN THE EPN COMBINED SOLUTION

proposed →

4. POSITIONS PUBLISHED BY THE COUNTRY



Planned activities (2)

- Automated comparisons with scientific coordinates derived within EPN based on 15-weekly updated accumulated solution (Kenyeres et al., 2009) or last weekly EPN combination (Habrich, 2008); possibly with a feedback to the countries (-> AQUUI). ([E. Brockmann](#))
- Development of an update mechanism of coordinate changes (e.g. as established with station log) ([EPNCB <-> E. Brockmann](#))





Resolution 3

- The IAG Reference Frame Sub-commission for Europe (EUREF)
- *Considering*
 - the importance of ETRS89 and its future maintenance
 - and the importance of the national realisations of ETRS89 in use today
- *invites* the member countries of EUREF to submit coordinates of EPN stations in their national realisation of ETRS89 to the TWG before **September 15, 2009**.



“Instructions” for national representatives

National ETRF coordinates for EPN stations of ALL countries desirable (if no objection against publication):

- **Send country file CCC_YYYYMMDD.ETRF** (CCC: national 3-character ISO 3166 code, YYYYMMDD: year, month and day of the information update to:
elmar.brockmann@swisstopo.ch
- **till September 15, 2009**
- Example file:
http://www.swisstopo.admin.ch/swisstopo/geodesy/pnac/divers/etrf_monitor/CCC_YYYYMMDD.ETRF
- Thanks to your kind cooperation !

Paper copies of the present status and all necessary information are available



File format for information exchange



File name: CHE_200810021.ETRF

Station D0MES	X	Y	Z	Frame	Epoch	valid from	to
-----*	-----**	-----**	-----**	-----**	-----**	****	****
-----*	-----**	-----**	-----**	-----**	-----**	****	****
-----*	-----**	-----**	-----**	-----**	-----**	****	****
ZIM2 14001M008	4331300.1443	567537.0824	4633133.4977	ETRF93	1993 01 01	2007 11 09	
ZIMM 14001M004	4331297.3388	567555.6380	4633133.7174	ETRF93	1993 01 01	1988 01 01	



File name: SWE_200903013.ETRF

Station D0MES	X	Y	Z	Frame	Epoch	valid from	to
-----*	-----**	-----**	-----**	-----**	-----**	****	****
-----*	-----**	-----**	-----**	-----**	-----**	****	****
-----*	-----**	-----**	-----**	-----**	-----**	****	****
KIR0 10422M001	2248123.5038	865686.5326	5886425.5943	ETRF97	1999 07 01	1993 08 01	
MAR6 10405M002	2998189.7132	931451.5886	5533398.4735	ETRF97	1999 07 01	1993 08 01	
ONSA 10402M004	3370658.8318	711876.9387	5349786.7450	ETRF97	1999 07 01	1999 02 02	
SKE0 10426M001	2534031.1978	975174.4040	5752078.3436	ETRF97	1999 07 01	1993 08 01	
SPT0 10425M001	3328984.8136	761910.0660	5369033.4748	ETRF97	1999 07 01	1995 12 01	2007 06 08
SPT0 10425M001	3328984.8211	761910.0677	5369033.4857	ETRF97	1999 07 01	2007 06 08	
VIL0 10424M001	2620258.8912	779137.9797	5743799.2762	ETRF97	1999 07 01	1993 08 01	
VIS0 10423M001	3246470.5614	1077900.3132	5365277.9025	ETRF97	1999 07 01	1993 08 01	