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Monitoring of official national ETRF coordinates on EPN web

E. Brockmann and many contributors



Milestones

- Oct. 2008 Frankfurt: Idea was born at LAC workshop
- Nov. 2008 Munich: Proposal TWG to start pilot project with 15 countries
- May 2009 Florence: Presentation pilot project and resolution asking all countries to contribute
- May 2010 Gävle: Presentation beta web pages 22 countries
- August 17, 2010: Publication on EPN-web



Country reactions final publication on August 17, 2010



- Spain: Discussion about official coordinates
Decision to wait with publishing coordinates on the EPN web if IGN Spain finished coordination work among different Spanish / Catalan / ... organizations
- Greece: no publishing of coordinates on EPN-web preferred



Coordinate web page (Example BOR1)

BOR1_12205M002

Site Description

LOCATION	Borowiec, Poland
	
LOG FILE	bor1_20080310.log (current) <input type="button" value="View"/>
PICTURES	
OPERATIONAL CENTRE	Information not yet available
OTHER NETWORKS	IGS, TOS, EGN
EPN INCLUSION	Since 365/1995 (GPSweek No 0834).
INACTIVITY PERIODS	None
COORDINATES	Published positions/velocities in ITRS and ETRS89

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



Example page BOR1

1. POSITIONS/VELOCITIES PUBLISHED BY EUREF

EUREF has classified BOR1 (Borowiec, Poland) as a **class A station** which means that it can be used as fiducial station for EUREF densifications.

Latest release

EPN_A_ETRF2000_C1600.SSC - EPN_A_ITRF2005_C1600.SSC (October 23, 2010)

EPN densif. solution →

ETRF2000	epoch to	Position (m)			Velocity (m/y)		
		X	Y	Z	V _x	V _y	V _z
309/2006 - 254/2010	001/2005	3738358.774 ± 0.000	1148173.500 ± 0.000	5021815.580 ± 0.000	-0.0001 ± 0.0001	-0.0007 ± 0.0000	-0.0003 ± 0.0001
157/1999 - 308/2006	001/2005	3738358.775 ± 0.000	1148173.501 ± 0.000	5021815.581 ± 0.000	-0.0001 ± 0.0001	-0.0007 ± 0.0000	-0.0003 ± 0.0001
182/1996 - 149/1999	001/2005	3738358.779 ± 0.001	1148173.499 ± 0.000	5021815.585 ± 0.001	-0.0001 ± 0.0001	-0.0007 ± 0.0000	-0.0003 ± 0.0001

2. POSITIONS/VELOCITIES PUBLISHED BY THE IERS

3. POSITION PUBLISHED WEEKLY IN THE EPN COMBINED SOLUTION

4. POSITIONS PUBLISHED BY THE COUNTRY

new →

The official ETRS89 coordinates used in Poland are maintained by **GUGIK**. This agency is fully responsible for the information kindly provided to the EPN:

Valid (from - to)	epoch to	Position (m)			Velocity (m/y)		
		X	Y	Z	V _x	V _y	V _z
000/0000 - now	123/2008	3738358.775	1148173.498	5021815.579	NA	NA	NA

Following a recent initiative of the EUREF Technical Working Group ([Monitoring of official national ETRF coordinates on EPN web](#)), the differences between the national coordinates and the latest cumulative EPN solutions (section 1) are regularly monitored. They are given in two maps: [\[horizontal differences\]](#) and [\[vertical differences\]](#).



Comparison with EPN reference solution

157 stations

26 countries

horizontally

vertically

at country
specified epoch





Results

- Different ETRF realizations very homogeneous realized (1-2 cm horizontally, 1-4 cm vertically)
- Countries with movements w.r.t stable part of Europe: reference epoch is important (e.g. Scandinavian postglacial rebound; Italy; Greece; ...)



Planned activities

- Countries responsible for correctness of information!
 - Please send information, if you change national ETRF coordinates!
 - Additional information to be displayed on the EPN web (e.g. national reference frame name)?
 - Development of an update mechanism of coordinate changes (e.g. as established with station log). Update feedback at the moment manually.
- Coordinate Monitoring: At present automated check of the coordinates every 15 weeks. In future possibly automated e-mailing in case of bigger differences.



Thanks for your attention

- Acknowledgment
 - 26 contributing countries and national agencies
 - EPN web team for the support





Missing countries

Country	(#ETRF/ #EPN)
UKRAINE	(0 / 10)
RUSSIAN FEDERATION	(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)
BOSNIA AND HERZEGOWINA	(0 / 1)
countries	Total number of not yet provided stations
14	42

Submitted 22 countries:

83 EPN sites without official national ETRF coordinates (yet) or scientific stations

Status: 4.11.2010



Frame names

COU	Frame Name
AUT	ETRF00
BEL	ETRF2000
CHE	ETRF93
CZE	ETRF2000(R05), ETRF89
DEU	ETRS89
DNK	ETRF92
ESP	ETRF2005
EST	ETRF96
FIN	ETRF96
FRA	ETRF2000(R05)
GBR	ETRF97
HRV	ETRF2000(R05)
HUN	ETRF00
ITA	ETRF2000
LVA	ETRF2000
NLD	ETRF2000
NOR	ETRF97
POL	ETRF2000(R05)
PRT	ETRF97
PRT	ETRF97
SVK	ETRF2000
SVN	ETRF05
SWE	ETRF97

```
$countryframes = array(  
    'ETRF2000(R05)' => 'ETRF2000(R05)',  
    'ETRF2000' => 'ETRF2000',  
    'ETRF00' => 'ETRF00',  
    'ETRF2005' => 'ETRF05',  
    'ETRF05' => 'ETRF05',  
    'ETRF92' => 'ETRF92',  
    'ETRF93' => 'ETRF93',  
    'ETRF96' => 'ETRF96',  
    'ETRF97' => 'ETRF97',  
    'ETRS89' => 'ETRS89',  
    'ETRF89' => 'ETRF89',  
    'ETRF05(R05)' => 'ETRF05(R05),  
);
```

No “translation”, because responsibility is by the countries



Reference solution

1. POSITIONS/VELOCITIES PUBLISHED BY EUREF

EPN reference solutions with frequent updates are provided (Kenyeres, 2009):

- every 15 weeks
- [relative before week 1400] + absolute PCVs
- actually combination is week 1600 (October 23, 2010);
EPN_A_ITRF_C1600.SNX (latest release)

Remarks:

- ITRF2005 -> ETRF2000 using ETRF2000(R05) transformation parameters
- only class-A stations are compared; only most recent station setup is compared; comparison at reference epoch specified by the country



“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)
- 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	DOMES	X	Y	Z	Frame	Epoch	valid from	to
		-----*-----**-----**-----**-----**-----*-----					**yyyy*mm*dd**yyyy*mm*dd**yyyy*mm*dd	
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	DOMES	X	Y	Z	Frame	Epoch	valid from	to
		-----*-----**-----**-----**-----*-----					**yyyy*mm*dd**yyyy*mm*dd**yyyy*mm*dd	
KIRO	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	