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Report on the Results

of the

PL-ETRF2000 project of the ETRS89 densification in Poland

Presented to

EUREF Technical Working Group

May 28, 2013

Budapest, Hungary

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CONTENTS

List of tables:

List of figures:

List of Appendices:

1. Introduction

In 2008 the Head Office of Geodesy and Cartography (hereinafter called "GUGiK") has established ASG-EUPOS (Active Geodetic Network – European Position Determination System) – the Polish multifunctional augmenting system based on permanent reference stations network. During the system development it was necessary to establish an accurate reference frame and to set up its proper relationship to the national reference frame EUREF-89. Since the beginning it was considered that the stations of ASG-EUPOS system should realize the European Terrestrial Reference System (ETRS89) on the territory of Poland. According to resolution No. 2 undertaken by the sub-committee EUREF at EUREF symposium in Gavle, Sweden (June 2, 2010) GUGiK decided that the ETRF2000 will be the reference frame for ASG-EUPOS and geodetic control network as well. The new datum was called PL-ETRF2000 and its realization was based on the GNSS observation data from some EPN stations, all ASG-EUPOS stations and GNSS observations on geodetic control points, performed in 2008 – 2011.

2. Description of the densification project

2.1. Background of the project

Last realization of ETRS89 in Poland, called EUREF-89, was developed by two consecutive GNSS campaigns in which two geodetic reference networks were built. First one, called EUREF-POL, was measured on July 5-8, 1992. During this campaign coordinates of 11 geodetic points were obtained in ITRF91 (epoch 1992.5) and were also transformed to ETRS89. Results of this work were accepted by the IAG EUREF sub-committee in 1994. These points were used as fundamental points during the next GPS campaigns where new 359 points were chosen for densification of ETRS89 on Polish territory. Campaigns were carried out between July 10, 1994 and May 25, 1995. Network created on the basis of these points was named POLREF and was a second order to EUREF-POL.

POLREF network was adjusted together with EUREF-POL points used as fixed points and final coordinates were determined in ETRS89. Since 1996 these geodetic control networks have maintained a national datum ETRF-89 for horizontal network and were used as fixed points for densification of lower order networks being measured either by GNSS or classical methods.

After launching of the ASG-EUPOS system, in order to keep a consistency with ground control networks, the coordinates of reference stations were determined in the ETRS89 from an adjustment performed in ETRF2005 frame on epoch 2008.33. After analysis some discrepancies in coordinates between ETRF2005 and EUREF-89 were discovered and it became clear that the ETRF2005 and EUREF-89 can not be used together. Thus, it was decided to carry out a complex GNSS campaign, which aim was to integrate the reference stations network and the classical ground control networks. Inclusion the EUREF-POL and POLREF network (all points) into this process gave the possibility of defining a common reference frame for all networks called PL-ETRF2000 as well as empiric determination of transformation parameters between the old and new realization of ETRS89 in Poland.

On the Polish territory there are 18 reference stations included to the EPN network. Summary of their lifetime in years is presented on Figure 1. During the densification campaigns 15 EPN sites in Poland had a category A, and

were utilized in datum definition whereas stations with class B: BPDL 12223M001, KRA1 12218M002 and BYDG 12224M001 were used as regular points.

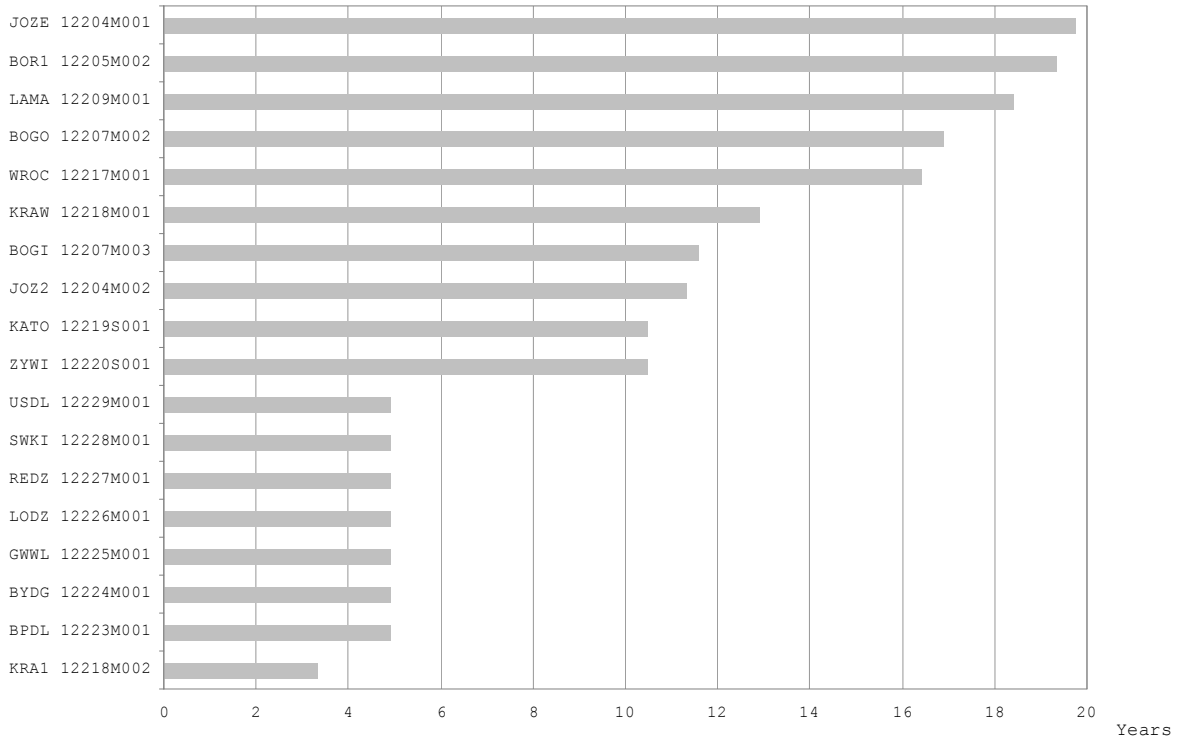

Fig. 1. Operational time of Polish fiducial reference stations working in EPN network (May, 2013)

2.2. List of densification stations and points

Totally 682 sites were included into PL-ETRF200 densification project. There were reference stations and geodetic control points belonging to different type of geodetic networks. We can distinguish some categories of the points according to their type and location:

1) Sites where permanent observations were carried out:
   - fiducial stations located abroad Poland working within EPN network (only class A) – 23 points,
   - fiducial stations located in Poland working within EPN network (class A and B) – 18 points,
   - reference stations of ASG-EUPOS network (excluding EPN sites) located in Poland – 83 points,
   - reference stations located next to the border zone outside Poland working in ASG-EUPOS system but not being managed by the Polish institutions (selected stations from systems: SAPOS, CZEPOS, SKPOS, LITPOS and one station from Ukraine) – 24 points in total,

2) Sites used for campaign observations carry out (all located in Poland):
   - EUREF-POL points on which it was possible to carry out the GNSS measurements – 8 points,
   - POLREF points on which it was possible to carry out the GNSS measurements – 340 points,
   - EUVN points that were not destroyed and on which it was possible to carry out the GNSS measurements – 42 points (10 fundamental points and 32 points of EUVN densification),

- eccentric points for the Polish EPN reference station, located in the close distance of the station from 1 to 1.5 km (either two or one for every station) – 113 points in total,
- points of 1st order horizontal network – 31 points.

All points being in interest of GUGiK were included into densification project but not all of them have been used as the Polish ETRS89 densification.

Reference stations located in neighbouring countries are needed to enlarge area of a reference frame to the borders of Poland and they are also important for the ASG-EUPOS services distribution. The points of lower order network are referenced to POLREF thus they were measured for analysis of accuracy of lower networks. These points must have coordinates expressed in the same datum, thus they were included in the observation campaign but excluded from ETRS89 densification.

Distribution of above described points as well as information about the types of networks are presented in Appendices 1 to 4 and the list of reference station and geodetic control points names is presented in Appendix 5.

2.3. Observation campaigns

GNSS measurements were performed from April 23, 2008 to April 1, 2011 (114/2008 – 091/2011 day of year). GUGiK decided to divide whole work into smaller sub-campaigns because of a large amount of measurements (over 530 field sites) and costs. All sub-campaigns were based on the same survey procedure and parameters, such as:

- observation time for reference station – 24 hour in every day of the campaign,
- observation time for ground control EUREF-POL network – 7 continuous 24 hour sessions,
- observation time for other ground control points – 24 hour session (from 12 till 12 GPST next day) with redundancy – minimum 2 independent sessions (sessions spaced for minimum 24 hours) with usage of different equipment unit,
- elevation cut-off – for all points 0 degree, and
- sampling rate – for all points 5 seconds.

Campaigns were planned for dual-frequency observations using GPS system, but GLONASS measurements were also conducted wherever possible. Final goal was to prepare a cumulative solution for the GPS measurements whereas GPS/GLONASS solutions were performed for checking and analysis purposes. Totally 66 days of observations were carried out.

First part of a densification campaign was conducted between April 23 and May 10, 2008 (114 to 131 day of the year 2008). Beside the reference stations, measurements were included from all EUREF-POL, almost all EUVN (excluding 1 point) and about 120 POLREF points evenly distributed on the Polish territory. As noted above the EUREF-POL points were measured continuously trough seven days, whereas all other points were measured in two 24 hours independent sessions. Second part of the campaign, was preformed mainly in 2010 and due to adverse weather conditions completed in 2011, on the following dates: October 12 – 22, 2010 (285–302/2010), November 4 – 13, 2010 (308–317/2010), December 7 – 14, 2010 (341–348/2010) and March 31 – April 1, 2011 (080–

091/2011). During the campaigns the reference stations the remaining POLREF as well as eccentric points of reference stations were measured.

Observation files and the log files for EPN/IGS fiducial stations for every sub-campaign were downloaded from their original data centres [10][11].

Year	DOY	GPS Week/DOW	Days
2008	114 – 131	1476/3 – 1478/6	18
2010	285 – 302	1605/2 – 1607/5	18
2010	308 – 317	1608/4 – 1609/6	10
2010	341 – 348	1613/2 – 1614/2	8
2011	080 – 091	1628/1 – 1629/5	12
		Total:	66

Tab 1. Summary of particular sub-campaign details

2.4. GNSS equipment used

Detailed list of GNSS equipment used during campaigns is presented in Table 2. The largest groups of the same equipment corresponded to:

- ASG-EUPOS reference stations (68 stations in total) where Trimble NetRS (TRIMBLE NETRS) receivers and Trimble Zephyr Geodetic w/Radome (TRM41249.00 TZGD) antenna were used,
- GPS measurements during campaign in 2008 (143 points) were made using rovers Trimble R8 (TRM5800 NONE), and
- GNSS measurements during campaign in 2010 and 2011 (360 points) were recorded using Trimble R8 GNSS (TRMR8_GNSS NONE) receiver.

Antenna type		Receiver type	No. of sets
ASH700936A_M	NONE	ASHTECH Z-XII3	1
ASH700936C_M	SNOW	TPS EUROCARD	1
ASH701945C_M	SNOW	ASHTECH UZ-12	**9**
ASH701945E_M	NONE	ASHTECH UZ-12	1
ASH701945E_M	SNOW	TRIMBLE 4000SSI	1
ASH701945C_M	SNOW	JAVAD TRE_G3T DELTA	1
ASH701946.2	SNOW	ASHTECH Z18	1
AOAD/M_B	OSOD	JPS E_GGD	1
AOAD/M_T	NONE	TRIMBLE NETRS	1
AOAD/M_T	NONE	ROGUE SNR-8000	1
AOAD/M_T	DUTD	AOA SNR-12 ACT	1
AOAD/M_T	OSOD	JPS E_GGD	1
AOAD/M_T	OSOD	JPS EGGDT	1
JAV_RINGANT_G3T	NONE	JAVAD TRE_G3TH DELTA	1
NOV702GG	NONE	NOV OEMV3	2
LEIAR25.R3	LEIT	JPS LEGACY	2
LEIAR25.R3	LEIT	LEICA GRX1200+GNSS	1
LEIAR25.R3	LEIT	LEICA GRX1200GGPRO	1
LEIAR25.R3	LEIT	TRIMBLE NETRS	2

Antenna type		Receiver type	No. of sets
LEIAT504	LEIS	LEICA GRX1200PRO	**8**
LEIAT504GG	NONE	LEICA GRX1200GGPRO	1
LEIAT504GG	LEIS	LEICA GRX1200+GNSS	1
LEIAT504GG	LEIS	LEICA GRX1200GGPRO	4
TPSCR.G3	TPSH	TPS NETG3	4
TPSCR3_GGD	CONE	JPS LEGACY	1
TRM5800	NONE	TRIMBLE R8	**143**
TRMR8_GNSS	NONE	TRIMBLE R8	**360**
TRM57971.00	NONE	TRIMBLE NETR5	1
TRM57971.00	TZGD	TRIMBLE NETR5	1
TRM55971.00	NONE	TRIMBLE NETR8	1
TRM55971.00	NONE	TRIMBLE NETR5	**6**
TRM55971.00	TZGD	TRIMBLE NETR5	**9**
TRM41249.00	TZGD	TRIMBLE NETRS	**68**
TRM41249.00	NONE	TRIMBLE 5700	2
TRM41249.00	NONE	TRIMBLE 4700	1
TRM29659.00	NONE	TRIMBLE NETRS	3
TRM29659.00	NONE	TRIMBLE 4700	1
TRM29659.00	SCIT	TRIMBLE NETRS	3
TRM33429.00+GP	TCWD	TRIMBLE 4000SSI	1
TRM14532.00	NONE	TRIMBLE 4000SSI	1
TRM14532.00	DOME	TRIMBLE 4000SSE	1

Tab. 2. Summary of equipment groups used in densification project

Information concerning reference stations is also available in the site log files, recorded on the attached CD. A comprehensive information about antenna's calibration is presented in chapter 3.4. During the campaigns, equipment on 6 reference stations was changed, some details are shown in Table 3.

Site	Time boundries			Receiver type	Antenna type	
0139	previous	10:285:00000	10:348:86370	TRIMBLE NETRS	TRM41249.00	TZGD
	changed on	11:080:00000	11:091:86370	TRIMBLE NETRS	LEIAR25.R3	LEIT
0147	previous	10:285:00000	10:348:86370	TRIMBLE NETRS	TRM41249.00	TZGD
	changed on	11:081:00000	11:091:86370	TRIMBLE NETRS	LEIAR25.R3	LEIT
POTS	previous	08:114:00000	10:348:86370	SEPT POLARX2	AOAD/M_T	NONE
	changed on	11:080:00000	11:091:86370	JAVAD TRE_G3TH DELTA	JAV_RINGANT_G3T	NONE
UZHL	previous	08:114:00000	10:348:86370	TRIMBLE 4000SSI	TRM29659.00	NONE
	changed on	11:080:00000	11:091:86370	NOV OEMV3	NOV702GG	NONE
MIMA*	previous	08:114:00000	10:348:86370	TRIMBLE NETRS	TRM41249.00	TZGD
	changed on	11:080:00000	11:091:86370	TRIMBLE NETR5	TRM57971.00	TZGD
WODZ*	previous	08:129:00000	10:348:86370	ASHTECH UZ-12	ASH701945C_M	SNOW
	changed on	11:080:00000	11:091:86370	TRIMBLE NETR5	TRM57971.00	TZGD
SOCH*	previous	08:114:00000	10:348:86370	TRIMBLE NETRS	TRM41249.00	TZGD
	changed on	11:080:00000	11:091:86370	TRIMBLE NETR5	TRM57971.00	TZGD

**For station MIMA, SOCH and WODZ their names in SINEX files were changed on MIM2, SOC2 and WOD2 respectively.*

Tab. 3. Summary of equipment changes occurred during the campaign

2.5. Monument description

The point's monumentation encompassed two categories, first one was related to the mountings of reference station antennas and the second was related to standard monumentation of ground control points and reference station eccentric points.

2.5.1. Reference station monumentation

ASG-EUPOS reference station equipped with TRM55971.00 TZGD and TRM41249.00 NONE antennas are in number of 77 from total 98 and are the largest group of reference stations located in Poland. Typical mounting of their antenna masts is presented on Figure 2. An aluminium post inside a plastic tube is a very stable material that do not reacting too much for temperature variation. Antenna masts are attached to the stable parts of buildings, such as a chimney or main walls, using steel claws, plates or clamping rings. Mountings for rest of the reference stations and the EPN sites are described in site log files (recorded on the attached CD).

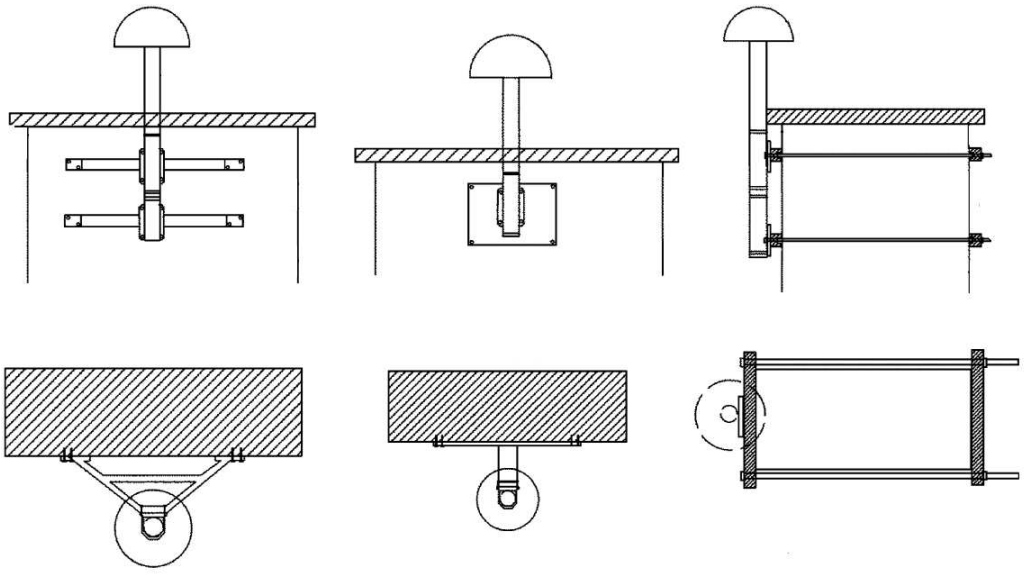

Fig. 2. Example of mounting of reference station antenna masts: respectively front, side and down sections

2.5.2. Geodetic control point monumentation

The points of POLREF network had been established and monumented in 1994. The construction of such points is based on concrete elements practically with most part buried in the ground. On Figure 3 are presented examples of POLREF and EUVN point's construction. Reference station eccentric points, established in 2010, have almost the same construction as the POLREF points. This construction design has proven points' stability and usefulness within all the years of POLREF network existence, thus it was also used for eccentric points.

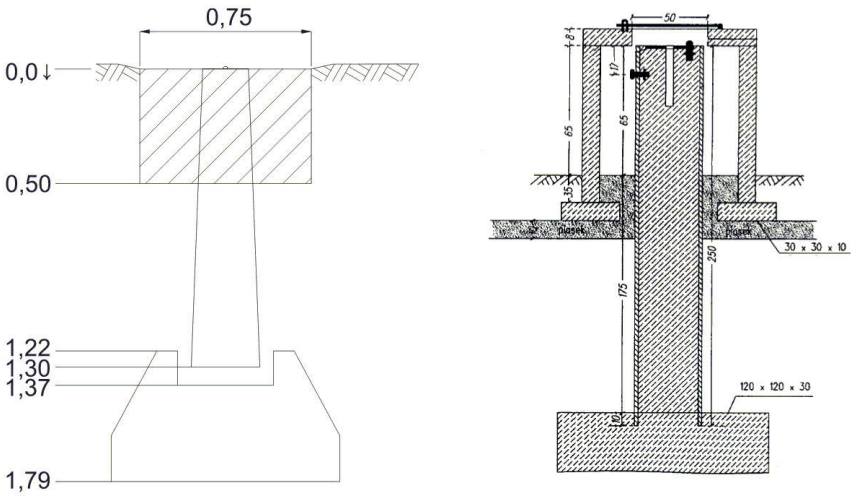

Fig. 3. Example of monumentation used for ground control points POLREF and EUVN (longitudinal section)

3. Data processing

3.1. Fiducial stations

In total 42 EPN fiducial sites were selected and utilized in densification project to assure a strong connection with the EPN network. The fiducial points stated over 6% of all processed points. Also, it should be noted that 18 of them was located in Poland and 15 were categorized as a class A (according to solution EPN_A_ITRF2005_C1600.SSC) From 23 EPN fiducial stations distributed outside Poland 4 were rejected: GOPE 11502M002, POTS 14106M003, UZHL 12301M001 and METS 10503S011 due to different reasons (for more details see chapter 3.1.2). Distribution of all used fiducial stations is presented in Appendix 1.

3.1.1. List of fiducial stations

No	Site id.	Domes number	No	Site id.	Domes number	No	Site id.	Domes number	No	Site id.	Domes number
1	BOGI	12207M003	10	LODZ	12226M001	19	GANP	11515M001	28	SASS	14281M001
2	BOGO	12207M002	11	REDZ	12227M001	20	GLSV	12356M001	29	SULP	12366M001
3	BOR1	12205M002	12	SWKI	12228M001	21	GRAZ	11001M002	30	VIS0	10423M001
4	GWWL	12225M001	13	USDL	12229M001	22	MAR6	10405M002	31	VLNS	10801M001
5	JOZ2	12204M002	14	WROC	12217M001	23	MOPI	11507M001	32	WARN	14277M002
6	JOZE	12204M001	15	ZYWI	12220S001	24	ONSA	10402M004	33	WSRT	13506M005
7	KATO	12219S001	16	BISK	11520M001	25	PENC	11206M006	34	WTZR	14201M010
8	KRAW	12218M001	17	BUCU	11401M001	26	POLV	12336M001	35	ZIMM	14001M004
9	LAMA	12209M001	18	DRES	14108M001	27	RIGA	12302M002			

Tab. 4. List of EPN fiducial stations used for the reference frame definition

3.1.2. Fiducial station verification

For the PL-ETRF2000 reference frame realization only EPN sites with class A were considered. First verification of their positions was carried out using time series solutions/residuals presented on the EPN website. On station

METS 10503S011 there was an antenna change in August 2010 that caused significant position change (10 mm in the horizontal plane). Additionally, in EPN cumulative solution C1600 new coordinates of the stations were determined from only 3 weeks of observations, thus METS was rejected from the reference frame densification. Positions of other sites were verified by comparisons of results obtained for sub-campaigns based on daily solutions for 2008, 2010 and 2011 as well as from cumulative solutions for 2008/10/11. Due to negative results of comparison station GOPE 11502M002 had also to be rejected from set of fiducial stations. Furthermore the stations POTS 14106M003 and UZHL 12301M001 were rejected because of equipment change during the campaign.

Last verification of selected sites was performed by comparison of coordinates derived from EPN cumulative solution C1600 (EPN_A_ITRF2005_C1600.SSC) and PL-ITRF2005 coordinates obtained from the final adjustment of observations. The result of comparison is presented in chapter 5.3 in Table 9.

3.2. EPN SINEX solutions

No EPN SINEX solutions were used in data processing. For each day of campaign positions and velocities in ITRF2005 of EPN sites were calculated on appropriate epoch from EPN cumulative solution for week 1600 (EPN_A_ITRF2005_C1600.SSC).

3.3. Orbit models

Ephemerides and clock for GPS satellites and Earth Rotation Parameters were taken from IGS final product solution. For GLONASS in an alternative processing CODE products were used.

3.4. Antenna calibration models

For all antennas used in GNSS campaign, wherever it was possible individual calibration models were used. These models were derived from EPN sets or individual and absolute calibrations contracted by GUGiK. Otherwise absolute calibration models from IGS05_1627.ATX (for 1627 GPS week) were applied.

3.4.1. Reference station antennas

List of individual calibrations is presented in Table 5. By the time of network adjustment GUGiK was in possession of three individual calibrations for the EPN sites CLIB 11526M001, CPAR 11527M001, CFRM 11525M001 that hasn't been available in EPN calibration set. In these cases, individual calibrations from GUGiK were used (originally provided by CZEPOS system). For antenna types outside the list, absolute calibrations were used.

Antenna type		Site id	Sinex sn#	EPN Class	Calibrations from
LEIAR25.R3	LEIT	WTZR	20031	Class A	EPN
LEIAR25.R3	LEIT	WARN	50002	Class A	EPN
LEIAR25.R3	LEIT	DRES	70015	Class A	EPN
LEIAT504GG	LEIS	PENC	00219	Class A	EPN

Antenna type		Site id	Sinex sn#	EPN Class	Calibrations from
LEIAT504GG	LEIS	BUCU	00456	Class A	EPN
TPSCR3_GGD	CONE	SASS	70155	Class A	EPN
TRM55971.00	NONE	GANP	37385	Class A	EPN
TRM55971.00	TZGD	LODZ	07789	Class A	EPN
TRM55971.00	TZGD	REDZ	36524	Class A	EPN
TRM55971.00	TZGD	ZYWI	36564	Class A	EPN
TRM55971.00	TZGD	USDL	36693	Class A	EPN
TRM55971.00	TZGD	SWKI	77052	Class A	EPN
TRM55971.00	TZGD	GWWL	77056	Class A	EPN
TRM57971.00	TZGD	KATO	29151	Class A	EPN
TRM55971.00	TZGD	BYDG	36334	Class B	EPN
TRM55971.00	TZGD	BPDL	36730	Class B	EPN
LEIAT504	LEIS	CPAR	02546	Class B	GUGiK
LEIAT504	LEIS	CLIB	02943	Class B	GUGiK
LEIAT504	LEIS	CFRM	03035	Class B	GUGiK
LEIAR25.R3	LEIT	0147*	60009	-	GUGiK
TRM41249.00	TZGD	0147*	54990	-	GUGiK
LEIAT504	LEIS	CSVI	02549	-	GUGiK
LEIAT504	LEIS	CTRU	02937	-	GUGiK
LEIAT504	LEIS	CSUM	02941	-	GUGiK
LEIAT504	LEIS	CBRU	03051	-	GUGiK
TPSCR.G3	TPSH	14	30121	-	GUGiK
TPSCR.G3	TPSH	17	30137	-	GUGiK
TPSCR.G3	TPSH	22	30216	-	GUGiK
TRM33429.00+GP	TCWD	781	86639	-	GUGiK
TRM41249.00	TZGD	0139*	78844	-	GUGiK
TRM55971.00	NONE	SKSV	37169	-	GUGiK
TRM55971.00	NONE	LIE1	37208	-	GUGiK
TRM57971.00	TZGD	MIMA*	25319	-	GUGiK
TRM57971.00	TZGD	SOCH*	36130	-	GUGiK
TRM57971.00	TZGD	WODZ*	36186	-	GUGiK

** denote sites were equipment was changed during campaign (see 2.4).*

Tab. 5. List of antennas and sites with individual calibrations

3.4.2. Rover antennas

All field GNSS measurements were performed by Trimble R8 (TRM5800 NONE) and Trimble R8 GNSS (TRMR8_GNSS NONE) instruments, respectively in the campaigns of 2008 and 2010/11. For the TRM5800 NONE antenna observations were processed using an absolute type calibration derived from individual calibration one of the antennas (the same calibration model was applied for all field measurements). For TRMR8_GNSS NONE antenna the absolute type calibration was used from IGS05_1627.ATX (antenna was added to the list in 1569 GPS week).

4. Processing strategy

The processing strategy presented in this report, was developed by Warsaw University of Technology (hereinafter called “WUT”) [1], which is also one of EPN LAC. The strategy was formed on the basis of EPN standards:

Guidelines for EUREF densifications [4] and Guidelines for EPN Analysis Centres [5], experience of WUT LAC and the requirements and conditions of the densification campaign. The main assumptions of the strategy are presented in Table 6.

Strategy parameter	**Parameter values**
Satellite system	GPS
Satellite positions and Earth Orientation Parameters EOP	IGS-Final
Elevation cut-off	5° (10° for the ambiguity resolution)
Baseline creating strategy	Maximum number of observations, distance (L) less than 100 km; also some very short vectors were forced
Baseline processing	Cycle slips were repaired using triple differences (for L1 and L2 phase measurements). Triple differences were also used for data screening.
Positioning mode	Double difference network mode
Ambiguity resolution strategy	SIGMA L1&L2 (L ≤ 20 km) SIGMA L5/L3 (20 < L ≤ 200 km) QIF (L > 200 km)
A priori troposphere model	Saastamionen + NMF, dry part
Troposphere mapping function	NMF, wet part
Interval for ZTD	1 hour
Tropospheric gradients	yes
Ionosphere model	global CODE, only first order terms
Modelling of loading effects	FES2004
Antenna phase canter modelling	individual(EPN/GUGiK)+ absolute IGS05_1627.ATX
Reference frame	ITRF2005 from EPN cumulative solution C1600

Tab. 6. Summary of processing strategy and important adjustment parameters

4.1. Software used

For the conversion from RAW data files to RINEX 2.10 format and for changing the sampling rate from 5 to 30 seconds the UNAVCO Teqc [8] was used. Further data processing and adjustment were performed using Bernese GNSS Software version 5.0 [9] updated up to May 11, 2011.

4.2. Processing method

Schema of processing is presented on Figure 4. General assumption was to prepare 66 daily, free network solutions to stack them into one cumulative minimum constrained solution. The observations were prepared for 24 hours daily sessions starting from 0:00 GPST. As a result of the processing of each daily session minimally constrained normal equation files were obtained.

For verification of stations stability and processing correctness before a final combined solution (2008/10/11) daily solutions has been stacked to prepare sub-campaign adjustments for 2008, 2010 and 2011. Results of sub-campaigns were analysed in order to find any misbehaving stations. In some cases new reference station names were introduced (see chapter 4.10) and some fiducial stations were excluded from reference datum definition (see chapter 3.1.2).

For preparing final solution, ITRF2005 coordinates for selected fiducial stations were calculated on the basis of positions and velocities from EPN cumulative solution C1600 (EPN_A_ITRF2005_C1600.SSC). Last step was to make transformation of coordinates from ITRF2005 to the ETRF2000 frame as a conventional realization of ETRS89.

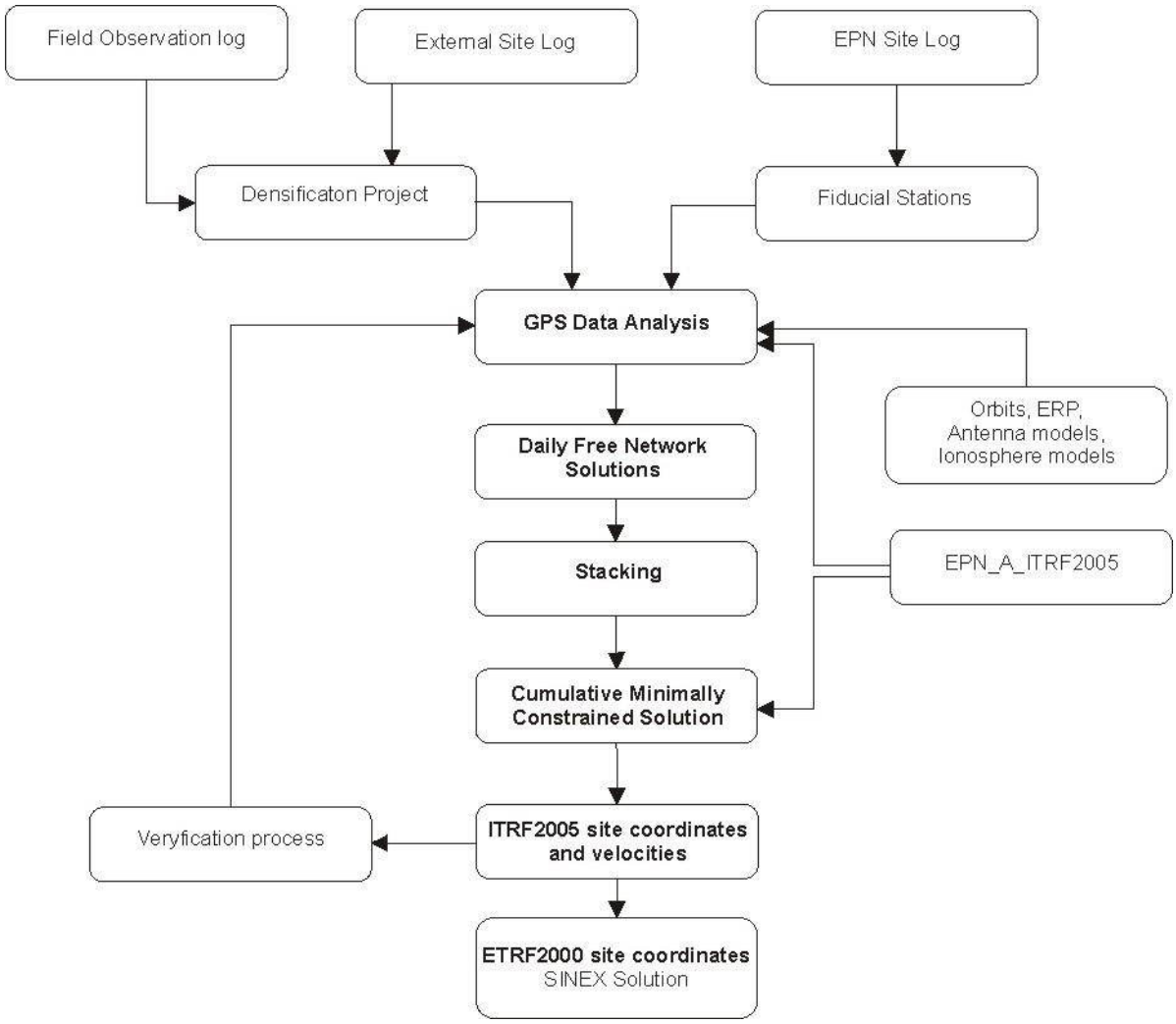

Fig. 4. Processing method schema

4.3. Elevation cut-off

Observation data were collected without using elevation cut off limit (cut-off set to 0 degree). In final processing, cut-off parameter with settings of 5 and 10 degrees was tested (see chapter 5). Finally, due to better results,

elevation cut off parameter with value of 5 degrees was selected as the most accurate. In both cases, for ambiguity resolution elevation cut-off was set to 10 degrees.

4.4. Positioning mode

Positioning mode was based on forming baselines for double difference solution, and their adjustment in network mode. Baselines were mainly selected using option MAXOBS – maximum number of observations for analysed vector. In particular cases very short baselines were forced for co-located sites (i.e. JOZE-JOZ2, BOGO-BOGI) and the reference station eccentric points. In campaign from 2008, mean baseline length for daily solutions varied between 120 and 170 km. In 2010 mean baseline distance for daily solutions varied from 110 to 160 km, whereas in 2011 mean distance varied between 140 and 180 km.

4.5. Modelling of loading effects

For modelling of loading effects the global ocean tide model FES2004 was used.

4.6. Ambiguity resolution strategy

For the ambiguity resolution strategy three different approaches based on baseline length were used. If baselines distance was less than 20 km, ambiguity resolution was based on SIGMA L1&L2 strategy. For baselines between 20 and 200 km, SIGMA L5/L3 strategy was used and for baselines exceeding 200 km (only for distances between EPN sites) – QIF strategy. In most cases ambiguities were resolved using the second strategy. For each sub-campaign and for the final solution mean percentage of resolved ambiguities was greater than 92% (see also Table 7). Ambiguity resolution strategies were applied only for GPS satellites.

4.7. Modelling of the troposphere

Tropospheric zenith total delay was estimated for each station in one hour intervals. As a priori model dry part of Saastamoinen model was used together with dry part of Niell mapping function. Estimated corrections to the model were mapped using Niell function for wet part. In addition, for each station, tropospheric gradients were estimated in 24 hour intervals. Tropospheric gradients were only estimated for solutions with elevation mask of 5 degrees.

4.8. Modelling of the ionosphere

First order ionosphere was eliminated by using linear combination of L1 and L2 observations. During ambiguity resolution a global ionosphere model from CODE was used.

4.9. Alternative strategies for test purposes

Besides the division into sub-campaigns for 2008, 2010 and 2011 each solution was made in different variants: GPS with elevation cut-off of 5 or 10 degrees and GPS/GLONASS elevation cut off of 5 degrees.

In Table 7 positions repeatability in North, East and Up components and RMS for each solution is presented. Based on this comparison and considering that the GLONASS system could not be used for all baselines in network it has been decided to use only GPS solution with 5 degrees elevation cut off. Differences in RMS and coordinates repeatability are on the same level. Another argument against common GPS/GLONASS solution is a fact that GLONASS ambiguities could not be resolved correctly in used software.

Sub campaign	Adjustment variant	Repeatability [mm]			RMS [mm]	N [%]	Number of observations
		N	E	U			
2008	GPS 5°	0.97	0.99	2.64	1.30	92.2	10 175 270
	GPS 10°	1.15	1.23	2.94	1.32	93.9	8 958 888
2010	GPS 5°	1.30	1.37	3.34	1.29	92.8	21 602 786
	GPS 10°	1.49	1.38	3.74	1.32	94.3	18 674 394
	GNSS 5°	1.23	1.31	3.08	1.27	92.8	27 140 216
2011	GPS 5°	0.85	0.83	2.21	1.29	92.5	6 839 723
	GPS 10°	0.99	0.83	2.51	1.32	94.2	5 899 616
	GNSS 5°	0.84	0.82	2.24	1.28	92.4	8 506 863

Tab. 7. Repeatability of positions in North, East and Up components for different solutions

An alternative solution to the presented in this report was a control solution performed by Space Research Center of the Polish Academy of Sciences (hereinafter called "CBK PAN") [2]. The strategy prepared by this institution was a bit different from this obtained by WUT. Main differences revealed in:

- definition of daily sessions – in CBK PAN solution daily sessions corresponded to session length of field measurement, daily session for free network processing lasted from 12 till next day to 12 with respect to GPS time,
- baseline creating strategy wasn't based on MAXOBS strategy. Baseline network was created in two step approach, using modified STAR strategy. Firstly baselines were created between EPN fiducial sites (only class A). In the next step baselines were created between the EPN stations located on Polish territory and the nearest measured points (remaining reference stations and points of ground control networks),
- the method of ambiguity resolution was based only on the QIF strategy.

Comparisons of the final results obtained by the CBK PAN and WUT did show any significant differences due to use of different processing strategies. RMSs of the Helmert transformation between coordinates obtained by CBK PAN and WUT, expressed in ETRF2005 at the epoch 2011.0, for GPS solution with 5 degrees elevation cut-off for north, east and up components reached values 1.2, 1.5 and 2.8 mm. [3].

4.10. Combination of daily solutions (stacking)

As mentioned earlier the cumulative solutions were made for sub-campaigns 2008, 2010 and 2011 in order to find misbehaving points or outliers and to check position repeatability of processed points in 3-years period. Each

approach was using normal equations from daily free network solution and combining them with ADDNEQ2 into cumulative solution using minimum constraint approach.

Final cumulative solution 2008/10/11 was performed using ADDNEQ2 from BSW software where 66 daily free network solutions were combined together. Besides the coordinates in ITRF2005 also velocities were estimated as in this case velocities had greater influence then in sub-campaigns solutions.

For 2008 solution some new names were introduced for reference stations: changing name from 0014 to _014, 0017 to _017, 0022 to _022 and for campaign type points SEPO to SEP0 (last sign is zero), WROE to WRO0, because of differences in positions occurred when comparing to the results from 2010. For comparison all positions were reduced to the same epoch.

For 2010 and 2011 solution also some new names were introduced for reference stations: changing name from 0139 to 0139 B, 0147 to 0147 B, POTS 14106M003 to POTS 14106M003B, UZHL 12301M001 to UZHL 12301M001B, MIMA 12273M001 to MIM2 12273M001, WODZ 18998M001 to WOD2 18998M001, SOCH 12291M001 to SOC2 12291M001. These changes were made because of antenna changes between 2010 and 2011.

For final 2008/10/11 solution additional new names were introduced for reference stations: changing from HOZD 12248M001 to HOZD 12248M001B due to coordinates jump, and from STRG 18994M001 to STRG 18994M001B because of coordinates jump after correcting antenna mast installation. In 2008 and 2010 STRG 18994M001 coordinates had a big noise that significantly decreased in 2011.

4.11. Minimum constrained solutions

The definition of the reference frame was realized by imposing no-net translation minimum constraint conditions on coordinates of 35 fiducial stations (see chapter 3.1.1, Table 4), taken from EPN cumulative solution (C1600)

For velocities, the following constraints were applied:

- 0.1 mm for EPN reference sites with reference to cumulative velocities (C1600),
- 0.2 mm for ASG-EUPOS permanent sites with respect to ITRF2005 velocity of Eroasian plate. Exceptions were made for sites: 0014, 0017, 0022, 0139, 0147, CHNO 12241M001, CPAR 11527M001, HOZD 12248M001, STRG 18994M001, KAM1 12258M001, KRA1 12218M002, SHAZ , SZE2 12294M001, WODZ 18998M001 (including their alternative names), because of equipment change, reference point change, coordinates change or because of to short time series. These stations had a fixed velocities (0.01 mm) to the mean velocity of Eurasian tectonic plate obtained from the ITRF2005 solution,
- 0.01 mm with respect to ITRF2005 velocity of Eurasian plate for other points, such as EUREF-POL, POLREF, EUVN and eccentric points.

5. Results from the processing

Final coordinates for all point adjusted in PL-ITRF2005 and PL-ETRF2000 frames are presented respectively in Appendix 6 and Appendix 7. Epoch of realized frame in the cumulative solution is 2011.0. The coordinate jumps and position changes due to changes in reference station equipment were taken into account. The changes described in the previous sections of the report are kept in an original SINEX files.

5.1. Daily mean ambiguity solution

Daily mean ambiguity solutions are presented for following sub-campaigns:

1) In 2008 sub-campaign:
   - for L < 20 km and SIGMA L1/L2 strategy – solution at level of 80-100%,
   - for 20 < L < 200 km and SIGMA L5/L3 strategy – solution at level of 90-95%,
   - for L > 200 km and QIF strategy – solution at level of 85-92%,

2) In 2010 sub-campaign:
   - for L < 20 km and SIGMA L1/L2 strategy – solution at level of 98%,
   - for 20 < L < 200 km and SIGMA L5/L3 strategy– solution at level of 92%,
   - for L > 200 km and QIF strategy – solution at level of 85%,

3) In 2011 sub-campaign:
   - For L < 20 km and SIGMA L1/L2 strategy – solution at level of 98%
   - For 20 < L < 200 km and SIGMA L5/L3 strategy– solution at level of 93%
   - For L > 200 km and QIF strategy – solution at level of 85%

5.2. Comparison of the daily coordinate solutions

Daily coordinates repeatability for the final cumulative solution, after rejecting the outliers specified in chapter 4.10 are presented in Table 8.

Repeatability [mm]			RMS [mm]	Number of observations
N	E	U		
1.20	1.23	3.11	1.29	38 617 779

Tab. 8. Repeatability of positions in North, East and Up components for the combined solution 2008 – 2011

5.3. Comparison for the fiducial station coordinates

Differences in coordinates for positions of fiducial stations obtained from EPN C1600 cumulative solution and these from the minimum constrained solution are presented in Table 9. Coordinates were compared referring to epoch 2011.0, additional differences for ETRF2000 coordinates are also shown. All used fiducial sites are sufficient for reference frame definition as positions in every case are within 10 mm limit.

Site id.	Domes number	PL-ITRF2005 - EPN_A_ITRF2005_C1600.SSC			PL-ETRF2000 - EPN_A_ETRF2000_C1600.SSC		
		dx [m]	dy [m]	dz [m]	dx [m]	dy [m]	dz [m]
BISK	11520M001	-0.0025	0.0004	-0.0018	-0.0025	-0.0001	-0.0021
BOGI	12207M003	-0.0007	0.0003	-0.0012	-0.0014	0.0001	-0.0012
BOGO	12207M002	0.0003	0.0003	0.0003	0.0006	0.0007	0.0013
BOR1	12205M002	-0.0003	0.0002	0.0012	0.0004	0.0004	0.0004
BUCU	11401M001	0.0026	0.0001	0.0007	0.0022	0.0010	0.0000
DRES	14108M001	-0.0020	-0.0015	-0.0054	-0.0016	-0.0013	-0.0057
GANP	11515M001	0.0046	0.0012	0.0045	0.0044	0.0012	0.0045
GLSV	12356M001	0.0022	0.0019	0.0001	0.0023	0.0015	0.0000
GRAZ	11001M002	0.0008	-0.0020	0.0010	0.0006	-0.0025	0.0006
GWWL	12225M001	-0.0006	0.0008	0.0014	-0.0001	0.0009	0.0007
JOZ2	12204M002	-0.0019	-0.0002	-0.0027	-0.0019	-0.0002	-0.0026
JOZE	12204M001	0.0004	0.0014	-0.0004	0.0004	0.0014	-0.0003
KATO	12219S001	0.0004	-0.0010	0.0005	-0.0005	-0.0015	0.0014
KRAW	12218M001	0.0011	-0.0004	-0.0014	0.0014	-0.0002	-0.0013
LAMA	12209M001	-0.0038	-0.0015	-0.0016	-0.0044	-0.0011	-0.0015
LODZ	12226M001	-0.0008	0.0004	0.0014	-0.0002	-0.0001	0.0019
MAR6	10405M002	-0.0034	0.0012	0.0000	-0.0030	0.0006	0.0004
MOPI	11507M001	0.0049	0.0026	0.0052	0.0052	0.0023	0.0057
ONSA	10402M004	-0.0022	0.0000	-0.0012	-0.0029	0.0007	-0.0014
PENC	11206M006	0.0018	0.0007	0.0007	0.0005	0.0011	0.0016
POLV	12336M001	0.0043	0.0024	0.0016	0.0040	0.0030	0.0018
REDZ	12227M001	-0.0012	0.0000	-0.0012	-0.0013	-0.0004	-0.0019
RIGA	12302M002	-0.0040	-0.0002	-0.0036	-0.0034	-0.0004	-0.0037
SASS	14281M001	-0.0027	0.0007	-0.0035	-0.0028	0.0010	-0.0038
SULP	12366M001	0.0016	0.0009	0.0019	0.0016	0.0000	0.0014
SWKI	12228M001	-0.0015	0.0015	-0.0016	-0.0024	0.0012	-0.0014
USDL	12229M001	0.0012	0.0002	0.0013	0.0007	0.0011	0.0015
VIS0	10423M001	-0.0035	0.0003	-0.0018	-0.0034	0.0008	-0.0017
VLNS	10801M001	-0.0029	-0.0015	-0.0039	-0.0029	-0.0018	-0.0032
WARN	14277M002	-0.0019	0.0037	-0.0017	-0.0018	0.0029	-0.0013
WROC	12217M001	-0.0020	0.0008	-0.0025	-0.0013	0.0003	-0.0015
WSRT	13506M005	-0.0009	-0.0002	-0.0001	-0.0014	-0.0005	0.0003
WTZR	14201M010	-0.0017	0.0004	-0.0011	-0.0015	0.0005	-0.0013
ZIMM	14001M004	0.0048	0.0003	0.0061	0.0039	0.0002	0.0060
ZYWI	12220S001	0.0009	0.0003	0.0029	0.0019	-0.0001	0.0034

Tab. 9. Differences between coordinates on epoch 2011.0 from EPN cumulative solution EPN_C1600 and solutions obtained from adjustment

5.4. Transformation to ETRS89

Transformation from ITRF2005 on epoch 2011.0 to ETRF2000 on epoch 2011.0 was performed by parameters provided in Memo specification in table 5 [5]. Parameters expressed at epoch 2011.0 are presented in Table 10.

Epoch	T1 [m]	T2 [m]	T3 [m]	D [ppm]	R1 [mas]	R2 [mas]	R3 [mas]
2011.0	0.0519	0.0513	-0.0736	0.00128	1.7820	10.7800	-17.4240

Tab. 10. Transformation parameters from ITRF2005 to ETRF2000 on 2011.0 epoch

5.5. Comparison with previous ETRS89 densification

The results of comparison of coordinates between the new ETRS89 realization in Poland i.e. PL-ETRF2000 and previous densifications – EUREF-89 are presented in Appendix 8. Comparison of both ETRS89 realization, conducted on POLREF network (points were evenly distributed on the entire densification area and had coordinates in both frames) is presented using direct and indirect (after usage of 7-parameter Helmert transformation based on POLREF points) approach. Scale parameter for indirect approach is used intentionally. In principle there should be no influence of scale factor between these two ETRS89 realizations but because of the fact that EUREF-89 was defined during the period of different ITRS realization (from ITRF91 to 93) thus cannot be treated as the homogeneous realization of ETRS89 with PL-ETRF2000. Thus, for comparison 7-parameter Helmert transformation must be used which parameters are presented in Table 11.

Parameter	T1 [m]	T2 [m]	T3 [m]	D [mm/km]	R1 [mas]	R2 [mas]	R3 [mas]
Value	0.0514 ±0.0223	0.3160 ±0.0205	-0.4489 ±0.0193	0.0510 ±0.0025	129.0 ±6.2	90.5 ±7.9	18.9 ±5.9

Tab. 11. Transformation parameters from ETRF2000 (2011.0) to EUREF-89

Obtained RMSs for North, East an Up components are for direct comparison are equal respectively 10.5, 24.9 and 72.2 mm whereas for indirect comparison reach 7.5, 8.3 and 24.0 mm values. Residuals obtained after transformation indicate that POLREF network was established as a coherent network. Some differences has occurred due to a long time period (about 20 years) between these two realizations when accuracy of GNSS measurements has significantly increased and new realizations of ITRF/ETRF has been implemented.

6. Conclusions

The results of the adjustment of ASG-EUPOS stations as well as geodetic control networks are at a sufficient accuracy and accepted by Head Office Of geodesy and Cartography. Horizontal position accuracy was better than 1.5 mm, and for the vertical component better than 3.5 mm with RMS on level 1.3 mm. Processing strategy realized by Warsaw University of Technology follows EPN recommendations. Alternative solutions with different approaches were performed by Space Research Center of the Polish Academy of Sciences. Results obtained from both independent solutions confirm high accuracy and internal conformity of PL-ETRF2000 datum realization.

Different approach to baseline network definition and daily session definition has given practically the same results with RMS smaller then 3 mm for North, East and Up components. Also the use of GLONASS observations did not

result in a significant increase of accuracy. Because of lack of technical capabilities of used software to fix ambiguities for GLONASS measurements combined GPS/GLONASS solution was not used as a final solution. Such a solution will be performed in the future.

Final solution is prepared in PL-ETRF2000 frame on epoch 2011.0 obtained from the GPS solution with parameter of elevation cut-off of 5 degrees is the official realization of ETRS89 in Poland.

Comparison with the previous ETRS89 realization shows that the connection between these two frames i.e. EUREF-89 and PL-ETRF2000 should be realized by 7-parameter Helmert transformation.

According to resolution No. 2 undertaken by the sub-committee EUREF on EUREF Symposium 2010 in Gavle, Sweden (June 2, 2010) it was decided to use ETRF2000 as the new realization of ETRS89 in Poland. The reference frame PL-ETRF2000 (epoch 2011.0) has been introduced into Polish technical standard (*Regulation of Council of Ministers* of 15 October 2012 *on state spatial reference system*). Currently there are used two realization of the ETRS89 in Poland. New PL-ETRF2000 is recommended to be used in GNSS surveying with ASG-EUPOS corrections whereas ETRF89 will still be maintained in an interim period as reference for geodetic network.

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Acknowledgment

Author would like to give special thanks to Mr. Wiesław Graszka and Mr. Tomasz Liwosz for the support given during preparation of this report.

7. Deliverables

Deliverables listed below are available on CD disk attached to the report in directories specified below:

1. Site-log files for EPN sites and ASG-EUPOS stations

   /Site-log/.log*

2. Antanna calibrations

   ANTEX/.ATX*

3. Minimum constrained solution in the SINEX format

   /Solutions/WUT_ASG_05M.SNX

4. List of coordinates for all densification points expressed in the PL-ITRF2005 on epoch 2011.0

   /Coords/PL-ITRF2005_2011.0.CRD

5. List of coordinates for all densification points expressed in the PL-ETRF2000 on epoch 2011.0

   /Coords/PL-ETRF2000_2011.0.CRD

6. List of fiducial sites

   /Coords/EPN.FIX

7. Coordinates and velocities used for the fiducial sites

   /Coords/EPN_A_ITRF2005_C1600.SSC

   /Coords/EPN_fiducial_ITRF2005.CRD

   /Coords/EPN_fiducial_ITRF2005.VEL

8. References

[1] *Liwosz T., Rogowski J., Kruczyk M., Rajner M., Kurka W. (2011), „Sprawozdanie Techniczne: Wyrównanie kontrolne obserwacji satelitarnych GNSS wykonanych na punktach ASG-EUPOS, EUREF-POL, EUVN, POLREF i osnowy I klasy wraz z ocena wyników"; Katedra Geodezji i Astronomii Geodezyjnej Wydziału Geodezji i Kartografii Politechniki Warszawskiej, Wydział Warszawa 15 grudnia 2011.*

[2] *Jaworski L. (2011), „Sprawozdanie Techniczne: Zintegrowanie Podstawowej Osnowy Geodezyjnej na obszarze Polski ze stacjami referencyjnymi systemu ASG-EUPOS – etap IV Opracowanie i wyrównanie obserwacji GNSS"; Okręgowe Przedsiębiorstwo Geodezyjno–Kartograficzne w Lublinie Spółka z o.o., Centrum Badań Kosmicznych Polskiej Akademii Nauk, Warszawa – wykonanie prac w etapie IV, Polskie Przedsiębiorstwo Geodezyjno-Kartograficzne S.A., Warszawa, Przedsiębiorstwo Pomiarów Geodezyjnych Spółka z o. o., Warszawa, Okręgowe Przedsiębiorstwo Geodezyjno - Kartograficzne w Łodzi Spółka z o.o., Przedsiębiorstwo Miernictwa Górniczego Spółka z o.o., Katowice; Warszawa, lipiec 2011.*

[3] *Bosy J. (2011), „Wyniki weryfikacji wyników integracji podstawowej osnowy geodezyjnej na obszarze kraju ze stacjami referencyjnymi systemu ASG-EUPOS" Wrocław 20 listopada 2011.*

[4] *Bruyninx, C., Z. Altamimi, A. Caporali, A. Kenyeres, M. Lidberg, G. Stangl, J.A. Torres (2012), "Guidelines for EUREF Densifications", Version 4, http://www.epncb.oma.be*

[5] *EPN Coordination Group and EPN Central Bureau (2013), "Guidelines for EPN Analysis Centres", Version 2012-06-13, http://www.epncb.oma.be*

[6] *Boucher C., Z. Altamimi (2011), "Memo: Specifications for reference frame fixing in the analysis of a EUREF GPS campaign", http://etrs89.ensg.ign.fr.*

[7] *Altamimi, Z., X. Collilieux, J. Legrand, B. Garayt, C. Boucher (2007), "ITRF2005: A new release of the International Terrestrial Reference Frame based on time series of station positions and Earth Orientation Parameters", J. Geophys. Res., 112, B09401, doi: 10.1029/2007JB004949.*

[8] *UNAVCO Teqc (2013), http://www.unavco.org/*

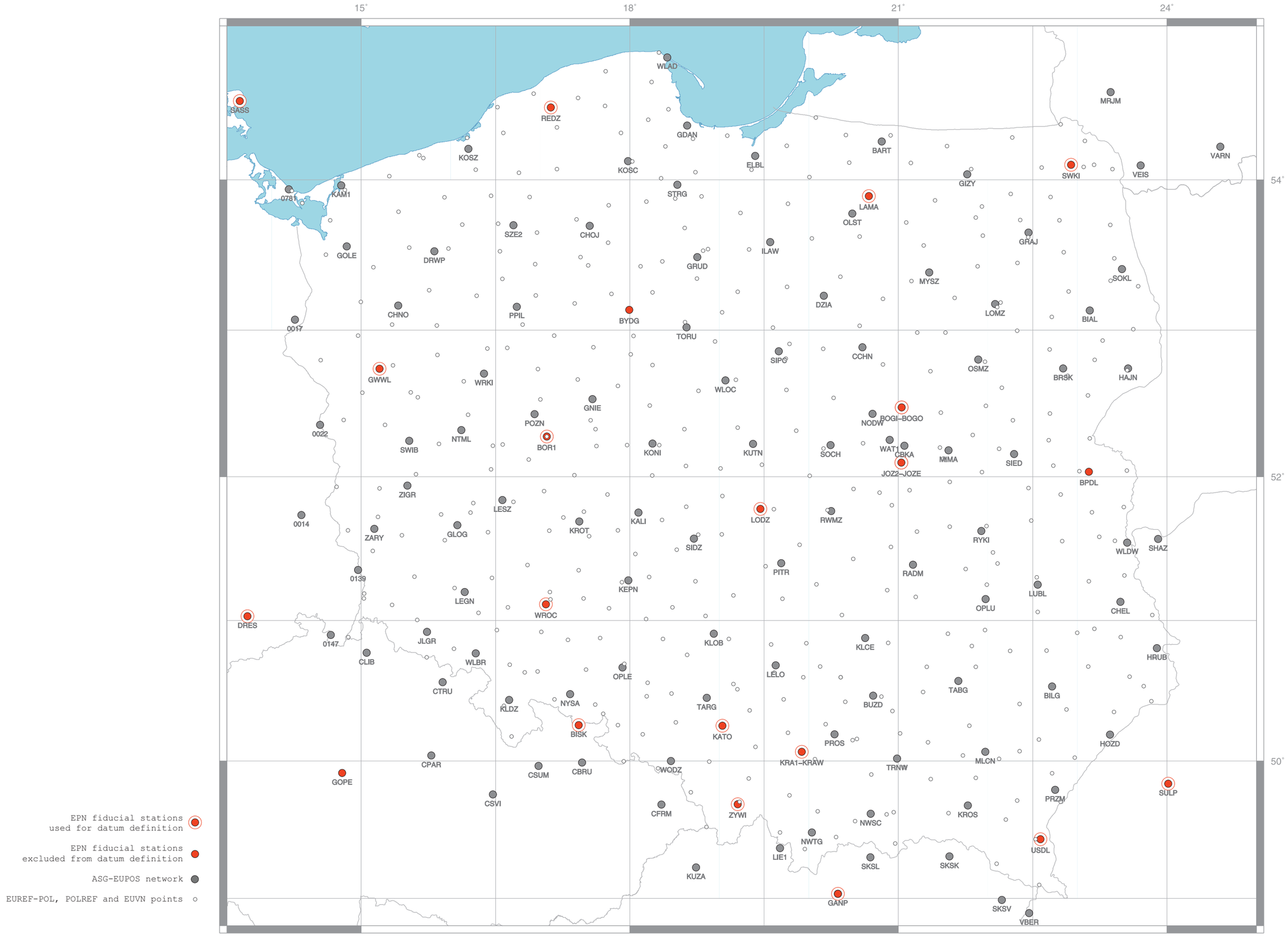
[9] *Dach, R., S. Hugentobler, P. Fridez, M. Meindl (eds.) (2007), "Bernese GPS Software Version 5.0." Astronomical Institute, University of Berne.*

[10] *EPN (2013), http://www.epncb.oma.be*

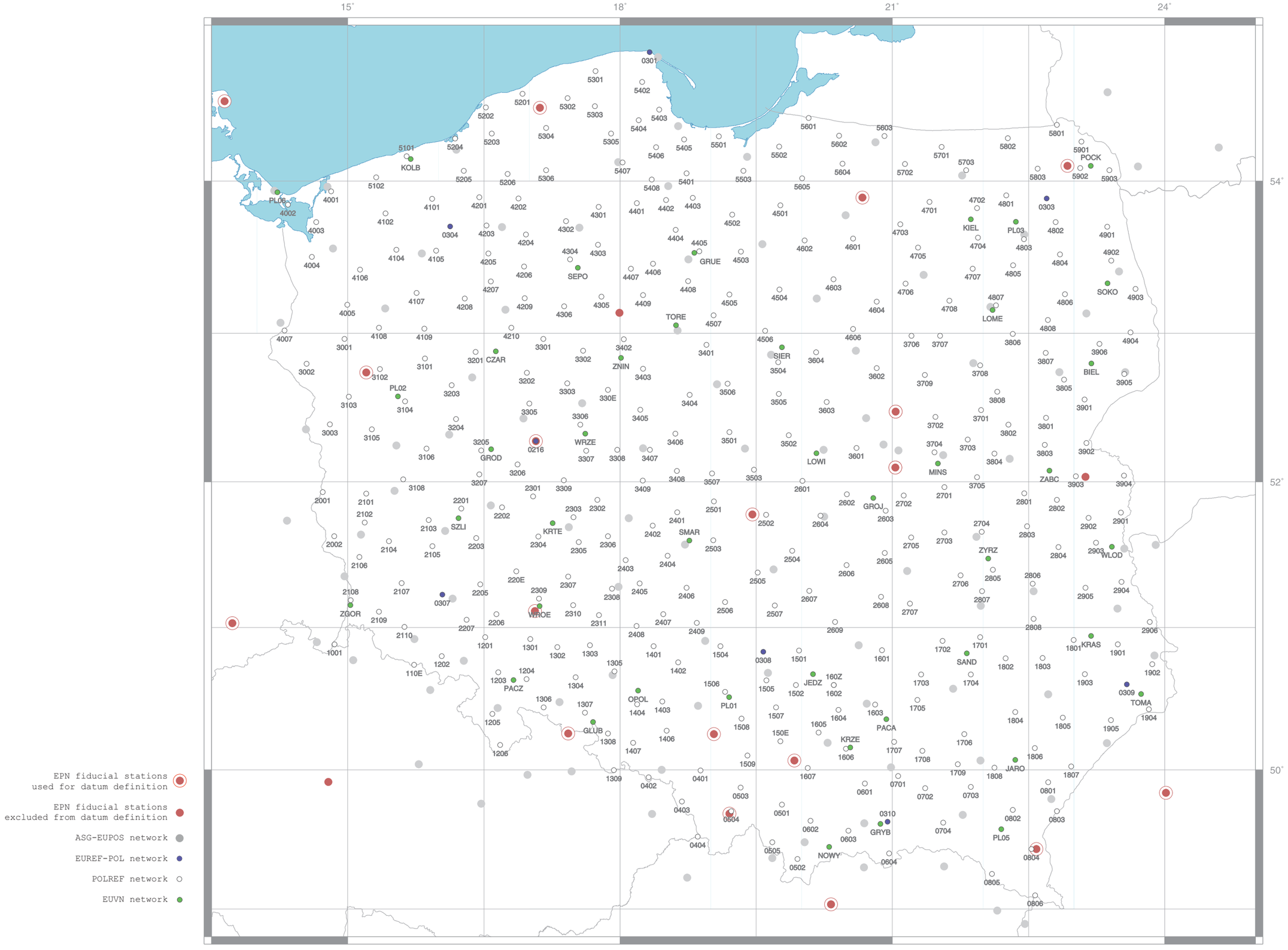
[11] *IGS (2013), http://igscb.jpl.nasa.gov*

Appendix 1. Map of the fiducial EPN stations used in densyfication project

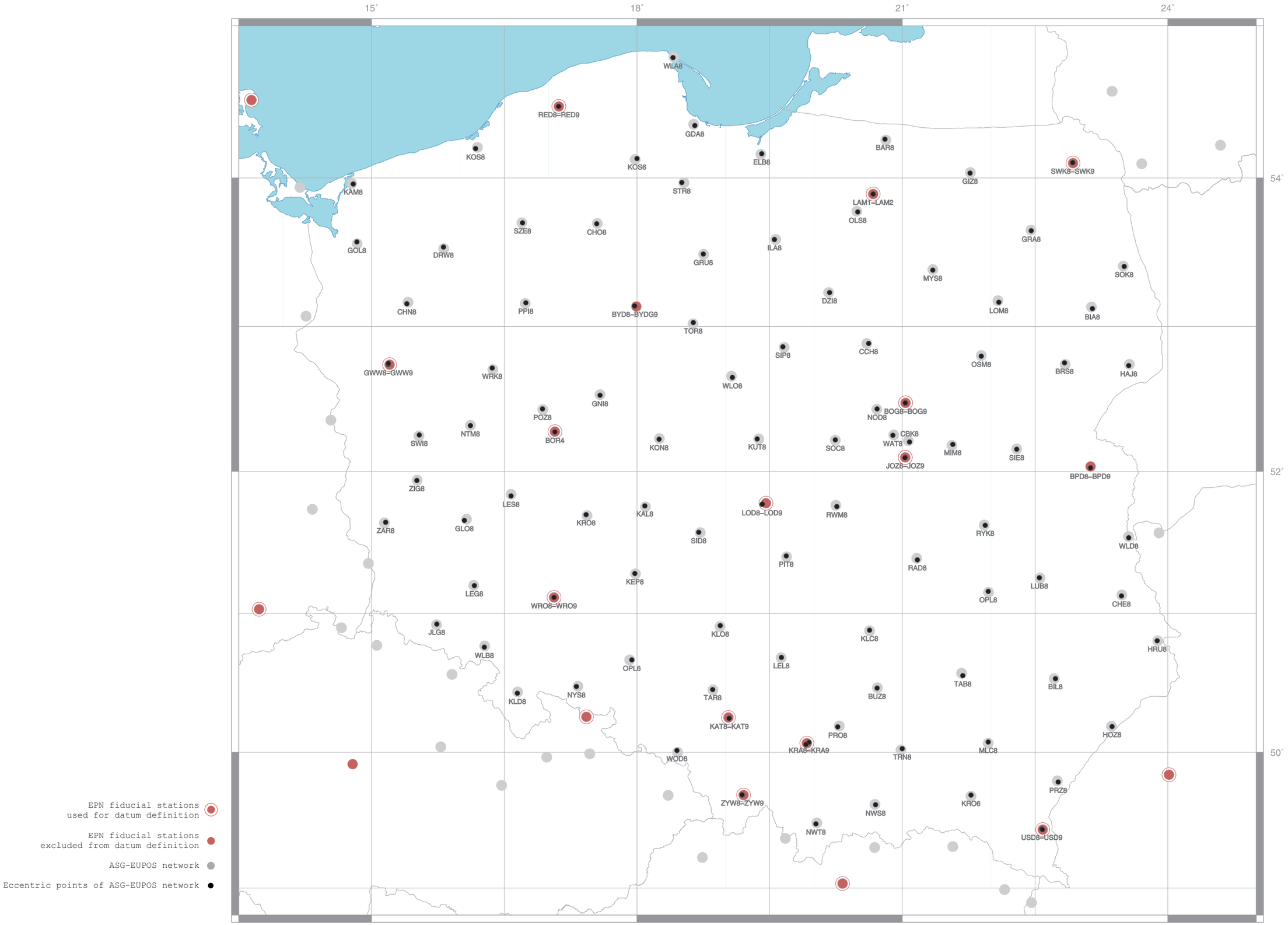
Appendix 2. Map of the ASG-EUPOS network used in densyfication project



Appendix 3. Map of the EUREF-POL, POLREF and EUVN points used in densyfication project



Appendix 4. Map of the eccentric points of ASG-EUPOS stations used in densyfication project



Appendix 5. List of reference stations and geodetic control points and their equipment sets

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
EPN class A stations used for constraint						
BOGI	12207M003	EPN	permanent	JAVAD TRE_G3T DELTA	ASH701945C_M	SNOW
BOR1	12205M002	EPN	permanent	TRIMBLE NETRS	AOAD/M_T	NONE
GWWL	12225M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
JOZ2	12204M002	EPN	permanent	LEICA GRX1200GGPRO	LEIAT504GG	NONE
KATO	12219S001	EPN	permanent	TRIMBLE NETR5	TRM57971.00	TZGD
LAMA	12209M001	EPN	permanent	LEICA GRX1200+GNSS	LEIAT504GG	LEIS
LODZ	12226M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
REDZ	12227M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
SWKI	12228M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
USDL	12229M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
WROC	12217M001	EPN	permanent	LEICA GRX1200GGPRO	LEIAT504GG	LEIS
ZYWI	12220S001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
BISK	11520M001	EPN	permanent	ASHTECH Z18	ASH701946.2	SNOW
BOGO	12207M002	EPN	permanent	TPS EUROCARD	ASH700936C_M	SNOW
BUCU	11401M001	EPN	permanent	LEICA GRX1200GGPRO	LEIAT504GG	LEIS
DRES	14108M001	EPN	permanent	JPS LEGACY	LEIAR25.R3	LEIT
GANP	11515M001	EPN	permanent	TRIMBLE NETR8	TRM55971.00	NONE
GLSV	12356M001	EPN	permanent	NOV OEMV3	NOV702GG	NONE
GRAZ	11001M002	EPN	permanent	LEICA GRX1200+GNSS	LEIAR25.R3	LEIT
JOZE	12204M001	EPN	permanent	TRIMBLE 4000SSI	TRM14532.00	NONE
KRAW	12218M001	EPN	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
MAR6	10405M002	EPN	permanent	JPS E_GGD	AOAD/M_T	OSOD
MOPI	11507M001	EPN	permanent	TRIMBLE 4000SSE	TRM14532.00	DOME
ONSA	10402M004	EPN	permanent	JPS E_GGD	AOAD/M_B	OSOD
PENC	11206M006	EPN	permanent	LEICA GRX1200GGPRO	LEIAT504GG	LEIS
POLV	12336M001	EPN	permanent	TRIMBLE 4700	TRM29659.00	NONE
RIGA	12302M002	EPN	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
SASS	14281M001	EPN	permanent	JPS LEGACY	TPSCR3_GGD	CONE
SULP	12366M001	EPN	permanent	TRIMBLE 4700	TRM41249.00	NONE
VIS0	10423M001	EPN	permanent	JPS EGGDT	AOAD/M_T	OSOD
VLNS	10801M001	EPN	permanent	ASHTECH Z-XII3	ASH700936A_M	NONE
WARN	14277M002	EPN	permanent	JPS LEGACY	LEIAR25.R3	LEIT
WSRT	13506M005	EPN	permanent	AOA SNR-12 ACT	AOAD/M_T	DUTD
WTZR	14201M010	EPN	permanent	LEICA GRX1200GGPRO	LEIAR25.R3	LEIT
ZIMM	14001M004	EPN	permanent	TRIMBLE NETRS	TRM29659.00	NONE
EPN class A stations excluded from constraint						
GOPE	11502M002	EPN	permanent	TPS NETG3	TPSCR.G3	TPSH
POTS	14106M003	EPN	permanent	JAVAD TRE_G3TH DELTA	JAV_RINGANT_G3T	NONE
UZHL	12301M001	EPN	permanent	NOV OEMV3	NOV702GG	NONE
EPN class B stations (excluded from constraint)						
BPDL	12223M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
BYDG	12224M001	EPN	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
KRA1	12218M002	EPN	permanent	TRIMBLE NETR5	TRM57971.00	NONE
Densification of ETRS89						
BART	12234M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
BIAL	12235M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
BILG	12236M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
BRSK	12237M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
BUZD	12238M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
CBKA	12221M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945E_M	NONE
CCHN	12239M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
CHEL	12240M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
CHNO	12241M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
CHOJ	12242M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
DRWP	12243M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
DZIA	12244M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
ELBL	18991M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
GDAN	12252M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
GIZY	12253M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
GLOG	12254M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
GNIE	12255M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
GOLE	12256M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
GRAJ	12245M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
GRUD	12246M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
HAJN	12247M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
HOZD	12248M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
HRUB	12249M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
ILAW	12250M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
JLGR	12251M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KALI	12257M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KAM1	12258M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KEPN	12259M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KLCE	12260M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KLDZ	12261M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KLOB	12219M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
KONI	12262M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KOSC	12263M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KOSZ	12264M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KROS	12265M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KROT	12266M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
KUTN	12267M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
LEGN	12268M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
LELO	12269M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
LESZ	12270M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
LOMZ	12271M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
LUBL	12272M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
MIMA	12273M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
MLCN	12274M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
MYSZ	12275M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
NODW	12276M001	ASG-EUPOS	permanent	TRIMBLE NETR5	TRM55971.00	TZGD
NTML	12277M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
NWSC	12231M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
NWTG	12232M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM29659.00	SCIT
NYSA	12278M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
OLST	12203M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
OPLE	12283M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
OPLU	12284M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
OSMZ	12285M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
PITR	12287M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
POZN	12206M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
PPIL	12286M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
PROS	12233M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM29659.00	SCIT
PRZM	12279M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
RADM	12280M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
RWMZ	12281M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
RYKI	12282M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SIDZ	12288M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SIED	12289M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SIPC	12290M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SOCH	12291M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SOKL	12292M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
STRG	18994M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
SWIB	12293M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
SZE2	12294M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
TABG	12295M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
TARG	12296M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
TORU	12202M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
TRNW	12230M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM29659.00	SCIT
WAT1	12297M001	ASG-EUPOS	permanent	LEICA GRX1200GGPRO	LEIAT504GG	LEIS
WLAD	12222M001	ASG-EUPOS	permanent	TRIMBLE 4000SSI	ASH701945E_M	SNOW
WLBR	12298M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
WLDW	12299M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
WLOC	18999M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
WODZ	18998M001	ASG-EUPOS	permanent	ASHTECH UZ-12	ASH701945C_M	SNOW
WRKI	18997M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
ZARY	18996M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
ZIGR	18995M001	ASG-EUPOS	permanent	TRIMBLE NETRS	TRM41249.00	TZGD
ASG-EUPOS station eccentric points						
BAR8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BIA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BIL8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BOG8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BOG9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BOR4	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BPD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BPD9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BRS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BUZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BYD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
BYD9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
CBK8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
CCH8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
CHE8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
CHN8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
CHO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
DRW8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
DZI8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ELB8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GDA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GIZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GLO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GNI8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GOL8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GRA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GRU8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GWW8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GWW9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
HAJ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
HOZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
HRU8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ILA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
JLG8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
JOZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
JOZ9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KAL8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KAM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KAT8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KAT9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KEP8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KLC8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
KLD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KLO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KON8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KOS6	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KOS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KRA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KRA9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KRO6	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KRO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
KUT8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LAM1	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LAM2	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LEG8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LEL8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LES8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LOD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LOD9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LOM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
LUB8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
MIM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
MLC8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
MYS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
NOD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
NTM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
NWS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
NWT8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
NYS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
OLS8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
OPL6	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
OPL8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
OSM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
PIT8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
POZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
PPI8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
PRO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
PRZ8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
RAD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
RED8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
RED9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
RWM8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
RYK8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SID8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SIE8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SIP8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SOC8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SOK8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
STR8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SWI8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SWK8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SWK9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SZE8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
TAB8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
TAR8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
TAR9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
TOR8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
TRN8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
USD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
USD9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WAT8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
WLA8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WLB8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WLD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WLO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WOD8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WRK8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WRO8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WRO9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ZAR8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ZIG8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ZYW8	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
ZYW9	–	ASG-EUPOS	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
EUREF-POL network points						
0216	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0301	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0303	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0304	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0307	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0308	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0309	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
0310	–	EUREF-POL	campaign (7x24h)	TRIMBLE R8	TRM5800	NONE
POLREF network points						
0401	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0402	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0403	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0404	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0501	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0502	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0503	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0504	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0505	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0601	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0602	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0603	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0604	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0701	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0702	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0703	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0704	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0801	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0802	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
0803	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0804	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0805	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
0806	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1001	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
110E	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1201	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1202	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1203	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1204	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1205	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1206	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1301	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1302	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1303	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1304	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
1305	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1306	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1307	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1308	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1309	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1401	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1402	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1403	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1404	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1406	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1407	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1501	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1502	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1504	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1505	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1506	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1507	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1508	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1509	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
150E	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1601	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1602	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1603	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1604	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1605	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1606	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1607	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
160Z	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1701	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1702	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1703	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1704	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1705	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1706	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1707	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1708	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1709	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1801	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1802	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1803	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1804	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1805	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1806	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1807	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1808	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1901	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1902	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1903	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
1904	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
1905	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2001	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2002	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2101	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2102	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2103	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2104	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2105	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2106	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2107	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
2108	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2109	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2110	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2201	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2202	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2203	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2205	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2206	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2207	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
220E	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2301	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2302	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2303	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2304	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2305	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2306	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2307	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2308	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2309	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2310	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2311	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2401	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2402	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2403	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2404	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2405	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2406	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2407	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2408	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2409	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2501	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2502	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2503	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2504	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2505	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2506	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2507	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2601	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2602	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2603	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2604	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2605	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2606	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2607	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2608	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2609	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2701	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2702	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2703	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2704	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2705	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2706	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2707	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2801	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2802	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2803	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2804	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2805	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2806	-	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
2807	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2808	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2901	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2902	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2903	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2904	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
2905	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
2906	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3001	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3002	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3003	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3101	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3102	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3103	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3104	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3105	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3106	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3108	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3201	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3202	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3203	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3204	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3205	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3206	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3207	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3301	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3302	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3303	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3305	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3306	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3307	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3308	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3309	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
330E	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3401	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3402	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3403	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3404	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3405	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3406	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3407	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3408	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3409	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3501	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3502	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3503	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3504	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3505	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3506	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3507	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3601	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3602	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3603	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3604	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3701	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3702	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3703	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3704	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3705	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
3706	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3707	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3708	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3709	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3801	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3802	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3803	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3804	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3805	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3806	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3807	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3808	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3901	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3902	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
3903	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3904	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3905	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
3906	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4001	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4002	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4003	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4004	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4005	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4007	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4101	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4102	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4104	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4105	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4106	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4107	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4108	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4109	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4201	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4202	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4203	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4204	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4205	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4206	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4207	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4208	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4209	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4210	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4301	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4302	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4303	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4304	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4305	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4306	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4401	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4402	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4403	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4404	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4405	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4406	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4407	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4408	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4409	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4501	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4502	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
4503	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4504	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4505	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4506	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4507	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4601	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4602	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4603	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4604	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4606	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4701	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4702	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4703	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4704	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4705	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4706	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4707	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4708	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4801	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4802	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4803	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4804	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4805	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4806	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4807	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4808	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4901	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
4902	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4903	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
4904	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5101	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5102	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5201	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5202	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5203	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5204	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5205	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5206	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5301	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5302	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5303	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5304	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5305	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5306	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5401	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5402	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5403	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5404	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5405	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5406	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5407	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5408	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5501	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5502	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5503	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5601	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5602	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5603	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5604	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
5605	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5701	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5702	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5703	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5801	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
5802	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5803	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5901	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5902	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
5903	–	POLREF	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
EUVN network points						
PL01	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PL02	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PL03	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PL05	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PL06	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
BIEL	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
CZAR	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GLUB	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
GROD	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
GROJ	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
GRUE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
GRYB	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
JARO	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
JEDZ	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
KIEL	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
KOLB	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
KRAS	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
KRTE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
KRZE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
LAM6	–	EUVN	campaign (2x24h)	ROGUE SNR-8000	AOAD/M_T	NONE
LOME	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
LOWI	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
MINS	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
NOWY	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
OPOL	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PACA	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
PACZ	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
POCK	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
SAND	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
SEPO	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
SIER	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
SMAR	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
SOKO	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
SZLI	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
TOMA	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
TORE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
WLOD	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
WROE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRMR8_GNSS	NONE
WRZE	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
ZABC	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
ZGOR	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
ZNIN	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
ZYRZ	–	EUVN	campaign (2x24h)	TRIMBLE R8	TRM5800	NONE
EUPOS station located in neighboring countries						
CBRU	–	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
CFRM	11525M001	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS

Site id.	Domes number	Network type	Observation period	Receiver type	Antenna type	
CLIB	11526M001	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
CPAR	11527M001	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
CSUM	–	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
CSVI	–	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
CTRU	–	CZEPOS	permanent	LEICA GRX1200PRO	LEIAT504	LEIS
MRJM	–	LITPOS	permanent	TRIMBLE NETRS	TRM29659.00	NONE
VARN	–	LITPOS	permanent	TRIMBLE 5700	TRM41249.00	NONE
VEIS	–	LITPOS	permanent	TRIMBLE NETRS	TRM29659.00	NONE
0014	–	SAPOS	permanent	TPS NETG3	TPSCR.G3	TPSH
0017	–	SAPOS	permanent	TPS NETG3	TPSCR.G3	TPSH
0022	–	SAPOS	permanent	TPS NETG3	TPSCR.G3	TPSH
0139	–	SAPOS	permanent	TRIMBLE NETRS	LEIAR25.R3	LEIT
0147	–	SAPOS	permanent	TRIMBLE NETRS	LEIAR25.R3	LEIT
0781	–	SAPOS	permanent	TRIMBLE 4000SSI	TRM33429.00+GP	TCWD
KUZA	11532M001	SKPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE
LIE1	11533M001	SKPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE
SKSK	11544M001	SKPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE
SKSL	11545M001	SKPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE
SKSV	11546M001	SKPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE
SHAZ	–	UAPOS	permanent	TRIMBLE 5700	TRM41249.00	NONE
VBER	–	UAPOS	permanent	TRIMBLE NETR5	TRM55971.00	NONE

Appendix 6. List of final coordinates in PL-ITRF2005 epoch 2011.0

Site id.	Domes number	Network type	PL-ITRF2005-XYZ X [m]	Y [m]	Z [m]
EPN class A stations used for constraint					
BOGI	12207M003	EPN	3633815.2423	1397454.2131	5035281.0478
BOR1	12205M002	EPN	3738358.3577	1148173.8026	5021815.8312
GWWL	12225M001	EPN	3734525.7596	1015013.0990	5053042.7912
JOZ2	12204M002	EPN	3664880.4721	1409190.6836	5009618.5339
KATO	12219S001	EPN	3862991.9468	1332822.9774	4881105.6941
LAMA	12209M001	EPN	3524522.8194	1329693.7147	5129846.4098
LODZ	12226M001	EPN	3728601.4490	1317402.5650	4987811.3910
REDZ	12227M001	EPN	3550066.5066	1093332.0826	5167562.1976
SWKI	12228M001	EPN	3452304.4091	1460314.8755	5143362.6368
USDL	12229M001	EPN	3837557.7796	1596303.3440	4822409.8945
WROC	12217M001	EPN	3835751.2112	1177250.0584	4941605.3115
ZYWI	12220S001	EPN	3904632.8811	1360192.1963	4840631.0371
BISK	11520M001	EPN	3898945.8431	1223993.4564	4881826.5022
BOGO	12207M002	EPN	3633738.8701	1397434.2233	5035353.5335
BUCU	11401M001	EPN	4093760.7738	2007793.9135	4445130.0429
DRES	14108M001	EPN	3904724.6106	954013.4871	4935790.0518
GANP	11515M001	EPN	3929181.4212	1455236.8270	4793653.9613
GLSV	12356M001	EPN	3512888.8434	2068979.9685	4888903.2555
GRAZ	11001M002	EPN	4194423.7218	1162702.7988	4647245.4812
JOZE	12204M001	EPN	3664940.0620	1409153.9576	5009571.4468
KRAW	12218M001	EPN	3856935.7351	1397750.7828	4867719.6968
MAR6	10405M002	EPN	2998189.3422	931451.8638	5533398.7756
MOPI	11507M001	EPN	4053737.7965	1260571.7096	4744940.9404
ONSA	10402M004	EPN	3370658.4654	711877.2254	5349787.0248
PENC	11206M006	EPN	4052449.3740	1417681.2277	4701407.1745
POLV	12336M001	EPN	3411557.2321	2348464.0708	4834396.9430
RIGA	12302M002	EPN	3183899.0934	1421478.5760	5322810.8568
SASS	14281M001	EPN	3606145.9901	875303.4363	5170194.0109
SULP	12366M001	EPN	3765296.8864	1677559.2963	4851297.4703
VIS0	10423M001	EPN	3246470.1667	1077900.5999	5365278.1692
VLNS	10801M001	EPN	3343600.5089	1580417.8237	5179337.3463
WARN	14277M002	EPN	3658785.7143	784470.9711	5147870.6561
WSRT	13506M005	EPN	3828735.7783	443305.0510	5064884.7755
WTZR	14201M010	EPN	4075580.4621	931853.9012	4801568.2007
ZIMM	14001M004	EPN	4331296.9900	567555.9887	4633134.0139
EPN class A stations excluded from constraint					
GOPE	11502M002	EPN	3979316.0411	1050312.5759	4857067.1744
POTS	14106M003	EPN	3800689.5454	882077.4796	5028791.3848
UZHL	12301M001	EPN	3907587.3519	1602428.7838	4763783.8099
EPN class B stations (excluded from constraint)					
BPDL	12223M001	EPN	3615989.7023	1544391.1448	5005373.7520
BYDG	12224M001	EPN	3647216.7750	1184604.3853	5079625.2237
KRA1	12218M002	EPN	3856938.5002	1397750.5205	4867717.5895
Densification of ETRS89					
BART	12234M001	ASG-EUPOS	3490896.5367	1327144.0195	5153172.3386
BIAL	12235M001	ASG-EUPOS	3526537.7137	1507014.8264	5079530.1452
BILG	12236M001	ASG-EUPOS	3747351.2344	1568978.3748	4900768.9212
BRSK	12237M001	ASG-EUPOS	3566372.3334	1501993.6637	5053285.2181
BUZD	12238M001	ASG-EUPOS	3805090.9346	1439261.5910	4896192.6323
CBKA	12221M001	ASG-EUPOS	3654409.5971	1407752.7769	5017577.1636
CCHN	12239M001	ASG-EUPOS	3610610.7610	1356983.6866	5062816.7492
CHEL	12240M001	ASG-EUPOS	3678820.0917	1598101.1870	4942832.8653

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
CHNO	12241M001	ASG-EUPOS	3694305.1587	1018555.5554	5081594.3911
CHOJ	12242M001	ASG-EUPOS	3608519.7052	1141388.3620	5116893.6947
DRWP	12243M001	ASG-EUPOS	3655958.5509	1035736.1118	5105717.3152
DZIA	12244M001	ASG-EUPOS	3591708.8202	1319169.9919	5086093.9095
ELBL	18991M001	ASG-EUPOS	3530686.5407	1243375.5413	5146944.6223
GDAN	12252M001	ASG-EUPOS	3529800.1744	1190807.9833	5159896.8695
GIZY	12253M001	ASG-EUPOS	3486403.0960	1392187.6228	5139218.9012
GLOG	12254M001	ASG-EUPOS	3809340.5882	1097657.9691	4979900.9592
GNIE	12255M001	ASG-EUPOS	3706493.8344	1174620.0771	5039232.2197
GOLE	12256M001	ASG-EUPOS	3670267.7219	972331.7004	5107777.2628
GRAJ	12245M001	ASG-EUPOS	3501475.9814	1446945.2027	5113951.9368
GRUD	12246M001	ASG-EUPOS	3601223.4442	1222799.4961	5103133.7959
HAJN	12247M001	ASG-EUPOS	3547043.5699	1547151.8661	5053300.8655
HOZD	12248M001	ASG-EUPOS	3756466.8375	1622631.3412	4876495.5856
HRUB	12249M001	ASG-EUPOS	3693100.2461	1635499.5753	4920024.3599
ILAW	12250M001	ASG-EUPOS	3575245.5822	1270835.8022	5109730.4031
JLGR	12251M001	ASG-EUPOS	3878289.3429	1092567.1621	4928218.1121
KALI	12257M001	ASG-EUPOS	3760909.3980	1228903.7612	4986013.4422
KAM1	12258M001	ASG-EUPOS	3636190.0021	959188.5300	5134372.8438
KEPN	12259M001	ASG-EUPOS	3802580.4847	1234329.2496	4953272.3943
KLCE	12260M001	ASG-EUPOS	3774368.4300	1420921.4734	4925093.2609
KLDZ	12261M001	ASG-EUPOS	3900141.5518	1166529.9528	4894068.5981
KLOB	12219M001	ASG-EUPOS	3812245.1078	1307966.8307	4927157.7284
KONI	12262M001	ASG-EUPOS	3718009.4893	1226301.9963	5018514.8596
KOSC	12263M001	ASG-EUPOS	3563309.7294	1156522.9704	5144921.1246
KOSZ	12264M001	ASG-EUPOS	3590529.9927	1042990.8361	5150117.8974
KROS	12265M001	ASG-EUPOS	3840336.0542	1534054.1524	4840009.6248
KROT	12266M001	ASG-EUPOS	3779936.3369	1187254.6196	4981792.6143
KUTN	12267M001	ASG-EUPOS	3693480.4603	1298866.7538	5018375.6622
LEGN	12268M001	ASG-EUPOS	3846687.3540	1114288.6462	4947658.8867
LELO	12269M001	ASG-EUPOS	3814250.5809	1360360.4553	4911505.1388
LESZ	12270M001	ASG-EUPOS	3784869.5077	1126771.6483	4991968.2016
LOMZ	12271M001	ASG-EUPOS	3550310.8868	1440214.6862	5082321.7420
LUBL	12272M001	ASG-EUPOS	3694474.8455	1534437.7554	4951248.9455
MIMA	12273M001	ASG-EUPOS	3644974.1083	1440150.1890	5015356.9016
MLCN	12274M001	ASG-EUPOS	3804457.3321	1534914.9767	4867705.7451
MYSZ	12275M001	ASG-EUPOS	3550868.3886	1387537.5964	5096451.5957
NODW	12276M001	ASG-EUPOS	3645290.5401	1378210.3929	5032291.8062
NTML	12277M001	ASG-EUPOS	3753277.5110	1084607.4094	5024800.6978
NWSC	12231M001	ASG-EUPOS	3873461.3218	1462888.4537	4835656.2710
NWTG	12232M001	ASG-EUPOS	3901050.4458	1422373.3513	4826032.5505
NYSA	12278M001	ASG-EUPOS	3882469.4328	1211763.1717	4896966.4957
OLST	12203M001	ASG-EUPOS	3538408.9897	1322052.8259	5122295.9718
OPLE	12283M001	ASG-EUPOS	3854337.6876	1246354.5148	4910366.5632
OPLU	12284M001	ASG-EUPOS	3717924.0218	1500320.8776	4944131.2309
OSMZ	12285M001	ASG-EUPOS	3585797.4056	1440878.2649	5057302.9423
PITR	12287M001	ASG-EUPOS	3754198.2404	1343527.3599	4961743.5410
POZN	12206M001	ASG-EUPOS	3728246.6645	1135212.0204	5032258.6112
PPIL	12286M001	ASG-EUPOS	3670392.6773	1103842.9587	5081135.3432
PROS	12233M001	ASG-EUPOS	3837828.5782	1418780.2083	4876685.8578
PRZM	12279M001	ASG-EUPOS	3804695.2706	1595661.1373	4848106.7289
RADM	12280M001	ASG-EUPOS	3719233.1745	1439895.0378	4961004.5239
RWMZ	12281M001	ASG-EUPOS	3711199.1848	1369172.7971	4986762.4814
RYKI	12282M001	ASG-EUPOS	3680882.8971	1481736.6941	4977132.5351
SIDZ	12288M001	ASG-EUPOS	3762312.9640	1274760.3353	4973563.8559
SIED	12289M001	ASG-EUPOS	3628142.2820	1487581.9628	5013729.4834
SIPC	12290M001	ASG-EUPOS	3634432.0919	1298646.7044	5061077.8193
SOCH	12291M001	ASG-EUPOS	3673992.3187	1354866.4498	5017844.9862

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
SOKL	12292M001	ASG-EUPOS	3494481.5986	1519135.3238	5097954.9988
STRG	18994M001	ASG-EUPOS	3565383.3053	1195036.4127	5134648.9028
SWIB	12293M001	ASG-EUPOS	3770280.2871	1048163.5651	5019843.7427
SZE2	12294M001	ASG-EUPOS	3624637.8940	1087539.2283	5117214.8095
TABG	12295M001	ASG-EUPOS	3772239.0570	1498959.0112	4903535.6444
TARG	12296M001	ASG-EUPOS	3851054.5136	1315388.6011	4895186.1230
TORU	12202M001	ASG-EUPOS	3643531.8781	1228658.8672	5071868.6924
TRNW	12230M001	ASG-EUPOS	3834315.3201	1470638.6518	4864150.9870
WAT1	12297M001	ASG-EUPOS	3655222.7329	1396074.7344	5020262.6221
WLAD	12222M001	ASG-EUPOS	3496344.6542	1164350.2861	5188401.9167
WLBR	12298M001	ASG-EUPOS	3880291.9465	1133212.1752	4917654.7972
WLDW	12299M001	ASG-EUPOS	3643580.5705	1588599.6678	4971661.4019
WLOC	18999M001	ASG-EUPOS	3664306.4793	1266512.6149	5047682.0653
WODZ	18998M001	ASG-EUPOS	3896698.3374	1300674.0141	4863029.6149
WRKI	18997M001	ASG-EUPOS	3715835.9617	1091592.2845	5050832.4452
ZARY	18996M001	ASG-EUPOS	3828791.3730	1036393.6542	4978198.5439
ZIGR	18995M001	ASG-EUPOS	3796759.6829	1053955.0842	4998889.6583
ASG-EUPOS station eccentric points					
BAR8	–	ASG-EUPOS	3490743.7612	1326246.3614	5153481.1702
BIA8	–	ASG-EUPOS	3527272.3345	1507971.8280	5078722.2441
BIL8	–	ASG-EUPOS	3746918.3083	1569637.6128	4900876.8419
BOG8	–	ASG-EUPOS	3633836.6509	1397470.6290	5035260.0035
BOG9	–	ASG-EUPOS	3633762.2929	1397360.0388	5035344.2808
BOR4	–	ASG-EUPOS	3738500.8488	1148259.6535	5021680.8301
BPD8	–	ASG-EUPOS	3616946.0513	1544612.0986	5004586.7148
BPD9	–	ASG-EUPOS	3616662.2201	1544718.9816	5004754.6354
BRS8	–	ASG-EUPOS	3565709.6704	1501424.5989	5053908.1857
BUZ8	–	ASG-EUPOS	3805370.4142	1439006.2316	4896010.5094
BYD8	–	ASG-EUPOS	3647199.3078	1183507.7942	5079861.8623
BYD9	–	ASG-EUPOS	3647253.7792	1183293.8202	5079871.1825
CBK8	–	ASG-EUPOS	3654752.7767	1408933.8818	5016990.7875
CCH8	–	ASG-EUPOS	3610004.7925	1358200.7818	5062891.5378
CHE8	–	ASG-EUPOS	3679308.7561	1598021.2014	4942470.9071
CHN8	–	ASG-EUPOS	3695348.8501	1017882.4547	5080961.8227
CHO8	–	ASG-EUPOS	3608766.0913	1141053.0054	5116767.1223
DRW8	–	ASG-EUPOS	3655070.2815	1035140.4790	5106443.2336
DZI8	–	ASG-EUPOS	3591555.1882	1319778.3345	5086012.2606
ELB8	–	ASG-EUPOS	3530112.3974	1243924.9023	5147194.5770
GDA8	–	ASG-EUPOS	3530261.9235	1191786.0040	5159318.3169
GIZ8	–	ASG-EUPOS	3486687.0331	1392242.4523	5138986.4359
GLO8	–	ASG-EUPOS	3810374.3283	1096275.8701	4979420.9724
GNI8	–	ASG-EUPOS	3706846.1566	1174780.7395	5038914.3191
GOL8	–	ASG-EUPOS	3669250.0038	971883.0555	5108568.9717
GRA8	–	ASG-EUPOS	3501750.5668	1447373.0376	5113622.3924
GRU8	–	ASG-EUPOS	3601230.7533	1222412.6838	5103204.5093
GWW8	–	ASG-EUPOS	3734608.0874	1014044.5203	5053157.3306
GWW9	–	ASG-EUPOS	3733963.7785	1013811.3195	5053660.9141
HAJ8	–	ASG-EUPOS	3547929.9564	1547021.1050	5052717.8309
HOZ8	–	ASG-EUPOS	3756362.0514	1623216.5514	4876366.7492
HRU8	–	ASG-EUPOS	3693285.2104	1635067.9939	4919999.6551
ILA8	–	ASG-EUPOS	3575561.1497	1269999.0013	5109707.0872
JLG8	–	ASG-EUPOS	3877760.1707	1092757.3128	4928560.5111
JOZ8	–	ASG-EUPOS	3664803.4745	1409193.1179	5009656.8480
JOZ9	–	ASG-EUPOS	3664975.8161	1409132.4459	5009550.3437
KAL8	–	ASG-EUPOS	3760504.5851	1228336.3078	4986445.4244
KAM8	–	ASG-EUPOS	3636212.3226	960215.5503	5134149.5690
KAT8	–	ASG-EUPOS	3863242.8097	1333491.0579	4880686.8714

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
KAT9	–	ASG-EUPOS	3863398.4210	1333395.6661	4880591.3281
KEP8	–	ASG-EUPOS	3802442.1632	1233755.4307	4953500.5097
KLC8	–	ASG-EUPOS	3774031.9958	1420694.5229	4925373.5447
KLD8	–	ASG-EUPOS	3900821.8982	1166474.4422	4893509.1889
KLO8	–	ASG-EUPOS	3811609.6389	1308005.4851	4927599.6262
KON8	–	ASG-EUPOS	3718348.1248	1226168.5104	5018255.9863
KOS6	–	ASG-EUPOS	3562524.6319	1157541.9966	5145238.0887
KOS8	–	ASG-EUPOS	3591663.7316	1041974.2121	5149451.6993
KRA8	–	ASG-EUPOS	3855804.8080	1399151.2980	4868194.8247
KRA9	–	ASG-EUPOS	3857944.8244	1397233.7663	4867044.1356
KRO6	–	ASG-EUPOS	3839665.2002	1533891.3574	4840546.3431
KRO8	–	ASG-EUPOS	3779632.4991	1186223.0871	4982237.2498
KUT8	–	ASG-EUPOS	3693688.2378	1297853.1182	5018456.1505
LAM1	–	ASG-EUPOS	3524575.5134	1329706.1102	5129806.7296
LAM2	–	ASG-EUPOS	3524472.5310	1329658.6706	5129890.2756
LEG8	–	ASG-EUPOS	3846644.3205	1114931.2121	4947525.8440
LEL8	–	ASG-EUPOS	3813968.7117	1360574.8780	4911646.8770
LES8	–	ASG-EUPOS	3785788.4338	1126841.7091	4991231.3056
LOD8	–	ASG-EUPOS	3730384.5443	1314733.3934	4987147.0869
LOD9	–	ASG-EUPOS	3730157.5411	1314851.1638	4987288.0990
LOM8	–	ASG-EUPOS	3550855.2540	1441251.5545	5081637.4453
LUB8	–	ASG-EUPOS	3694407.8752	1534010.6918	4951388.1146
MIM8	–	ASG-EUPOS	3644146.6627	1440683.2298	5015786.4124
MLC8	–	ASG-EUPOS	3803826.5310	1534715.5182	4868238.7283
MYS8	–	ASG-EUPOS	3551126.4981	1387812.1541	5096182.4189
NOD8	–	ASG-EUPOS	3644960.6456	1378457.5989	5032438.2805
NTM8	–	ASG-EUPOS	3753451.2367	1084715.2267	5024628.8131
NWS8	–	ASG-EUPOS	3873485.2148	1463471.1575	4835466.9992
NWT8	–	ASG-EUPOS	3901716.3328	1421854.4444	4825640.1797
NYS8	–	ASG-EUPOS	3883010.1973	1210673.0736	4896779.4117
OLS8	–	ASG-EUPOS	3538648.4667	1322748.4480	5121945.9968
OPL6	–	ASG-EUPOS	3853772.9275	1247951.2203	4910388.2485
OPL8	–	ASG-EUPOS	3717557.3856	1499763.3286	4944555.4105
OSM8	–	ASG-EUPOS	3586061.9402	1441009.0079	5057056.5726
PIT8	–	ASG-EUPOS	3753806.5863	1343184.0745	4962100.3517
POZ8	–	ASG-EUPOS	3727933.7263	1134890.6798	5032501.7172
PPI8	–	ASG-EUPOS	3670063.2834	1104176.5015	5081265.2391
PRO8	–	ASG-EUPOS	3838881.0847	1417744.5230	4876176.6480
PRZ8	–	ASG-EUPOS	3805237.0667	1596513.9697	4847328.5427
RAD8	–	ASG-EUPOS	3719972.8897	1440599.5621	4960245.0241
RED8	–	ASG-EUPOS	3550099.3040	1093402.5069	5167500.2070
RED9	–	ASG-EUPOS	3550176.4193	1093217.4239	5167486.9345
RWM8	–	ASG-EUPOS	3711665.3526	1370051.2476	4986171.2092
RYK8	–	ASG-EUPOS	3680608.4594	1482446.9514	4977085.0037
SID8	–	ASG-EUPOS	3762566.1500	1273558.8143	4973679.0700
SIE8	–	ASG-EUPOS	3628367.1551	1487536.6863	5013557.0306
SIP8	–	ASG-EUPOS	3634387.3344	1297871.0613	5061288.5797
SOC8	–	ASG-EUPOS	3673845.0649	1354729.6676	5017970.7391
SOK8	–	ASG-EUPOS	3494281.0293	1519851.3962	5097842.0926
STR8	–	ASG-EUPOS	3565668.0543	1193478.1226	5134804.2649
SWI8	–	ASG-EUPOS	3769722.1975	1048236.8665	5020221.4117
SWK8	–	ASG-EUPOS	3452206.2674	1460128.7790	5143456.7778
SWK9	–	ASG-EUPOS	3452091.9106	1460056.9339	5143556.5308
SZE8	–	ASG-EUPOS	3624498.9699	1087897.3510	5117217.8787
TAB8	–	ASG-EUPOS	3773313.1960	1500346.7997	4902269.6089
TAR8	–	ASG-EUPOS	3850818.5327	1315125.0110	4895425.6027
TAR9	–	ASG-EUPOS	3850806.8100	1315300.8819	4895376.0859
TOR8	–	ASG-EUPOS	3642870.2681	1228488.1104	5072349.4890

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
TRN8	–	ASG-EUPOS	3833150.8310	1471271.3423	4864843.6150
USD8	–	ASG-EUPOS	3837451.2314	1595612.1420	4822745.8896
USD9	–	ASG-EUPOS	3837552.2053	1596052.5076	4822492.8740
WAT8	–	ASG-EUPOS	3655678.7762	1395395.0376	5020104.1425
WLA8	–	ASG-EUPOS	3497026.7724	1163756.6330	5188087.1321
WLB8	–	ASG-EUPOS	3881179.9058	1133174.8577	4916950.3487
WLD8	–	ASG-EUPOS	3644230.5301	1589066.9751	4971005.3628
WLO8	–	ASG-EUPOS	3664713.1319	1267455.2381	5047131.3728
WOD8	–	ASG-EUPOS	3895793.6173	1299852.5781	4863998.6734
WRK8	–	ASG-EUPOS	3715106.4104	1090900.5049	5051507.5209
WRO8	–	ASG-EUPOS	3835703.7324	1177221.4079	4941620.3427
WRO9	–	ASG-EUPOS	3835671.1718	1177277.5452	4941632.4659
ZAR8	–	ASG-EUPOS	3828100.0839	1037320.7503	4978513.8274
ZIG8	–	ASG-EUPOS	3796939.6468	1053897.0872	4998732.8037
ZYW8	–	ASG-EUPOS	3904838.9078	1359155.7966	4840722.6352
ZYW9	–	ASG-EUPOS	3904705.0799	1358974.5280	4840876.9470
EUREF-POL network points					
0216	–	EUREF-POL	3738396.7350	1148286.0420	5021752.4333
0301	–	EUREF-POL	3495579.1864	1157845.8045	5190403.8237
0303	–	EUREF-POL	3475730.2042	1453976.7919	5129449.0087
0304	–	EUREF-POL	3635006.3782	1051224.7835	5117503.4372
0307	–	EUREF-POL	3846613.9195	1106084.1893	4949572.7015
0308	–	EUREF-POL	3803542.4837	1352681.4112	4921846.0186
0309	–	EUREF-POL	3717652.1198	1622949.1942	4905873.1269
0310	–	EUREF-POL	3866099.8258	1479953.2994	4836446.6192
POLREF network points					
0401	–	POLREF	3887243.0406	1329807.6872	4862762.7618
0402	–	POLREF	3904243.0021	1292261.1978	4859172.3986
0403	–	POLREF	3909975.8684	1322068.9960	4846853.7896
0404	–	POLREF	3926190.6934	1341019.9311	4828956.6535
0501	–	POLREF	3885923.3017	1397713.3915	4845615.1611
0502	–	POLREF	3912840.6455	1420597.7403	4817598.3866
0503	–	POLREF	3886775.9725	1363194.3675	4854015.6292
0504	–	POLREF	3902624.4026	1361058.6674	4842066.6111
0505	–	POLREF	3909753.9987	1398216.0998	4826170.8073
0601	–	POLREF	3850831.2707	1454838.2062	4855996.0820
0602	–	POLREF	3887165.7606	1422385.0609	4837282.8236
0603	–	POLREF	3882238.2958	1452851.7584	4831821.6258
0604	–	POLREF	3883649.9166	1488148.0933	4820316.2727
0701	–	POLREF	3837106.4588	1477784.0555	4859943.7212
0702	–	POLREF	3836356.3850	1500381.9299	4853614.0763
0703	–	POLREF	3822285.2237	1533819.0944	4854430.2018
0704	–	POLREF	3850409.9619	1521396.3129	4836052.4445
0801	–	POLREF	3796397.7849	1589464.1690	4856583.0471
0802	–	POLREF	3822703.7926	1569854.1824	4842669.8429
0803	–	POLREF	3809787.4952	1602606.3553	4841885.1873
0804	–	POLREF	3839057.3966	1592622.3527	4822448.3558
0805	–	POLREF	3865104.5939	1569220.6533	4809491.6783
0806	–	POLREF	3864199.7556	1606524.9697	4798921.2943
1001	–	POLREF	3897645.3959	1033937.3022	4925522.6606
110E	–	POLREF	3893991.8508	1096891.4188	4916292.1019
1201	–	POLREF	3861970.4237	1144992.8650	4928919.8372
1202	–	POLREF	3882341.5116	1115798.3083	4919957.7845
1203	–	POLREF	3879186.1165	1160831.3357	4911891.0744
1204	–	POLREF	3876709.7774	1183134.5029	4908496.9884
1205	–	POLREF	3904751.1900	1163580.4930	4891222.4398

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
1206	-	POLREF	3921019.1852	1174808.4675	4875680.2361
1301	-	POLREF	3852863.8200	1178765.1282	4928015.8959
1302	-	POLREF	3851309.9491	1200226.6668	4924084.7762
1303	-	POLREF	3842689.0695	1224110.1992	4924923.5721
1304	-	POLREF	3864364.8692	1219317.1834	4909323.5620
1305	-	POLREF	3851711.5438	1246870.8038	4912272.5600
1306	-	POLREF	3889142.8799	1200894.4274	4894357.6552
1307	-	POLREF	3882558.6316	1232535.4463	4891802.3228
1308	-	POLREF	3888990.9608	1253654.5068	4881410.7533
1309	-	POLREF	3908788.3549	1264990.3016	4862816.5923
1401	-	POLREF	3827873.3881	1271287.0858	4924622.9782
1402	-	POLREF	3831105.7156	1292225.9166	4916716.5710
1403	-	POLREF	3857405.3961	1288067.7114	4897384.5272
1404	-	POLREF	3865243.5058	1270049.6021	4895969.0225
1406	-	POLREF	3873005.6467	1296936.1089	4882774.2212
1407	-	POLREF	3888206.9843	1274262.5421	4876706.6747
1501	-	POLREF	3793428.9798	1378554.6921	4922474.1807
1502	-	POLREF	3813796.1593	1383313.5985	4905555.1166
1504	-	POLREF	3811331.2815	1320323.6740	4924563.3307
1505	-	POLREF	3818986.7558	1360875.4311	4907827.2515
1506	-	POLREF	3836190.0049	1332820.5851	4902120.1504
1507	-	POLREF	3831852.2674	1373464.8650	4894474.4577
1508	-	POLREF	3847095.0896	1350291.0059	4888901.5049
1509	-	POLREF	3866759.7032	1361871.7288	4870300.0663
150E	-	POLREF	3849915.3008	1383600.4633	4877577.4929
1601	-	POLREF	3770769.8754	1438932.8483	4922651.1334
1602	-	POLREF	3803550.1223	1411191.7806	4905516.7037
1603	-	POLREF	3803216.6681	1445496.8780	4895904.1709
1604	-	POLREF	3816282.8480	1419890.8909	4893259.1375
1605	-	POLREF	3834578.4641	1409935.9693	4881820.6664
1606	-	POLREF	3836351.8614	1433505.8549	4873612.1731
1607	-	POLREF	3857655.1369	1409129.2920	4863901.9395
160Z	-	POLREF	3803550.2893	1411191.9047	4905516.7979
1701	-	POLREF	3735488.0802	1506894.5859	4929086.2902
1702	-	POLREF	3748556.9470	1480628.8746	4927115.6340
1703	-	POLREF	3773487.6644	1472499.7947	4910732.7629
1704	-	POLREF	3759061.0980	1508419.4190	4910653.7453
1705	-	POLREF	3788648.2124	1475338.6226	4898114.4007
1706	-	POLREF	3794466.2107	1517055.8273	4880992.5745
1707	-	POLREF	3818990.0710	1467469.3851	4877024.1837
1708	-	POLREF	3816028.2813	1490289.3061	4872494.0410
1709	-	POLREF	3813317.6290	1519081.2862	4865845.0296
1801	-	POLREF	3709402.8657	1574385.9886	4927756.9550
1802	-	POLREF	3739956.5029	1529949.9027	4918646.3445
1803	-	POLREF	3728889.0195	1556537.4353	4918827.5071
1804	-	POLREF	3767134.9570	1549201.3913	4891972.0363
1805	-	POLREF	3755864.4378	1584927.0208	4889216.0316
1806	-	POLREF	3781360.0427	1571692.3451	4873840.9613
1807	-	POLREF	3780369.2747	1602443.8352	4864683.7416
1808	-	POLREF	3804557.4592	1546685.9247	4864129.9054
1901	-	POLREF	3698491.5218	1606801.2626	4925523.1909
1902	-	POLREF	3698645.6797	1636106.8949	4915684.7072
1903	-	POLREF	3724985.7048	1590533.2529	4910892.2535
1904	-	POLREF	3724466.0167	1644696.4751	4893427.9963
1905	-	POLREF	3742487.5412	1620070.4189	4888085.6560
2001	-	POLREF	3811595.4637	1001672.1305	4998177.7760
2002	-	POLREF	3834830.6838	1016946.6797	4977534.6559
2101	-	POLREF	3803995.5369	1033755.4250	4997498.3313

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
2102	–	POLREF	3820996.6222	1037222.6251	4983947.0525
2103	–	POLREF	3806428.7560	1083844.3314	4985068.1088
2104	–	POLREF	3826944.6222	1057985.2682	4975059.4249
2105	–	POLREF	3820715.1732	1090833.2703	4972770.1400
2106	–	POLREF	3841970.5490	1038831.8958	4967569.0669
2107	–	POLREF	3848525.8580	1074114.3426	4955119.5045
2108	–	POLREF	3868770.4748	1039055.7675	4946915.7095
2109	–	POLREF	3869737.7350	1061966.5866	4941414.4163
2110	–	POLREF	3873517.4105	1083255.3628	4934133.1439
2201	–	POLREF	3793073.2821	1105805.4794	4990430.3361
2202	–	POLREF	3783646.4765	1135133.2910	4991004.2061
2203	–	POLREF	3806710.3903	1121488.8063	4976595.8314
2205	–	POLREF	3832497.5544	1132374.8212	4954522.9569
2206	–	POLREF	3846100.0412	1149375.2630	4940171.8108
2207	–	POLREF	3855887.7302	1128283.2412	4937468.3595
220E	–	POLREF	3817044.1058	1156640.7563	4960747.4476
2301	–	POLREF	3770419.2663	1155843.2388	4996237.0850
2302	–	POLREF	3757905.6754	1202884.7935	4994606.2711
2303	–	POLREF	3773200.4497	1188844.0066	4986497.3547
2304	–	POLREF	3792172.0315	1166621.1723	4977346.4417
2305	–	POLREF	3786256.7431	1197071.6930	4974663.4659
2306	–	POLREF	3776181.6691	1217279.4897	4977467.8541
2307	–	POLREF	3808458.6560	1195550.1897	4958277.9361
2308	–	POLREF	3805142.9559	1229780.4614	4952444.8460
2309	–	POLREF	3827594.9869	1178124.1619	4947673.3782
2310	–	POLREF	3823657.4875	1204451.8998	4944431.1973
2311	–	POLREF	3823194.2088	1225126.4105	4939757.2555
2401	–	POLREF	3745972.4090	1262801.9049	4988806.9560
2402	–	POLREF	3759520.8094	1247725.6828	4982450.8290
2403	–	POLREF	3785523.9142	1234534.9557	4966149.0342
2404	–	POLREF	3772975.8445	1264296.5977	4968237.3479
2405	–	POLREF	3795422.8891	1249168.8094	4955025.2535
2406	–	POLREF	3786502.9703	1284090.9606	4952940.8631
2407	–	POLREF	3807249.0044	1272188.7660	4940204.0489
2408	–	POLREF	3820583.4117	1254857.2797	4934359.1138
2409	–	POLREF	3803978.0140	1298442.7640	4935928.8929
2501	–	POLREF	3730830.8697	1287060.5847	4993910.7450
2502	–	POLREF	3725358.9142	1327271.1828	4987629.8515
2503	–	POLREF	3752981.0703	1294252.8894	4975589.1516
2504	–	POLREF	3738849.9066	1353195.3982	4970591.2165
2505	–	POLREF	3760122.1324	1332829.8220	4960162.1618
2506	–	POLREF	3785070.5817	1315040.7622	4946039.4727
2507	–	POLREF	3774312.2512	1351670.4989	4944381.5707
2601	–	POLREF	3696824.8896	1346298.8449	5003467.6457
2602	–	POLREF	3692805.4640	1380665.9033	4997235.9791
2603	–	POLREF	3691426.3826	1411667.4228	4989548.1581
2604	–	POLREF	3711791.7754	1366169.0810	4987173.2445
2605	–	POLREF	3715370.4656	1419902.9215	4969567.3229
2606	–	POLREF	3732508.8075	1395279.3096	4963762.3723
2607	–	POLREF	3756914.2568	1373664.9628	4951473.1326
2608	–	POLREF	3741050.3117	1426801.1852	4948557.6650
2609	–	POLREF	3767581.2732	1398847.2055	4936551.9645
2701	–	POLREF	3662259.5272	1448107.0974	5000527.0590
2702	–	POLREF	3678092.7630	1421108.6039	4996663.1806
2703	–	POLREF	3687460.3656	1457953.4202	4979193.6561
2704	–	POLREF	3676520.7993	1484270.1202	4979603.2926
2705	–	POLREF	3699372.3644	1435565.5580	4976937.7365
2706	–	POLREF	3706758.7560	1478867.6467	4958874.7213

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
2707	-	POLREF	3736909.6071	1448947.4561	4945241.5577
2801	-	POLREF	3643039.2675	1505610.7790	4997615.5897
2802	-	POLREF	3637132.6415	1529814.6076	4994572.3103
2803	-	POLREF	3660331.8676	1515026.8587	4982212.4429
2804	-	POLREF	3662746.8623	1541830.1740	4972274.0139
2805	-	POLREF	3694397.1789	1500635.5156	4961543.1026
2806	-	POLREF	3690462.5474	1532178.9612	4954933.7884
2807	-	POLREF	3709435.2978	1497835.5379	4951280.5828
2808	-	POLREF	3709779.0357	1540799.9591	4937922.4072
2901	-	POLREF	3625033.8903	1577456.5944	4988594.4654
2902	-	POLREF	3637602.7134	1556104.9640	4986169.7506
2903	-	POLREF	3648972.2312	1567185.8017	4974472.9194
2904	-	POLREF	3662744.6947	1594616.8698	4955806.0067
2905	-	POLREF	3677014.0538	1570565.4368	4952884.5279
2906	-	POLREF	3676099.1270	1624156.3173	4936352.9295
3001	-	POLREF	3719563.5316	994155.6655	5068069.9062
3002	-	POLREF	3740836.3989	970692.2560	5057027.1027
3003	-	POLREF	3771237.2054	996746.3355	5029530.1158
3101	-	POLREF	3714715.1250	1054870.7504	5059358.5238
3102	-	POLREF	3729822.3582	1024117.9241	5054668.0058
3103	-	POLREF	3751759.4401	1006192.3493	5042037.0293
3104	-	POLREF	3743383.4718	1047464.0966	5039917.9157
3105	-	POLREF	3766032.9790	1027960.7114	5027243.2879
3106	-	POLREF	3765989.5257	1070478.2313	5018355.8596
3108	-	POLREF	3788408.4573	1058472.5051	5004061.3814
3201	-	POLREF	3700730.9680	1089927.0617	5062195.5476
3202	-	POLREF	3701445.8086	1129917.6928	5052967.8488
3203	-	POLREF	3724579.0308	1078271.8399	5047283.2992
3204	-	POLREF	3743005.0350	1086868.4989	5031981.1692
3205	-	POLREF	3755596.1604	1110355.5666	5017470.8486
3206	-	POLREF	3755611.9022	1139071.5743	5011067.3208
3207	-	POLREF	3769528.9366	1113141.9688	5006455.1602
3301	-	POLREF	3678762.3440	1135625.8767	5068163.1011
3302	-	POLREF	3676724.1884	1165825.7898	5062859.1471
3303	-	POLREF	3698579.1051	1160458.2150	5048244.0844
3305	-	POLREF	3718498.2572	1136898.6421	5038994.5439
3306	-	POLREF	3719008.8226	1177132.9137	5029450.2815
3307	-	POLREF	3732511.2047	1185983.8592	5017413.0537
3308	-	POLREF	3724922.1651	1208053.2900	5017784.0887
3309	-	POLREF	3754362.9668	1175104.2271	5003758.7285
330E	-	POLREF	3693119.0231	1190490.6586	5045316.6708
3401	-	POLREF	3644656.9424	1251513.0373	5065517.9213
3402	-	POLREF	3660982.7320	1192415.2838	5067959.3349
3403	-	POLREF	3673172.6972	1211499.5318	5054709.1731
3404	-	POLREF	3676883.6811	1249262.9343	5042891.8040
3405	-	POLREF	3696849.2829	1217103.6515	5036219.0941
3406	-	POLREF	3702123.7860	1246704.8283	5025205.7703
3407	-	POLREF	3717165.2699	1231465.4175	5017828.3164
3408	-	POLREF	3722636.9762	1254795.0508	5008072.3033
3409	-	POLREF	3736381.8443	1232081.2313	5003551.7028
3501	-	POLREF	3688072.9121	1284688.7902	5025939.3111
3502	-	POLREF	3674855.2207	1327388.2000	5024516.6796
3503	-	POLREF	3702906.4615	1309597.5596	5008666.0863
3504	-	POLREF	3636827.2775	1305146.9024	5057686.6445
3505	-	POLREF	3654207.5671	1312001.6142	5043468.1774
3506	-	POLREF	3661243.9527	1273988.1620	5048051.2032
3507	-	POLREF	3715513.7719	1280308.4492	5006918.2840
3601	-	POLREF	3664303.3739	1377626.3784	5018710.3332

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
3602	–	POLREF	3614609.8730	1375062.1882	5055099.5563
3603	–	POLREF	3646600.7123	1347214.3945	5039718.8016
3604	–	POLREF	3621628.8214	1329584.0550	5062205.4819
3701	–	POLREF	3609478.5127	1456692.8210	5036023.9303
3702	–	POLREF	3625816.5982	1426427.4113	5032930.6875
3703	–	POLREF	3629352.5938	1453985.7983	5022645.9572
3704	–	POLREF	3645716.4959	1433342.3426	5016712.5551
3705	–	POLREF	3647612.7072	1468784.0256	5005178.2067
3706	–	POLREF	3587634.5552	1392433.0119	5069442.4379
3707	–	POLREF	3579967.8354	1411981.0924	5069446.4857
3708	–	POLREF	3585067.2261	1446035.7643	5056360.3038
3709	–	POLREF	3605538.9796	1410025.1891	5051962.8096
3801	–	POLREF	3595233.3010	1503407.2996	5032561.0887
3802	–	POLREF	3609883.6006	1478877.4843	5029371.9243
3803	–	POLREF	3610498.1058	1508770.2694	5020089.7590
3804	–	POLREF	3629569.1158	1475685.7383	5016197.2114
3805	–	POLREF	3569137.6648	1507067.2023	5049853.4283
3806	–	POLREF	3558769.8554	1461475.4945	5070382.1798
3807	–	POLREF	3559886.9447	1488299.1205	5061856.2838
3808	–	POLREF	3594800.1274	1463829.2437	5044380.2640
3901	–	POLREF	3573901.8360	1525792.1980	5040951.1740
3902	–	POLREF	3597248.0380	1537077.3050	5020981.8427
3903	–	POLREF	3618435.9110	1537608.1567	5005682.1463
3904	–	POLREF	3603693.7415	1570954.4961	5005944.9370
3905	–	POLREF	3548370.6081	1546932.2261	5052442.0840
3906	–	POLREF	3539316.5834	1522882.2729	5065971.9306
4001	–	POLREF	3638179.5326	962434.7788	5132358.4130
4002	–	POLREF	3653578.1589	934132.9209	5126668.9307
4003	–	POLREF	3658327.1407	956623.4617	5119185.5394
4004	–	POLREF	3678924.4800	958570.8173	5104241.6091
4005	–	POLREF	3699529.1597	990869.4867	5083232.7165
4007	–	POLREF	3725996.1131	950129.5409	5071779.8578
4101	–	POLREF	3623086.3074	1034012.3095	5129251.3285
4102	–	POLREF	3640444.4911	1003872.8949	5122929.6901
4104	–	POLREF	3658761.3139	1017282.4901	5107348.3404
4105	–	POLREF	3651567.7416	1045295.0861	5106901.5348
4106	–	POLREF	3677051.7369	994542.9836	5098717.4249
4107	–	POLREF	3679328.7724	1038344.0454	5088439.7797
4108	–	POLREF	3706540.5856	1017203.9260	5073051.7883
4109	–	POLREF	3697962.6972	1049574.3813	5072687.3904
4201	–	POLREF	3612677.3786	1066678.2249	5129931.8251
4202	–	POLREF	3605223.9456	1094061.3837	5129454.6309
4203	–	POLREF	3626985.0937	1076456.0741	5117884.6746
4204	–	POLREF	3623828.1407	1105288.6980	5114015.6092
4205	–	POLREF	3642477.5046	1082295.6780	5105708.7539
4206	–	POLREF	3642223.8492	1109565.8299	5100061.0927
4207	–	POLREF	3657546.8721	1088729.4773	5093582.8667
4208	–	POLREF	3672767.9064	1073142.5668	5086030.4895
4209	–	POLREF	3659933.6402	1115542.5649	5086107.6268
4210	–	POLREF	3679443.8883	1111012.4792	5073100.5917
4301	–	POLREF	3592518.5882	1150984.7357	5125904.4440
4302	–	POLREF	3607659.5457	1130961.3609	5119783.2861
4303	–	POLREF	3613911.5477	1157472.2882	5109492.0087
4304	–	POLREF	3628306.7626	1140590.6073	5103113.9100
4305	–	POLREF	3642269.7913	1169047.2050	5086796.3223
4306	–	POLREF	3655776.0006	1144684.8418	5082642.5970
4401	–	POLREF	3581874.5926	1176746.9165	5127466.4986
4402	–	POLREF	3573617.3703	1196101.0955	5128712.2797

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
4403	-	POLREF	3566048.9413	1214118.8392	5129675.0339
4404	-	POLREF	3587931.0611	1208406.8161	5115928.4993
4405	-	POLREF	3594254.7838	1228687.8725	5106680.3571
4406	-	POLREF	3611953.2764	1199071.3459	5101254.7842
4407	-	POLREF	3619845.3451	1184590.6337	5099084.2362
4408	-	POLREF	3613553.1052	1226643.2881	5093631.6134
4409	-	POLREF	3631877.5705	1197911.8089	5087462.6895
4501	-	POLREF	3549276.8428	1275463.3865	5126543.6025
4502	-	POLREF	3566083.5062	1244388.4432	5122498.3705
4503	-	POLREF	3584544.6380	1257433.8572	5106514.1039
4504	-	POLREF	3596065.0958	1291503.6932	5090073.8485
4505	-	POLREF	3611101.3024	1257975.4290	5087782.1916
4506	-	POLREF	3622498.1622	1289952.8018	5071764.5208
4507	-	POLREF	3626481.2618	1250916.8468	5078621.8135
4601	-	POLREF	3549435.1365	1331904.0093	5112198.5822
4602	-	POLREF	3562596.7849	1299107.0448	5111466.8501
4603	-	POLREF	3576817.7376	1326893.5682	5094564.4118
4604	-	POLREF	3577976.0239	1361205.8540	5084666.3091
4606	-	POLREF	3599290.0910	1350618.8796	5072506.5308
4701	-	POLREF	3509525.5051	1376040.2201	5127985.4163
4702	-	POLREF	3500144.3351	1409444.1855	5125247.1565
4703	-	POLREF	3529286.7905	1361059.0042	5118450.7923
4704	-	POLREF	3515867.3622	1416440.8876	5112658.0807
4705	-	POLREF	3537416.8156	1378010.3665	5108313.2213
4706	-	POLREF	3560496.7946	1377261.7918	5092521.2187
4707	-	POLREF	3534186.2620	1419648.1613	5099165.3180
4708	-	POLREF	3558039.3900	1410743.6034	5085097.2173
4801	-	POLREF	3485201.6410	1426290.6759	5130747.9357
4802	-	POLREF	3485987.3048	1465292.9583	5119278.3263
4803	-	POLREF	3504097.4021	1447915.3592	5111913.7982
4804	-	POLREF	3502200.9105	1475487.6109	5105337.2734
4805	-	POLREF	3521238.3735	1446316.9060	5100636.0459
4806	-	POLREF	3522218.6649	1488079.3603	5087990.1510
4807	-	POLREF	3547973.1054	1443606.7093	5082987.9418
4808	-	POLREF	3541313.4452	1482341.8413	5076505.6876
4901	-	POLREF	3473691.8477	1500833.8995	5117355.7589
4902	-	POLREF	3490819.1553	1511485.7179	5102711.4161
4903	-	POLREF	3499011.5285	1534488.3719	5090292.0202
4904	-	POLREF	3524033.9880	1541271.1111	5071052.7426
5101	-	POLREF	3604047.9638	1009724.3174	5147268.5774
5102	-	POLREF	3621837.1838	991814.2896	5138291.7481
5201	-	POLREF	3545946.4325	1079005.6245	5173299.9808
5202	-	POLREF	3561083.1348	1056401.0374	5167659.2157
5203	-	POLREF	3574447.1287	1064617.1469	5156788.5029
5204	-	POLREF	3584621.9835	1040331.1306	5154632.0548
5205	-	POLREF	3601035.1842	1051559.4204	5141071.9753
5206	-	POLREF	3593743.3077	1082464.0190	5139935.0633
5301	-	POLREF	3518010.8095	1124716.7254	5182678.7124
5302	-	POLREF	3538798.6892	1110603.9323	5171601.0433
5303	-	POLREF	3537552.0259	1130590.6111	5168224.1292
5304	-	POLREF	3559899.2061	1101110.6876	5159221.3715
5305	-	POLREF	3549046.7778	1146513.8392	5157011.8536
5306	-	POLREF	3583517.0964	1108323.4822	5141523.1600
5401	-	POLREF	3553942.9381	1205346.8129	5140068.9961
5402	-	POLREF	3513692.1890	1158158.4056	5178245.0418
5403	-	POLREF	3525101.1203	1174847.1671	5166883.3191
5404	-	POLREF	3535680.5479	1162779.3648	5162487.8918
5405	-	POLREF	3535809.0589	1197316.1287	5154266.1114

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
5406	–	POLREF	3546656.3978	1179629.1209	5151240.0097
5407	–	POLREF	3562620.2570	1159531.3649	5144752.8565
5408	–	POLREF	3565420.9308	1182645.6797	5137505.5986
5501	–	POLREF	3526125.8254	1220196.0532	5155525.6148
5502	–	POLREF	3517260.1436	1263038.7543	5151351.7344
5503	–	POLREF	3539248.4569	1243611.4954	5141014.1047
5601	–	POLREF	3494494.5227	1277401.6402	5163289.5207
5602	–	POLREF	3496671.3984	1301375.1730	5155937.2701
5603	–	POLREF	3485276.9361	1331736.0936	5155774.3521
5604	–	POLREF	3511015.4160	1309204.9528	5144195.8733
5605	–	POLREF	3529230.0289	1284864.4654	5137960.6378
5701	–	POLREF	3476393.7453	1372471.1770	5151229.6346
5702	–	POLREF	3495242.4454	1351384.1962	5144103.9569
5703	–	POLREF	3482498.0292	1393921.5561	5141403.1122
5801	–	POLREF	3433288.0573	1444189.0539	5160585.5212
5802	–	POLREF	3453919.8427	1414485.3054	5155009.4184
5803	–	POLREF	3462184.0386	1441326.2921	5142105.0239
5901	–	POLREF	3435367.1144	1464081.8918	5153618.6021
5902	–	POLREF	3449838.1405	1469303.1648	5142444.3812
5903	–	POLREF	3442723.3722	1489243.6988	5141467.6370
EUVN network points					
PL01	–	EUVN	3838174.2971	1336730.0420	4899501.4087
PL02	–	EUVN	3741888.1229	1041415.5980	5042252.2752
PL03	–	EUVN	3496922.4734	1438441.0866	5119413.7228
PL05	–	EUVN	3836865.1069	1565871.8389	4832581.0054
PL06	–	EUVN	3648326.2695	924984.2260	5132035.3876
BIEL	–	EUVN	3552336.7754	1521943.6722	5057181.0997
CZAR	–	EUVN	3696025.4908	1104043.5880	5062622.5313
GLUB	–	EUVN	3885976.5998	1240403.2985	4887126.3253
GROD	–	EUVN	3752777.6571	1117390.7814	5018012.2657
GROJ	–	EUVN	3687667.8858	1400207.8082	4995547.1889
GRUE	–	EUVN	3596346.0049	1225500.8440	5105881.7745
GRYB	–	EUVN	3869251.2585	1475239.6739	4835560.9275
JARO	–	EUVN	3793804.1341	1560228.8719	4867963.1429
JEDZ	–	EUVN	3802993.8906	1393667.9482	4910876.3050
KIEL	–	EUVN	3507907.1992	1407672.5347	5120437.2063
KOLB	–	EUVN	3604828.4305	1012884.7083	5146095.6616
KRAS	–	EUVN	3701978.6032	1585728.0463	4929560.5580
KRTE	–	EUVN	3781306.5550	1174601.5337	4983687.1029
KRZE	–	EUVN	3834390.6534	1436506.4103	4874194.1091
LAM6	–	EUVN	3524630.6857	1329778.2698	5129764.2222
LOME	–	EUVN	3551376.3180	1442381.6594	5080950.7355
LOWI	–	EUVN	3677742.9986	1350519.1852	5016251.6035
MINS	–	EUVN	3651031.5066	1438327.1504	5011460.6233
NOWY	–	EUVN	3896851.3005	1441788.5274	4823624.7035
OPOL	–	EUVN	3857098.3960	1268178.9469	4902668.5061
PACA	–	EUVN	3808345.1357	1456956.3896	4888364.7799
PACZ	–	EUVN	3880285.4449	1173532.9330	4908076.6500
POCK	–	EUVN	3445774.9472	1475738.8451	5143284.6240
SAND	–	EUVN	3748460.2525	1500756.1874	4921057.8843
SEPO	–	EUVN	3631289.9474	1147338.3320	5099494.1184
SIER	–	EUVN	3627537.8023	1304831.1657	5064393.1992
SMAR	–	EUVN	3759051.5320	1277116.2213	4975382.6689
SOKO	–	EUVN	3504161.8898	1514221.7045	5092741.6351
SZLI	–	EUVN	3799256.2158	1105191.5942	4985893.8370
TOMA	–	EUVN	3718512.1089	1635523.8244	4900984.9862
TORE	–	EUVN	3641003.0143	1226576.0322	5074154.1427

Site id.	Domes number	Network type	PL-ITRF2005-XYZ		
			X [m]	Y [m]	Z [m]
WLOD	–	EUVN	3646374.6755	1579403.2267	4972520.9778
WROE	–	EUVN	3831781.5637	1179910.6513	4944010.8295
WRZE	–	EUVN	3723114.4339	1182243.6794	5025227.9624
ZABC	–	EUVN	3623260.7800	1517867.9675	5008194.2214
ZGOR	–	EUVN	3871644.6652	1039663.8238	4944540.3988
ZNIN	–	EUVN	3672159.1808	1193993.8977	5059586.4693
ZYRZ	–	EUVN	3689495.2321	1495010.1299	4966816.2088
EUPOS station located in neighboring countries					
CBRU	–	CZEPOS	3919707.5810	1233461.6607	4862456.6193
CFRM	11525M001	CZEPOS	3924572.7486	1301971.3286	4840464.7514
CLIB	11526M001	CZEPOS	3903195.1203	1050232.5701	4917869.9029
CPAR	11527M001	CZEPOS	3949918.6814	1116467.3669	4865832.8046
CSUM	–	CZEPOS	3931871.5455	1200665.4016	4860559.2002
CSVI	–	CZEPOS	3959346.1342	1170655.8187	4845811.5632
CTRU	–	CZEPOS	3904532.3714	1112858.1679	4903151.9755
MRJM	–	LITPOS	3401531.5599	1469808.8494	5174067.3716
VARN	–	LITPOS	3398712.1741	1555724.9840	5150966.9314
VEIS	–	LITPOS	3432563.7342	1507108.0370	5143018.2373
0014	–	SAPOS	3834912.5452	979734.9958	4984828.7894
0017	–	SAPOS	3722229.8697	945894.7140	5075244.1526
0022	–	SAPOS	3778673.9811	980133.2276	5027192.2410
0139	–	SAPOS	3856023.2899	1030743.0136	4958467.7863
0147	–	SAPOS	3899907.0999	1020318.7107	4926621.3396
0781	–	SAPOS	3648128.9206	922442.7314	5132647.9020
KUZA	11532M001	SKPOS	3952344.4757	1340788.2166	4807403.3015
LIE1	11533M001	SKPOS	3918778.7801	1401454.5890	4817956.9373
SKSK	11544M001	SKPOS	3874878.9683	1531897.7774	4813203.5352
SKSL	11545M001	SKPOS	3898822.4698	1472199.2362	4812907.3769
SKSV	11546M001	SKPOS	3883835.4147	1581339.9049	4790061.3857
SHAZ	–	UAPOS	3631977.8882	1609614.5755	4973373.1237
VBER	–	UAPOS	3882899.0685	1605134.2039	4782931.9234

Appendix 7. List of final coordinates in PL-ETRF2000 epoch 2011.0

Site id.	Domes number	Network type	PL-ETRF2000-XYZ X [m]	Y [m]	Z [m]
EPN class A stations used for constraint					
BOGI	12207M003	EPN	3633815.6800	1397453.9157	5035280.8028
BOR1	12205M002	EPN	3738358.7738	1148173.4962	5021815.5786
GWWL	12225M001	EPN	3734526.1661	1015012.7925	5053042.5377
JOZ2	12204M002	EPN	3664880.9095	1409190.3838	5009618.2874
KATO	12219S001	EPN	3862992.3713	1332822.6619	4881105.4364
LAMA	12209M001	EPN	3524523.2562	1329693.4257	5129846.1701
LODZ	12226M001	EPN	3728601.8776	1317402.2599	4987811.1403
REDZ	12227M001	EPN	3550066.9255	1093331.7908	5167561.9545
SWKI	12228M001	EPN	3452304.8576	1460314.5926	5143362.4020
USDL	12229M001	EPN	3837558.2233	1596303.0315	4822409.6403
WROC	12217M001	EPN	3835751.6257	1177249.7445	4941605.0539
ZYWI	12220S001	EPN	3904633.3059	1360191.8777	4840630.7774
BISK	11520M001	EPN	3898946.2585	1223993.1377	4881826.2417
BOGO	12207M002	EPN	3633739.3078	1397433.9259	5035353.2885
BUCU	11401M001	EPN	4093761.2328	2007793.5832	4445129.7784
DRES	14108M001	EPN	3904725.0060	954013.1671	4935789.7887
GANP	11515M001	EPN	3929181.8516	1455236.5068	4793653.7011
GLSV	12356M001	EPN	3512889.3301	2068979.6835	4888903.0224
GRAZ	11001M002	EPN	4194424.1202	1162702.4571	4647245.2044
JOZE	12204M001	EPN	3664940.4994	1409153.6578	5009571.2003
KRAW	12218M001	EPN	3856936.1644	1397750.4680	4867719.4399
MAR6	10405M002	EPN	2998189.7658	931451.6152	5533398.5604
MOPI	11507M001	EPN	4053738.2080	1260571.3791	4744940.6719
ONSA	10402M004	EPN	3370658.8613	711876.9467	5349786.7880
PENC	11206M006	EPN	4052449.7965	1417680.8979	4701406.9074
POLV	12336M001	EPN	3411557.7394	2348463.7952	4834396.7176
RIGA	12302M002	EPN	3183899.5476	1421478.3142	5322810.6359
SASS	14281M001	EPN	3606146.3908	875303.1394	5170193.7630
SULP	12366M001	EPN	3765297.3384	1677558.9898	4851297.2206
VIS0	10423M001	EPN	3246470.5942	1077900.3320	5365277.9421
VLNS	10801M001	EPN	3343600.9693	1580417.5498	5179337.1182
WARN	14277M002	EPN	3658786.1062	784470.6699	5147870.4047
WSRT	13506M005	EPN	3828736.1372	443304.7357	5064884.5121
WTZR	14201M010	EPN	4075580.8489	931853.5679	4801567.9283
ZIMM	14001M004	EPN	4331297.3375	567555.6348	4633133.7248
EPN class A stations excluded from constraint					
GOPE	11502M002	EPN	3979316.4407	1050312.2504	4857066.9081
POTS	14106M003	EPN	3800689.9395	882077.1675	5028791.1266
UZHL	12301M001	EPN	3907587.7931	1602428.4659	4763783.5520
EPN class B stations (excluded from constraint)					
BPDL	12223M001	EPN	3615990.1509	1544390.8494	5005373.5092
BYDG	12224M001	EPN	3647217.1971	1184604.0861	5079624.9762
KRA1	12218M002	EPN	3856938.9295	1397750.2057	4867717.3326
Densification of ETRS89					
BART	12234M001	ASG-EUPOS	3490896.9745	1327143.7331	5153172.1006
BIAL	12235M001	ASG-EUPOS	3526538.1629	1507014.5379	5079529.9068
BILG	12236M001	ASG-EUPOS	3747351.6798	1568978.0692	4900768.6716
BRSK	12237M001	ASG-EUPOS	3566372.7808	1501993.3720	5053284.9776
BUZD	12238M001	ASG-EUPOS	3805091.3688	1439261.2804	4896192.3785
CBKA	12221M001	ASG-EUPOS	3654410.0348	1407752.4780	5017576.9176
CCHN	12239M001	ASG-EUPOS	3610611.1967	1356983.3909	5062816.5051
CHEL	12240M001	ASG-EUPOS	3678820.5416	1598100.8869	4942832.6196

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
CHNO	12241M001	ASG-EUPOS	3694305.5669	1018555.2520	5081594.1397
CHOJ	12242M001	ASG-EUPOS	3608520.1255	1141388.0657	5116893.4489
DRWP	12243M001	ASG-EUPOS	3655958.9618	1035735.8115	5105717.0660
DZIA	12244M001	ASG-EUPOS	3591709.2539	1319169.6976	5086093.6661
ELBL	18991M001	ASG-EUPOS	3530686.9711	1243375.2515	5146944.3815
GDAN	12252M001	ASG-EUPOS	3529800.6011	1190807.6934	5159896.6283
GIZY	12253M001	ASG-EUPOS	3486403.5385	1392187.3370	5139218.6640
GLOG	12254M001	ASG-EUPOS	3809340.9980	1097657.6570	4979900.7024
GNIE	12255M001	ASG-EUPOS	3706494.2536	1174619.7733	5039231.9690
GOLE	12256M001	ASG-EUPOS	3670268.1276	972331.3988	5107777.0123
GRAJ	12245M001	ASG-EUPOS	3501476.4273	1446944.9159	5113951.6993
GRUD	12246M001	ASG-EUPOS	3601223.8707	1222799.2007	5103133.5512
HAJN	12247M001	ASG-EUPOS	3547044.0211	1547151.5761	5053300.6264
HOZD	12248M001	ASG-EUPOS	3756467.2861	1622631.0351	4876495.3359
HRUB	12249M001	ASG-EUPOS	3693100.6980	1635499.2742	4920024.1137
ILAW	12250M001	ASG-EUPOS	3575246.0131	1270835.5090	5109730.1602
JLGR	12251M001	ASG-EUPOS	3878289.7496	1092566.8446	4928217.8516
KALI	12257M001	ASG-EUPOS	3760909.8191	1228903.4533	4986013.1890
KAM1	12258M001	ASG-EUPOS	3636190.4080	959188.2310	5134372.5950
KEPN	12259M001	ASG-EUPOS	3802580.9046	1234328.9385	4953272.1390
KLCE	12260M001	ASG-EUPOS	3774368.8641	1420921.1651	4925093.0086
KLDZ	12261M001	ASG-EUPOS	3900141.9630	1166529.6339	4894068.3370
KLOB	12219M001	ASG-EUPOS	3812245.5326	1307966.5191	4927157.4732
KONI	12262M001	ASG-EUPOS	3718009.9118	1226301.6917	5018514.6087
KOSC	12263M001	ASG-EUPOS	3563310.1524	1156522.6777	5144920.8814
KOSZ	12264M001	ASG-EUPOS	3590530.4065	1042990.5409	5150117.6518
KROS	12265M001	ASG-EUPOS	3840336.4935	1534053.8395	4840009.3699
KROT	12266M001	ASG-EUPOS	3779936.7543	1187254.3101	4981792.3598
KUTN	12267M001	ASG-EUPOS	3693480.8889	1298866.4514	5018375.4132
LEGN	12268M001	ASG-EUPOS	3846687.7635	1114288.3312	4947658.6280
LELO	12269M001	ASG-EUPOS	3814251.0093	1360360.1437	4911504.8839
LESZ	12270M001	ASG-EUPOS	3784869.9205	1126771.3382	4991967.9463
LOMZ	12271M001	ASG-EUPOS	3550311.3305	1440214.3955	5082321.5018
LUBL	12272M001	ASG-EUPOS	3694475.2905	1534437.4538	4951248.6984
MIMA	12273M001	ASG-EUPOS	3644974.5486	1440149.8909	5015356.6564
MLCN	12274M001	ASG-EUPOS	3804457.7729	1534914.6665	4867705.4922
MYSZ	12275M001	ASG-EUPOS	3550868.8286	1387537.3055	5096451.3550
NODW	12276M001	ASG-EUPOS	3645290.9761	1378210.0946	5032291.5604
NTML	12277M001	ASG-EUPOS	3753277.9219	1084607.1016	5024800.4439
NWSC	12231M001	ASG-EUPOS	3873461.7549	1462888.1379	4835656.0138
NWTG	12232M001	ASG-EUPOS	3901050.8751	1422373.0332	4826032.2915
NYSA	12278M001	ASG-EUPOS	3882469.8480	1211762.8543	4896966.2359
OLST	12203M001	ASG-EUPOS	3538409.4255	1322052.5357	5122295.7313
OPLE	12283M001	ASG-EUPOS	3854338.1063	1246354.1997	4910366.3052
OPLU	12284M001	ASG-EUPOS	3717924.4636	1500320.5740	4944130.9823
OSMZ	12285M001	ASG-EUPOS	3585797.8481	1440877.9715	5057302.7002
PITR	12287M001	ASG-EUPOS	3754198.6699	1343527.0529	4961743.2892
POZN	12206M001	ASG-EUPOS	3728247.0801	1135211.7147	5032258.3590
PPIL	12286M001	ASG-EUPOS	3670393.0927	1103842.6575	5081135.0938
PROS	12233M001	ASG-EUPOS	3837829.0097	1418779.8951	4876685.6021
PRZM	12279M001	ASG-EUPOS	3804695.7155	1595660.8274	4848106.4765
RADM	12280M001	ASG-EUPOS	3719233.6121	1439894.7339	4961004.2747
RWMZ	12281M001	ASG-EUPOS	3711199.6177	1369172.4936	4986762.2321
RYKI	12282M001	ASG-EUPOS	3680883.3390	1481736.3934	4977132.2883
SIDZ	12288M001	ASG-EUPOS	3762313.3883	1274760.0275	4973563.6031
SIED	12289M001	ASG-EUPOS	3628142.7262	1487581.6662	5013729.2395
SIPC	12290M001	ASG-EUPOS	3634432.5226	1298646.4066	5061077.5735
SOCH	12291M001	ASG-EUPOS	3673992.7520	1354866.1491	5017844.7387

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
SOKL	12292M001	ASG-EUPOS	3494482.0497	1519135.0378	5097954.7622
STRG	18994M001	ASG-EUPOS	3565383.7311	1195036.1200	5134648.6598
SWIB	12293M001	ASG-EUPOS	3770280.6947	1048163.2559	5019843.4875
SZE2	12294M001	ASG-EUPOS	3624638.3098	1087538.9306	5117214.5624
TABG	12295M001	ASG-EUPOS	3772239.4966	1498958.7034	4903535.3929
TARG	12296M001	ASG-EUPOS	3851054.9374	1315388.2865	4895185.8658
TORU	12202M001	ASG-EUPOS	3643532.3035	1228658.5685	5071868.4455
TRNW	12230M001	ASG-EUPOS	3834315.7553	1470638.3391	4864150.7319
WAT1	12297M001	ASG-EUPOS	3655223.1698	1396074.4354	5020262.3760
WLAD	12222M001	ASG-EUPOS	3496345.0801	1164349.9987	5188401.6771
WLBR	12298M001	ASG-EUPOS	3880292.3561	1133211.8577	4917654.5369
WLDW	12299M001	ASG-EUPOS	3643581.0211	1588599.3704	4971661.1580
WLOC	18999M001	ASG-EUPOS	3664306.9067	1266512.3147	5047681.8176
WODZ	18998M001	ASG-EUPOS	3896698.7583	1300673.6959	4863029.3551
WRKI	18997M001	ASG-EUPOS	3715836.3745	1091591.9797	5050832.1933
ZARY	18996M001	ASG-EUPOS	3828791.7775	1036393.3404	4978198.2855
ZIGR	18995M001	ASG-EUPOS	3796760.0899	1053954.7729	4998889.4018
ASG-EUPOS station eccentric points					
BAR8	–	ASG-EUPOS	3490744.1989	1326246.0750	5153480.9322
BIA8	–	ASG-EUPOS	3527272.7837	1507971.5394	5078722.0057
BIL8	–	ASG-EUPOS	3746918.7537	1569637.3073	4900876.5923
BOG8	–	ASG-EUPOS	3633837.0886	1397470.3316	5035259.7585
BOG9	–	ASG-EUPOS	3633762.7306	1397359.7414	5035344.0358
BOR4	–	ASG-EUPOS	3738501.2649	1148259.3471	5021680.5775
BPD8	–	ASG-EUPOS	3616946.4999	1544611.8031	5004586.4719
BPD9	–	ASG-EUPOS	3616662.6687	1544718.6861	5004754.3925
BRS8	–	ASG-EUPOS	3565710.1178	1501424.3073	5053907.9452
BUZ8	–	ASG-EUPOS	3805370.8484	1439005.9210	4896010.2556
BYD8	–	ASG-EUPOS	3647199.7298	1183507.4950	5079861.6148
BYD9	–	ASG-EUPOS	3647254.2012	1183293.5210	5079870.9350
CBK8	–	ASG-EUPOS	3654753.2145	1408933.5828	5016990.5415
CCH8	–	ASG-EUPOS	3610005.2283	1358200.4862	5062891.2938
CHE8	–	ASG-EUPOS	3679309.2060	1598020.9013	4942470.6613
CHN8	–	ASG-EUPOS	3695349.2582	1017882.1513	5080961.5713
CHO8	–	ASG-EUPOS	3608766.5116	1141052.7091	5116766.8765
DRW8	–	ASG-EUPOS	3655070.6924	1035140.1788	5106442.9845
DZI8	–	ASG-EUPOS	3591555.6220	1319778.0402	5086012.0172
ELB8	–	ASG-EUPOS	3530112.8279	1243924.6125	5147194.3362
GDA8	–	ASG-EUPOS	3530262.3502	1191785.7140	5159318.0757
GIZ8	–	ASG-EUPOS	3486687.4756	1392242.1665	5138986.1987
GLO8	–	ASG-EUPOS	3810374.7379	1096275.5579	4979420.7155
GNI8	–	ASG-EUPOS	3706846.5758	1174780.4356	5038914.0684
GOL8	–	ASG-EUPOS	3669250.4095	971882.7540	5108568.7213
GRA8	–	ASG-EUPOS	3501751.0127	1447372.7508	5113622.1548
GRU8	–	ASG-EUPOS	3601231.1798	1222412.3884	5103204.2646
GWW8	–	ASG-EUPOS	3734608.4938	1014044.2138	5053157.0771
GWW9	–	ASG-EUPOS	3733964.1849	1013811.0130	5053660.6606
HAJ8	–	ASG-EUPOS	3547930.4076	1547020.8149	5052717.5917
HOZ8	–	ASG-EUPOS	3756362.5001	1623216.2453	4876366.4996
HRU8	–	ASG-EUPOS	3693285.6623	1635067.6928	4919999.4089
ILA8	–	ASG-EUPOS	3575561.5805	1269998.7080	5109706.8442
JLG8	–	ASG-EUPOS	3877760.5774	1092756.9954	4928560.2506
JOZ8	–	ASG-EUPOS	3664803.9119	1409192.8182	5009656.6015
JOZ9	–	ASG-EUPOS	3664976.2535	1409132.1461	5009550.0972
KAL8	–	ASG-EUPOS	3760505.0062	1228335.9999	4986445.1713
KAM8	–	ASG-EUPOS	3636212.7286	960215.2513	5134149.3202
KAT8	–	ASG-EUPOS	3863243.2343	1333490.7424	4880686.6137

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
KAT9	–	ASG-EUPOS	3863398.8455	1333395.3506	4880591.0704
KEP8	–	ASG-EUPOS	3802442.5831	1233755.1196	4953500.2544
KLC8	–	ASG-EUPOS	3774032.4299	1420694.2147	4925373.2924
KLD8	–	ASG-EUPOS	3900822.3094	1166474.1232	4893508.9278
KLO8	–	ASG-EUPOS	3811610.0637	1308005.1735	4927599.3710
KON8	–	ASG-EUPOS	3718348.5473	1226168.2058	5018255.7354
KOS6	–	ASG-EUPOS	3562525.0550	1157541.7040	5145237.8455
KOS8	–	ASG-EUPOS	3591664.1452	1041973.9169	5149451.4536
KRA8	–	ASG-EUPOS	3855805.2374	1399150.9833	4868194.5679
KRA9	–	ASG-EUPOS	3857945.2536	1397233.4515	4867043.8787
KRO6	–	ASG-EUPOS	3839665.6396	1533891.0445	4840546.0883
KRO8	–	ASG-EUPOS	3779632.9164	1186222.7776	4982236.9953
KUT8	–	ASG-EUPOS	3693688.6663	1297852.8158	5018455.9015
LAM1	–	ASG-EUPOS	3524575.9502	1329705.8212	5129806.4899
LAM2	–	ASG-EUPOS	3524472.9678	1329658.3816	5129890.0359
LEG8	–	ASG-EUPOS	3846644.7301	1114930.8972	4947525.5853
LEL8	–	ASG-EUPOS	3813969.1401	1360574.5664	4911646.6221
LES8	–	ASG-EUPOS	3785788.8466	1126841.3989	4991231.0503
LOD8	–	ASG-EUPOS	3730384.9727	1314733.0882	4987146.8361
LOD9	–	ASG-EUPOS	3730157.9695	1314850.8586	4987287.8482
LOM8	–	ASG-EUPOS	3550855.6978	1441251.2638	5081637.2051
LUB8	–	ASG-EUPOS	3694408.3202	1534010.3902	4951387.8675
MIM8	–	ASG-EUPOS	3644147.1031	1440682.9318	5015786.1672
MLC8	–	ASG-EUPOS	3803826.9718	1534715.2081	4868238.4754
MYS8	–	ASG-EUPOS	3551126.9381	1387811.8632	5096182.1782
NOD8	–	ASG-EUPOS	3644961.0816	1378457.3006	5032438.0348
NTM8	–	ASG-EUPOS	3753451.6476	1084714.9189	5024628.5591
NWS8	–	ASG-EUPOS	3873485.6480	1463470.8417	4835466.7420
NWT8	–	ASG-EUPOS	3901716.7620	1421854.1262	4825639.9207
NYS8	–	ASG-EUPOS	3883010.6123	1210672.7561	4896779.1519
OLS8	–	ASG-EUPOS	3538648.9025	1322748.1578	5121945.7563
OPL6	–	ASG-EUPOS	3853773.3464	1247950.9052	4910387.9906
OPL8	–	ASG-EUPOS	3717557.8274	1499763.0251	4944555.1619
OSM8	–	ASG-EUPOS	3586062.3827	1441008.7144	5057056.3305
PIT8	–	ASG-EUPOS	3753807.0158	1343183.7676	4962100.0999
POZ8	–	ASG-EUPOS	3727934.1418	1134890.3742	5032501.4650
PPI8	–	ASG-EUPOS	3670063.6988	1104176.2003	5081264.9897
PRO8	–	ASG-EUPOS	3838881.5161	1417744.2097	4876176.3923
PRZ8	–	ASG-EUPOS	3805237.5117	1596513.6597	4847328.2902
RAD8	–	ASG-EUPOS	3719973.3273	1440599.2582	4960244.7749
RED8	–	ASG-EUPOS	3550099.7229	1093402.2151	5167499.9639
RED9	–	ASG-EUPOS	3550176.8381	1093217.1321	5167486.6914
RWM8	–	ASG-EUPOS	3711665.7856	1370050.9440	4986170.9598
RYK8	–	ASG-EUPOS	3680608.9013	1482446.6507	4977084.7569
SID8	–	ASG-EUPOS	3762566.5742	1273558.5064	4973678.8171
SIE8	–	ASG-EUPOS	3628367.5993	1487536.3897	5013556.7866
SIP8	–	ASG-EUPOS	3634387.7651	1297870.7635	5061288.3339
SOC8	–	ASG-EUPOS	3673845.4982	1354729.3669	5017970.4916
SOK8	–	ASG-EUPOS	3494281.4805	1519851.1102	5097841.8560
STR8	–	ASG-EUPOS	3565668.4799	1193477.8299	5134804.0218
SWI8	–	ASG-EUPOS	3769722.6051	1048236.5573	5020221.1566
SWK8	–	ASG-EUPOS	3452206.7159	1460128.4961	5143456.5430
SWK9	–	ASG-EUPOS	3452092.3591	1460056.6510	5143556.2960
SZE8	–	ASG-EUPOS	3624499.3858	1087897.0533	5117217.6316
TAB8	–	ASG-EUPOS	3773313.6357	1500346.4918	4902269.3573
TAR8	–	ASG-EUPOS	3850818.9565	1315124.6964	4895425.3455
TAR9	–	ASG-EUPOS	3850807.2338	1315300.5673	4895375.8287
TOR8	–	ASG-EUPOS	3642870.6935	1228487.8117	5072349.2421

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
TRN8	–	ASG-EUPOS	3833151.2663	1471271.0297	4864843.3600
USD8	–	ASG-EUPOS	3837451.6750	1595611.8295	4822745.6354
USD9	–	ASG-EUPOS	3837552.6490	1596052.1951	4822492.6198
WAT8	–	ASG-EUPOS	3655679.2130	1395394.7385	5020103.8963
WLA8	–	ASG-EUPOS	3497027.1982	1163756.3456	5188086.8924
WLB8	–	ASG-EUPOS	3881180.3154	1133174.5401	4916950.0883
WLD8	–	ASG-EUPOS	3644230.9807	1589066.6777	4971005.1188
WLO8	–	ASG-EUPOS	3664713.5593	1267454.9379	5047131.1251
WOD8	–	ASG-EUPOS	3895794.0382	1299852.2600	4863998.4137
WRK8	–	ASG-EUPOS	3715106.8232	1090900.2001	5051507.2690
WRO8	–	ASG-EUPOS	3835704.1469	1177221.0940	4941620.0851
WRO9	–	ASG-EUPOS	3835671.5863	1177277.2313	4941632.2083
ZAR8	–	ASG-EUPOS	3828100.4885	1037320.4366	4978513.5691
ZIG8	–	ASG-EUPOS	3796940.0538	1053896.7759	4998732.5472
ZYW8	–	ASG-EUPOS	3904839.3325	1359155.4780	4840722.3755
ZYW9	–	ASG-EUPOS	3904705.5046	1358974.2094	4840876.6873
EUREF-POL network points					
0216	–	EUREF-POL	3738397.1511	1148285.7356	5021752.1807
0301	–	EUREF-POL	3495579.6118	1157845.5172	5190403.5841
0303	–	EUREF-POL	3475730.6514	1453976.5071	5129448.7726
0304	–	EUREF-POL	3635006.7910	1051224.4849	5117503.1893
0307	–	EUREF-POL	3846614.3284	1106083.8743	4949572.4428
0308	–	EUREF-POL	3803542.9120	1352681.1004	4921845.7642
0309	–	EUREF-POL	3717652.5699	1622948.8912	4905872.8793
0310	–	EUREF-POL	3866100.2604	1479952.9842	4836446.3625
POLREF network points					
0401	–	POLREF	3887243.4639	1329807.3698	4862762.5028
0402	–	POLREF	3904243.4221	1292260.8790	4859172.1383
0403	–	POLREF	3909976.2903	1322068.6768	4846853.5293
0404	–	POLREF	3926191.1160	1341019.6107	4828956.3925
0501	–	POLREF	3885923.7299	1397713.0745	4845614.9027
0502	–	POLREF	3912841.0742	1420597.4213	4817598.1270
0503	–	POLREF	3886776.3982	1363194.0503	4854015.3705
0504	–	POLREF	3902624.8275	1361058.3490	4842066.3515
0505	–	POLREF	3909754.4259	1398215.7809	4826170.5476
0601	–	POLREF	3850831.7042	1454837.8921	4855995.8259
0602	–	POLREF	3887166.1904	1422384.7439	4837282.5653
0603	–	POLREF	3882238.7279	1452851.4419	4831821.3680
0604	–	POLREF	3883650.3511	1488147.7768	4820316.0152
0701	–	POLREF	3837106.8944	1477783.7426	4859943.4661
0702	–	POLREF	3836356.8222	1500381.6171	4853613.8214
0703	–	POLREF	3822285.6638	1533818.7829	4854429.9479
0704	–	POLREF	3850410.4000	1521395.9991	4836052.1890
0801	–	POLREF	3796398.2297	1589463.8597	4856582.7950
0802	–	POLREF	3822704.2351	1569853.8710	4842669.5893
0803	–	POLREF	3809787.9404	1602606.0450	4841884.9346
0804	–	POLREF	3839057.8400	1592622.0401	4822448.1015
0805	–	POLREF	3865105.0347	1569220.3386	4809491.4224
0806	–	POLREF	3864200.1989	1606524.6552	4798921.0388
1001	–	POLREF	3897645.7975	1033936.9830	4925522.3985
110E	–	POLREF	3893992.2573	1096891.1001	4916291.8406
1201	–	POLREF	3861970.8349	1144992.5490	4928919.5780
1202	–	POLREF	3882341.9198	1115797.9906	4919957.5239
1203	–	POLREF	3879186.5281	1160831.0184	4911890.8144
1204	–	POLREF	3876710.1907	1183134.1858	4908496.7287
1205	–	POLREF	3904751.6008	1163580.1737	4891222.1784

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
1206	-	POLREF	3921019.5962	1174808.1470	4875679.9740
1301	-	POLREF	3852864.2339	1178764.8130	4928015.6374
1302	-	POLREF	3851310.3647	1200226.3518	4924084.5180
1303	-	POLREF	3842689.4871	1224109.8849	4924923.3146
1304	-	POLREF	3864365.2856	1219316.8674	4909323.3033
1305	-	POLREF	3851711.9627	1246870.4889	4912272.3022
1306	-	POLREF	3889143.2940	1200894.1094	4894357.3950
1307	-	POLREF	3882559.0482	1232535.1290	4891802.0632
1308	-	POLREF	3888991.3787	1253654.1890	4881410.4935
1309	-	POLREF	3908788.7728	1264989.9823	4862816.3316
1401	-	POLREF	3827873.8097	1271286.7728	4924622.7218
1402	-	POLREF	3831106.1385	1292225.6035	4916716.3146
1403	-	POLREF	3857405.8177	1288067.3962	4897384.2694
1404	-	POLREF	3865243.9258	1270049.2862	4895968.7641
1406	-	POLREF	3873006.0683	1296935.7925	4882773.9626
1407	-	POLREF	3888207.4037	1274262.2245	4876706.4151
1501	-	POLREF	3793429.4103	1378554.3822	4922473.9271
1502	-	POLREF	3813796.5893	1383313.2870	4905554.8619
1504	-	POLREF	3811331.7072	1320323.3625	4924563.0756
1505	-	POLREF	3818987.1840	1360875.1191	4907826.9964
1506	-	POLREF	3836190.4305	1332820.2717	4902119.8941
1507	-	POLREF	3831852.6960	1373464.5521	4894474.2020
1508	-	POLREF	3847095.5160	1350290.6917	4888901.2482
1509	-	POLREF	3866760.1296	1361871.4131	4870299.8086
150E	-	POLREF	3849915.7294	1383600.1490	4877577.2363
1601	-	POLREF	3770770.3109	1438932.5404	4922650.8815
1602	-	POLREF	3803550.5546	1411191.4700	4905516.4498
1603	-	POLREF	3803217.1028	1445496.5676	4895903.9173
1604	-	POLREF	3816283.2805	1419890.5794	4893258.8830
1605	-	POLREF	3834578.8951	1409935.6563	4881820.4108
1606	-	POLREF	3836352.2940	1433505.5419	4873611.9176
1607	-	POLREF	3857655.5670	1409128.9772	4863901.6827
160Z	-	POLREF	3803550.7216	1411191.5941	4905516.5440
1701	-	POLREF	3735488.5218	1506894.2810	4929086.0407
1702	-	POLREF	3748557.3863	1480628.5686	4927115.3836
1703	-	POLREF	3773488.1022	1472499.4867	4910732.5111
1704	-	POLREF	3759061.5388	1508419.1123	4910653.4946
1705	-	POLREF	3788648.6498	1475338.3134	4898114.1481
1706	-	POLREF	3794466.6507	1517055.5179	4880992.3220
1707	-	POLREF	3818990.5066	1467469.0735	4877023.9294
1708	-	POLREF	3816028.7186	1490288.9949	4872493.7871
1709	-	POLREF	3813318.0684	1519080.9753	4865844.7761
1801	-	POLREF	3709403.3129	1574385.6860	4927756.7075
1802	-	POLREF	3739956.9459	1529949.5975	4918646.0950
1803	-	POLREF	3728889.4647	1556537.1311	4918827.2584
1804	-	POLREF	3767135.4002	1549201.0841	4891971.7855
1805	-	POLREF	3755864.8839	1584926.7146	4889215.7817
1806	-	POLREF	3781360.4869	1571692.0369	4873840.7099
1807	-	POLREF	3780369.7210	1602443.5272	4864683.4905
1808	-	POLREF	3804557.9008	1546685.6146	4864129.6526
1901	-	POLREF	3698491.9716	1606800.9610	4925522.9442
1902	-	POLREF	3698646.1314	1636106.5934	4915684.4607
1903	-	POLREF	3724986.1525	1590532.9492	4910892.0053
1904	-	POLREF	3724466.4680	1644696.1716	4893427.7485
1905	-	POLREF	3742487.9902	1620070.1139	4888085.4071
2001	-	POLREF	3811595.8663	1001671.8179	4998177.5183
2002	-	POLREF	3834831.0866	1016946.3654	4977534.3970
2101	-	POLREF	3803995.9422	1033755.1131	4997498.0742

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
2102	–	POLREF	3820997.0271	1037222.3119	4983946.7946
2103	–	POLREF	3806429.1649	1083844.0195	4985067.8520
2104	–	POLREF	3826945.0284	1057984.9546	4975059.1668
2105	–	POLREF	3820715.5820	1090832.9573	4972769.8825
2106	–	POLREF	3841970.9532	1038831.5810	4967568.8078
2107	–	POLREF	3848526.2645	1074114.0274	4955119.2454
2108	–	POLREF	3868770.8780	1039055.4506	4946915.4490
2109	–	POLREF	3869738.1398	1061966.2697	4941414.1560
2110	–	POLREF	3873517.8167	1083255.0457	4934132.8835
2201	–	POLREF	3793073.6931	1105805.1686	4990430.0802
2202	–	POLREF	3783646.8900	1135132.9810	4991003.9510
2203	–	POLREF	3806710.8019	1121488.4945	4976595.5749
2205	–	POLREF	3832497.9658	1132374.5074	4954522.6991
2206	–	POLREF	3846100.4533	1149374.9482	4940171.5525
2207	–	POLREF	3855888.1404	1128282.9256	4937468.1005
220E	–	POLREF	3817044.5195	1156640.4438	4960747.1909
2301	–	POLREF	3770419.6818	1155842.9299	4996236.8307
2302	–	POLREF	3757906.0947	1202884.4858	4994606.0179
2303	–	POLREF	3773200.8675	1188843.6976	4986497.1006
2304	–	POLREF	3792172.4469	1166620.8618	4977346.1864
2305	–	POLREF	3786257.1609	1197071.3830	4974663.2111
2306	–	POLREF	3776182.0888	1217279.1806	4977467.6000
2307	–	POLREF	3808459.0729	1195549.8780	4958277.6801
2308	–	POLREF	3805143.3754	1229780.1501	4952444.5905
2309	–	POLREF	3827595.4018	1178123.8486	4947673.1211
2310	–	POLREF	3823657.9044	1204451.5869	4944430.9406
2311	–	POLREF	3823194.6272	1225126.0977	4939756.9990
2401	–	POLREF	3745972.8331	1262801.5983	4988806.7039
2402	–	POLREF	3759521.2319	1247725.3751	4982450.5761
2403	–	POLREF	3785524.3348	1234534.6459	4966148.7798
2404	–	POLREF	3772976.2677	1264296.2890	4968237.0944
2405	–	POLREF	3795423.3103	1249168.4989	4955024.9987
2406	–	POLREF	3786503.3944	1284090.6509	4952940.6090
2407	–	POLREF	3807249.4268	1272188.4546	4940203.7936
2408	–	POLREF	3820583.8324	1254856.9672	4934358.8577
2409	–	POLREF	3803978.4384	1298442.4530	4935928.6380
2501	–	POLREF	3730831.2961	1287060.2794	4993910.4939
2502	–	POLREF	3725359.3436	1327270.8780	4987629.6011
2503	–	POLREF	3752981.4964	1294252.5824	4975588.8994
2504	–	POLREF	3738850.3374	1353195.0925	4970590.9656
2505	–	POLREF	3760122.5609	1332829.5145	4960161.9096
2506	–	POLREF	3785071.0080	1315040.4527	4946039.2190
2507	–	POLREF	3774312.6805	1351670.1904	4944381.3179
2601	–	POLREF	3696825.3214	1346298.5424	5003467.3969
2602	–	POLREF	3692805.8984	1380665.6013	4997235.7308
2603	–	POLREF	3691426.8192	1411667.1210	4989547.9102
2604	–	POLREF	3711792.2081	1366168.7774	4987172.9951
2605	–	POLREF	3715370.9019	1419902.6178	4969567.0738
2606	–	POLREF	3732509.2415	1395279.0045	4963762.1220
2607	–	POLREF	3756914.6883	1373664.6557	4951472.8809
2608	–	POLREF	3741050.7475	1426800.8796	4948557.4145
2609	–	POLREF	3767581.7061	1398846.8977	4936551.7124
2701	–	POLREF	3662259.9674	1448106.7980	5000526.8129
2702	–	POLREF	3678093.2008	1421108.3032	4996662.9335
2703	–	POLREF	3687460.8056	1457953.1189	4979193.4088
2704	–	POLREF	3676521.2415	1484269.8198	4979603.0461
2705	–	POLREF	3699372.8024	1435565.2557	4976937.4883
2706	–	POLREF	3706759.1967	1478867.3439	4958874.4731

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
2707	-	POLREF	3736910.0446	1448947.1509	4945241.3077
2801	-	POLREF	3643039.7124	1505610.4813	4997615.3451
2802	-	POLREF	3637133.0883	1529814.3105	4994572.0662
2803	-	POLREF	3660332.3125	1515026.5597	4982212.1975
2804	-	POLREF	3662747.3090	1541829.8749	4972273.7686
2805	-	POLREF	3694397.6216	1500635.2139	4961542.8552
2806	-	POLREF	3690462.9924	1532178.6599	4954933.5415
2807	-	POLREF	3709435.7397	1497835.2350	4951280.3346
2808	-	POLREF	3709779.4806	1540799.6563	4937922.1594
2901	-	POLREF	3625034.3408	1577456.2984	4988594.2224
2902	-	POLREF	3637603.1620	1556104.6669	4986169.5067
2903	-	POLREF	3648972.6801	1567185.5038	4974472.6750
2904	-	POLREF	3662745.1450	1594616.5709	4955805.7618
2905	-	POLREF	3677014.5019	1570565.1367	4952884.2820
2906	-	POLREF	3676099.5788	1624156.0175	4936352.6841
3001	-	POLREF	3719563.9371	994155.3601	5068069.6533
3002	-	POLREF	3740836.8019	970691.9489	5057026.8485
3003	-	POLREF	3771237.6092	996746.0261	5029529.8602
3101	-	POLREF	3714715.5352	1054870.4456	5059358.2717
3102	-	POLREF	3729822.7655	1024117.6180	5054667.7526
3103	-	POLREF	3751759.8453	1006192.0414	5042036.7748
3104	-	POLREF	3743383.8804	1047463.7895	5039917.6620
3105	-	POLREF	3766033.3853	1027960.4025	5027243.0328
3106	-	POLREF	3765989.9351	1070477.9225	5018355.6049
3108	-	POLREF	3788408.8650	1058472.1945	5004061.1254
3201	-	POLREF	3700731.3813	1089926.7581	5062195.2965
3202	-	POLREF	3701446.2248	1129917.3892	5052967.5980
3203	-	POLREF	3724579.4423	1078271.5344	5047283.0467
3204	-	POLREF	3743005.4465	1086868.1919	5031980.9158
3205	-	POLREF	3755596.5731	1110355.2587	5017470.5947
3206	-	POLREF	3755612.3170	1139071.2665	5011067.0672
3207	-	POLREF	3769529.3490	1113141.6599	5006454.9056
3301	-	POLREF	3678762.7614	1135625.5749	5068162.8515
3302	-	POLREF	3676724.6081	1165825.4883	5062858.8979
3303	-	POLREF	3698579.5236	1160457.9117	5048243.8340
3305	-	POLREF	3718498.6732	1136898.3372	5038994.2922
3306	-	POLREF	3719009.2415	1177132.6089	5029450.0301
3307	-	POLREF	3732511.6238	1185983.5534	5017412.8017
3308	-	POLREF	3724922.5860	1208052.9848	5017783.8373
3309	-	POLREF	3754363.3843	1175103.9195	5003758.4752
330E	-	POLREF	3693119.4440	1190490.3559	5045316.4209
3401	-	POLREF	3644657.3694	1251512.7386	5065517.6745
3402	-	POLREF	3660983.1542	1192414.9836	5067959.0868
3403	-	POLREF	3673173.1203	1211499.2307	5054708.9245
3404	-	POLREF	3676884.1068	1249262.6330	5042891.5555
3405	-	POLREF	3696849.7055	1217103.3486	5036218.8443
3406	-	POLREF	3702124.2106	1246704.5251	5025205.5204
3407	-	POLREF	3717165.6928	1231465.1130	5017828.0656
3408	-	POLREF	3722637.4006	1254794.7460	5008072.0524
3409	-	POLREF	3736382.2666	1232080.9253	5003551.4510
3501	-	POLREF	3688073.3399	1284688.4882	5025939.0623
3502	-	POLREF	3674855.6520	1327387.8992	5024516.4318
3503	-	POLREF	3702906.8905	1309597.2565	5008665.8369
3504	-	POLREF	3636827.7086	1305146.6045	5057686.3986
3505	-	POLREF	3654207.9981	1312001.3149	5043467.9306
3506	-	POLREF	3661244.3807	1273987.8620	5048050.9557
3507	-	POLREF	3715514.1984	1280308.1450	5006918.0337
3601	-	POLREF	3664303.8091	1377626.0786	5018710.0864

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
3602	–	POLREF	3614610.3099	1375061.8923	5055099.3121
3603	–	POLREF	3646601.1461	1347214.0960	5039718.5555
3604	–	POLREF	3621629.2548	1329583.7583	5062205.2370
3701	–	POLREF	3609478.9555	1456692.5258	5036023.6871
3702	–	POLREF	3625817.0383	1426427.1147	5032930.4432
3703	–	POLREF	3629353.0357	1453985.5015	5022645.7129
3704	–	POLREF	3645716.9357	1433342.0444	5016712.3098
3705	–	POLREF	3647613.1494	1468783.7274	5005177.9616
3706	–	POLREF	3587634.9942	1392432.7181	5069442.1953
3707	–	POLREF	3579968.2761	1411980.7993	5069446.2437
3708	–	POLREF	3585067.6690	1446035.4709	5056360.0618
3709	–	POLREF	3605539.4192	1410024.8940	5051962.5662
3801	–	POLREF	3595233.7475	1503407.0057	5032560.8466
3802	–	POLREF	3609884.0449	1478877.1891	5029371.6813
3803	–	POLREF	3610498.5521	1508769.9743	5020089.5162
3804	–	POLREF	3629569.5592	1475685.4416	5016196.9673
3805	–	POLREF	3569138.1125	1507066.9104	5049853.1877
3806	–	POLREF	3558770.3003	1461475.2033	5070381.9393
3807	–	POLREF	3559887.3914	1488298.8293	5061856.0435
3808	–	POLREF	3594800.5712	1463828.9496	5044380.0216
3901	–	POLREF	3573902.2848	1525791.9058	5040950.9333
3902	–	POLREF	3597248.4867	1537077.0110	5020981.6008
3903	–	POLREF	3618436.3590	1537607.8611	5005681.9033
3904	–	POLREF	3603694.1923	1570954.2018	5005944.6950
3905	–	POLREF	3548371.0593	1546931.9360	5052441.8448
3906	–	POLREF	3539317.0332	1522881.9834	5065971.6917
4001	–	POLREF	3638179.9387	962434.4797	5132358.1641
4002	–	POLREF	3653578.5623	934132.6205	5126668.6808
4003	–	POLREF	3658327.5456	956623.1610	5119185.2894
4004	–	POLREF	3678924.8843	958570.5150	5104241.3581
4005	–	POLREF	3699529.5657	990869.1828	5083232.4646
4007	–	POLREF	3725996.5151	950129.2349	5071779.6042
4101	–	POLREF	3623086.7193	1034012.0118	5129251.0811
4102	–	POLREF	3640444.9002	1003872.5957	5122929.4415
4104	–	POLREF	3658761.7233	1017282.1895	5107348.0909
4105	–	POLREF	3651568.1534	1045294.7862	5106901.2859
4106	–	POLREF	3677052.1440	994542.6815	5098717.1743
4107	–	POLREF	3679329.1826	1038343.7433	5088439.5293
4108	–	POLREF	3706540.9933	1017203.6217	5073051.5363
4109	–	POLREF	3697963.1076	1049574.0777	5072687.1391
4201	–	POLREF	3612677.7933	1066677.9281	5129931.5785
4202	–	POLREF	3605224.3626	1094061.0875	5129454.3849
4203	–	POLREF	3626985.5086	1076455.7762	5117884.4273
4204	–	POLREF	3623828.5579	1105288.4004	5114015.3623
4205	–	POLREF	3642477.9194	1082295.3789	5105708.5058
4206	–	POLREF	3642224.2660	1109565.5309	5100060.8449
4207	–	POLREF	3657547.2868	1088729.1770	5093582.6179
4208	–	POLREF	3672768.3195	1073142.2653	5086030.2397
4209	–	POLREF	3659934.0568	1115542.2645	5086107.3781
4210	–	POLREF	3679444.3039	1111012.1773	5073100.3419
4301	–	POLREF	3592519.0098	1150984.4407	5125904.1992
4302	–	POLREF	3607659.9653	1130961.0647	5119783.0403
4303	–	POLREF	3613911.9690	1157471.9916	5109491.7628
4304	–	POLREF	3628307.1822	1140590.3095	5103113.6632
4305	–	POLREF	3642270.2125	1169046.9062	5086796.0750
4306	–	POLREF	3655776.4195	1144684.5418	5082642.3487
4401	–	POLREF	3581875.0165	1176746.6224	5127466.2545
4402	–	POLREF	3573617.7958	1196100.8022	5128712.0362

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
4403	-	POLREF	3566049.3684	1214118.5465	5129674.7910
4404	-	POLREF	3587931.4870	1208406.5217	5115928.2552
4405	-	POLREF	3594255.2110	1228687.5776	5106680.1128
4406	-	POLREF	3611953.7008	1199071.0496	5101254.5387
4407	-	POLREF	3619845.7682	1184590.3367	5099083.9902
4408	-	POLREF	3613553.5315	1226642.9917	5093631.3681
4409	-	POLREF	3631877.9941	1197911.5110	5087462.4430
4501	-	POLREF	3549277.2749	1275463.0953	5126543.3610
4502	-	POLREF	3566083.9355	1244388.1506	5122498.1278
4503	-	POLREF	3584545.0676	1257433.5632	5106513.8604
4504	-	POLREF	3596065.5274	1291503.3984	5090073.6046
4505	-	POLREF	3611101.7311	1257975.1329	5087781.9467
4506	-	POLREF	3622498.5928	1289952.5049	5071764.2755
4507	-	POLREF	3626481.6894	1250916.5495	5078621.5677
4601	-	POLREF	3549435.5726	1331903.7183	5112198.3412
4602	-	POLREF	3562597.2182	1299106.7527	5111466.6081
4603	-	POLREF	3576818.1724	1326893.2750	5094564.1693
4604	-	POLREF	3577976.4611	1361205.5609	5084666.0668
4606	-	POLREF	3599290.5267	1350618.5848	5072506.2873
4701	-	POLREF	3509525.9457	1376039.9324	5127985.1777
4702	-	POLREF	3500144.7784	1409443.8987	5125246.9187
4703	-	POLREF	3529287.2294	1361058.7149	5118450.5526
4704	-	POLREF	3515867.8054	1416440.5996	5112657.8421
4705	-	POLREF	3537417.2554	1378010.0766	5108312.9813
4706	-	POLREF	3560497.2335	1377261.5001	5092520.9774
4707	-	POLREF	3534186.7048	1419647.8718	5099165.0785
4708	-	POLREF	3558039.8314	1410743.3120	5085096.9764
4801	-	POLREF	3485202.0860	1426290.3903	5130747.6988
4802	-	POLREF	3485987.7525	1465292.6728	5119278.0897
4803	-	POLREF	3504097.8479	1447915.0722	5111913.5605
4804	-	POLREF	3502201.3583	1475487.3241	5105337.0361
4805	-	POLREF	3521238.8186	1446316.6176	5100635.8073
4806	-	POLREF	3522219.1129	1488079.0720	5087989.9127
4807	-	POLREF	3547973.5494	1443606.4188	5082987.7018
4808	-	POLREF	3541313.8922	1482341.5515	5076505.4482
4901	-	POLREF	3473692.2983	1500833.6151	5117355.5233
4902	-	POLREF	3490819.6060	1511485.4322	5102711.1797
4903	-	POLREF	3499011.9805	1534488.0856	5090291.7835
4904	-	POLREF	3524034.4396	1541270.8229	5071052.5046
5101	-	POLREF	3604048.3746	1009724.0211	5147268.3308
5102	-	POLREF	3621837.5926	991813.9918	5138291.5004
5201	-	POLREF	3545946.8504	1079005.3330	5173299.7378
5202	-	POLREF	3561083.5506	1056400.7446	5167658.9717
5203	-	POLREF	3574447.5446	1064616.8531	5156788.2583
5204	-	POLREF	3584622.3973	1040330.8359	5154631.8094
5205	-	POLREF	3601035.5982	1051559.1244	5141071.7292
5206	-	POLREF	3593743.7243	1082463.7237	5139934.8178
5301	-	POLREF	3518011.2318	1124716.4362	5182678.4713
5302	-	POLREF	3538799.1097	1110603.6414	5171600.8010
5303	-	POLREF	3537552.4479	1130590.3204	5168223.8871
5304	-	POLREF	3559899.6252	1101110.3950	5159221.1280
5305	-	POLREF	3549047.2006	1146513.5476	5157011.6110
5306	-	POLREF	3583517.5152	1108323.1878	5141522.9153
5401	-	POLREF	3553943.3650	1205346.5211	5140068.7538
5402	-	POLREF	3513692.6139	1158158.1168	5178244.8012
5403	-	POLREF	3525101.5460	1174846.8775	5166883.0780
5404	-	POLREF	3535680.9723	1162779.0743	5162487.6501
5405	-	POLREF	3535809.4858	1197315.8383	5154265.8700

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
5406	–	POLREF	3546656.8231	1179628.8296	5151239.7675
5407	–	POLREF	3562620.6803	1159531.0723	5144752.6133
5408	–	POLREF	3565421.3557	1182645.3870	5137505.3555
5501	–	POLREF	3526126.2543	1220195.7637	5155525.3741
5502	–	POLREF	3517260.5759	1263038.4656	5151351.4945
5503	–	POLREF	3539248.8871	1243611.2049	5141013.8635
5601	–	POLREF	3494494.9568	1277401.3533	5163289.2821
5602	–	POLREF	3496671.8342	1301374.8861	5155937.0316
5603	–	POLREF	3485277.3744	1331735.8077	5155774.1145
5604	–	POLREF	3511015.8518	1309204.6648	5144195.6341
5605	–	POLREF	3529230.4624	1284864.1758	5137960.3974
5701	–	POLREF	3476394.1868	1372470.8919	5151229.3978
5702	–	POLREF	3495242.8848	1351383.9095	5144103.7189
5703	–	POLREF	3482498.4720	1393921.2706	5141402.8752
5801	–	POLREF	3433288.5053	1444188.7725	5160585.2873
5802	–	POLREF	3453920.2879	1414485.0222	5155009.1831
5803	–	POLREF	3462184.4854	1441326.0084	5142104.7884
5901	–	POLREF	3435367.5637	1464081.6103	5153618.3682
5902	–	POLREF	3449838.5897	1469302.8821	5142444.1466
5903	–	POLREF	3442723.8230	1489243.4168	5141467.4029
EUVN network points					
PL01	–	EUVN	3838174.7229	1336729.7285	4899501.1523
PL02	–	EUVN	3741888.5311	1041415.2910	5042252.0215
PL03	–	EUVN	3496922.9188	1438440.8001	5119413.4854
PL05	–	EUVN	3836865.5485	1565871.5263	4832580.7510
PL06	–	EUVN	3648326.6724	924983.9260	5132035.1379
BIEL	–	EUVN	3552337.2247	1521943.3817	5057180.8601
CZAR	–	EUVN	3696025.9053	1104043.2848	5062622.2806
GLUB	–	EUVN	3885977.0169	1240402.9809	4887126.0656
GROD	–	EUVN	3752778.0704	1117390.4738	5018012.0121
GROJ	–	EUVN	3687668.3218	1400207.5066	4995546.9411
GRUE	–	EUVN	3596346.4318	1225500.5490	5105881.5301
GRYB	–	EUVN	3869251.6927	1475239.3585	4835560.6706
JARO	–	EUVN	3793804.5771	1560228.5627	4867962.8907
JEDZ	–	EUVN	3802994.3217	1393667.6376	4910876.0510
KIEL	–	EUVN	3507907.6421	1407672.2472	5120436.9681
KOLB	–	EUVN	3604828.8415	1012884.4119	5146095.4149
KRAS	–	EUVN	3701979.0514	1585727.7443	4929560.3109
KRTE	–	EUVN	3781306.9714	1174601.2240	4983686.8482
KRZE	–	EUVN	3834391.0863	1436506.0974	4874193.8538
LAM6	–	EUVN	3524631.1225	1329777.9808	5129763.9825
LOME	–	EUVN	3551376.7618	1442381.3687	5080950.4953
LOWI	–	EUVN	3677743.4314	1350518.8842	5016251.3558
MINS	–	EUVN	3651031.9466	1438326.8518	5011460.3777
NOWY	–	EUVN	3896851.7313	1441788.2097	4823624.4449
OPOL	–	EUVN	3857098.8162	1268178.6317	4902668.2482
PACA	–	EUVN	3808345.5710	1456956.0788	4888364.5261
PACZ	–	EUVN	3880285.8574	1173532.6156	4908076.3900
POCK	–	EUVN	3445775.3970	1475738.5628	5143284.3897
SAND	–	EUVN	3748460.6931	1500755.8815	4921057.6341
SEPO	–	EUVN	3631290.3674	1147338.0340	5099493.8715
SIER	–	EUVN	3627538.2337	1304830.8685	5064392.9538
SMAR	–	EUVN	3759051.9566	1277115.9137	4975382.4162
SOKO	–	EUVN	3504162.3402	1514221.4177	5092741.3980
SZLI	–	EUVN	3799256.6265	1105191.2829	4985893.5808
TOMA	–	EUVN	3718512.5598	1635523.5213	4900984.7387
TORE	–	EUVN	3641003.4397	1226575.7337	5074153.8959

Site id.	Domes number	Network type	PL-ETRF2000-XYZ		
			X [m]	Y [m]	Z [m]
WLOD	–	EUVN	3646375.1254	1579402.9290	4972520.7336
WROE	–	EUVN	3831781.9786	1179910.3377	4944010.5722
WRZE	–	EUVN	3723114.8531	1182243.3743	5025227.7109
ZABC	–	EUVN	3623261.2265	1517867.6714	5008193.9780
ZGOR	–	EUVN	3871645.0683	1039663.5067	4944540.1382
ZNIN	–	EUVN	3672159.6027	1193993.5966	5059586.2206
ZYRZ	–	EUVN	3689495.6746	1495009.8285	4966815.9617
EUPOS station located in neighboring countries					
CBRU	–	CZEPOS	3919707.9962	1233461.3405	4862456.3577
CFRM	11525M001	CZEPOS	3924573.1685	1301971.0082	4840464.4901
CLIB	11526M001	CZEPOS	3903195.5229	1050232.2506	4917869.6407
CPAR	11527M001	CZEPOS	3949919.0870	1116467.0439	4865832.5404
CSUM	–	CZEPOS	3931871.9579	1200665.0803	4860558.9377
CSVI	–	CZEPOS	3959346.5433	1170655.4952	4845811.2990
CTRU	–	CZEPOS	3904532.7785	1112857.8484	4903151.7137
MRJM	–	LITPOS	3401532.0107	1469808.5706	5174067.1396
VARN	–	LITPOS	3398712.6310	1555724.7057	5150966.7002
VEIS	–	LITPOS	3432564.1866	1507107.7558	5143018.0039
0014	–	SAPOS	3834912.9453	979734.6813	4984828.5302
0017	–	SAPOS	3722230.2715	945894.4082	5075243.8991
0022	–	SAPOS	3778674.3834	980132.9175	5027191.9848
0139	–	SAPOS	3856023.6929	1030742.6977	4958467.5264
0147	–	SAPOS	3899907.5005	1020318.3913	4926621.0773
0781	–	SAPOS	3648129.3233	922442.4314	5132647.6523
KUZA	11532M001	SKPOS	3952344.8972	1340787.8942	4807403.0391
LIE1	11533M001	SKPOS	3918779.2072	1401454.2694	4817956.6772
SKSK	11544M001	SKPOS	3874879.4061	1531897.4618	4813203.2785
SKSL	11545M001	SKPOS	3898822.9026	1472198.9185	4812907.1184
SKSV	11546M001	SKPOS	3883835.8555	1581339.5888	4790061.1289
SHAZ	–	UAPOS	3631978.3406	1609614.2791	4973372.8806
VBER	–	UAPOS	3882899.5109	1605133.8879	4782931.6669

Appendix 8. Comparison between EUREF-89 and PL-ETRF2000

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
0401	POLREF	-25.4	27.2	76.0	-13.6	1.5	-2.8	
0402	POLREF	-1.5	19.3	116.0	11.3	-5.4	38.1	
0403	POLREF	-18.9	27.2	72.0	-5.6	1.2	-8.5	
0404	POLREF	-14.2	15.3	35.0	-0.4	-11.8	-47.4	
0501	POLREF	-20.1	18.8	94.0	-8.5	-10.0	9.7	
0502	POLREF	-17.6	16.1	94.0	-4.4	-14.1	7.0	
0503	POLREF	-17.9	30.3	77.0	-6.0	3.0	-4.4	
0504	POLREF	-1.5	25.0	70.0	11.3	-2.4	-12.4	
0505	POLREF	-13.0	26.5	81.0	0.1	-2.7	-4.2	
0601	POLREF	-5.3	29.9	91.0	5.1	-1.1	5.0	
0602	POLREF	-4.6	27.6	85.0	7.2	-2.3	-0.7	
0603	POLREF	4.9	-7.8	96.0	16.9	-39.0	7.9	*
0604	POLREF	-5.6	26.4	86.0	6.4	-6.3	-4.0	
0701	POLREF	-11.4	30.2	104.0	-2.0	-1.4	17.2	
0702	POLREF	-9.6	21.1	105.0	0.0	-11.5	16.4	
0703	POLREF	-0.6	30.7	114.0	8.7	-3.2	24.8	
0704	POLREF	-11.1	25.8	104.0	-0.6	-7.9	13.6	
0801	POLREF	-1.9	46.2	89.0	6.4	10.2	-2.8	
0802	POLREF	5.3	47.6	100.0	14.7	12.1	7.8	
0803	POLREF	-11.1	29.0	108.0	-2.4	-7.6	13.5	
0804	POLREF	-17.6	26.1	103.0	-7.4	-10.4	7.8	
0805	POLREF	9.9	36.9	98.0	21.4	1.0	3.0	
0806	POLREF	-3.4	18.8	129.0	8.1	-18.5	31.5	
1001	POLREF	-3.4	31.2	112.0	10.2	18.4	51.4	
1201	POLREF	-16.7	19.7	42.0	-5.8	2.3	-23.4	
1202	POLREF	-16.1	12.3	70.0	-4.0	-4.2	5.5	
1203	POLREF	-18.2	2.9	70.0	-6.3	-15.3	2.5	
1204	POLREF	-17.6	-19.4	70.0	-5.9	-38.9	1.7	*
1205	POLREF	-9.0	14.8	99.0	3.9	-4.1	30.1	
1206	POLREF	-10.2	18.4	71.0	3.8	-1.2	0.1	
1301	POLREF	-24.7	21.2	60.0	-14.6	2.6	-7.3	
1302	POLREF	-22.6	16.0	73.0	-12.3	-3.8	5.5	
1303	POLREF	-17.3	13.5	58.0	-7.8	-7.2	-10.8	
1304	POLREF	-13.6	17.4	62.0	-2.7	-3.3	-7.9	
1305	POLREF	-15.5	9.6	68.0	-5.4	-12.1	-3.4	
1306	POLREF	-24.7	16.0	63.0	-12.5	-4.5	-7.4	
1307	POLREF	-20.4	18.1	78.0	-8.8	-3.5	5.3	
1308	POLREF	-12.4	19.2	66.0	-0.5	-3.6	-8.5	
1309	POLREF	-14.2	16.5	83.0	-1.3	-6.8	6.9	
1401	POLREF	-11.8	19.3	60.0	-2.8	-3.1	-11.6	
1402	POLREF	-3.7	9.2	63.0	5.2	-14.2	-10.2	
1403	POLREF	-9.0	20.5	66.0	1.4	-3.1	-9.4	
1404	POLREF	-10.2	21.5	24.0	0.5	-1.3	-49.9	
1407	POLREF	-28.4	4.0	71.0	-16.4	-19.7	-5.2	
1501	POLREF	-8.3	31.2	93.0	-1.4	4.5	16.4	
1502	POLREF	-8.7	28.9	80.0	-0.5	1.6	2.6	
1504	POLREF	-5.6	16.0	39.0	2.3	-8.5	-35.3	
1506	POLREF	-4.3	21.6	66.0	4.8	-3.7	-10.6	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
1507	POLREF	-17.0	23.0	78.0	-8.0	-3.9	-1.2	
1508	POLREF	-9.9	27.6	26.0	-0.3	1.4	-51.8	
1509	POLREF	-21.0	41.5	91.0	-10.1	14.5	10.8	
1601	POLREF	-3.4	23.0	84.0	2.7	-6.1	5.1	
1602	POLREF	-22.3	36.7	293.0	-14.4	8.3	213.1	*
1604	POLREF	-15.5	26.8	100.0	-7.3	-2.0	18.8	
1605	POLREF	-7.7	26.1	69.0	1.6	-2.7	-12.5	
1606	POLREF	-15.5	23.0	87.0	-6.1	-6.8	3.2	
1607	POLREF	-17.3	16.7	93.0	-6.9	-12.3	10.3	
1701	POLREF	29.4	41.7	113.0	34.0	10.0	30.9	*
1702	POLREF	5.3	32.2	95.0	10.3	1.4	13.1	
1703	POLREF	-11.1	28.4	77.0	-4.9	-2.3	-5.8	
1705	POLREF	-12.7	27.7	83.0	-5.6	-3.3	-0.3	
1706	POLREF	-3.4	31.2	123.0	4.4	-1.5	35.8	
1707	POLREF	-5.6	31.9	101.0	3.2	1.0	15.8	
1708	POLREF	0.6	32.7	110.0	9.2	0.8	24.1	
1709	POLREF	-4.3	28.0	94.0	4.2	-5.0	5.7	
1801	POLREF	1.5	35.9	107.0	5.5	1.3	22.0	
1802	POLREF	4.6	33.0	89.0	9.8	0.1	4.9	
1803	POLREF	1.2	37.3	85.0	5.8	3.4	-0.3	
1804	POLREF	10.5	16.6	90.0	17.0	-17.4	2.1	
1805	POLREF	-7.4	32.5	90.0	-1.1	-2.9	0.5	
1806	POLREF	-3.1	28.1	94.0	4.1	-6.9	4.3	
1807	POLREF	-13.0	32.8	110.0	-5.6	-3.7	19.0	
1808	POLREF	-9.6	45.3	94.0	-1.2	11.1	4.0	
1901	POLREF	1.2	38.8	83.0	4.8	2.9	-4.6	
1902	POLREF	7.4	48.3	77.0	11.4	11.2	-12.3	
1903	POLREF	3.4	46.6	100.0	8.2	11.3	12.6	
1904	POLREF	-12.1	48.1	96.0	-6.7	10.3	4.7	
1905	POLREF	-5.6	41.6	87.0	0.2	4.7	-3.1	
2001	POLREF	-5.6	19.4	57.0	3.0	9.8	4.7	
2002	POLREF	-17.9	14.0	48.0	-7.9	3.0	-7.8	
2101	POLREF	-9.3	13.5	49.0	-1.3	2.3	-5.3	
2102	POLREF	-7.7	22.2	61.0	1.2	10.6	5.9	
2103	POLREF	-21.0	19.7	123.0	-13.1	6.2	65.9	*
2104	POLREF	-10.2	19.4	57.0	-1.0	6.8	-0.4	
2105	POLREF	-17.0	8.8	115.0	-8.1	-5.3	55.8	*
2106	POLREF	-22.9	18.1	67.0	-12.6	6.0	10.0	
2107	POLREF	-24.1	15.1	24.0	-13.7	1.2	-35.8	
2108	POLREF	-13.6	17.6	47.0	-1.8	5.0	-11.9	
2109	POLREF	-12.7	21.4	67.0	-0.9	7.7	6.4	
2110	POLREF	-23.5	24.3	76.0	-11.8	9.6	14.4	
2201	POLREF	-21.0	12.8	72.0	-13.7	-1.5	13.8	
2202	POLREF	-4.9	19.7	68.0	1.6	4.1	7.8	
2203	POLREF	-19.2	14.8	52.0	-11.1	-0.6	-8.1	
2205	POLREF	-19.5	14.5	70.0	-10.4	-1.7	6.9	
2206	POLREF	-13.9	17.9	42.0	-3.7	0.6	-22.0	
2207	POLREF	-19.2	23.3	61.0	-8.6	6.9	-2.6	
2301	POLREF	-11.8	13.9	67.0	-6.1	-2.5	6.6	
2303	POLREF	4.9	24.1	51.0	10.6	6.1	-11.2	
2304	POLREF	-10.8	13.8	85.0	-3.8	-3.3	22.2	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
2305	POLREF	-5.6	12.7	62.0	0.8	-5.9	-2.1	
2308	POLREF	-6.5	13.0	47.0	1.1	-7.3	-20.5	
2309	POLREF	-15.8	20.2	72.0	-6.8	2.0	7.5	
2310	POLREF	-13.0	25.4	63.0	-4.7	6.0	-4.2	
2311	POLREF	-17.9	17.5	75.0	-9.5	-2.8	6.8	
2401	POLREF	4.9	18.2	69.0	9.1	-2.8	3.0	
2402	POLREF	-4.3	14.4	42.0	0.7	-6.0	-24.2	
2403	POLREF	-14.5	24.1	51.0	-8.2	3.8	-16.1	
2404	POLREF	-4.9	16.6	50.0	0.8	-4.8	-16.9	
2405	POLREF	-11.4	23.0	53.0	-4.4	2.1	-15.0	
2406	POLREF	-10.8	18.4	59.0	-4.3	-4.2	-9.9	
2407	POLREF	-15.8	20.8	49.0	-8.0	-1.4	-21.2	
2408	POLREF	-10.2	26.1	54.0	-1.9	4.4	-16.2	
2409	POLREF	-17.6	18.3	41.0	-10.1	-5.2	-30.6	
2501	POLREF	-1.9	22.1	65.0	1.8	0.3	-1.6	
2502	POLREF	0.0	23.3	73.0	3.3	-0.4	3.4	
2503	POLREF	-8.0	15.0	66.0	-3.3	-7.5	-2.7	
2504	POLREF	-3.7	24.6	62.0	0.4	-0.2	-9.4	
2505	POLREF	-12.7	35.3	86.0	-7.4	10.9	14.6	
2506	POLREF	-9.0	12.0	77.0	-2.5	-12.0	4.7	
2507	POLREF	-2.8	26.0	68.0	3.0	0.6	-5.7	
2601	POLREF	3.4	26.5	45.0	5.4	2.2	-23.1	
2602	POLREF	2.5	25.7	83.0	4.0	0.0	12.9	
2603	POLREF	4.0	29.4	80.0	6.1	2.1	7.6	
2604	POLREF	11.4	22.4	78.0	14.0	-2.9	6.6	
2605	POLREF	0.6	26.9	78.0	3.7	-1.0	2.9	
2606	POLREF	-3.4	19.7	60.0	0.7	-7.2	-14.0	
2607	POLREF	-0.3	25.4	62.0	4.9	-0.7	-12.3	
2608	POLREF	-0.9	21.5	76.0	3.4	-6.8	-1.0	
2609	POLREF	-1.9	27.6	82.0	4.0	0.2	5.4	
2701	POLREF	-3.4	32.2	84.0	-2.7	3.6	10.3	
2702	POLREF	9.0	37.4	65.0	10.1	9.9	-7.9	
2703	POLREF	1.5	28.6	83.0	3.4	-0.8	7.4	
2704	POLREF	0.0	25.7	70.0	1.6	-4.6	-7.0	
2705	POLREF	5.3	50.7	-2.0	7.7	22.3	-77.0	*
2706	POLREF	0.0	28.8	70.0	2.8	-1.6	-8.0	
2707	POLREF	-9.9	19.2	94.0	-5.5	-10.1	16.2	
2801	POLREF	2.8	29.8	93.0	2.7	-1.3	16.5	
2802	POLREF	5.6	38.8	85.0	5.4	6.5	7.8	
2803	POLREF	3.1	22.6	81.0	4.0	-8.9	2.8	
2804	POLREF	7.4	34.6	81.0	8.7	1.9	-0.1	
2805	POLREF	-0.9	36.8	67.0	1.7	5.6	-12.3	
2806	POLREF	2.8	31.9	73.0	5.4	-0.7	-8.6	
2807	POLREF	1.5	26.9	79.0	4.9	-4.3	-1.3	
2808	POLREF	1.9	34.6	79.0	5.2	1.6	-3.9	
2901	POLREF	1.2	38.3	48.0	0.9	4.0	-32.4	
2902	POLREF	4.6	34.3	82.0	4.6	0.9	2.4	
2903	POLREF	5.3	37.1	100.0	6.0	3.3	19.2	
2904	POLREF	-5.6	40.8	85.0	-3.9	5.5	0.1	
2905	POLREF	5.3	40.0	102.0	7.6	5.9	18.9	
2906	POLREF	0.9	38.9	83.0	3.5	2.5	-4.2	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
3001	POLREF	1.9	25.3	63.0	5.3	17.4	16.7	
3002	POLREF	-31.8	40.6	75.0	-26.9	33.6	28.4	*
3003	POLREF	5.6	5.7	74.0	12.0	-3.1	23.8	
3101	POLREF	-7.7	14.2	49.0	-5.1	3.3	-1.2	
3102	POLREF	2.8	14.0	25.0	6.7	4.6	-24.5	
3103	POLREF	-2.2	15.8	56.0	2.9	6.8	6.8	
3104	POLREF	-4.6	16.7	38.0	0.0	6.0	-12.8	
3105	POLREF	-5.6	15.5	40.0	0.4	5.2	-11.7	
3106	POLREF	-9.0	15.5	46.0	-3.2	3.1	-8.1	
3108	POLREF	-0.3	32.2	57.0	7.0	20.2	1.7	
3201	POLREF	2.5	8.6	54.0	4.6	-3.6	2.1	
3202	POLREF	-23.8	38.2	54.0	-21.7	24.2	0.0	
3203	POLREF	-6.2	6.4	84.0	-3.1	-5.7	30.9	
3204	POLREF	-10.2	9.6	68.0	-5.8	-2.9	13.3	
3205	POLREF	2.5	17.2	76.0	7.3	3.3	19.5	
3206	POLREF	-2.2	21.3	54.0	2.6	6.0	-4.7	
3207	POLREF	-7.1	13.1	63.0	-1.4	-1.3	5.8	
3301	POLREF	-4.3	8.9	54.0	-3.6	-5.3	0.5	
3302	POLREF	-4.0	15.3	44.0	-3.4	-0.2	-10.8	
3303	POLREF	6.5	13.9	53.0	8.3	-1.7	-3.4	
3305	POLREF	0.3	17.9	195.0	3.2	3.3	138.9	*
3306	POLREF	-0.9	18.7	39.0	1.8	2.0	-20.0	
3307	POLREF	-2.8	19.1	68.0	0.8	1.9	8.4	
3308	POLREF	-4.3	16.3	62.0	-1.3	-1.9	0.3	
3309	POLREF	-6.5	18.5	50.0	-1.5	1.6	-10.2	
3401	POLREF	4.0	22.2	57.0	2.8	3.0	-1.3	
3402	POLREF	5.6	24.8	49.0	5.3	8.2	-7.5	
3403	POLREF	-7.7	-11.8	41.0	-7.4	-29.6	-17.7	*
3404	POLREF	-0.3	19.7	48.0	0.2	0.1	-13.4	
3405	POLREF	-1.2	17.1	41.0	0.1	-1.2	-18.8	
3406	POLREF	-7.7	20.8	47.0	-5.8	1.1	-15.0	
3407	POLREF	-4.9	15.3	37.0	-2.0	-3.7	-25.0	
3408	POLREF	1.9	14.4	54.0	4.8	-5.7	-10.0	
3409	POLREF	-8.7	19.6	51.0	-5.0	0.2	-12.0	
3501	POLREF	0.3	20.2	38.0	1.7	-1.0	-25.5	
3502	POLREF	5.9	19.5	57.0	6.6	-3.6	-8.4	
3503	POLREF	-5.3	18.1	50.0	-3.0	-4.7	-16.8	
3504	POLREF	14.2	34.6	58.0	12.7	12.8	-4.7	
3505	POLREF	-1.2	15.6	63.0	-1.9	-6.7	-0.5	
3506	POLREF	4.0	17.4	62.0	3.6	-3.1	1.2	
3507	POLREF	-6.2	16.0	37.0	-3.3	-5.5	-28.5	
3601	POLREF	5.9	22.9	78.0	6.1	-2.6	8.4	
3602	POLREF	-5.6	29.2	78.0	-8.0	4.2	12.6	
3603	POLREF	-5.6	19.7	105.0	-6.4	-4.2	38.7	
3604	POLREF	2.8	19.8	43.0	0.8	-3.1	-20.1	
3701	POLREF	6.8	26.0	66.0	4.9	-2.6	-4.8	
3702	POLREF	-1.2	20.9	82.0	-3.0	-6.3	11.7	
3703	POLREF	9.3	27.0	80.0	8.5	-1.7	7.9	
3704	POLREF	-0.3	28.4	76.0	-0.6	0.5	4.8	
3705	POLREF	5.3	30.6	60.0	5.4	1.2	-14.5	
3706	POLREF	3.4	24.4	79.0	-0.4	-1.2	13.2	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
3707	POLREF	2.5	27.4	59.0	-1.4	0.9	-7.7	
3708	POLREF	8.3	19.1	52.0	4.6	-8.9	-17.0	
3709	POLREF	7.7	26.6	61.0	5.0	0.1	-7.0	
3801	POLREF	8.7	37.5	74.0	6.1	6.8	-0.2	
3802	POLREF	4.0	37.6	84.0	2.1	7.8	11.0	
3803	POLREF	3.1	32.4	75.0	1.6	1.2	0.8	
3804	POLREF	8.3	31.5	80.0	7.3	1.9	7.0	
3805	POLREF	0.6	35.0	66.0	-3.2	4.3	-6.9	
3806	POLREF	0.6	35.9	56.0	-4.0	7.3	-13.0	
3807	POLREF	4.0	39.2	89.0	-0.4	9.3	18.7	
3808	POLREF	7.4	35.1	74.0	4.7	6.3	3.3	
3901	POLREF	3.7	33.3	53.0	0.3	1.5	-20.4	
3902	POLREF	5.3	35.4	87.0	3.2	3.2	11.2	
3903	POLREF	3.7	31.6	83.0	2.7	-0.9	5.7	
3904	POLREF	-2.5	36.5	106.0	-3.7	2.7	26.9	
3905	POLREF	-3.4	38.0	59.0	-7.9	5.4	-15.7	
3906	POLREF	5.6	34.9	42.0	0.4	3.6	-29.0	
4001	POLREF	-5.3	1.1	61.0	-6.4	-4.0	20.7	
4002	POLREF	7.7	4.2	42.0	7.7	0.2	2.6	
4003	POLREF	-0.6	12.6	38.0	-0.4	7.7	-3.6	
4004	POLREF	4.9	9.4	52.0	6.3	4.0	10.1	
4005	POLREF	2.2	8.5	49.0	4.6	1.0	3.5	
4007	POLREF	-3.1	12.1	52.0	0.9	6.2	7.9	
4101	POLREF	1.5	8.2	53.0	-0.8	-0.2	9.6	
4102	POLREF	-8.7	26.3	70.0	-9.9	19.1	27.6	
4104	POLREF	3.7	-1.3	72.0	3.5	-9.3	27.4	
4105	POLREF	3.1	14.1	54.0	2.2	4.8	7.9	
4106	POLREF	14.5	19.5	37.0	15.7	12.2	-6.9	
4107	POLREF	-2.8	12.8	72.0	-1.7	3.4	25.6	
4108	POLREF	1.9	11.9	57.0	4.2	3.2	9.8	
4109	POLREF	6.8	11.0	50.0	8.9	0.8	0.8	
4201	POLREF	3.1	7.7	38.0	0.2	-2.3	-7.2	
4202	POLREF	-2.5	9.8	61.0	-5.8	-1.3	14.8	
4203	POLREF	11.8	12.3	28.0	9.6	1.6	-18.3	
4204	POLREF	15.2	-2.7	79.0	12.6	-14.7	31.0	
4205	POLREF	-4.0	14.3	51.0	-5.2	3.2	2.6	
4206	POLREF	1.2	3.5	57.0	-0.3	-9.0	8.2	
4207	POLREF	-1.5	7.6	25.0	-2.0	-3.9	-24.2	
4208	POLREF	-2.5	11.5	48.0	-2.1	0.4	-0.6	
4209	POLREF	4.6	14.3	40.0	4.3	1.3	-10.9	
4210	POLREF	5.3	8.0	30.0	5.8	-5.0	-21.8	
4301	POLREF	-0.9	14.1	48.0	-5.3	0.2	-1.8	
4302	POLREF	0.3	9.3	65.0	-3.1	-3.8	16.2	
4303	POLREF	-5.9	3.1	71.0	-8.9	-11.4	20.6	
4304	POLREF	5.6	8.1	68.0	3.3	-5.7	17.0	
4305	POLREF	1.5	1.3	55.0	0.3	-14.1	1.4	
4306	POLREF	-0.9	12.6	55.0	-1.8	-1.7	2.3	
4401	POLREF	-9.3	12.8	55.0	-14.0	-2.2	3.9	
4402	POLREF	5.9	33.2	63.0	0.9	17.2	12.1	
4403	POLREF	0.6	50.8	49.0	-5.1	34.2	-2.9	*
4404	POLREF	-5.3	4.0	43.0	-9.7	-12.8	-9.6	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
4405	POLREF	-14.8	13.2	62.0	-18.9	-4.5	7.6	
4406	POLREF	-9.3	3.5	78.0	-12.5	-13.0	24.6	
4407	POLREF	0.0	6.3	72.0	-2.7	-9.6	18.8	
4408	POLREF	3.1	16.4	55.0	0.0	-1.5	-0.6	
4409	POLREF	1.5	11.5	40.0	-0.4	-5.2	-14.8	
4501	POLREF	19.5	20.3	70.0	13.2	0.5	14.7	
4502	POLREF	4.0	7.3	64.0	-1.7	-11.0	10.3	
4503	POLREF	-0.9	29.8	52.0	-5.6	10.7	-3.5	
4504	POLREF	-2.8	15.9	69.0	-6.7	-5.0	9.9	
4505	POLREF	1.2	15.0	67.0	-1.9	-4.3	9.3	
4506	POLREF	0.3	26.8	44.0	-2.3	5.7	-15.9	
4507	POLREF	2.8	16.3	44.0	0.7	-2.7	-13.6	
4601	POLREF	4.0	21.3	66.0	-2.1	-1.1	7.4	
4602	POLREF	13.6	19.3	5.0	8.0	-1.7	-52.8	
4603	POLREF	6.2	26.9	84.0	1.6	4.7	23.3	
4604	POLREF	-0.9	20.0	61.0	-5.5	-4.0	-1.6	
4606	POLREF	-18.9	26.4	57.0	-22.2	2.7	-5.5	
4701	POLREF	17.6	32.3	73.0	9.5	7.8	13.3	
4702	POLREF	10.2	33.4	56.0	2.1	7.4	-5.4	
4703	POLREF	7.1	25.4	73.0	-0.1	1.6	12.5	
4704	POLREF	5.9	28.1	59.0	-1.5	1.7	-3.9	
4705	POLREF	3.4	33.8	64.0	-2.9	9.3	2.7	
4706	POLREF	8.7	26.8	53.0	3.3	2.0	-9.7	
4707	POLREF	1.5	32.6	73.0	-4.9	6.1	8.9	
4708	POLREF	7.7	24.1	49.0	2.5	-2.1	-16.1	
4801	POLREF	1.2	30.2	54.0	-7.6	3.6	-8.0	
4802	POLREF	6.2	30.7	99.0	-2.3	2.2	34.3	
4803	POLREF	7.4	36.9	52.0	-0.2	9.2	-12.1	
4804	POLREF	12.7	26.8	61.0	5.4	-2.3	-4.9	
4805	POLREF	8.7	43.5	79.0	2.1	15.7	13.7	
4806	POLREF	-0.6	31.3	56.0	-7.0	1.5	-12.5	
4807	POLREF	43.6	20.0	57.0	38.0	-7.8	-10.2	*
4808	POLREF	2.8	30.8	55.0	-2.8	1.3	-13.6	
4901	POLREF	3.7	28.4	64.0	-4.9	-1.8	-2.5	
4902	POLREF	4.6	30.2	32.0	-3.0	-0.6	-36.3	
4903	POLREF	3.7	10.0	51.0	-3.3	-21.8	-18.7	
4904	POLREF	13.3	41.5	63.0	7.6	9.4	-9.0	
5101	POLREF	5.9	5.6	49.0	2.6	-1.3	8.0	
5102	POLREF	0.0	10.7	30.0	-2.3	4.5	-10.4	
5201	POLREF	-8.0	5.0	43.0	-15.0	-4.8	0.8	
5202	POLREF	19.2	14.0	26.0	13.3	5.3	-15.5	
5203	POLREF	9.0	5.1	42.0	3.7	-4.4	-0.2	
5204	POLREF	15.8	18.8	47.0	11.4	10.5	5.3	
5205	POLREF	12.4	12.2	47.0	8.7	3.0	4.2	
5206	POLREF	2.8	10.7	28.0	-1.6	0.1	-17.0	
5301	POLREF	9.3	14.5	36.0	0.8	2.5	-7.5	
5302	POLREF	8.0	1.1	43.0	0.9	-10.3	-0.4	
5303	POLREF	5.9	9.7	44.0	-1.3	-2.8	-0.2	
5304	POLREF	8.0	8.8	26.0	1.9	-2.4	-18.0	
5305	POLREF	2.8	13.0	43.0	-4.0	-0.2	-4.2	
5306	POLREF	-3.4	8.0	61.0	-8.3	-3.7	15.4	

Site id.	Network type	Direct comparsion EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	After 7-param. transf. EUREF-89 - PL-ETRF2000-XYZ dN [mm]	dE [mm]	dU [mm]	
5401	POLREF	0.9	16.0	38.0	-5.2	-0.4	-13.0	
5402	POLREF	4.9	8.9	38.0	-3.7	-4.6	-7.5	
5403	POLREF	-2.8	6.5	53.0	-10.8	-8.1	5.3	
5404	POLREF	11.4	24.5	62.0	4.0	10.6	14.9	
5405	POLREF	15.2	6.1	-145.0	7.7	-9.7	-194.3	*
5406	POLREF	5.6	11.9	47.0	-1.0	-3.2	-1.7	
5407	POLREF	4.9	15.2	63.0	-1.2	1.1	14.6	
5408	POLREF	5.9	5.3	62.0	0.1	-10.0	11.9	
5501	POLREF	12.1	19.0	41.0	4.4	2.0	-9.8	
5502	POLREF	10.5	17.4	55.0	2.4	-1.4	2.1	
5503	POLREF	7.4	15.8	52.0	0.4	-2.3	-0.4	
5601	POLREF	11.1	21.6	47.0	1.6	2.1	-4.8	
5602	POLREF	14.2	6.7	76.0	5.0	-14.0	22.6	
5603	POLREF	27.2	20.9	60.0	17.6	-1.1	4.6	
5604	POLREF	6.8	8.0	51.0	-1.3	-13.0	-3.7	
5605	POLREF	25.0	33.4	73.0	17.7	13.5	18.1	
5701	POLREF	3.4	29.7	58.0	-6.3	5.6	0.5	
5702	POLREF	20.4	13.6	55.0	11.5	-9.6	-1.5	
5703	POLREF	8.3	26.3	94.0	-0.8	1.2	34.3	
5801	POLREF	7.7	40.5	51.0	-3.5	13.2	-9.5	
5802	POLREF	8.3	44.8	58.0	-2.2	18.8	-1.3	
5803	POLREF	10.2	35.9	65.0	0.5	8.5	3.3	
5901	POLREF	0.6	40.5	68.0	-10.3	12.1	6.5	
5902	POLREF	-1.9	45.5	54.0	-11.9	17.0	-9.3	
5903	POLREF	5.3	42.8	41.0	-5.0	13.3	-23.1	
	RMS	10.5	24.9	72.2	7.5	8.3	24.0	

** points excluded from Helmert transformation. but not from RMS*

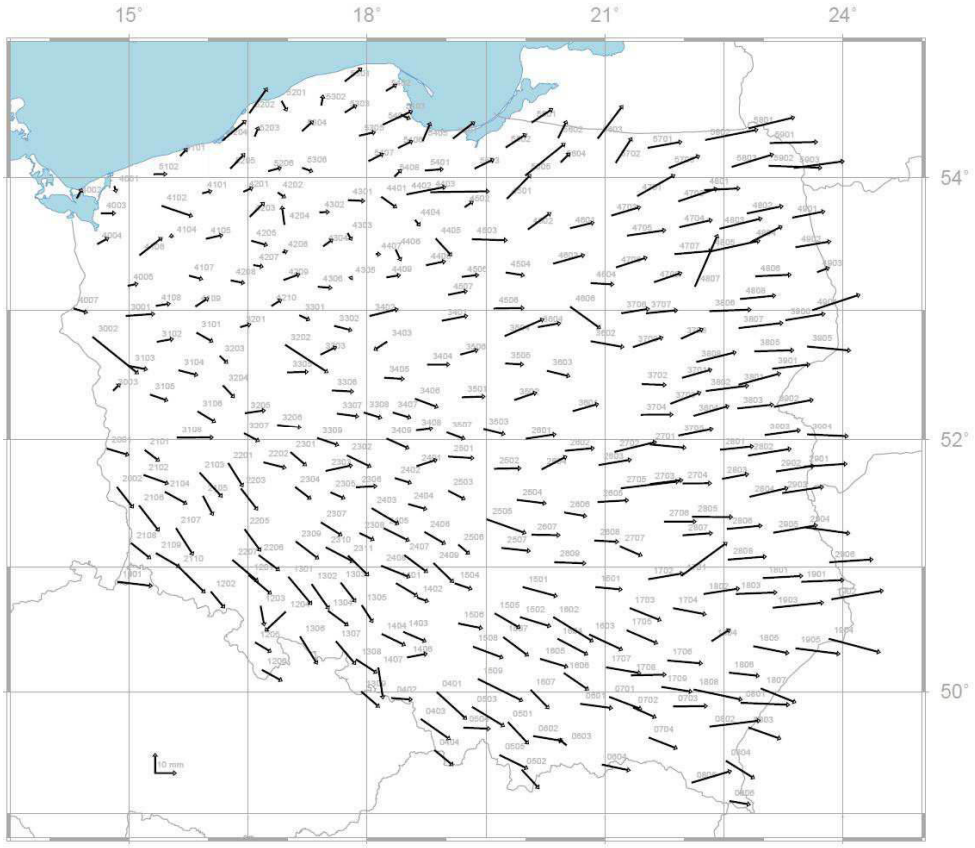


Fig 1. Direct horizontal differences between EUREF-89 and PL-ETRF2000

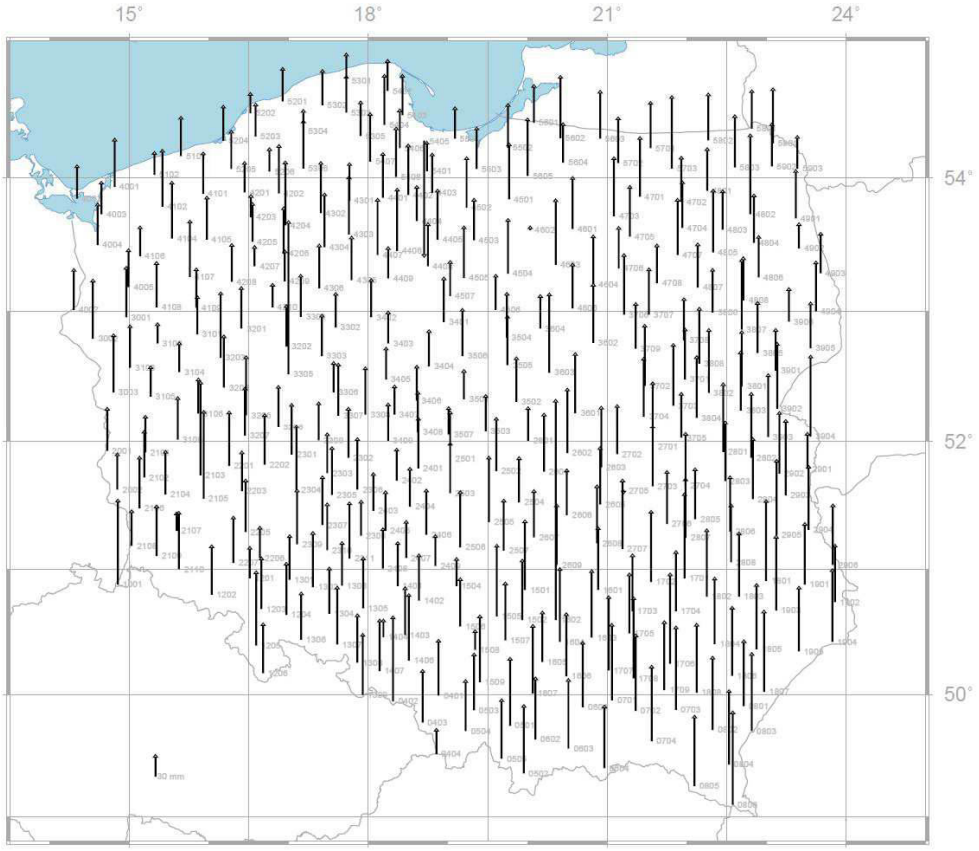


Fig 2. Direct vertical differences between EUREF-89 and PL-ETRF2000

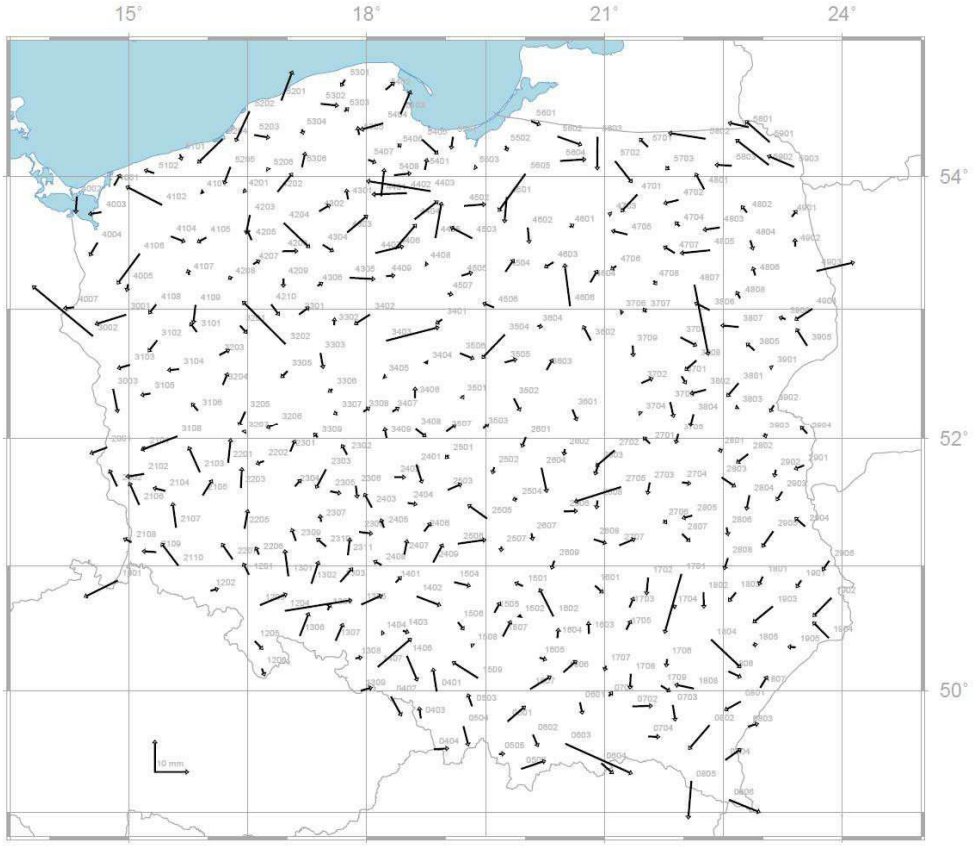


Fig 3. Horizontal differences between EUREF-89 and PL-ETRF2000 after Helmert transformation

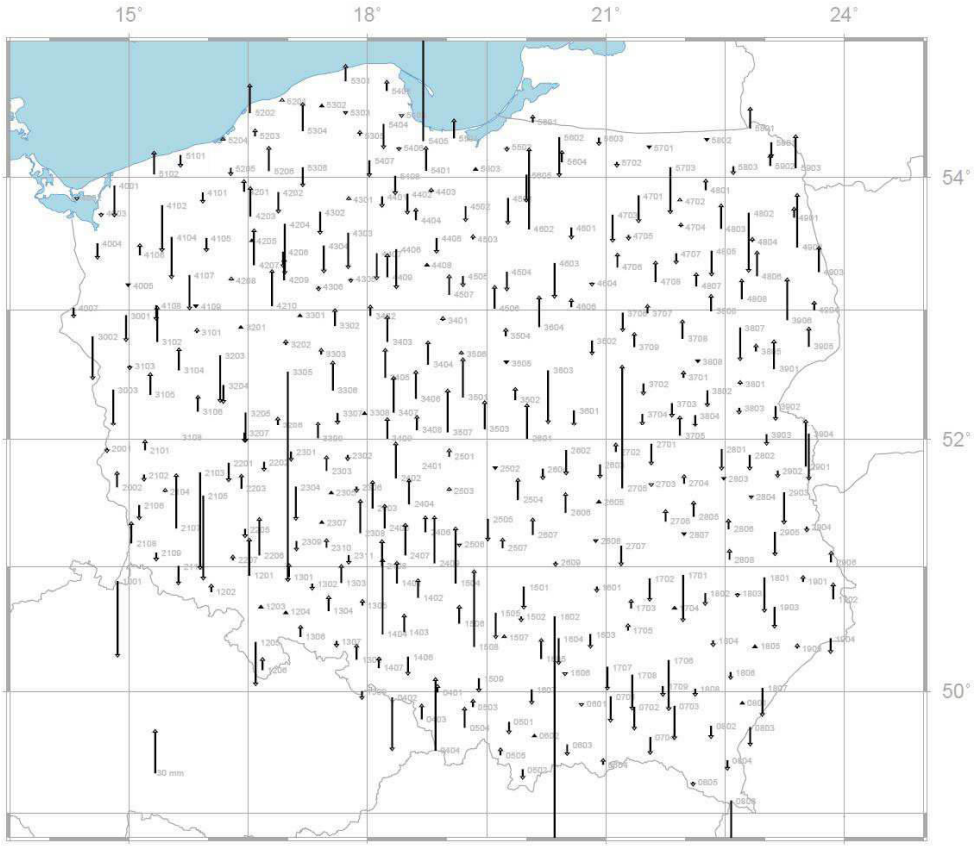


Fig 4. Vertical differences between EUREF-89 and PL-ETRF2000 after Helmert transformation

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