

ABSTRACT:

Since September 2017 MUT AC provides homogeneous GNSS products of over 450 Polish GNSS stations. This data are collected in the MUT GNSS Repository in the frame of the EPOS-PL project being part of the wider EPOS (European Plate Observing System) programme. The station list contains official extension of ETRS89 over Poland territory (ASG-EUPOS network) and also points belonging the commercial companies and other bodies. The total number of stations reached this year 491 (**Fig. 1**). The processing strategy used in our analysis corresponds to our strategy used in EPN Repro2 and routine MUT AC analysis. It is based on the Gamit/Globk v. 10.61 software (currently GPS only is used) and followed the EPN guidelines.

A NEW HOMOGENEOUS GNSS PRODUCTS PROVIDED BY MUT AC

SHORT TIME MONITORING

Our new RAPID solutions (previous were based on BSW) are available since GPS week 1976. The main purpose of it is to give a feedback to GNSS data providers about the quality of their data and stability of stations coordinates used for frame realisation or RT geodetic measurements (**Fig. 2**). Delay of the solution is about 19 hours and results from the waiting for used orbits (IGSR).

The GPS ambiguity resolution for WL is not below 95% and for NL not below 89% for all solutions. The mean values for last 4 weeks are respectively 98.0% and 91.4%.

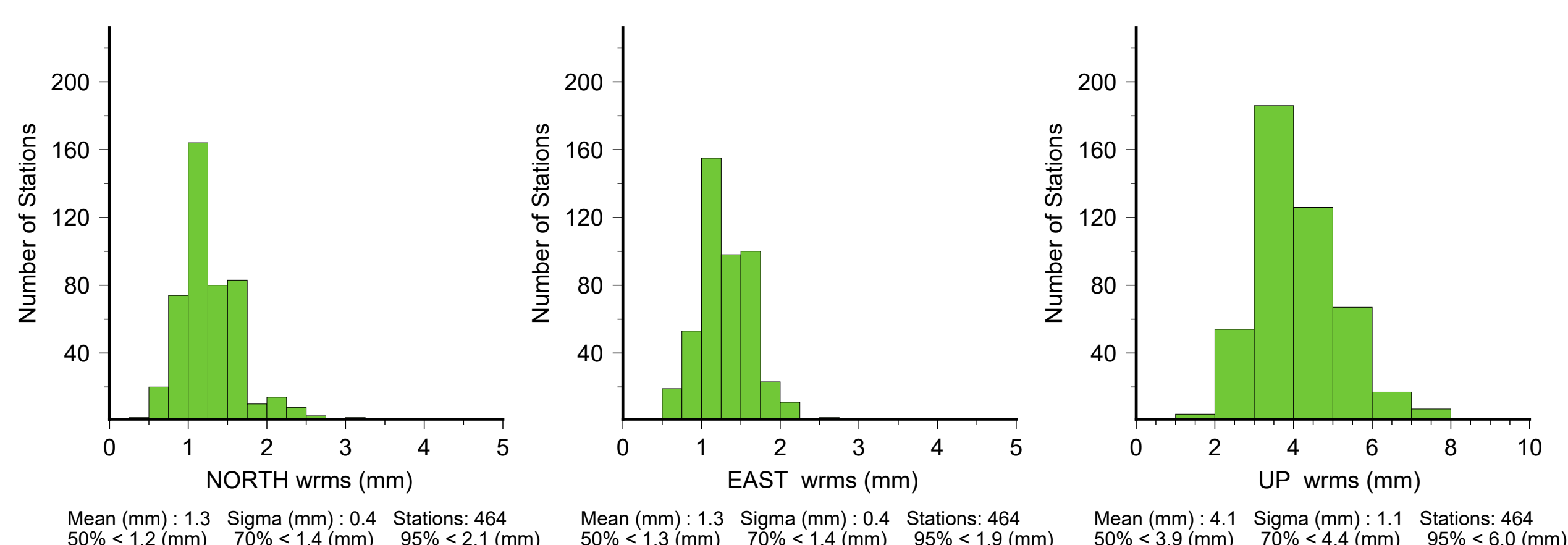
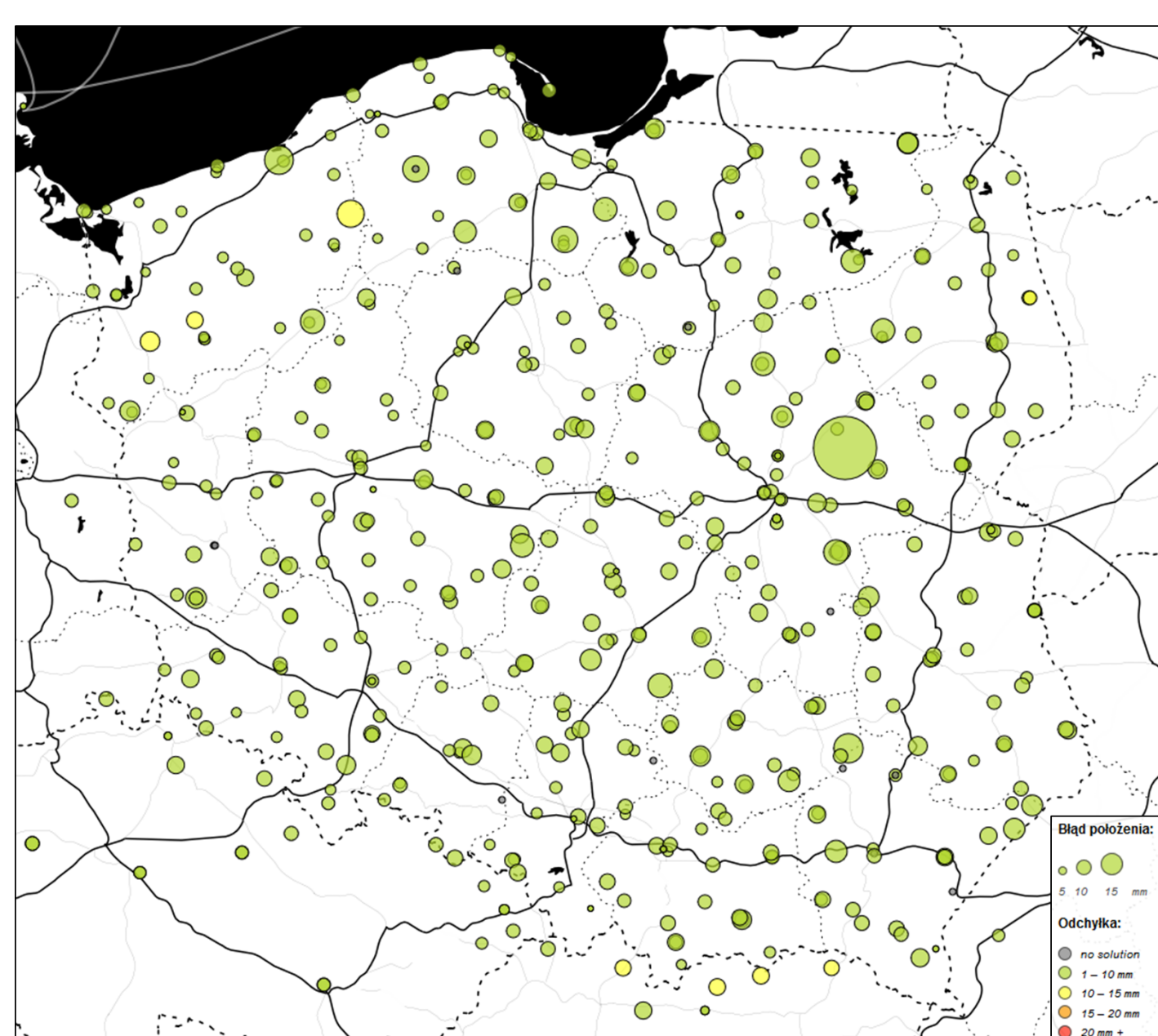


Fig. 3. Position repeatability (from 2018-03-20 to 2018-05-21) came from monitoring service (RAPID solution).

	Rapid	Final
Software	GAMIT 10.61	
GNSS	GPS	
Elevation mask	3°/5°	
Orbits	IGS14 (R)	IGS14 (F)
Antennas	igs14.atx + indiv.calib. (EPN, ASG)	
Troposphere	GPT2 + GMF	VMF1
Ionosphere	HOI (CORG)	HOI (CODG)
EOP	IER52010	
Tides	IER52010	
Loadings	FES2004	+ atmospheric (for trop.)
Reference	31 EPN Class A sites (IGS14)	

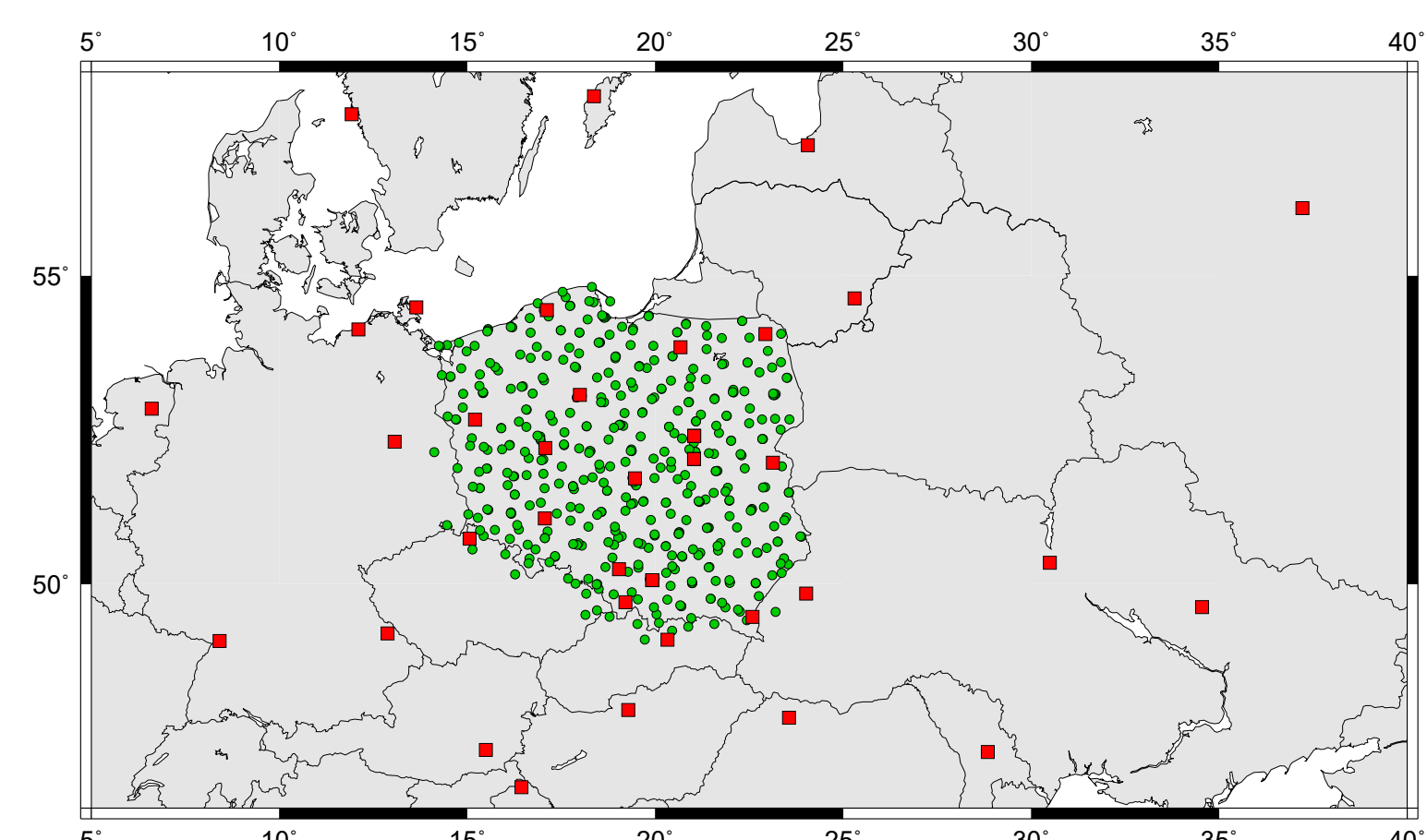


Fig. 1. Summary of the processing strategy (left). Stations included in the analysis (right). Red squares indicate EPN stations used for frame definition.

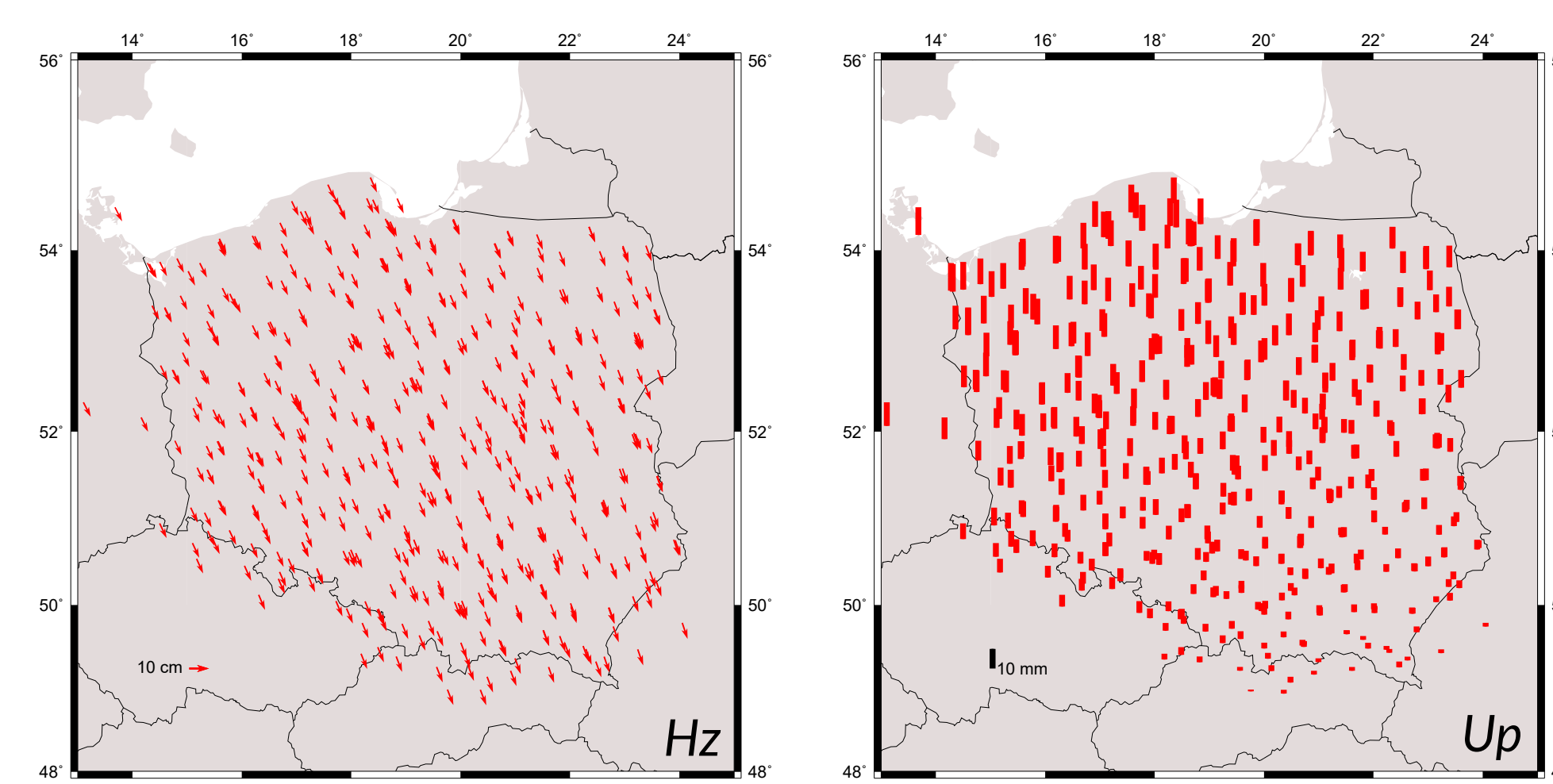


Fig. 4. Difference between ETRF2000 and ETRF2014 positions over Poland territory. Common epoch: 2018-03-17 (2018.20)

COMPARISON WITH EPN SOLUTIONS

Our routine FINAL solutions are available since GPS week 1990. We provide final coordinates expressed in ITRS and both ETRS realisations (differences can be seen on **Fig. 4**) (ETRF2000 is adopted in Poland). Reprocessing campaign covering period 2008-2017 is in progress. Each week we compare our solution to the appropriate EPN combined product to verify our results. In general, differences are small and repeatable. All presented here informations refer to GPS week 1992.

Mean differences between our solution and EPN are 0.9/0.9/3.2 mm (NEU). A small sistematic effect is visible, but it is on an admitted level of few millimeters (**Fig. 5**).

Fig. 5. Difference of ITRF2014 positions between MUTPL solution and EPN combined solution for GPS week 1992. Common epoch: 2018-03-17 (2018.20)

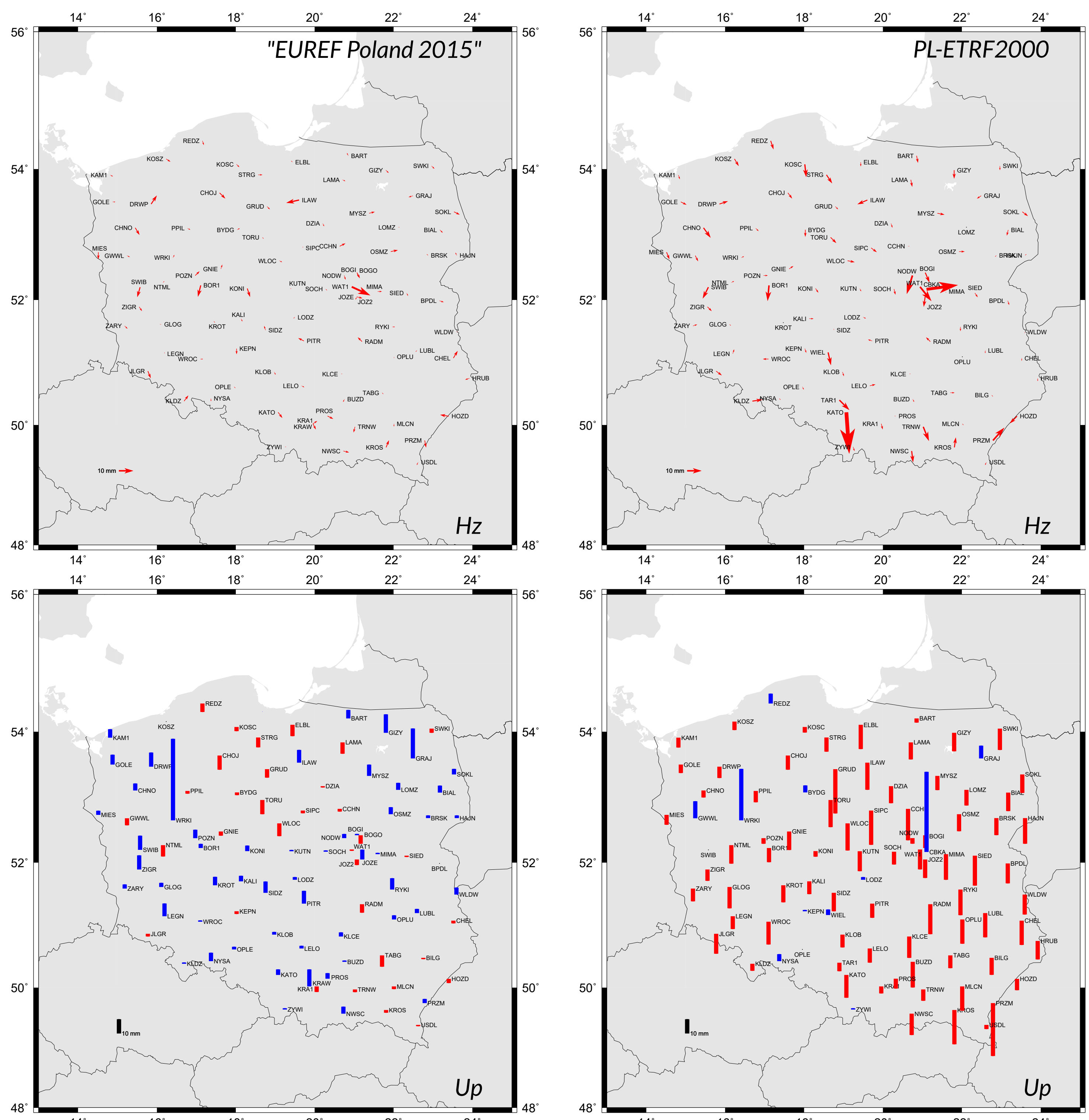
Fig. 6. (first column) Difference of ETRF2000 positions between MUTPL solution and "EUREF Poland 2015" campaign. Common epoch: 2018-03-17 (2018.20)

Fig. 7. (second column) Difference of ETRF2000 positions between MUTPL solution and official PL-ETRF2000. Expressed at different epoch !!!

COMPARISON WITH OTHER POLISH SOLUTIONS

Thanks to Tomasz Liwosz (WUT) we were able to compare our solutions with previous one (ASG-EUPOS only) aproved already by EUREF TWG. Both solutions are very consistent (**Fig. 6**), mean absolute differences are 2.0/1.9/4.8 mm (NEU). The biggest differences appear at stations that today are equipped with different hardware than was installed during previous campaign (e.g. WRKI or WAT1).

Last comparison (**Fig. 7**) was done with the official realisation of ETRS adopted in Poland by law. Since both solutions have no official velocities we compared them as they are. Horizontal components are quite consistent - absolute mean is 3.6/2.5 mm (NE). Much worse is for the Up component, where differences exceed 1 cm. Such differences came from not considering velocities (horizontal velocities in ETRF are about 0.6 mm/year, so this effect is much smaller and is not visible so clear on map).



Above map presents pure differences without any transformation.