

ECC and the EUROPEAN DENSE VELOCITY FIELD

AMBRUS KENYERES
EPN REFERENCE FRAME COORDINATOR

T HORVÁTH

**A CAPORALI - B DROSCAK - P FRANKE - B GARAYT - I GEORGIEV - M GIANNIOU -
D HANSEN - L HUISMAN - I JUMARE - J NAGL - P PIHLAK - G STANGL - M VALDES -
K SZAFRANEK - M FIGURSKI**

AND MANY MORE . . .

TARGET

Combination of national long term weekly SINEX solutions to realize homogeneous, dense European level position and velocity database

TARGET GROUPS AND PARTNERS

- IAG WG on Dense Velocity Fields
 - a subset is provided for the global velocity solution
- EPN WG on Velocity modeling
 - provides input velocity field data to support the improved realization of ETRS89
- EPOS
 - close cooperation with EPOS WG4
- Earth sciences (not only solid Earth ...)
- NMCAs

BENEFITS

USER / PROVIDER SIDE

- independent tests of the national SINEX solutions,
- cleaned and “internationalized” (site naming) SINEX back to the user for own purposes,
- **the combined solution is freed from occasional reference frame definition weaknesses,**
- **decreased network effect,**
- high quality ETRS89 positions to test the national realization,
- push forward the scientific analysis and use of the national GNSS production networks,

COMMUNITY SIDE

- creation of an “absolutely” homogeneous, dense ETRS89 velocity field
 - **TECTONIC INTERPRETATION**
- steps forward to the better realization of ETRS89,
 - **POSSIBLE EXTENSION OF ETRS89 OVER THE NON-STABLE PART OF EUROPE (EPN WG)**

THE APPROACH

- **COLLECTION AND PREPARATION OF NATIONAL LONG TERM WEEKLY / DAILY SINEX SOLUTIONS**
 - SINEX testing (constraints, quality, site naming)
 - SINEX CLEANING: outlier and offset detection, elimination
 - soln harmonization with EPN
- **COMBINATION WITH EPN WEEKLY SINEX**
 - EPN as reference
 - CATREF / MC approach
 - Handling of different software products (BERNESE, GAMIT)
 - **same reference network as for the EPN cumulative**
- **RESULTS / PRODUCTS**
 - cleaned national SINEX solutions,
 - position and velocity estimates in ITRFyy/IGSyy/ETRFyy,
 - time series plots
 - EPN densification will be a GLOBAL product

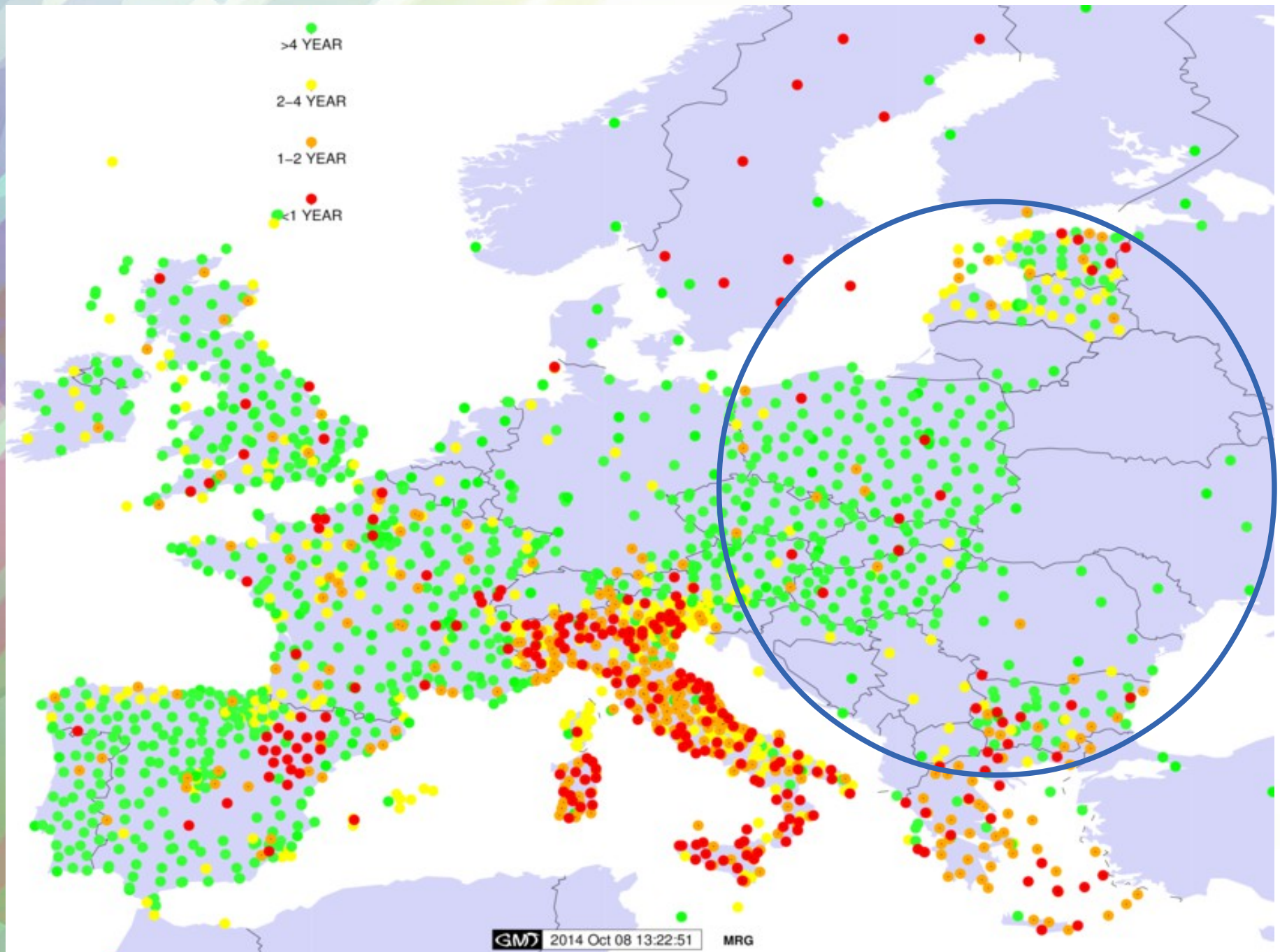
DATA AVAILABILITY - OCTOBER 2014

ASG	Poland	: 1482 - >1800	re-processed	
EST	Estonia	: 1448 - >1800		
GGI	Latvia	: 1461 - >1800		ECC
GKU	Slovakia	: 1408 - 1729	DrBrDr will explain ...	
CZE	Czech R	: 1565 - 1800		
SGO	Hungary	: 1200 - >1800	re-processed	
AMON	Austria	: 1356 - >1800		
MON	Middle East	: 1400 - >1800		
GRE	Greece	: 1721 - >1800		
HEPOS	Greece	: 1460- 1616	RAW data	
CEGRN	CE-Europe	: 1400 - >1800		G.Stangl
BUL	Bulgaria	: 1434 - 1800	daily GAMIT	
UPA	Italy	: 1623 - >1778		
IGN Spain	Spain/Portugal	: 1400 - 1770		
AGRS	The Netherlands	: 0782 >1800		
SGN	France (glo)	: 1200 - >1800	GLOBAL	
BIGF	UK (glo)	: 1200 - >1800	IGS08 - GLOBAL	
AGNES	Switzerland	: 0953 - >1800	IGS08 - cumulative	

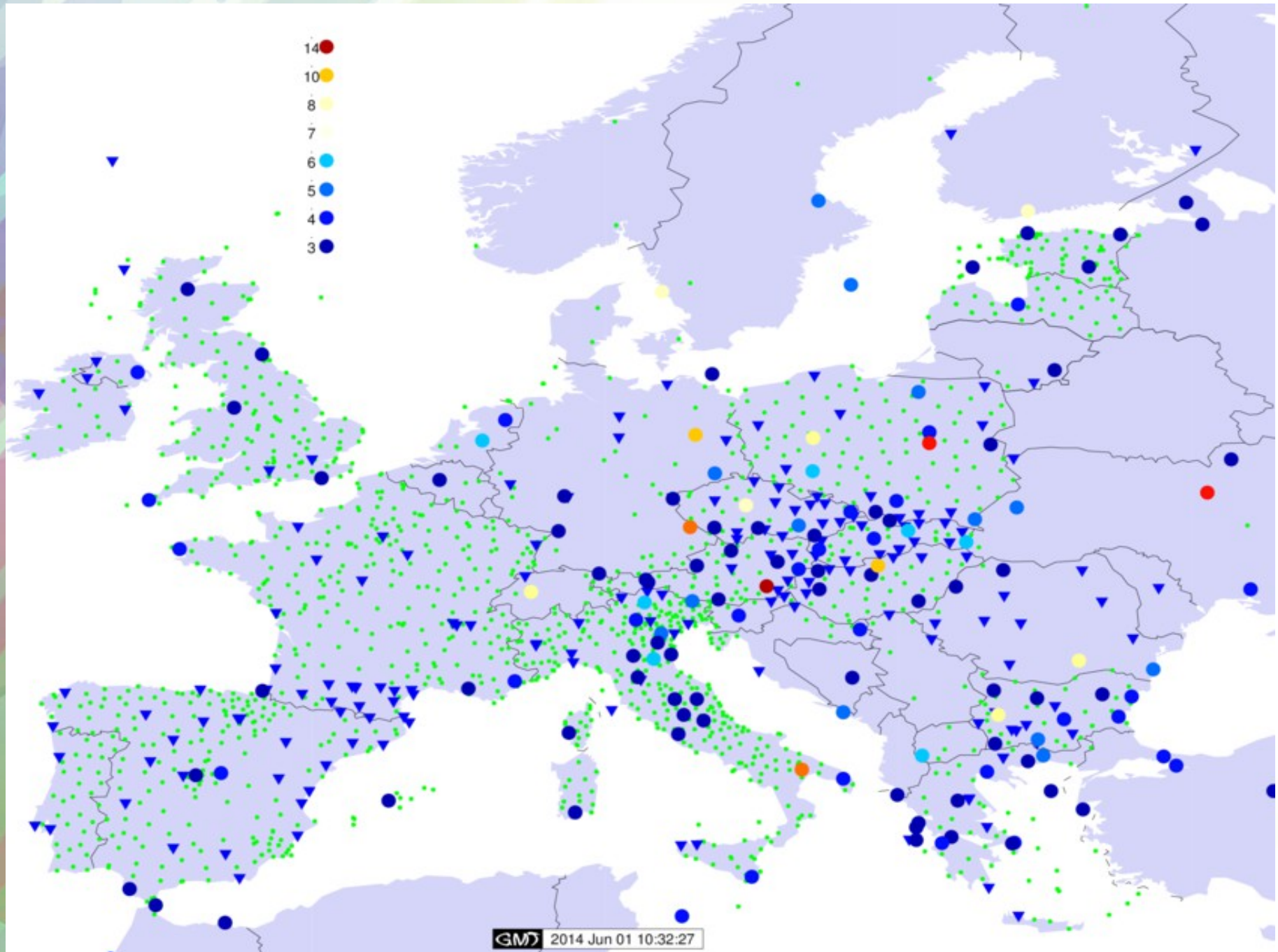
some STATISTICS, as of today

- 2750 sites and 3940 solutions* in the EDV solution SINEX
- ~80 4charID overlap
- 6500 weekly SINEX files (plus daily - w/o HEPOS)
- ~22 GB of SINEX data (... a full HD movie)
- data availability mostly since 2007 (after w1400)
- ~2000 single outliers/short outlier periods had to delete
stored in a meta-database
- runtime: well manageable with a multi-core compiler environment
- the latest combination is done in two clusters:
 - global (BIGF and SGN)
 - all other

LENGTH OF SINEX AVAILABILITY



OVERLAPPING SITES



ANALYSIS ISSUE: MIXED IGS05/08 ATX

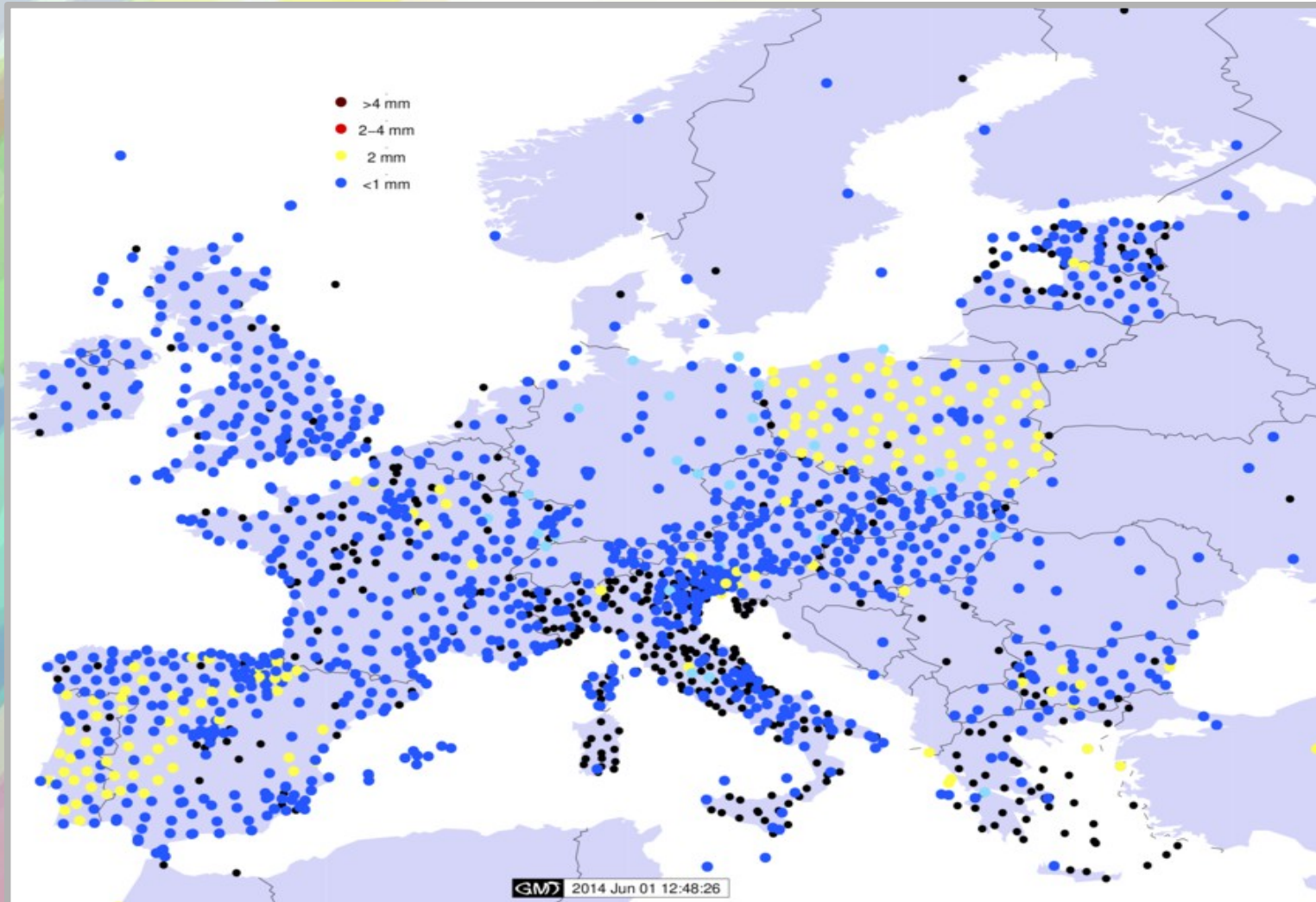
Analysis groups - except BIFG/UK, MUT/PL and SGO/HU - used IGS05 until GPSweek 1632, then changed to IGB08 at week 1709

→ position offsets may appear at GPSweek 1632 in the position time series

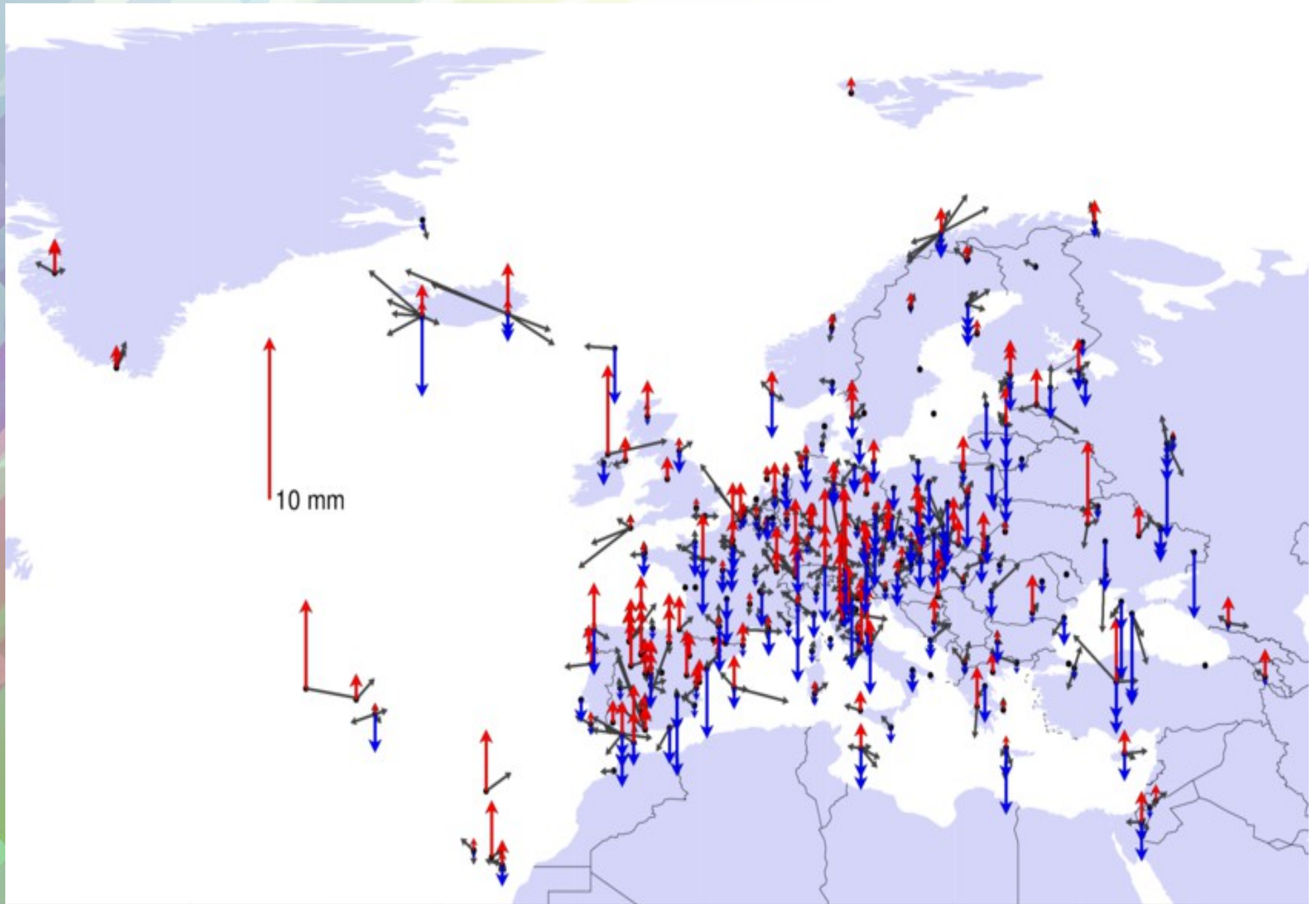
**NORTH COMPONENT
CORRECTION
ESTIMATES FROM
THE IGS TOOL**



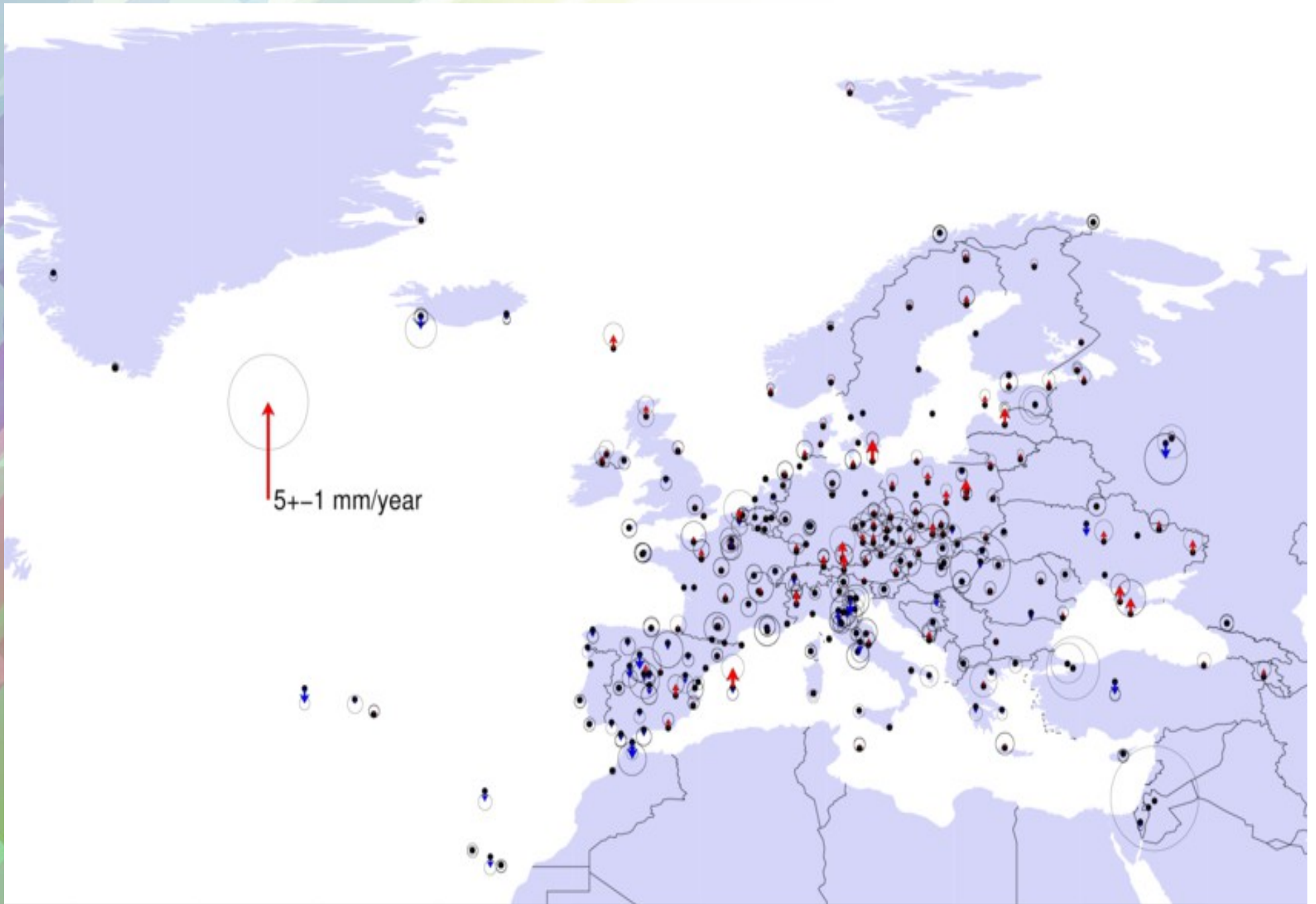
**POLAND HAD BEEN
REPROCESSED
&
OFFSET ESTIMATES
HAD BEEN ADDED
TO THE SPANISH
SOLUTION**



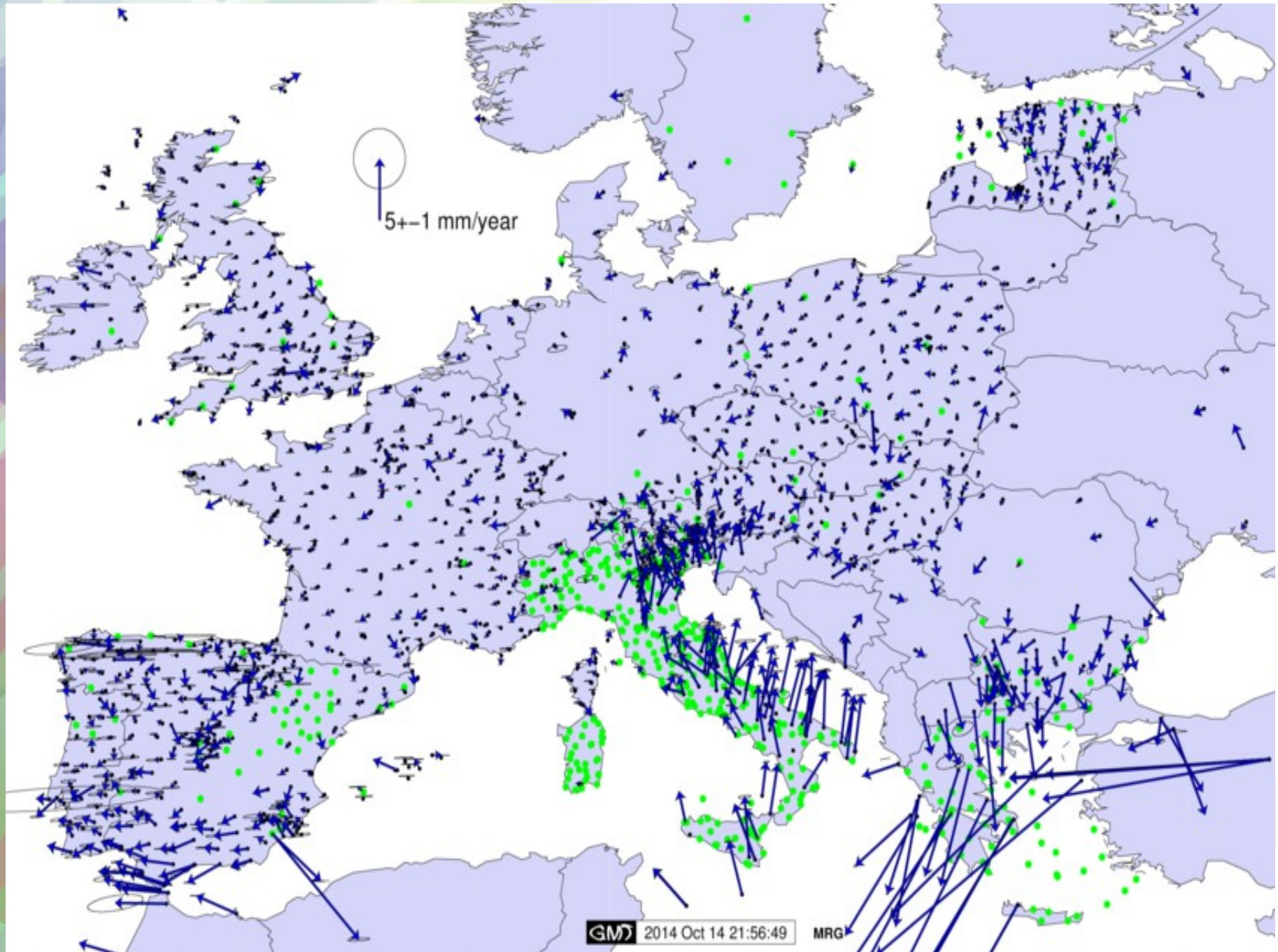
COMPARISON WITH OFFICIAL EPN - CRD



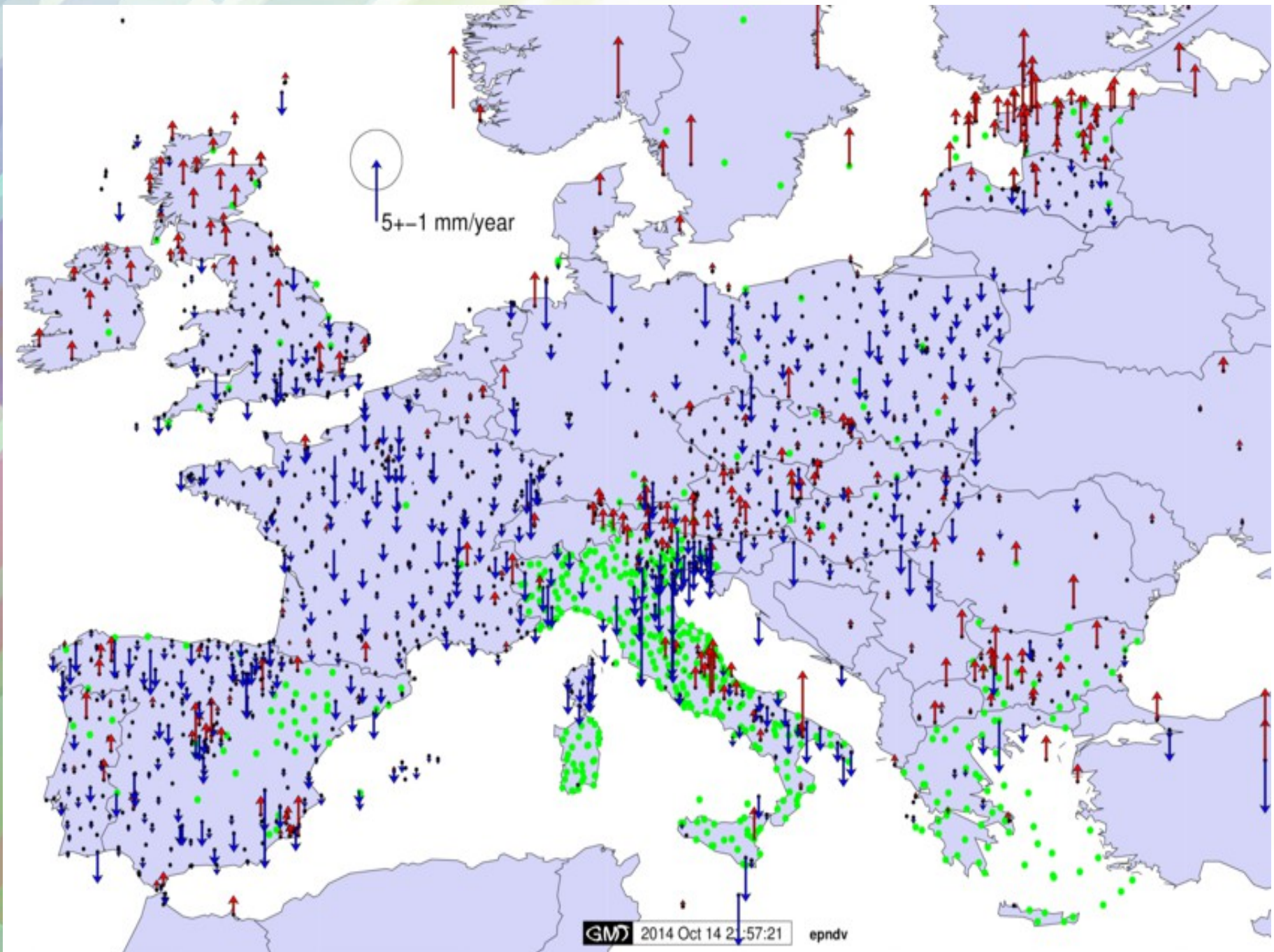
COMPARISON WITH OFFICIAL EPN - VEL



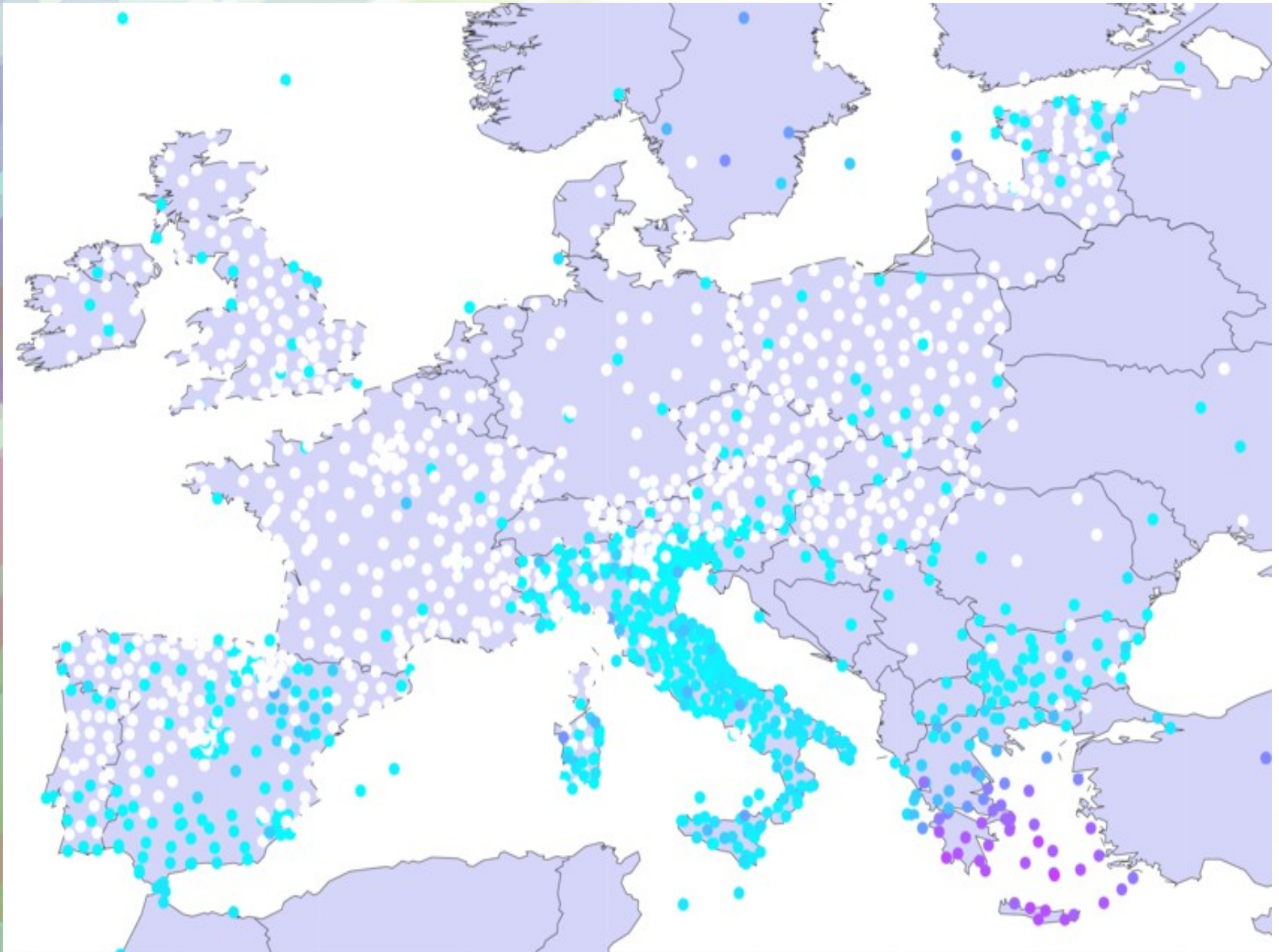
ETRF2000 2D VELOCITIES $L > 3$ years



UP VELOCITIES



STABLE PART OF EUROPE (1 mm/y level)



FUTURE PLANS for ECC and EDV

- **FILLING IN THE WHITE SPOTS (Balkan, Fennoscandia)**
- **EPN DENSIFICATION WILL BE GLOBAL → ← EPN not (yet)**
- **WEBSITE UNDER PREPARATION (EPNCB)**
 - metadata (log files, station related information)
 - ACs contributing to the work will be visible
 - results
- **WORKING GROUP BEING FORMED**
- **MULTIDISCIPLINARY USE OF THE PRODUCTS**
- **FIRST PUBLICATION: BEFORE EGU2015**
- **RESULTS RELEASED TO THE EPN WG ON DEFORMATION MODELING**