The CEGRN 2011 Campaign and the densification of ETRF2000 in Central Europe

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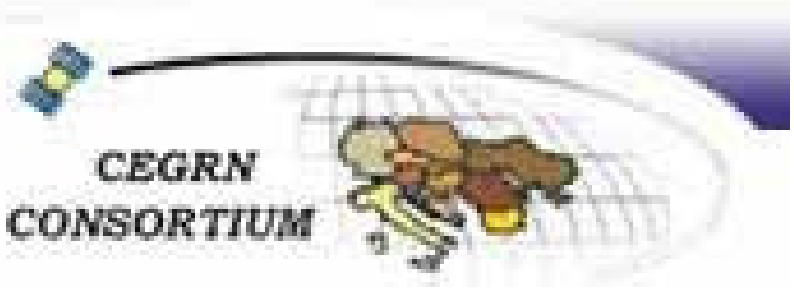


EUREF Symposium 2012

Outline

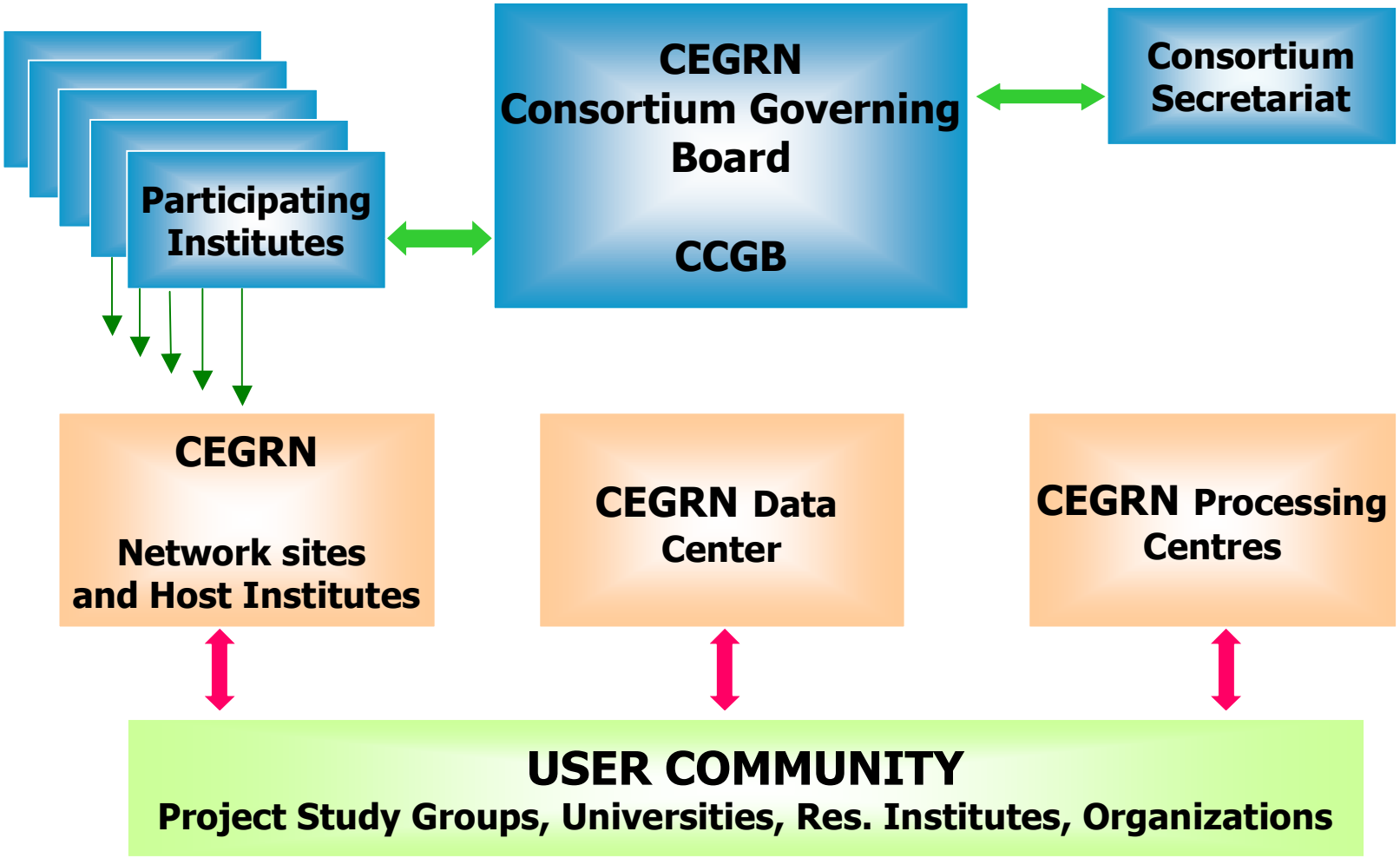
- Main Objectives
- Structure
- Data Flow
- Network
- Data base and Campaigns
- CEGRN vs. IGS and EPN
- Tectonic setting
- Results
- Conclusions and outlook

Main Objectives

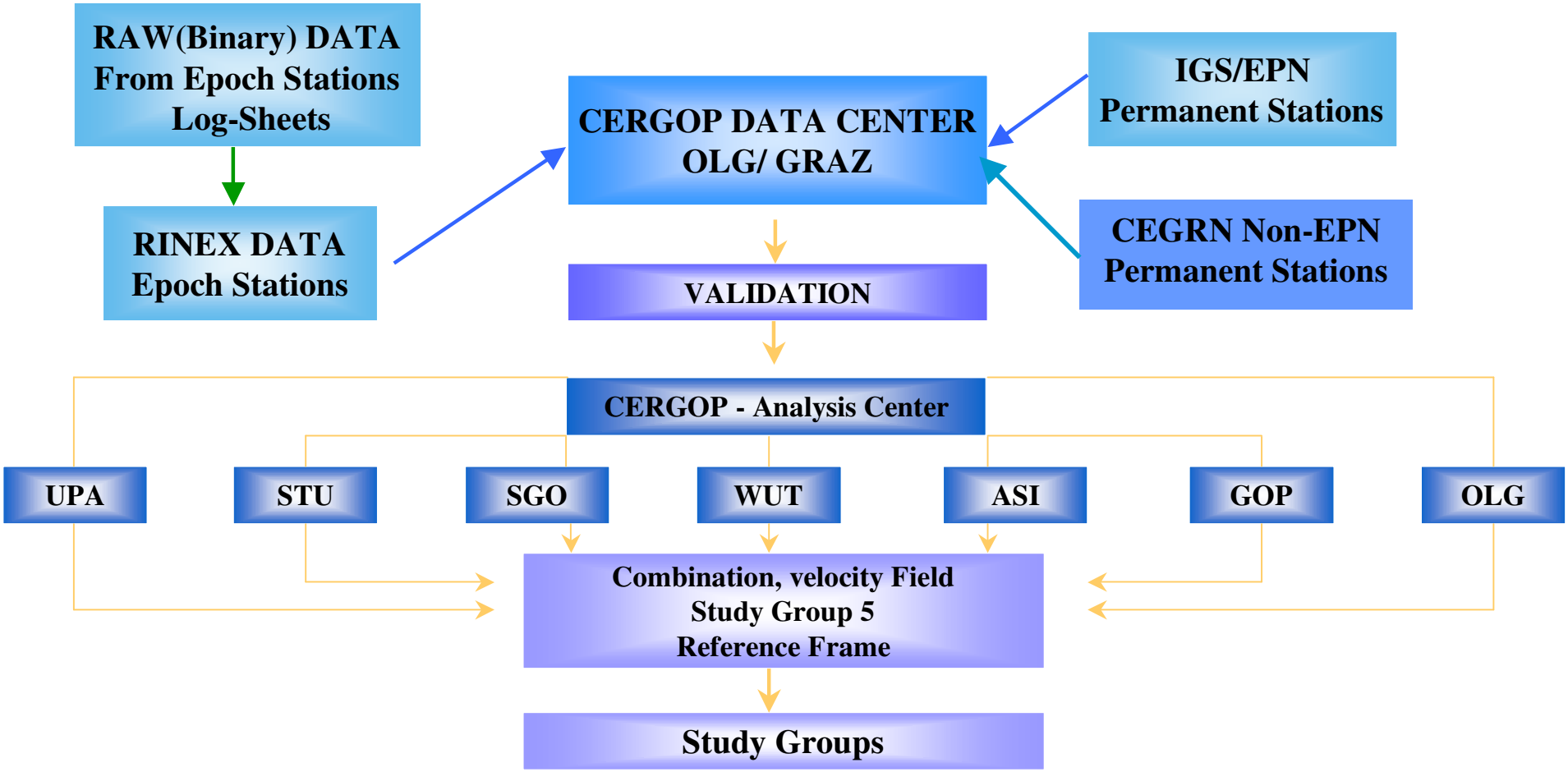
Modelling of regional intra-plate 3D velocity field at millimetre level

- Combination of solutions of individual analysis centres
- Combination of repeated epoch networks, coordinate and velocity estimates
- Evaluation of accuracy and reliability of obtained information
- Velocity maps, regular grid velocities, deformations, geo-kinematical interpretations
- Evaluation of statistical significance of derived quantities
- Visualisation of products, geo-kinematical maps
- Strain analysis and detection of velocity changes for dynamical investigations and special study areas with national or regional densification networks

CEGRN Structure



CEGRN Data Flow



CEGRN – General+Network

International: CEI (Central European Initiative)

11 Countries:

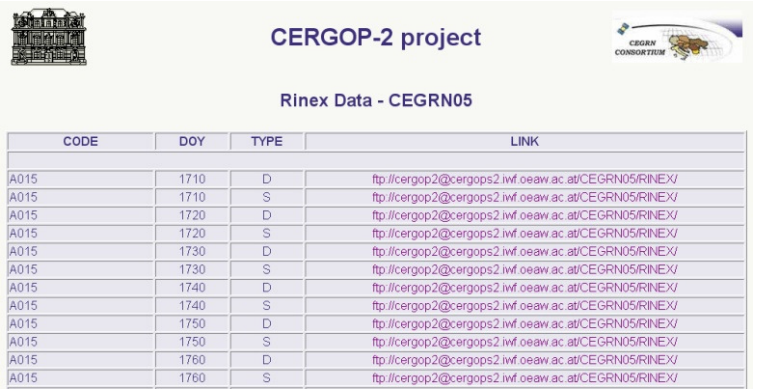
Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia, Ukraine.

CEGRN 2011: CEI Countries + 3 Countries :

Bosnia Herzegovina, Rumania, Serbia.

The CERGOP2 database

- **CEGRN campaign information (maps, equipment, observed stations),**
- **ftp access to observations**
- **Epoch solutions of the campaigns (SINEX)**
- **daily and hourly RINEX files of the non-EPN permanent stations**
- **links to work packages and the CEGRN Consortium**
- **Public and Project area**



CERGOP-2 project

Rinex Data - CEGRN05

CODE	DOY	TYPE	LINK
A015	1710	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN05/RINEX/
A015	1710	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN05/RINEX/
A015	1720	D	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN05/RINEX/
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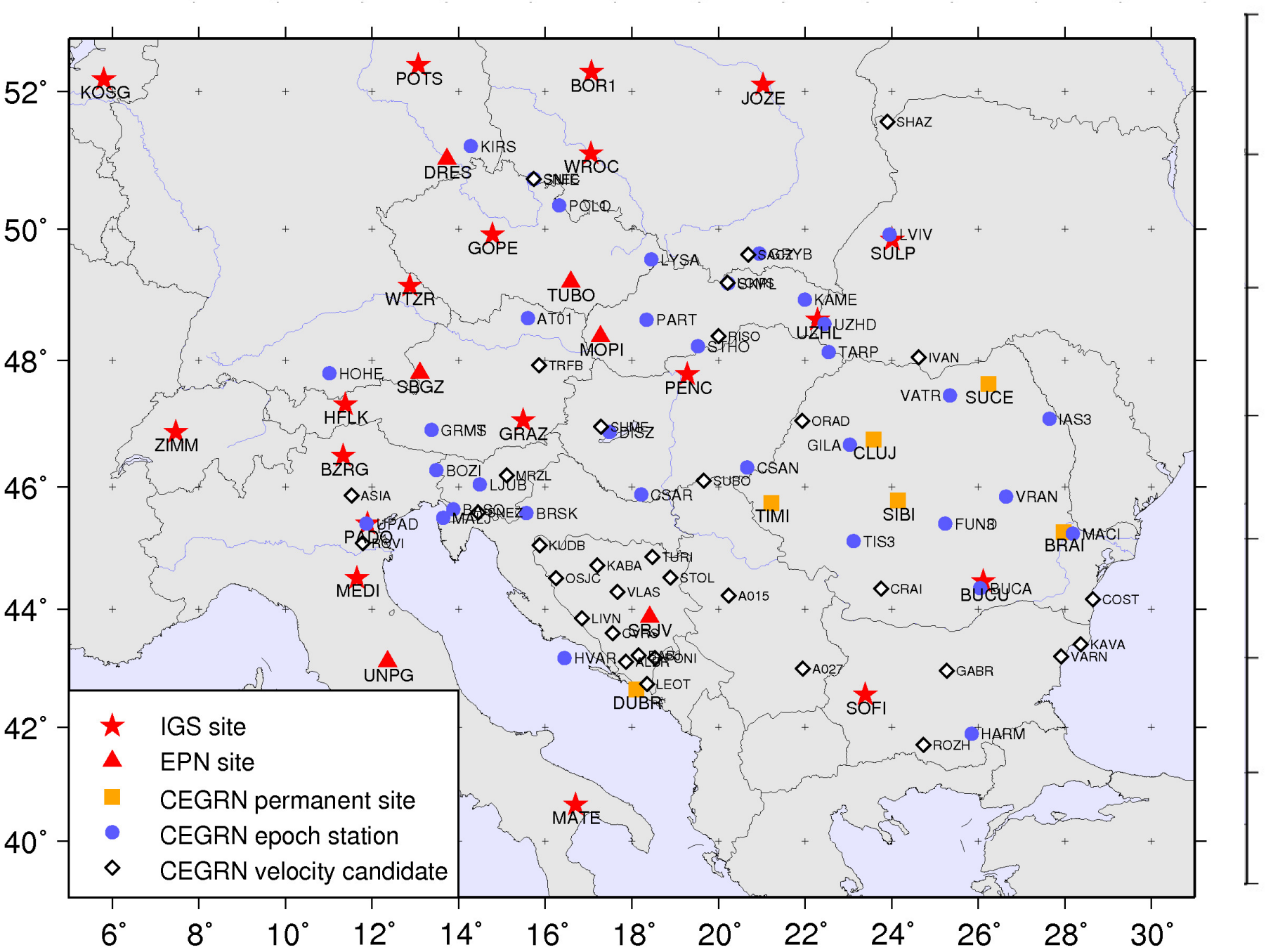
A015	1760	S	ftp://cergop2@cergops2.iwf.oeaw.ac.at/CEGRN05/RINEX/

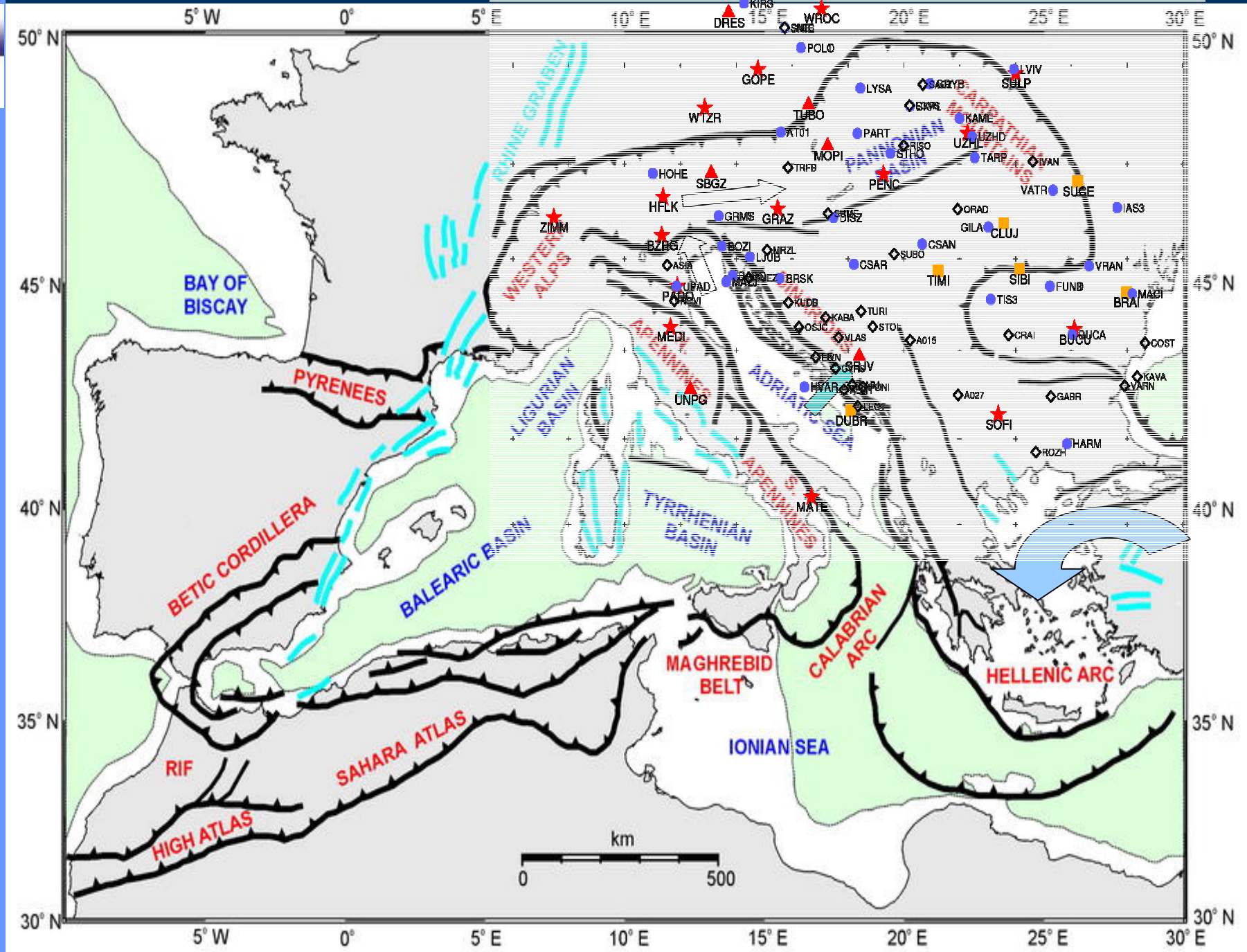
CEGRN Campaigns

Campaigns	Period	Country	Sites
CEGRN'94	2-6 May 1994	10	30
CEGRN'95	29 May-3 June 1995	11	36+5
CEGRN'96	10-15 June 1996	11	35+6
CEGRN'97	4-10 June 1997	12	35+10
CEGRN'99	14-19 June 1999	13 (extended network)	57 (19P+38E)
CEGRN'01	18-23 June 2001	13 (extended network)	51 (28P+23E)
CEGRN'03	16-21 June 2003	13 (extended network)	51 (28P+23E)
CEGRN'05	20-25 June 2005	14 (extended network)	94
CEGRN'06	12-18 June 2006	Only CGPS	44P
CEGRN'07	18-23 June 2007	14 (extended network)	
CEGRN'09	22-27 June 2009	14 (extended network)	85
CEGRN'11	20-26 June 2011	14 (extended network)	74

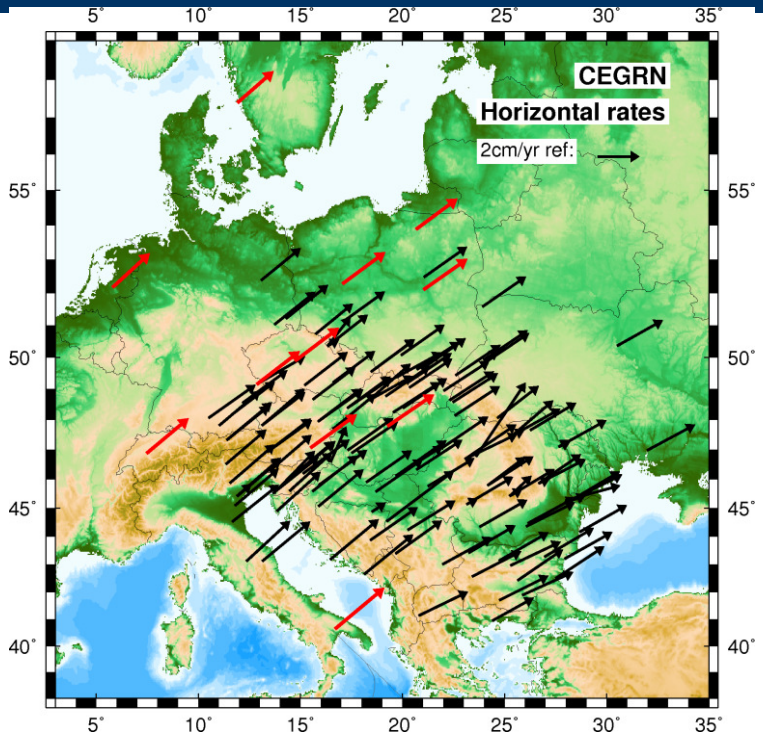
CERGOP-2 Network fits into IGS + EPN

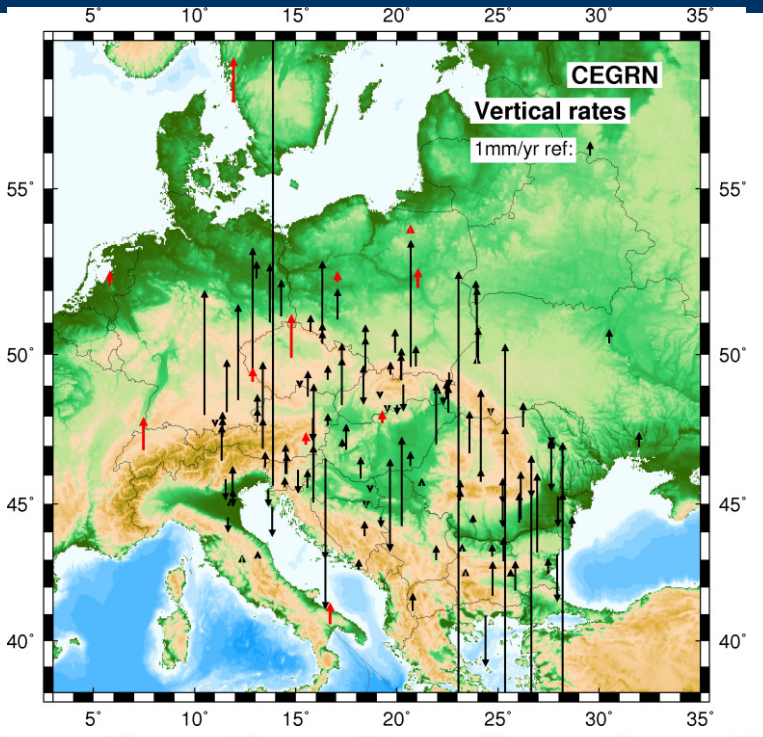


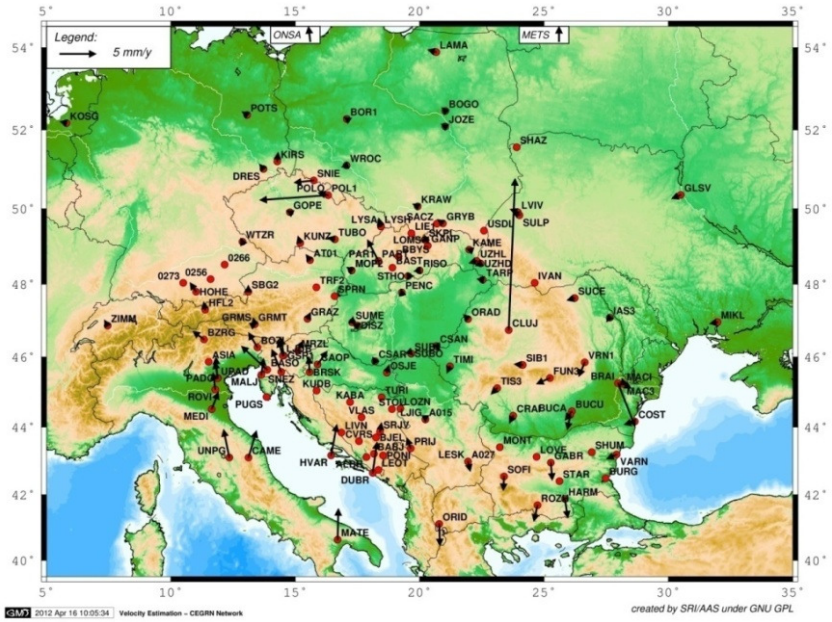
Tectonic setting

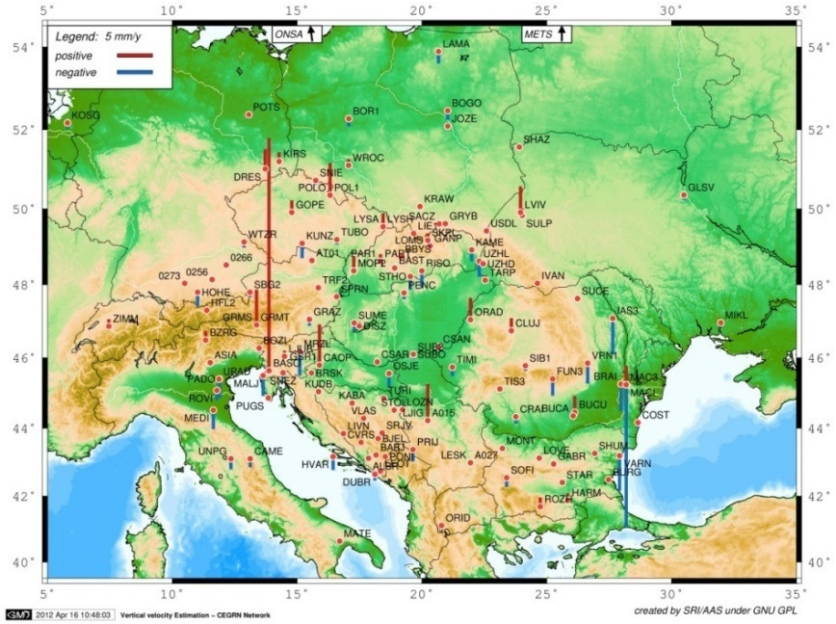


2011 results (ITRF2008 and ETRF2000)



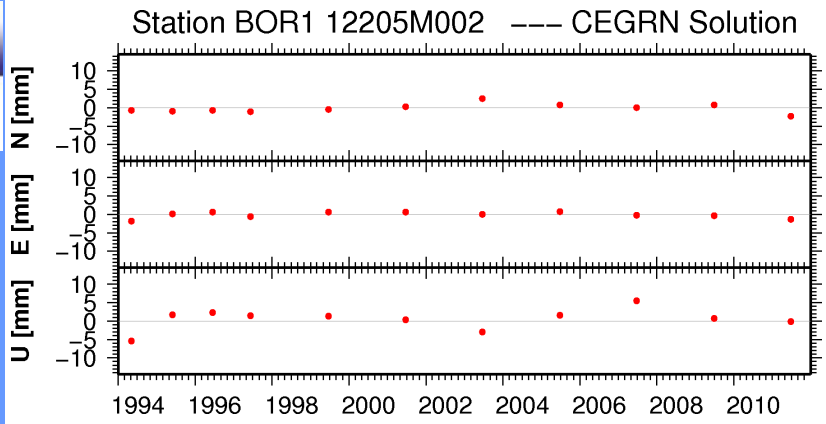


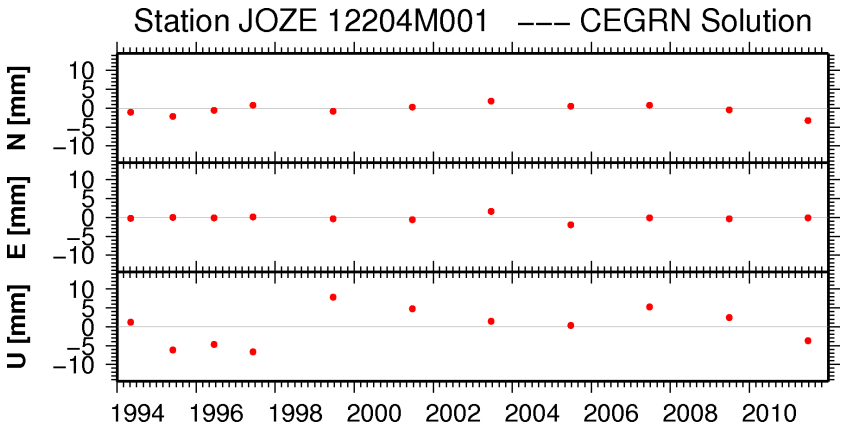


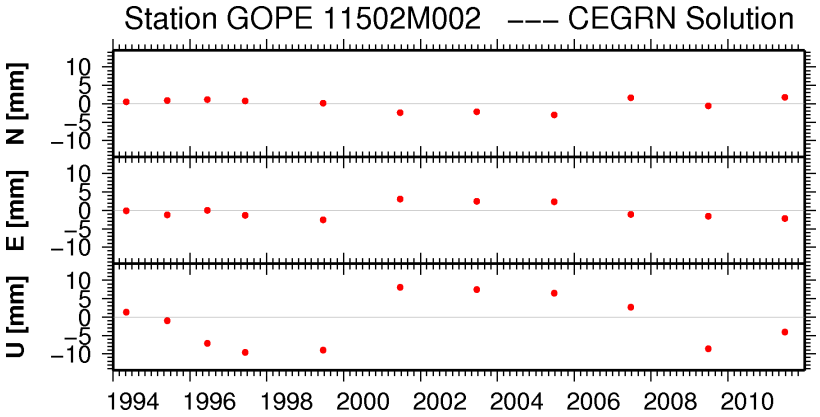


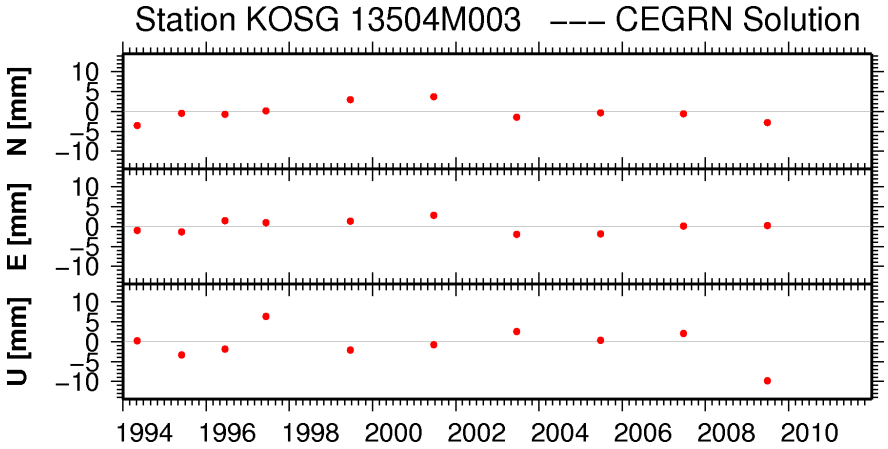
Horizontal

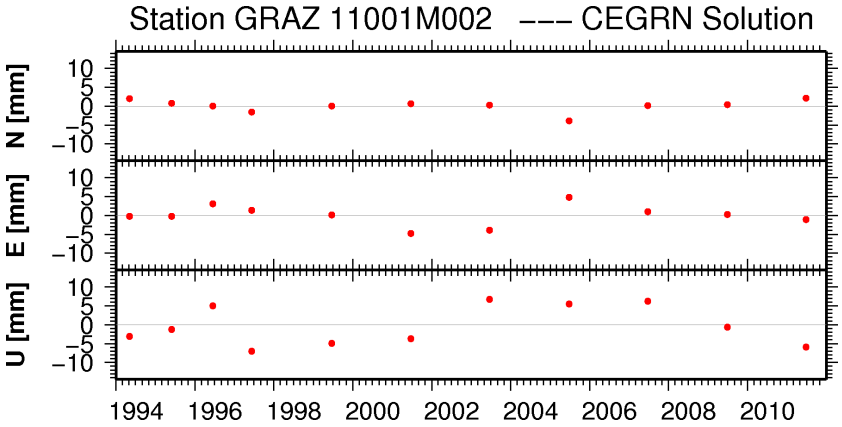
Time series of Minimum Constraint stations (1/2)
(Translation in position and velocity)

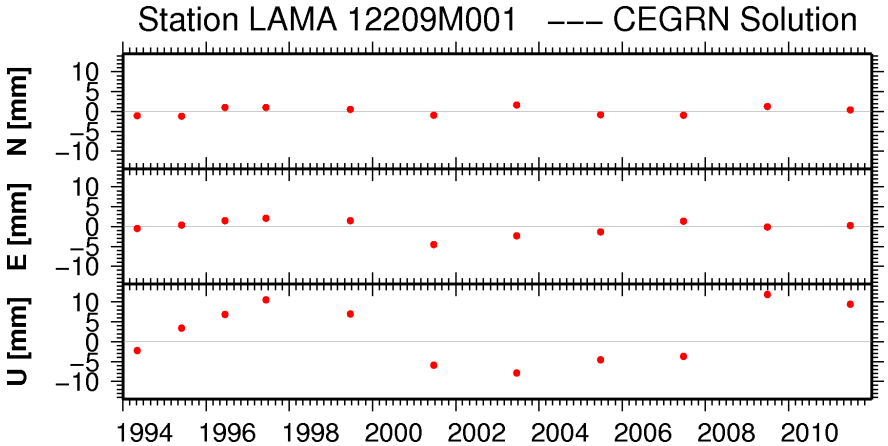




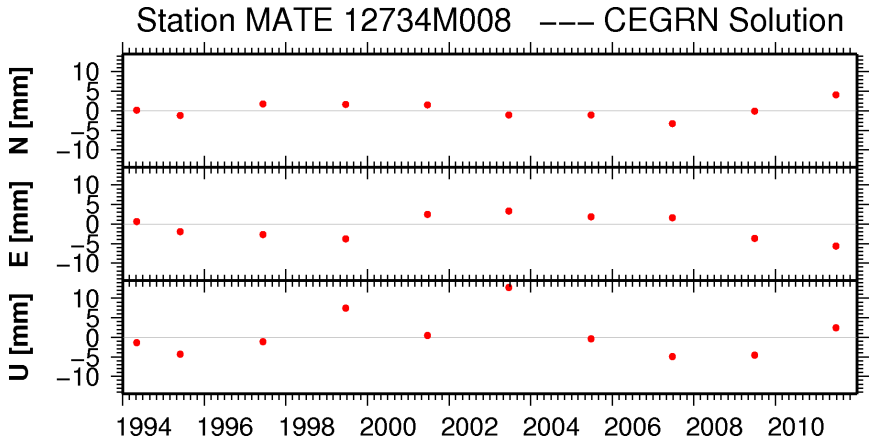


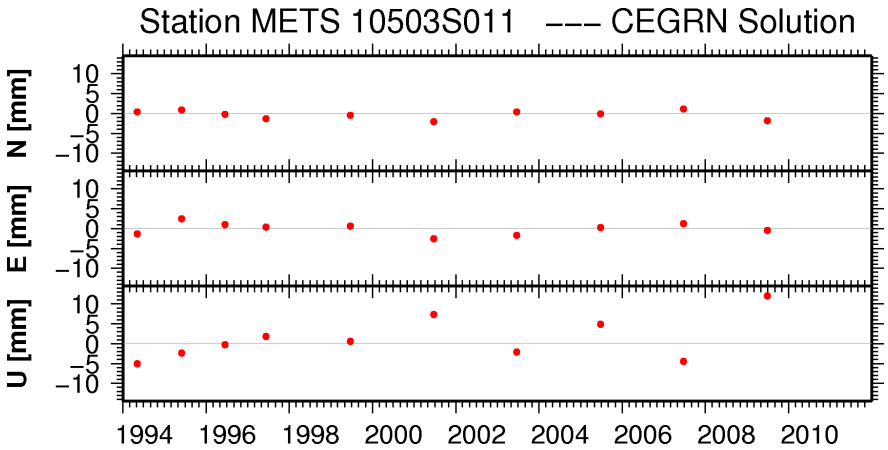


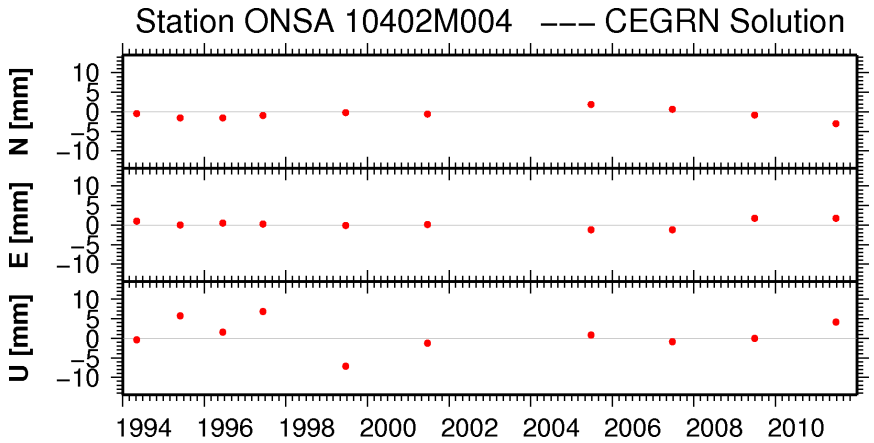


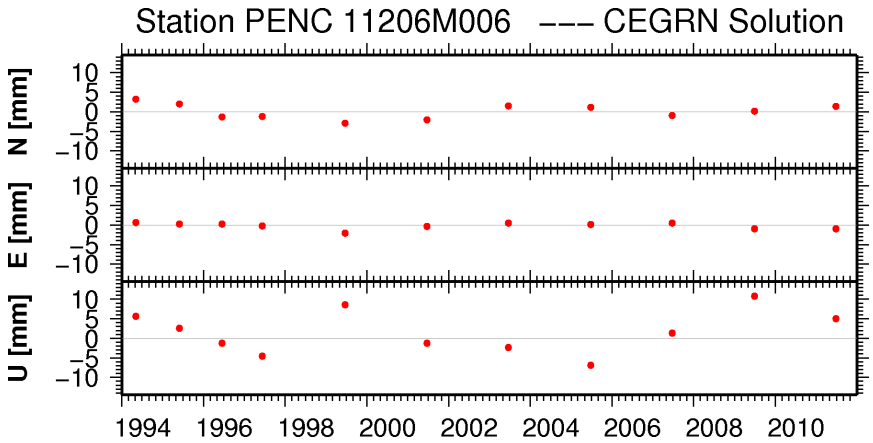


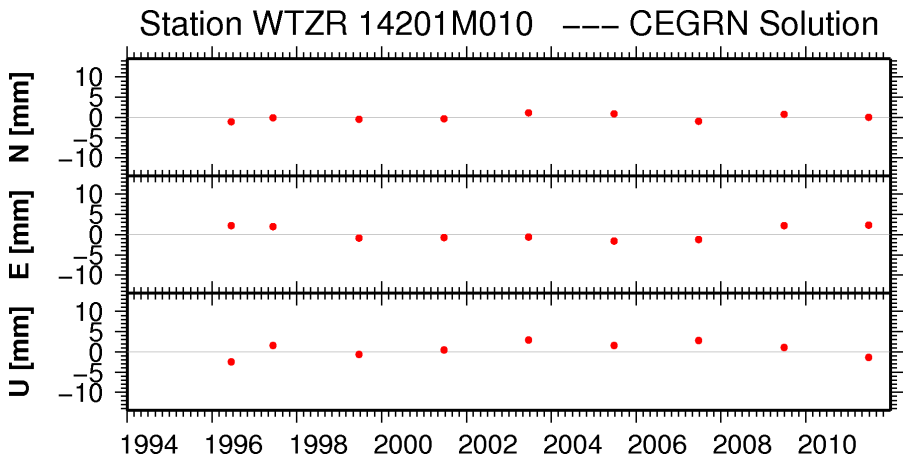
Time Series of MC Stations (2/2)

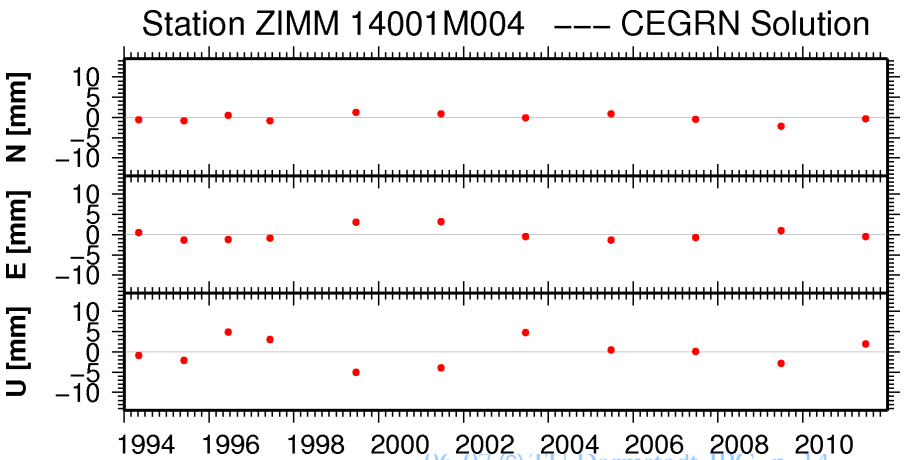












New Challanges

- The new challanges of CEGRN focus on Science and Applications
  - Science:
    - support the IAG project on Dense Velocity Fields by providing Epoch Sinex files resulting from state-of-the-art processing standards (IGS-EPN guidelines); EUREF WG on Geokinematics
    - Geokinematical interpretation of the velocity field (TopoEurope project, Wegener) and characterization of areas subject to the largest deformation (Balkans, Dinarids, Vrancea, Eastern Alps)
  - Applications (direct relation to FP7/FP8 Calls)
    - INSPIRE: the CEGRN network can serve as geospatial infrastructure for harmonization of geodetic standards across Europe
    - NEREUS (Network of European Regions Using Space Technologies): has one WG on GNSS and one on GMES; powerful lobby in Brussels
    - EUPOS: requires stations with high qualification and trained personnel
    - Emerging networks: ALBPOS…

Summary and Outlook

- Unique Reference frame – blend of Permanent and Epoch stations
- (Intra-) Plate velocities at the < 0.5 mm/yr level
- Re-Processing with ITRF2008 and Absolute Antenna Phase Centers
- Present tectonics in Central and SE Europe:
  crustal motion, deformation, strain accumulation
  - CEGRN is planning continuation in new frames / projects:
    - GNSS + Seismology
    - GMES – Environment and Security
  - Potential cooperation :
    - Densification of ITRF20xx + Dense Velocity Field in Europe
    - Topoeurope, Geohazard
    - INSPIRE, NEREUS FP7/8
    - EUPOS
    - WEGENER GEODAC – Database