Time Series SP: upgrades and contribution to the European Velocity project

AMBRUS KENYERES

FOMI Satellite Geodetic Observatory

Hungary

A REMAINDER:
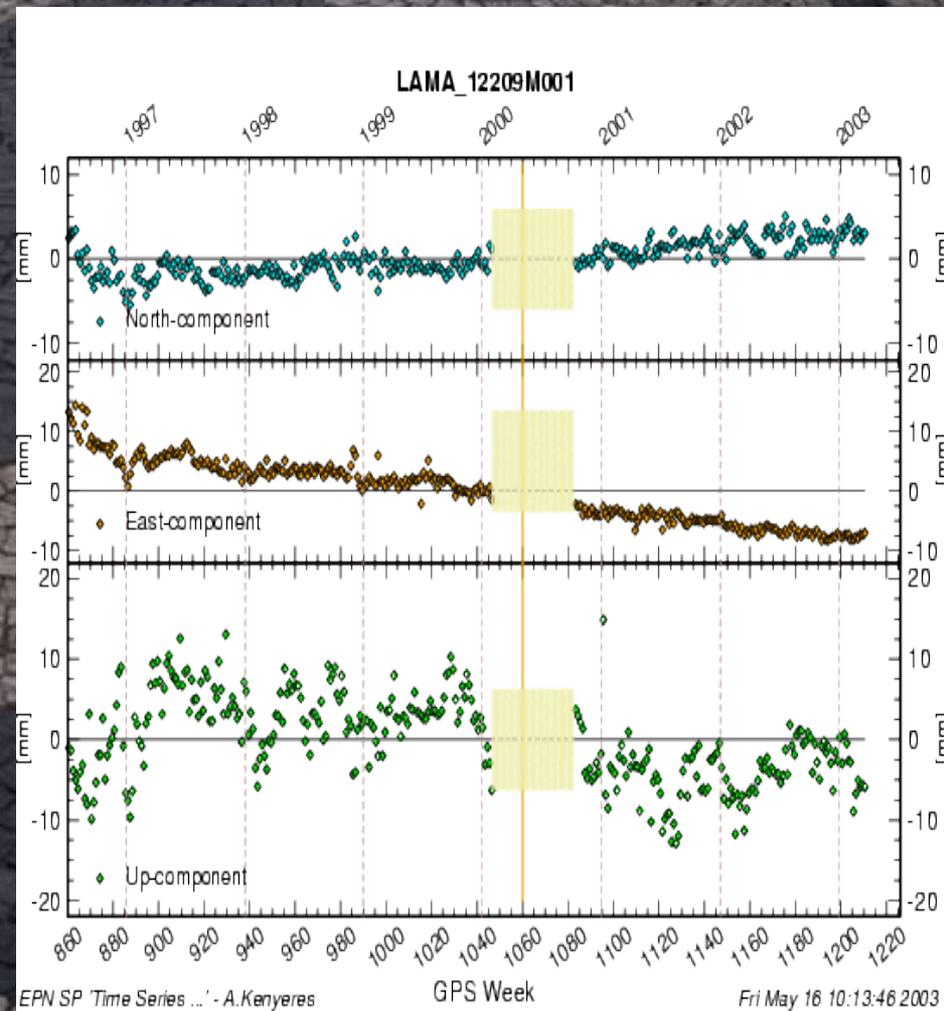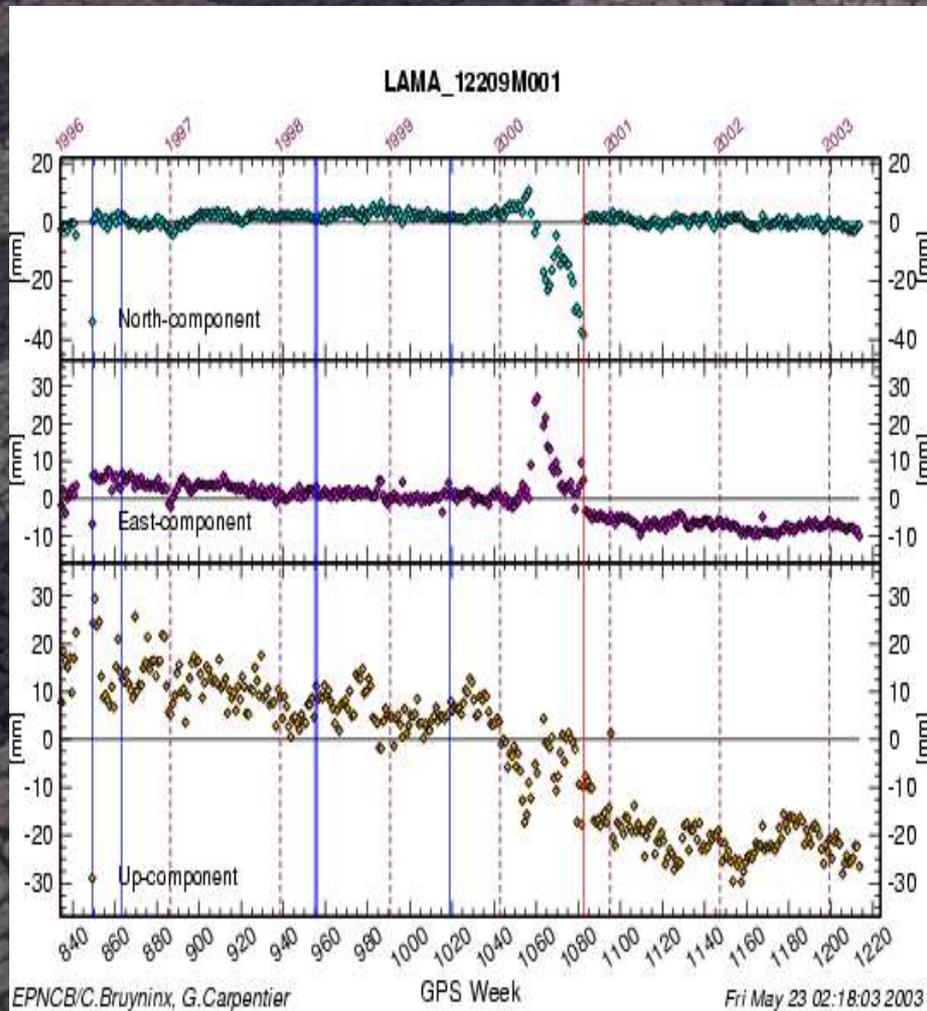# WHAT IS THE SP DOING?

TRACKING THE PERFORMANCE OF EACH EPN SITE USING THE WEEKLY COMBINED EPN SINEX SOLUTION

TASKS:

- OFFSET & OUTLIER DETECTION, ESTIMATION AND ELIMINATION

- CREATION OF 'IMPROVED' TIME SERIES
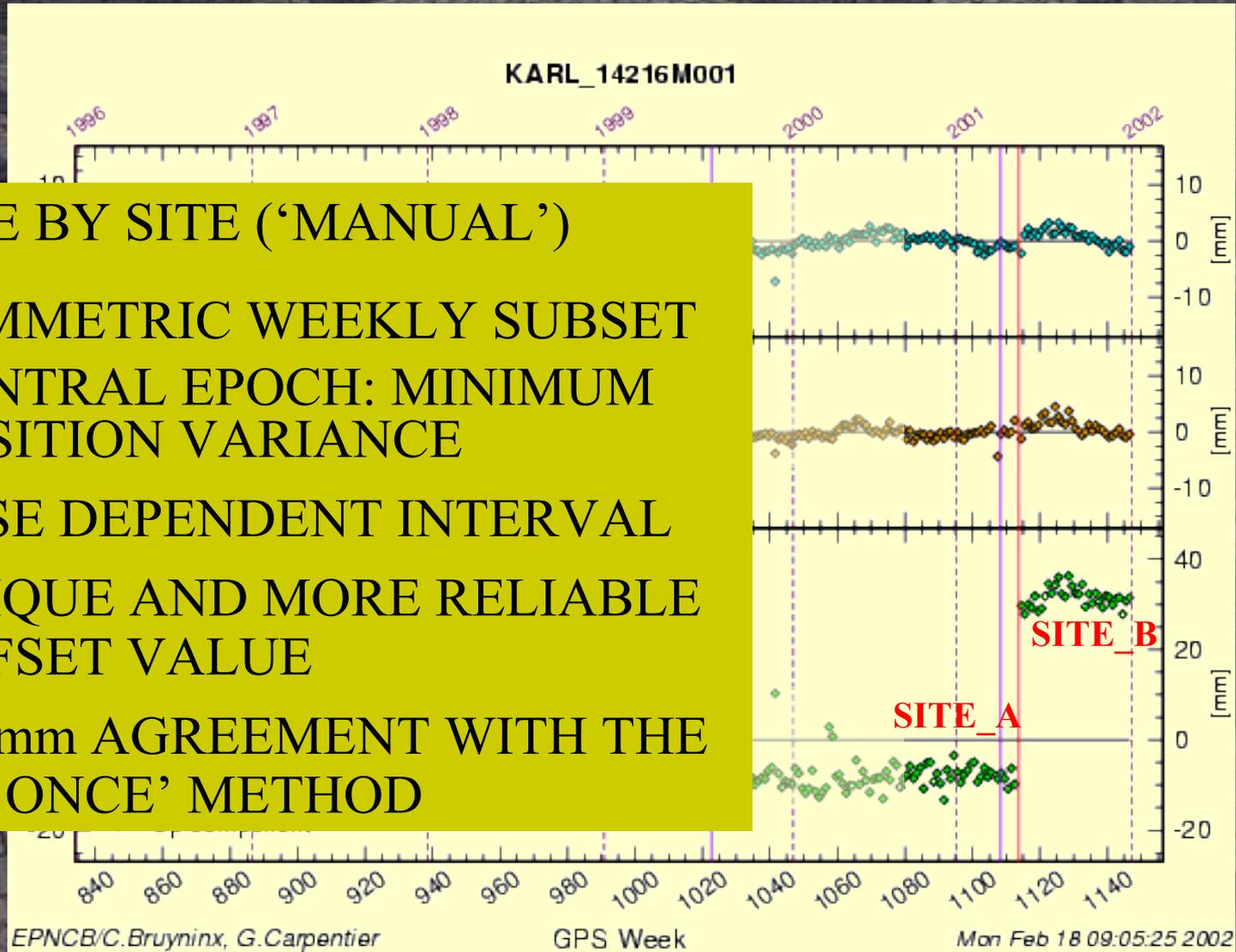
- ESTIMATION OF EPN SITE VELOCITIES

OUTLIER ELIMINATION

'MANUAL' INSPECTION NECESSARY

OFFSET ESTIMATION

- SITE BY SITE ('MANUAL')

- SYMMETRIC WEEKLY SUBSET
  CENTRAL EPOCH: MINIMUM
  POSITION VARIANCE

- CASE DEPENDENT INTERVAL

- UNIQUE AND MORE RELIABLE
  OFFSET VALUE

- 1-2 mm AGREEMENT WITH THE
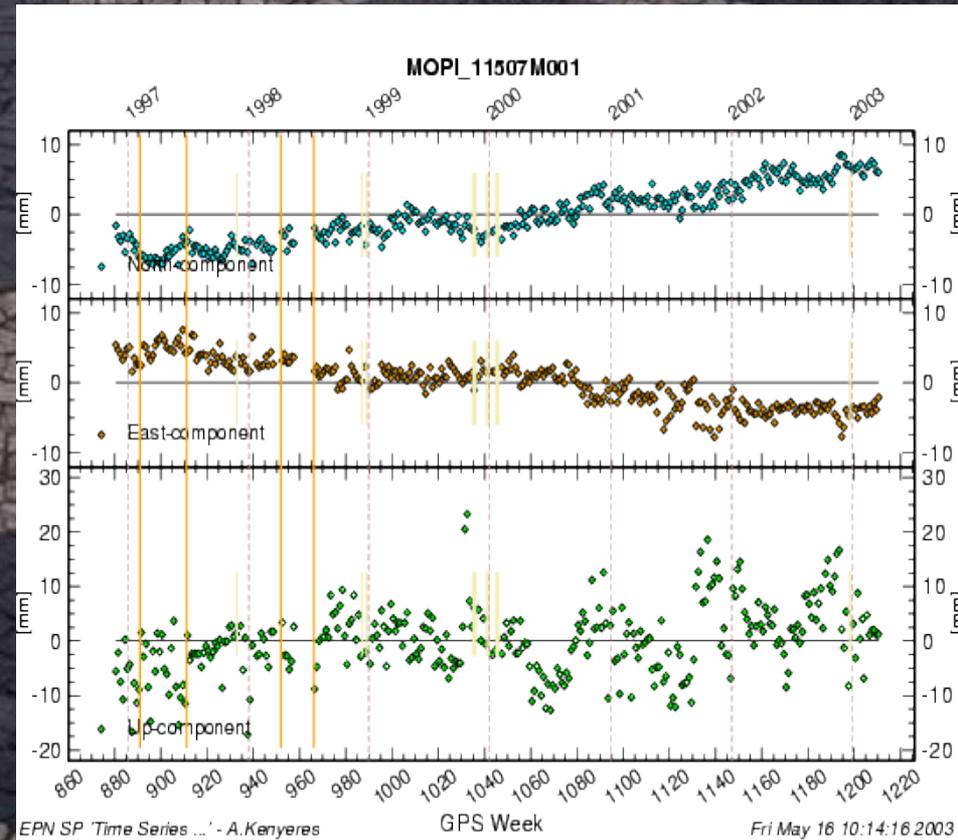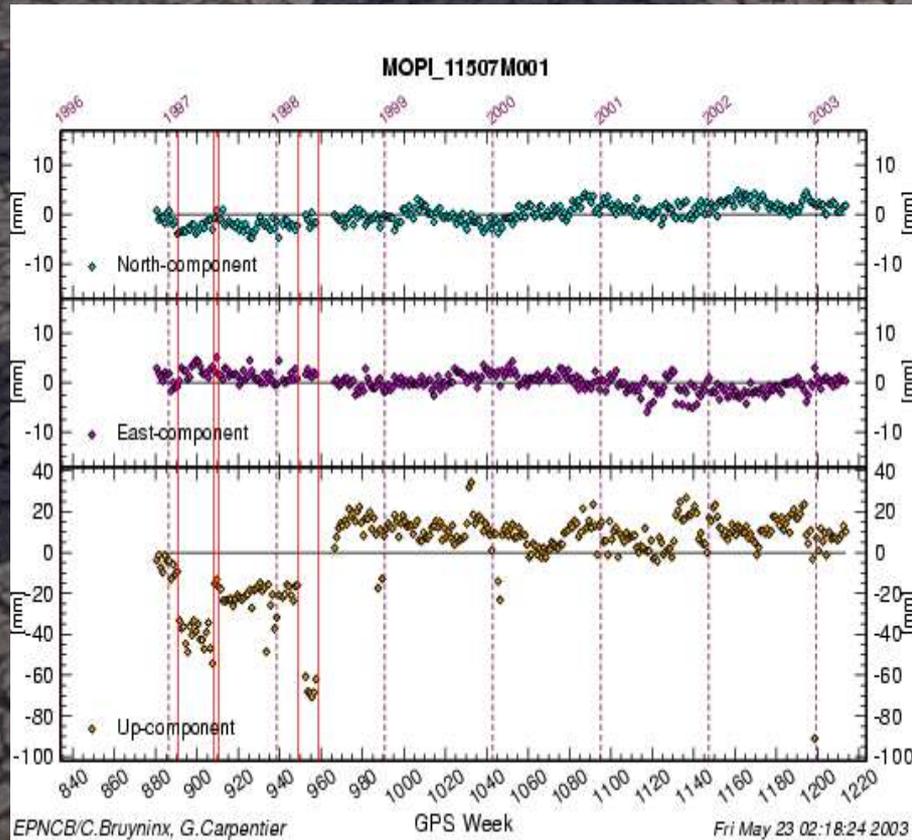 'AT ONCE' METHOD

KARL_14216M001

SITE_A

SITE_B

EPNCB/C.Bruyninx, G.Carpentier   GPS Week   Mon Feb 18 09:05:25 2002

OFFSET CORRECTION

ONE COORDINATE PER SITE

WE ARE RUNNING OUT OF
REFERENCE SITES WITHOUT OFFSET!

PRODUCTS: OUTLIER DATABASE

```
station              start    end
-------------------------GPSweek--
ACOR_13434M001        1024   1043
ACOR_13434M001        1170   1276
AJAC_10077M005        1125   1129
AMMN_22201M001        1043   1224
ANKR_20805M002        1024   1033
BOGO_12207M002         860    899
BOGO_12207M002        1123   1126
BOR1_12205M002         943    944
BORK_14268M001        1215   1221
BRST_10004M004        1083   1085
BUCU_11401M001        1000   1021
BZRG_12751M001        1091   1094
BZRG_12751M001        1120   1174
CACE_13447M001        1116   1130
CAGL_12725M003        1123   1146
CAME_12754M001        1062   1098
CREU_13432M001         992   1011
CREU_13432M001        1221   1250
DENT_13112M001        1156   1156
DOUR_13113M001        1065   1134
DRES_14108M001        1202   1250
EBRE_13410M001         874    903
EIJS_13533M001        1015   1026
GLSV_12356M001        1050   1050
GRAZ_11001M002        1113   1120
GRAS_10002M006        1215   1215
GOPE_11502M002        1034   1082
.
```

SINGLE OUTLIERS/

OUTLIER PERIODS

OUTLIER SIZE
SHOULD BE ADDED

PRODUCTS: OFFSET DATABASE

Station_name	GPSwk	N_offs	N_rms	E_offs	E_rms	U_offs	U_rms
AJAC 10077M005	1130.	-0.0017	0.0003	0.0001	0.0002	-0.0062	0.0016
ALAC 13433M001	1130.	0.0015	0.0002	-0.0002	0.0002	-0.0056	0.0012
BELL 13431M001	1130.	0.0002	0.0003	-0.0015	0.0002	-0.0091	0.0016
BOGO 12207M002	1125.	0.0027	0.0004	0.0011	0.0002	-0.0061	0.0016
BOR1 12205M002	1012.	0.0006	0.0001	0.0046	0.0001	0.0008	0.0011
BOR1 12205M002	1011.	0.0008	0.0003	0.0050	0.0001	-0.0010	0.0016
BRUS 13101M004	1059.	-0.0032	0.0005	-0.0002	0.0004	0.0019	0.0025
BZRG 12751M001	1091.	0.0003	0.0011	-0.0012	0.0009	-0.0165	0.0021
CASC 13909S001	1029.	-0.0025	0.0008	0.0025	0.0007	0.0006	0.0040
CREU 13432M001	1109.	0.0011	0.0003	-0.0086	0.0001	-0.0020	0.0014
DELF 13502M004	1072.	0.0017	0.0003	-0.0002	0.0001	0.0150	0.0014
DELF 13502M004	1130.	0.0008	0.0004	-0.0001	0.0002	0.0075	0.0015
DENT 13112M001	1046.	0.0020	0.0003	-0.0025	0.0001	-0.0063	0.0013
DENT 13112M001	1156.	-0.0041	0.0004	0.0011	0.0003	0.0011	0.0018
DOUR 13113M001	1106.	0.0006	0.0006	0.0022	0.0004	0.0005	0.0030
EIJS 13533M001	1059.	0.0023	0.0004	0.0049	0.0003	0.0165	0.0023
EUSK 14258M003	1112.	-0.0025	0.0002	-0.0011	0.0001	0.0449	0.0012
EUSK 14258M003	1130.	-0.0025	0.0002	-0.0010	0.0001	0.0415	0.0012
GOPE 11502M002	1082.	-0.0019	0.0004	0.0036	0.0003	-0.0164	0.0022
GRAZ 11001M002	1113.	-0.0004	0.0004	-0.0027	0.0003	0.0011	0.0017
HOBU 14202M003	1172.	-0.0012	0.0006	0.0033	0.0004	0.0037	0.0028

THE CURRENT FORMAT SHOULD BE ADJUSTED ACCORDING TO THE PROPOSAL OF Z.ALTAMIMI
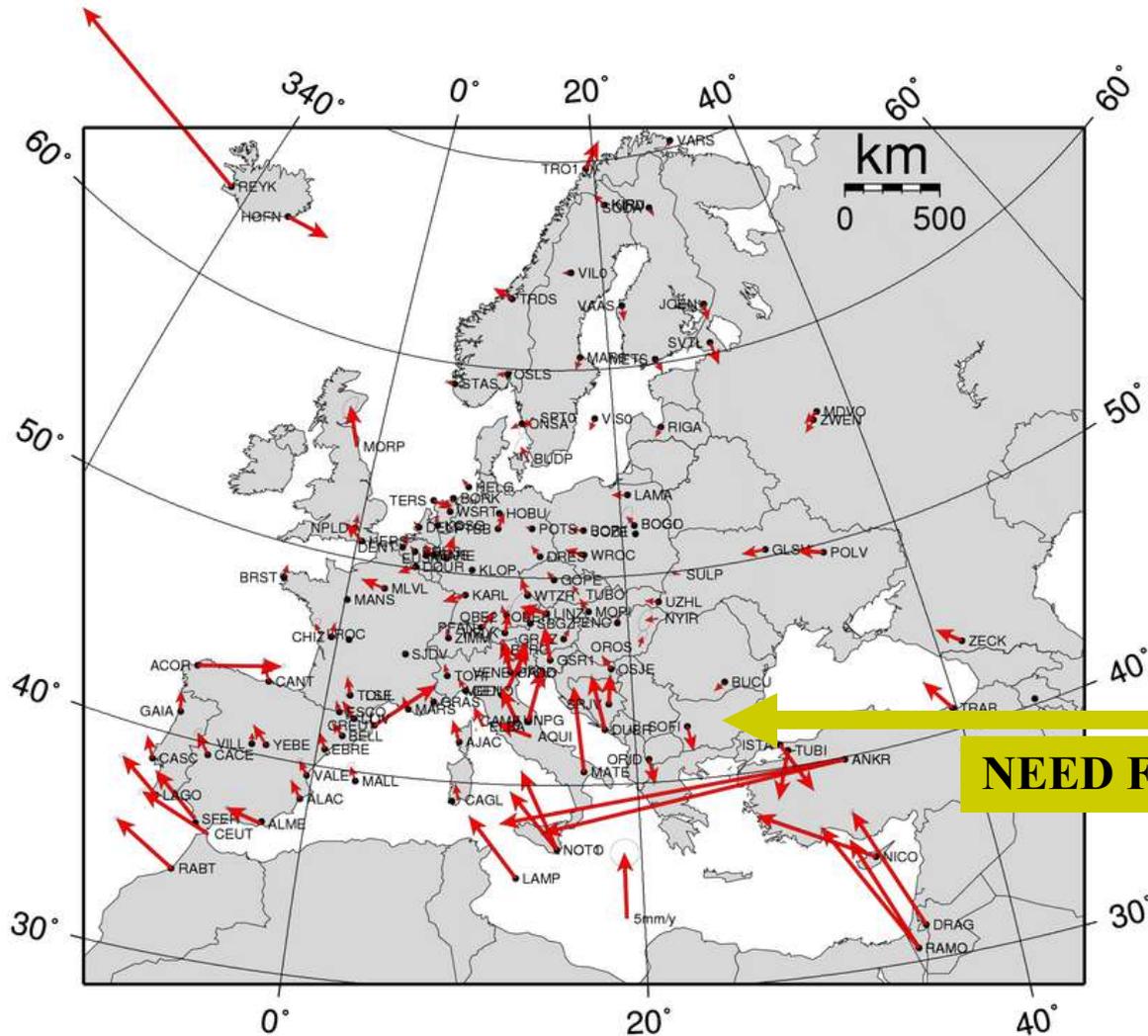
PRODUCTS: VELOCITIES

```
ESTIMATED VELOCITIES OF THE EPN STATIONS          VERSION 24MAY04
BASED ON WEEKLY SOLUTIONS OF GPSWEEKS [860 - 1265]
RESIDUAL VELOCITY COMPONENTS (ALL UNITS ARE MM/YEAR)
ALL VALUES ARE RELATIVE TO THE EURASIAN PLATE!
```

| STATION_ID	vN	sig_vN	vE	sig_vE	vU	sig_vU
CAGL 12725M003	1.21	0.03	-0.36	0.02	-1.04	0.13
BOR1 12205M002	-0.05	0.02	-1.22	0.02	-1.75	0.12
KOSG 13504M003	0.59	0.01	-0.23	0.01	0.62	0.02
BRUS 13101M004	0.21	0.02	-0.37	0.02	-0.26	0.11
ZIMM 14001M004	0.66	0.01	-0.23	0.01	-0.44	0.01
GOPE 11502M002	0.49	0.02	-0.68	0.02	1.33	0.11
GRAZ 11001M002	0.68	0.01	0.32	0.01	-2.22	0.01
JOZE 12204M001	0.04	0.01	0.01	0.01	-0.97	0.02
KIRU 10403M002	0.40	0.03	-0.89	0.02	4.14	0.19
WTZR 14201M010	1.25	0.01	-0.65	0.01	-1.21	0.05
MEDI 12711M003	3.33	0.02	1.33	0.02	-2.33	0.11
ZWEN 12330M001	-0.84	0.04	-1.26	0.03	-1.09	0.20
PENC 11206M006	0.46	0.02	-0.17	0.02	-0.92	0.13
THU1 43001M001	-2.09	0.04	-13.53	0.05	0.28	0.43
KELY 43005M001	1.11	0.04	-16.69	0.04	-12.56	0.24
UPAD 12750M002	2.43	0.03	-0.76	0.02	-2.57	0.17
DELF 13502M004	0.34	0.03	-0.51	0.02	-1.90	0.12
VILL 13406M001	0.78	0.01	-0.14	0.01	-1.37	0.02
MATE 12734M008	6.49	0.01	-0.64	0.00	-1.02	0.01
ANKR 20805M002	-0.78	0.09	-23.54	0.08	-0.66	0.63
GRAS 10002M006	0.32	0.01	-0.30	0.01	-0.76	0.02
VIL0 10424M001	-0.38	0.03	-0.74	0.02	7.70	0.14

ETRF2000 VELOCITIES

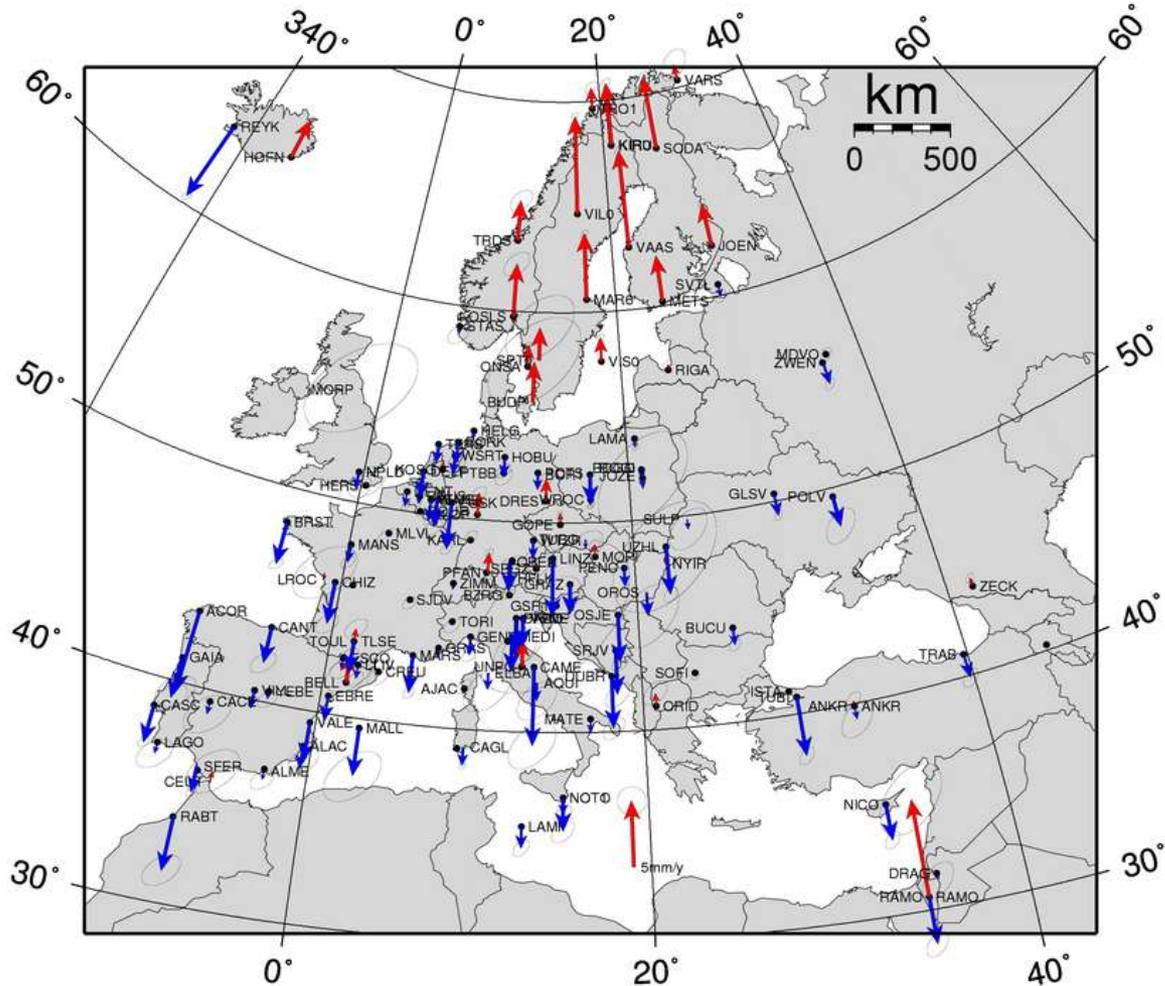# PRODUCTS: NE VELOCITIES

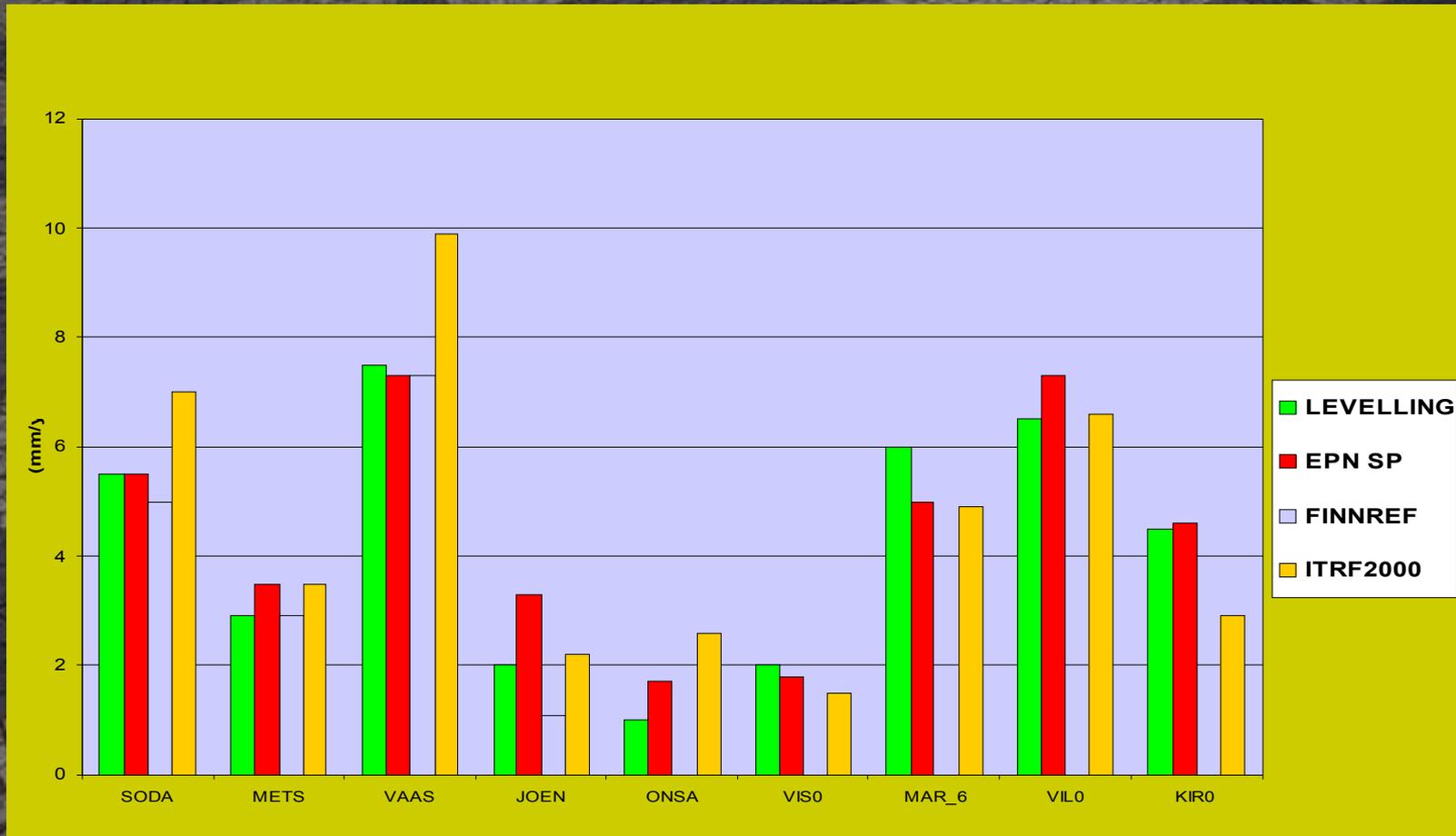

NEED FOR DENSIFICATION!

THE NEED FOR DENSIFICATION

EPN

CEGRN
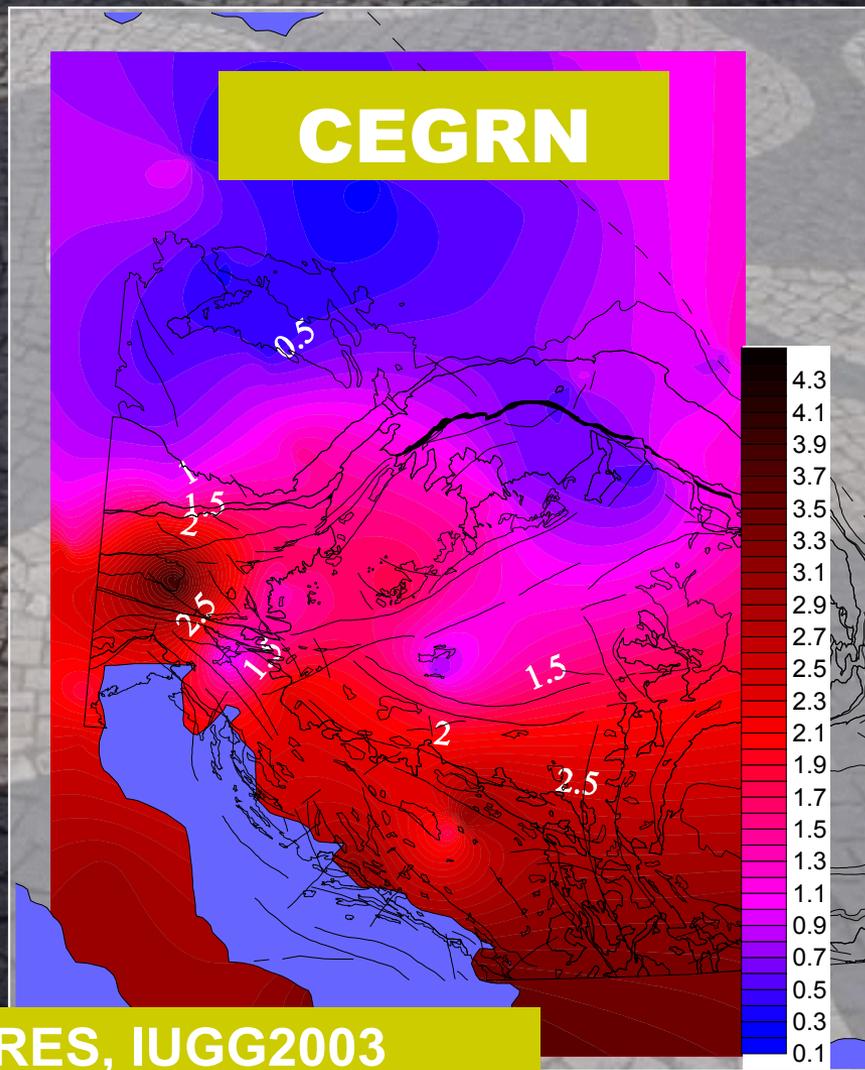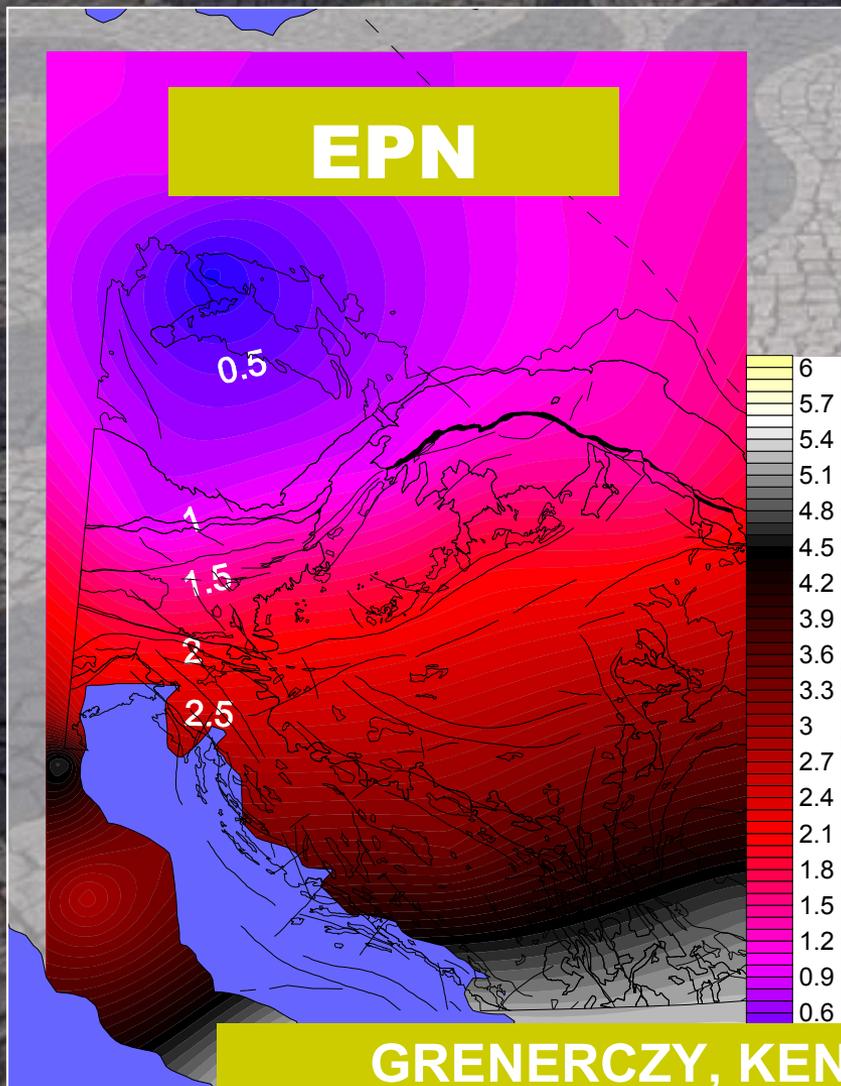
GRENERCZY, KENYERES, IUGG2003

PRODUCTS: UP VELOCITIES

EXTERNAL COMPARISON: FENNOSCANDIAN UPLIFT

EXTERNAL COMPARISON: VLBI

WTZR:=0

CAMPBELL, 2003

SUMMARY

THE TIME SERIES SP PROJECT PERFORMS:

• CAREFUL TIME SERIES INSPECTION, SITE-BY-SITE

• RELIABLE OFFSET ESTIMATION

• EXTERNALLY CHECKED VELOCITY ESTIMATION

PRODUCTS:

• OUTLIER TABLE

• OFFSET TABLE

• ETRF2000 VELOCITIES AND PLOTS

PRODUCT UPDATE: 5 WEEKS, AVAILABLE AT THE EPNCB SP WEBPAGES

TS SP CONTRIBUTIONS TO THE VELOCITY PROJECT

- **WORKLOAD SHARING : EPN AND ITS DENSIFICATION**

- **OUTLIER AND OFFSET TABLES IN THE SINEX CONFORM FORMAT**

- **TS PLOTS ON THE EPNCB WEB**

- **EXTERNAL VELOCITY ESTIMATIONS AND CHECKS**

- **NOISE ANALYSIS**

- **RELIABLE VELOCITY UNCERTAINITY ESTIMATION**