ECC and the EUROPEAN DENSE VELOCITY FIELD

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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
<table>
<thead>
<tr>
<th>Country</th>
<th>Region</th>
<th>Start Year</th>
<th>End Year</th>
<th>Notes</th>
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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
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

5±1 mm/year
ETRF2000 2D VELOCITIES L> 3 years
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