COMBINATION OF DENSE NATIONAL WEEKLY GNSS SOLUTIONS

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R O O T S

➔ EUPOS Combination Centre - ECC

- homogenisation of national permanent GNSS networks
- ETRS89: EPN → *********POS* → local networks
- quality upgrade: production networks for SCIENCE

➔ IAG Working Group on Dense Regional Velocity Fields

- issues around collection and management of mixed epoch and CORS observations
- focus on the dense weekly SINEX solutions
- Resolution #4 at the EUREF2010 symposium:

The IAG Reference Frame Sub-commission for Europe (EUREF)

Noting that the European contribution to the IAG WG on Regional Dense Velocity Fields is coordinated by EUREF

Considering that there are permanent tracking stations, not included in the EPN, but are of scientific importance

Encourages analysis of the data following the guidelines for EUREF densifications and transmission of weekly SINEX solutions to EUREF

ECC TARGETS

- *homogenisation and UPGRADE of the national permanent (RTK) GNSS networks*
  - frame / analysis / products
  - training of station managers
- *long term site monitoring*
  - *EPNCB + SQII (System Quality, Integrity and Interference)*
  - *site log validation and feedback (EPNCB; ESDB)*
- *production GNSS networks for science*
  - *time series analysis & interpretation*
  - *velocity modeling – IAG WG*
  - *…*

SINEX COMBINATION

- *EPN analogy - "patchwork" of national contributions*

  EPN weekly SINEX as reference
- *TOOL: CATREF (== ITRF and EPN solutions)*
- *STRATEGY:*
  - *INPUT: weekly SINEX solutions*
  - *CHECK SINEX from each analysis centre (iteration with LAC),*
  - *COMBINATION: EPN + all national solutions on the weekly level,*
  - *DATUM: latest class_A EPN cumulative solution*

    NOW: ITRF2008

INPUT EXPECTED

WEEKLY NATIONAL SINEX SOLUTIONS

- *scientific (BERNESE) analysis,*
- *EPN strategy,*
- *EPN stations as datum,*
- *Minimum Constrained solutions,*
- *DOMES numbers added/requested,*
- *Long term reliability of network operators and analysts (look EPN)*

ACTUAL CONTRIBUTIONS

TEST ANALYSIS 1538 – 1564 (EUREF2010)

ASG Poland : WEEK 1482 – 1619 – 2.9y

EST Estonia : WEEK 1448 – 1625 – 3.5y

GGI Latvia : WEEK 1513 – 1609 – 2.0y

GKU Slovakia : WEEK 1538 – 1621 – 2.0y

SGO Hungary : WEEK 1400 – 1625 – 4.5y

. . .

More contributions are asked!

ECC sites as of today

EXPERIENCES, ISSUES

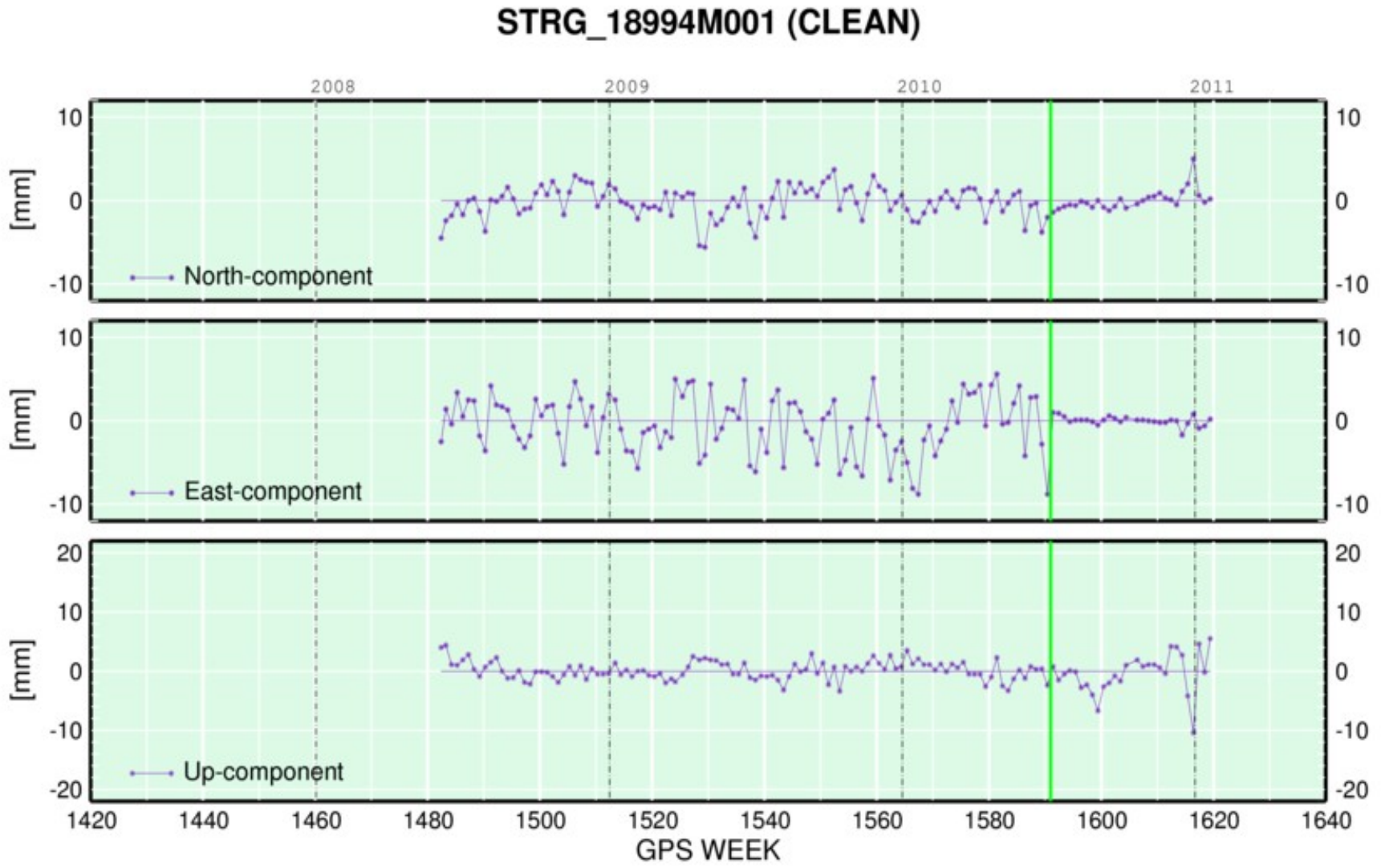
- *DOMES numbers were successfully implemented: EASY procedure (ask IERS – Bruno Garayt),*

  HIGHLY RECOMMENDED for all permanent stations to avoid later confusions !
- *Site codes and DOMES numbers must be checked*
- *Site log database maintenance*

  All changes must be logged
  Log file database (EPNCB / ESDB / ...)
  LEARN from EPN, do not degrade your worth work !

MOUNTING RE-ENFORCEMENT

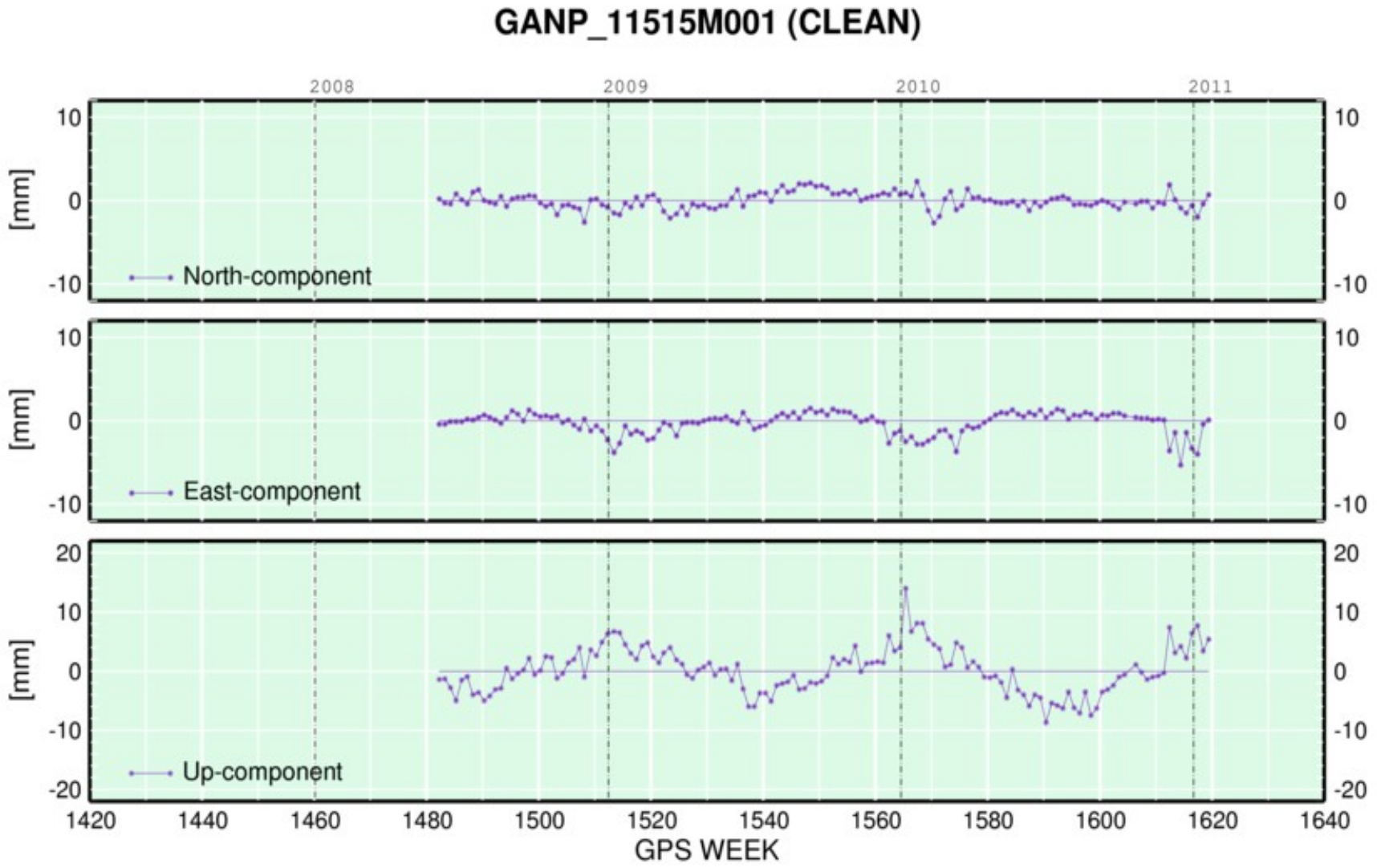
MARKER INSTABILITY



ASG_eupos_weekly

Wed Apr 6 12:39:22 2011

SEASONAL SIGNAL



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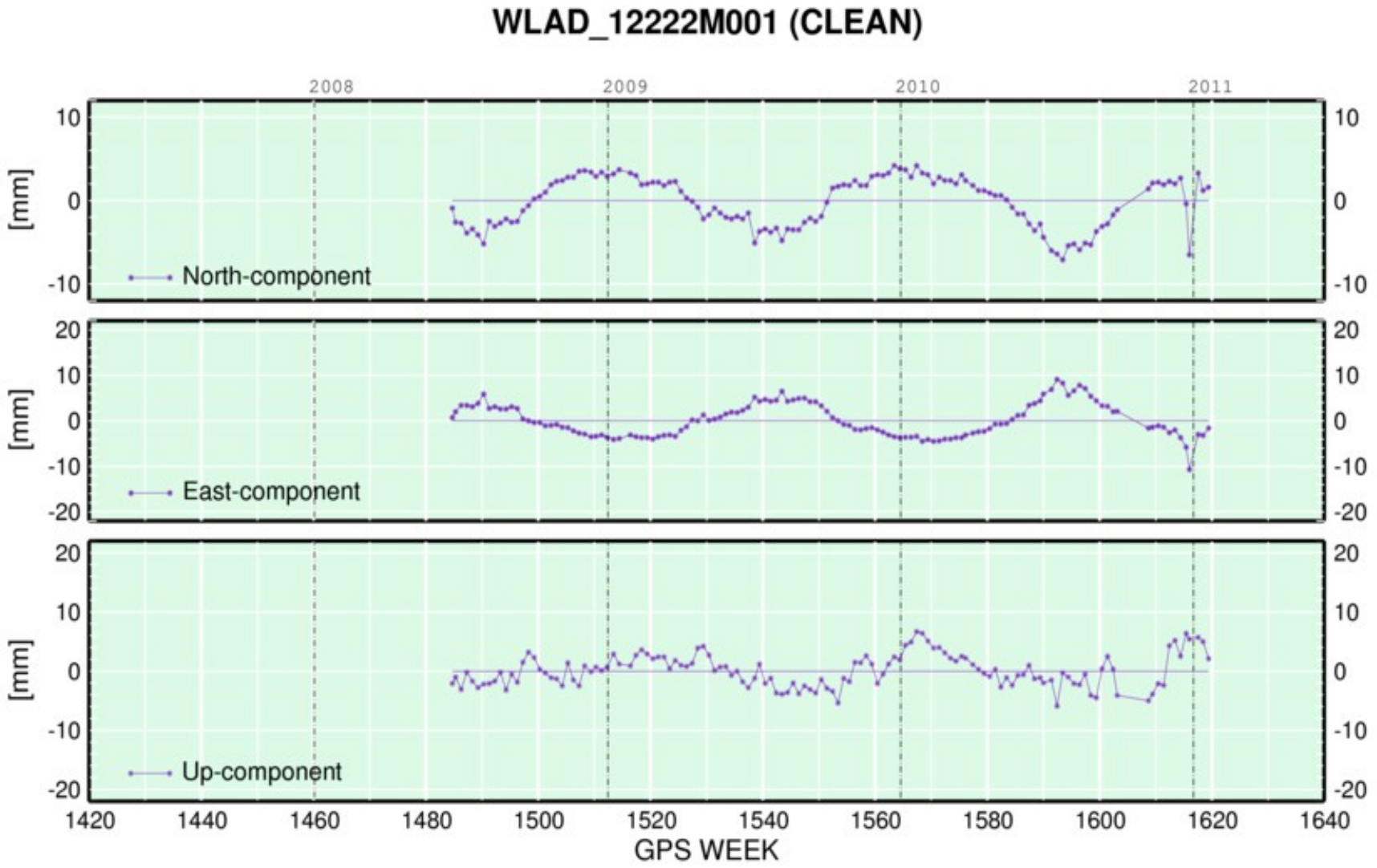
SEASONAL ~~SIGNAL~~ AS NOISE



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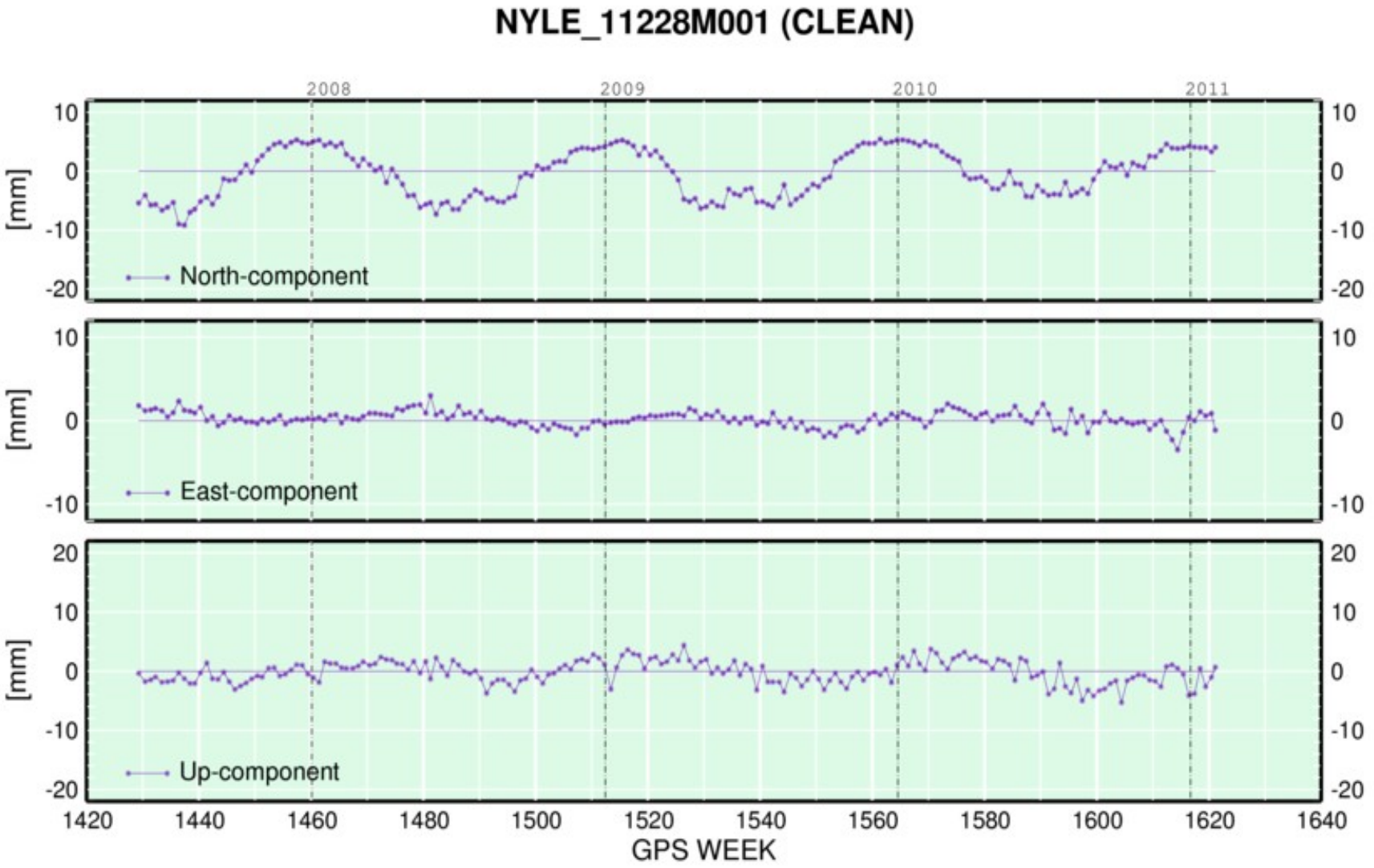
SEASONAL NOISE CONSEQUENCE:

STATION RE-INSTALLED IN HUNGARY



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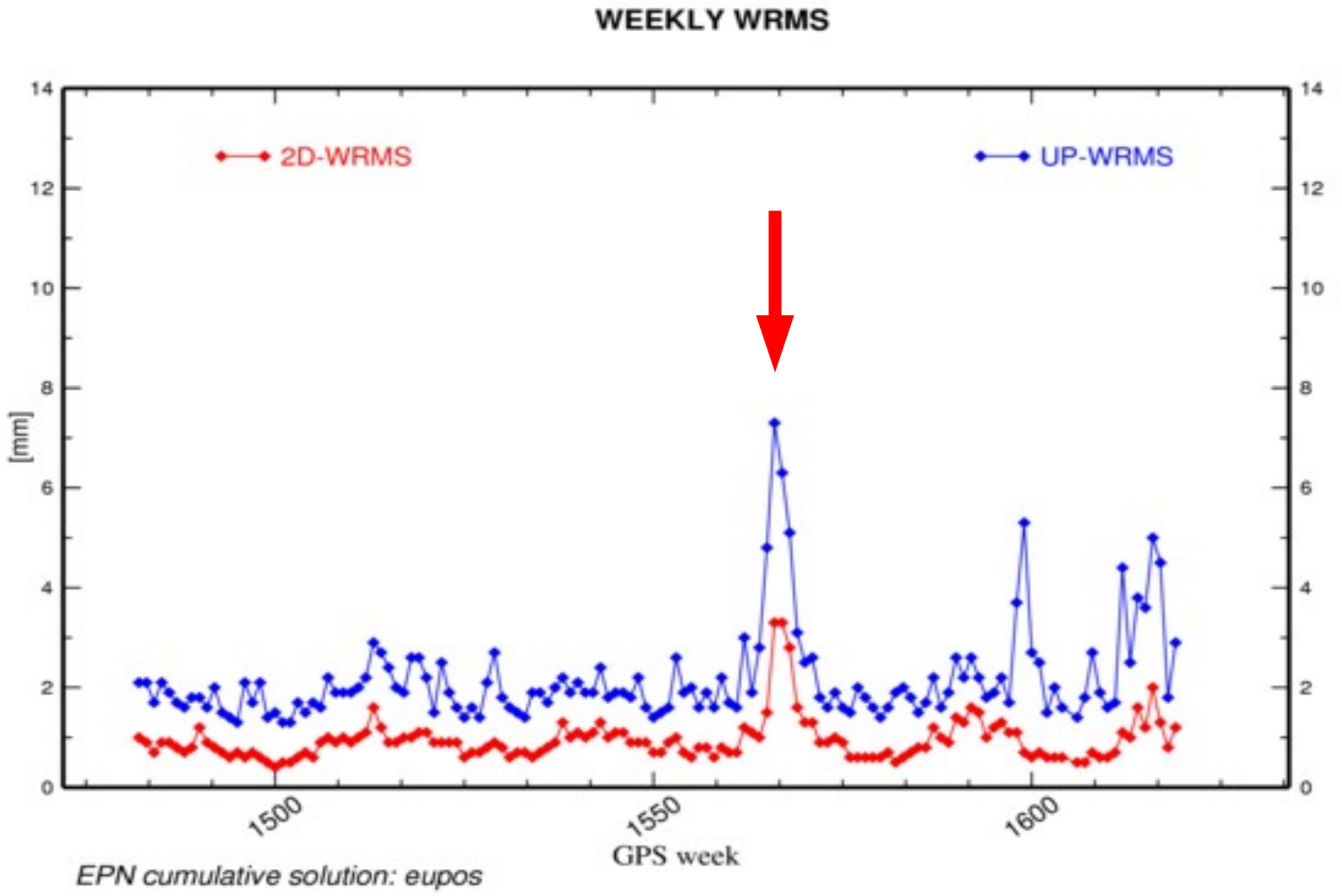
WINTER – NETWORK WRMS

2009 – SNOWY WINTER IN NE-EUROPE

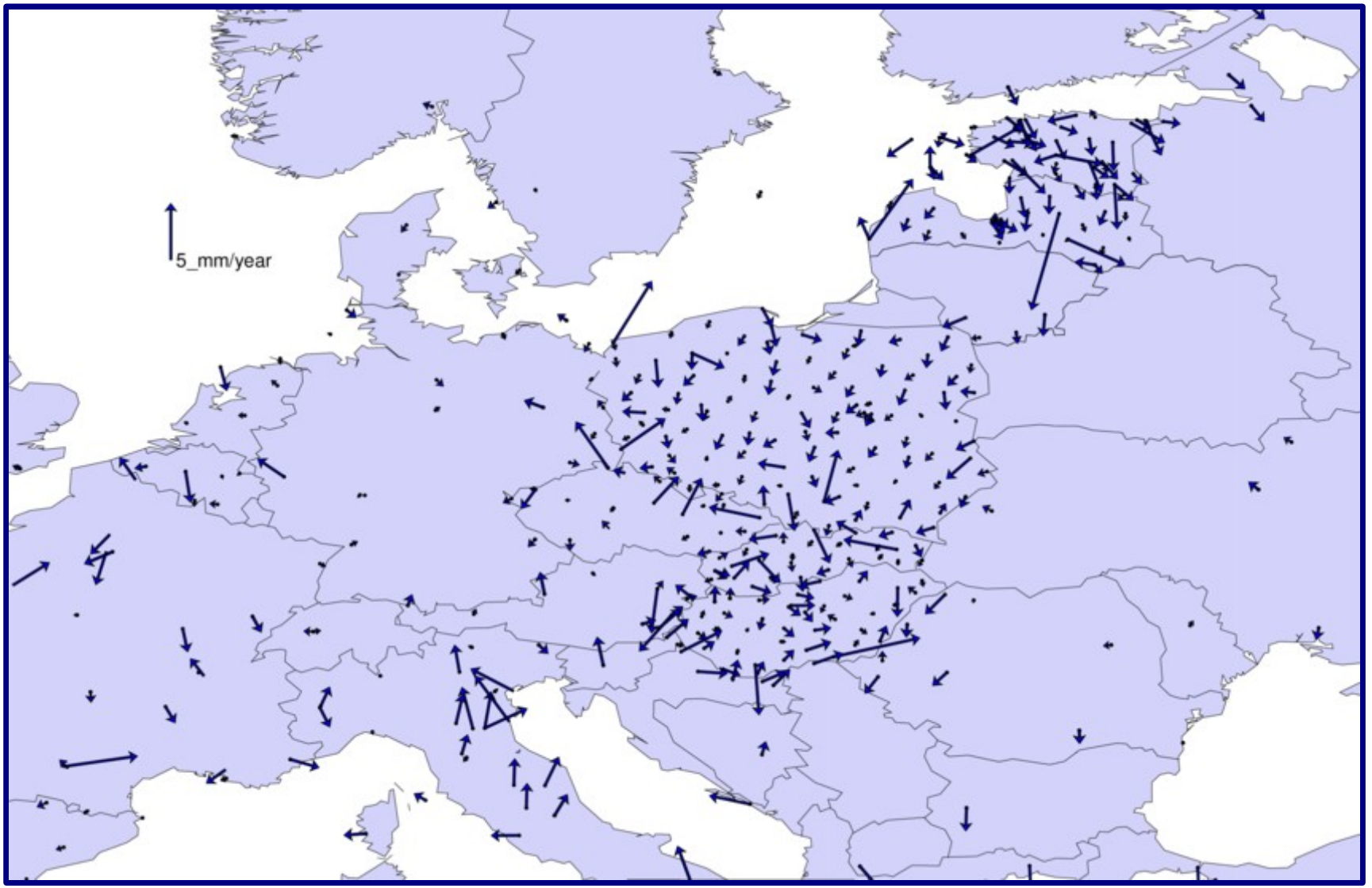


ADVANTAGES

- *Enhanced metadatabase (station logs),*
- *Highly reliable ETRS89 coordinates and velocities*
  - *comparable to EPN class_A &B – same product line!*
  - *class_C(?) - should be discussed*
  - *validation of the national ETRS89 realizations*
  - *site quality estimation / monitoring*
- *Scientific quality velocities – towards a pan-European dense velocity model*
- *Appetizer:*

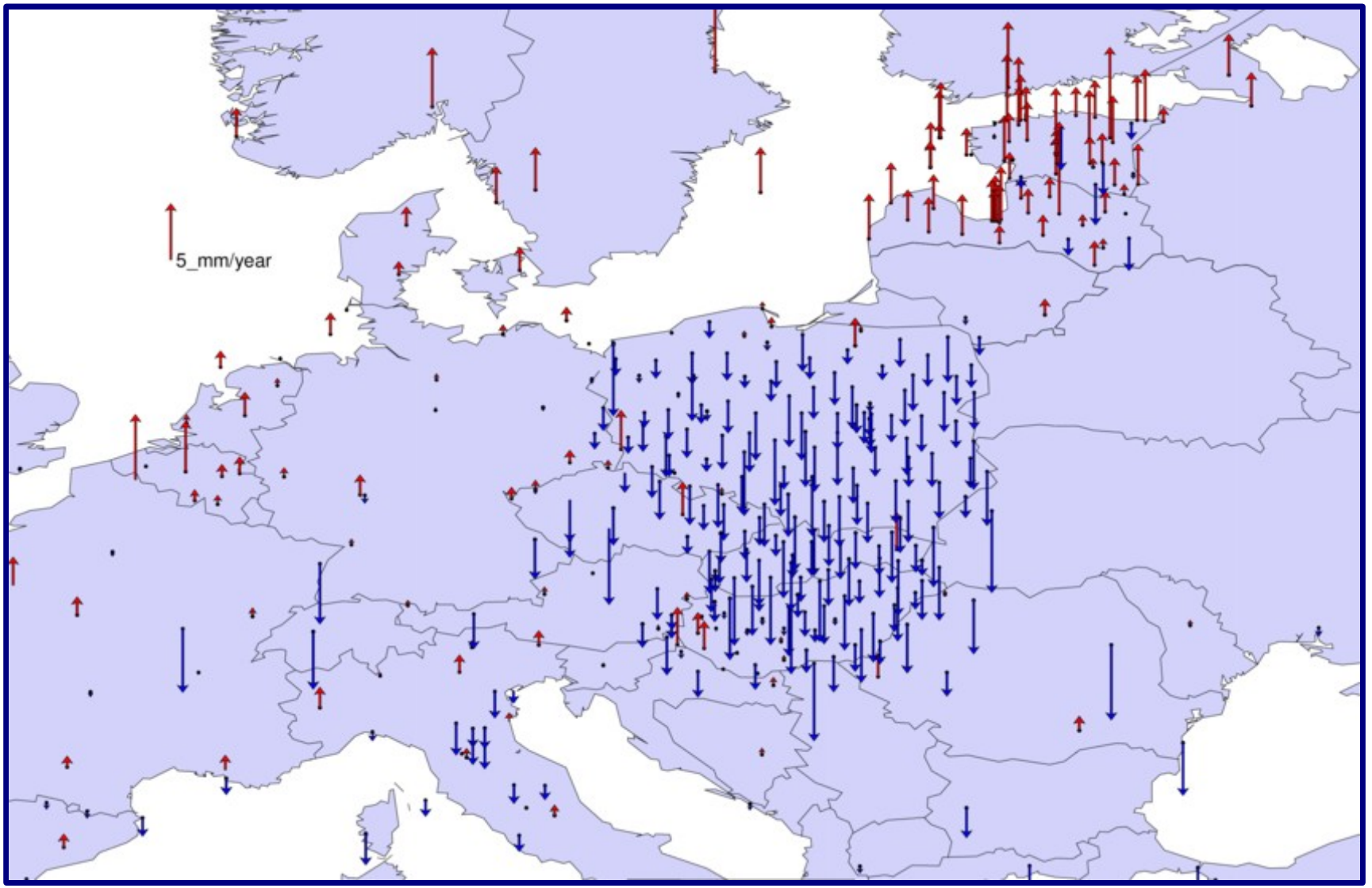
DENSIFIED ETRF2000 VELOCITY FIELD

HORIZONTAL COMPONENT



DENSIFIED ETRF2000 VELOCITY FIELD

VERTICAL COMPONENT



EXPECTED PRODUCTS

- *Cumulative solutions per national network*
- *merged ECC weekly SINEX solutions*
- *Free ECC cumulative SINEX solution*
- *Coordinate and estimates in ITRF2008*
  ETRS89 – ETRF2000(R08)
- *class_C solutions?*
- *Analogous time series handling as in EPN*
- *Inputs for scientific interpretation*

RECOMMENDATIONS

- ***Network operators***
  - *up to date (meta)data preparation*
    - *Log file database,*
    - *DOMES numbers, unique 4-char IDs*
- ***Local analysts***
  - *Analyse historic data,*
  - *Provision of routine weekly solutions*
  - *Use up to date metadata*
- ***ECC***
  - *Pan-European cooperation*
  - *Feedback to Acs, EPNCB and ESDB*
  - *Common publication of the results*