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GNSS services in Estonia: ESTPOS as a case study

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Outline

- GNSS-RTK permanent station network – ESTPos
 - Reconstruction, Equipment, Software, Services
- Applications for geodetic system monitoring
- Future insights



ESTPOS reconstruction

- Estonian-Swiss cooperation programme
- Establishment of GNSS-RTK permanent station network (May 2014 – September 2015)
 - GNSS permanent station receivers (18+9)
 - Meteosensors (13)
 - GNSS rovers (11)
 - Software for GNSS-RTK network

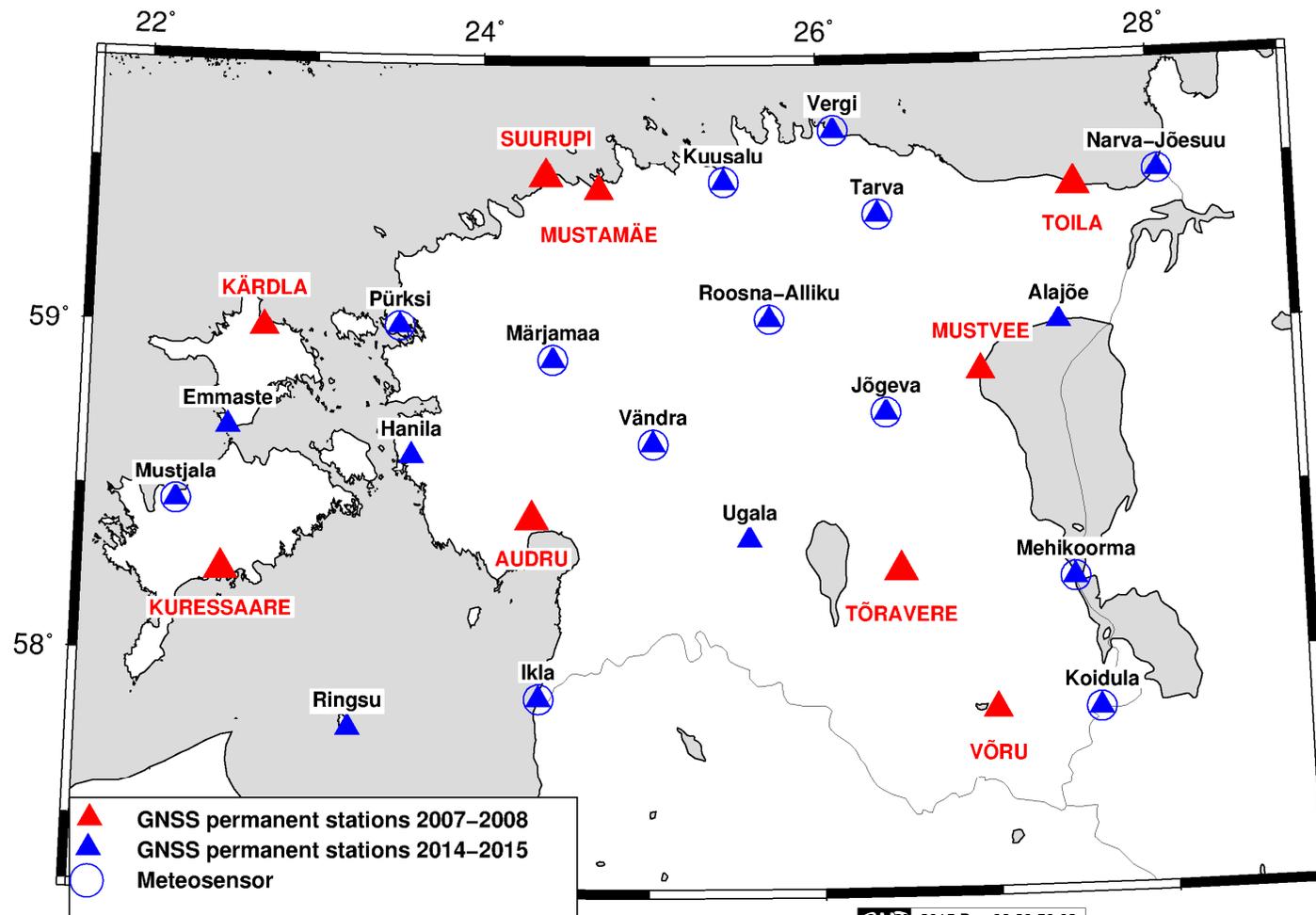


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ESTONIAN-SWISS COOPERATION PROGRAMME

ESTPOS network





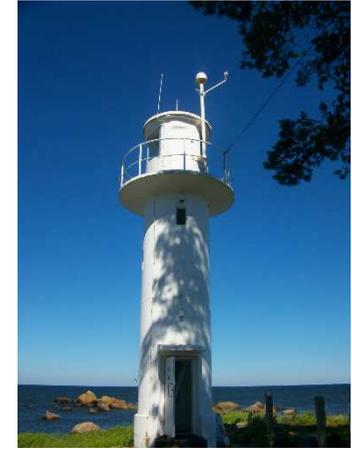
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ESTPOS reconstruction

- Two types of installations:
 - To the wall (or chimney)
 - To the chimney through the roof





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ESTPOS: Equipment

- 18 new stations
 - receiver Leica GR25
 - antenna LEIAR25 + radome LEIT
 - meteosensors (Väisala WTX520) in 13 stations





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ESTPOS: Equipment

- Equipment change in 9 stations
 - 4 stations: receiver GPS500 + antenna LEIAT504 → receiver GR25 and antenna LEIAR25 + radome LEIT
 - 5 stations: receiver GRX1200GGPRO + antenna LEIAT504GG + radome LEIS → receiver GR25 and antenna LEIAT504GG + radome LEIS



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ESTPOS: Software

- Leica Spider software for monitoring and RTK-network
- Leica SpiderWeb
- Leica Business Center



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ESTPOS: Services

- For Administrators
 - Site server: status of GNSS sites, configuration
 - Network server: status of RTK network, RTK product definition
 - Spider QC: Quality of the network and individual sites
 - LBC: user management, RTK articles & subscription management, LiveView for network and rovers status

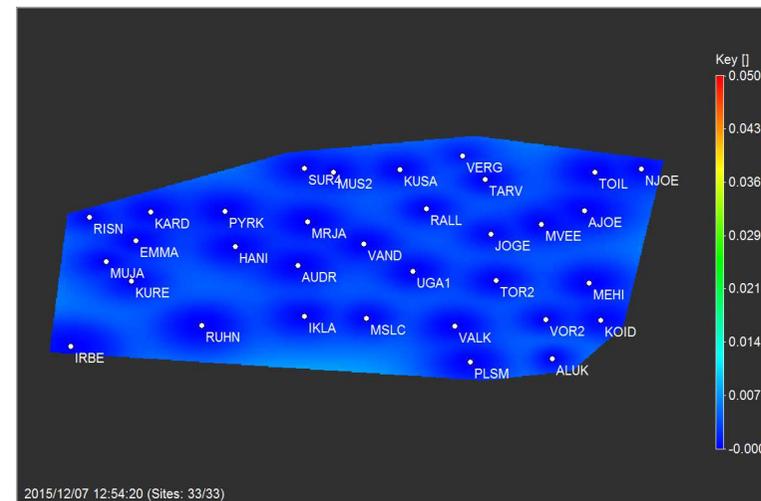
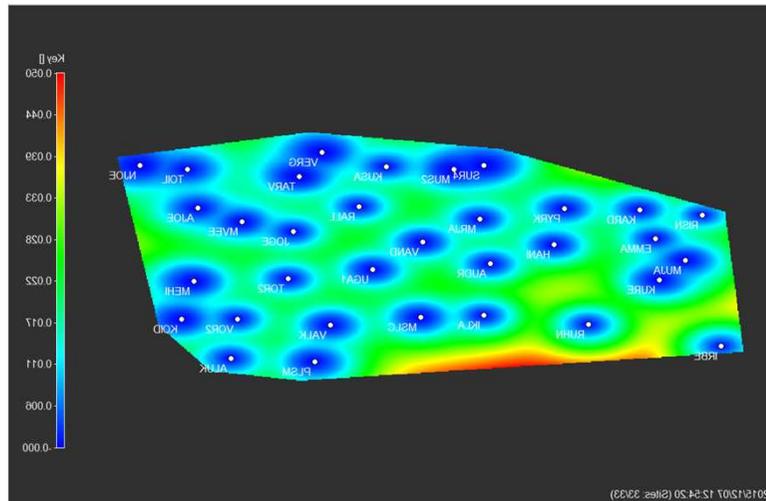
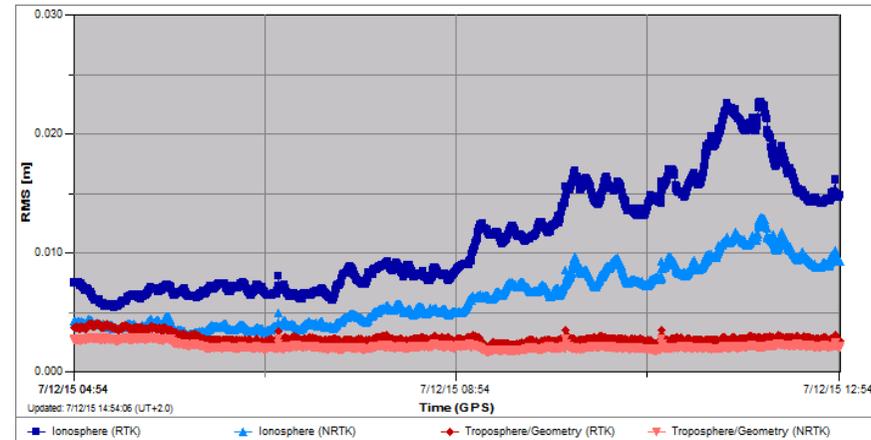


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ESTPOS: Monitoring quality



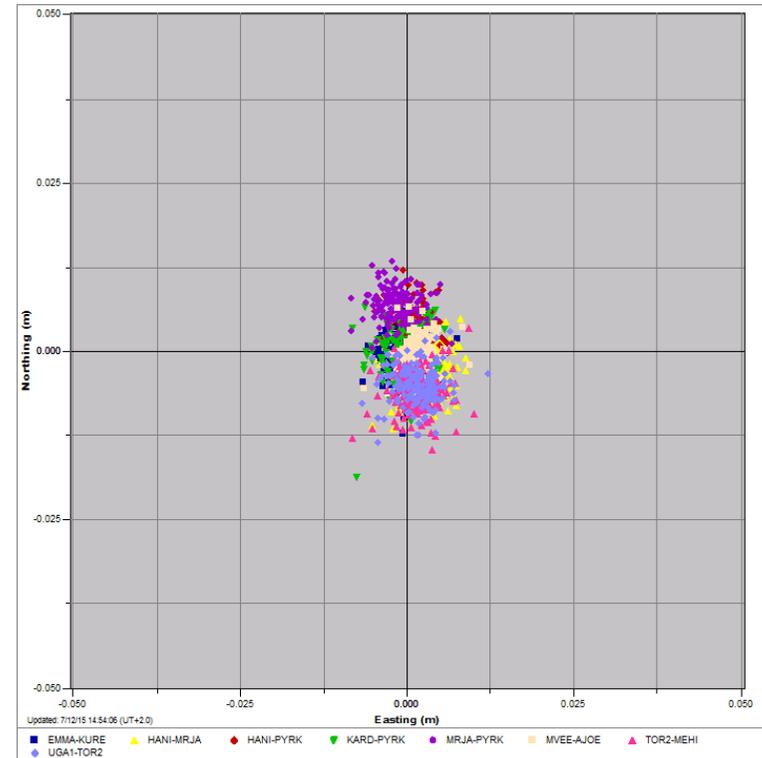
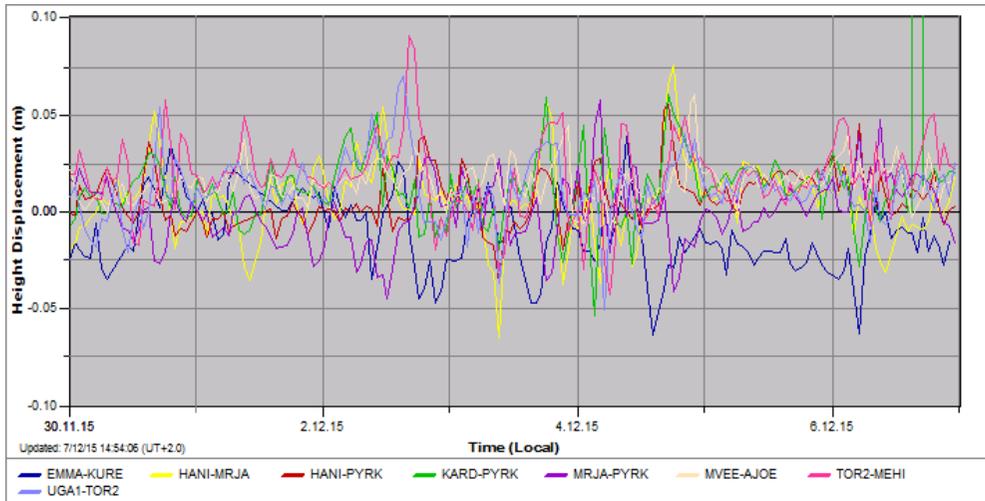


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ESTPOS: Post-processing quality



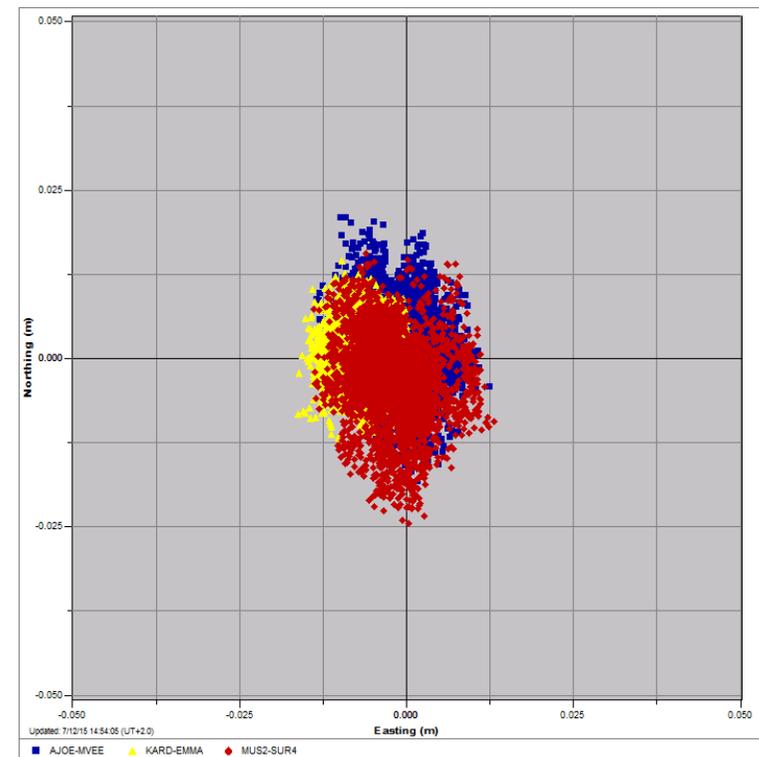
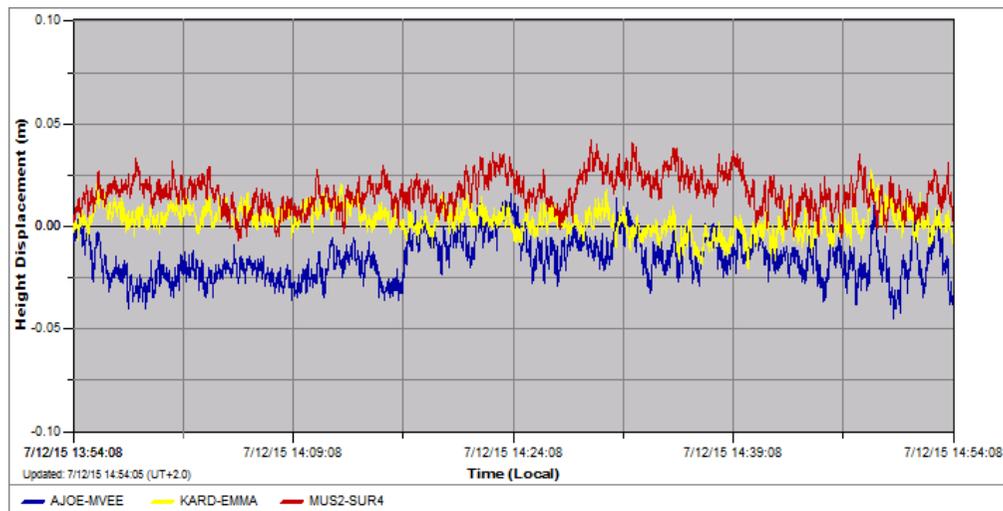


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ESTPOS: Real-time quality





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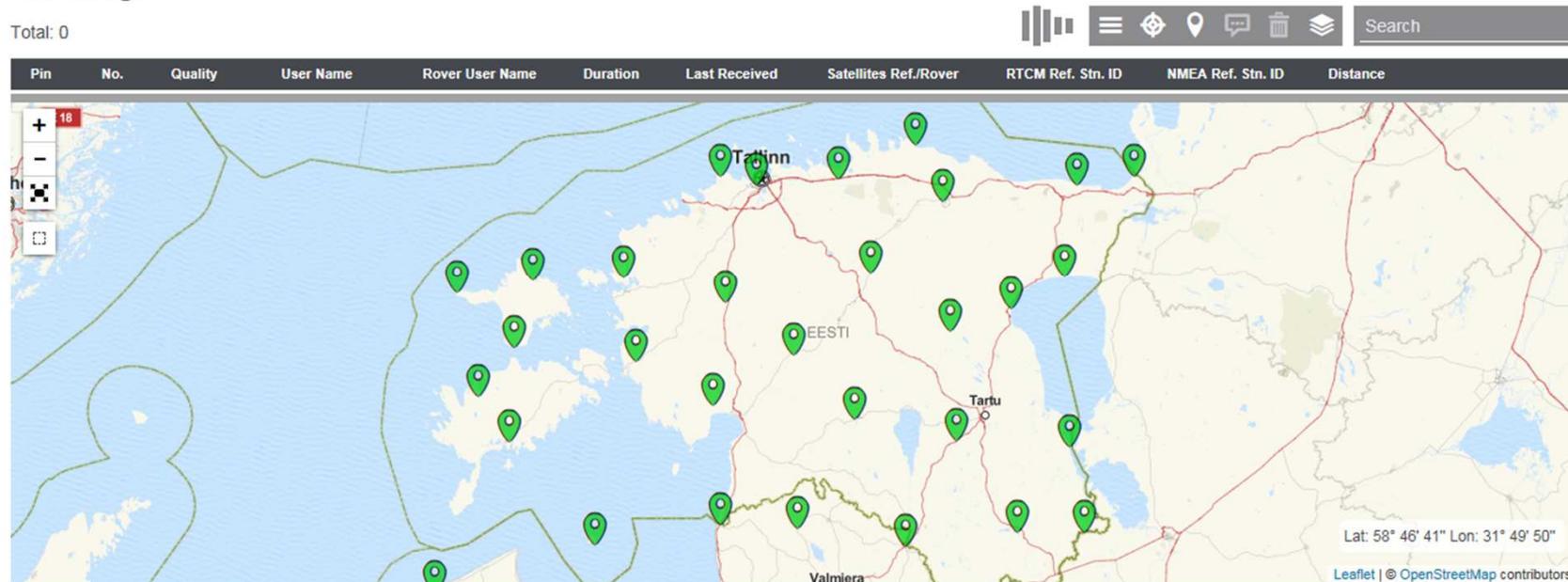


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ESTPOS: LiveView

Live Usage

Total: 0





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ESTPOS: Services

- For Users SpiderWeb:
 - Site quality overview and file availability
 - Network quality overview
 - RINEX/VRINEX download
 - Online coordinate computation service
- For Users LBC
 - choice of the RTK-products
 - LiveView for network and rover status

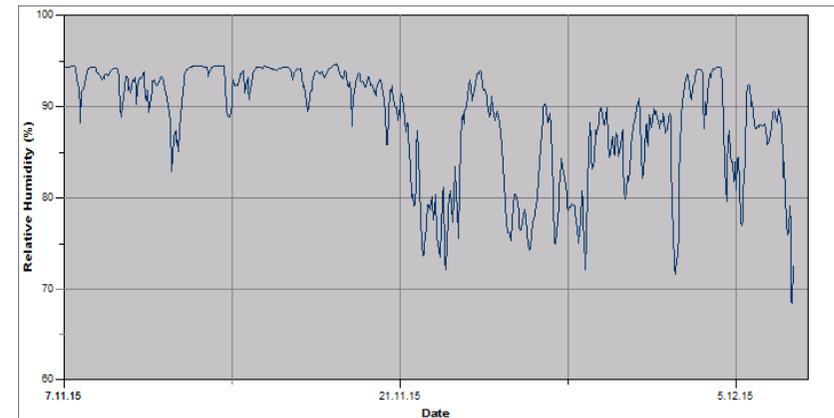
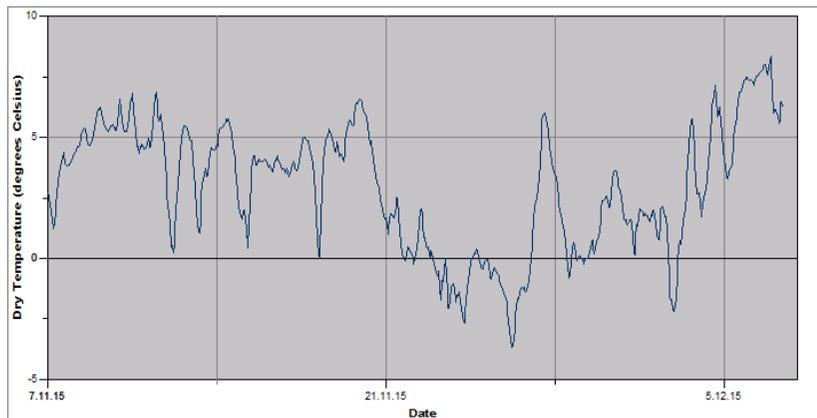
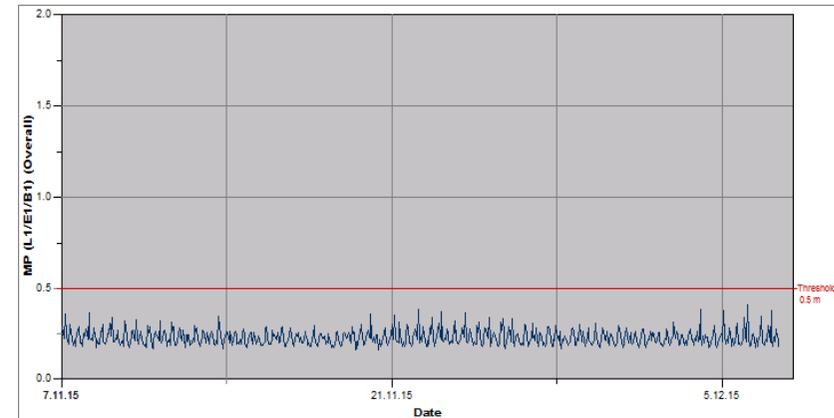
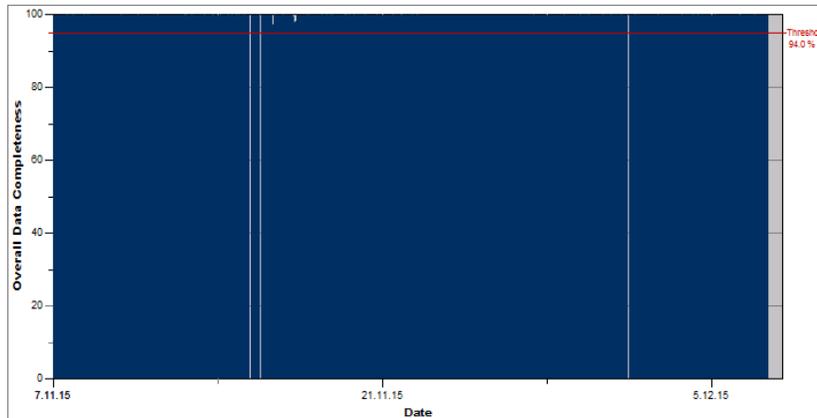


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ESTPOS: Site quality JOGE



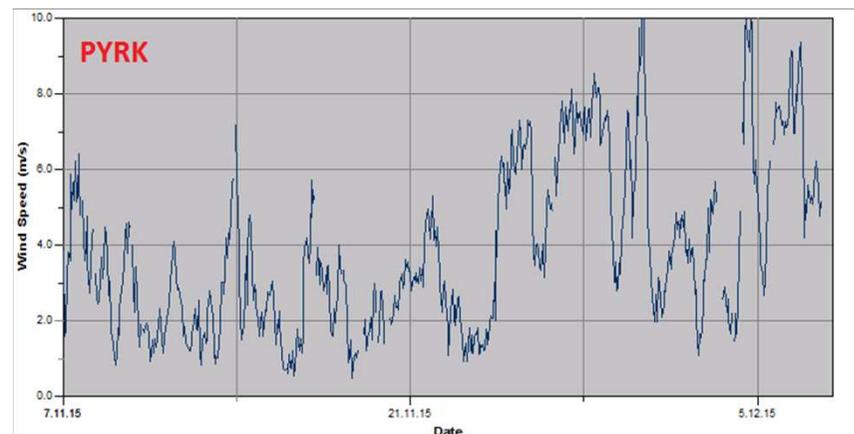
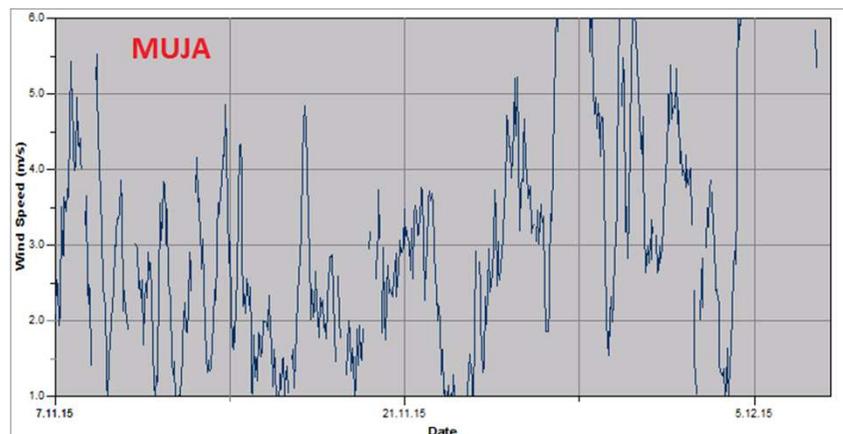
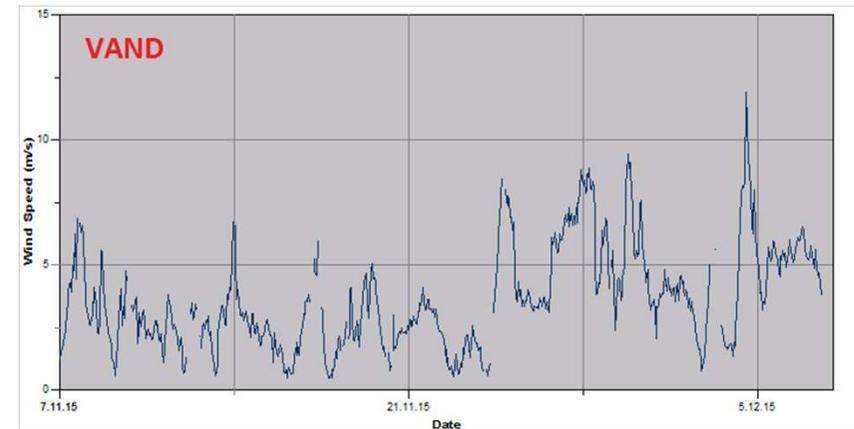
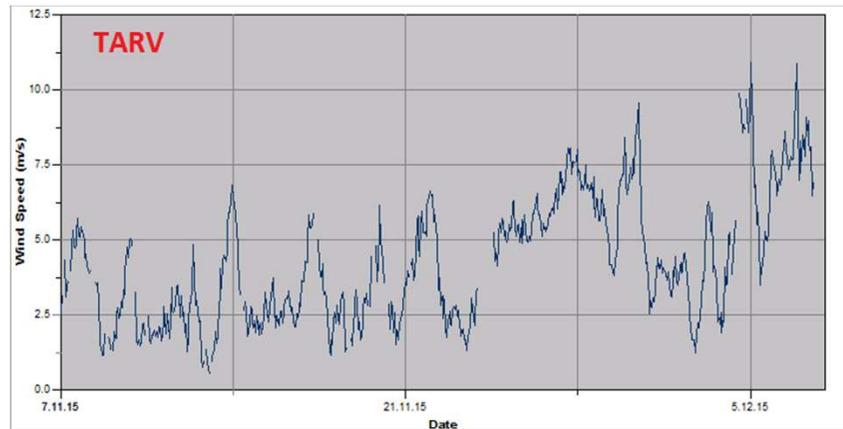


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ESTPOS: Site quality – wind speed





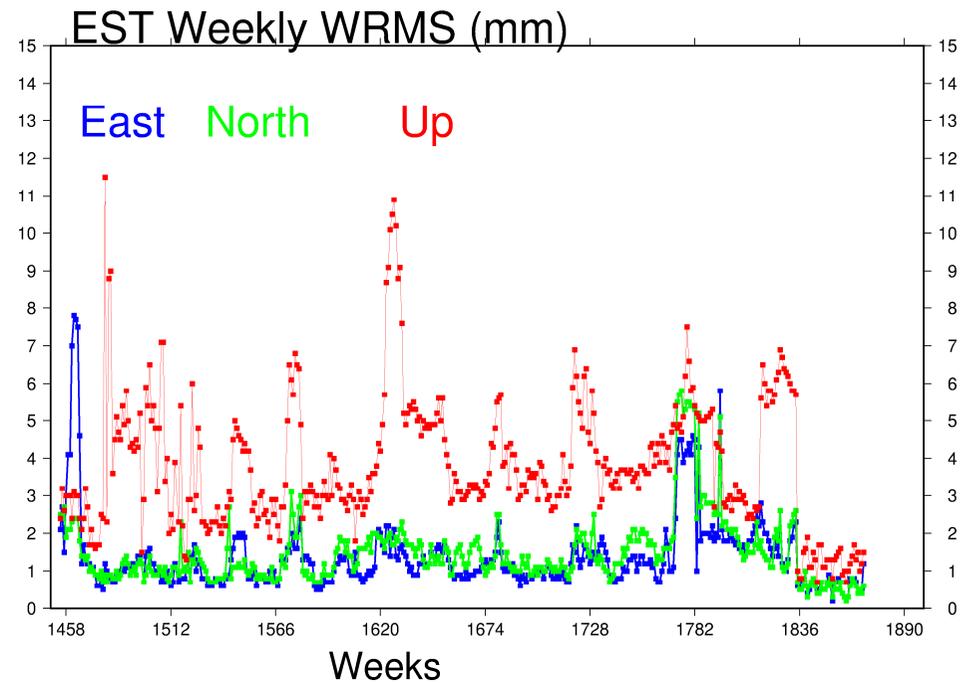
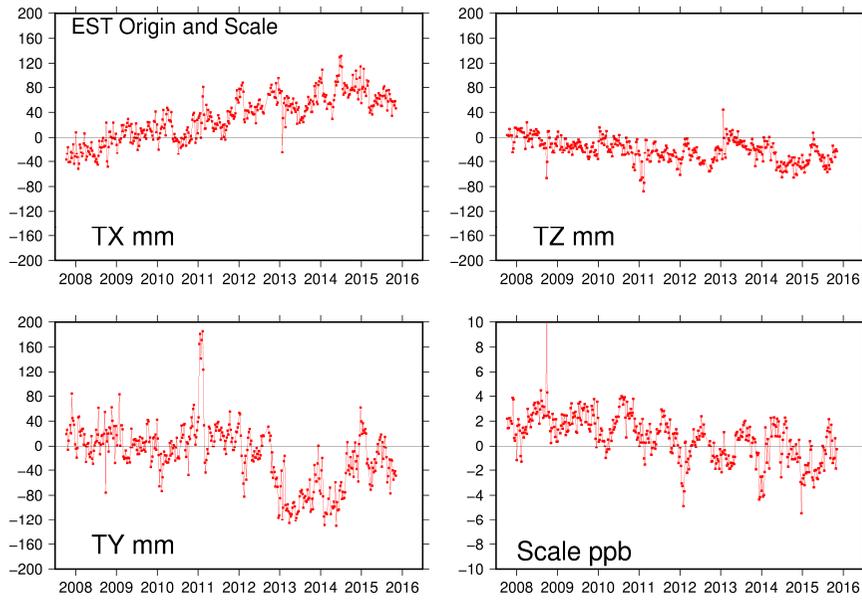
Reference frame computations

- All stations have ETRS89 coordinates in national realization EUREF-EST89
- Bernese 5.2 software
- Verification with different time-series analysis programs
- Weekly computations submitted
 - EUPOS analysis centre & NKG analysis centre



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Statistics





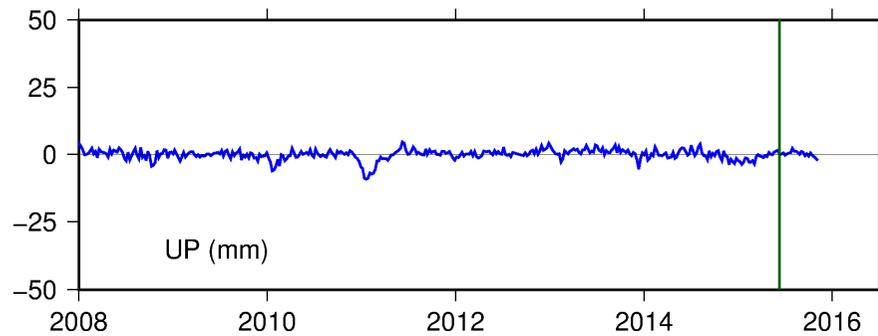
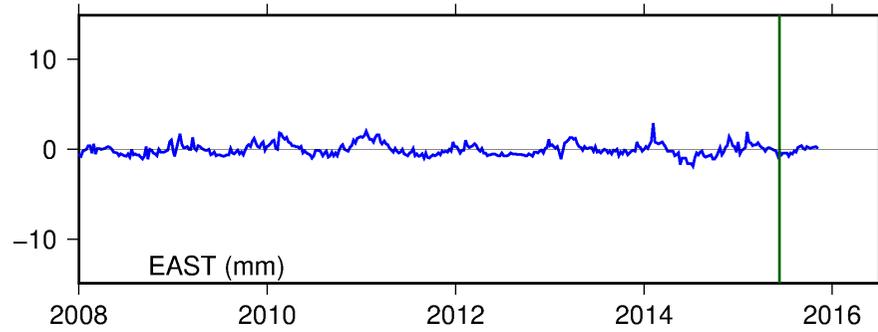
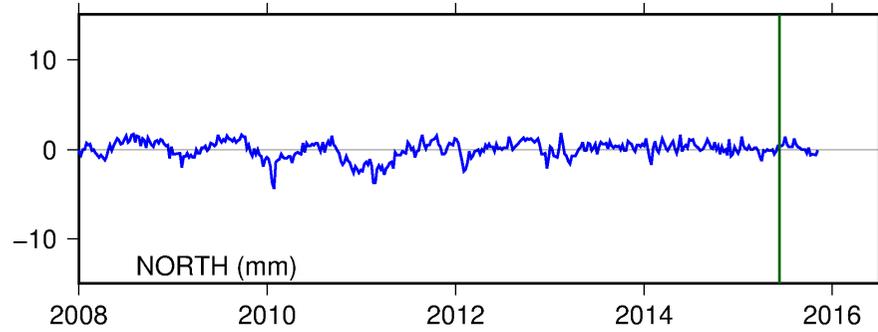
Time-series analysis

- From GPS week 1448 (7.10.2007)
- Reference frames:
 - IGS05 (GPS weeks 1448...1631)
 - IGS08 (GPS weeks 1632...1708)
 - IGb08 (from GPS week 1709)
- Used programs:
 - CATS, CATREF

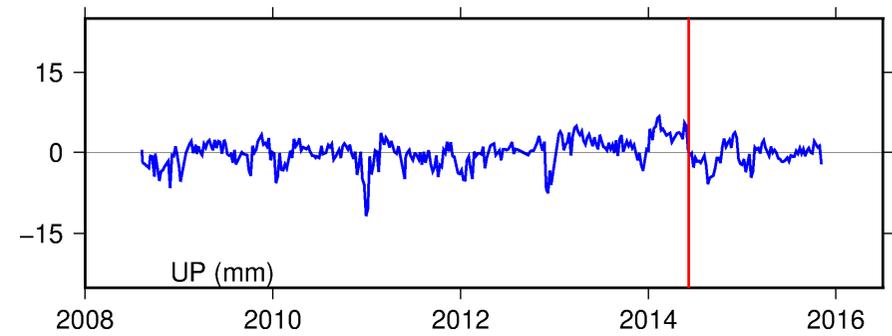
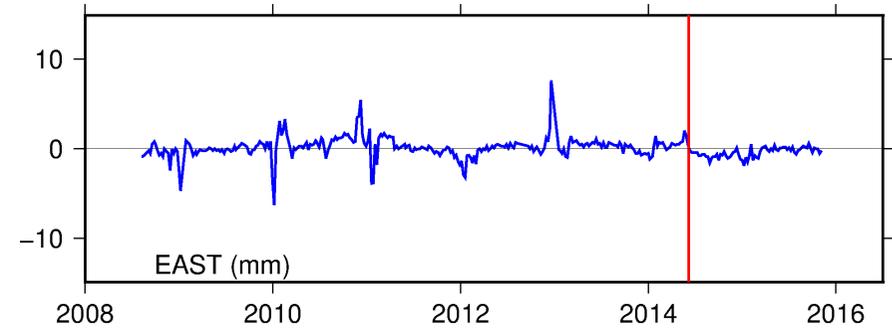
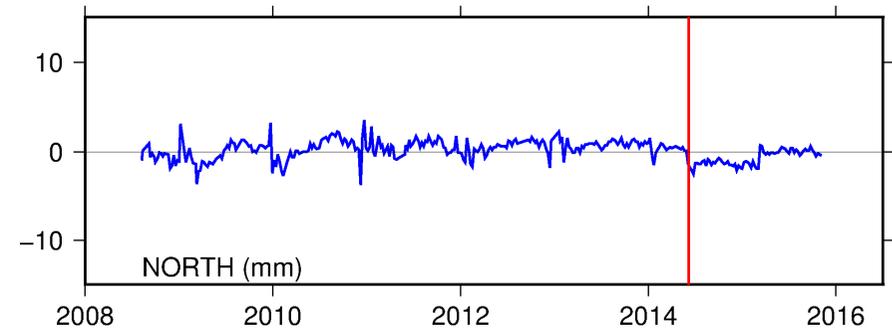


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TOIL Residuals



KARD Residuals





FUTURE

- Cooperation with neighbours
 - Latvia: LGIA
 - Finland: MML
- Reference frame computations
- New services to the users



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Thank you for your attention!



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