GNSS permanent stations as the part of integrated geodetic system in Estonia

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Outline

- Integrated network concept
- Case study: Estonia
- Integrated network in Estonia
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  - GNSS permanent stations with gravimetric network points
  - GNSS permanent stations with levelling network points
  - GNSS permanent stations with tide-gauges
- Co-locations: insights
- Future foresights

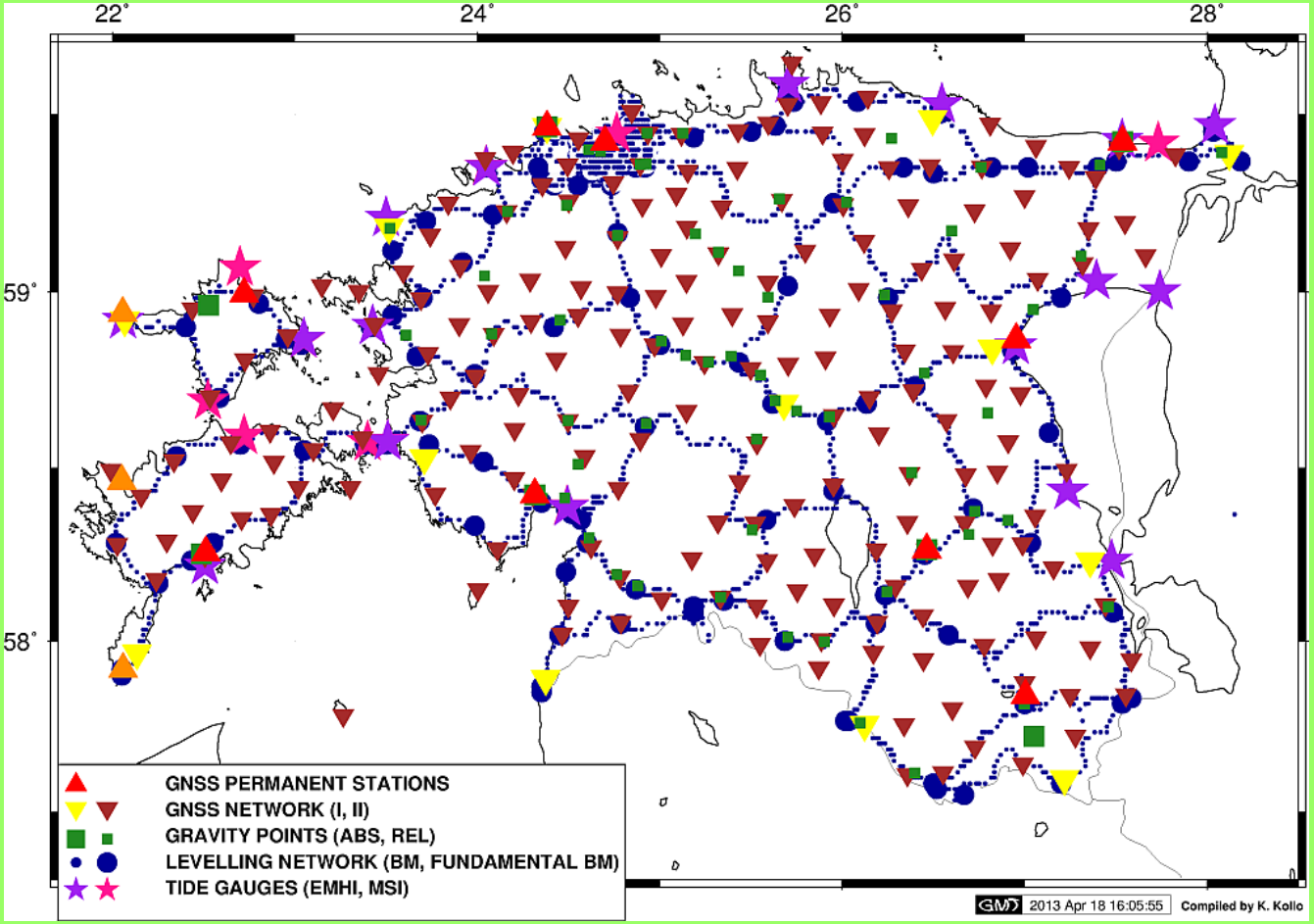
Integrated network concept

- Integrated network concept – better possibilities to tie different techniques
  - GNSS, Levelling, Gravity, Tide gauges, Meteorological, SLR & VLBI
- GNSS-technique can be used as a connection between the different measurement techniques

Case study: Estonia

- Determination of changes of geodetic quantities in space and time
  - Postglacial uplift has an influence on measured geodetic quantities
- Unification of reference systems (vertical, 3D)
- Determination of geoid models (or transformation surfaces)

- GNSS measurements and CORS
  - Deformation studies, improvement the geophysical deformation models
- Repeated levelling
  - Apparent land uplift
- Tide-gauges (Sea level data)
- Gravity network
  - Relative gravity measurements
  - Absolute gravity measurements



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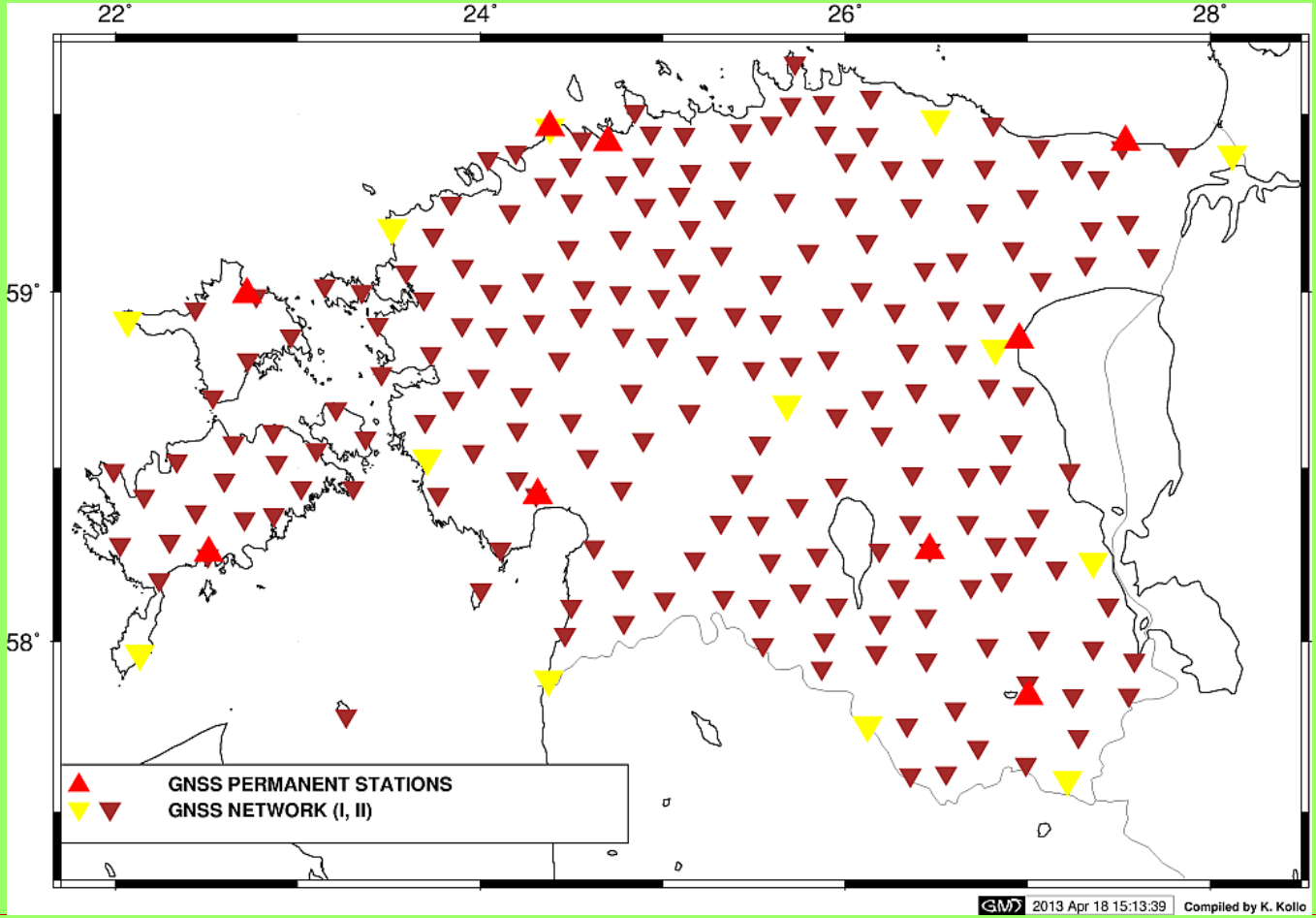
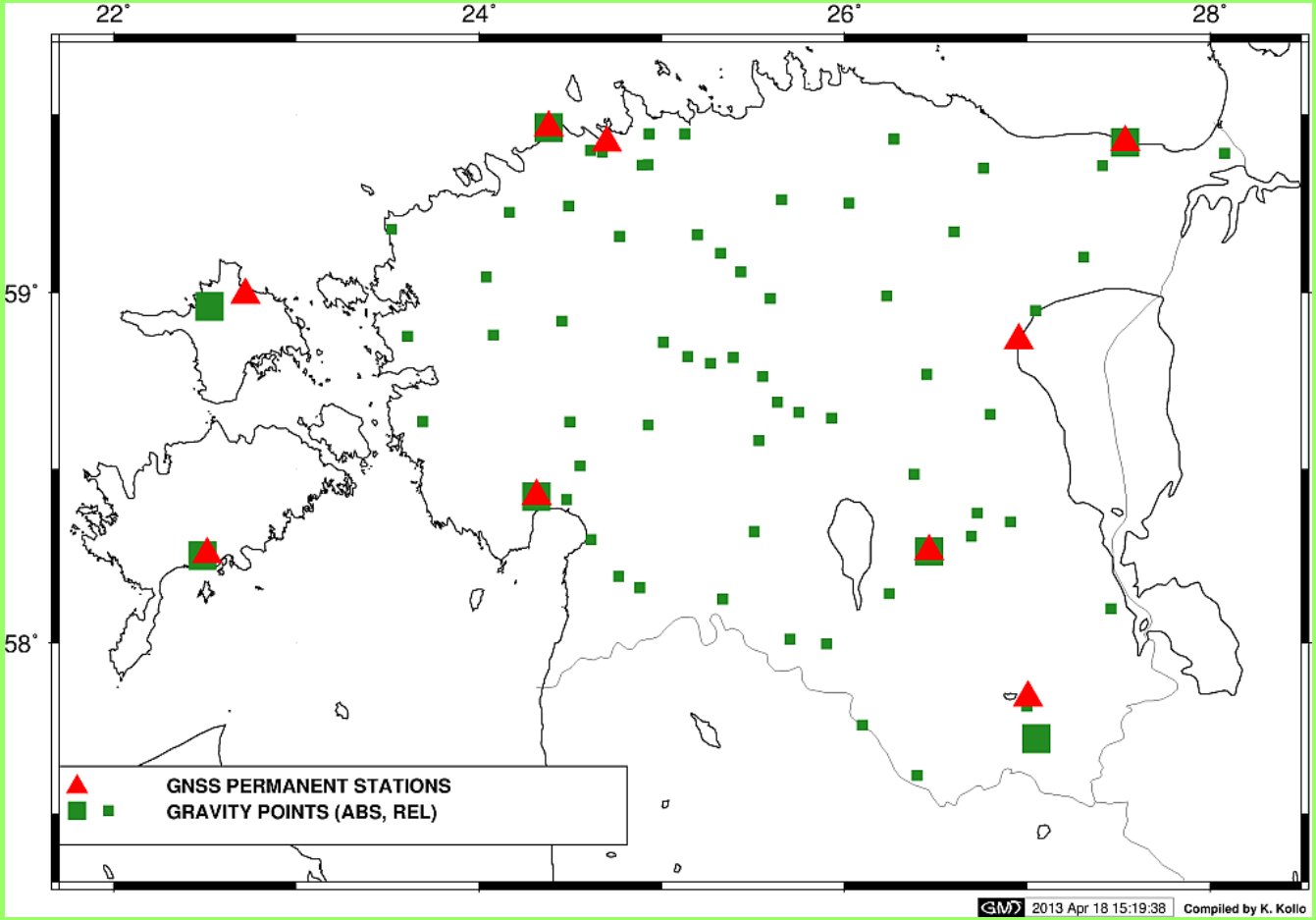
Integrated network in Estonia

- Levelling network
  - Within 1.5 km of the levelling lines – 129 RGP points (60%)
- Gravimetric network
  - From RGP points 56 are situated in a few kilometres range
- Sea level stations
  - Distances from RGP points 1-12 km

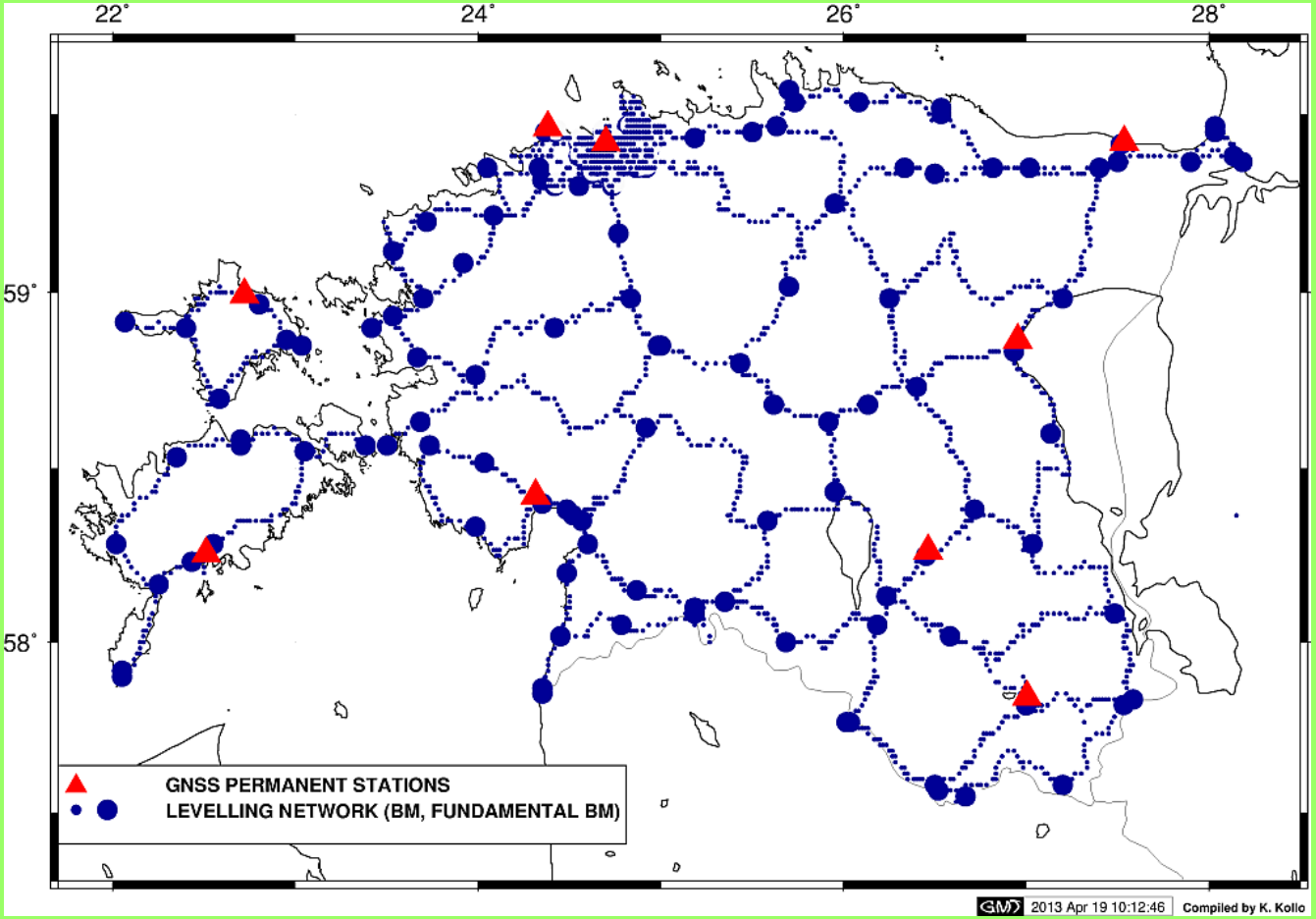
GNSS permanent stations with GPS network points



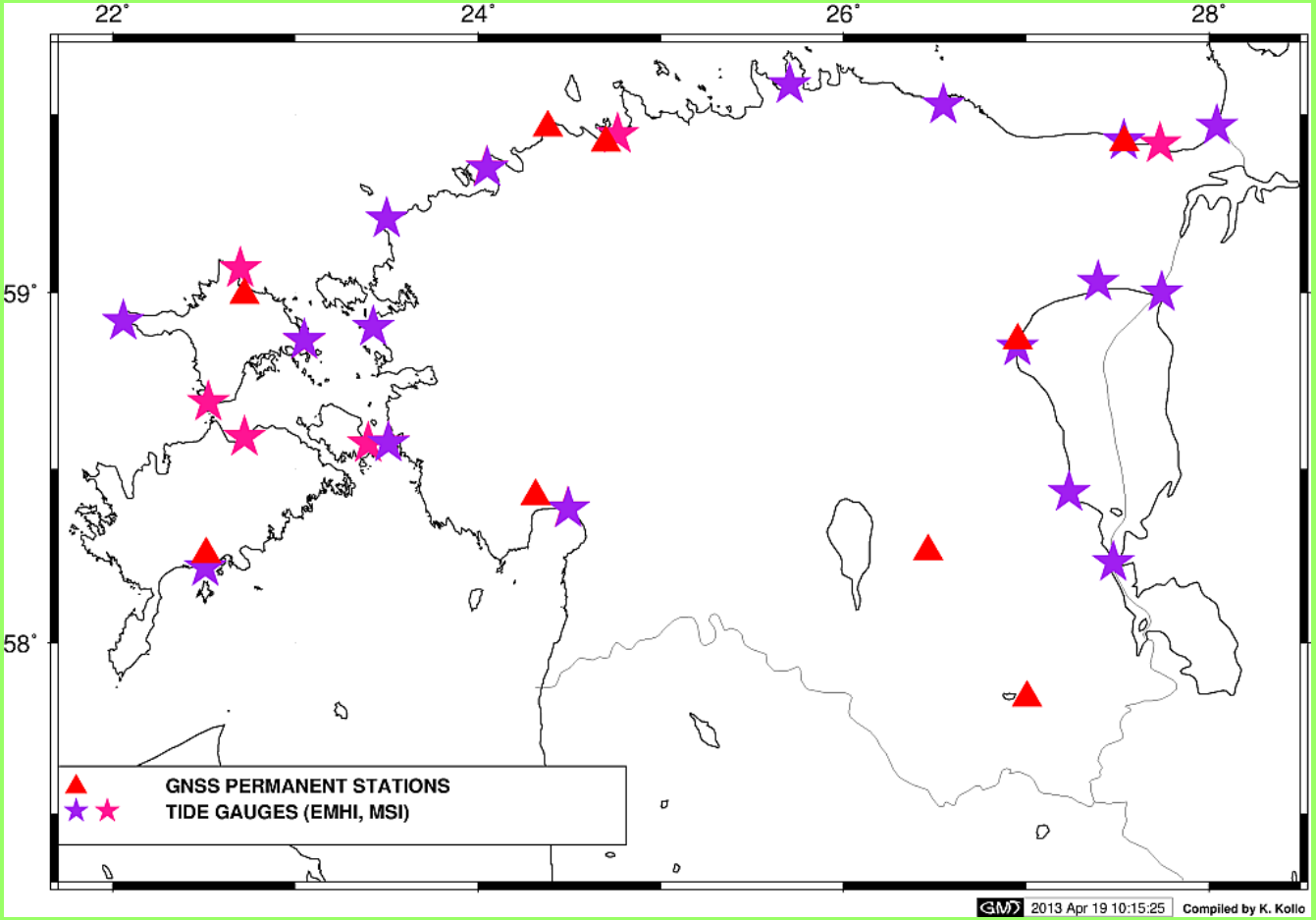
GNSS permanent stations with gravimetric network points



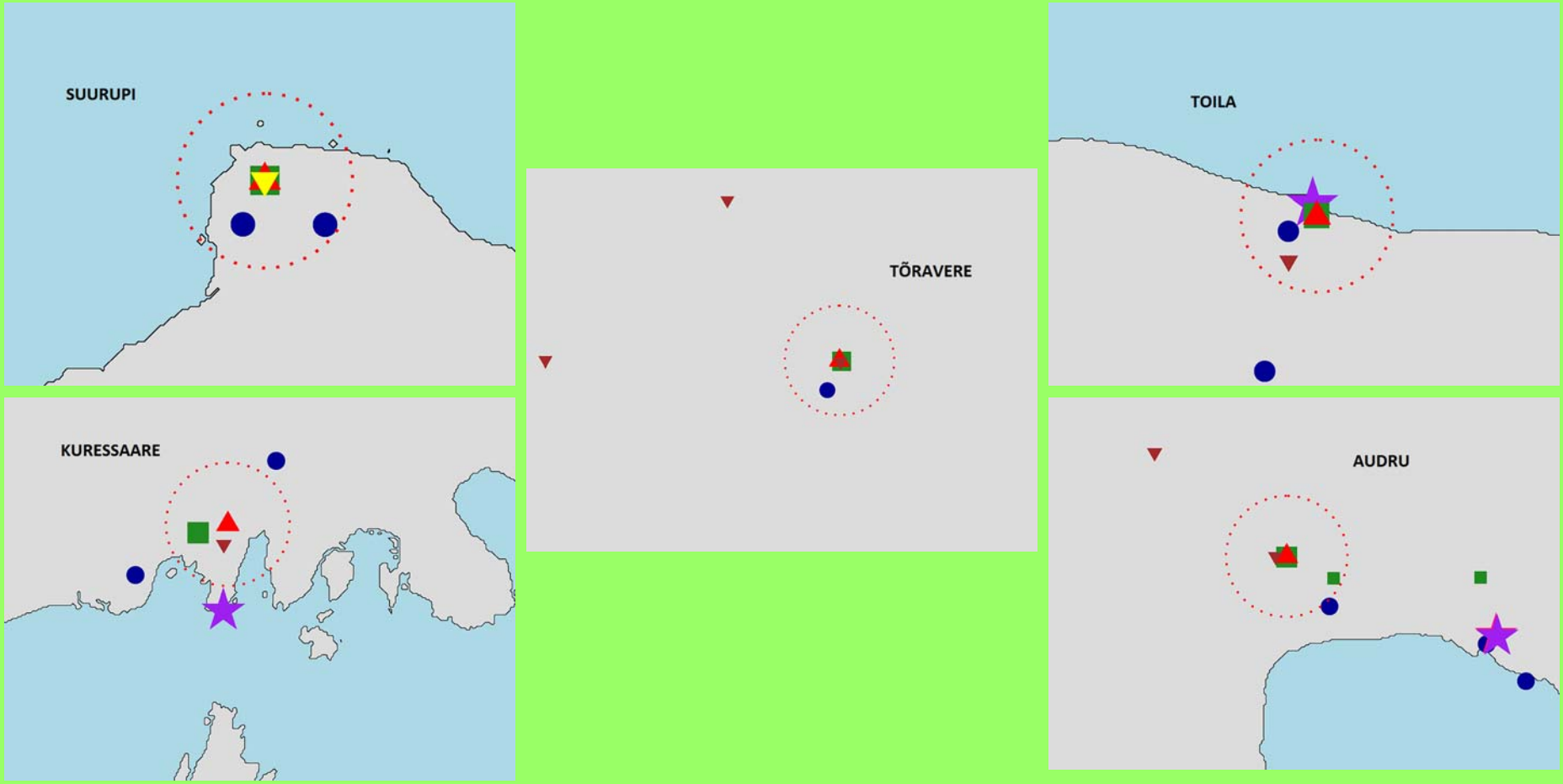
GNSS permanent stations with levelling network points



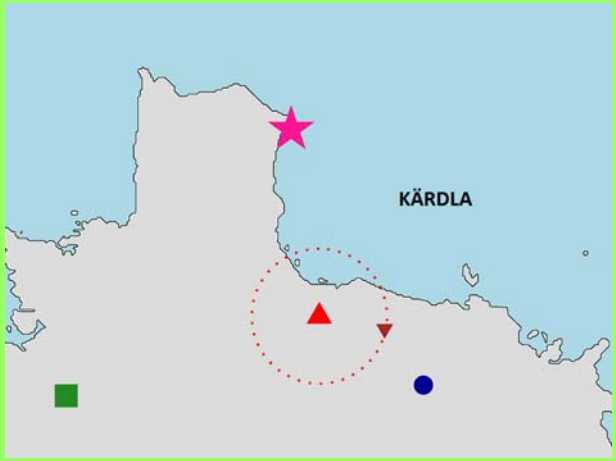
GNSS permanent stations with tide-gauges

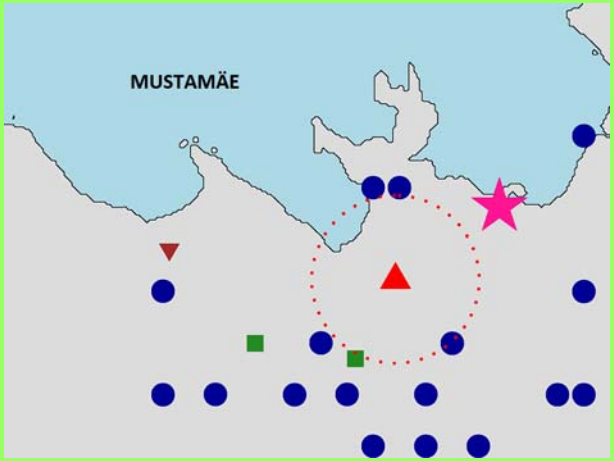


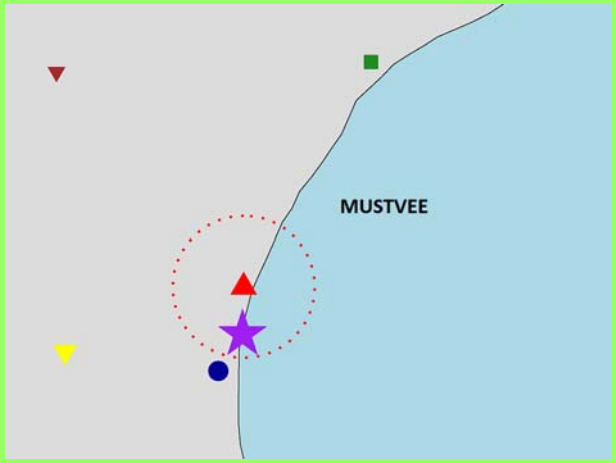
Co-locations: insight (2007)

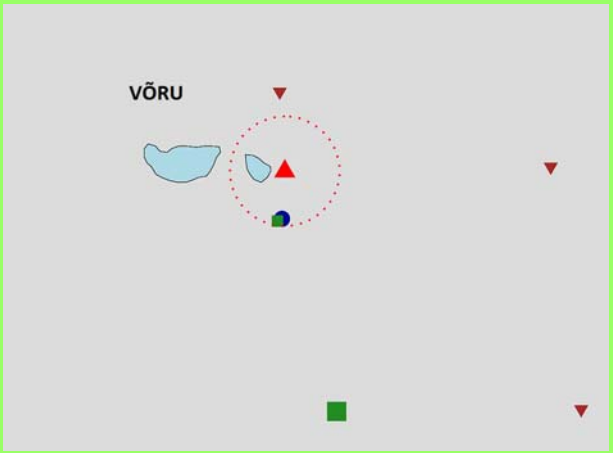


Co-locations: insights (2008)









Future foresights

- Several techniques are available in one location
  - In most CORS locations 3 different techniques available
- Establishment of double CORS stations to monitor the stability
- Establishment of stations with at least three measurement techniques available

References

- Andres Rüdja: “Geodetic datums, reference systems and geodetic networks in Estonia ”, PhD thesis, Helsinki, 2004
- Geodetic Point Database http://www.maaamet.ee/rr/geo

- Thank you for your attention!

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