NLS
NATIONAL
LAND SURVEY
OF FINLAND

“Subgroup”: GNSMART

Meeting April 12th, 2024 (Teams)

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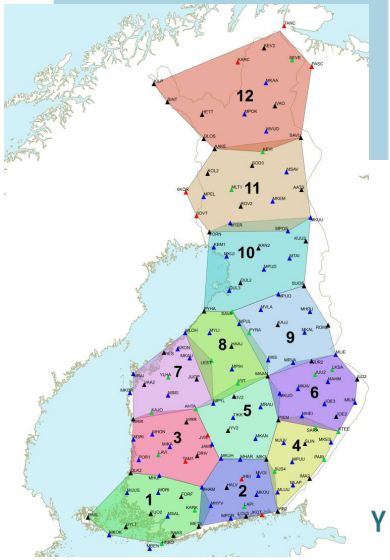
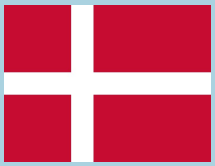
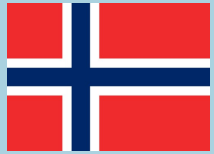
GNSMART in NKG

Use?	R&D	Production	Production	R&D	R&D
	1 sub-network (11 stations)	12 sub-networks	1 sub-network (32 stations!)	1 network (11 stations)	7 separate sub-networks



GNSMART in NKG

					
Real-time services	VRS + SSR	VRS (+ SSR)	VRS	SSR	VRS + SSR
Projects, other information	• TAPAS	• In NLS SSR just briefly tested by ourselves		• Hypos	• DINPAS, ended 2024 • SSR testing again later

VRS mode in GNSMART

”Pure” VRS (**ssrm2o** module) → ’extract’ VRS observations directly from state-space model

→ original approach in GREC processing in GNSMART

→ But has had many issues

FKP-based VRS (**ssrm2fkp** module) → generate FKP from state-space model, then apply these to reference observations to generate VRS

→ was created after ssrm2o did not work as expected

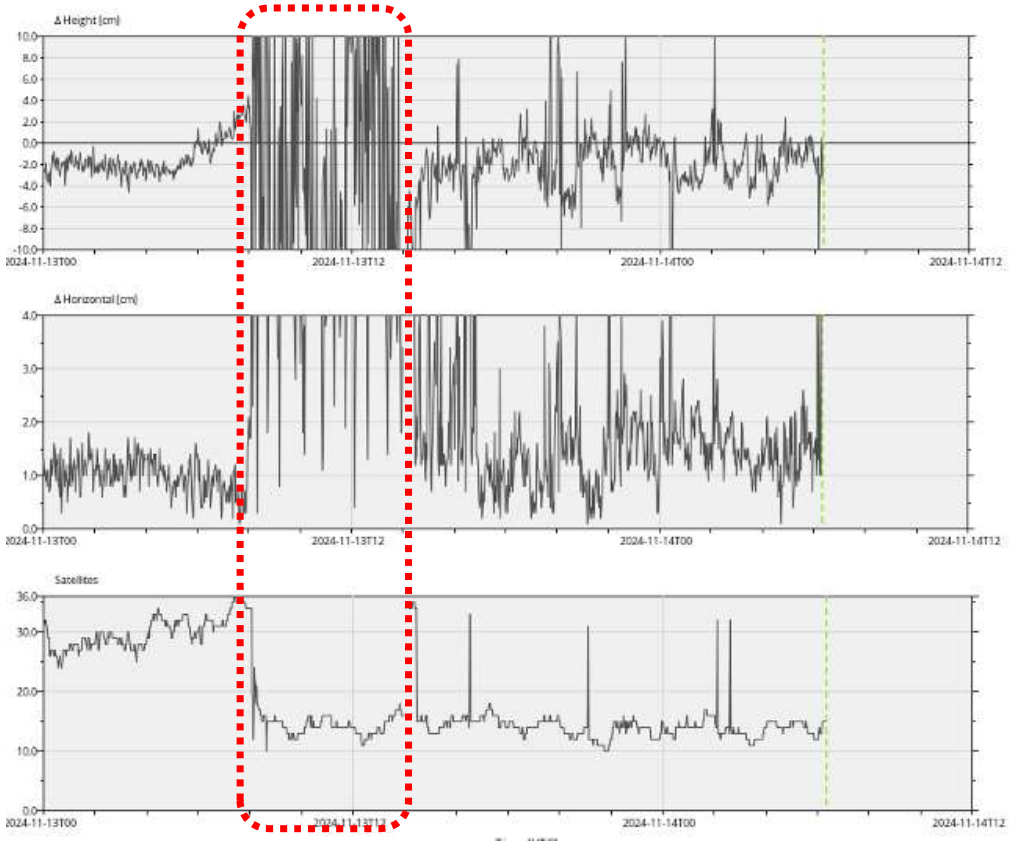
→ working method so far

VRS mode comparison

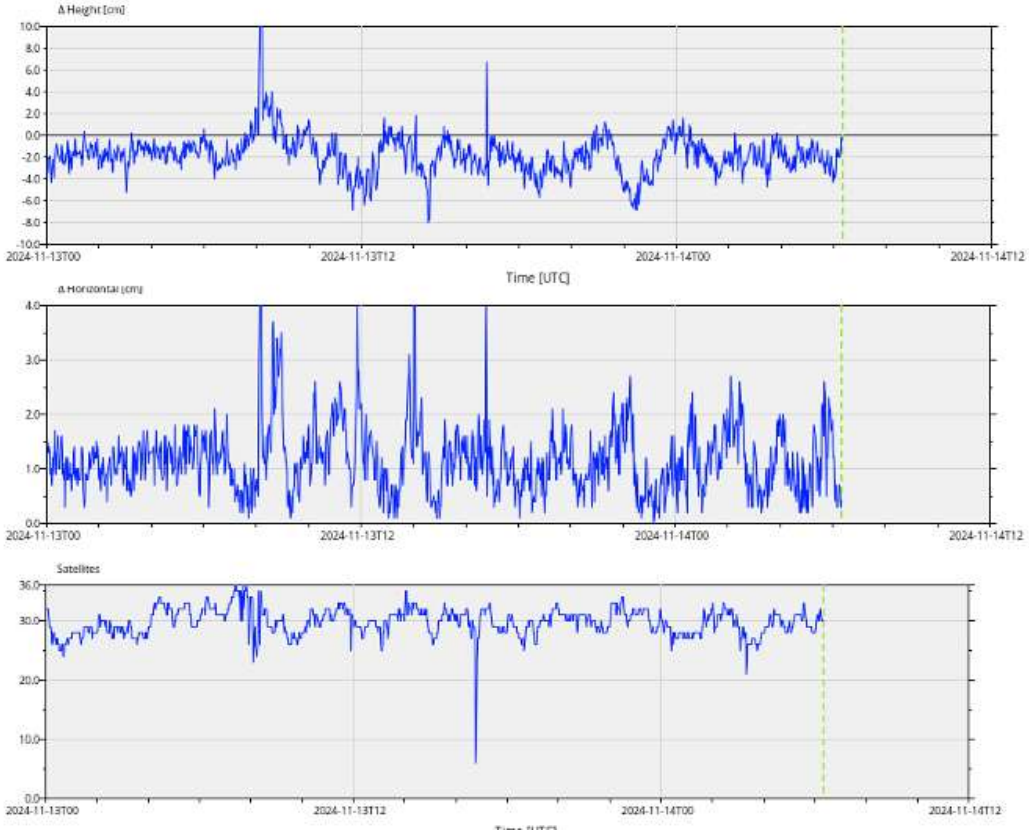
Data from NLS monitoring station in Pasila, Nov 2024

Septentrio has some issues when switching from ssr2mfkp to ssrm2o

ssrm2o / ”pure”



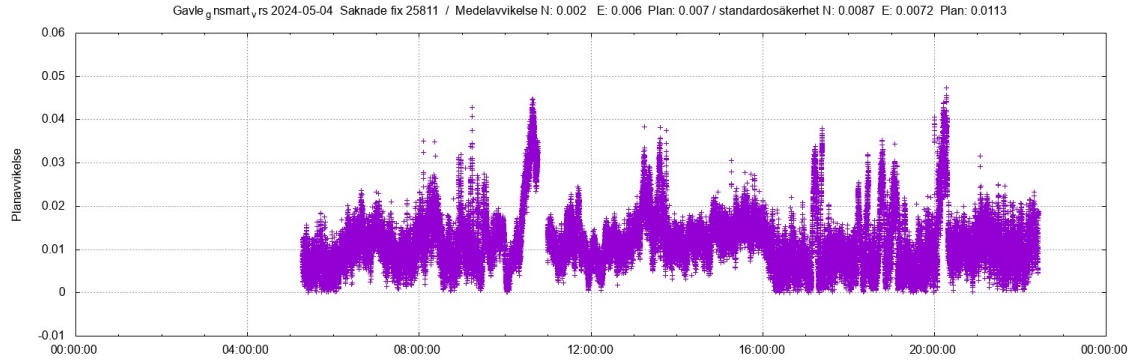
ssrm2fkp / FKP-based

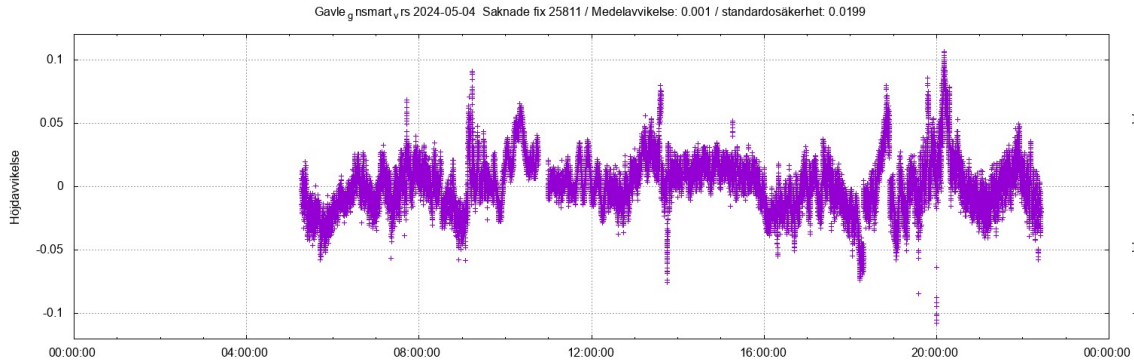


VRS mode comparison

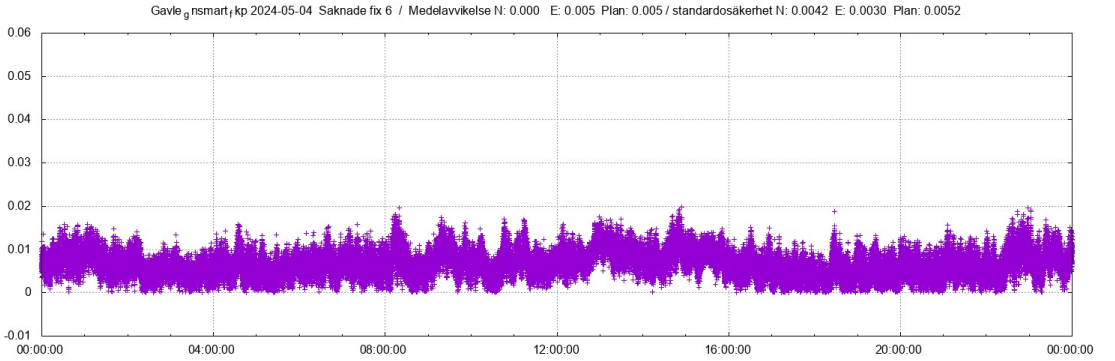
Data from Lantmäteriet monitoring station in Gävle, May 2024

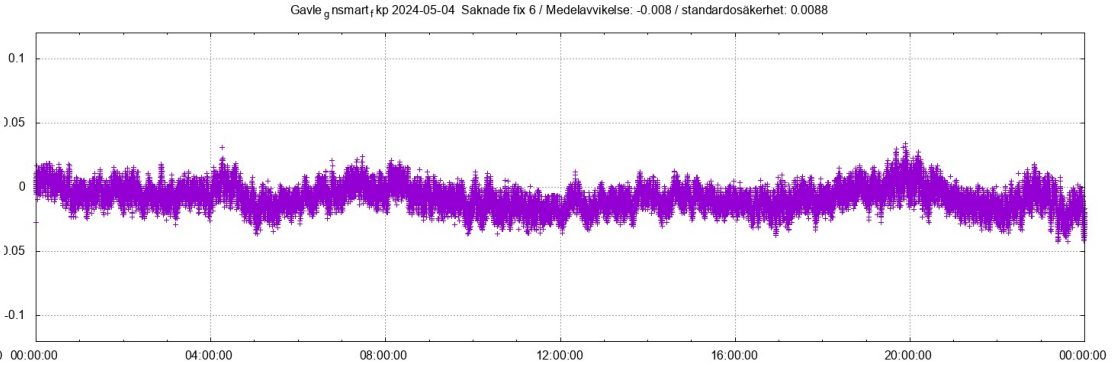
ssrm2o / ”pure”





ssrm2fkp / FKP-based

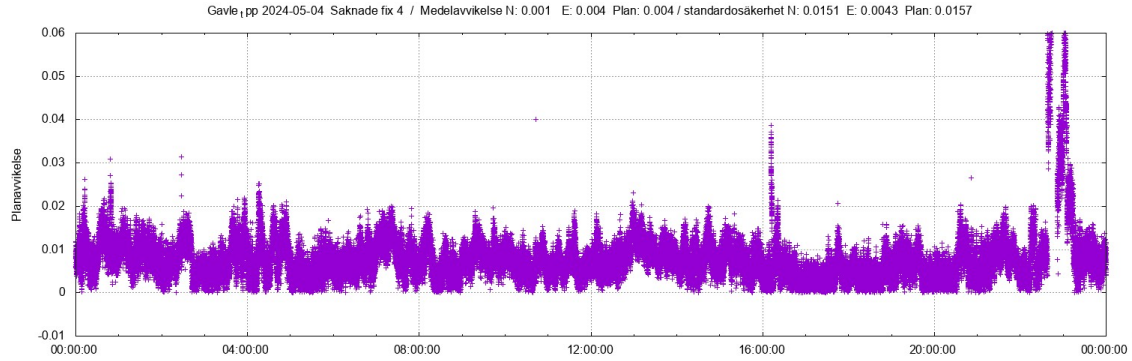


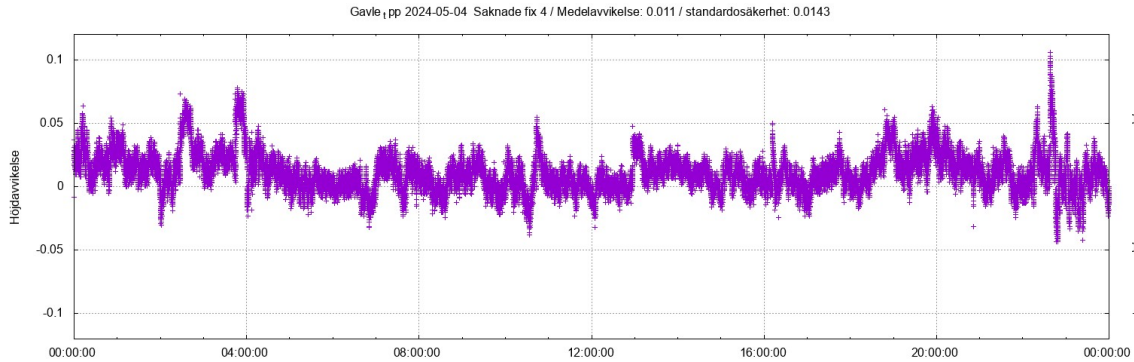


VRS mode comparison

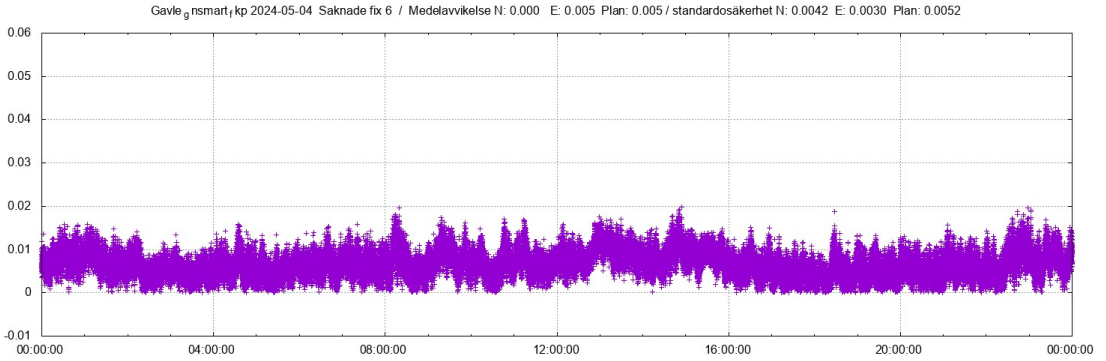
Data from Lantmäteriet monitoring station in Gävle, May 2024

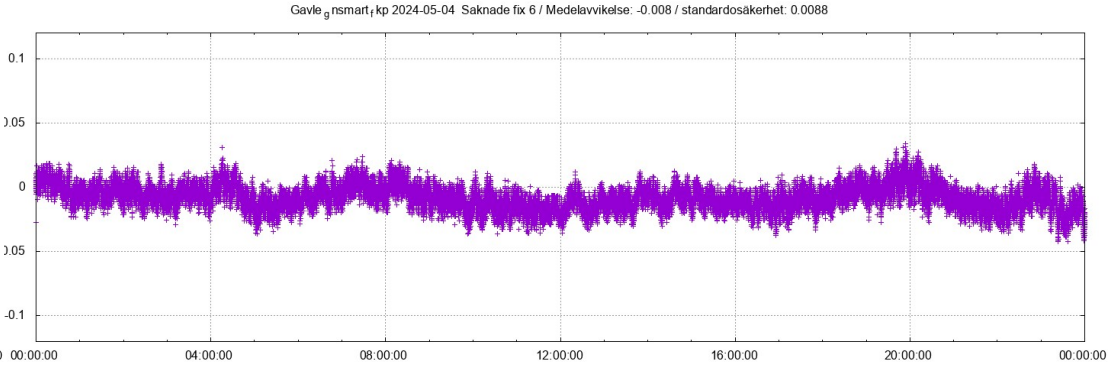
SWEPOS (Pivot)





ssrm2fkp / FKP-based





Pros and cons of “pure” VRS

- Less reliant on closest reference station
- More ”uniform” data
- Reference coordinates?
  - With ssrm2fkp it is clear that rover gets coordinates of base station
  - With ssrm2o the output uses transformation parameters (-DAT)

    → If -DAT not provided, one could provide ITRF + local ETRF with the same service! Just different mountpoints

Coordinate transformation possibilites: local <> ITRF

GNSMART

- Helmert 15P + GNSMART estimates
- Velocities
- Official & technical coordinates
  - Model in ITRF, but mountpoint outputs official local ETRF in RTK
- Conversion for user with RTCM parameters
- PROJ support coming!

Pivot

- Helmert 15P + dynamic coordinates
- Velocities
- NKG2020 transformation parameters are available, but deformation model not properly used! Trimble is fixing this!