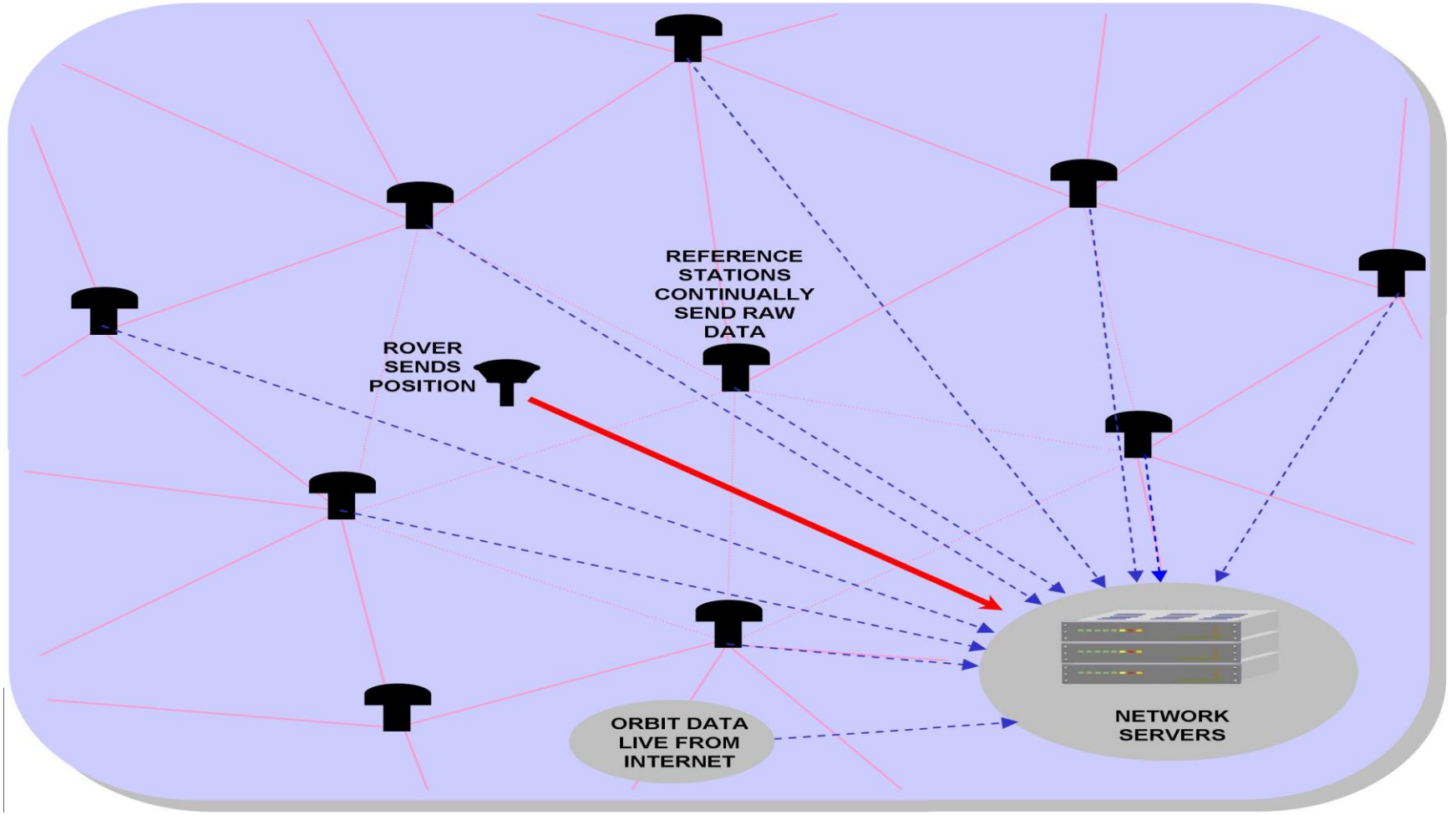
Recent NGS Releases

- “Tale of two RTN’s: Rigorous Evaluation of Real-Time Network GNSS Observations” Allahyari et al. 2018
- Release of NGS NCAT
- Discussion of common practices

Tale of Two RTNs

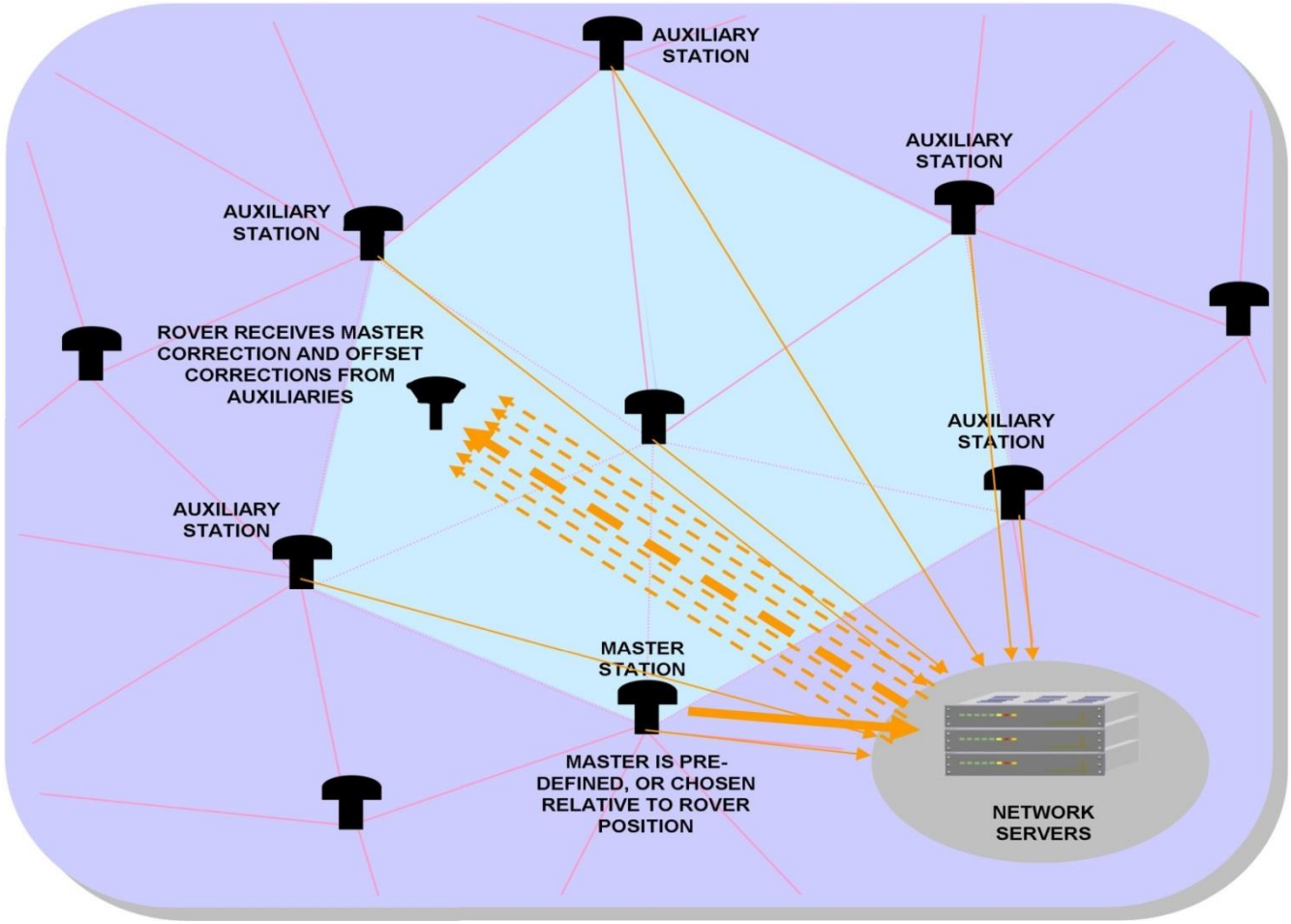
- Two Separate Networks Tested
  - Oregon ORGN (MAX)
  - South Carolina (VRS)
- Network (nRTK) Vs Single Base (sRTK)
- Optimal Observation Times
- Effect on baseline length with fixed integer solutions.
- GPS only and GPS+GLONASS

Multi Station Corrections



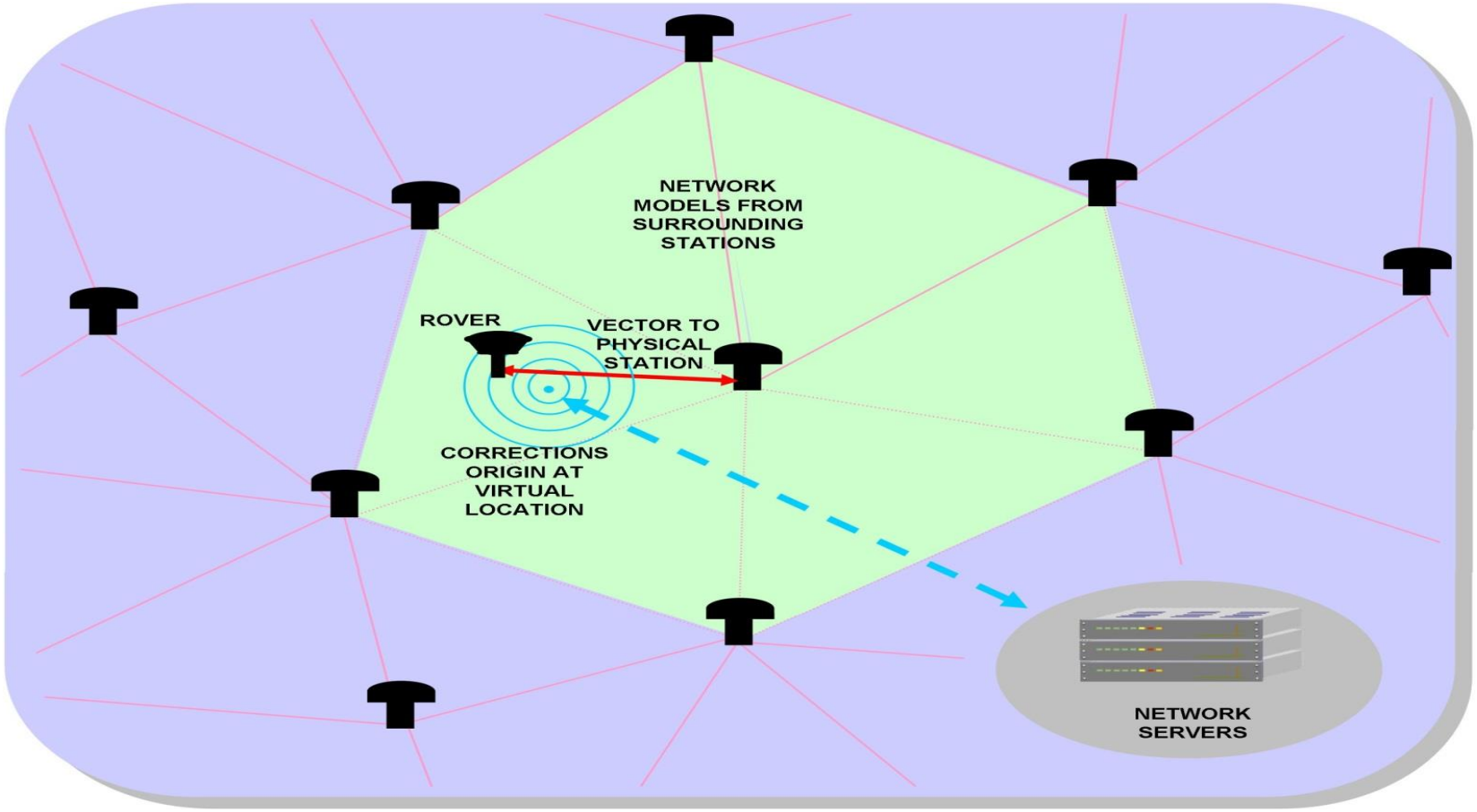
Graphic Credit – Gavin Schrock

RTCM (Master Auxiliary)



Graphic Credit – Gavin Schrock

Trimble – CMR(VRS)



Graphic Credit – Gavin Schrock

Baseline Lengths and Fixed Observations

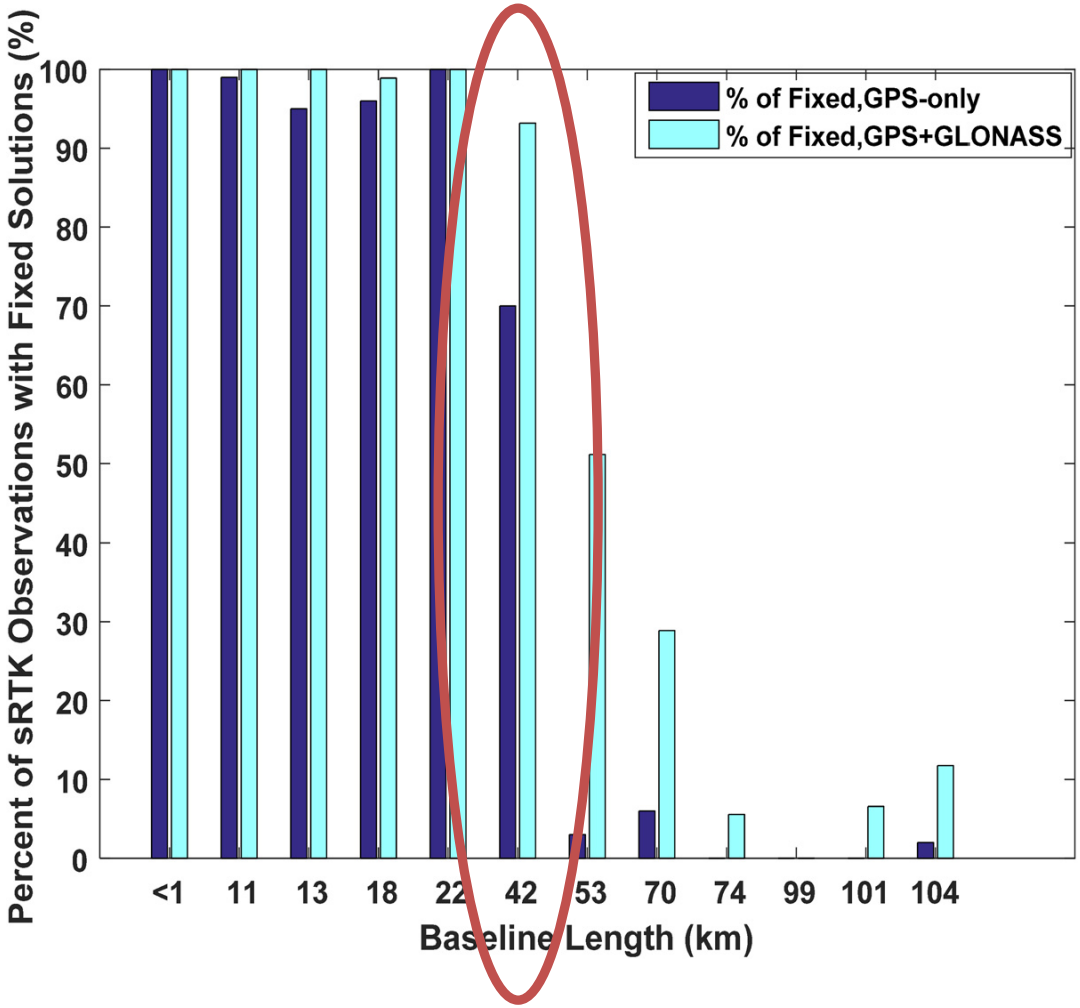


Fig. 3. Comparison of the percentage of fixed solutions as a function of baseline length for sRTK with GPS and sRTK with GPSþGLONASS observables (considering all observations and durations)

HRMSE and VRMSE with Baseline length

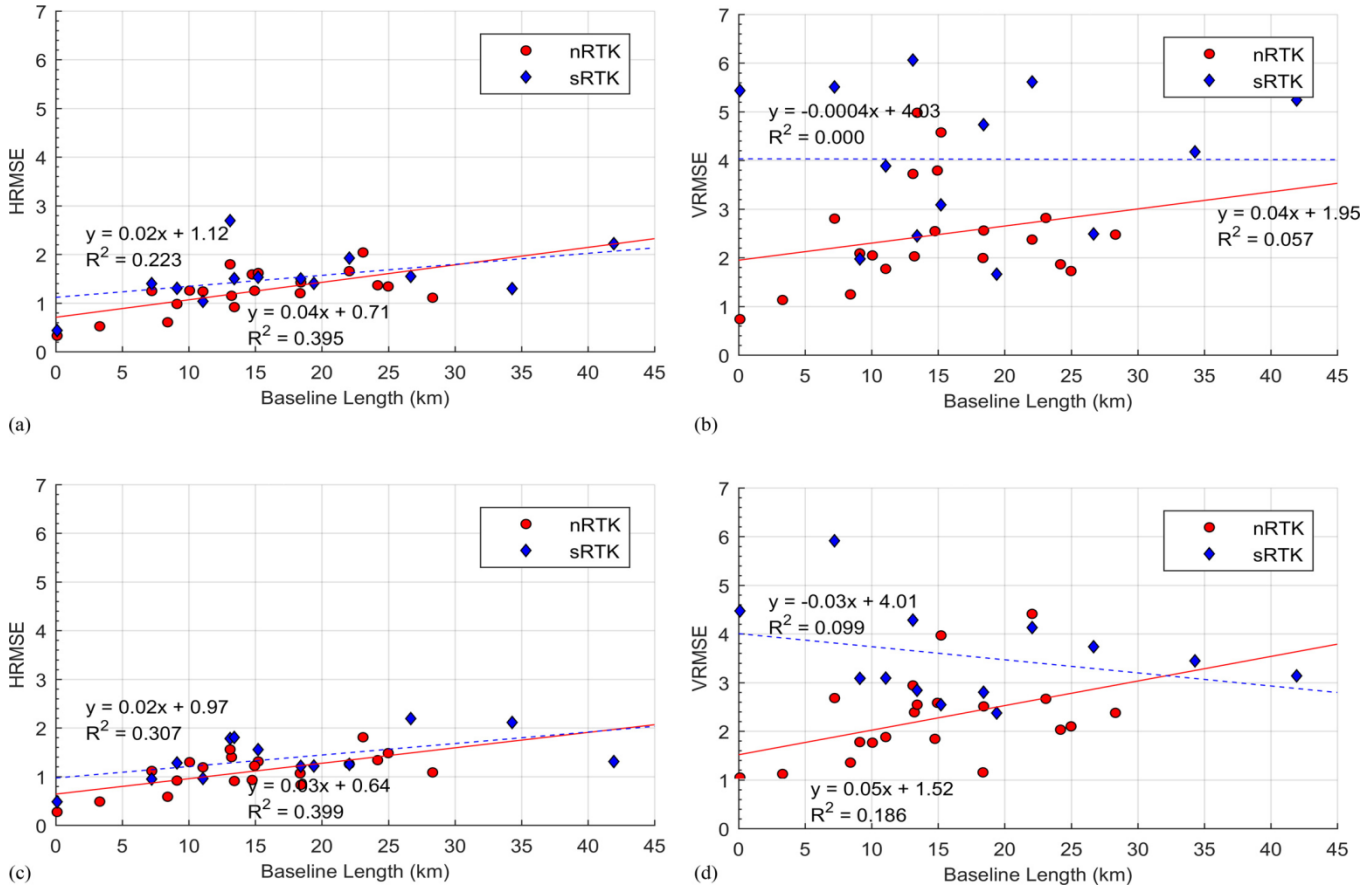
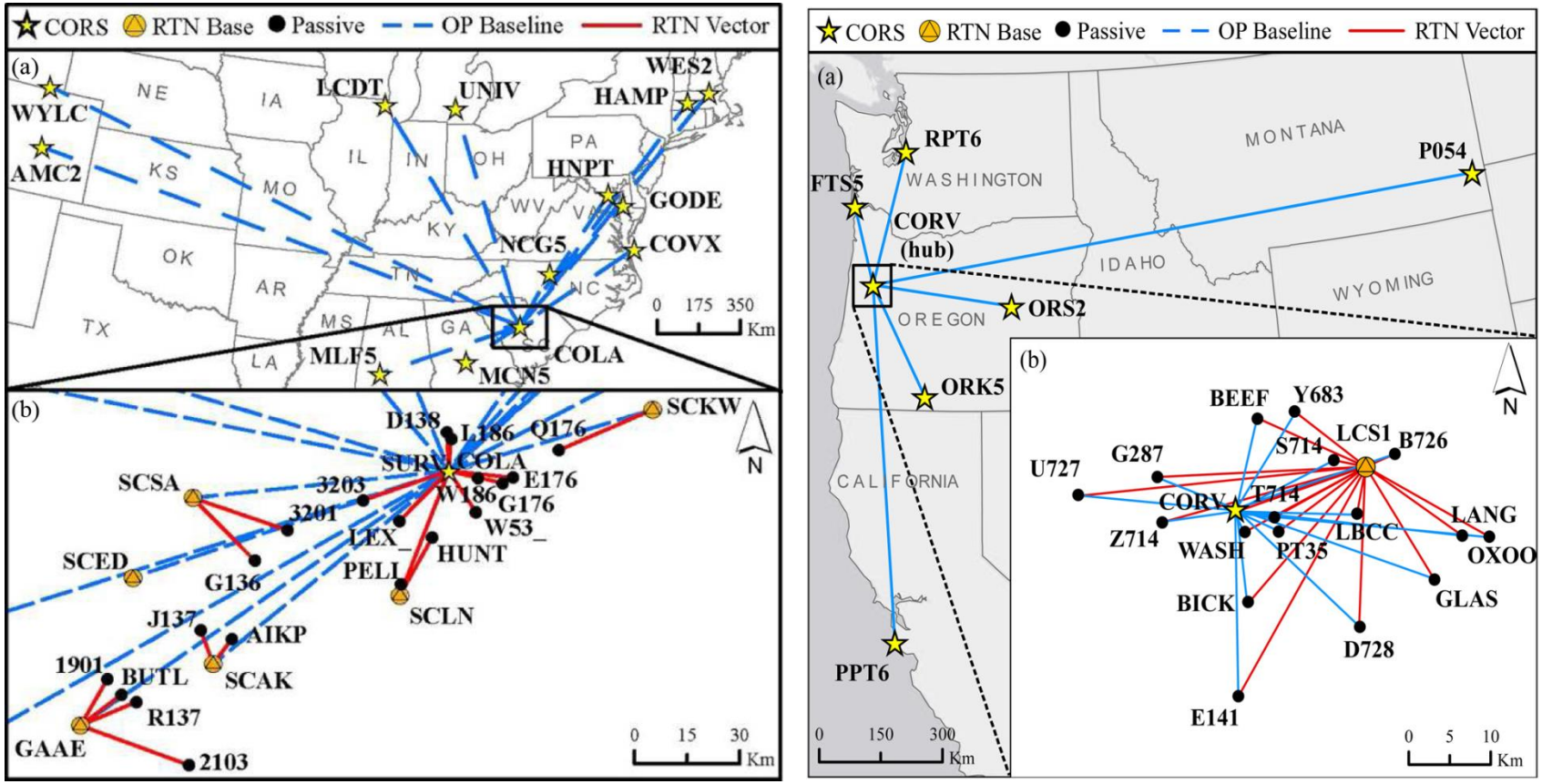


Fig. 6. Comparison of HRMSE and VRMSE versus baseline length in South Carolina (180-s observations): (a) HRMSE, GPS only; (b) VRMSE, GPS only; (c)HRMSE, GPS&GLONASS; (d)VRMSE, GPS&GLONASS

Project Control – CORS used in OPUS Projects

- (1) had data available during the survey campaign;
- (2) the daily solutions, as computed and plotted in short-term time series by NGS, were within +/–1 cm of the NGS published position; and
- (3) NGS had estimated their formal errors and computed

Project Control Cont.



HRMSE - sRTK vs. nRTK South Carolina

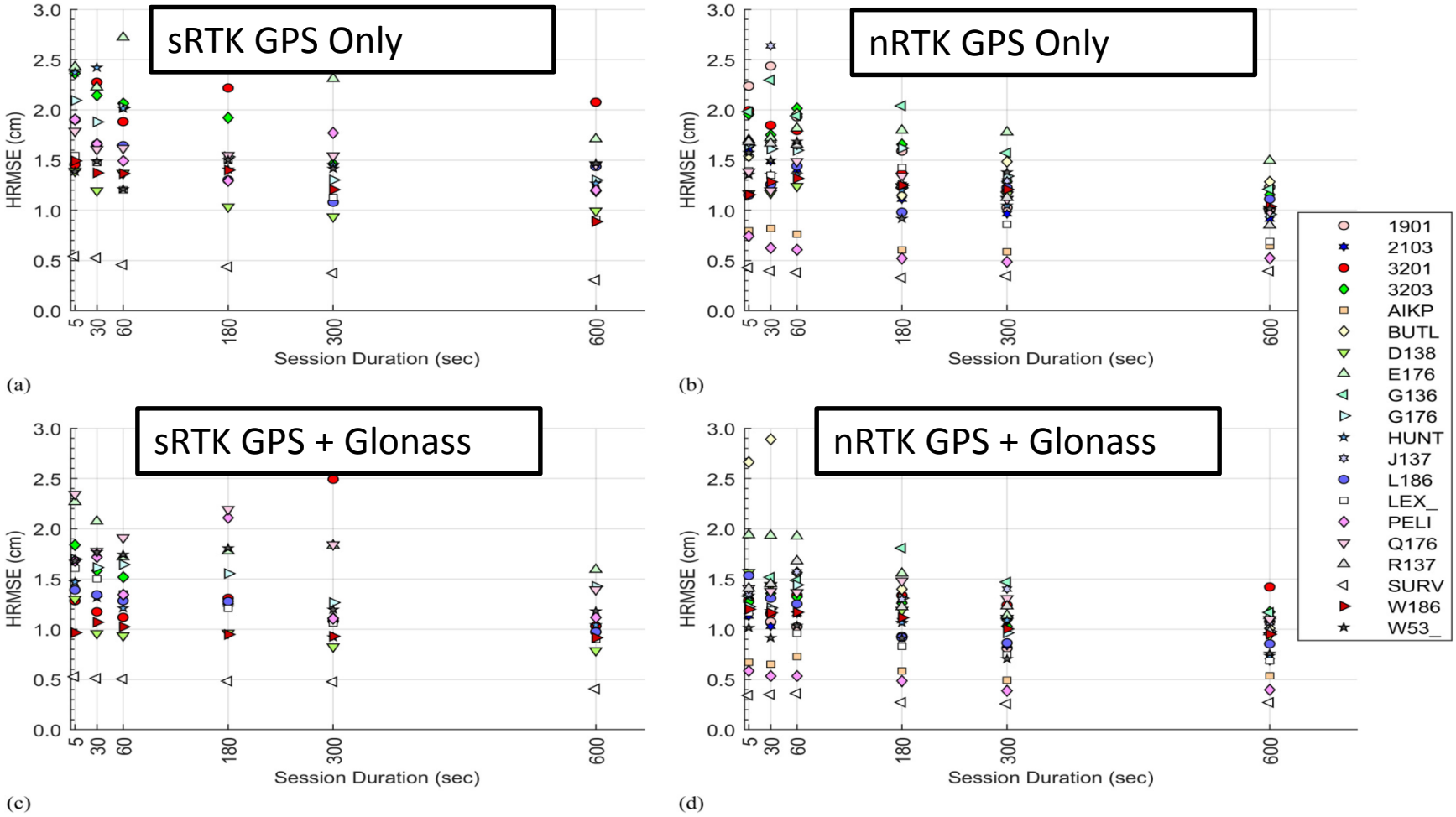


Fig. 4. HRMSE at each mark in South Carolina, data versus observation duration: (a) sRTK GPS only; (b) nRTK GPS only; (c) sRTK GPS&GLONASS; (d) nRTK GPS&GLONASS

VRMSE – sRTK vs. nRTK South Carolina

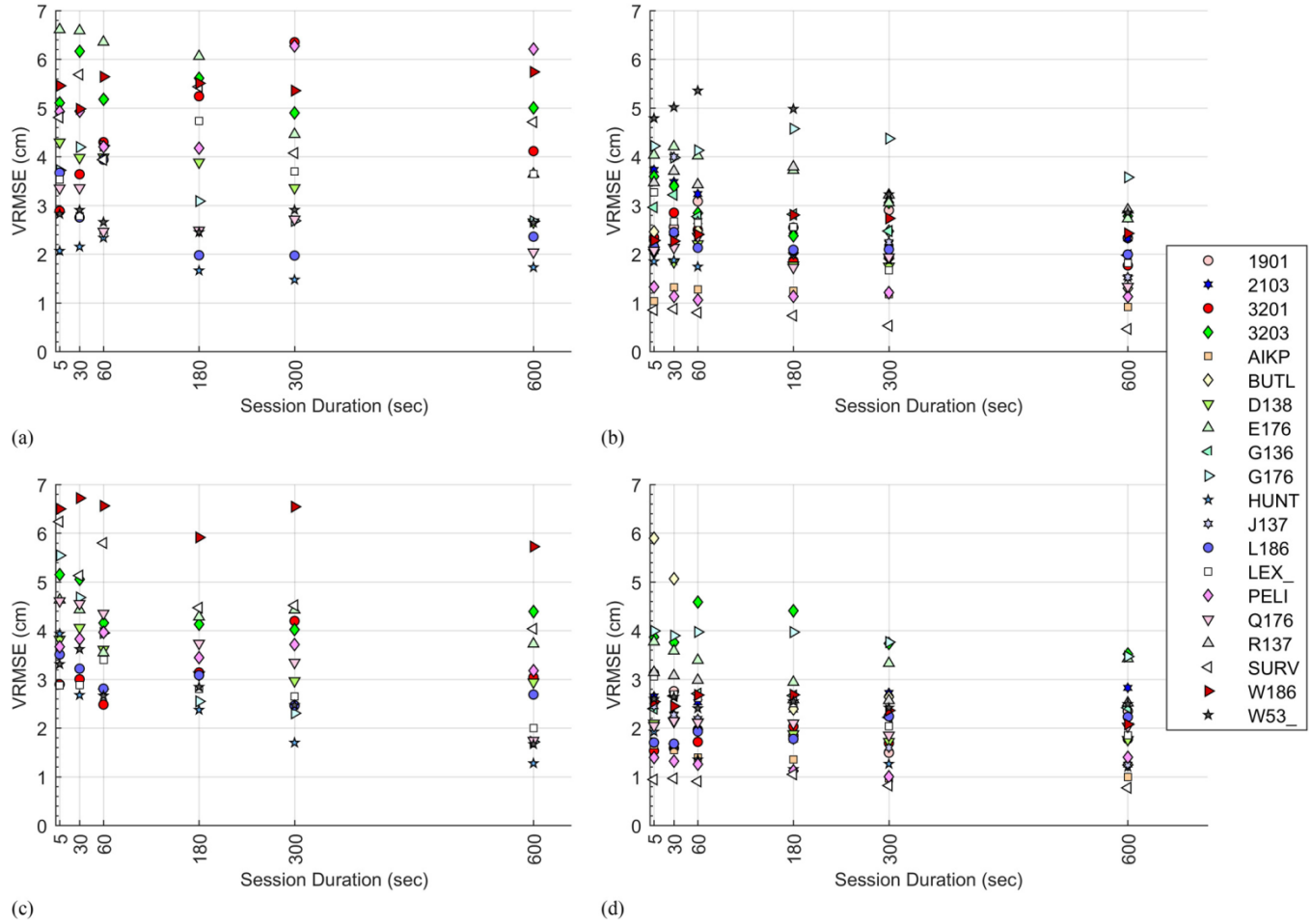
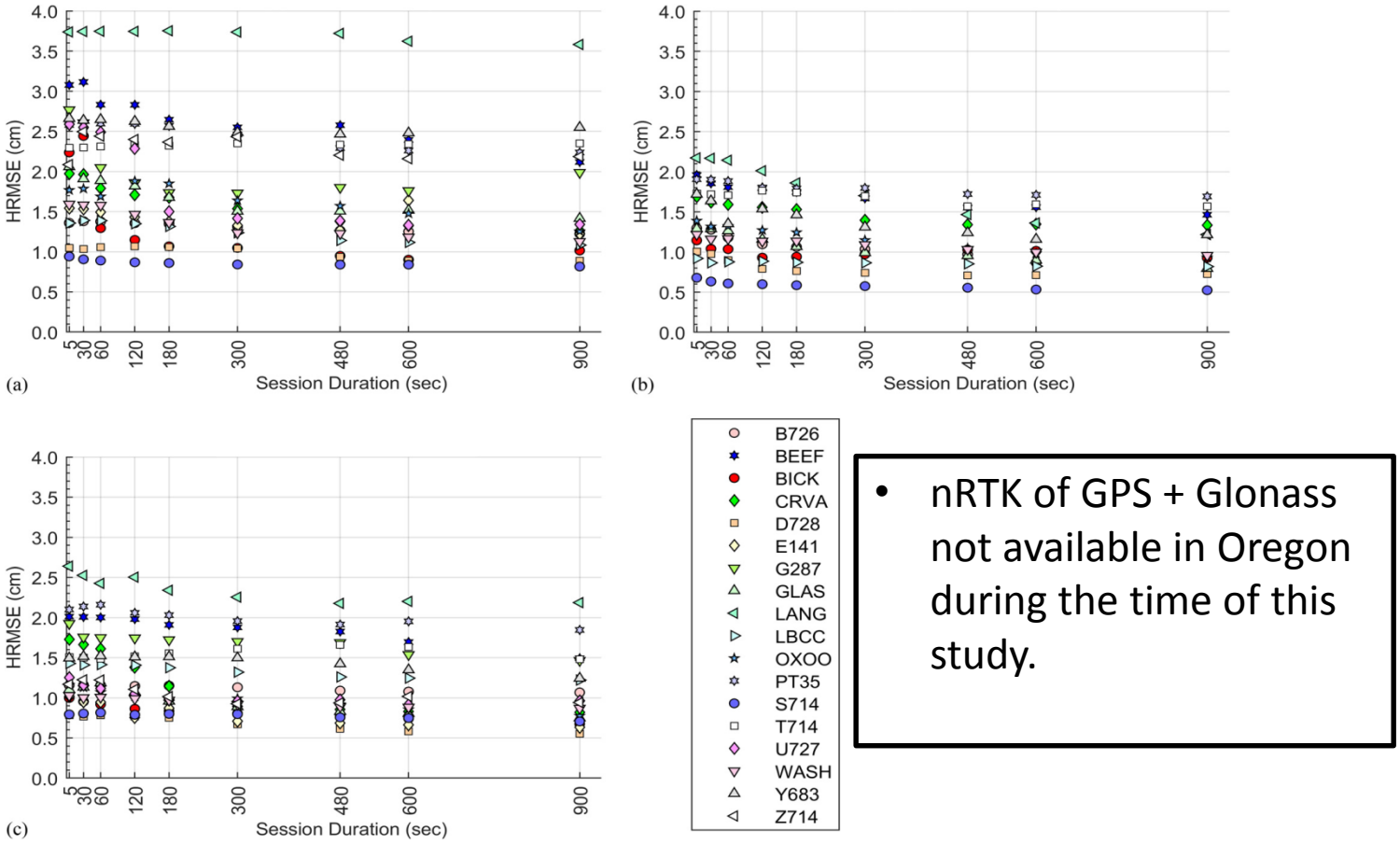


Fig. 5. VRMSE at each mark in South Carolina, data versus observation duration: (a) sRTK GPS only; (b) nRTK GPS only; (c) sRTK GPS&GLONASS; (d) nRTK GPS&GLONASS

HRMSE sRTK vs. nRTK Oregon



- nRTK of GPS + Glonass not available in Oregon during the time of this study.

Fig. 7. HRMSE at each mark in Oregon, data versus observation duration: (a) sRTK GPS only; (b) nRTK GPS only; (c) sRTK GPS&GLONASS

VRMSE sRTK vs. nRTK Oregon

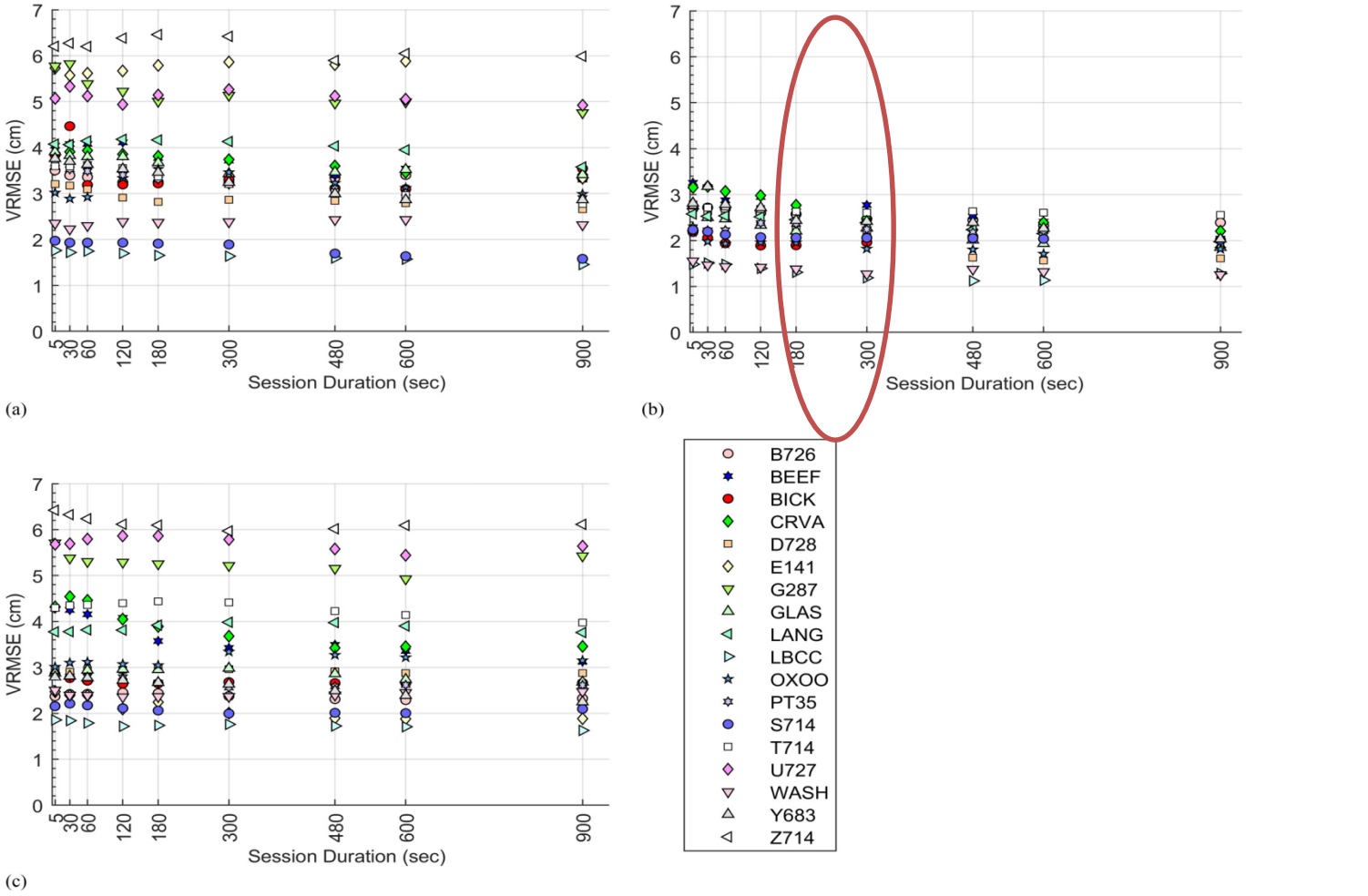
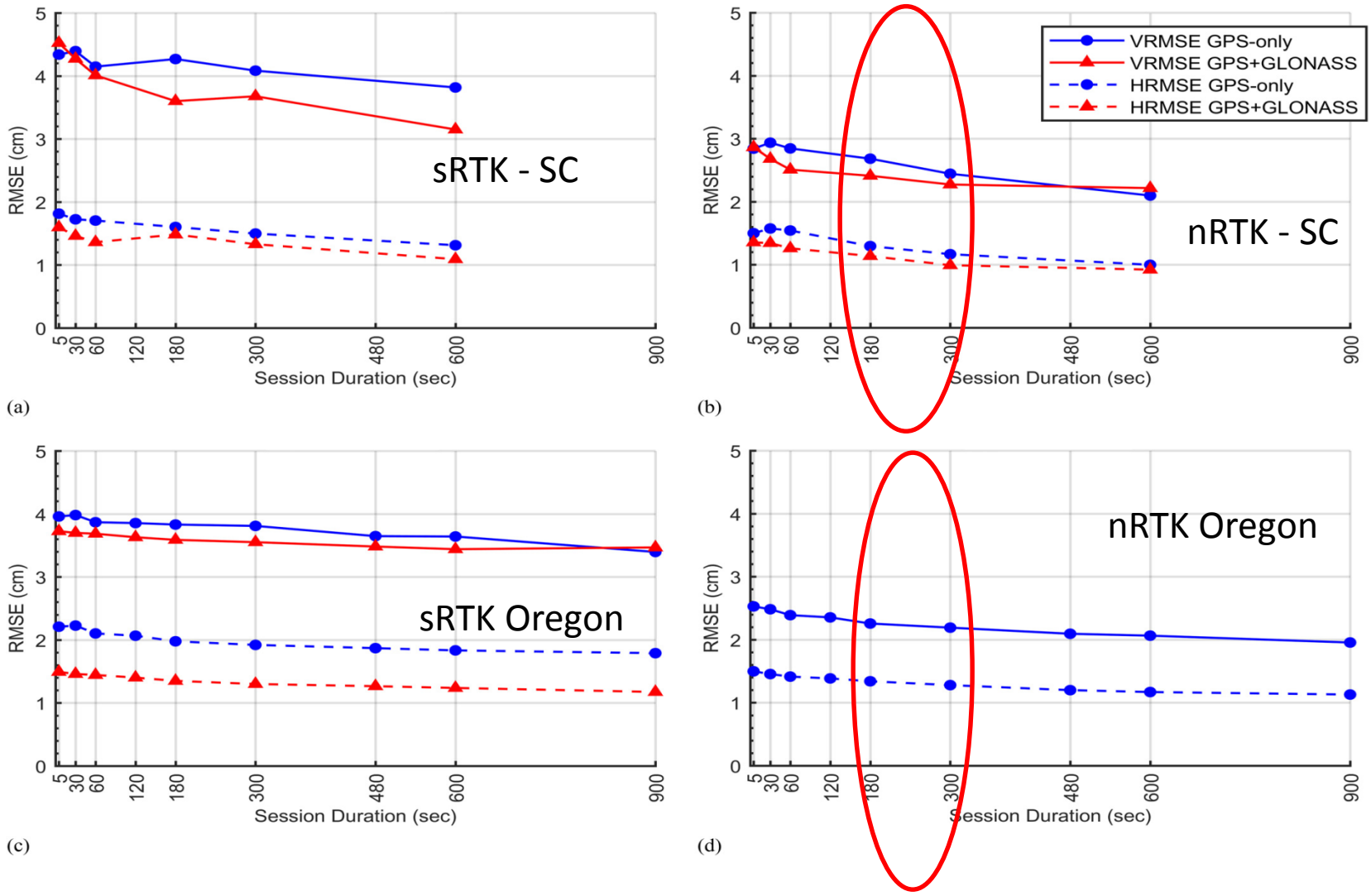


Fig. 8. VRMSE at each mark in Oregon, data versus observation duration: (a) sRTK GPS only; (b) nRTK GPS only; (c) sRTK GPSþGLONASS

Optimal Observation Times



Conclusions

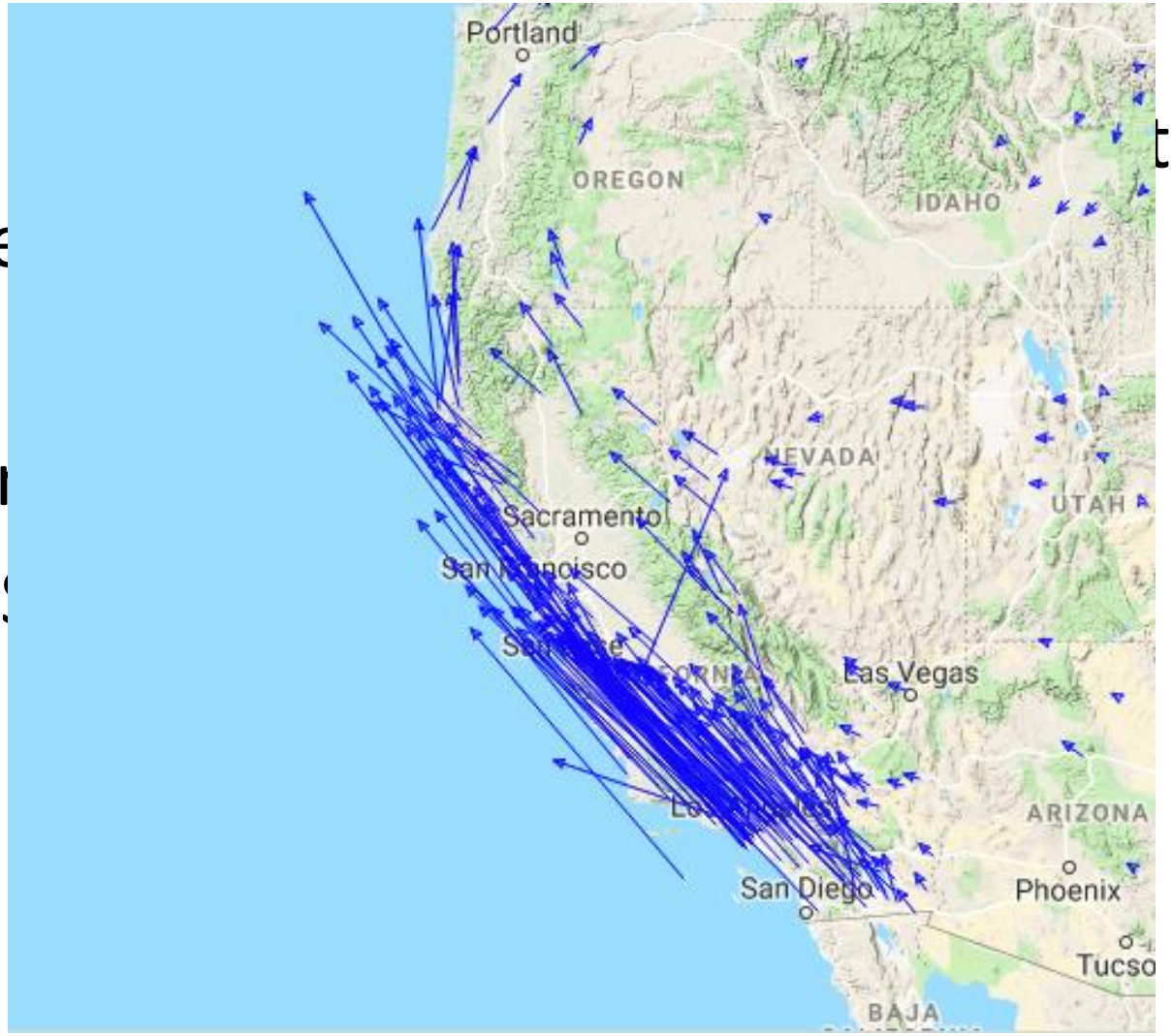
- 3-5 minute data collected with full network (nRTK) tended to be more accurate than Single reference station (sRTK).
- Adding GLONASS improved accuracy of observations and improved the number of fixed solutions at greater baseline lengths and under canopy.

Firmware Updates

- PRS Antenna phase center may not be recognized and give false correcting values in ellipsoid height.
  - Attributed to “non-recognized recievers”
- nRTK (+8.546cm)
- sRTK (+4.13cm)

What would be useful?

- Do we t new receive
- List of
  - Ar
  - NS



NGS NCAT

- Geoid Model can be loaded on to controller.
- Most RTNs broadcast NAD83(2011) epoch 2010.00 horizontal datum.
- Excellent tool for multipoint horizontal datum conversion.