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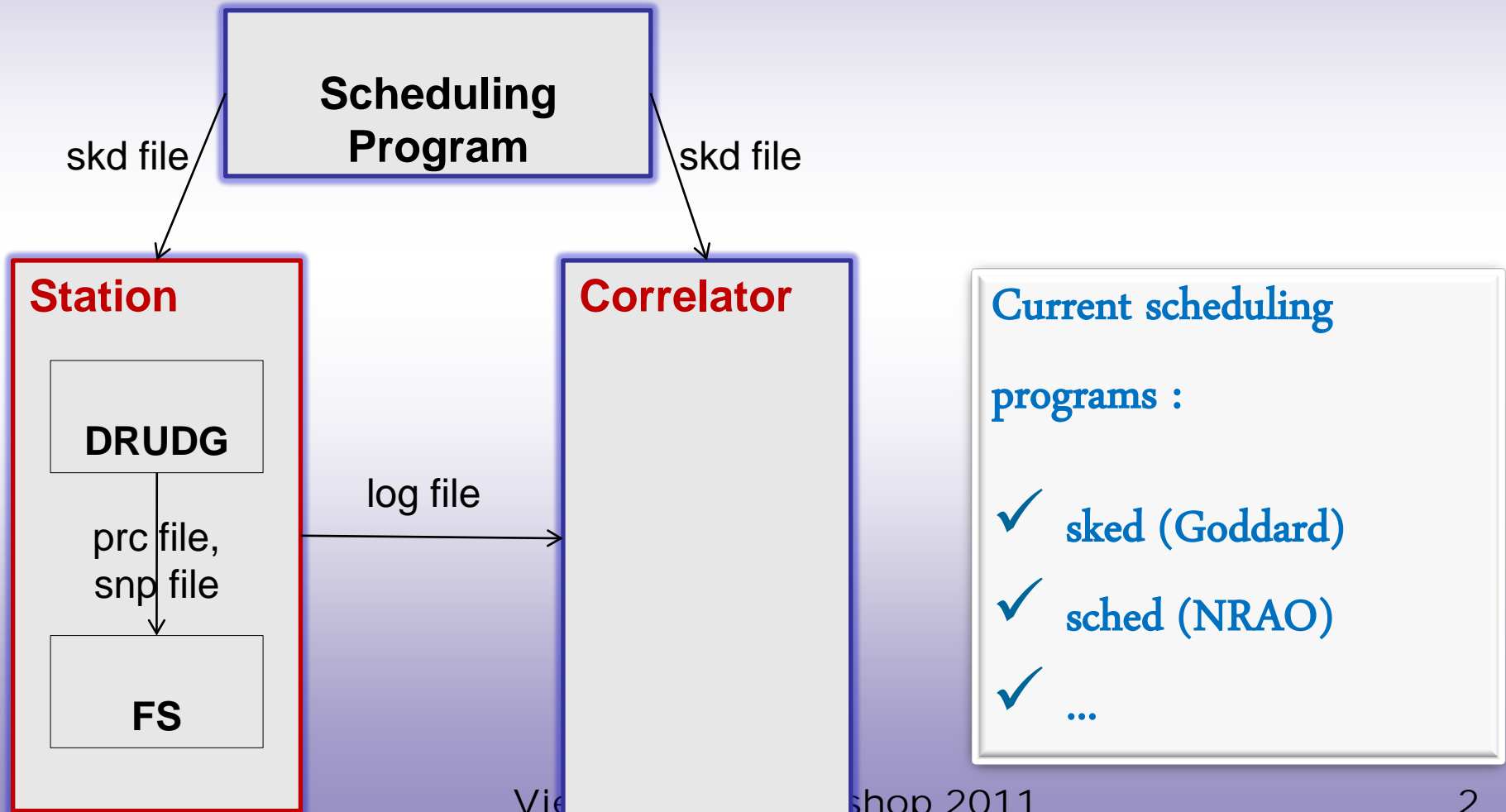
VIE_SCHED

Jing SUN

VieVS User Workshop
14 - 16 September, 2011
Vienna






What's the purpose of a scheduling program ?







Why is a new scheduling program needed?

VLBI2010 Goals

-  1 mm measurement accuracy on global baselines
-  continuous measurements for time series of station positions and EOP
-  turnaround time to initial geodetic results of less than 24 hrs.

VLBI2010 Specifications

-  small fast-moving antennas
-  broadband frequency (2–14 GHz)
-  two or more antennas at a site
-  ...

Input files

'source.cat'; % source positions
'flux.cat'; % source fluxes

'antenna.cat'; % antenna information
'position.cat'; % station x,y,z locations
'equip.cat'; % equipment IDs
'mask.cat'; % horizon and coordinate masks

'modes.cat'; % observing modes

'freq.cat'; % frequency sequences
'rx.cat'; % receiver setups
'loif.cat'; % station Lo and IF setups
'rec.cat'; % recording modes
'hdpos.cat'; % head offsets
'tracks.cat'; % standard recorded tracks

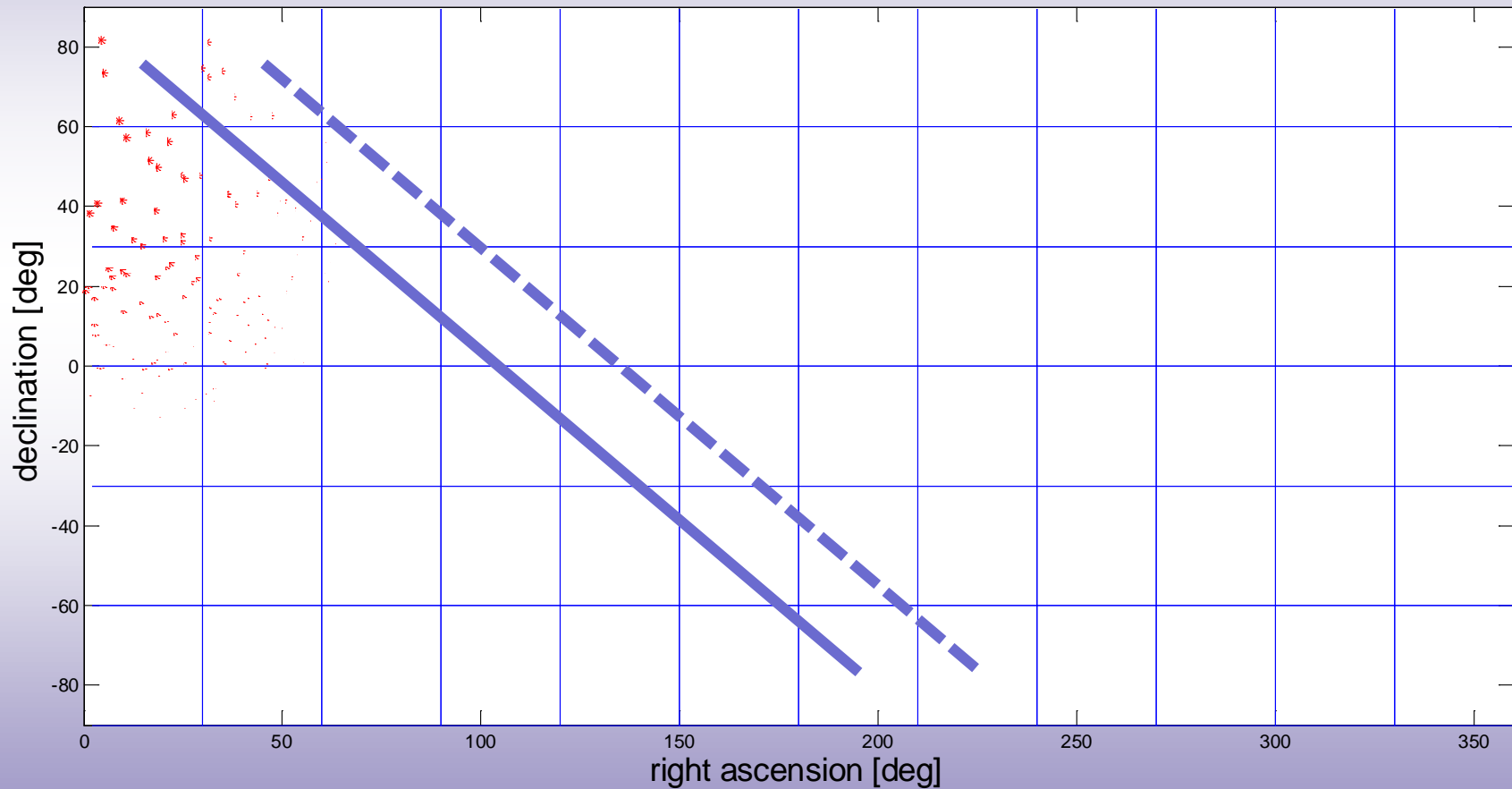
Output files

NGS file

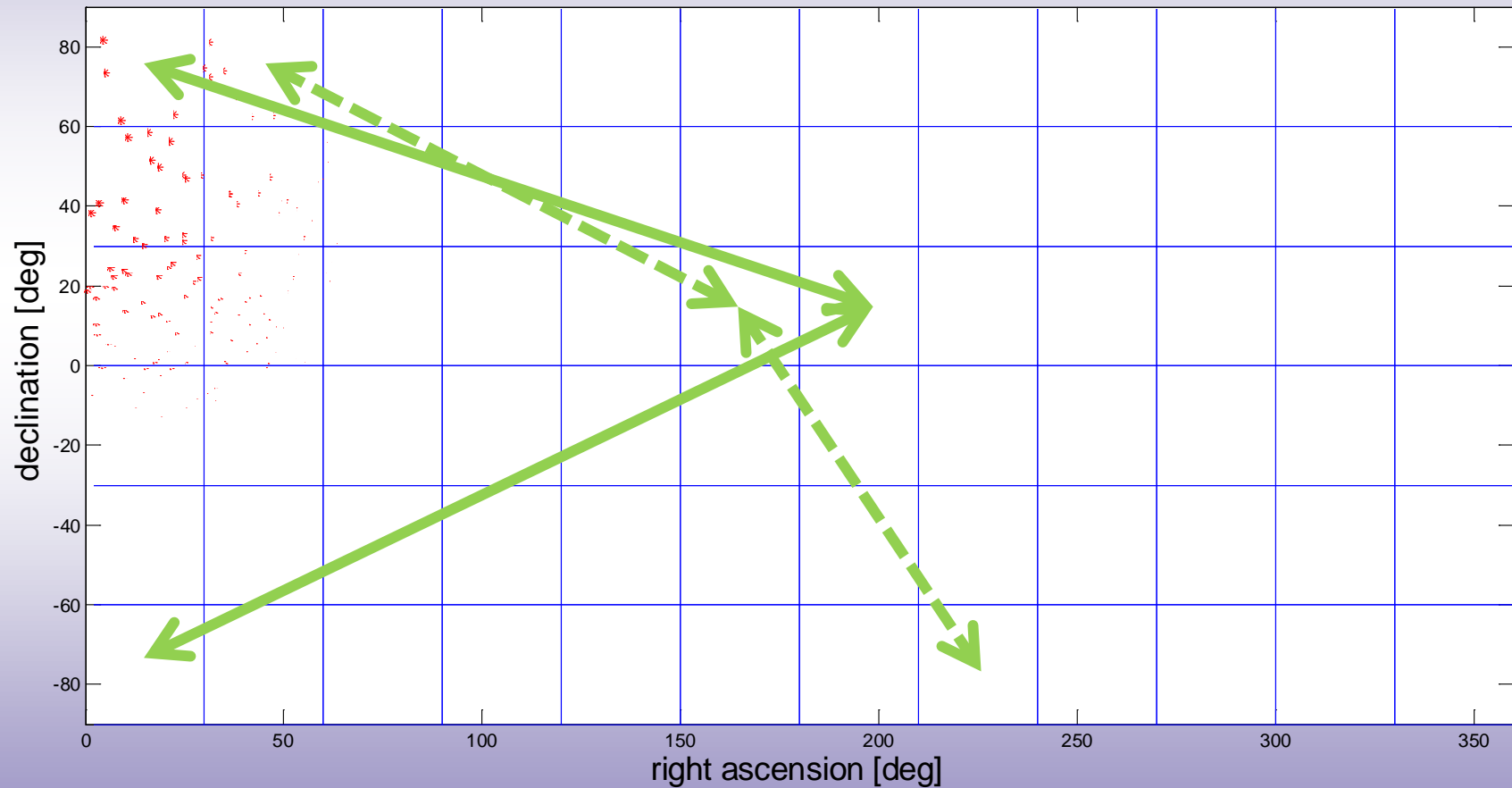
SKD file

SKD-sum file

Source dependent scheduling strategy



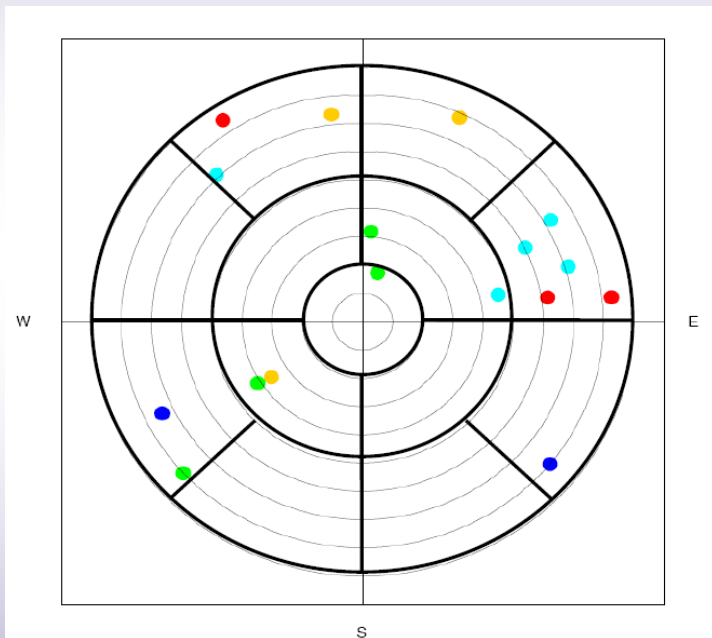
Source dependent scheduling strategy



Source dependent scheduling strategy

- ❑ Base on a more global station distribution
- ❑ Simple and effective

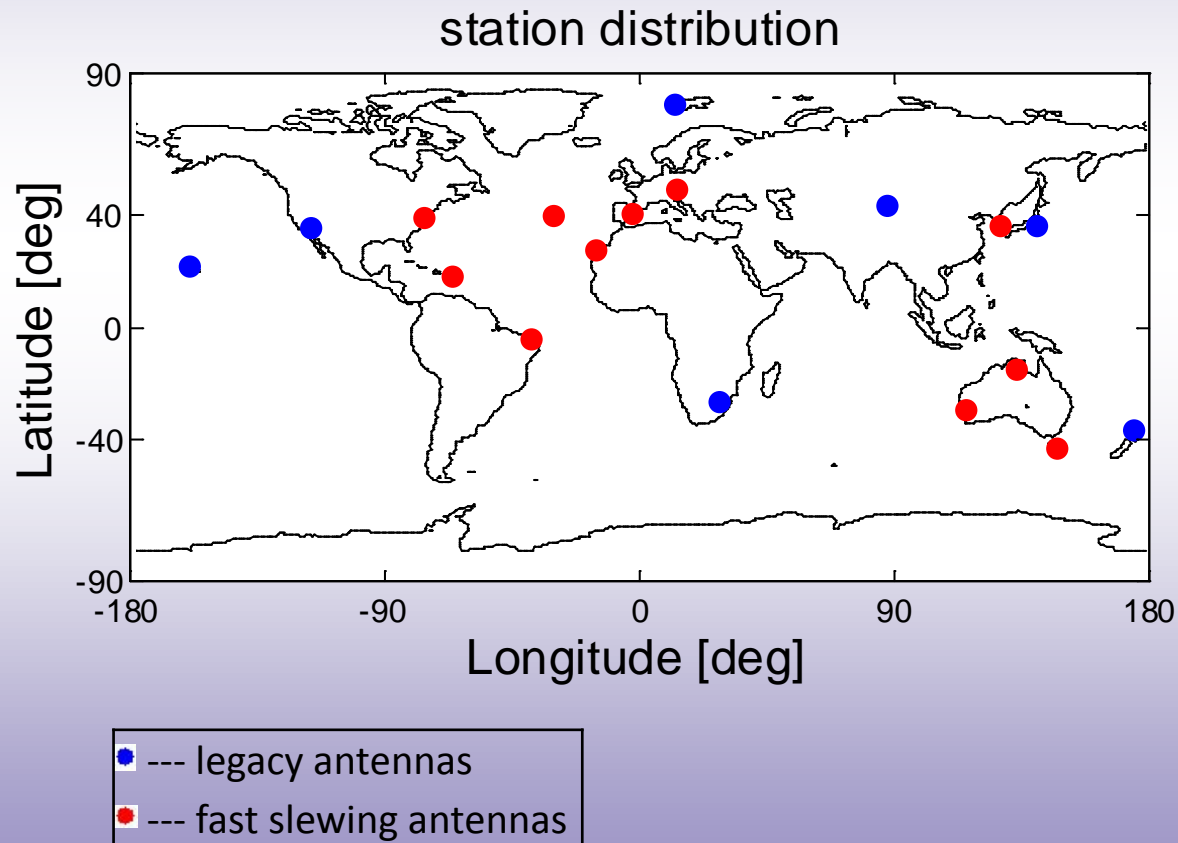
Station dependent scheduling strategy



- ❖ divide the sky above the station in 13 segments;
- ❖ count the segments which contain at least one observed source in a certain time interval.
- ❖ the best possible sky coverage: 13

Schedule parameters

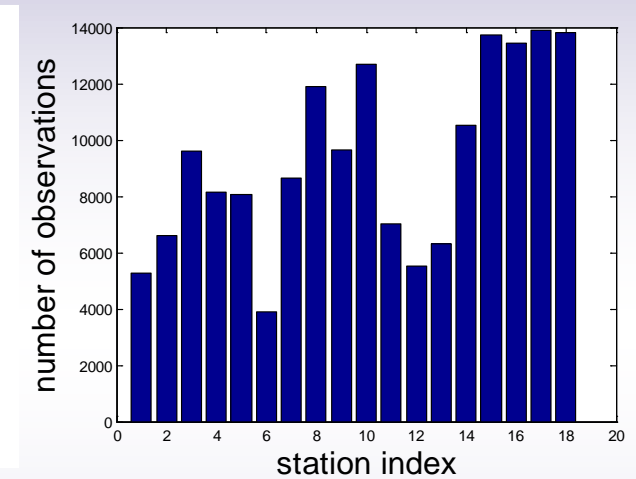
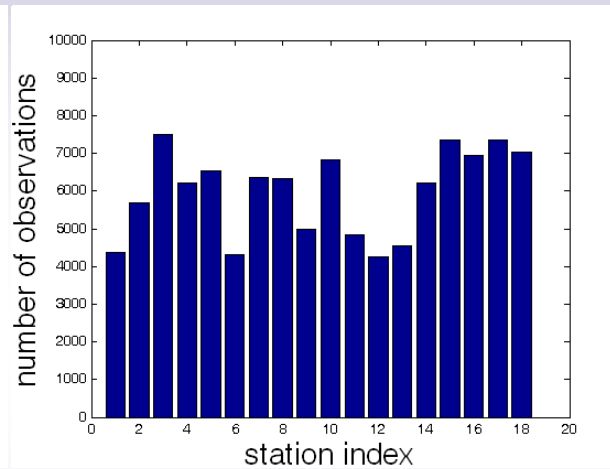
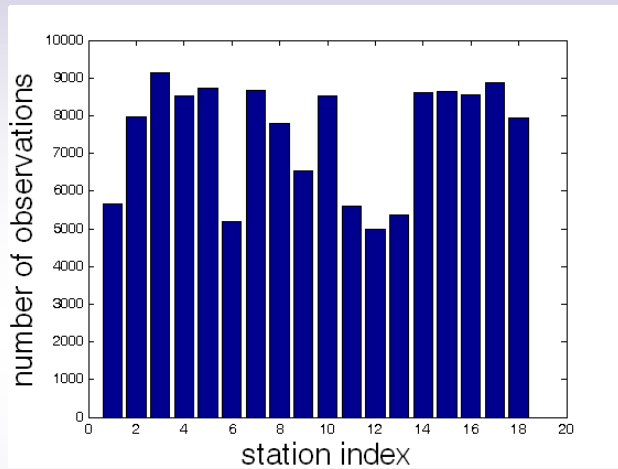
- Interim network : 18 stations



number of observations

	From VIE_SCHED_1	From VIE_SCHED_2	From VIE_SCHED_3
	2 sources in a subnet source-dependent	3 sources in a subnet source-dependent	station-dependent
Number of sources	197	190	225
number of scans	2102	3371	4138
number of observations	67633	53828	84398

distribution of observations

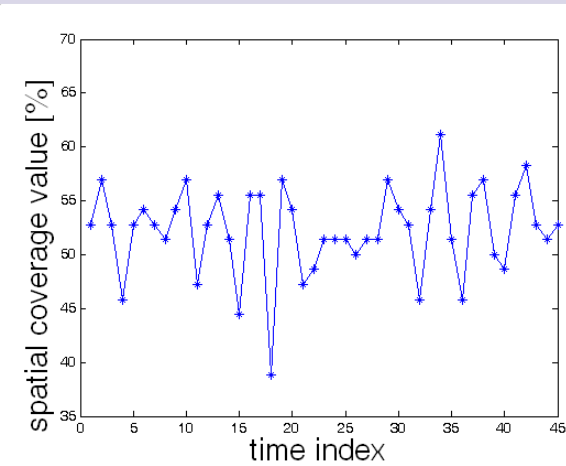


From VIE_SCHED_1

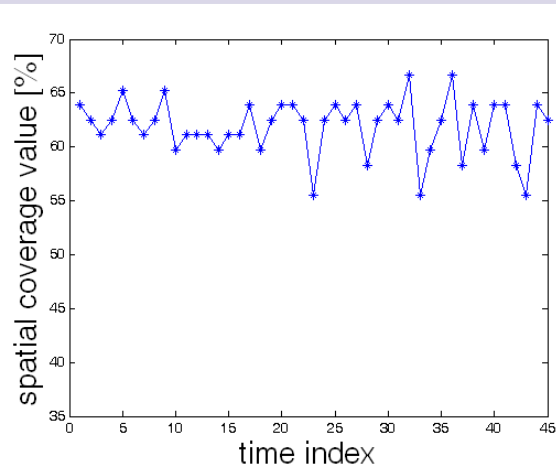
From VIE_SCHED_2

From VIE_SCHED_3

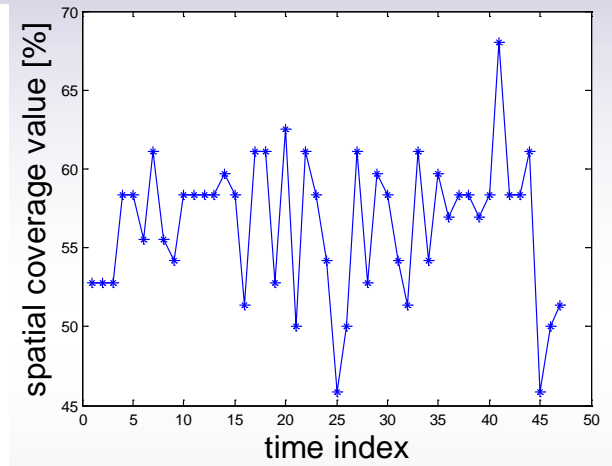
spatial coverage of sources



From VIE_SCHED_1

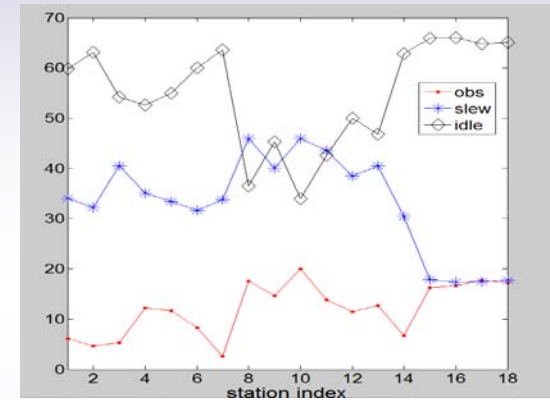
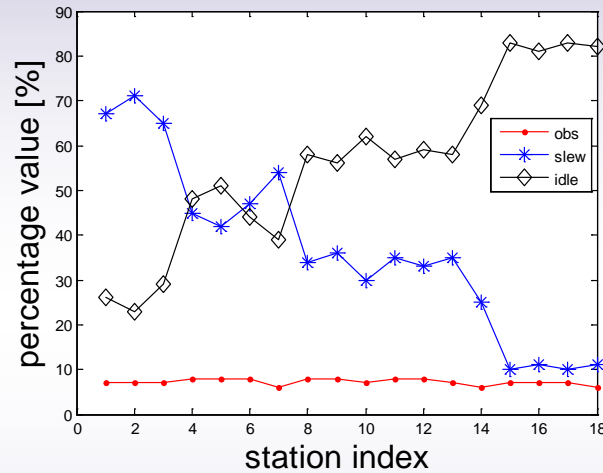
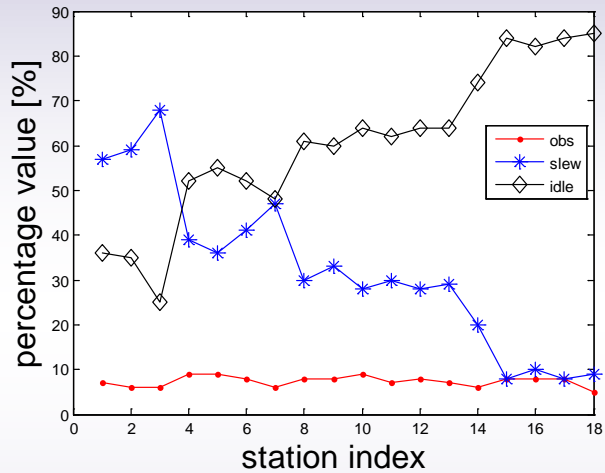


From VIE_SCHED_2



From VIE_SCHED_3

idling percentage

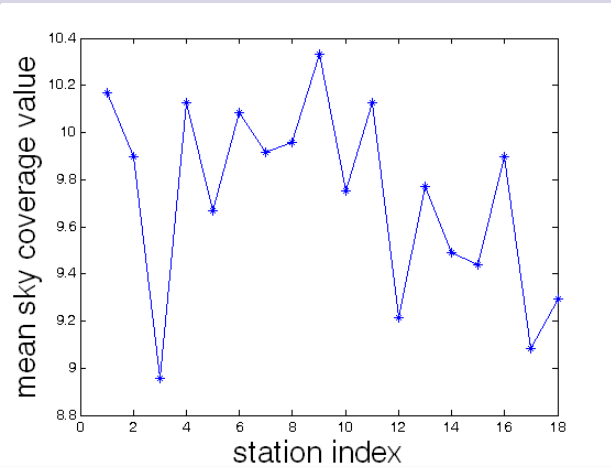


From VIE_SCHED_1

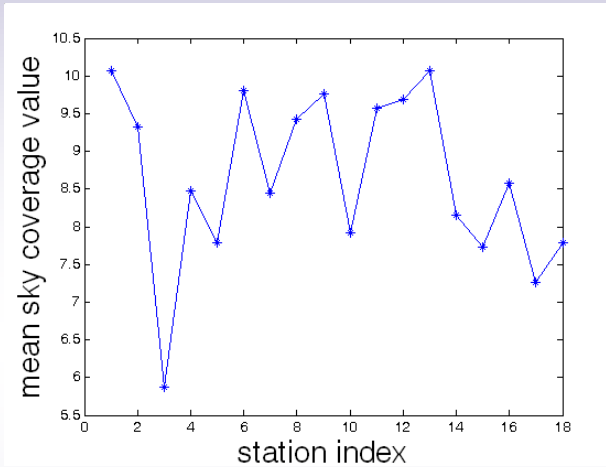
From VIE_SCHED_2

From VIE_SCHED_3

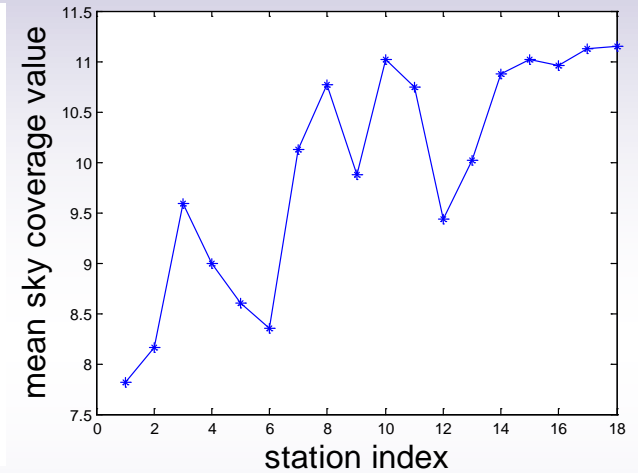
mean sky coverage



From VIE_SCHED_1



From VIE_SCHED_2



From VIE_SCHED_3

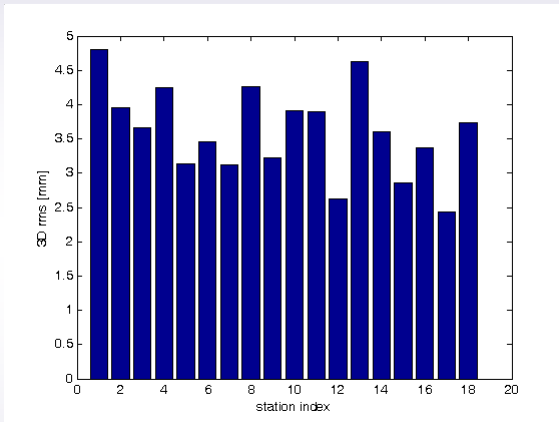
Simulation parameters

- the refractive index structure constant C_n : $2.5 \times 1.0^{-7} m^{-\frac{1}{3}}$
- the effective height of wet troposphere H : 2000 [m]
- the wind velocity vector v (8.0 m/s) towards east
- the Allan standard deviation (ASD) of $1e-14$ @ 50 min
- the white noise : 16 ps per baseline

Estimated parameters

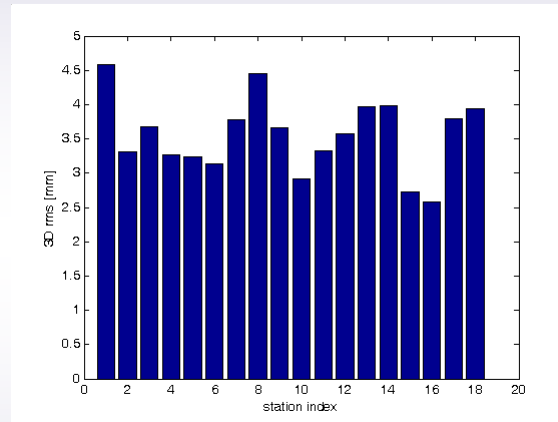
- NNR/NNT for all a priori station coordinates; source coordinates fixed to ICRF2.
- EOP offsets for each 24-hour session.
- Quadratic function plus 60 min piecewise linear function for clocks with relative constraints of 42 ps.
- 6 min piecewise linear function for zenith wet delays with relative constraints of 19 ps.
- 10 min piecewise linear function for gradients with 1.4 mm relative constraints and 1 mm absolute constraints.

station position repeatabilities



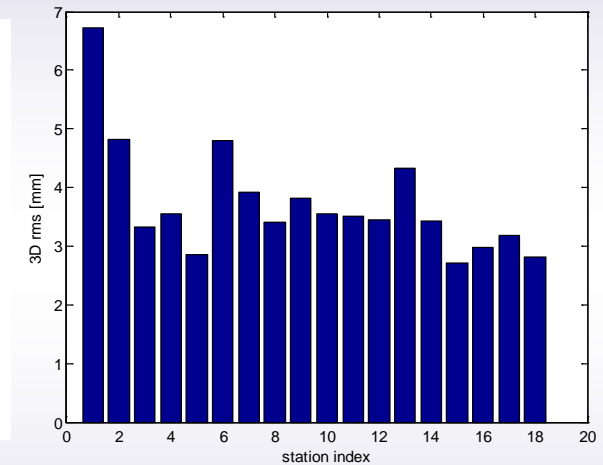
mean station position
repeatabilities = 3.61

From VIE_SCHED_1



mean station position
repeatabilities = 3.55

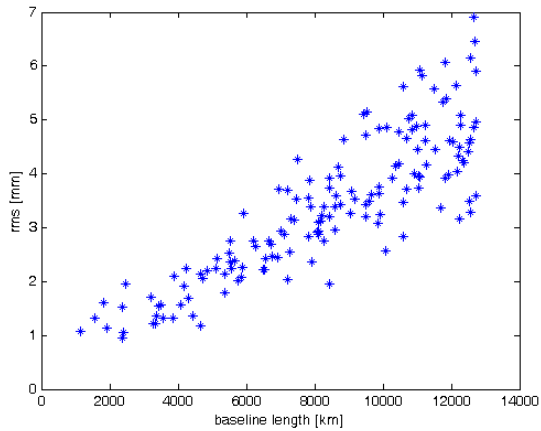
From VIE_SCHED_2



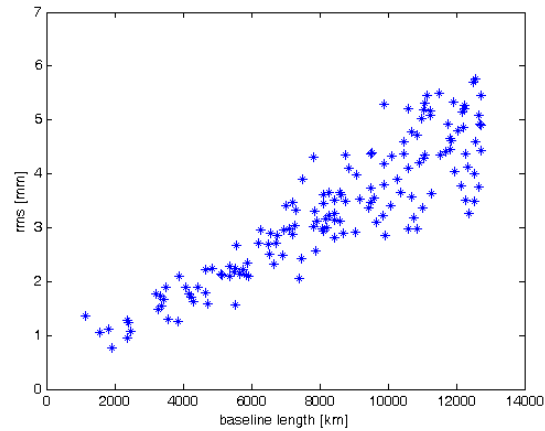
mean station position
repeatabilities = 3.72

From VIE_SCHED_3

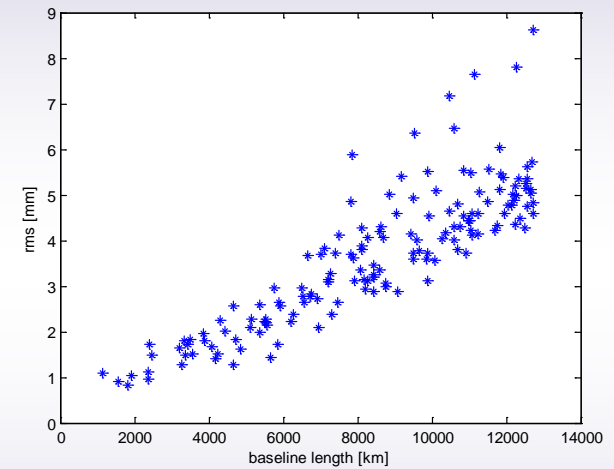
baseline length repeatabilities



From VIE_SCHED_1



From VIE_SCHED_2



From VIE_SCHED_3

Ongoing and planned developments of VIE_SCHED

- 📌 Variance and covariance analysis and even a dynamic optimization process
- 📌 Twin/multiple telescopes at a site
- 📌 Spacecraft tracking
- 📌 Interactive interface
- 📌 More analyses and comparisons
 - with sked, sched and other scheduling package

Thanks for your attention!

problems? questions?
mail to jing.sun@tuwien.ac.at

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