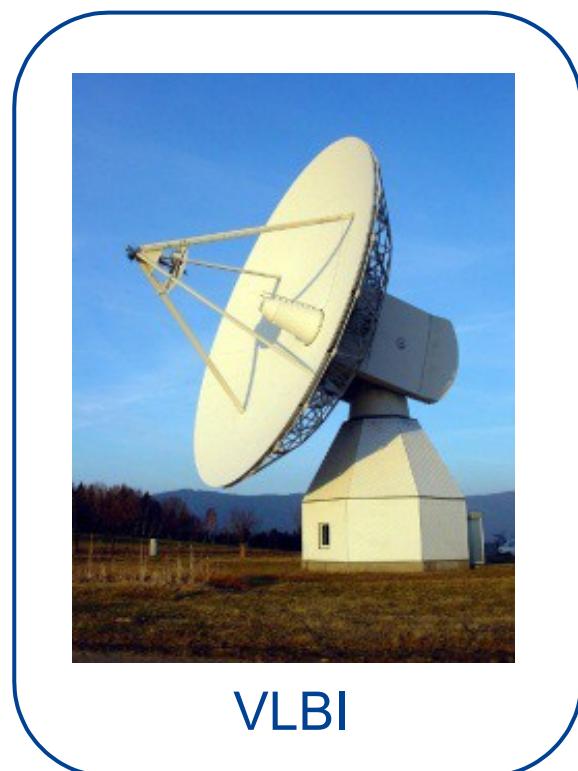


Development of a VLBI Intra-Technique Combination Strategy for CRF Determination

Andreas Iddink, Axel Nothnagel, Thomas Artz

16.09.2013

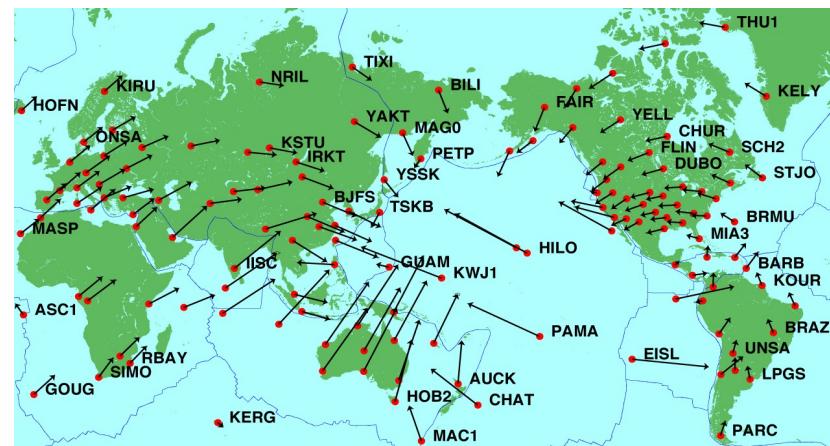
- Motivation
 - Consistency of ICRF / ITRF / EOPs
- Combination process
- First Results
- Inclusion of X / Ka Sources
- Outlook



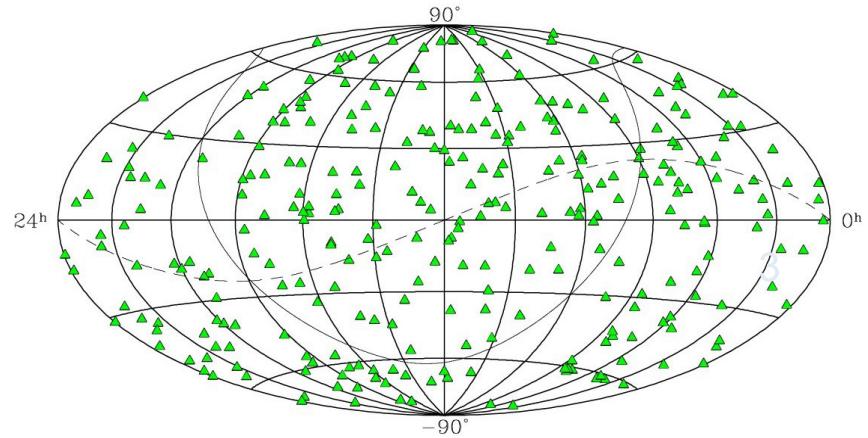
VLBI



VTRF



2



ICRF2

- 1 single monolithic solution
- 1 software package
- Only indirect control
- Consistency (only) with VTRF2008

IERS Combination & Products

IVS Combination

AC 1..n



IGS Combination

AC 1..n



ILRS Combination

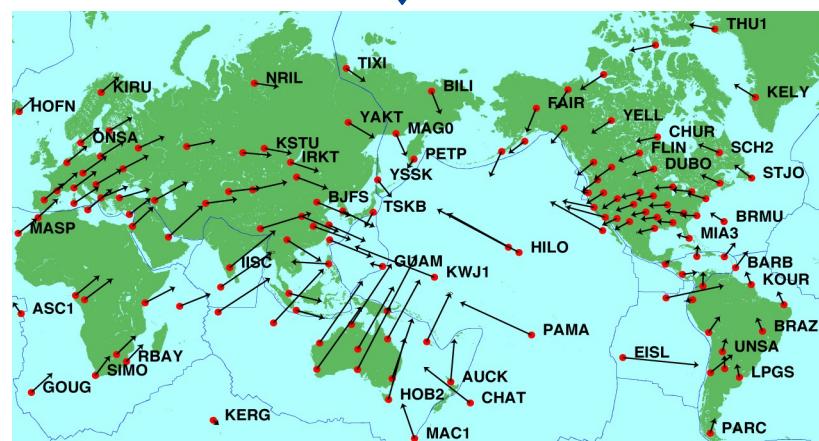
AC 1..n

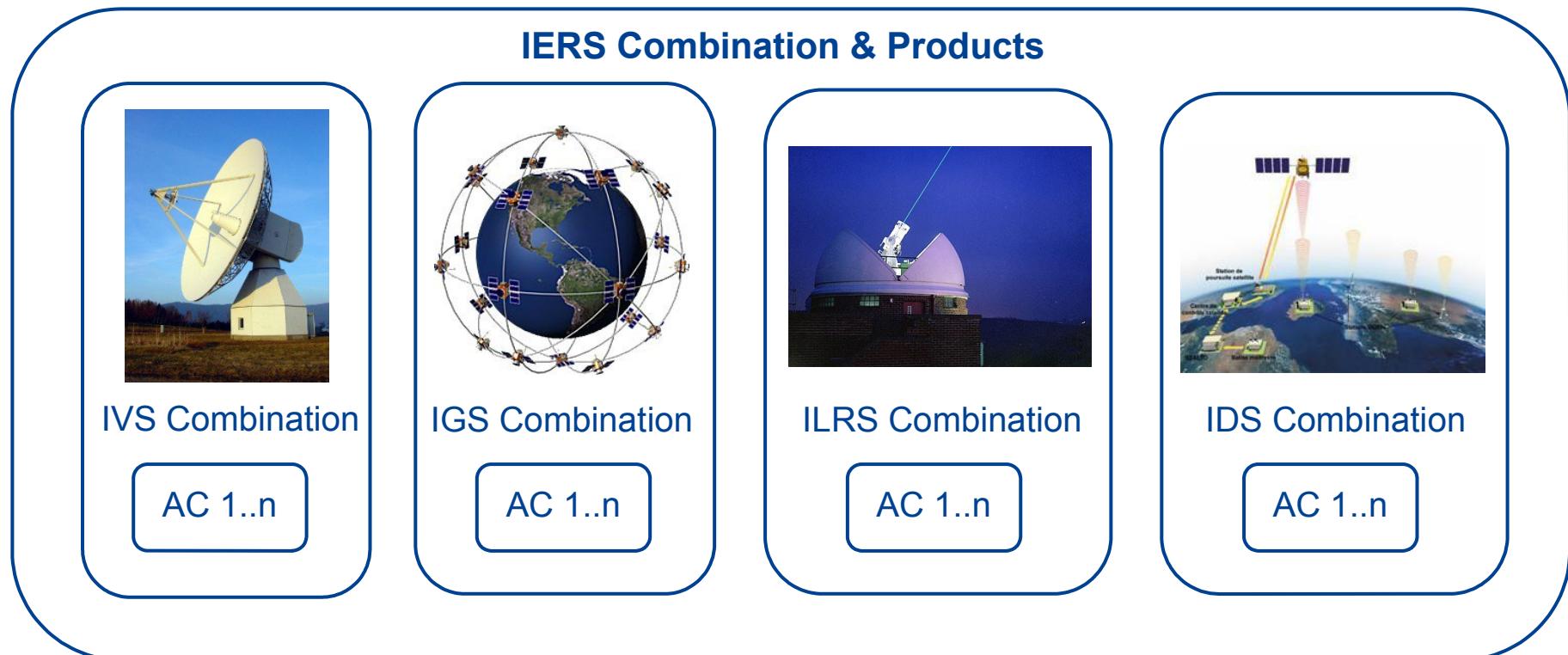


IDS Combination

AC 1..n

ITRF



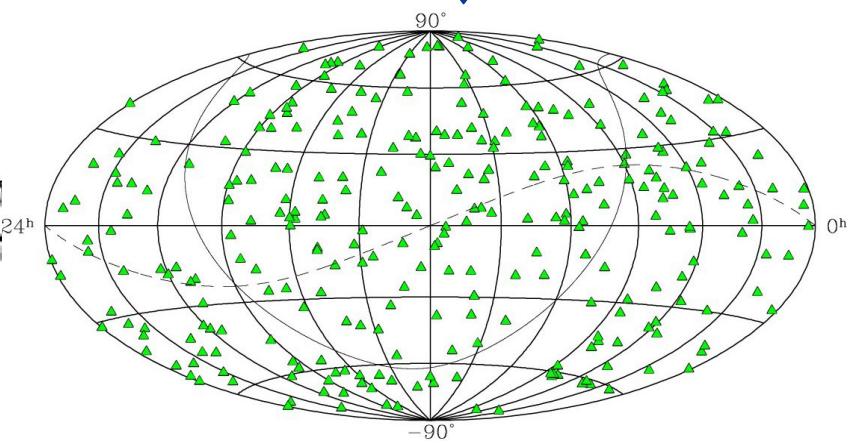
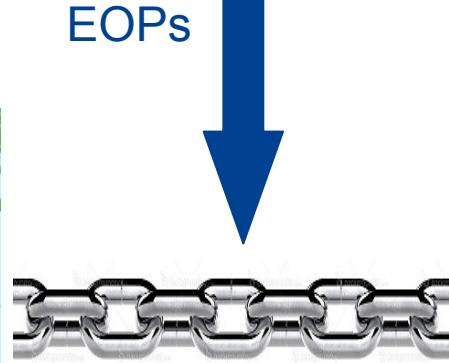
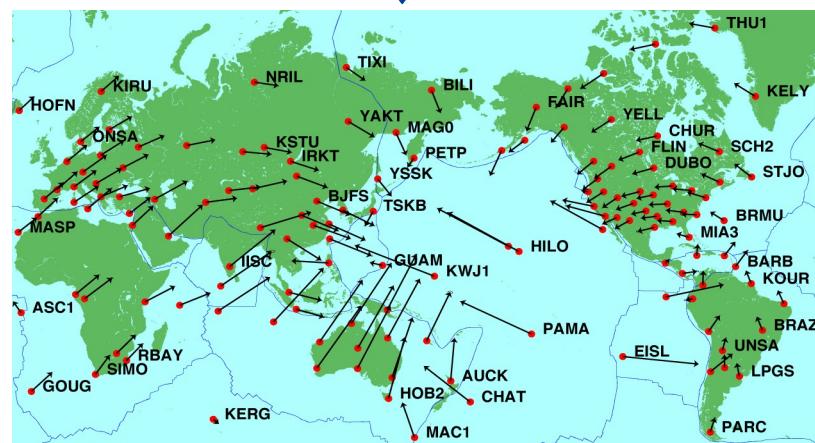


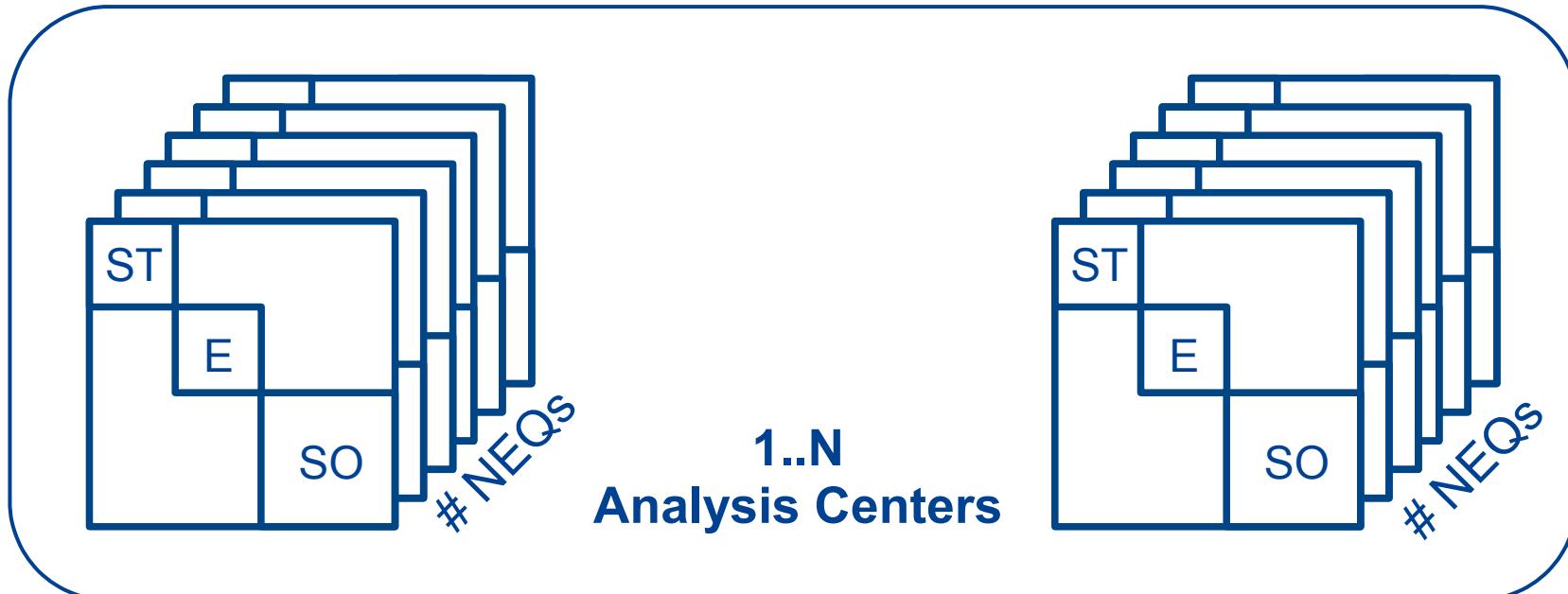
3

ITRF

EOPs

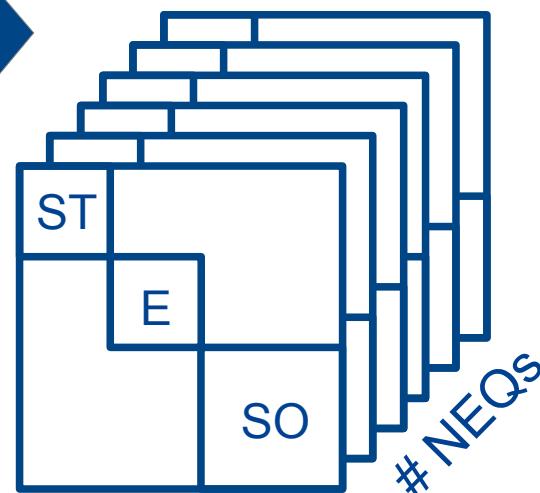
ICRF





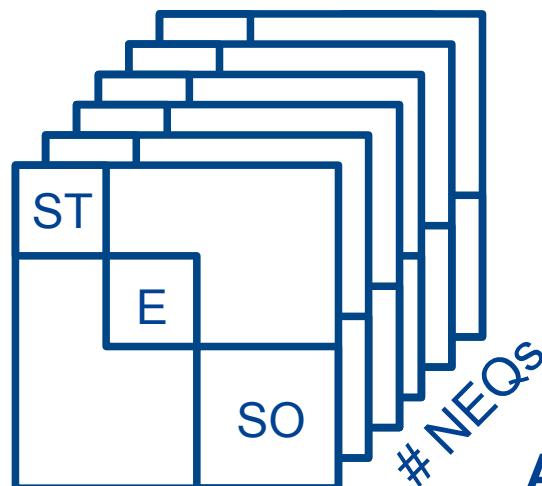
1..N
Analysis Centers

- Station positions (ST)
- EOPs (E)
- Source positions (SO)

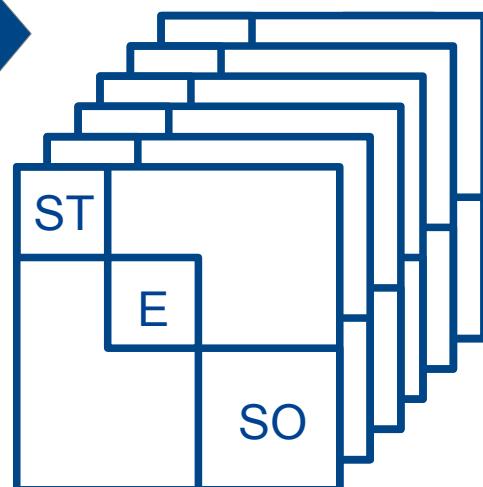
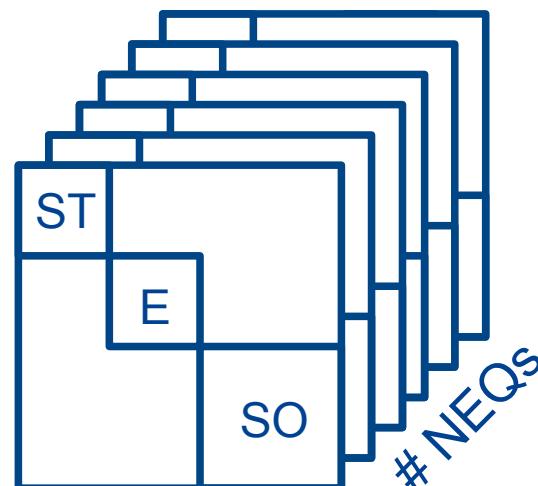


combined single session NEQs

- Different software packages
- Different analysis centers
- Different analysis strategies

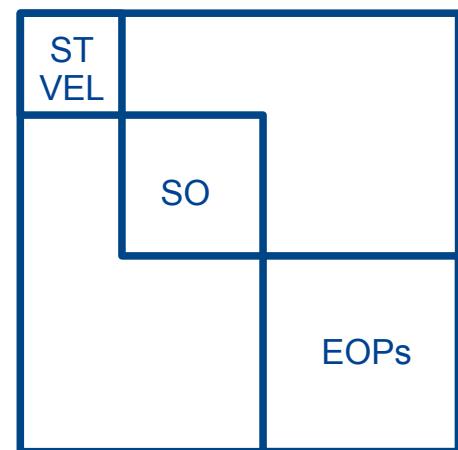


1..N
Analysis Centers

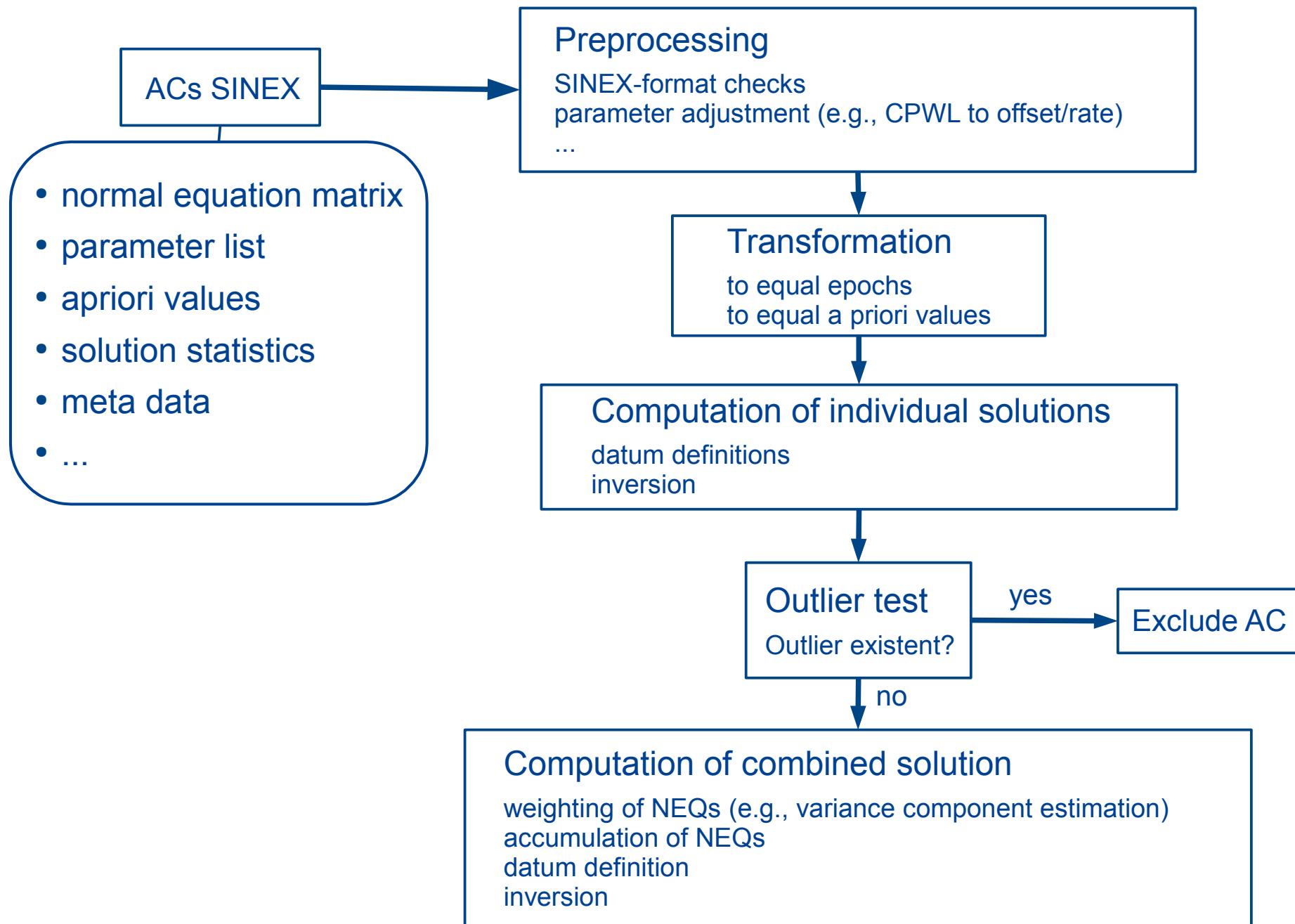


combined single session
NEQs

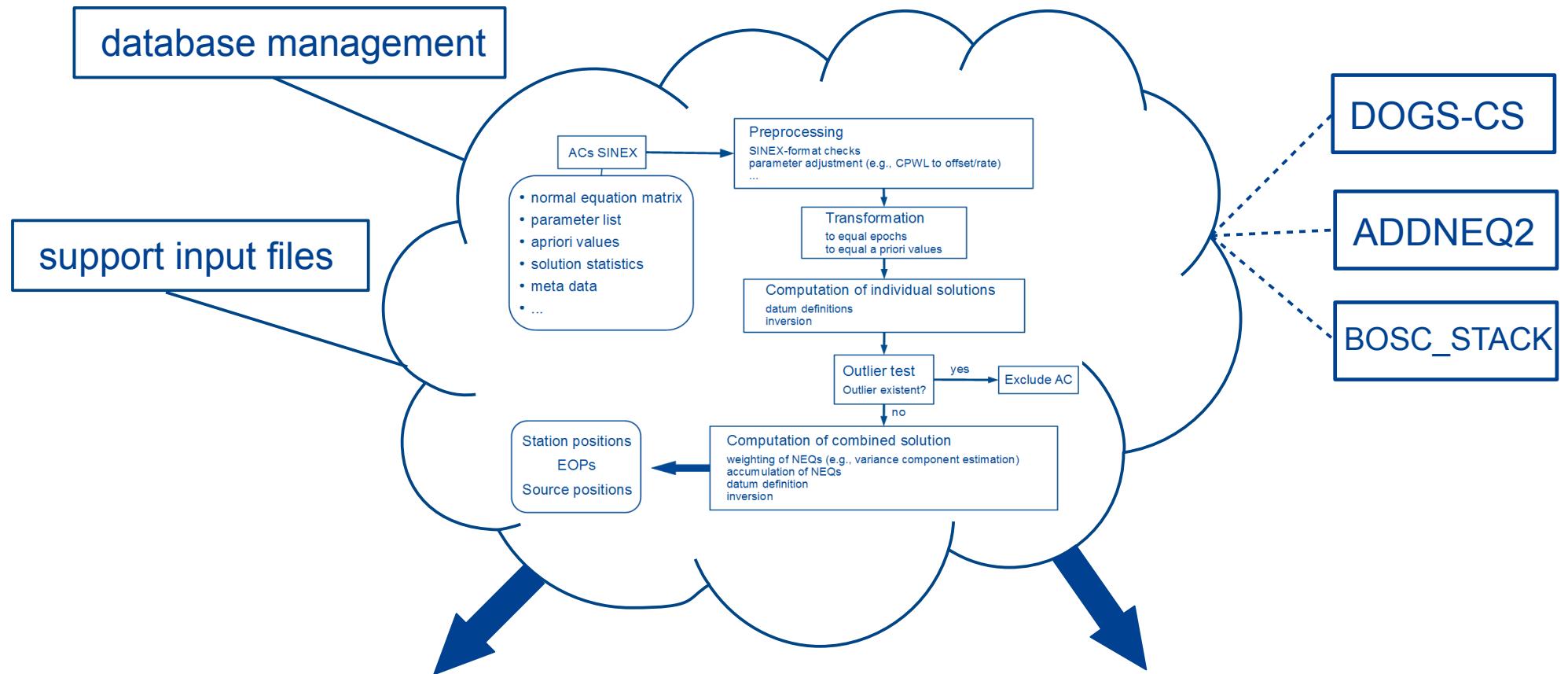
- Free choice of:
- session selection
 - arc / global parameters
 - parameterization



VLBI intra-technique
NEQ



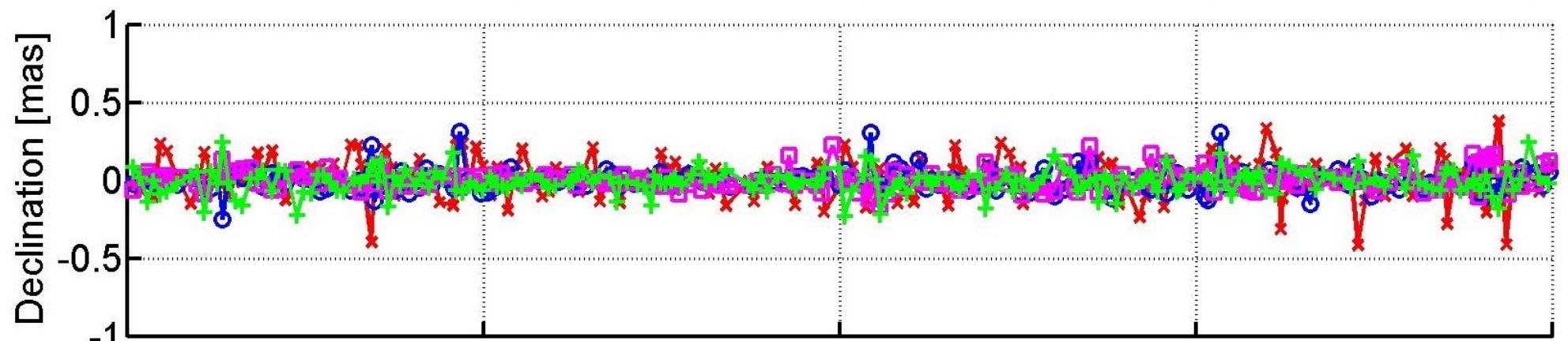
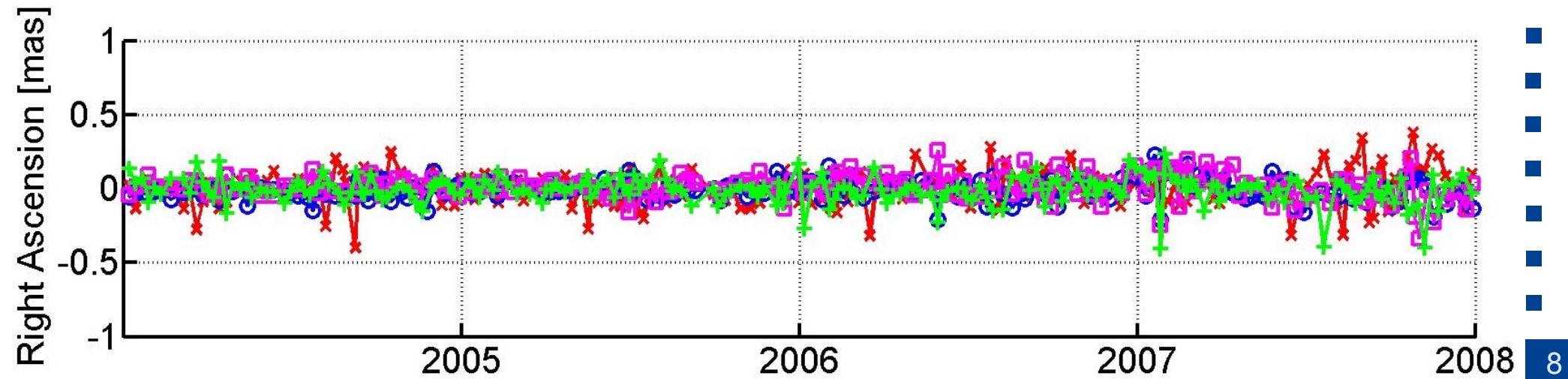
BoSC - BonnSolutionCombination



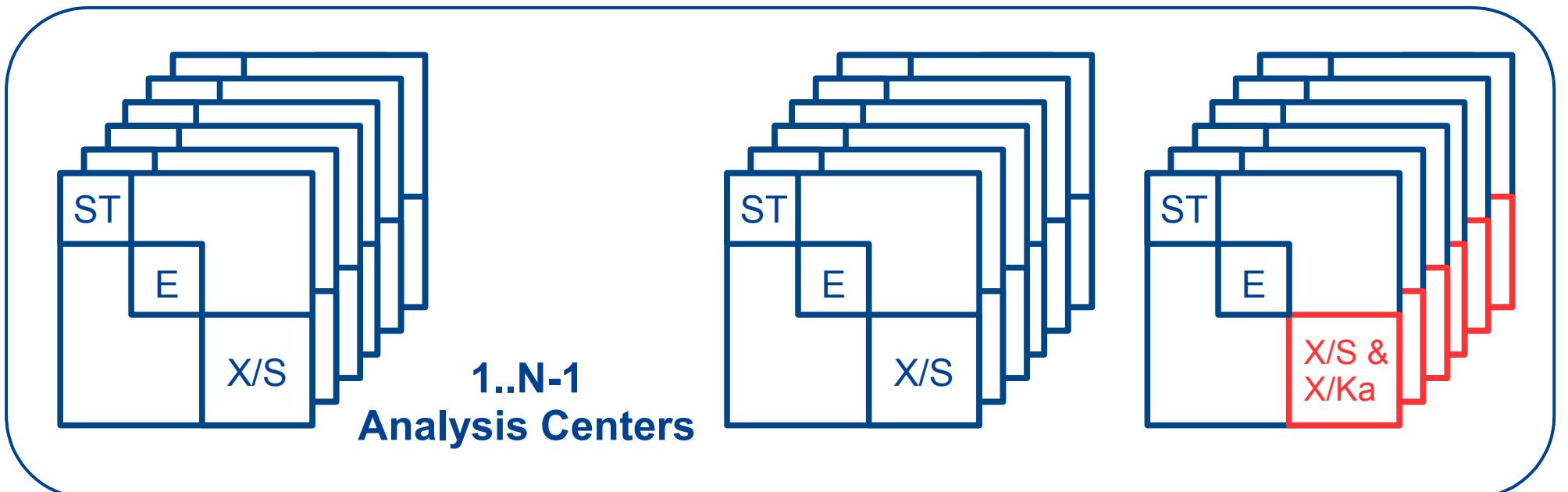
Final estimated results e.g.,

- time series of source positions
 - residuals of EOPs
 - global solved CRF or TRF

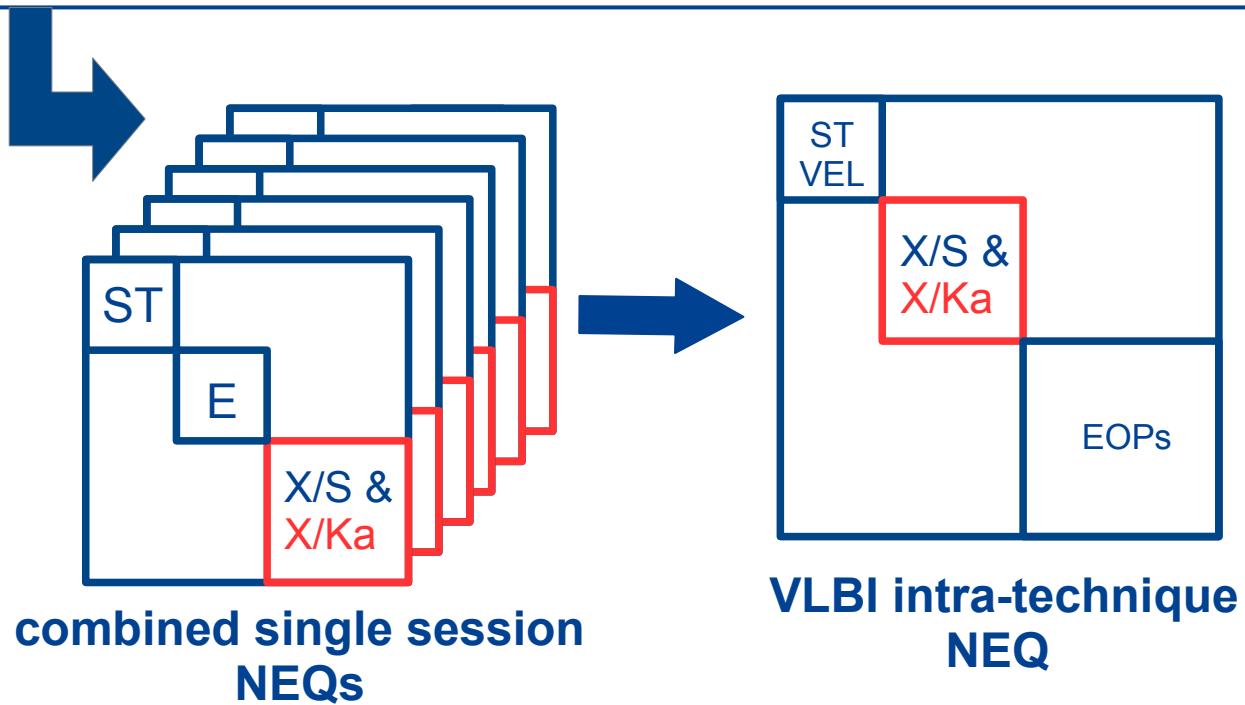
Consistent datum-free normal equation system
important for further processing
and investigations



AC	Bias [μas]	RMS [μas]	#Ses
BKG	2	120	201
GSFC	- 4	75	205
OPA	12	80	203
USNO	9	91	205



9

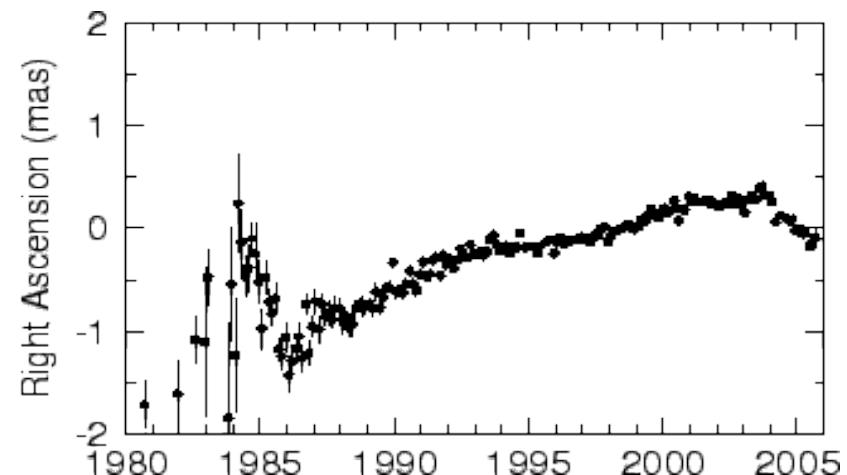
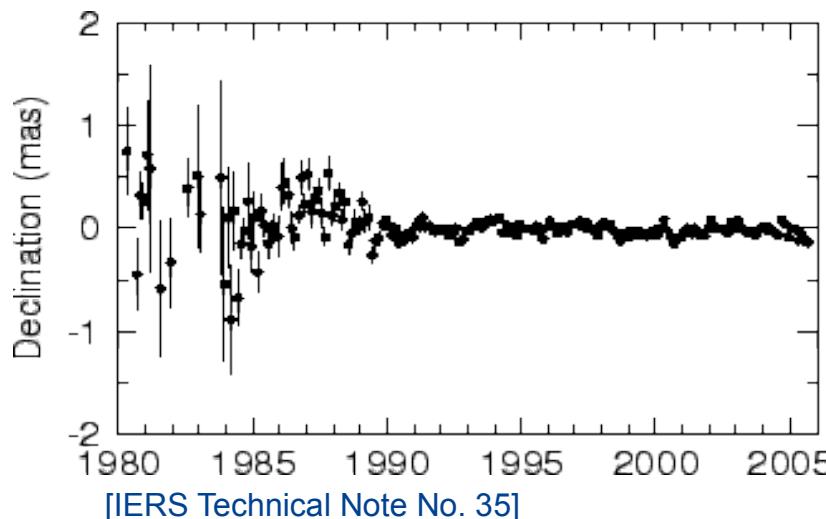




Issues to be investigated

- Non ITRF telescope positions
- Frequency dependence
- Core shift
- „Source Tie“

- Comparison of ADDNEQ2 / DOGS-CS / BOSC_STACK
 - Differences, individual shortcomings, numerical problems
- Estimation and comparison of individual CRFs
- Parameterization of special handling sources
 - Continuous Piecewise Linear (CPWL) Function approach
 - Astrophysical phenomena background
 - Cooperation with Max Planck Institute for Radio Astronomy Bonn



→ VLBI Output Contribution to inter-technique (VLBI, GNSS, SLR, DORIS) combination