TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

Processing Intensive Sessions with VieVS

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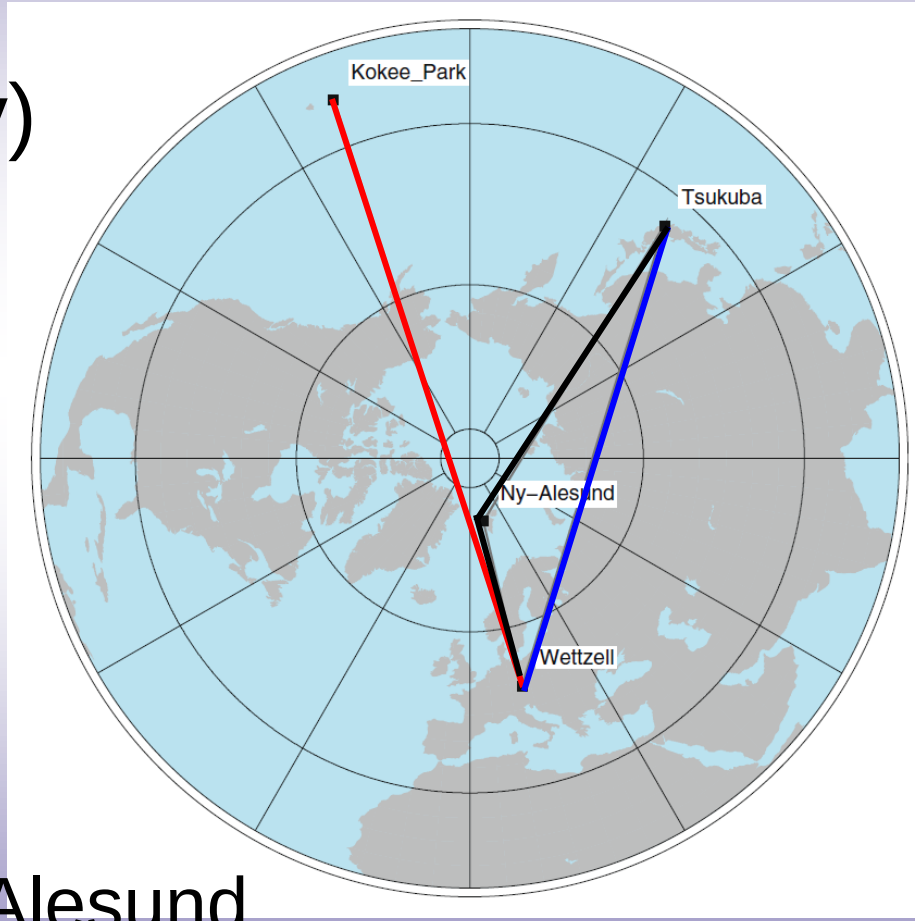
VieVS User Workshop

14 – 16 September, 2011

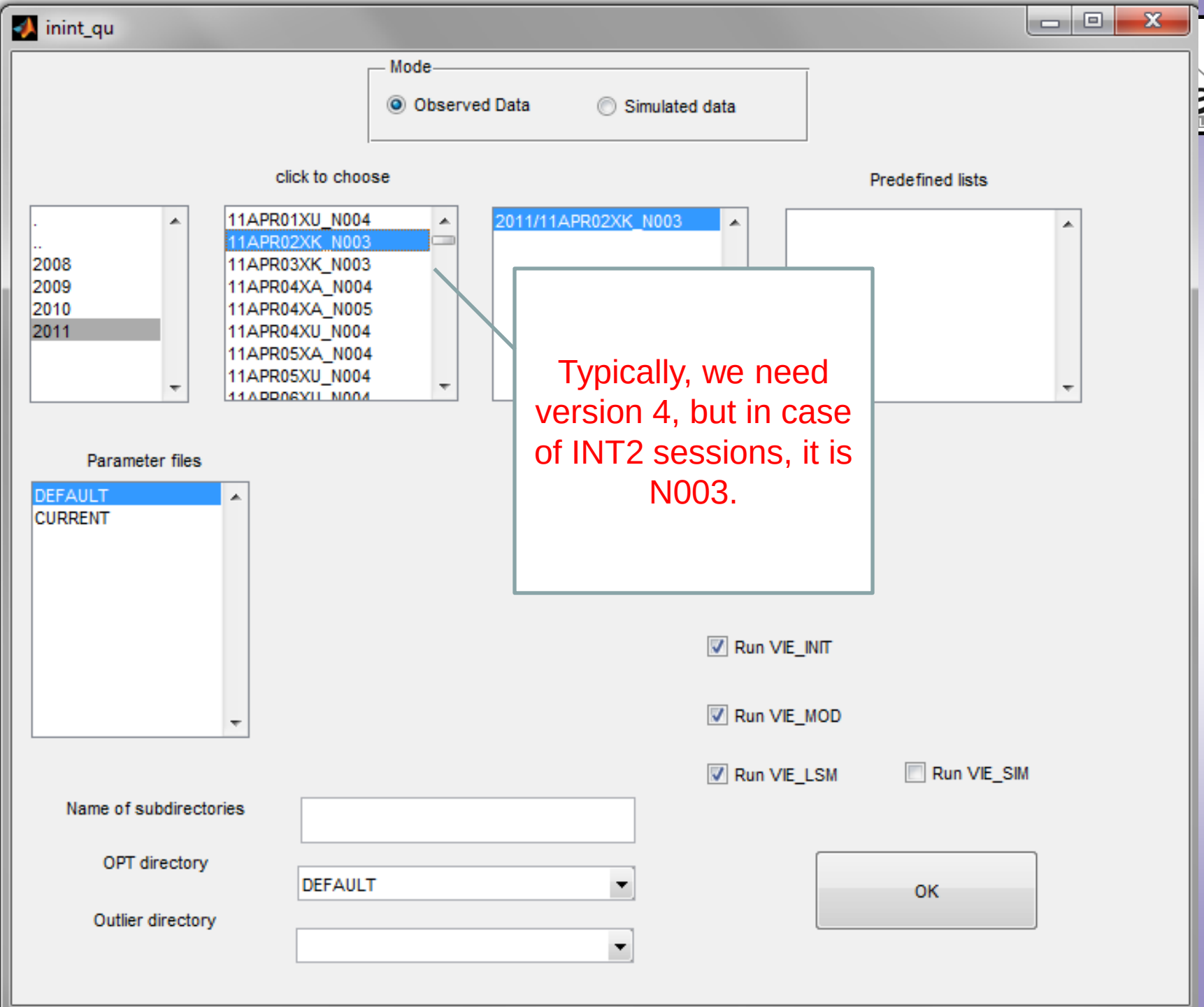
Vienna

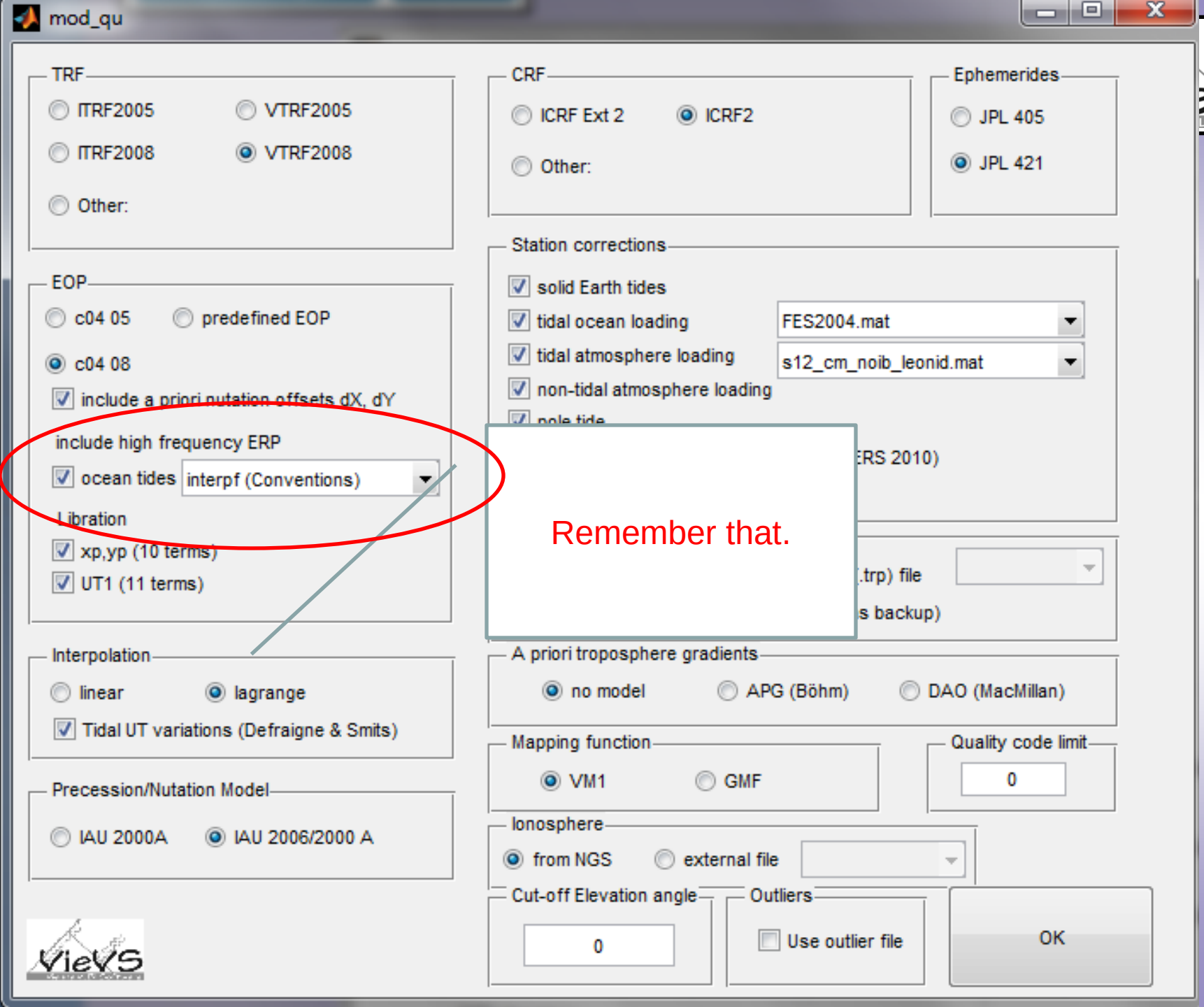
Introduction

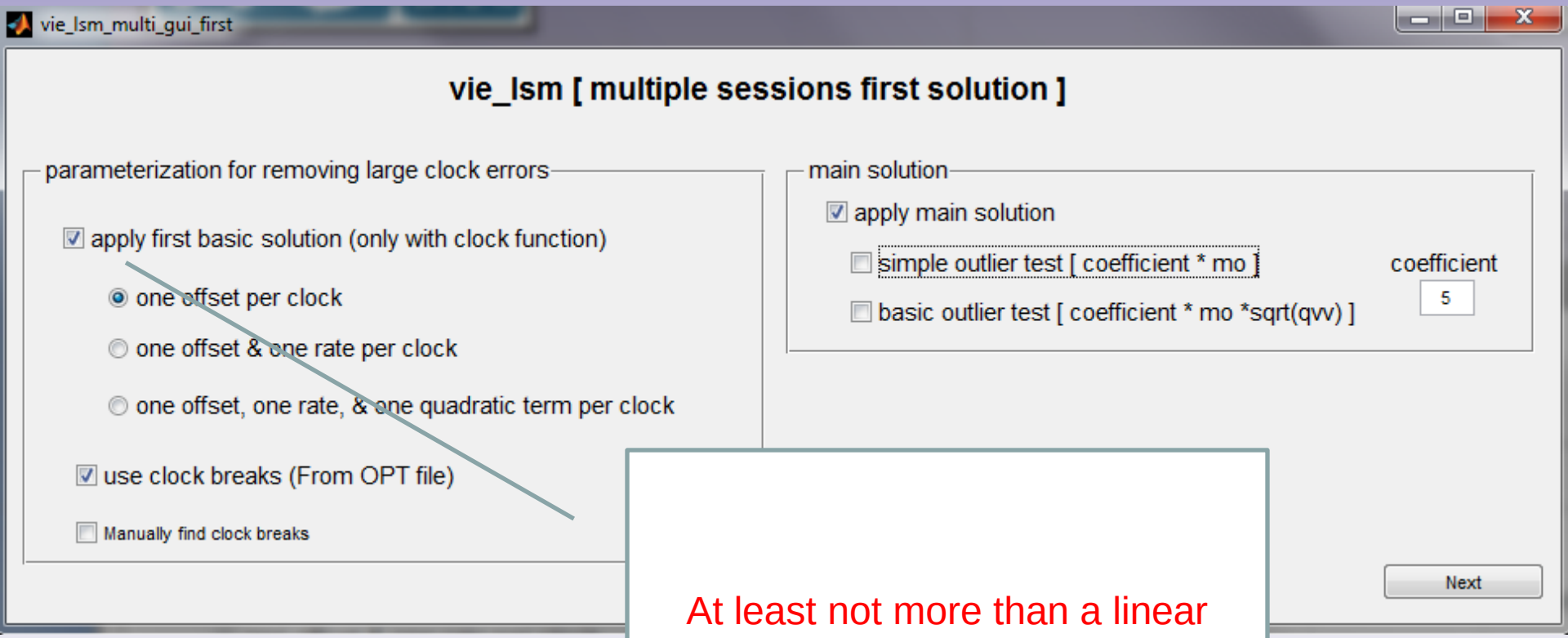
- INT1 (2-3 days latency)
  - Kokee-Wettzell
  - Mo-Fr 18:30
- INT2 (e-transfer)
  - Tsukuba-Wettzell
  - Sa-So 7:30
- INT3 (e-transfer)
  - Tsukuba-Wettzell-NyAlesund
  - Mo 7:00



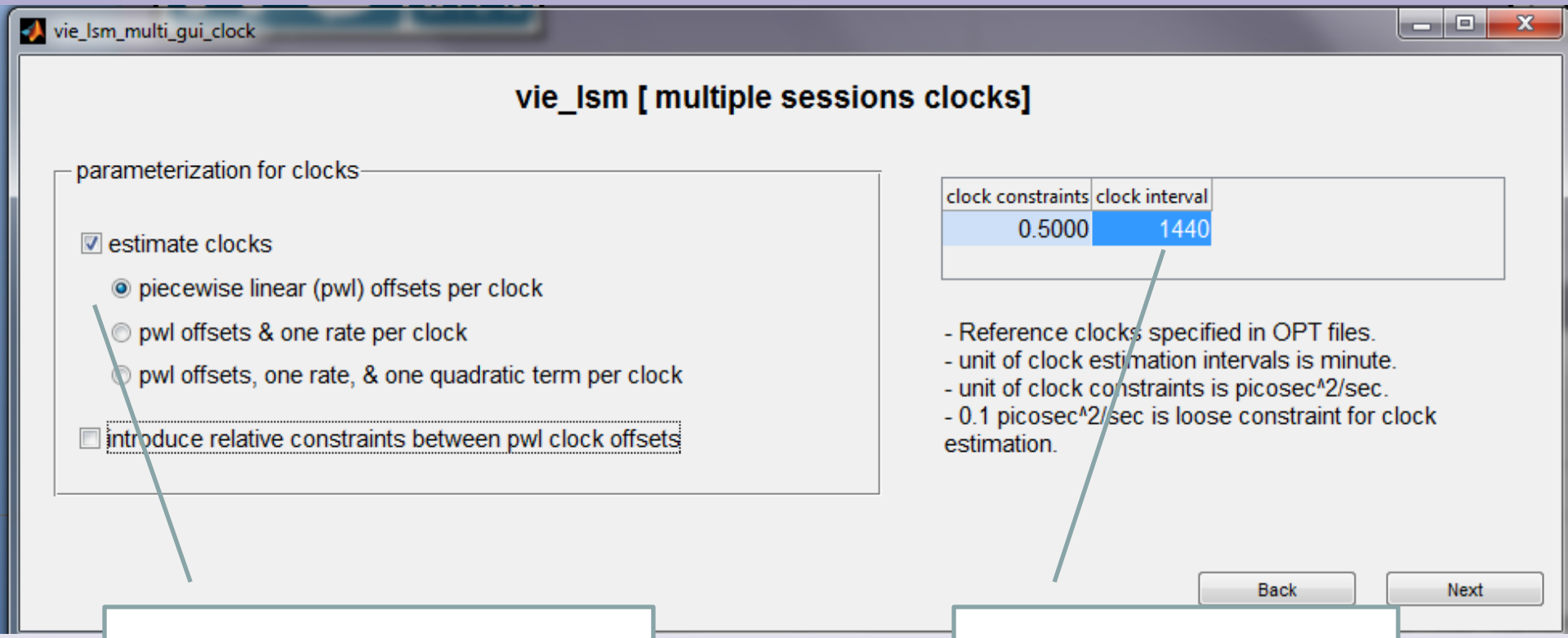
Luzum and Nothnagel (2010)


inint_qu
Mode
Observed Data
Simulated data
click to choose
Predefined lists
.
..
2008
2009
2010
2011
11APR01XU_N004
11APR02XK_N003
11APR03XK_N003
11APR04XA_N004
11APR04XA_N005
11APR04XU_N004
11APR05XA_N004
11APR05XU_N004
2011/11APR02XK_N003
Typically, we need version 4, but in case of INT2 sessions, it is N003.
Parameter files
DEFAULT
CURRENT
Run VIE_INIT
Run VIE_MOD
Run VIE_LSM
Run VIE_SIM
Name of subdirectories
OPT directory
DEFAULT
Outlier directory
OK


mod_qu
TRF
ITRF2005
VTRF2005
ITRF2008
VTRF2008
Other:
CRF
ICRF Ext 2
ICRF2
Other:
Ephemerides
JPL 405
JPL 421
EOP
c04 05
predefined EOP
c04 08
include a priori nutation offsets dX, dY
include high frequency ERP
ocean tides
interpf (Conventions)
Libration
xp,yp (10 terms)
UT1 (11 terms)
Station corrections
solid Earth tides
tidal ocean loading
FES2004.mat
tidal atmosphere loading
s12_cm_noib_leonid.mat
non-tidal atmosphere loading
pole tide
ERS 2010)
.trp) file
s backup)
Remember that.
Interpolation
linear
lagrange
Tidal UT variations (Defraigne & Smits)
A priori troposphere gradients
no model
APG (Böhm)
DAO (MacMillan)
Precession/Nutation Model
IAU 2000A
IAU 2006/2000 A
Mapping function
VM1
GMF
Quality code limit
0
Ionosphere
from NGS
external file
Cut-off Elevation angle
0
Outliers
Use outlier file
OK

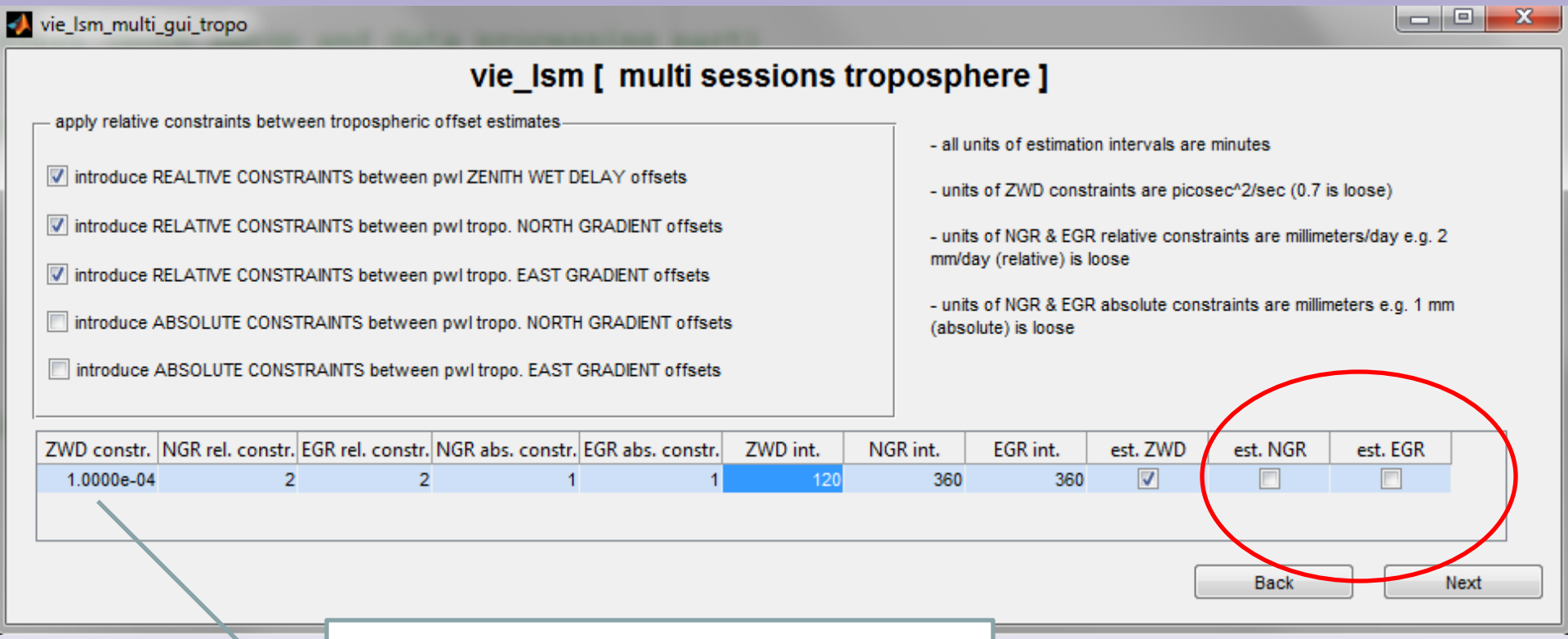


At least not more than a linear function between the two clocks.

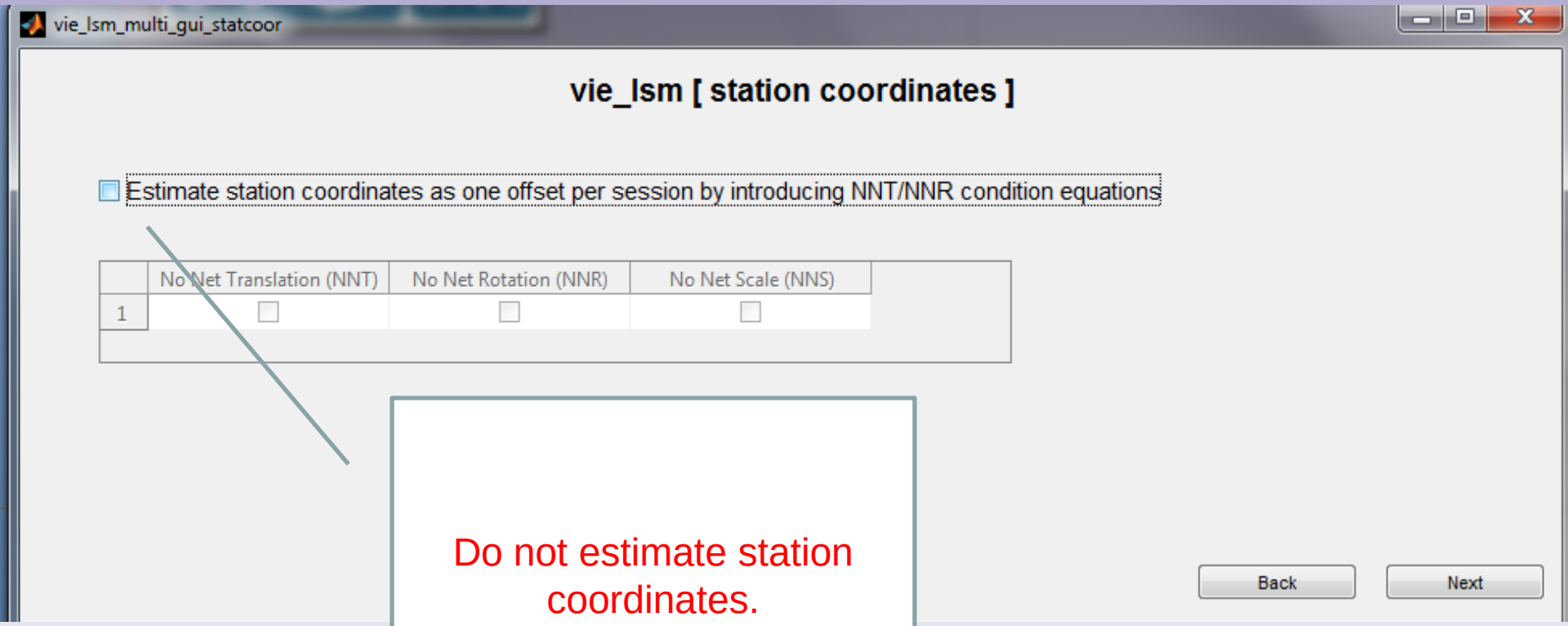


Choose this option.

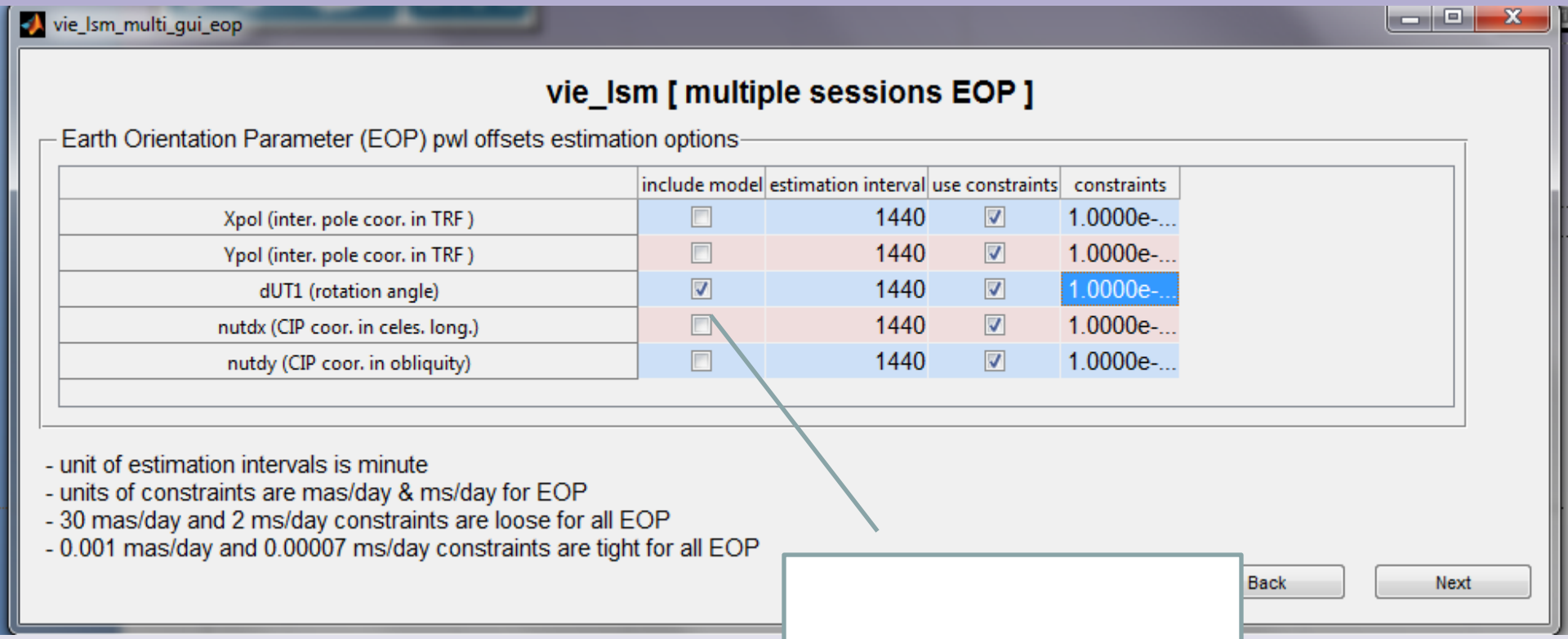
This is important. The time interval should cover the whole session.



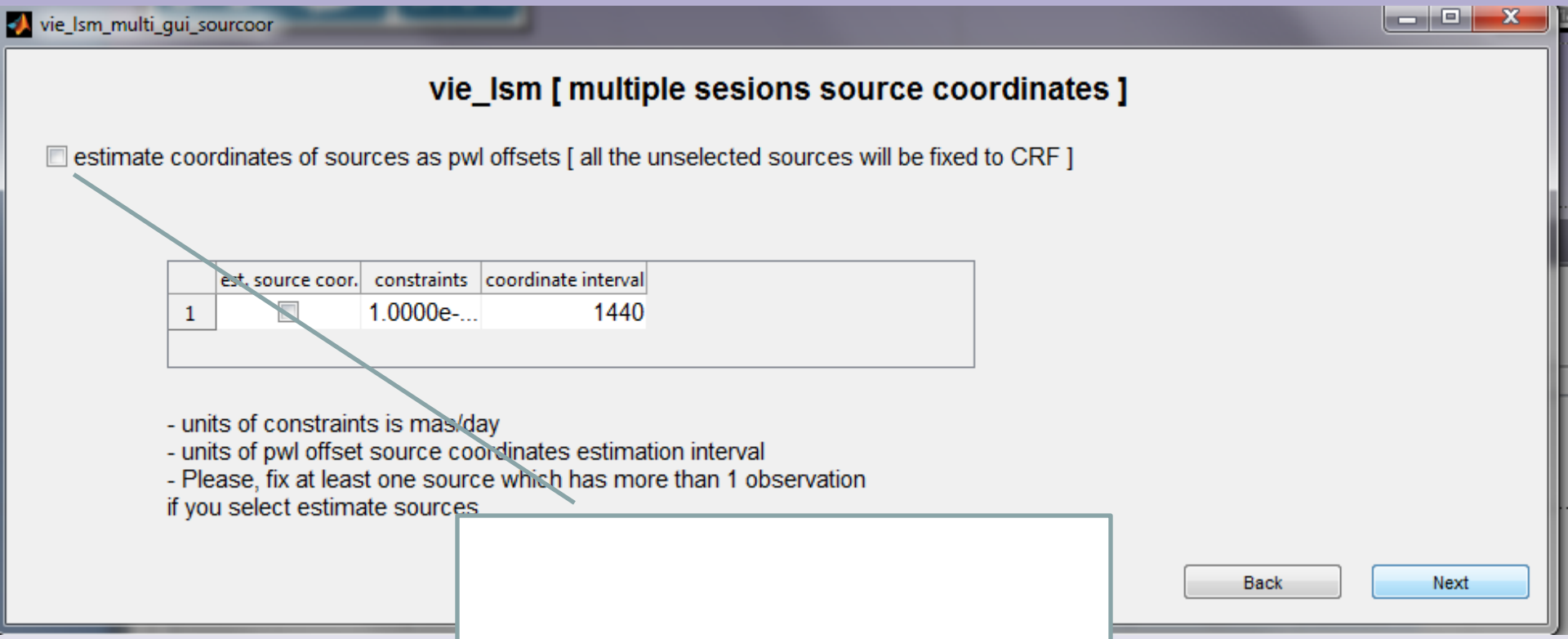
Make one constant zenith wet delay per station and do not estimate gradients.



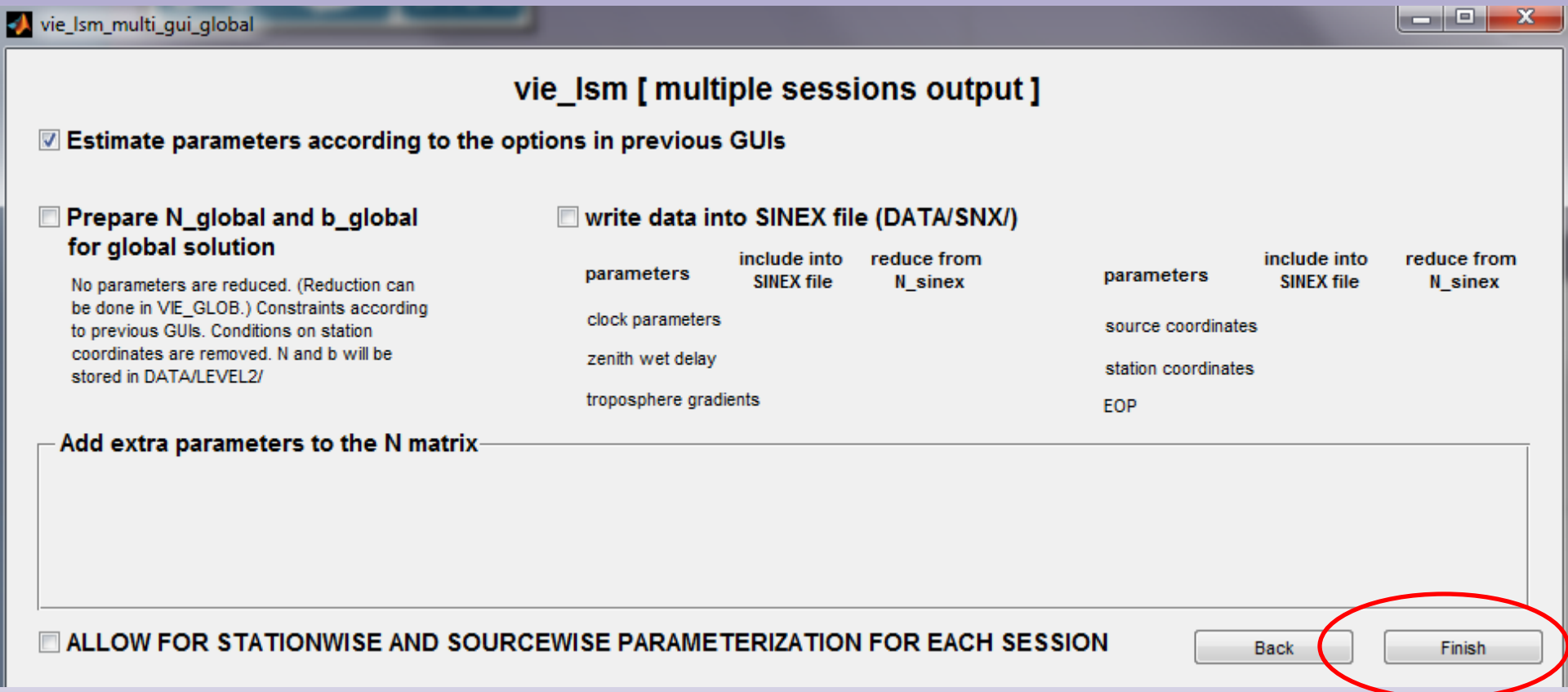
Do not estimate station coordinates.

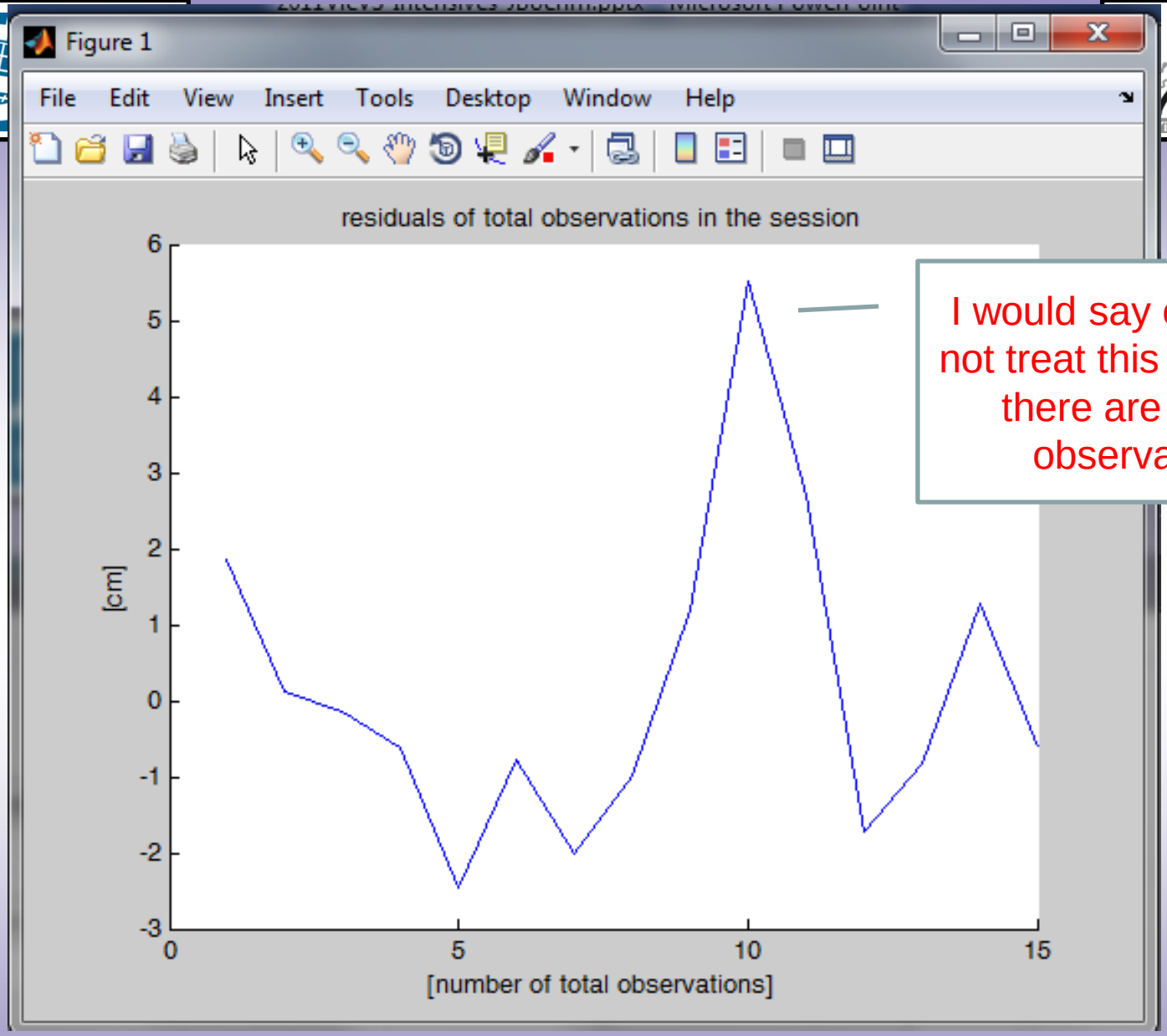


Only estimate one constant dUT1 per session. (1e-4)



Do not estimate source coordinates.


vie_lsm_multi_gui_global
vie_lsm [multiple sessions output]
Estimate parameters according to the options in previous GUIs
Prepare N_global and b_global for global solution
No parameters are reduced. (Reduction can be done in VIE_GLOB.) Constraints according to previous GUIs. Conditions on station coordinates are removed. N and b will be stored in DATA/LEVEL2/
write data into SINEX file (DATA/SNX/)
parameters
include into SINEX file
reduce from N_sinex
clock parameters
zenith wet delay
troposphere gradients
parameters
include into SINEX file
reduce from N_sinex
source coordinates
station coordinates
EOP
Add extra parameters to the N matrix
ALLOW FOR STATIONWISE AND SOURCEWISE PARAMETERIZATION FOR EACH SESSION
Back
Finish



I would say ok. I would not treat this as outlier if there are only 15 observations.

```
Thanks for your choice!

session     1  of     1
fil =
../DATA/LEVEL0//11APR02XK_N003
------------------------------------------------------------
|                  Welcome to VIE_INIT!!!!!                  |
------------------------------------------------------------

Start reading 2011/11APR02XK_N003
[antenna,sources,scan]=read_ngs(ngsfile,trffile,infofile,crffile,ini_opt)
Done reading the file!
A total of 2 stations, 14 sources and 15 scans were found
The following stations were found:
KOKEE
WETTZELL
VIE_INIT finished!!! You can now continue with VIE_MOD
------------------------------------------------------------
|                     Welcome to VIE_MOD                     |
------------------------------------------------------------
C04_08
Lagrange interpolation of EOP
interpf (Conventions)
reading_jpl_421 ephemerides
IAU_2006A
station corrections
Cubic model after 2010.0 is not available, a linear model for extrapolation is used. (IERS Conv. 2010)

vie_mod successfully finished!
```

This is not too much.

```
------------------------------------------------------------
|                  Welcome to VIE_LSM!!!!!                 |
------------------------------------------------------------

Warning: The fourth output, VERSN, of FILEPARTS will be removed in a future release.
> In fileparts at 35
  In vie_lsm at 132
  In vie_batch1d at 109
  In vievs at 67
number of scans :   15
number of antennas :  2
number of sources :  14
number of obs. :    15
2. CREATING DEFAULT OPTIONS
3. FORMING THE WEIGHT MATRIX OF THE OBSERVATIONS "Pobser
apriori std. dev. of unit weight. : 1.4741
obs. of the antenna KOKEE    :   15
obs. of the antenna WETTZELL :   15
4. FORMING THE REDUCED OBSERVATION VECTOR "oc_observ"
clock KOKEE    is selected as the ref. clock for the first solution
chi-squared of first solution: 2.3201
5. FORMING THE DESIGN MATRICES "A(i).sm" ...
6. FORMING THE CONSTRAIN MATRIX and WEIGHT MATRIX OF CONSTRAINTS
7. ESTIMATING THE PARAMETERS WITH LEAST SQUARES
condition number of normal equation matrix: 6.1497e+008
clock KOKEE    is selected as the ref. clock for the main solution
chi-squared of main solution: 1.6135
```

Could be better but ok.

```
----------
outlier detection test was not applied!
----------
total number of estimated parameters:   10
total clock offsets:    2
total rate and quad. terms of clock funct.:    0
total zenith wet delay offsets:    6
total tropo. north gradients:    0
total tropo. east gradients:    0
total pole coor. (x-pol) offsets:    0
total pole coor. (y-pol) offsets:    0
total dUT1 offsets:    2
total celestial pole (nutation dx) offsets:    0
total celestial pole (nutation dy) offsets:    0
total right ascension offsets of sources :    0
total declination offsets of sources :    0
antenna coor. dx offsets:    0
antenna coor. dy offsets:    0
antenna coor. dz offsets:    0
----------
estimated parameters are saved as ../VieVS/DATA/LEVEL3//x_11APR02XK_N003.mat
estimation options are saved as ../VieVS/DATA/LEVEL3//opt_11APR02XK_N003.mat
normal equation matrix is saved as ../VieVS/DATA/LEVEL3//atpa_11APR02XK_N003.mat
right hand side vector is saved as ../VieVS/DATA/LEVEL3//atpl_11APR02XK_N003.mat
8. vie_lsm IS COMPLETED!
Elapsed time is 0.707389 seconds.
Thank you for using vievs!
```

Actually, we only have 5 parameters: 2 for a linear clock between the stations, 2 for constant zenith wet delays at the stations, 1 dUT1.

```
>> cd ../DATA/LEVEL3/
>> ls

.                       atpa_11APR02XK_N003.mat  atpl_11APR02XK_N003.mat  opt_11APR02XK_N003.ma
..                      atpa_11APR04XA_N004.mat  atpl_11APR04XA_N004.mat  opt_11APR04XA_N004.ma

>> load x_11APR02XK_N003.mat
>> x_
x_ =
      pwclk: [1x2 struct]
      rqclk: [1x2 struct]
        zwd: [1x2 struct]
    antenna: [1x2 struct]
        ngr: [1x2 struct]
        egr: [1x2 struct]
       xpol: [1x1 struct]
       ypol: [1x1 struct]
       dut1: [1x1 struct]
      nutdx: [1x1 struct]
      nutdy: [1x1 struct]
      coorx: [1x2 struct]
      coory: [1x2 struct]
      coorz: [1x2 struct]
>> x_.dut1
ans =
    col: [9 10]
    mjd: [55653 55654]
    val: [-0.0036 -0.0036]
     mx: [0.0152 0.0152]
```

Here it is dUT1 in msec. It has been estimated in addition to the apriori values.