TECHNISCHE UNIVERSITÄT WIEN
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Results from the VLBI data analysis software comparison campaign

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VieVS User Workshop

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OUTLINE

- motivation
- what is it?
  - participants
- results
- conclusions (preliminary)

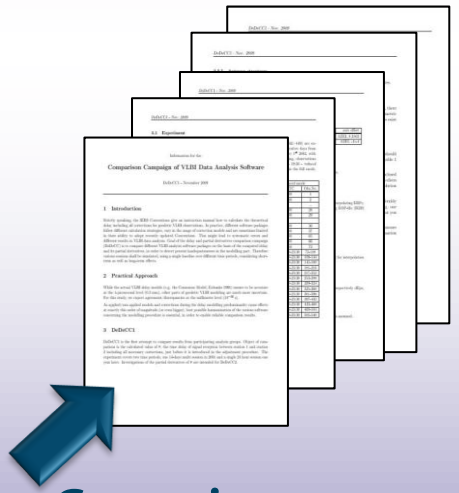
MOTIVATION

- verify new software
- difficulties when comparing VieVS and Occam with standard observations
  - Idea of fictitious observations
- interest by the IVS Analysis Coordinator to start a global campaign
  - DeDeCC – delay and partial derivatives comparison campaign

… goal is to compare different VLBI analysis software packages on the basis of the computed delay and its partial derivatives, in order to detect present inadequatenesses in the modelling part.

DeDeCC

- 1 baseline (Westford - Wettzell)
- 1 source
- various sessions
  (e.g. 14 days @ 30 min)
  - → “self-made” NGS files (resp. databases)



- **INPUT PARAMETERS:**
  - constant EOP
  - constant air pressure & temperature
  - no atmosphere loading

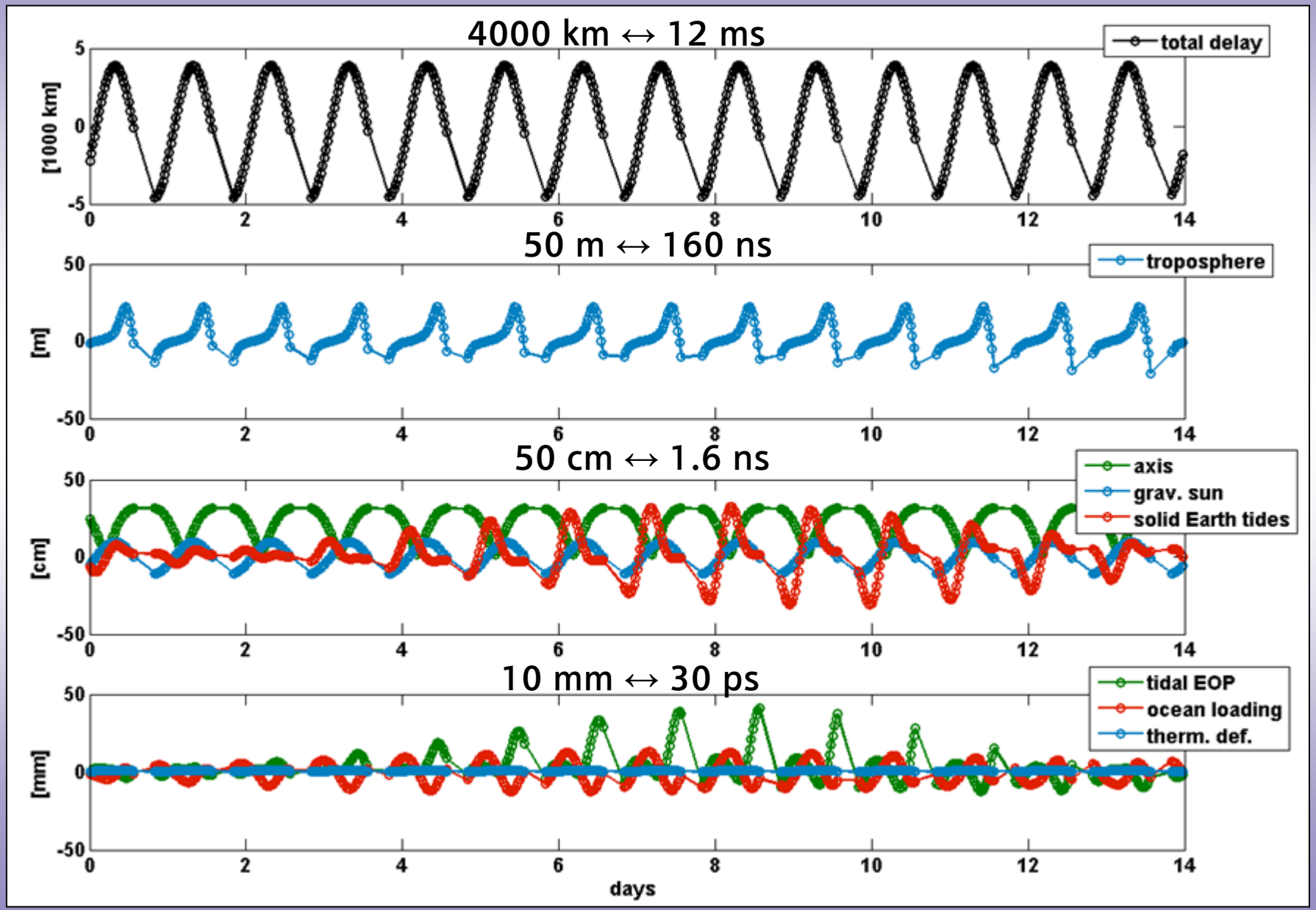
*find details in the **information note for the Comparison Campaign***
http://mars.hg.tuwien.ac.at/~vievs/

PARTICIPANTS

- TU Vienna, **VieVS**
- T. Artz (IGG Bonn), **CALC/Solve**

  Solve release: 2008.07.31, mod. version
- D. Gordon (GSFC), **CALC10.0/Solve**
- S. Bolotin (GSFC), **SteelBreeze**
- O. Titov (Geosc. Australia), **Occam 6.2**
- T. Hobiger (NICT), **c5++**

VieVS DELAY


4000 km ↔ 12 ms
total delay
[1000 km]
5
0
-5
0
2
4
6
8
10
12
14
50 m ↔ 160 ns
troposphere
[m]
50
0
-50
0
2
4
6
8
10
12
14
50 cm ↔ 1.6 ns
axis
grav. sun
solid Earth tides
[cm]
50
0
-50
0
2
4
6
8
10
12
14
10 mm ↔ 30 ps
tidal EOP
ocean loading
therm. def.
[mm]
50
0
-50
0
2
4
6
8
10
12
14
days

COMPARISON

- goal:

  overall accuracy of

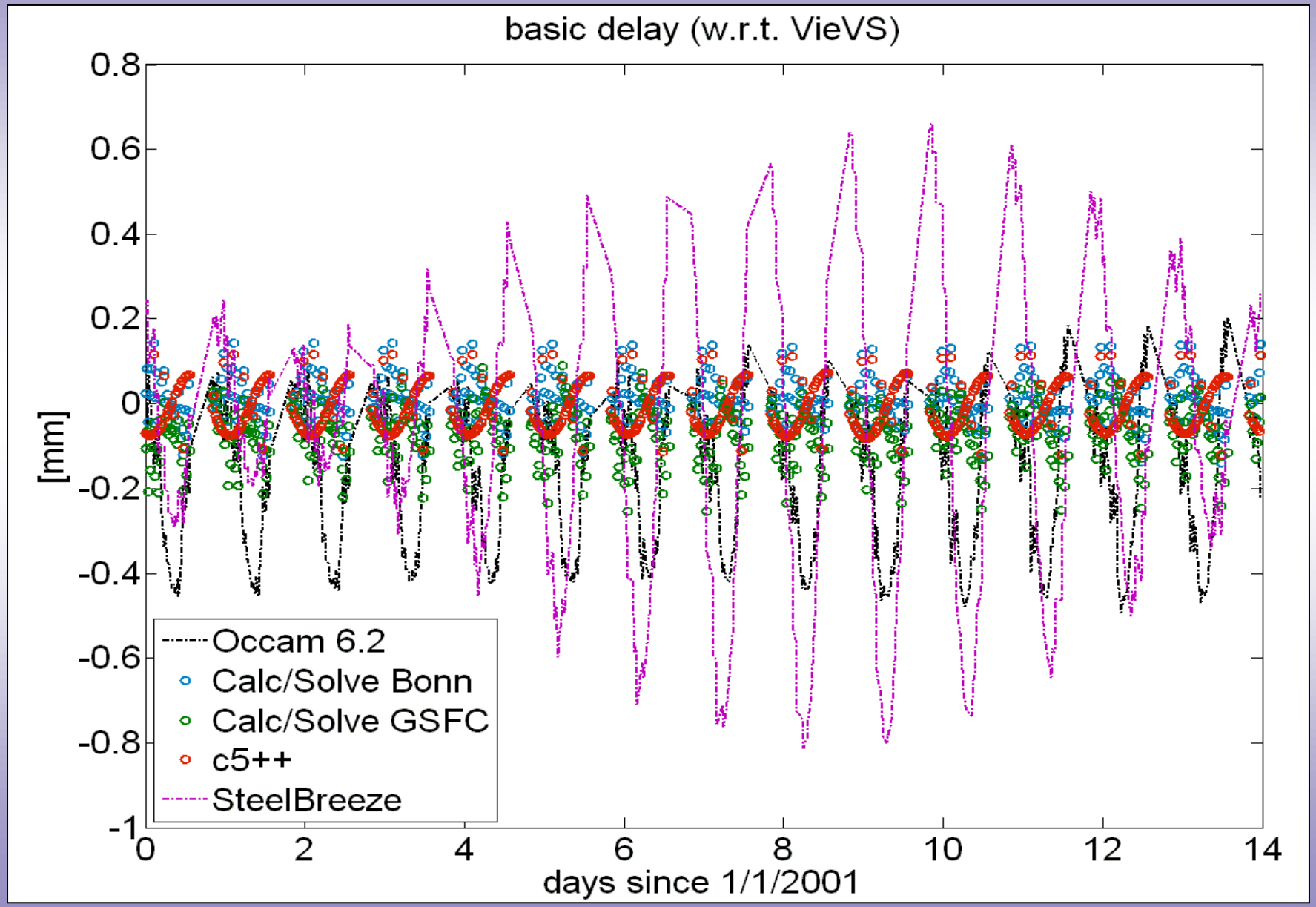
  0.3 mm ≈ 1 ps

- problems:

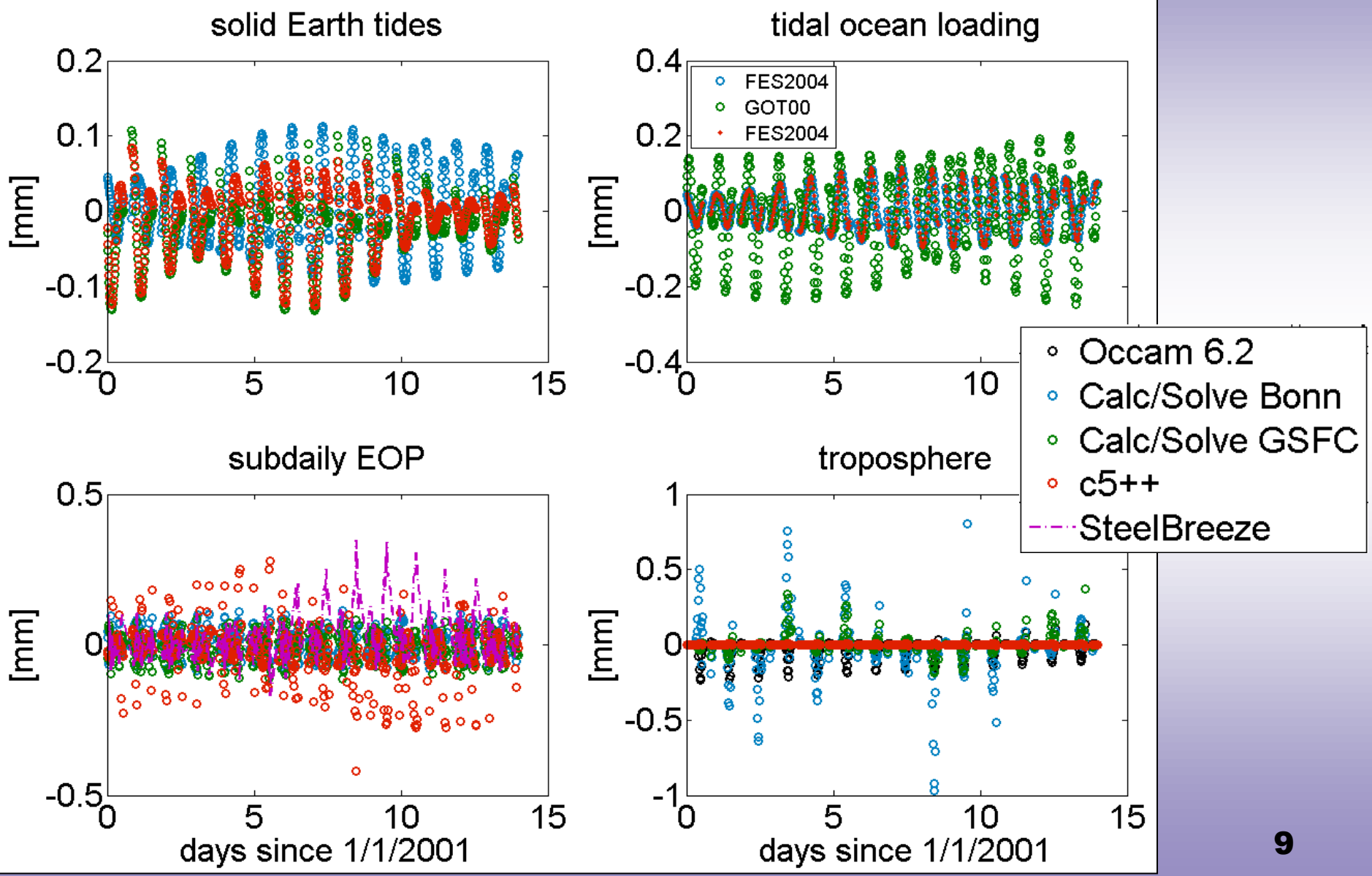
  → exactly the same models &

  → how to implement them

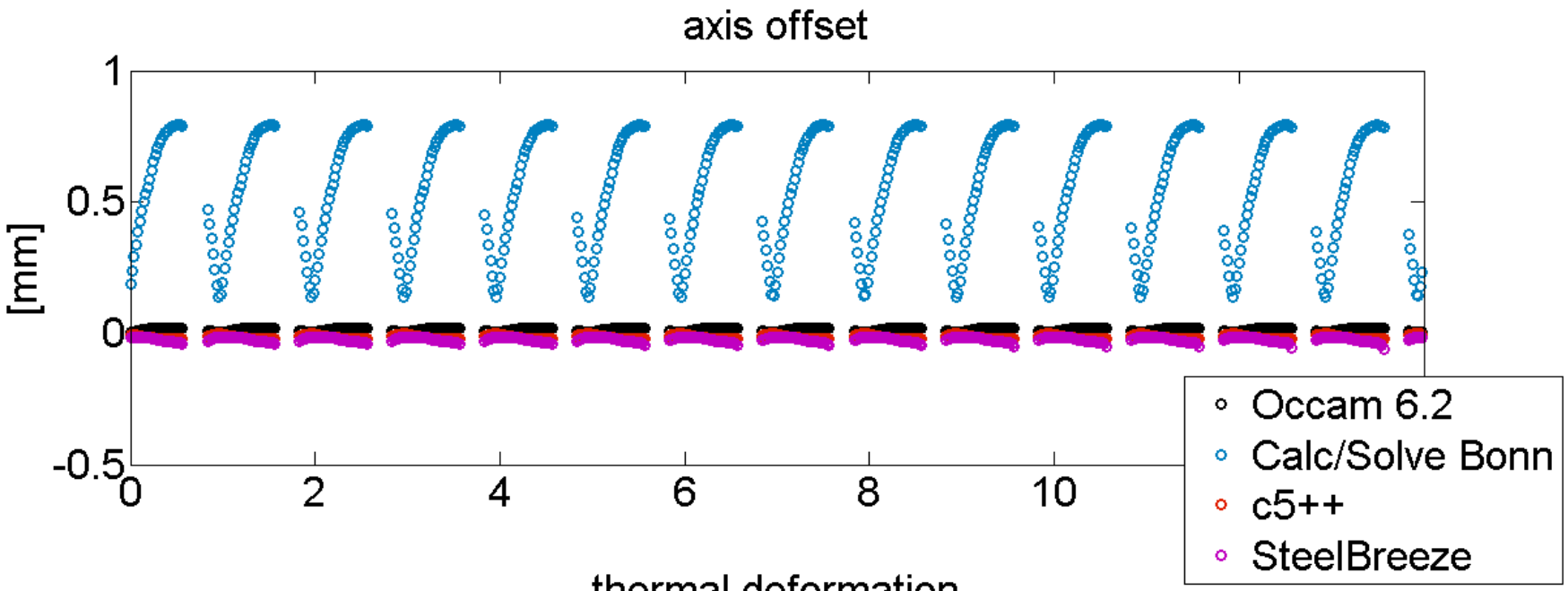
BASIC DELAY

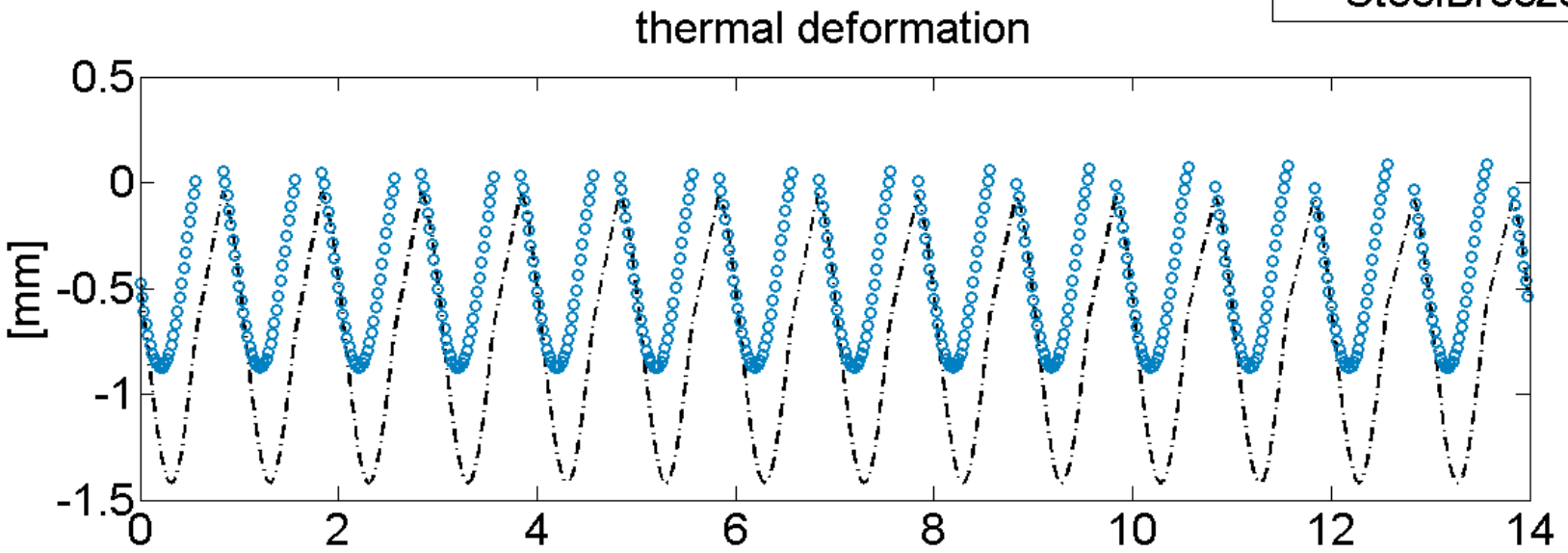

basic delay (w.r.t. VieVS)
[mm]
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
2
4
6
8
10
12
14
days since 1/1/2001
Occam 6.2
Calc/Solve Bonn
Calc/Solve GSFC
c5++
SteelBreeze

MODELS 1 (w.r.t. VieVS)



MODELS 2 (w.r.t. VieVS)





CONCLUSIONS

- Comparison is still difficult
  - no station velocities in CALC
  - when are corrections applied?
- Shows the complexity and sensitivity of VLBI data analysis
- VieVS results fit → verification

- Deviations at the mm-level are critical for combined products
  - Interpolation of EOP (excluded in DeDeCC)
  - Detailed Conventions needed (e.g. table of ocean loading coefficients,…)