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Station Coordinates, Earth Rotation Parameters, and Low Degree Harmonics from SLR within GGOS-D

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The GGOS-D Project

- Consistent combination of space-geodetic techniques
  - SLR, GPS, VLBI; LEOs, altimetry
  - Station coordinates, EOPs, low degree harmonics
- Two independent institutes and software packages generate SLR solutions
  - DGFI via DOGS and GFZ via EPOS
  - Test series 2004 available

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2004 Test Solution Standards vs. ILRS pos&eop

- Weekly solutions from LAGEOS-1 and -2
  - Station coordinates
  - X-, Y-pole, UT1; continuous, piecewise linear <-> dLOD; step functions
  - Degree 0 to 2 harmonics (GFZ only, 1m sigma) <-> no harmonics
- Gravity field model EIGEN-GL04S1 <-> EGM96
- Ocean tide model FES2004 <-> GOT99.2b
- Atmospheric tides Bode&Biancale2003 <-> standard
- Precession IAU 1976
- Nutation IAU 1980 with VLBI corrections <-> w/o VLBI corrections
- A priori: ITRF2000, EOP C04
- Ocean tide loading Scherneck-FES2004 <-> Scherneck-GOT99.2b
- Data treatment: Eastbourne recommendations, SLR discontinuities SINEX file

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Orbital Fits

	EPOS	DOGS
RMS (cm)	1.05	1.05
n	134,818	141,103

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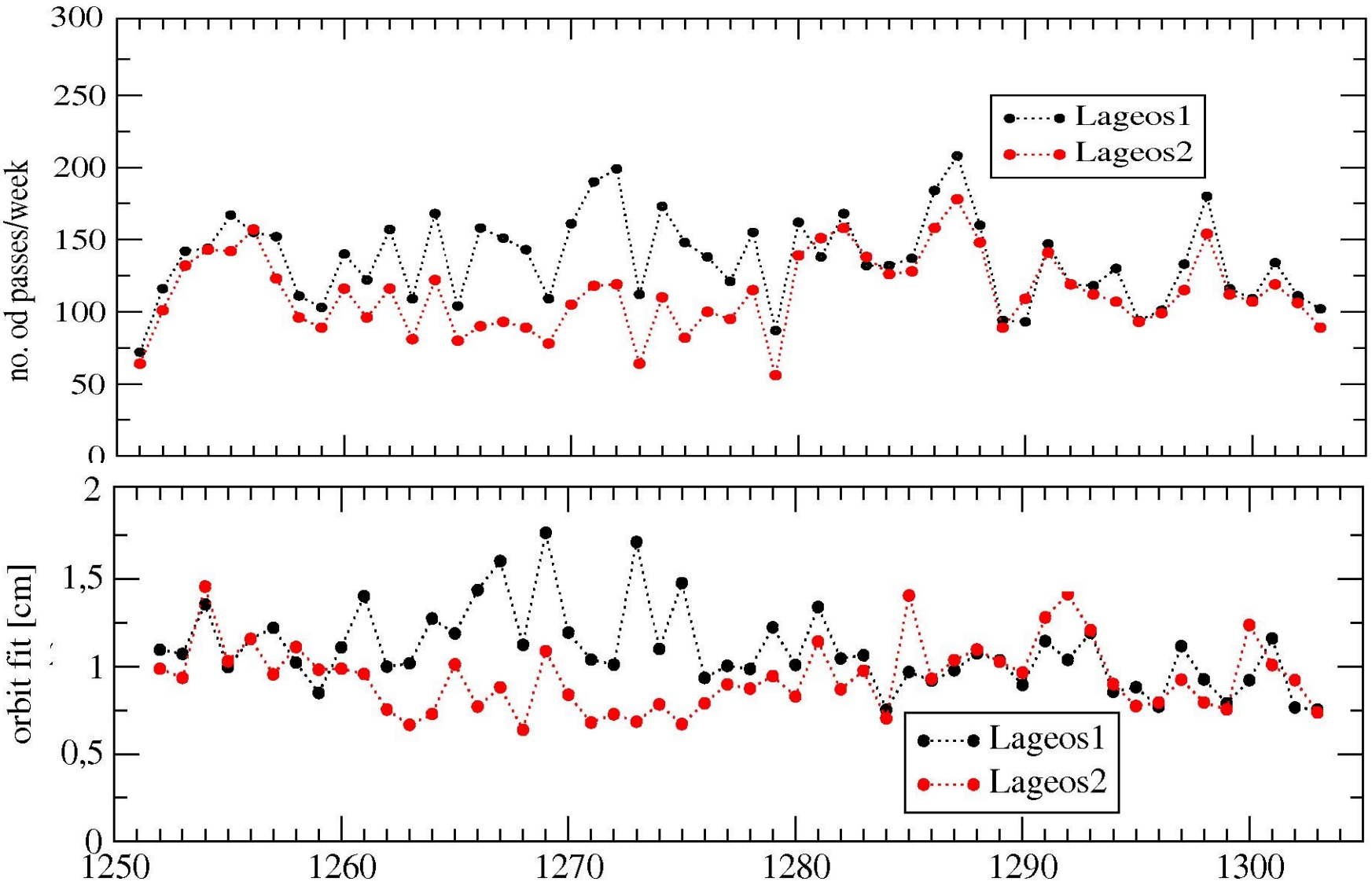
300
250
200
150
100
50
0
no. od passes/week
Lageos1
Lageos2
2
1,5
1
0,5
0
orbit fit [cm]
Lageos1
Lageos2
1250
1260
1270
1280
1290
1300

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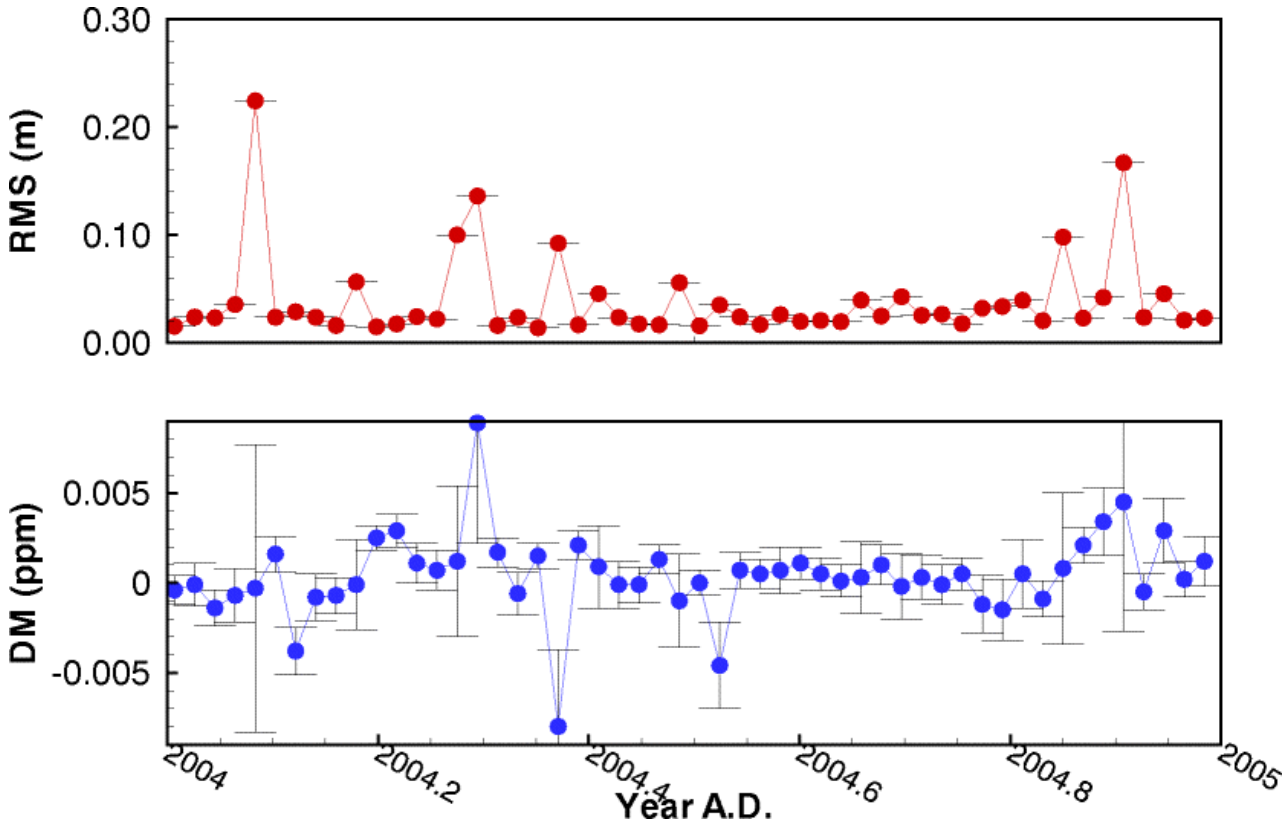
7-Param Transformation EPOS solution vs. ITRF2000: Disclosures (RMS) vs. Scale (DM)



BEFORE station disclosure screening

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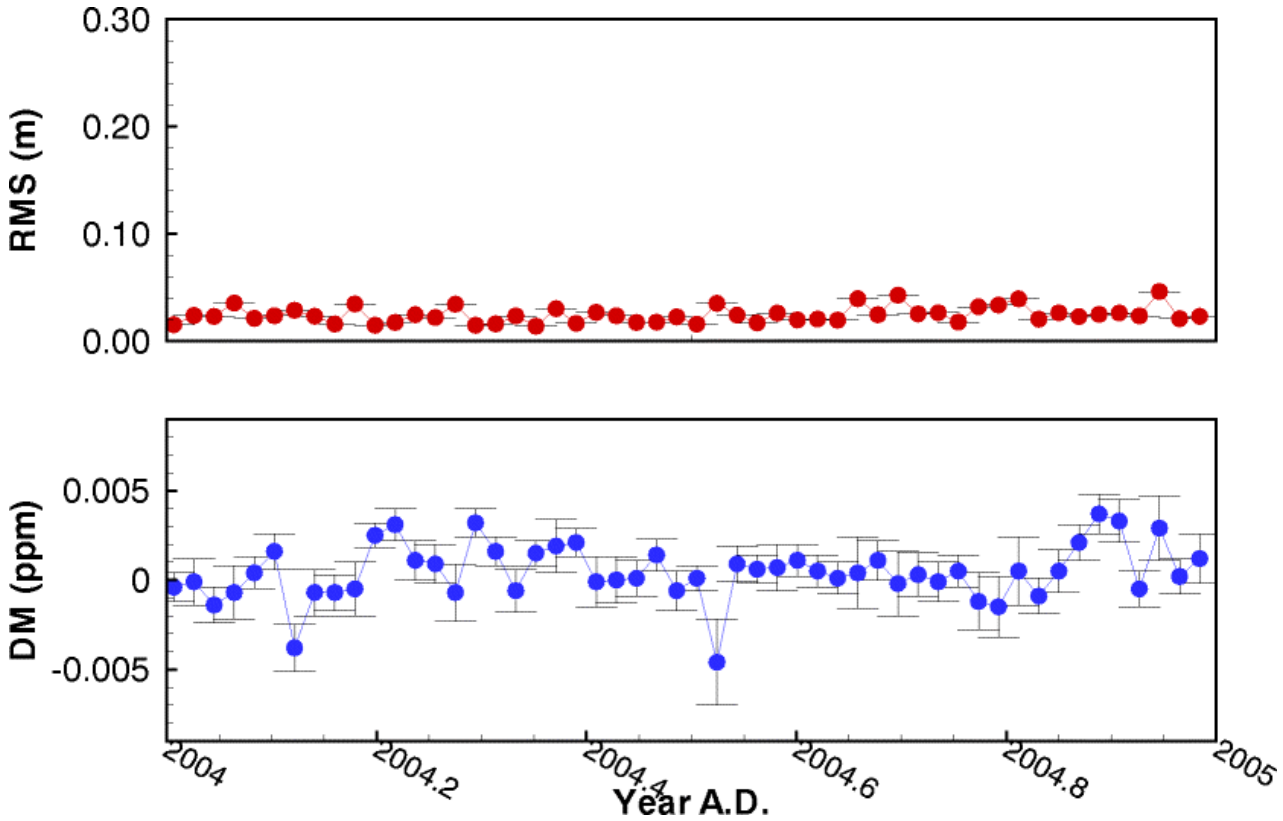
7-Param Transformation EPOS solution vs. ITRF2000: Disclosures (RMS) vs. Scale (DM)



AFTER station disclosure Screening

-> Some peaks in scale removed

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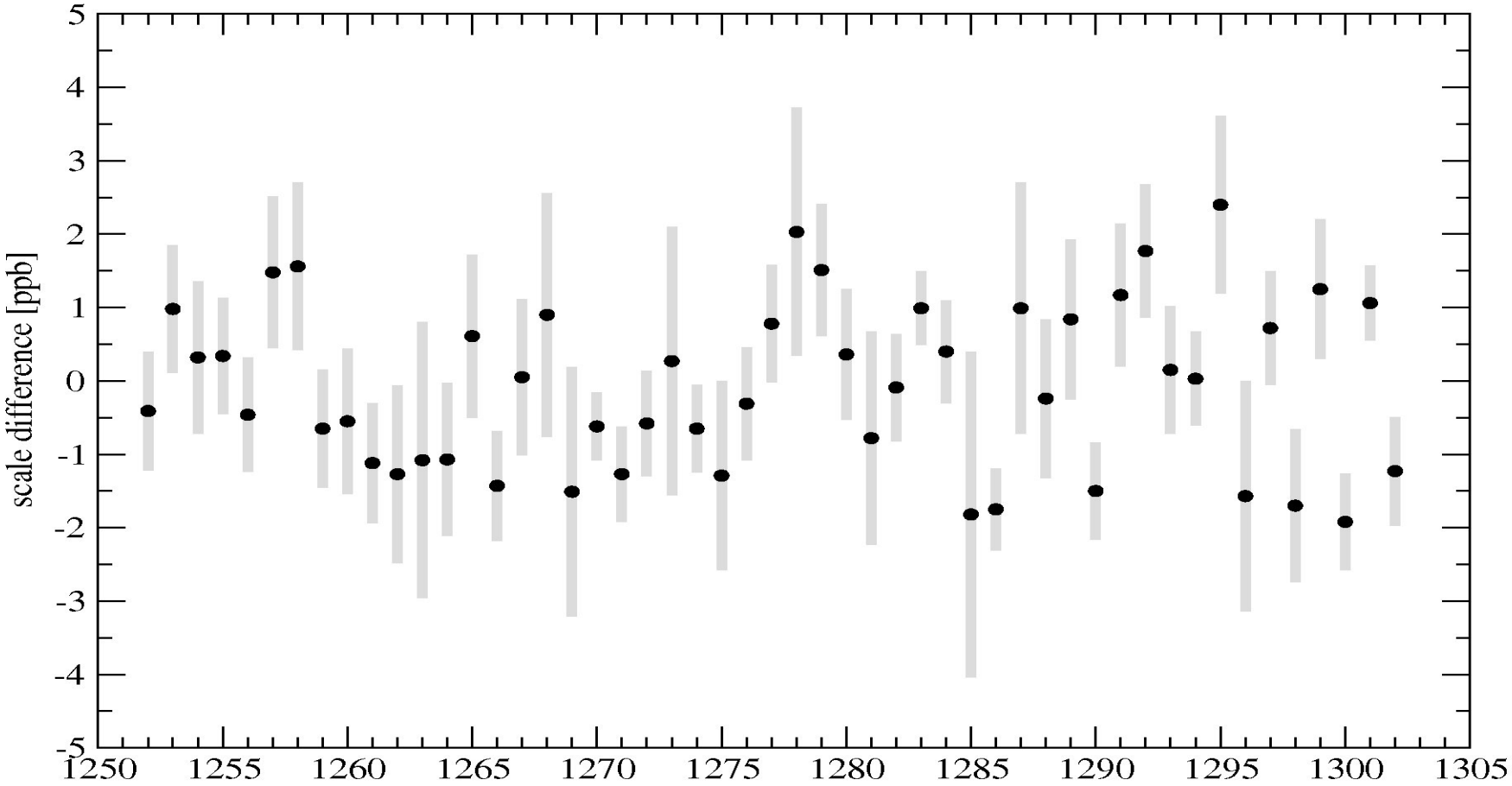
Scale Difference between DOGS and EPOS solution [ppb]



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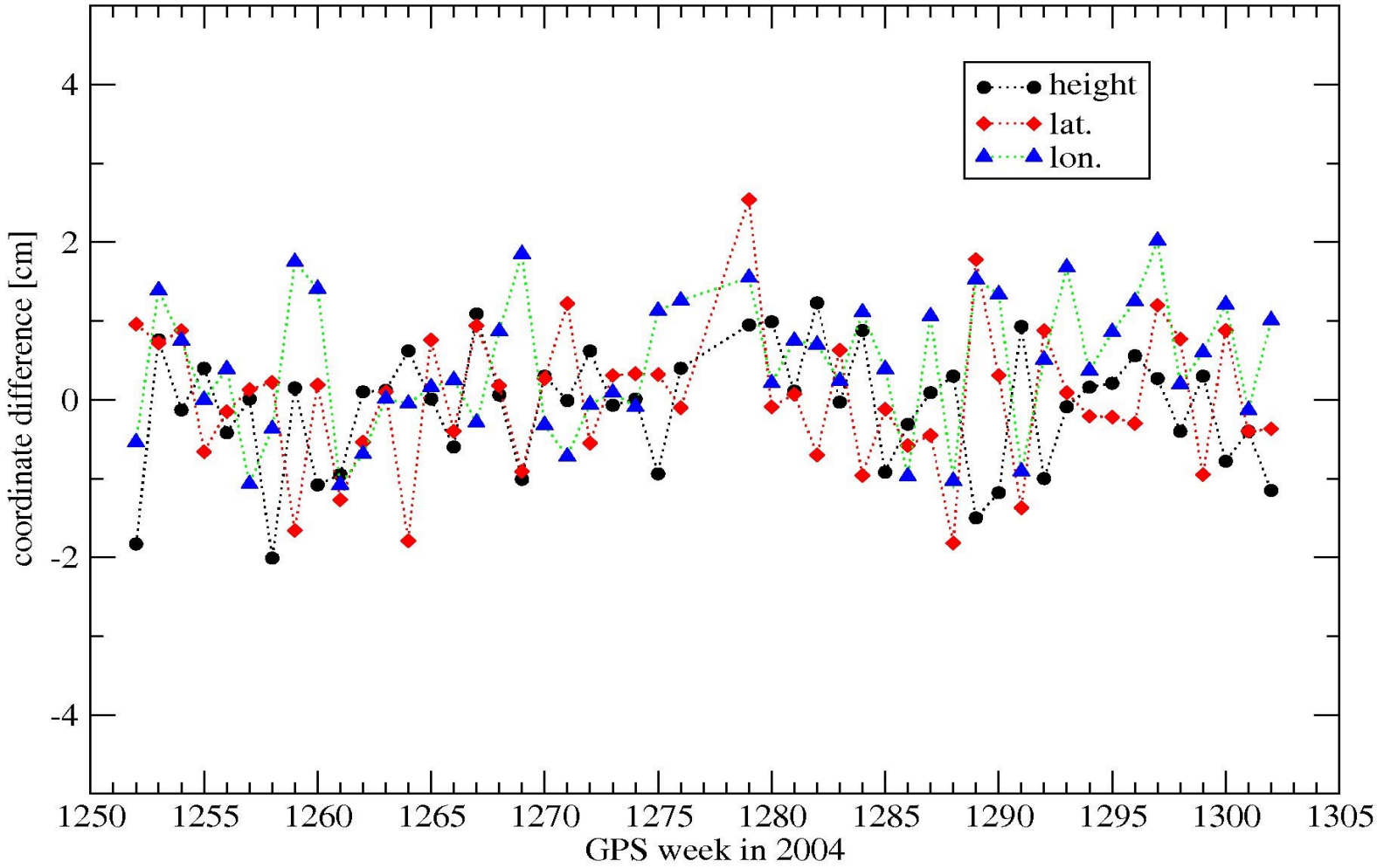
Coordinate Difference Time Series of Yarragadee Station



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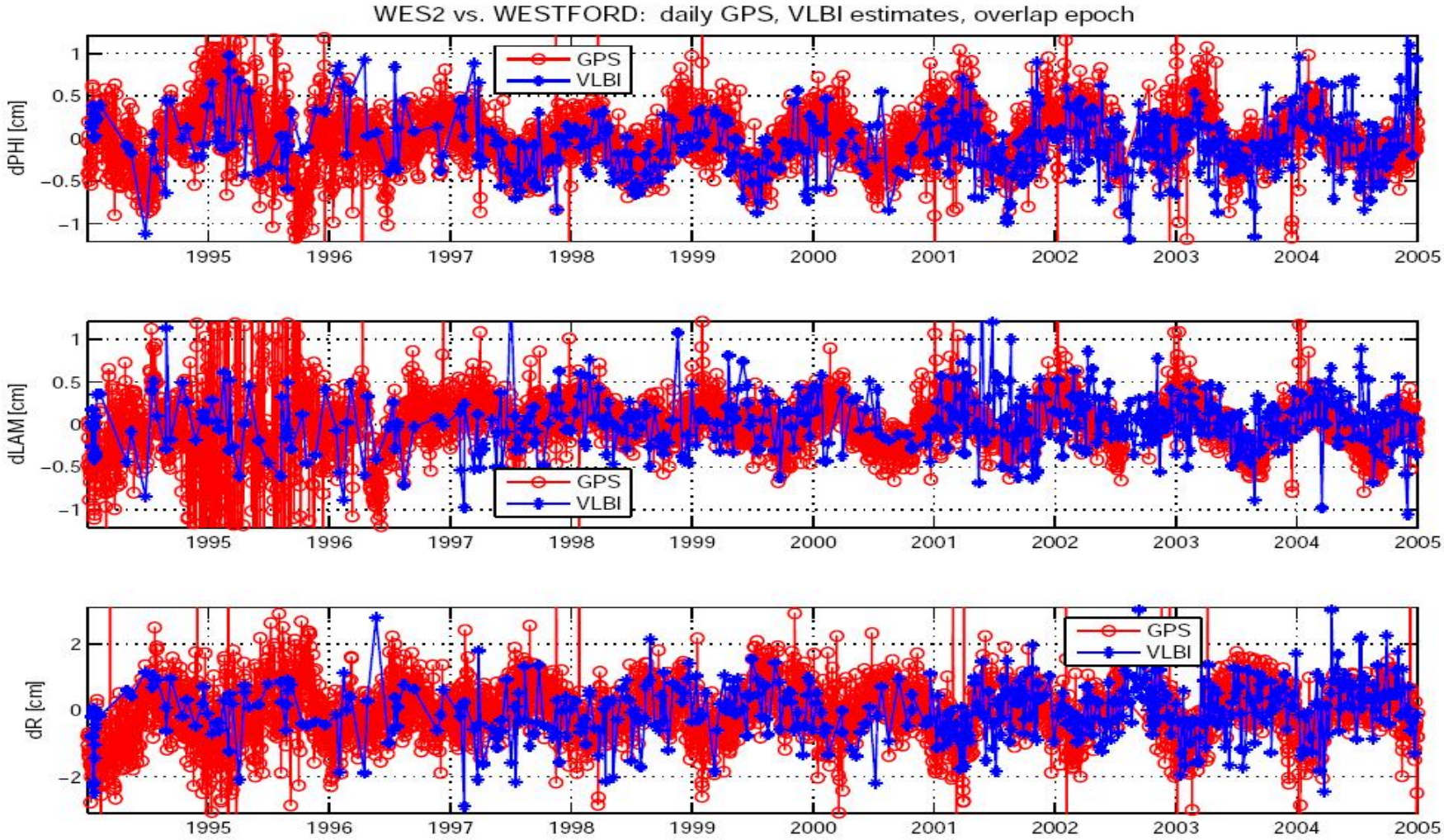
- DGFI and GFZ take part in GGOS-D project
- SLR technique treated by two independent software packages
- Processing standards different to ILRS pos&eop (f.i. EIGEN gravity model)
- Test series 2004 was generated:
  - Station coordinates, daily EOPs, low degree harmonics in weekly SINEX
  - 1 cm orbital fit
  - Comparisons DOGS – EPOS: still some work necessary
  - Treatment of series for geophysical interpretation open
  - Test combinations with GPS and VLBI started
- Back to 1983 processing foreseen
- Agreement between GPS and VLBI better than SLR (see next slide, comparison of time series of station positions from GPS and VLBI series, with adjusted software packages)



Source: V. Tesmer, DGFI, priv. comm.