

COL Analysis Center DGFI: VLBI

R. Heinkelmann



Overview

- IVS VLBI-sessions during the COL test period (10 – 30 August 2008)
- Specification of the VLBI-contribution of DGFI
- Optional: validation/ some results

VLBI Software

2nd COL Working Group Meeting

- OCCAM 6.1 (LSM) LINUX [Titov et al., 2004] for VLBI analysis + NGL-file generation
- DOGS-CS [Gerstl et al., 2000] for SINEX generation

VLBI Analysis (1)

OCCAM:

- Apriories
 - TRF: ITRF2008 (DGFI version)
 - EOPs: IERS C04-05
 - CRF: ICRF2 (full: non VCS + VCS)

VLBI Analysis (2)

OCCAM:

- Station coordinates
 - Permanent tide: no correction (this is not conform with IAG resolution but common practice)
 - Earth tides: IERS Conventions 2003
 - Pole tides: linear trend for mean pole offsets IERS Conventions 2003
 - Ocean loading: FES2004
 - Atmospheric loading: Petrov & Boy, 2004
 - Correction of axis offsets (official IVS numbers)
 - Antenna thermal expansion (Nothnagel, 2008)
 - Station eccentricities (official IVS table)

VLBI Analysis (3)

OCCAM:

■ EOP:

- Nutation model: IAU2000A disregarding the free core nutation part
- Subdaily EOP model, tidal variations in x , y , $dUT1$: Eanes, IERS Conventions 2003

VLBI Analysis (4)

OCCAM:

- Relativistic scale and Shapiro effect

- **Wrong** scale according to IAU!

$$X = X_{\text{GCRS}} * (1 - L_G)$$

- New version using the model without scaling of observed time delays: „consensus model“, IERS Conventions 2003 (updates available)

- Sun and Earth's gravity effect on signal propagation applied

VLBI Analysis (5)

OCCAM:

- Troposphere model

- Hydrostatic delay model: Modified Saastamoinen (Davis et al., 1985), pressure from log files (NGS files)
- Mapping functions: VMF1 (Böhm et al., 2006)
- Atmosphere gradients' model: MacMillan (1995)
- Apriori total atmosphere gradients: MacMillan & Ma (1997) DAO

VLBI Analysis (6)

OCCAM:

■ Parameterization

- No estimation of radio source positions; coordinates fix at ICRF2 (J2000.0) positions
- All EOP (x_p , y_p , $dUT1=UT1-TAI$, x_p -rate, y_p -rate, LOD, $dpsi$, $deps$), per session
- All (X, Y, Z) components of all sites, per station
- Atmosphere gradients (G_N , G_E), per station
- Atmosphere zenith delays (ZWD), 1 offset + 1h-rates of a PWLF, per station
- Coefficients of a quadratic clock model, 1 offset + 1h-rates of a PWLF, per station

VLBI Analysis (6)

OCCAM:

- Clock offsets and clock breaks (optional) are determined by first LSM
- „o-c“-vector gets reduced by clock model
- Apriories, normal equation ($N=A^T P A$) and vector of right hand side ($n=A^T P l$) without datum are written in DOGS-CS format (NGL)

VLBI Analysis (6)

DOGS-CS:

- Atmosphere parameters are reduced
- Apriori values, station coordinates and EOP are written into SINEX format (SNX)
- **Wrong** EOP-epoch! (version updated)

- End -

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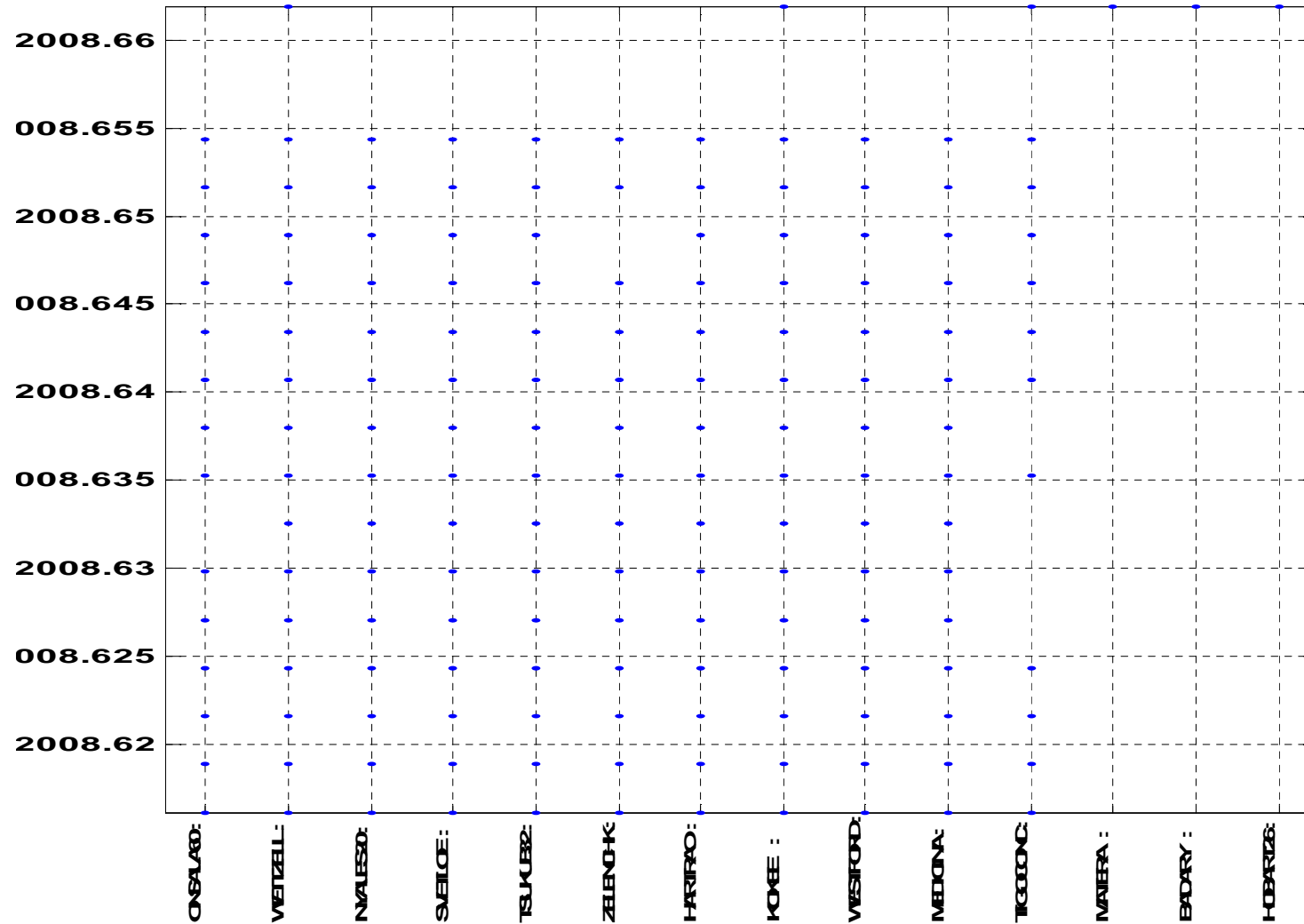


Thank you for your attention!

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IVS VLBI data during 2008-08-10/30

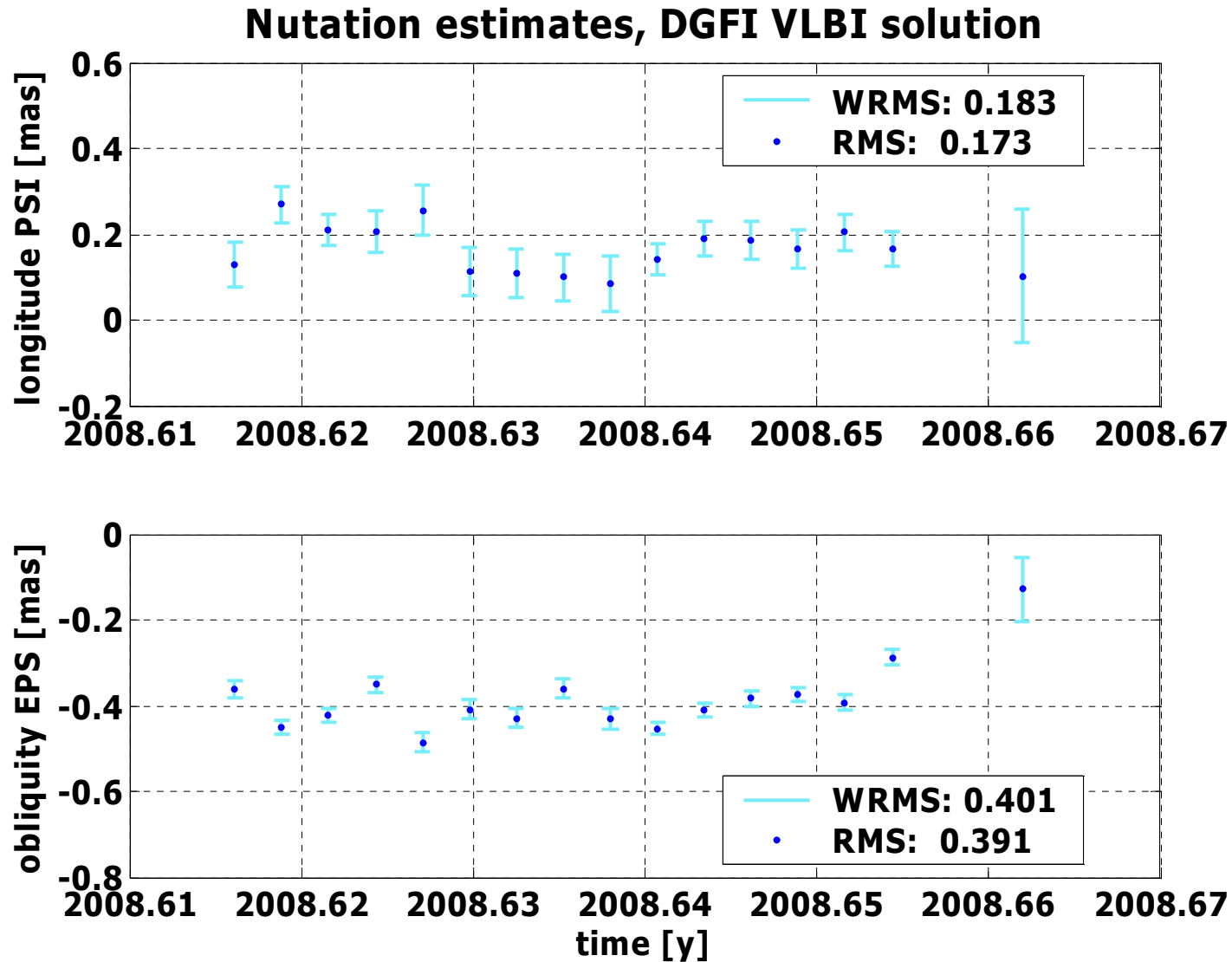
2nd COL Working Group Meeting



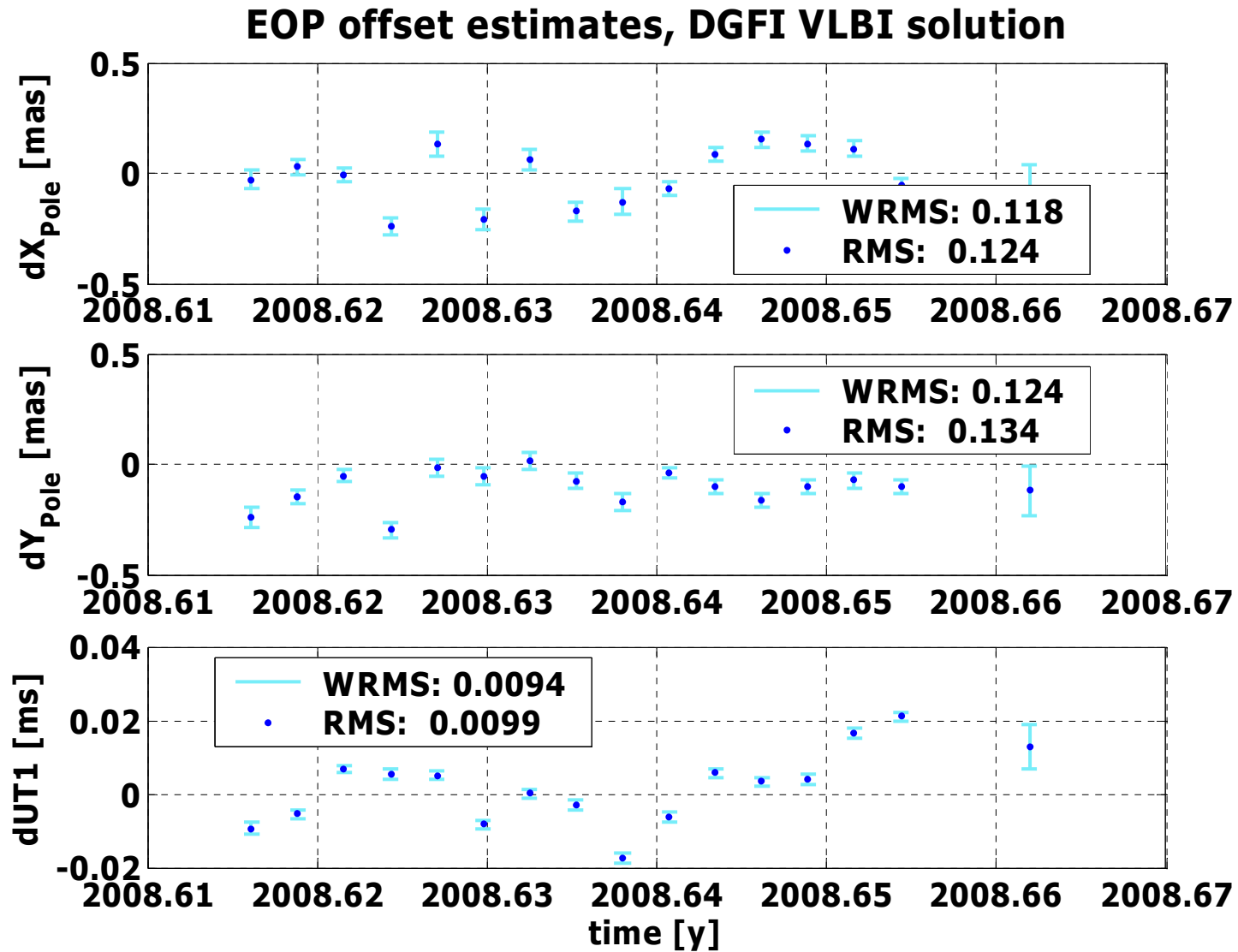
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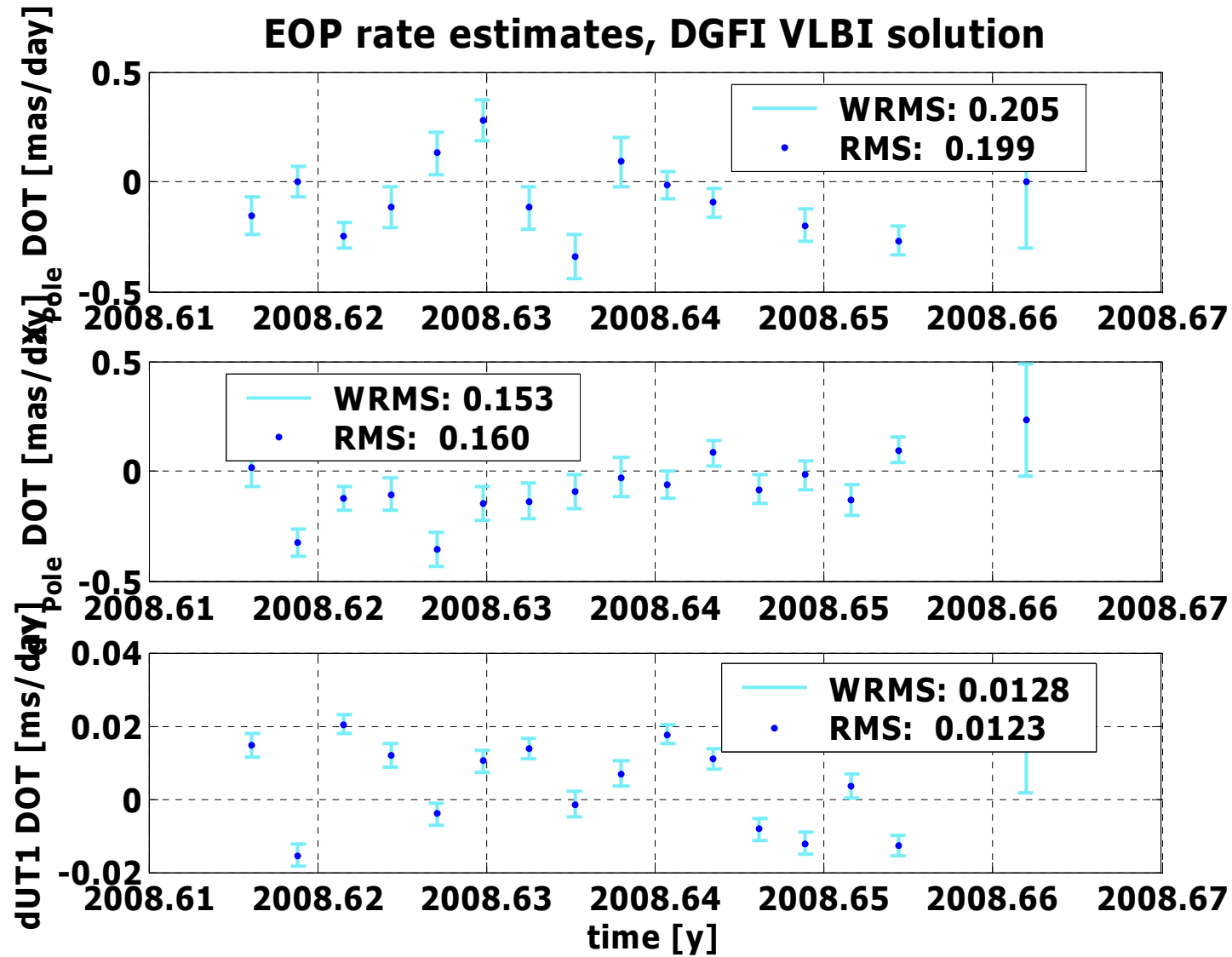
Celestial pole offsets



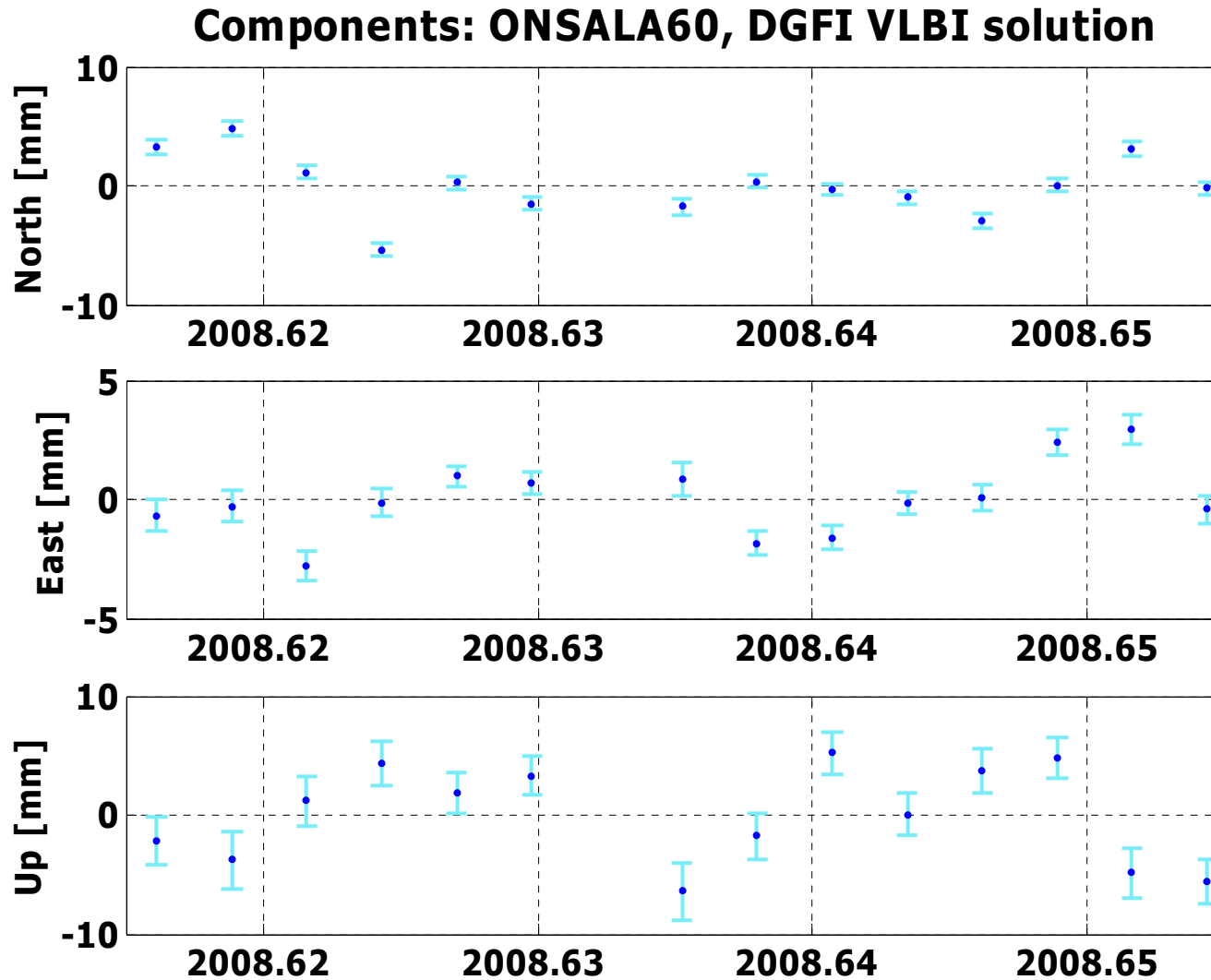
EOP



EOP-rates



Station coordinates, example: Onsala, Sweden



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