

COMPARISON OF WEEKLY GPS AND SLR COORDINATE / ERP COMBINATIONS

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Introduction

TANYA software, developed at the IGS Global Network Associate Analysis Centre (GNAAC) at University of Newcastle upon Tyne, UK, enables us to check, compare and combine the IGS AC SINEX solutions (A-networks) for ***station coordinates*** and ***Earth Rotation Parameters*** (ERP: X_p , Y_p , LOD) obtained from IGS and ILRS ACs.

NCL GNAAC submits combined GPS ERP starting May 2002 to IGS.

Input data

1. The ILRS OPS project's 7-days solutions (with loose constraints) from ASI, DGF, GFZ, NERC, JCET obtained from observations on the interval starting GPS week 1268 (2 May 2004) to 1298 (4 Dec 2004).
2. ILRS CB Sinex files for SITE/ID and SITE/ECCENTRICITY blocks (to create SLR catalogue file).
3. Regularly submitted to IGS "G-net" combination made by NCL GNAAC.



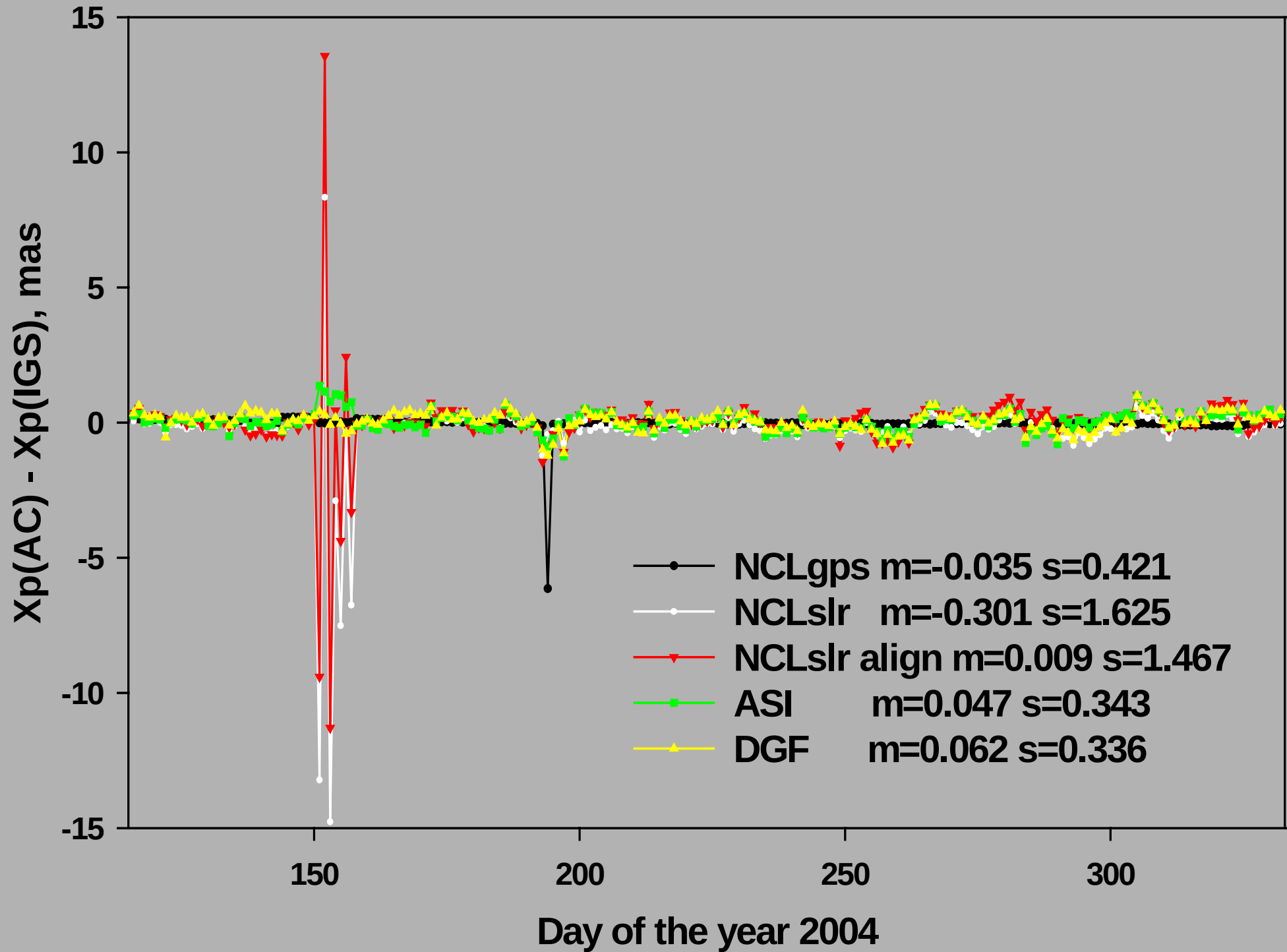
Analysis procedure

1. **Validation** - SINEX V1.0, 2.0
(<http://ucscgi2.ncl.ac.uk/~nkn3> on-line SINEX checker).
2. **Deconstraining** to get AC's loose solutions AC(loos).
3. **Estimating** (exclusion of stations, rescaling, combination) **GNET-solution** - loose combined solution (full covariance matrix used).
4. **Helmert transformation AC(loos) - GNET** to get postfit residuals.
5. **Outlier removal** (from analysis of postfit residuals).
6. **Variance component estimation** - to balance influence of ACs, to calibrate the outlier hypothesis test; iterate steps 3-6, if necessary.
7. **Product generation**: constrained solution **G**; summary file; Helmert parameters between AC(loos), GNET, CORE (ITRF2000) solutions.
8. **Reporting** to CDDIS or to ILRS AWG.

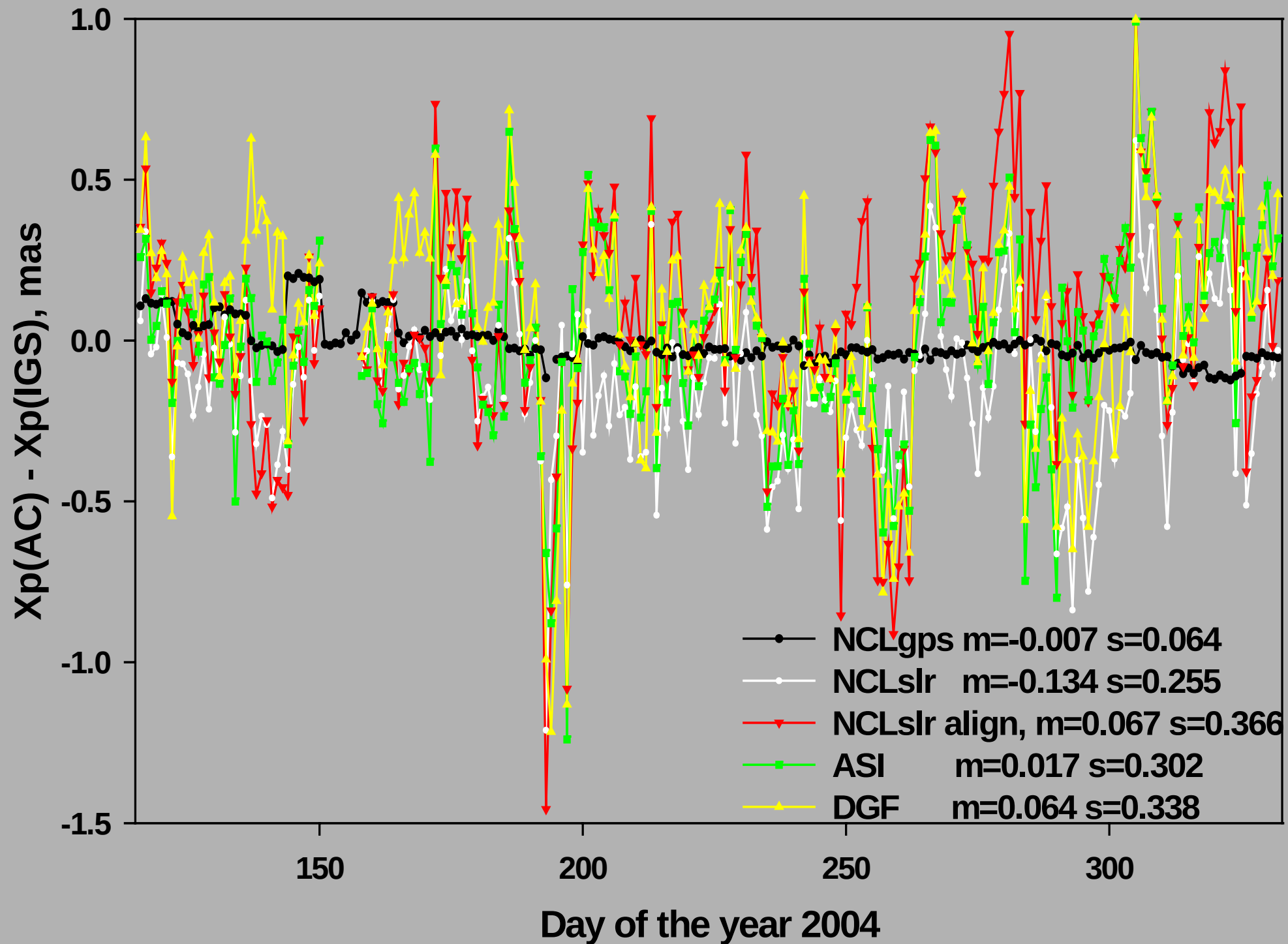
Comparisons

1. **Station coordinates.** Weighted RMS between solutions is 30-40 mm in comparisons wrt ITRF-2000 and 4-15 mm in comparisons wrt NCL.
2. **ERP.** Combined NCL and other ACs solutions have been compared with combined IGS (IGS04P) weekly solutions for ERP. The horizontal axes on figures for ERP represent day of the year. Seven months of ERP data have been used to create the figures. In the expressions of the kind $(X_p(\text{AC}) - (X_p(\text{IGS})))$ the mean values are computed for the each individual GPS week

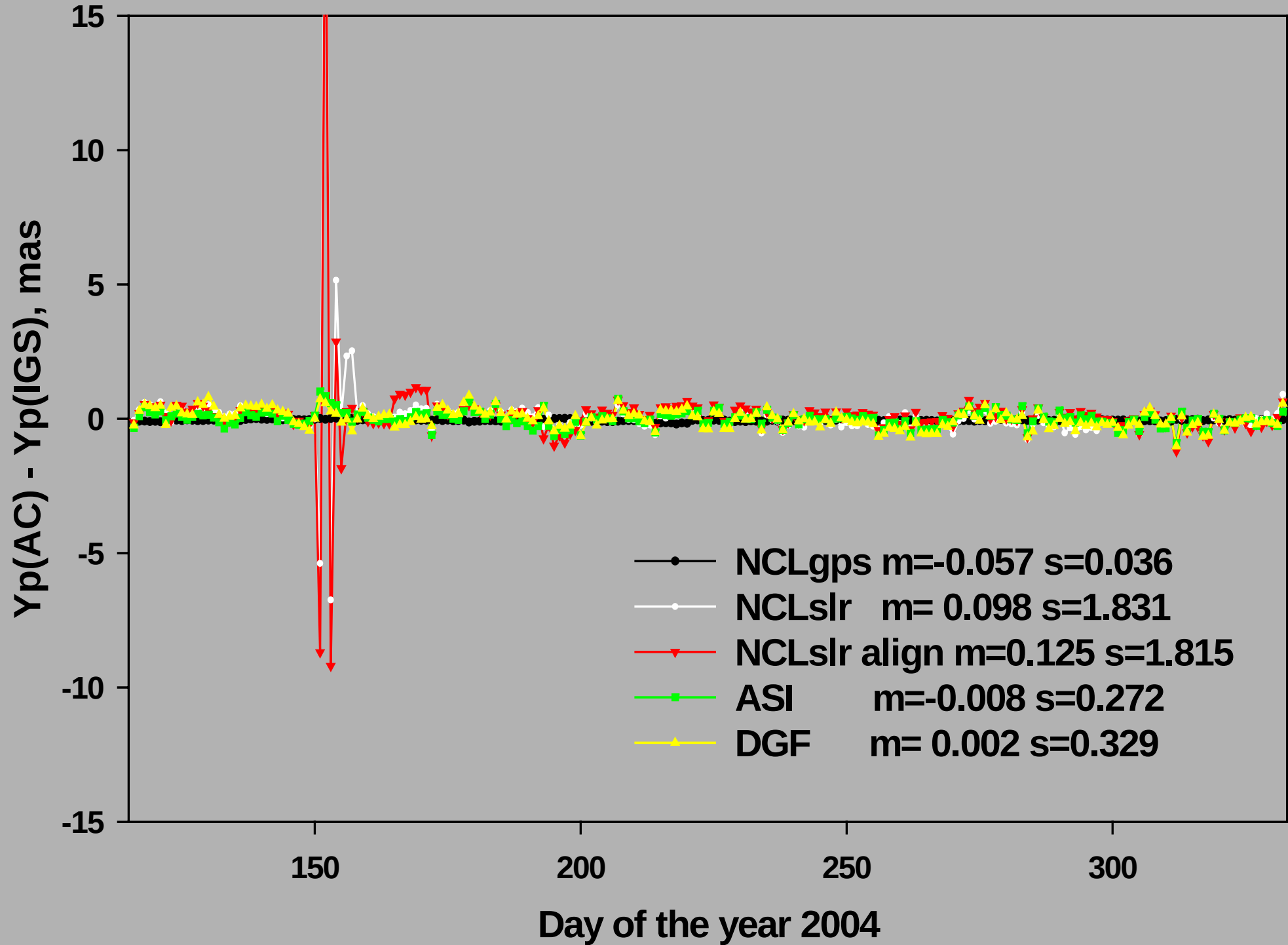
Xp(AC) - Xp(IGS)



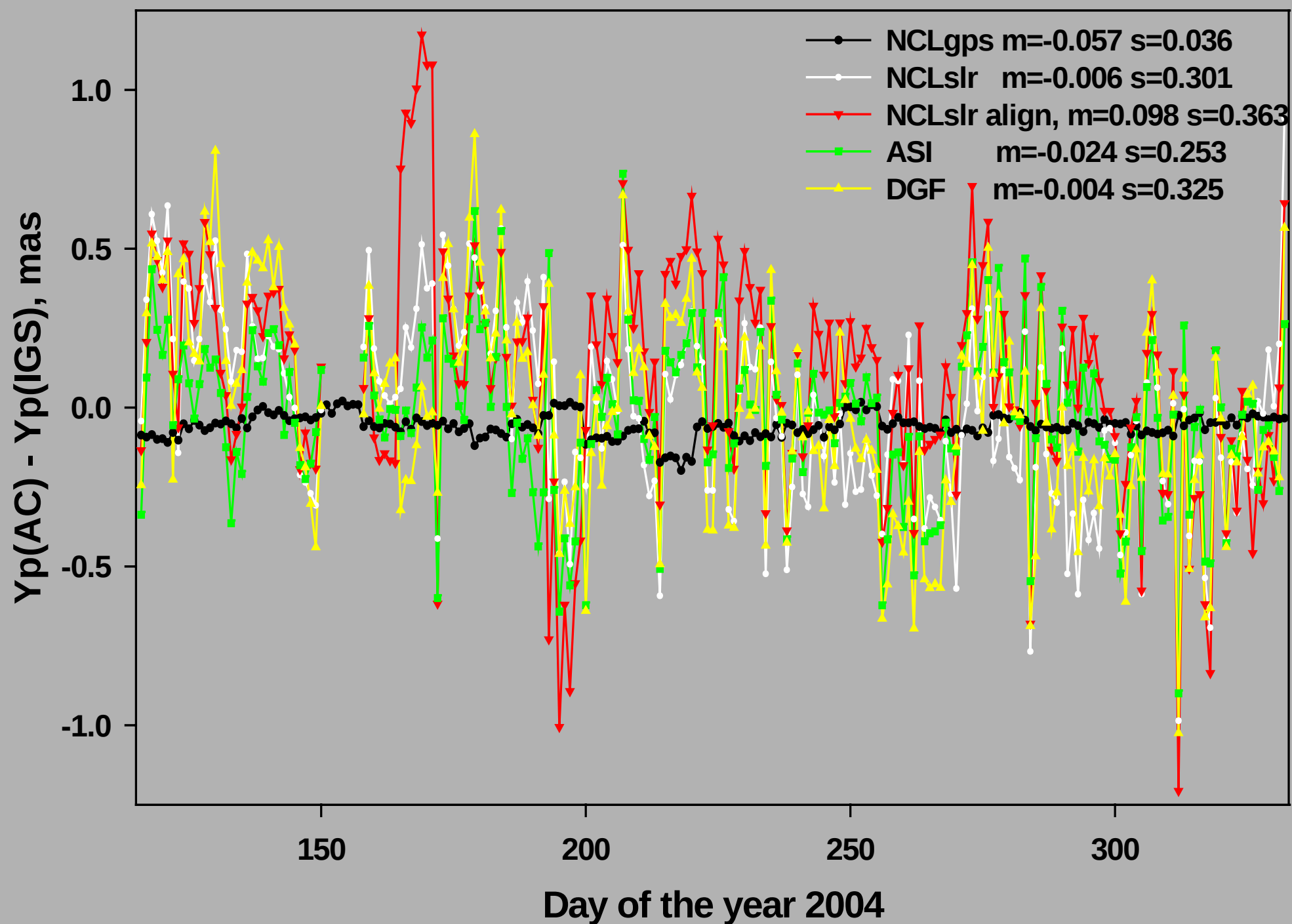
Xp(AC) - Xp(IGS) without days 144-150



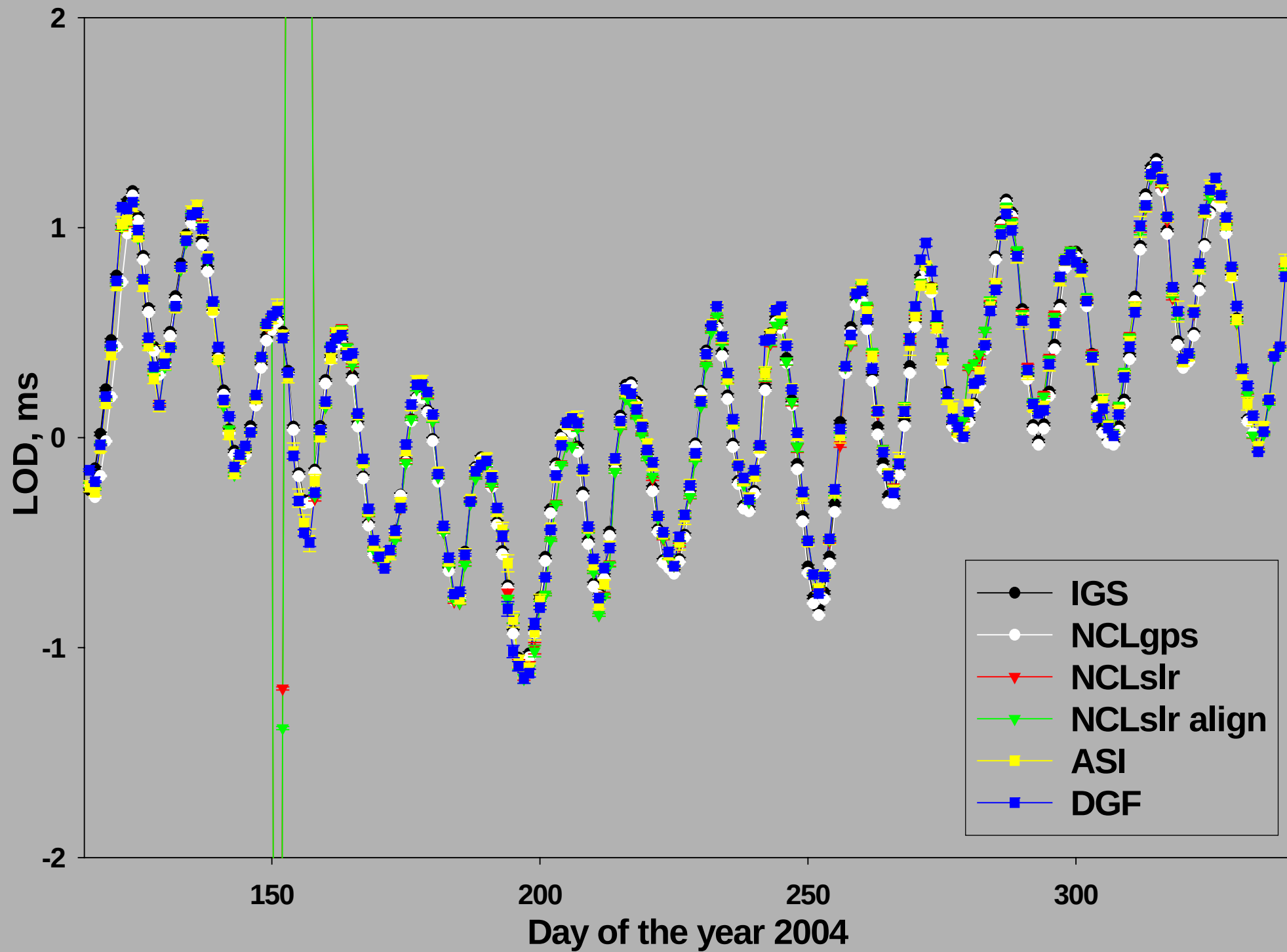
$Y_p(\text{AC}) - Y_p(\text{IGS})$



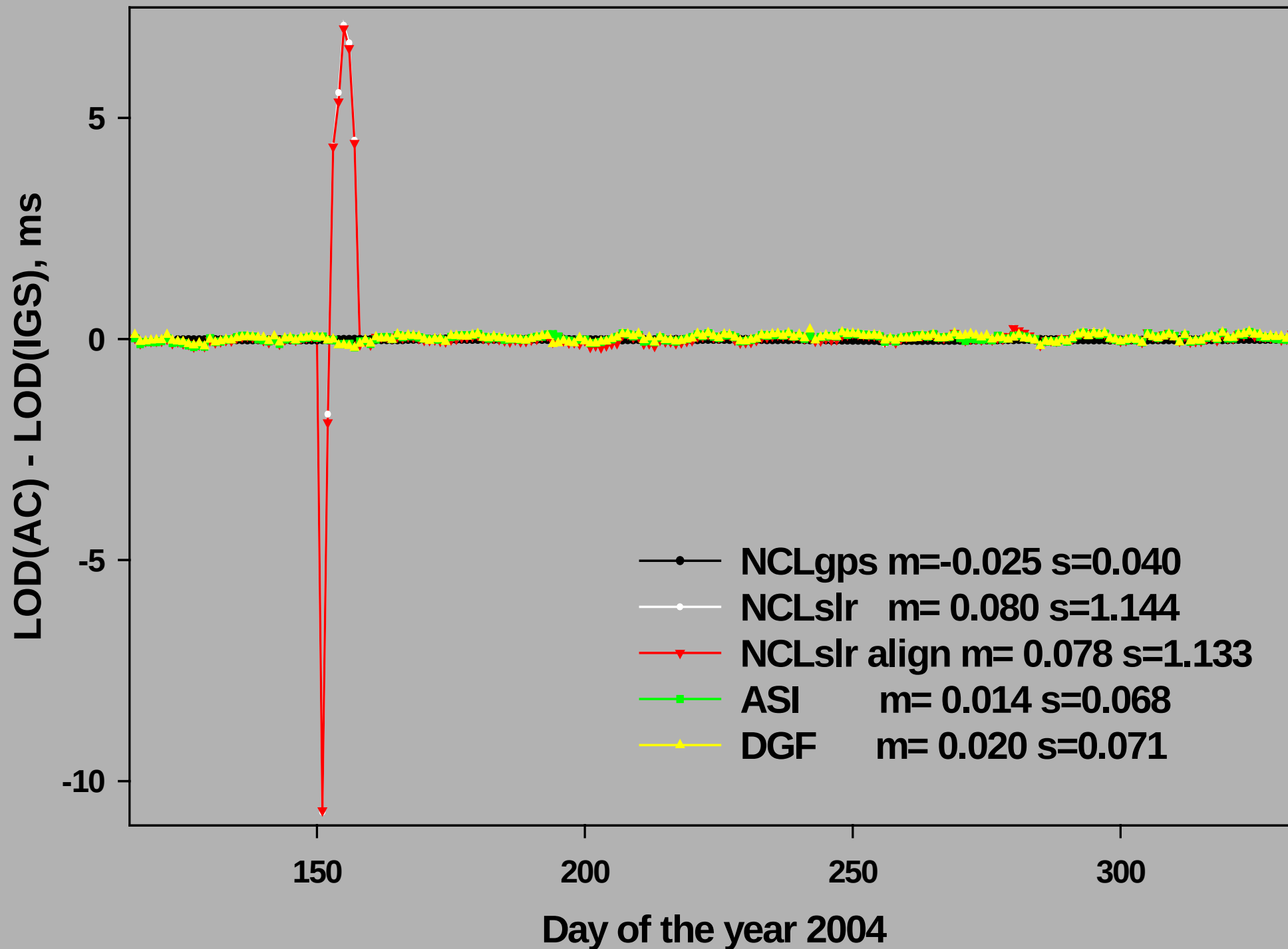
Yp(AC) - Yp(IGS) without days 144-150



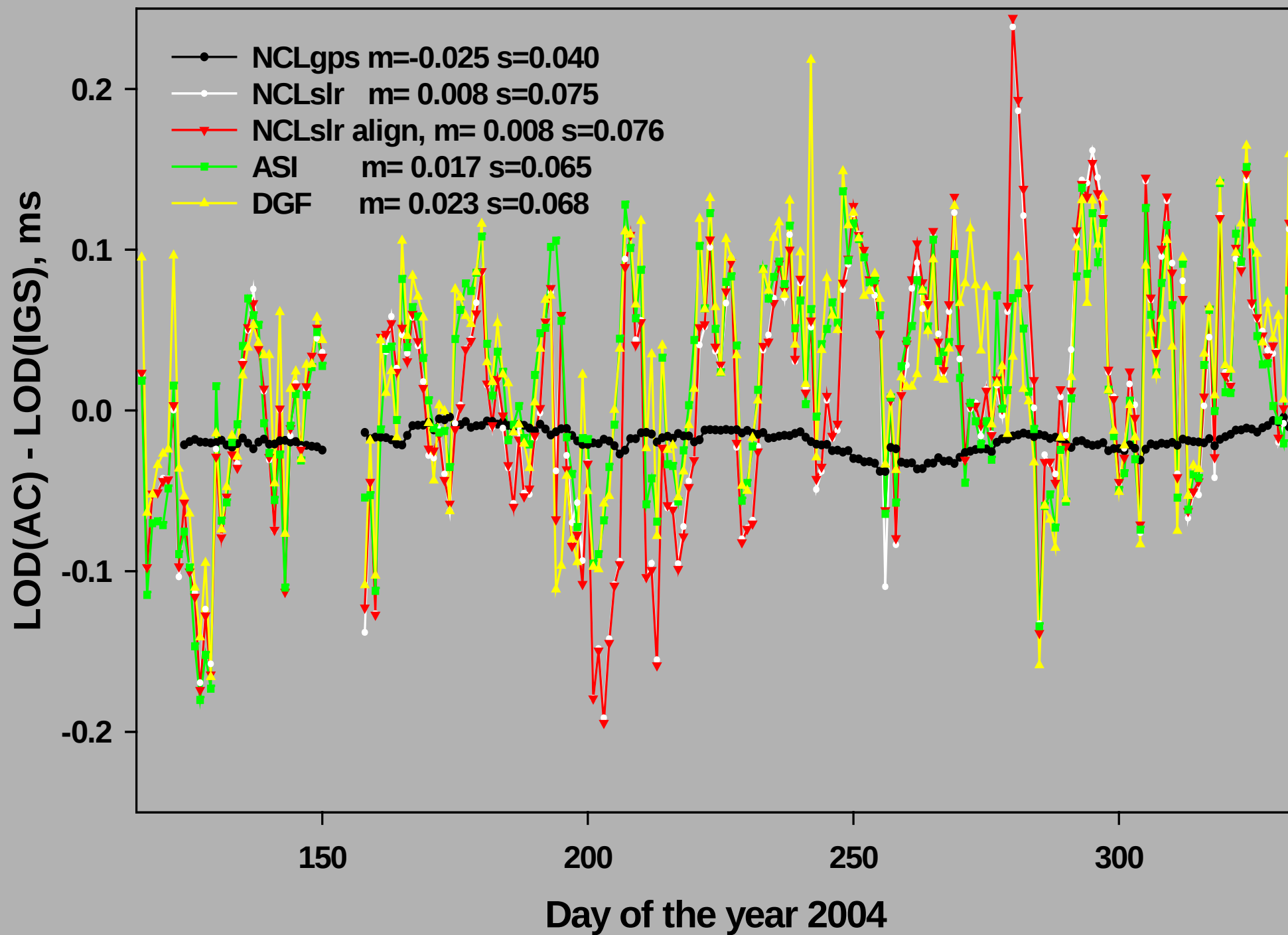
Excess of Length of Day



LOD(AC) - LOD(IGS)



LOD(AC) - LOD(IGS) without days 144-150



Conclusions

1. **Station coordinates.** Weighted RMS between SLR solutions is 30-40 mm in comparisons wrt ITRF-2000 and 4-15 mm in comparisons wrt NCL GPS.
2. **ERP.** SLR X_p and Y_p agree with IGS to ~ 0.25 mas, LOD to ~ 0.07 ms.
3. These values are commensurate with those obtained at AGI and DGF.
4. NCL GPS agreement to the IGS solution is somewhat better.