Russian Academy of Sciences
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# Comparison of CPO and FCN empirical models

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# Motivation

The actual celestial pole motion is more complicated than described by even the most accurate theory IAU2003/2006. The discrepancy (celestial pole offset) reaches 0.5 mas in each component  dX, dY.

CPO includes:

- free core notation (FCN), ~0.2 mas in our days;
- trend, perhaps at similar lavel;
- other (quasi)periodic terms, perhaps at similar level.

**The FCN is only a part of the CPO, even not prevailing in our days, but sometimes they are mixed in practical use, e.g. it seems to be the case for the IERS Conventions.**

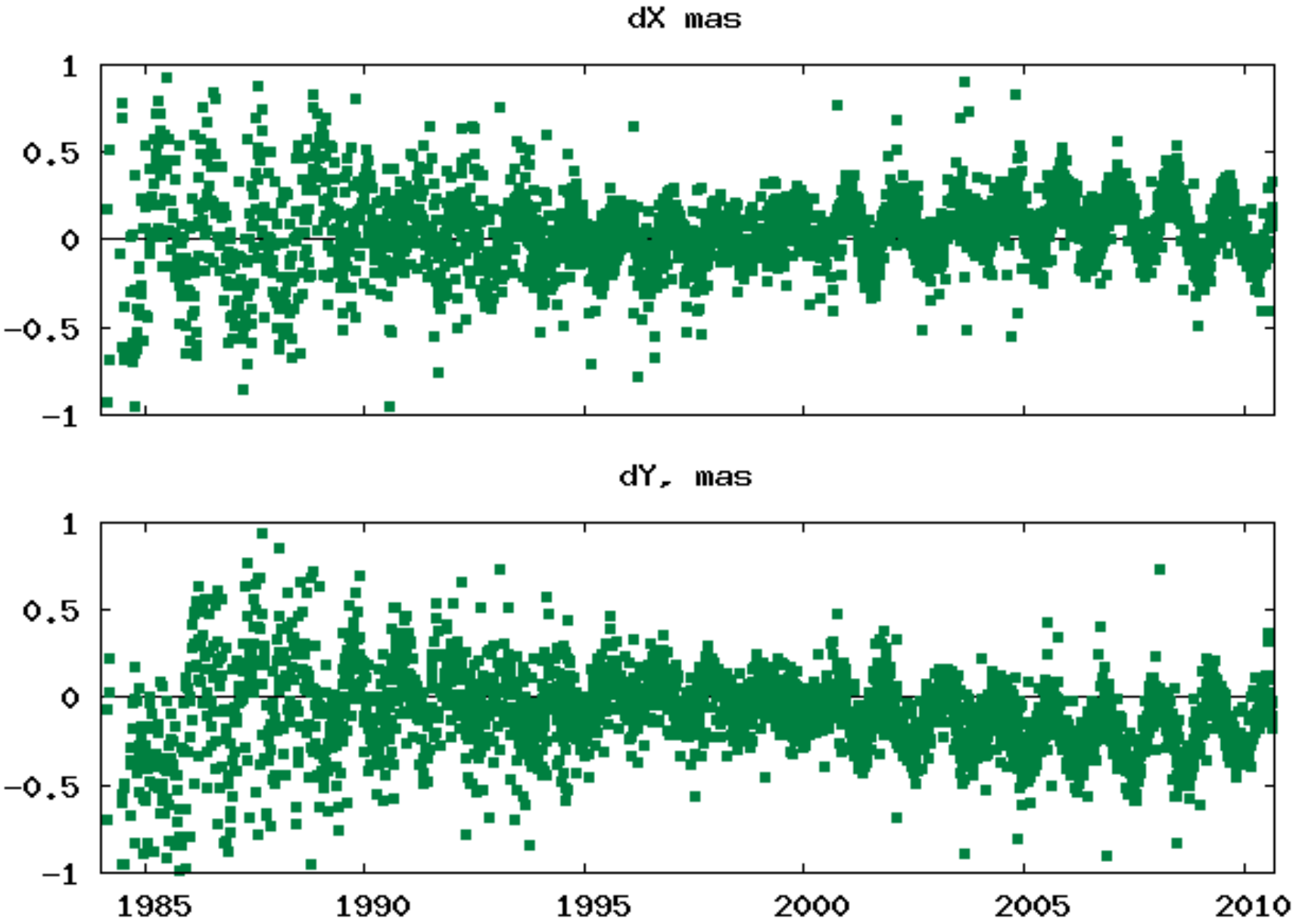
# What we are faced with in practice?

In practice, the following options are available for user's choice:

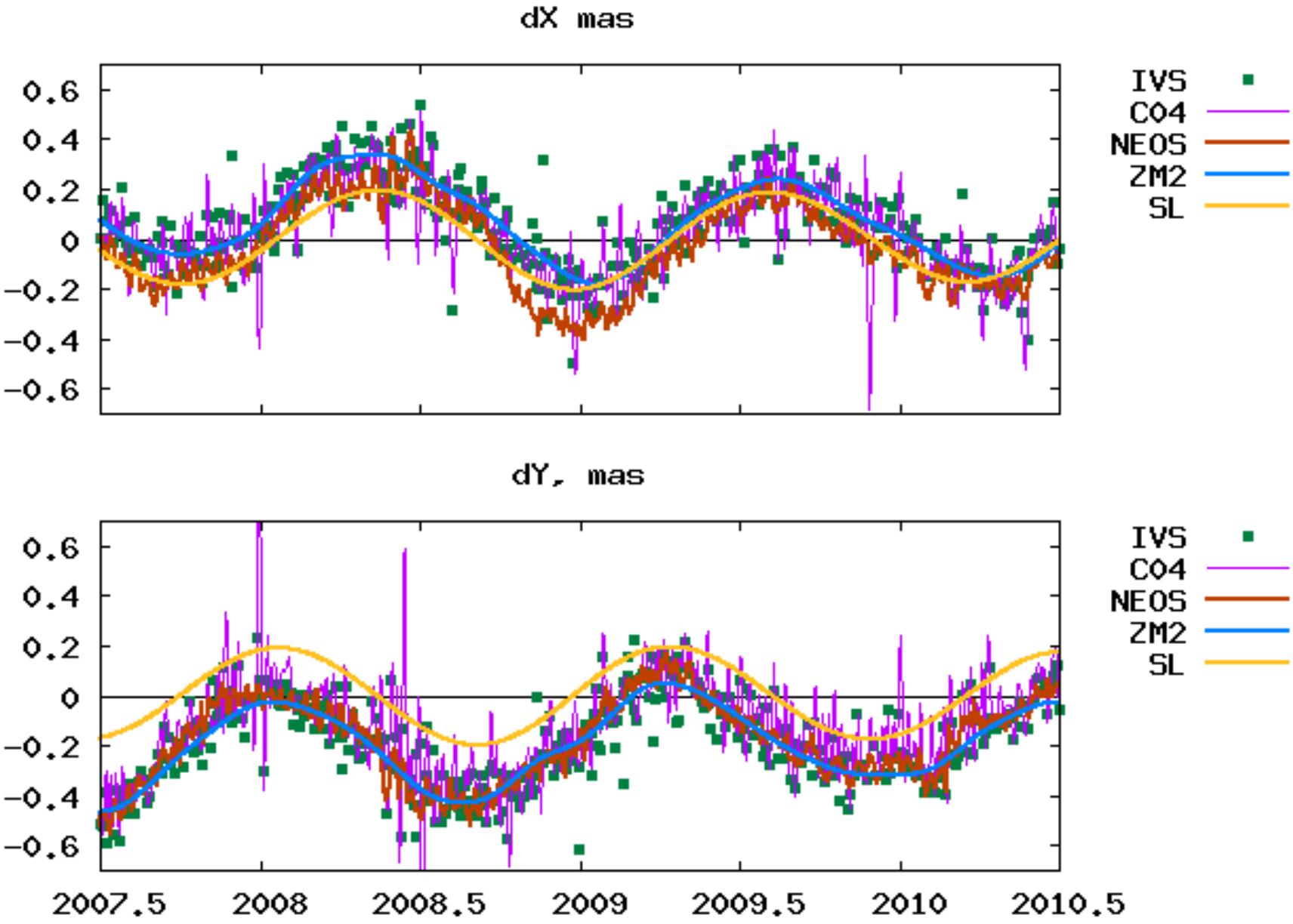
1. IAU PN model
2. IAU PN model + IERS FCN model (Lambert 2004-2009)
3. IAU PN model + IERS observed offsets:
   - OPA/C04 series
   - USNO series
4. Unofficial models:
   - OPA (C05)
   - Pulkovo (ZM2, Malkin 2007)

**It seems, all of them are used by different users, which may cause systematic differences in results (Malkin, 2009)**

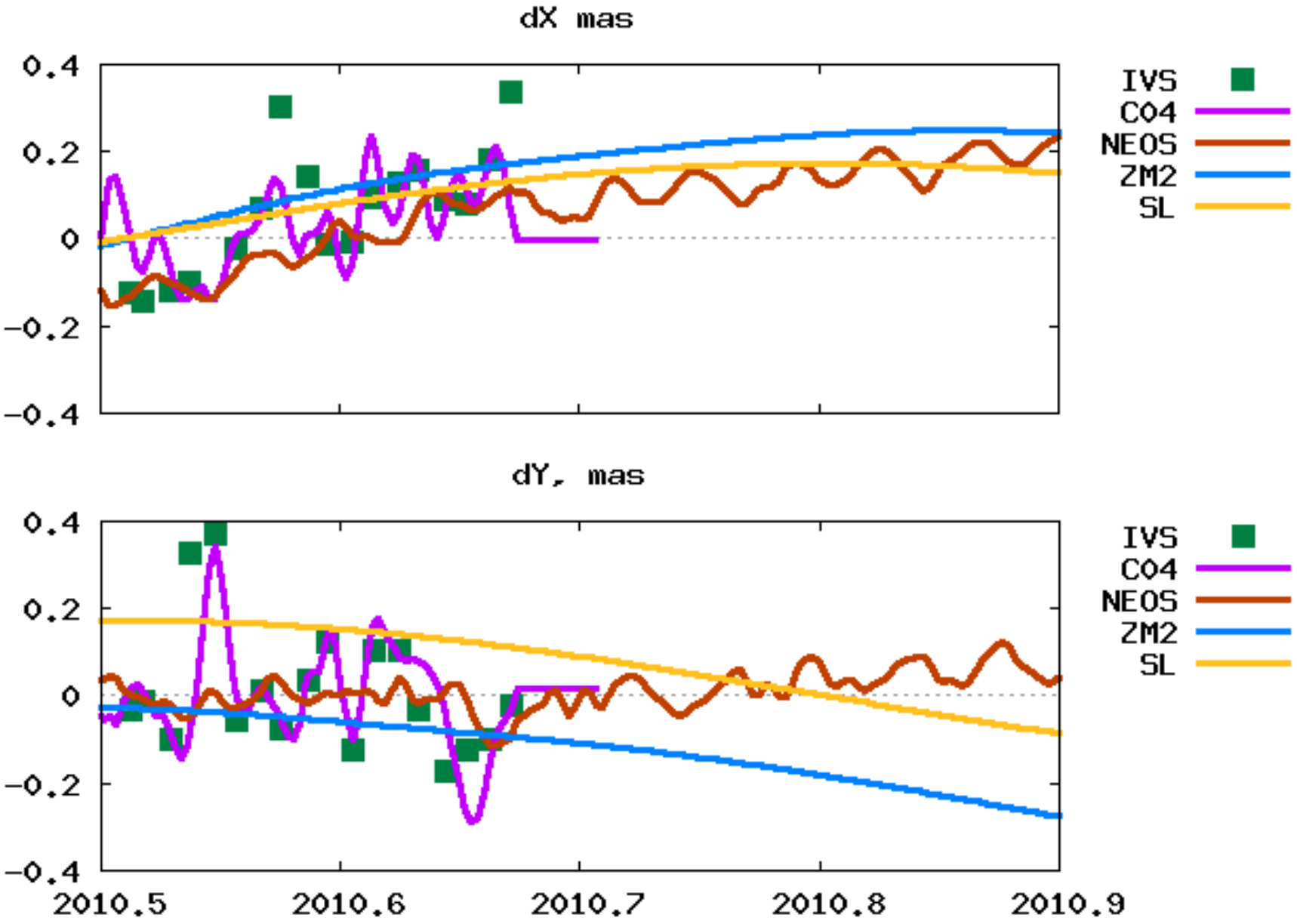
# CPO from IVS



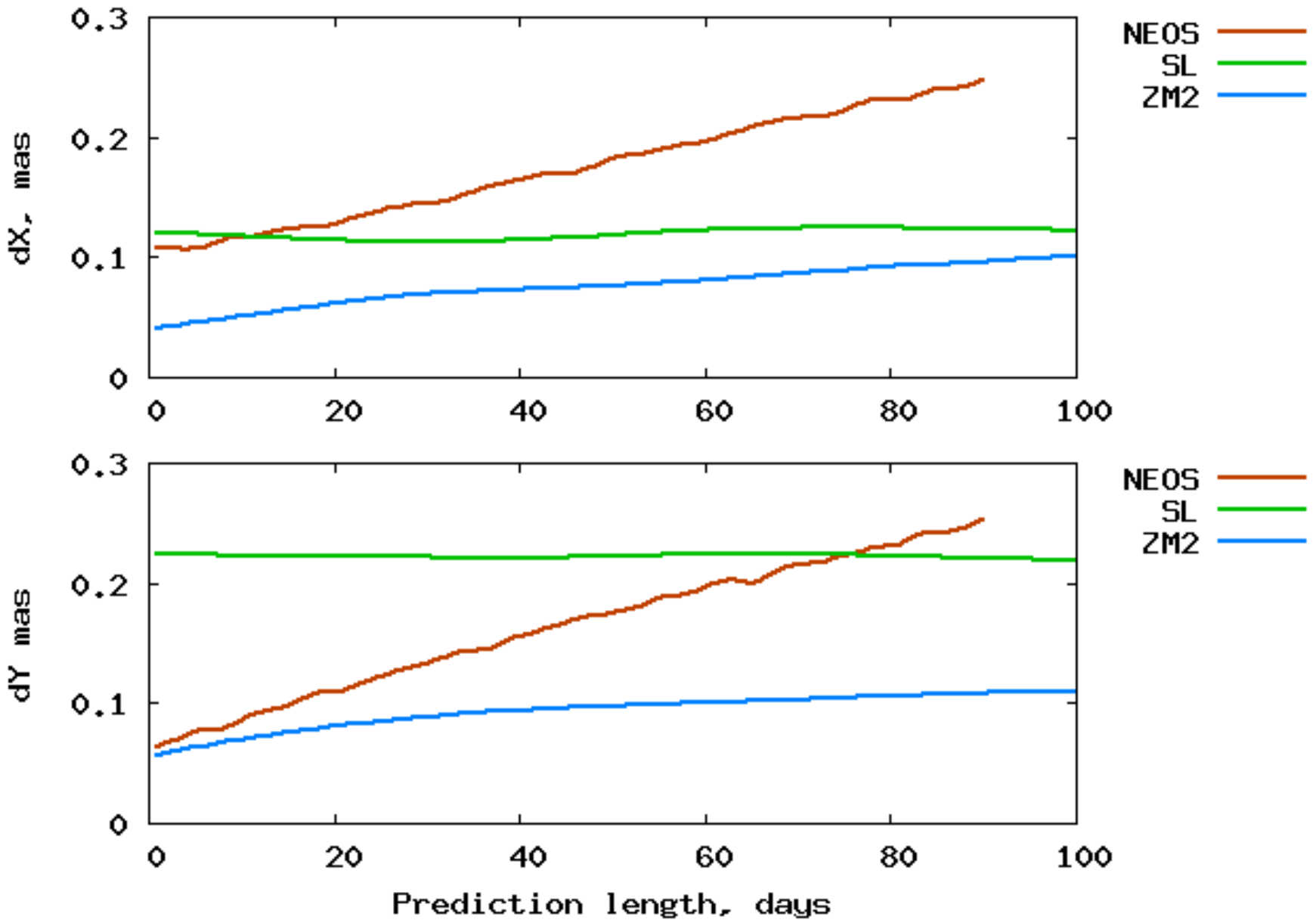
# CPO/FCN models vs. IVS (final)



# CPO/FCN models vs. IVS (real-time and prediction)

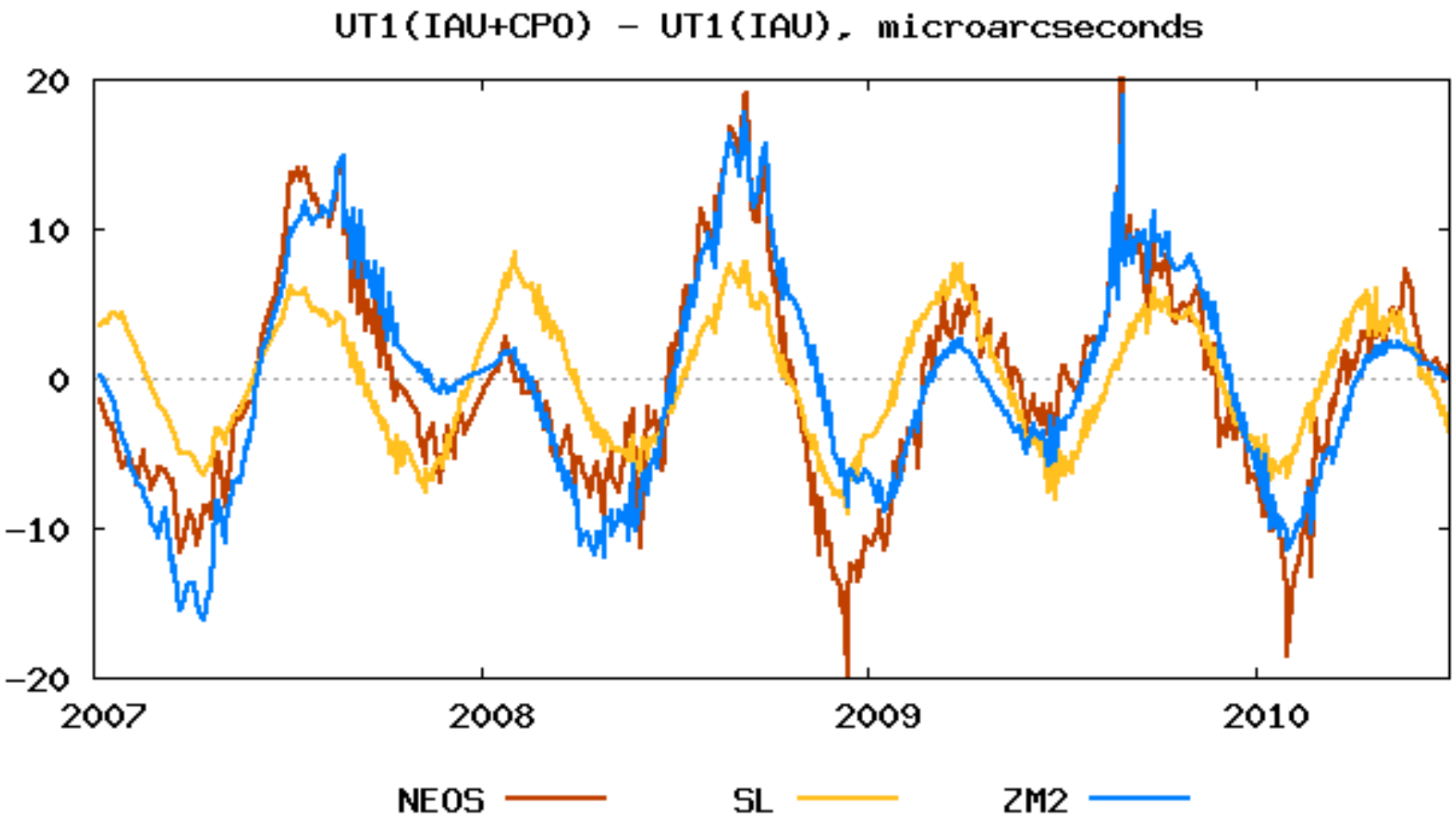


# CPO prediction




Astronomy Reports, 2010, in press

# UT1 Intensives




J. of Geodesy, submitted

# Conclusions

Is, there is no generally accepted option to account for the CPO during data processing, which can lead to systematic differences between results.  A reason may be that the model currently recommended by the IERS Conventions seems to be not the best choice.

IERS should consider another model more close to the actual CIP motion to recommend it in the Conventions.

A new model should also provide accurate CPO prediction for several weeks.

Thank you for your attention!