INFLUENCE OF THE UNSTABLE RADIOSOURCES ON THE CELESTIAL POLE OFFSET ESTIMATIONS

J.R. SOKOLOVA
Institute of Applied Astronomy
nab. Kutuzova, 10, St. Petersburg 191187
e-mail: jrs@ipa.nw.ru

ABSTRACT. Some of the CRF radio sources are known to have apparent proper motions at the sub-milliarcsecond level, which can lead to changes in estimates of precession or long-period nutation coefficients. The main goal of this work is to study the influence of unstable radiosources on the nutation offset estimates. Two nutation time series have been calculated from two global solutions in different modes.

1. INTRODUCTION

Since some of the CRF's radio sources are known to have apparent proper motions at the sub-milliarcsecond level, it can leads to changes in estimates of precession or long-period nutation coefficients (Feissel-Vernier et al., 2004). There are two possible ways to reduce the effect of source instability. The first way is to replace some of the ICRF defining sources by more stable ones for constraining the axes of ICRS. The second way is to model apparent proper motions for some unstable radiosources. The first way has been considered in this paper.

2. DATA ANALYSIS

Two solutions have been obtained by least squares collocation method using OCCAM 6.0 software (Titov et al., 2004). The first solution refers to the 207 'defining' radio sources (Fey et al., 2004) used for constraining the CRF axes. The second solution uses 199 'stable' radio sources proposed by Martine-Feissell (2003) for the same purpose. Improved positions of several hundred radio sources were listed in individual catalogue for each of these two solutions. After then, two nutation time series have been calculated with OCCAM/GROSS software using the source positions from the two catalogues.

Table 1: Series statistic (Unit of wrms: microarcsec)

-	Num. of points (after 1990 year)	Wrms dX	Wrms dY
Series 1	2289	151	158
Series 2	2289	144	156
Series 1 - Series 2	2197	30	32

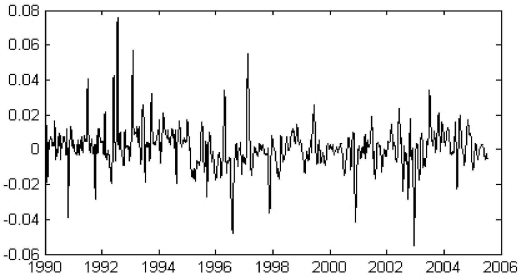

Figure 1: Smoothed differences between two offset nutation series (dX 1 - dX 2)(Unit: mas).

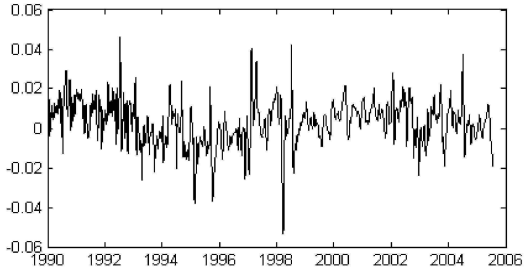

Figure 2: Smoothed differences between two offset nutation series (dY 1 - dY 2) (Unit: mas).

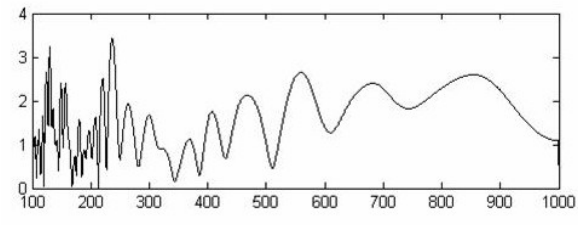

Figure 3: dX, Spectra of raw data, Ferraz - Mello method, (Unit : Solar days vs. microarcsec)(Unit: mas).

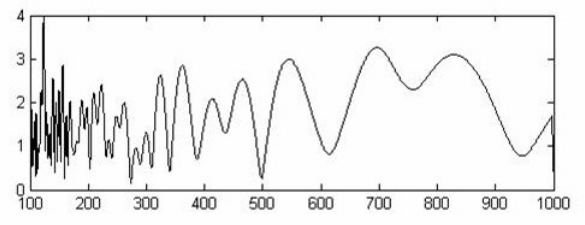

Figure 4: dY, Spectra of raw data, Ferraz - Mello method, (Unit : Solar days vs. microarcsec)(Unit: mas).

3. CONCLUSIONS

1. The differences in nutation offset estimations between two series are below 10 mas, which is below noise level (fig.1,2).
2. Changes in the period of the main harmonics are insignificant, when different source lists were used for constraining the CRF Axes.
3. Periodic signals in differences between two nutation time series, were not revealed (fig 3,4).

The first way to reduce effect of source instability, which has been considered in this paper did not show significant results, therefore the second way need to be considered.

REFERENCES

Feissel-Vernier M., et al., IVS 2004 General Meeting Proc., pp. 22-31
Titov O., et al., IVS 2004 General Meeting Proc., pp. 257-271
Fey A.L. et al., 2004, AJ. 127, 3587-3608
Feissel-Vernier, M., 2003, AA 403, 105-110