An Evaluation of the Currently Available "Weekly" Intra-Technique Combinations (Preliminary Results)

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Let me first stress that this presentation is a very **preliminary look** at the CPP data files that are available at the ftp site.

I would also like to Thank Arvid for his assistance in retrieving and reading the CCP data files.

I like to keep things simple and to relate things to first principles. Therefore, the first thing I am going to do is simple look at the data in the EOP parts of the SINEX: PM-X, PM-Y, UT1-UTC, and LOD variabiles.

Work Schedule

- Complete evaluation with respect to current C04 & Bulletin EOP solutions & Technique Solutions
- Compare/Evaluate CPP time series against geophysical excitation time series (AAM, OAM, HAM)
- After 400-450 days of CPP Intra-Technique EOP series, examine/produce an Inter-Technique Combination using the CPP Intra-Technique series
- Sub-daily rapid EOP series/Daily Nutation (VLBI+GPS)*

Let me briefly review our work plan. First, we will evaluate the CCD intra-technique comparisons and compared them with accepted EOP time series, To date, I have only compared the data against C04. I have NOT gotten as far along as I wanted to be,

Next, we will compare the series to geophysical time series.

After we have about 400-450 days worth of data, we can start thinking about combinations.

Finally, we will examine sub-daily EOPs and combinations of VLBI and GPS nutation series. We do not plan on creating a GPS nutation series. However, we plan on evaluating and possible use a GPS nutation series resulting from the CPP program.

Now, before I start let me first state how I am approaching this problem. I am approaching it from a rapid service user. I am wanting the best possible intra-technique combination that I do NOT have to do a great deal of processing to use in an inter-technique combination. I am not wanting an unconstrained solution. I am wanting a solution that I can use without jumping through a lot of hoops to make useful and I want it as soon as possible. Please keep this in mind during the presentation.

Data Sets

Ac.	Name	Type(s)	CPP
• ASI	Agenzia Spatiale Italiana	SLR	CPP
• CSR	UT Center for Space Research	SLR	No
• GSFC	NASA Goddard Space Flight Center	VLBI	No
• IGN	Institut Géographique National	DORIS	CPP
• IGS	International GPS Service	GPS	CPP
• IVS	International VLBI Service	VLBI(A,O)	CPP,No
• JCET	Joint Center for Earth Systems Technology (UMd/GSFC)	SLR**	No
• NCL	University of Newcastle upon Tyne	GPS, SLR	CPP

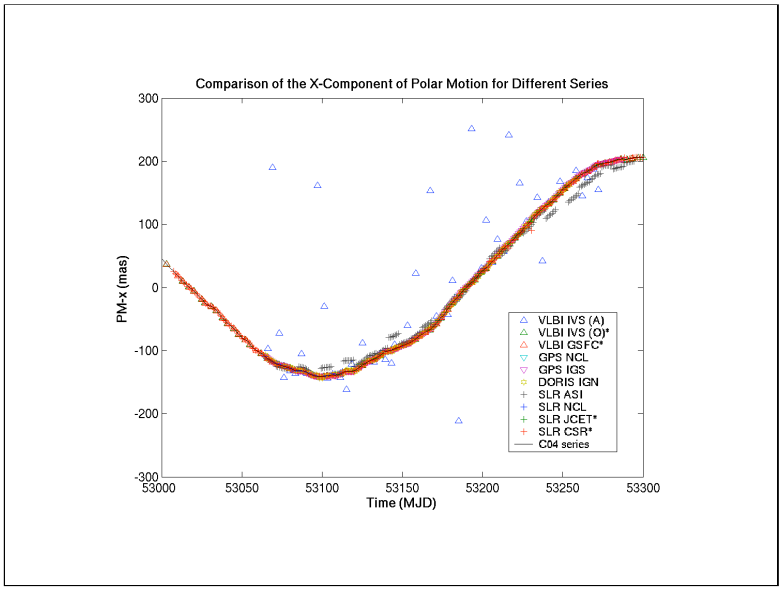
C04 & Bulletin A

This table shows the data sets I have looked at. First, we have the center acronyms, center names, the type of data produced and whether or not it a CPP data set.

I have also looked at some other data sets, some that are used in other intra-combinations and other combinations. For example, I use 2 VLBI datasets from the IVS. The first one I call A is the CPP and the other one, I call O, is one operational data file that is used in Bulletin A.

Please note that the JCET data is the single center SLR solution and not the JCET CPP intra-technique combination.

Also, the CSR series is new series from CSR and not their operational one.



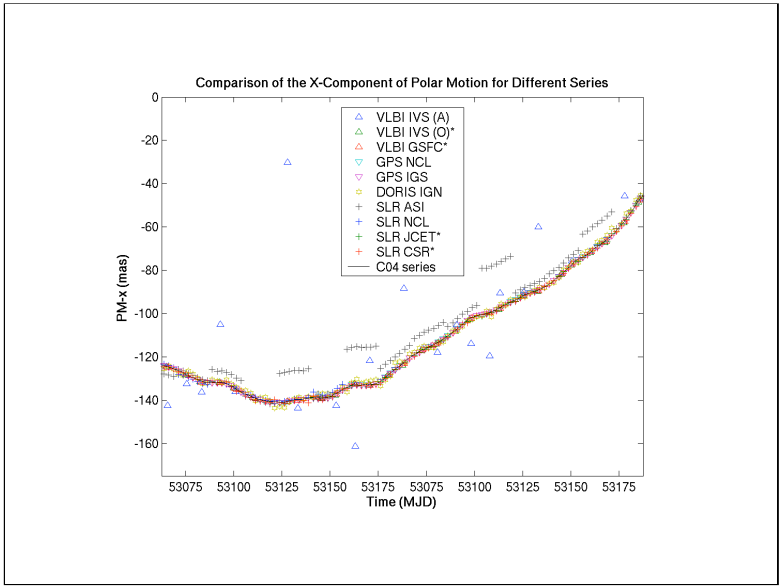
Here is the PM-X part, and we see similar for Y-component. The star next to the label name indicates NON-CPP series.

Things look good however, the VLBI IVS (A) and ASI SLR approach appear to have poorer agreement with C04.

The ASI SLR has a different bias and rate for each weekly solution, but the there is agree with the C04 trends during the weekly solution. The week to week differences are due to the lack of constraints on the solution. It is a unconstrained solution and therefore, really not too very useful to my comparison work.

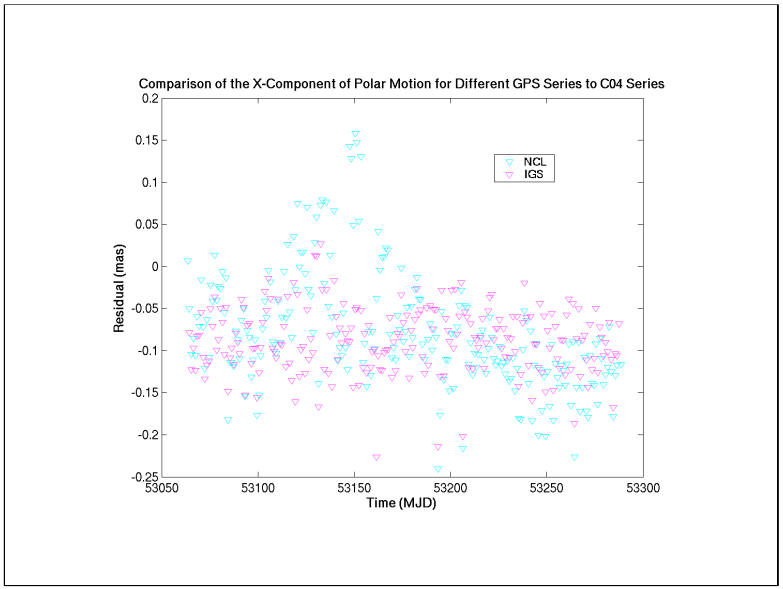
The VLBI differences, I am not sure of the cause of these large differences.

Let's take a closer look at the data around 53100

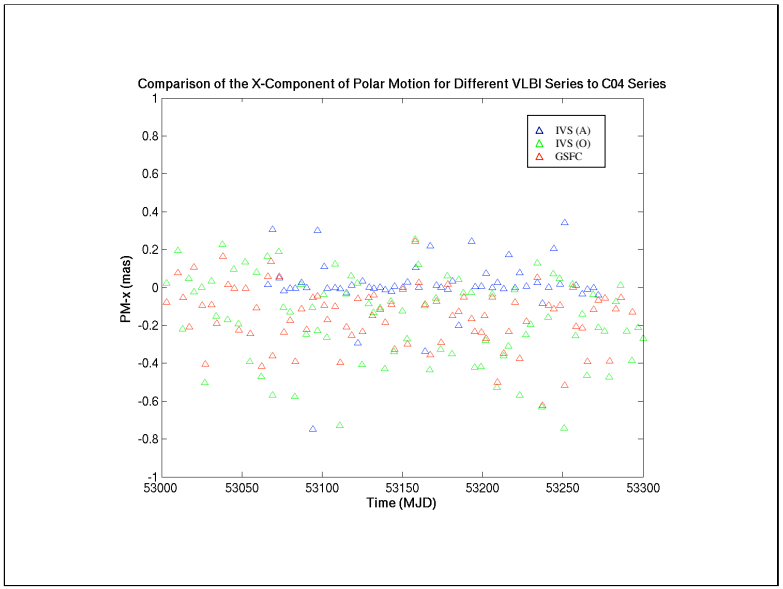


Here is a close up of the PM-x terms. You can clearly see the differences

Again, the jumps between ASI SLR are due to the fact it is an unconstrained solution.



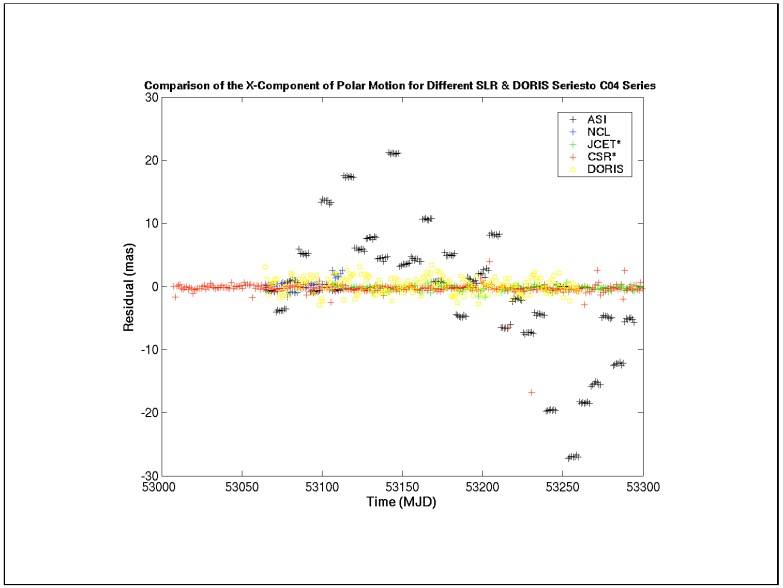
The GPS data looks very good



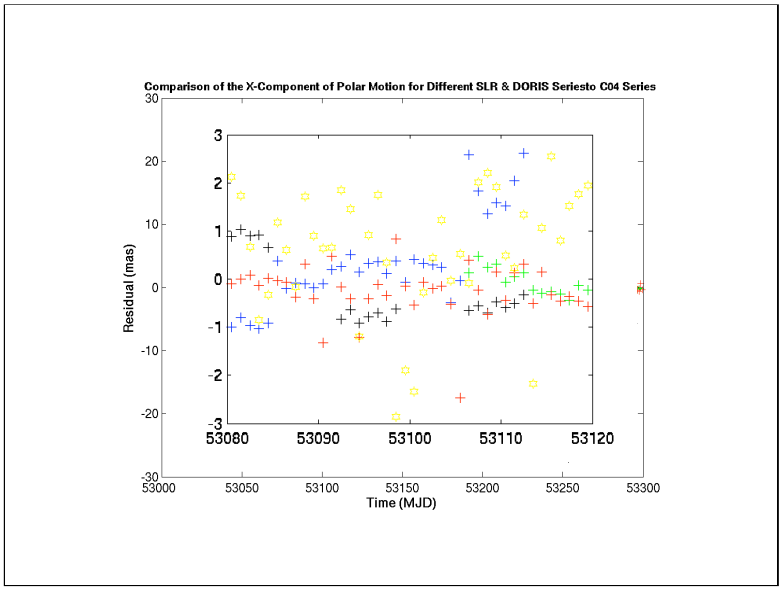
This is for the VLBI data. The IVS data series A was divided by 1000 to get on this plot.

Something appears to be incorrect with this data. I could have an error in our processing of the SINEX file.

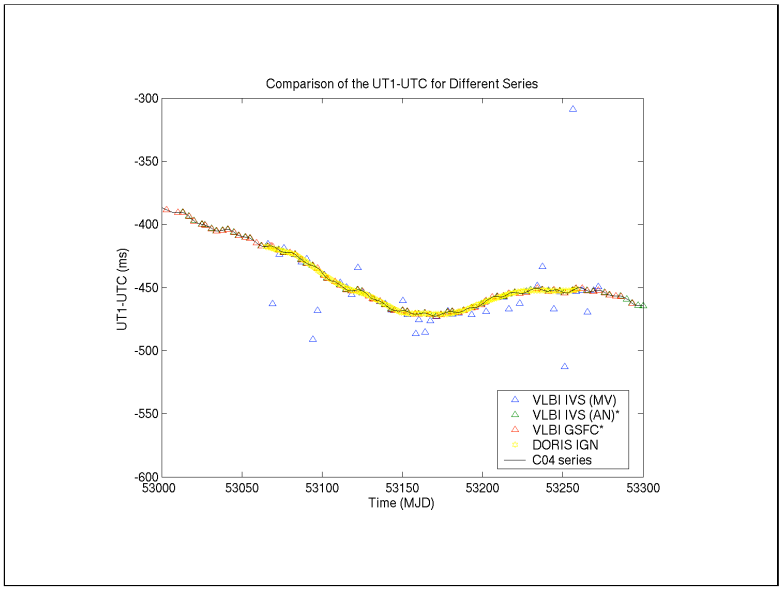
I am still trying to figure out what is going on.



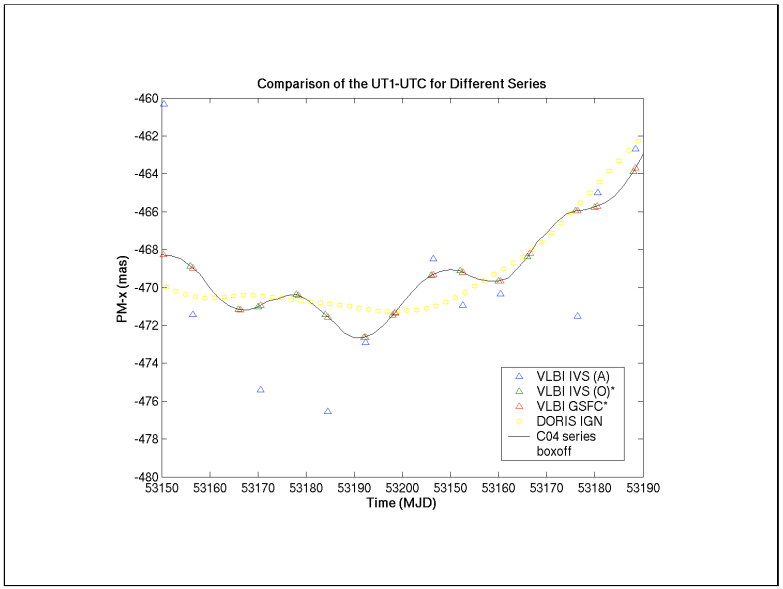
Here we see SLR and DORIS. The ASI SLR has discontinues do to lack of constrains.



Close up of earlier plot. DORIS looks good.

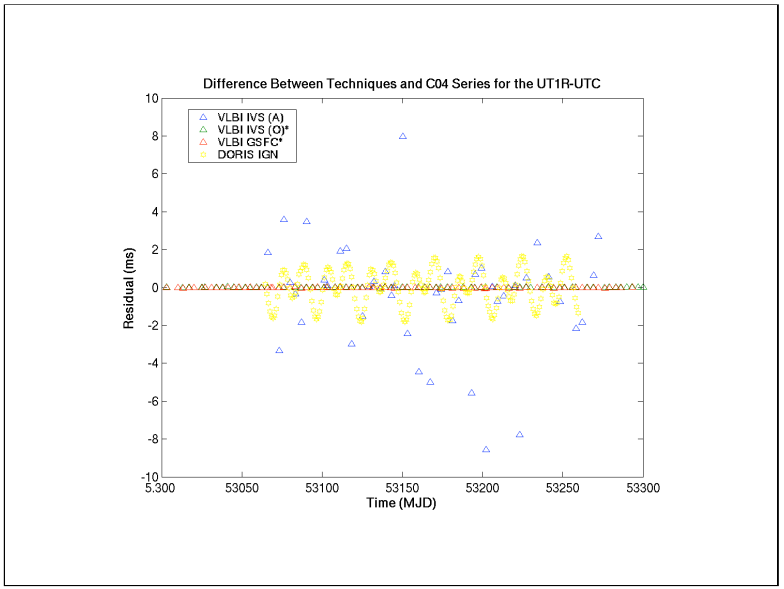


This is UT1-UTC plot.

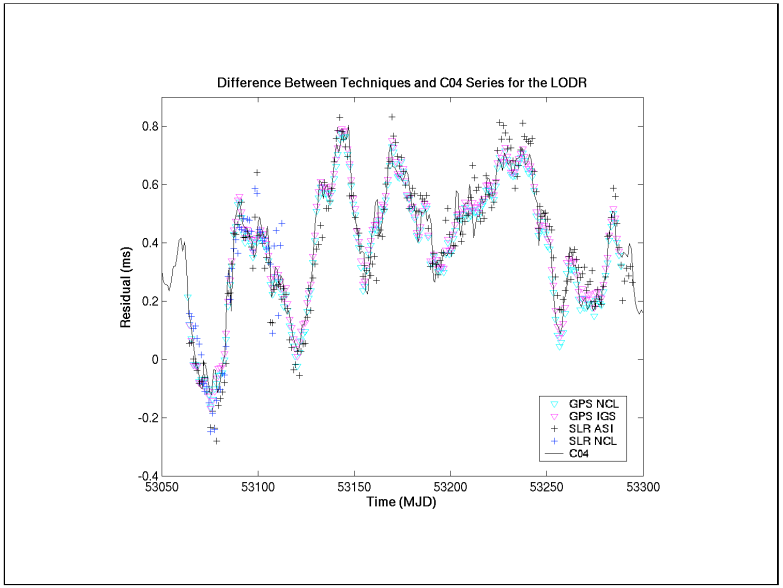


This is some what of an unfair comparison since C04 uses both IVS VLBI (O) and VLBI GSFC in the combination.

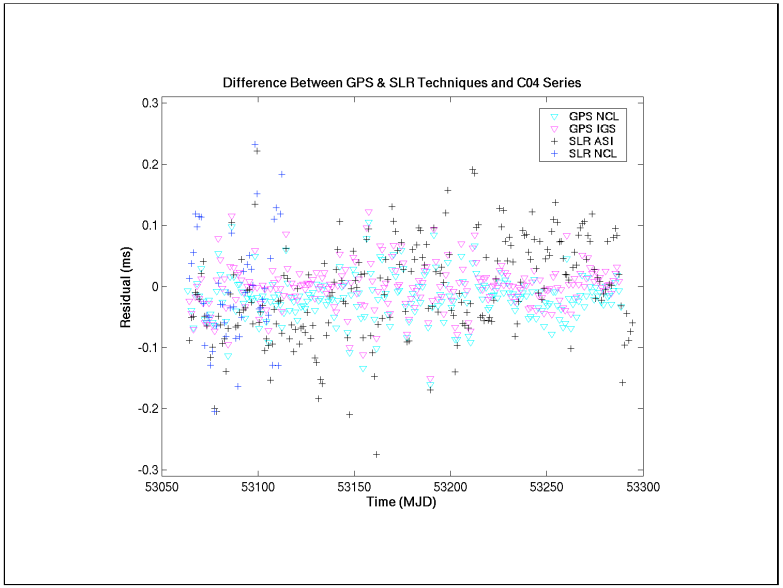
The Doris data looks very good.



Doris looks good, appear to have possibility a problem with the tidal corrections. And as expected, VLBI IVS (O) and GSFC look very good.



The good agreement between C04 and GPS and SLR look much better for LOD.



The residuals between the difference series and C04 LODR series.

Comparison of Different Intra-Technique Solutions to the C04 EOP Series

Type	Group	Mean			Standard Deviation		
		PM-x (mas)	PM-y (mas)	UT1R/LODR+ (ms)	PM-x (mas)	PM-y (mas)	UT1R/LODR+ (ms)
VLBI	IVS (A)	33.4082	-87.7821	-1.9279	229.621	534.837	23.8990
	IVS (O)	-0.1731	0.1720	0.00004	0.2401	0.1492	0.0109
	GSFC*	-0.1506	0.0072	-0.0109	0.1593	0.0944	0.0081
GPS	IGS	-0.0881	0.2574	-0.0012+	0.0391	0.0346	0.0382+
	NCL	-0.0785	0.2107	-0.0188	0.0688	0.0594	0.0369+
SLR	ASI	-0.6622	0.2268	-0.0048+	10.1017	7.4687	0.0802+
	NCL++	0.2708	2.2312	-0.0020+	0.8627	6.5977	0.0925+
	CSR*	-0.3289	0.4591	-.01294+?	1.1568	1.3488	0.456+?
	JCET*	-0.2472	0.1434	0.0743	0.3417	0.4581	0.1655
DORIS	IGN	0.1813	-0.1705	-0.0076	1.2589	0.6829	0.949

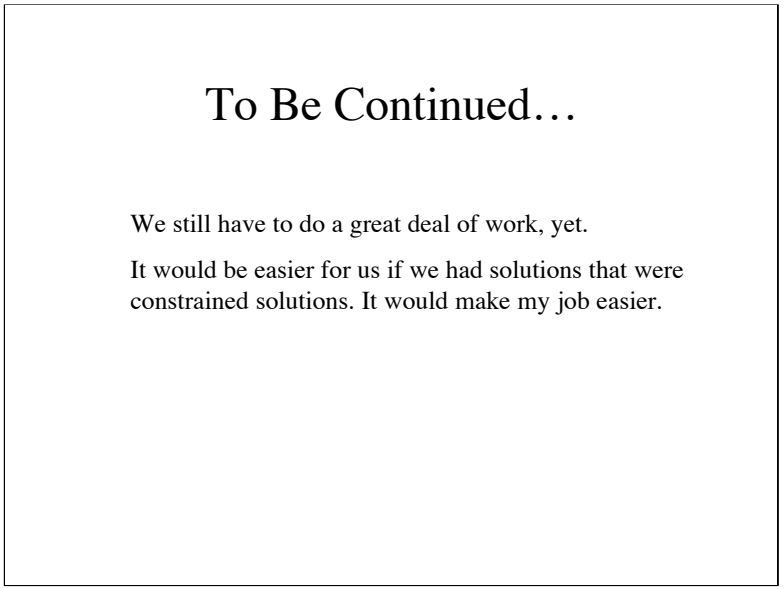
+ "Super Script Cross" represents LODR values

*Are non-CPP series and CSR is a non-operational series

++ double cross indicates not enough data to produce statistically significant results

We see the larger values from IVS VLBI and large LODR from CSR. The large LODR from CSR is mostly likely from the difference in tidal corrections being used that is why there is a "?" listed.

We see the ASI SLR unconstrained solution and the effects of this.



After Talk NOTE: This presentation has a great deal of construction. The audience informed the speaker that the IVS VLBI (A) was an unconstrained time series and that was the caused of the large errors. The speaker was also informed that several other series used were also unconstrained and this could be the source of the large than expected means and standard deviations.

Speaker commented for the need of constrained solutions. There was some discussion of possibly having two sets of solutions. One unconstrained and one possible constrained to ITRF2000.