3.5 Product Centres

3.5.1 Earth Orientation Centre

Revision of C04

In 2016 the Earth Orientation Center (EOC) has prepared a new C04, referred to as IERS EOP 14C04, aligned onto the most recent versions of the conventional reference frames (ITRF2014 and ICRF2). Additionally, the combination algorithm was revised to include an improved weighting of the intratechnique solutions. Over the period 2010–2015, differences to the IVS combination exhibit standard deviations of 40 μas for nutation and 10 μs for UT1. Differences to the IGS combination reveal a standard deviation of 30 μas for polar motion. The IERS EOP 14C04 was adopted by the IERS Directing Board as the official reference series by 1 February 2017.

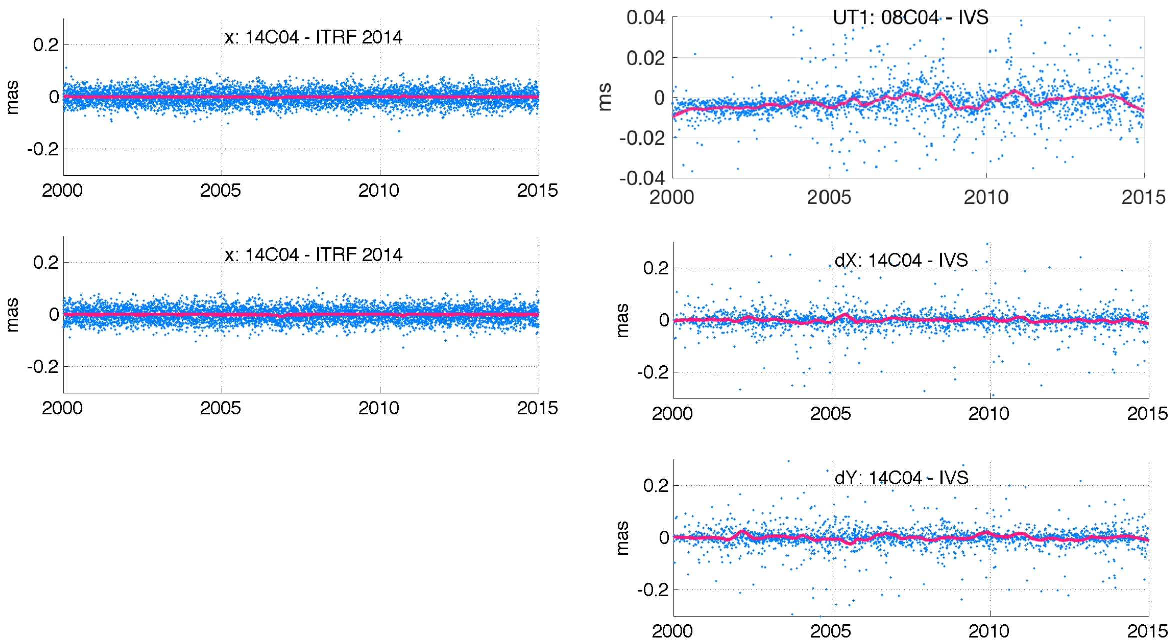

Fig. 1: *Differences in (left) pole coordinates between 14C04 and ITRF2014, and (right) UT1/nutation offsets between 14C04 and IVS. The thick, red curve represents a 3-month smoothing.*

Figure 1 displays the differences between 14C04 and the ITRF2014 EOP series. The bias of about 50 μas affecting the y-component in the similar Figure 2 relevant to the 08C04 series does not show up anymore. The standard deviation of the differences has been divided by a factor of two with respect to 08C04.

Whereas no substantial change have been introduced in the input EOP series, the 14C04 series better match the intratechnique combined solutions than the 08C04 version. This is evidenced by Table 1, where we report standard deviations of the differences between the C04 (both 08C04 and 14C04) and intratechnique and guide series. For pole coordinates the gain is about 10 μas with respect to the IGS solution from 2001 onward. For UT1 a gain of 3 μas is noticeable after 2001 with respect to the IVS solution. Nutation offsets evidence an improvement of about 30 to 60 μas from 1993 onward.

Moreover, a rigourous weighting of the input series allows to estimate for each combined EOP realistic formal uncertainties, for which the averaged values are given in Table 2.

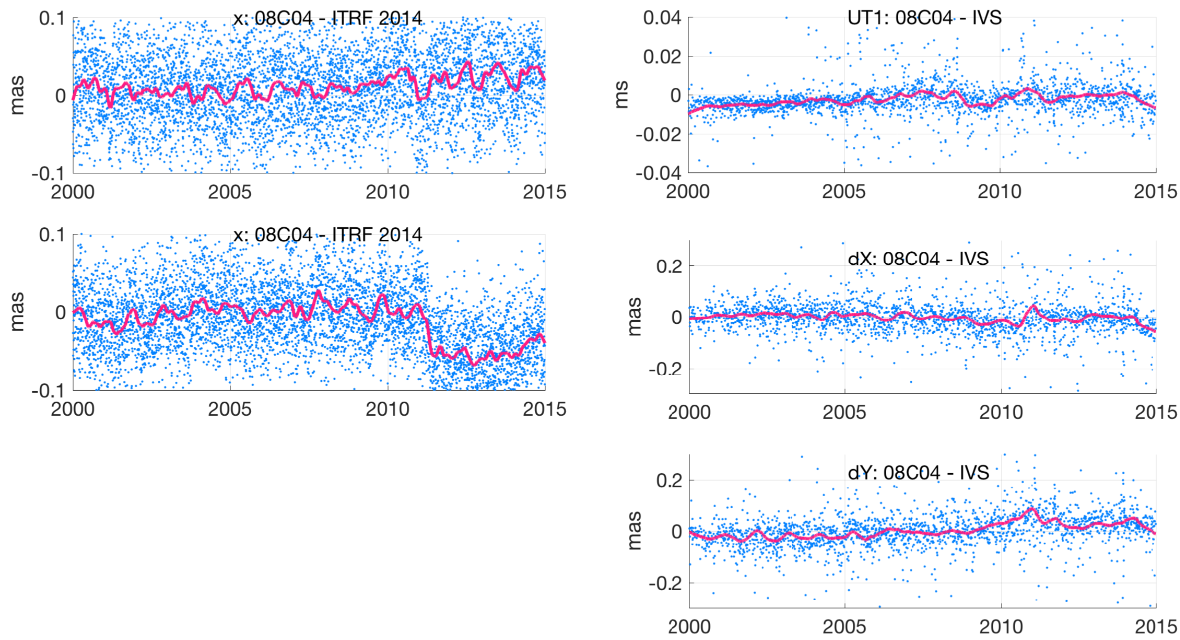

Fig. 2: *Differences in (left) pole coordinates between 08C04 and ITRF2014, and (right) UT1/nutation offsets between 08C04 and IVS. The thick, red curve represents a 3-month smoothing.*

Leap second on 2017 January 1

In July 2016 the EOC issued a leap leap-second through Bulletin C for 2017 January 1.

Other achievements

On the EOC web site http://hpiers.obspm.fr/eop-pc/ interactive tools for visualizing and analyzing Earth orientation parameters have been strikingly improved. Now the page http://hpiers.obspm.fr/eop-pc/index.php?index=analysis&lang=fr permits an easier selection of the EOP to be represented or analyzed. On the web page http://hpiers.obspm.fr/eop-pc/index.php?index=operational&lang=fr comparison is no more limited to two series but can encompass several EOP series.

Table 1: *Standard deviation of the differences of C04 time series with IGS, IVS and ILRS combined series and ITRF2014. Unit is μas.*

		08C04						14C04					
		x	y	UT1	dX	dY	LOD	x	y	UT1	dX	dY	LOD
1984-1993	IGS												
	IVS	121	110	7.4	90	89		344	291	12.0	100	104	
	ILRS												
	ITRF2014	403	372	21.5				238	202	37.9			
1993-2001	IGS												
	IVS	103	95	9.4	67	60		70	55	4.4	34	37	
	ILRS												
	ITRF2014	65	60	10.9				45	38	10.3			
2001-2010	IGS	49	37				13	41	33				18
	IVS	73	71	8.3	43	47		68	66	3.3	34	41	
	ILRS	103	102				18	95	93				22
	ITRF2014	47	40	13.2				75	26	11.9			
2010-2015	IGS	42	36				11	31	27				10
	IVS	83	74	9.6	56	74		58	56	3.4	21	29	
	ILRS	107	94				16	77	74				16
	ITRF2014	49	49	11.9				27	25	10.1			

Table 2: *Averaged formal uncertainty of the 14C04 solution (second line) corresponding to four successive periods. Unit is μas.*

	x	y	UT1	dX	dY	LOD
1984-1993	274	238	22.0	178	193	31
1993-2000	108	96	6.8	51	45	18
2000-2010	62	59	8.5	38	37	21
2010-2015	48	44	9.1	54	45	14

Earth Orientation Center staff in 2016 and functions

Christian Bizouard, Astronomer, head
Olivier Becker, Engineer, daily tasks
Teddy Carlucci, System Engineer
Lambert Sébastien, Astronomer, deputy to IERS DB
Daniel Gambis, Astronomer, retired in 2015, adviser

References

Bizouard C., Lambert S., Richard J.Y., Becker O., 2017, Combined solution C04 for Earth Rotation Parameters consistent with International Terrestrial Reference Frame 2014, Technical Note, http://hpiers.obspm.fr/iers/eop/eopc04/C04.guide.pdf

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