

3.5 Product Centres

3.5.1 Earth Orientation Centre

This section presents the activities and main results of the Earth Orientation Centre, located at Paris Observatory, over the year 2018.

According to the IERS Terms of Reference, this component is responsible for monitoring Earth Orientation Parameters including long term consistency, publications for time dissemination (DUT1) and leap second announcements. Earth Rotation Parameters (ERPs): Pole coordinates (x,y), Difference UT1–UTC, Length of Day variation (LOD) and Celestial pole offsets (dX, dY) are available to a broad community of users in various domains such as astronomy, geodesy, geophysics, space sciences and time. ERPs are firstly collected in the form of combined solutions derived by the Technique Centers (IGS, IVS, ILRS and IDS). Two main solutions are computed: a long-term solution (IERS C01) since 1846 until the end of the previous year and the Bulletin B / C04 given at one-day intervals, which is published monthly with a 30 day delay (Gambis, 2004; Bizouard and Gambis, 2009; Gambis and Luzum, 2011, Bizouard et al, 2018).

C04 series According to the decision of IERS DB 66 (April 8, 2018 in Vienna), the 14 C04 solution for UT1 has been modified by including the contribution of UT1 intensive back to 1996 (see note of January 2018). The old version, updated until 2018/04/16, has been put in the sub-directory /eopc04.2017.

Whereas they are delivered officially on Tuesday and Friday, C04 series are updated every day. As far as possible, the values are checked several times in the week, even during the week-end with the active participation of Jean-Yves Richard. To this aim we set up a graphic comparison with other EOP series: http://hpiers.obspm.fr/eop-pc/WEBFTP14/accueil_C04.html.

Web site upgrade The interactive WEB page allowing to compare polar motion and length of day with their geophysical excitation has been updated, and in addition to atmospheric NCEP and oceanic ECCO angular momentum function, now it includes the hydro-atmospheric series derived by GFZ in according to the output of the coupled ECMWF (atmospheric), MIP-MOM (ocean) and LSDM (land water): <http://hpiers.obspm.fr/eop-pc/index.php?index=excitactive&lang=en>.

Statistics Statistics of 14 C04 for the year 2018 are provided in Table 1 (standard deviations of C04 – intra-techniques solutions), Table 2 (mean and standard deviations of C04 – intra-technique combined solutions) and 3 (mean and standard deviations of C04 – multi-technique combined solutions).

Table 1: *Intra-techniques solutions: averaged time sampling and standard deviation with respect to the combined solutions Bulletin B / C04 over the year 2018. Solutions contributing to Bulletin B / C04 are flagged by stars (*).*

Individual solutions	Estimated uncertainties				
	Time sampling	Terrestrial Pole	UT1	LOD	Celestial Pole
		μas	μs		μas
VLBI - 24h					
EOP(AUS)	~16 d	265	28.1		144
EOP(BKG)	~3 d	133	25.8		78
EOP(GSFC)	~2 d	124	26.2		81
EOP(IAA)	~3 d	159	25.8		78
EOP(OPA)	~3 d	87	28.0		77
EOP(USNO)	~3 d	43	27.7		58
EOP(IVS) *	~3 d	89	27.7		39
VLBI - Intensive					
EOP(BKG) *	~1 d		38.2		
EOP(GSFC) *	~1 d		36.6		
EOP(IAA) *	~1 d		39.3		
EOP(PUL)	~1 d		37.8		
EOP(USNO) *	~1 d		37.2		
SLR					
EOP(MCC)	~1 d	104		187	
EOP(IAA)	~1 d	192		29	
EOP(ASI)	~1 d	206		42	
EOP(ILRS) *	~1 d	144		19	

GPS					
EOP(CODE)	~1 d	41		10	
EOP(JPL)	~1 d	36		13	
EOP(GFZ)	~1 d	39		10	
EOP(ESOC)	~1 d	34		9	
EOP(NOAA)	~3 d	50		9	
EOP(SIO)	~1 d	58		22	
EOP(EMR)	~1 d	47		12	
EOP(IAA)	~1 d	78		21	
EOP(GRGS)	~1 d	31		11	
EOP(ASI)	~1 d	50		42	
EOP(MIT)	~1 d	55		11	
EOP(IGR) *	~1 d	35		9	
EOP(IGS) *	~1 d	30		9	

Table 2: Mean and standard deviation (STD) in microarcsecond of the differences between intra-techniques combined solutions entering the combination and Bulletin B / C04 over 2018.

EOP	IGS Comb – IERS 14C04		ILRS Comb – IERS 14C04		IVS Comb – IERS 14C04	
	Mean	Stand deviation	Mean	Standard deviation	Mean	Standard deviation
X(μ as)	59	36	49	129	77	98
Y(μ as)	-23	23	74	158	-59	79
UT1(μ s)					21.2	27.7
LOD(μ s)	0	9	-2	19		
dX(μ as)					-24	48
dY(μ as)					-1	29

Table 3: Mean and standard deviation for Pole coordinates (x,y) and UT1 of the differences between combined solutions derived by both the Rapid Service/Prediction Center at USNO, the JPL and Bulletin B / C04 over 2018.

EOP	Unit	Bul A – Bul B		Comb JPL – Bul B	
		Mean	Stand deviation	Mean	Standard deviation
X	μas	56	50	27	63
Y	μas	-20	37	4	38
UT1	μs	12.5	44.5	10.8	35.7

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