Earth orientation parameters estimated from recent Australian mixed-mode and Southern Intensive sessions

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Overview

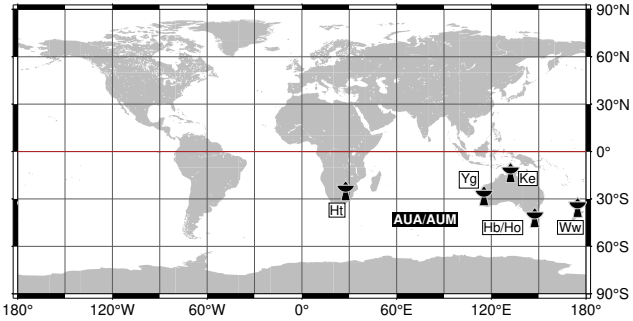
TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

UNIVERSITY of TASMANIA
AUSTRALIA

EOP from Australian mixed-mode sessions?

AUA/AUM

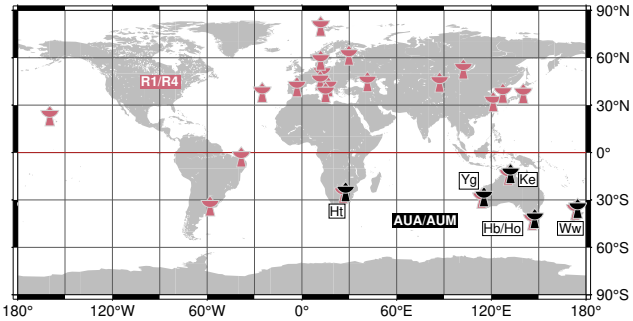
- 24-h sessions scheduled for 4-6 stations
- Effectively 3-5(6) stations observing
- Southern hemisphere
- Small N-S extension
- Potentially larger E-W extension (Ht)



Assessment of EOP from AUA/AUM

Data

- 84 AUA/AUM 2020-2023
- 91 R1/R4 close to AUA/AUM
- JPL EOP2 as reference time series



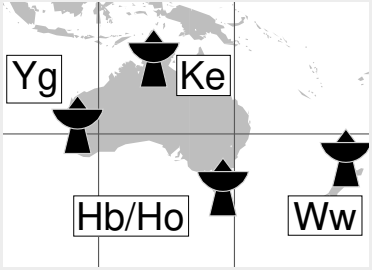
Processing settings

ICRF3 sources fixed, non-ICRF sources estimated

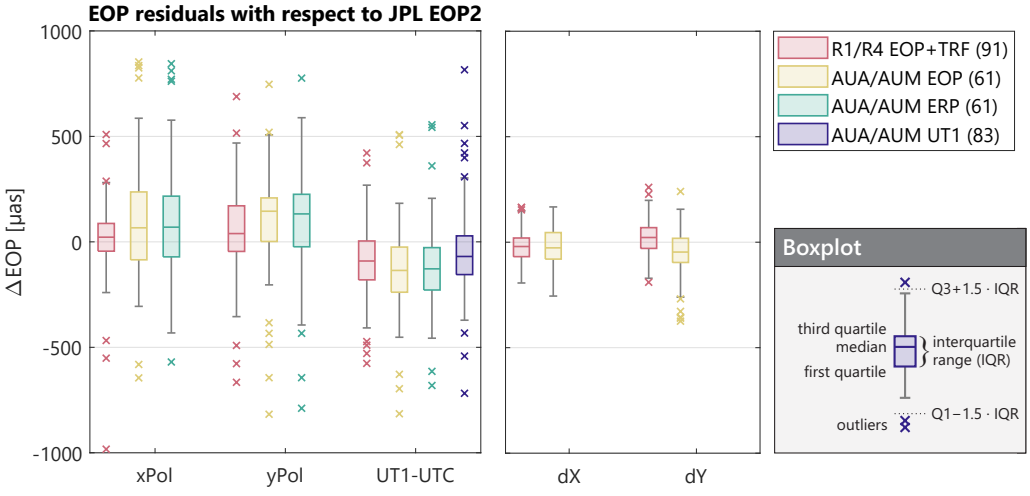
- **R1/R4:** EOP (xPol, yPol, UT1-UTC as pwlo; dX,dY as offsets); TRF (NNR/NNT ITRF2020)
- **AUA/AUM:** all EOP as offsets
- **AUA/AUM:** ERP (xPol, yPol, UT1-UTC as offsets)
- **AUA/AUM:** UT1-UTC as offset

Excluded sessions:

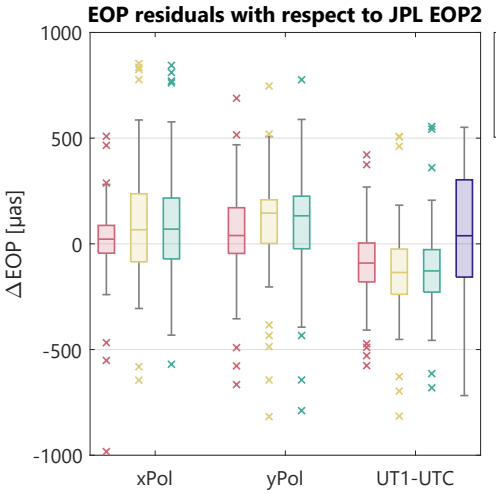
- ⛔ Residual/sigma > 1 mas
- ✕ 3/4 stations without Ht
- ✕ 23 for EOP/ERP
- ✕ 1 for UT1



Earth orientation parameter residuals

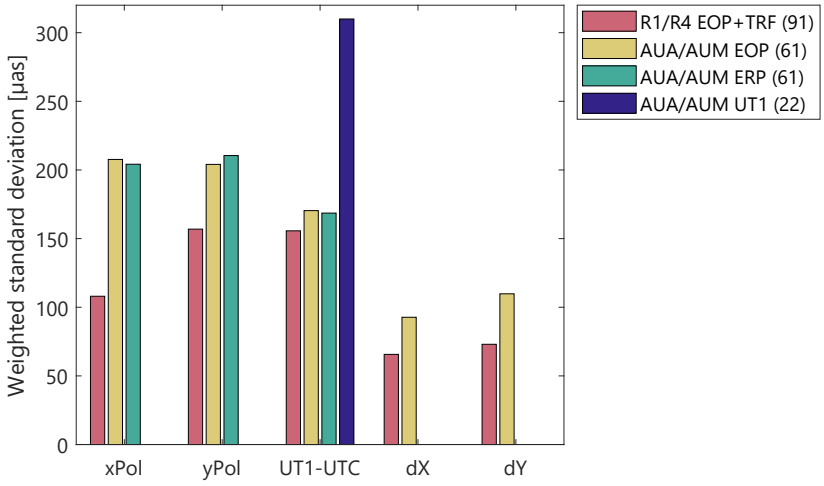


Earth orientation parameter residuals



- ✓ Calculate UT1-UTC from 61 sessions consistently together with CPO and/or polar motion (■|■)
- ✓ Use the Intensive-like strategy (■) only for the 22 sessions excluded otherwise.

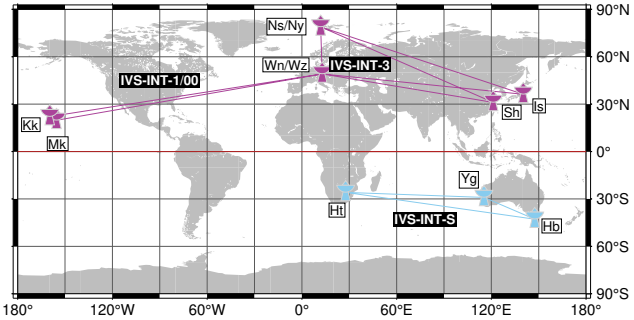
Weighted standard deviations



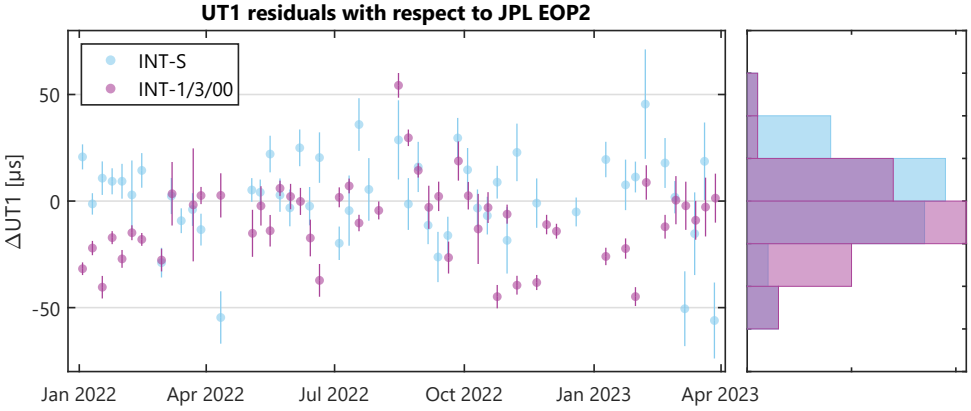
Southern Intensives performance 2022/23

Data

- 50 IVS-INT-S Jan 2022 to April 2023
- 50 IVS-INT-1/3/00 close to INT-S epochs
- JPL EOP2 as reference time series



Time series comparison



Statistics

Table 1: UT1-UTC estimates with respect to JPL EOP2

Statistical quantity [µs]	INT-S	INT-1/3/00
Weighted standard deviation	16	20
Weighted mean	2	−12
Interquartile range	23	24
Mean formal error	11	7
Median formal error	9	6

Conclusions

EOP from australian mixed-mode sessions

- AUA/AUM can be used to determine EOP if station coordinates are fixed. The deviations w.r.t. a reference time series are higher than those obtained from R1/R4 sessions, especially in the case of polar motion.
- There is no significant influence on polar motion or UT1-UTC estimates if celestial pole offsets are estimated or fixed.
- Sessions that fail when determining all EOP can be analysed in an Intensive-like mode to retrieve UT1-UTC, with an Intensive-like spread of the residuals, though.

UT1 from southern Intensive sessions

- The INT-S from 2022/23 yield good results, able to compete with UT1-UTC estimates from INT-1/3/00 sessions.