

IGS Analysis Center Coordination: Transition and Beyond



IGS

INTERNATIONAL
GNSS SERVICE



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Brief History of ACC

- IGS Analysis Center Coordinator (ACC) has overall responsibility for generating the main official IGS combined products.
- 4-year-term ACC duties

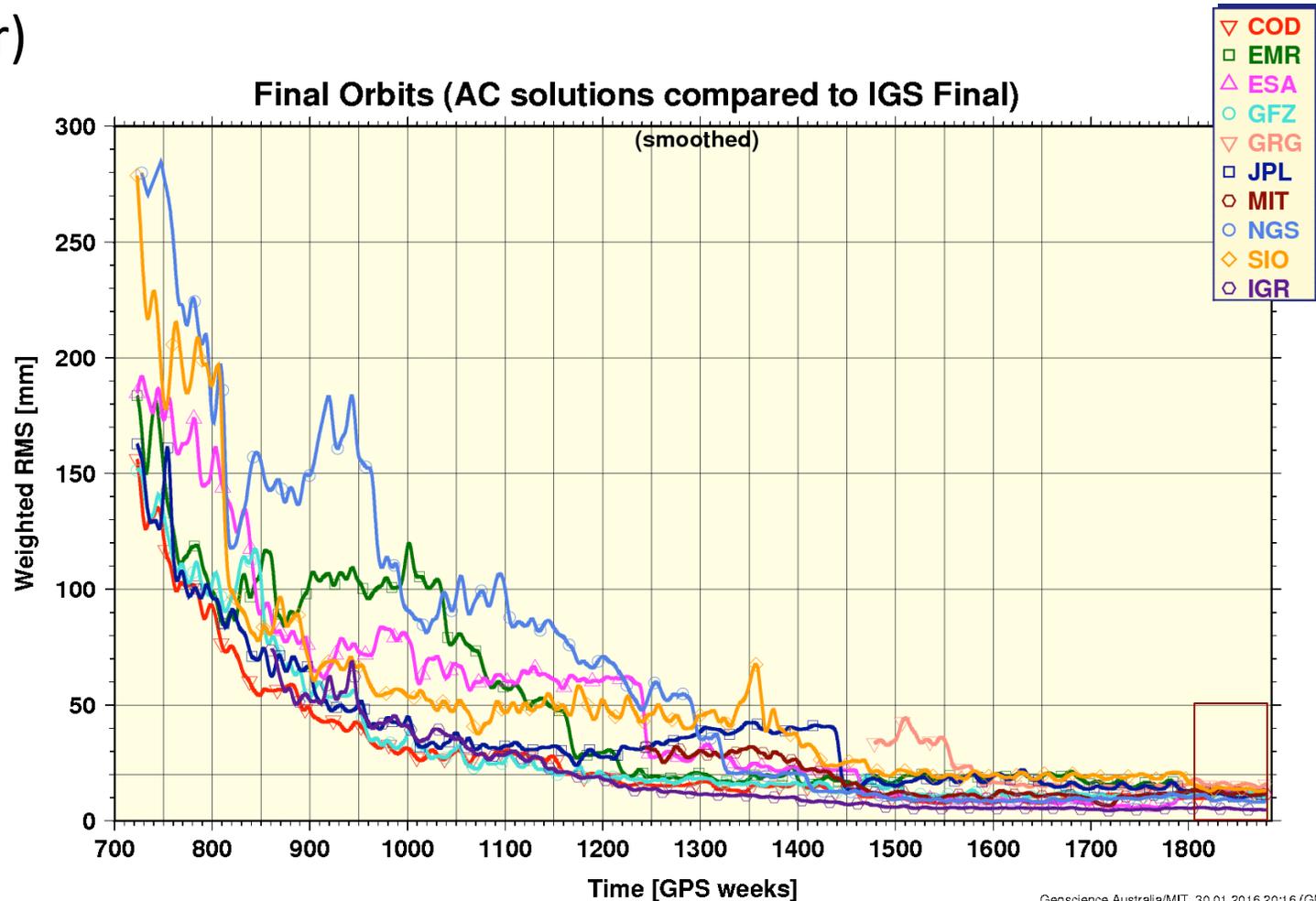
1994	1998	2003	2008	2012	2015	2018 (?)
NRCan	CODE	GFZ	NGS	NGS	GA/MIT	

- TRF combination

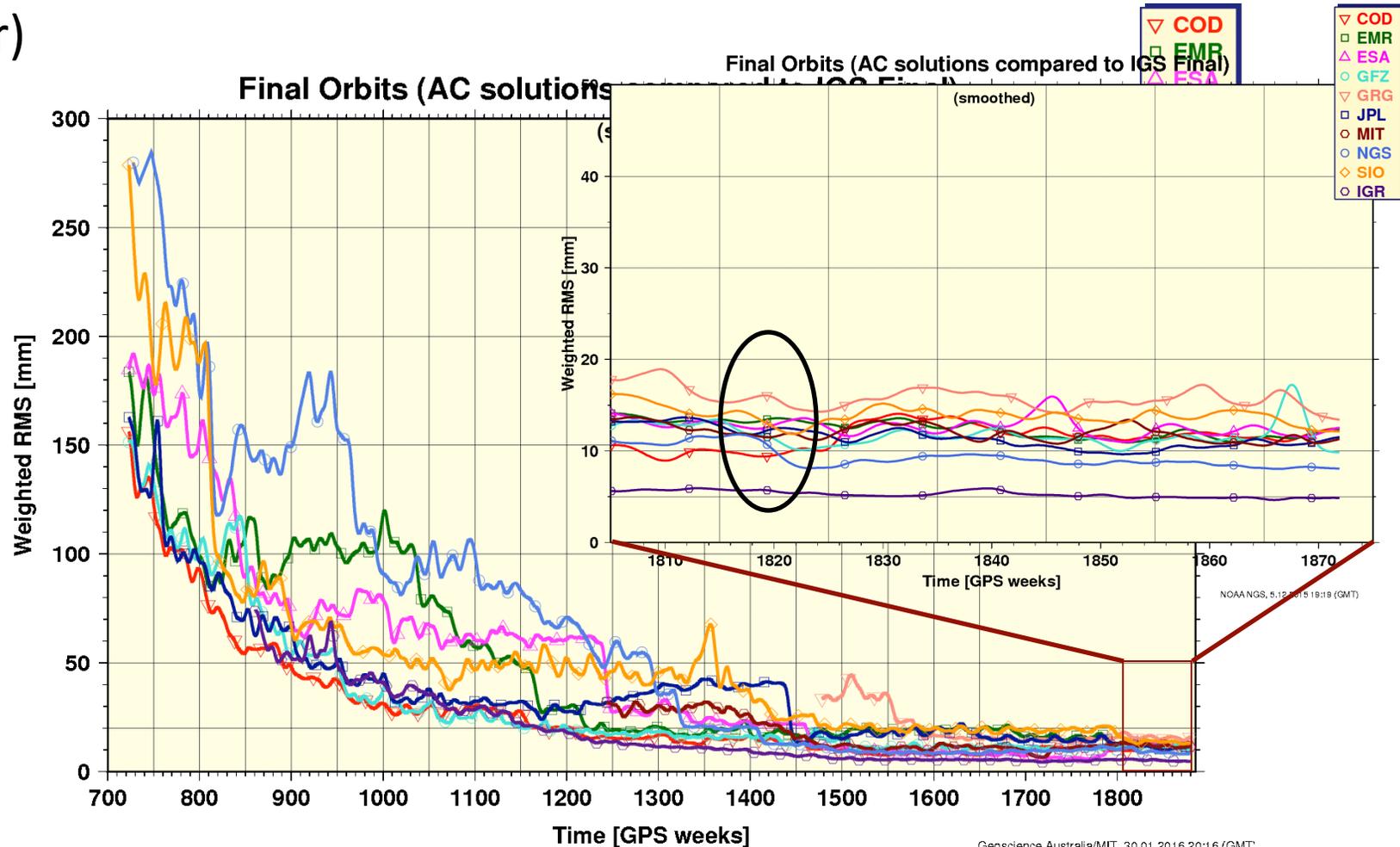
1994	2010	Current
NRCan	IGN	

- High-stability GPS Time Scale by Naval Research Laboratory in Washington DC.
 - Rapid and Final Products only

- <https://acc.igs.org> is the main source for the current and historic plots.
- Weighted RMS of combination residuals
 - **Final:** Better inter-AC agreement ~5 mm with precision ranges 3-4 mm (1D error)

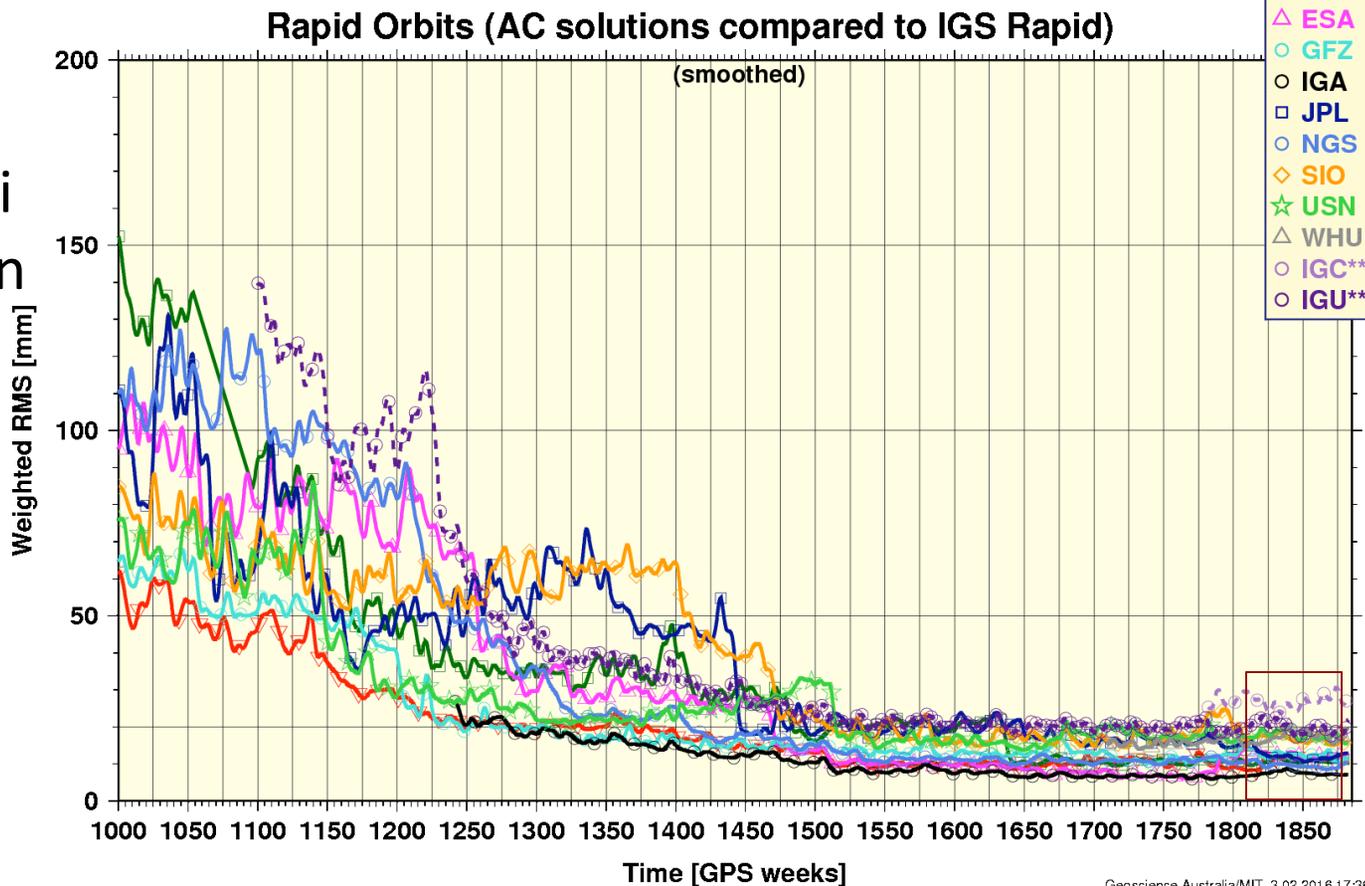


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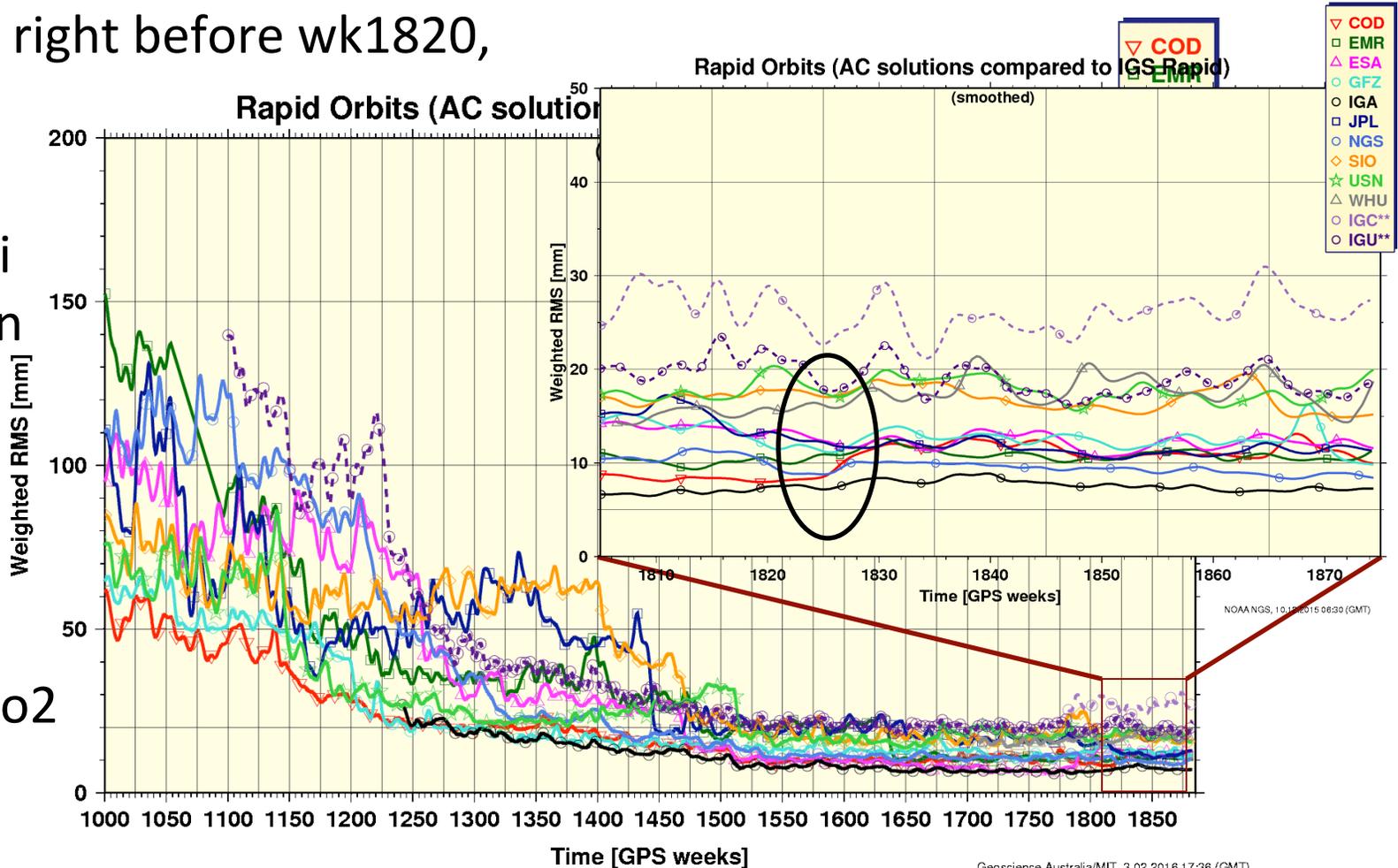
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 - **Rapid:** Due to repro2 ACs switched to match with the repro2 strategies right before wk1820,

WRMS differences between combination and comparison ACs became distinctive.



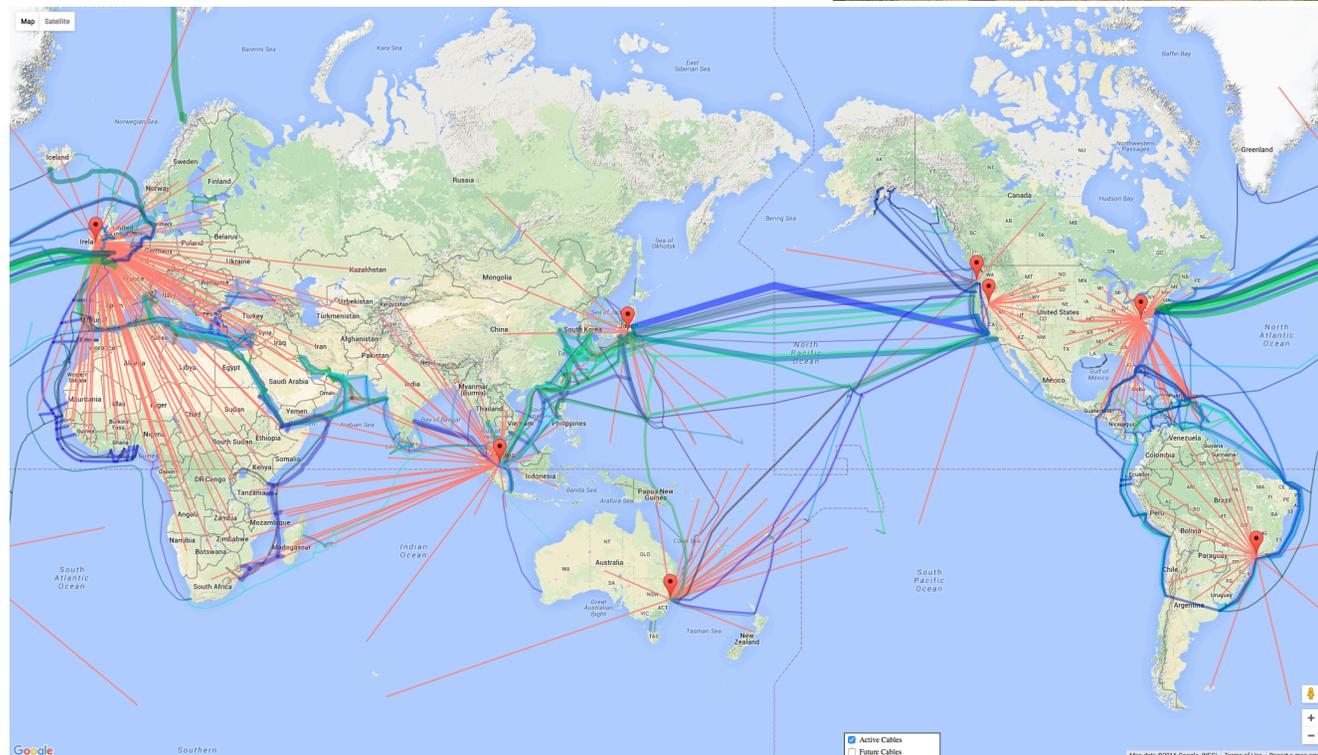
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- Weighted RMS of combination residuals
 - **Rapid:** Due to repro2 ACs switched to match with the repro2 strategies right before wk1820,

WRMS differences between combination and comparison ACs became distinctive. J. Griffiths presentation about the Repro2 orbit combi on Tuesday.



ACC Duty Transition

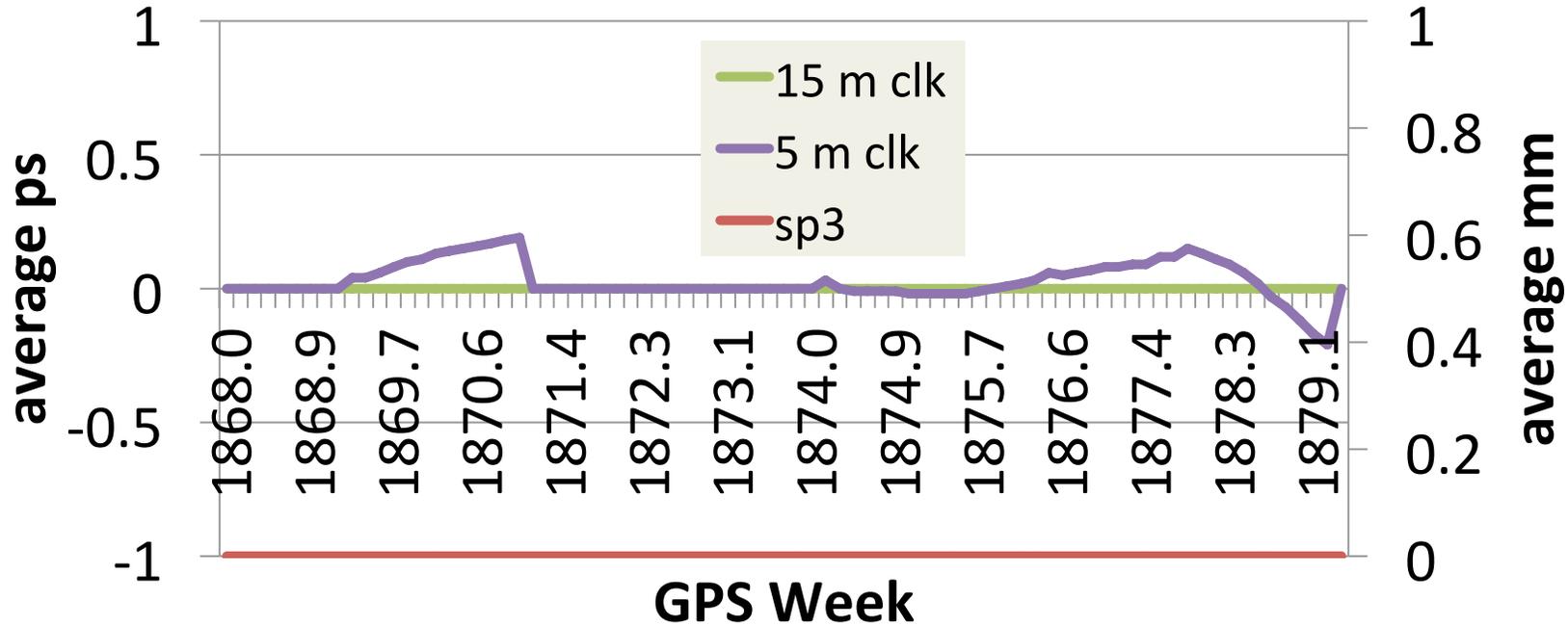
- New ACC search began in 2013.
- GA/MIT team submitted proposal in Sept. 2015
- What's new?
 - Distributed duties and geographic location
- ACC server migration to the Cloud.
 -  **EC2** Cloud server based in
- Network latency
 - Sydney (Backup)
 - Frankfurt (Main)



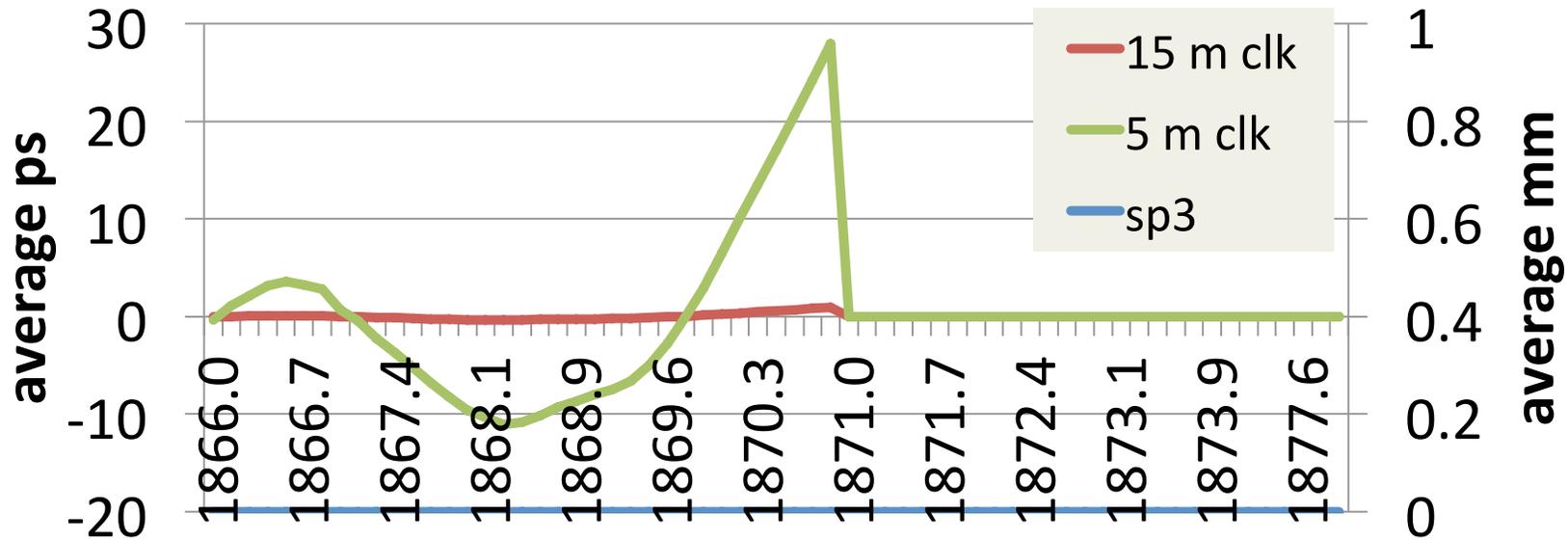
- Started exploration of the Cloud in July, 2015
 - server setup and preliminary testing (~2 mo)
- On-the-job training in November 2015 for 3 wks.
 - Unit testing for each software/product
 - Knowledge transfer
 - Creating information/instruction document
 - **Parallel combination started on wk1868**
- Duty Transition
 - 01 JAN 2016 : ACC duty hand over
 - Migration of official ACC email to acc@igs.org
 - 14 JAN 2016 : IGS Products source switch-over to the new Cloud server
 - 20 JAN 2016 : Web server acc.igs.org switch-over to Amazon EC2
 - **?? FEB 2016 : Decommission NGS combination servers**
 - Decommission igs.acc@noaa.gov
- Goal
 - Un-noticeable transition with full knowledge transfer

Parallel Comparison

Rapid



Final



- **Ultra-Rapids**
 - Delivered 03:00, 09:00, 15:00 and 21:00 UTC.
- **Rapids**
 - Delivered 17:00 UTC

	Rapid latency (23 days average)	Ultra-Rapid latency (24 days average)
Before	0.8 min	1.5 min
After switch-over	0.3 min	0.8 min

- **Finals**
 - Finals are manually started. Delivered 12-13 days after the last day of the week processed. This time table has been maintained and accelerated a little to avoid rolling over into the Australian weekend (GA has responsibilities for the finals).
- **Summary:**
 - Smooth transition, email lists were the biggest problem.

Comment:

“Don’t break anything”

Issues

- Adoption of ITRF2014, generating consistent orbits and clocks.
- Scale difference between Repro1 and Repro2.
- What are the most important model updates we should do?
- Multi-day orbit arcs but with everything else daily
- Radiation pressure and eclipse modeling (related yaw modeling)
- Loading corrections of various forms and timescales,
- Time dependent gravity, pole tide corrections (latter two are not independent),
- Issues associated with models in near real-time (2nd order ionosphere)

Resources

- How do we move forward with complete GNSS capability?
- Current ACC software can handle GPS and GLONASS. Update for other systems or wait for ACC 2.0

Back up slides

a priori datum
(IGS08/IGb08)

Analysis Center (AC) Products

satellite orbits & clocks (SP3),
receiver clocks (CLK), tropo
delays (TRO), and polar
motion & LOD (ERP) + daily
station positions (SNX)

- Latest IERS and IGS conventions generally adopted
- Adjust all obs model parameters
- Ultra-rapid and Rapid tightly constrained to *a priori* datum
- Finals uses no-net-rotation (NNR) constraint over *a priori* coordinates of core set of RF stations
- Finals realizes AC daily quasi-instantaneous “fiducial-free” frame w.r.t. *a priori* datum

AC SP3, CLK &
ERP files

IGS AC Coordinator (NGS)

- weighted average of AC products
- Rapid and Final clocks are aligned to IGS timescale

Combined Orbits, Clocks, and
ERPs (Rapid & Ultra-rapid only)

Ultra-rapid (IGU)
orbits (GPS, GLO),
clocks (SV), ERPs

Rapid (IGR) orbits
(GPS), clocks (SV,
Rx), ERPs

Final (IGS) orbits
(GPS, GLO), clocks
(SV, Rx), ERPs, and
TRF prods

IGS Core Products

IGS Core Products

