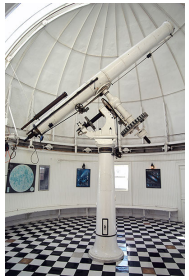
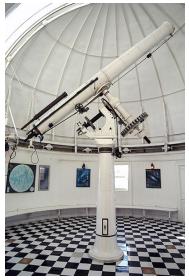


Recent Improvements to the IERS RS/PC

Nick Stamatakos

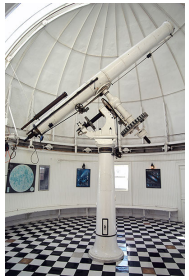
Brian Luzum

William Wooden



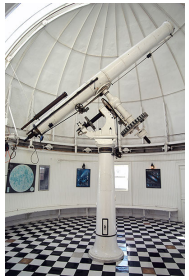
IERS RS/PC

- Produce daily and weekly EOP combination solutions
  - Daily EOPs produced after 4 PM UTC
  - Weekly EOPs produced Thursday after 4 PM UTC
  - Includes AAM, GPS, SLR, and VLBI data
  - Over 1500 users
    - Most use the data for practical (non-research) purposes (85 to 90%)
    - Not all are technically skilled



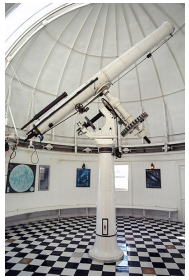
Combination Procedures

- Switched to 05 c04
- Benefited from e-VLBI Intensives
  - Reduced latency improved near-real-time UT1 values
- Added ILRS Series A
  - Removed the CSR and DUT SLR
- Added IGS Ultras
  - Only included Ultras which are beyond the last available IGS Rapids.
- Improved near real-time error estimates

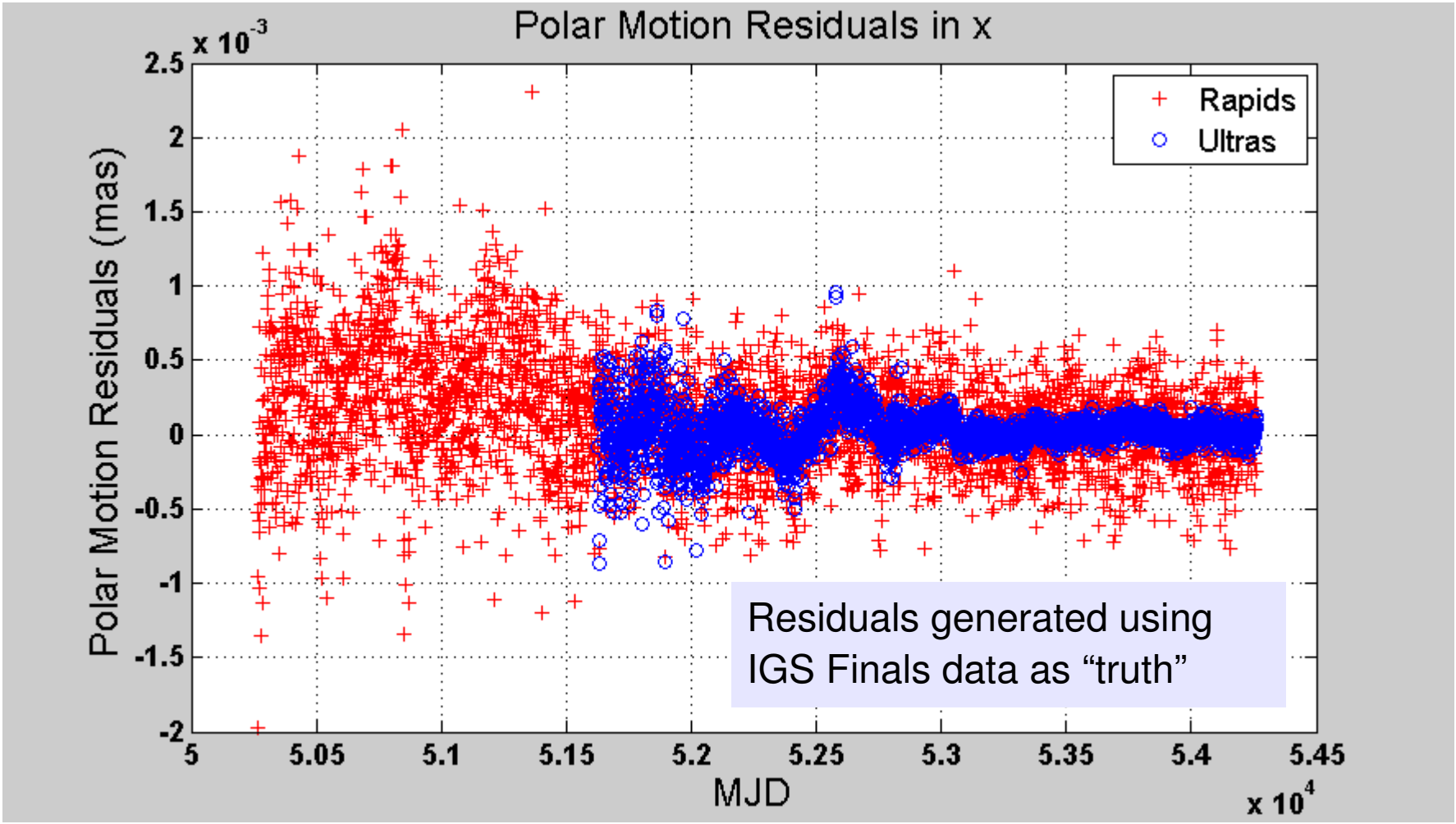


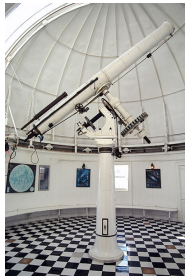
Switch to 05 C04

- Coordinated with the EOP PC on the new system
  - Provided feedback on the new series
  - Ensured the quality of the new system
  - Changed the RS/PC bias and rate to match the EOP PC – June 2007
- Will assist in the preparation of the IERS Technical Note

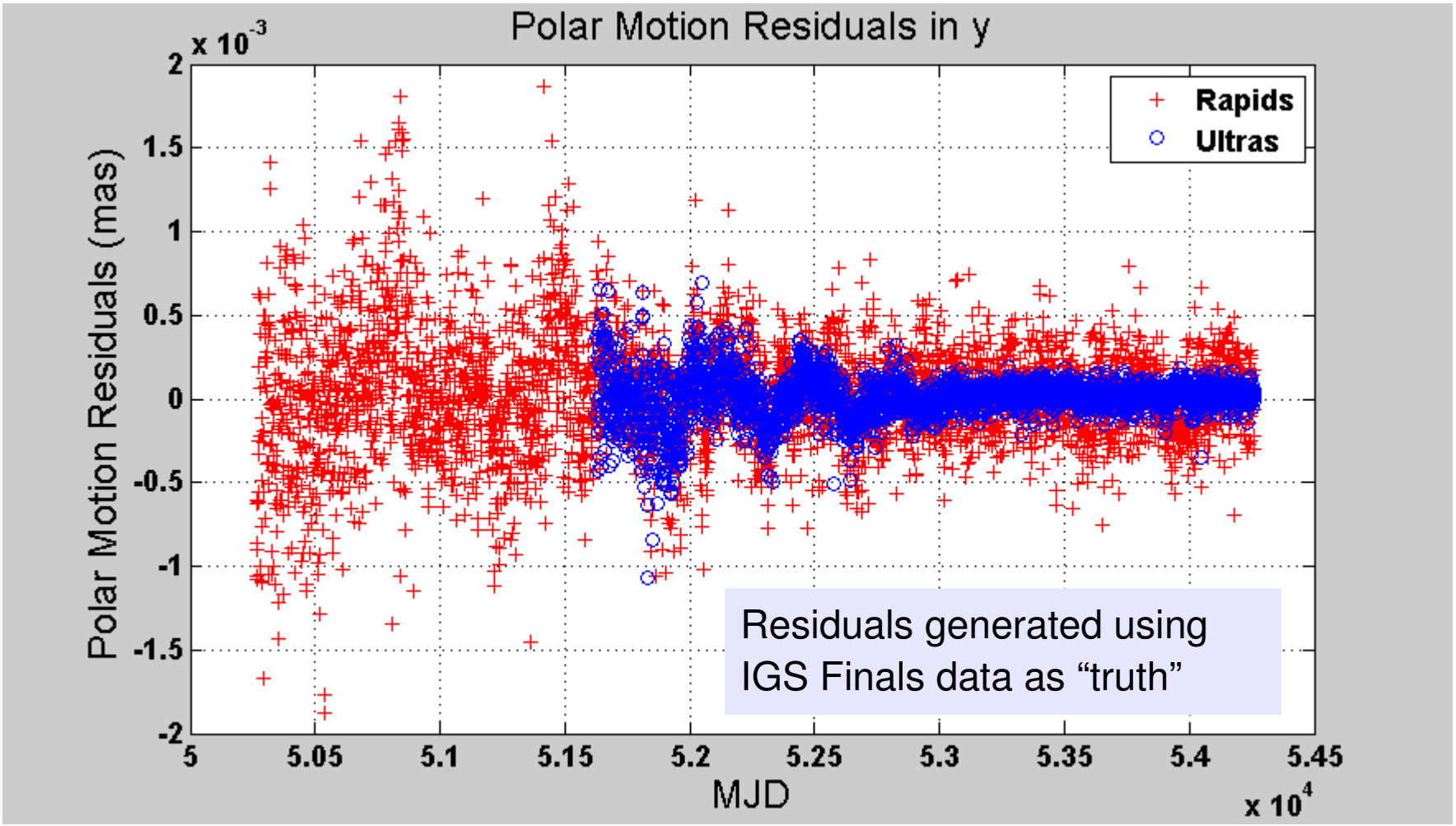


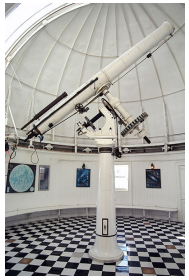
Comparison of PMx Residuals using IGS Extrapolated Rapids vs Ultras



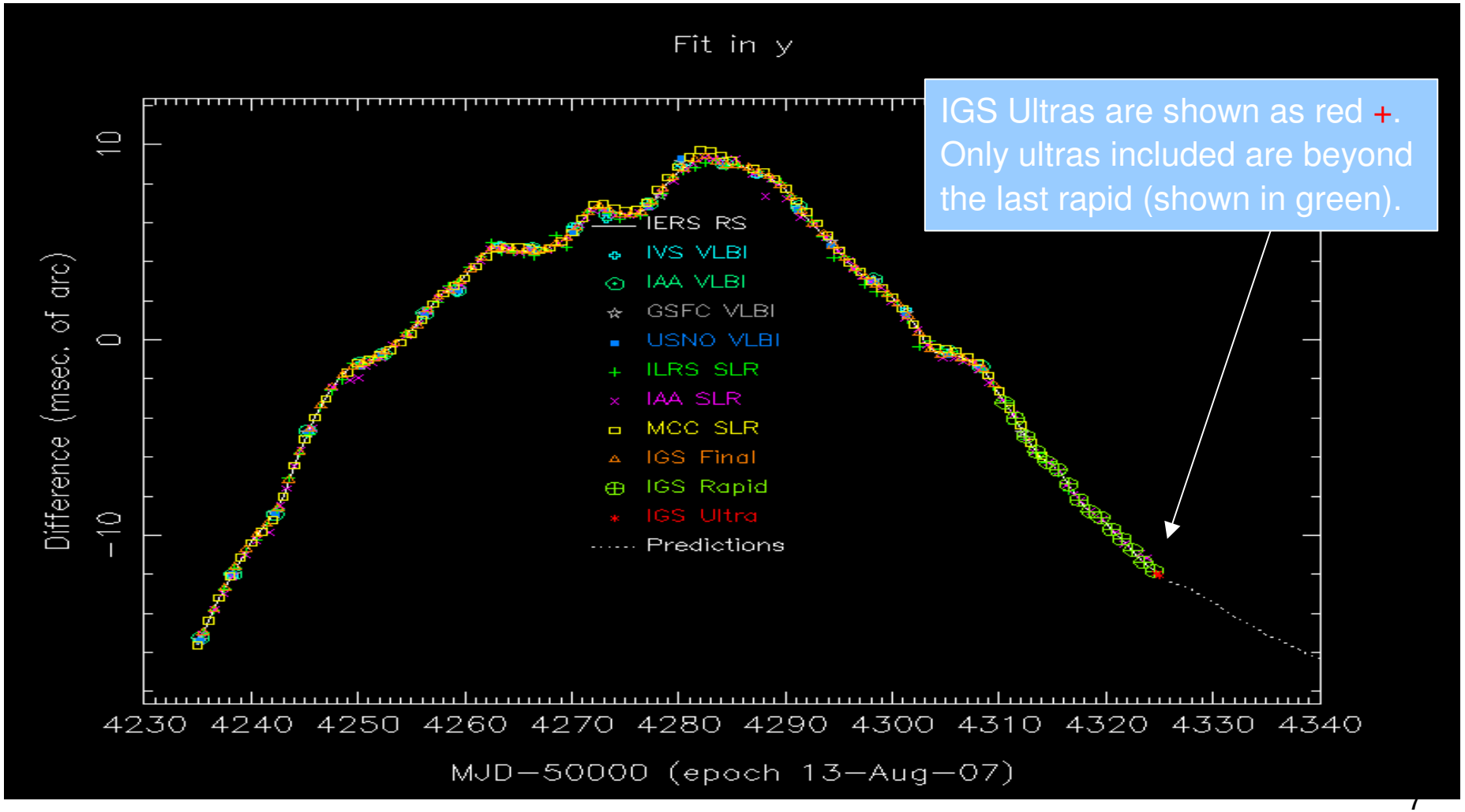


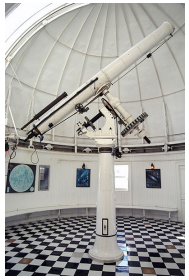
Comparison of PMy Residuals using IGS Extrapolated Rapids vs Ultras



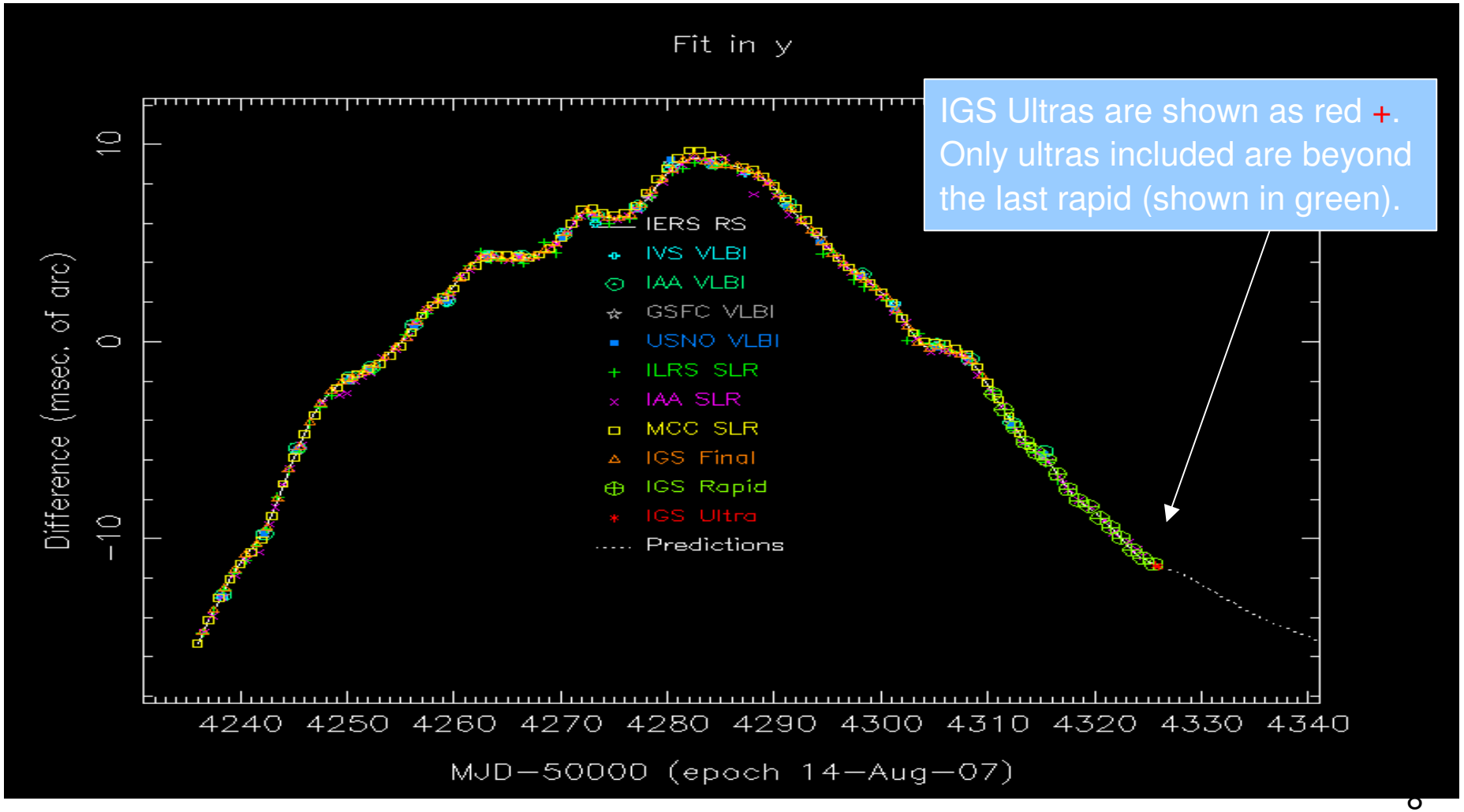


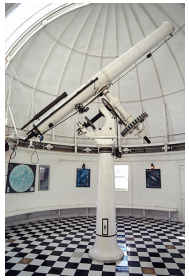
PMy using all Contributors with IGS Ultras (54325) Ultras predicted change in slope of PMy



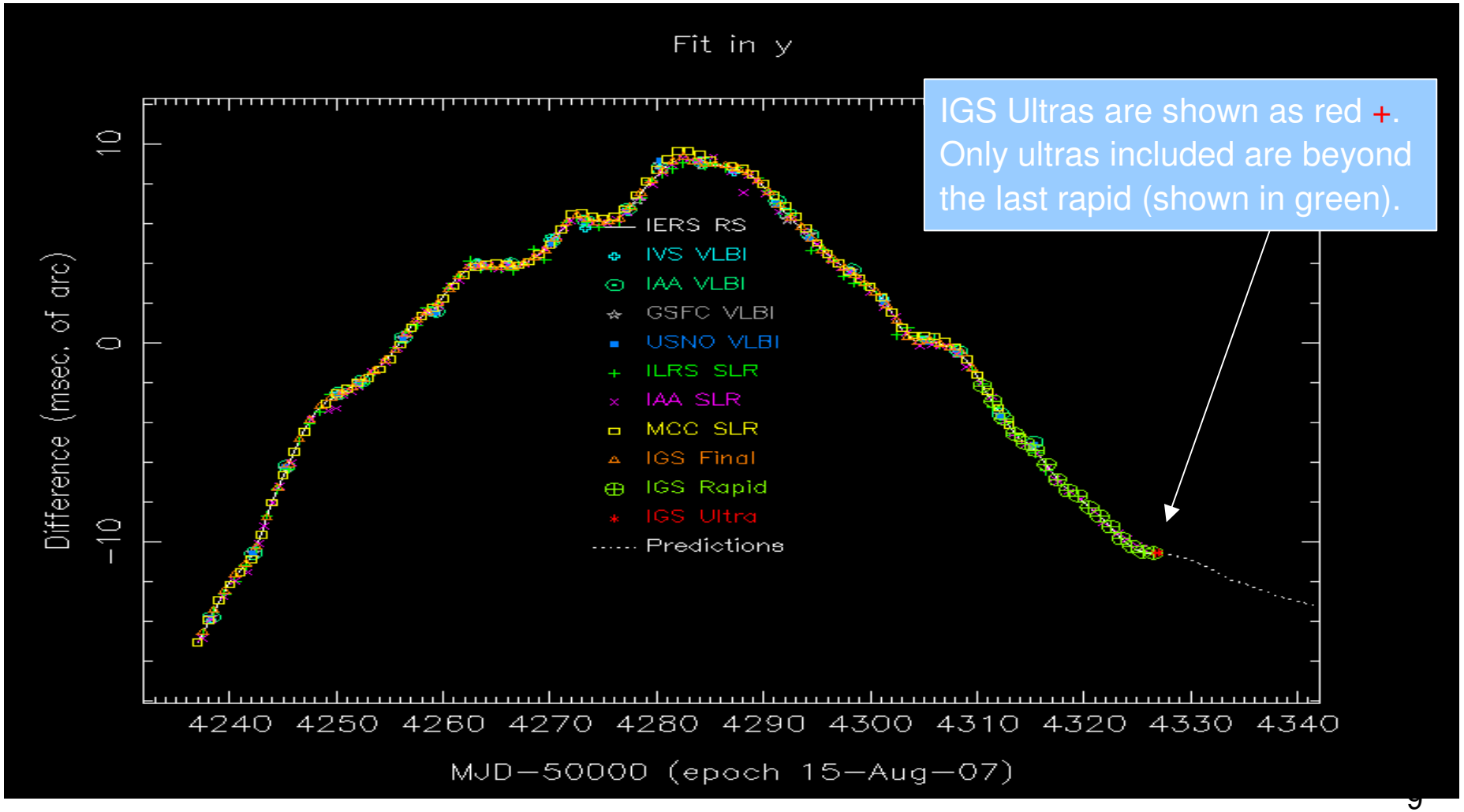


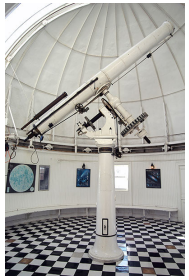
PMy using all Contributors with IGS Ultras (54326) Ultras predicted change in slope of PMy



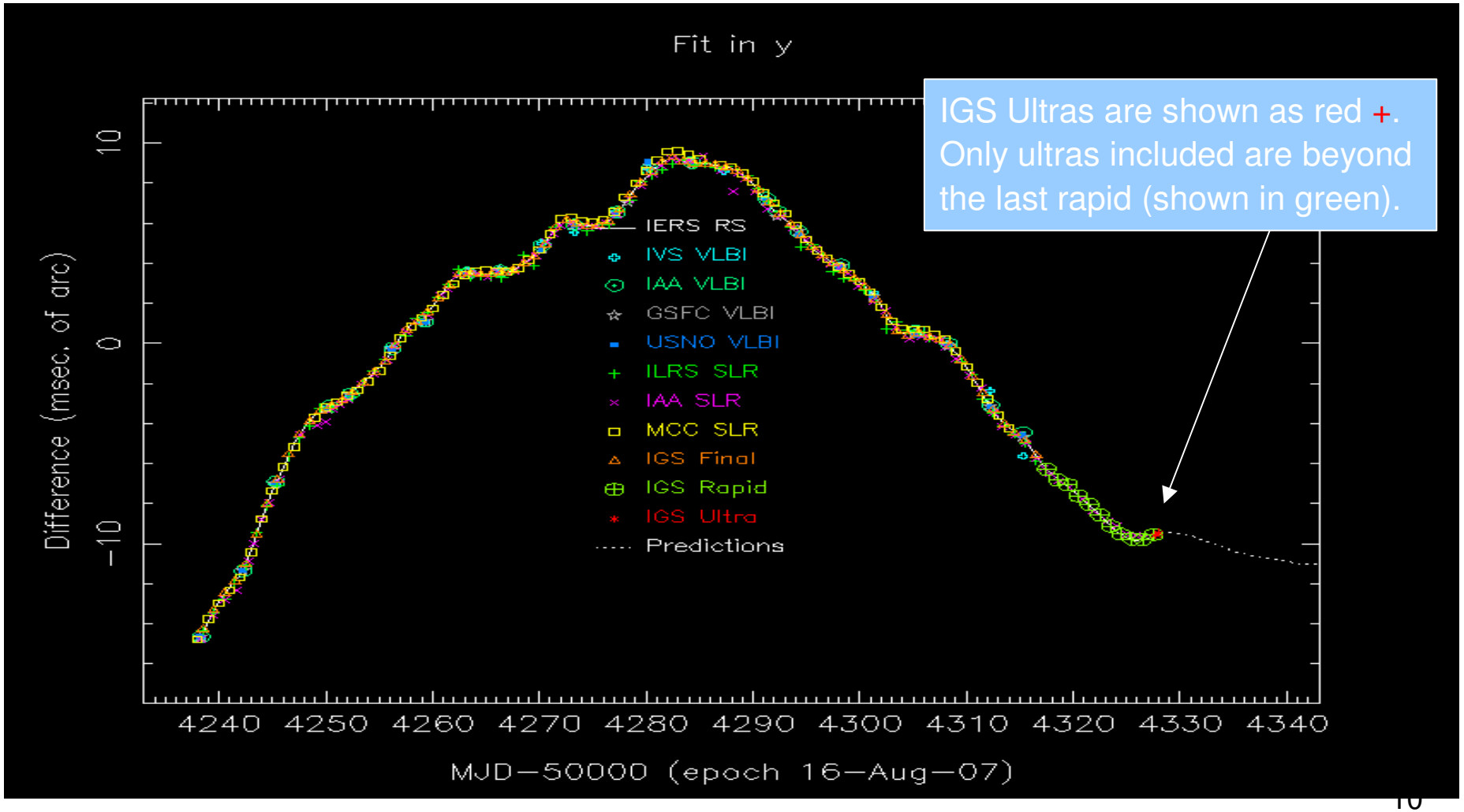


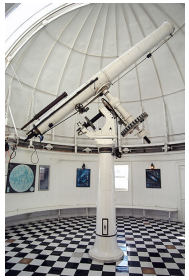
PMy using all Contributors with IGS Ultras (54327) Ultras predicted change in slope of PMy



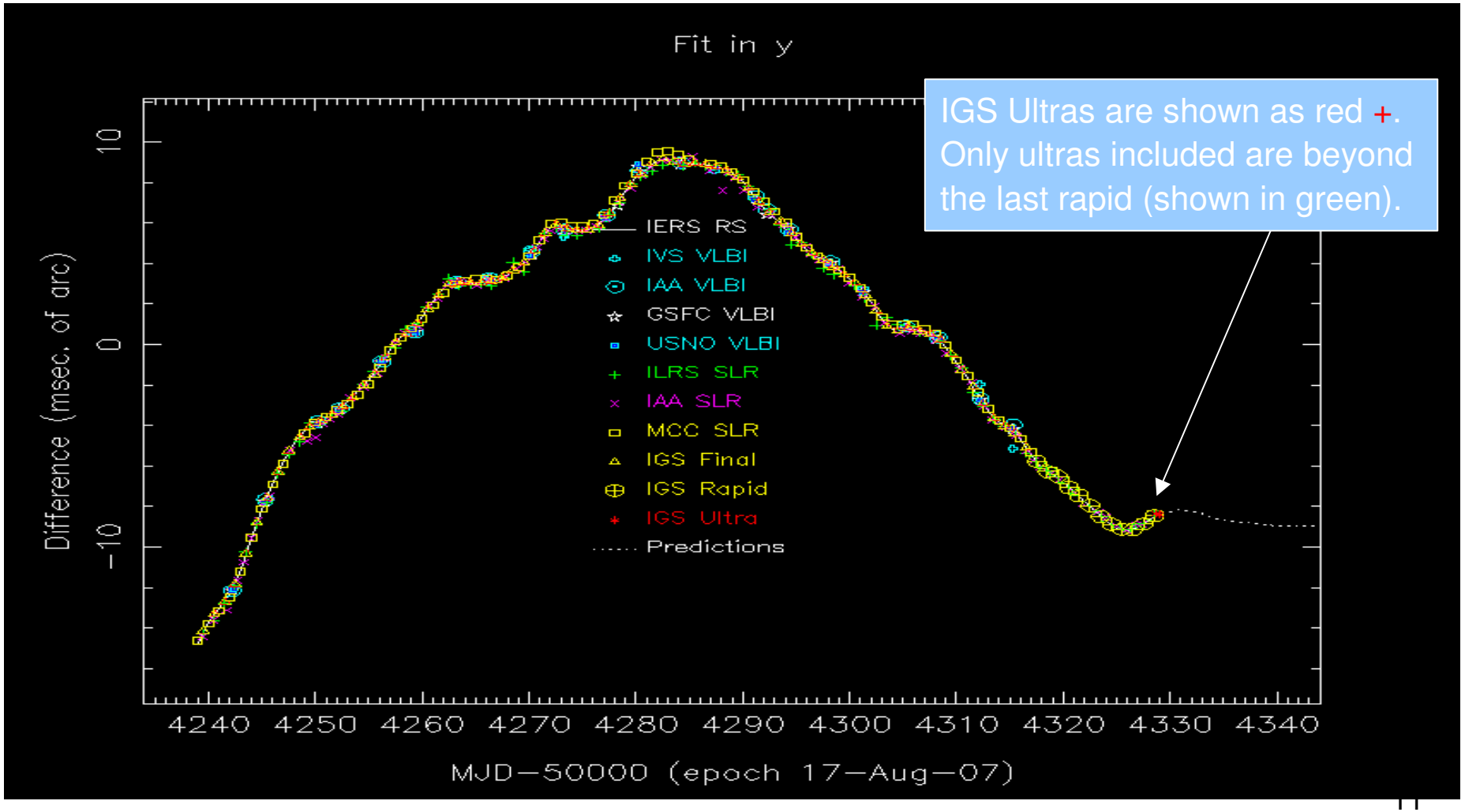


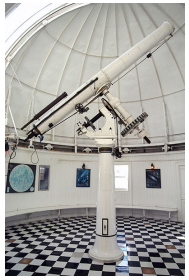
PMy using all Contributors with IGS Ultras (54328) Ultras predicted change in slope of PMy



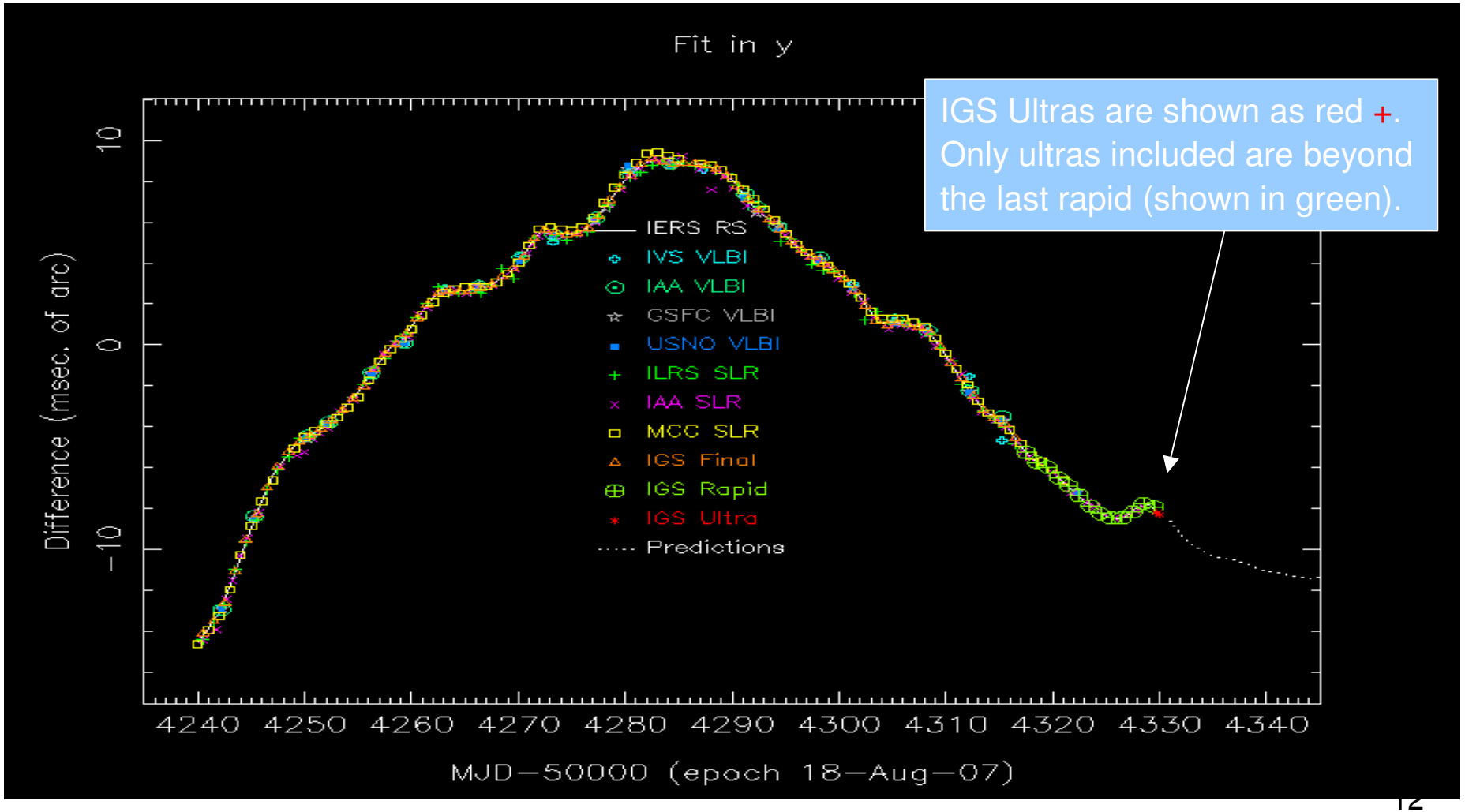


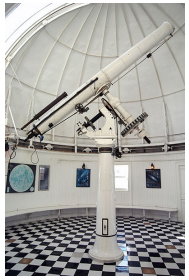
PMy using all Contributors with IGS Ultras (54329) Ultras predicted change in slope of PMy



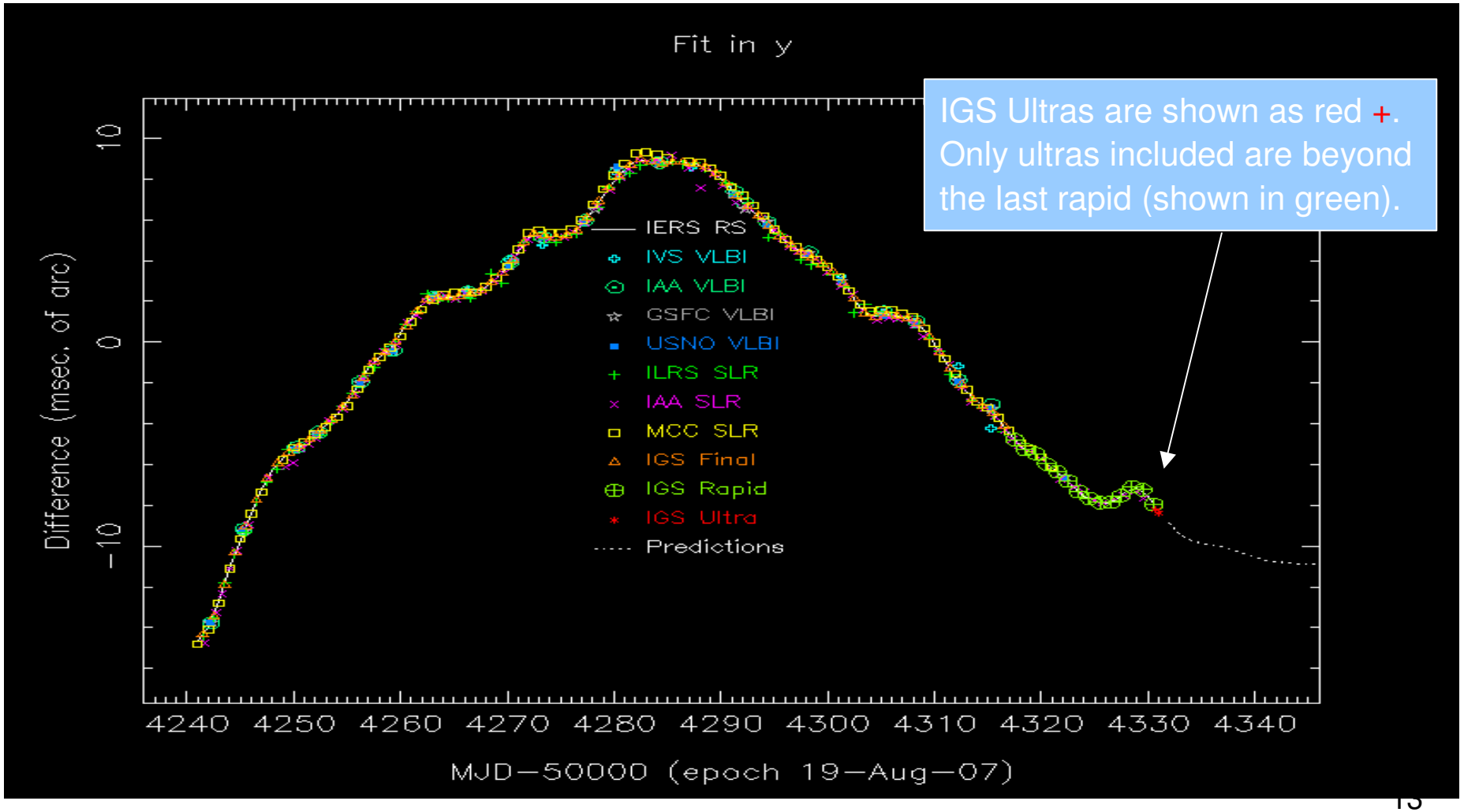


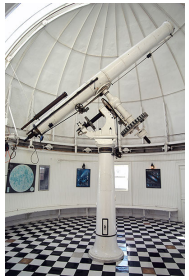
PMy using all Contributors with IGS Ultras (54330) Ultras predicted change in slope of PMy



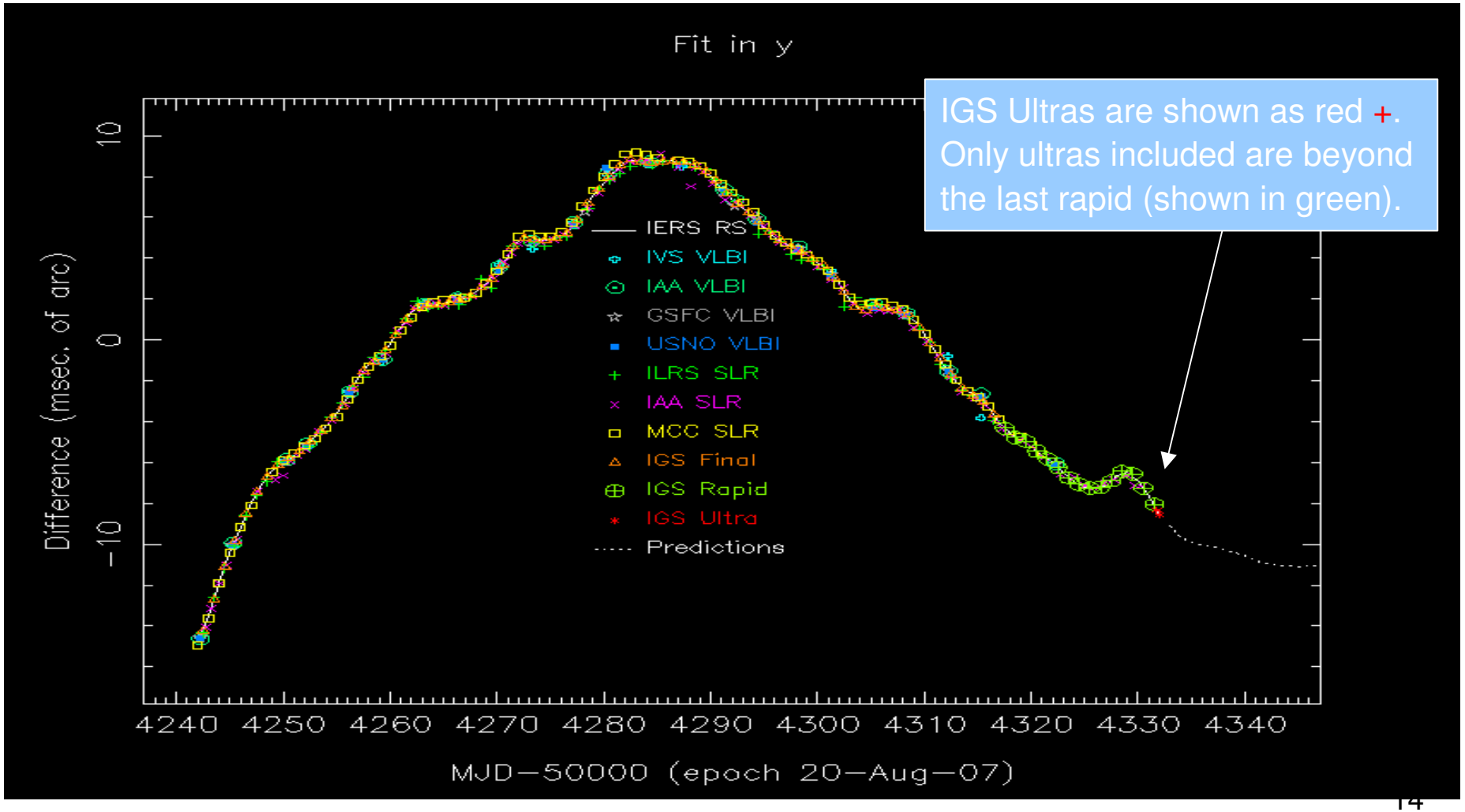


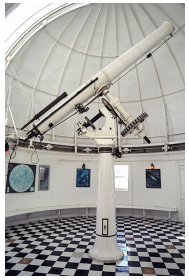
PMy using all Contributors with IGS Ultras (54331) Ultras predicted change in slope of PMy



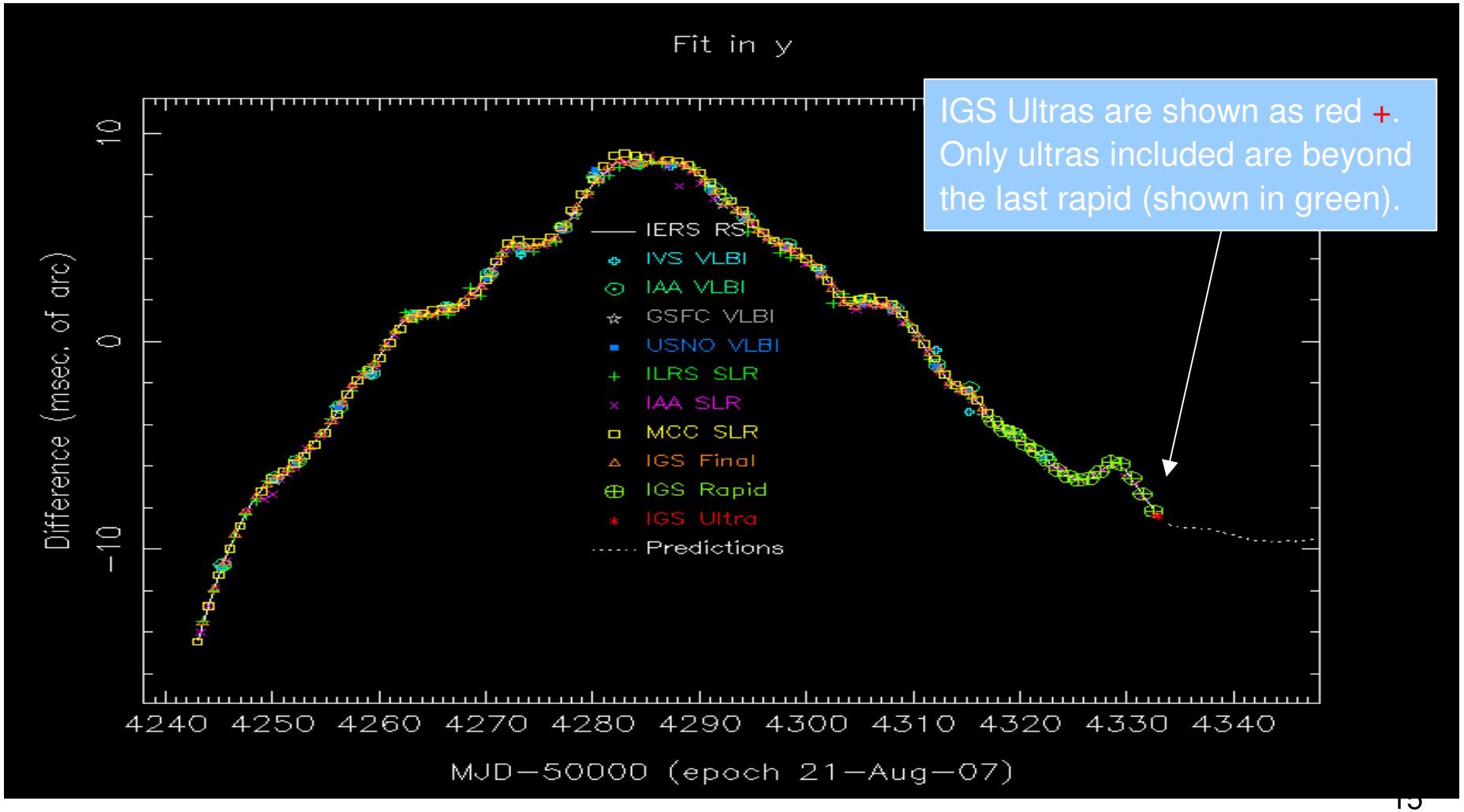


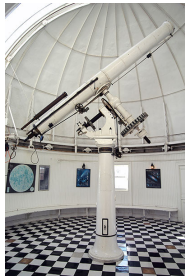
PMy using all Contributors with IGS Ultras (54332) Ultras predicted change in slope of PMy



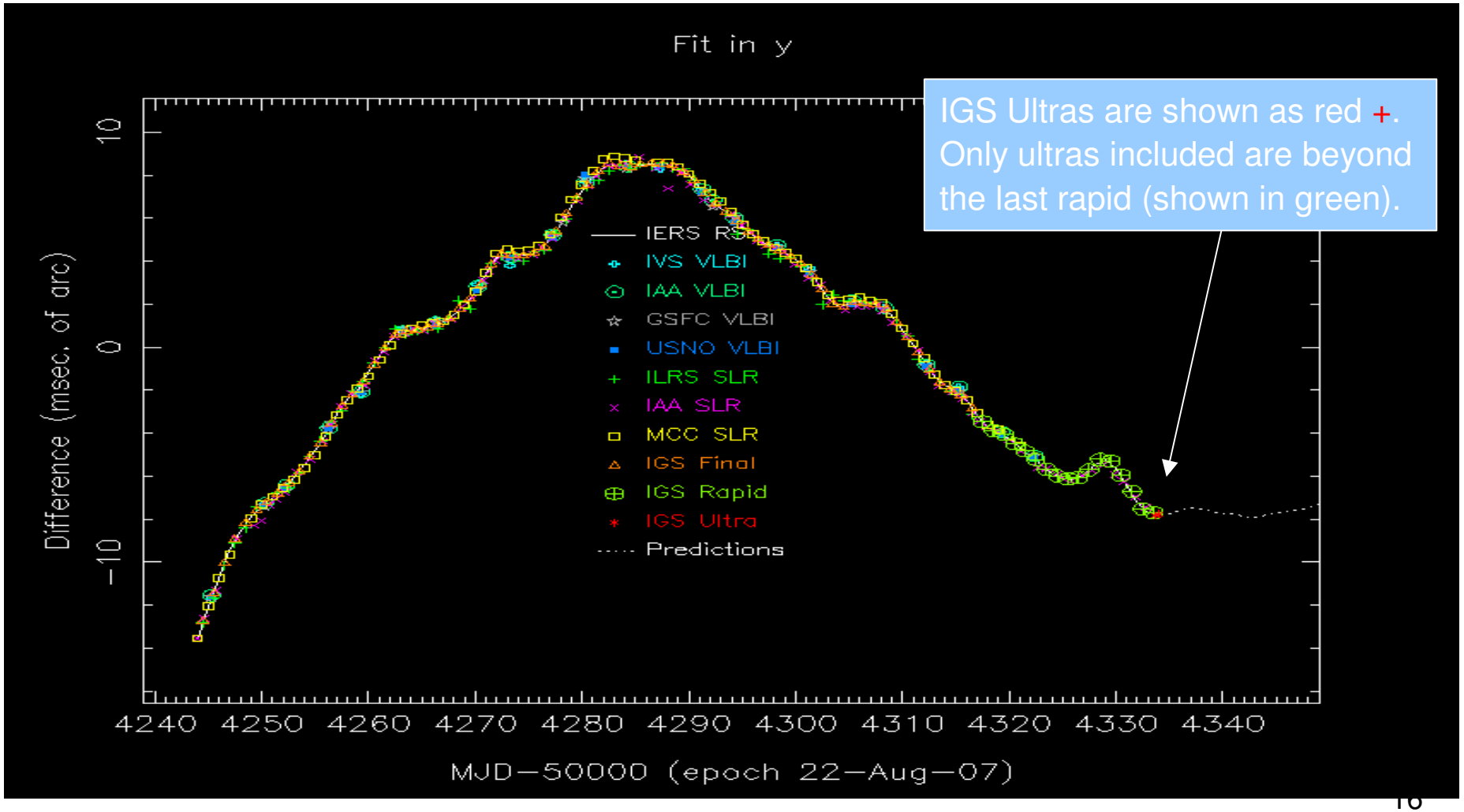


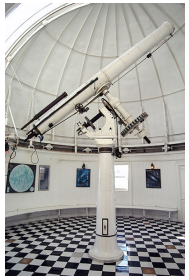
PMy using all Contributors with IGS Ultras (54333) Ultras predicted change in slope of PMy



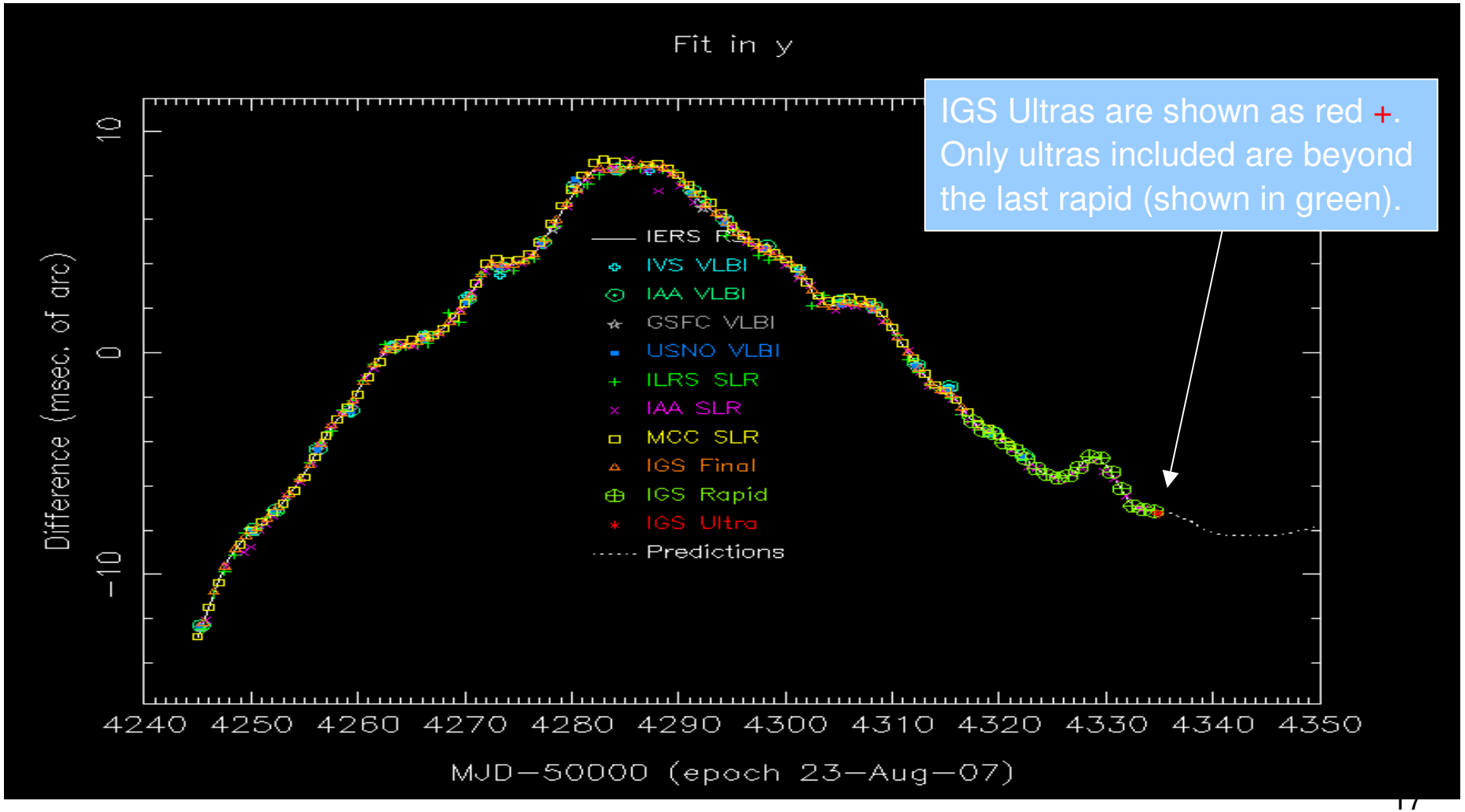


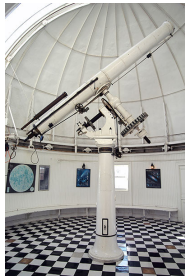
PMy using all Contributors with IGS Ultras (54334) Ultras predicted change in slope of PMy



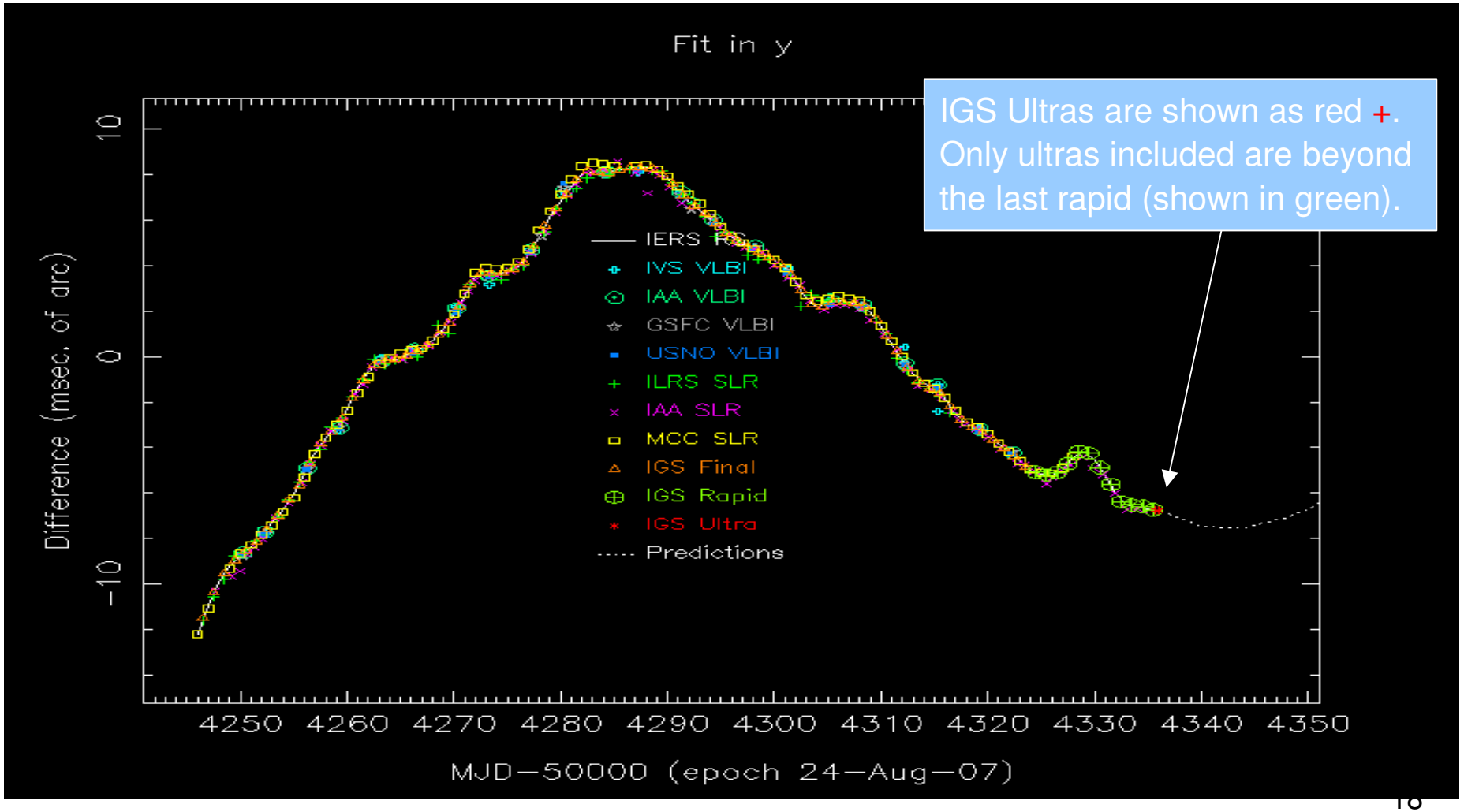


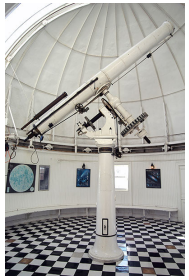
PMy using all Contributors with IGS Ultras (54335) Ultras predicted change in slope of PMy



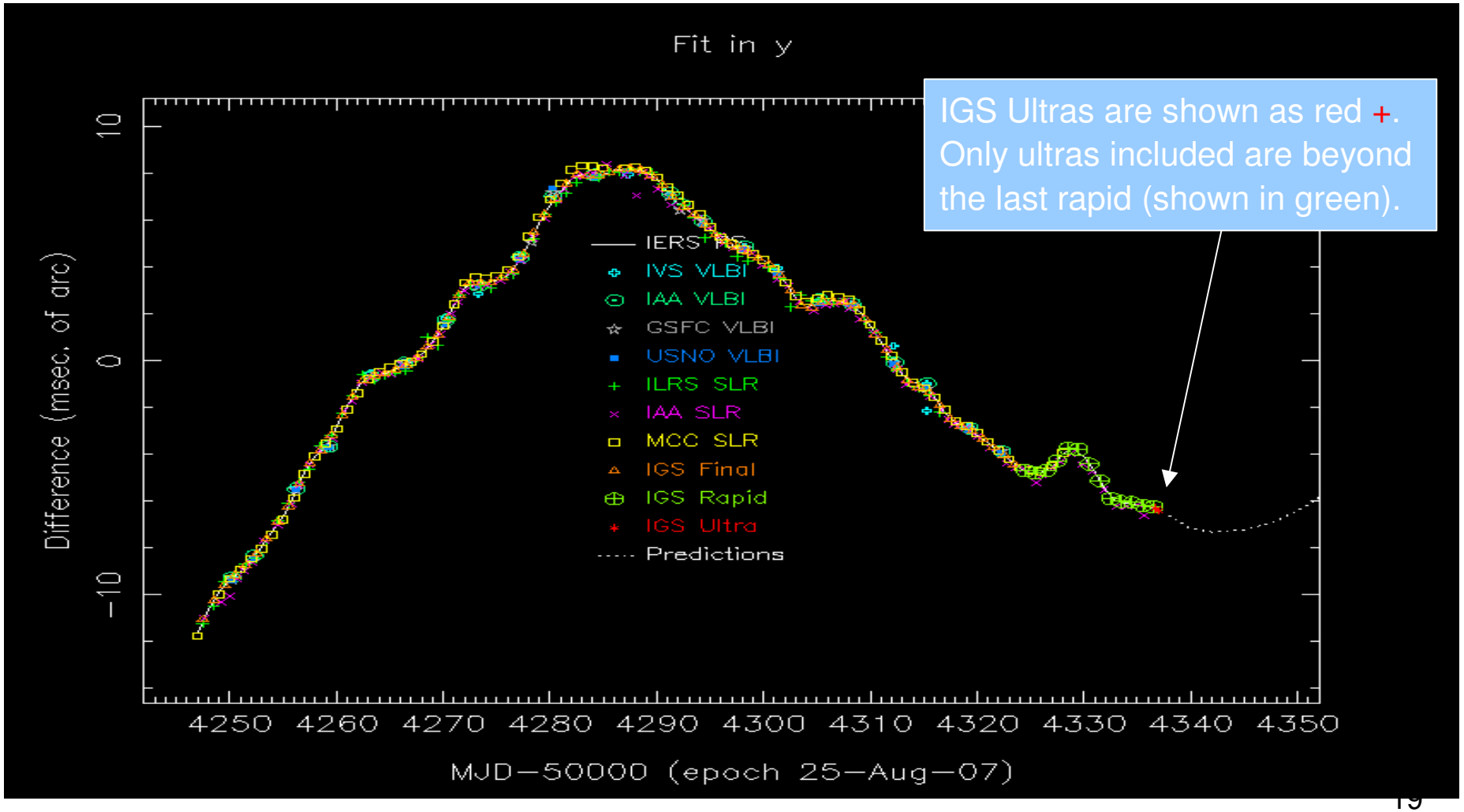


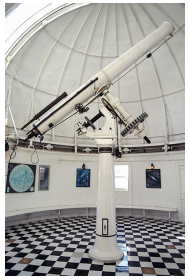
PMy using all Contributors with IGS Ultras (54336) Ultras predicted change in slope of PMy



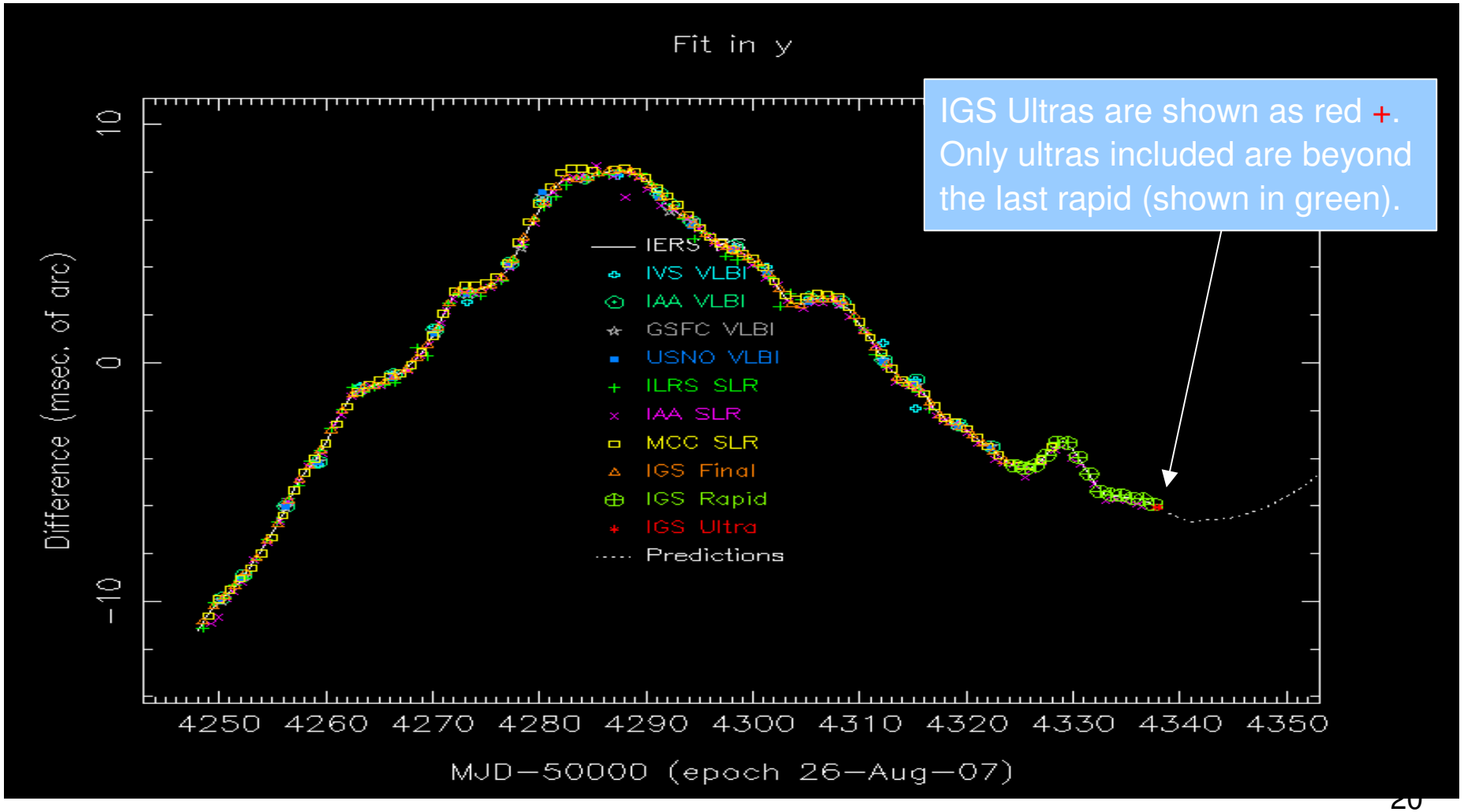


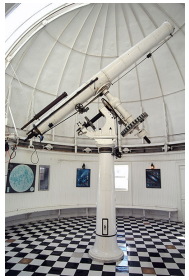
PMy using all Contributors with IGS Ultras (54337) Ultras predicted change in slope of PMy



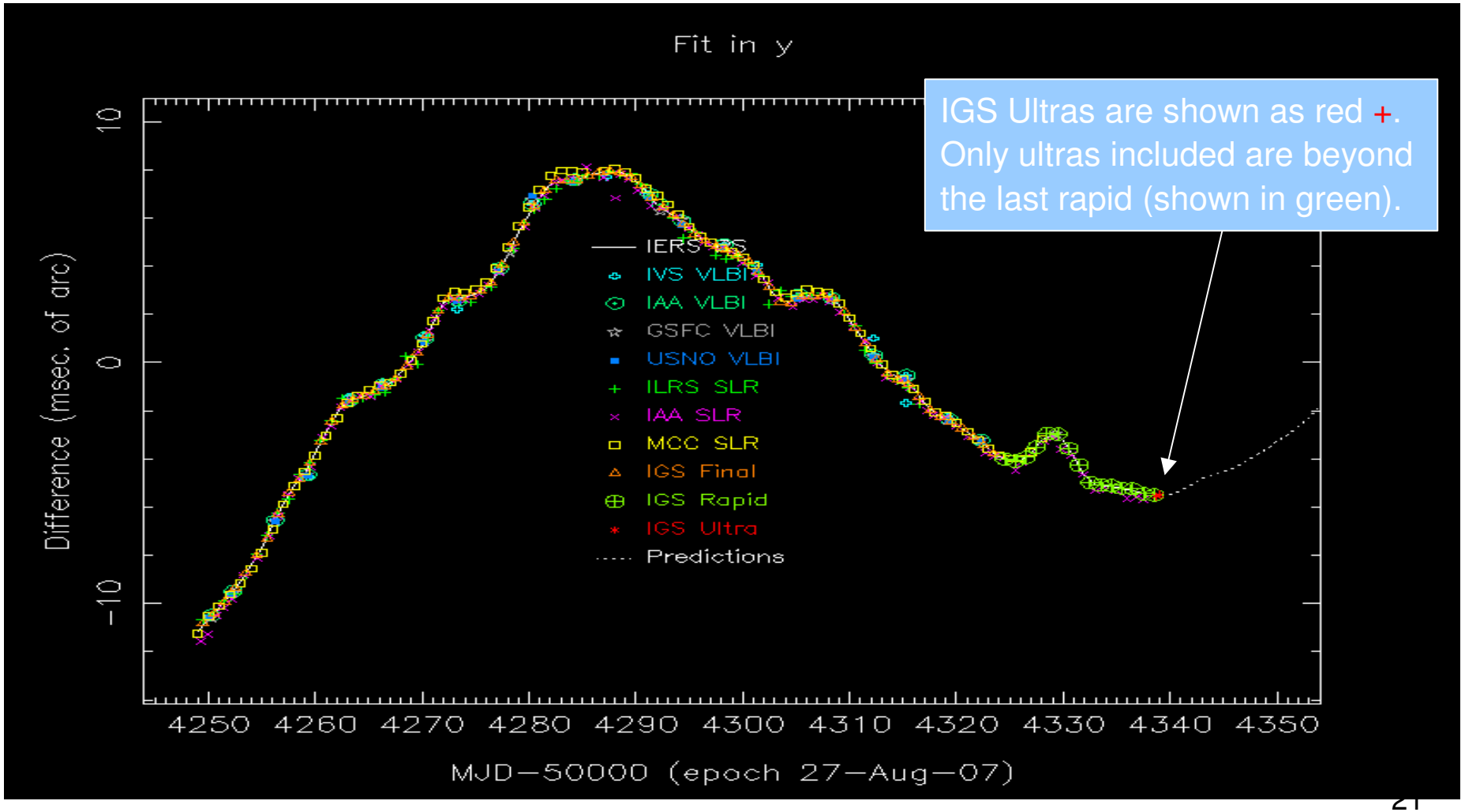


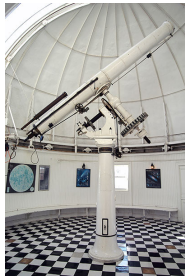
PMy using all Contributors with IGS Ultras (54338) Ultras predicted change in slope of PMy





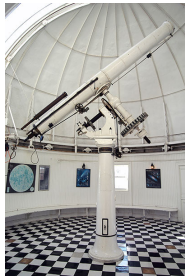
PMy using all Contributors with IGS Ultras (54339) Ultras predicted change in slope of PMy





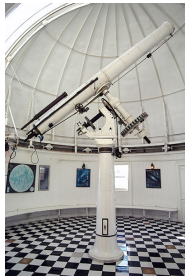
End of PMy animation

- Return to start of animation



Prediction Procedures

- Also benefited from e-VLBI Intensives
  - Reduced latency improved near-term UT1 predictions
- Implemented LS+AR algorithm for polar motion
  - Algorithm developed by W. Kosek in the 1990s.
- Improved AAM data with the addition of US Navy NOGAPS input series
  - More robust AAM estimation
  - US Navy NOGAPS recently extended predictions from 5 to 7 days – incorporating extra days into prediction (in process)



AAM Estimation Details

Obtain NOAA and Navy NOGAPS $\chi^{(w)}$ and $\chi^{(p)}$ values, spanning 15 previous to 5 future days.

Combine $\chi^{(w)}$ and $\chi^{(p)}$ and filter out high frequency terms with a 5 point Hanning window, spanning 48 hours (NOAA and Navy combined separately)

Any NOAA or Navy data missing or of poor quality?

Problem with NOAA data

Create estimates of NOAA data if possible. De-weight NOAA data.

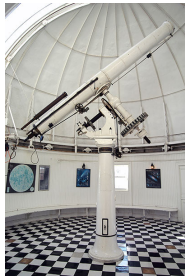
No

Equal weights Navy and NOAA

Problem with NAVY data

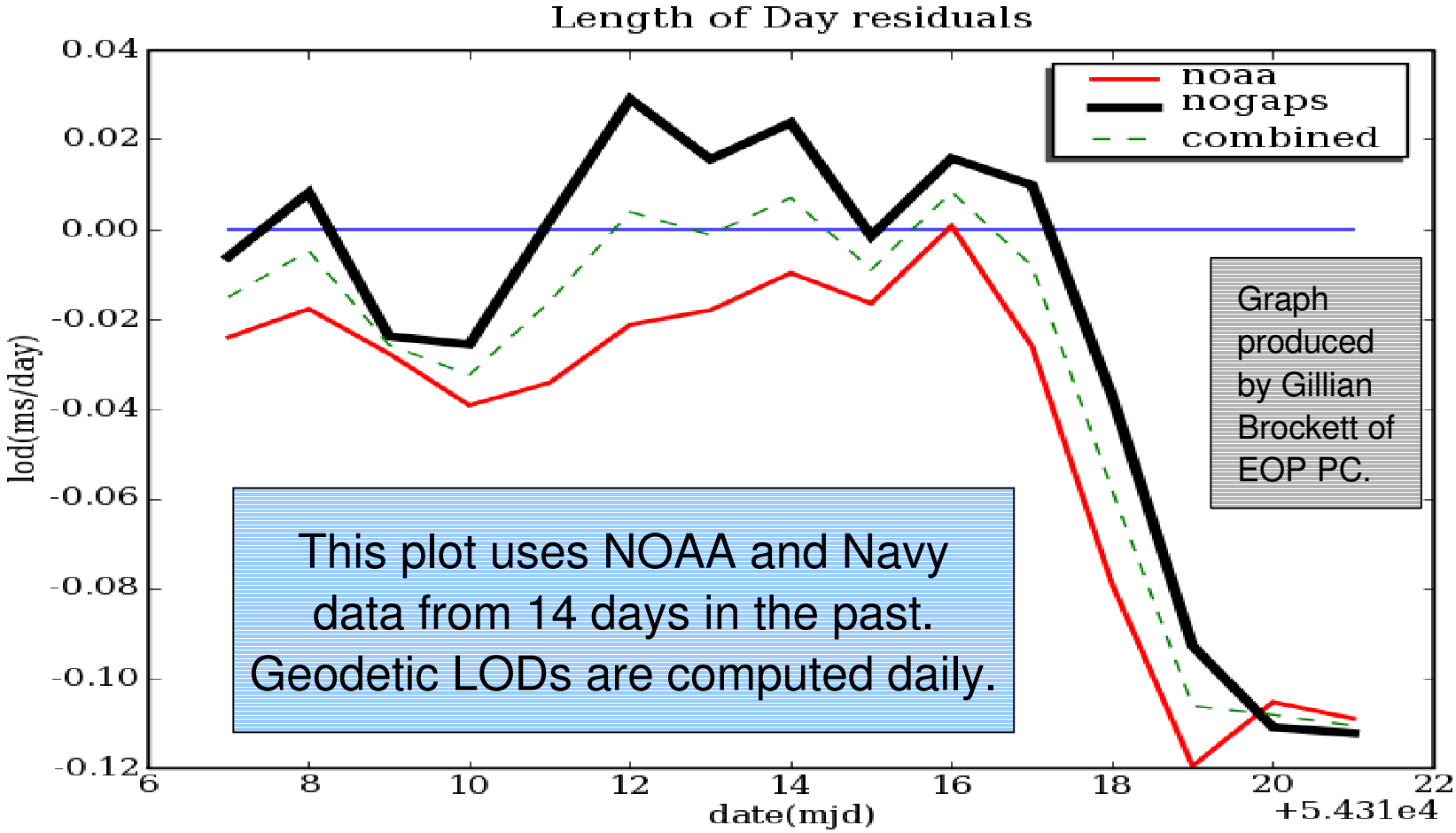
Create estimates of Navy data if possible. De-weight Navy data.

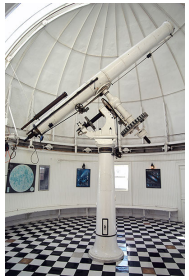
Combine weighted NOAA and Navy data to generate LOD estimates for predictions



AAM Diagnostics:

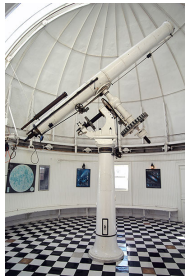
Comparison of AAM Observed with Geodetic LODs





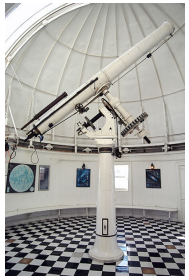
Interface with Users

- Initial updates to web pages
  - Archive notes
- More extensive dialogue with contributors
- Off-site backup computer for serving data
  - Working on expanding capability of off-site facility

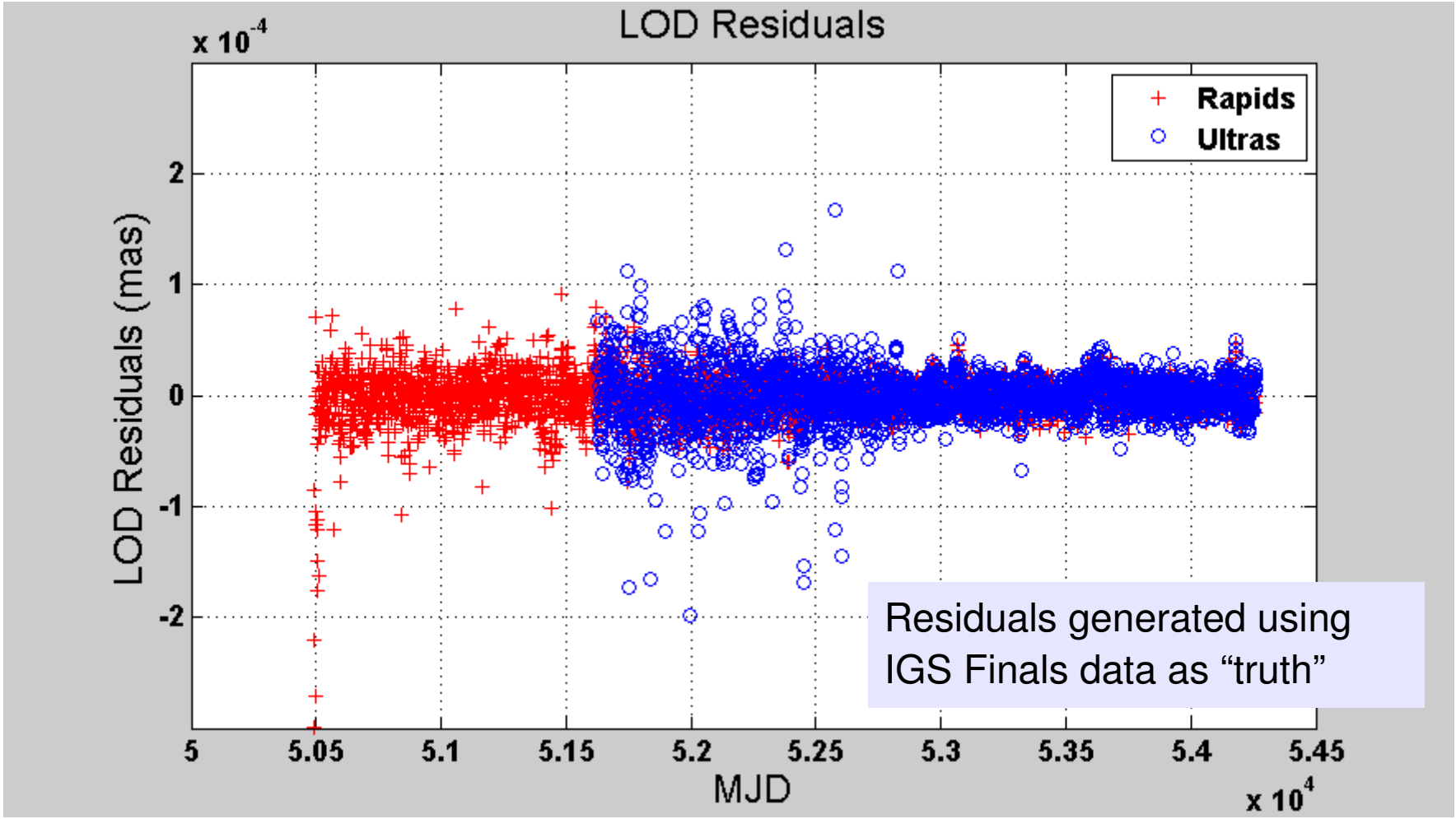


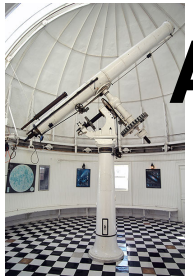
Future Directions

- Further AAM diagnostics
- Improved off-site capability



Appendix: LOD Residuals Comparing Extrapolated Rapids and Ultras





Appendix: Determination of UT1 from AAM data