



IRAC 2nd Workshop on High Precision Time Series Photometry: Getting the Most out of Exoplanet and Brown Dwarf Light Curves – Current Repeatability Results

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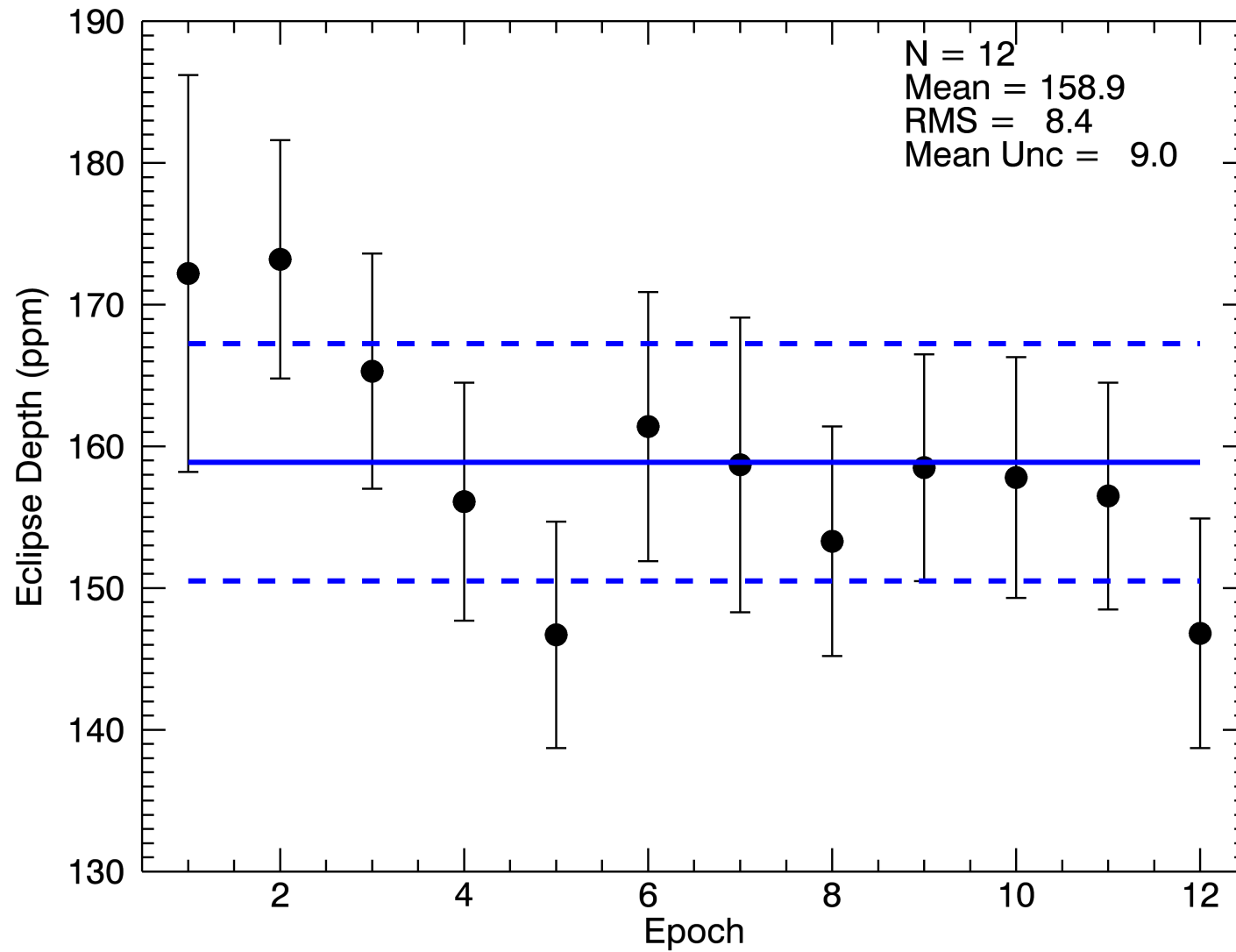
Current Results

- Warm mission only
 - Data taken using current best practices (PCRS pickup/sweetspot position)
- Multiple measurements of eclipse or transit in a single channel
 - Avoid mixing of different instrumental effects
- Compare rms scatter of measurements to mean uncertainty in measurement of eclipse/transit depth
- Modern reduction techniques used (Pixel Map, BLISS mapping, Gaussian Processes, MCMC to estimate uncertainties)
- Used literature results!!!

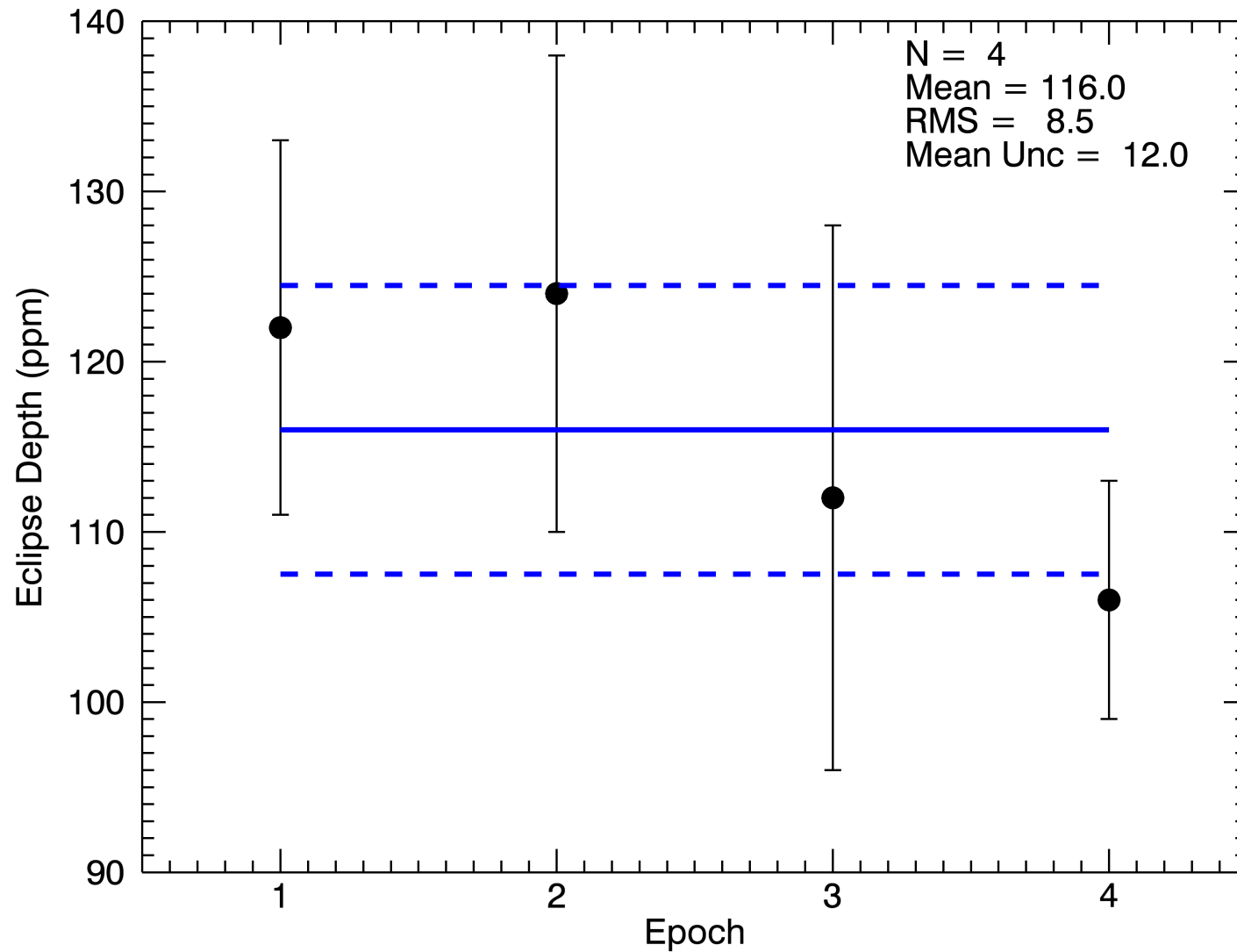
Repeatability in Literature

Name	λ	Type	N	RMS	σ	RMS/ σ	Ref
XO-3b	4.5	Eclipse	12	8.4	9.0	0.93	Wong et al. (2014)
HD209458b	3.6	Eclipse	4	8.5	12	0.71	Evans et al. (2015)
GJ1214b	4.5	Transit	14	233	150	1.56	Fraine et al. (2014)
HAT-P-2b	4.5	Eclipse	14	96	74	1.30	de Wit et al. (in prep)
55 Cnc e	4.5	Eclipse	8	68	47	1.44	Demory et al. (2015)

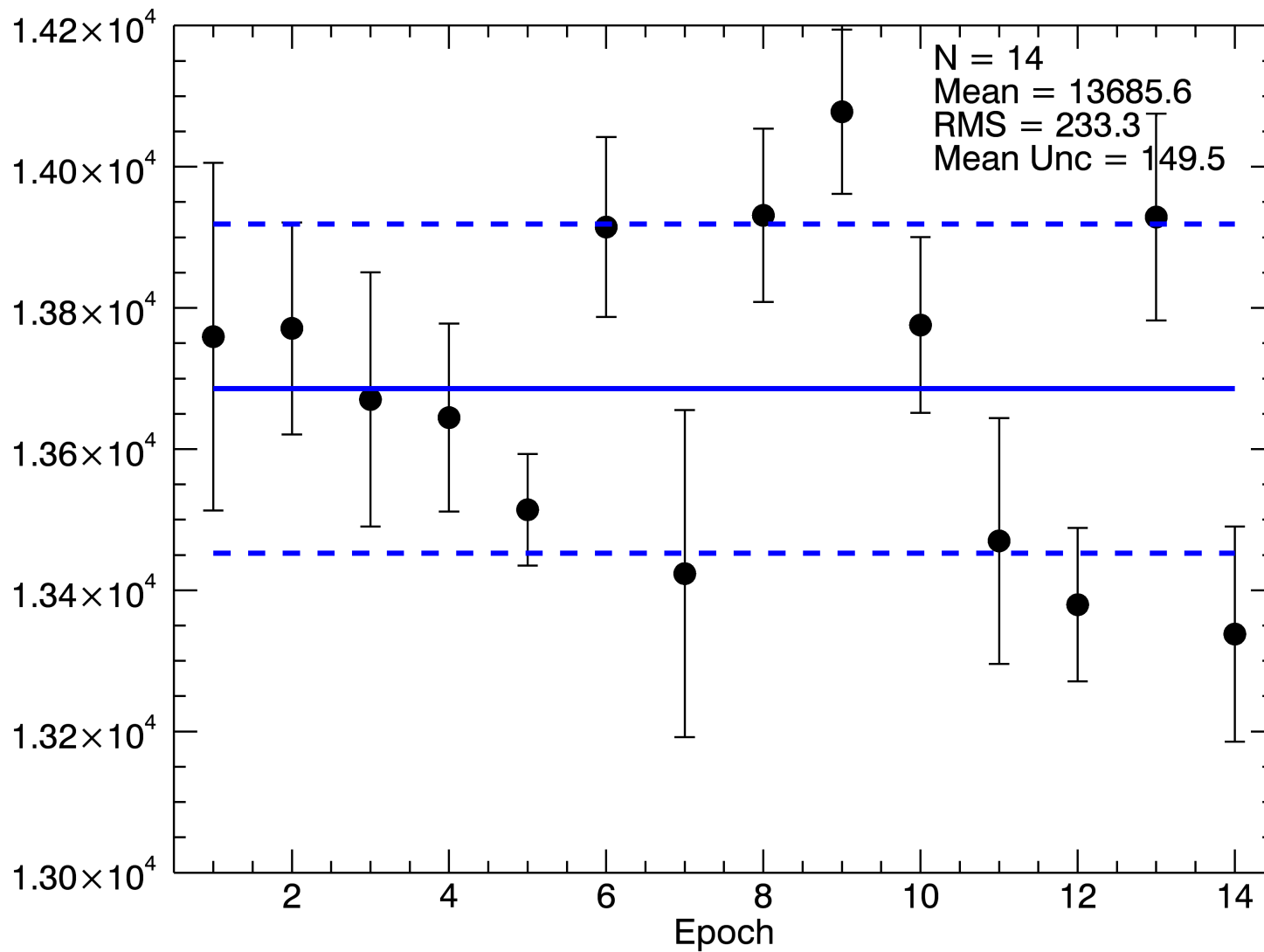
XO-3b 4.5 microns [Wong et al. (2014)]



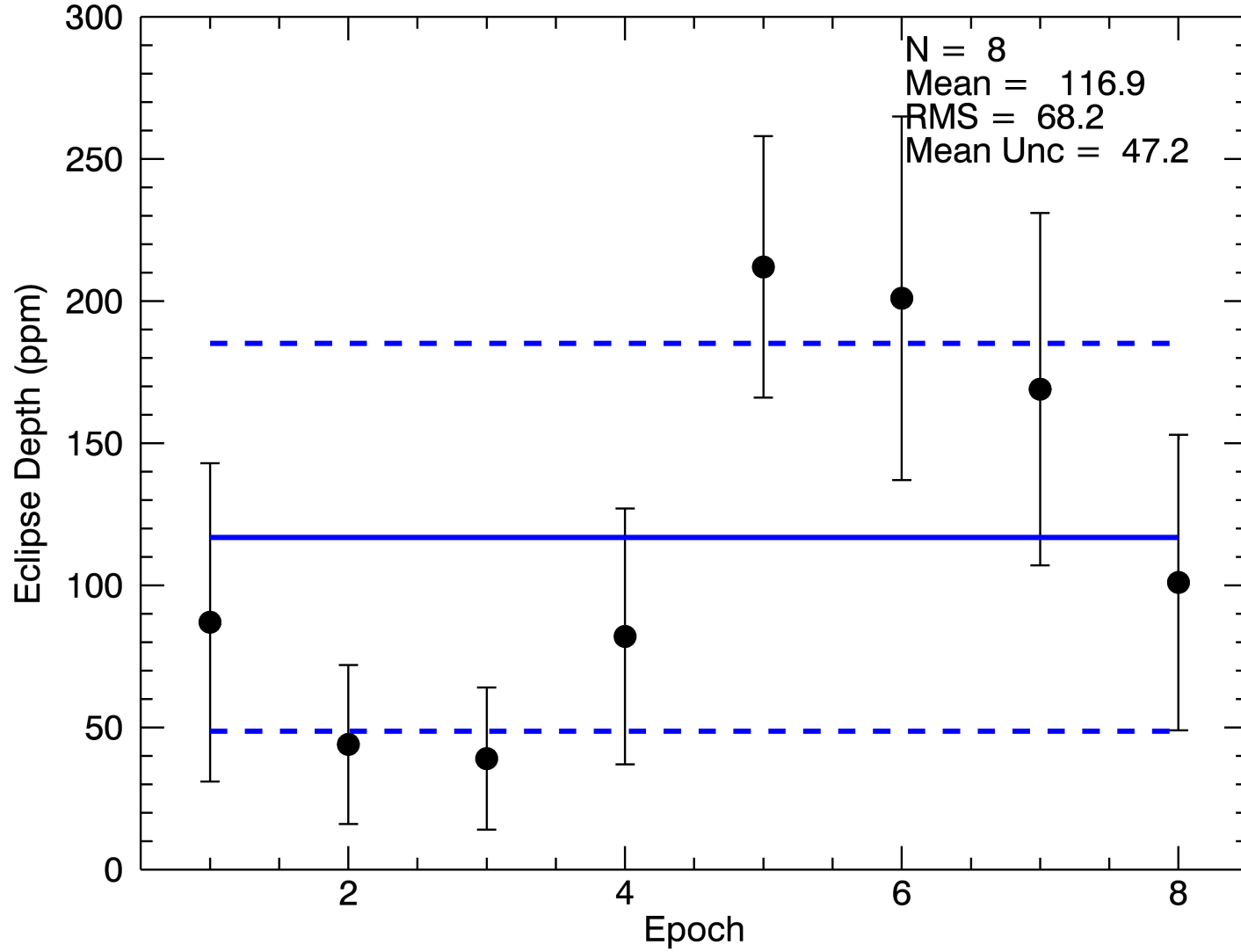
HD209458b 3.6 microns [Evans et al. (2015)]



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55 Cnc e 4.5 microns [Demory et al. (2015)]



Additional data coming

- GJ3470b: 10 eclipses at 4.5 μm
- HD 97658b: 4 transits each at 3.6 and 4.5 μm
- HAT-P-26b: 5 eclipses each at 3.6 and 4.5 μm

- Questions:
 - How much data do we need?
 - Do we create a monitoring calibration observation?

Summary

- Repeatability of warm data looks pretty good
- More tests at 3.6 μm would be great
- Modern reduction techniques produce uncertainty estimates that are consistent with measurement scatter
- Astrophysical contribution to scatter is certainly present
- Broad conclusions of Hansen et al. (2014) are not supported

- Can we do a joint analysis for systematics?
- Is there benefit for uniform analysis of current data?