

KIC 002304320

Q1-17 DR25 TCE Parameters

| TCE | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES | SNR | R_{\star} (R_{\odot}) | T_{\star} (K) | R_p (R_{\oplus}) | S_p (S_{\oplus}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 002304320-01 | OBS | 2033.01 | 16.540812 | 133.952016 | 366.7 | 2.715 | 27.8 | 30.8 | 0.77 | 5064 | 1.76 | 24.93 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 002304320-01 | OBS | PC | 1.00 | 0 | 0 | 0 | 0 | NO_COMMENT |

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

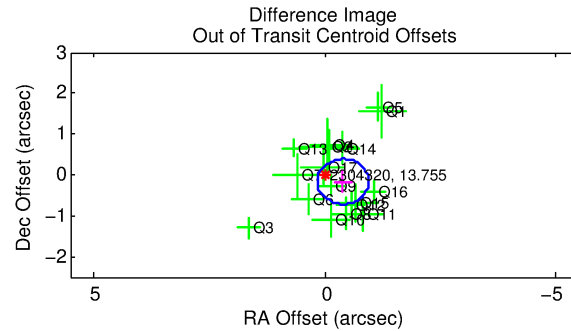
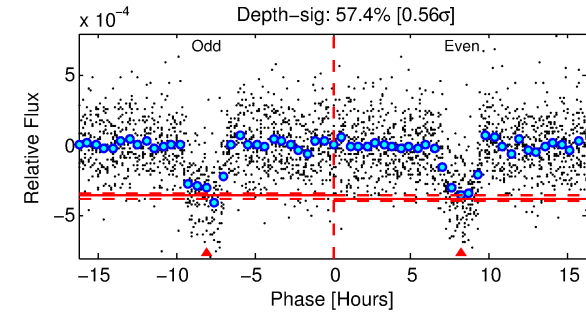
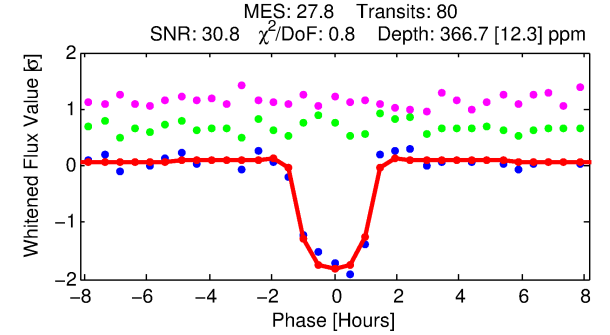
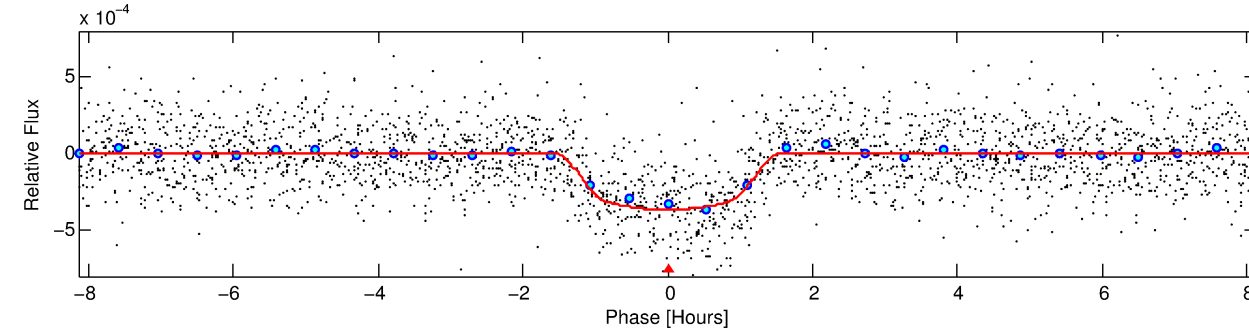
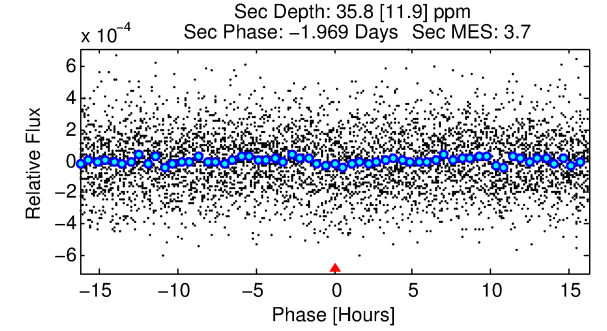
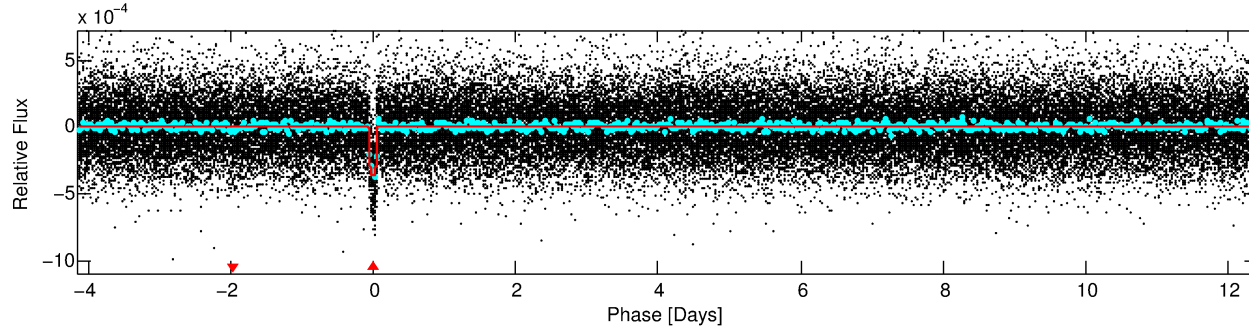
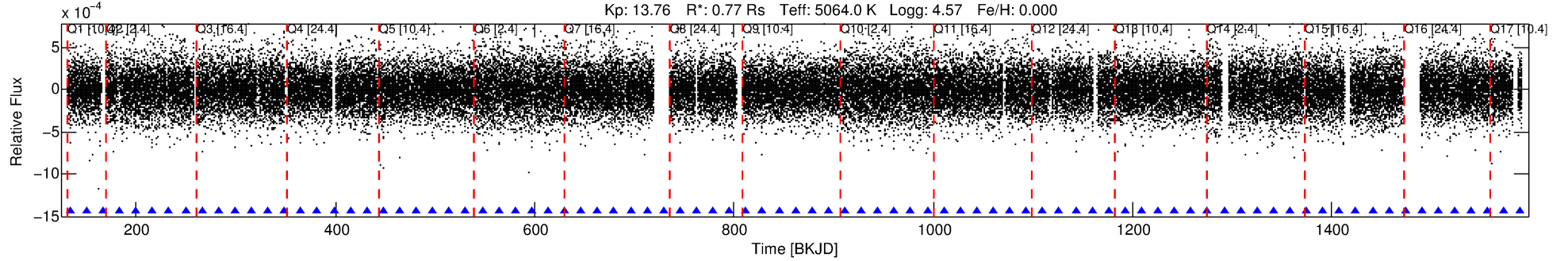
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002304320-01

No Significant Match Found

DV One-Page Summary

KIC: 2304320 Candidate: 1 of 1 Period: 16.541 d
KOI: K02033.01 Corr: 0.968



DV Fit Results:

Period = 16.54081 [0.00004] d
Epoch = 133.9520 [0.0022] BKJD
Rp/R* = 0.0210 [0.0047]
a/R* = 23.73 [20.95]
b = 0.88 [0.22]
Seff = 24.93 [2.91]
Teff = 570 [17] K
Rp = 1.76 [0.41] Re
a = 0.1182 [0.0066] AU
Ag = 88.68 [50.35] [1.74σ]
Teffp = 2703 [383] K [5.56σ]

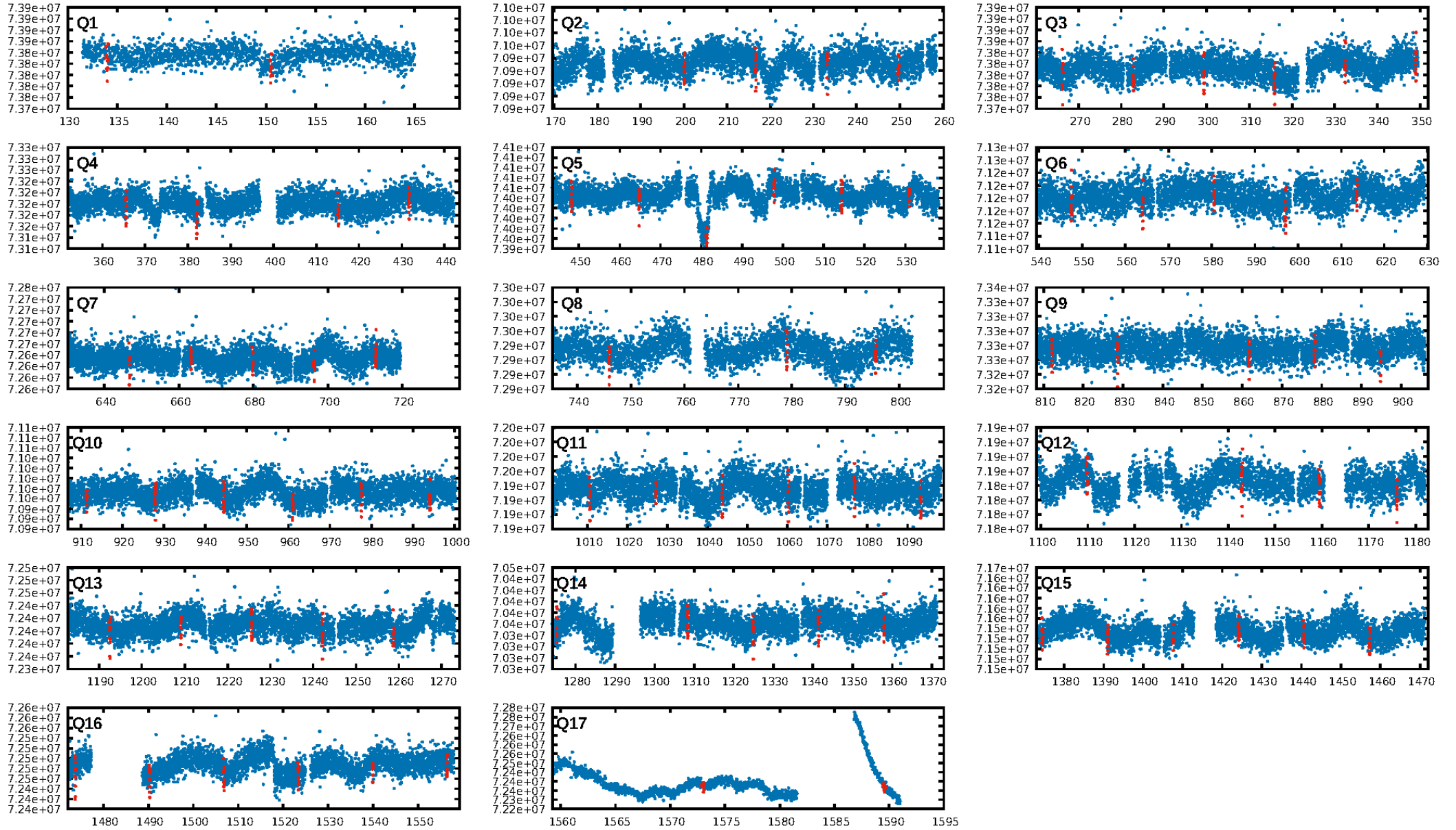
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 98.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.39e-167
RollingBand-fgt: 1.00 [76/76]
GhostDiagnostic-chr: 3.674
Centroid-sig: 0.0%
Centroid-so: 1.090 arcsec [2.44σ]
OotOffset-rm: 0.428 arcsec [2.32σ]
KicOffset-rm: 0.472 arcsec [2.39σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

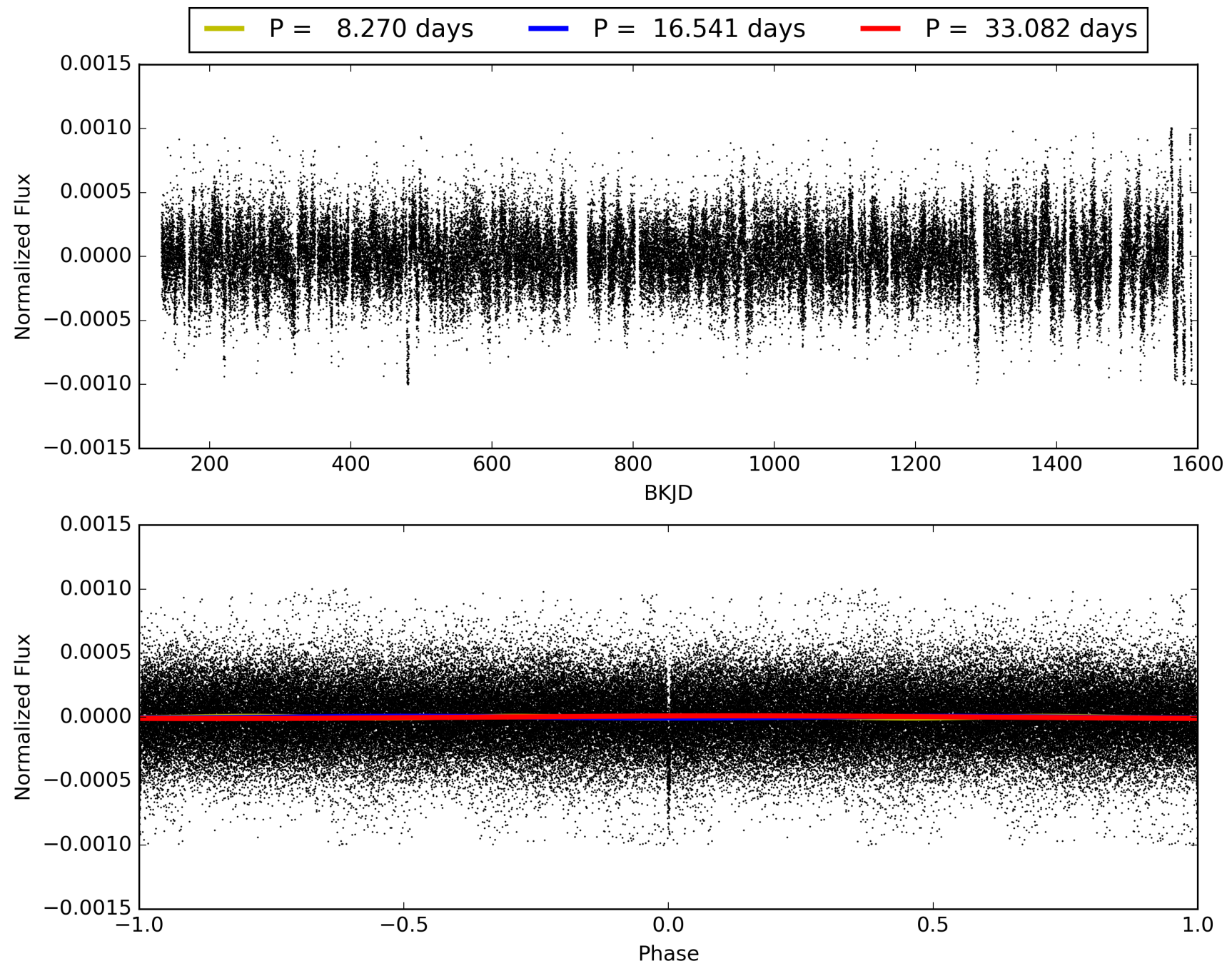
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:23:50 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 002304320-01, PDC Light Curves

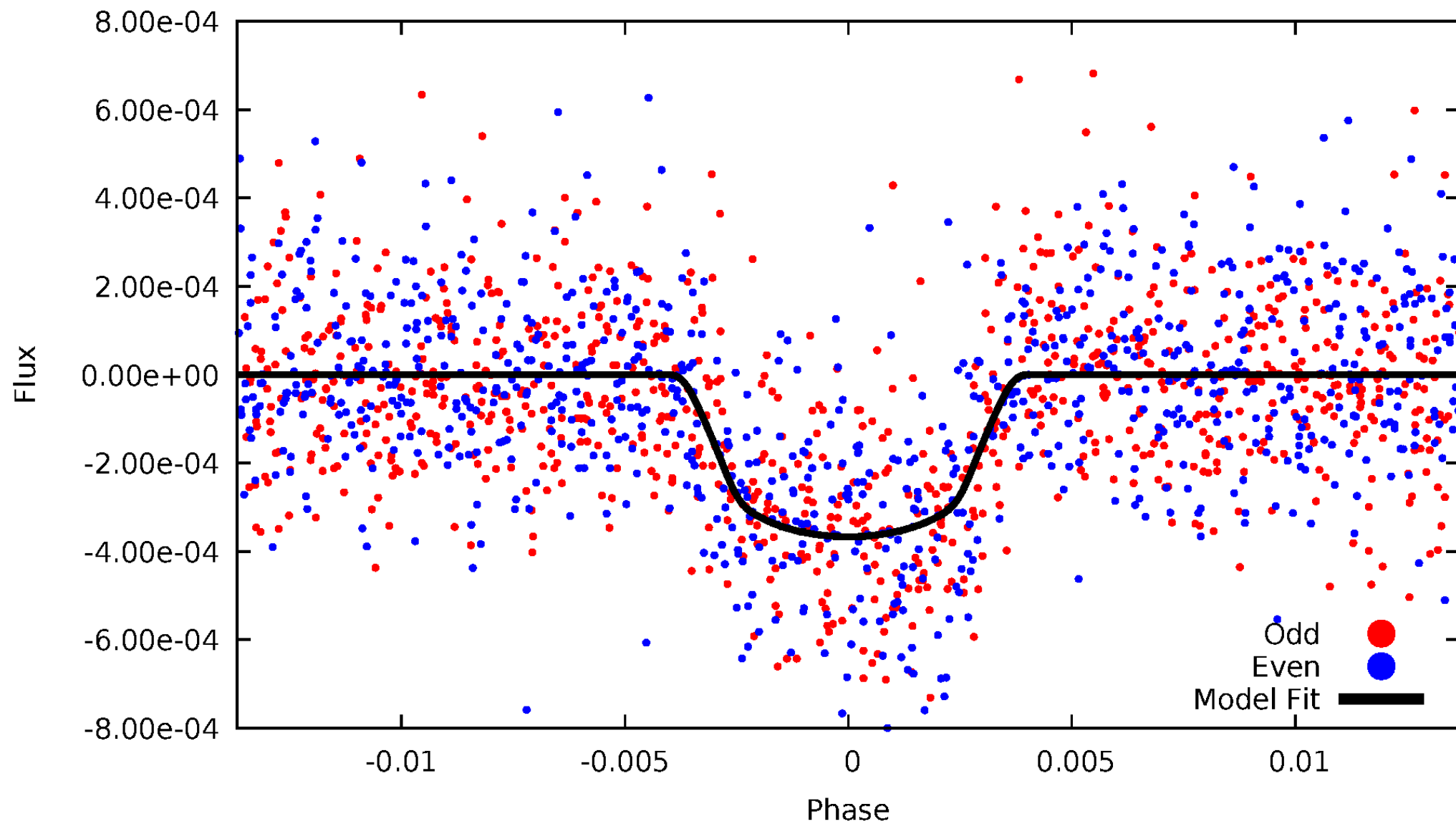


TCE 002304320-01



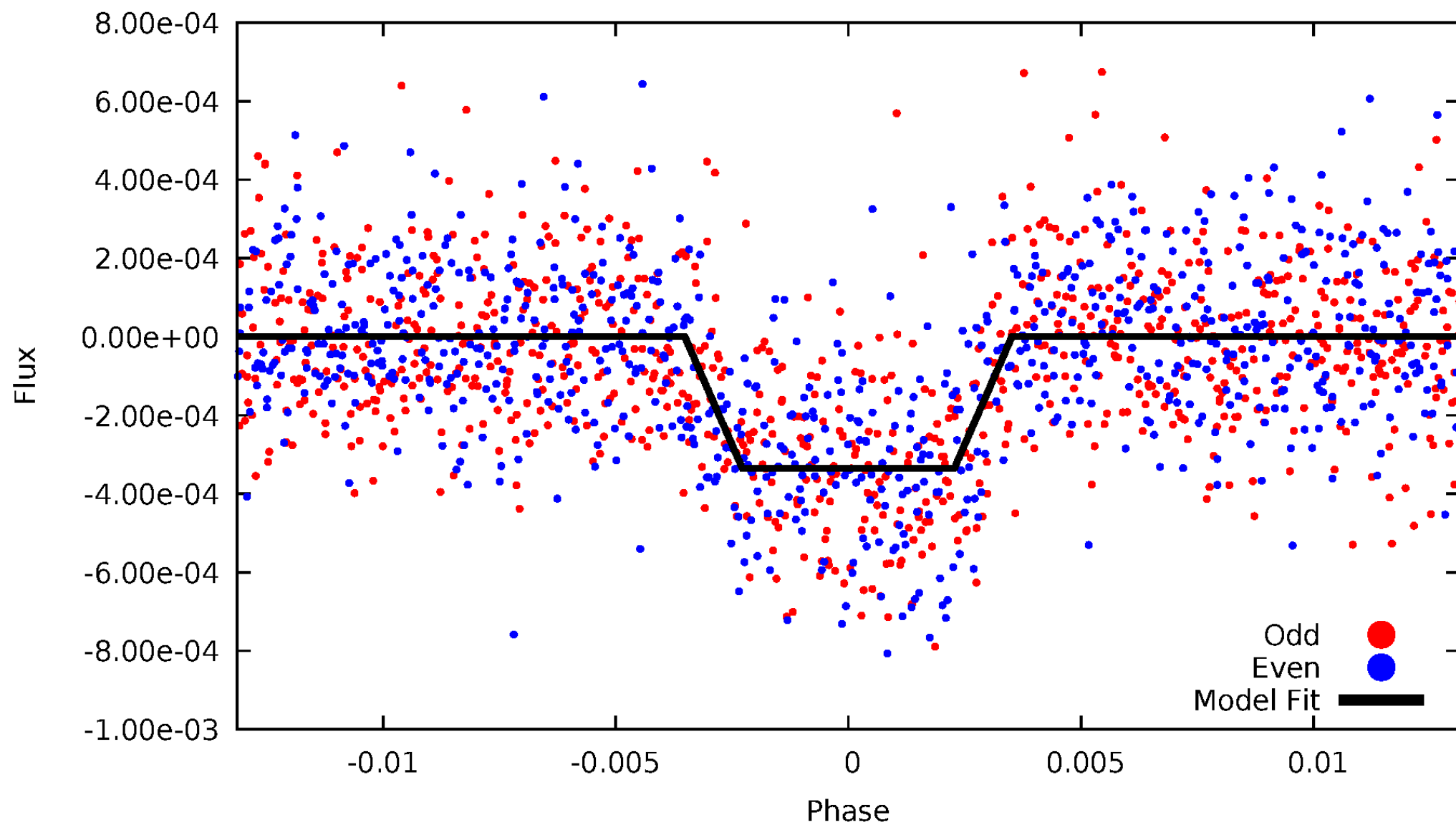
DV Odd/Even

TCE 002304320-01

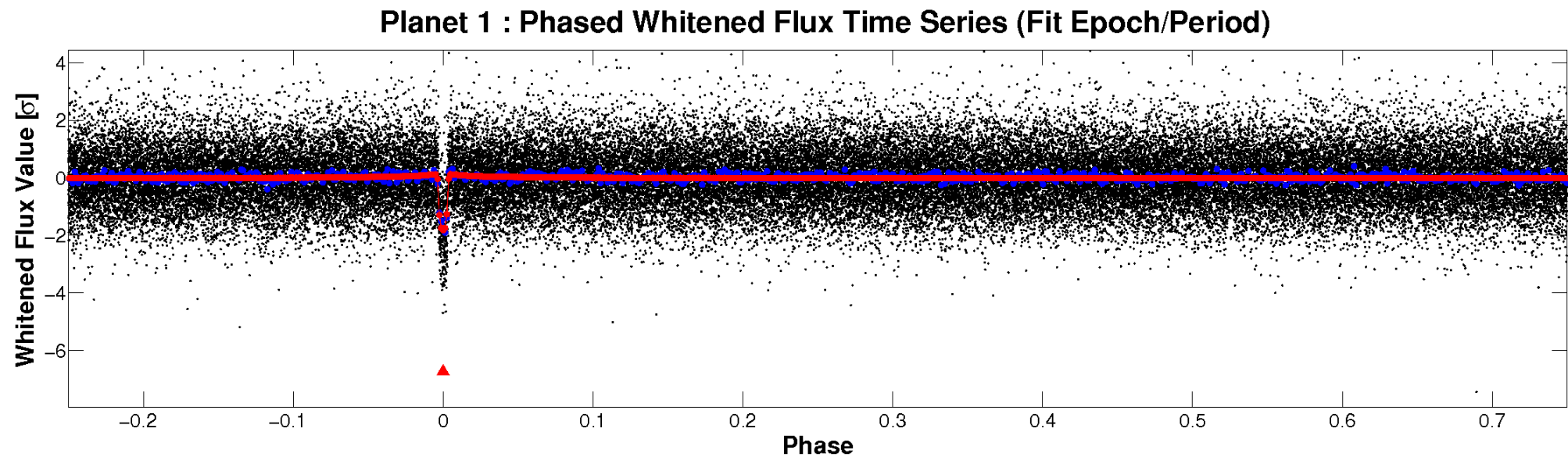
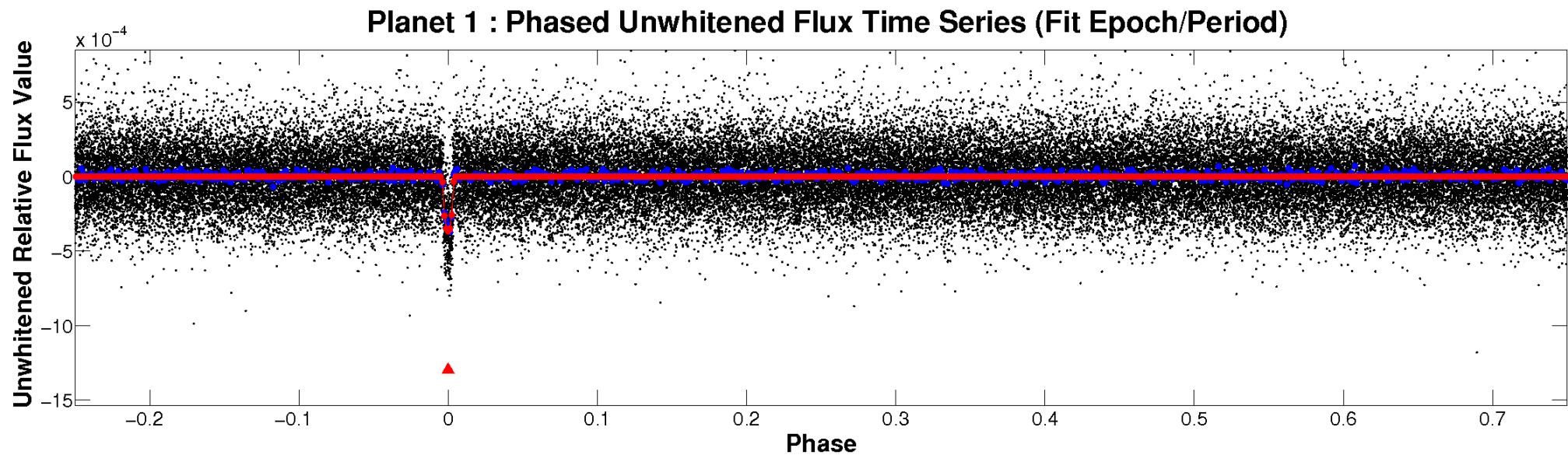


ALT Odd/Even

TCE 002304320-01

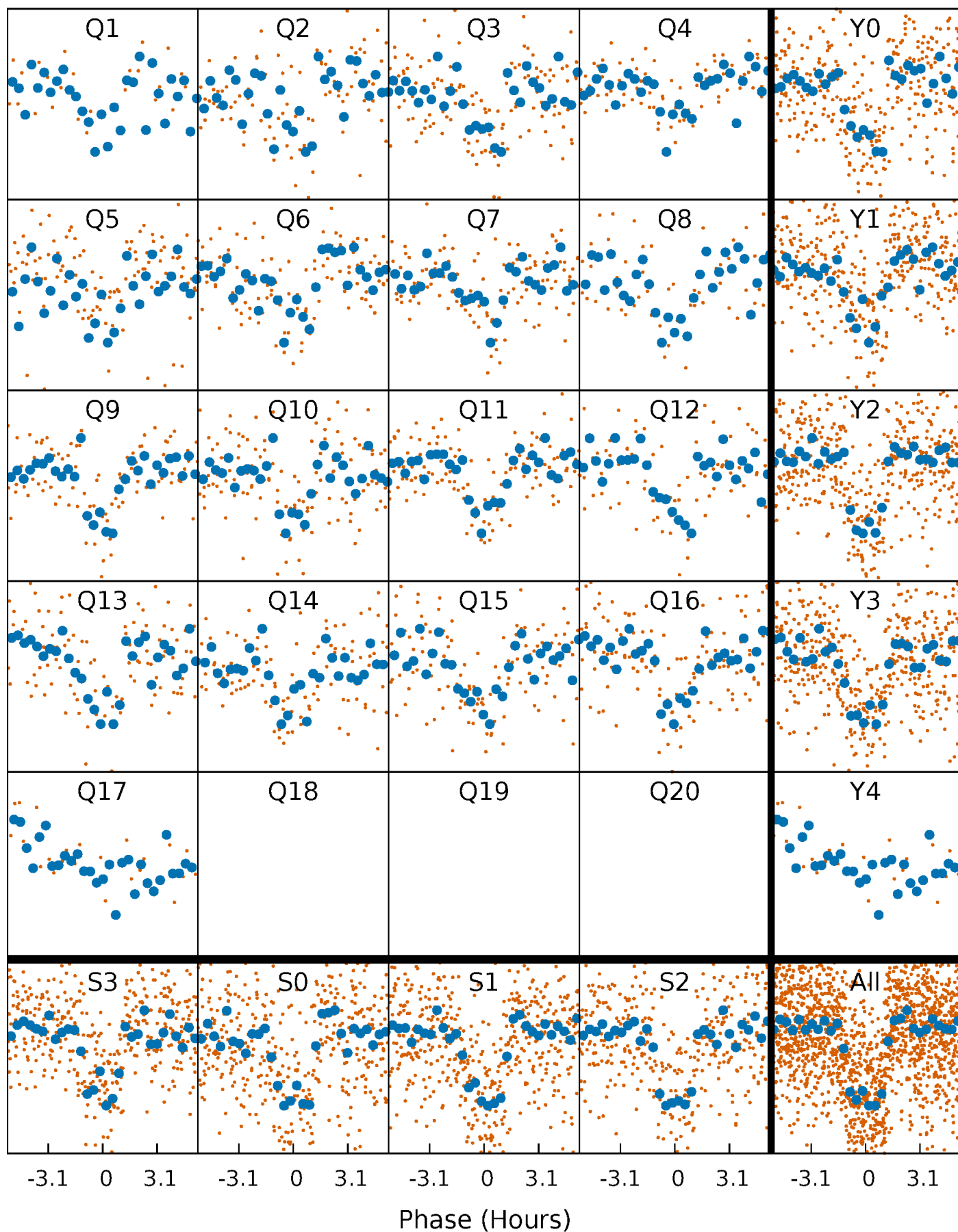


Non-Whitened Vs. Whitened Light Curve



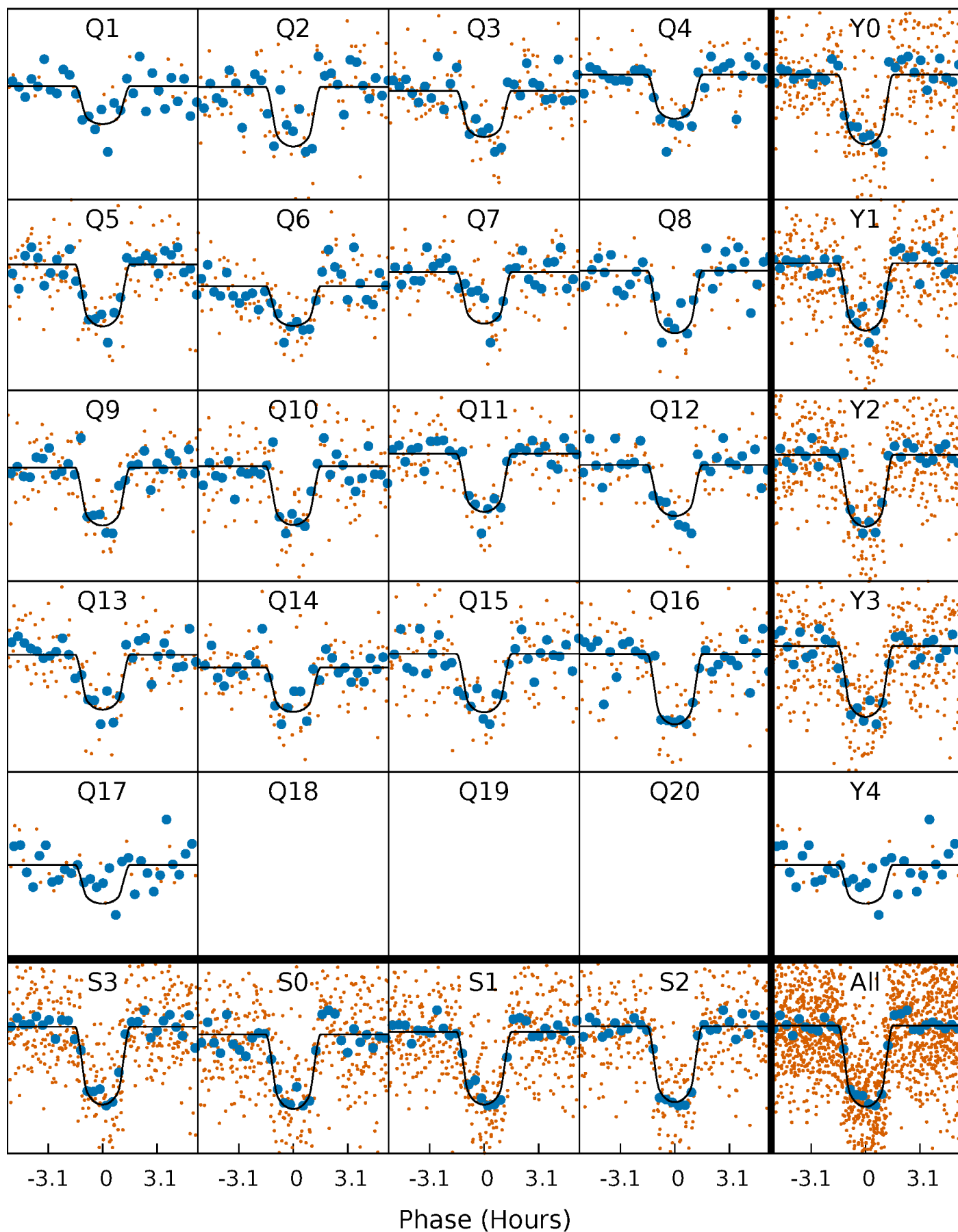
PDC Quarter-Phased Transit Curves

TCE 002304320-01 P= 16.540812 Days $T_0=133.952016$ (BKJD)



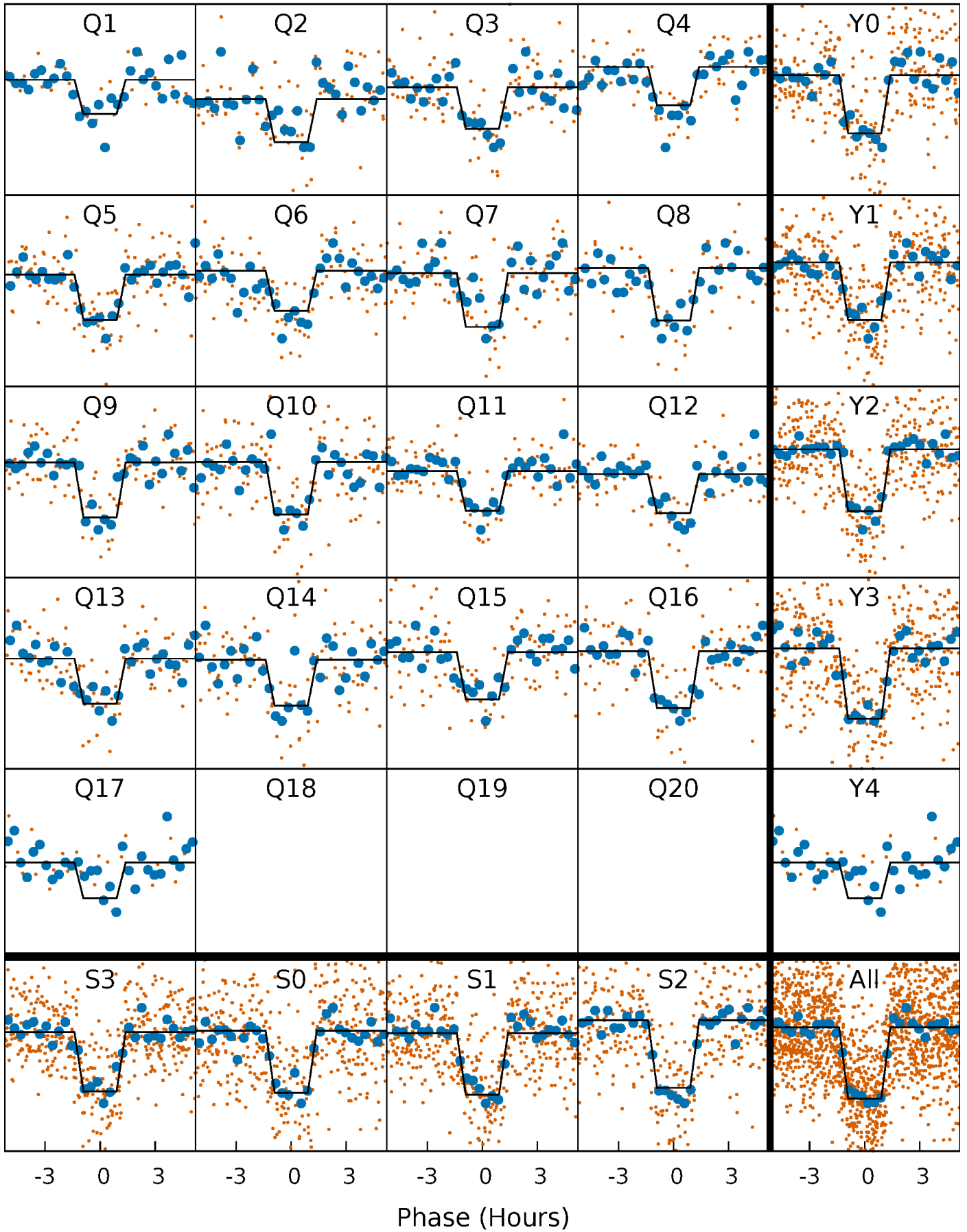
DV Quarter-Phased Transit Curves

TCE 002304320-01 P= 16.540812 Days $T_0=133.952016$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

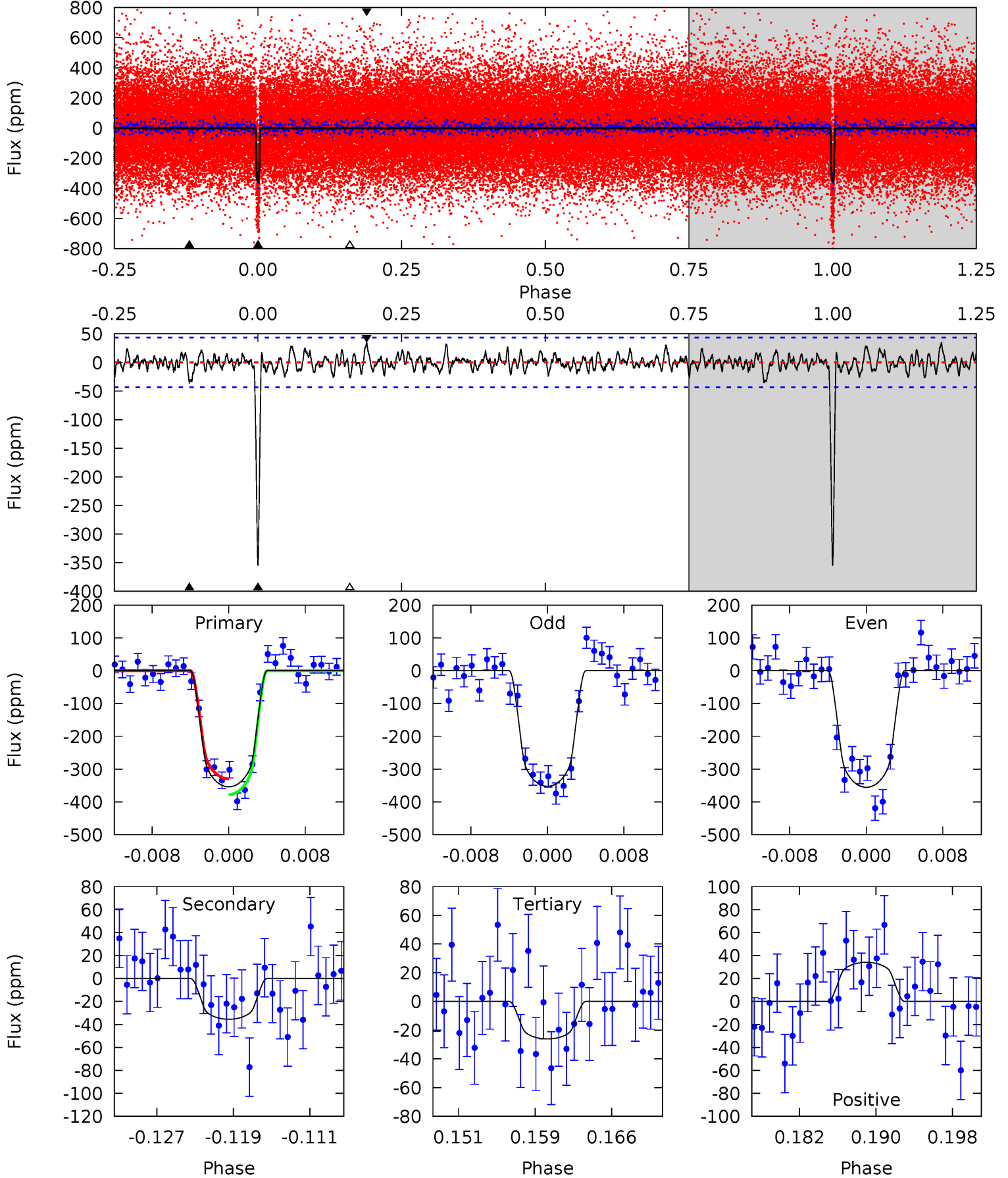
TCE 002304320-01 P= 16.540787 Days $T_0=133.953073$ (BKJD)



DV Model-Shift Uniqueness Test

002304320-01, P = 16.540812 Days, E = 117.411204 Days

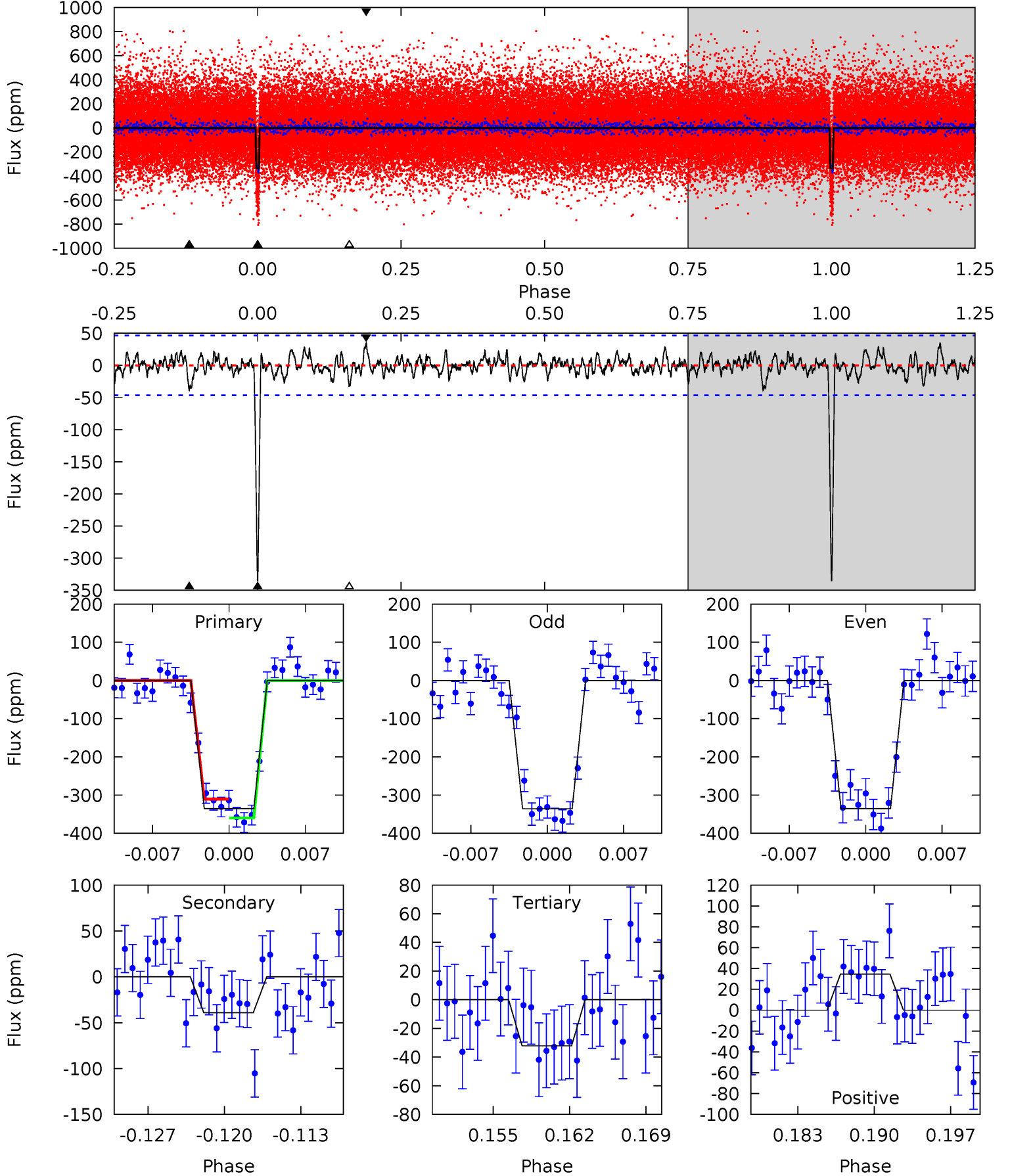
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 41.3 | 4.14 | 3.05 | 3.98 | 5.07 | 2.66 | 1.18 | 38.3 | 37.4 | 1.09 | 0.16 | 0.18 | 0.96 | 0.09 | 2.82 |



Alt Model-Shift Uniqueness Test

002304320-01, $P = 16.540787$ Days, $E = 117.412286$ Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 36.8 | 4.29 | 3.52 | 3.79 | 5.09 | 2.70 | 1.13 | 33.3 | 33.0 | 0.77 | 0.50 | 0.03 | 0.98 | 0.09 | 2.71 |



Stellar Parameters For KIC 002304320

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | R (R_{\odot}) | M (M_{\odot}) | p_{\star} ($\text{g}\cdot\text{cm}^{-3}$) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------------------------------|
| | 5064^{+101}_{-101} | $4.572^{+0.028}_{-0.048}$ | $0.000^{+0.150}_{-0.150}$ | $0.769^{+0.049}_{-0.038}$ | $0.806^{+0.040}_{-0.045}$ | $2.491^{+0.292}_{-0.382}$ |
| | +2%/-2% | +1%/-1% | +inf%/-inf% | +6%/-5% | +5%/-6% | +12%/-15% |
| Source | SPE57 | SPE57 | SPE57 | DSEP | | |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 002304320-01 / KOI 2033.01

| Detrend | Depth (ppm) | R_p (R_{\oplus}) | T_{max} (K) | T_{obs} (K) | A_{obs} |
|---------|-------------|------------------------|----------------------|----------------------|--------------------|
| DV | -35 ± 9 | $1.75^{+0.40}_{-0.40}$ | 798^{+19}_{-20} | 3238^{+306}_{-217} | 88^{+67}_{-33} |
| Alt. | -39 ± 9 | $1.55^{+0.40}_{-0.39}$ | 800^{+21}_{-20} | 3438^{+345}_{-282} | 125^{+107}_{-51} |

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

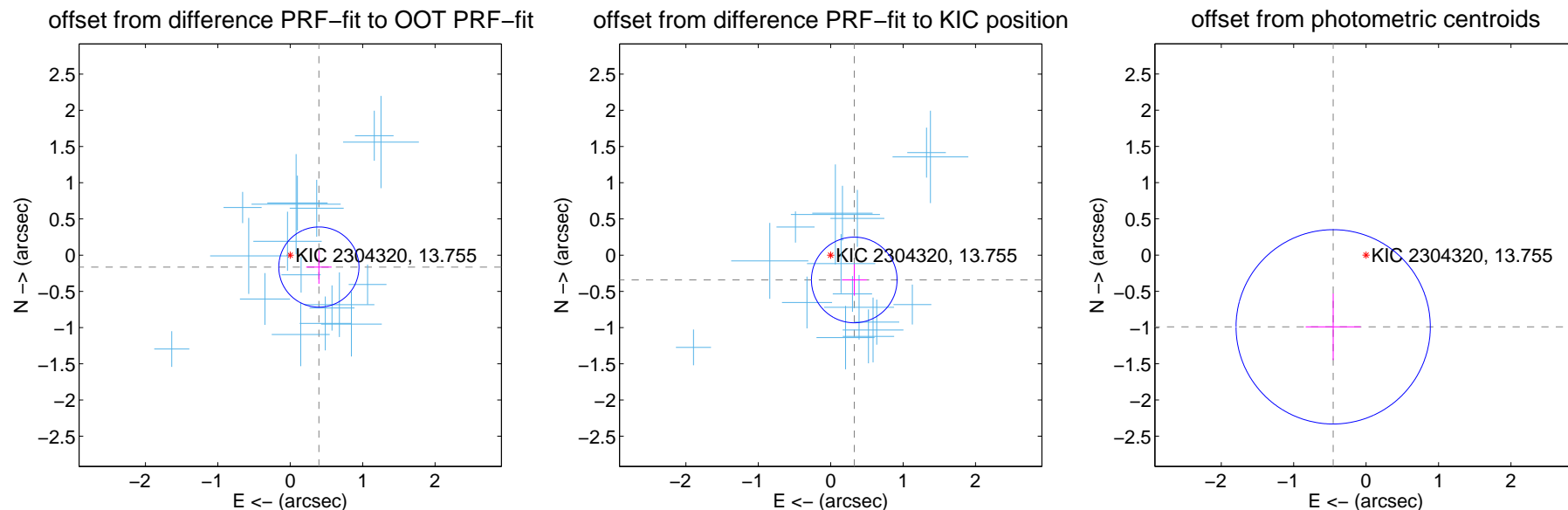
DV Centroid Data

Supplemental centroid analysis for 002304320-01. Kepler magnitude: 13.76. Transit SNR 30.83

There are 17 quarters with good PRF difference image offsets

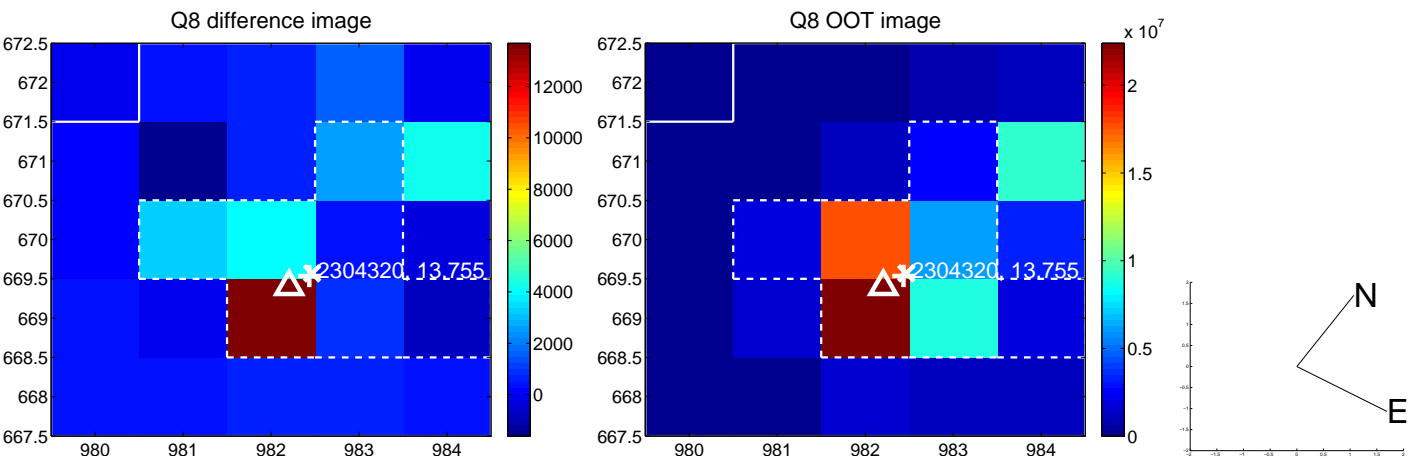
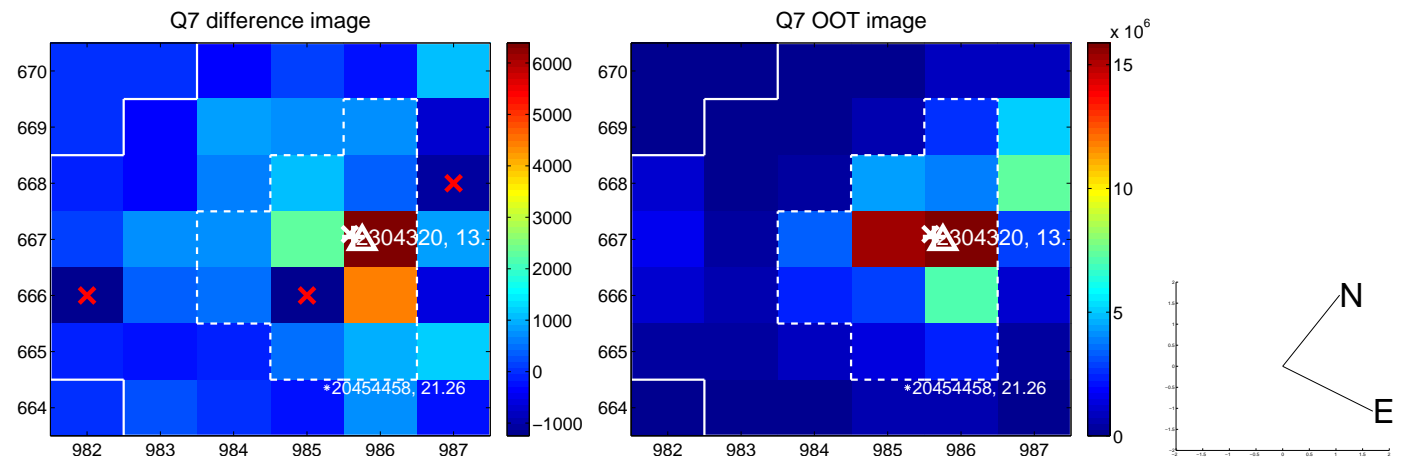
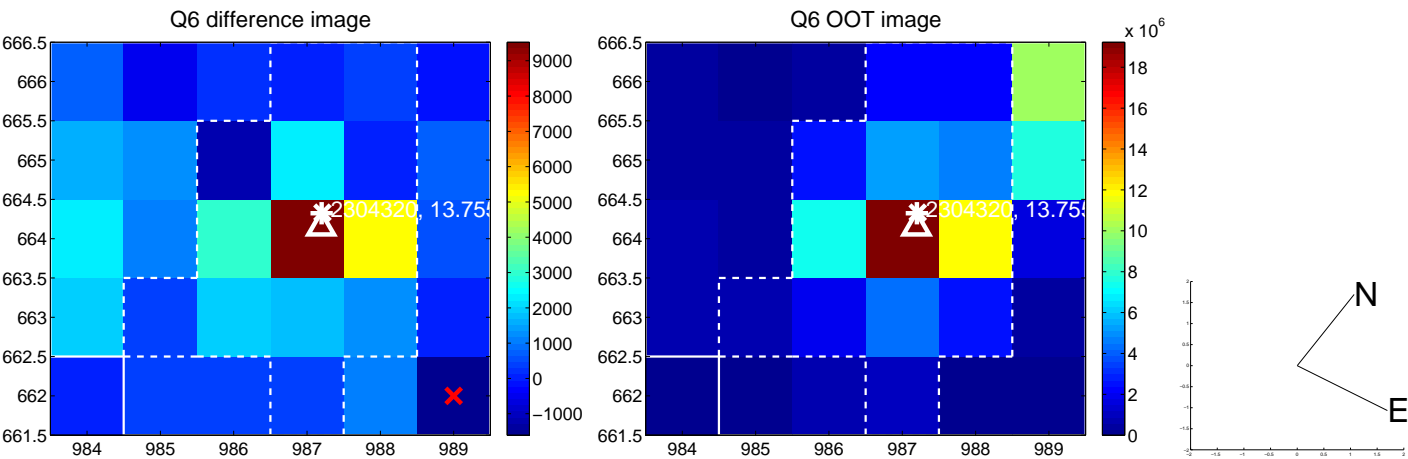
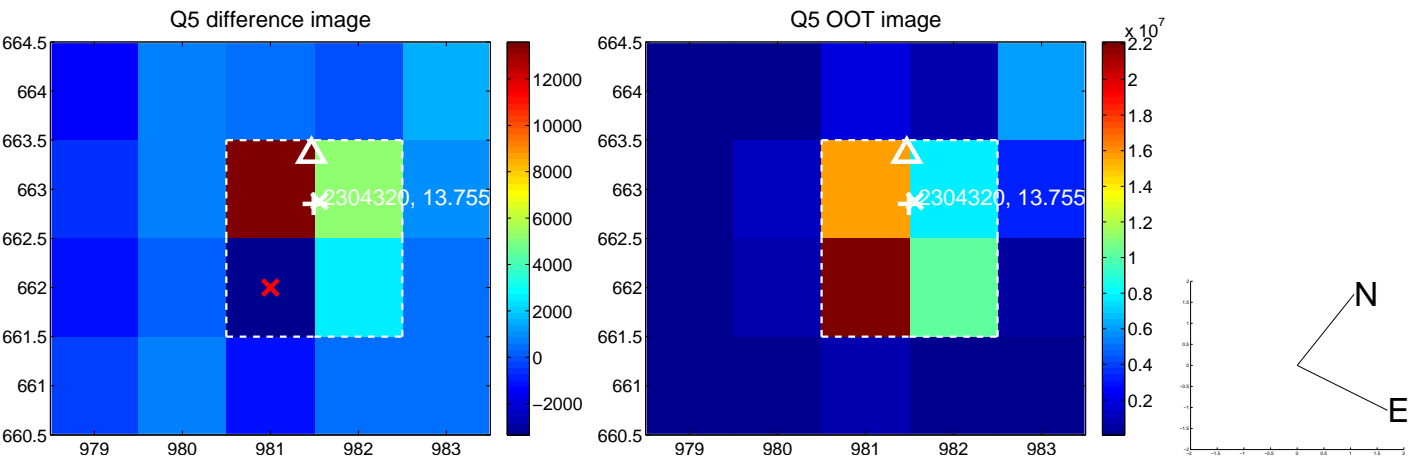
The direct PRF centroid is offset from the target star catalog position by about 0.36 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|-----------------------------------------|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT | 0.428 ± 0.185 | 2.32 | -0.395 ± 0.175 | -0.164 ± 0.231 |
| PRF-fit source offset from KIC position | 0.472 ± 0.197 | 2.39 | -0.325 ± 0.171 | -0.342 ± 0.218 |
| photometric centroid source offset | 1.09 ± 0.45 | 2.44 | 0.45 ± 0.38 | -0.99 ± 0.46 |

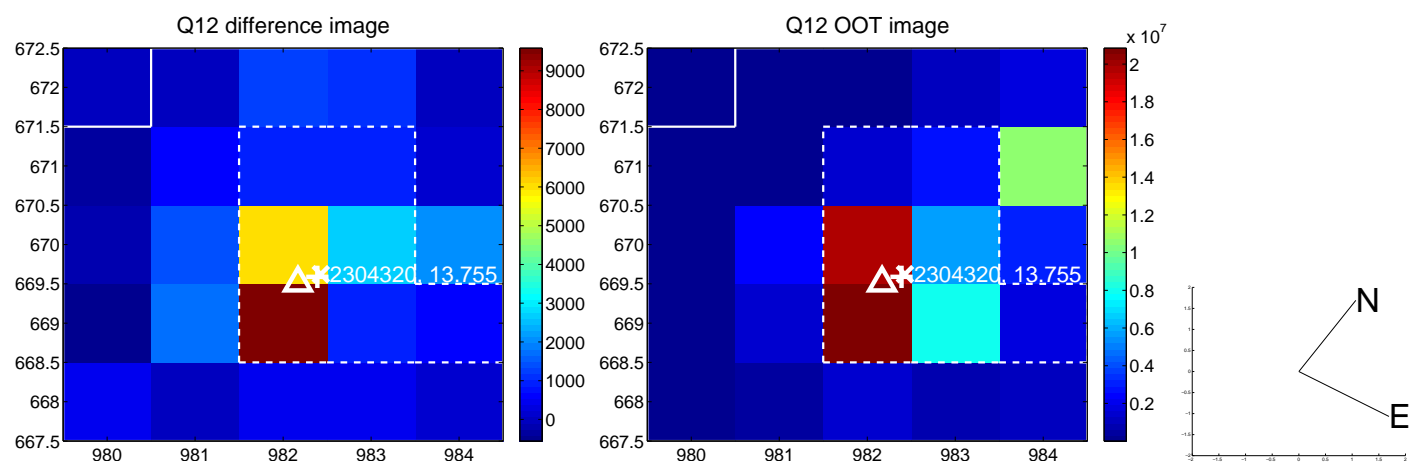
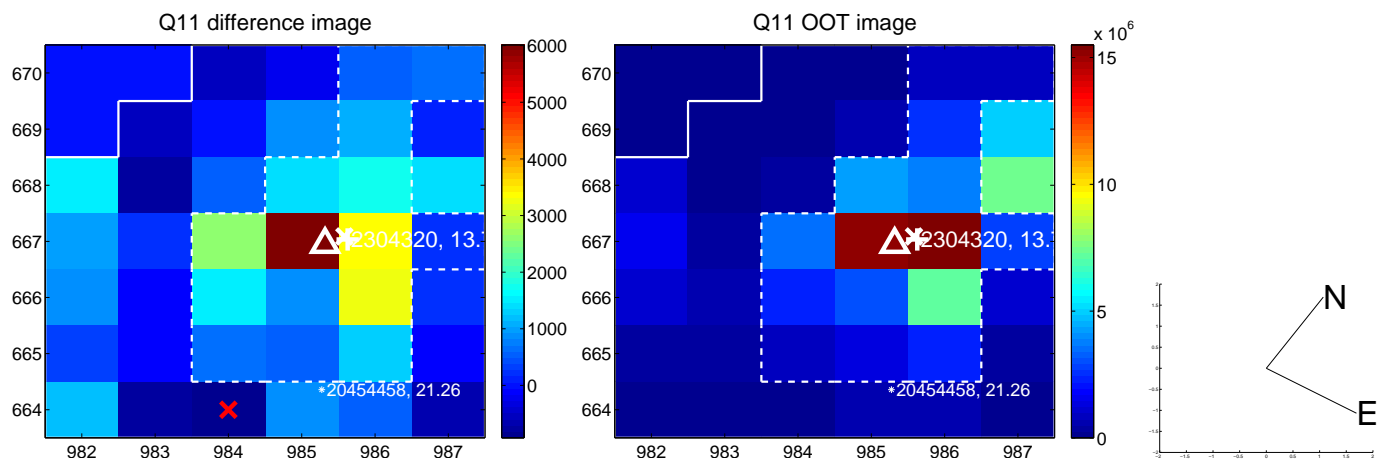
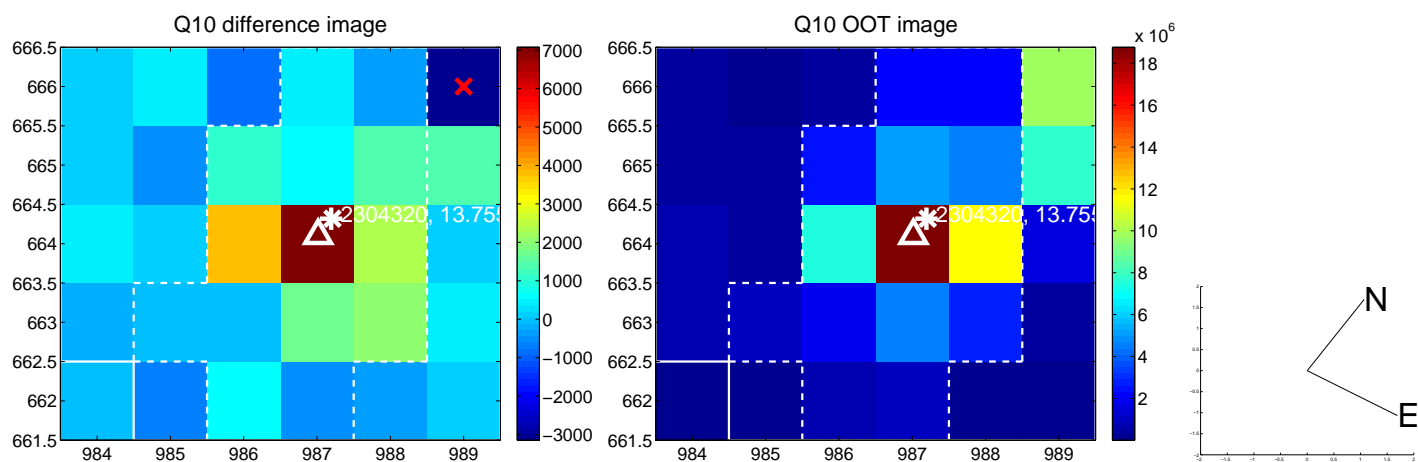
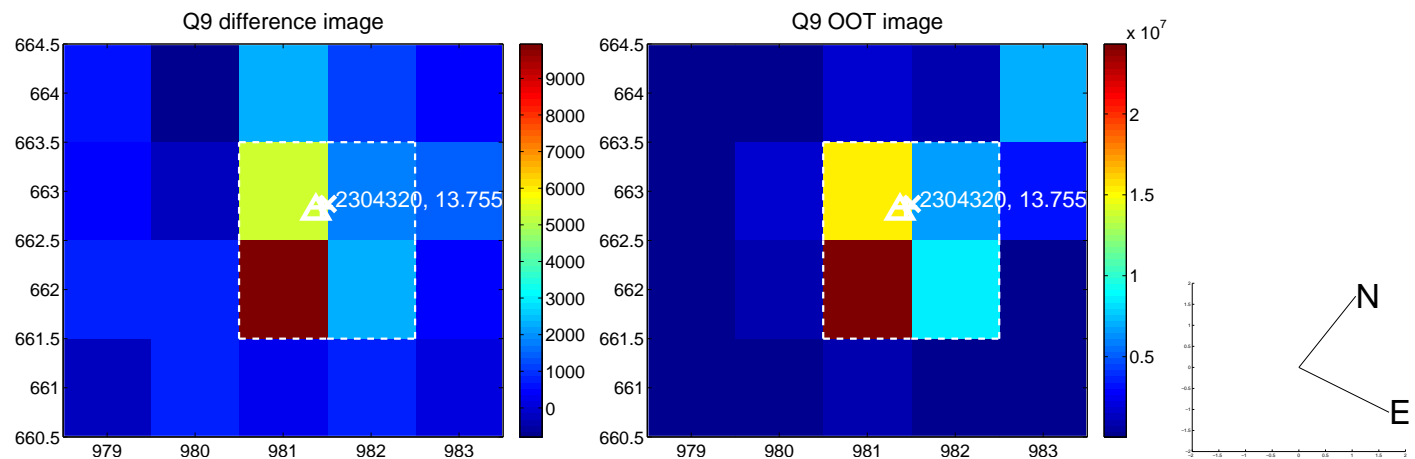


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

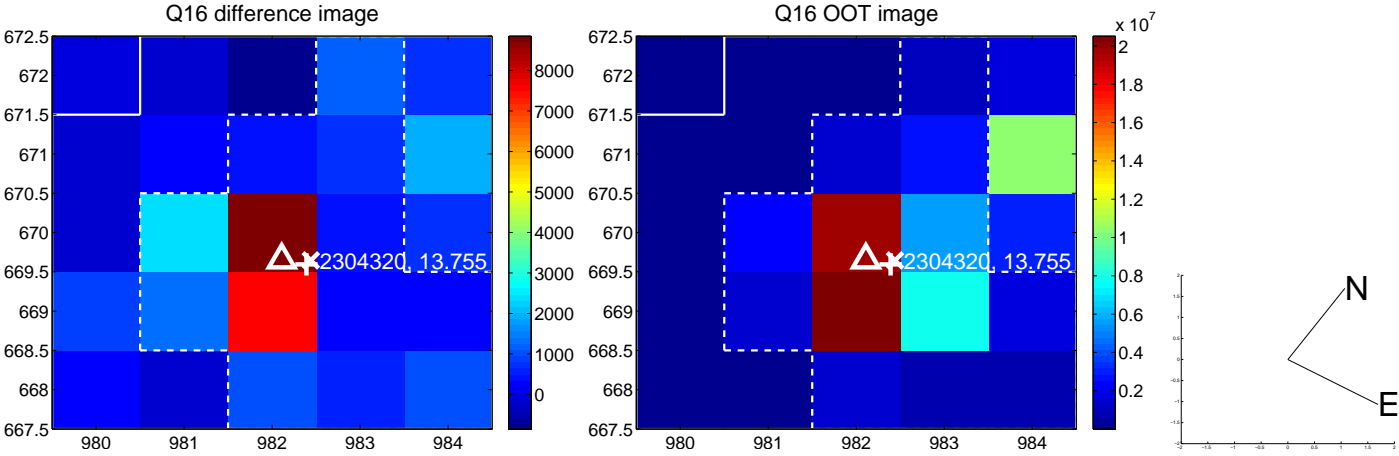
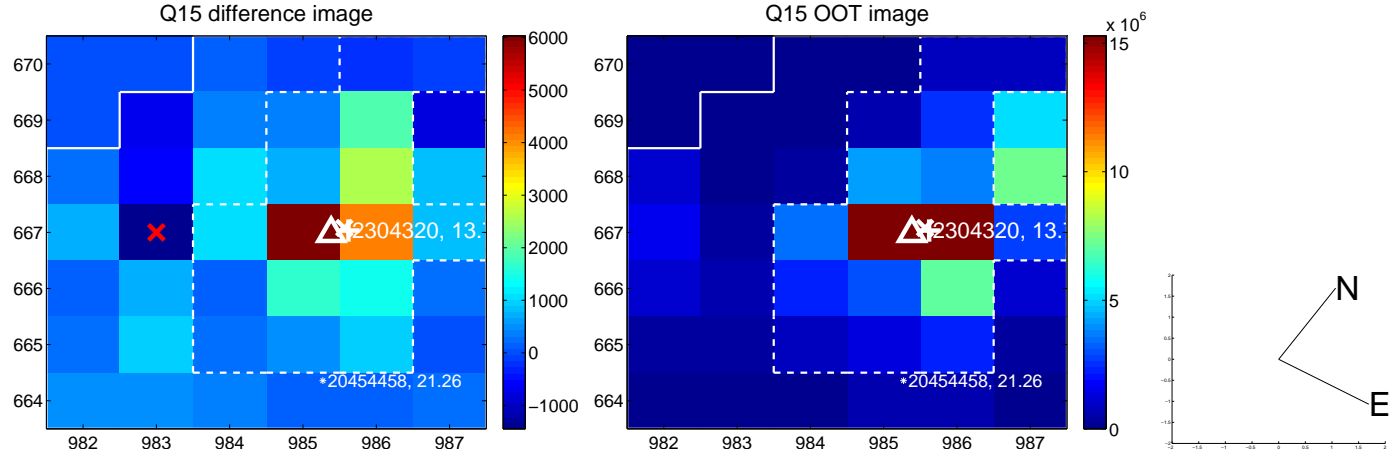
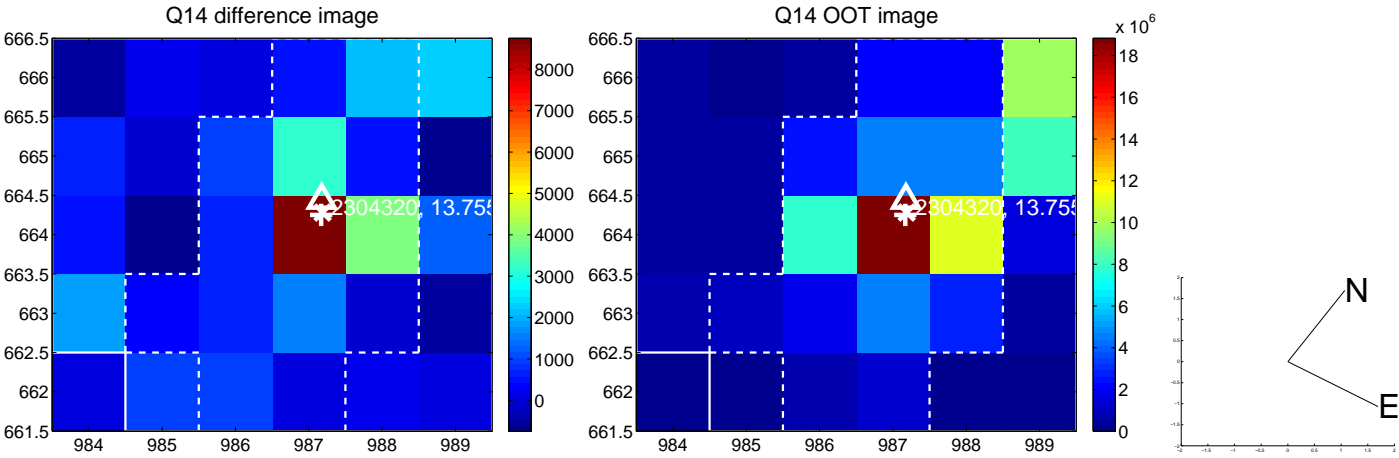
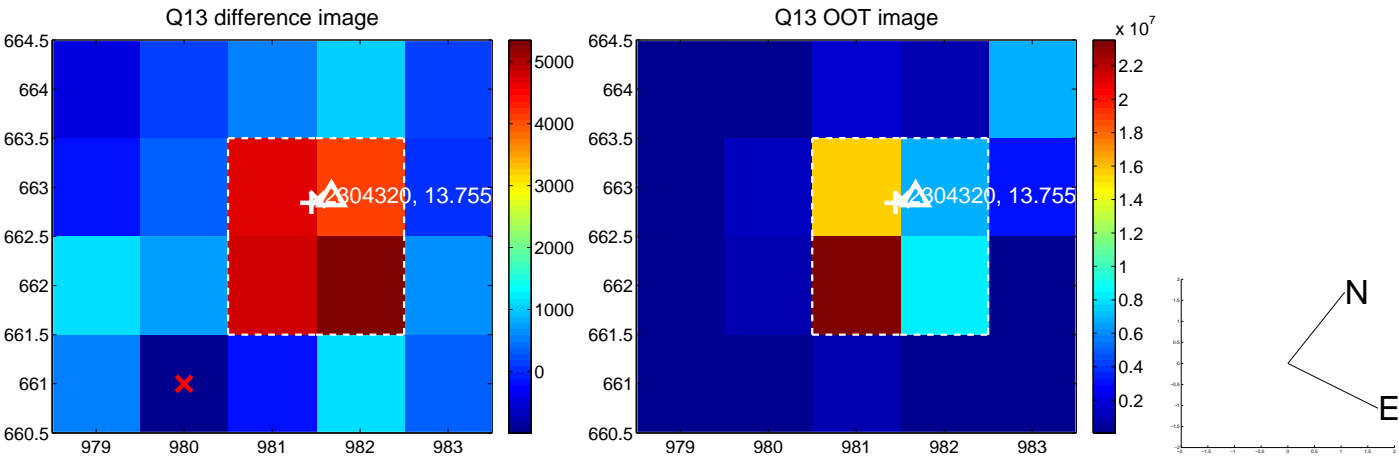
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



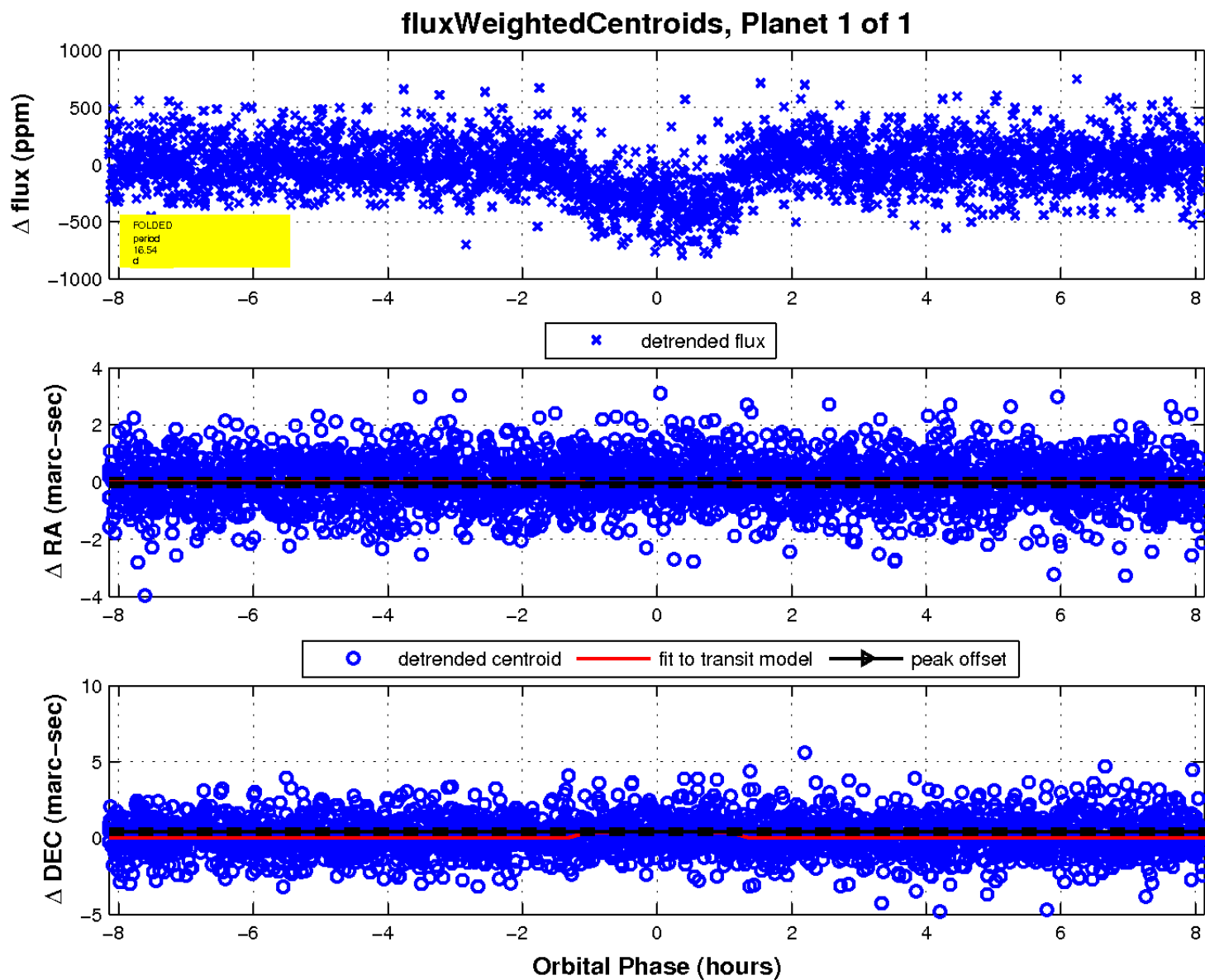
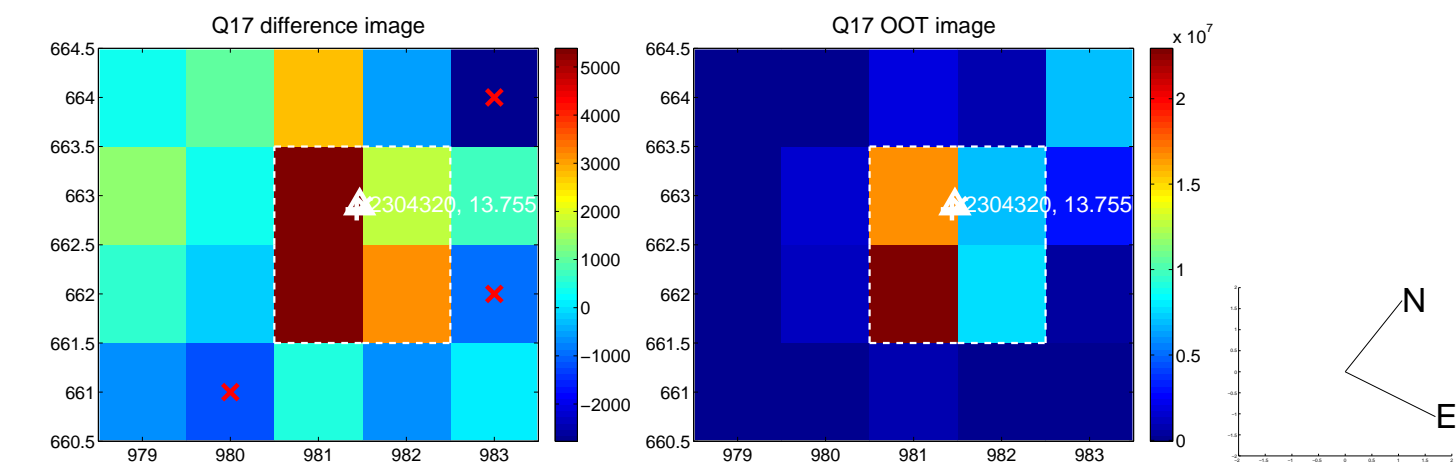
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

