

KIC 002449431

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}) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 002449431-01 | OBS | 2009.01 | 86.749445 | 170.290808 | 521.2 | 9.277 | 29.1 | 30.4 | 0.97 | 5579 | 2.36 | 5.95 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|------------|
| 002449431-01 | OBS | PC | 0.94 | 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.

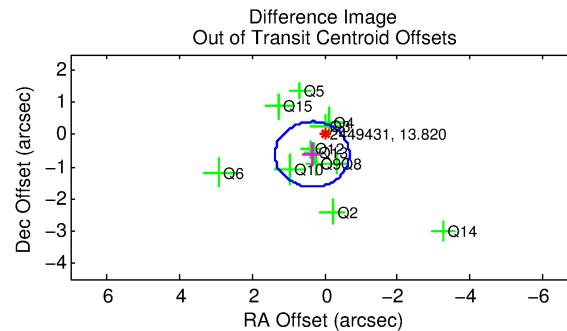
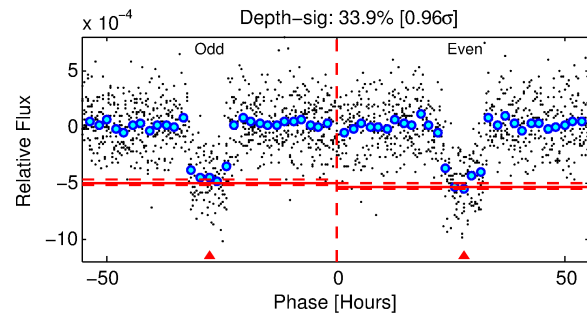
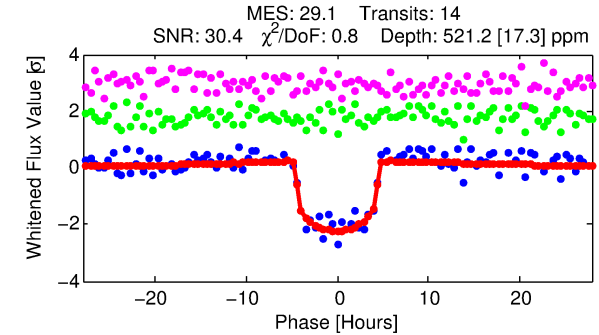
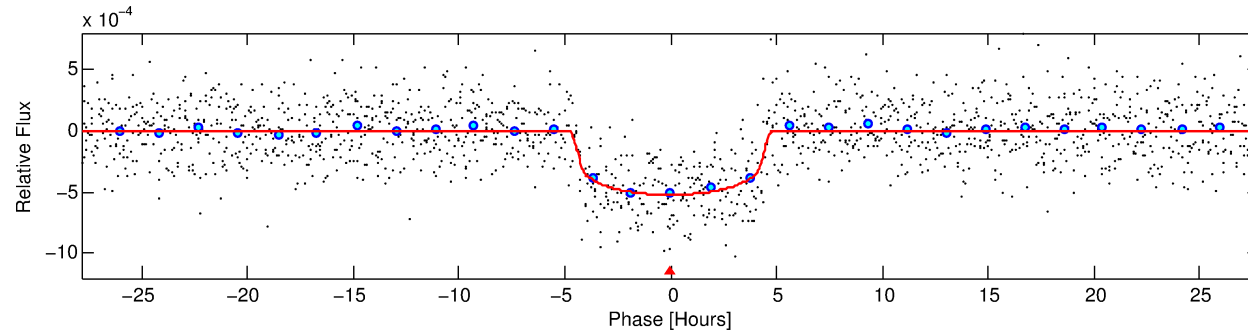
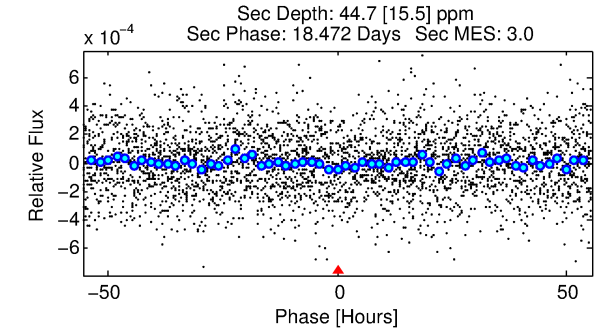
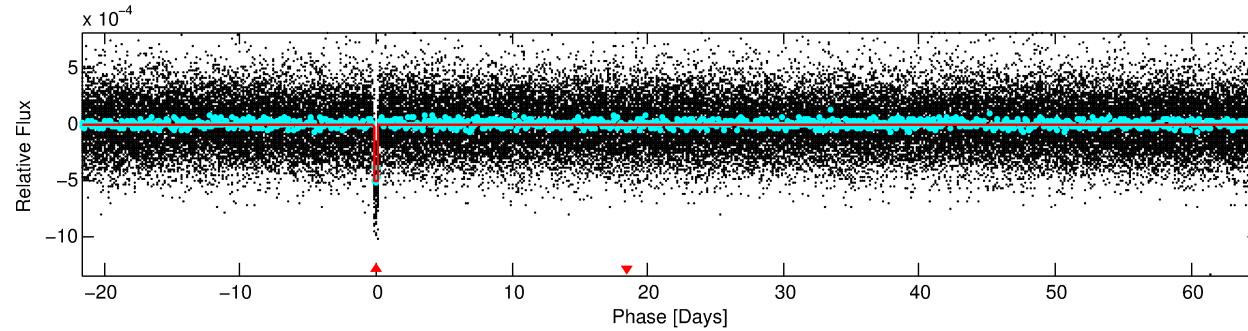
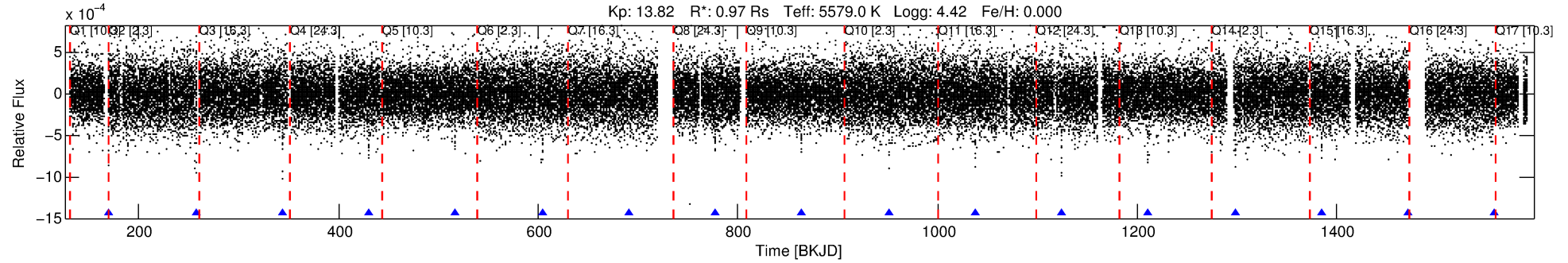
Ephemeris Match Information For 002449431-01

No Significant Match Found

DV One-Page Summary

KIC: 2449431 Candidate: 1 of 1 Period: 86.749 d

KOI: K02009.01 Corr: 0.992



DV Fit Results:

Period = 86.74945 [0.00062] d
Epoch = 170.2908 [0.0053] BKJD
Rp/R* = 0.0223 [0.0051]
a/R* = 53.35 [50.15]
b = 0.70 [0.70]
Seff = 5.95 [1.16]
Teq = 398 [19] K
Rp = 2.36 [0.62] Re
a = 0.3704 [0.0440] AU
Ag = 604.62 [361.33] [1.67σ]
Teffp = 3053 [440] K [6.03σ]

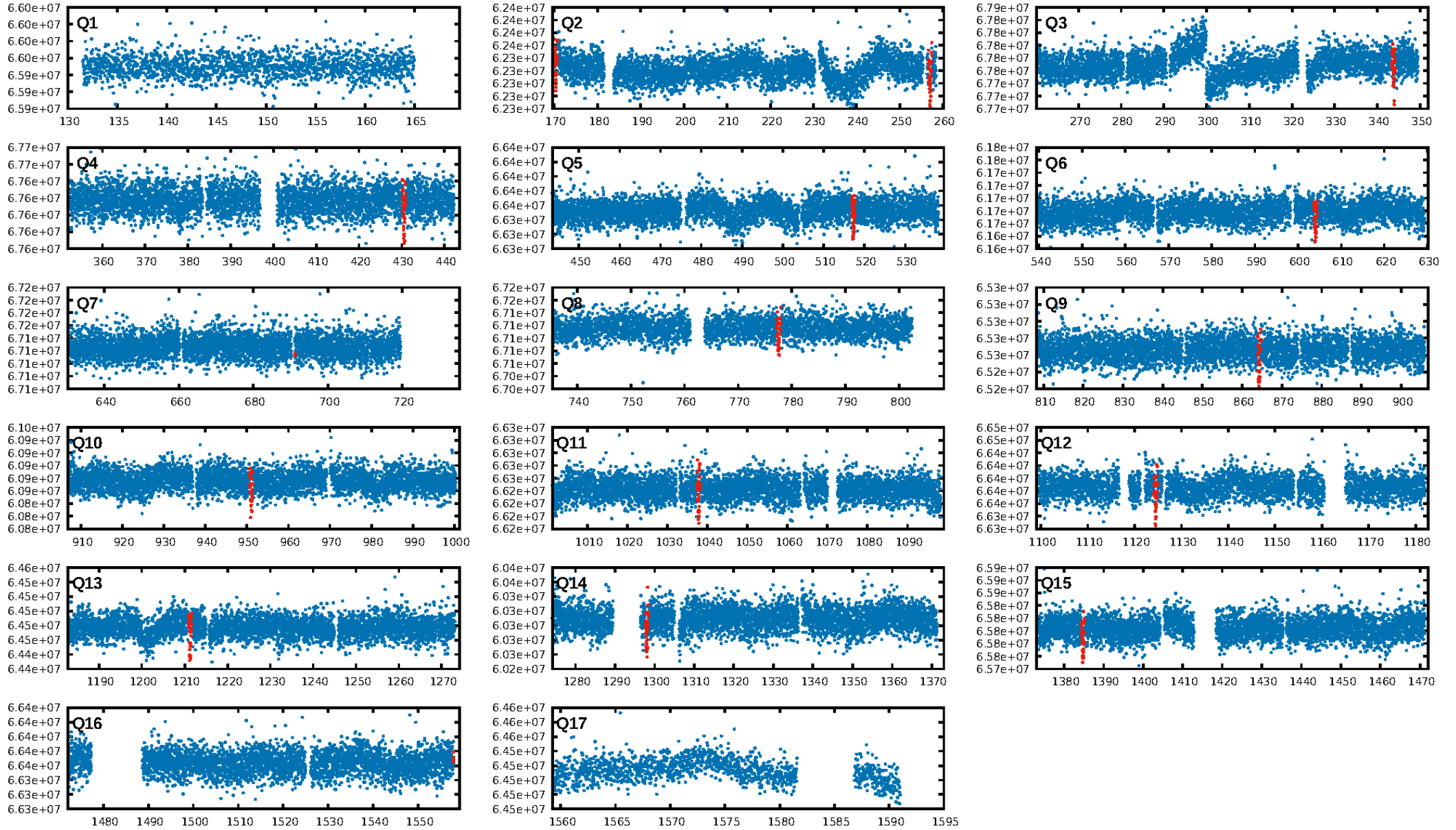
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: N/A
ModelChiSquare2-sig: 93.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.91e-161
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: 2.506
Centroid-sig: 1.5%
Centroid-so: 1.700 arcsec [3.89σ]
OotOffset-rm: 0.710 arcsec [2.09σ]
KicOffset-rm: 0.934 arcsec [2.62σ]
OotOffset-st: 4/2/3/3 [12]
KicOffset-st: 4/2/3/3 [12]
DiffImageQuality-fgm: 0.83 [10/12]
DiffImageOverlap-fno: 1.00 [12/12]

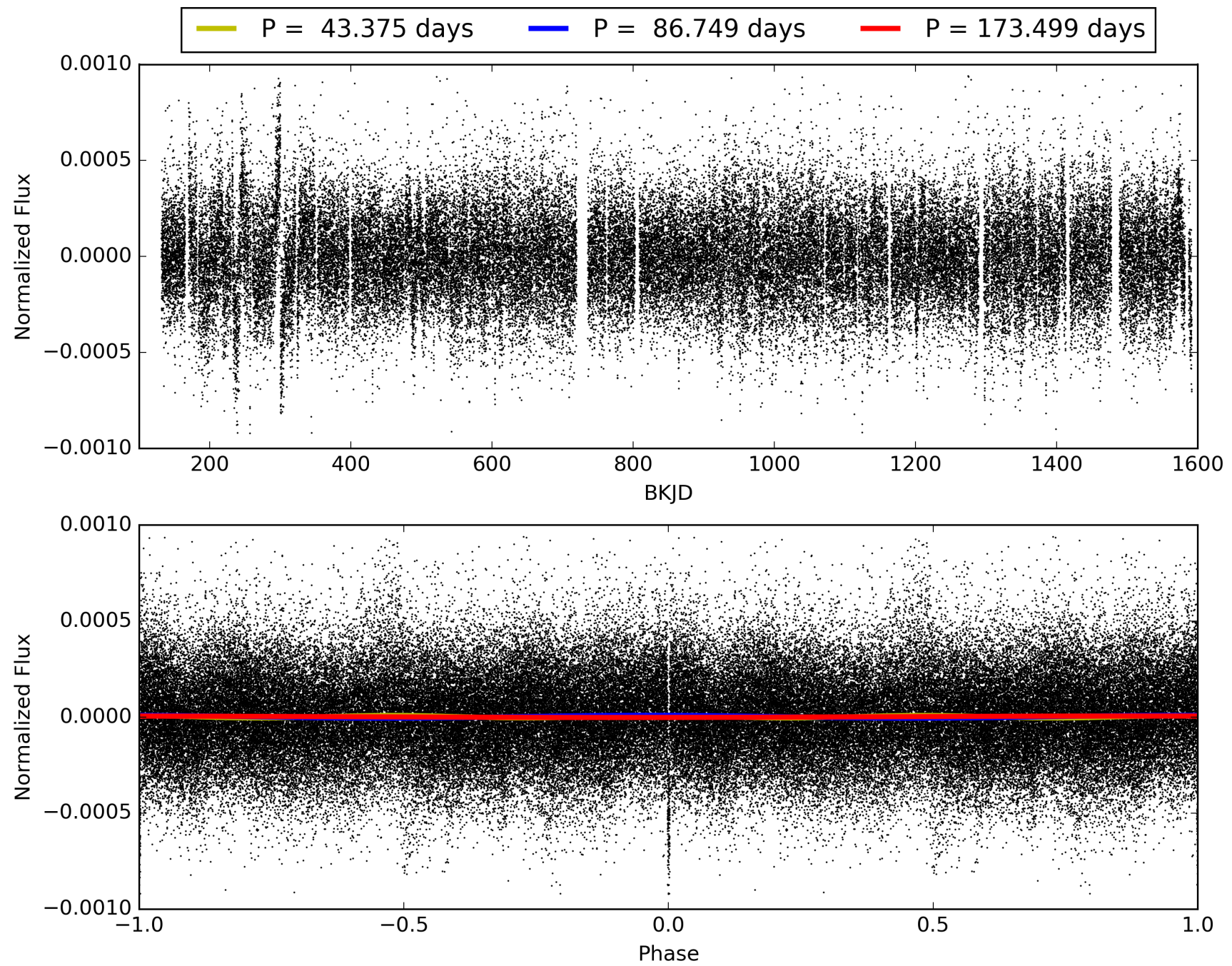
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 20:06:06 Z

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

TCE 002449431-01, PDC Light Curves

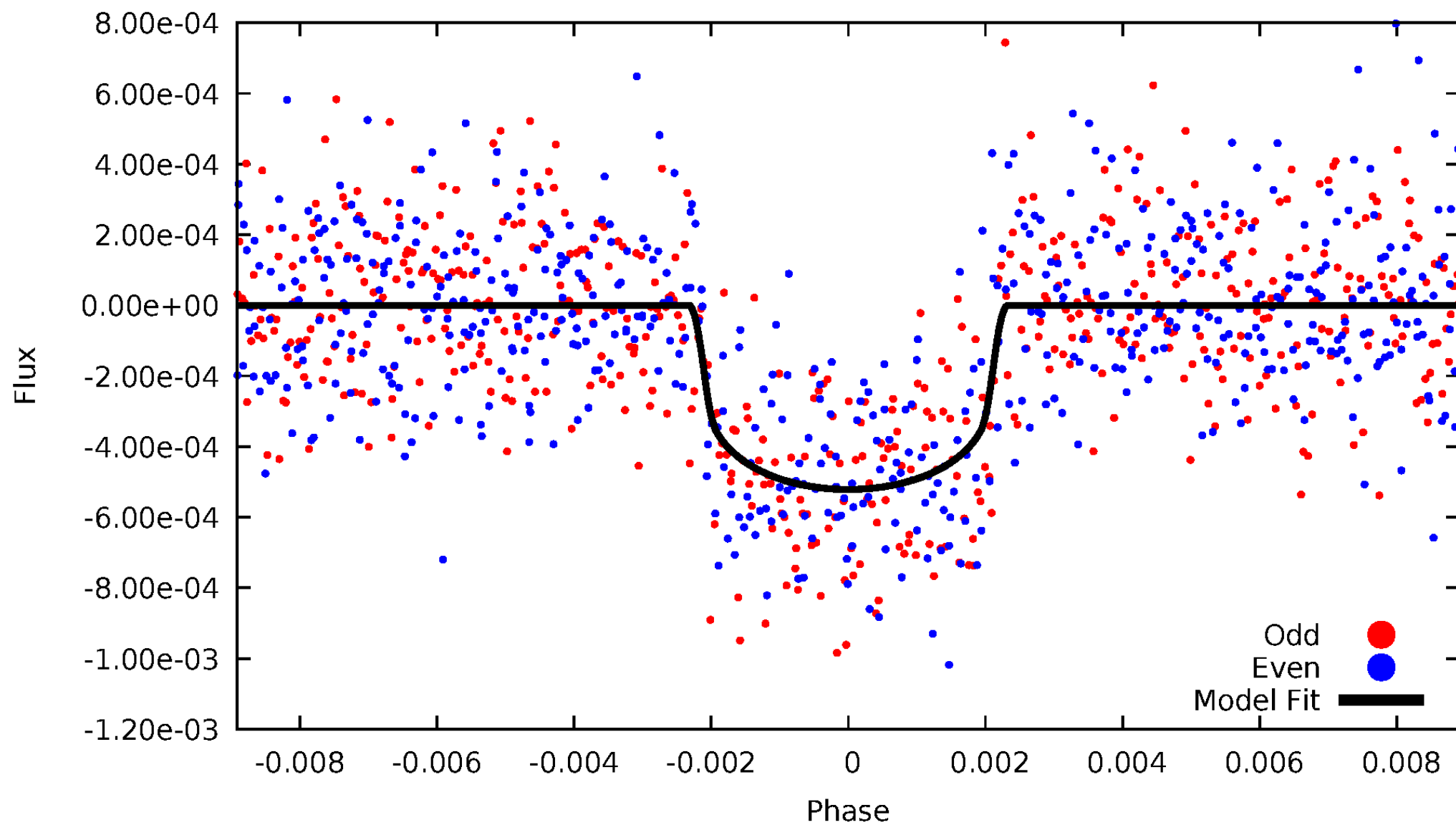


TCE 002449431-01



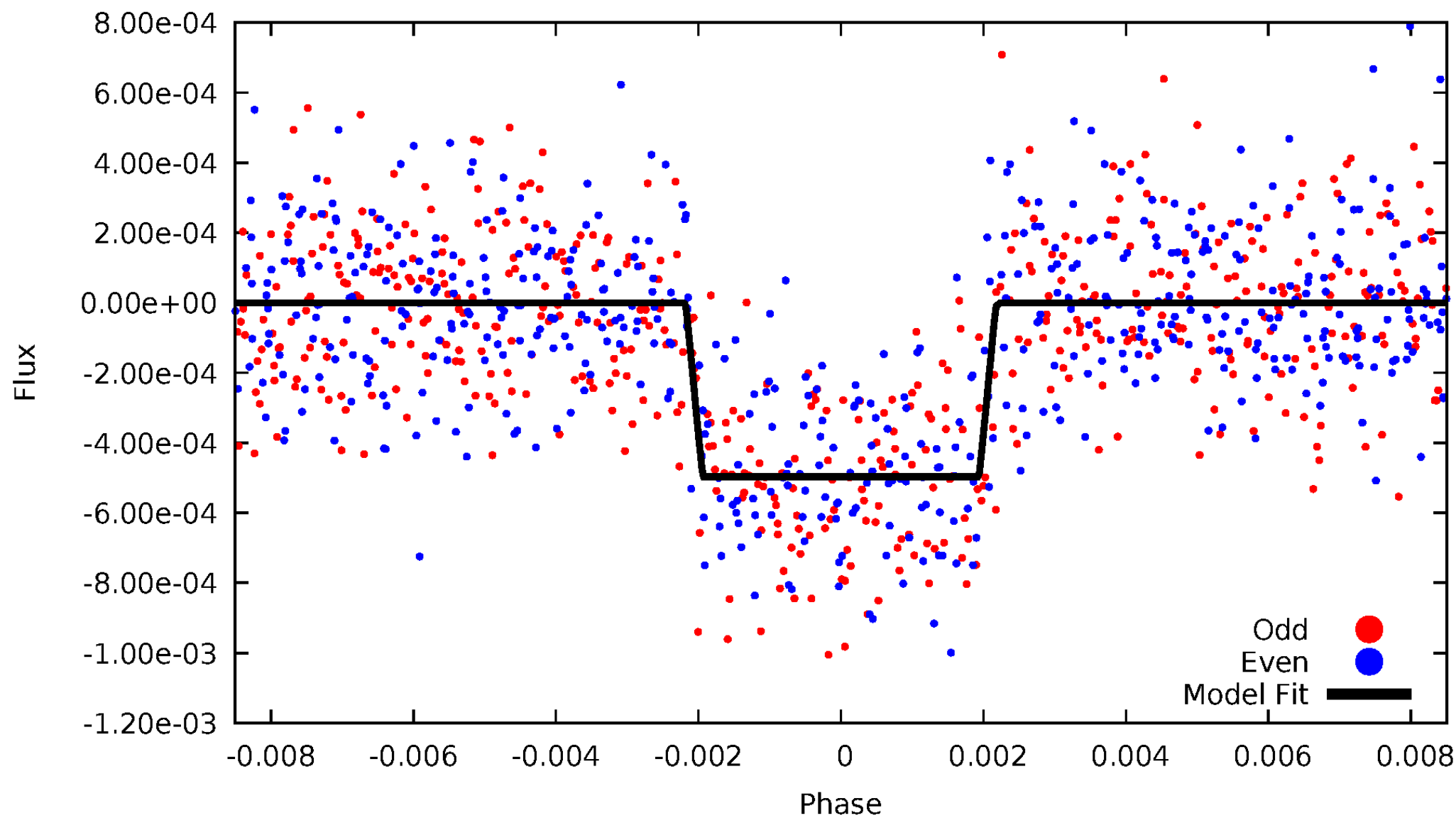
DV Odd/Even

TCE 002449431-01

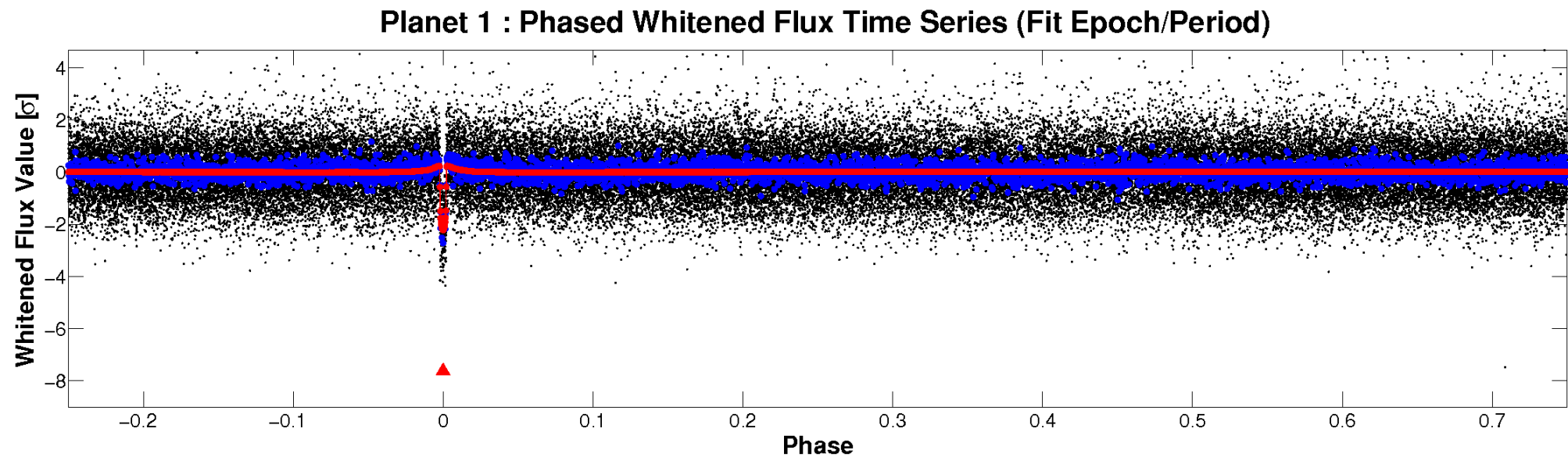
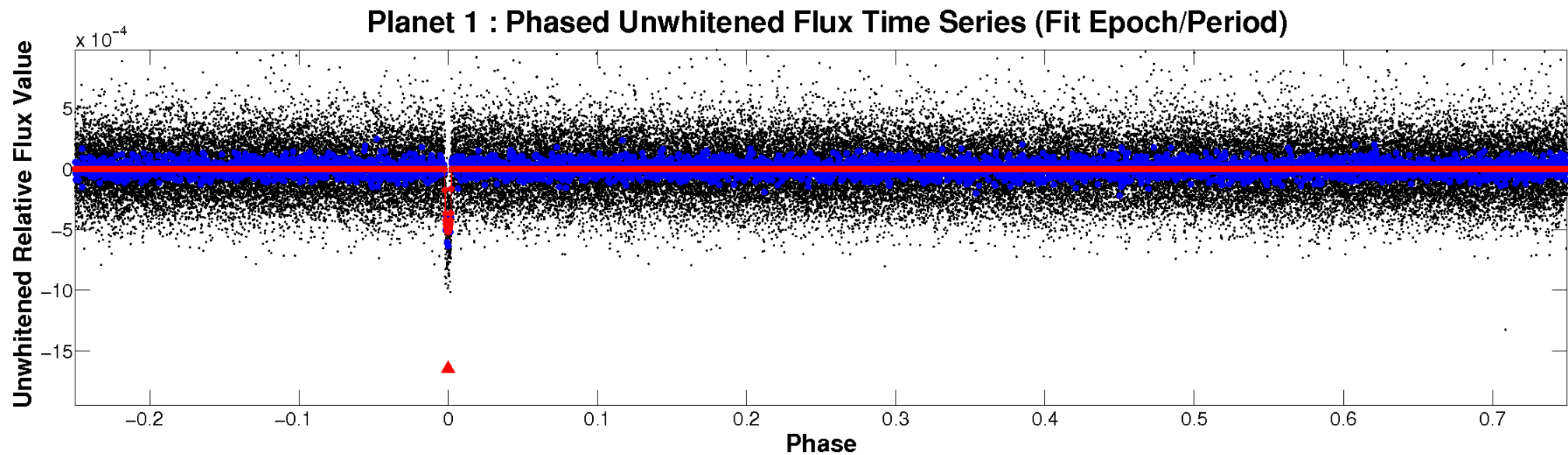


ALT Odd/Even

TCE 002449431-01

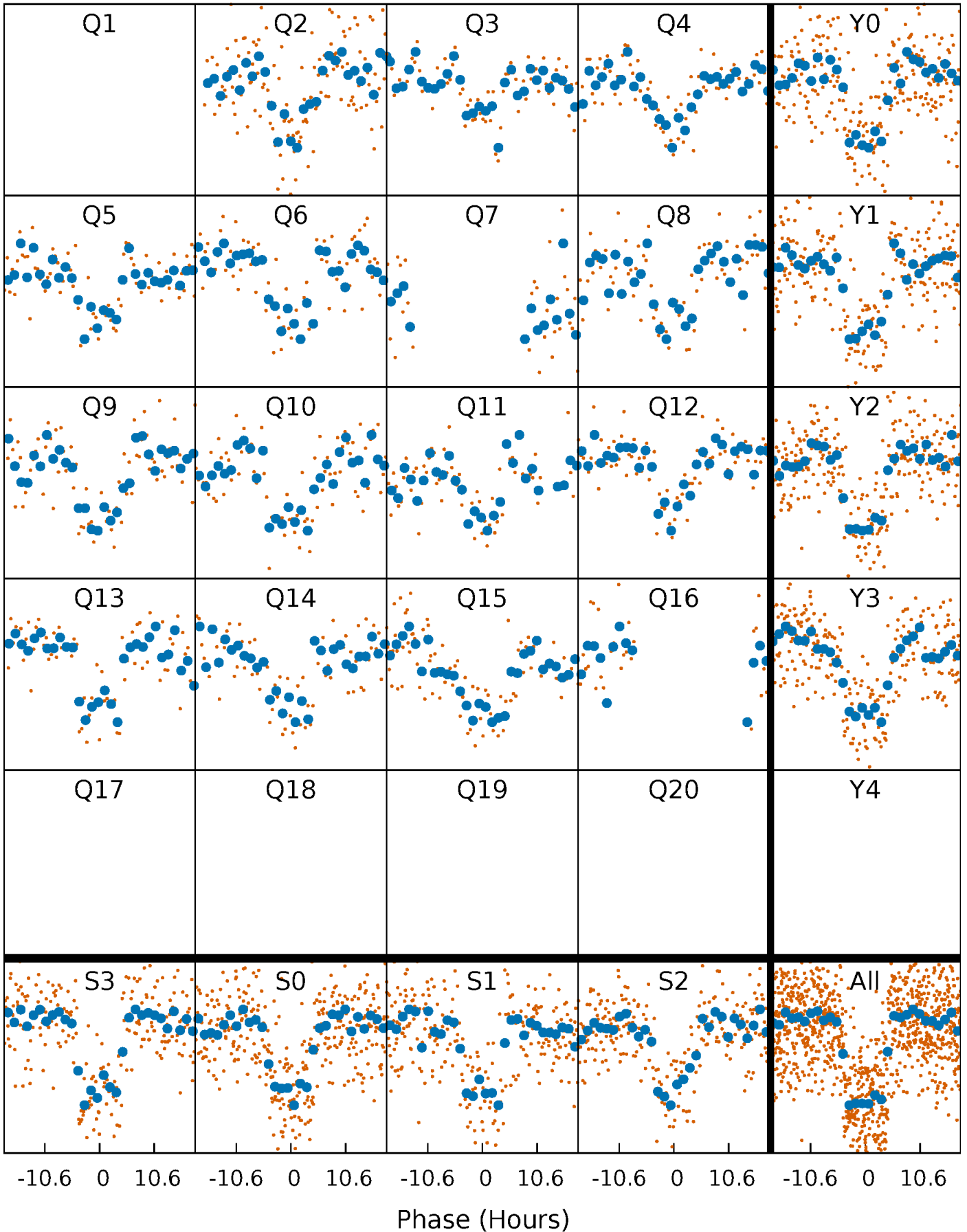


Non-Whitened Vs. Whitened Light Curve



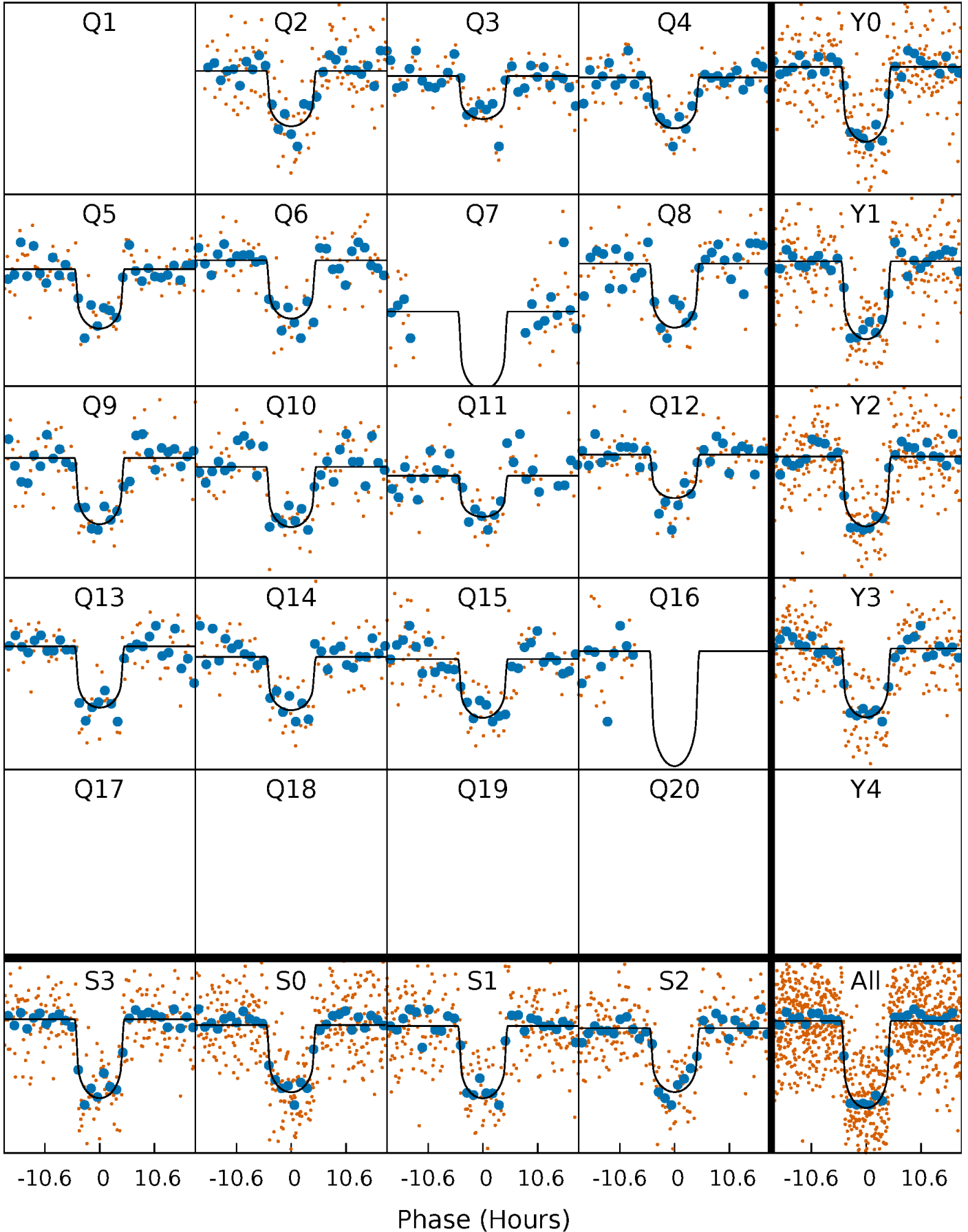
PDC Quarter-Phased Transit Curves

TCE 002449431-01 P= 86.749445 Days $T_0=170.290808$ (BKJD)



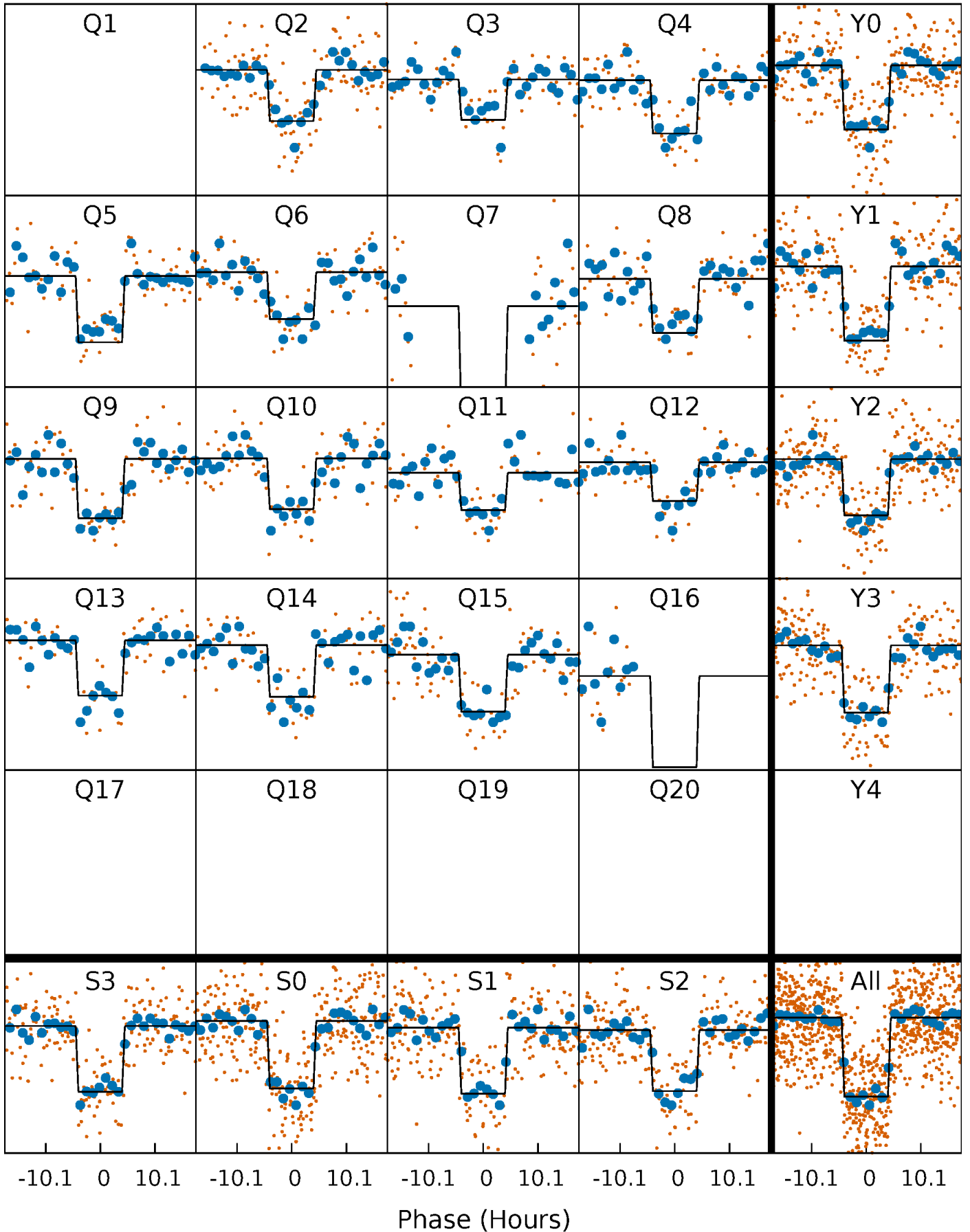
DV Quarter-Phased Transit Curves

TCE 002449431-01 P= 86.749445 Days $T_0=170.290808$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

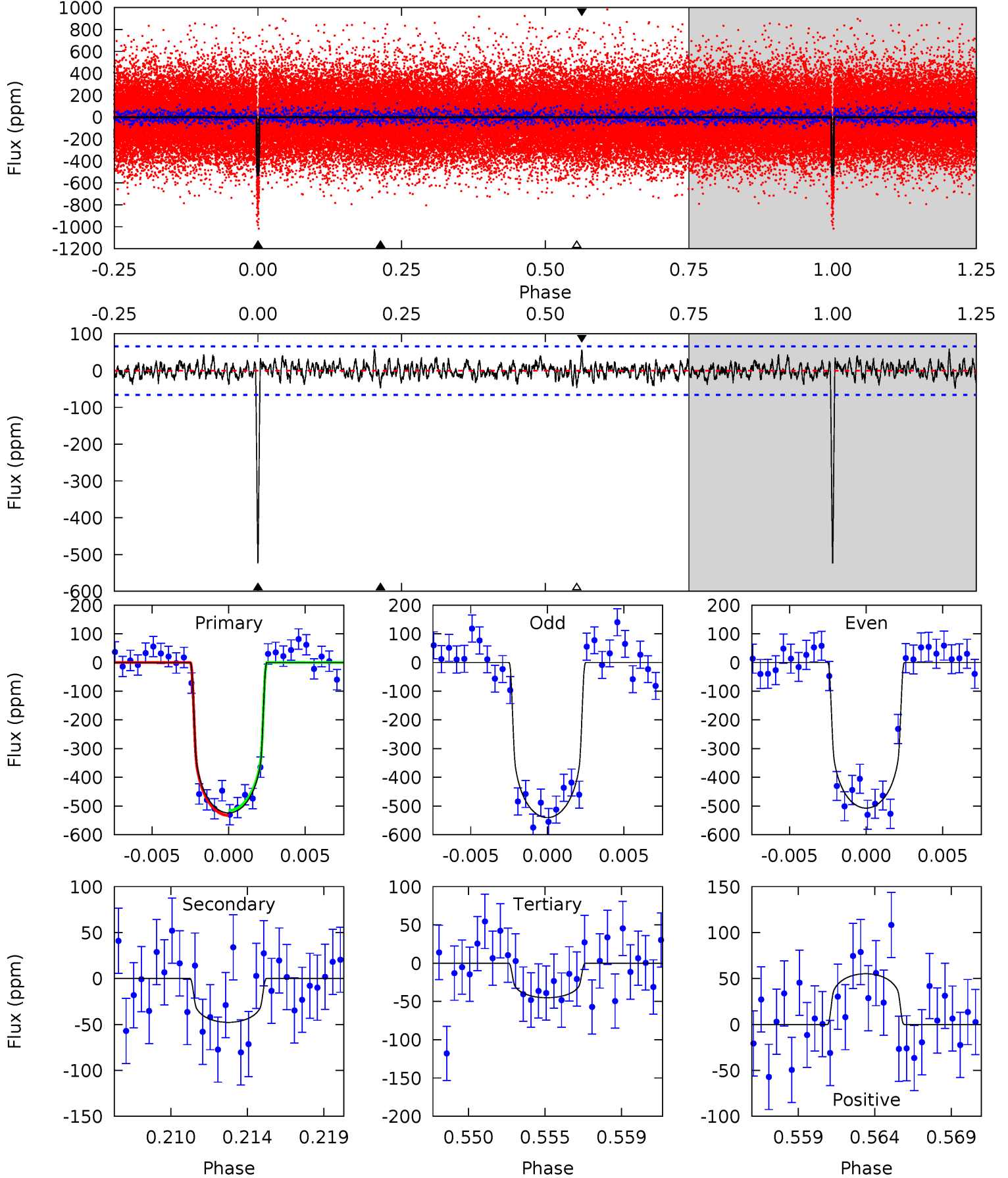
TCE 002449431-01 P= 86.750281 Days $T_0=170.282590$ (BKJD)



DV Model-Shift Uniqueness Test

002449431-01, P = 86.749445 Days, E = 83.541363 Days

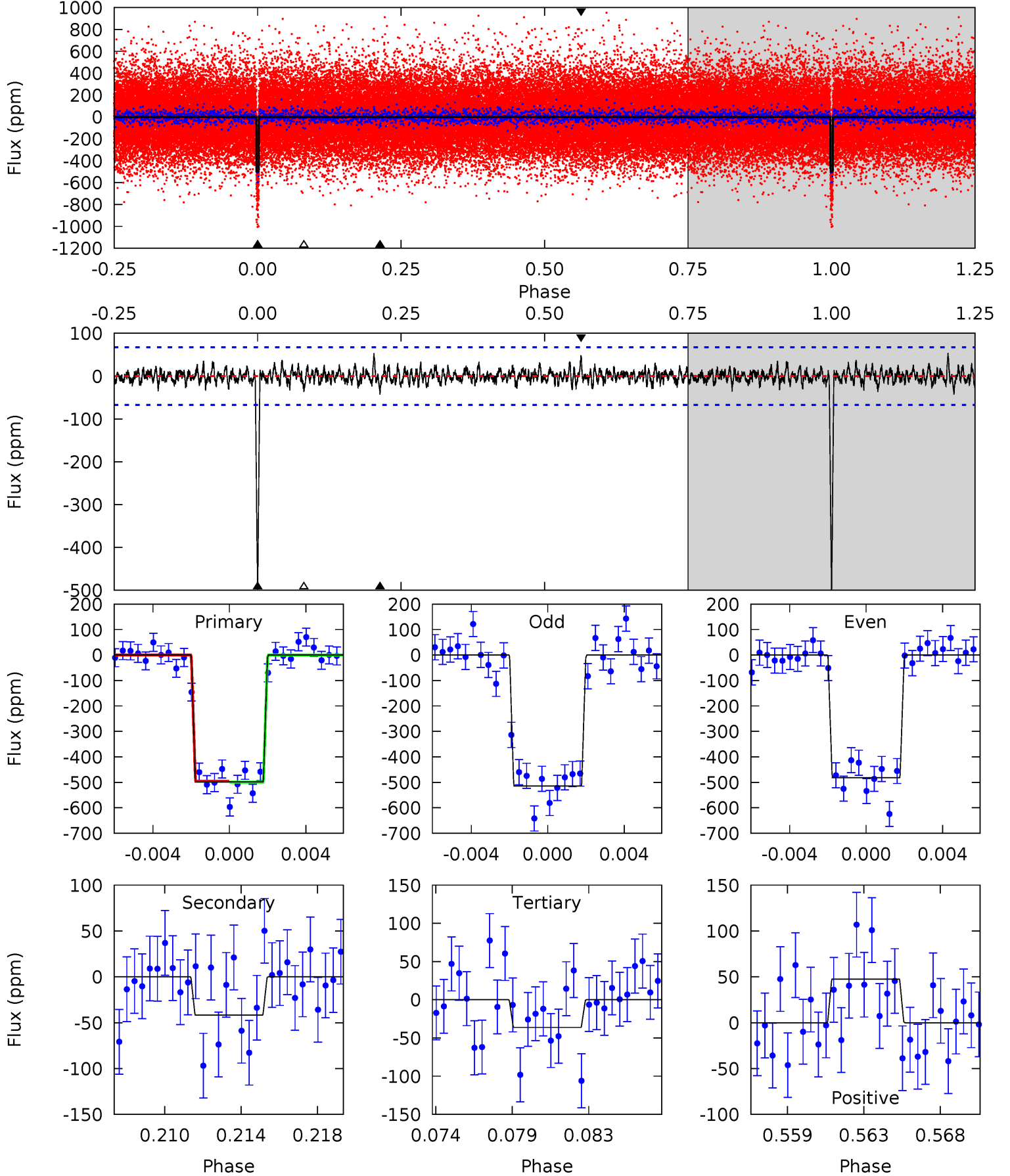
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 41.1 | 3.75 | 3.54 | 4.33 | 5.17 | 2.83 | 1.16 | 37.6 | 36.8 | 0.20 | -0.58 | 1.30 | 1.01 | 0.10 | 0.68 |



Alt Model-Shift Uniqueness Test

002449431-01, P = 86.750281 Days, E = 83.532309 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 38.2 | 3.21 | 2.78 | 3.65 | 5.18 | 2.85 | 0.91 | 35.5 | 34.6 | 0.43 | -0.43 | 1.26 | 0.97 | 0.10 | 0.14 |



Stellar Parameters For KIC 002449431

| | $T_{\text{eff}}(K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M(M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | 5579^{+111}_{-100} | $4.419^{+0.100}_{-0.100}$ | $0.000^{+0.150}_{-0.150}$ | $0.970^{+0.132}_{-0.096}$ | $0.901^{+0.068}_{-0.045}$ | $1.390^{+0.548}_{-0.425}$ |
| | +2%/-2% | +2%/-2% | +inf%/-inf% | +14%/-10% | +8%/-5% | +39%/-31% |
| 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 002449431-01 / KOI 2009.01

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | A_{obs} |
|---------|--------------|------------------------|----------------------|----------------------|---------------------|
| DV | -48 ± 13 | $2.37^{+0.57}_{-0.57}$ | 557^{+21}_{-20} | 3568^{+367}_{-287} | 661^{+513}_{-273} |
| Alt. | -42 ± 13 | $2.34^{+0.60}_{-0.56}$ | 557^{+22}_{-21} | 3480^{+383}_{-271} | 570^{+487}_{-244} |

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 $A_{\text{obs}} \gg 1.0$

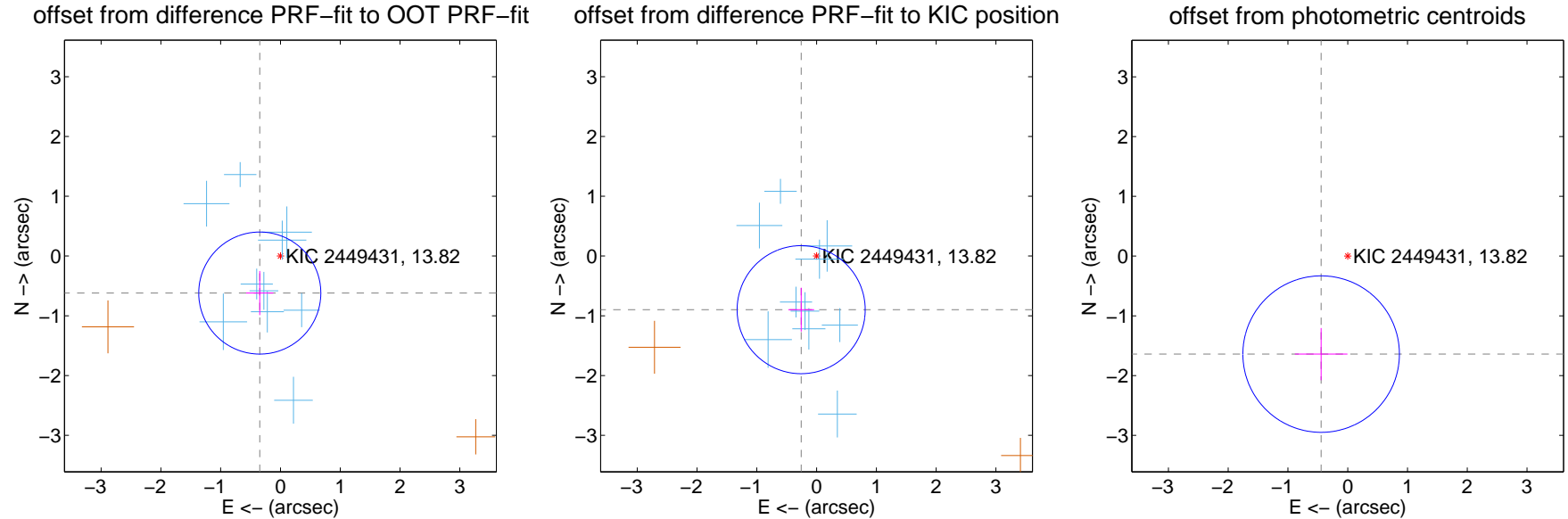
DV Centroid Data

Supplemental centroid analysis for 002449431-01. Kepler magnitude: 13.82. Transit SNR 30.40

There are 10 quarters with good PRF difference image offsets

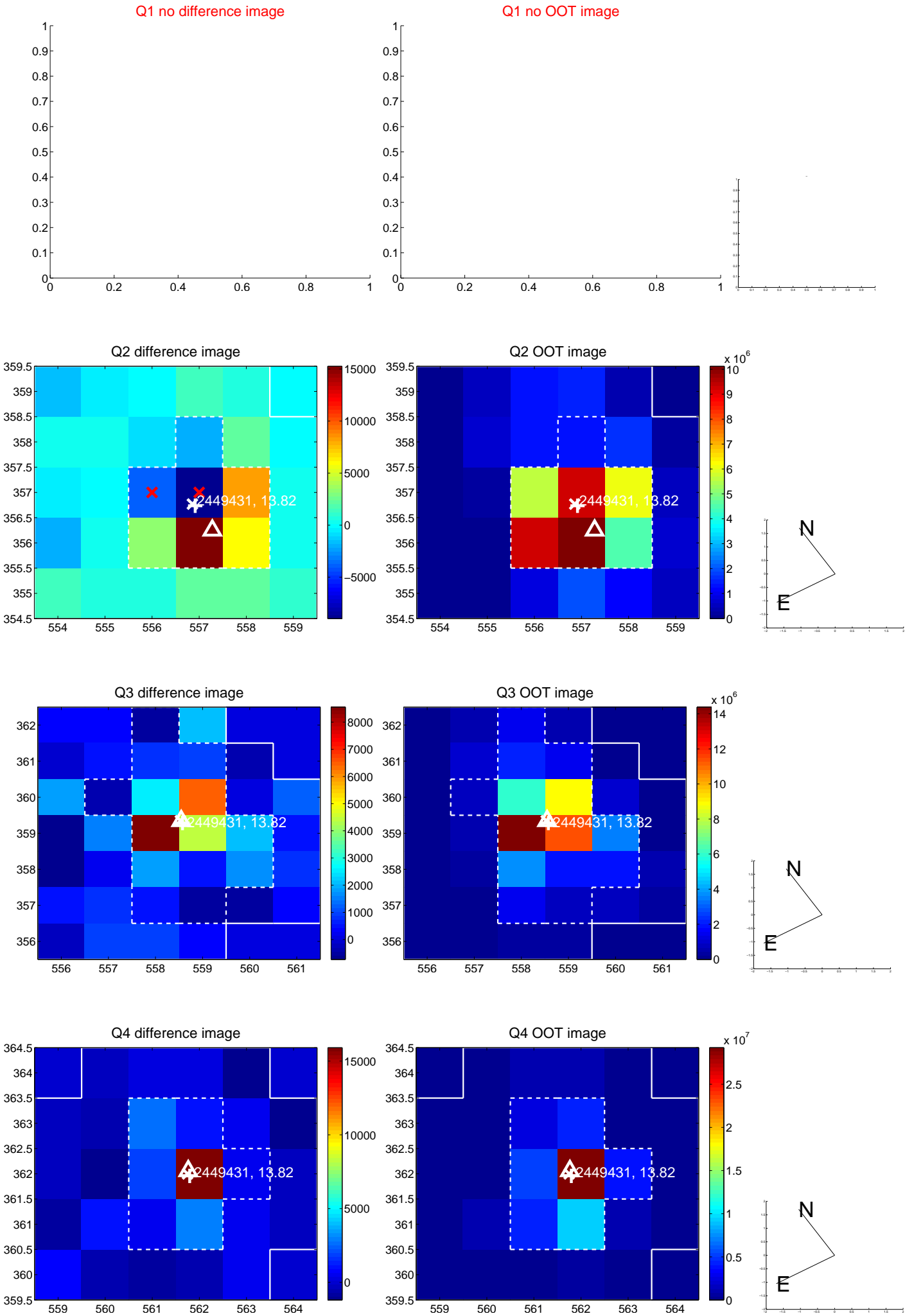
The direct PRF centroid is offset from the target star catalog position by about 0.46 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.710 ± 0.340 | 2.09 | 0.346 ± 0.227 | -0.620 ± 0.369 |
| PRF-fit source offset from KIC position | 0.934 ± 0.357 | 2.62 | 0.258 ± 0.215 | -0.898 ± 0.366 |
| photometric centroid source offset | 1.70 ± 0.44 | 3.89 | 0.44 ± 0.44 | -1.64 ± 0.44 |

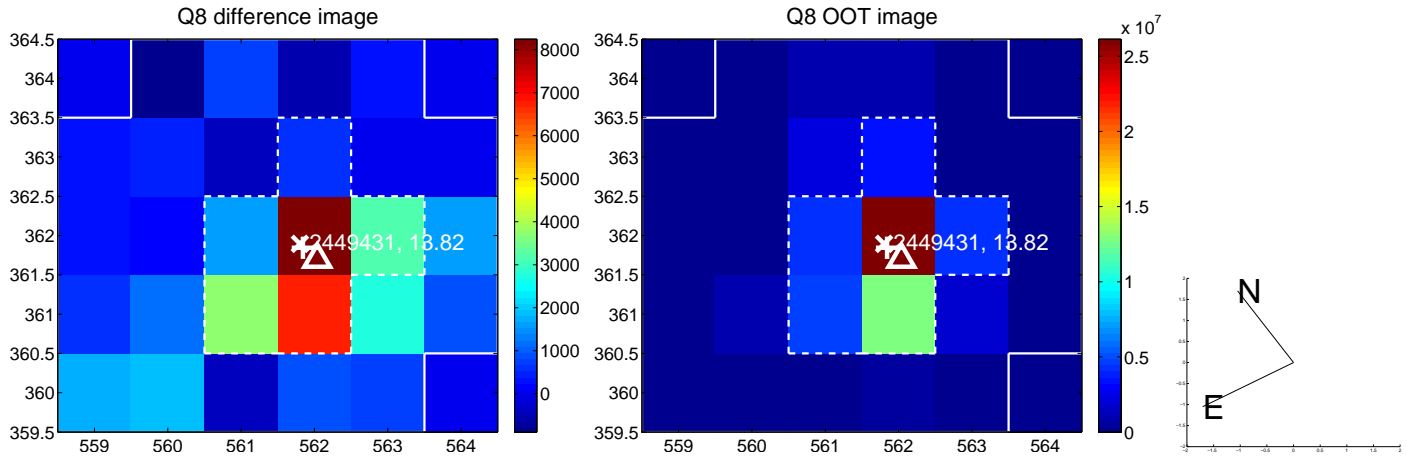
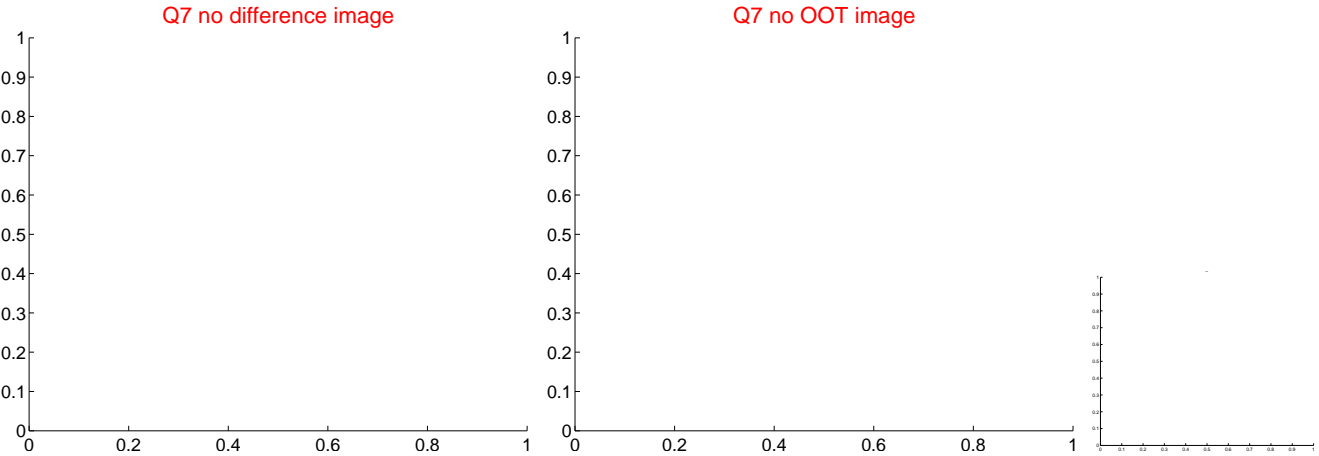
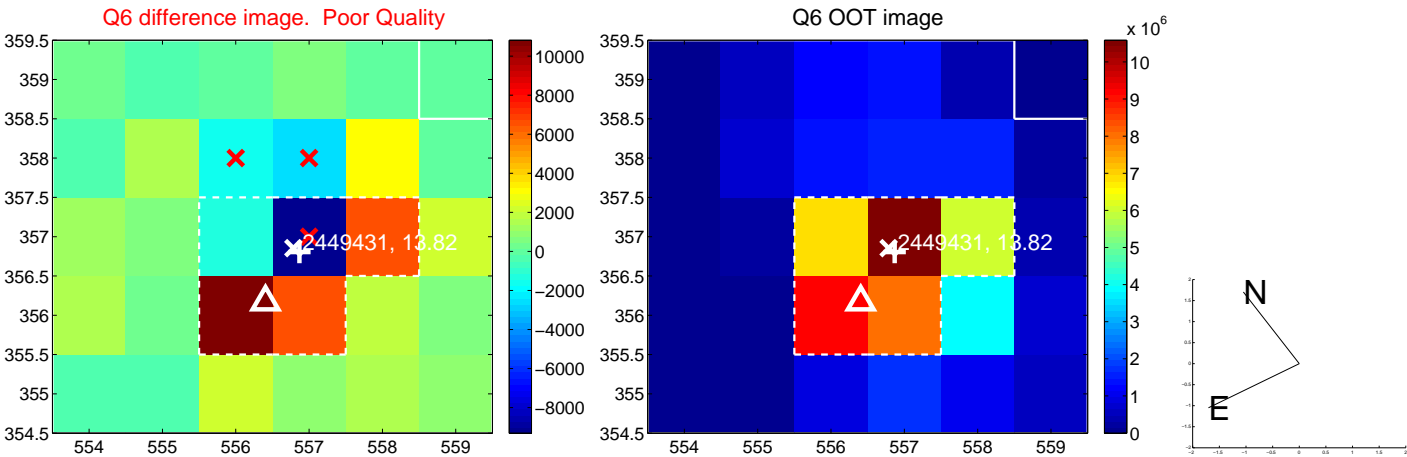
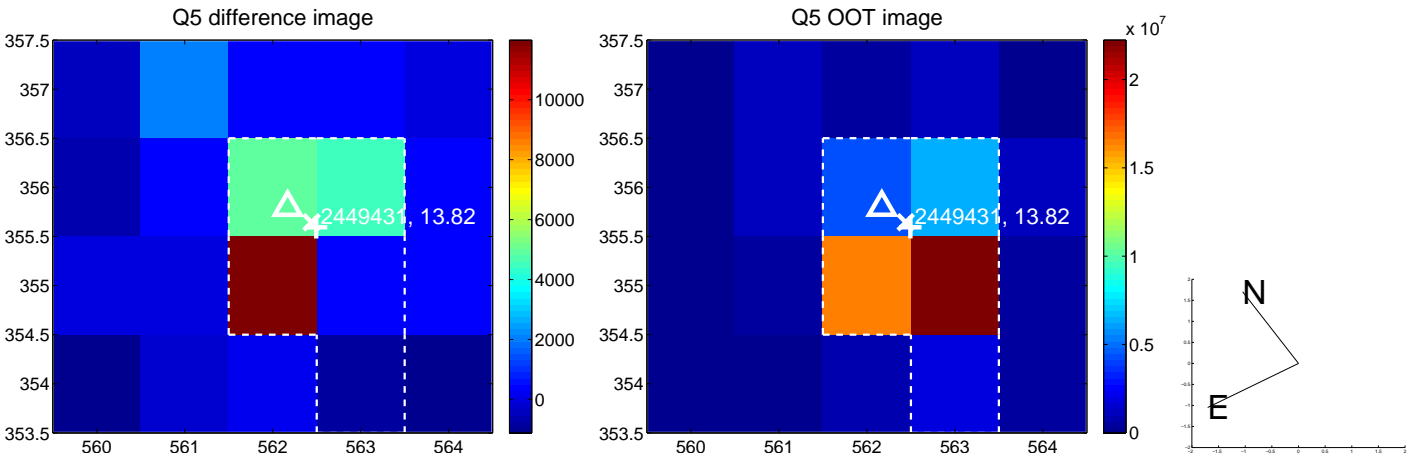


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- 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.

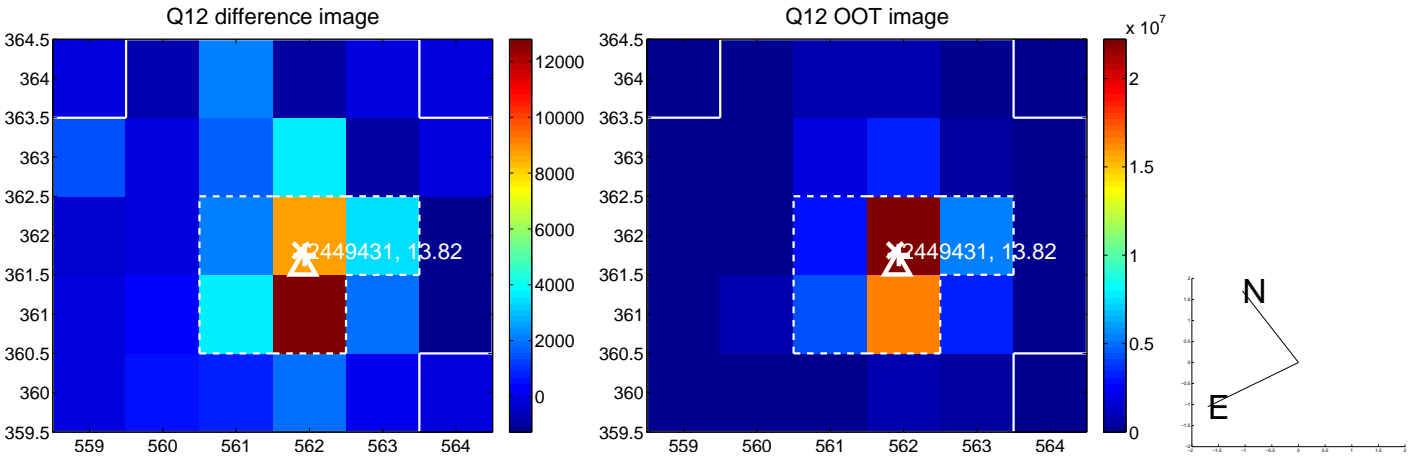
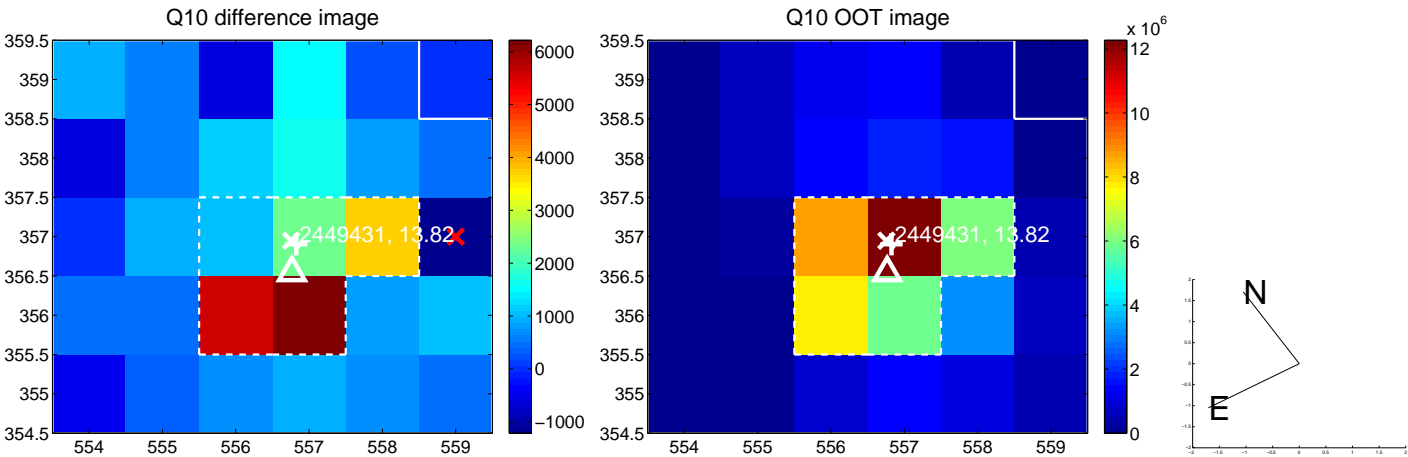
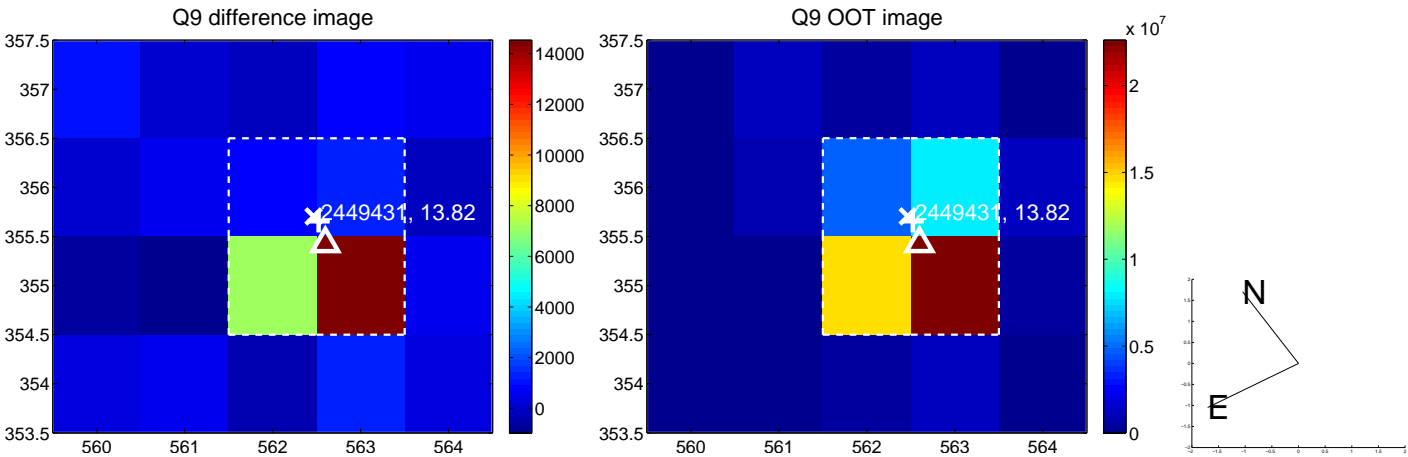
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



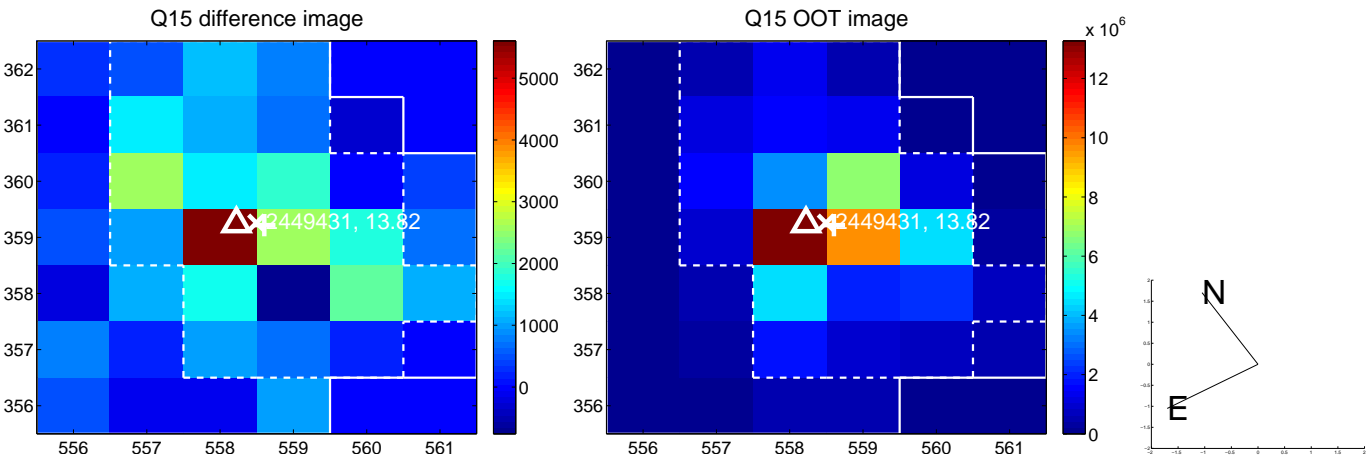
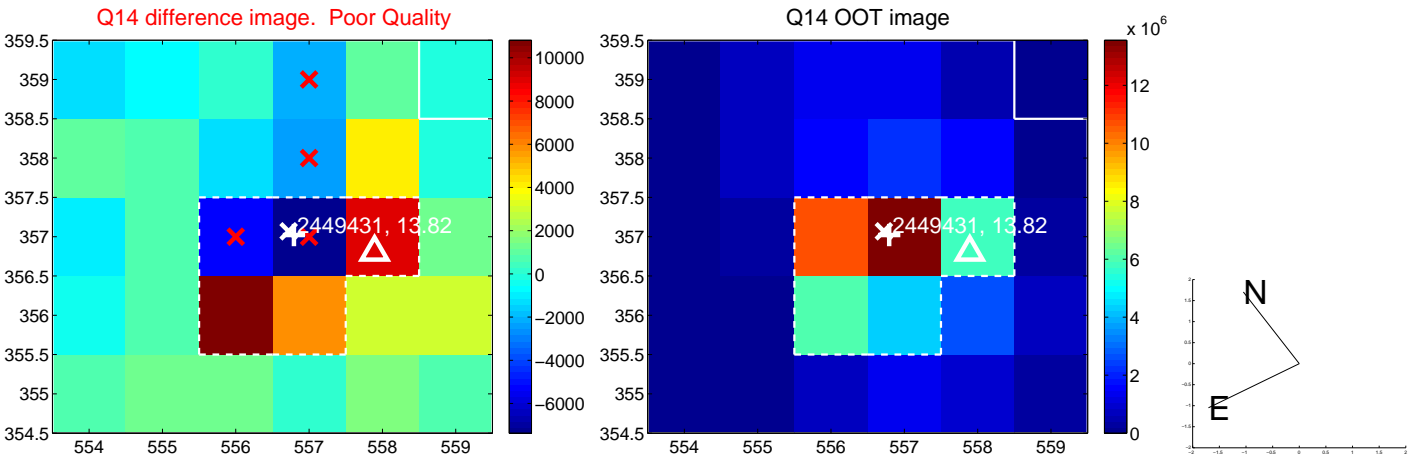
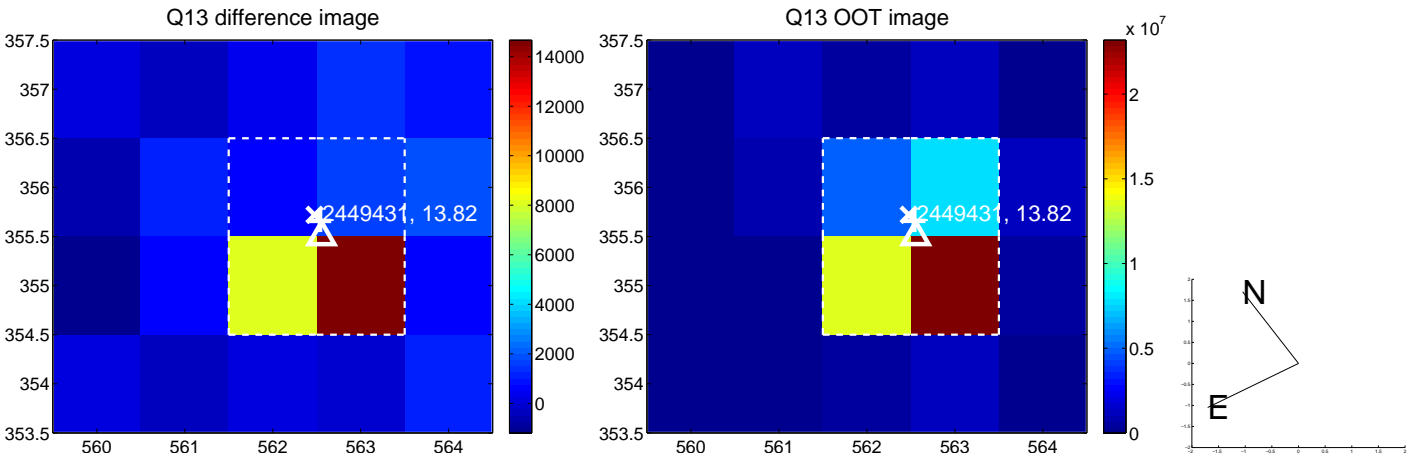
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



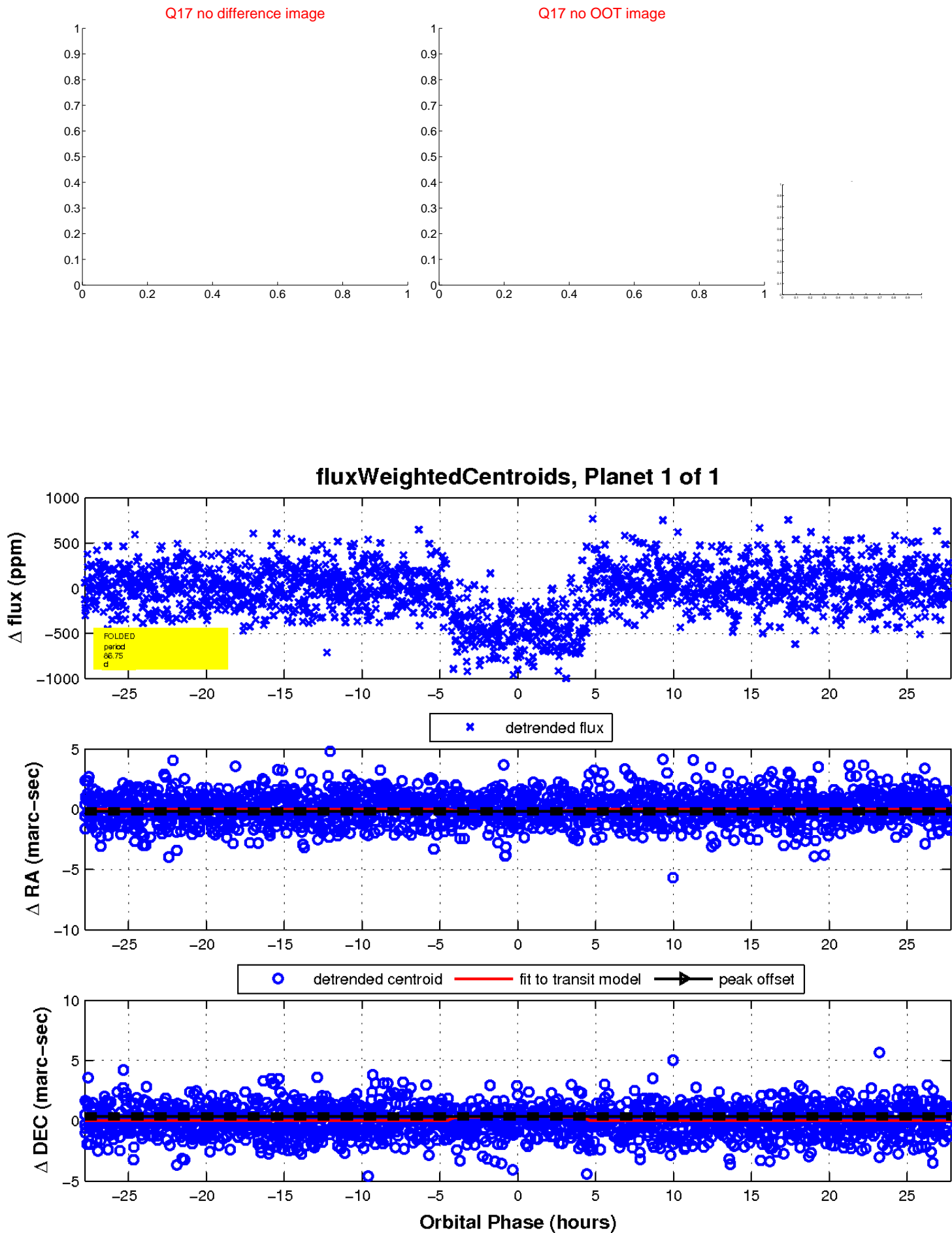
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UKIRT Image

Declination

