

## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

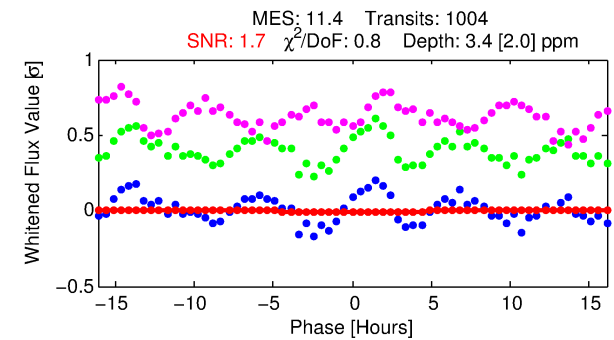
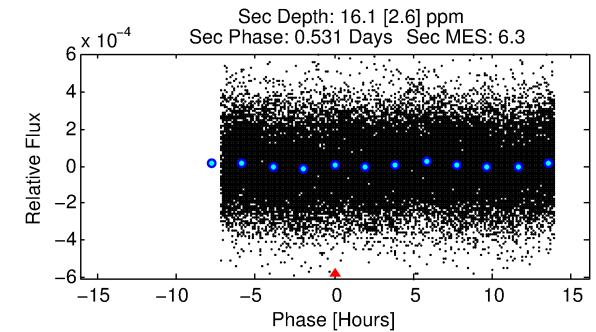
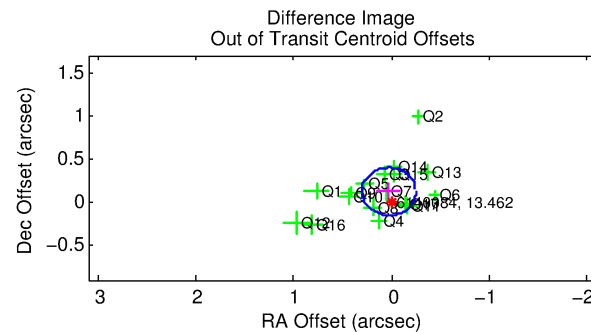
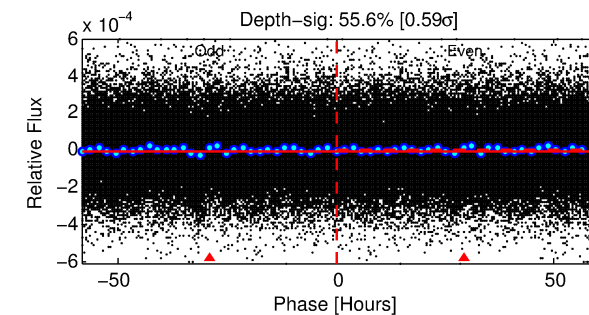
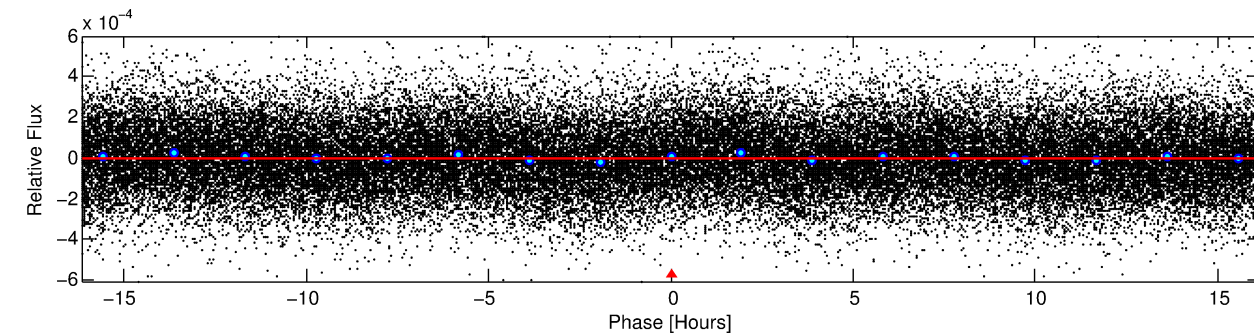
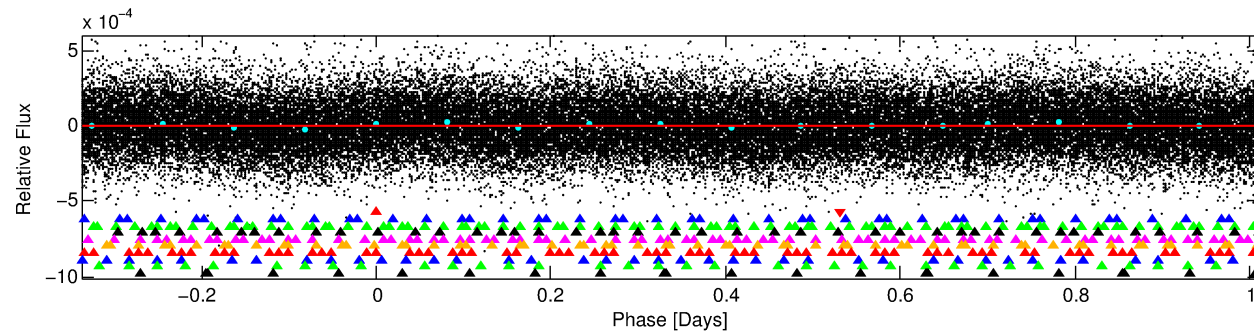
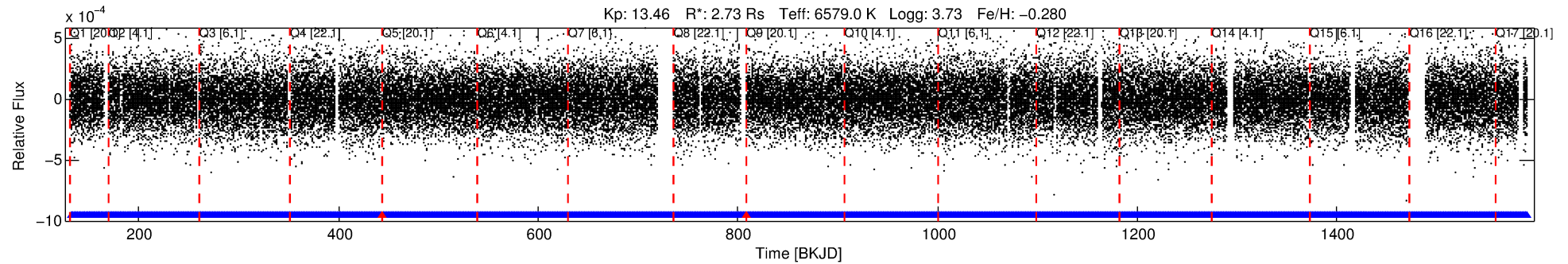
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-01

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 1 of 10 Period: 1.348 d



## DV Fit Results:

Period = 1.34848 [0.00011] d  
Epoch = 132.0763 [0.0342] BKJD  
Rp/R\* = 0.0020 [0.0032]  
a/R\* = 1.05 [1.03]  
b = 0.89 [2.24]  
Seff = 17086.49 [9416.60]  
Teq = 2915 [402] K  
Rp = 0.58 [0.97] Re  
a = 0.0270 [0.0092] AU  
Ag = 19.06 [62.66] [0.29σ]  
Teffp = 9418 [7642] K [0.85σ]

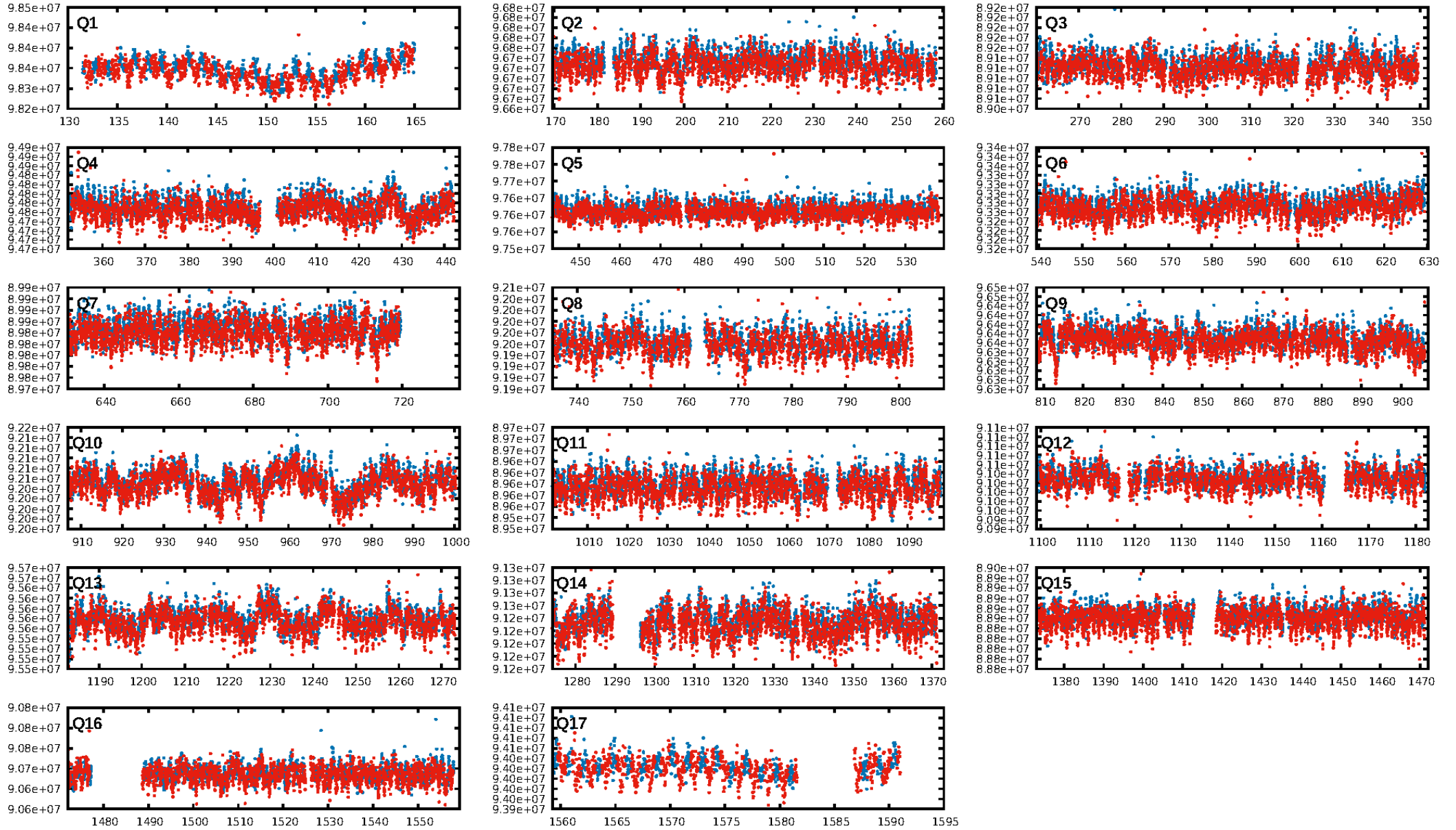
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [35.08σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [956/958]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.128 arcsec [1.40σ]  
KicOffset-rm: 0.160 arcsec [1.32σ]  
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: 03-Feb-2016 08:12:19 Z

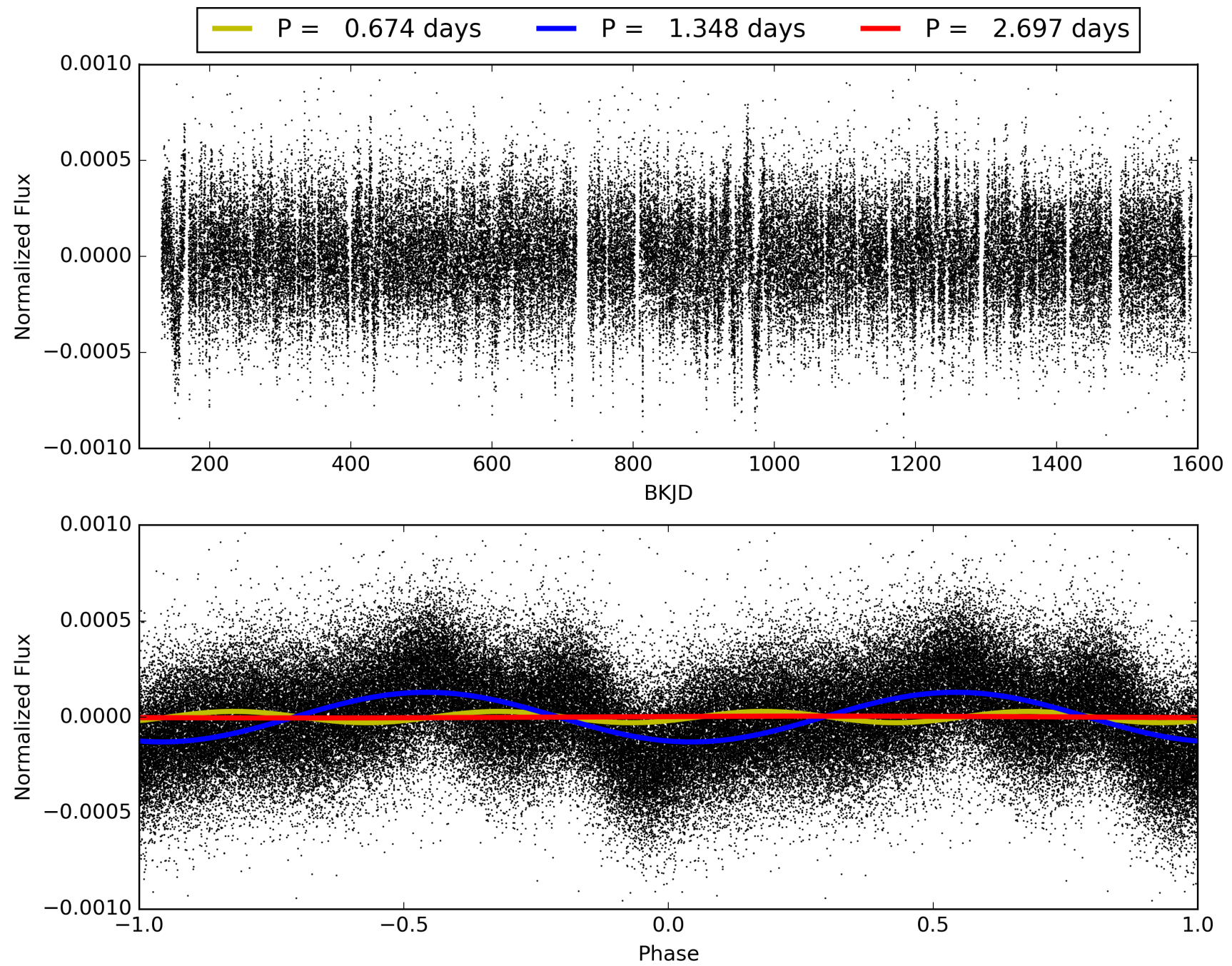
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-01, PDC Light Curves





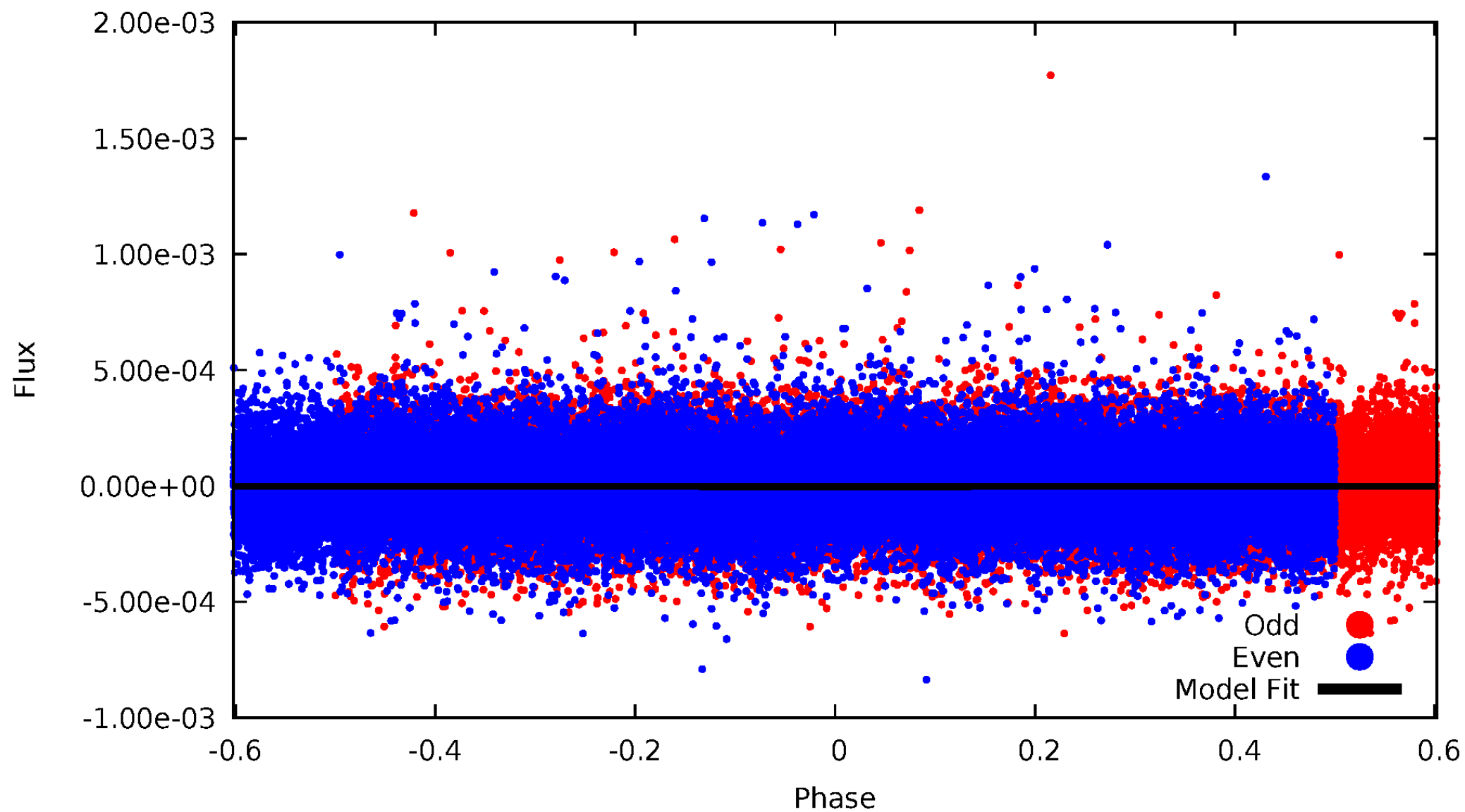
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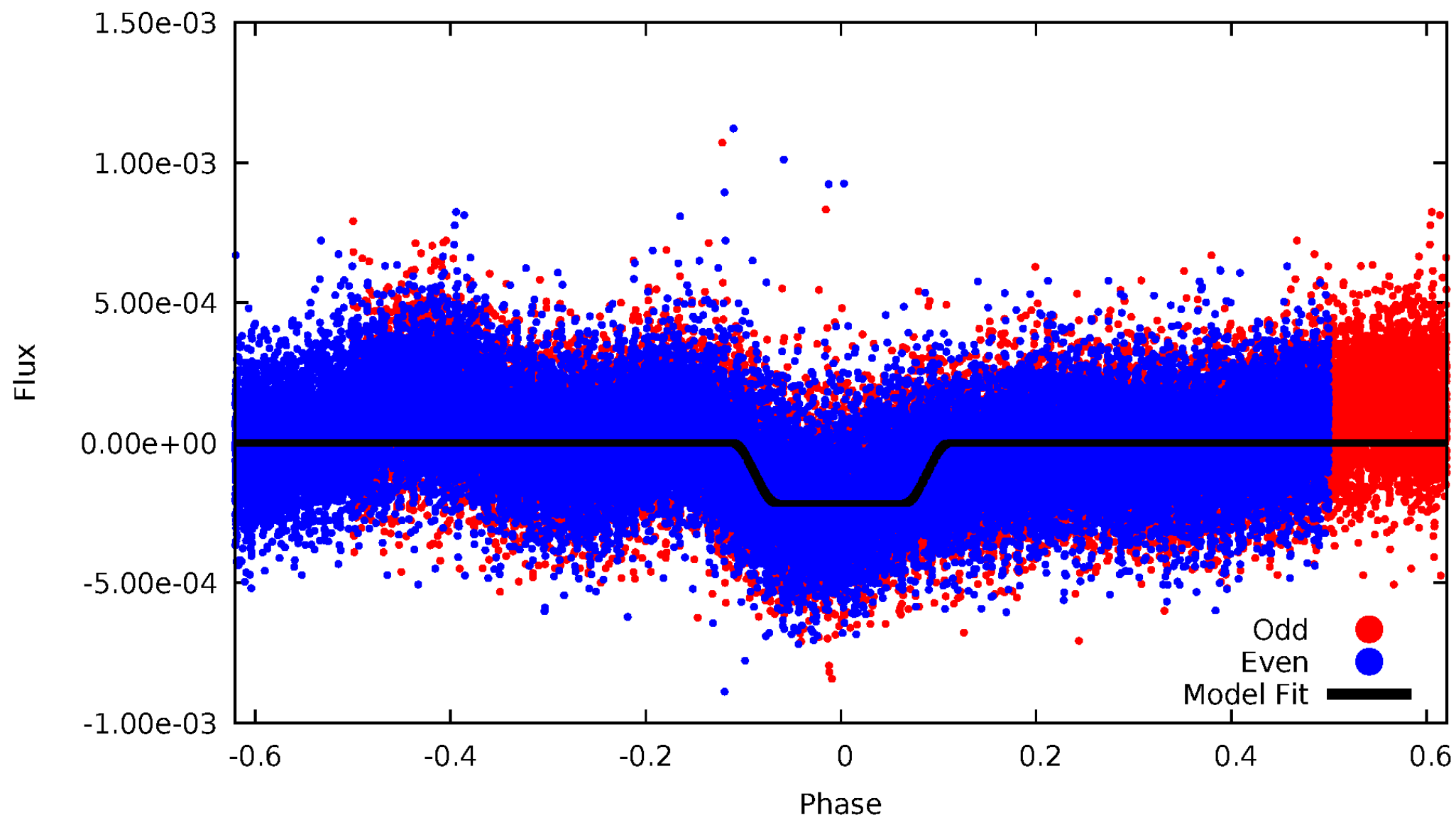
# DV Odd/Even

TCE 006140084-01



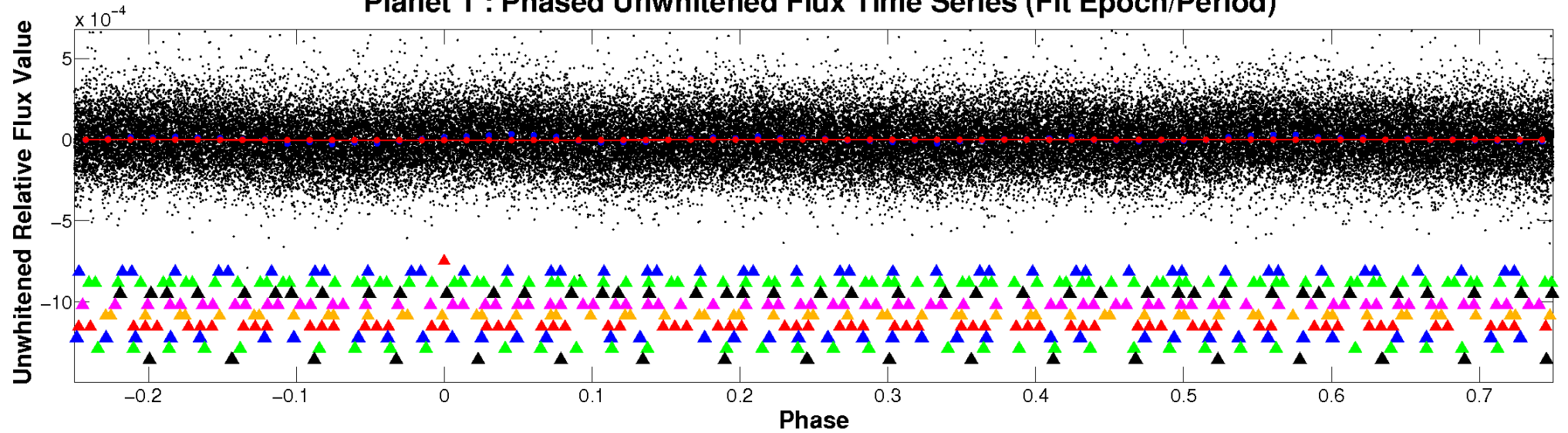
# ALT Odd/Even

TCE 006140084-01

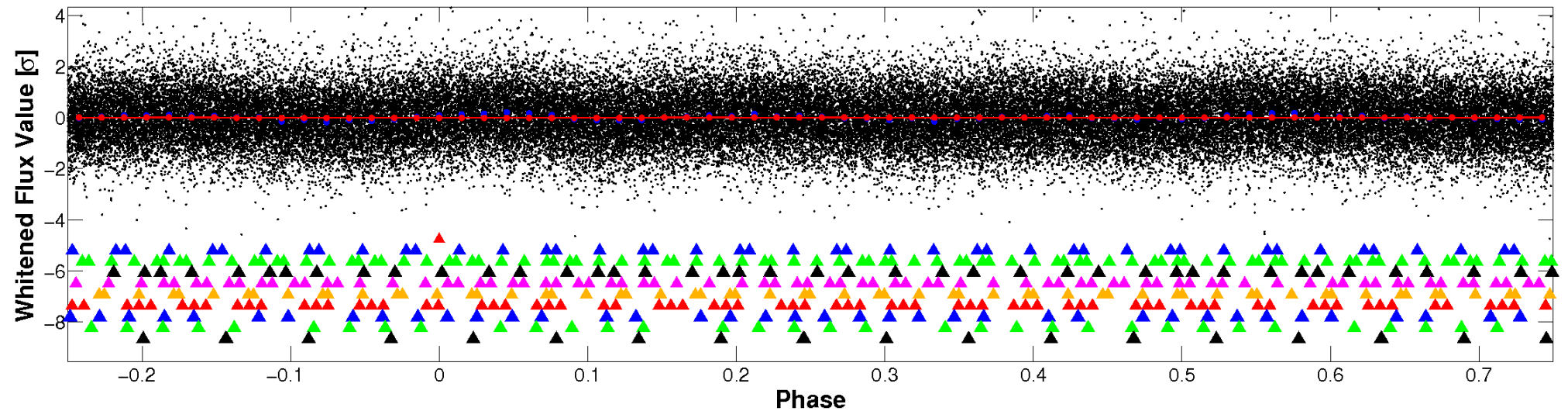


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**



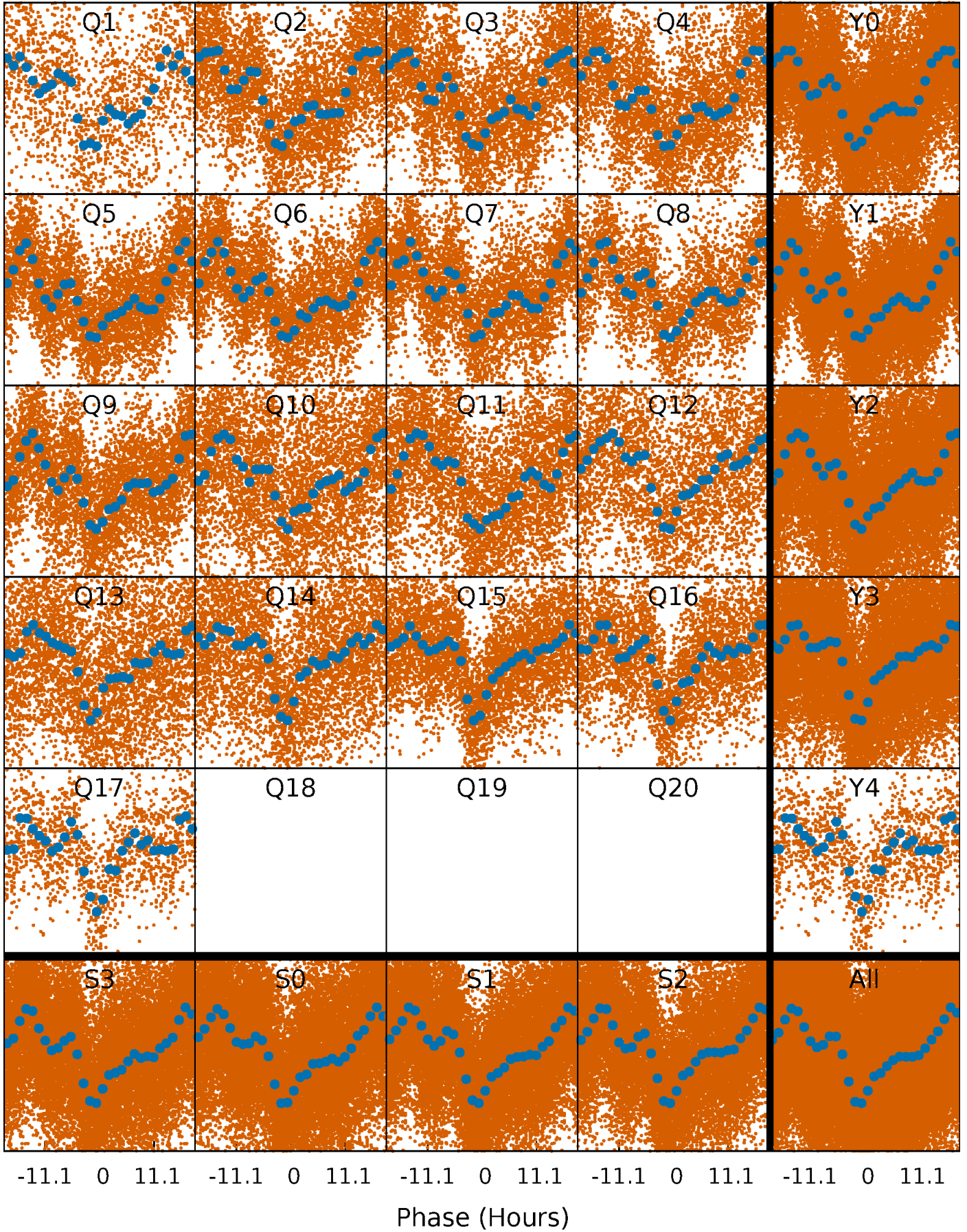
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





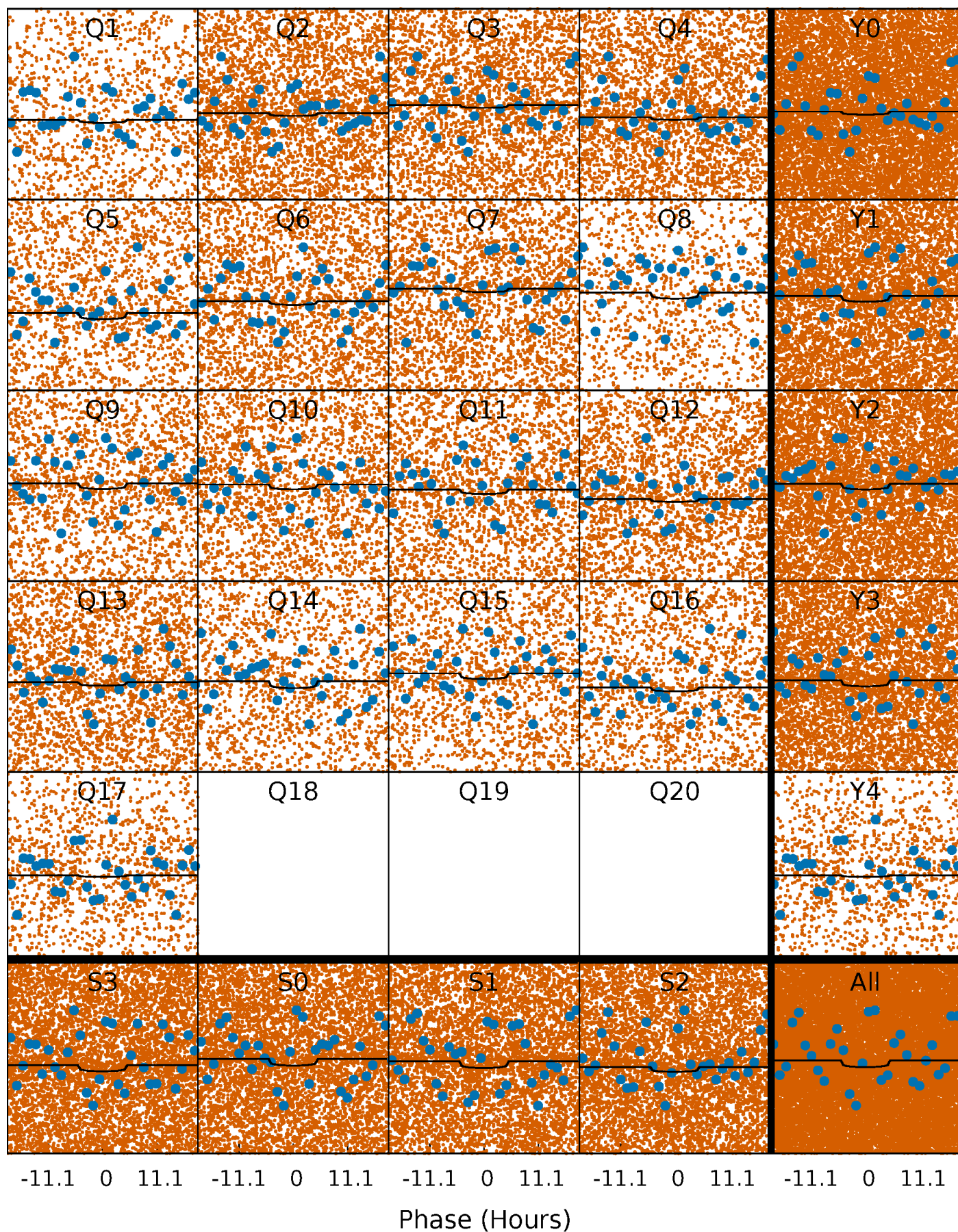
# PDC Quarter-Phased Transit Curves

TCE 006140084-01 P= 1.348478 Days  $T_0=132.076293$  (BKJD)



# DV Quarter-Phased Transit Curves

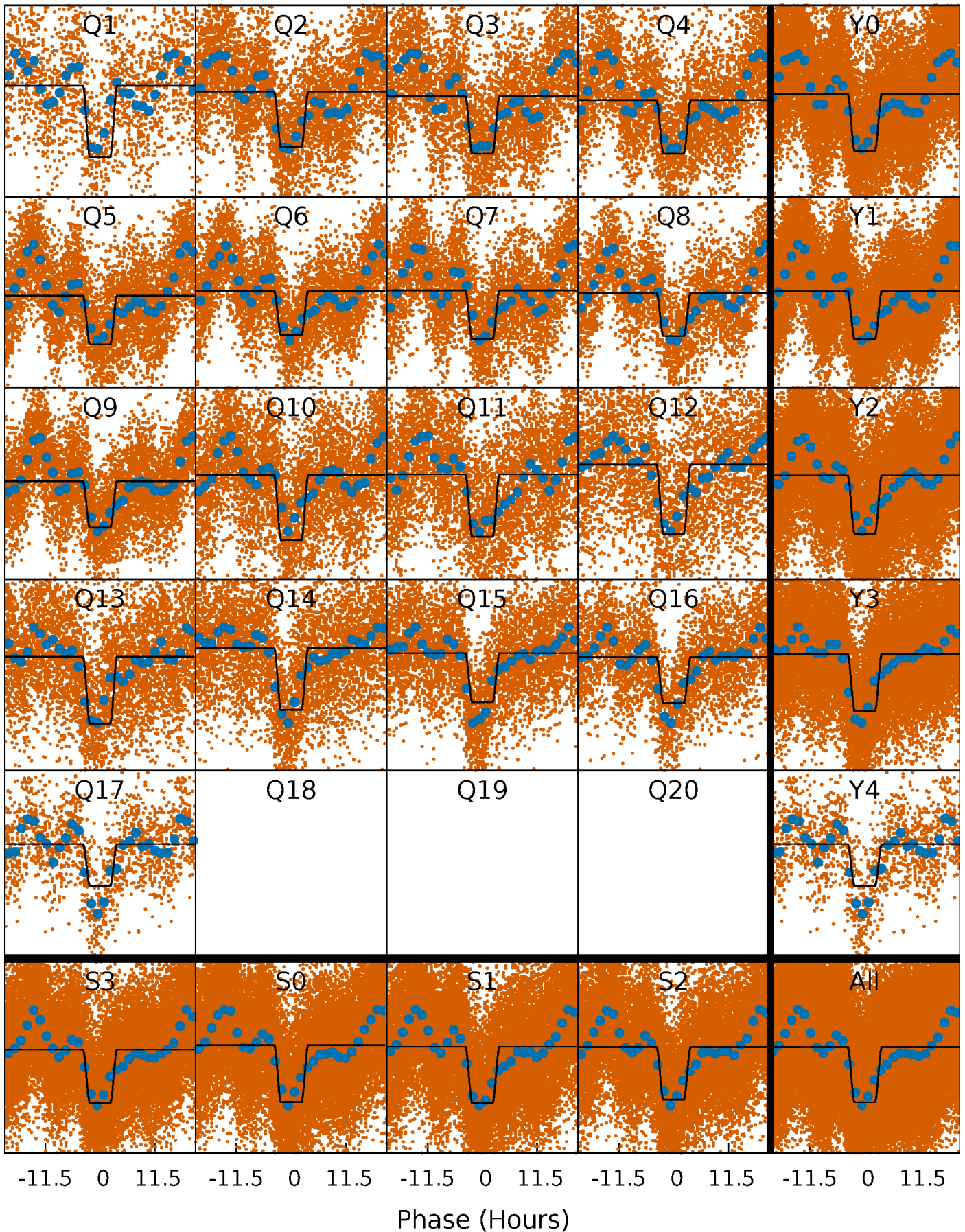
TCE 006140084-01 P= 1.348478 Days  $T_0=132.076293$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006140084-01 P= 1.348538 Days  $T_0=132.013800$  (BKJD)

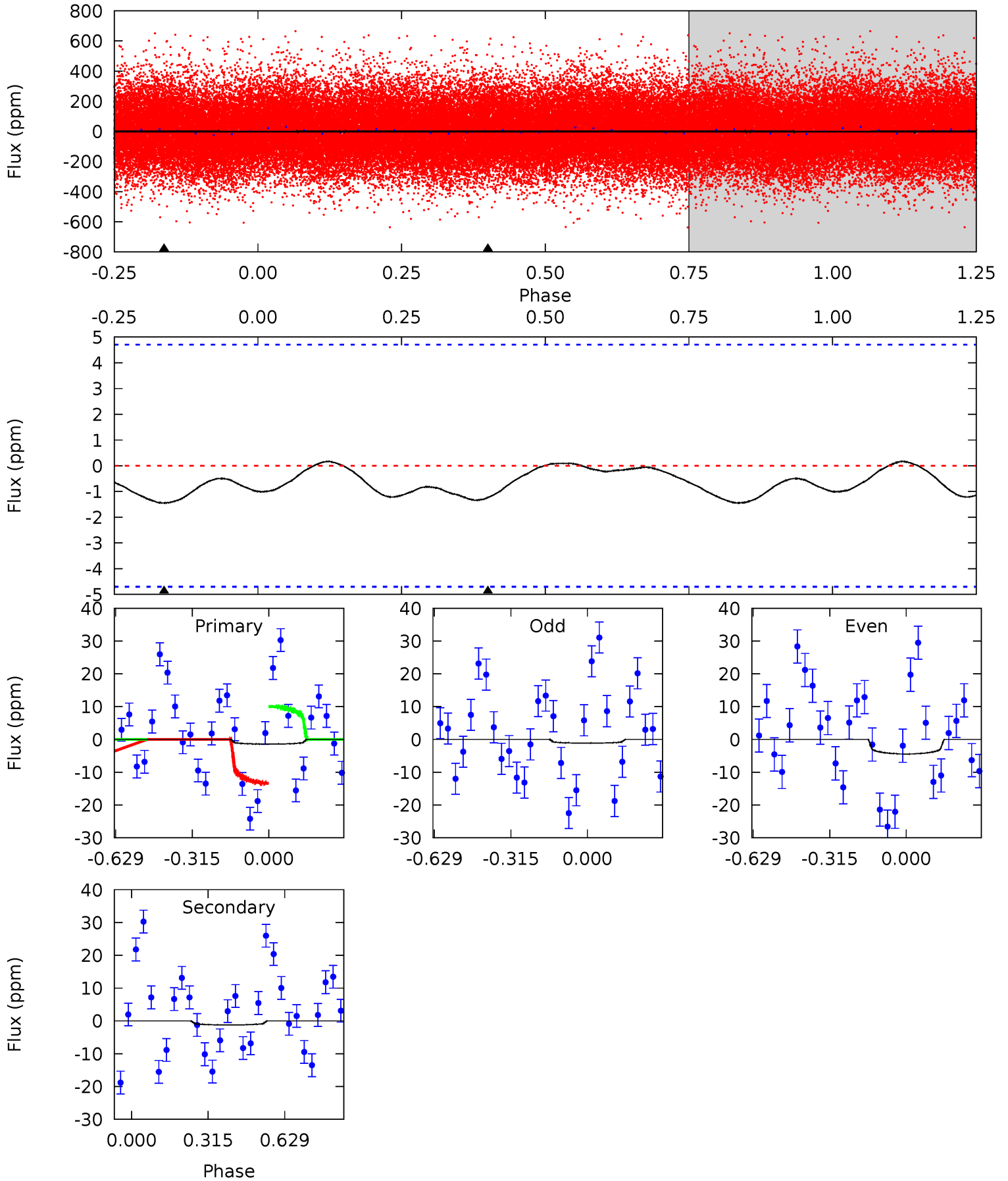




# DV Model-Shift Uniqueness Test

006140084-01, P = 1.348478 Days, E = 130.727815 Days

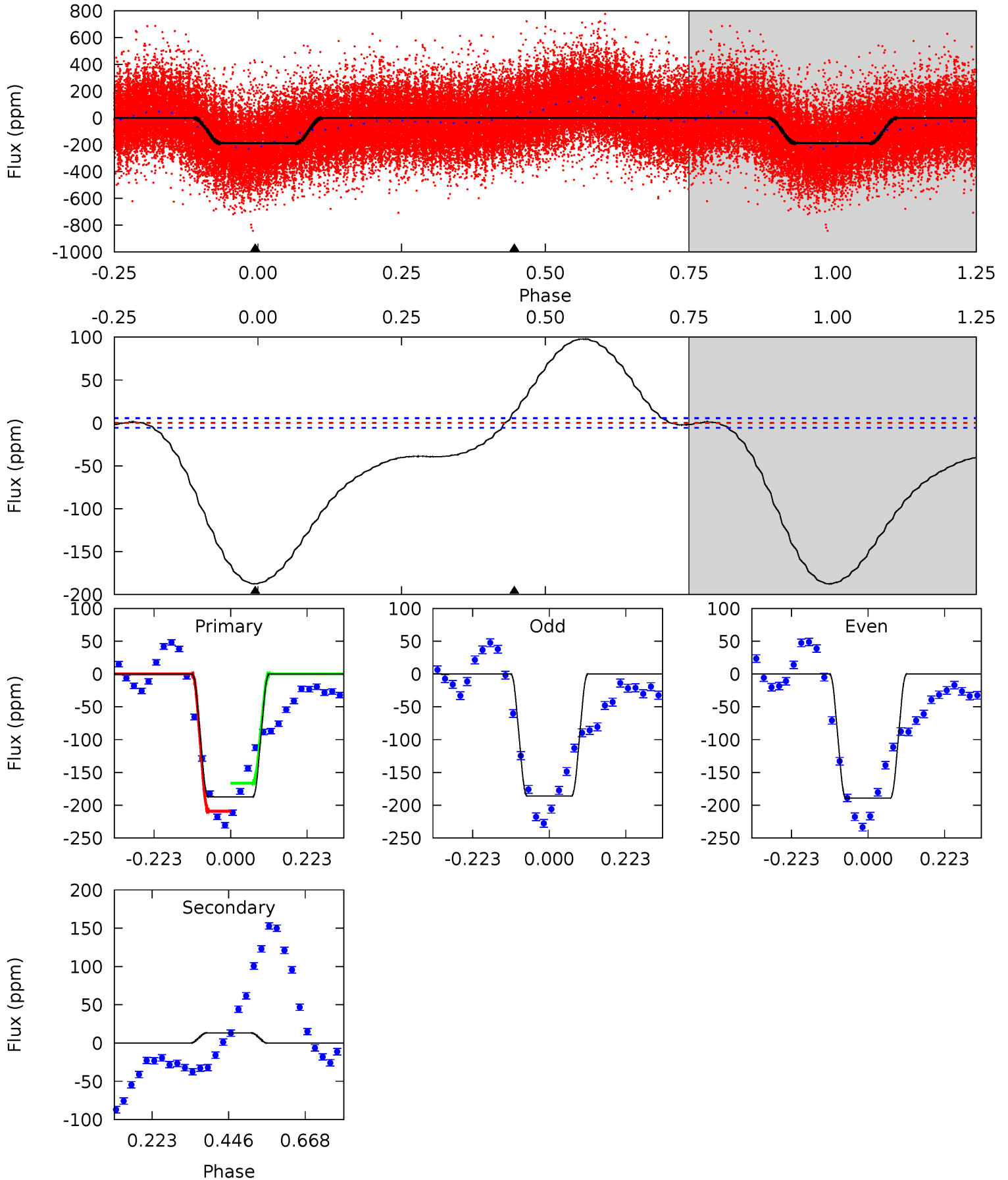
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 1.33 | 1.14 | 0   | 0   | 4.32            | 1.01            | 0.15             | 1.33    | 1.33    | 1.14    | 1.14    | 1.53    | 1.35 | 0.10  | 1.54 |



# Alt Model-Shift Uniqueness Test

006140084-01, P = 1.348538 Days, E = 130.665262 Days

| Pri   | Sec   | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|-------|-------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 145.8 | -10.2 | 0   | 0   | 4.39            | 1.22            | 9.85             | 145.8   | 145.8   | -10.2   | -10.2   | 1.25    | 1.02 | 0.34  | 16.6 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{max} (K)$        | $T_{obs} (K)$          | $A_{obs}$                  |
|---------|-------------|------------------------|----------------------|------------------------|----------------------------|
| DV      | $-1 \pm 1$  | $0.82^{+0.76}_{-0.56}$ | $3968^{+226}_{-397}$ | $3552^{+2942}_{-7126}$ | $0.553^{+4.352}_{-0.502}$  |
| Alt.    | $13 \pm 1$  | $4.09^{+1.18}_{-1.11}$ | $3983^{+231}_{-360}$ | $-4156^{+192}_{-236}$  | $-0.317^{+0.123}_{-0.272}$ |

$T_{max}$  = 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  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$



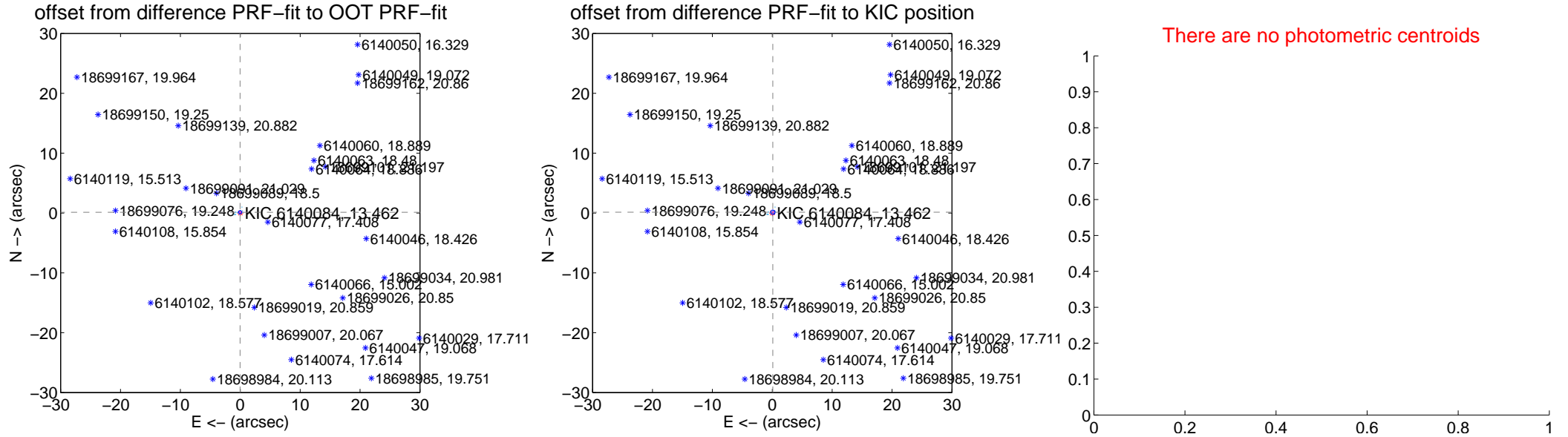
## DV Centroid Data

Supplemental centroid analysis for 006140084-01. Kepler magnitude: 13.46. Transit SNR 1.69

There are 17 quarters with good PRF difference image offsets

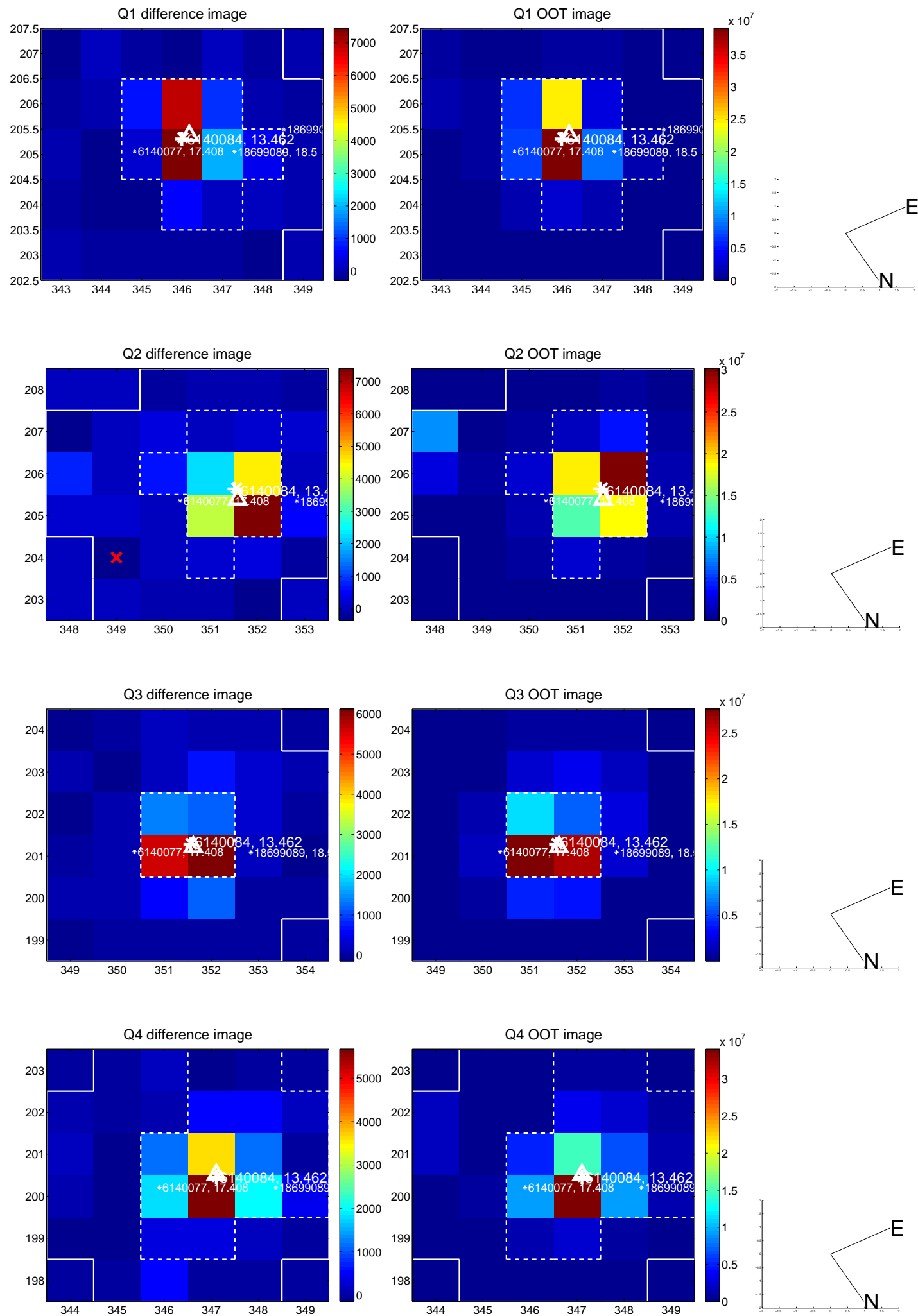
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.128 \pm 0.092$  | 1.40                | $0.028 \pm 0.112$  | $0.125 \pm 0.098$ |
| PRF-fit source offset from KIC position | $0.160 \pm 0.122$  | 1.32                | $-0.088 \pm 0.124$ | $0.134 \pm 0.095$ |
| photometric centroid source offset      | —                  | —                   | —                  | —                 |

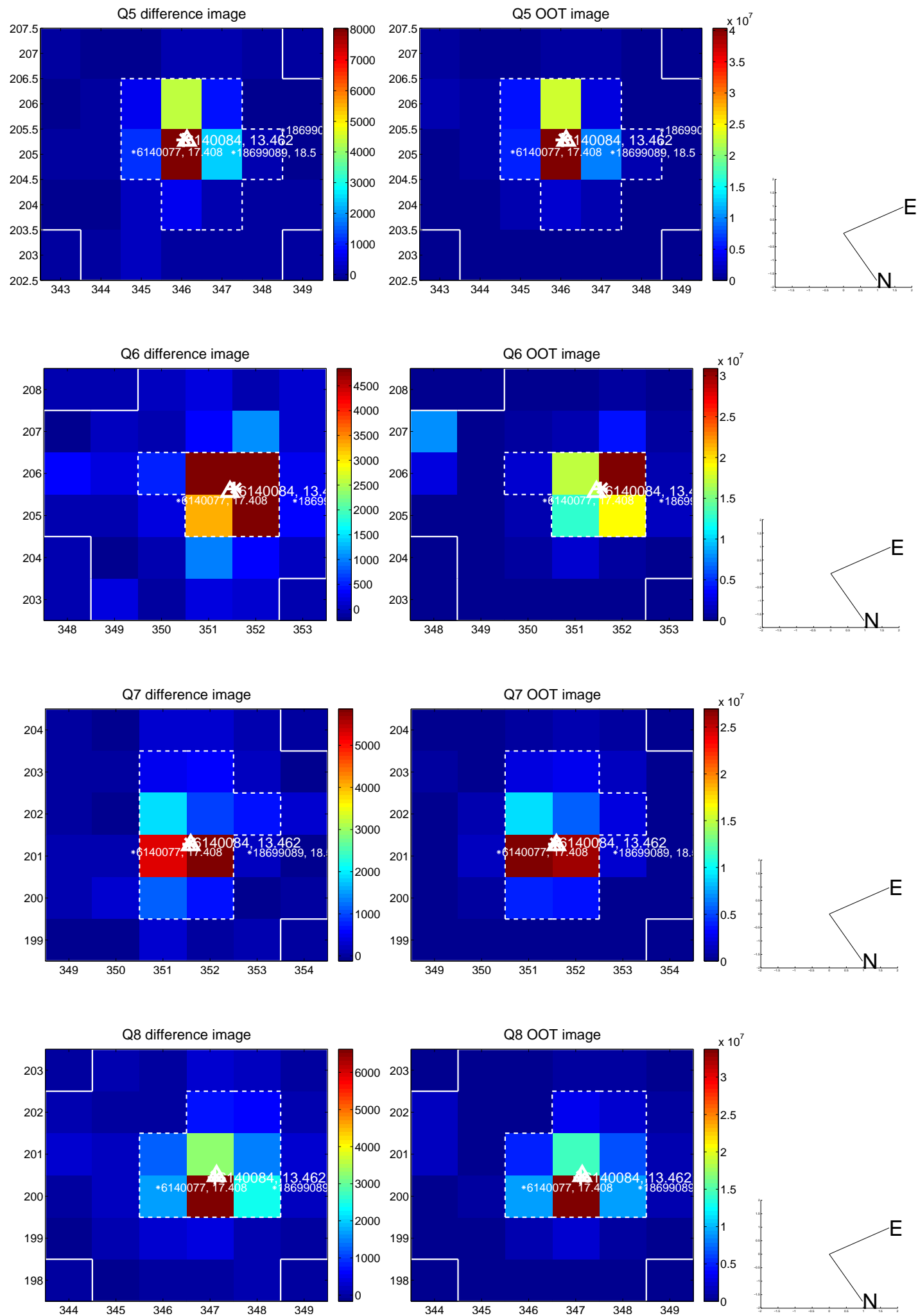


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

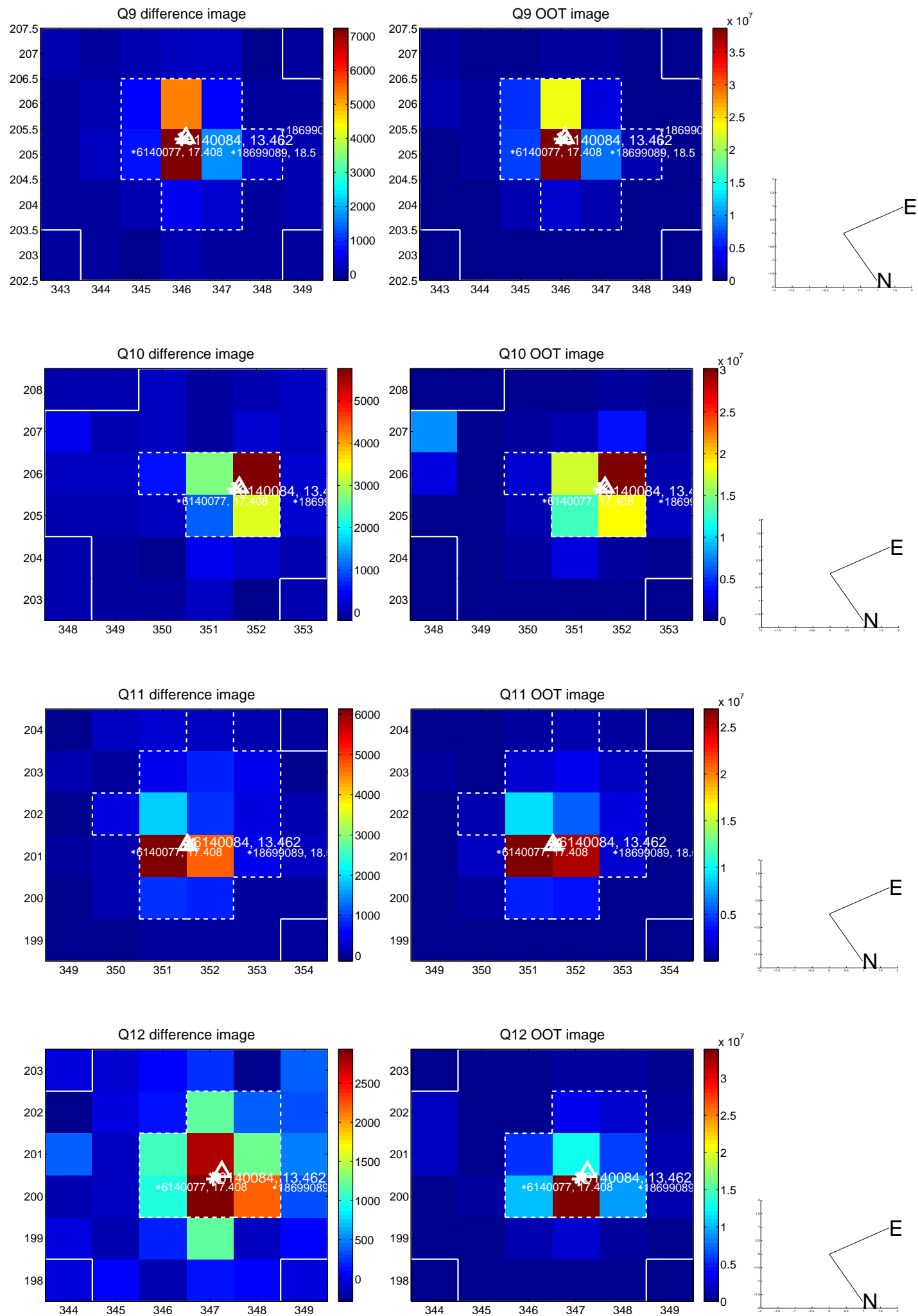


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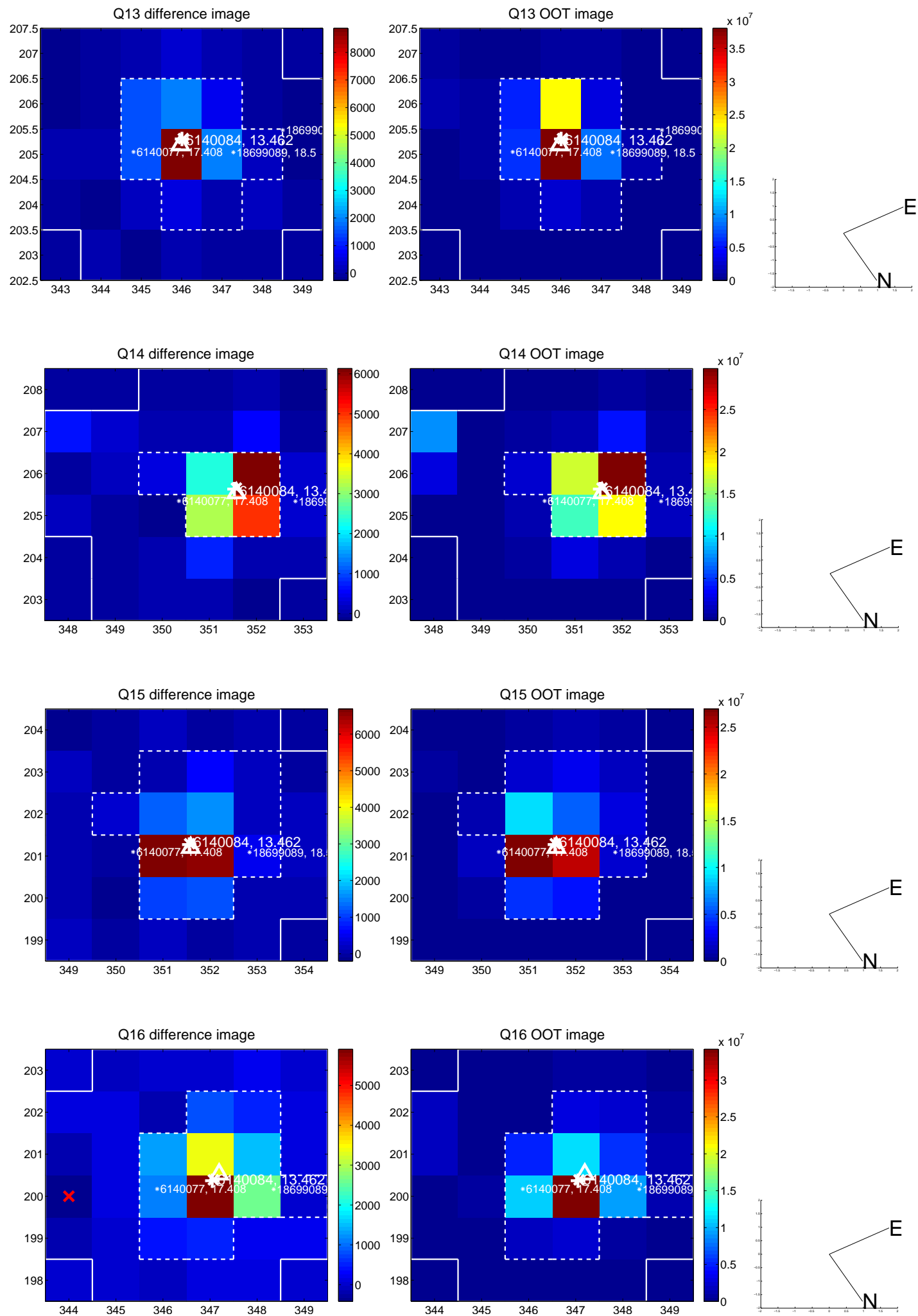




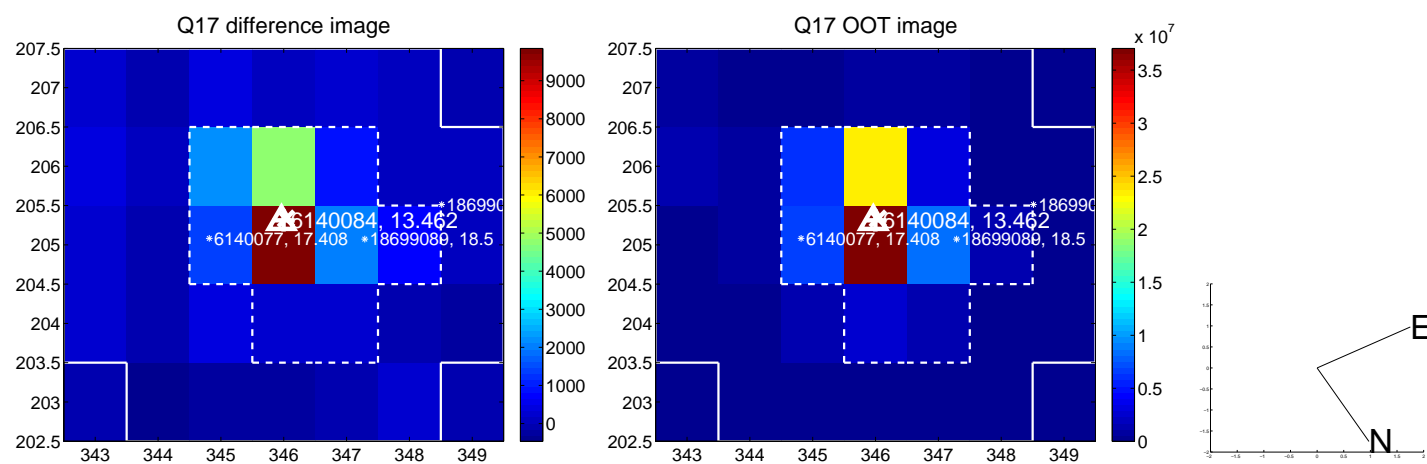
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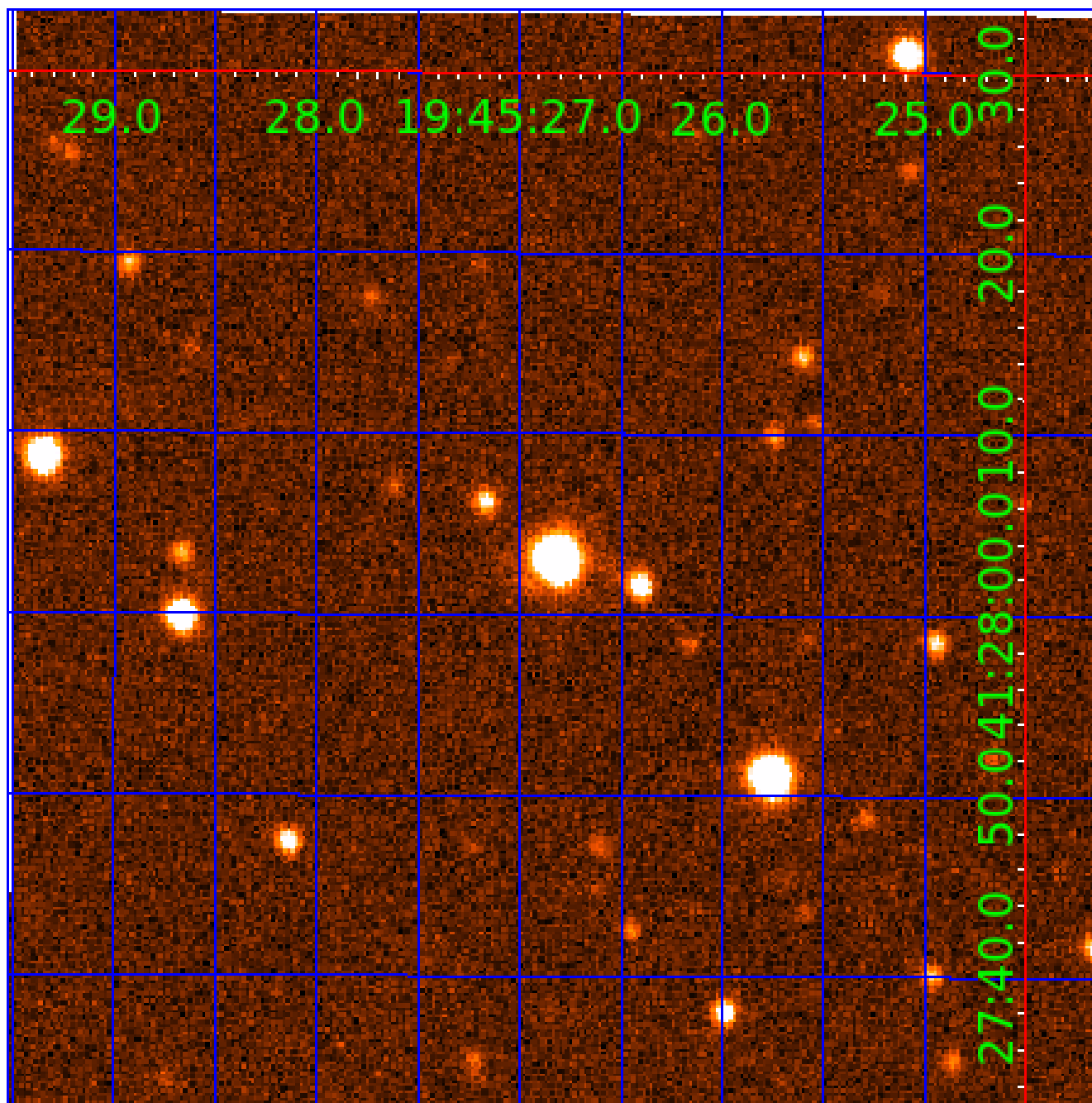
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folded centroid time series figure for this object.

UKIRT Image

Declination





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| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
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| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
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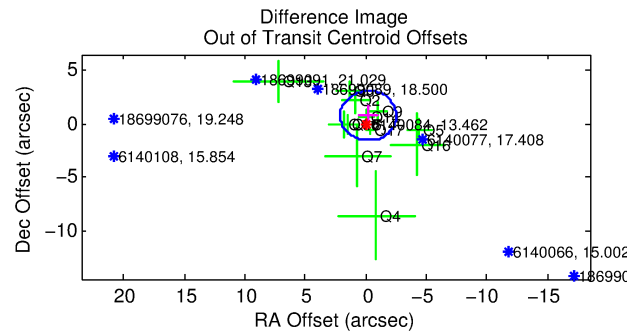
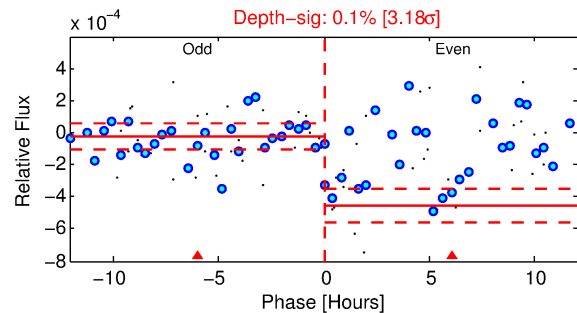
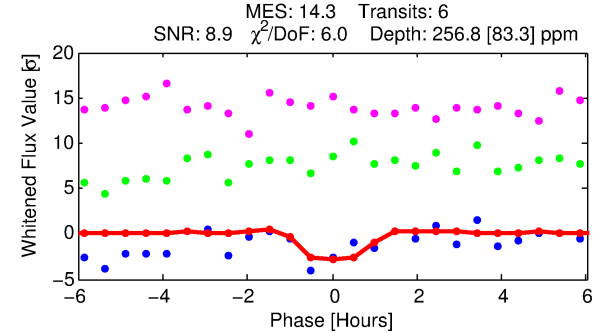
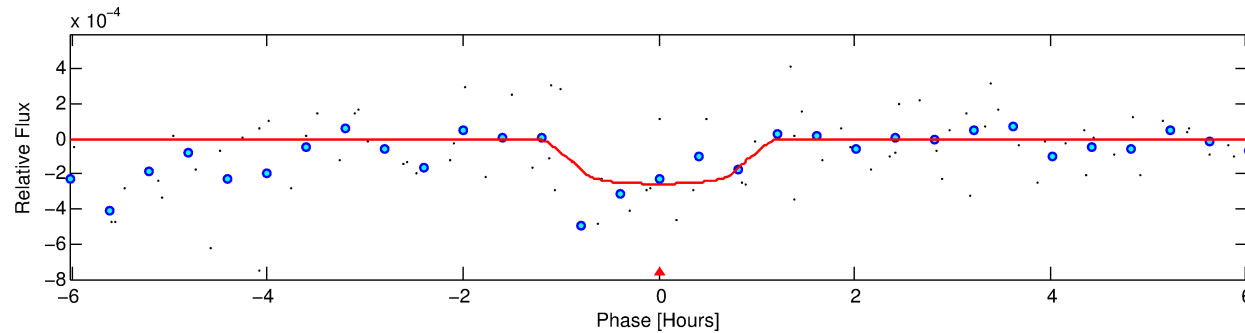
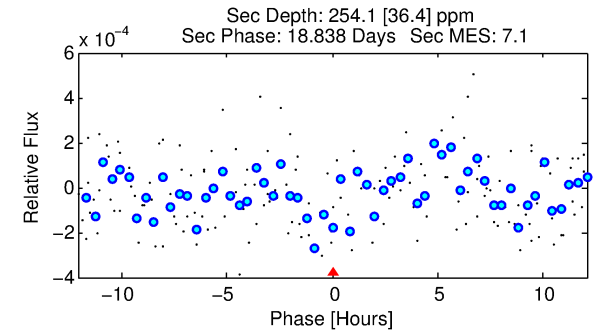
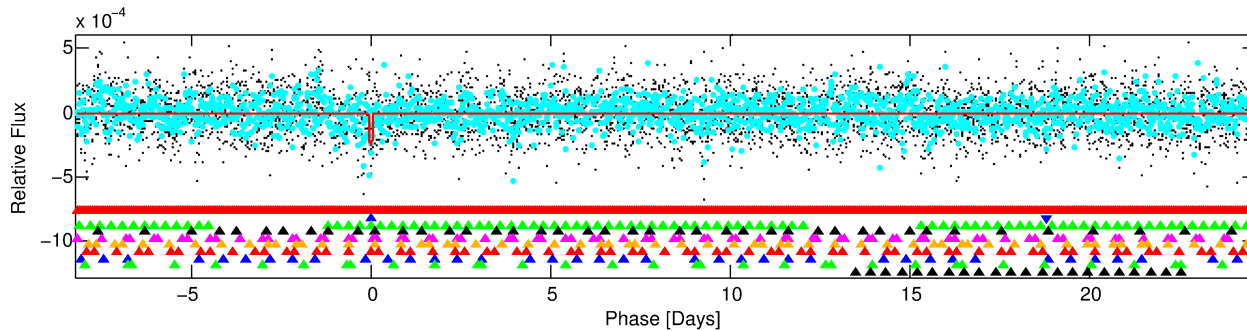
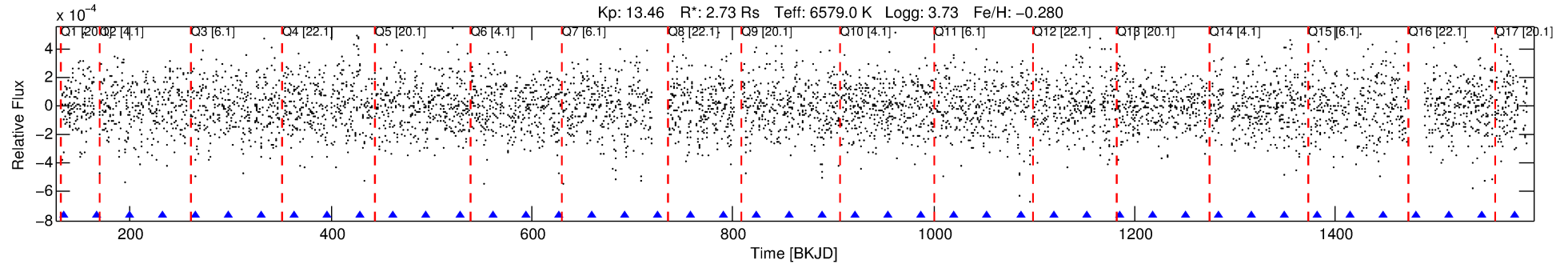
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-02

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 2 of 10 Period: 32.842 d



## DV Fit Results:

Period = 32.84225 [0.00062] d  
Epoch = 133.9132 [0.0179] BKJD  
Rp/R\* = 0.0165 [0.0835]  
a/R\* = 72.26 [2101.93]  
b = 0.84 [10.64]  
Seff = 242.03 [133.39]  
Teq = 1006 [139] K  
Rp = 4.91 [24.90] Re  
a = 0.2269 [0.0777] AU  
Ag = 299.23 [3035.10] [0.10σ]  
Teffp = 6467 [16378] K [0.33σ]

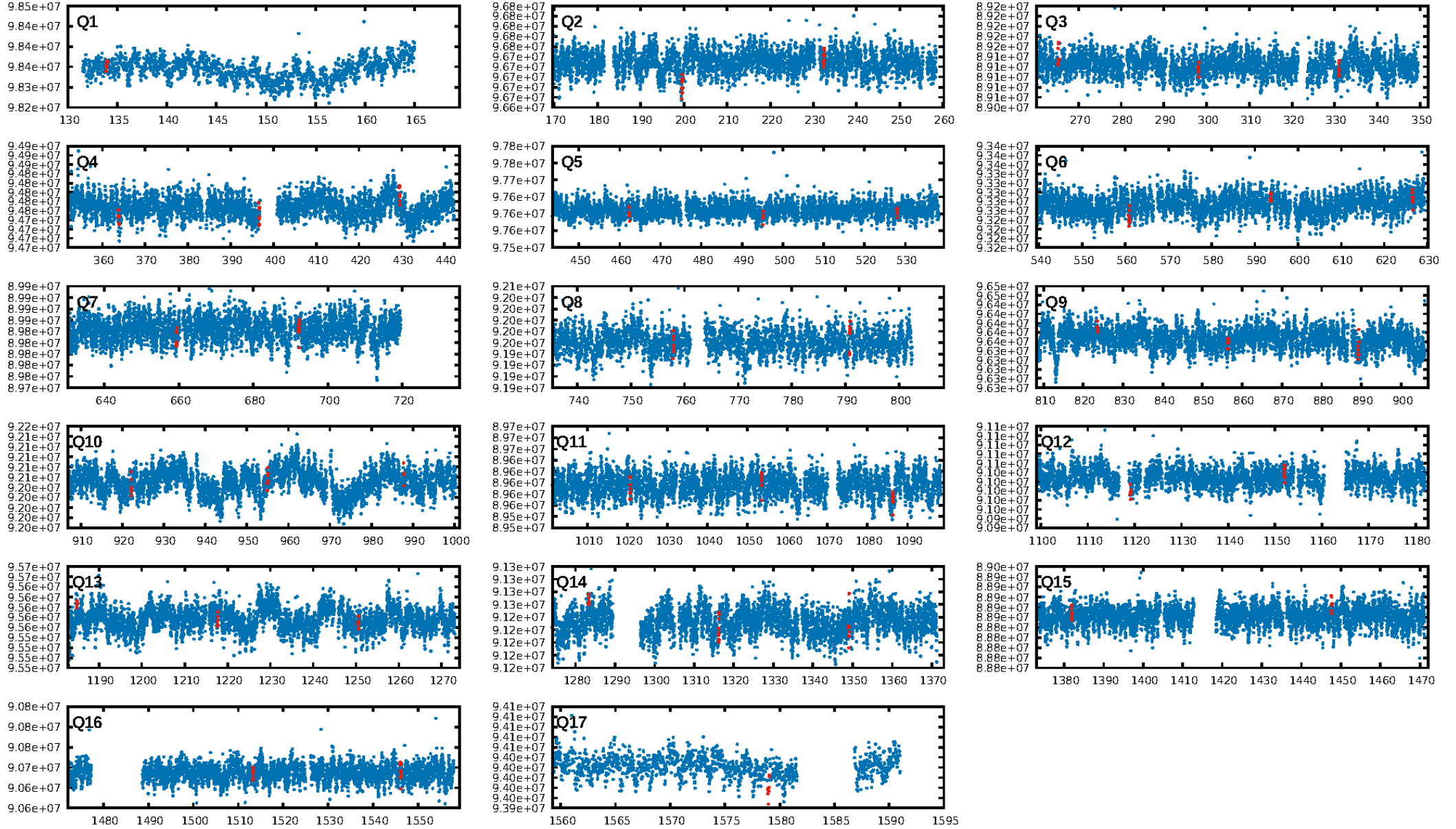
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [64.35σ]  
LongPeriod-sig: 100.0% [8.33σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: -2.577  
Centroid-sig: 15.4%  
Centroid-so: 0.755 arcsec [1.17σ]  
OotOffset-rm: 0.784 arcsec [1.02σ]  
OotOffset-st: 2/4/2/4 [12]  
KicOffset-rm: 0.846 arcsec [1.28σ]  
KicOffset-st: 2/4/2/4 [12]  
DiffImageQuality-fgm: 0.17 [2/12]  
DiffImageOverlap-fno: 0.59 [10/17]

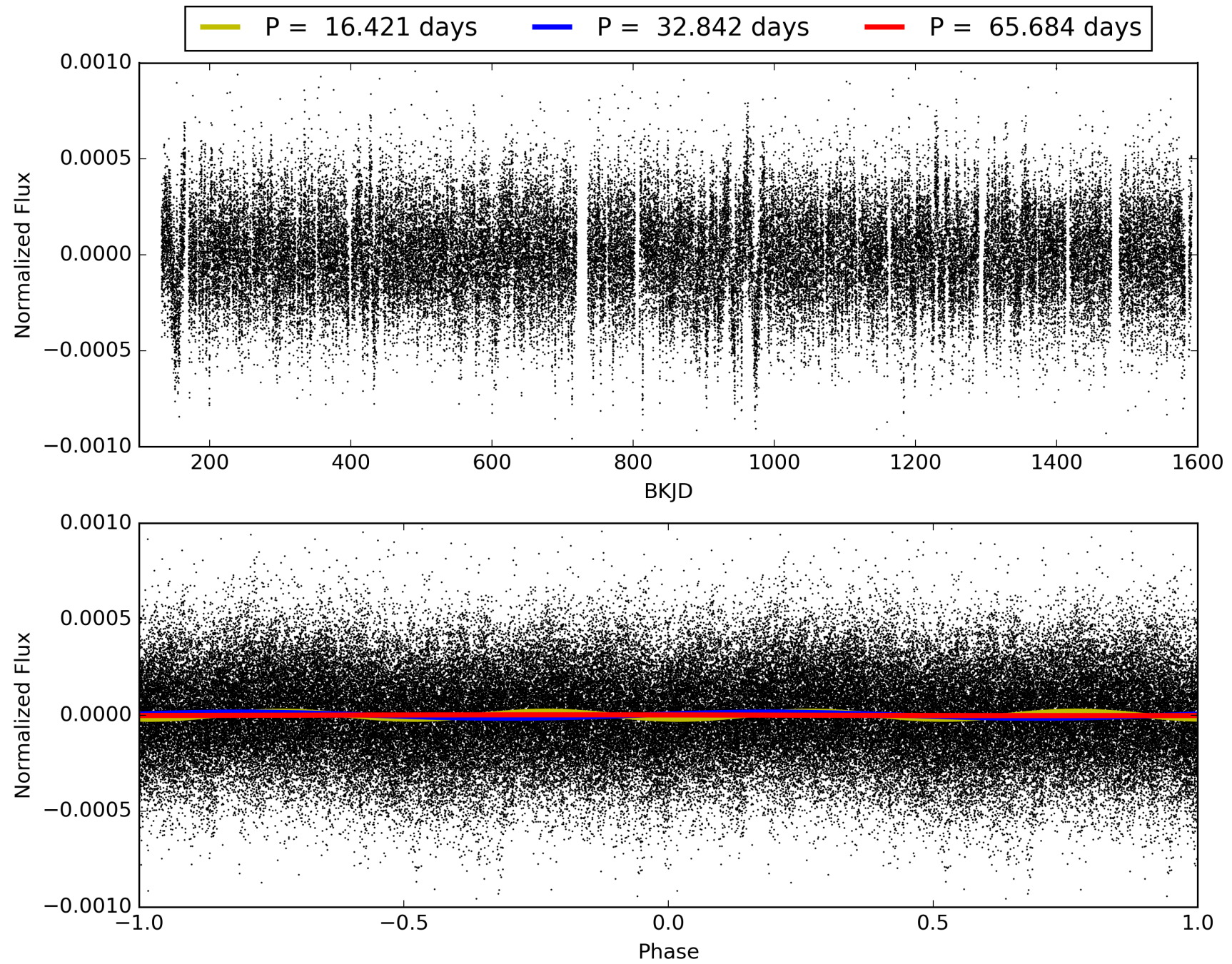
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:30 Z

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

# TCE 006140084-02, PDC Light Curves

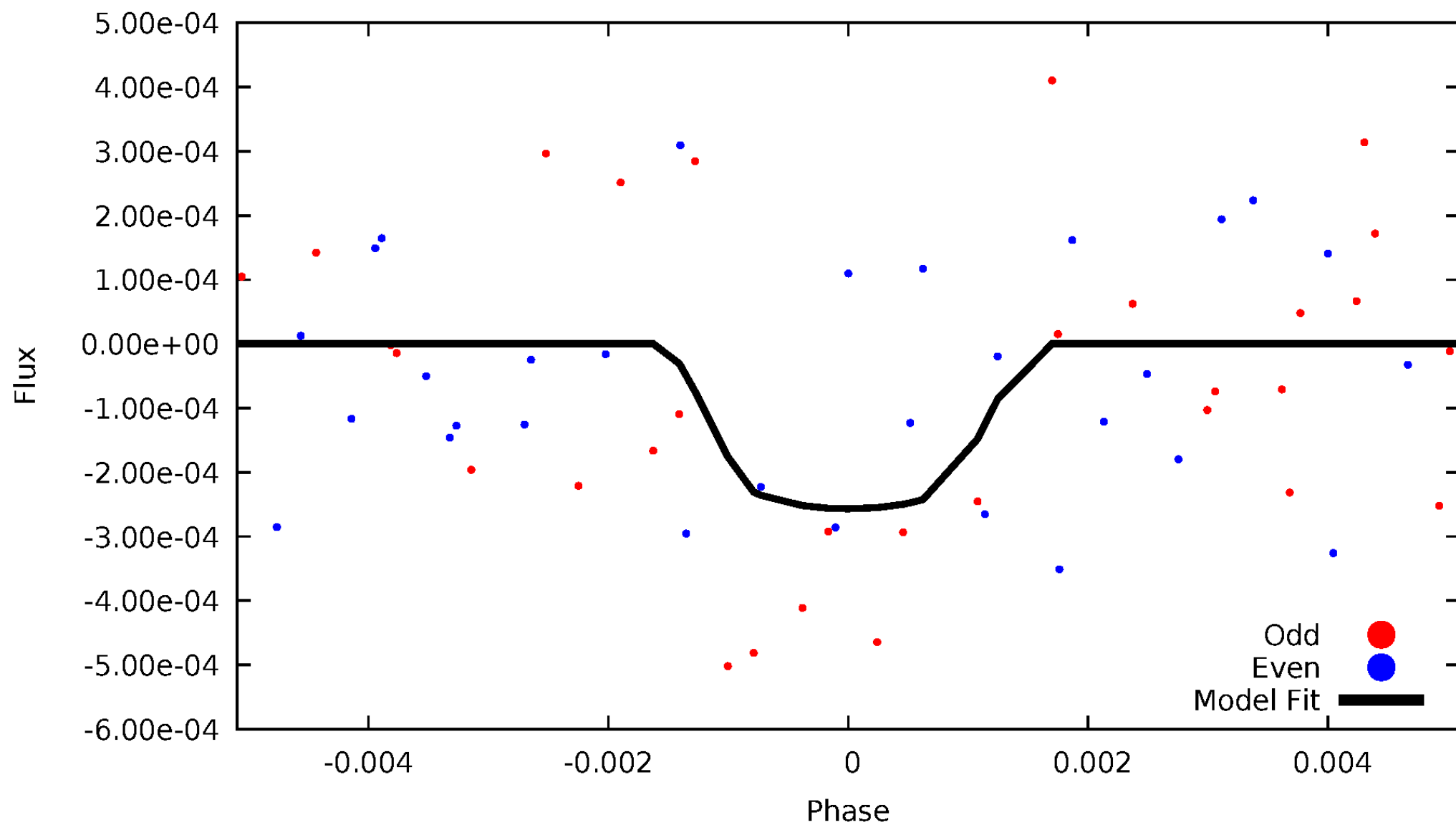


TCE 006140084-02



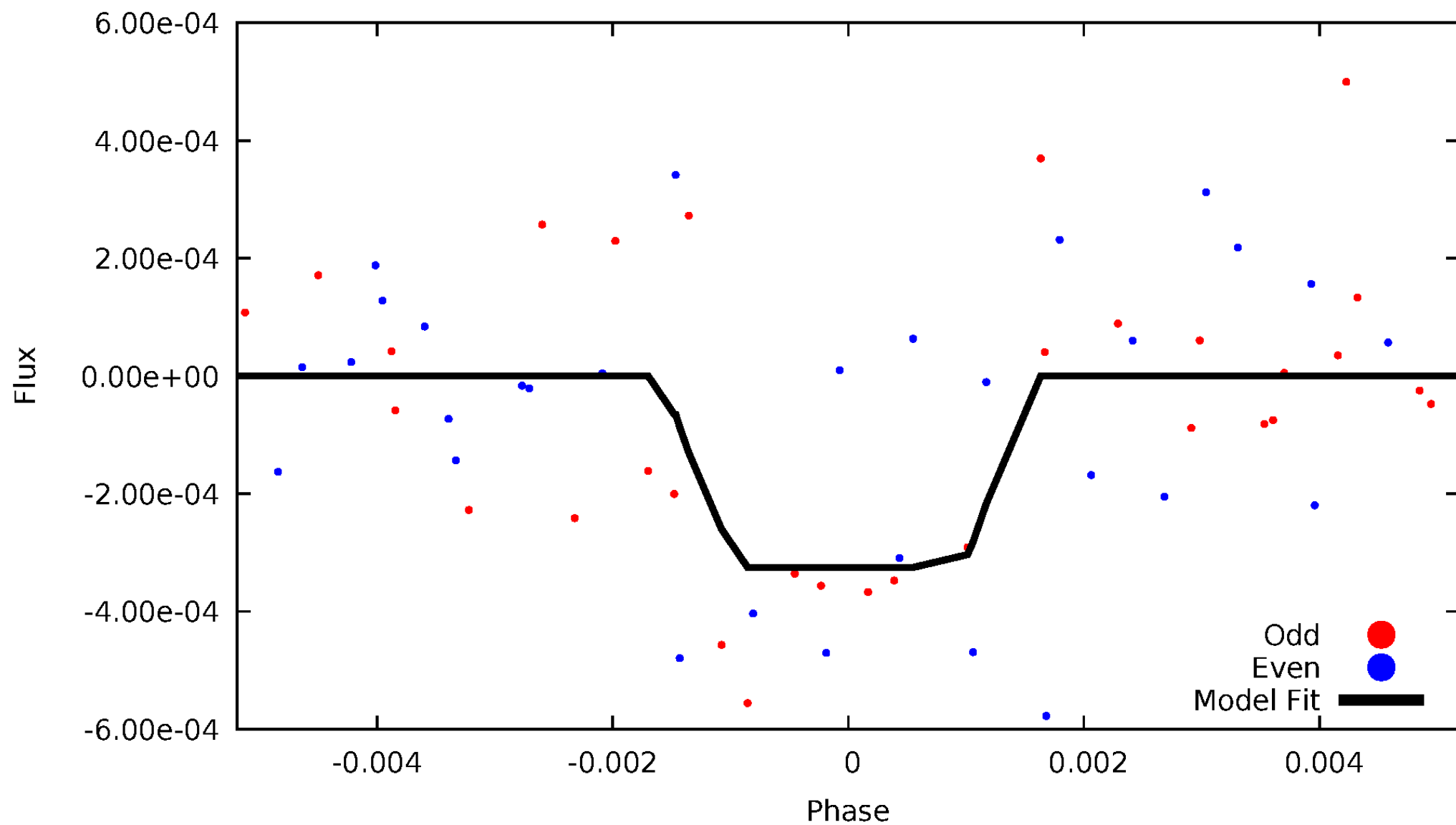
# DV Odd/Even

TCE 006140084-02



# ALT Odd/Even

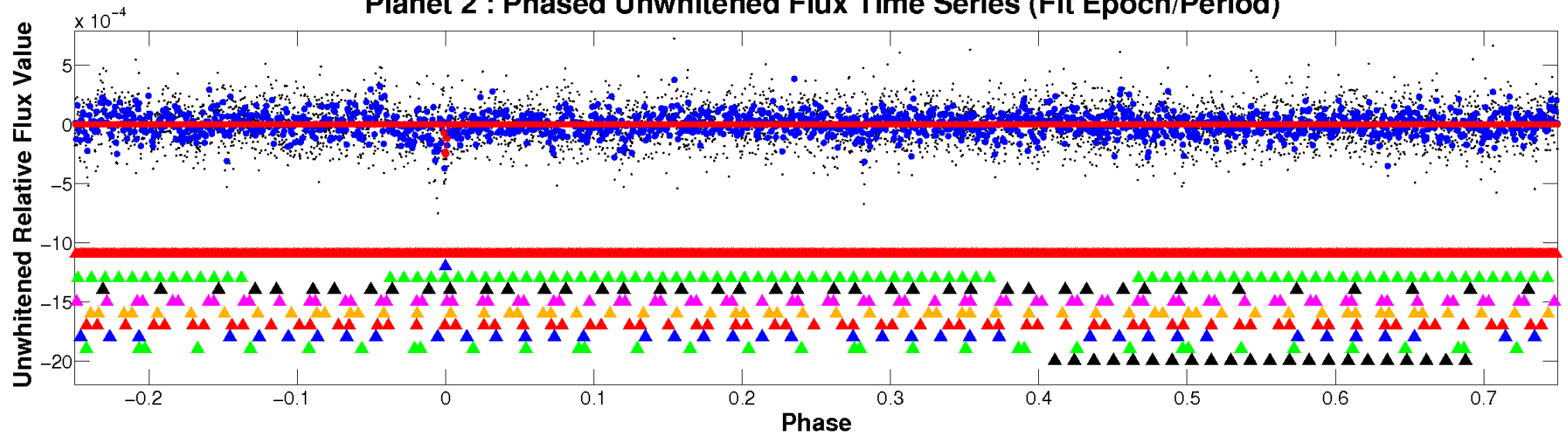
TCE 006140084-02



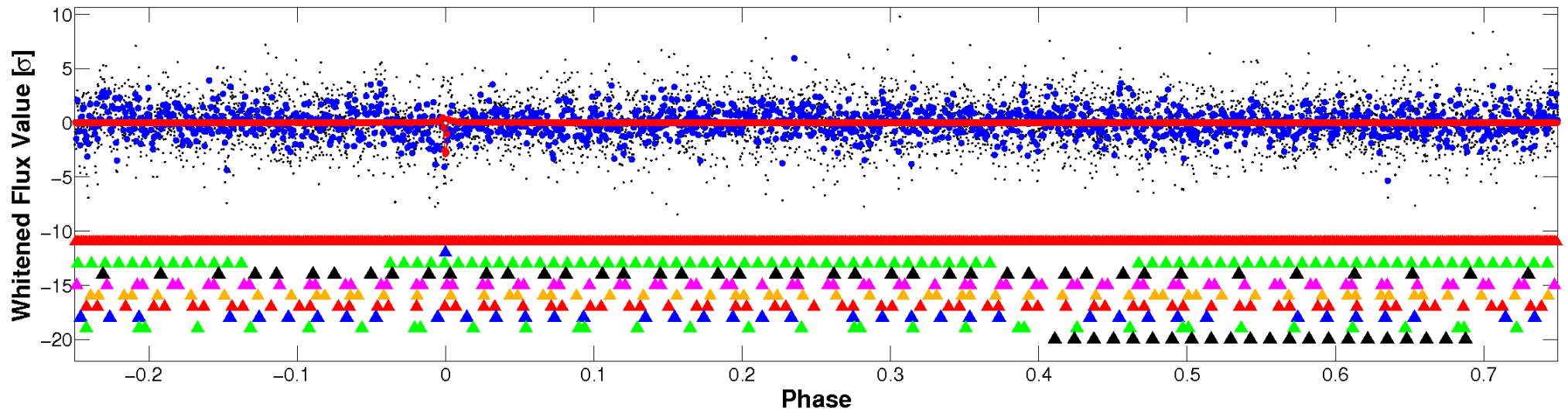


# Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

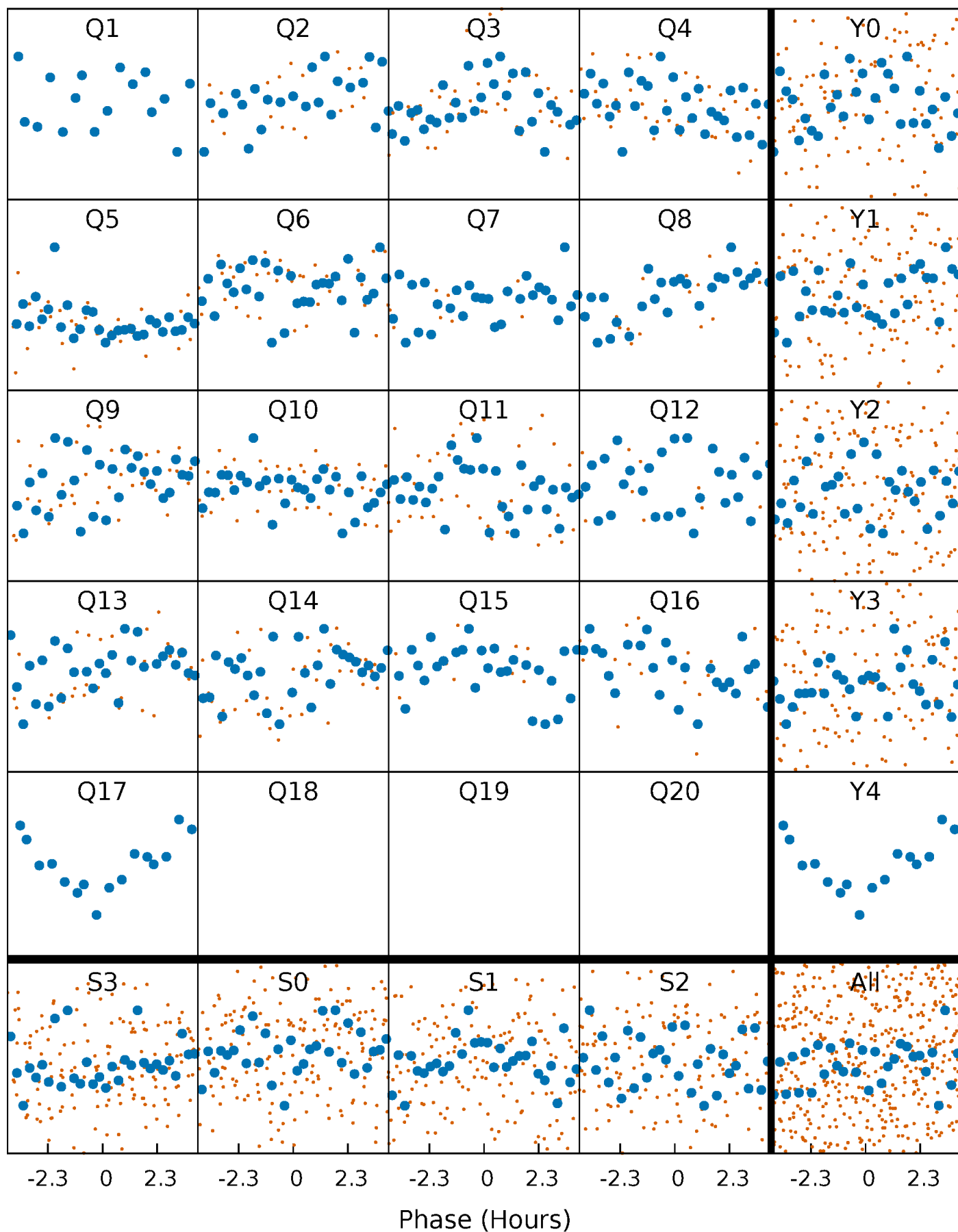


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



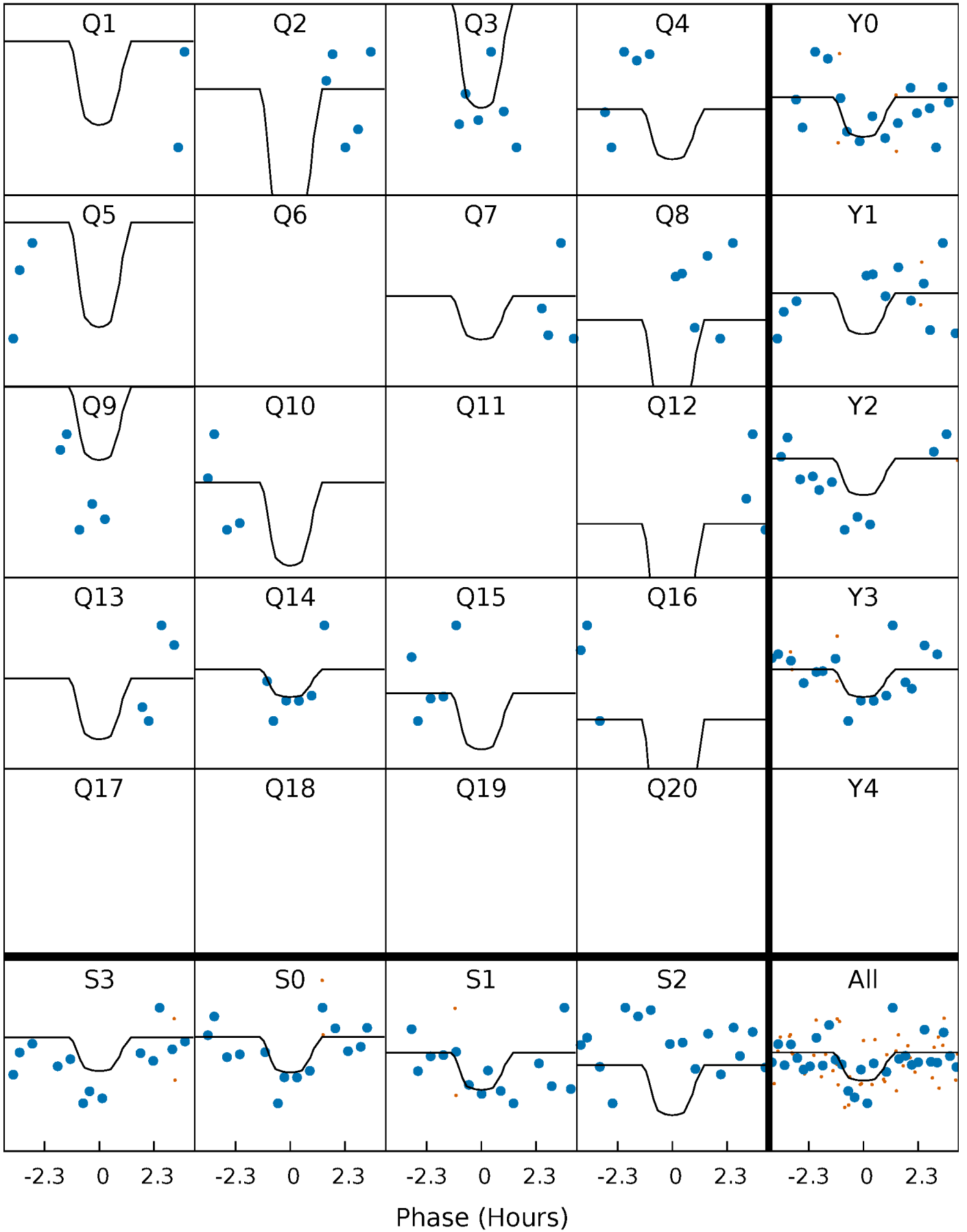
# PDC Quarter-Phased Transit Curves

TCE 006140084-02   P= 32.842249 Days    $T_0=133.913243$  (BKJD)



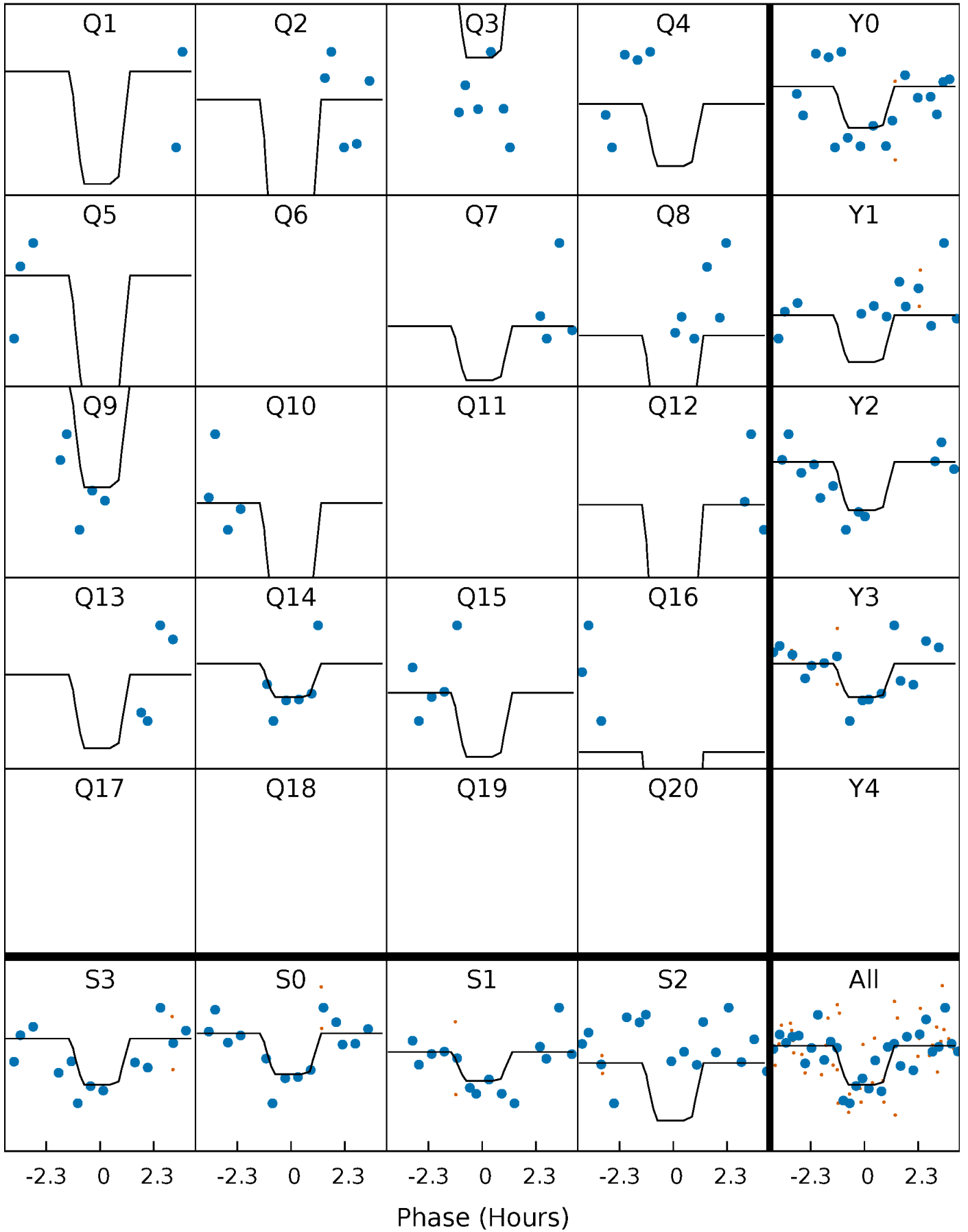
# DV Quarter-Phased Transit Curves

TCE 006140084-02   P= 32.842249 Days    $T_0=133.913243$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006140084-02   P= 32.842235 Days    $T_0=133.915952$  (BKJD)

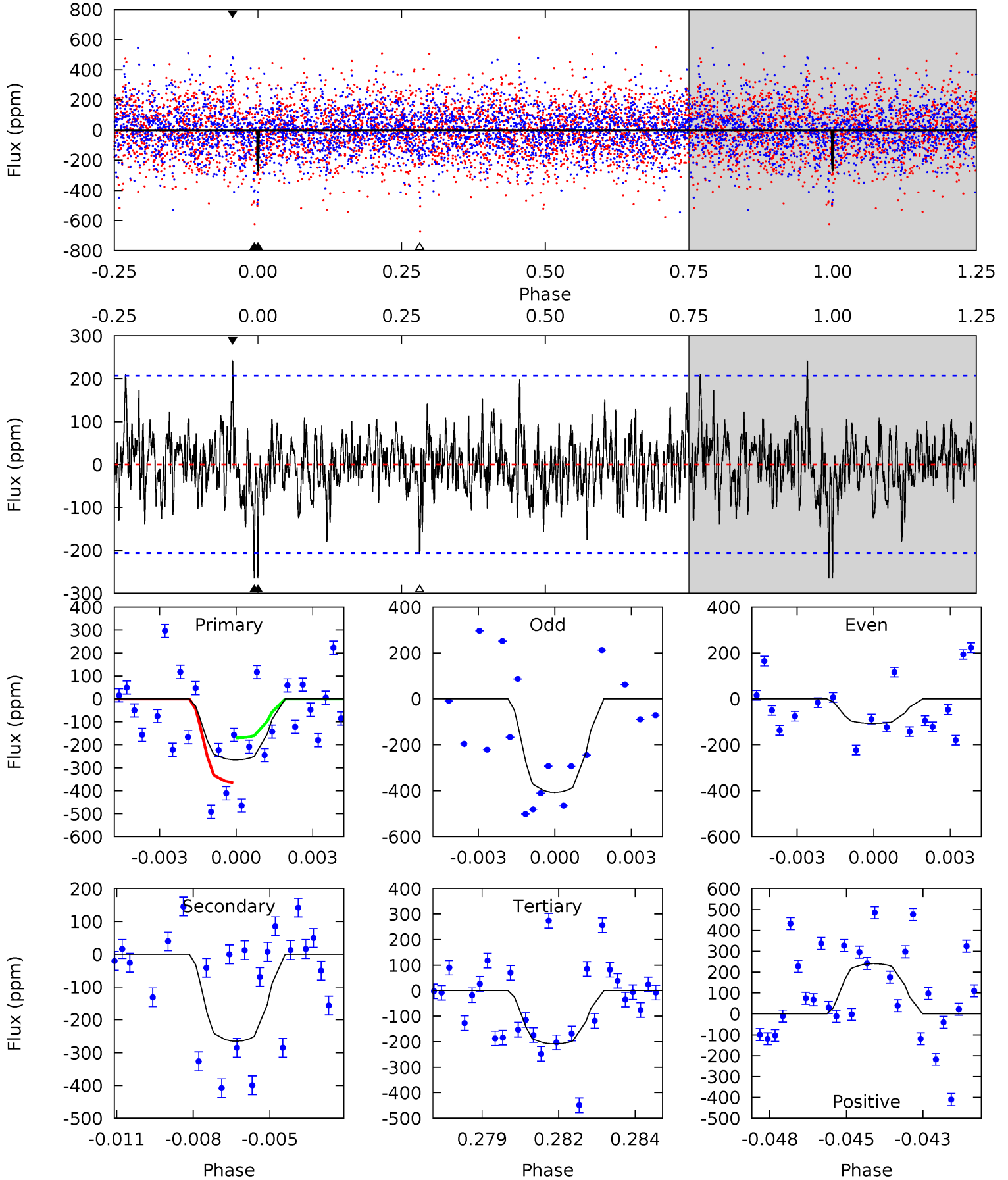




# DV Model-Shift Uniqueness Test

006140084-02, P = 32.842249 Days, E = 101.070994 Days

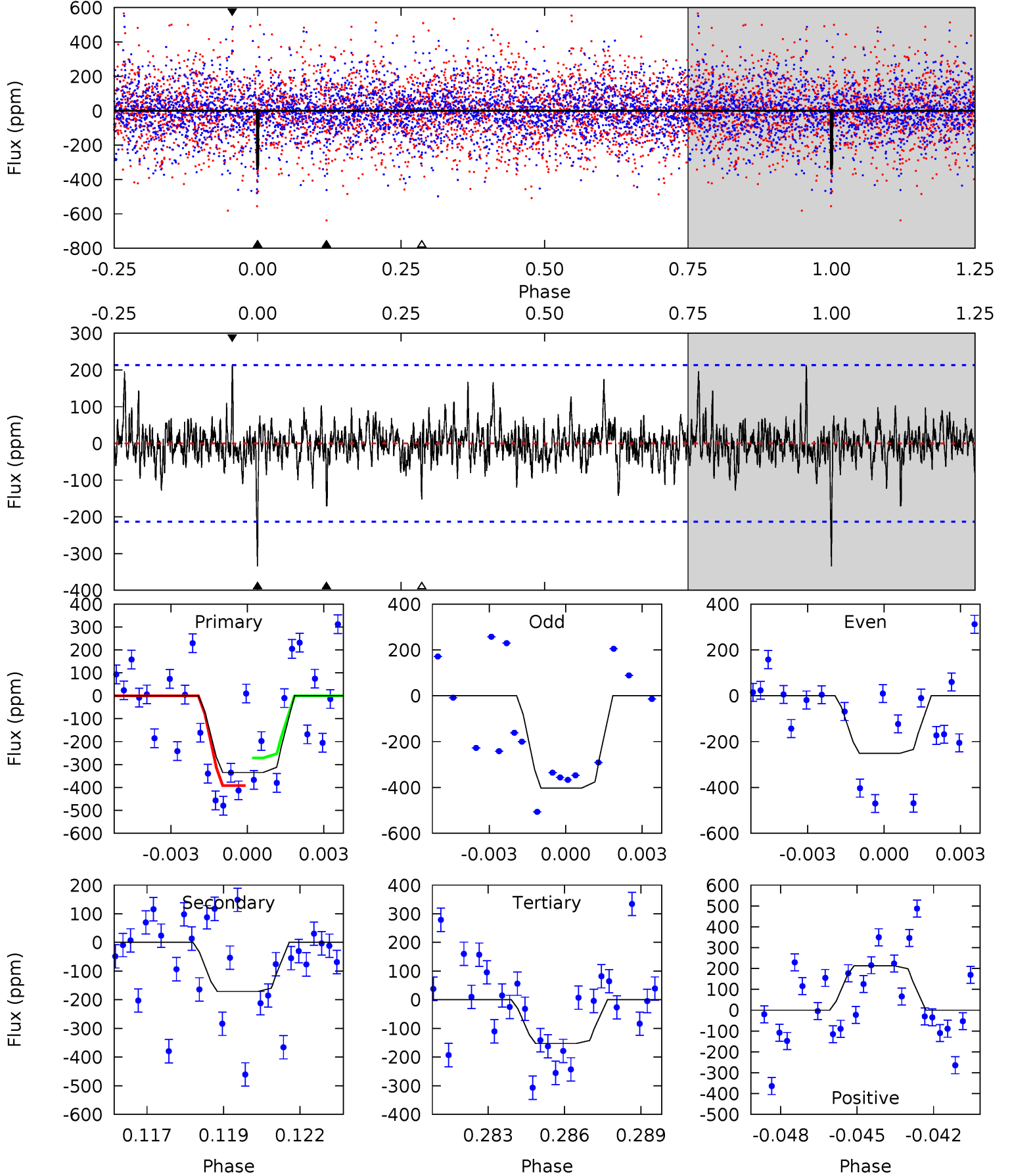
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.78 | 6.77 | 5.32 | 6.15 | 5.27            | 3.00            | 1.46             | 1.45    | 0.63    | 1.45    | 0.63    | 3.85    | 0.81 | 0.48  | 2.48 |



# Alt Model-Shift Uniqueness Test

006140084-02, P = 32.842235 Days, E = 101.073717 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.27 | 4.23 | 3.77 | 5.26 | 5.28            | 3.01            | 1.04             | 4.50    | 3.01    | 0.46    | -1.03   | 1.93    | 0.76 | 0.39  | 1.48 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-02 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$        | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$  | $A_{\text{obs}}$  |
|---------|---------------|---------------------------|----------------------|-----------------------|-------------------|
| DV      | $-265 \pm 39$ | $17.42^{+18.28}_{-12.06}$ | $1361^{+84}_{-107}$  | $3726^{+2282}_{-764}$ | $24^{+241}_{-19}$ |
| Alt.    | $-171 \pm 40$ | $17.27^{+19.32}_{-11.87}$ | $1369^{+86}_{-112}$  | $3456^{+1816}_{-670}$ | $16^{+148}_{-12}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = 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  $A_{\text{obs}} \gg 1.0$

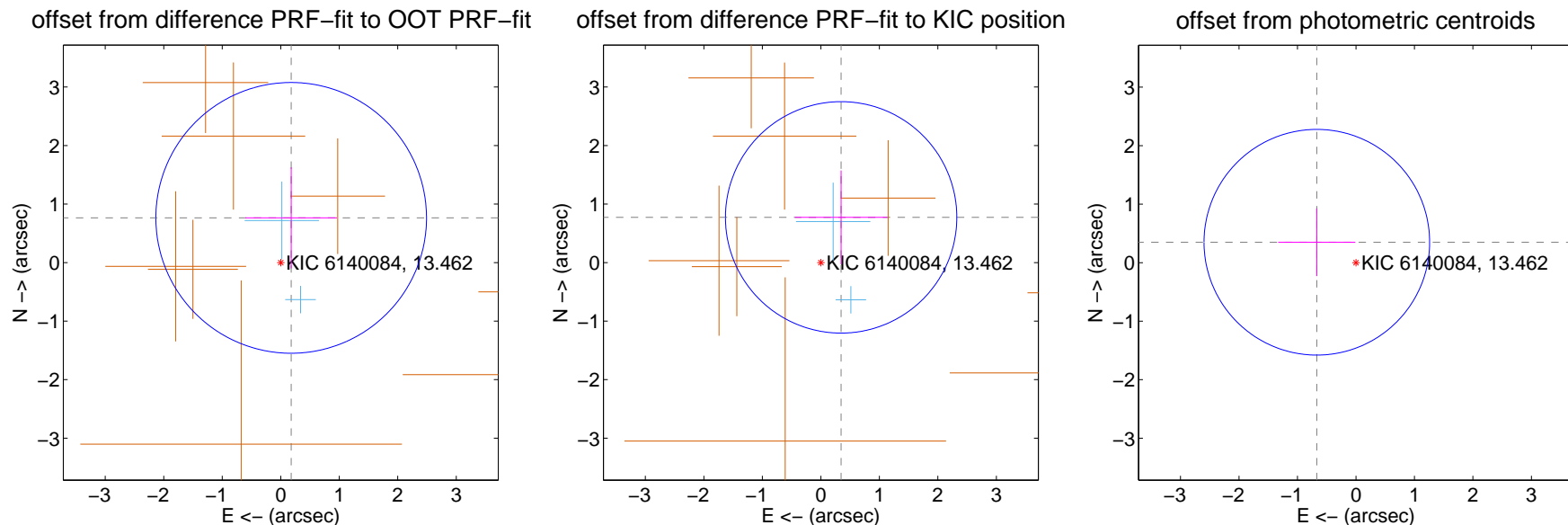
## DV Centroid Data

Supplemental centroid analysis for 006140084-02. Kepler magnitude: 13.46. Transit SNR 8.89

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

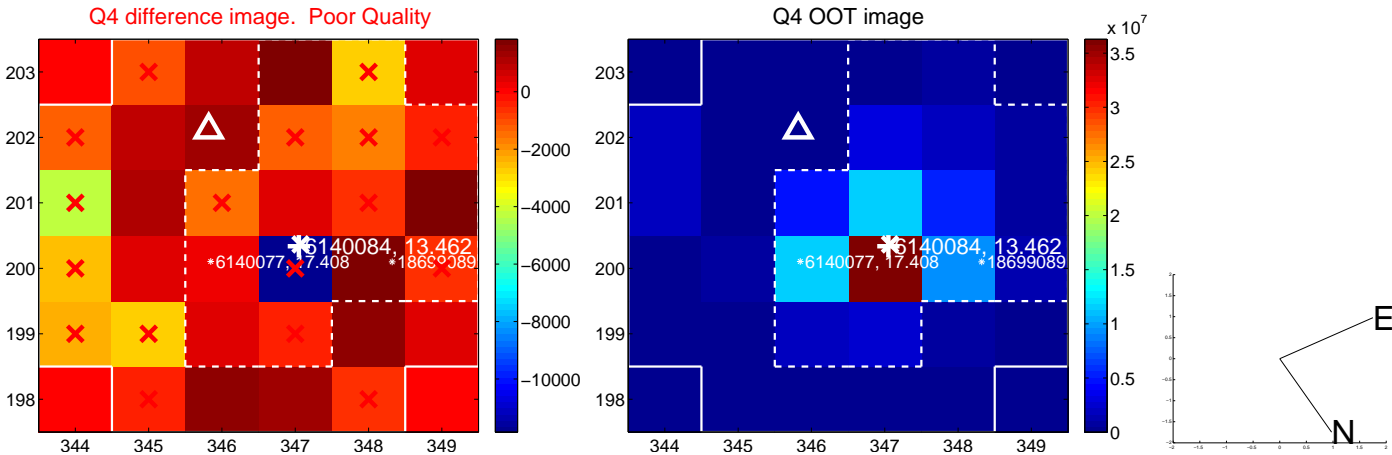
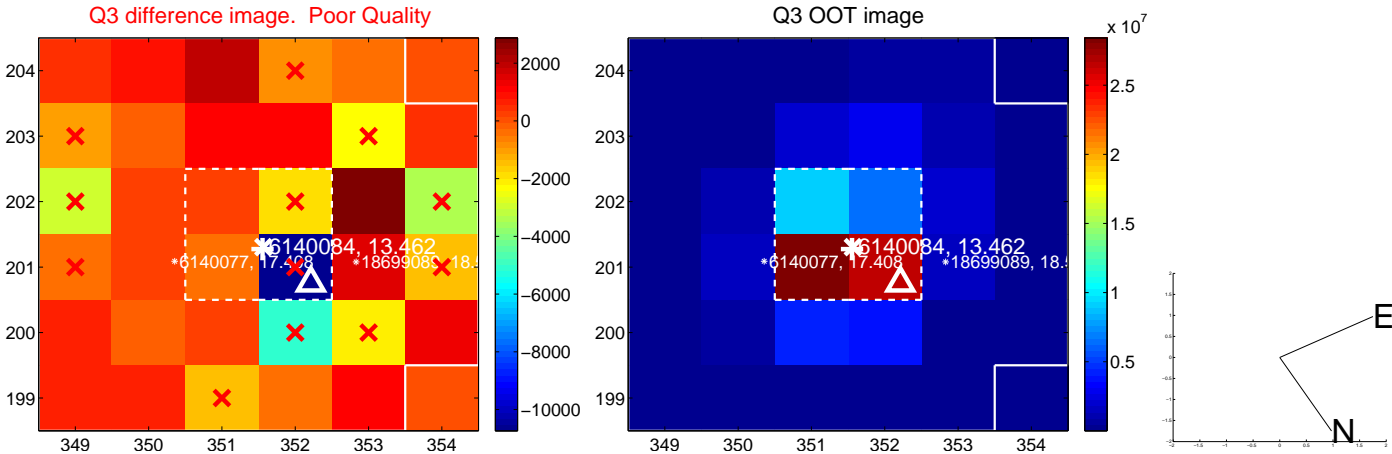
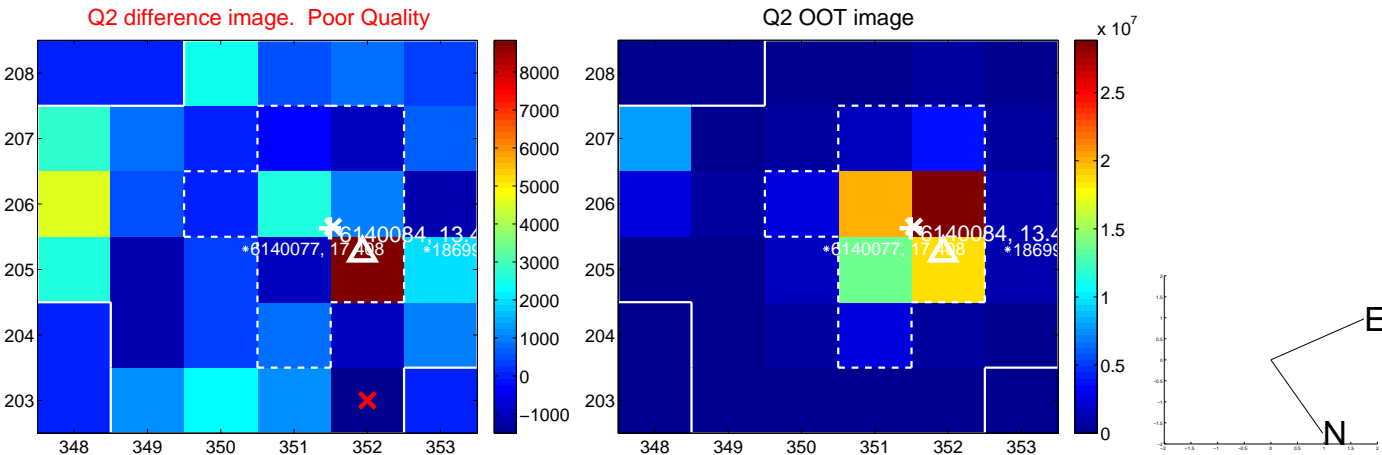
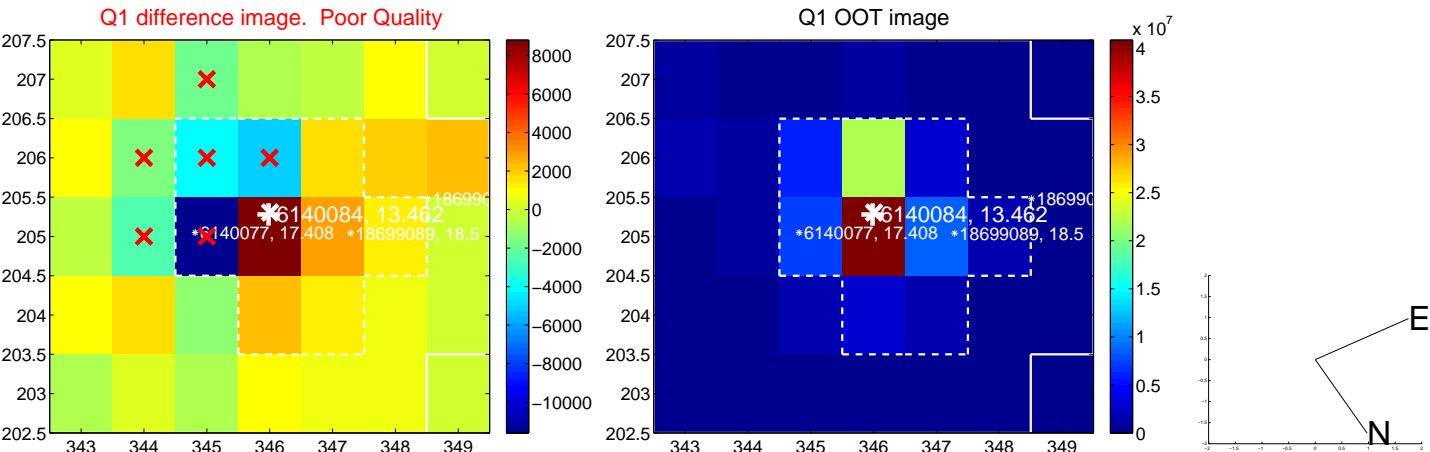
|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.784 \pm 0.771$  | 1.02                | $-0.178 \pm 0.783$ | $0.764 \pm 0.864$ |
| PRF-fit source offset from KIC position | $0.846 \pm 0.659$  | 1.28                | $-0.346 \pm 0.791$ | $0.772 \pm 0.802$ |
| photometric centroid source offset      | $0.75 \pm 0.64$    | 1.17                | $0.67 \pm 0.66$    | $0.35 \pm 0.58$   |



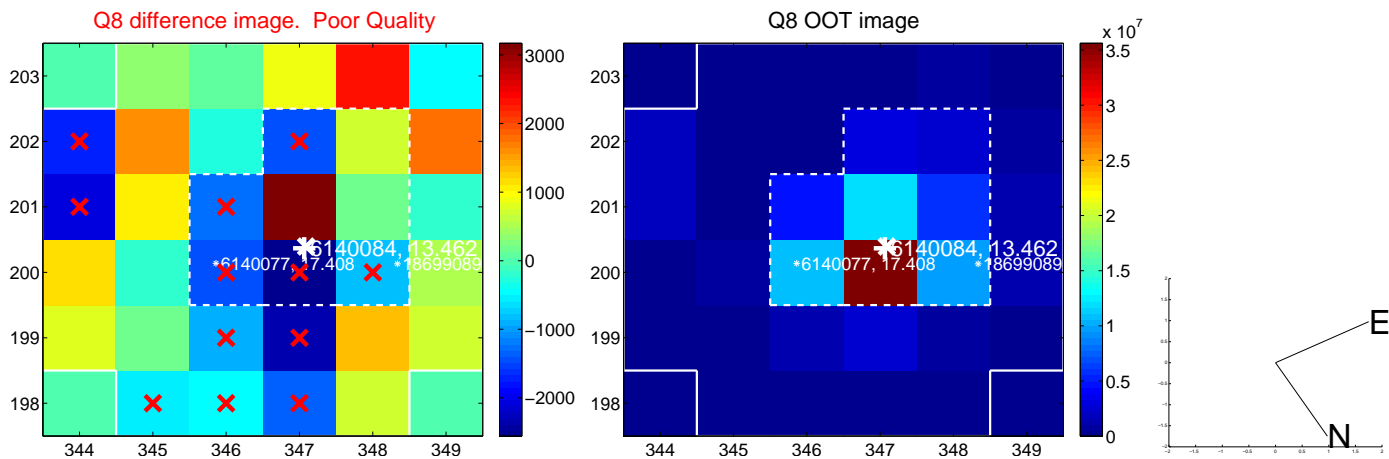
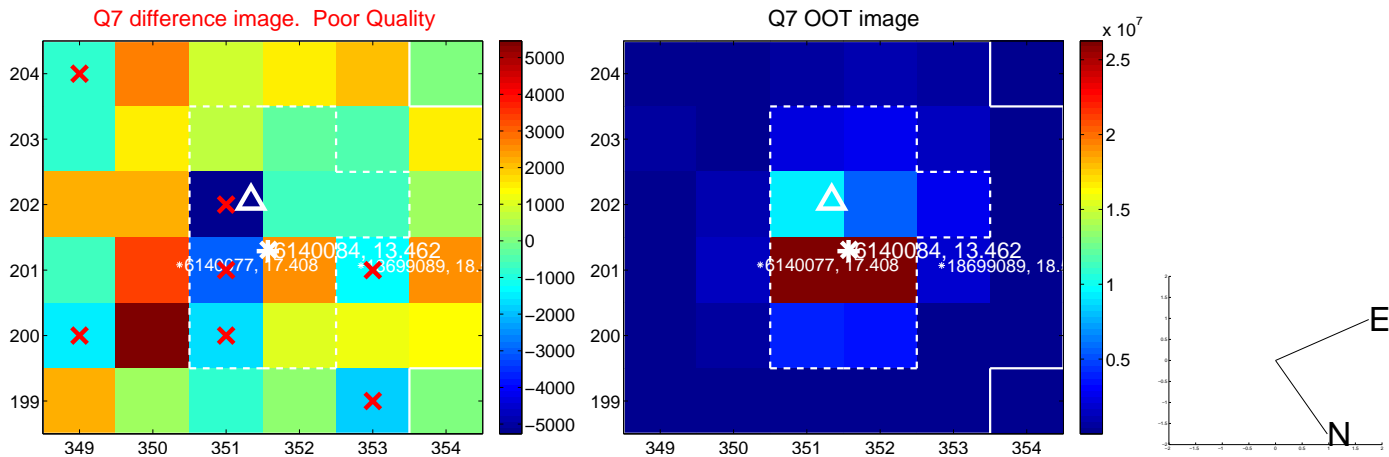
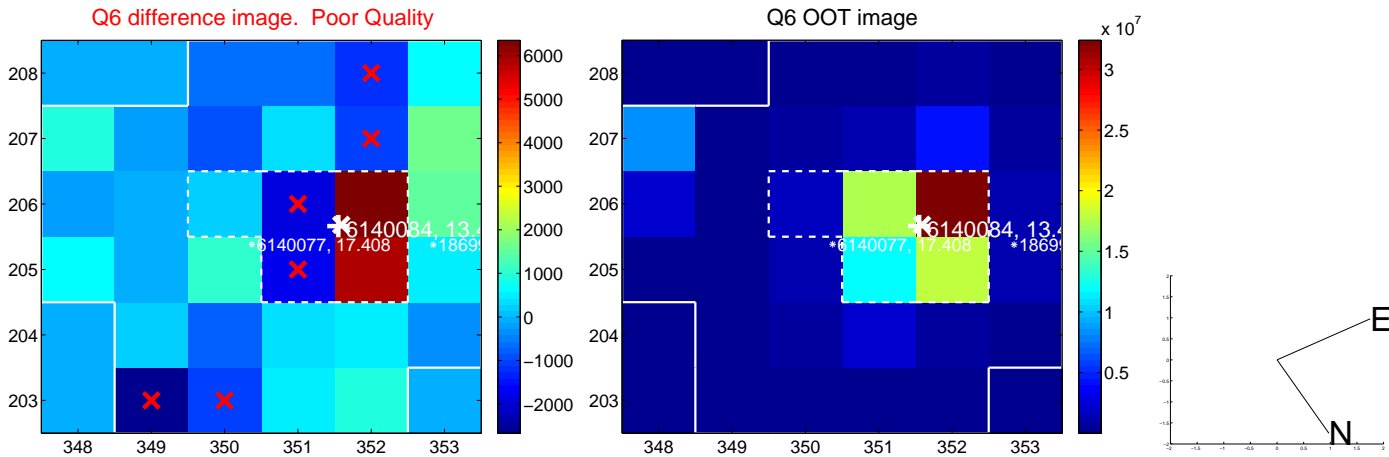
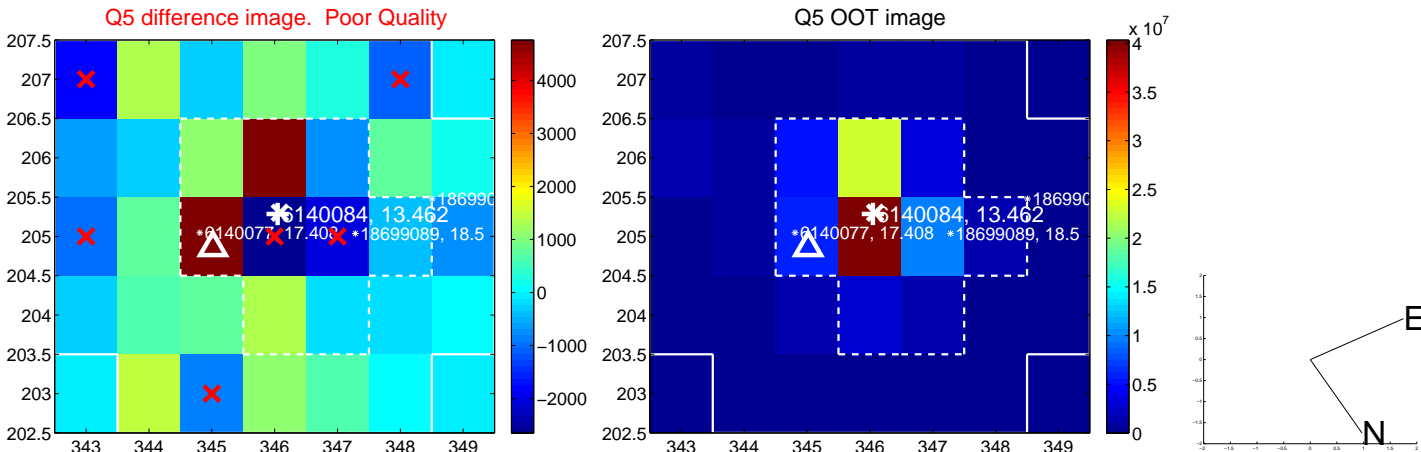
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



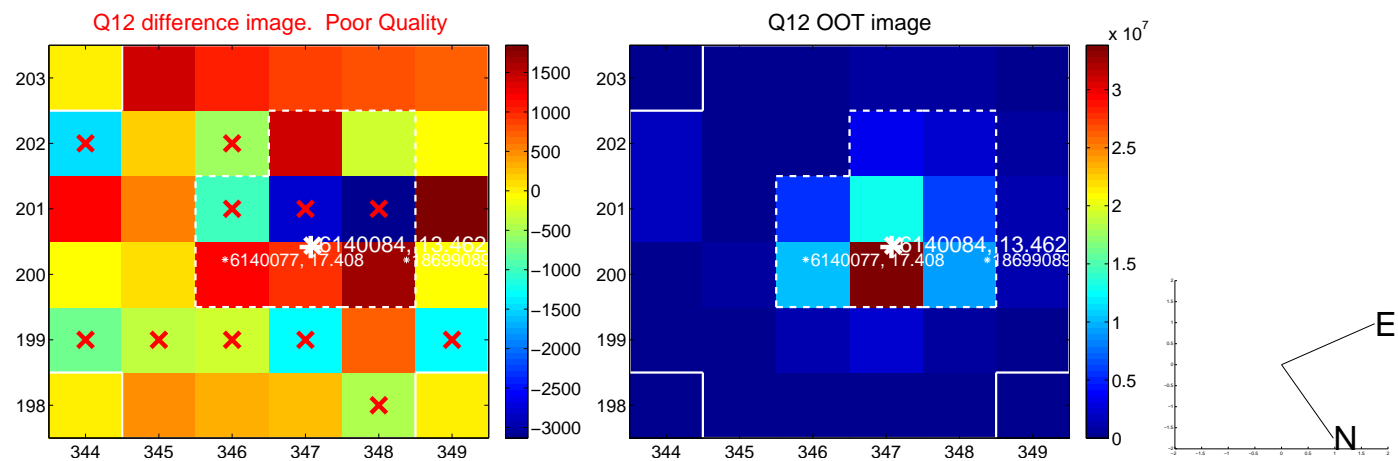
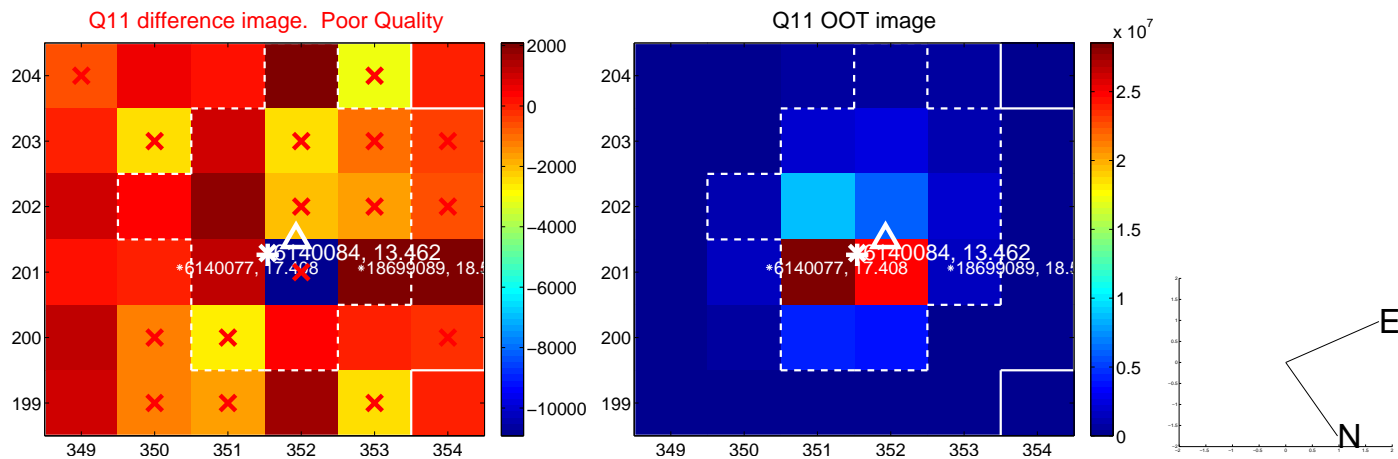
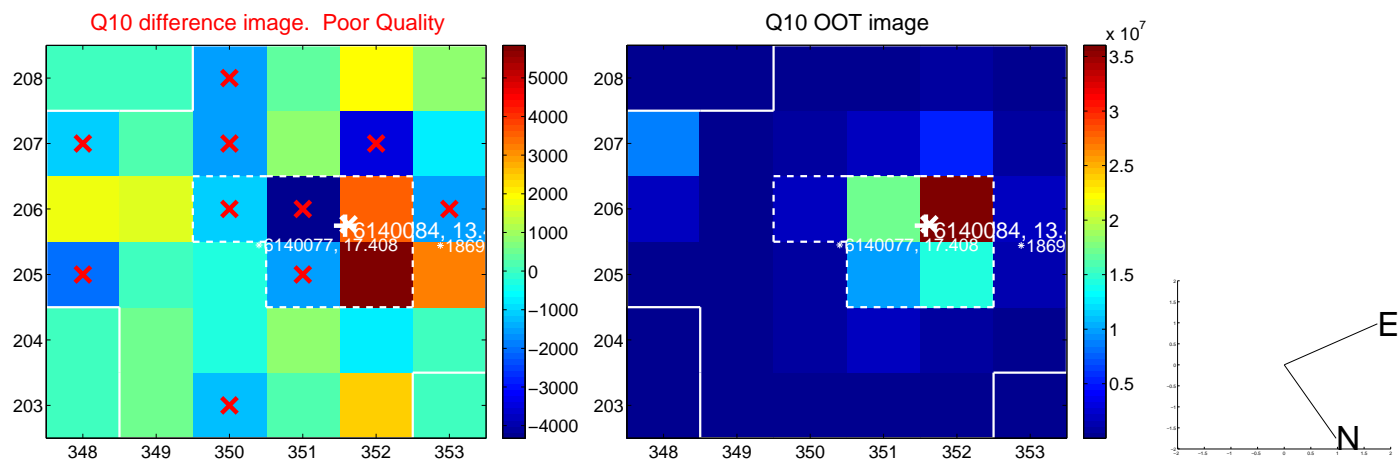
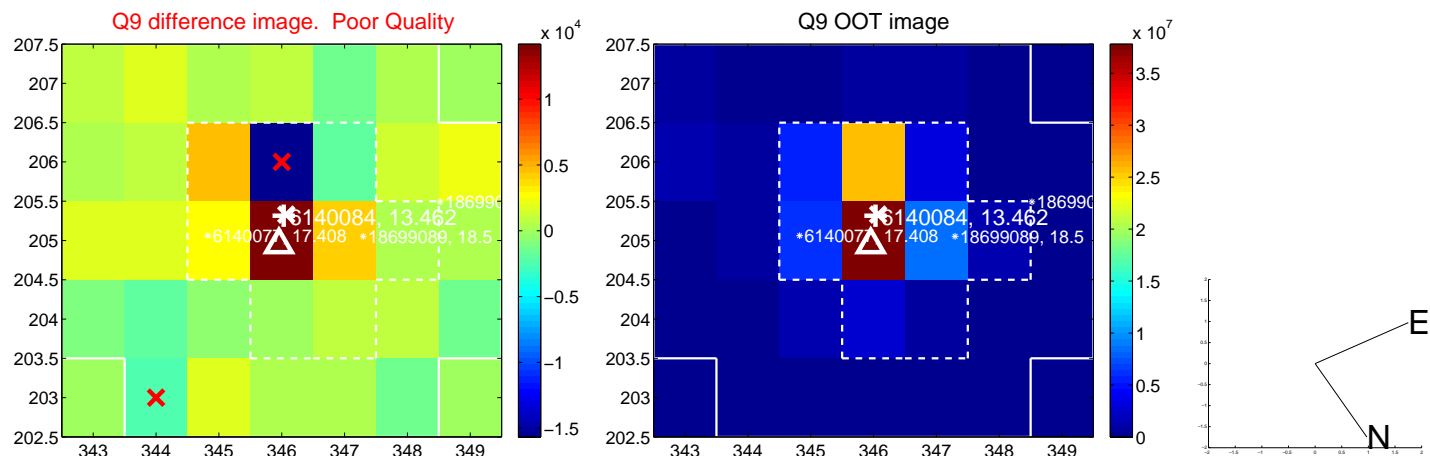
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



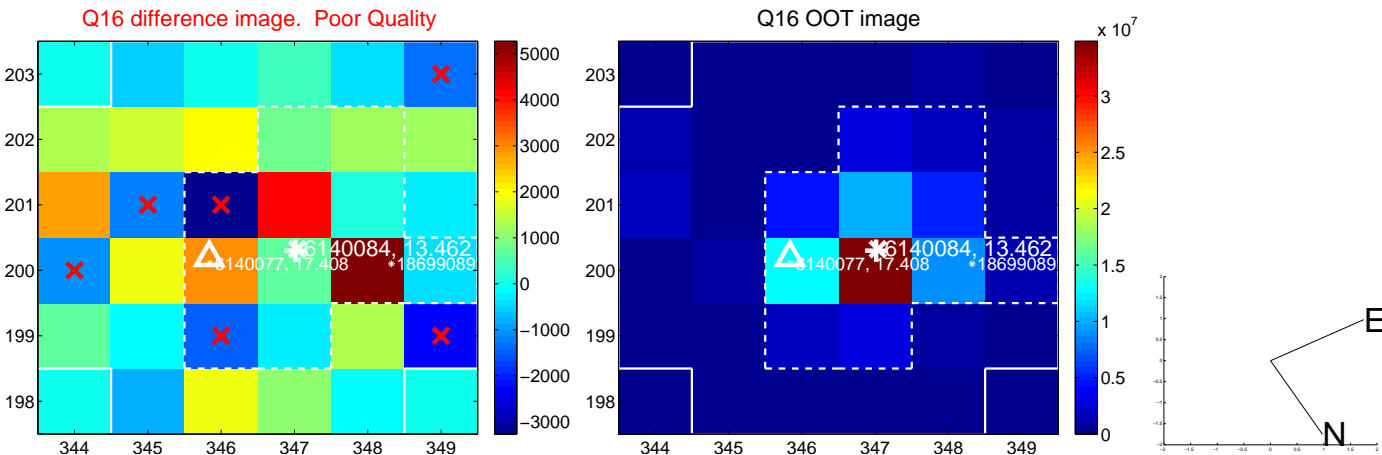
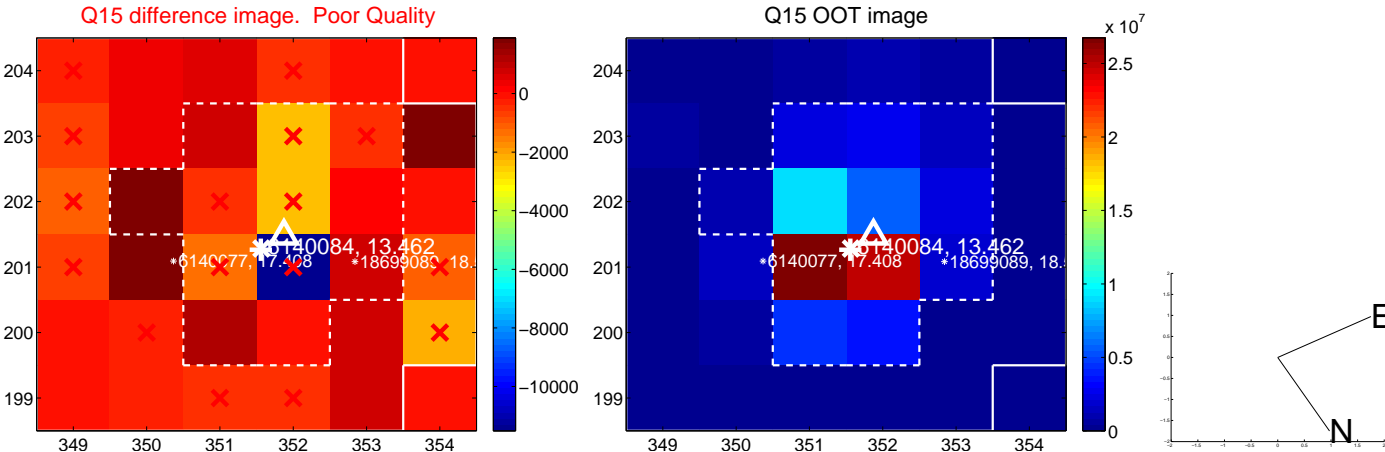
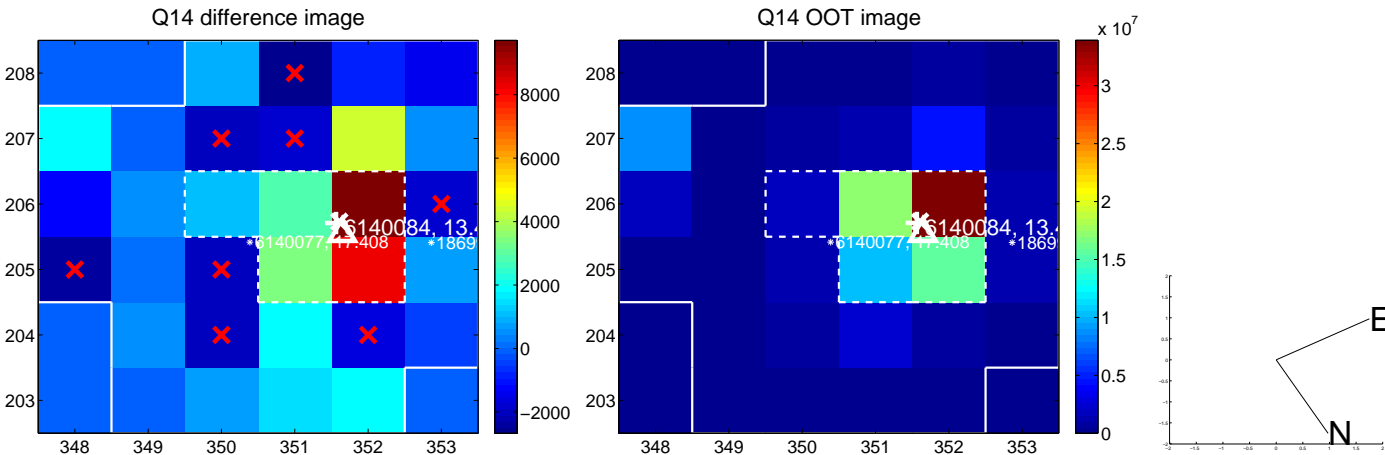
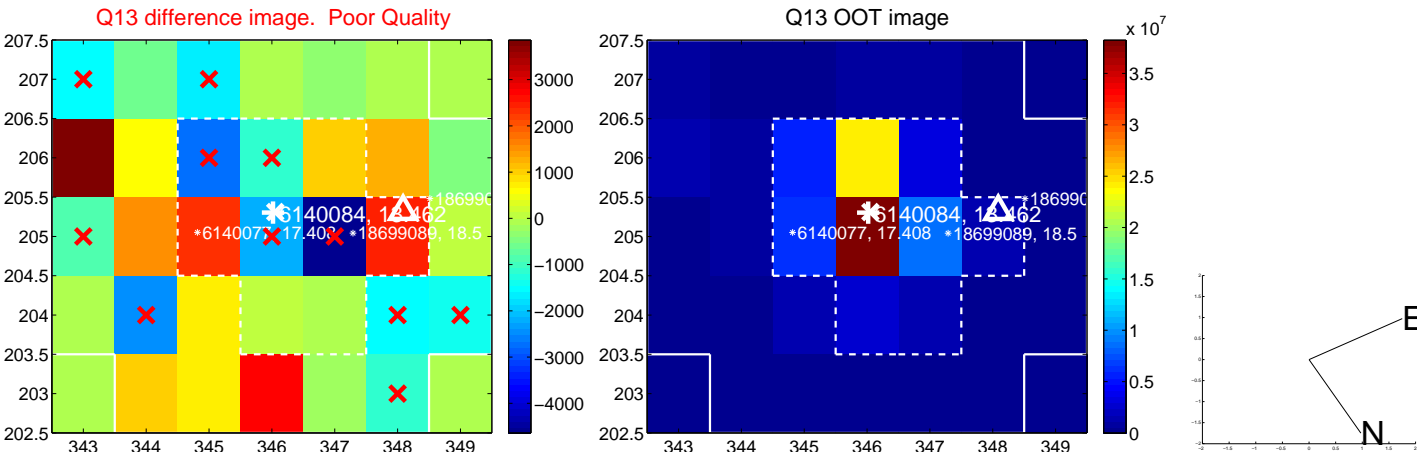
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



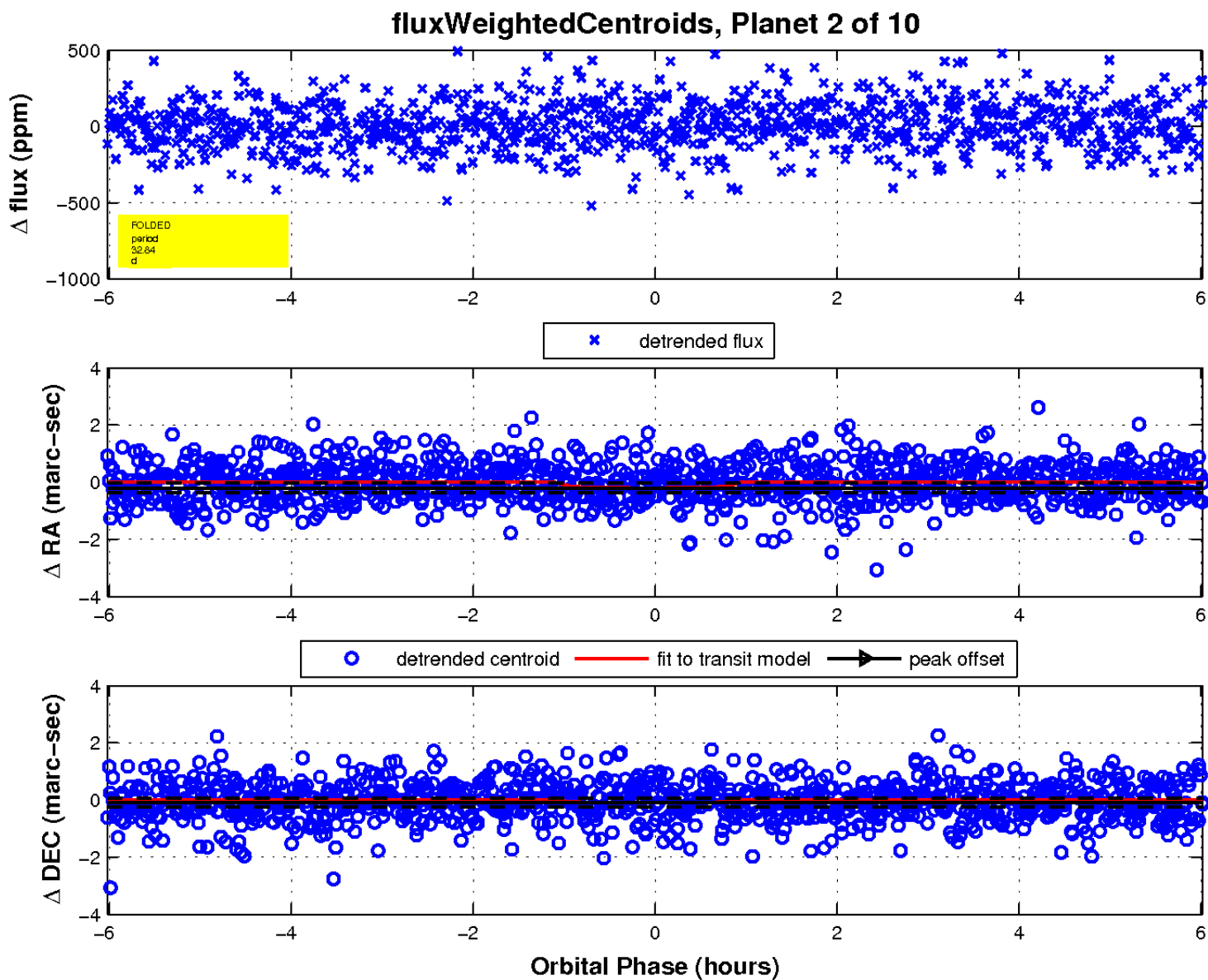
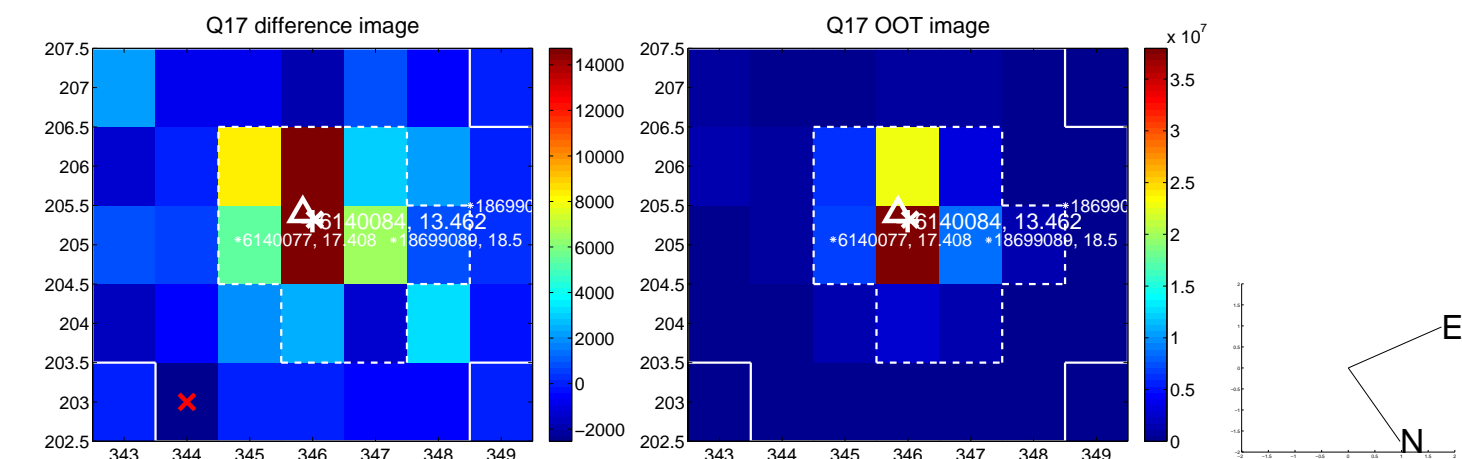
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



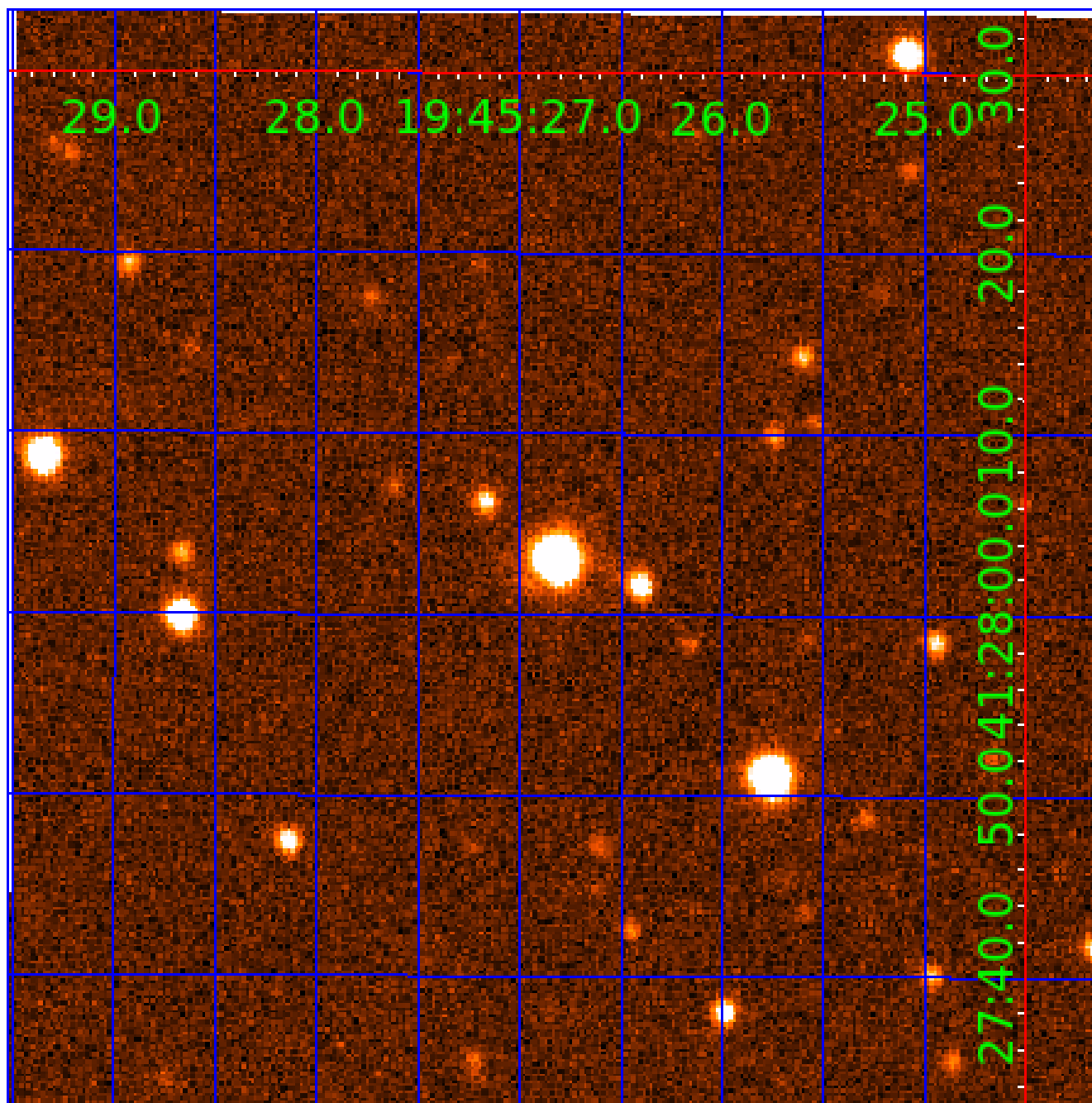
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

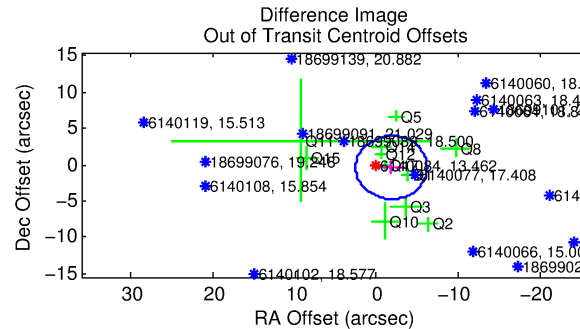
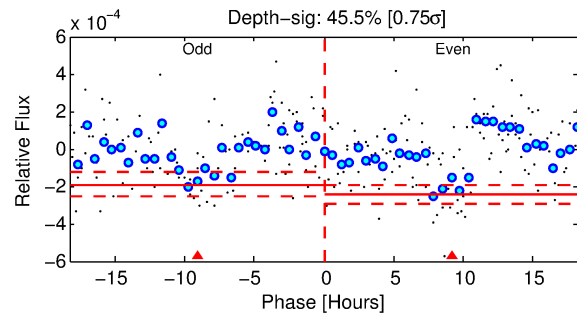
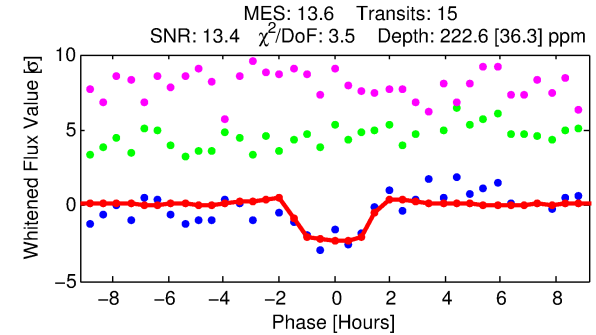
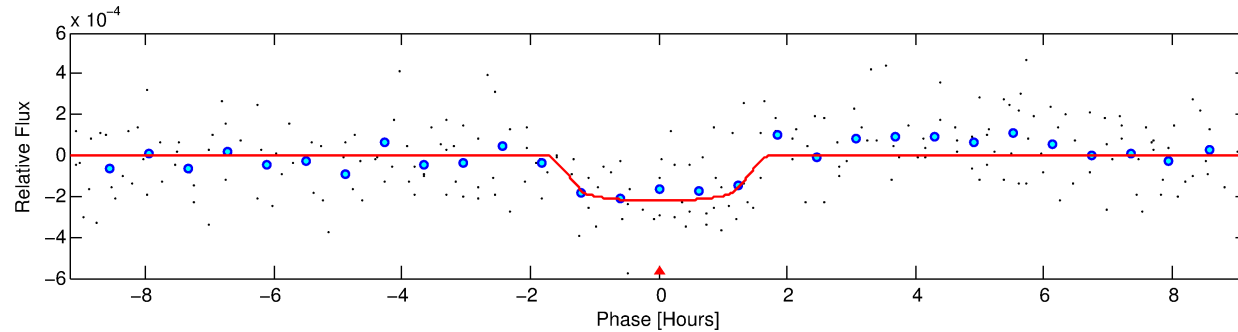
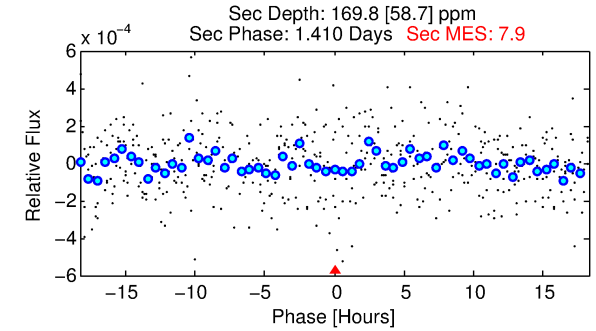
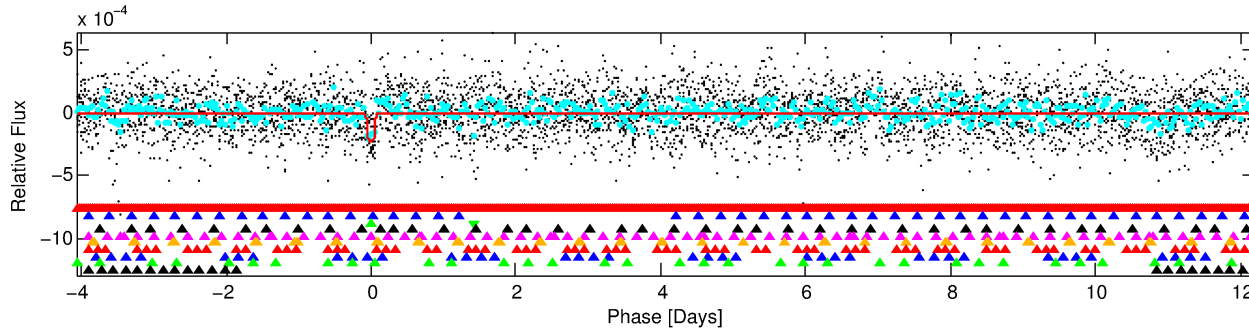
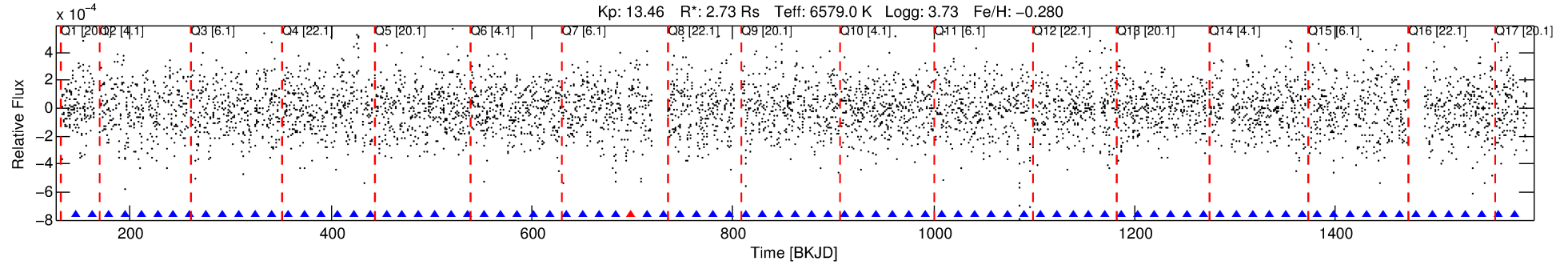
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-03

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 3 of 10 Period: 16.270 d



## DV Fit Results:

Period = 16.27026 [0.00024] d  
Epoch = 145.9659 [0.0110] BKJD  
Rp/R\* = 0.0156 [0.0133]  
a/R\* = 21.58 [106.04]  
b = 0.87 [1.44]  
Seff = 617.43 [340.27]  
Teq = 1271 [175] K  
Rp = 4.63 [4.30] Re  
a = 0.1421 [0.0486] AU  
Ag = 87.78 [159.95] [0.54σ]  
Teffp = 6015 [2624] K [1.80σ]

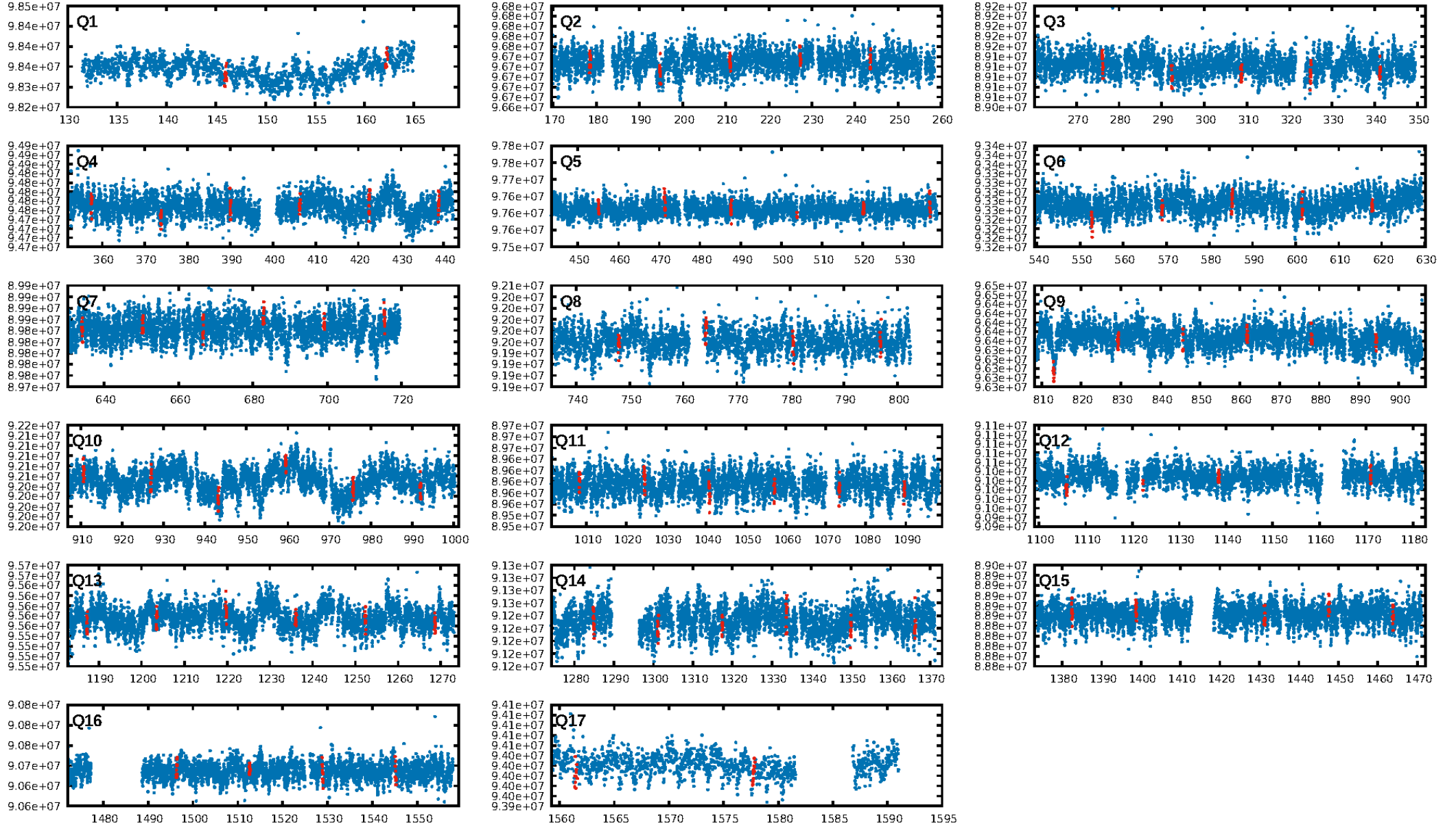
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [35.08σ]  
LongPeriod-sig: 100.0% [9.68σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 73.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.93 [14/15]  
GhostDiagnostic-chr: 4.84  
Centroid-sig: 13.4%  
Centroid-so: 0.736 arcsec [1.69σ]  
OotOffset-rm: 1.851 arcsec [1.27σ]  
KicOffset-rm: 2.012 arcsec [1.22σ]  
OotOffset-st: 3/3/2/3 [11]  
KicOffset-st: 3/3/2/3 [11]  
DiffImageQuality-fgm: 0.27 [3/11]  
DiffImageOverlap-fno: 0.47 [8/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:33 Z

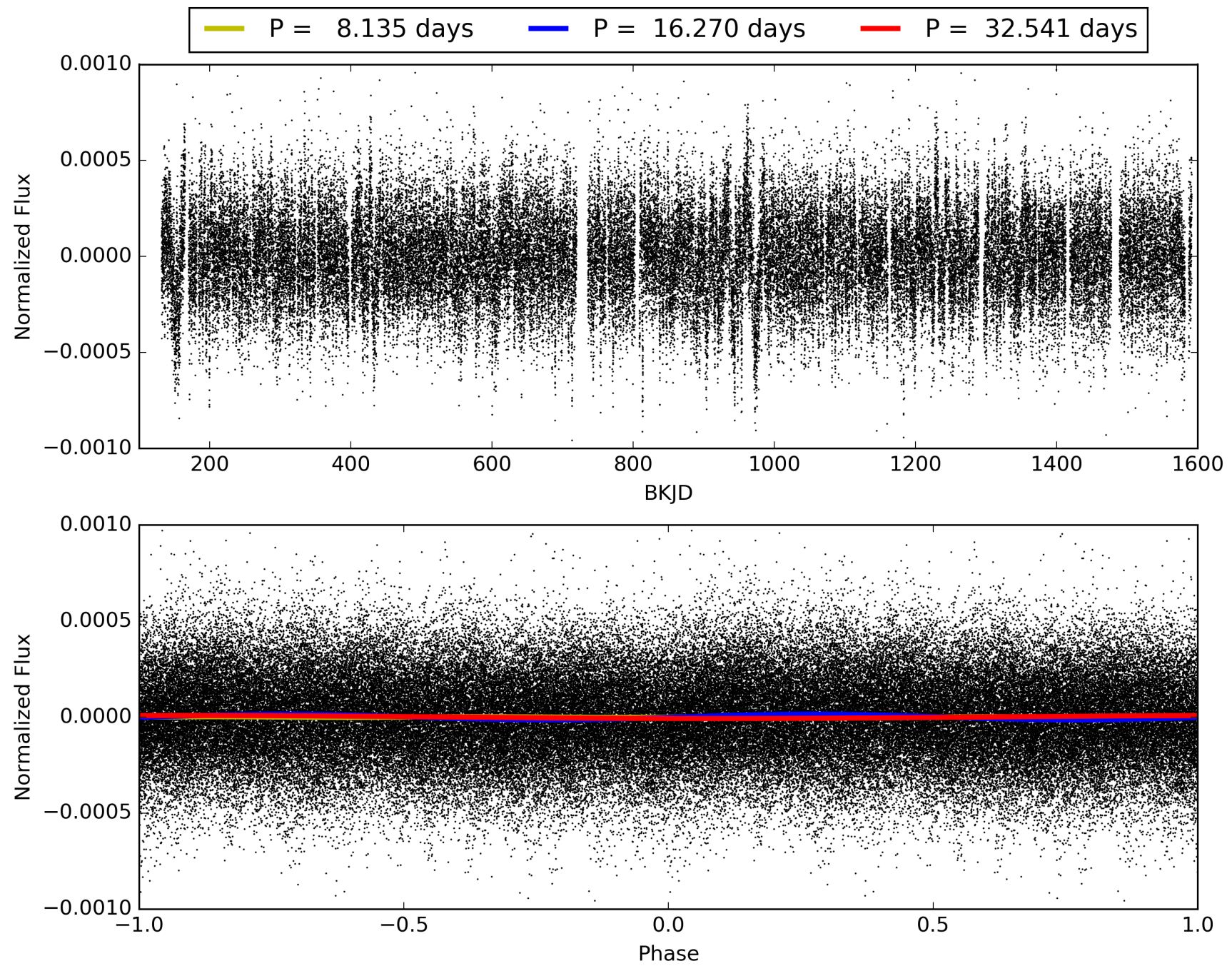
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-03, PDC Light Curves



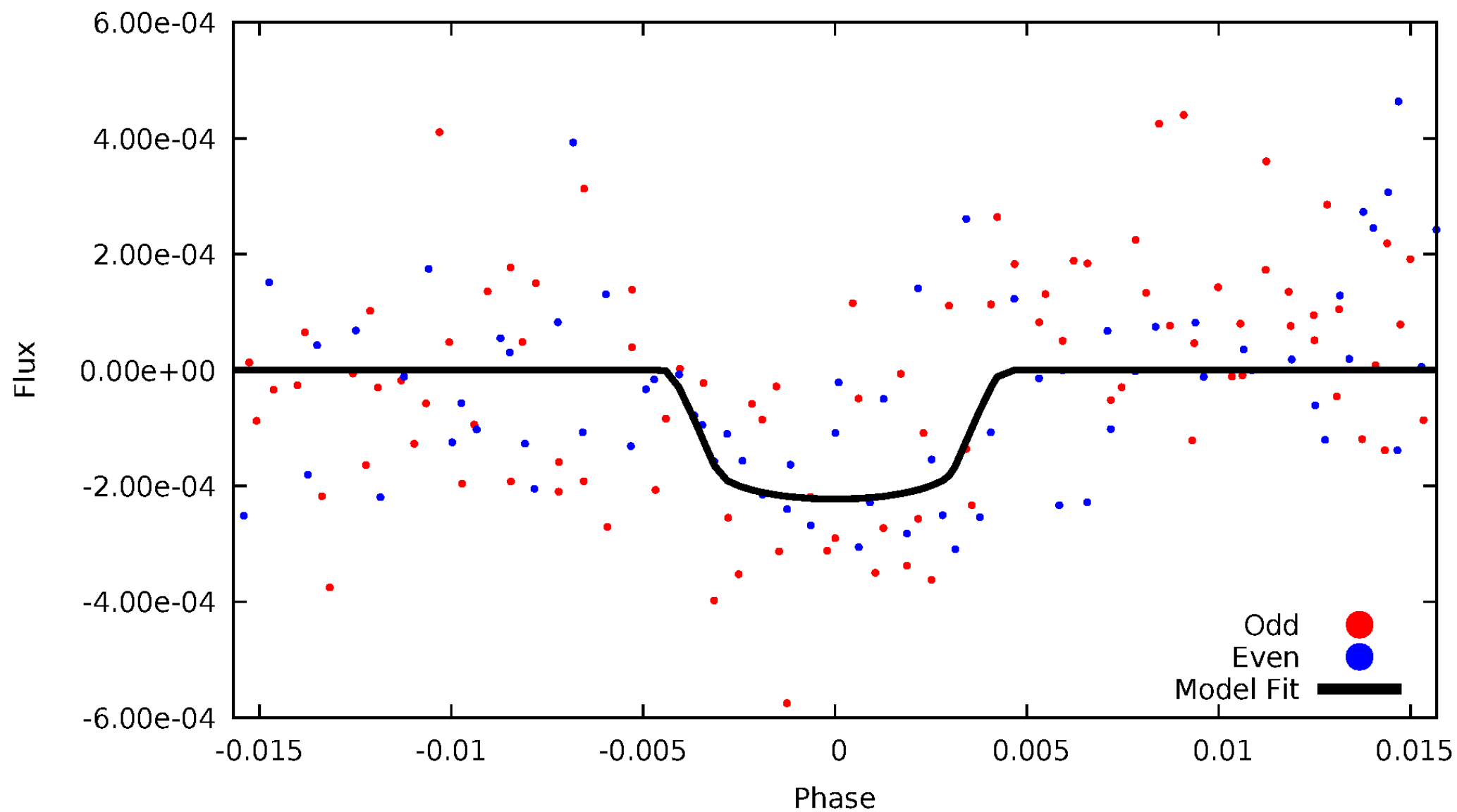


TCE 006140084-03



# DV Odd/Even

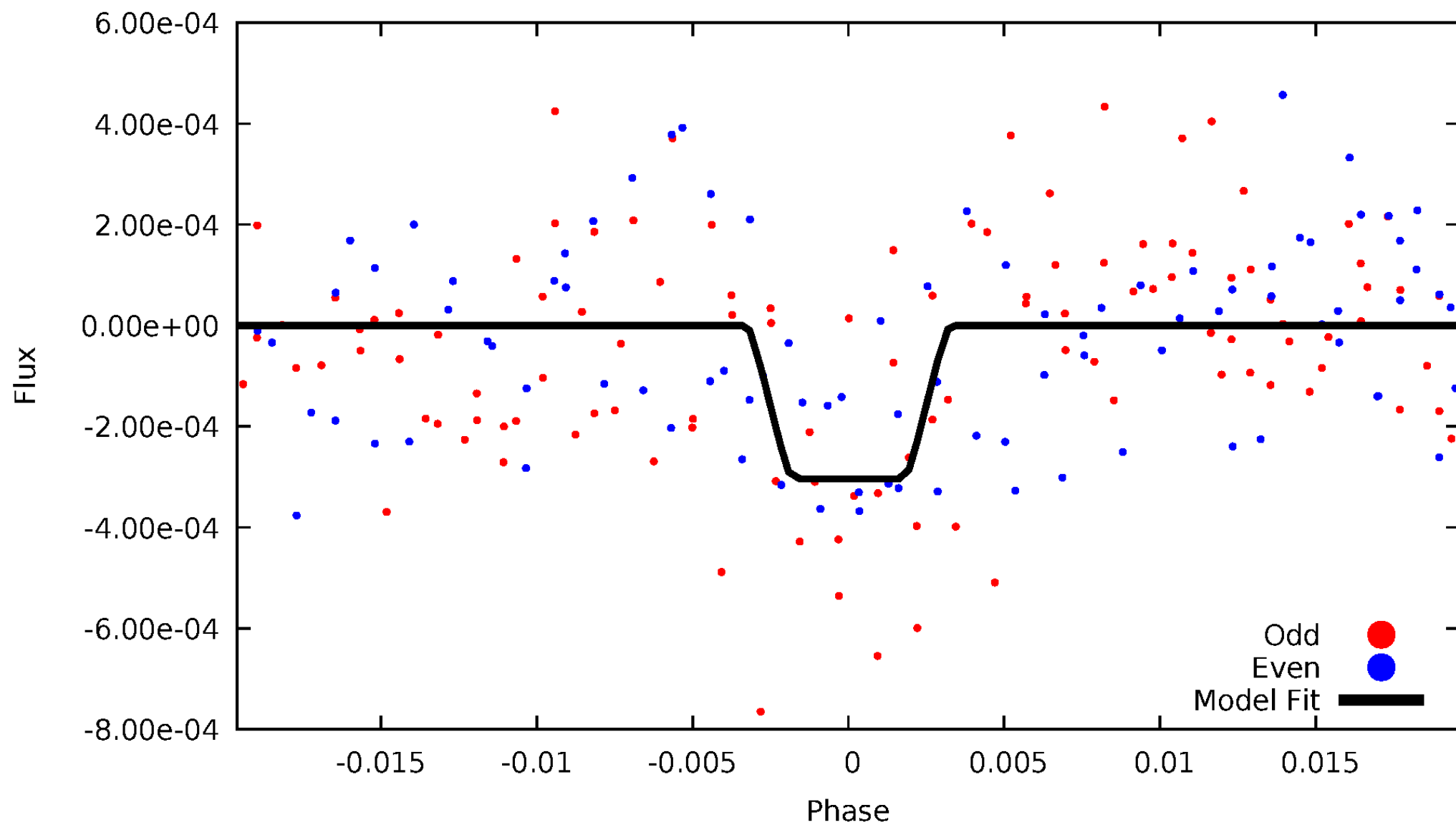
TCE 006140084-03





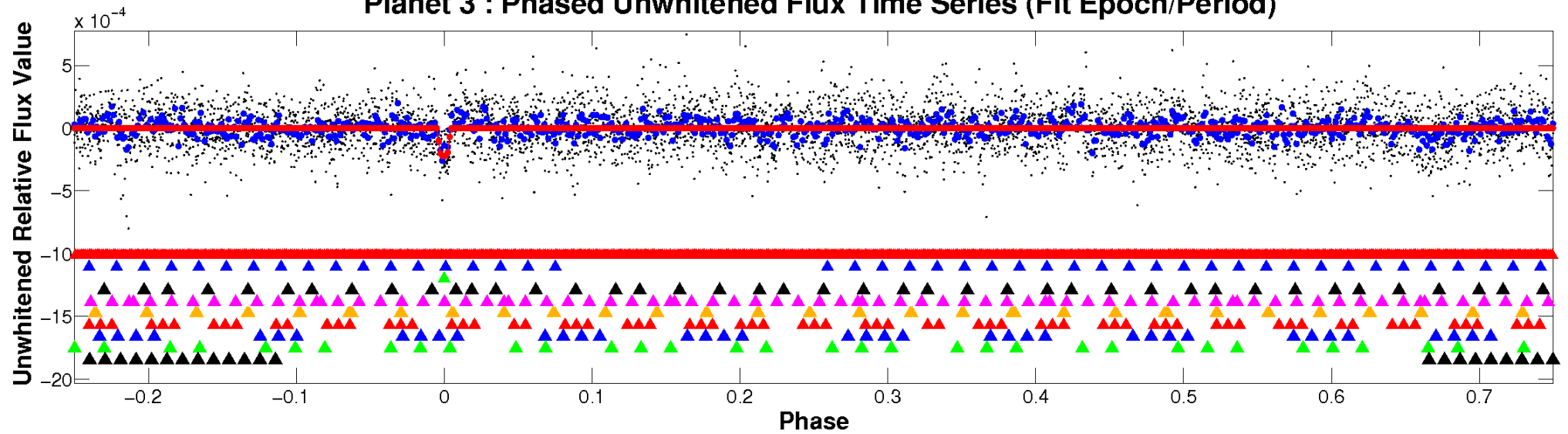
# ALT Odd/Even

TCE 006140084-03

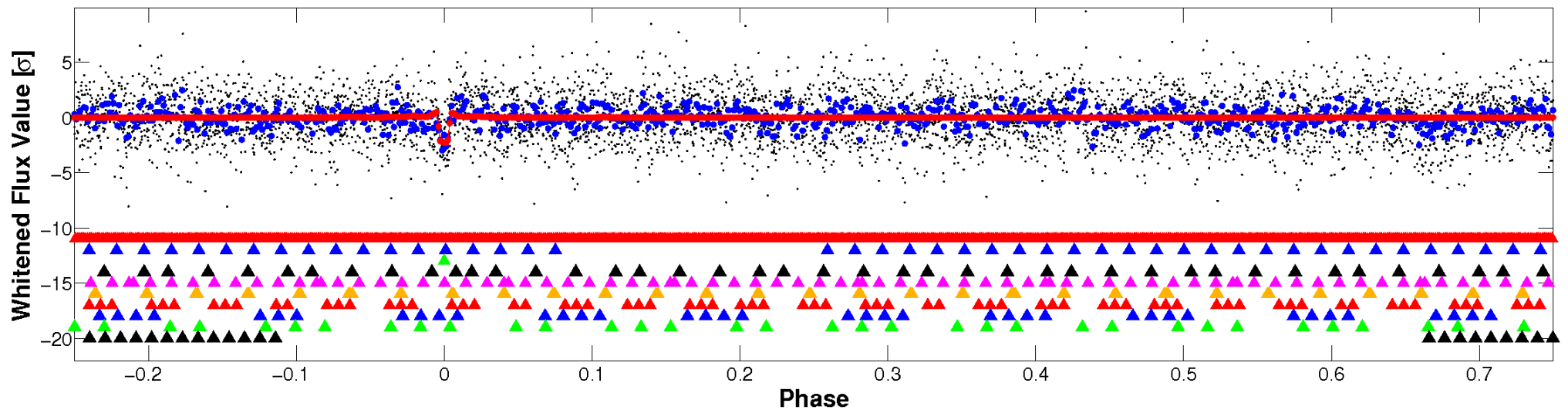


# Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

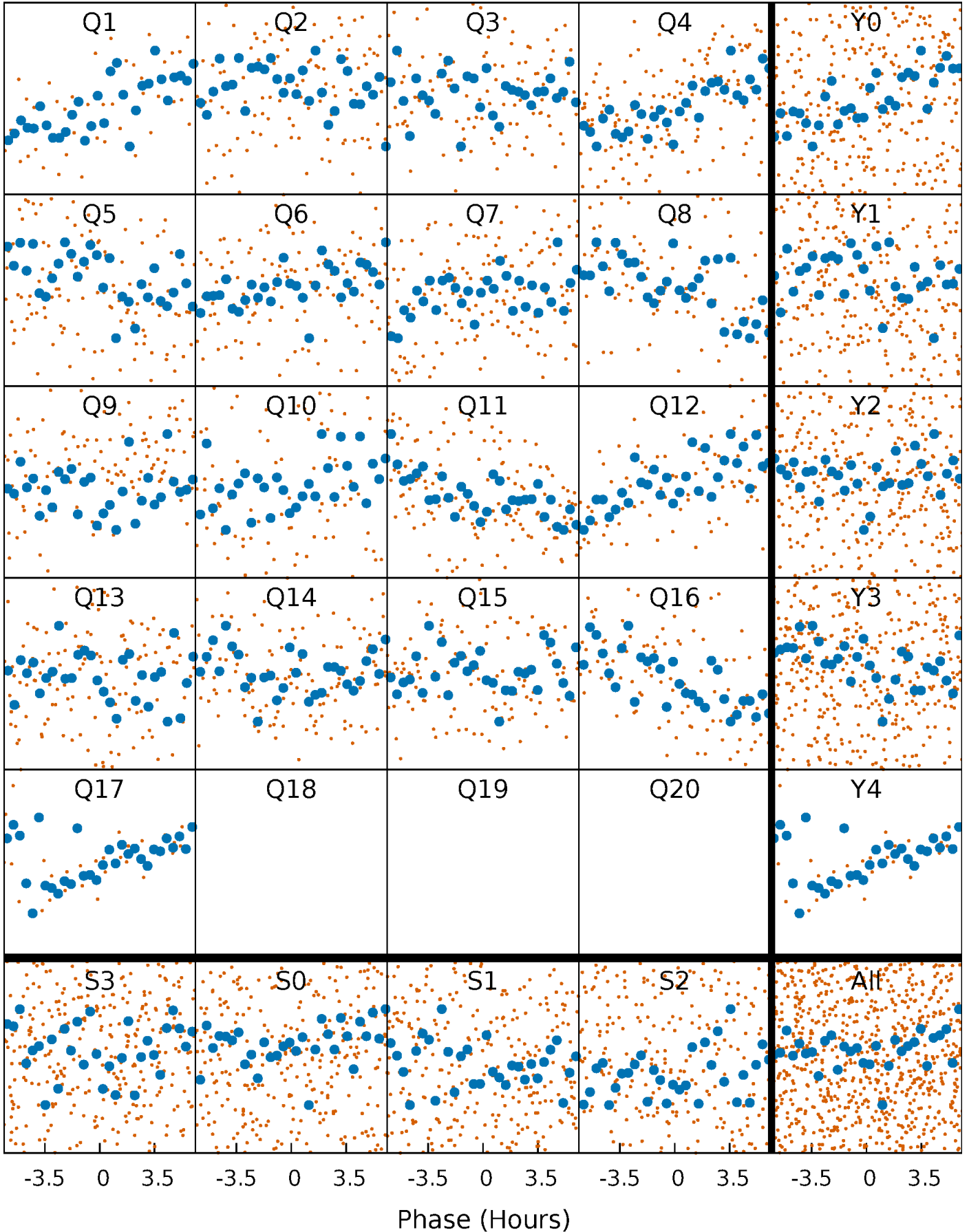


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



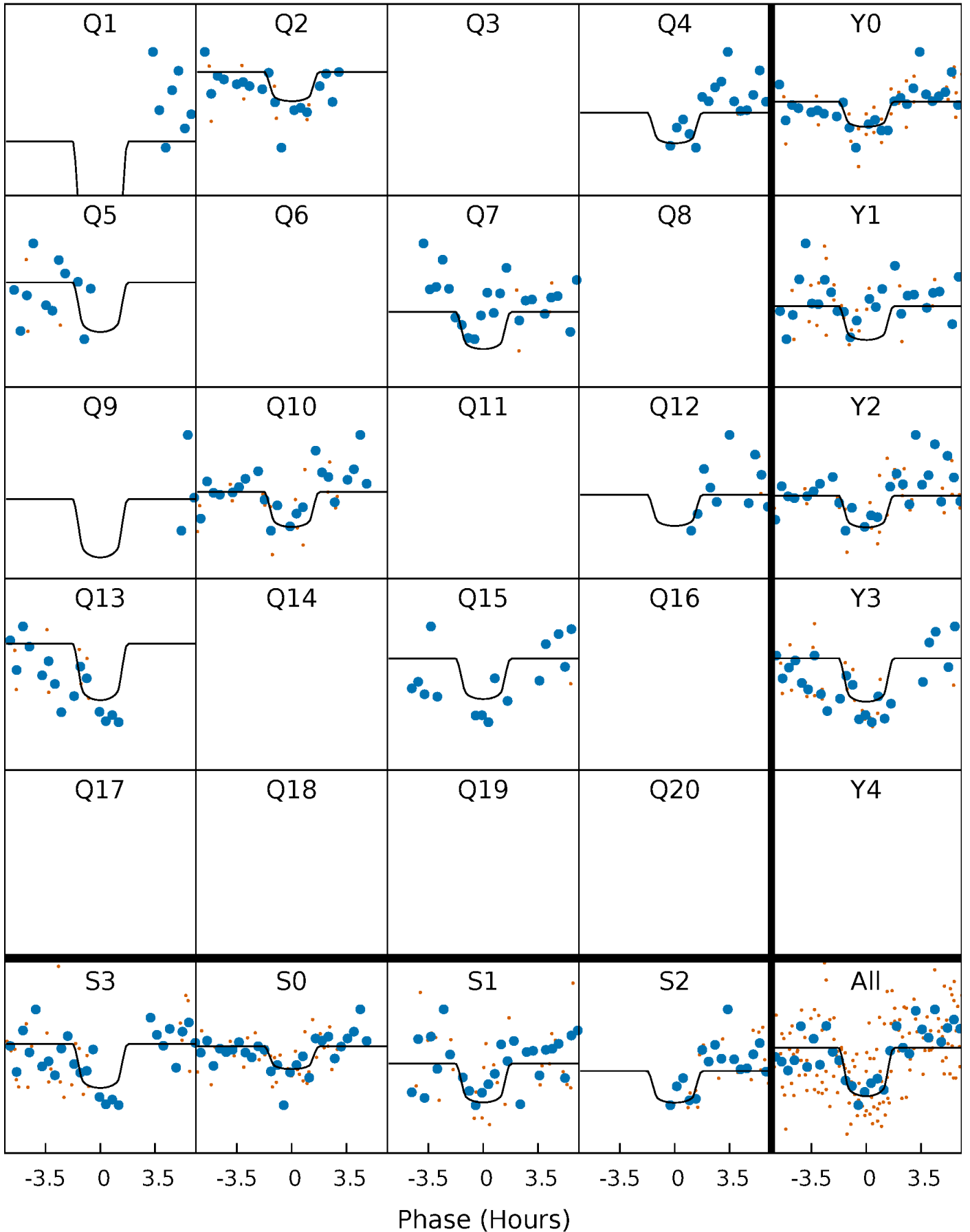
# PDC Quarter-Phased Transit Curves

TCE 006140084-03   P= 16.270261 Days    $T_0=145.965945$  (BKJD)



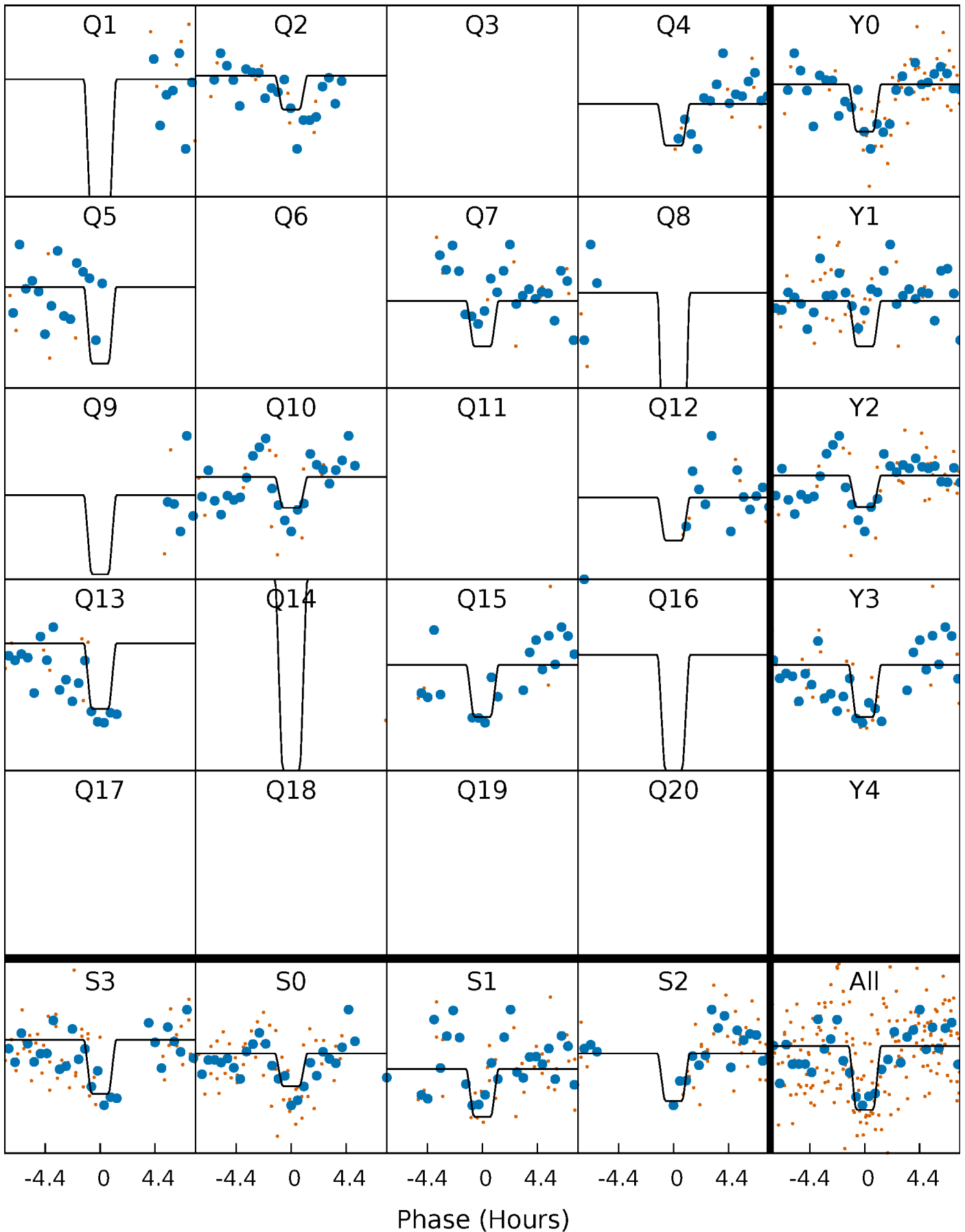
# DV Quarter-Phased Transit Curves

TCE 006140084-03 P= 16.270261 Days  $T_0=145.965945$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

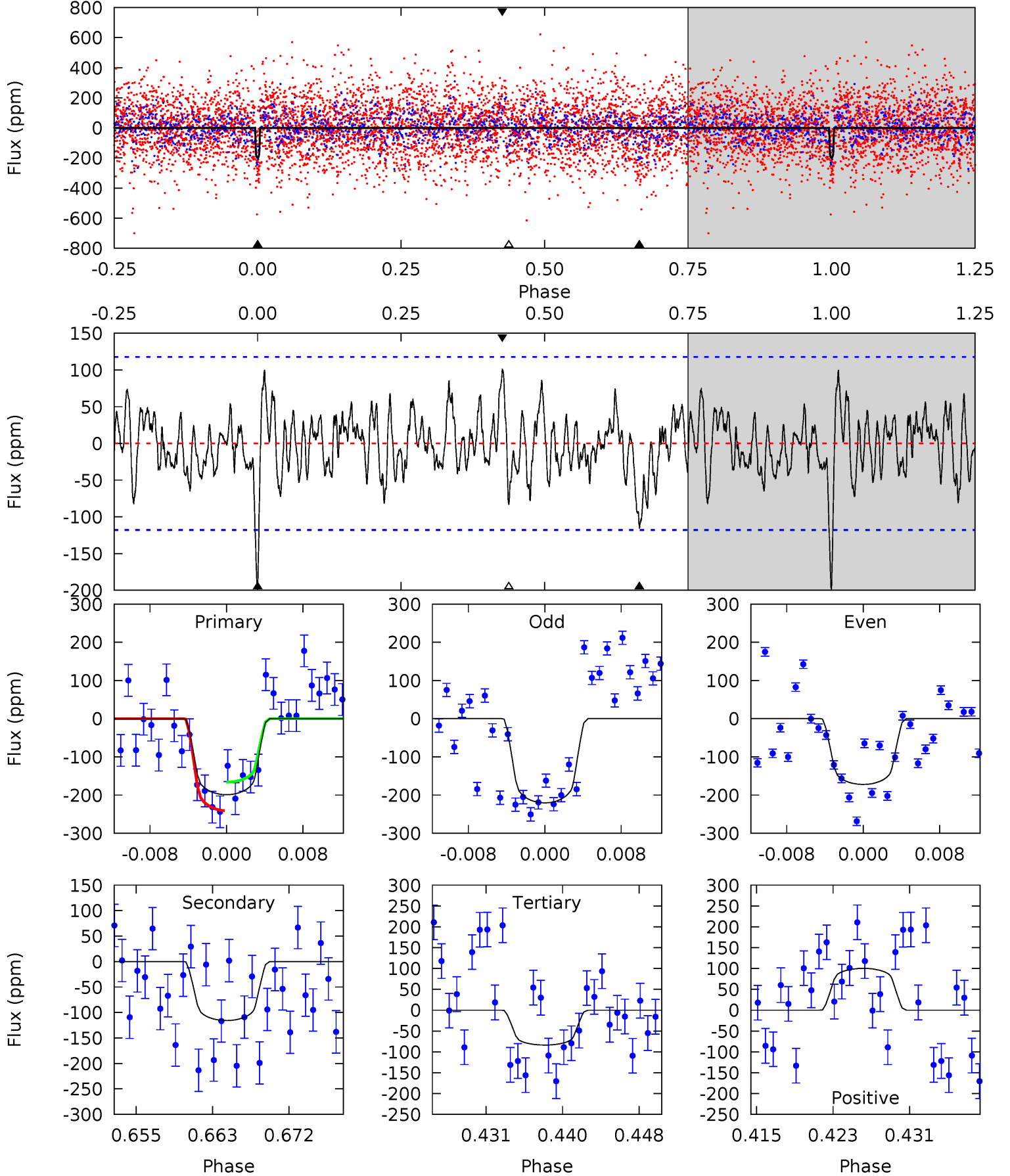
TCE 006140084-03 P= 16.270915 Days  $T_0=145.928396$  (BKJD)



# DV Model-Shift Uniqueness Test

006140084-03, P = 16.270261 Days, E = 129.695684 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.55 | 4.97 | 3.59 | 4.31 | 5.06            | 2.64            | 1.47             | 4.96    | 4.24    | 1.38    | 0.67    | 1.05    | 1.09 | 0.34  | 1.60 |

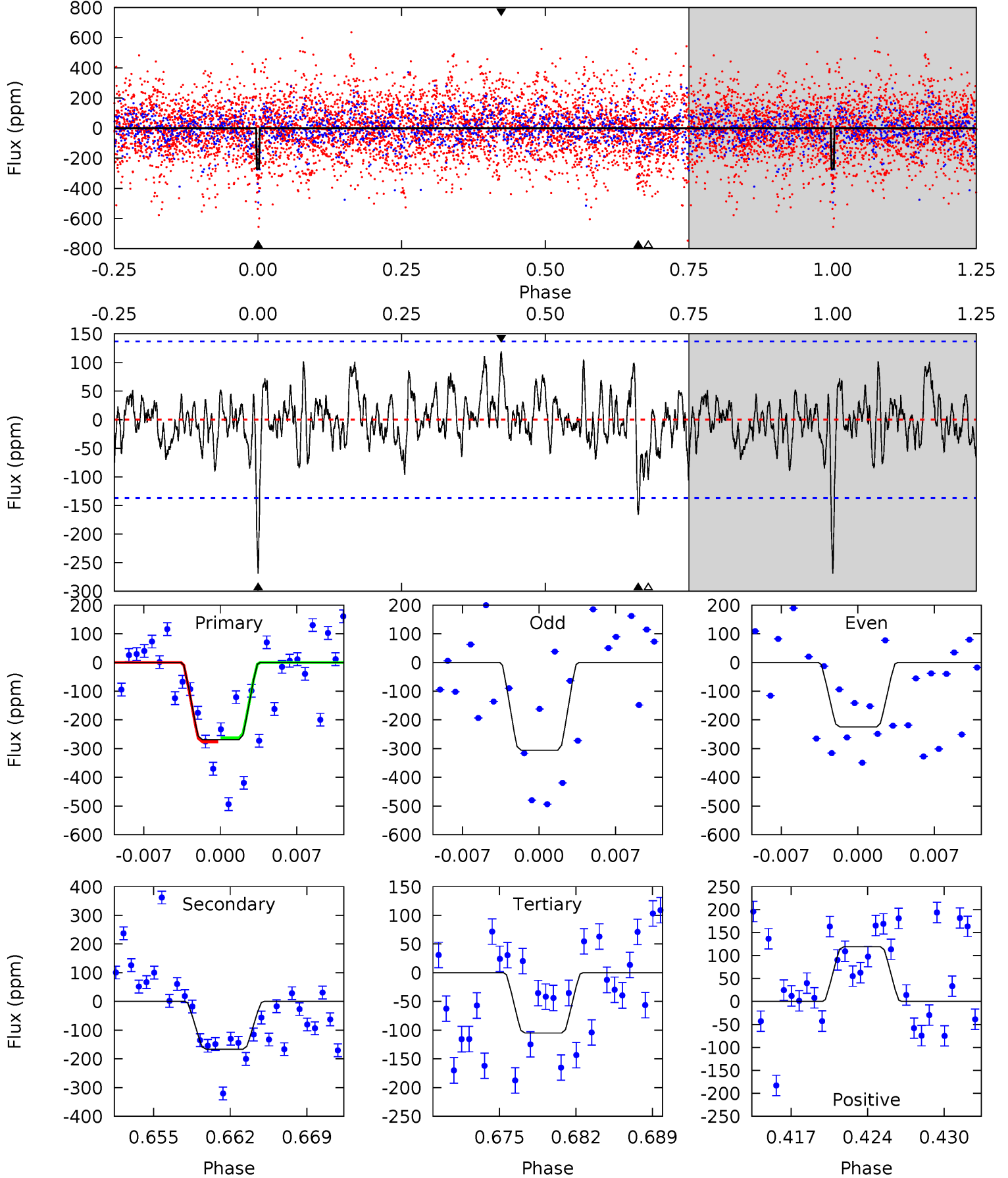




# Alt Model-Shift Uniqueness Test

006140084-03, P = 16.270915 Days, E = 129.657481 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.0 | 6.20 | 3.92 | 4.45 | 5.10            | 2.72            | 1.40             | 6.12    | 5.59    | 2.28    | 1.75    | 1.53    | 0.92 | 0.31  | 0.25 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-03 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$  |
|---------|---------------|------------------------|----------------------|------------------------|-------------------|
| DV      | $-116 \pm 23$ | $5.04^{+3.36}_{-3.09}$ | $1735^{+94}_{-147}$  | $5132^{+3350}_{-981}$  | $52^{+287}_{-34}$ |
| Alt.    | $-166 \pm 27$ | $5.25^{+3.94}_{-2.93}$ | $1725^{+104}_{-137}$ | $5415^{+2851}_{-1036}$ | $67^{+278}_{-45}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

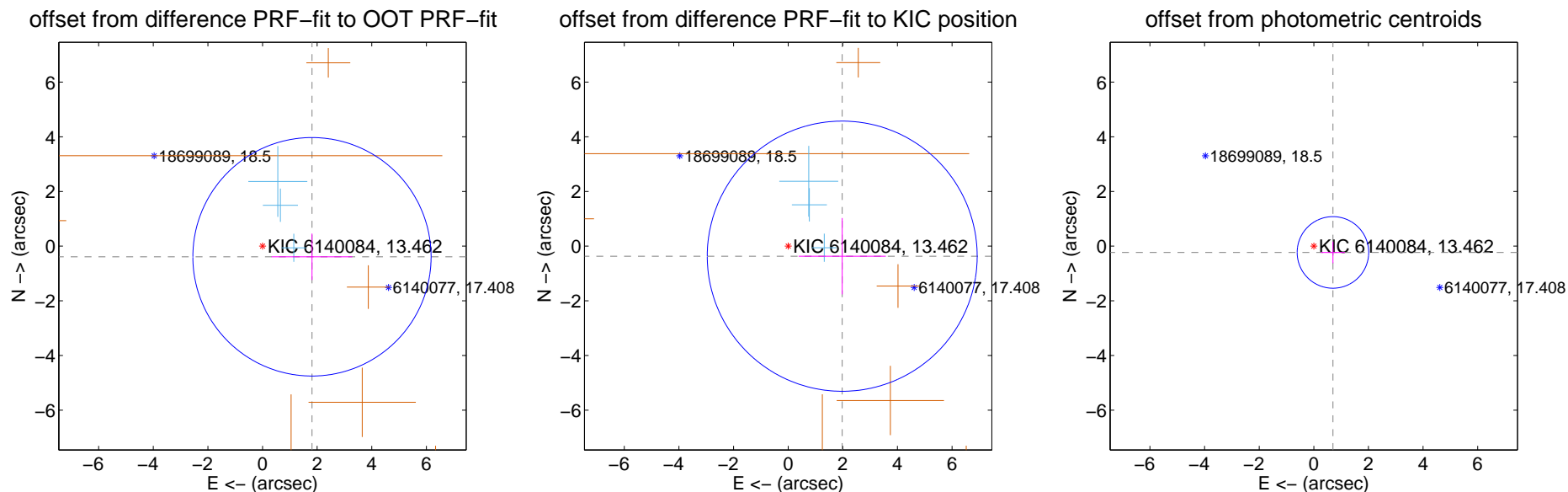
## DV Centroid Data

Supplemental centroid analysis for 006140084-03. Kepler magnitude: 13.46. Transit SNR 13.36

There are 3 quarters with good PRF difference image offsets

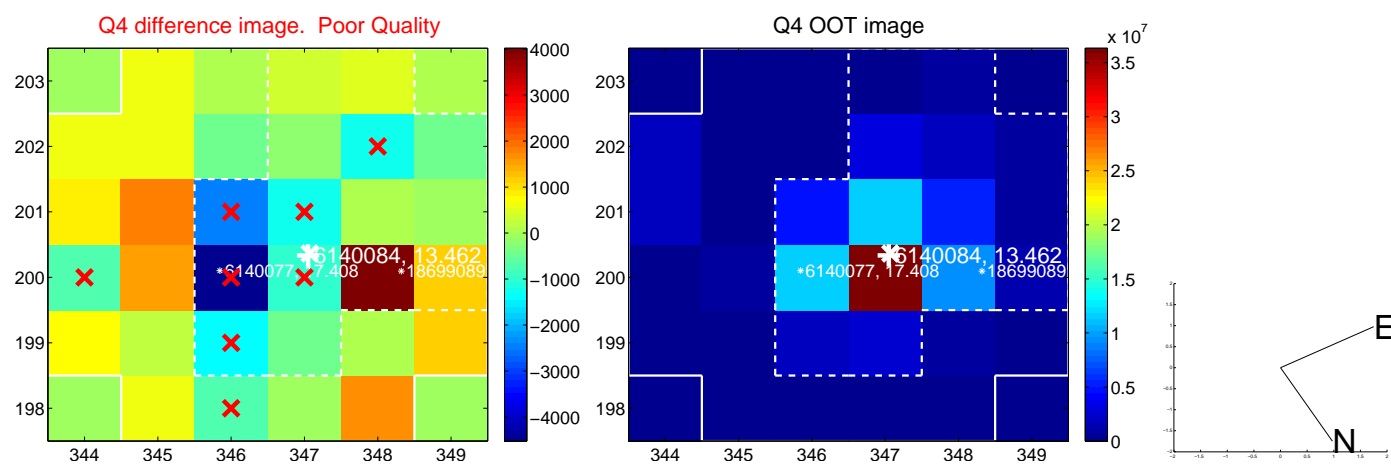
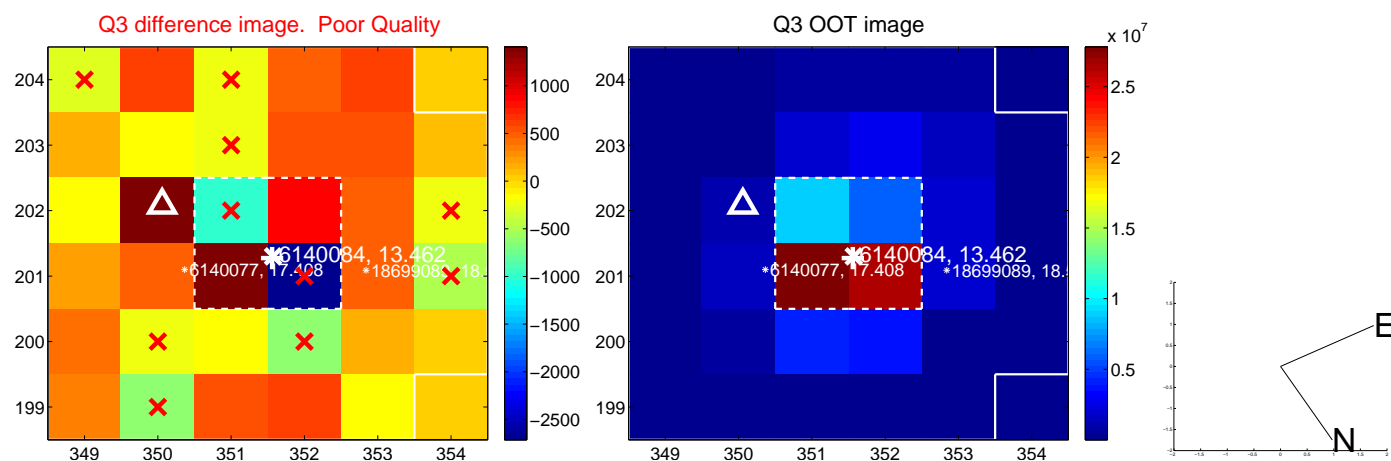
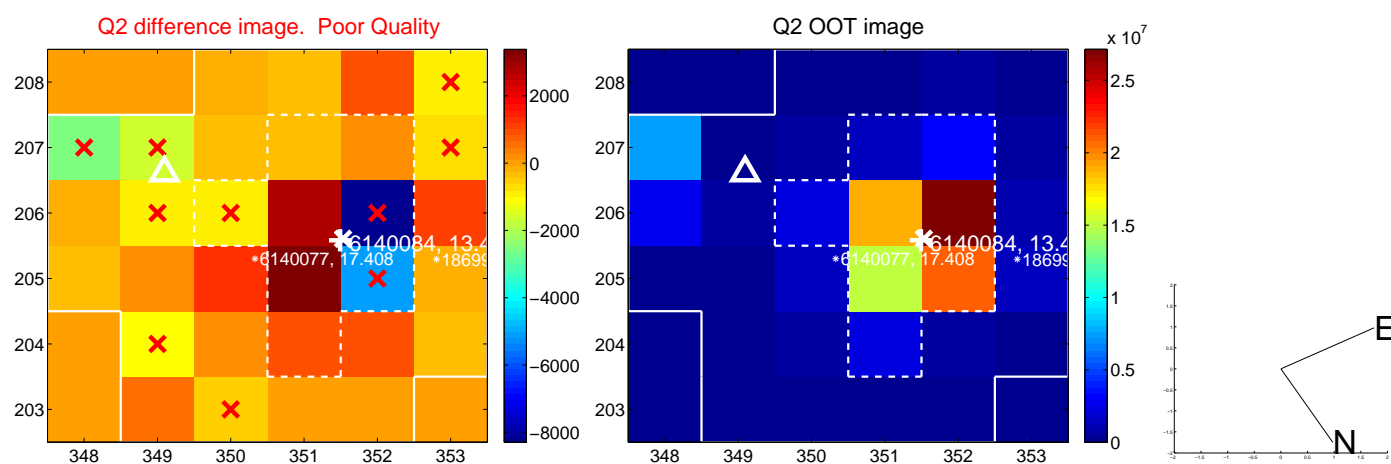
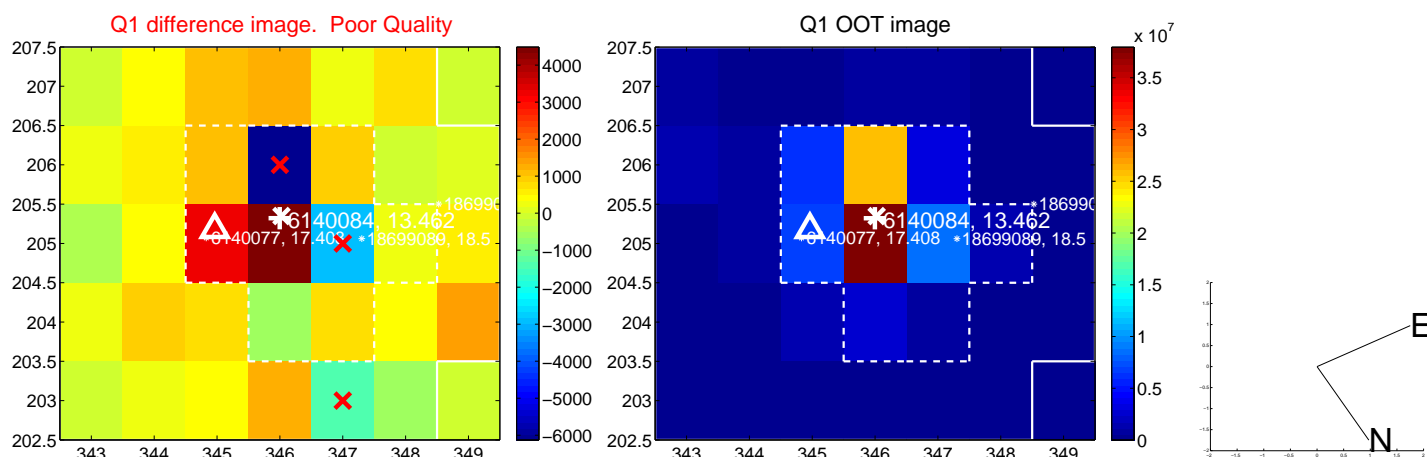
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $1.851 \pm 1.453$  | 1.27                | $-1.810 \pm 1.475$ | $-0.389 \pm 0.848$ |
| PRF-fit source offset from KIC position | $2.012 \pm 1.647$  | 1.22                | $-1.978 \pm 1.596$ | $-0.367 \pm 1.394$ |
| photometric centroid source offset      | $0.74 \pm 0.44$    | 1.69                | $-0.70 \pm 0.44$   | $-0.23 \pm 0.39$   |

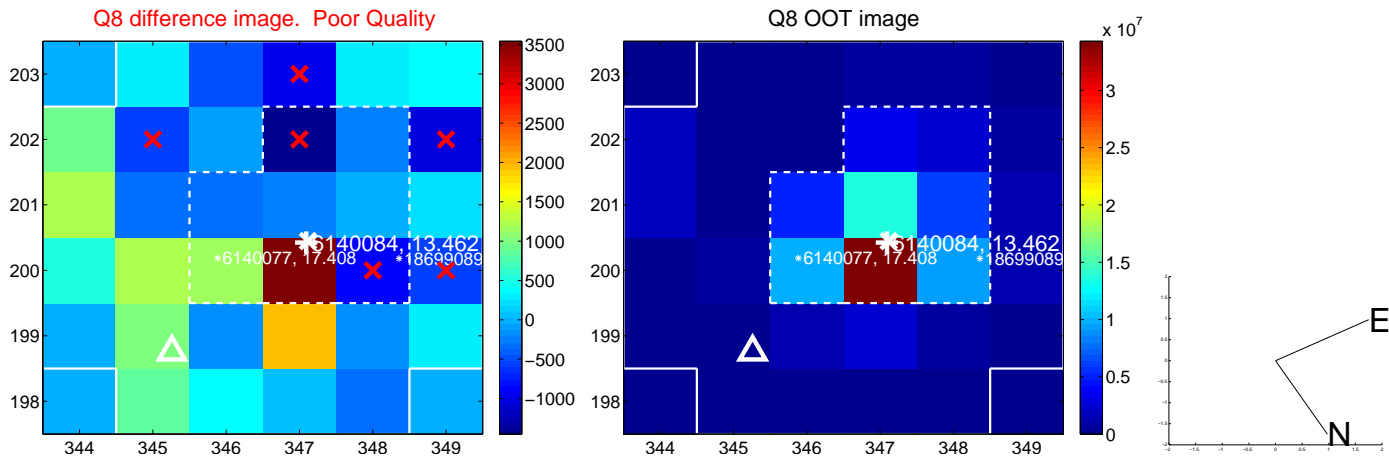
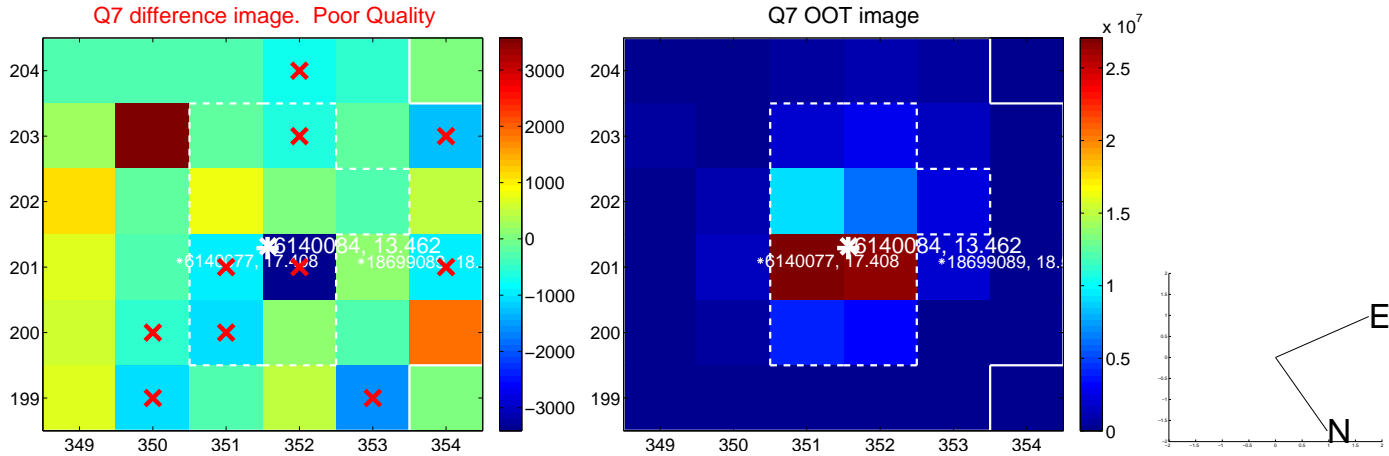
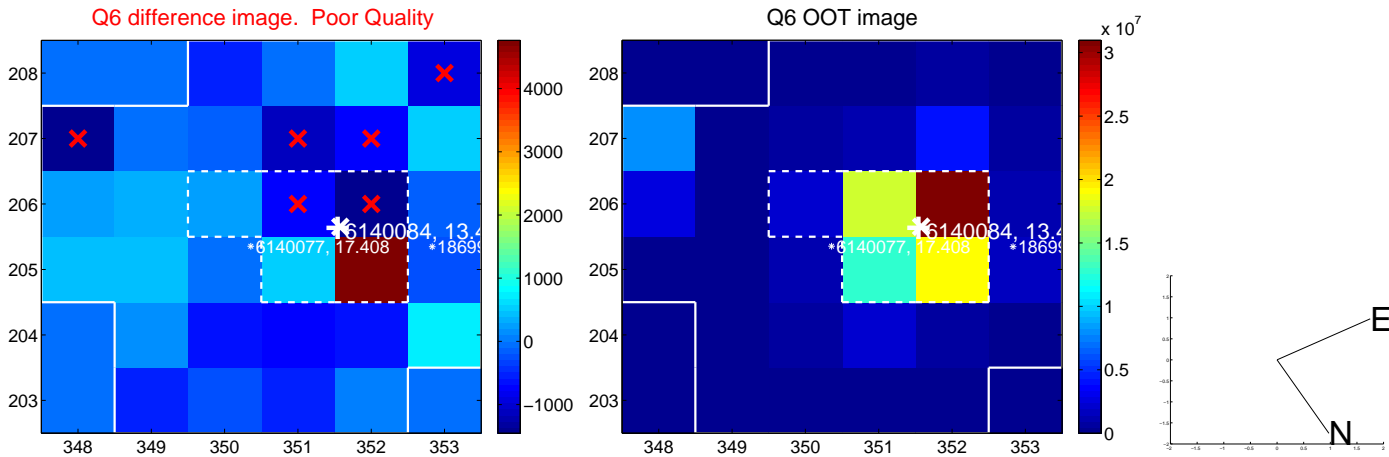
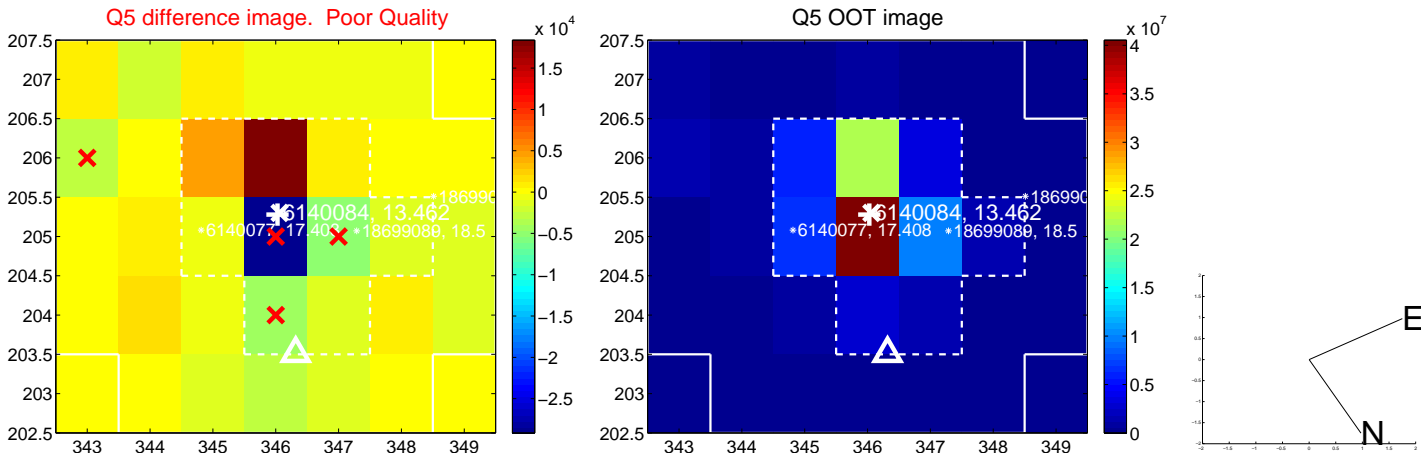


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

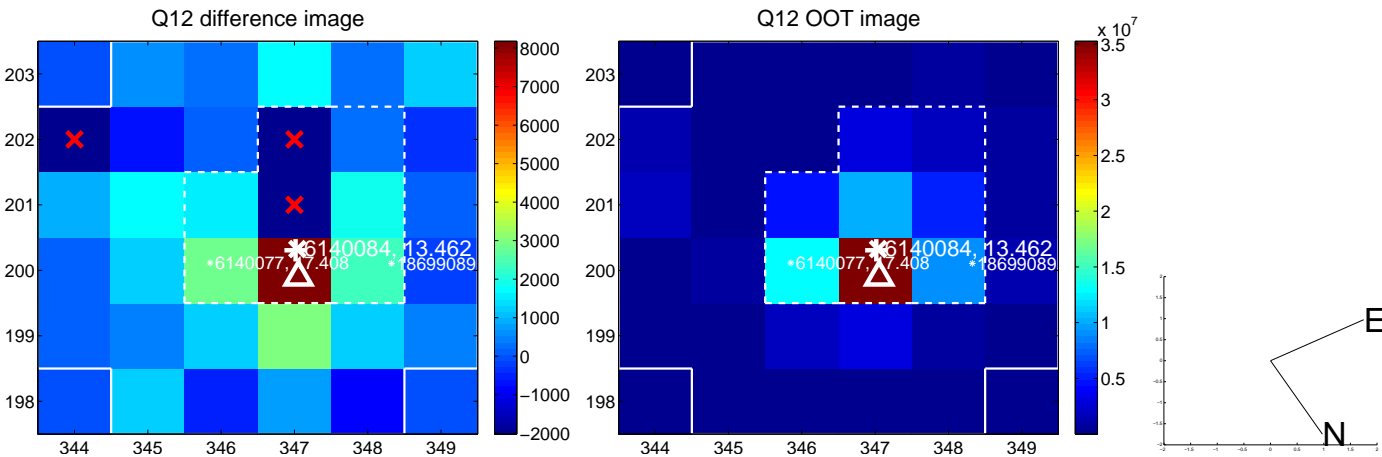
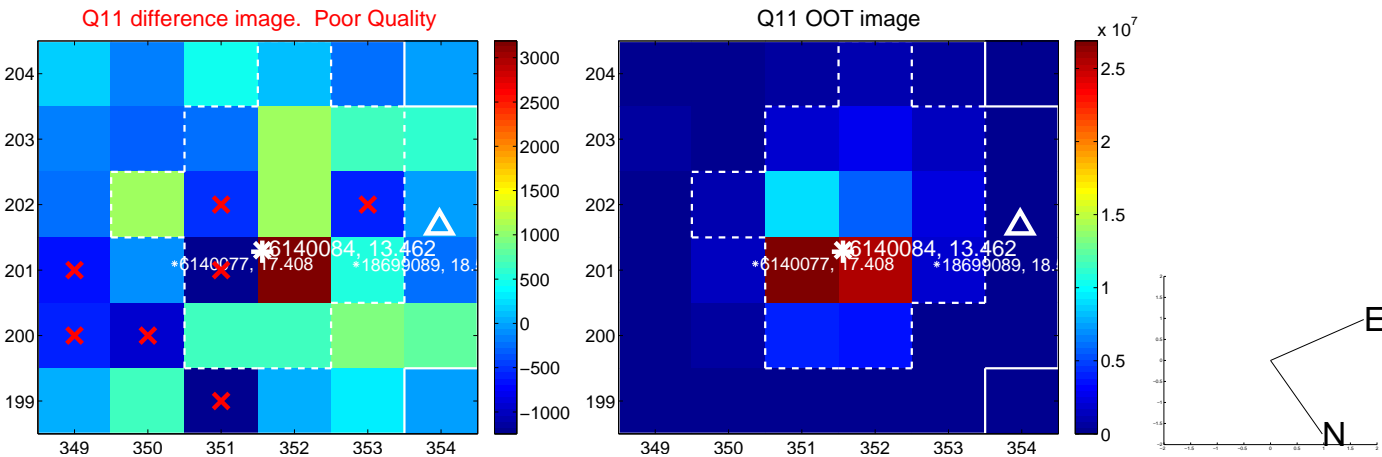
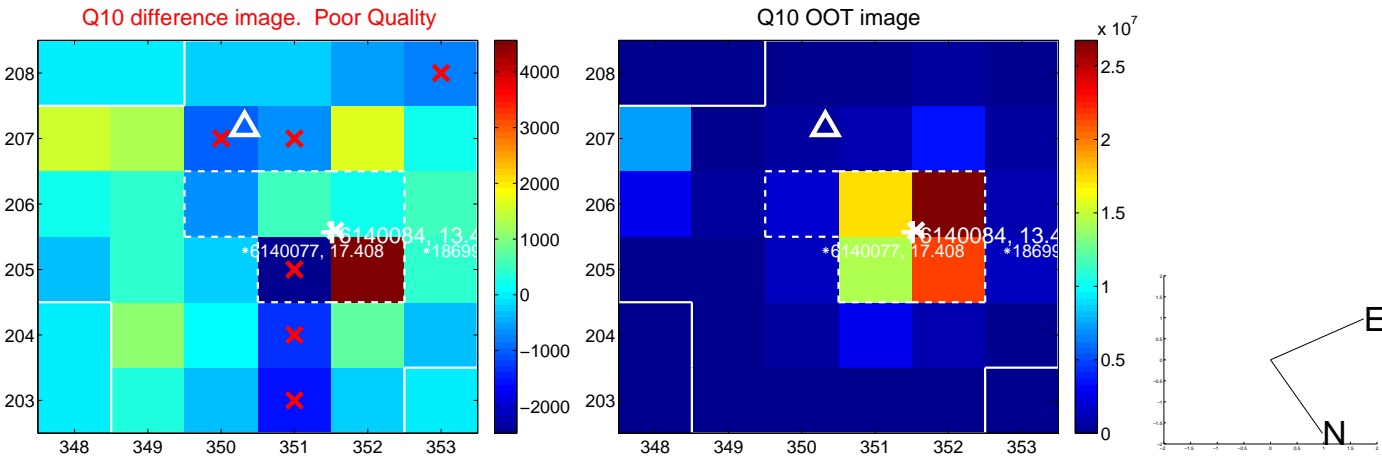
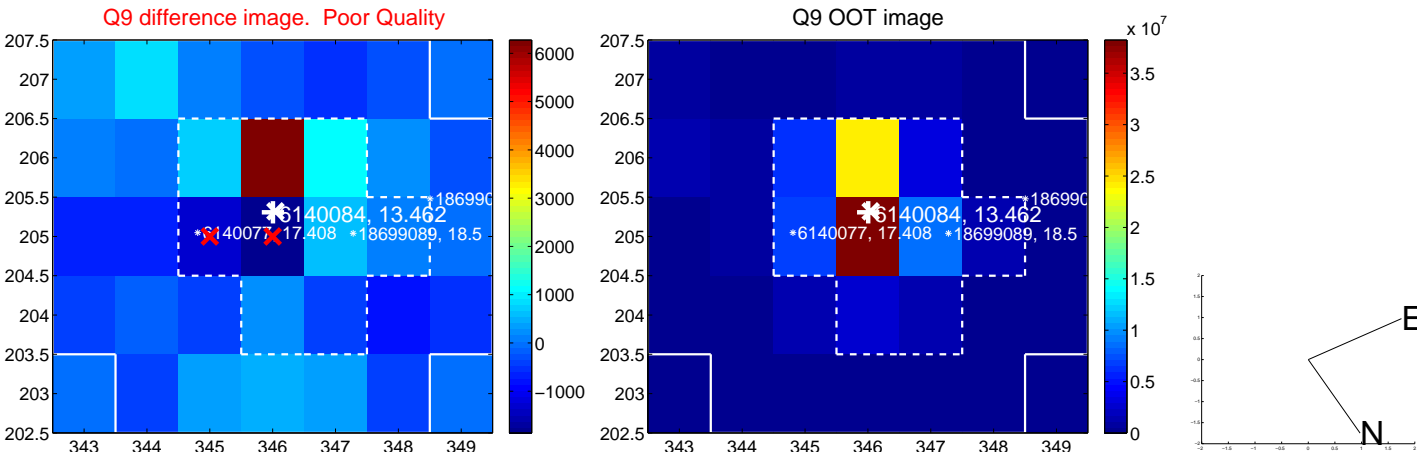
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

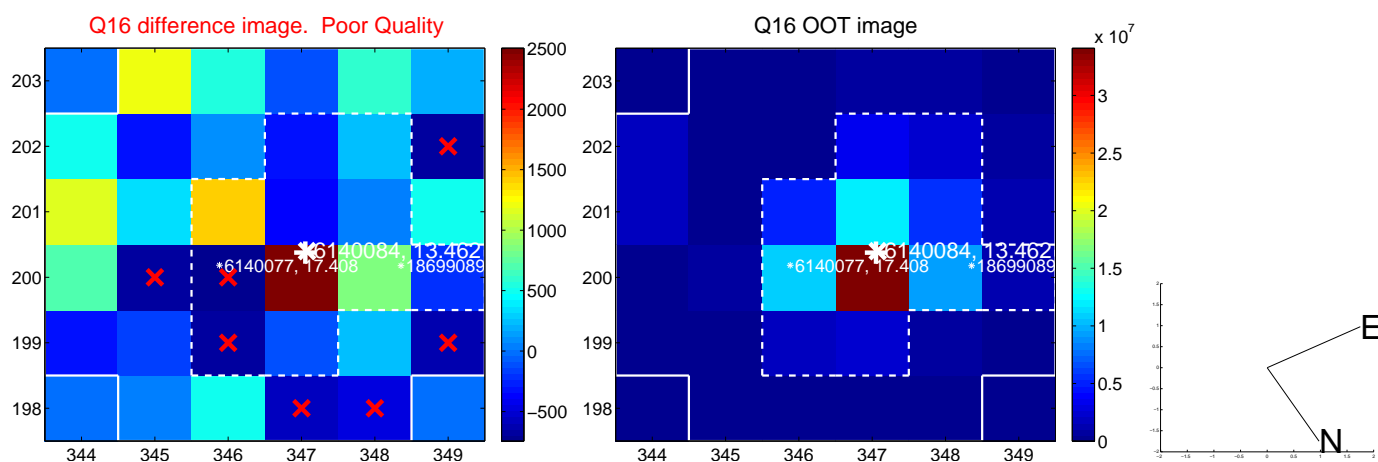
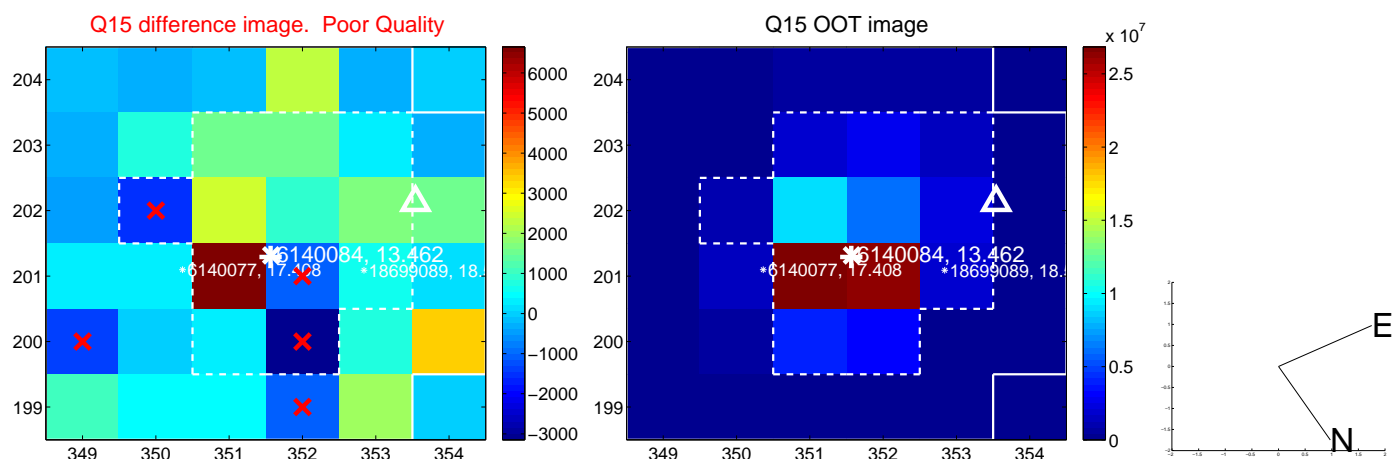
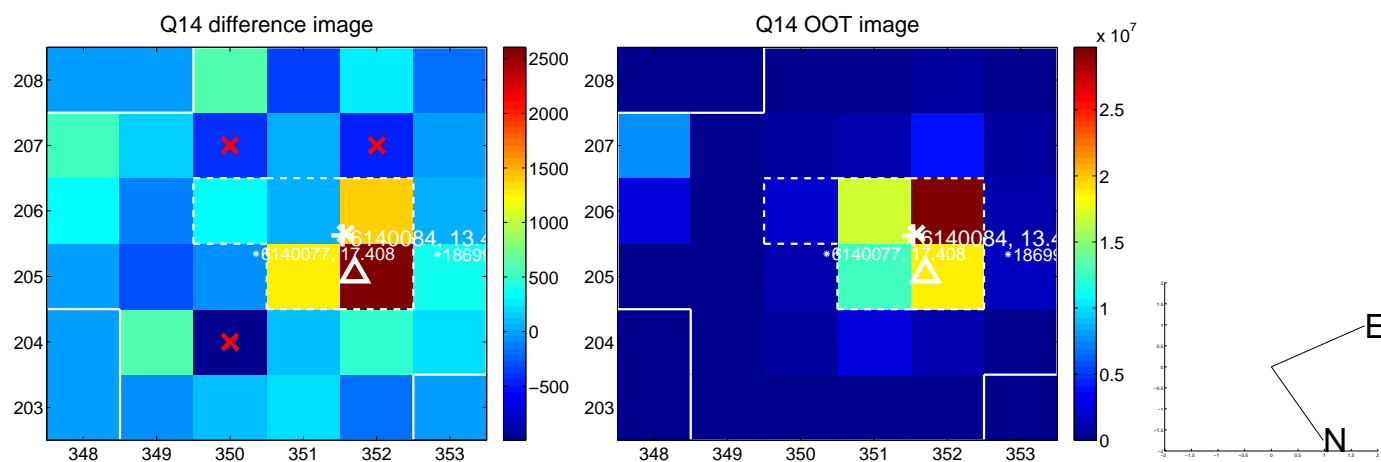
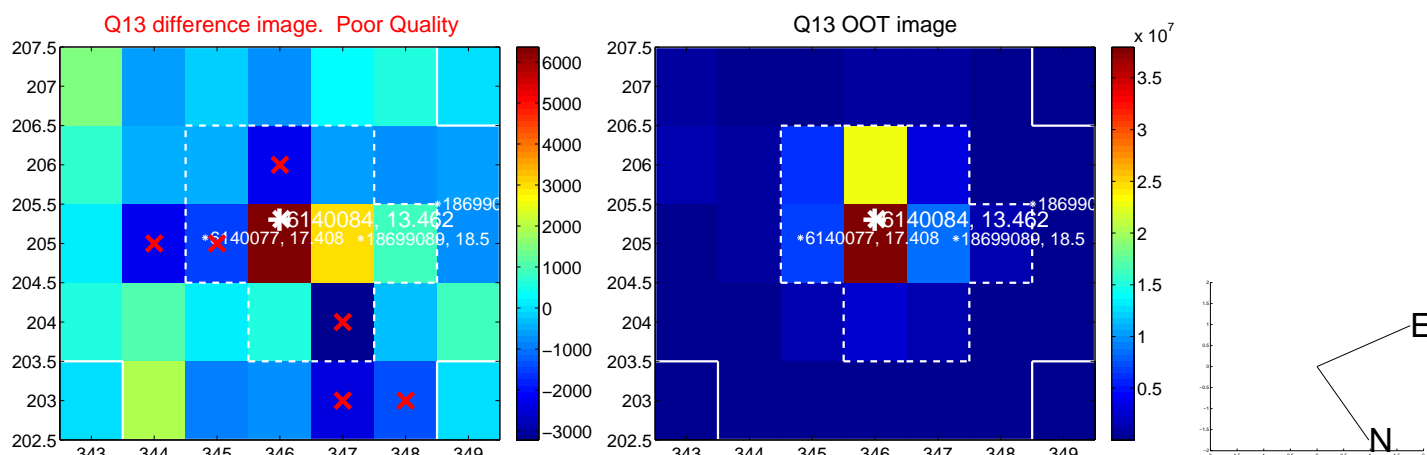


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





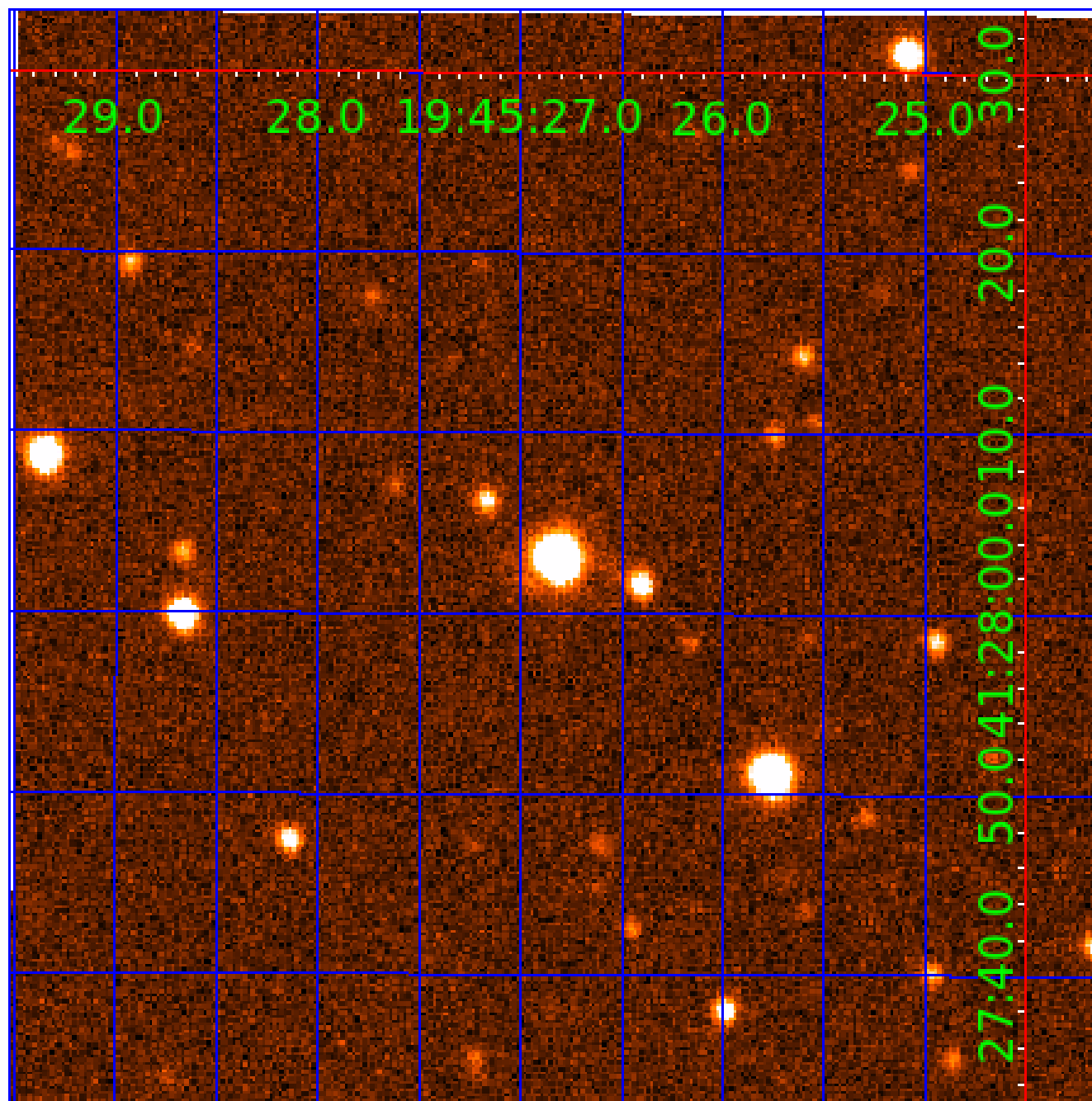
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

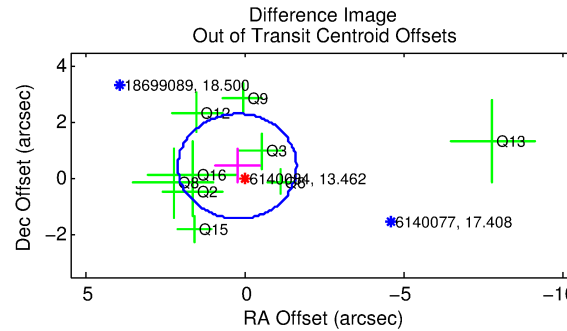
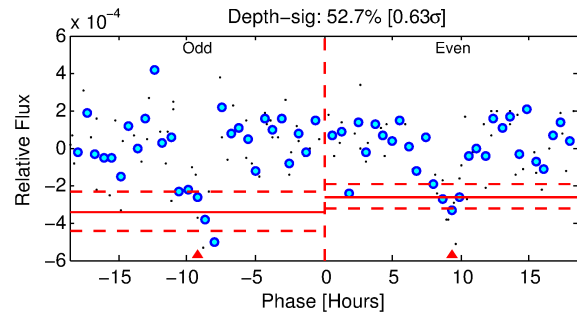
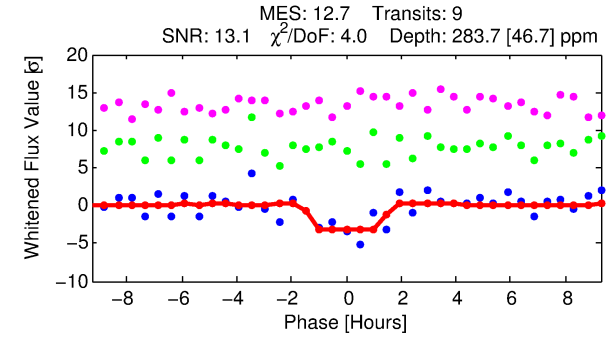
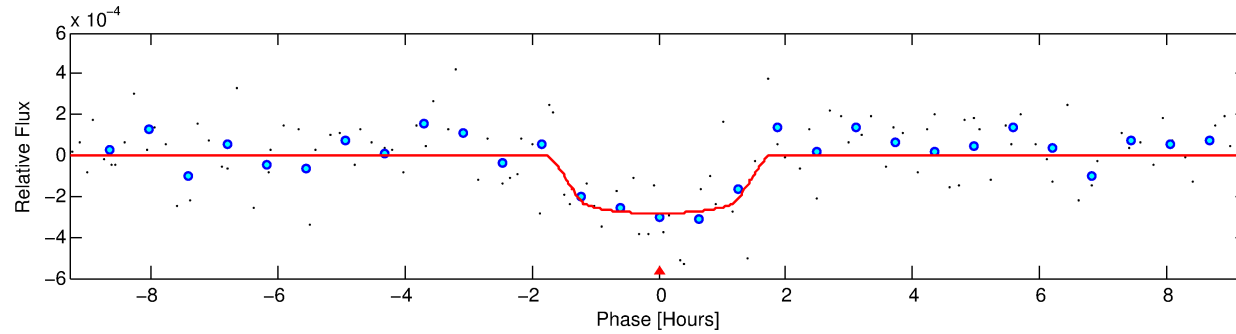
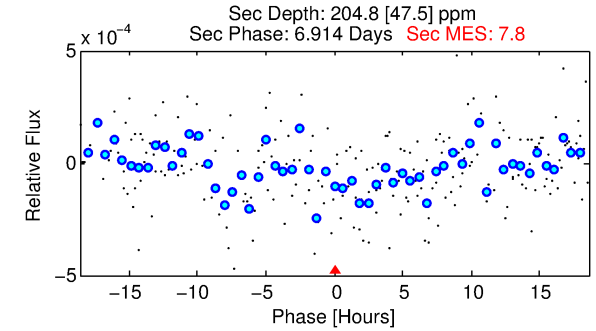
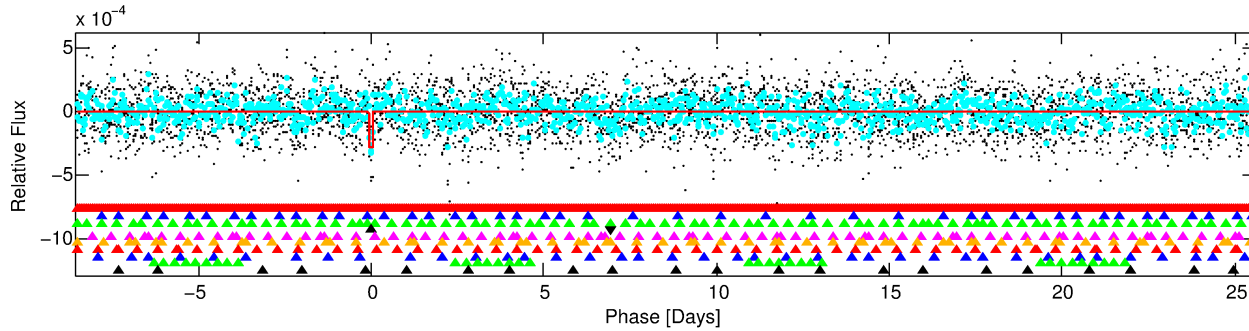
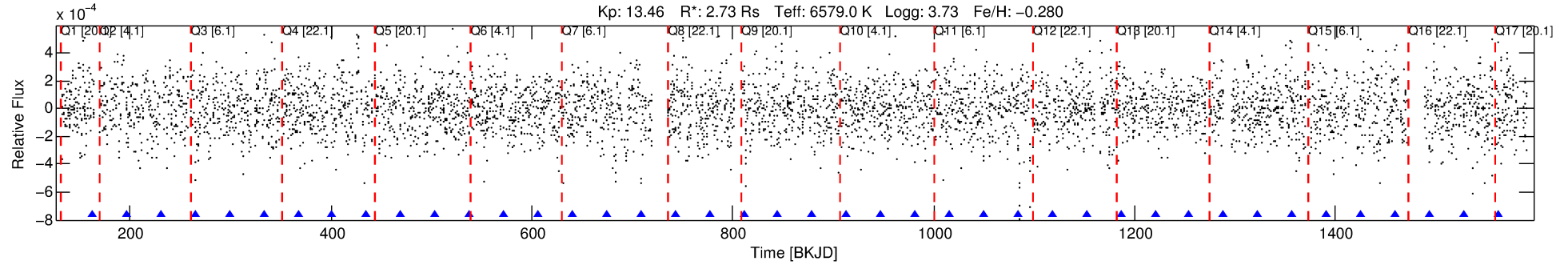
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-04

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 4 of 10 Period: 34.124 d



## DV Fit Results:

Period = 34.12359 [0.00074] d  
Epoch = 162.5404 [0.0153] BKJD  
Rp/R\* = 0.0170 [0.0157]  
a/R\* = 54.34 [281.50]  
b = 0.79 [2.57]  
Seff = 229.99 [126.75]  
Teq = 993 [137] K  
Rp = 5.04 [5.02] Re  
a = 0.2328 [0.0797] AU  
Ag = 240.07 [465.54] [0.51 $\sigma$ ]  
Teffp = 6043 [2821] K [1.79 $\sigma$ ]

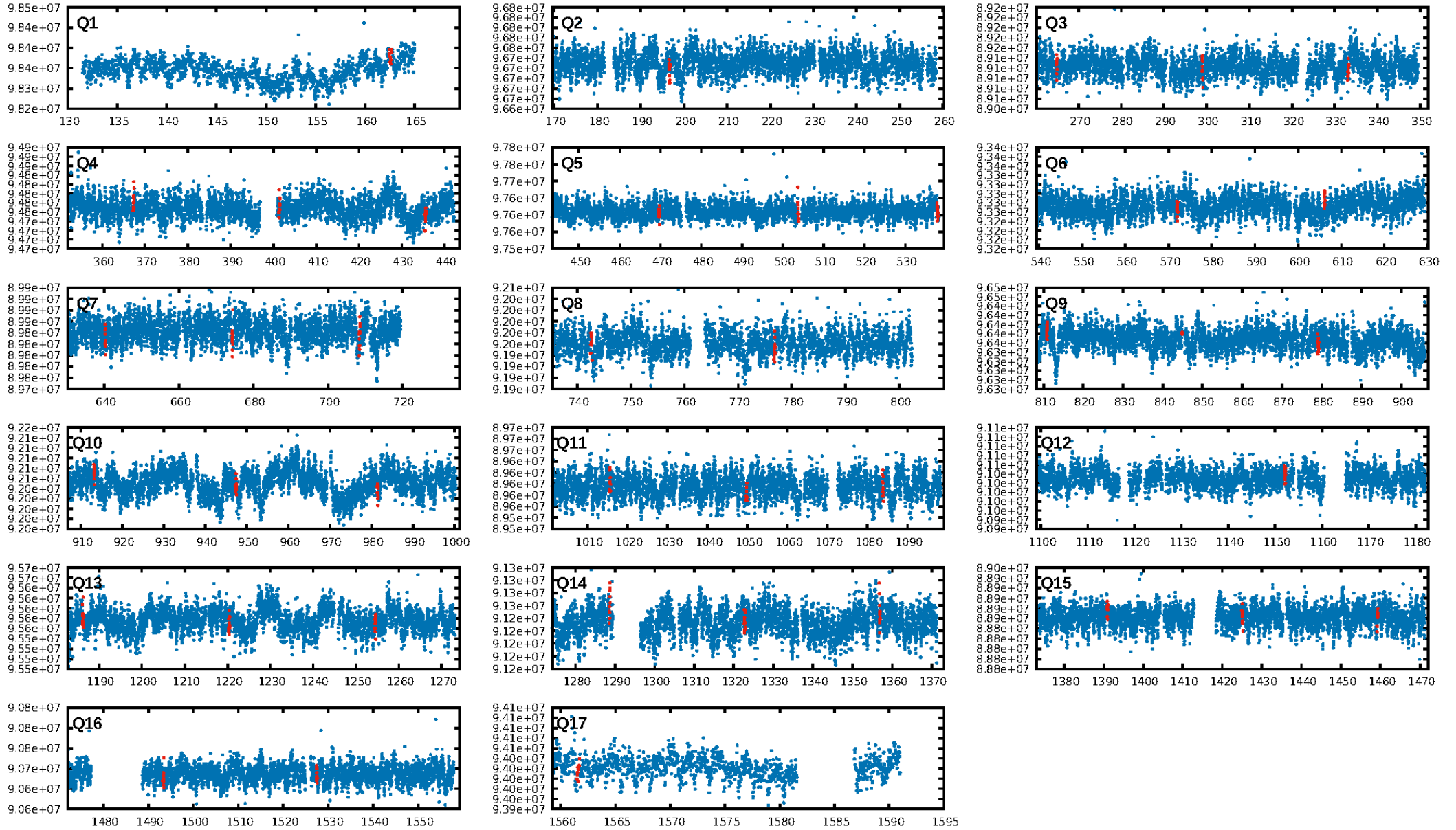
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [8.33 $\sigma$ ]  
LongPeriod-sig: 100.0% [19.76 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 28.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: -1.954  
Centroid-sig: 10.5%  
Centroid-so: 0.780 arcsec [1.60 $\sigma$ ]  
OotOffset-rm: 0.503 arcsec [0.81 $\sigma$ ]  
KicOffset-rm: 0.478 arcsec [0.76 $\sigma$ ]  
OotOffset-st: 2/2/3/2 [9]  
KicOffset-st: 2/2/3/2 [9]  
DiffImageQuality-fgm: 0.44 [4/9]  
DiffImageOverlap-fno: 0.41 [7/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:36 Z

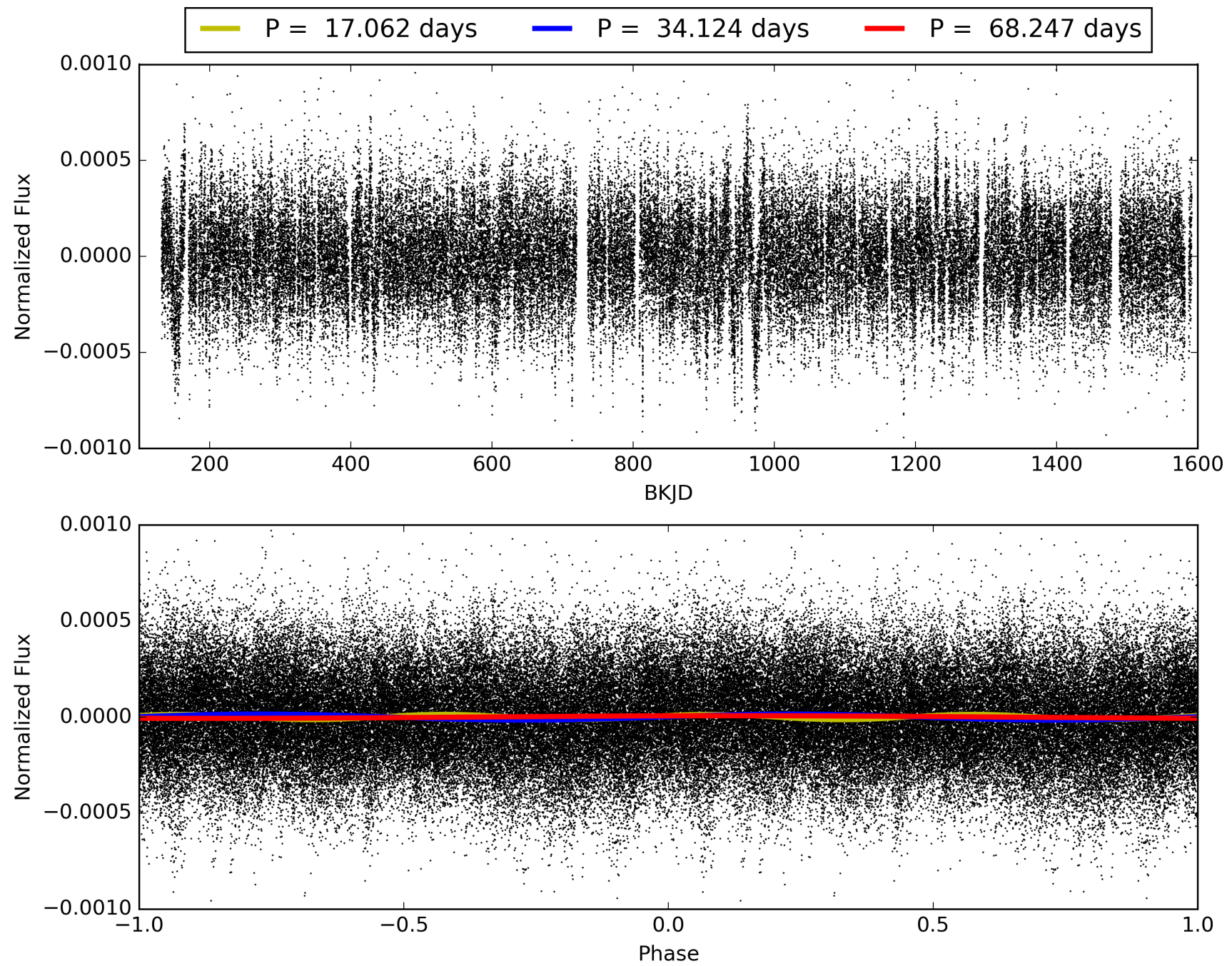
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-04, PDC Light Curves



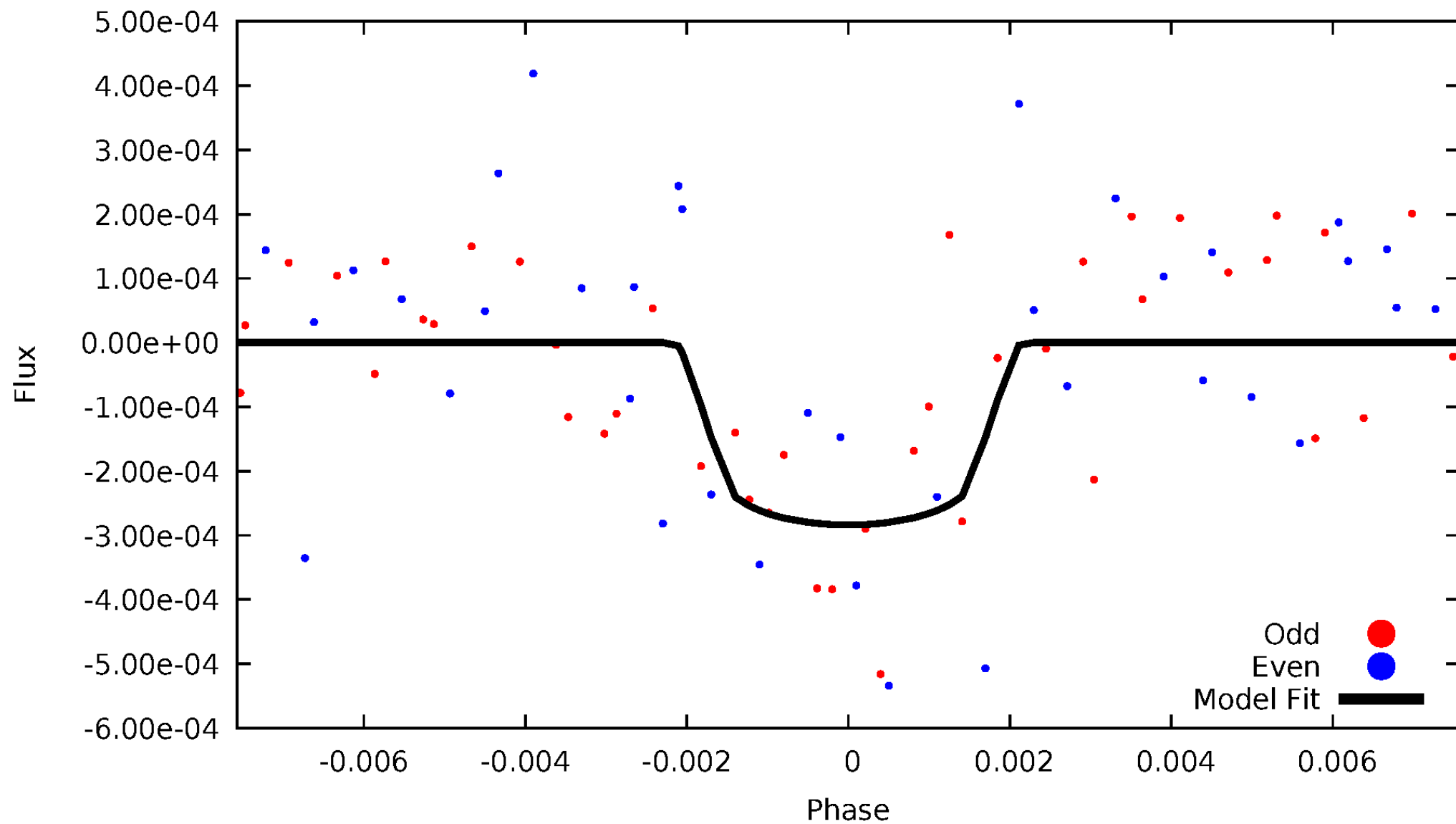


TCE 006140084-04



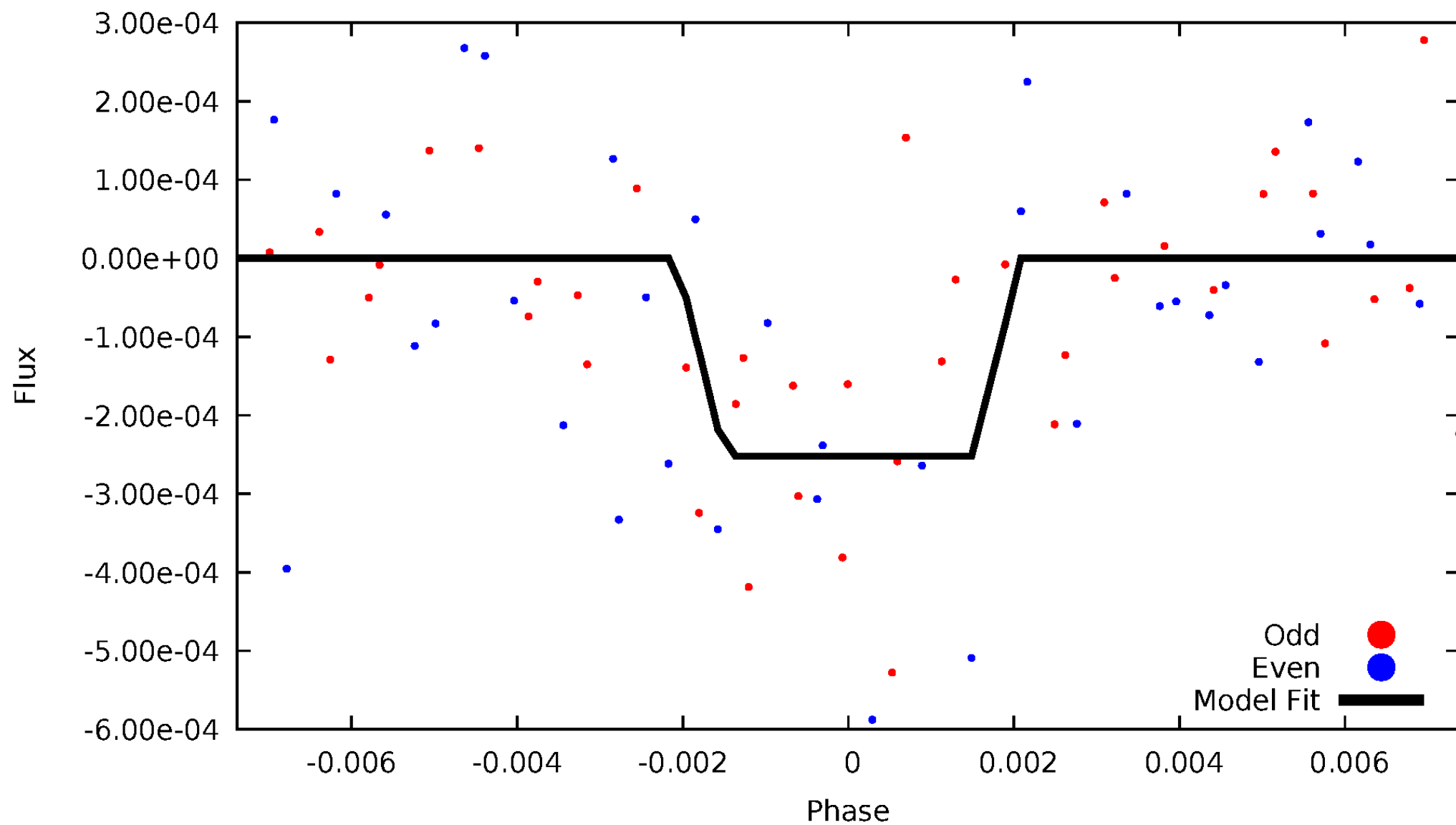
# DV Odd/Even

TCE 006140084-04



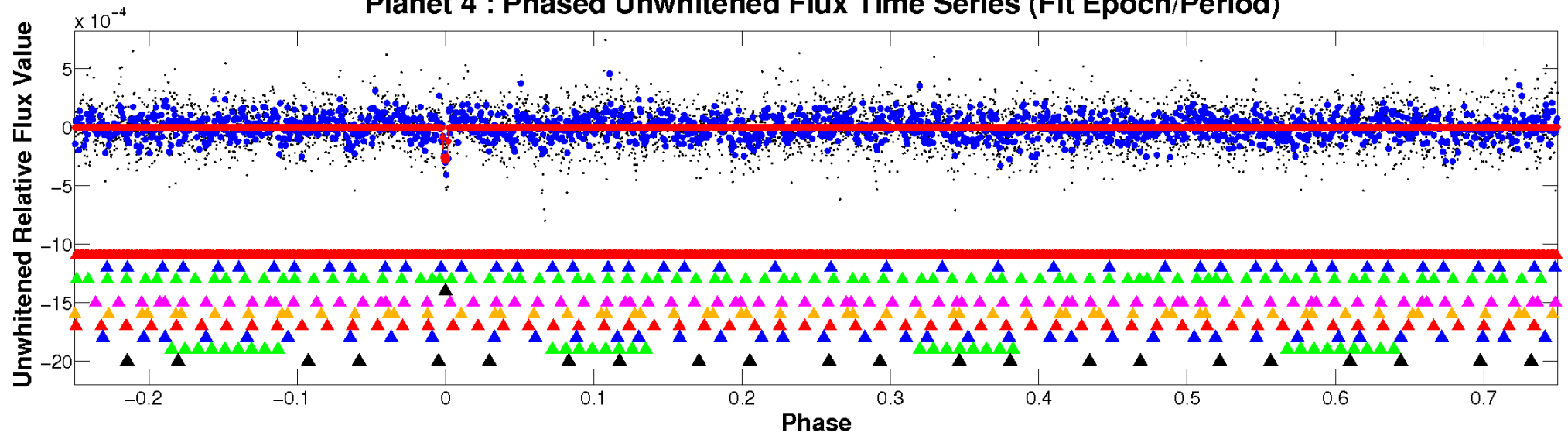
# ALT Odd/Even

TCE 006140084-04

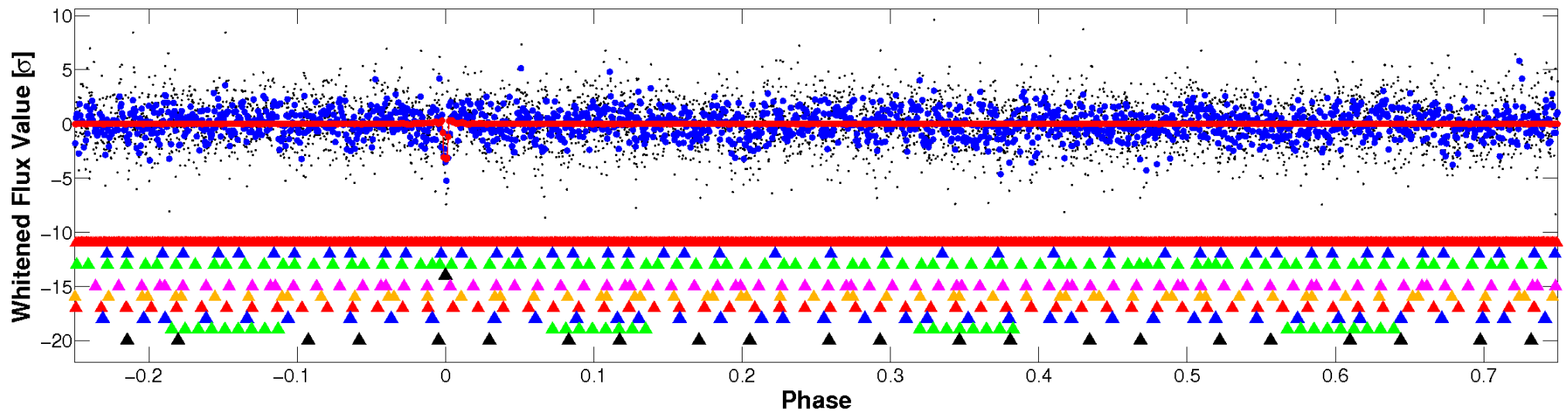


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

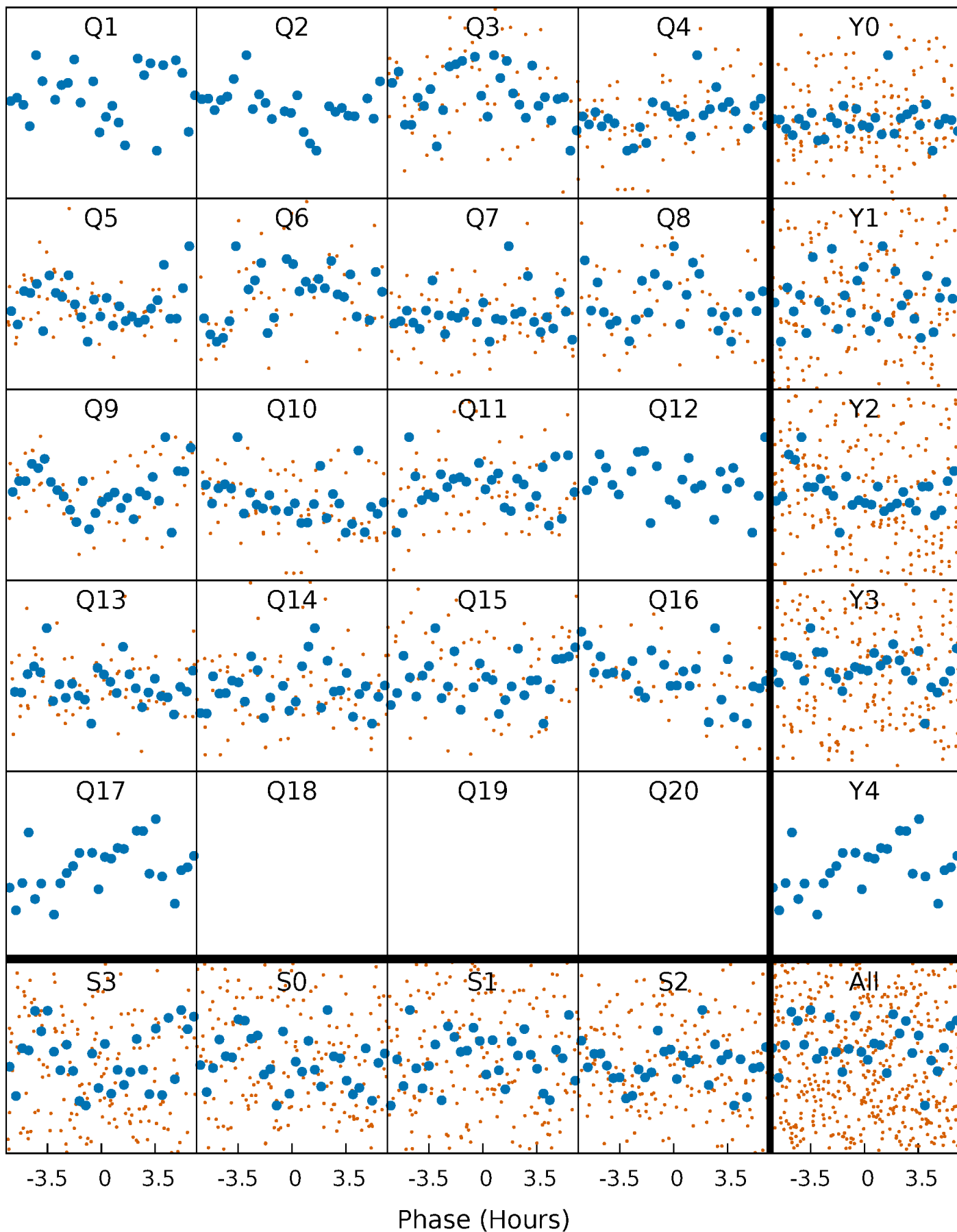


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



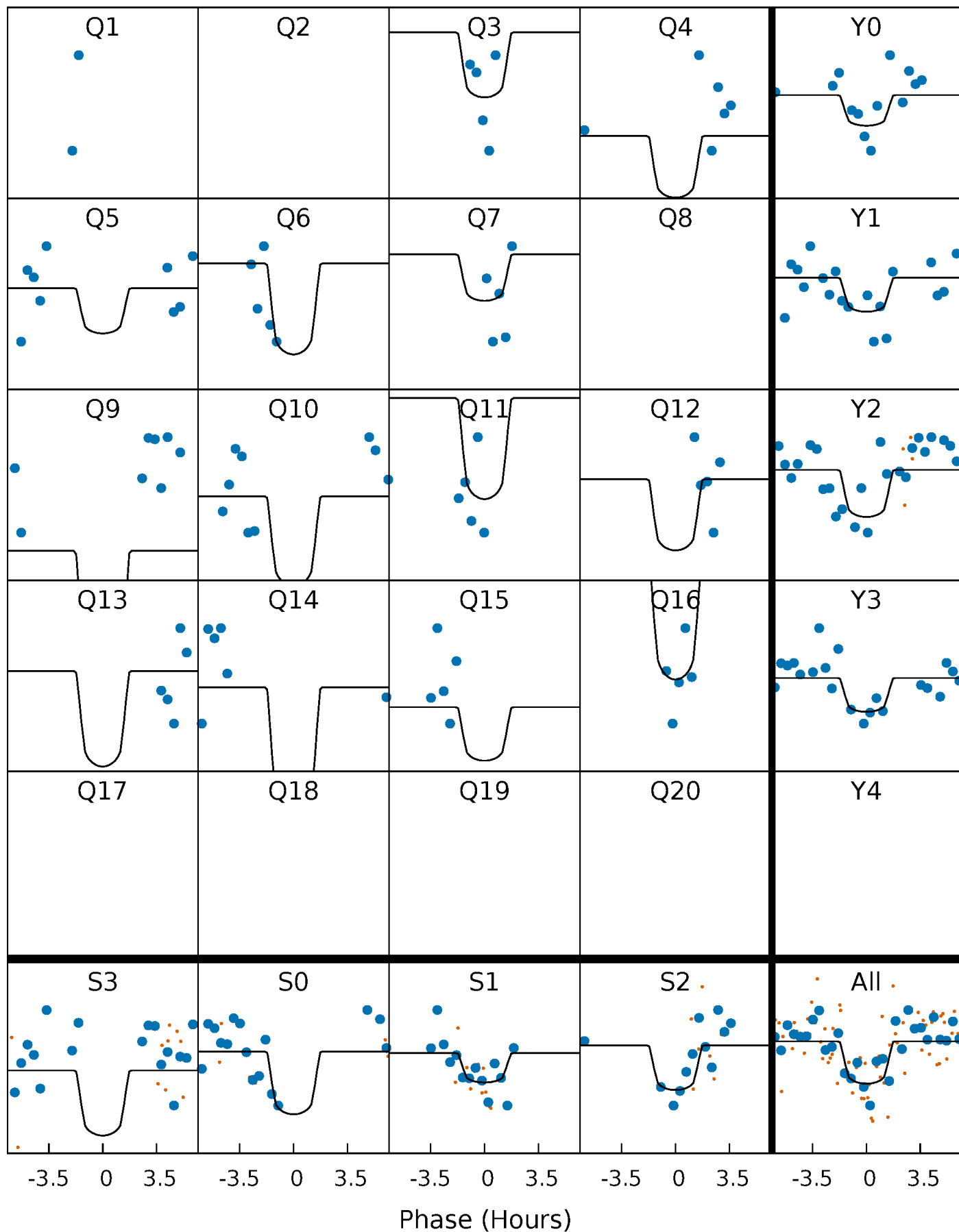
# PDC Quarter-Phased Transit Curves

TCE 006140084-04 P= 34.123591 Days  $T_0=162.540440$  (BKJD)



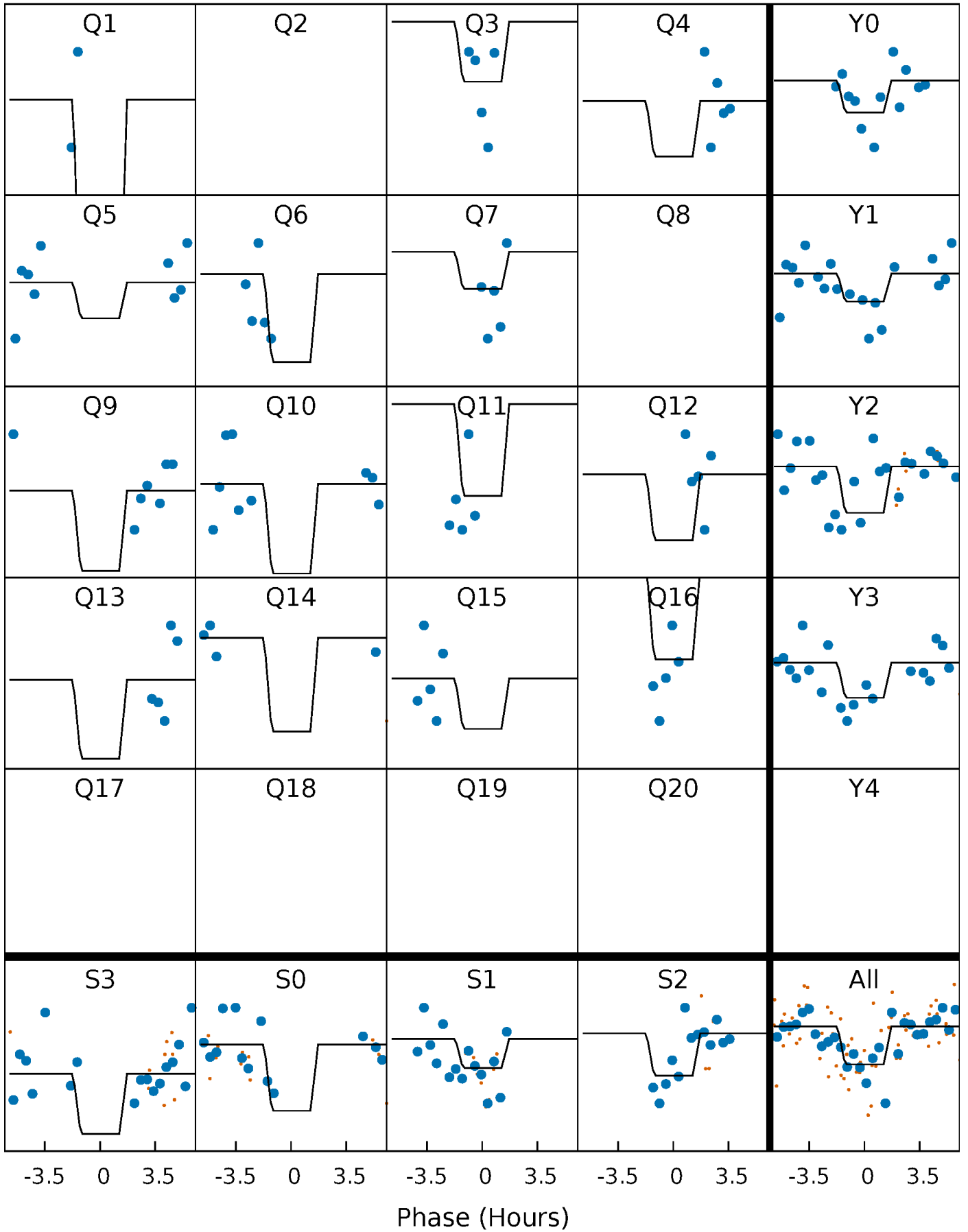
# DV Quarter-Phased Transit Curves

TCE 006140084-04 P= 34.123591 Days  $T_0=162.540440$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006140084-04   P= 34.124488 Days    $T_0=162.533321$  (BKJD)

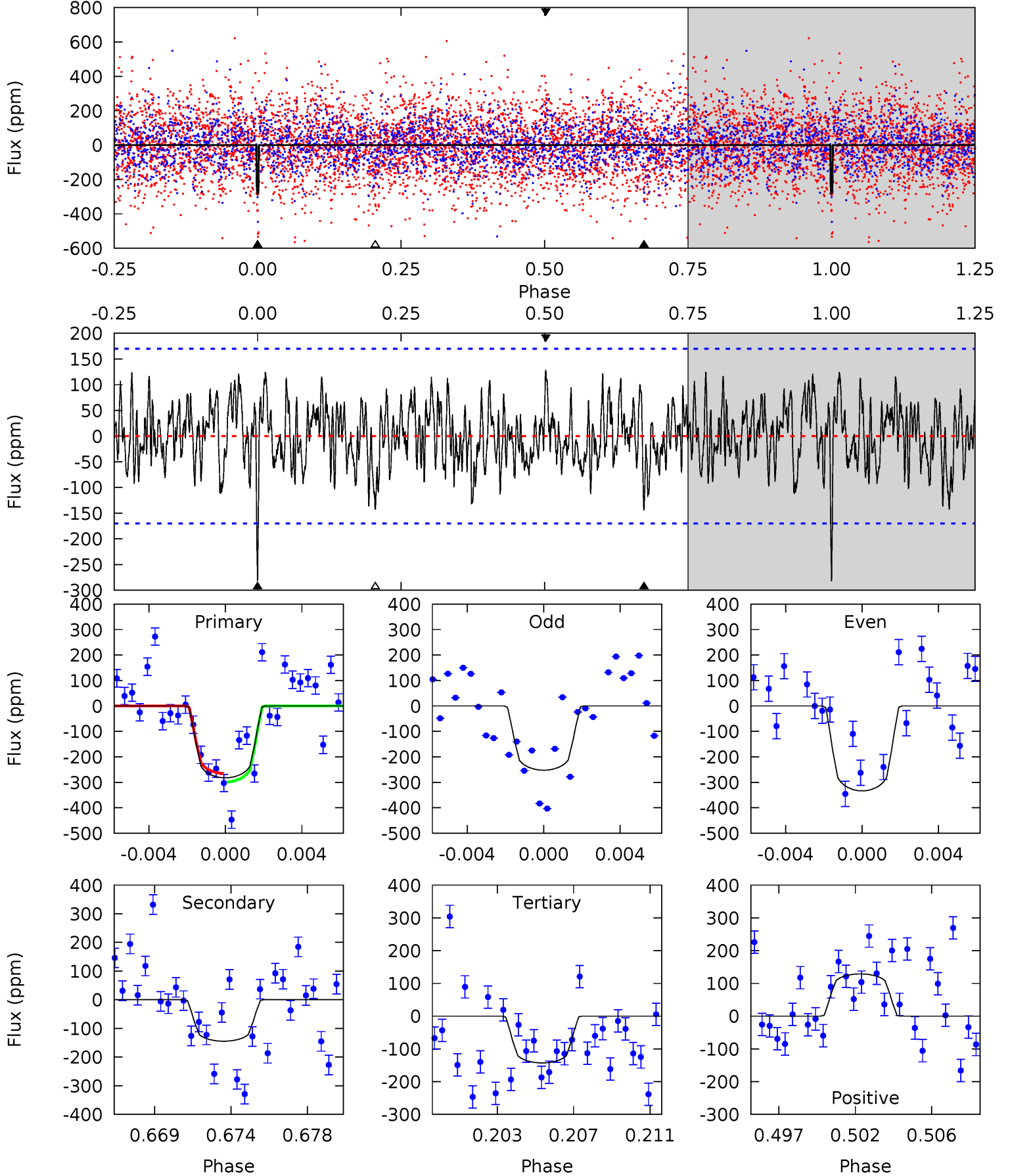




# DV Model-Shift Uniqueness Test

006140084-04, P = 34.123591 Days, E = 128.416849 Days

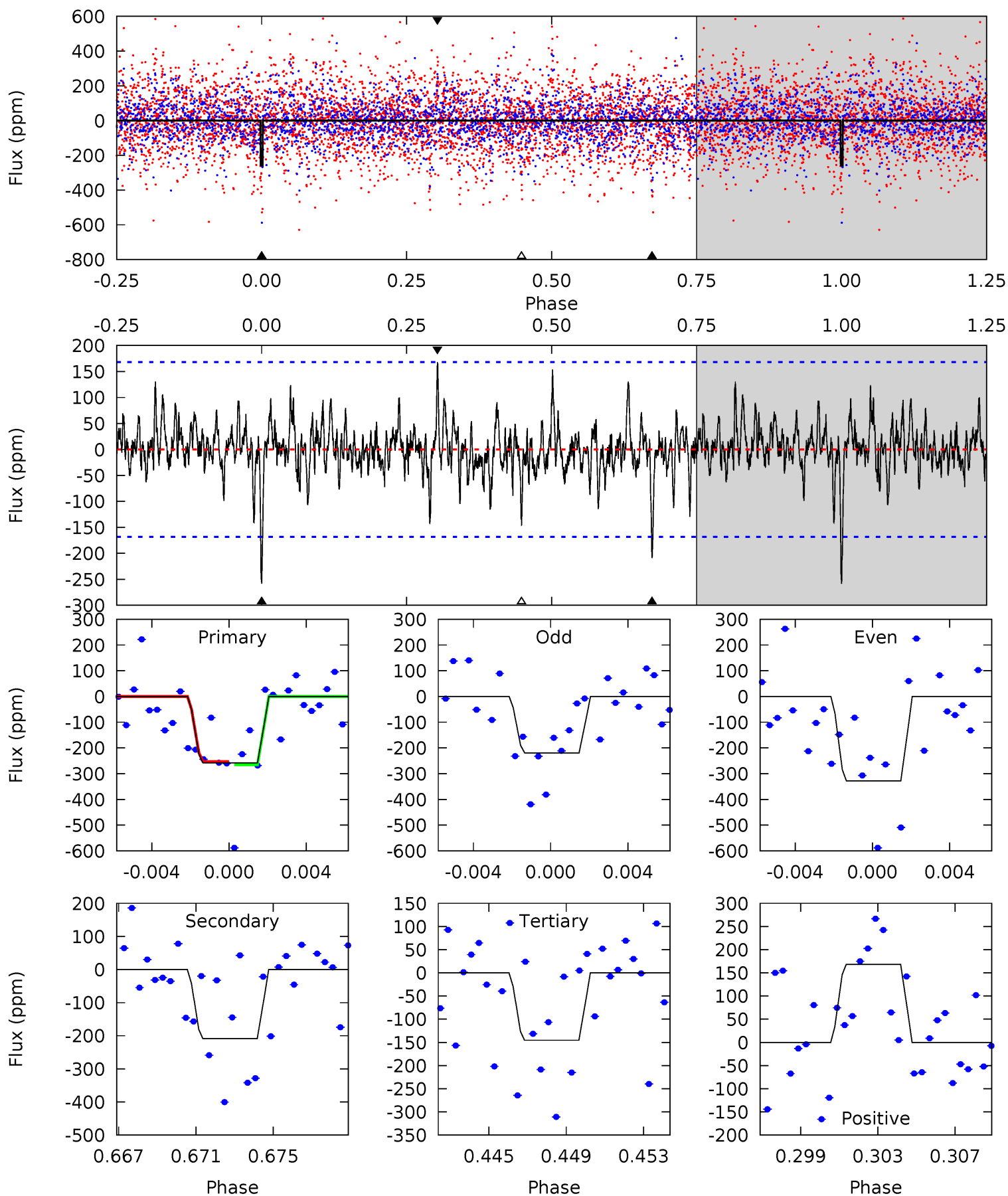
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 8.60 | 4.40 | 4.35 | 3.93 | 5.18            | 2.85            | 1.56             | 4.25    | 4.67    | 0.05    | 0.48    | 1.26    | 0.79 | 0.31  | 0.51 |



# Alt Model-Shift Uniqueness Test

006140084-04, P = 34.124488 Days, E = 128.408833 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.98 | 6.45 | 4.49 | 5.20 | 5.20            | 2.87            | 1.25             | 3.49    | 2.78    | 1.96    | 1.25    | 1.64    | 0.88 | 0.39  | 0.20 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-04 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$       | $T_{obs} (K)$          | $A_{obs}$            |
|---------|---------------|------------------------|---------------------|------------------------|----------------------|
| DV      | $-144 \pm 33$ | $5.62^{+4.10}_{-3.50}$ | $1352^{+80}_{-121}$ | $5163^{+3375}_{-1053}$ | $139^{+874}_{-95}$   |
| Alt.    | $-209 \pm 32$ | $5.20^{+4.23}_{-3.22}$ | $1352^{+76}_{-116}$ | $5722^{+4258}_{-1274}$ | $236^{+1391}_{-166}$ |

$T_{max}$  = 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  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

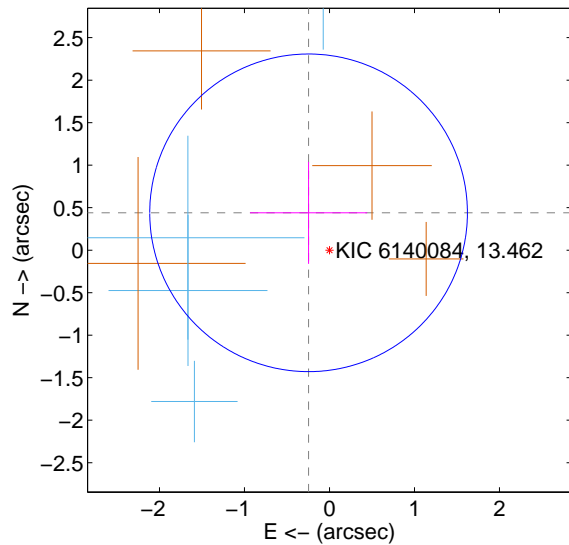
Supplemental centroid analysis for 006140084-04. Kepler magnitude: 13.46. Transit SNR 13.15

There are 4 quarters with good PRF difference image offsets

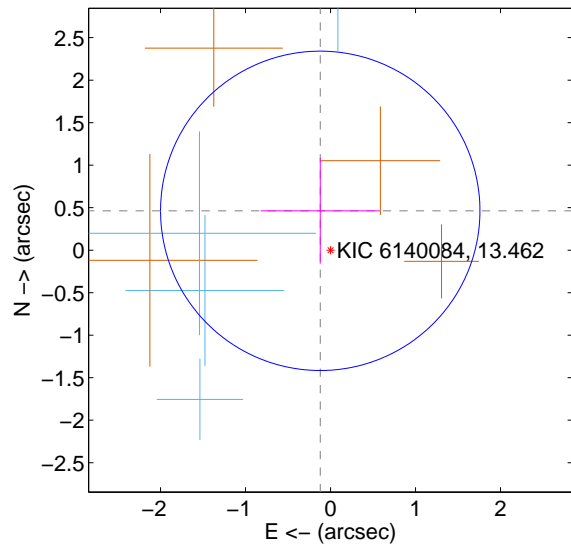
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $0.503 \pm 0.623$  | 0.81                | $0.246 \pm 0.689$ | $0.439 \pm 0.600$ |
| PRF-fit source offset from KIC position | $0.478 \pm 0.626$  | 0.76                | $0.121 \pm 0.701$ | $0.463 \pm 0.621$ |
| photometric centroid source offset      | $0.78 \pm 0.49$    | 1.60                | $-0.70 \pm 0.50$  | $0.34 \pm 0.45$   |

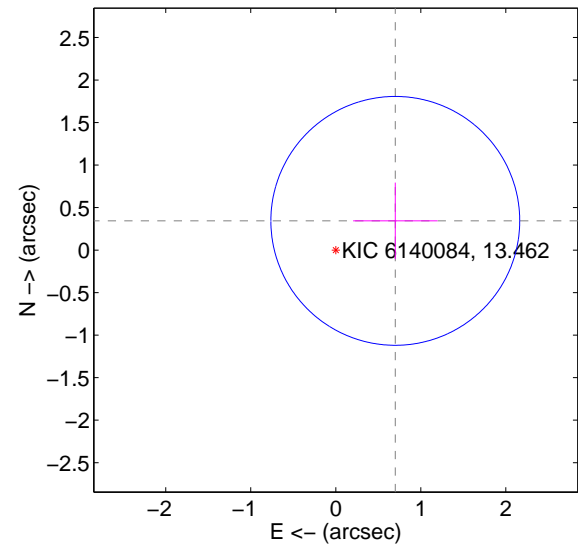
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

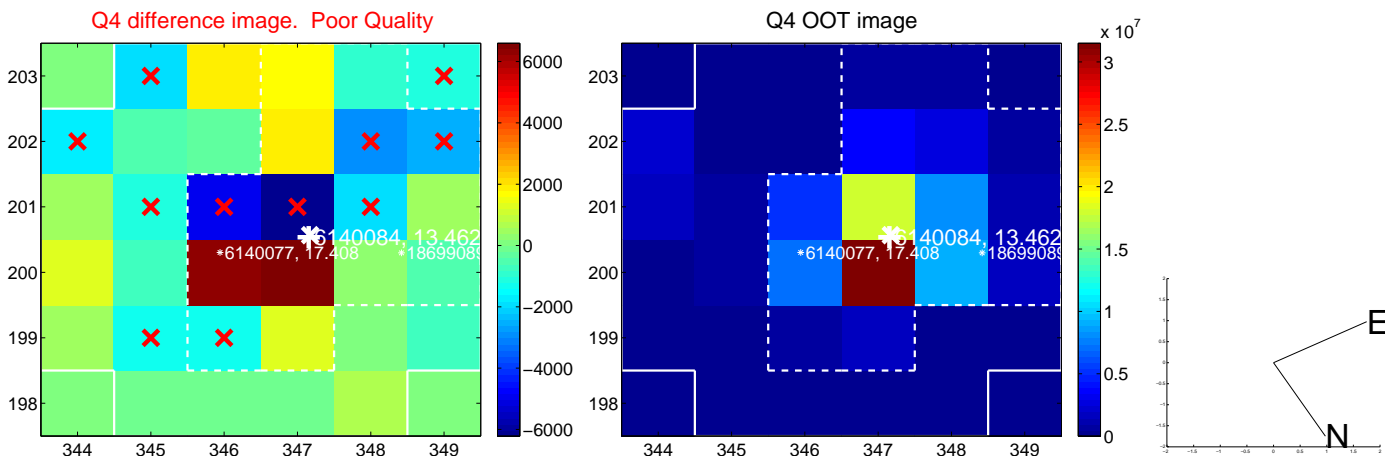
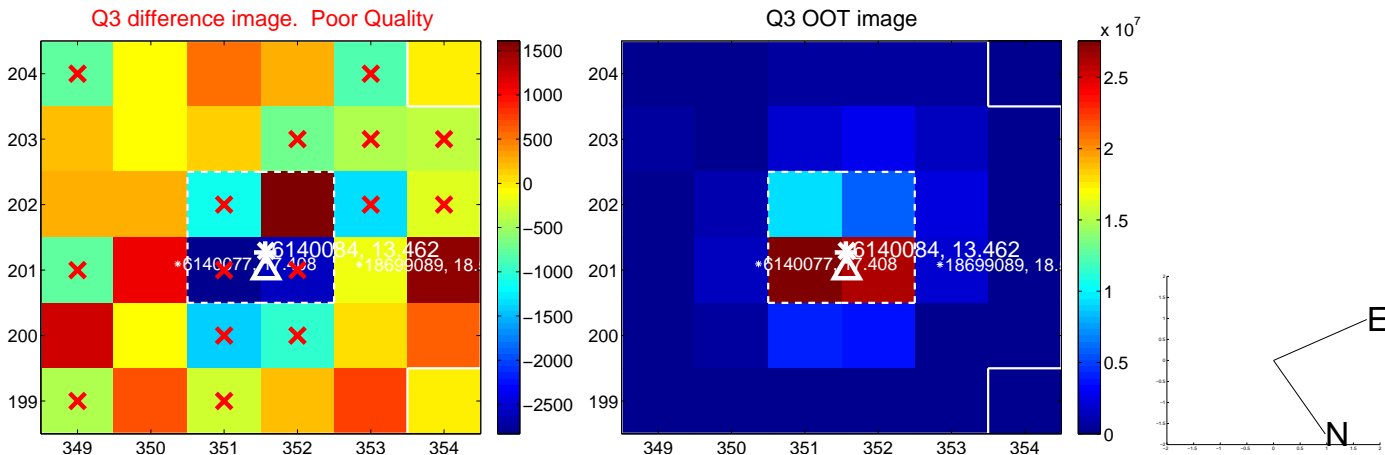
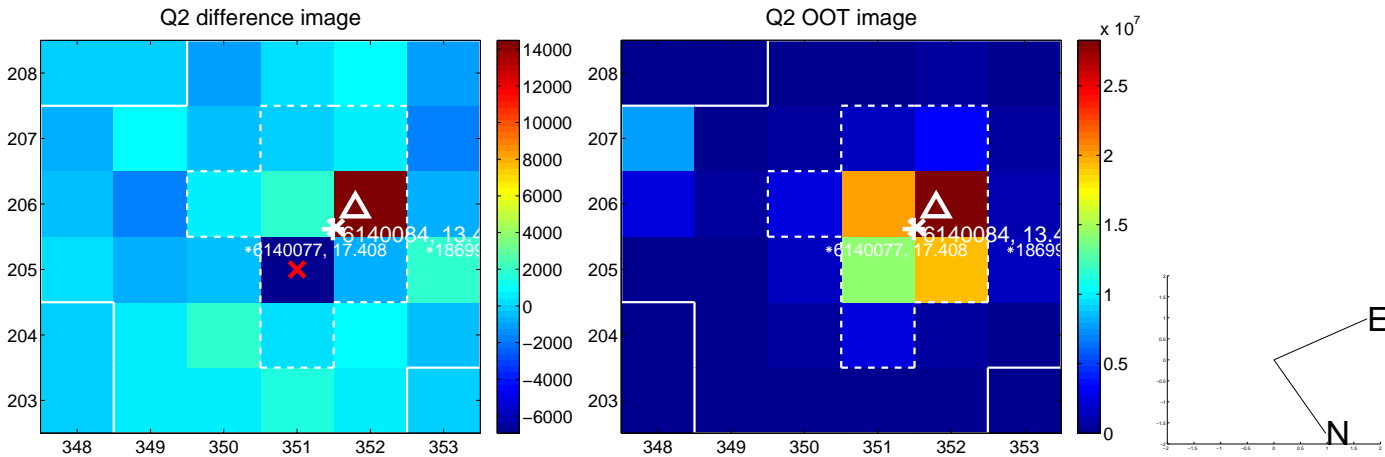
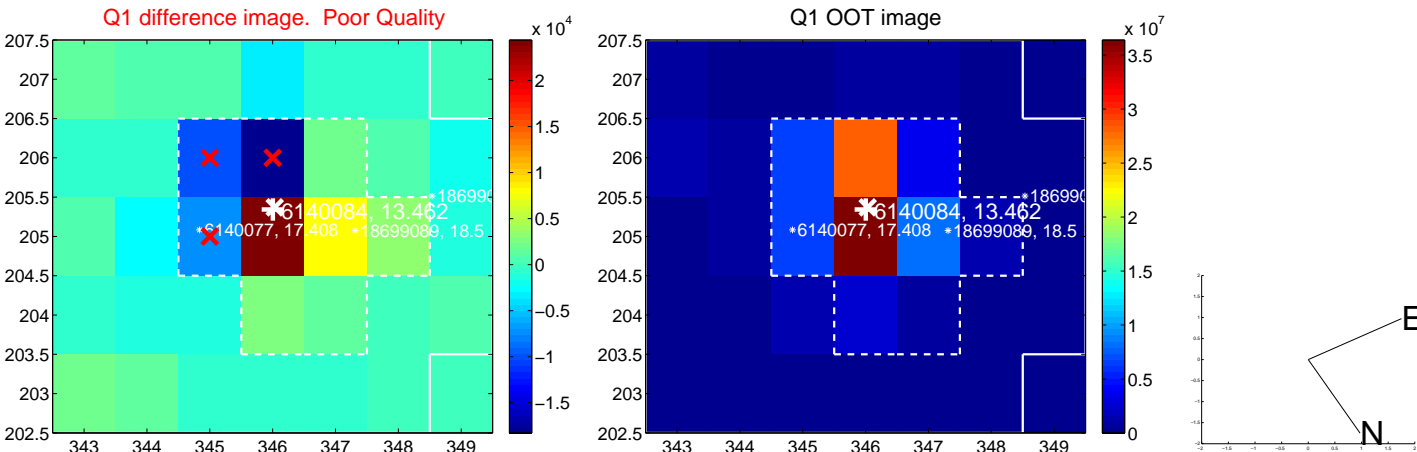


offset from photometric centroids

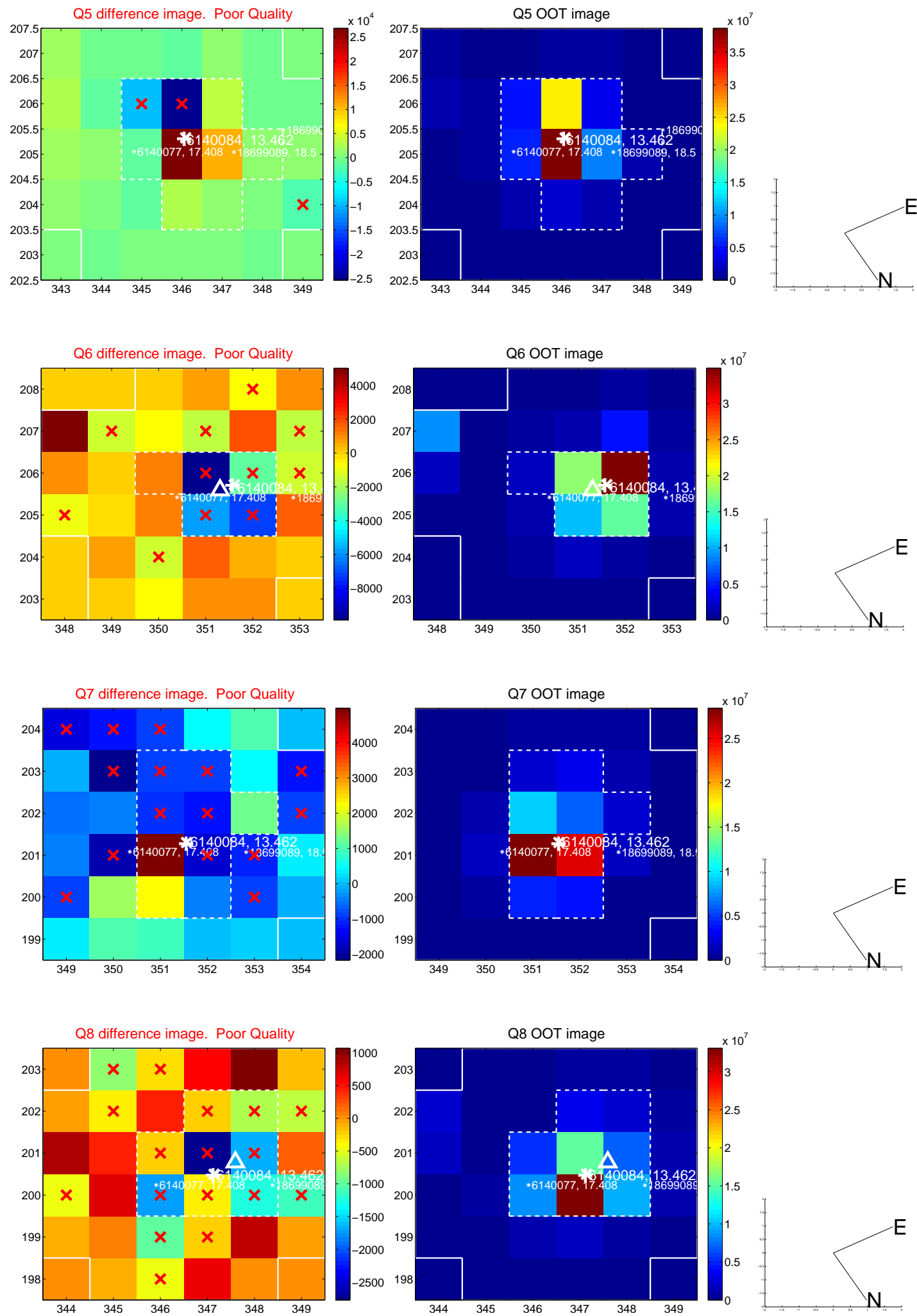


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

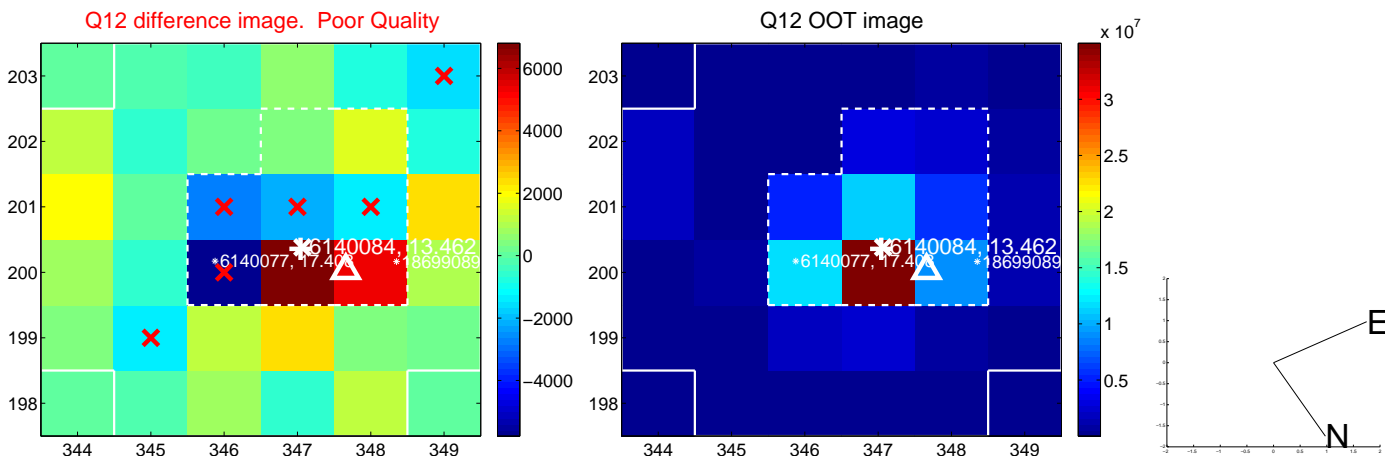
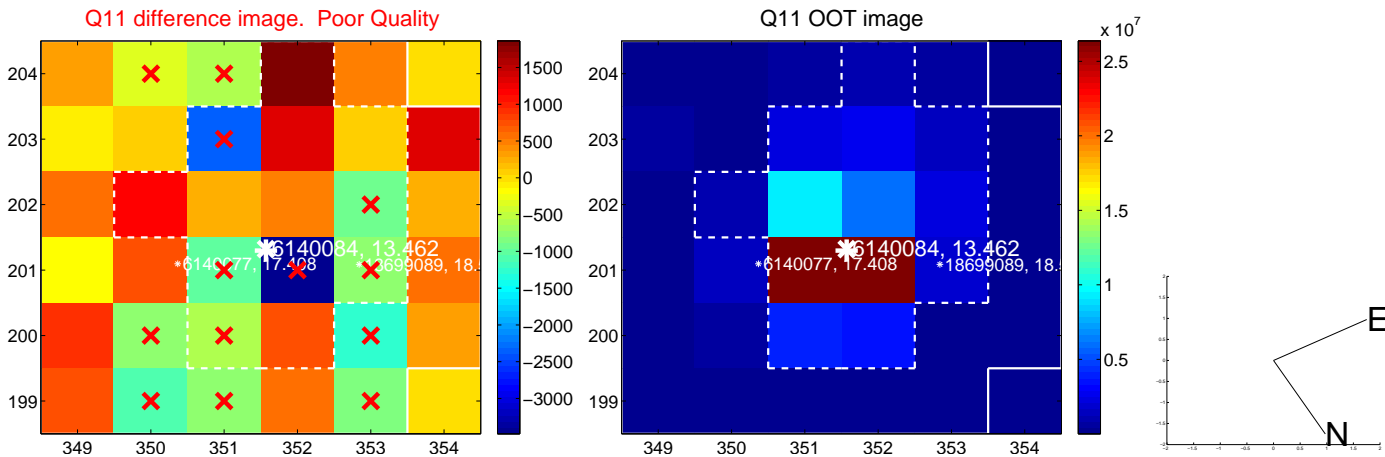
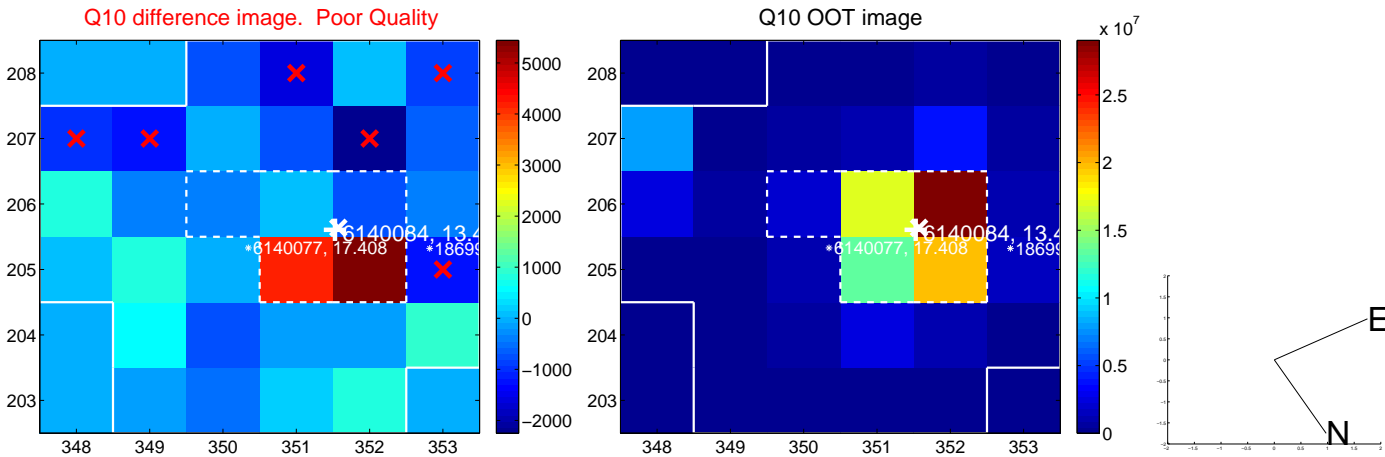
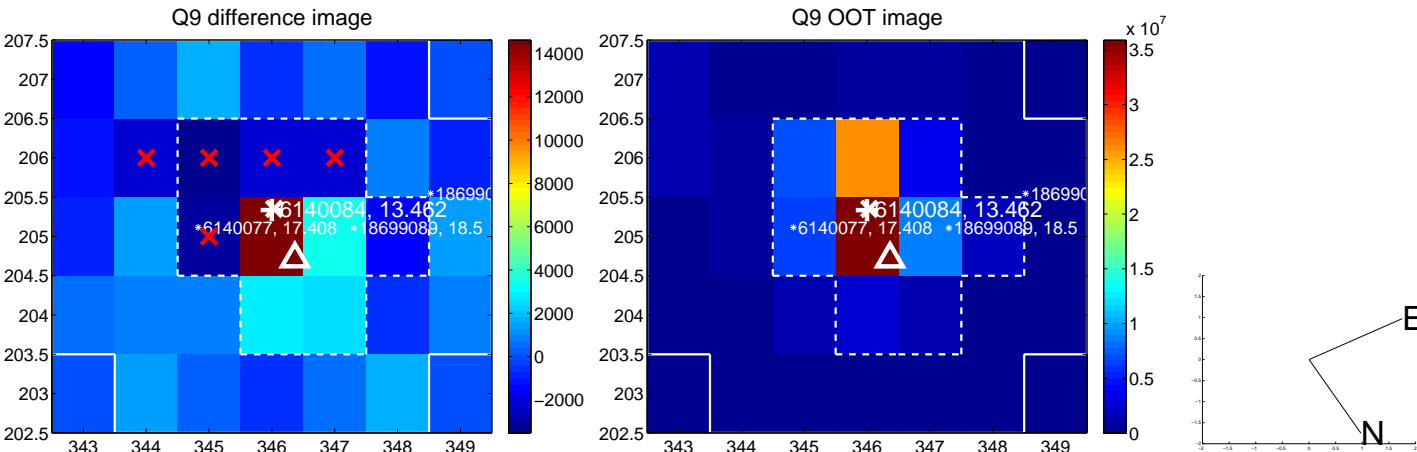
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

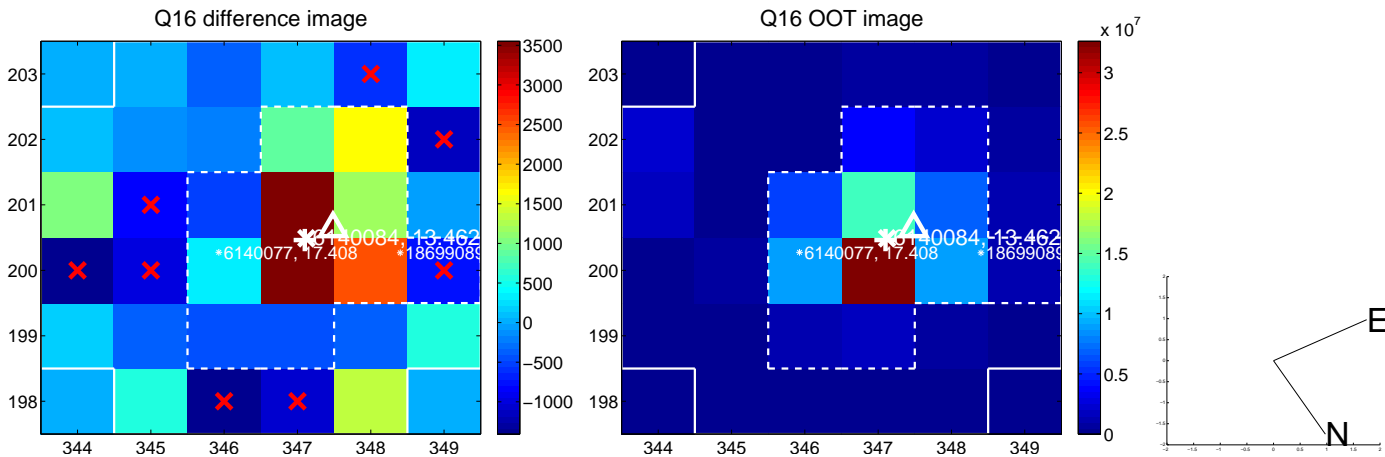
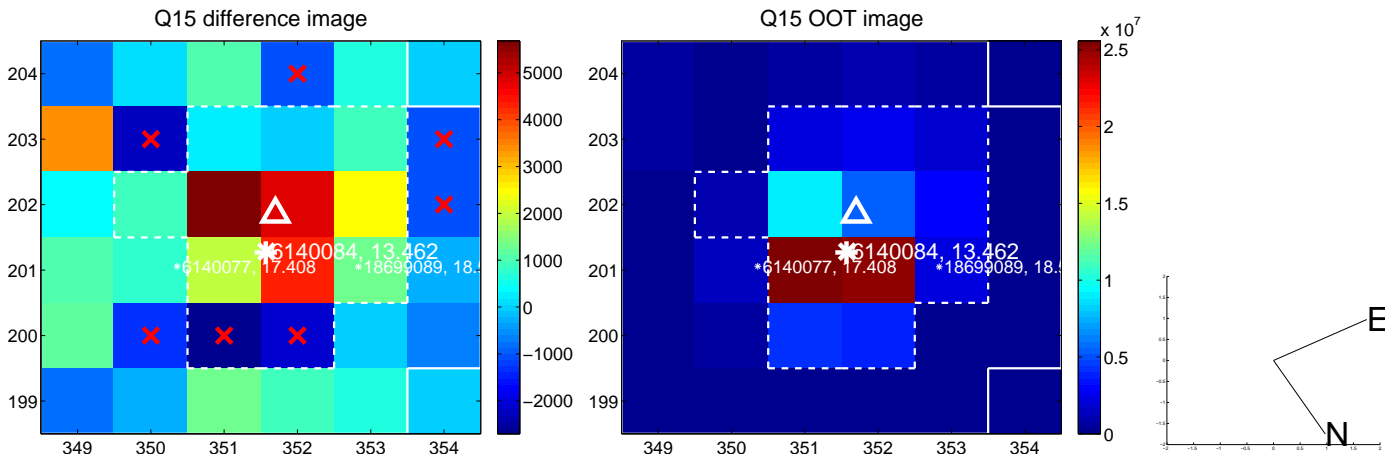
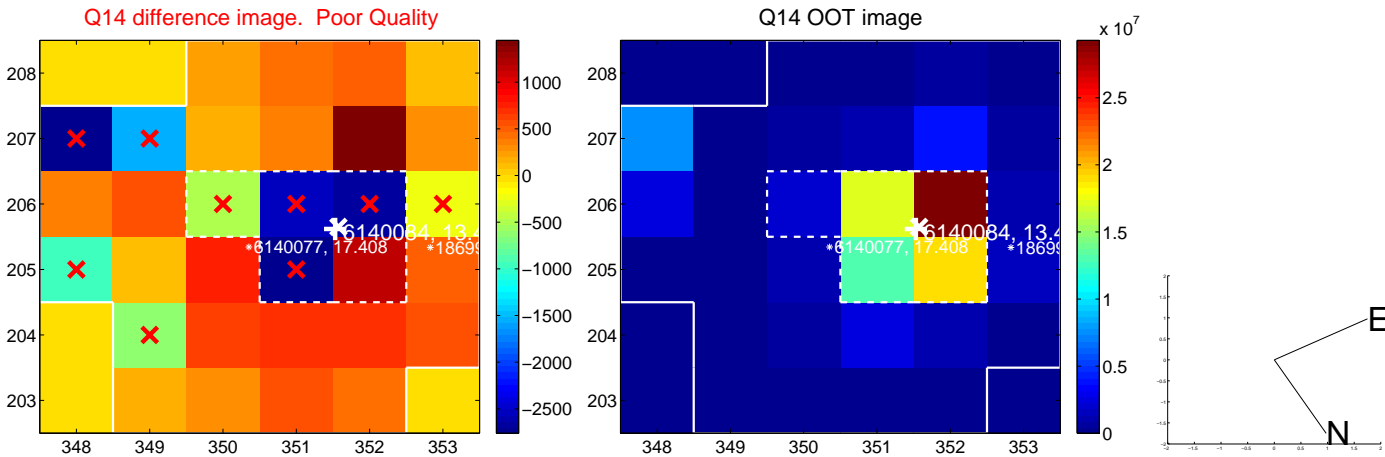
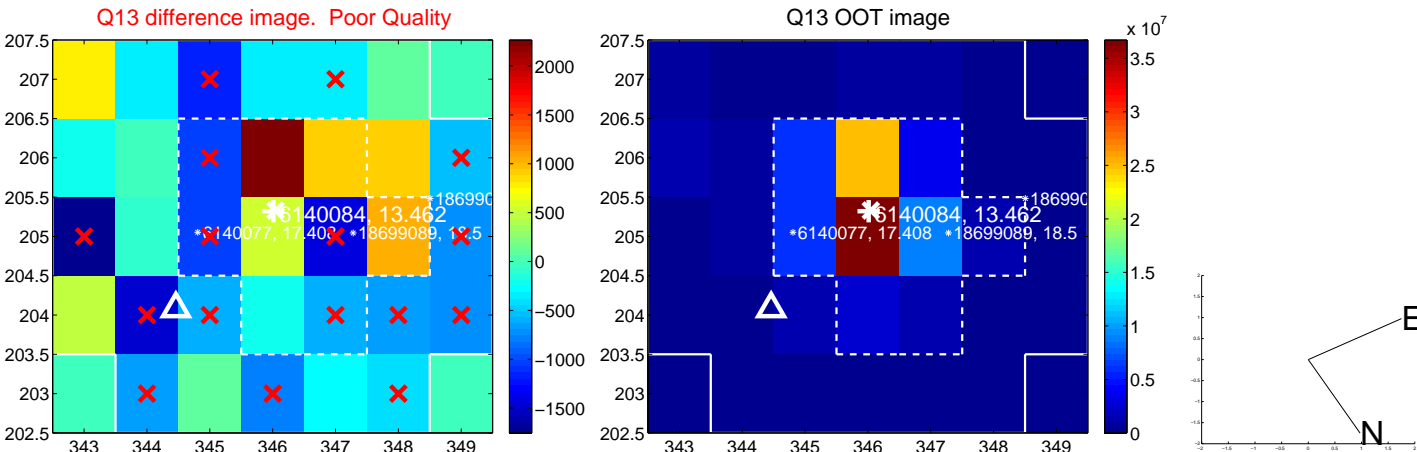


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

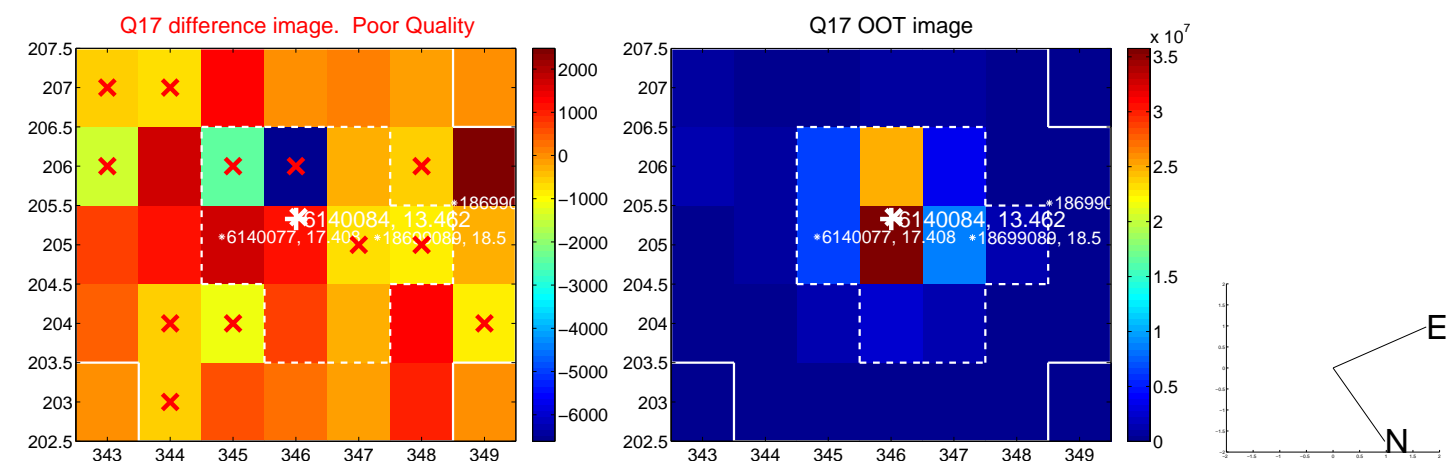




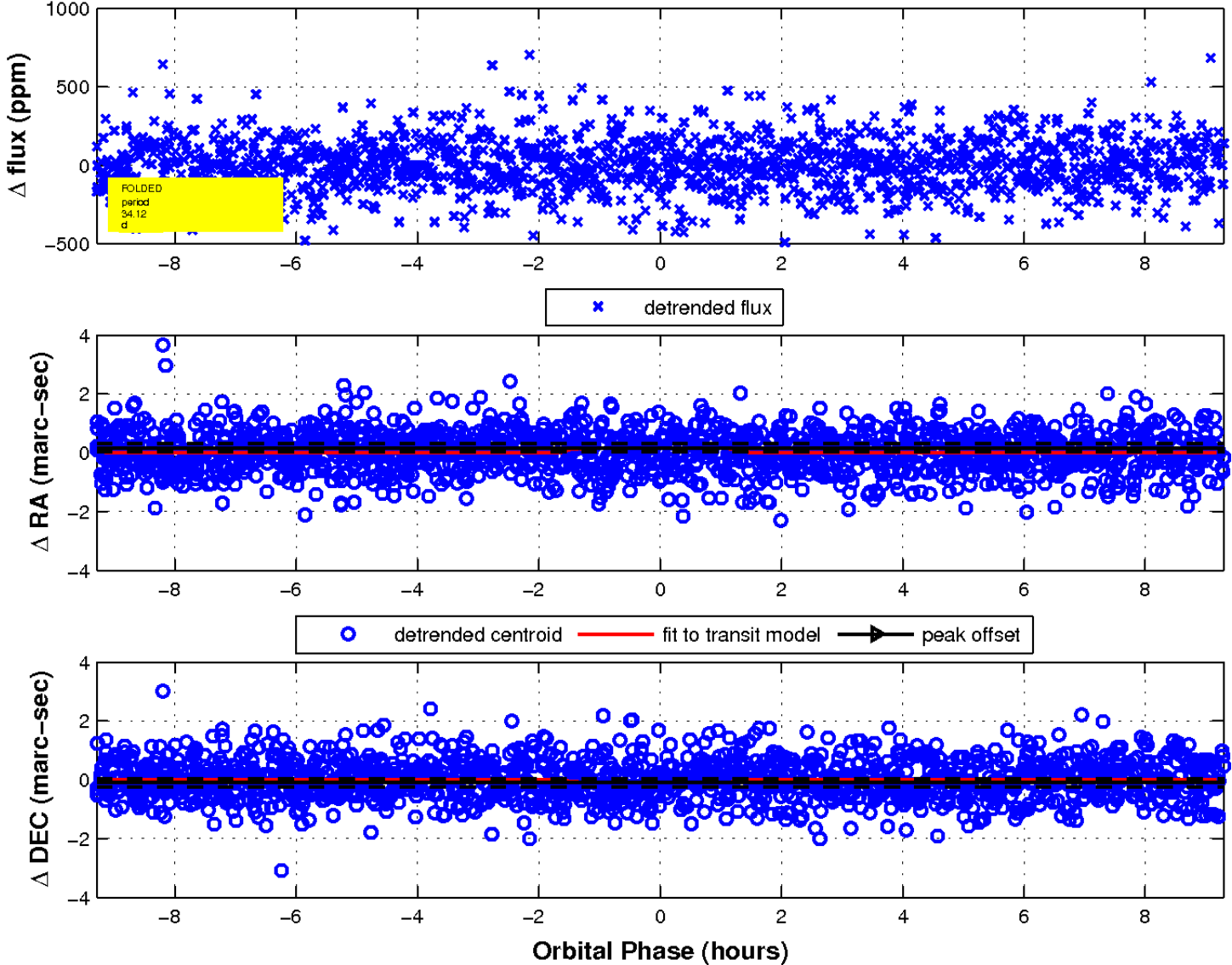
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

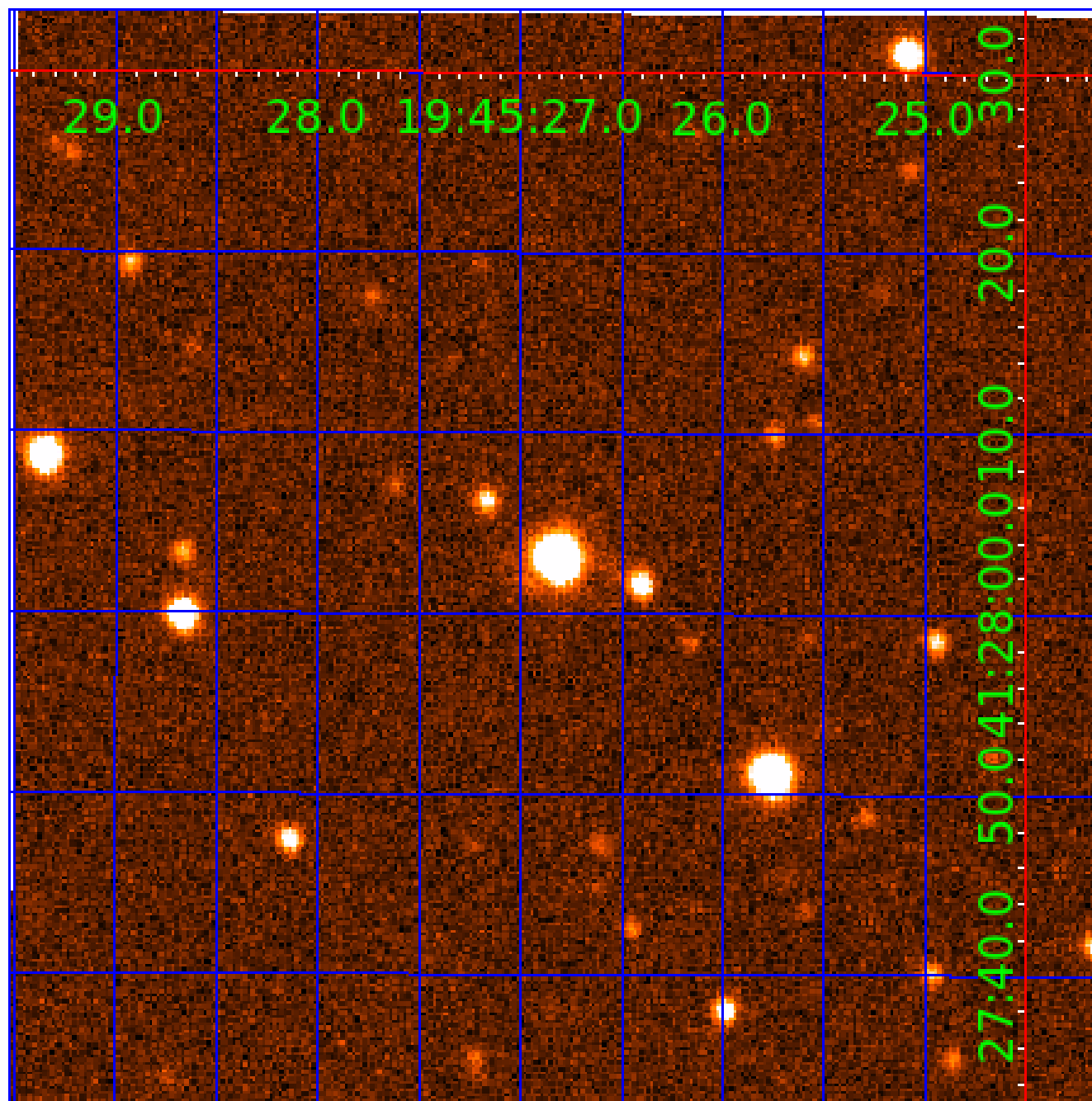


fluxWeightedCentroids, Planet 4 of 10



UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

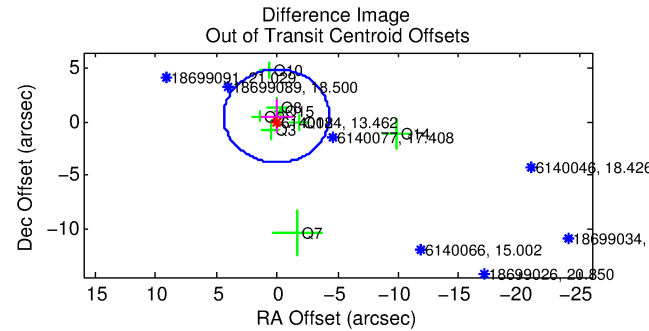
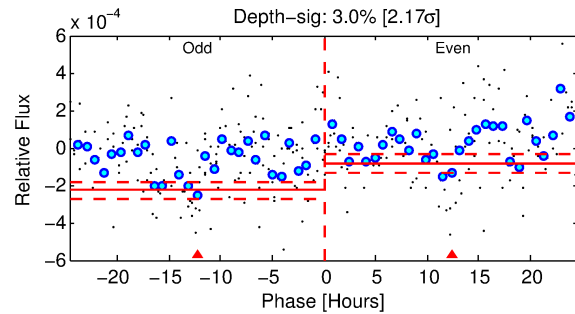
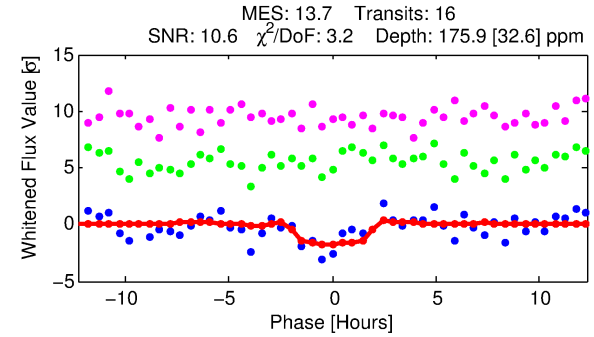
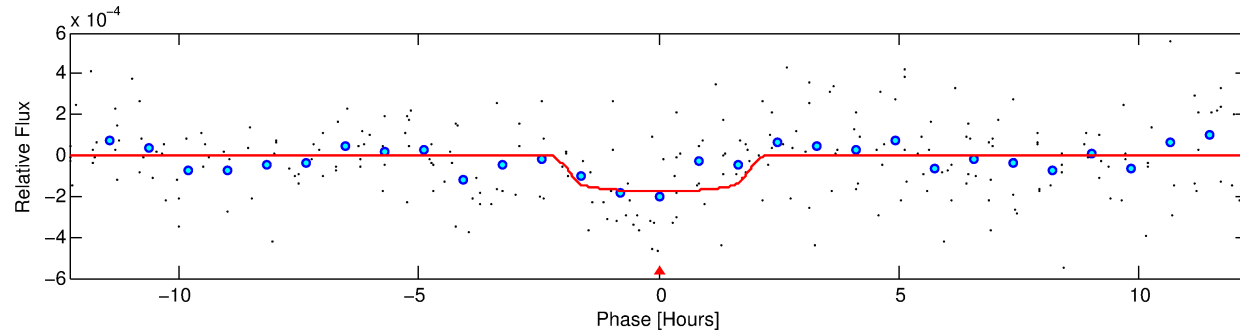
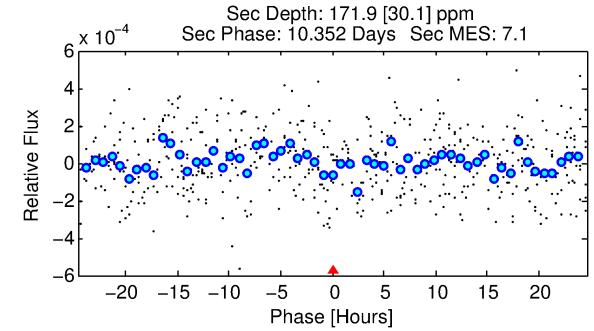
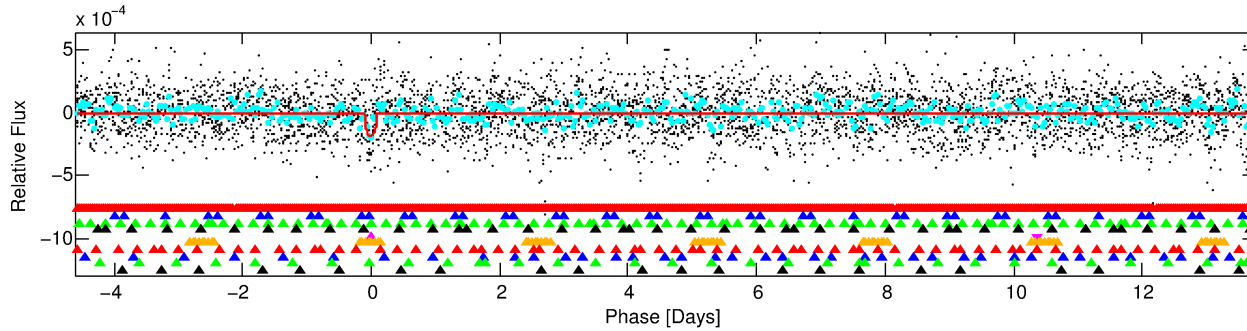
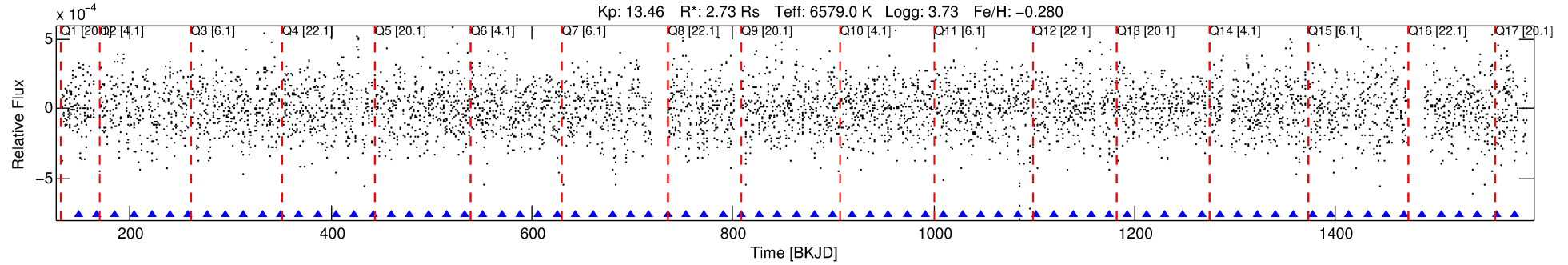
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-05

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 5 of 10 Period: 18.333 d



## DV Fit Results:

Period = 18.33337 [0.00031] d  
Epoch = 148.4533 [0.0128] BKJD  
Rp/R\* = 0.0140 [0.0097]  
a/R\* = 16.95 [67.30]  
b = 0.88 [0.98]  
Seff = 526.57 [290.20]  
Teq = 1221 [168] K  
Rp = 4.17 [3.26] Re  
a = 0.1539 [0.0527] AU  
Ag = 128.89 [192.19] [0.67σ]  
Teffp = 6363 [2221] K [2.31σ]

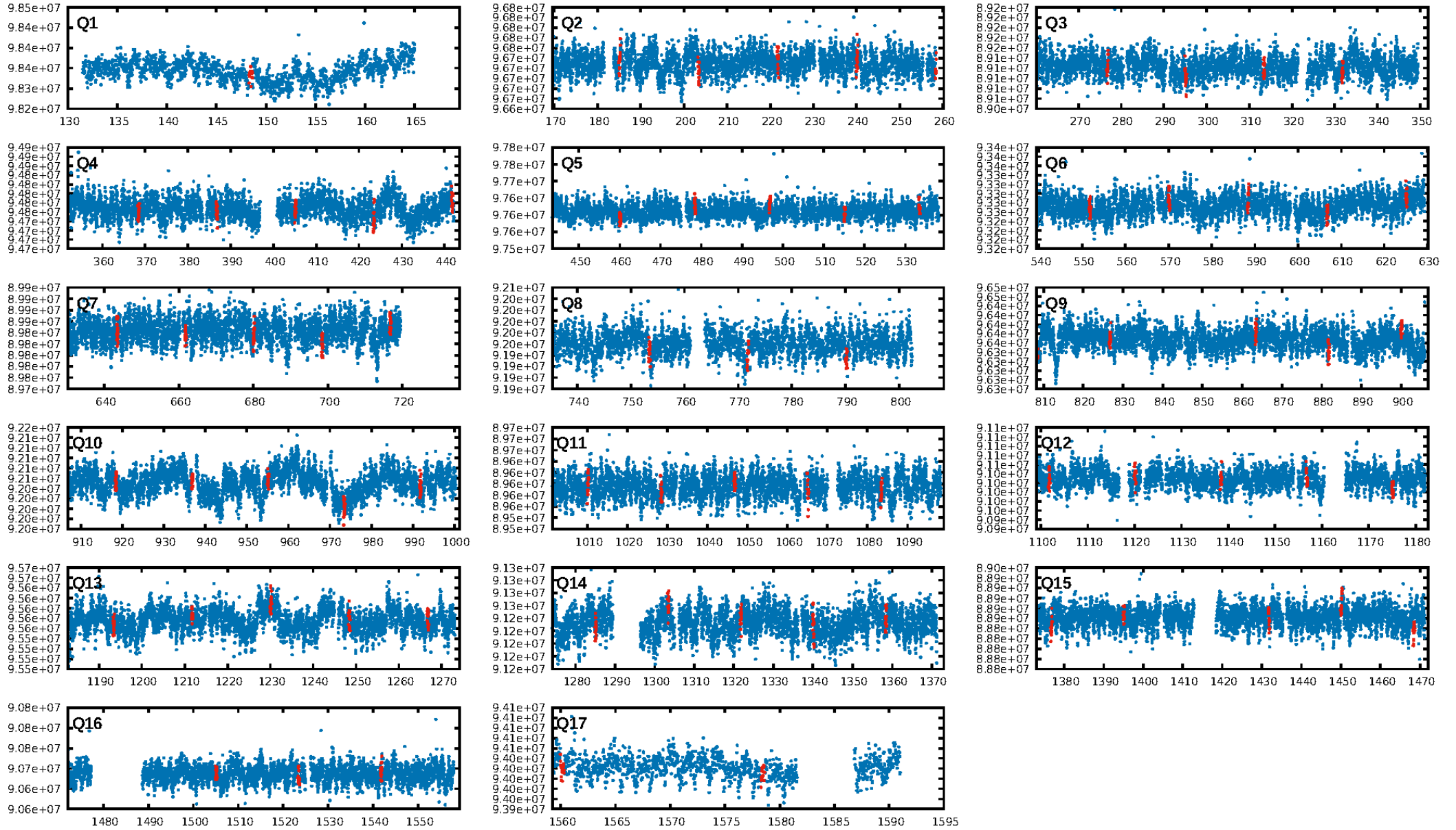
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [9.68σ]  
LongPeriod-sig: 100.0% [14.08σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 81.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [15/15]  
GhostDiagnostic-chr: 0.6295  
Centroid-sig: 28.2%  
Centroid-so: 0.661 arcsec [1.27σ]  
OotOffset-rm: 0.549 arcsec [0.38σ]  
KicOffset-rm: 0.592 arcsec [0.39σ]  
OotOffset-st: 2/3/2/1 [8]  
KicOffset-st: 2/3/2/1 [8]  
DiffImageQuality-fgm: 0.38 [3/8]  
DiffImageOverlap-fno: 0.53 [9/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:39 Z

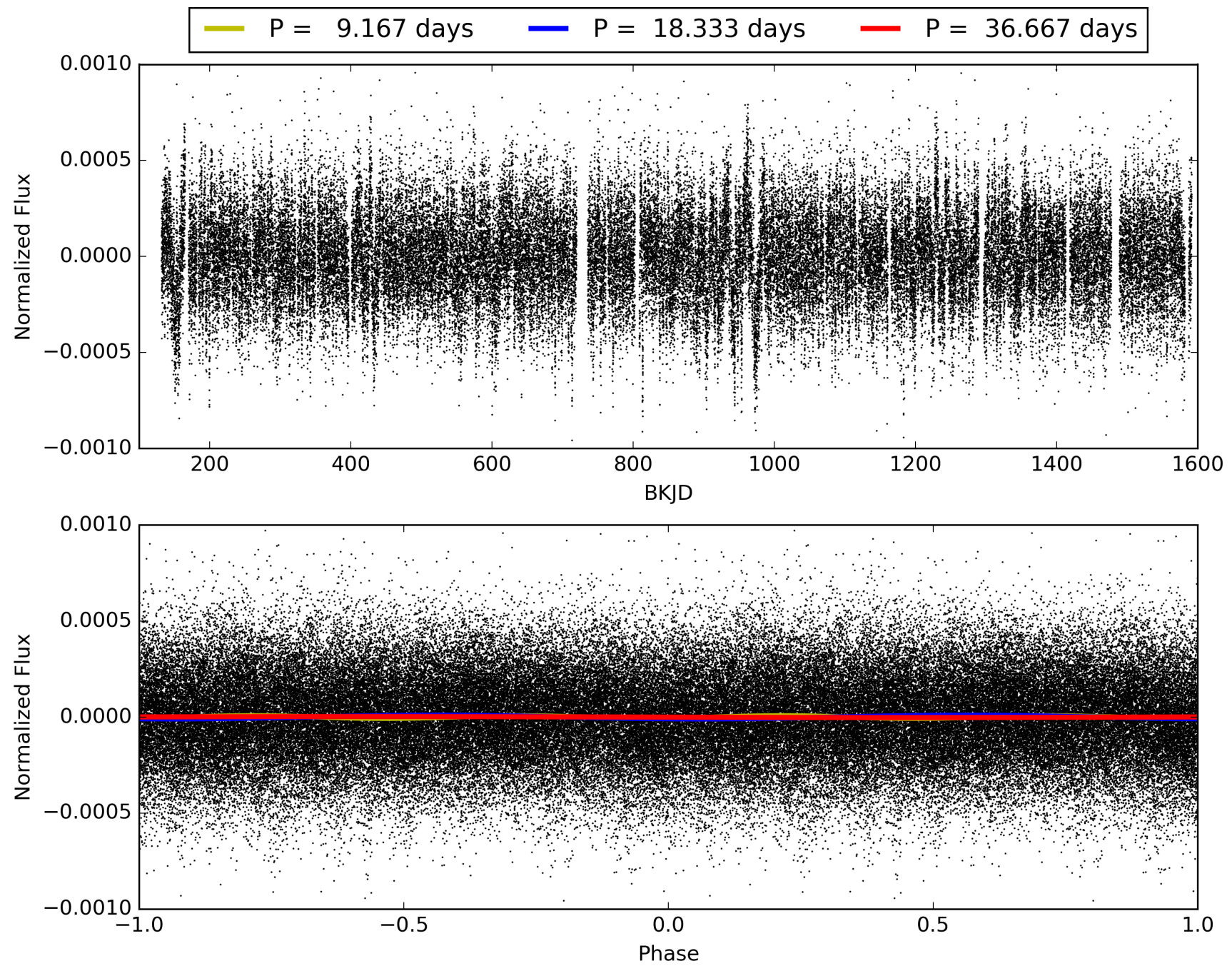
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-05, PDC Light Curves





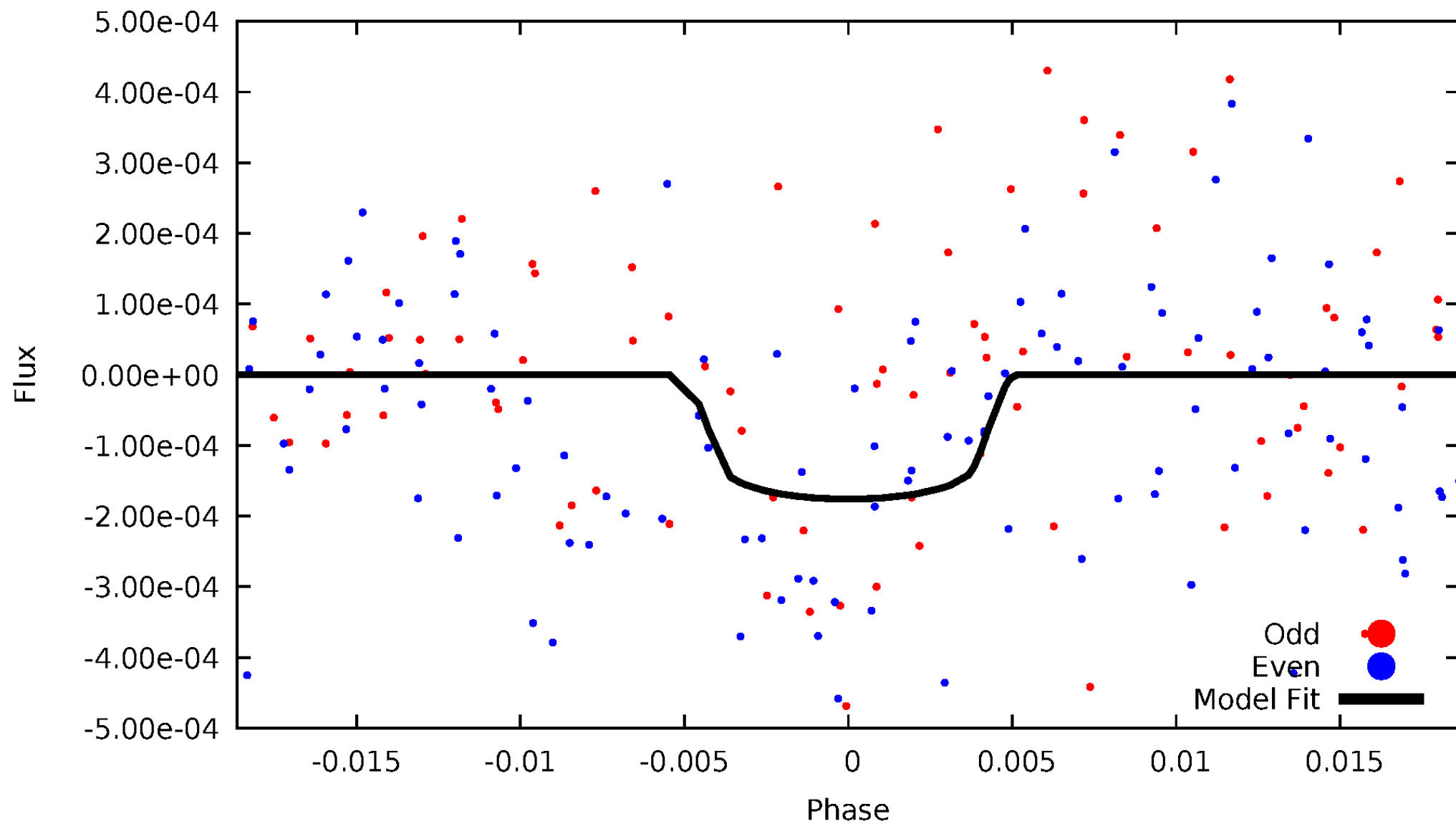
TCE 006140084-05





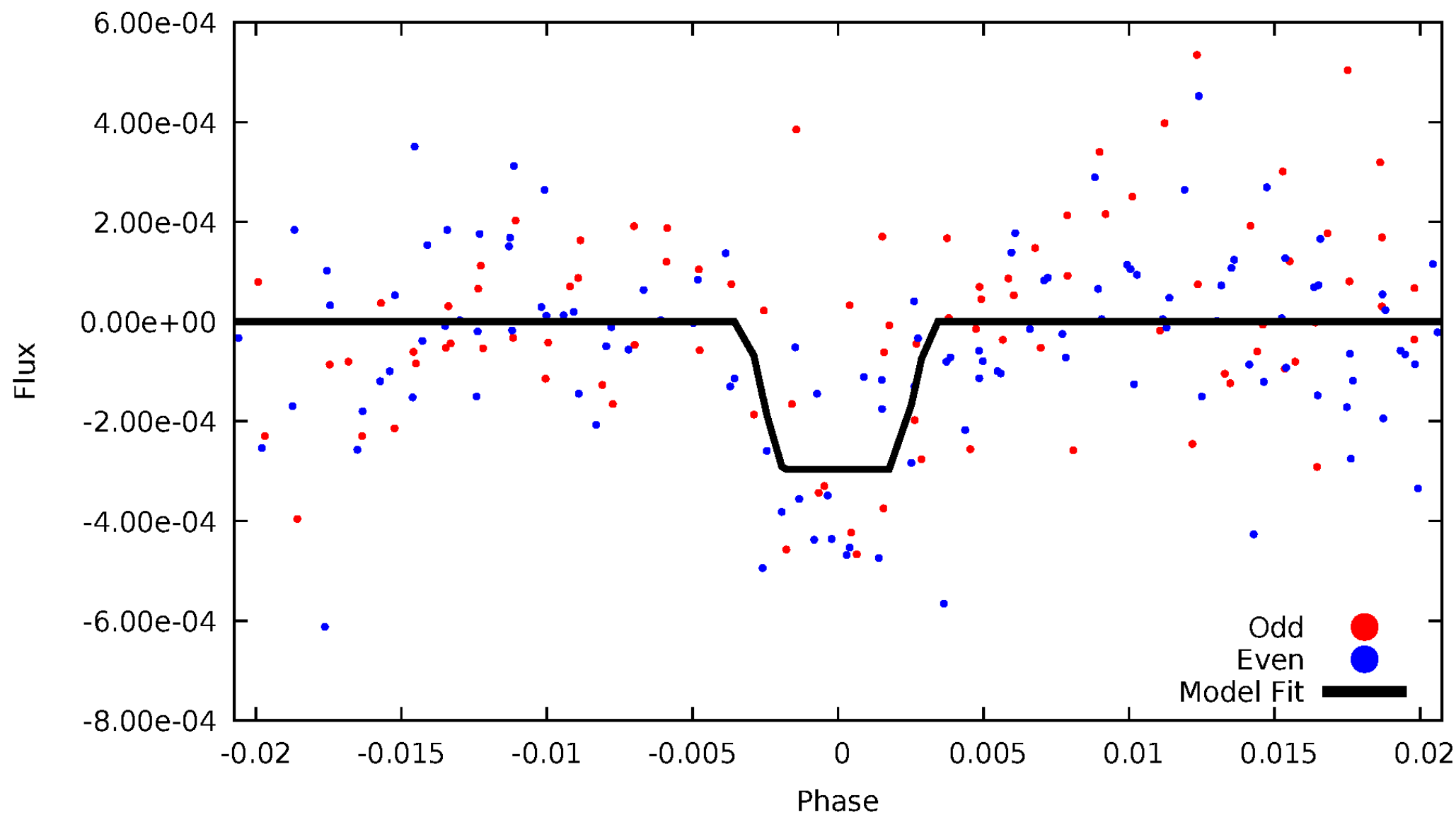
# DV Odd/Even

TCE 006140084-05



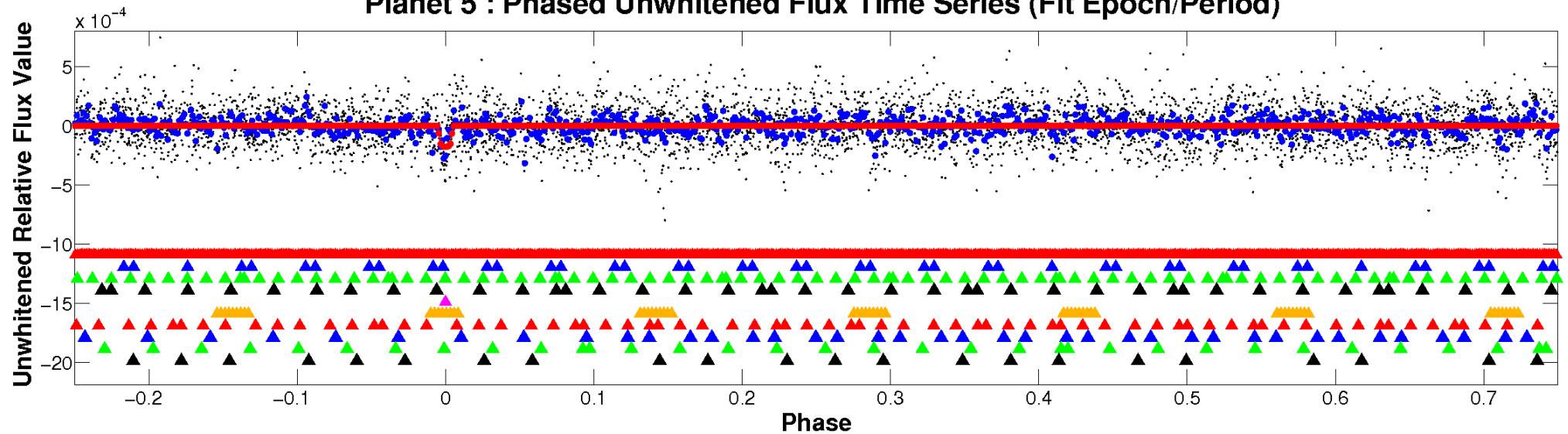
# ALT Odd/Even

TCE 006140084-05

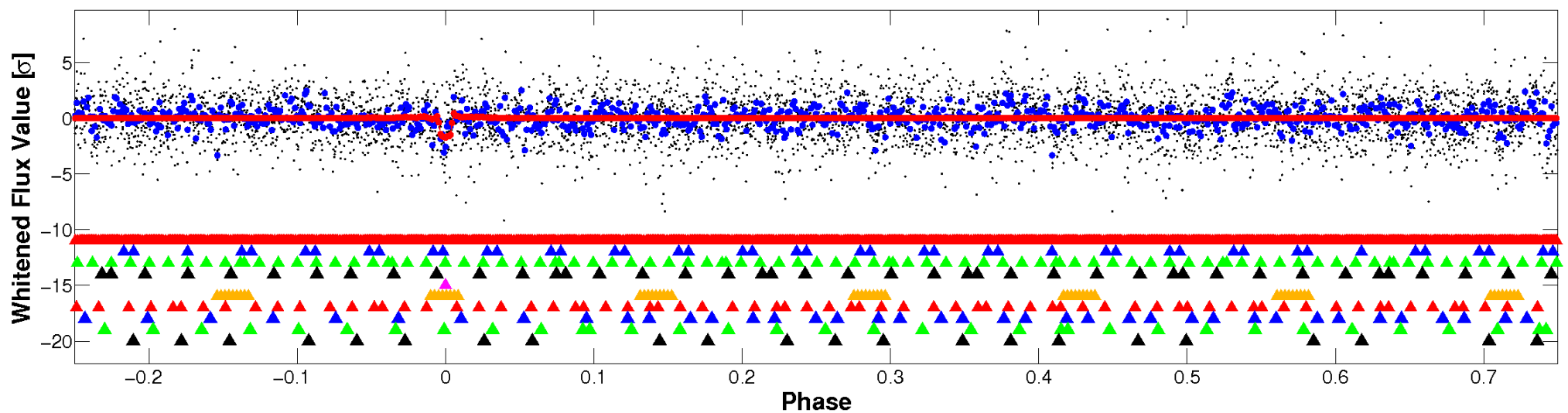


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

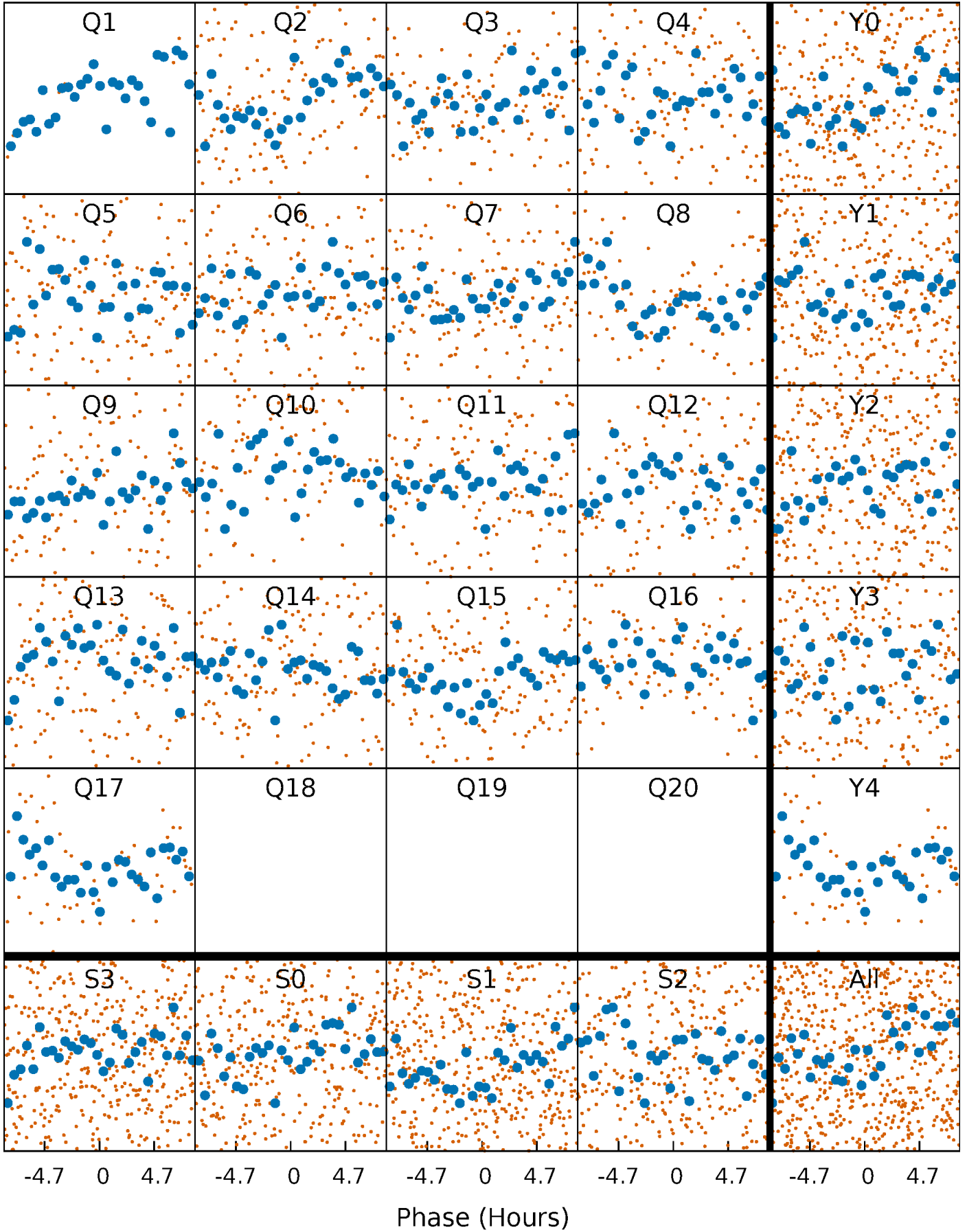


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



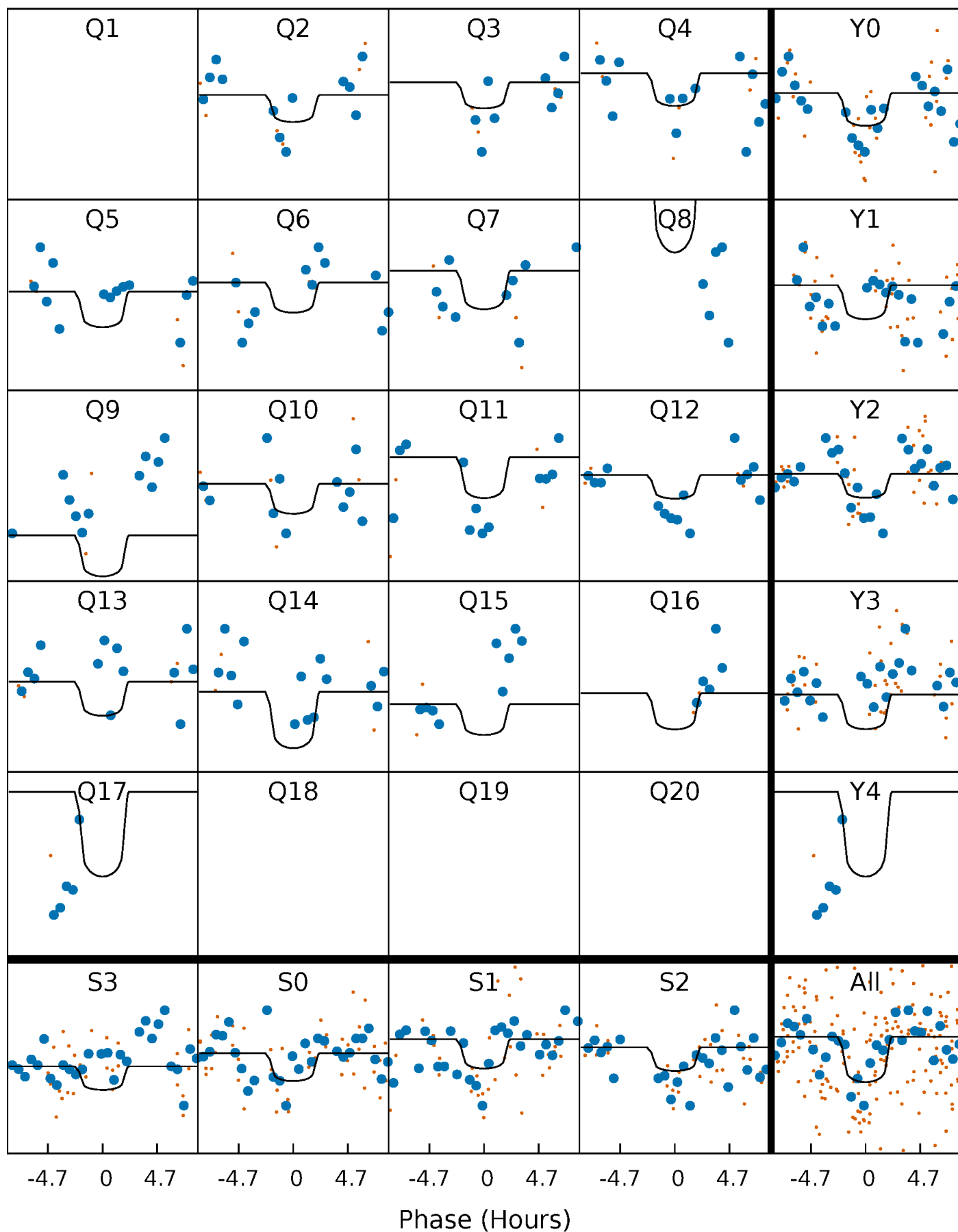
# PDC Quarter-Phased Transit Curves

TCE 006140084-05     $P = 18.333370$  Days     $T_0 = 148.453294$  (BKJD)



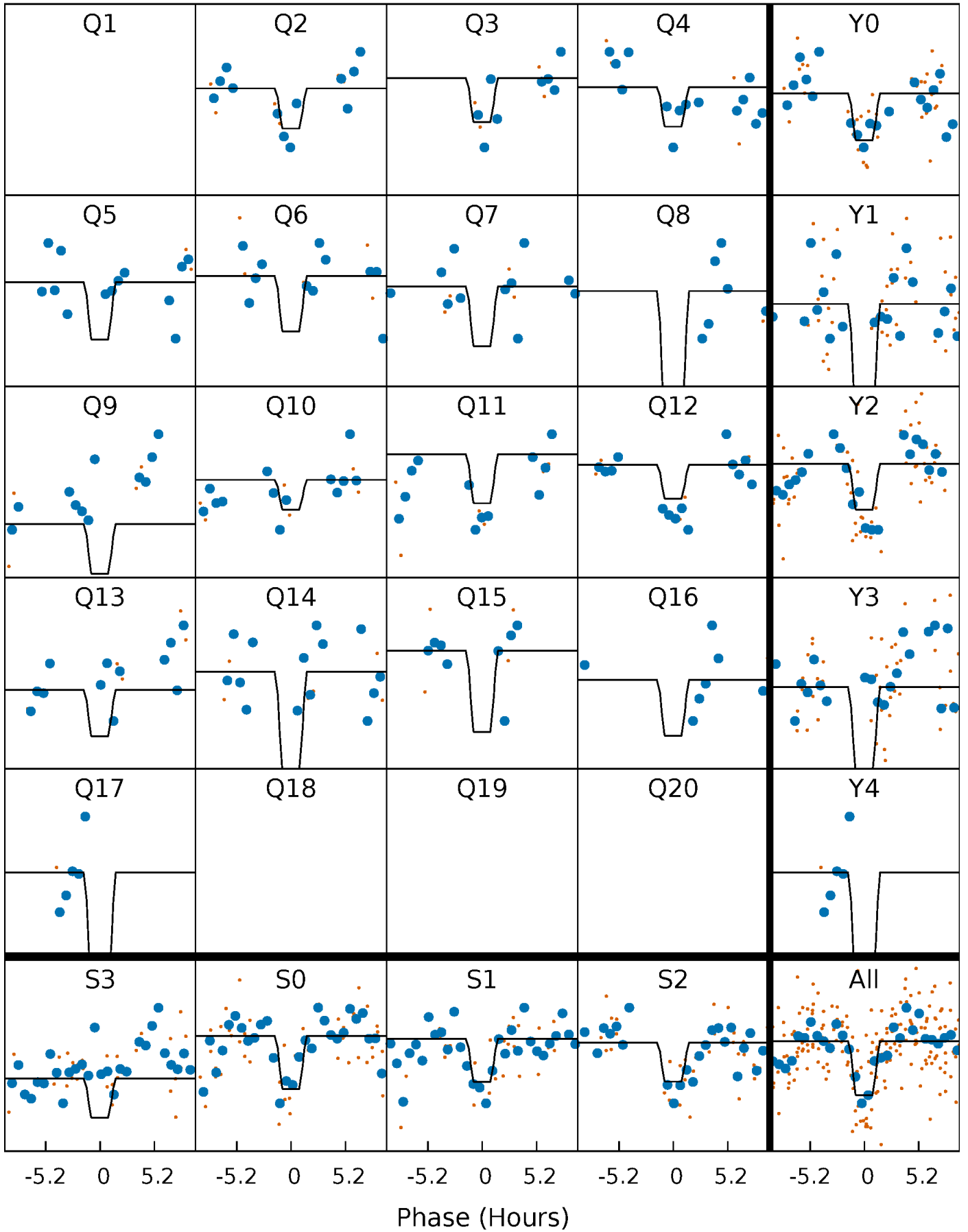
# DV Quarter-Phased Transit Curves

TCE 006140084-05   P= 18.333370 Days    $T_0=148.453294$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

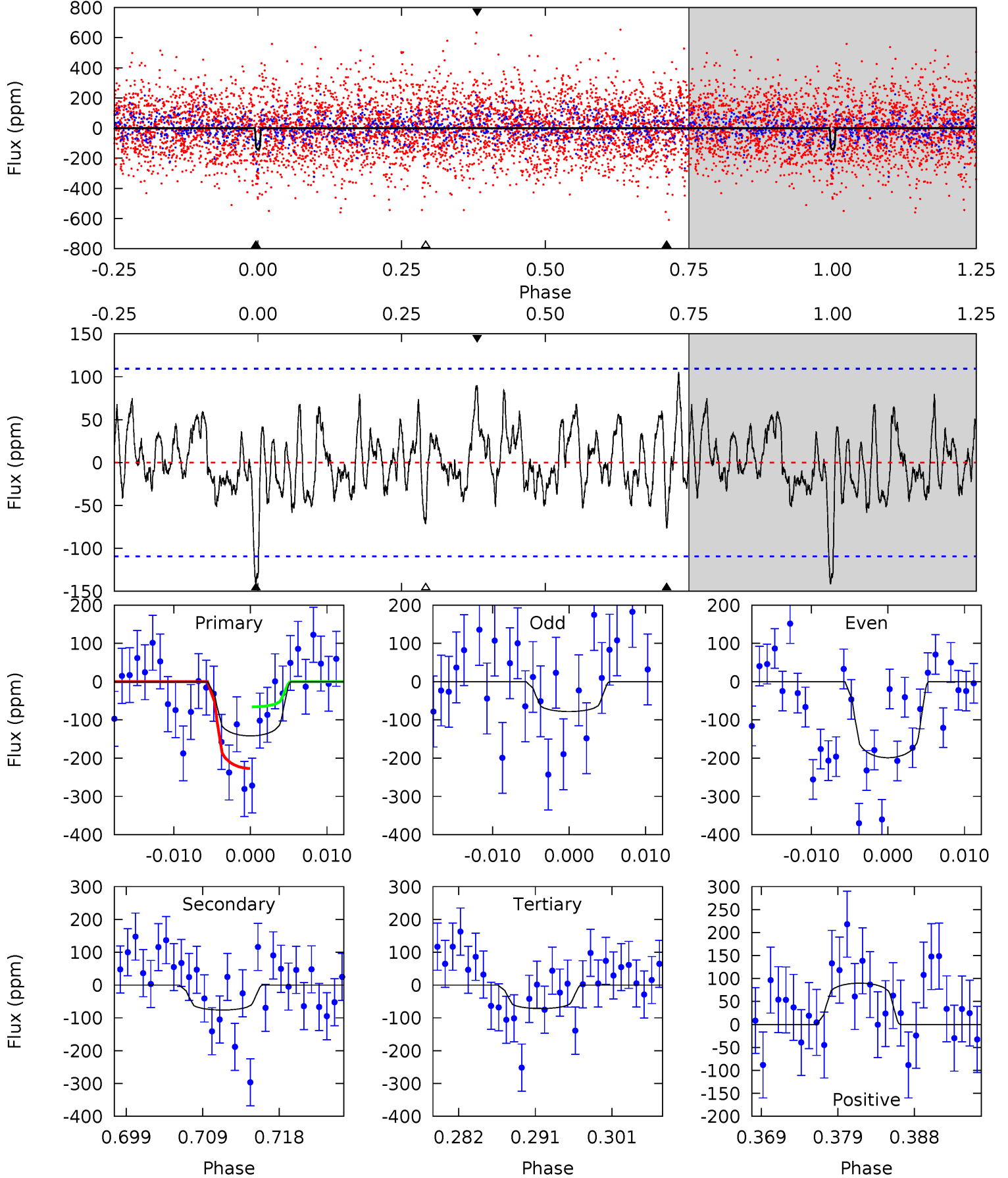
TCE 006140084-05 P= 18.333371 Days  $T_0=148.440367$  (BKJD)



# DV Model-Shift Uniqueness Test

006140084-05, P = 18.333370 Days, E = 130.119924 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.53 | 3.50 | 3.30 | 4.13 | 5.03            | 2.59            | 1.44             | 3.23    | 2.39    | 0.21    | -0.63   | 2.78    | 0.66 | 0.43  | 3.69 |

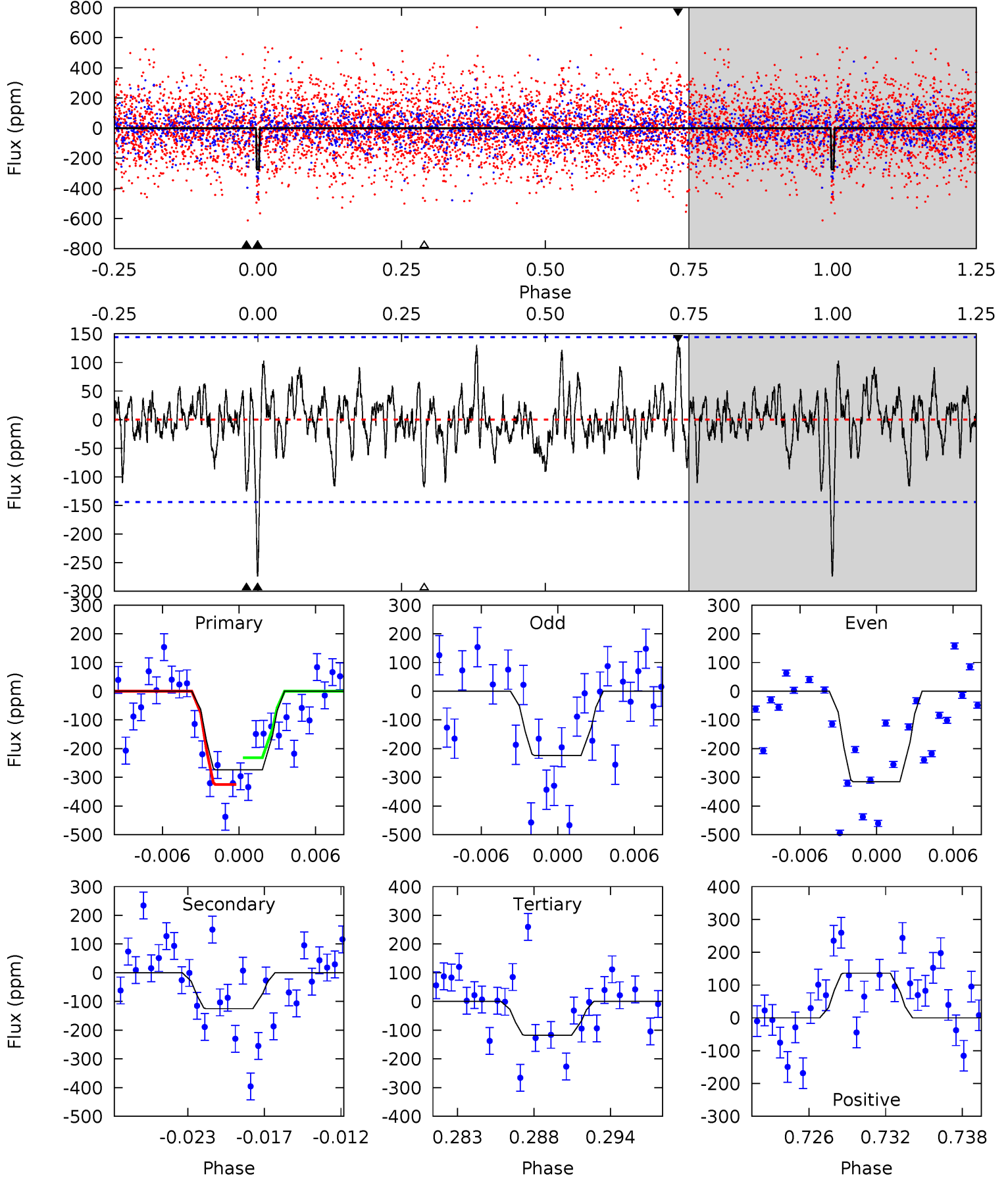




# Alt Model-Shift Uniqueness Test

006140084-05, P = 18.333371 Days, E = 130.106996 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.76 | 4.45 | 4.19 | 4.85 | 5.13            | 2.76            | 1.36             | 5.57    | 4.92    | 0.26    | -0.39   | 1.60    | 0.68 | 0.33  | 1.65 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-05 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$  | $A_{\text{obs}}$  |
|---------|---------------|------------------------|----------------------|-----------------------|-------------------|
| DV      | $-76 \pm 22$  | $4.14^{+2.51}_{-2.17}$ | $1670^{+91}_{-144}$  | $5090^{+2099}_{-943}$ | $57^{+203}_{-36}$ |
| Alt.    | $-125 \pm 28$ | $4.74^{+3.15}_{-2.42}$ | $1657^{+100}_{-149}$ | $5188^{+2596}_{-844}$ | $69^{+259}_{-42}$ |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

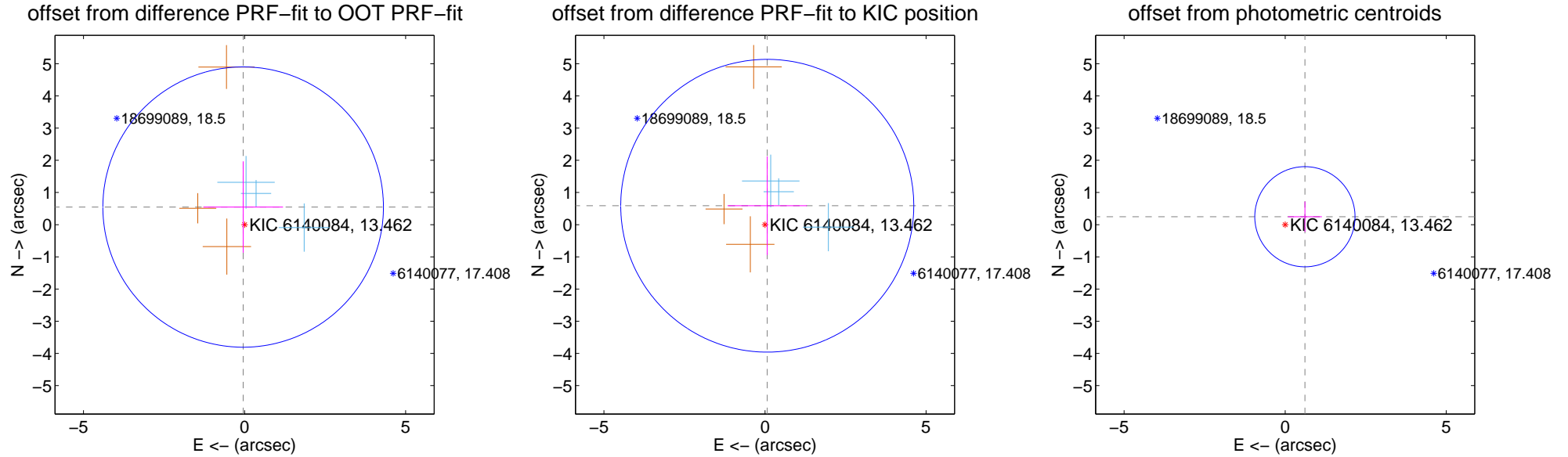
## DV Centroid Data

Supplemental centroid analysis for 006140084-05. Kepler magnitude: 13.46. Transit SNR 10.59

There are 3 quarters with good PRF difference image offsets

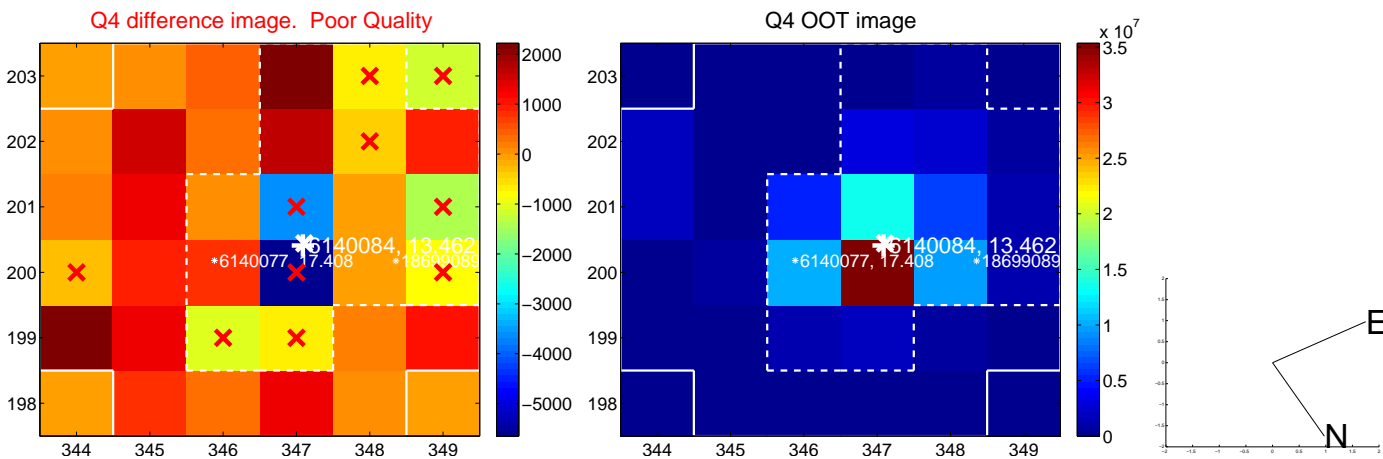
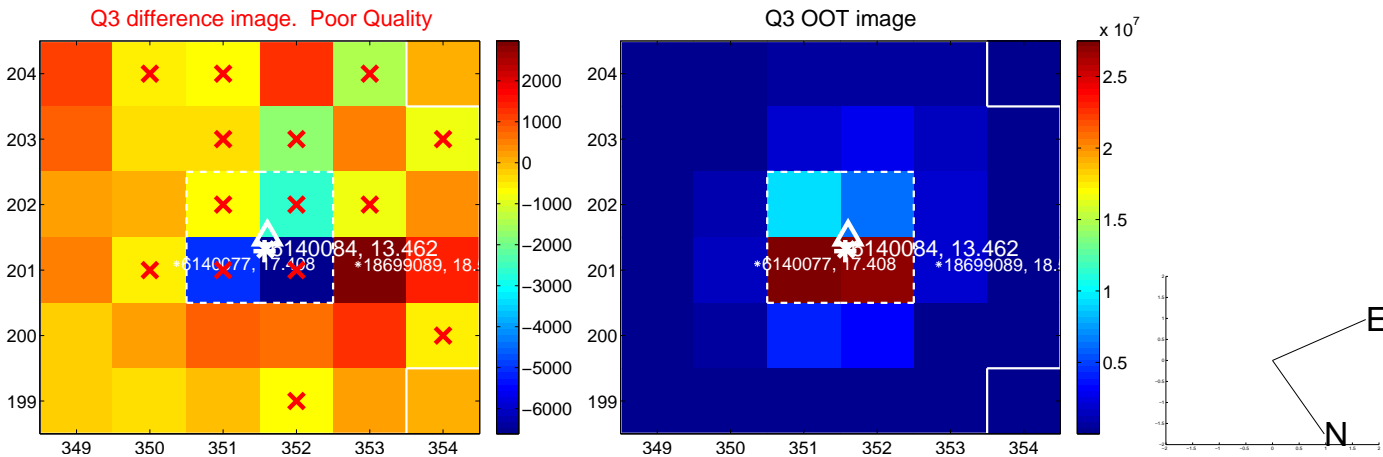
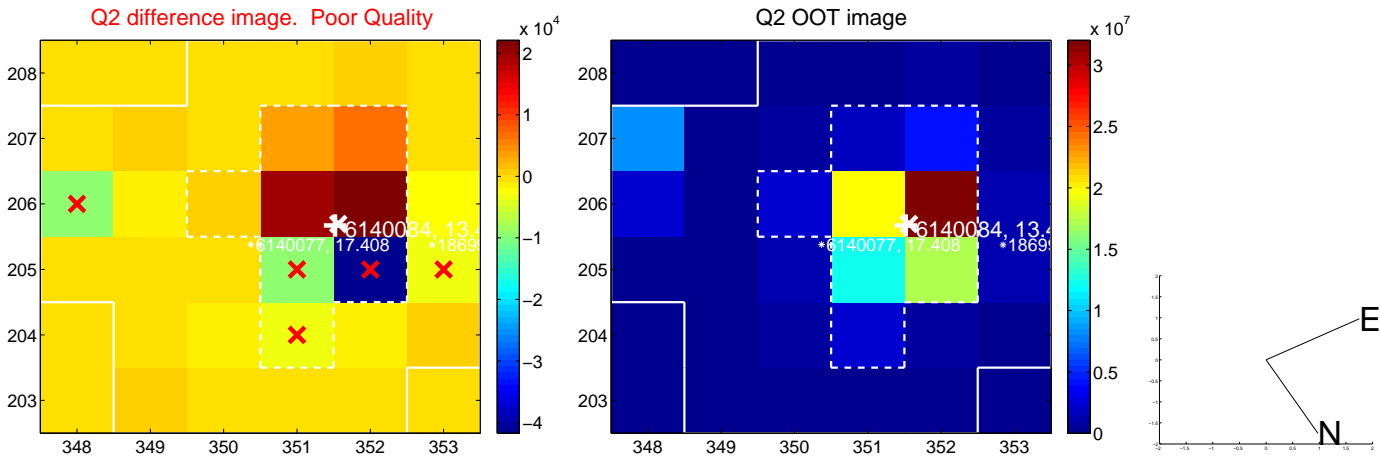
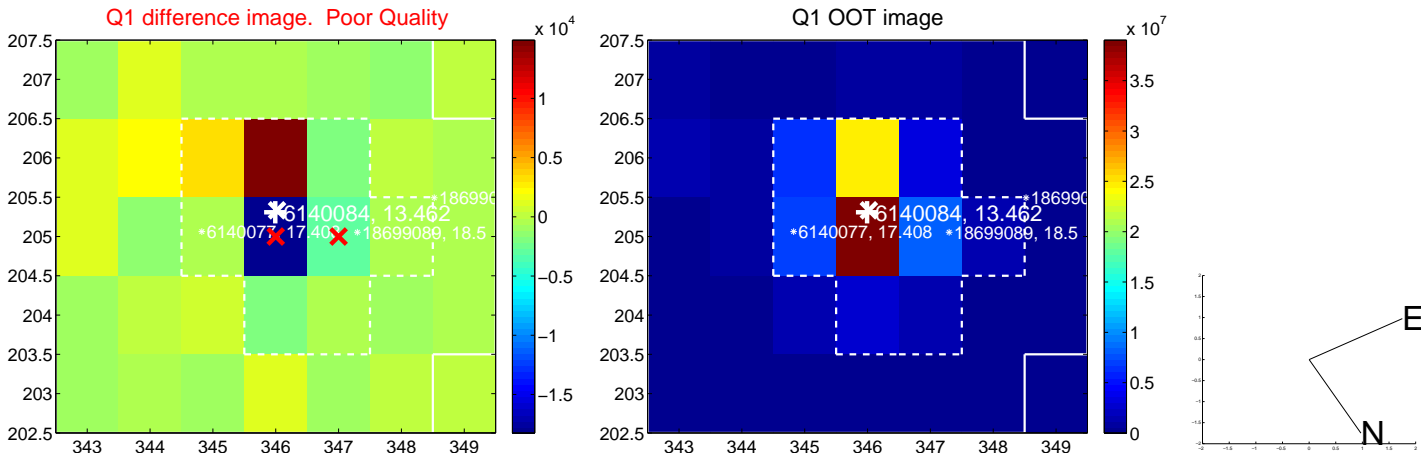
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $0.549 \pm 1.451$  | 0.38                | $0.044 \pm 1.237$  | $0.547 \pm 1.420$ |
| PRF-fit source offset from KIC position | $0.592 \pm 1.516$  | 0.39                | $-0.070 \pm 1.233$ | $0.588 \pm 1.531$ |
| photometric centroid source offset      | $0.66 \pm 0.52$    | 1.27                | $-0.61 \pm 0.53$   | $0.25 \pm 0.47$   |

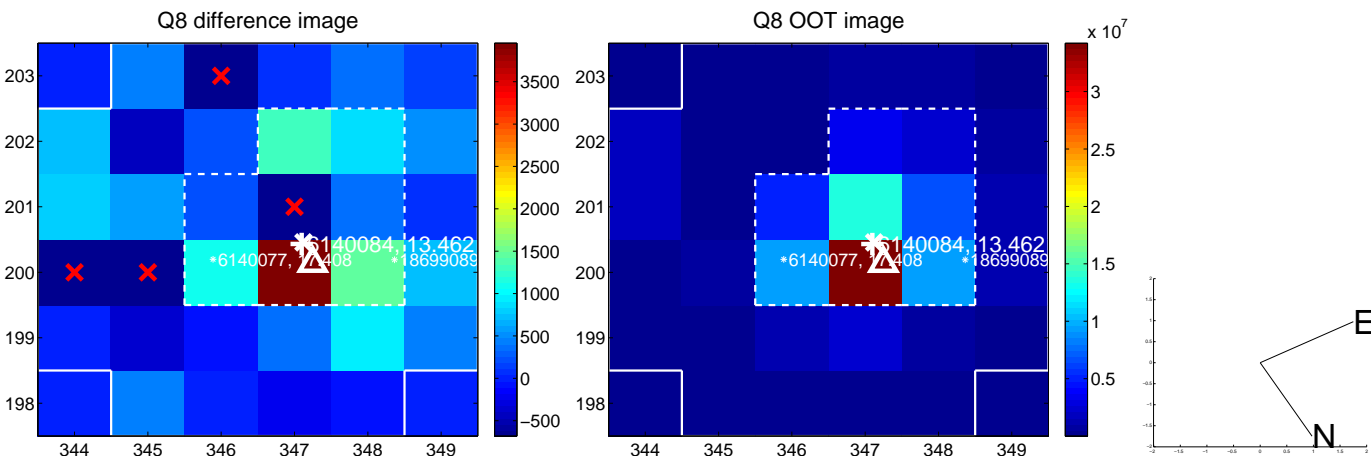
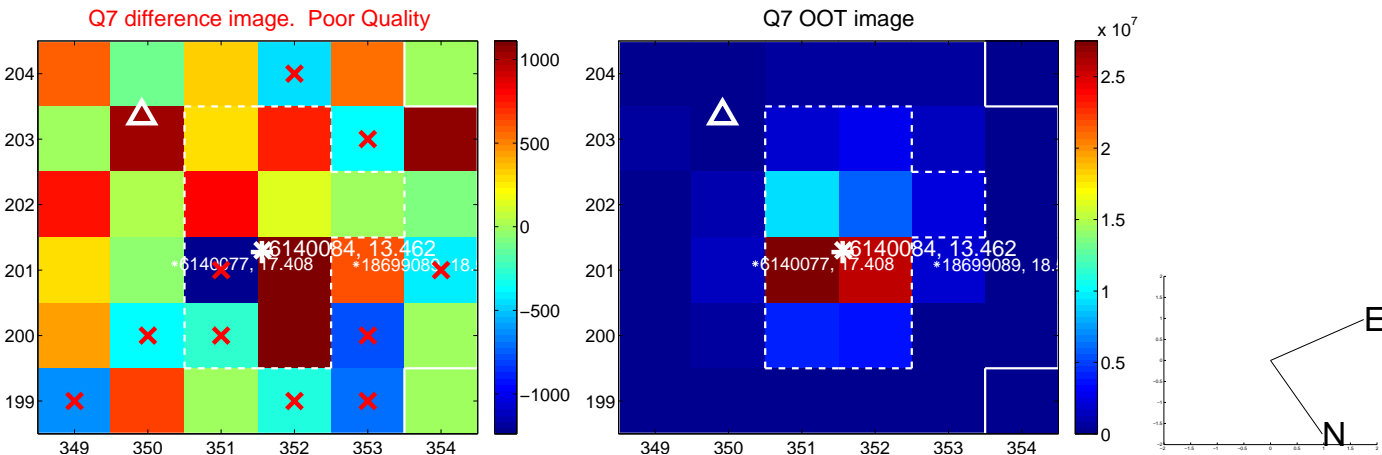
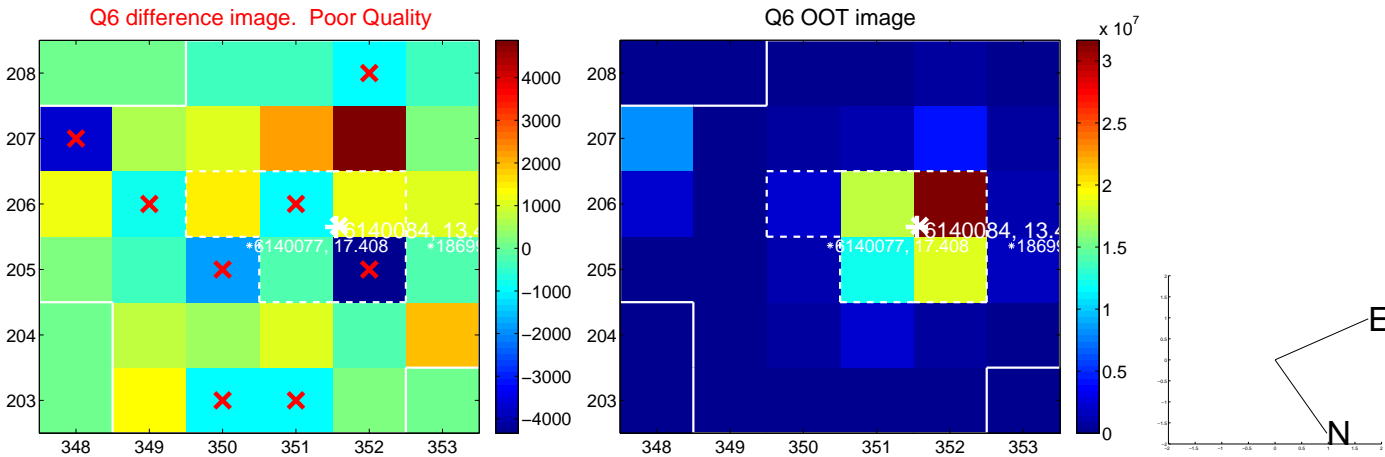
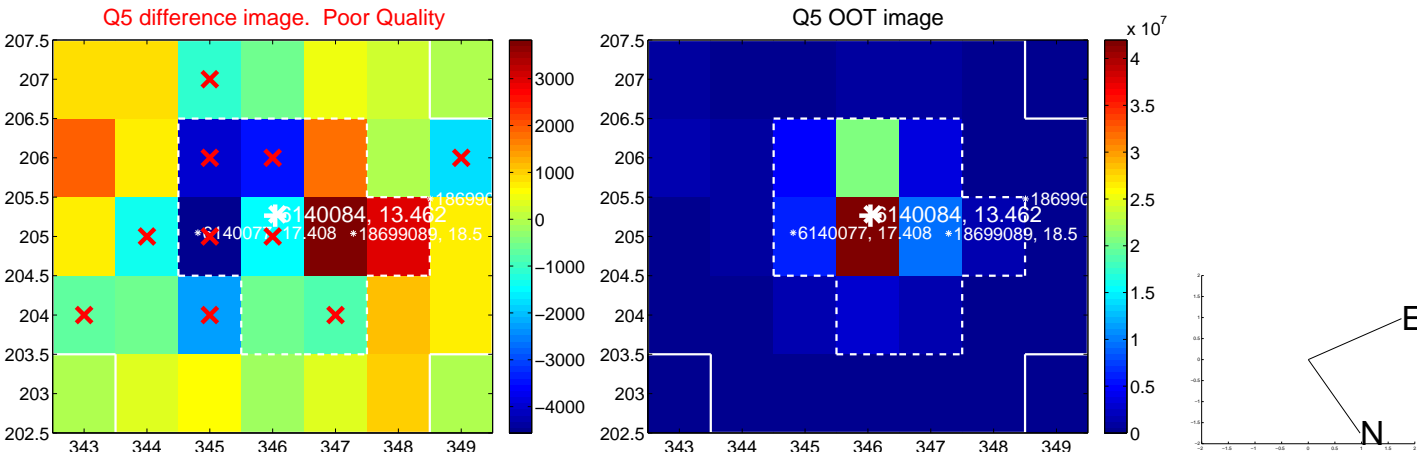


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

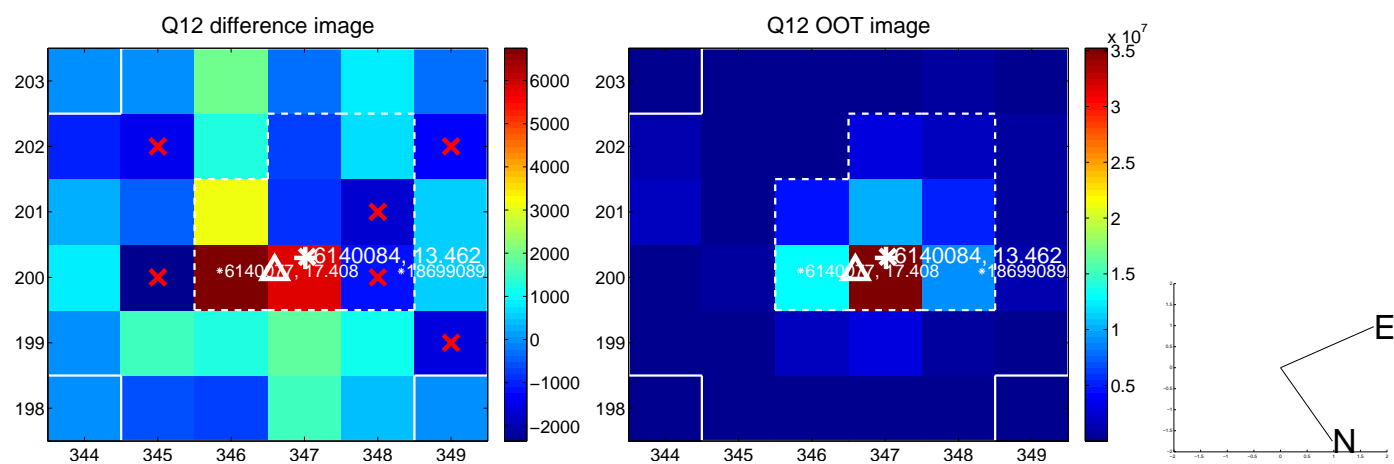
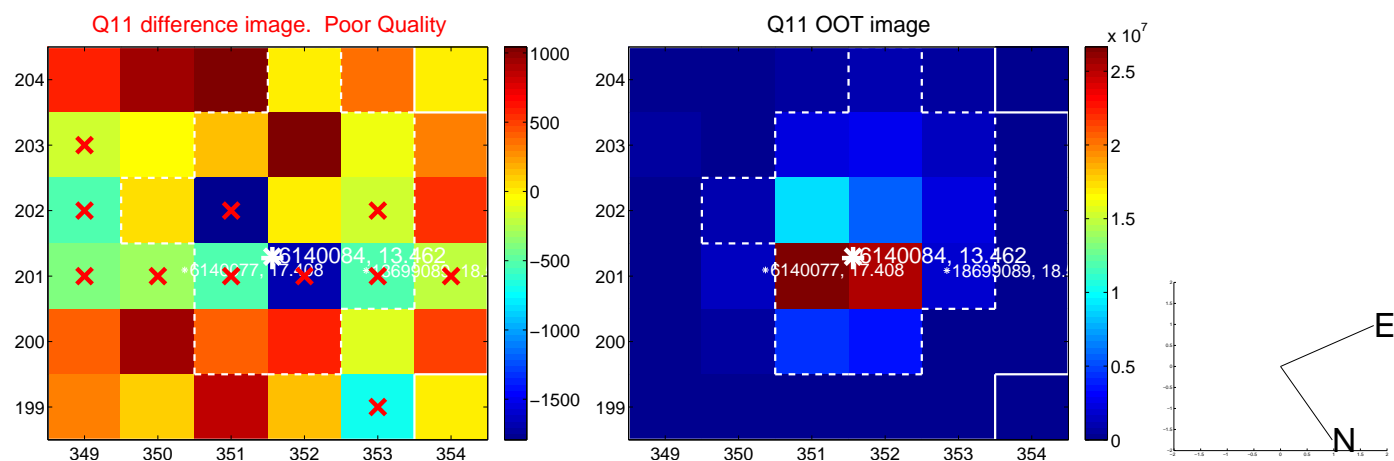
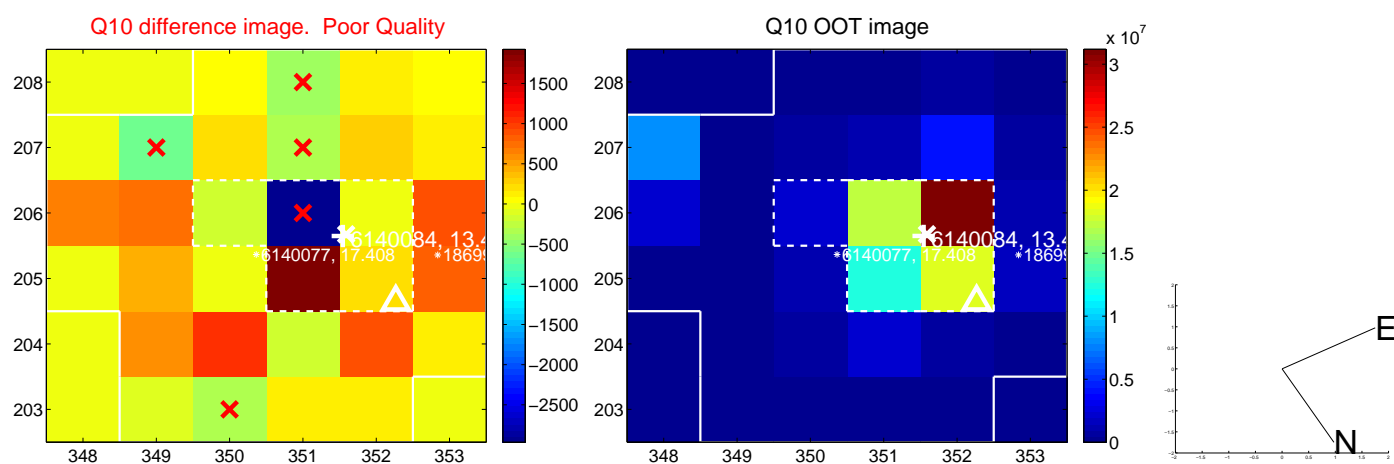
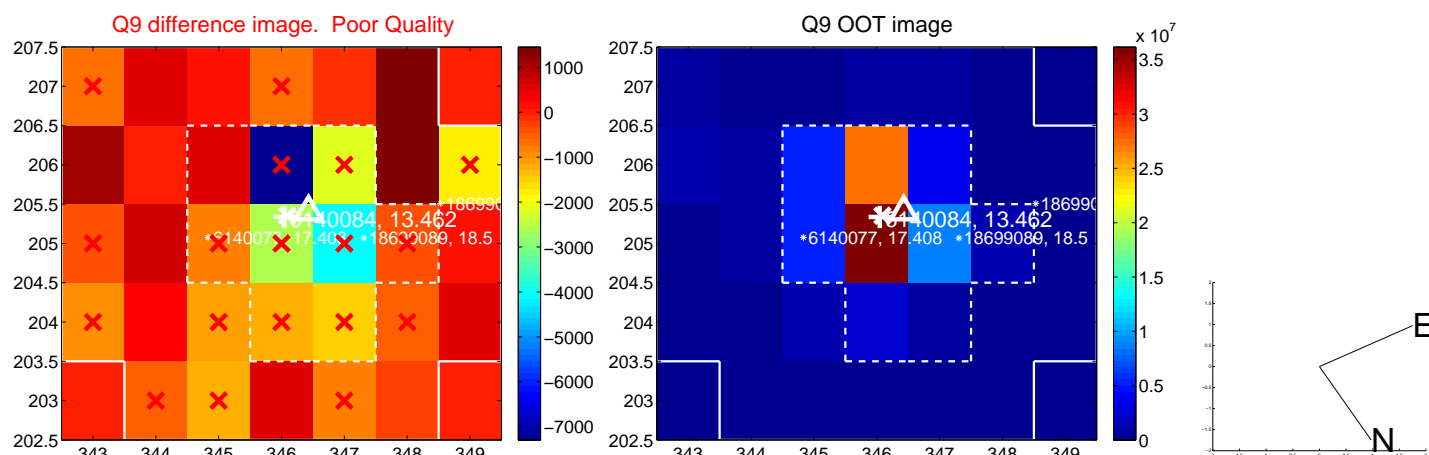
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



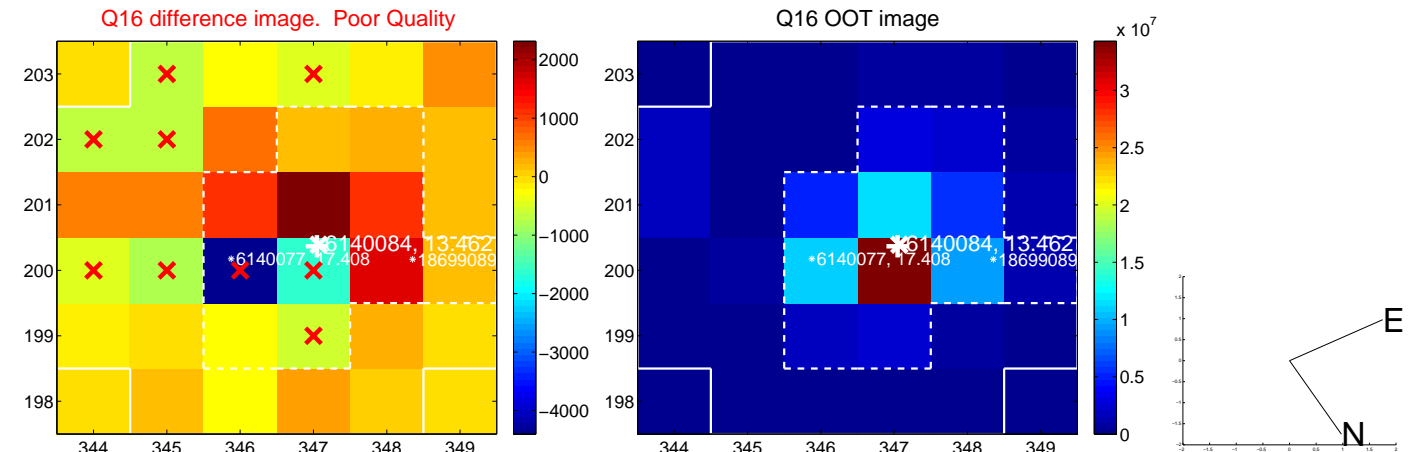
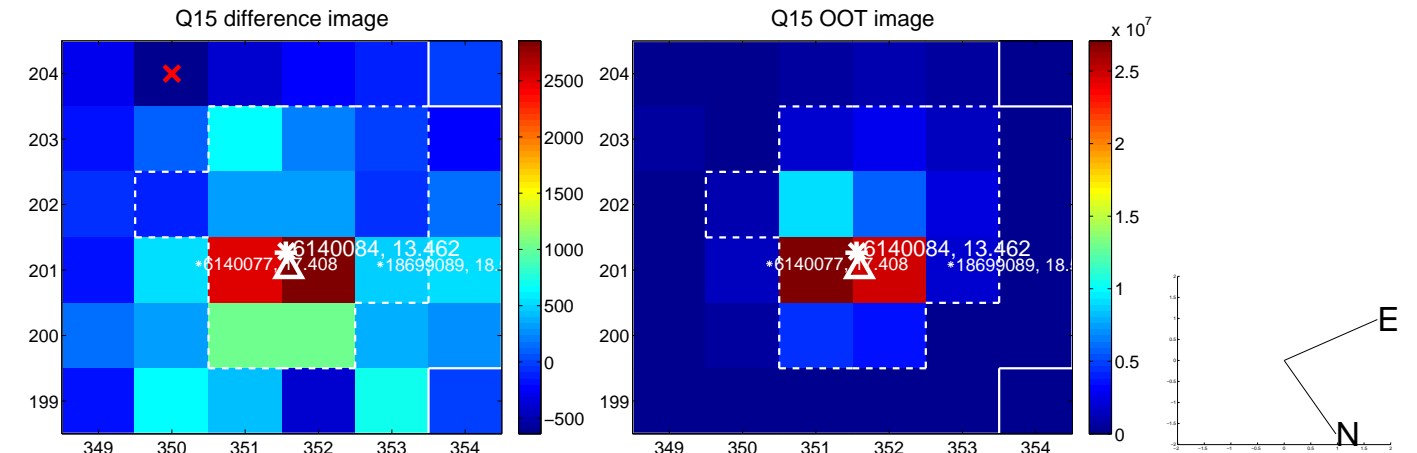
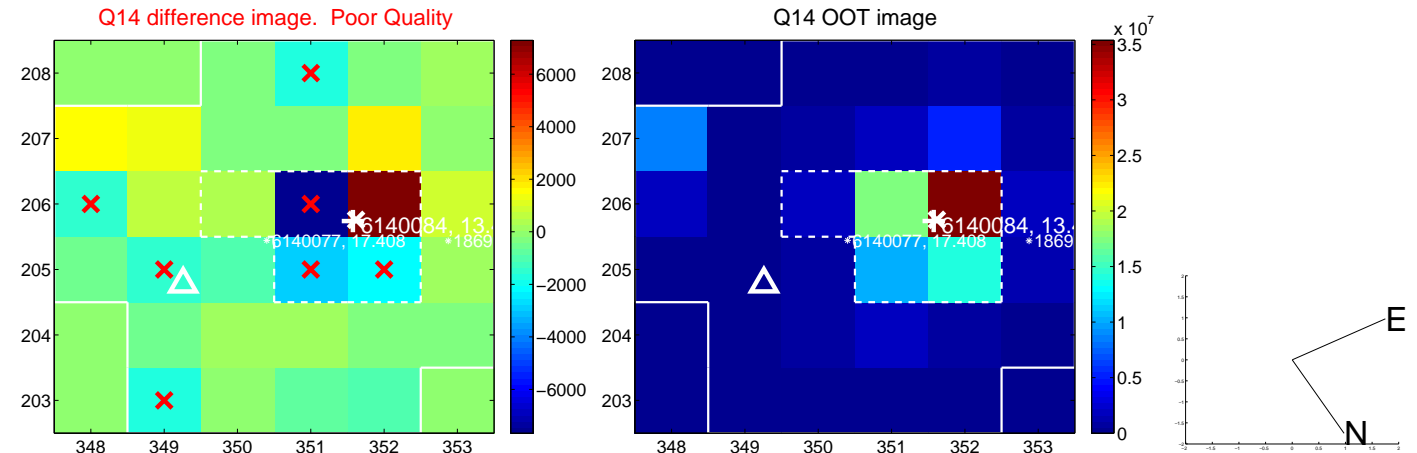
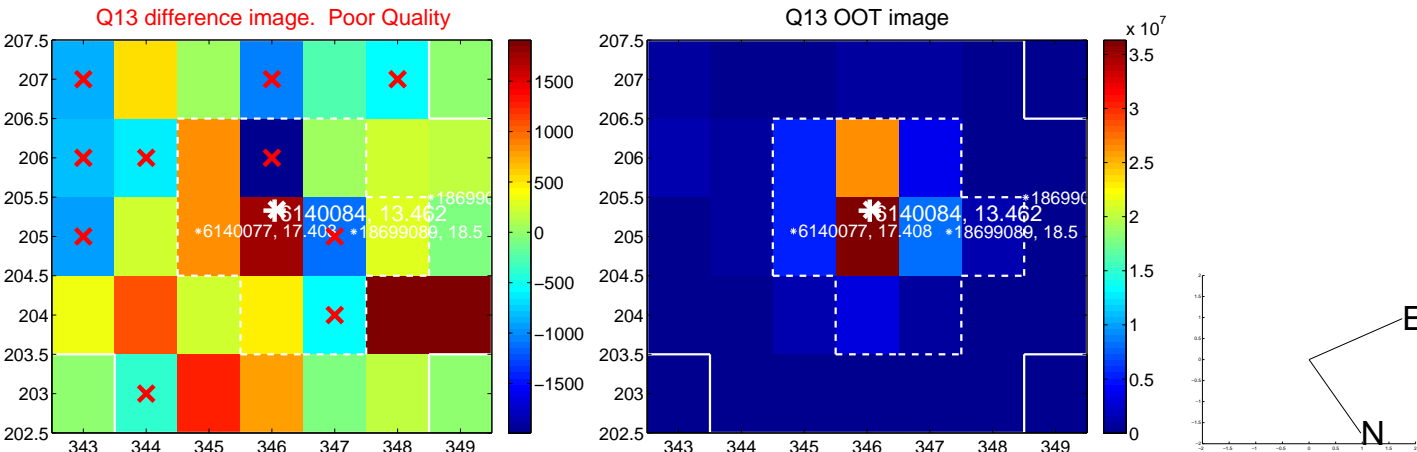
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

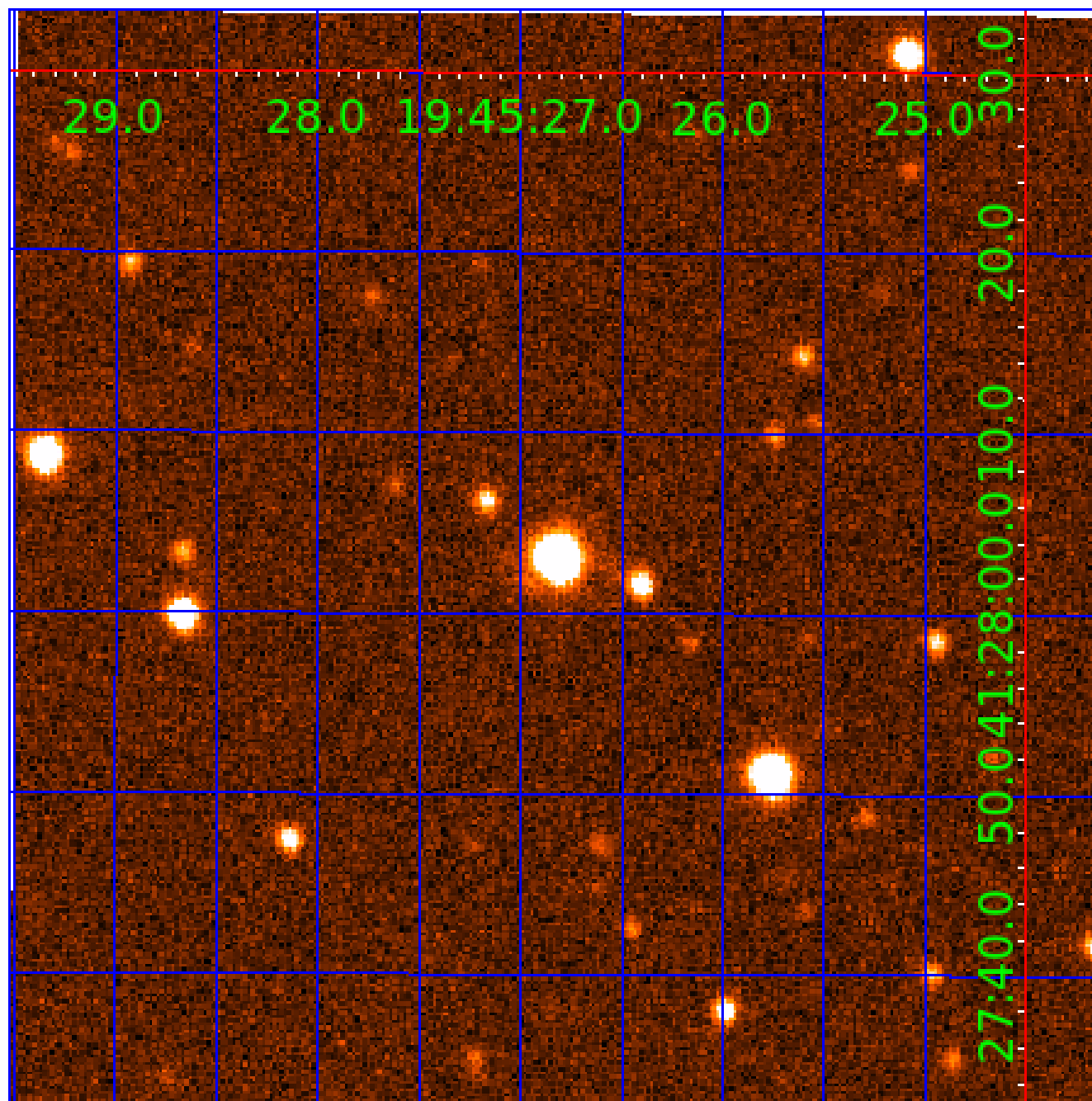






UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

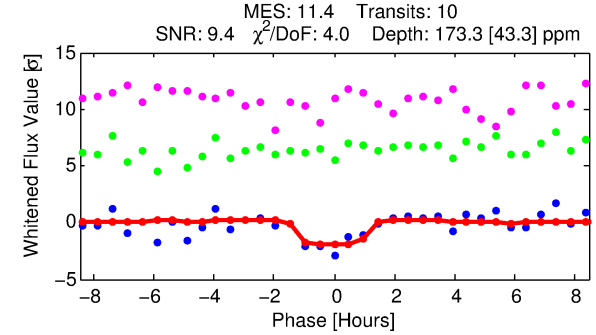
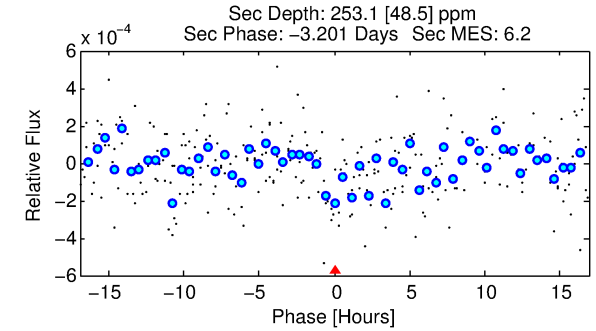
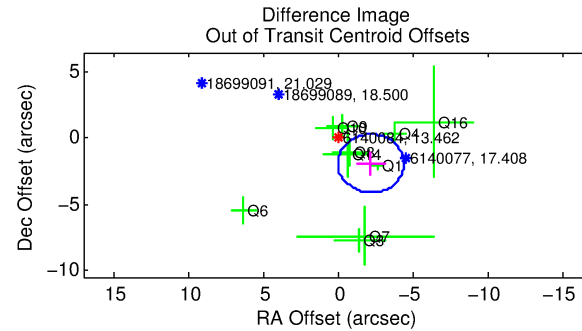
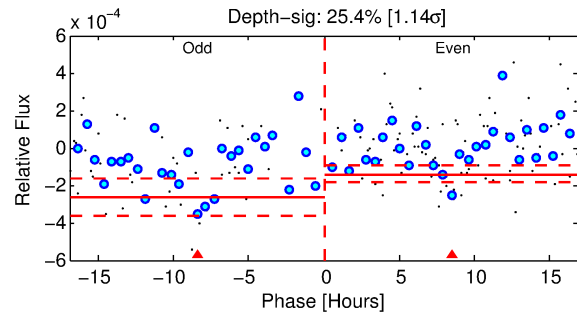
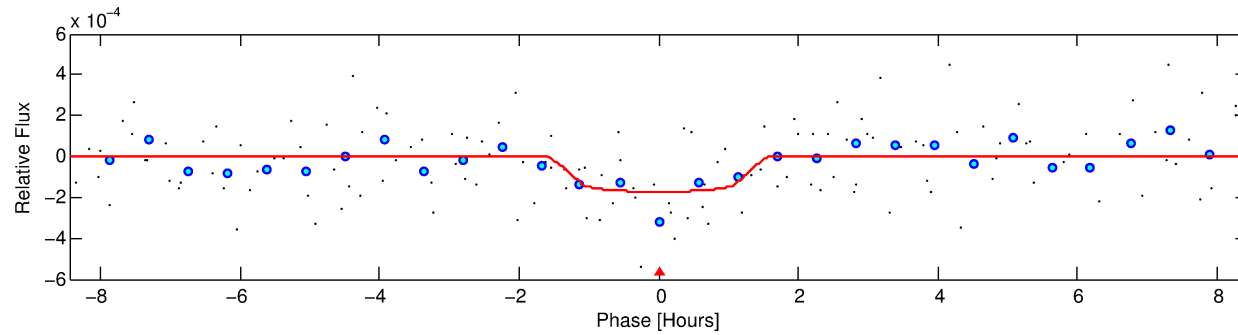
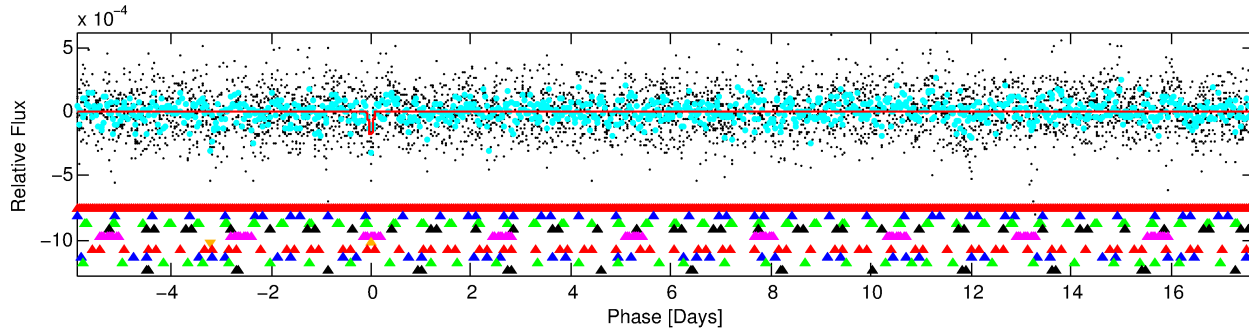
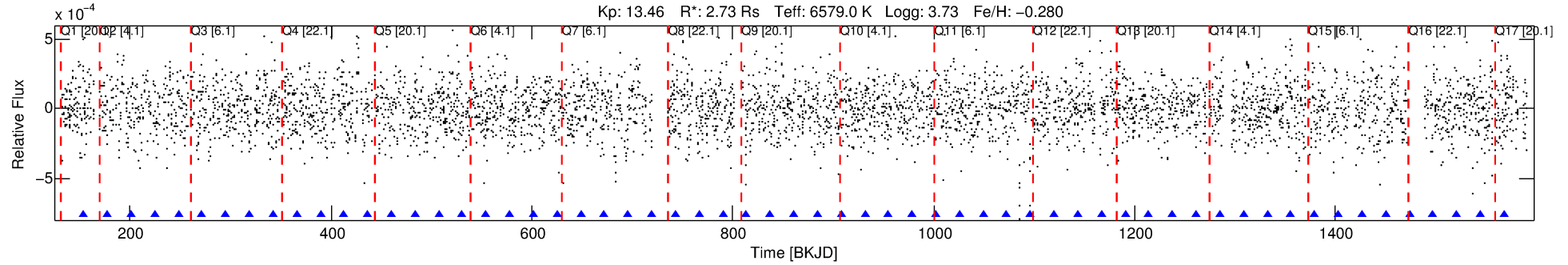
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-06

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 6 of 10 Period: 23.565 d



## DV Fit Results:

Period = 23.56454 [0.00048] d  
Epoch = 153.8893 [0.0153] BKJD  
Rp/R\* = 0.0138 [0.0175]  
a/R\* = 33.53 [243.14]  
b = 0.87 [2.10]  
Seff = 376.79 [207.65]  
Teq = 1123 [155] K  
Rp = 4.09 [5.42] Re  
a = 0.1819 [0.0623] AU  
Ag = 274.87 [716.73] [0.38 $\sigma$ ]  
Teffp = 7073 [4516] K [1.32 $\sigma$ ]

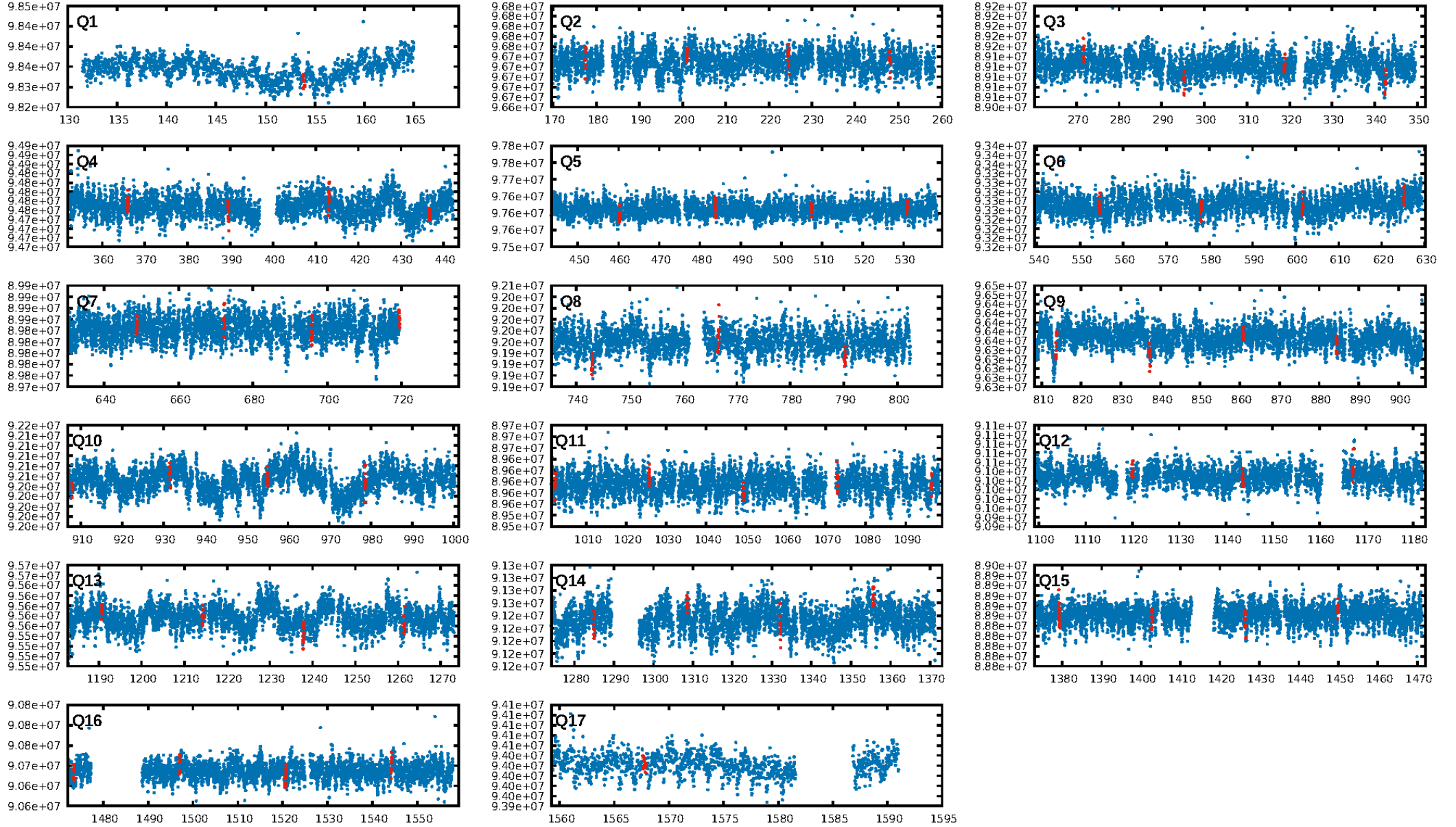
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [21.80 $\sigma$ ]  
LongPeriod-sig: 100.0% [64.35 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 8.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [10/10]  
GhostDiagnostic-chr: -0.8064  
Centroid-sig: 7.5%  
Centroid-so: 0.848 arcsec [1.36 $\sigma$ ]  
OotOffset-rm: 2.927 arcsec [3.98 $\sigma$ ]  
KicOffset-rm: 3.019 arcsec [3.63 $\sigma$ ]  
OotOffset-st: 3/2/3/2 [10]  
KicOffset-st: 3/2/3/2 [10]  
DiffImageQuality-fgm: 0.10 [1/10]  
DiffImageOverlap-fno: 0.47 [8/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:42 Z

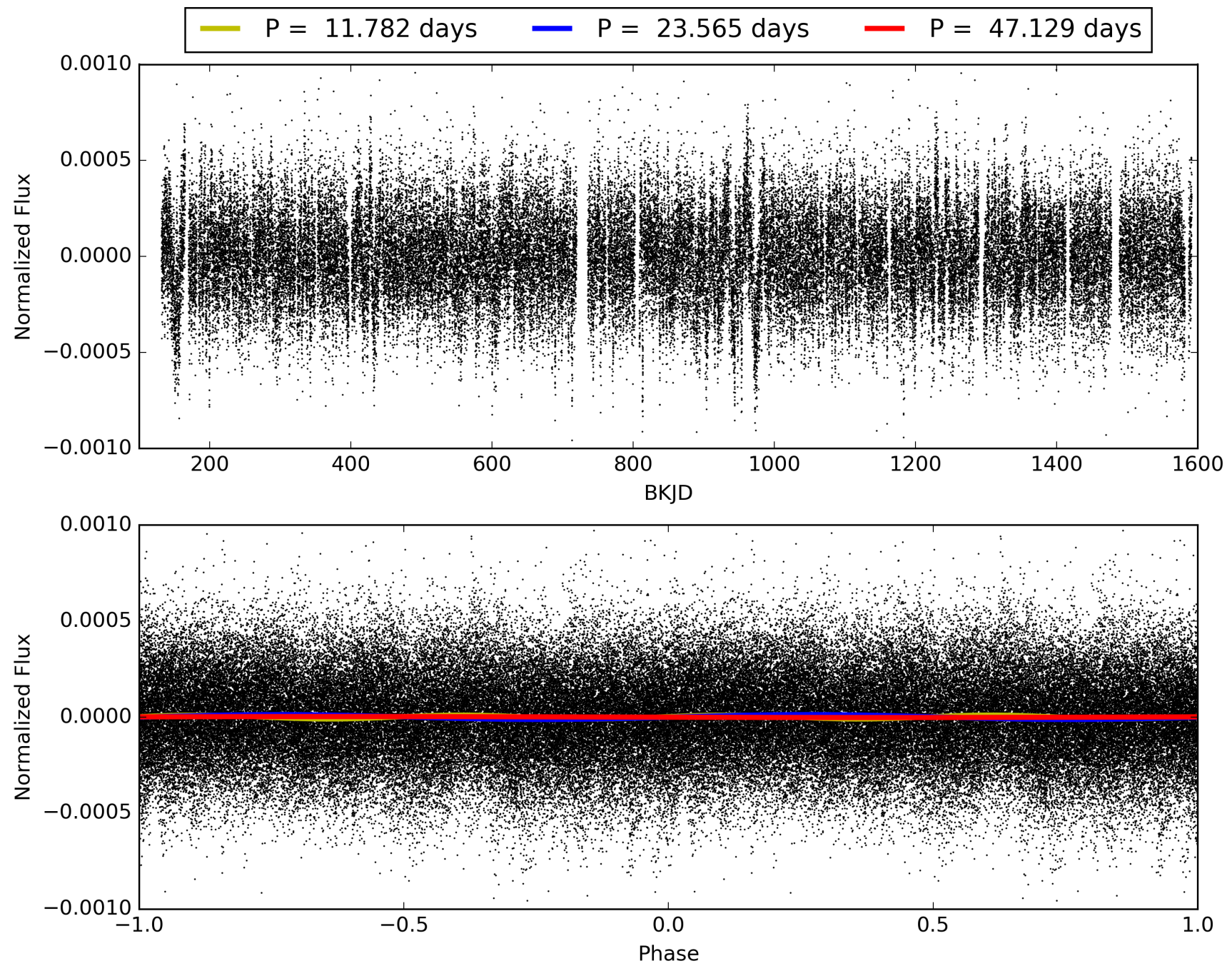
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-06, PDC Light Curves



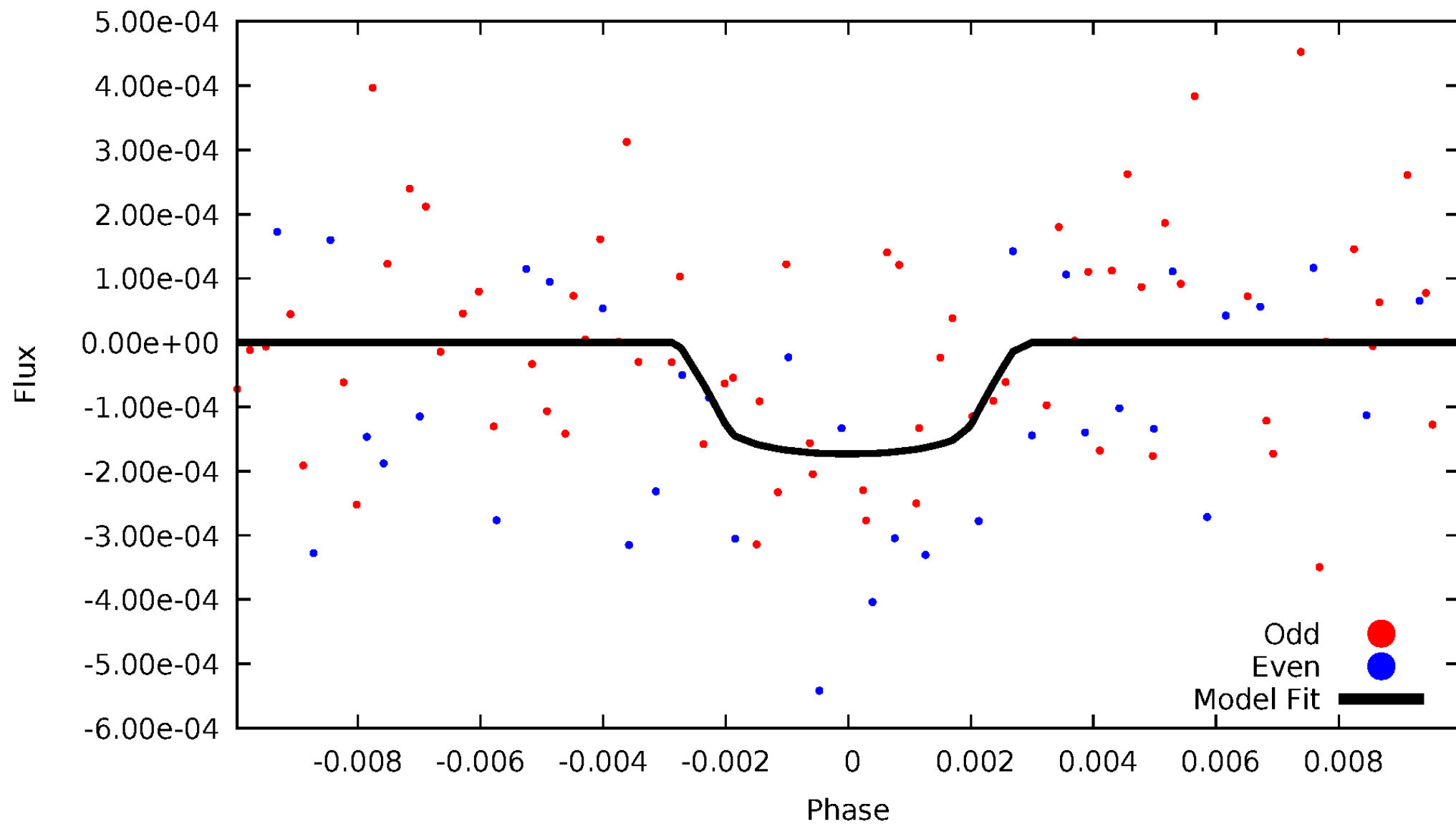


TCE 006140084-06



# DV Odd/Even

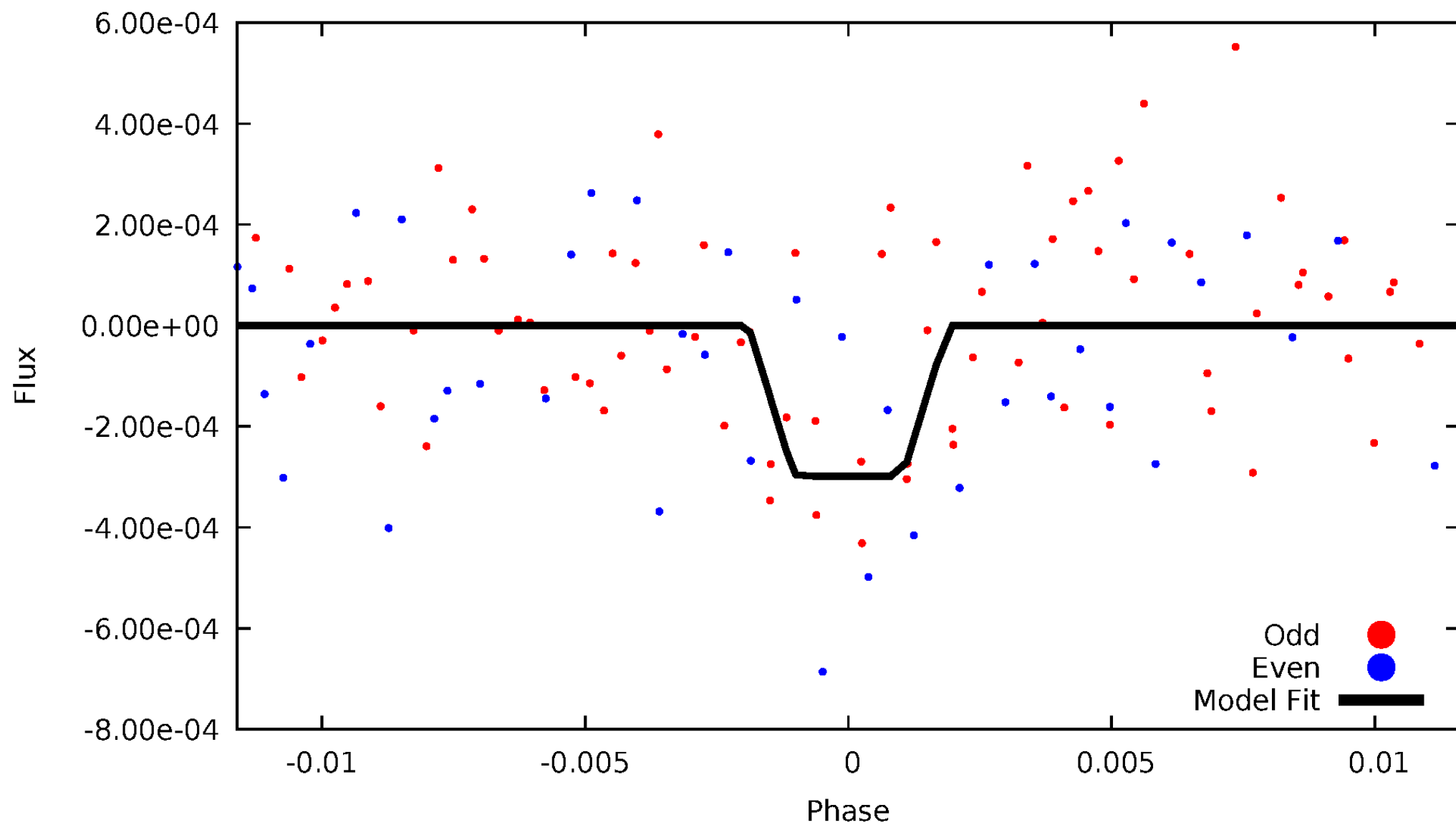
TCE 006140084-06





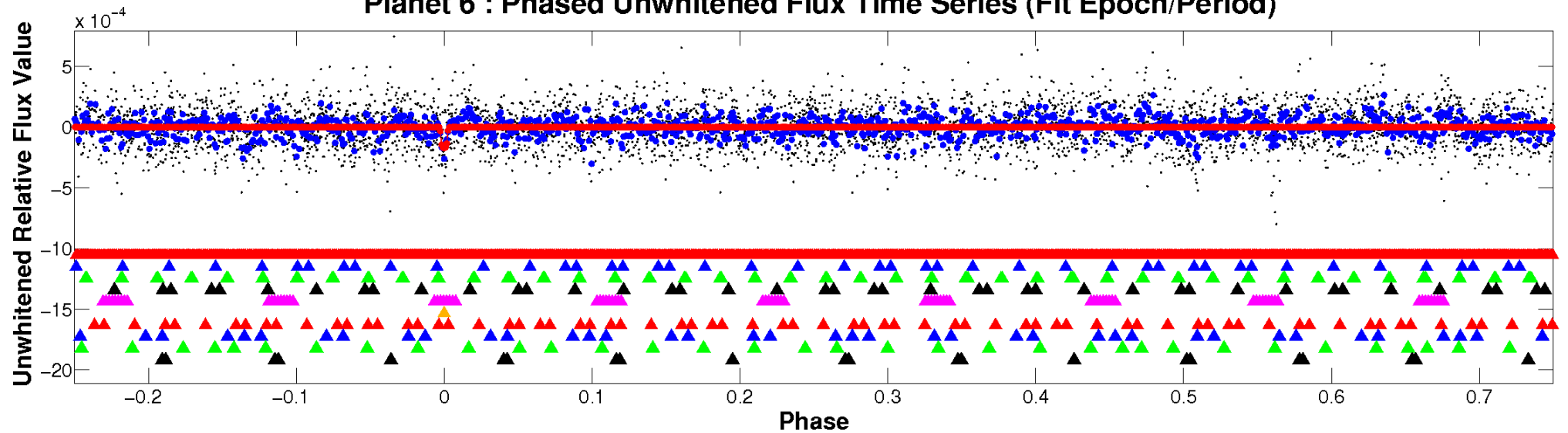
# ALT Odd/Even

TCE 006140084-06

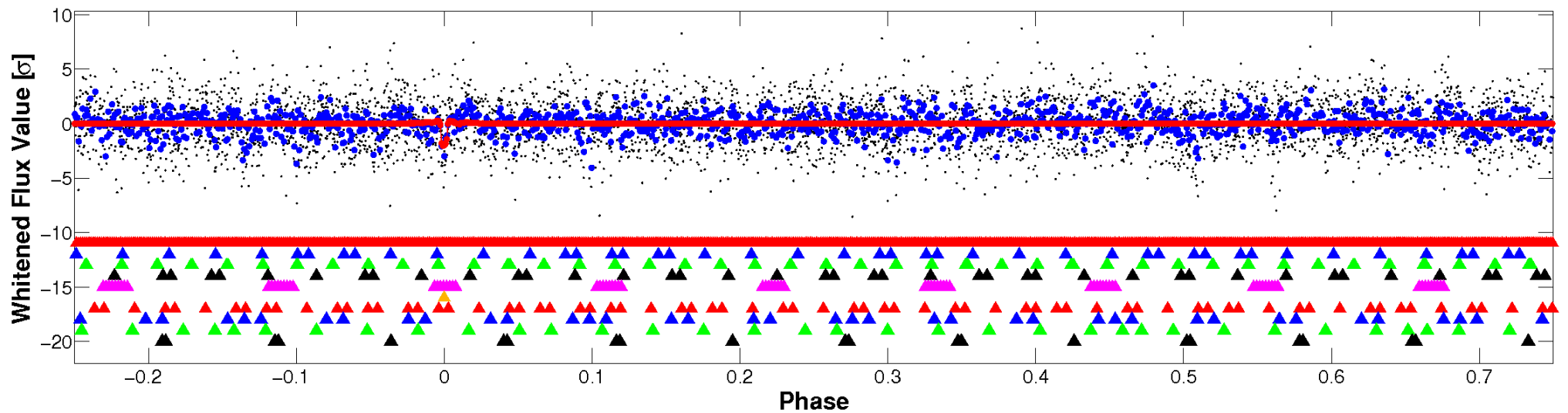


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

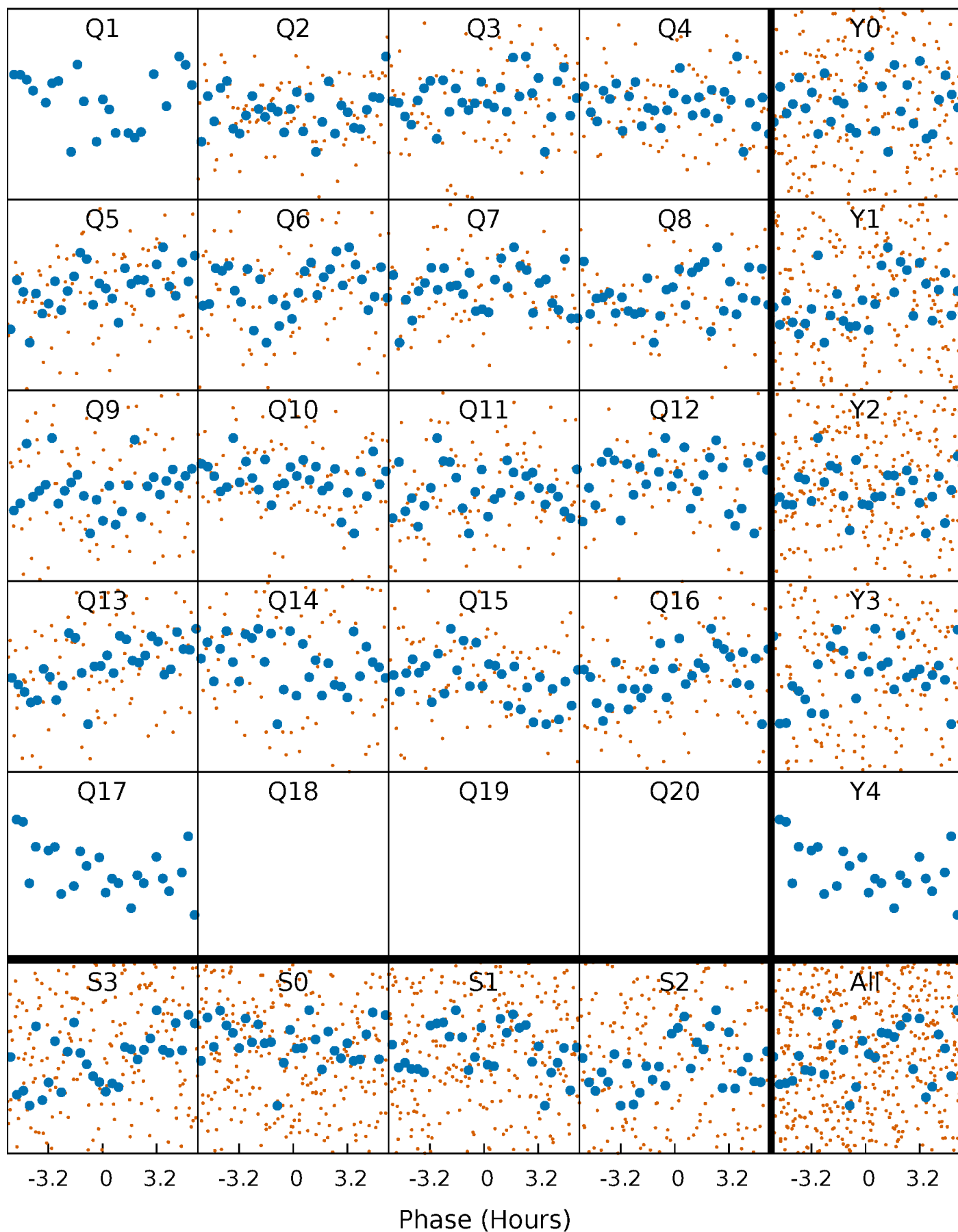


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



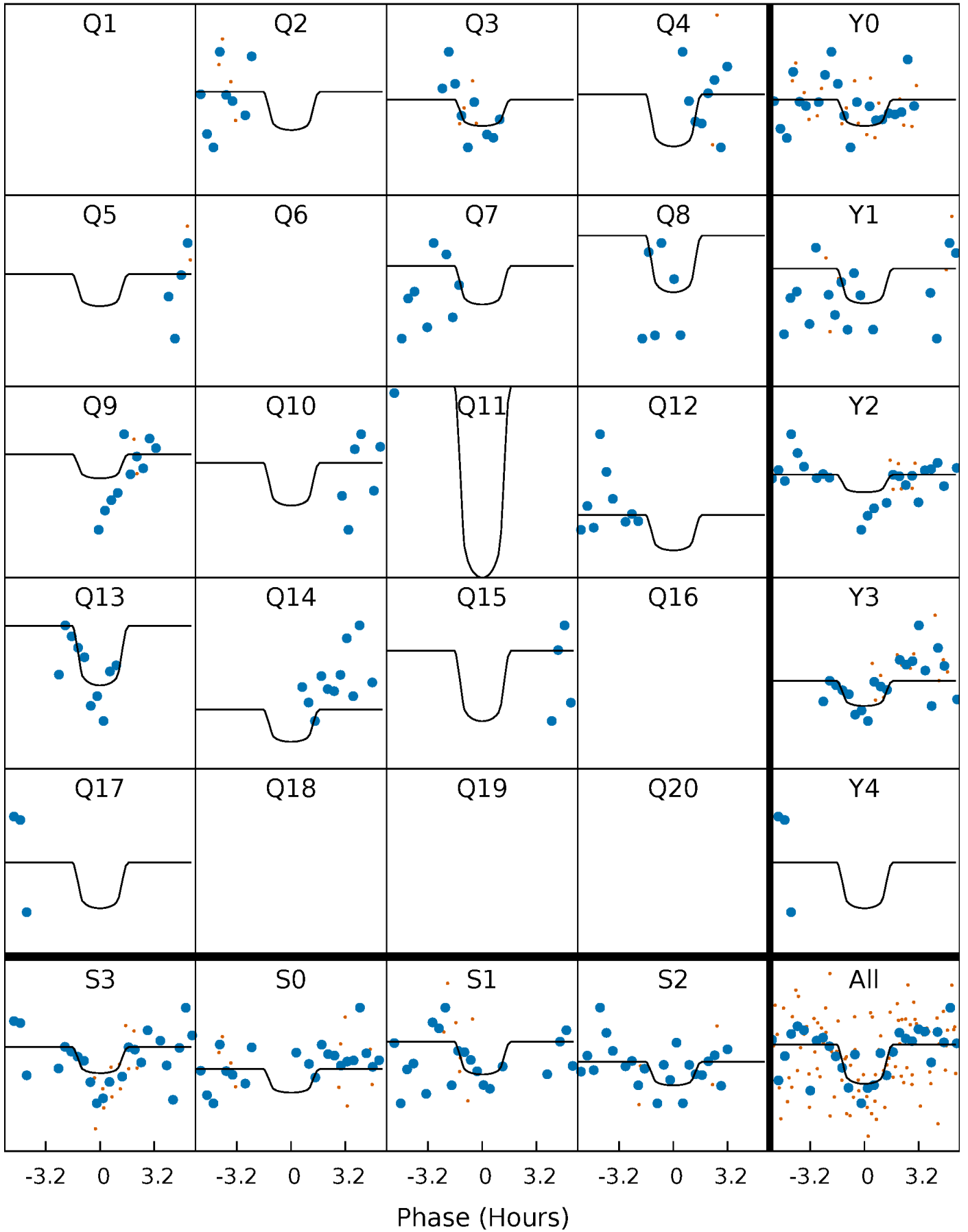
# PDC Quarter-Phased Transit Curves

TCE 006140084-06 P= 23.564542 Days  $T_0=153.889256$  (BKJD)



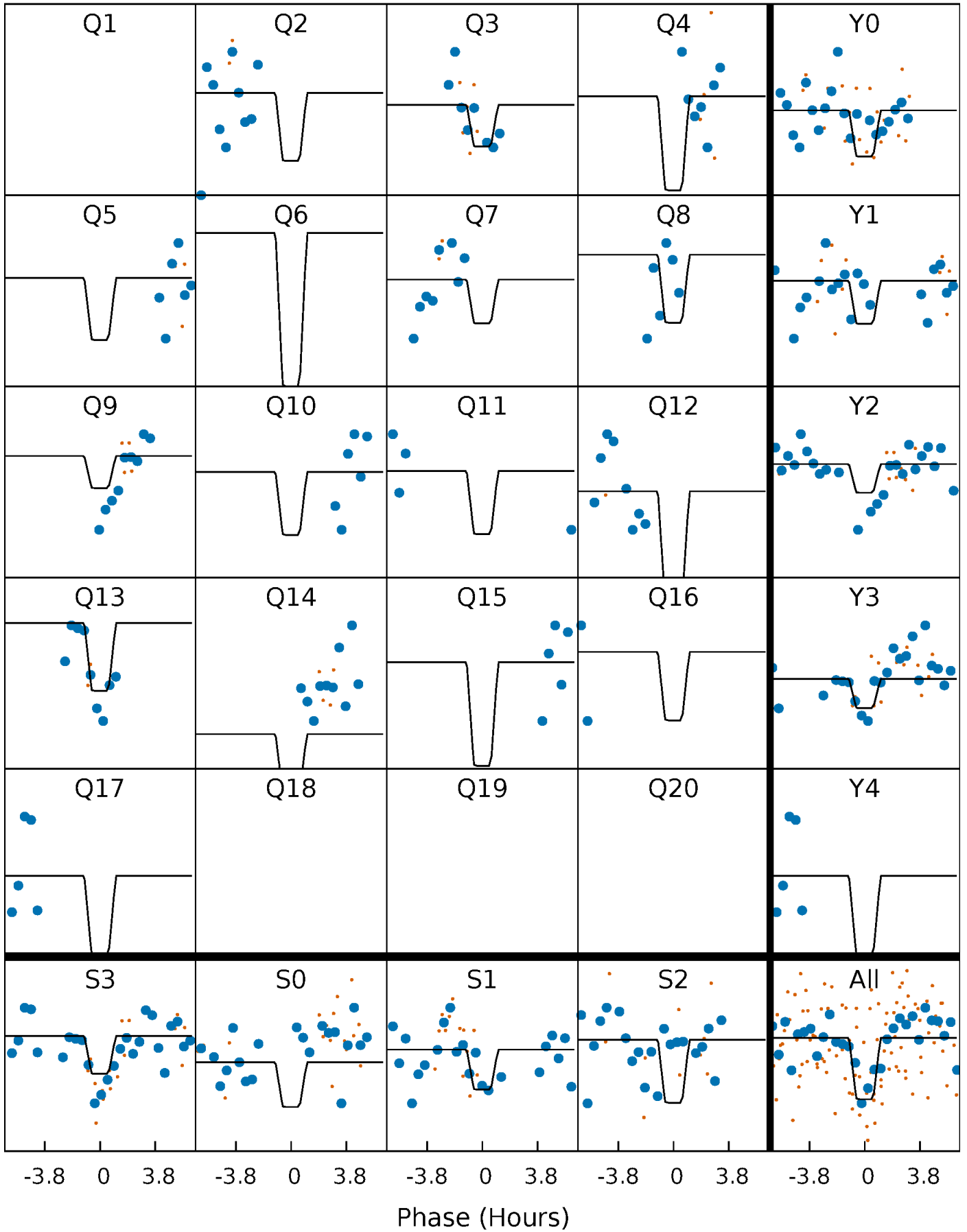
# DV Quarter-Phased Transit Curves

TCE 006140084-06   P= 23.564542 Days    $T_0=153.889256$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

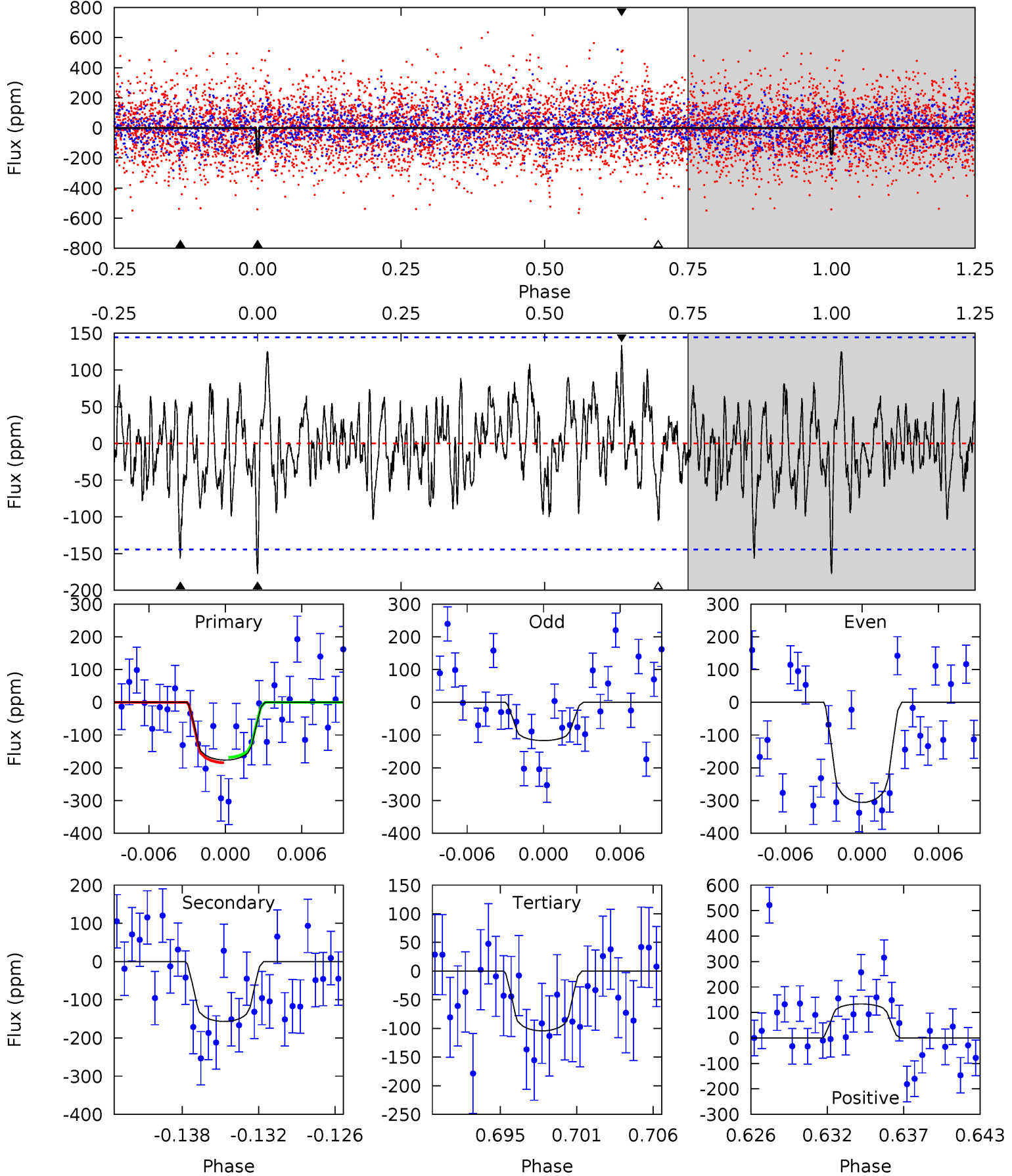
TCE 006140084-06 P= 23.564561 Days  $T_0=153.889044$  (BKJD)



# DV Model-Shift Uniqueness Test

006140084-06, P = 23.564542 Days, E = 130.324714 Days

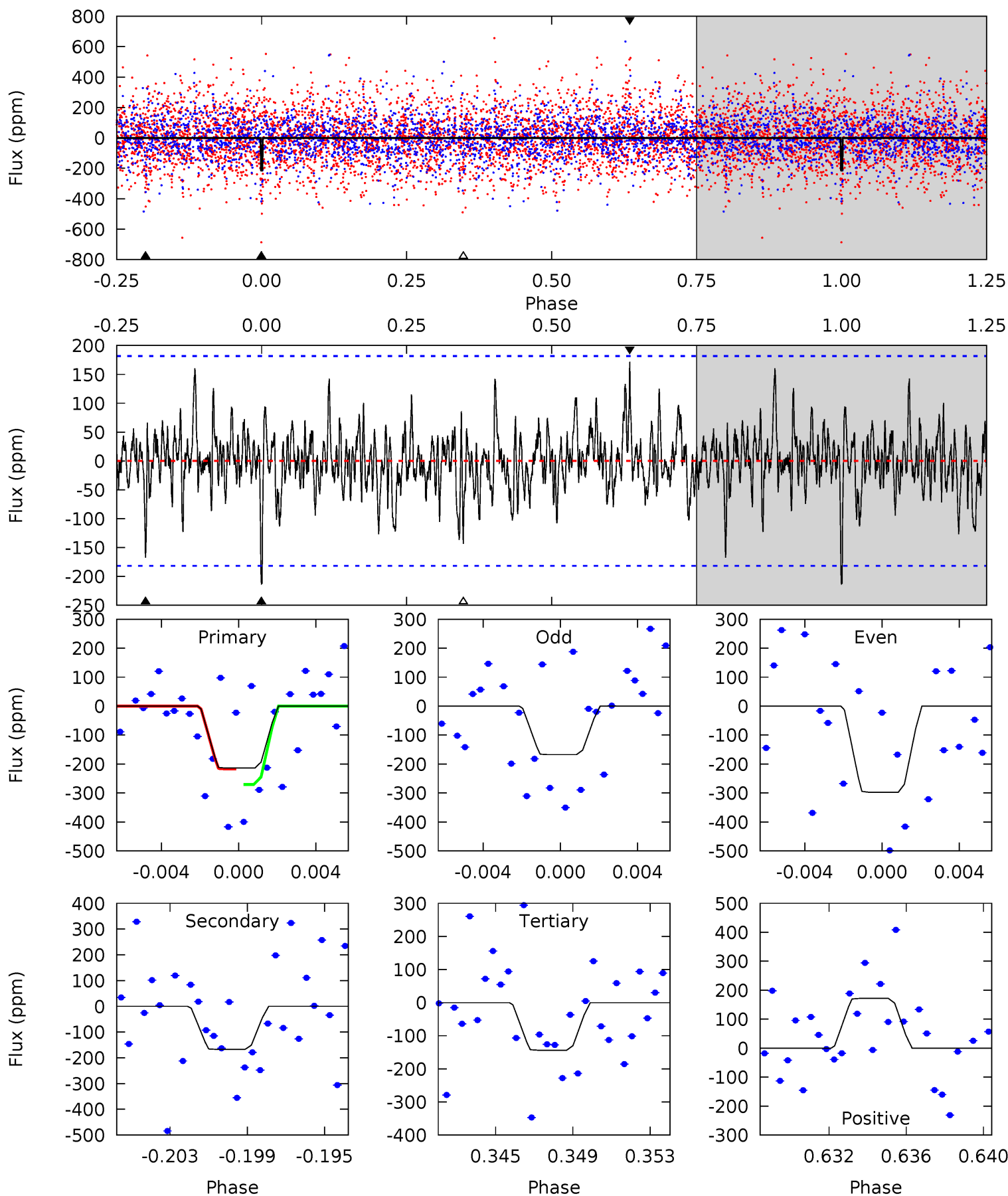
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.27 | 5.58 | 3.71 | 4.75 | 5.13            | 2.76            | 1.50             | 2.56    | 1.52    | 1.87    | 0.83    | 3.30    | 0.73 | 0.43  | 0.29 |



# Alt Model-Shift Uniqueness Test

006140084-06, P = 23.564561 Days, E = 130.324483 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.14 | 4.79 | 4.12 | 4.92 | 5.21            | 2.89            | 1.26             | 2.02    | 1.22    | 0.67    | -0.13   | 1.71    | 2.22 | 0.45  | 0.75 |





### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-06 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$       | $T_{obs} (K)$          | $A_{obs}$          |
|---------|---------------|------------------------|---------------------|------------------------|--------------------|
| DV      | $-157 \pm 28$ | $5.32^{+4.32}_{-3.36}$ | $1540^{+87}_{-139}$ | $5295^{+4193}_{-1128}$ | $100^{+657}_{-72}$ |
| Alt.    | $-167 \pm 35$ | $5.77^{+4.56}_{-3.76}$ | $1529^{+85}_{-139}$ | $5163^{+4016}_{-1049}$ | $94^{+648}_{-66}$  |

$T_{max}$  = 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  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

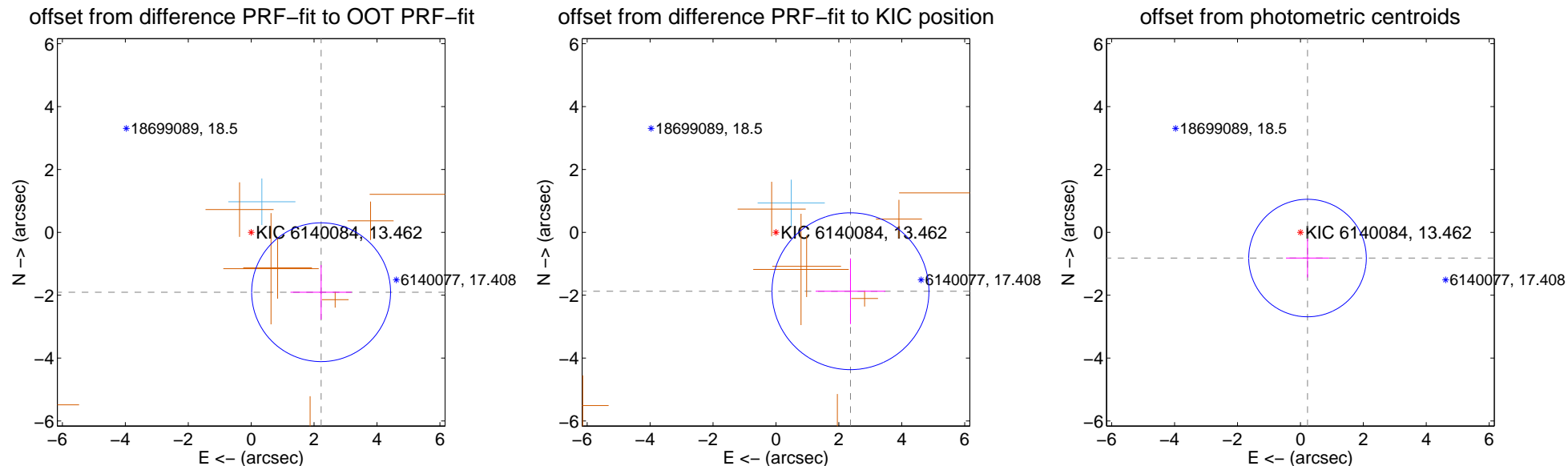
## DV Centroid Data

Supplemental centroid analysis for 006140084-06. Kepler magnitude: 13.46. Transit SNR 9.44

There are 1 quarters with good PRF difference image offsets

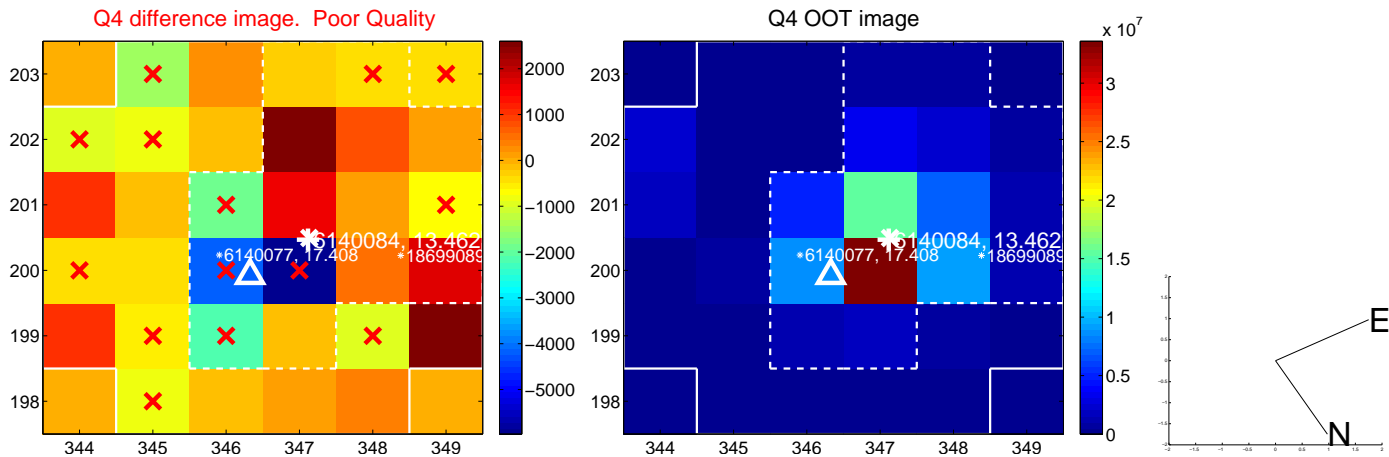
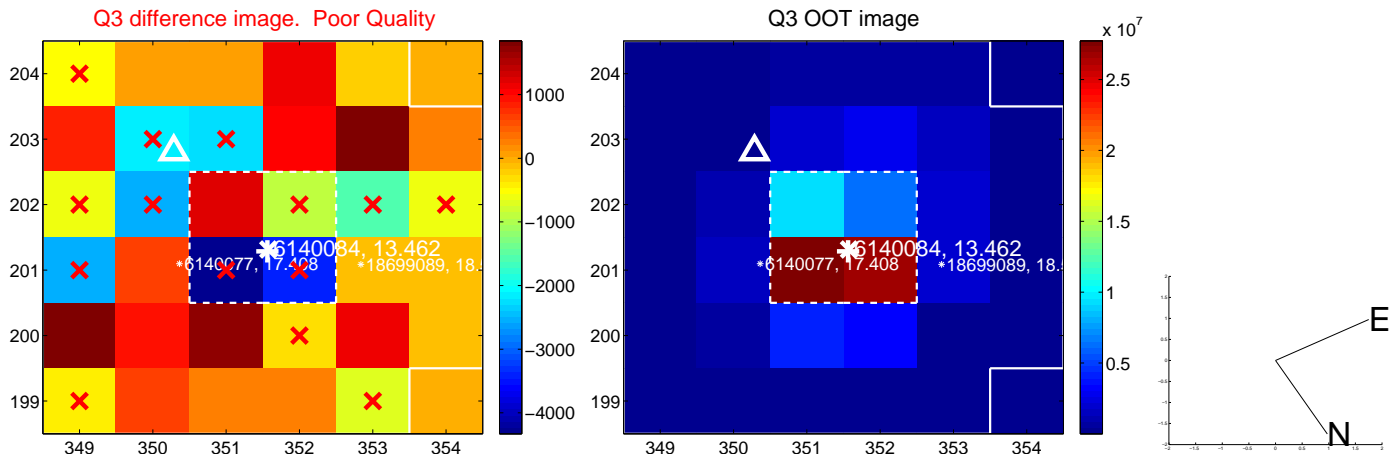
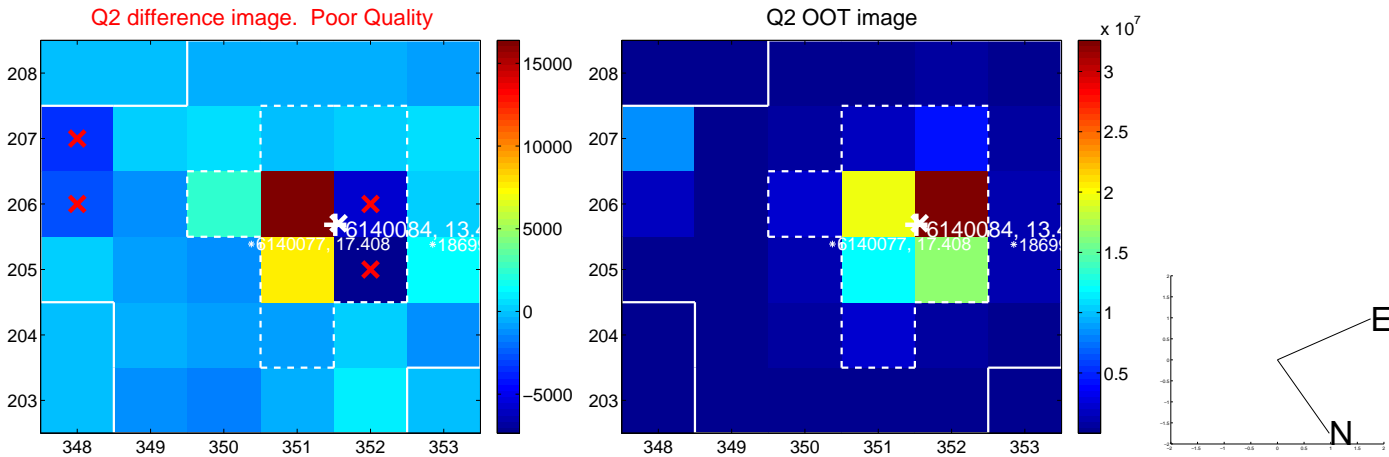
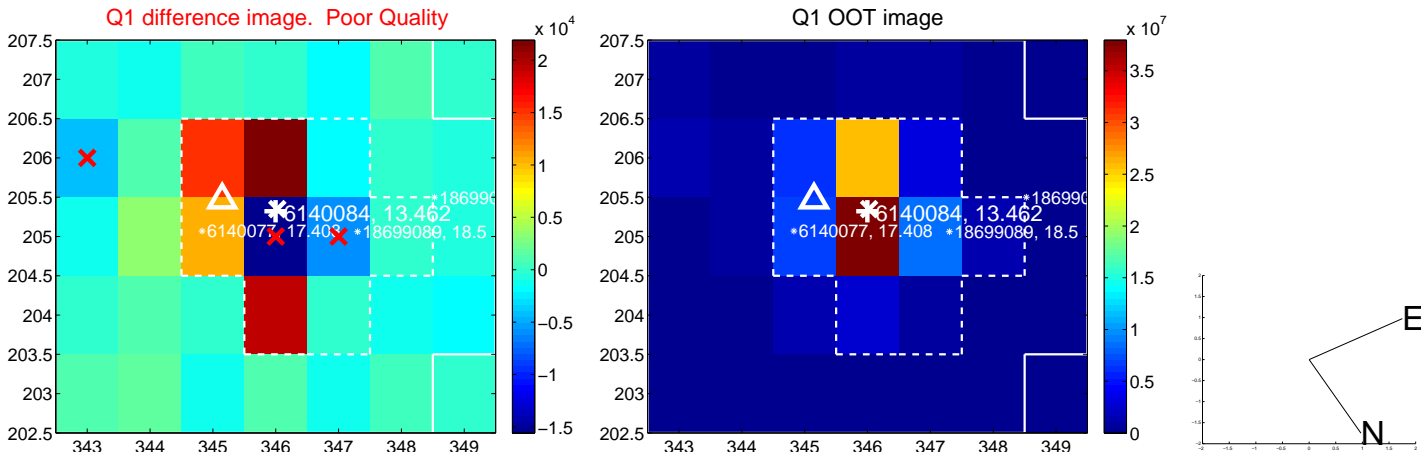
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $2.927 \pm 0.736$  | 3.98                | $-2.223 \pm 0.972$ | $-1.905 \pm 0.866$ |
| PRF-fit source offset from KIC position | $3.019 \pm 0.831$  | 3.63                | $-2.368 \pm 1.108$ | $-1.873 \pm 1.044$ |
| photometric centroid source offset      | $0.85 \pm 0.62$    | 1.36                | $-0.23 \pm 0.69$   | $-0.82 \pm 0.62$   |

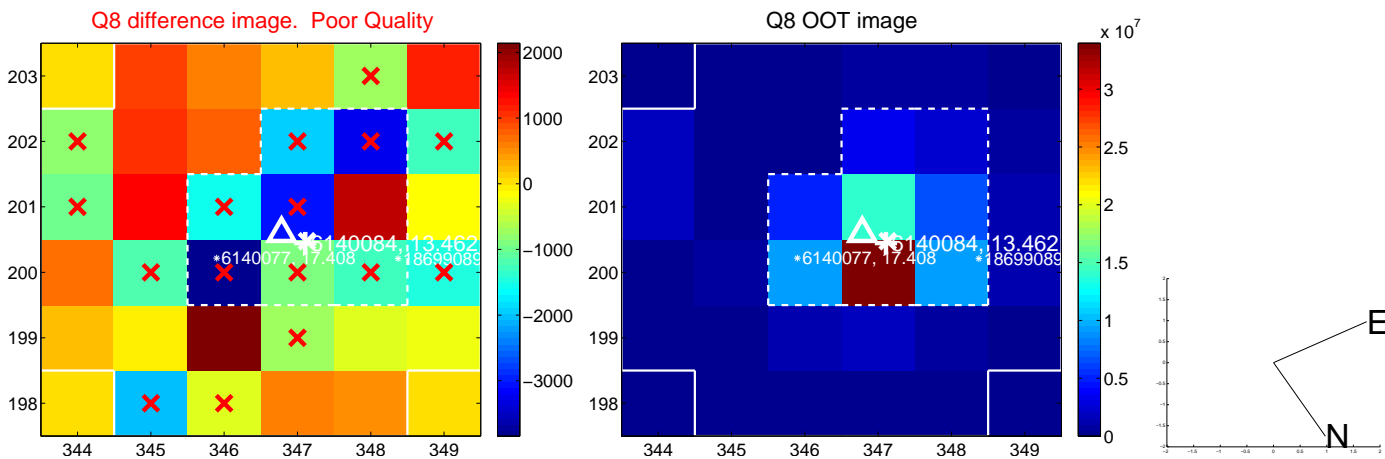
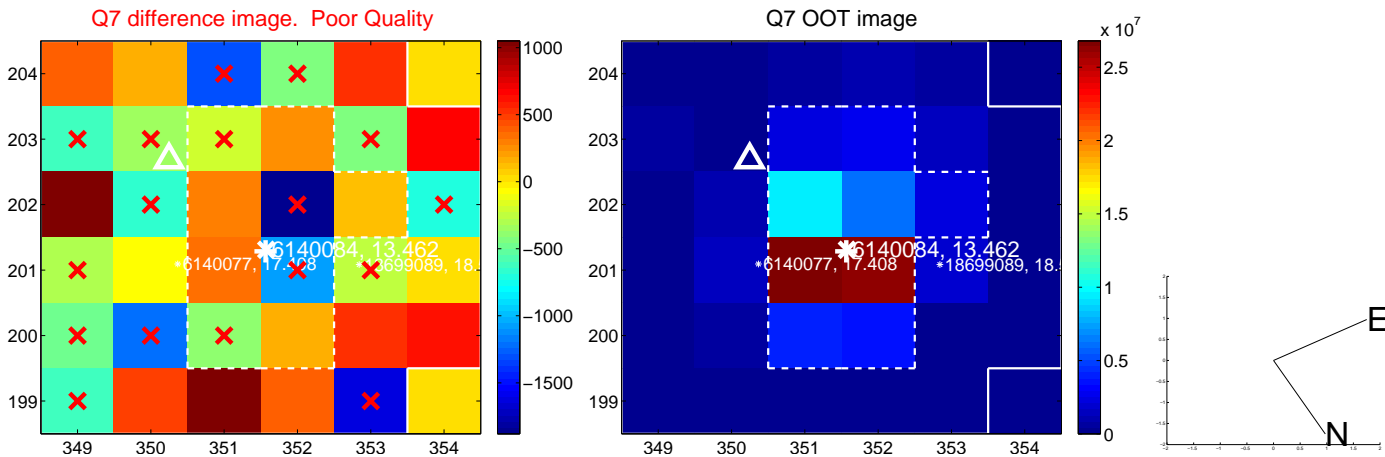
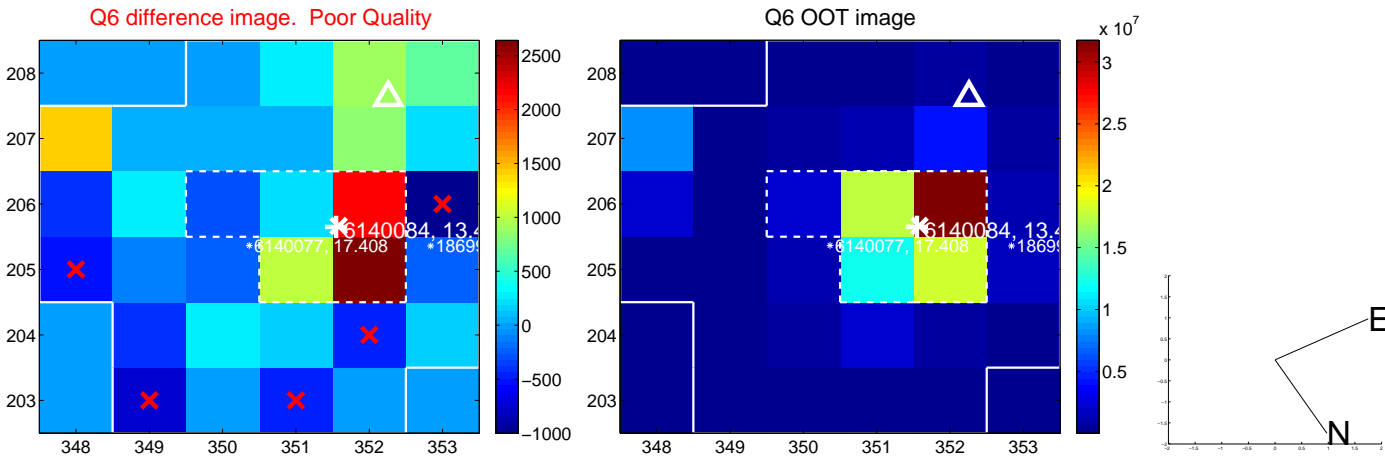
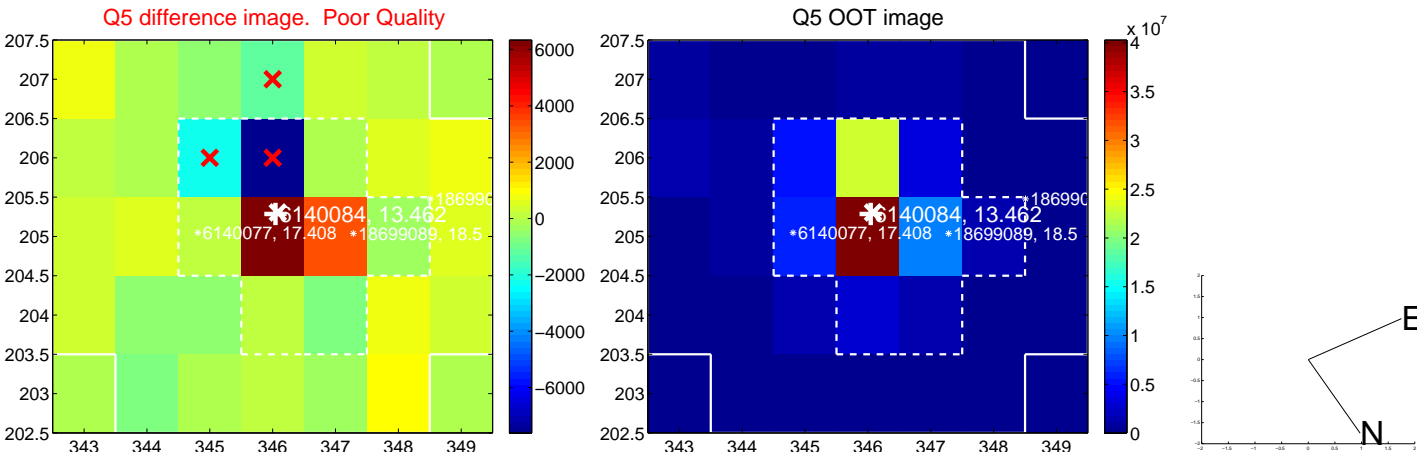


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

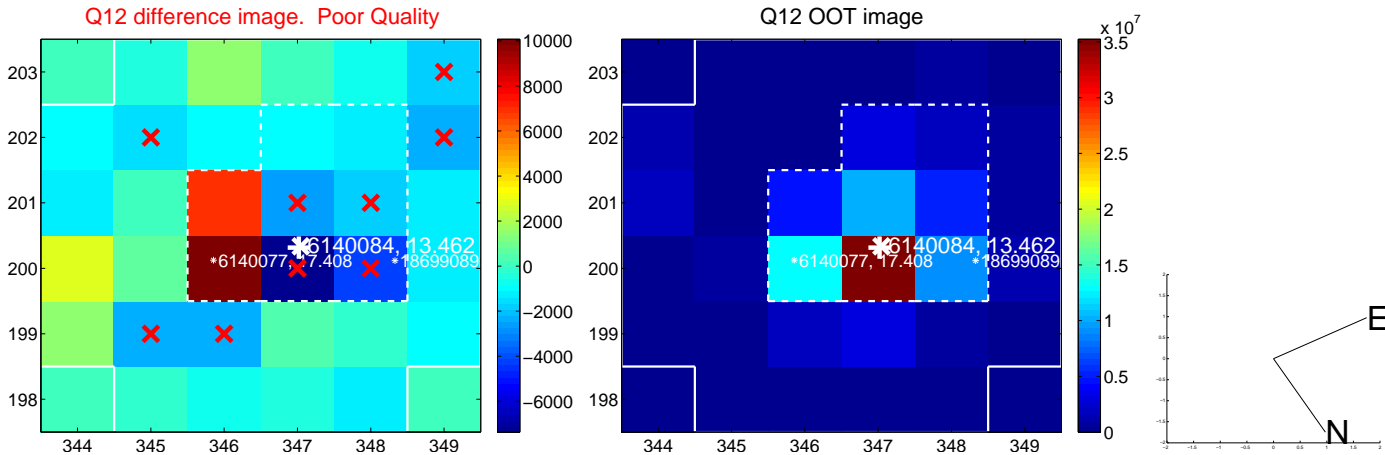
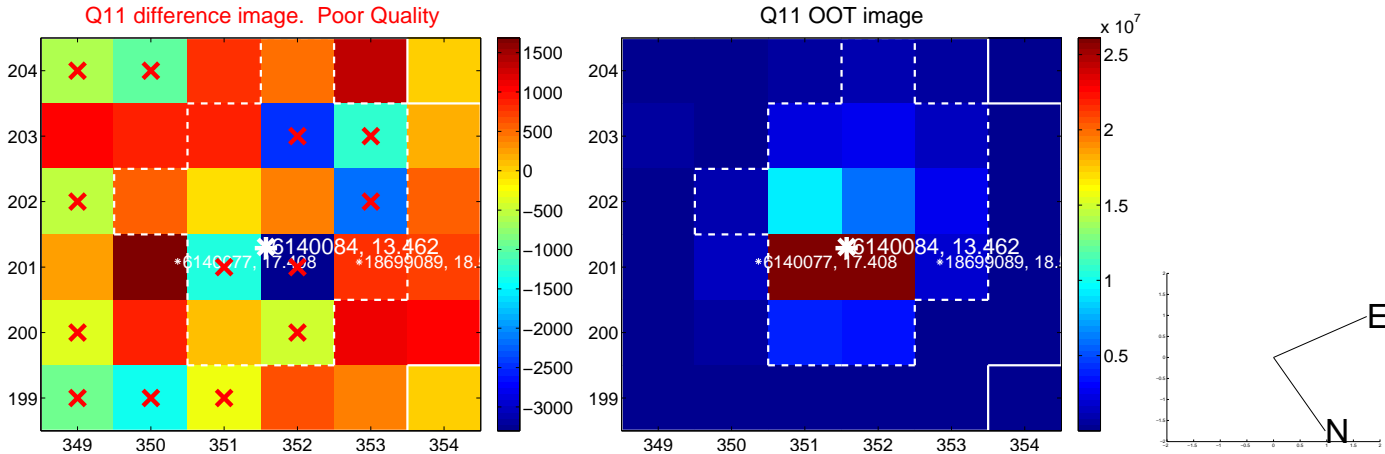
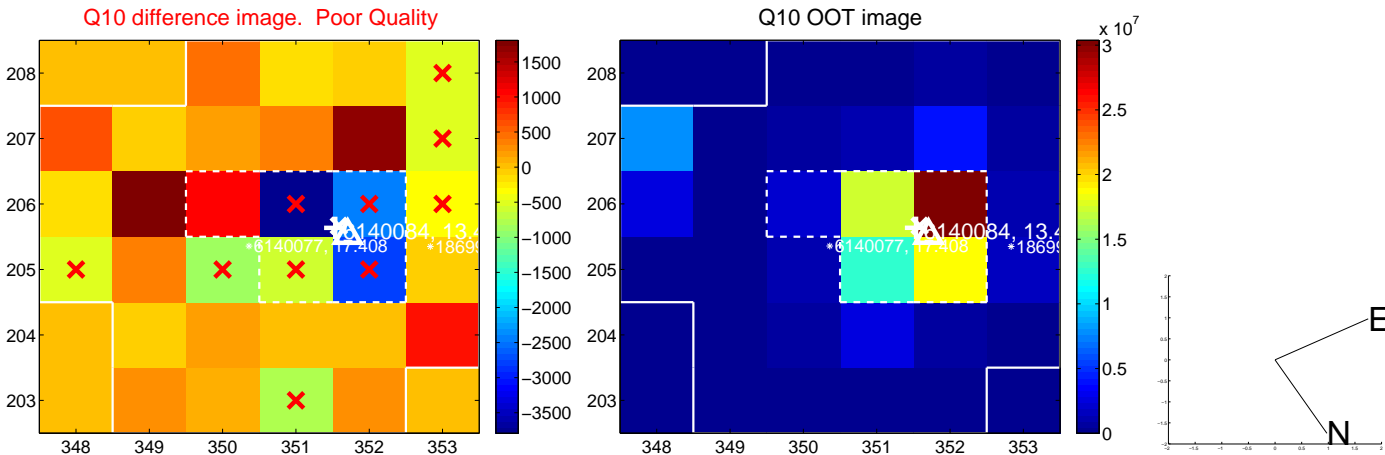
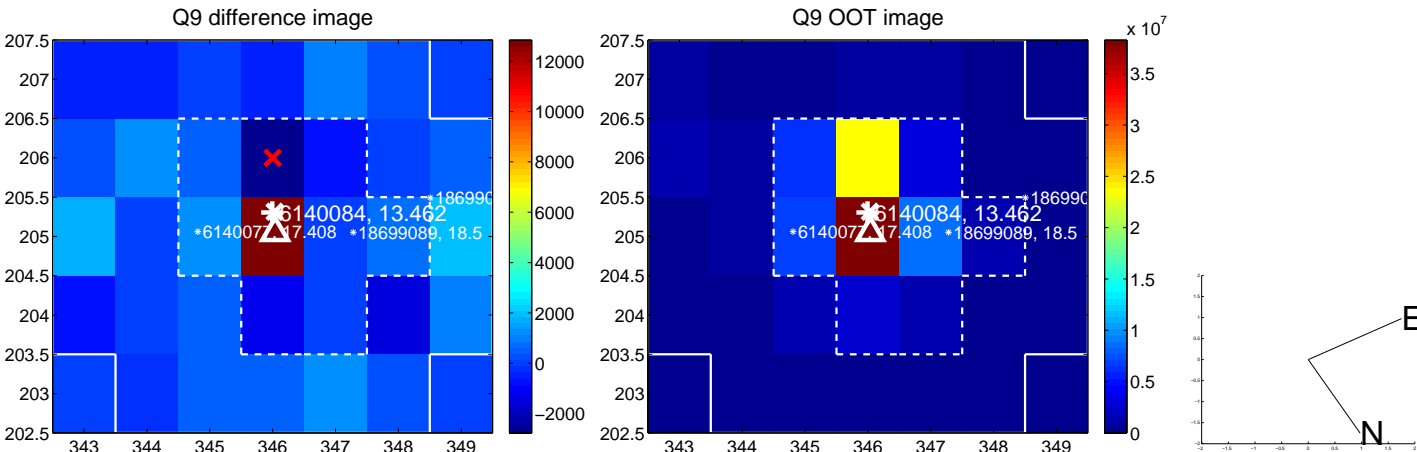
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



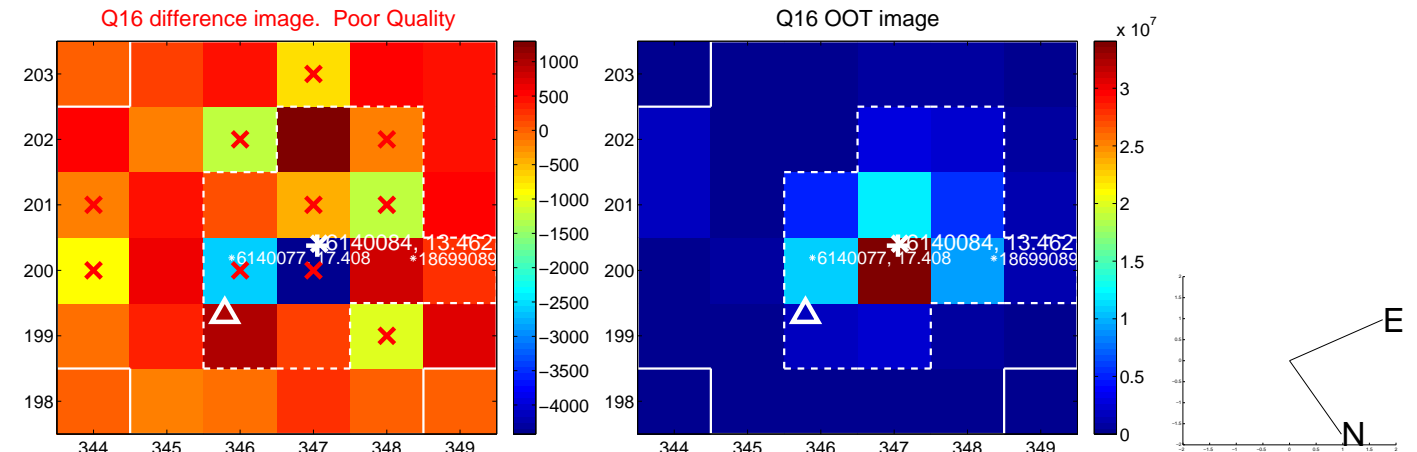
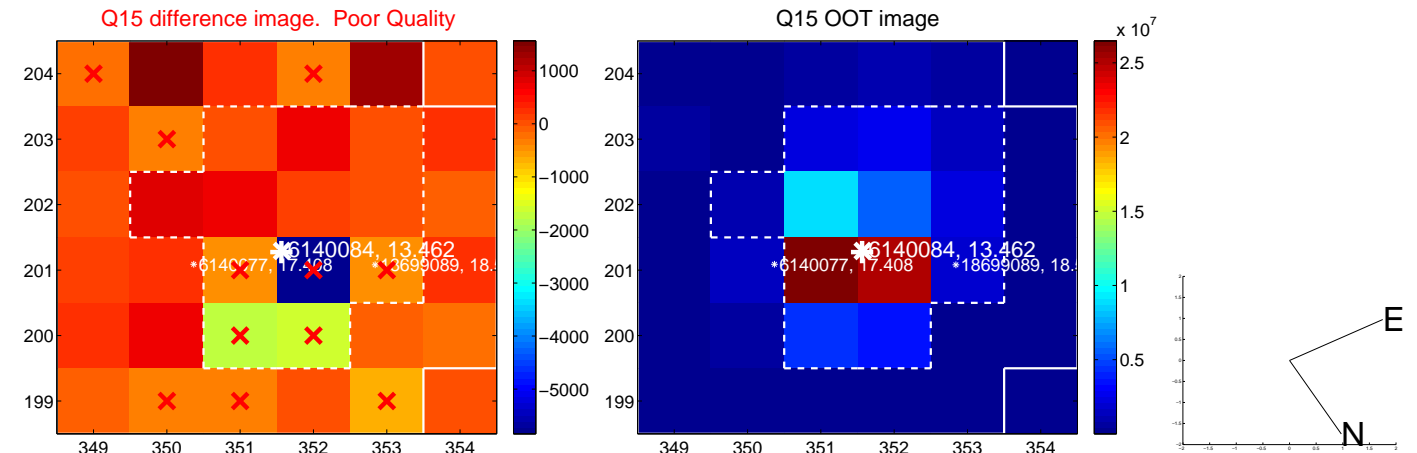
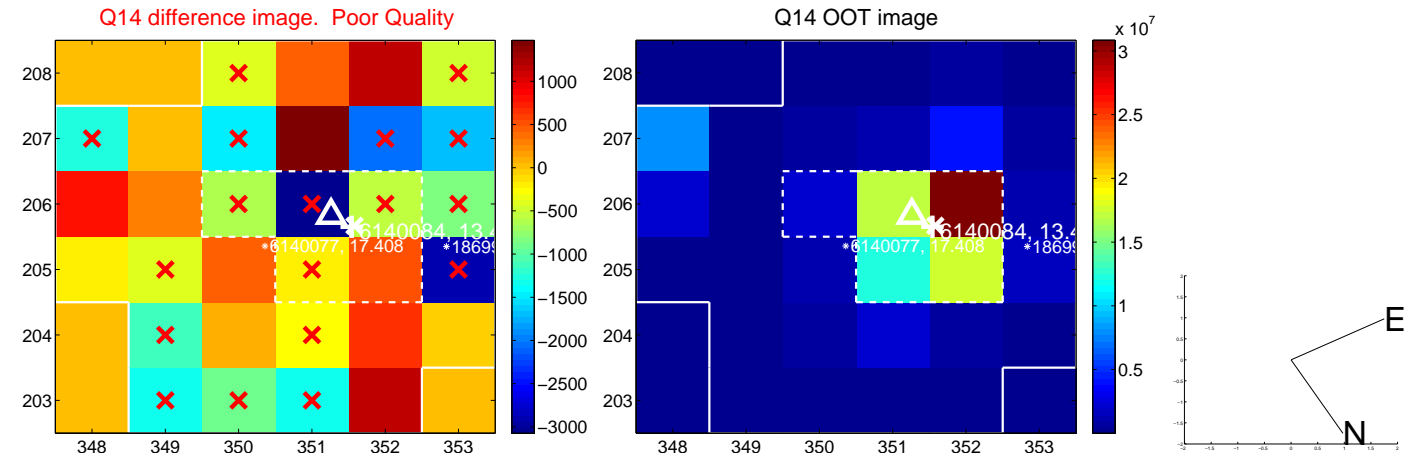
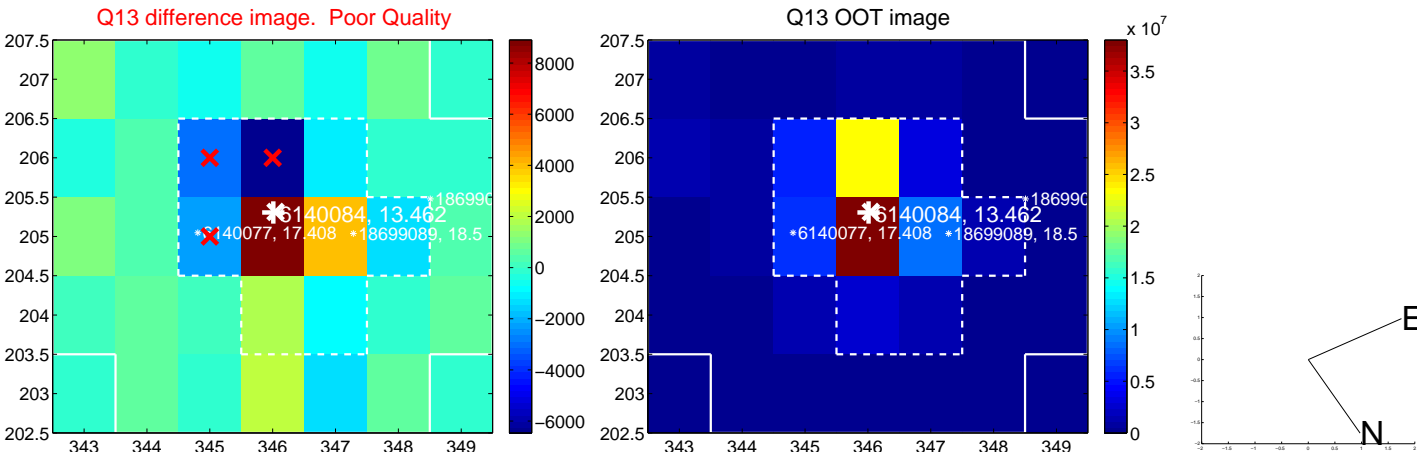
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



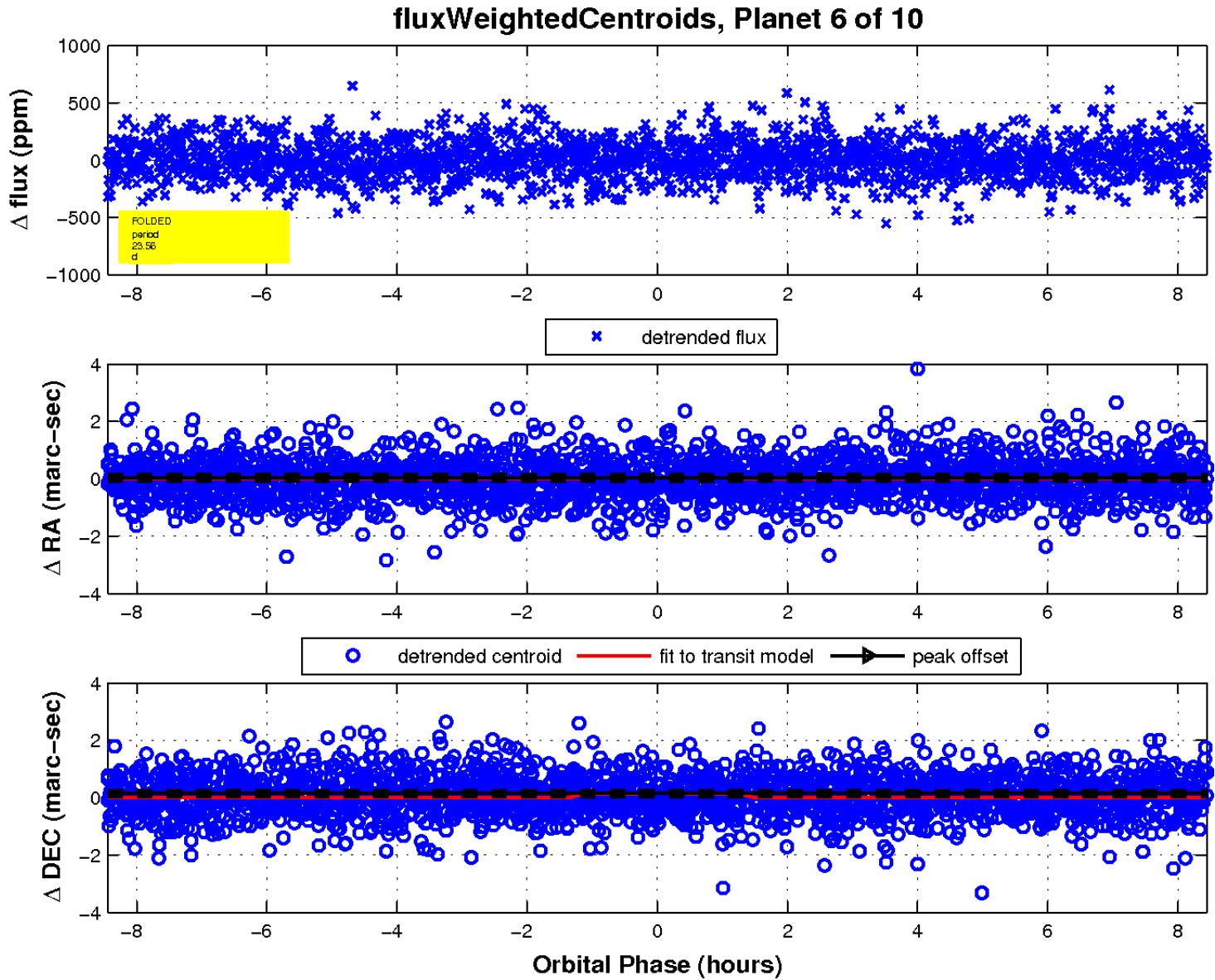
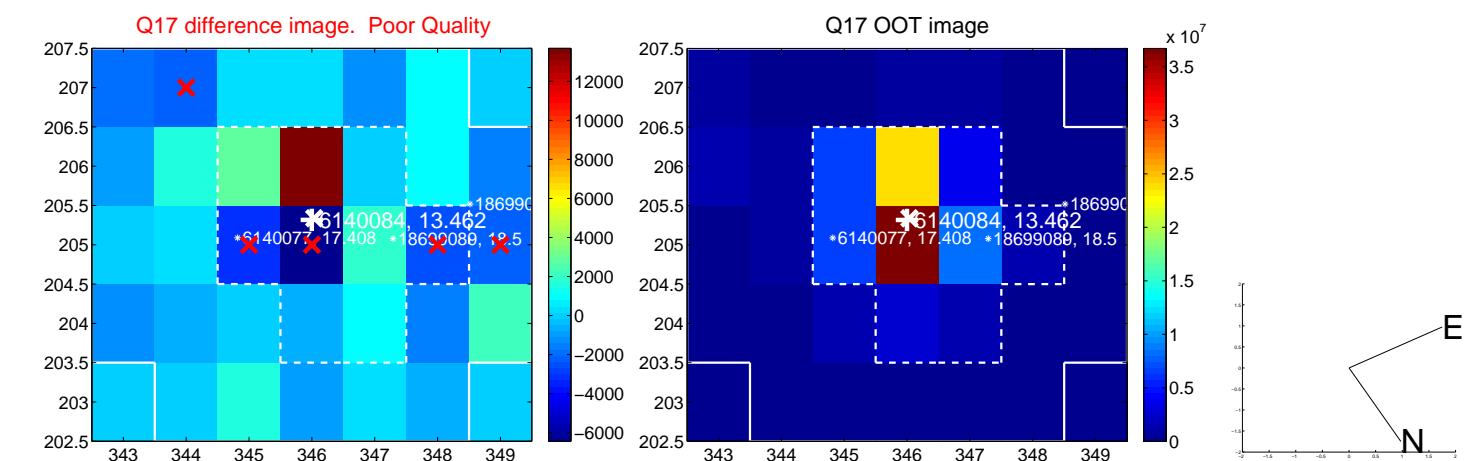
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



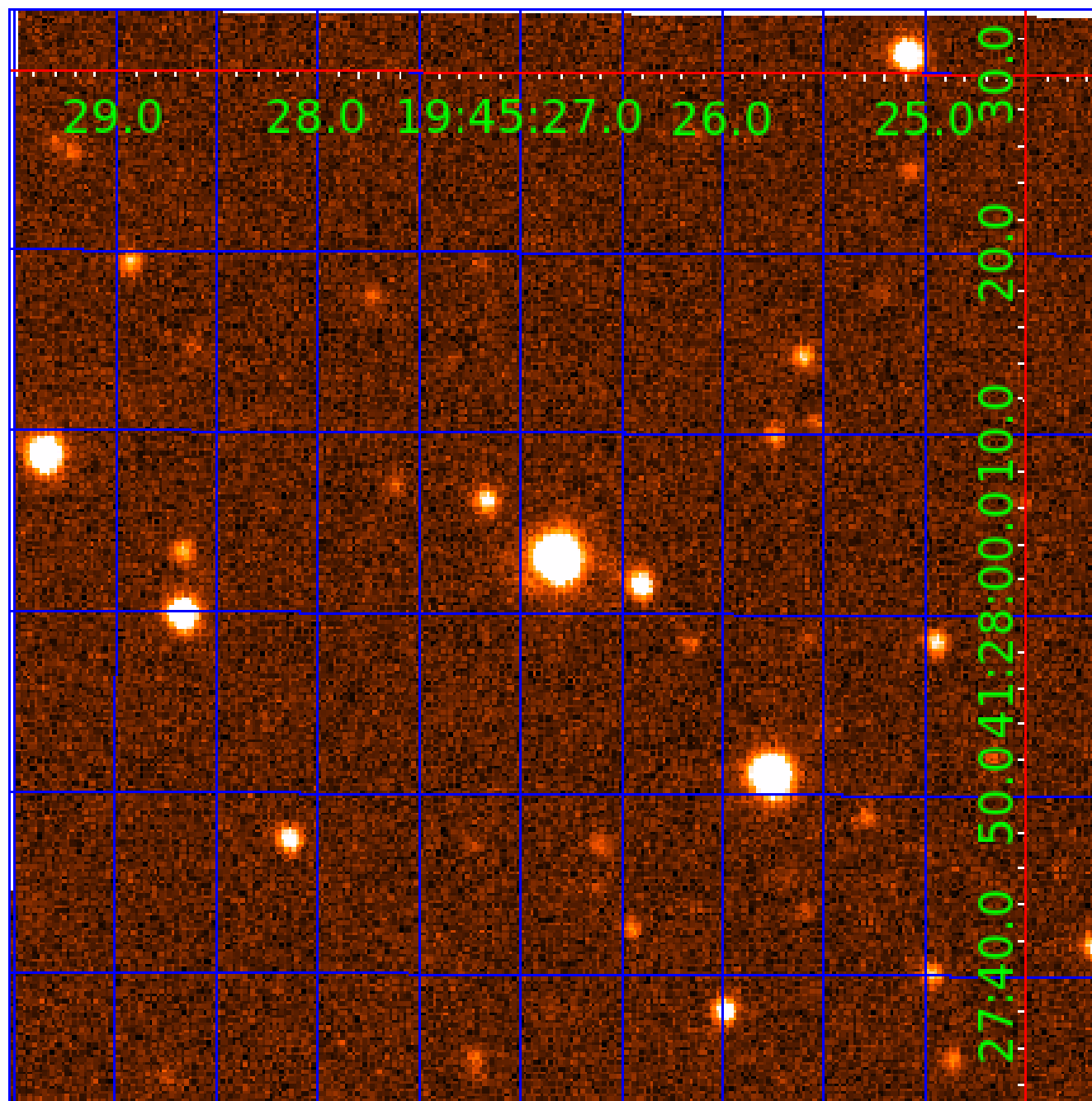
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

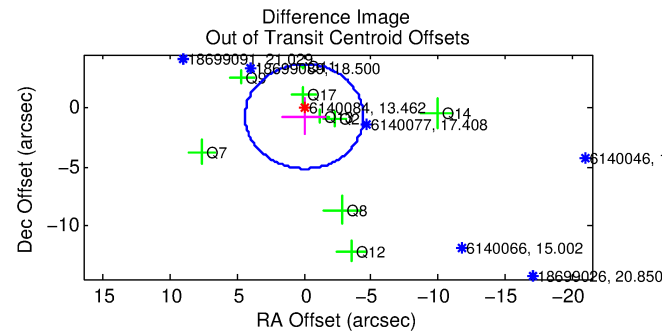
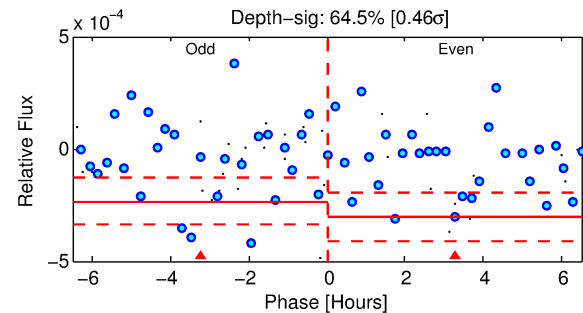
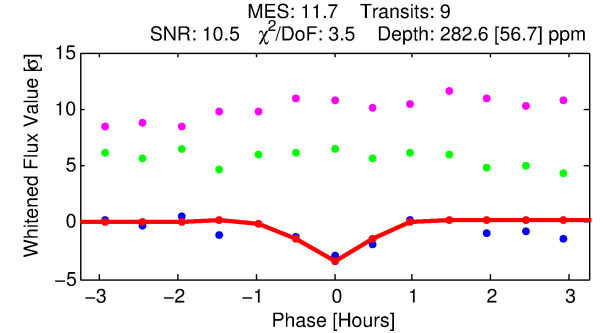
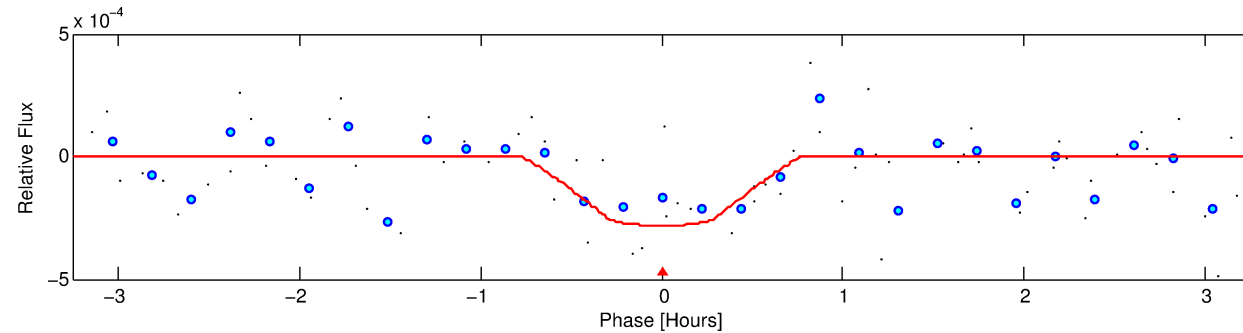
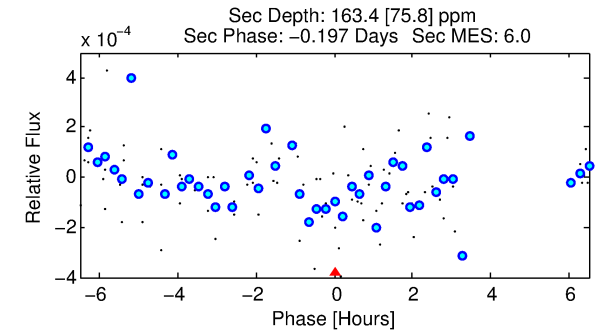
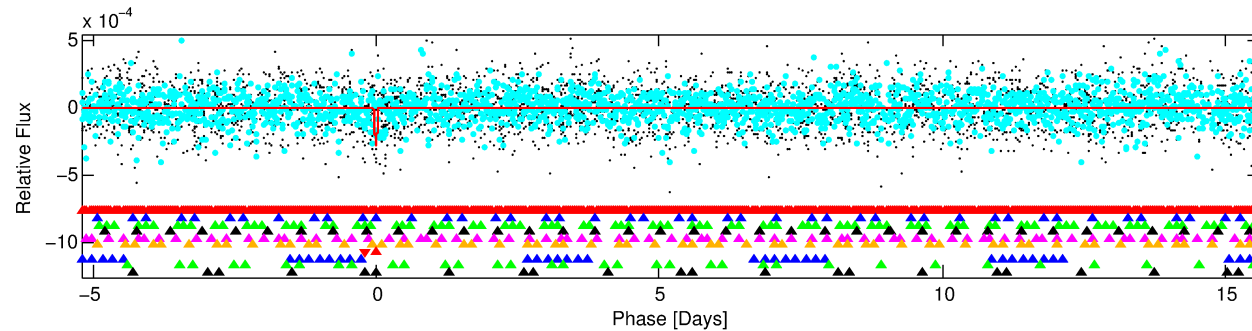
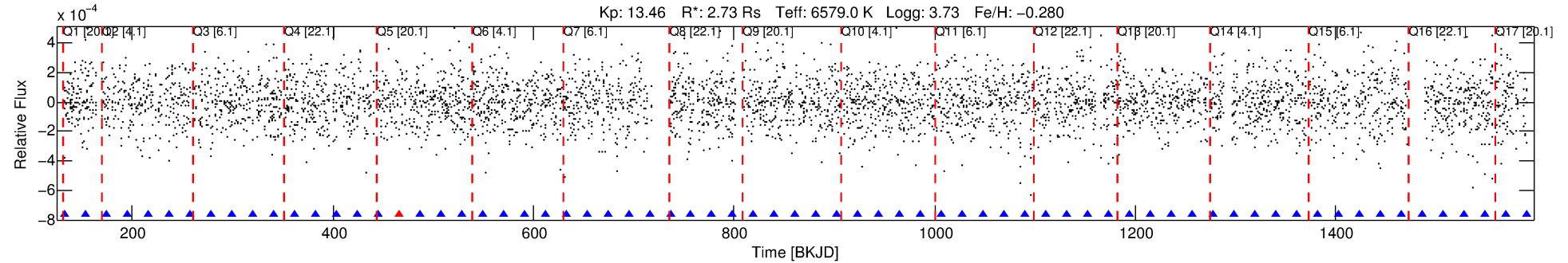
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-07

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 7 of 10 Period: 20.821 d



## DV Fit Results:

Period = 20.82093 [0.00019] d  
Epoch = 132.6480 [0.0078] BKJD  
Rp/R\* = 0.0160 [0.0337]  
a/R\* = 130.61 [1462.70]  
b = 0.49 [17.87]  
Seff = 444.40 [244.92]  
Teq = 1171 [161] K  
Rp = 4.76 [10.18] Re  
a = 0.1675 [0.0573] AU  
Ag = 111.33 [475.80] [0.23σ]  
Teffp = 5880 [6235] K [0.76σ]

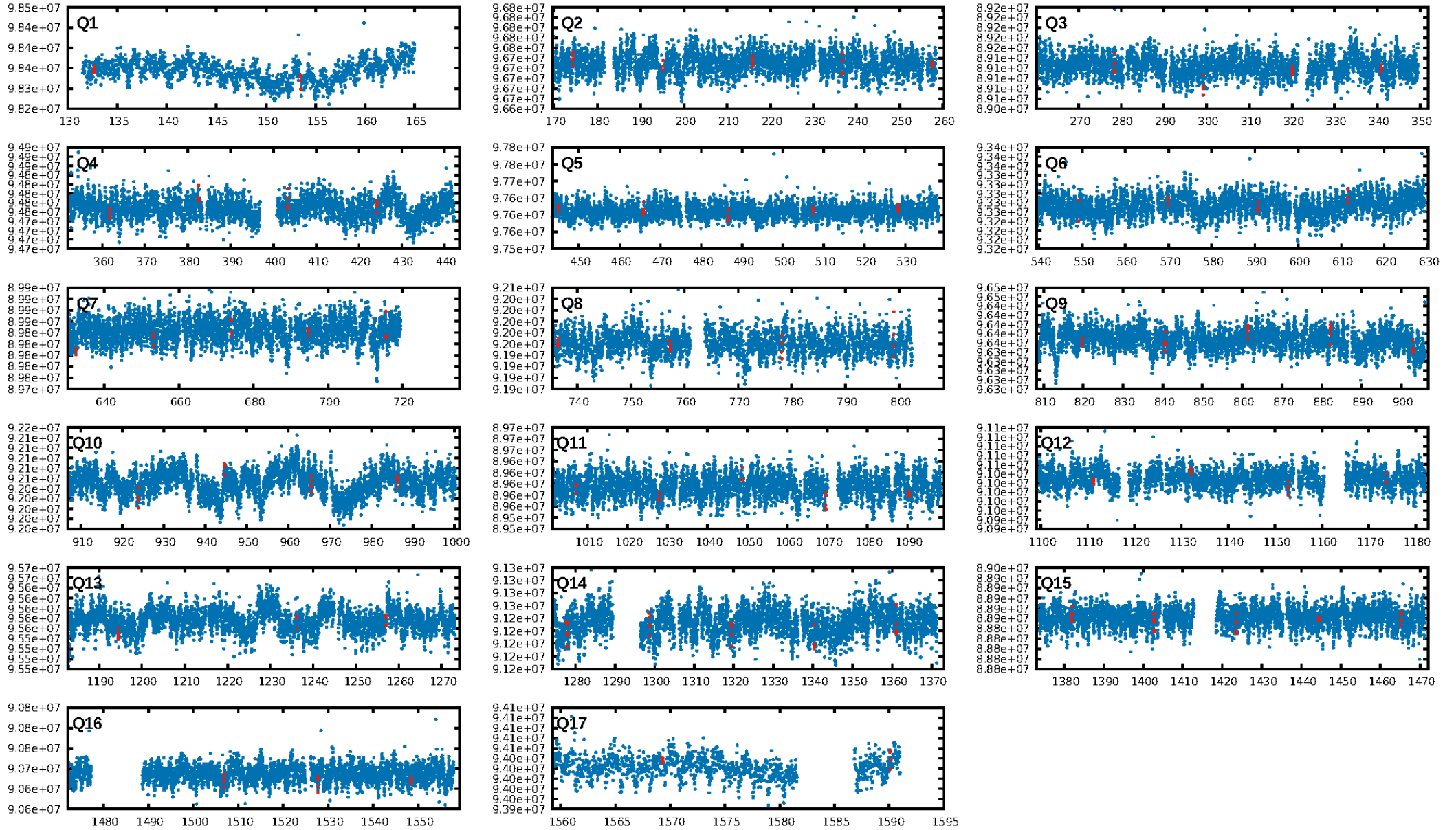
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.08σ]  
LongPeriod-sig: 100.0% [21.80σ]  
ModelChiSquare2-sig: 0.7%  
ModelChiSquareGof-sig: 26.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.89 [8/9]  
GhostDiagnostic-chr: -4.128  
Centroid-sig: 81.7%  
Centroid-so: 0.181 arcsec [0.29σ]  
OotOffset-rm: 0.752 arcsec [0.51σ]  
OotOffset-st: 2/2/2/3 [9]  
KicOffset-rm: 0.746 arcsec [0.48σ]  
KicOffset-st: 2/2/2/3 [9]  
DiffImageQuality-fgm: 0.22 [2/9]  
DiffImageOverlap-fno: 0.82 [14/17]

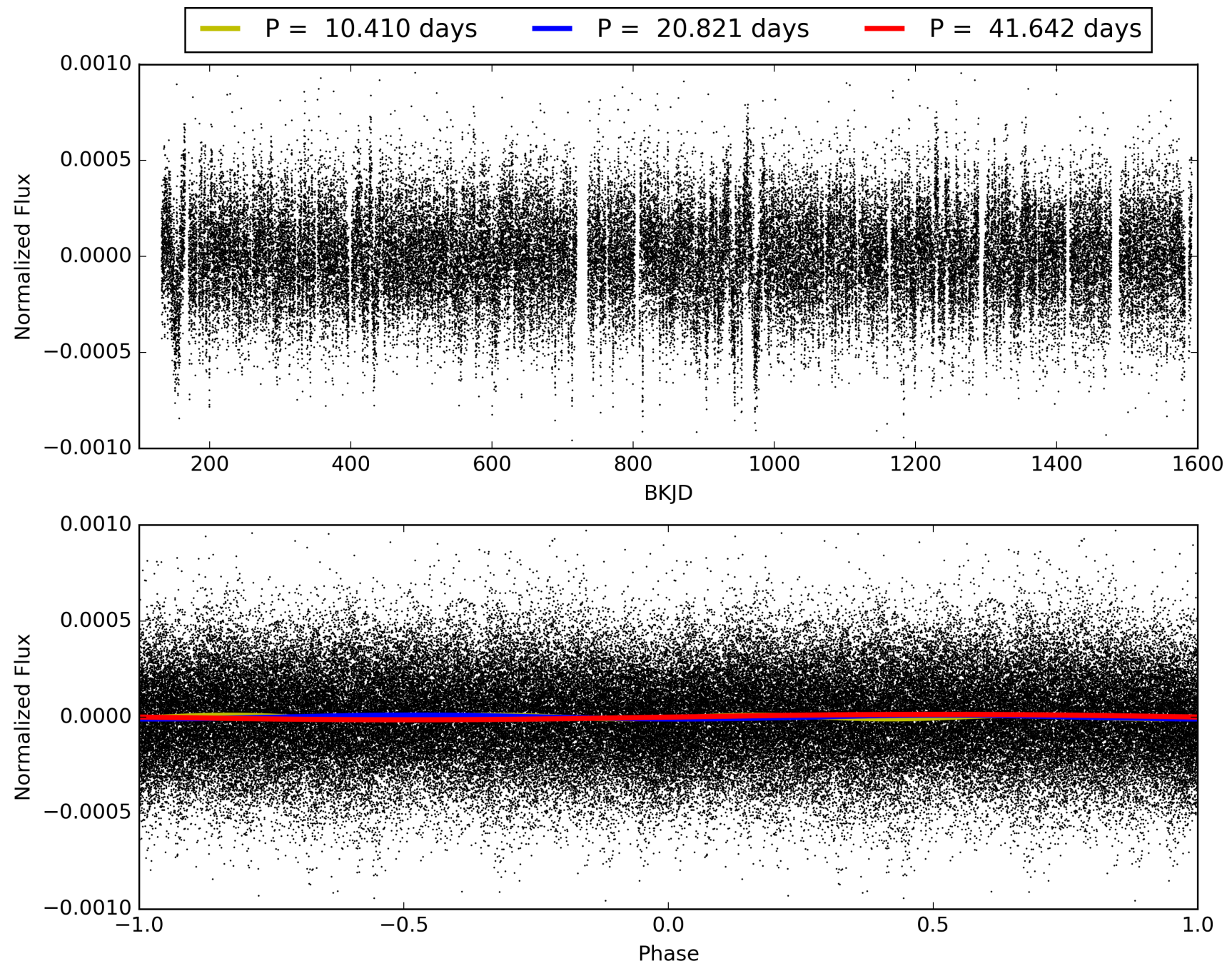
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:46 Z

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

# TCE 006140084-07, PDC Light Curves



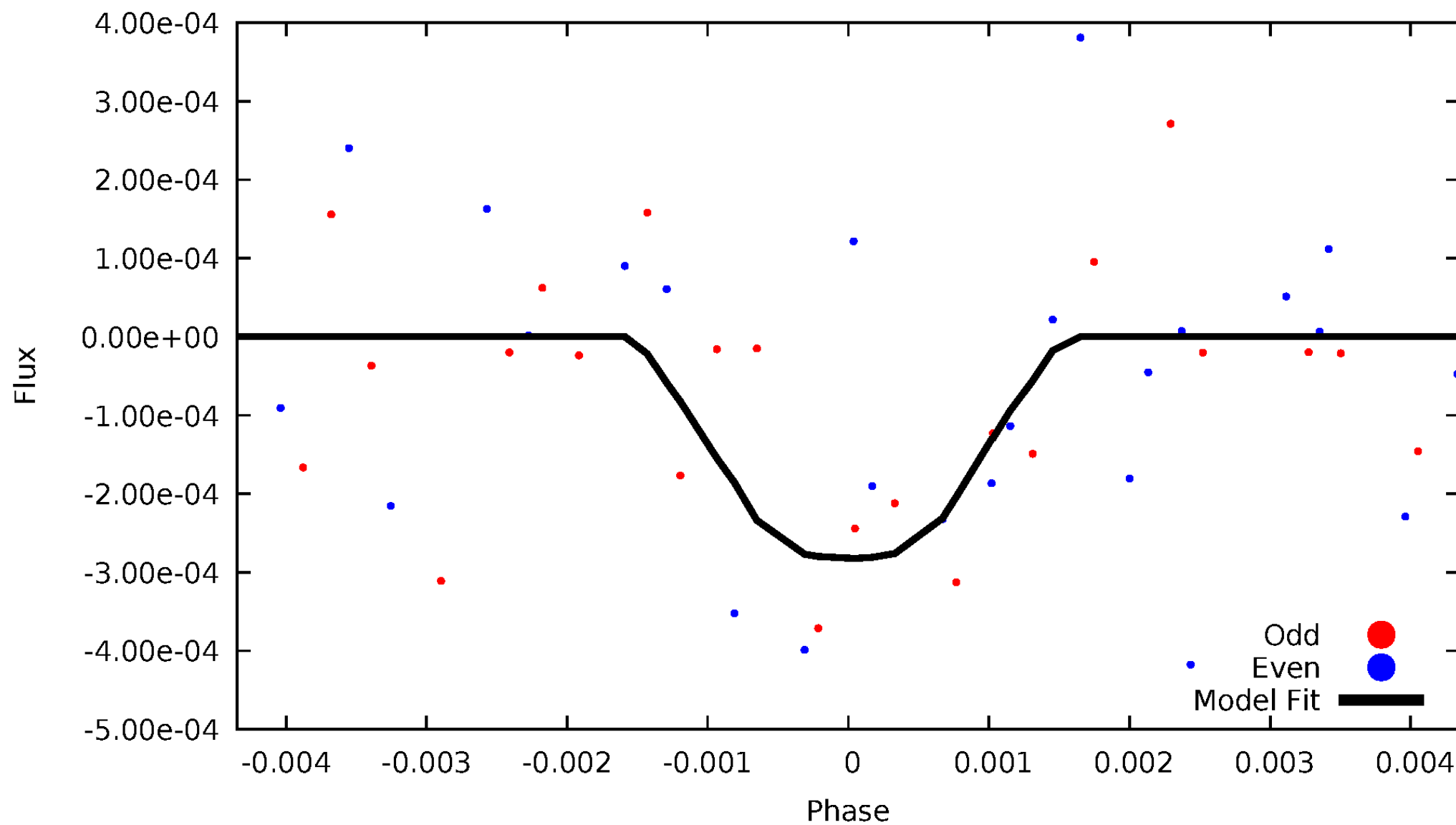
TCE 006140084-07





# DV Odd/Even

TCE 006140084-07





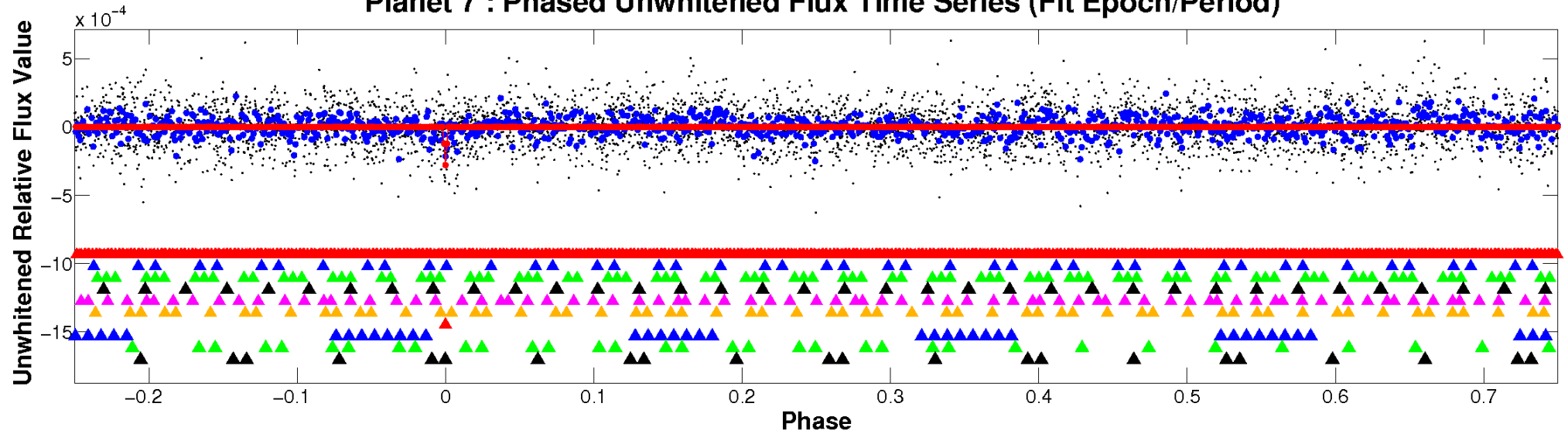


ALT Odd/Even

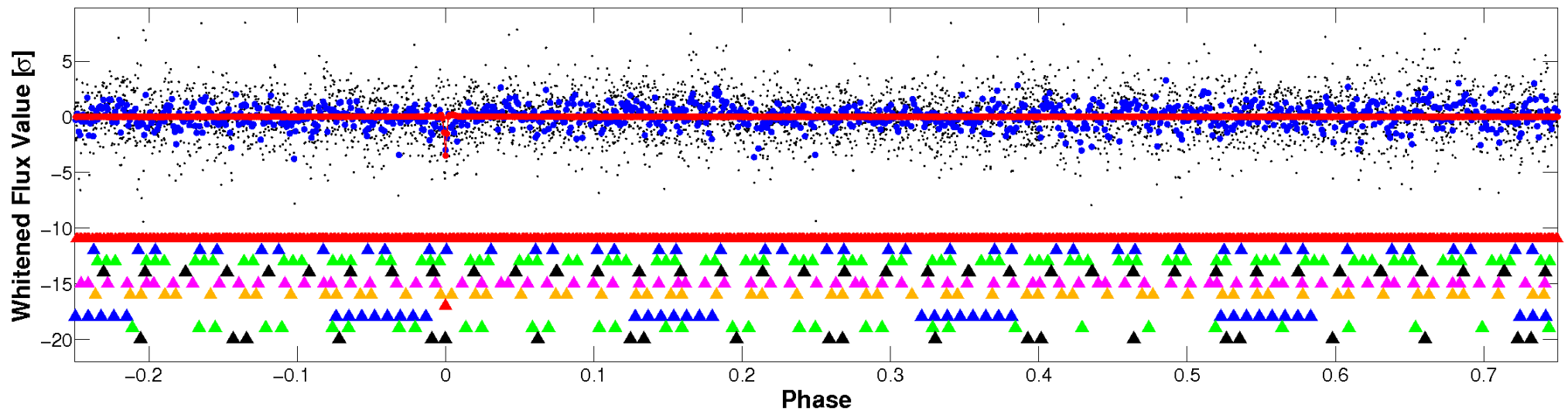
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

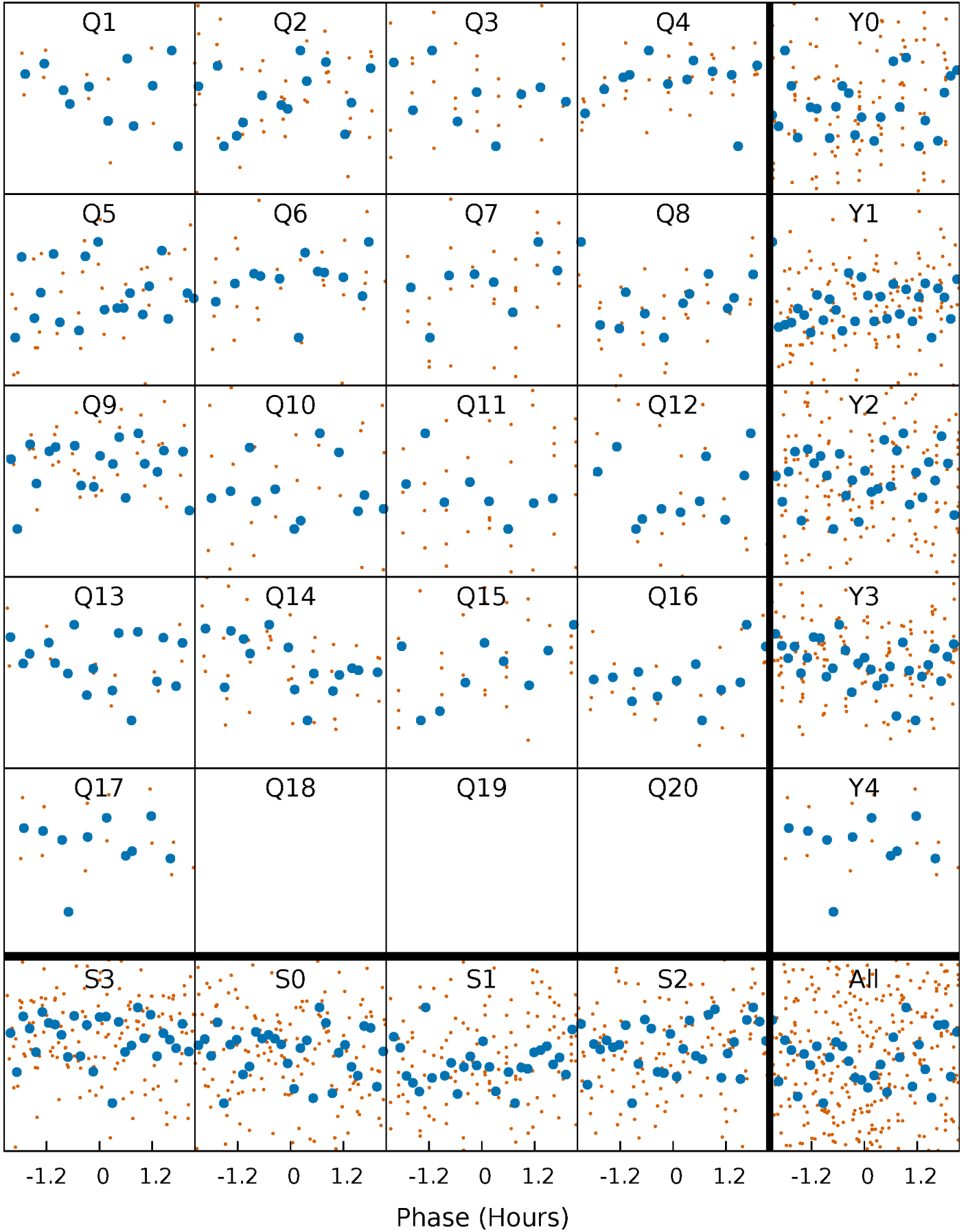


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



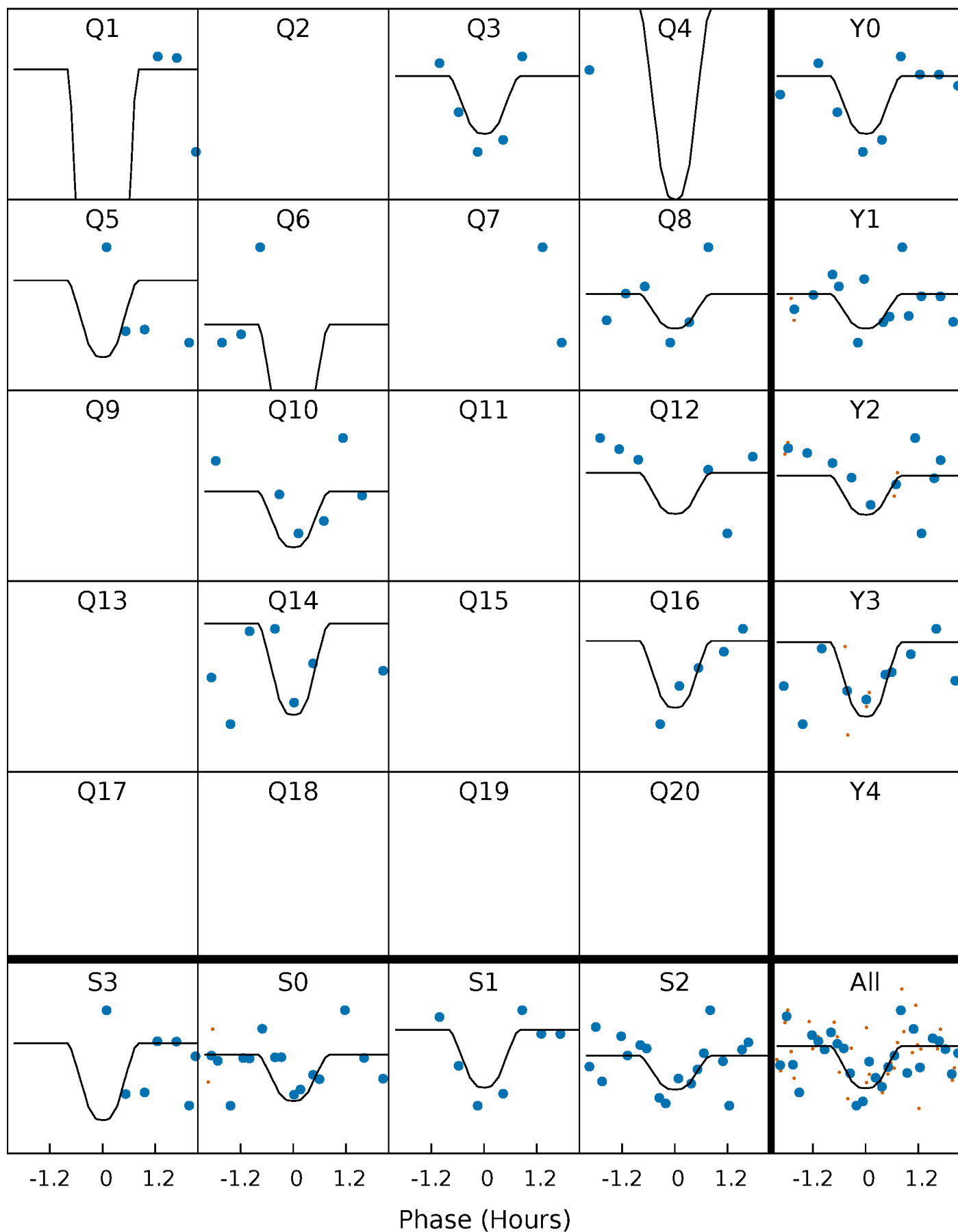
# PDC Quarter-Phased Transit Curves

TCE 006140084-07     $P = 20.820935$  Days     $T_0 = 132.647961$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 006140084-07 P= 20.820935 Days  $T_0=132.647961$  (BKJD)

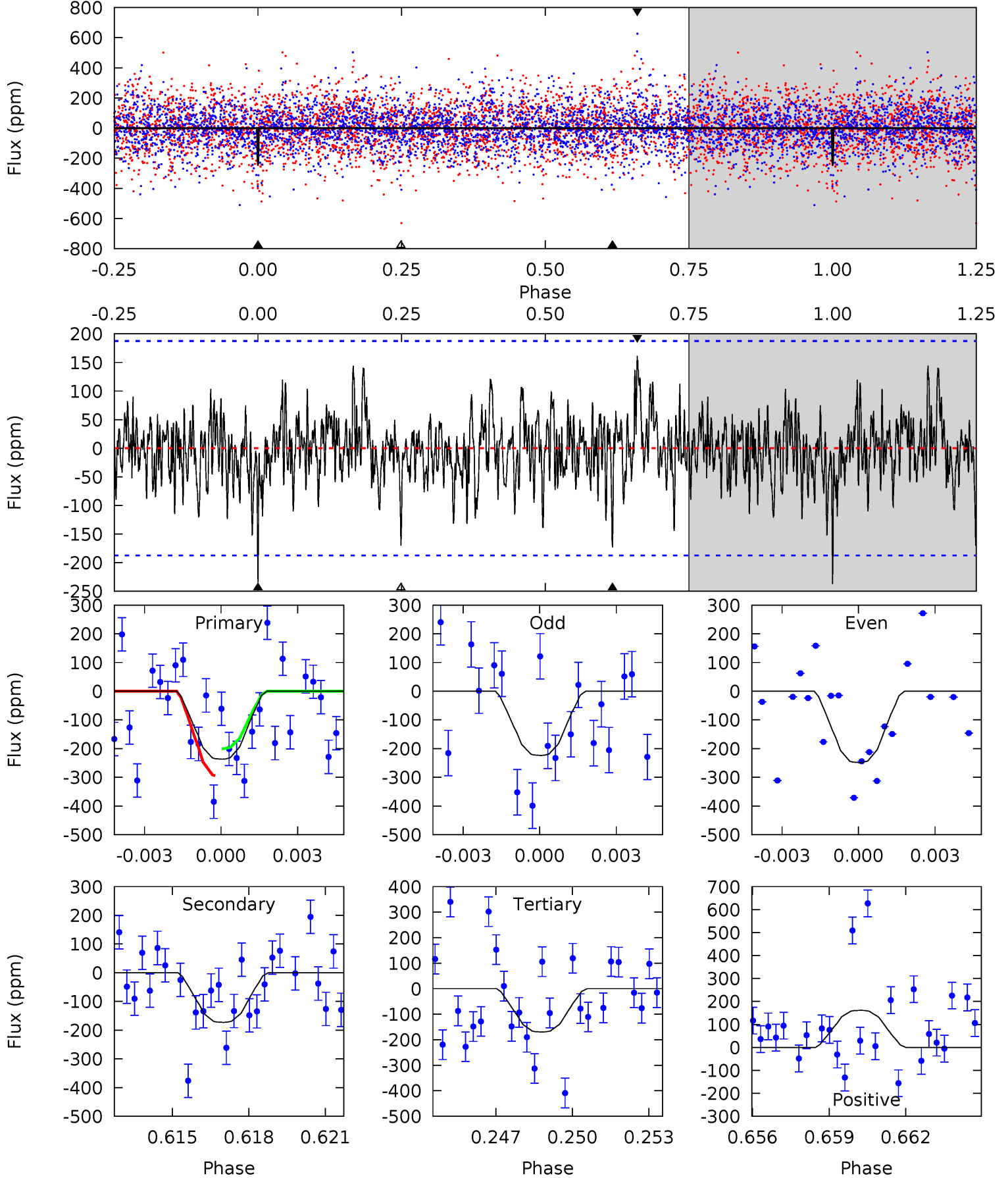


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

006140084-07, P = 20.820935 Days, E = 132.647961 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.66 | 4.86 | 4.77 | 4.54 | 5.27            | 2.99            | 1.34             | 1.89    | 2.12    | 0.09    | 0.32    | 0.35    | 0.91 | 0.41  | 1.29 |



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-07 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$  | $A_{\text{obs}}$  |
|---------|---------------|------------------------|----------------------|-----------------------|-------------------|
| DV      | $-173 \pm 36$ | $8.52^{+8.11}_{-5.57}$ | $1596^{+96}_{-137}$  | $4481^{+2737}_{-960}$ | $38^{+270}_{-28}$ |
| Alt.    | N/A           | N/A                    | N/A                  | N/A                   | N/A               |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

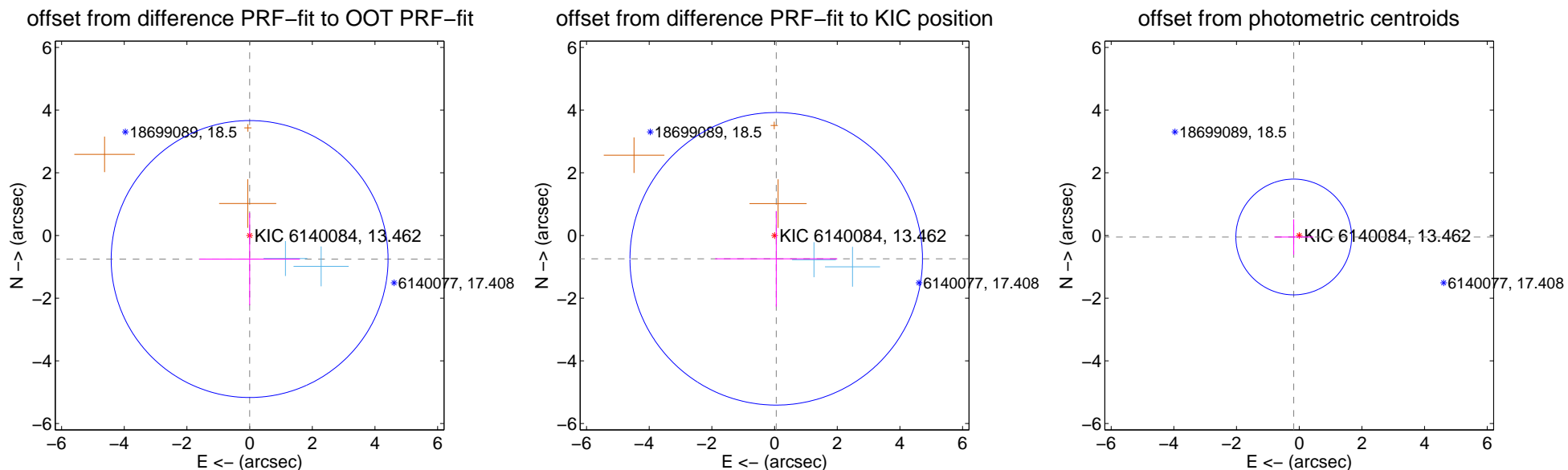
## DV Centroid Data

Supplemental centroid analysis for 006140084-07. Kepler magnitude: 13.46. Transit SNR 10.47

There are 2 quarters with good PRF difference image offsets

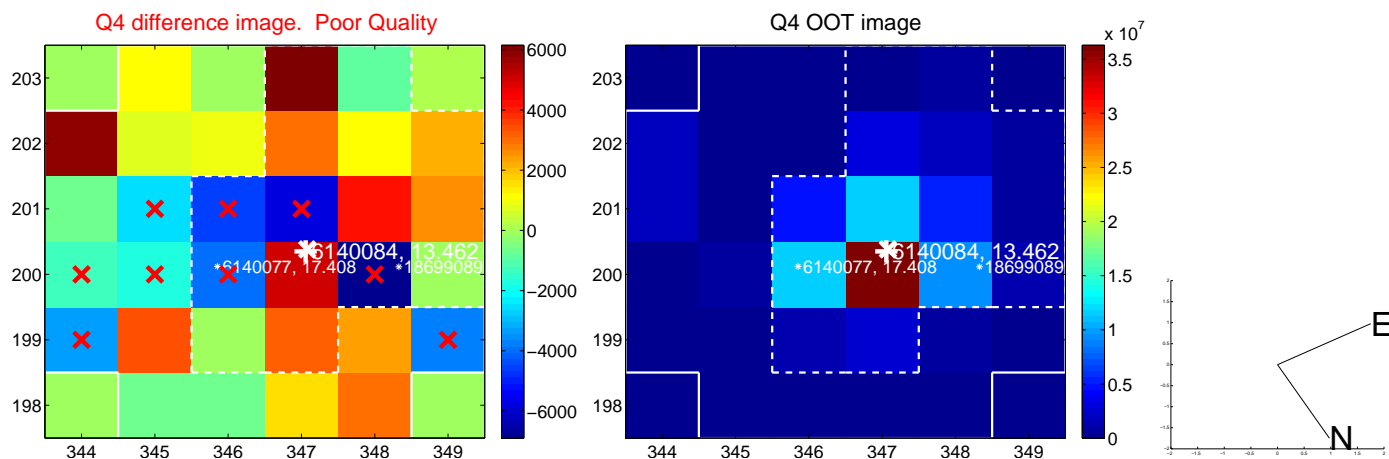
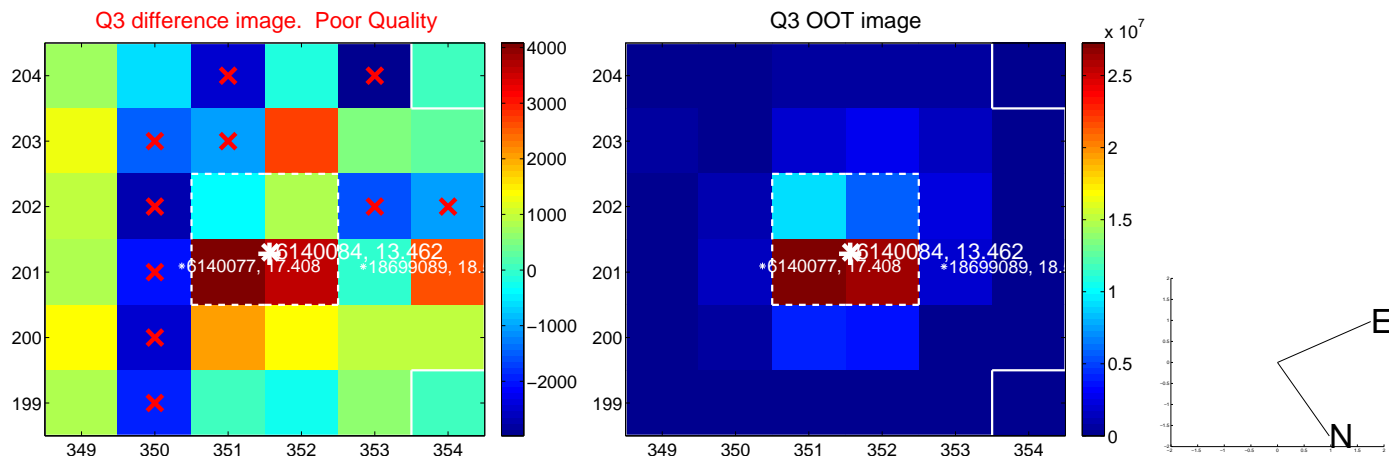
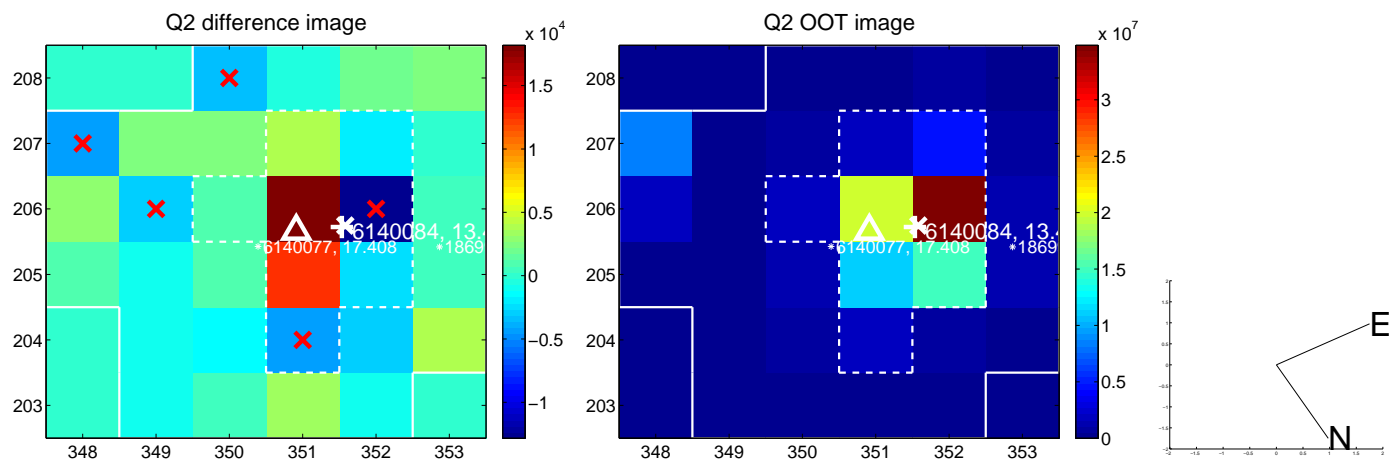
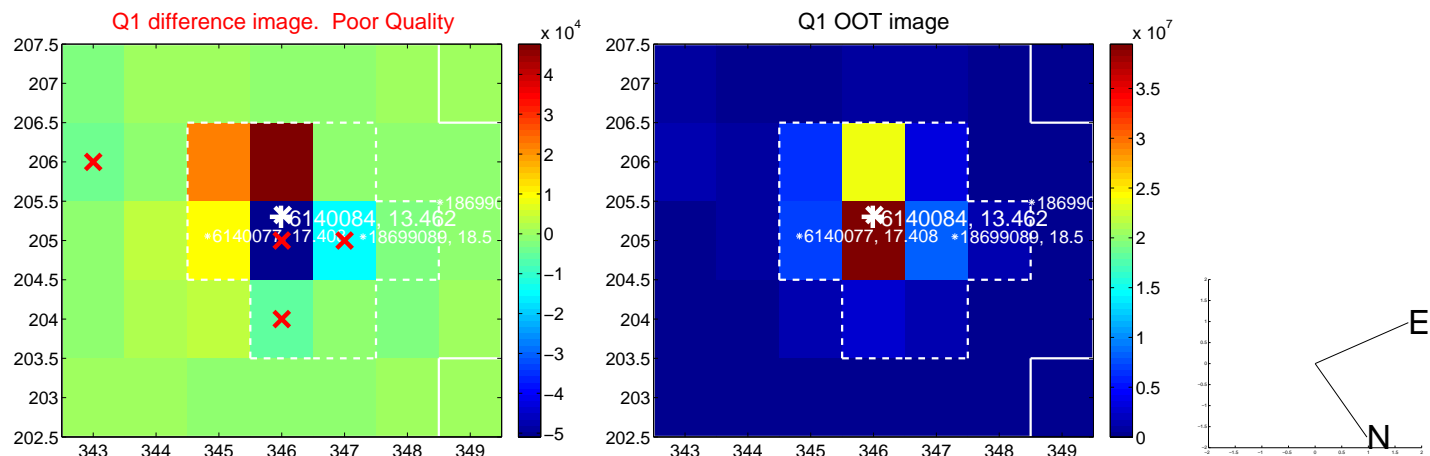
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec       |
|---|--------------------|---------------------|--------------------|--------------------|
| PRF-fit source offset from OOT          | $0.752 \pm 1.473$  | 0.51                | $-0.000 \pm 1.604$ | $-0.752 \pm 1.473$ |
| PRF-fit source offset from KIC position | $0.746 \pm 1.556$  | 0.48                | $-0.053 \pm 1.948$ | $-0.744 \pm 1.528$ |
| photometric centroid source offset      | $0.18 \pm 0.62$    | 0.29                | $0.17 \pm 0.62$    | $-0.05 \pm 0.56$   |

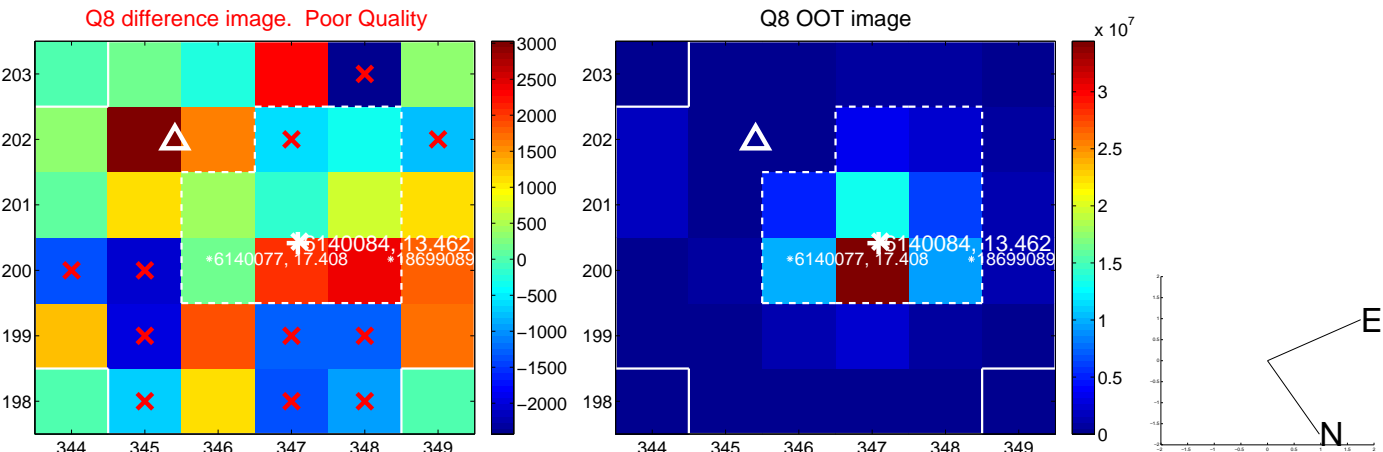
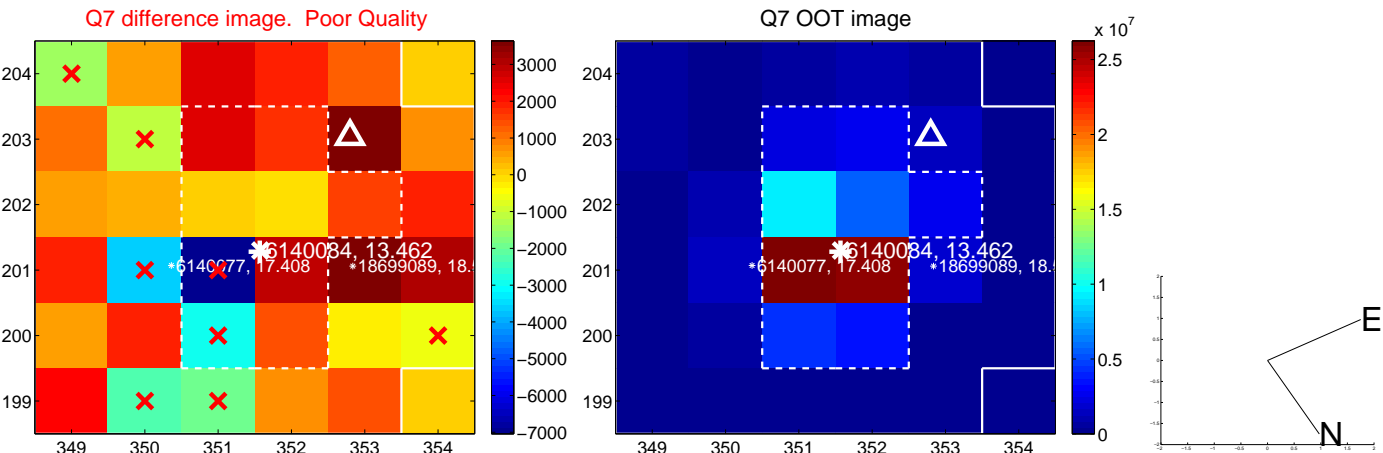
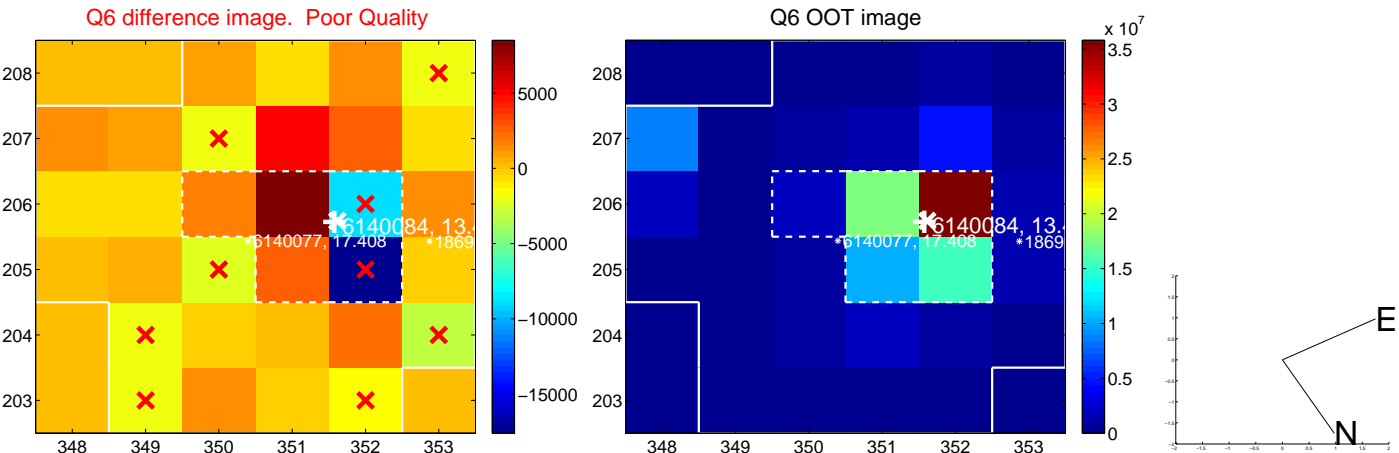
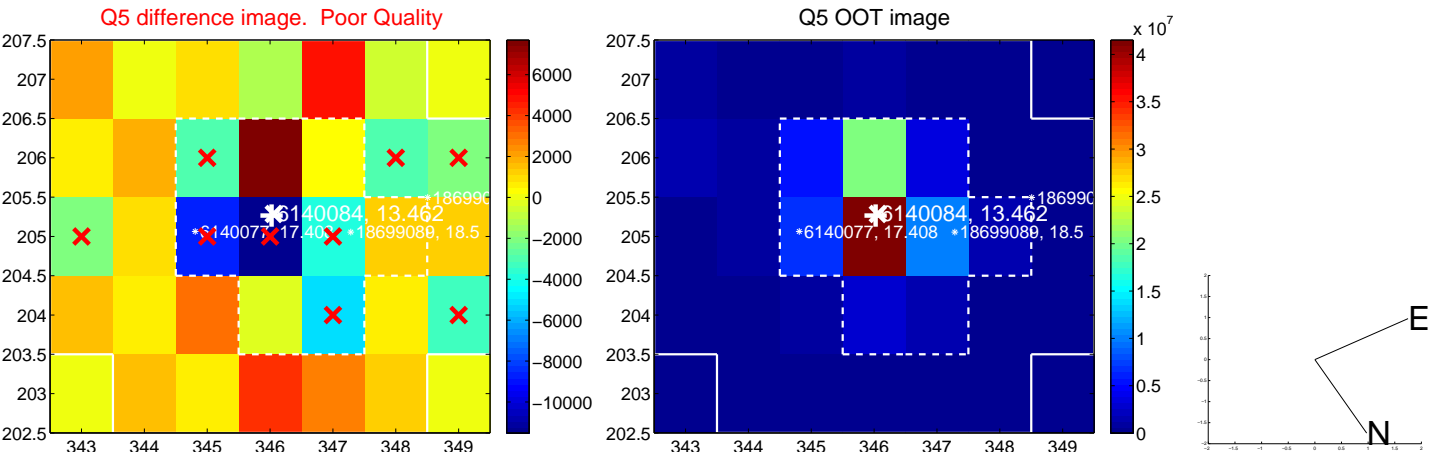


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

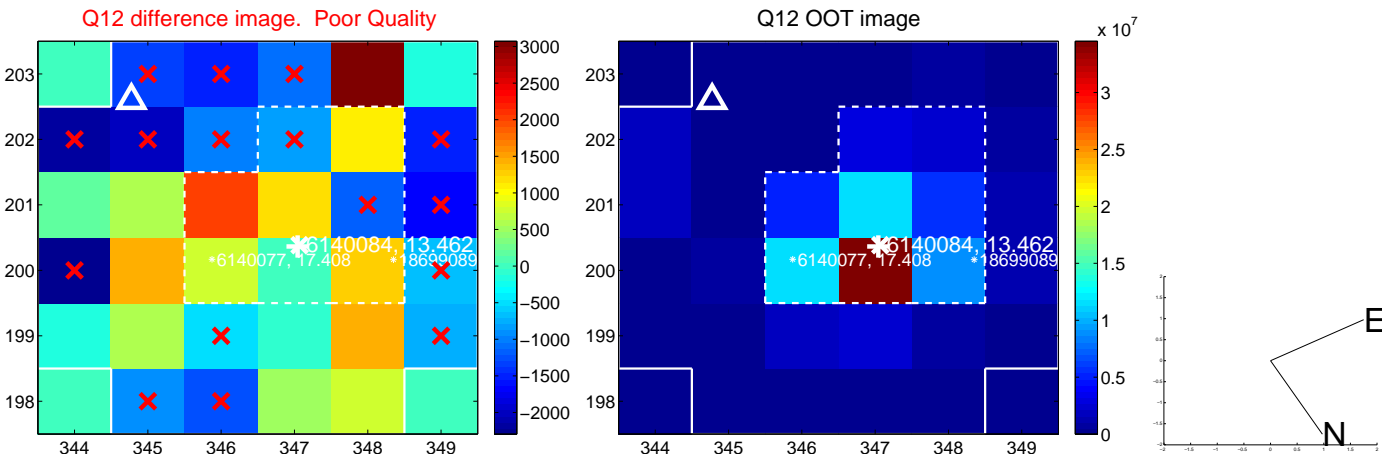
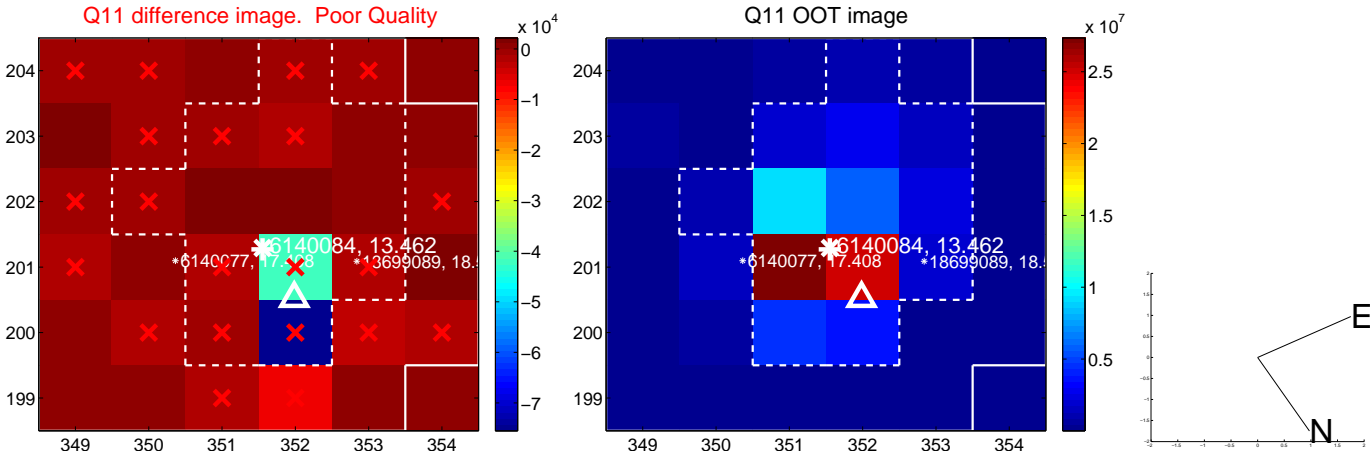
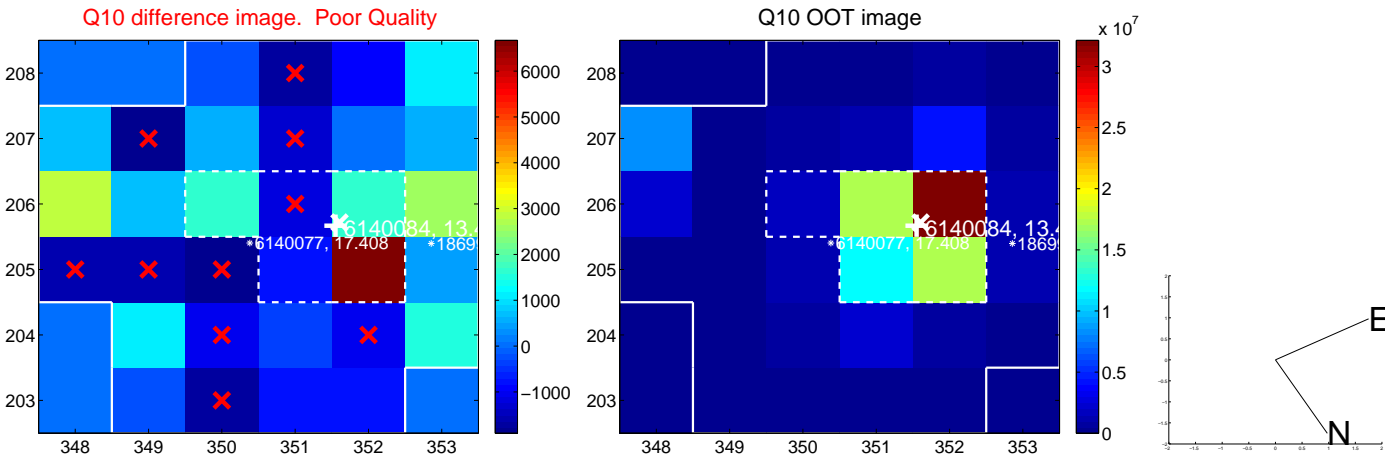
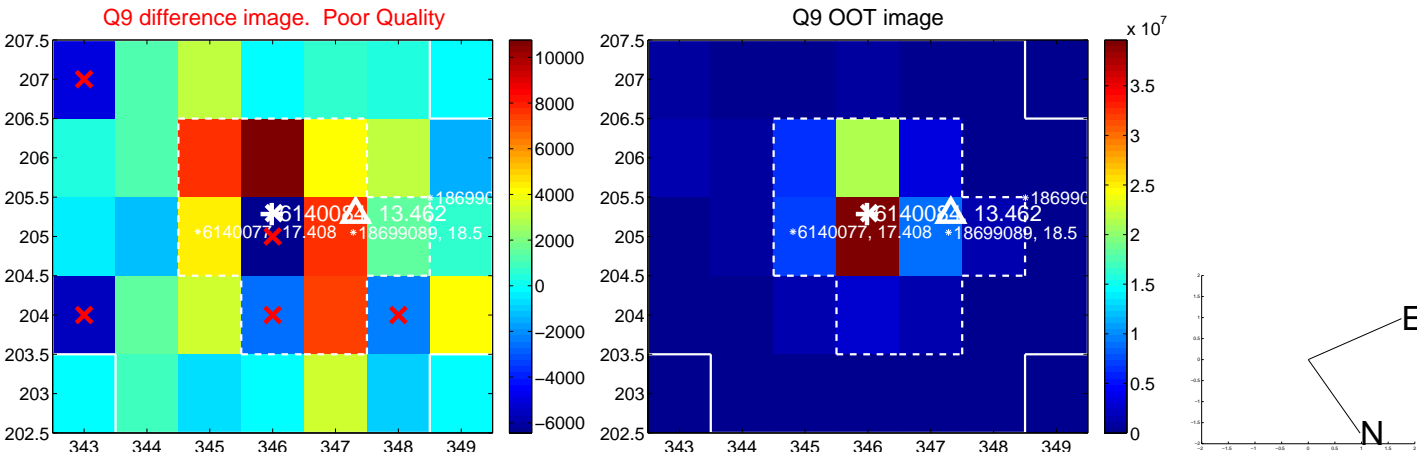
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



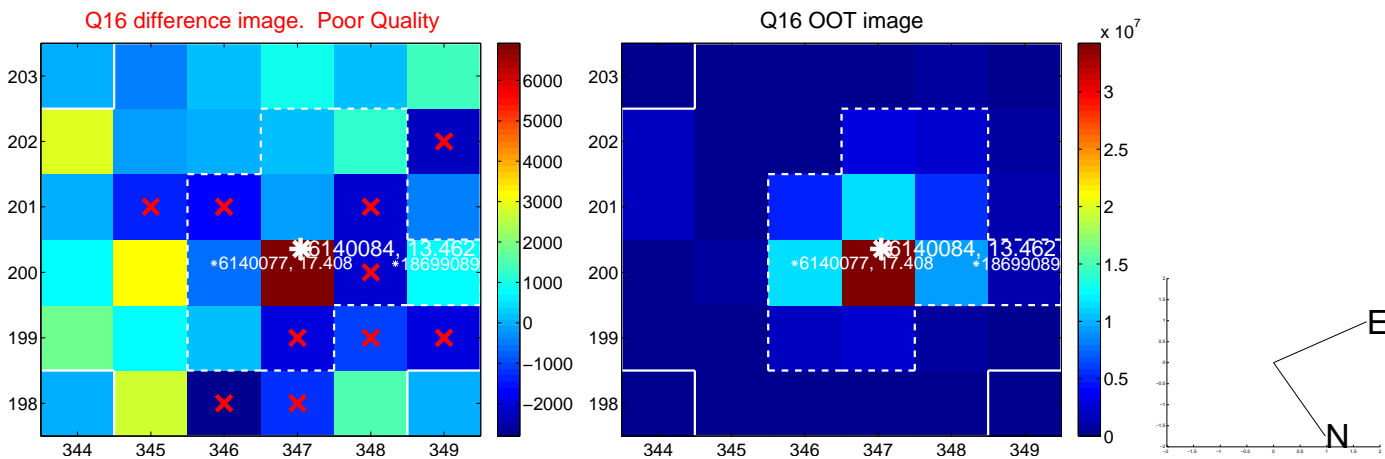
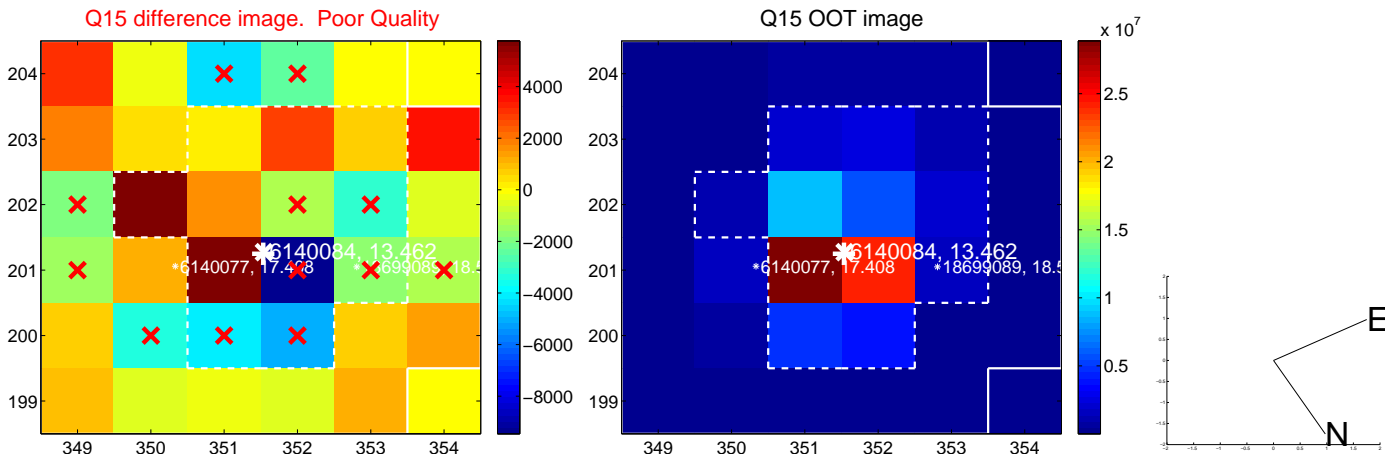
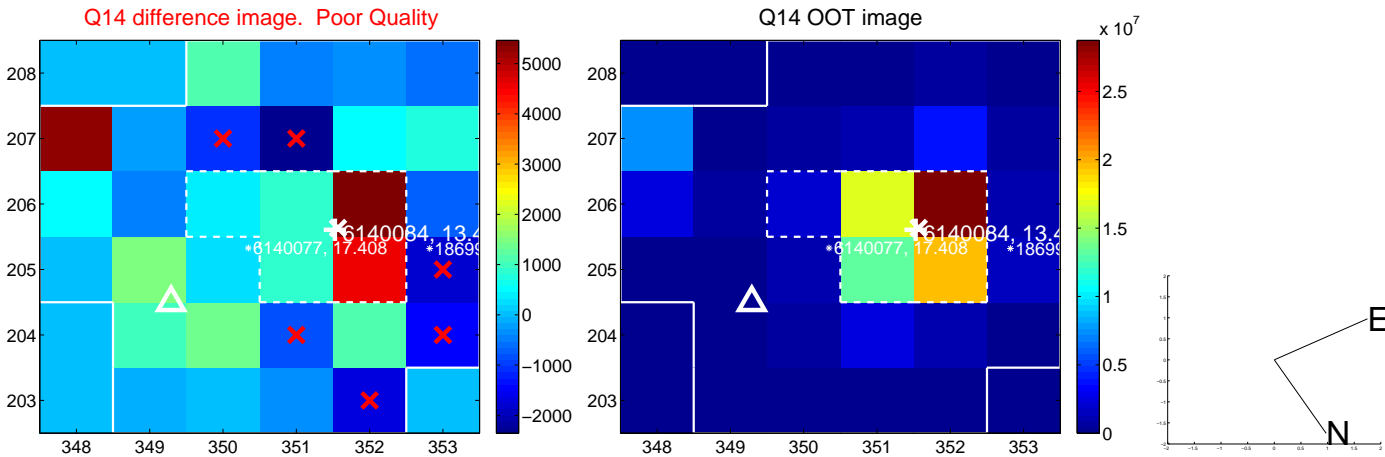
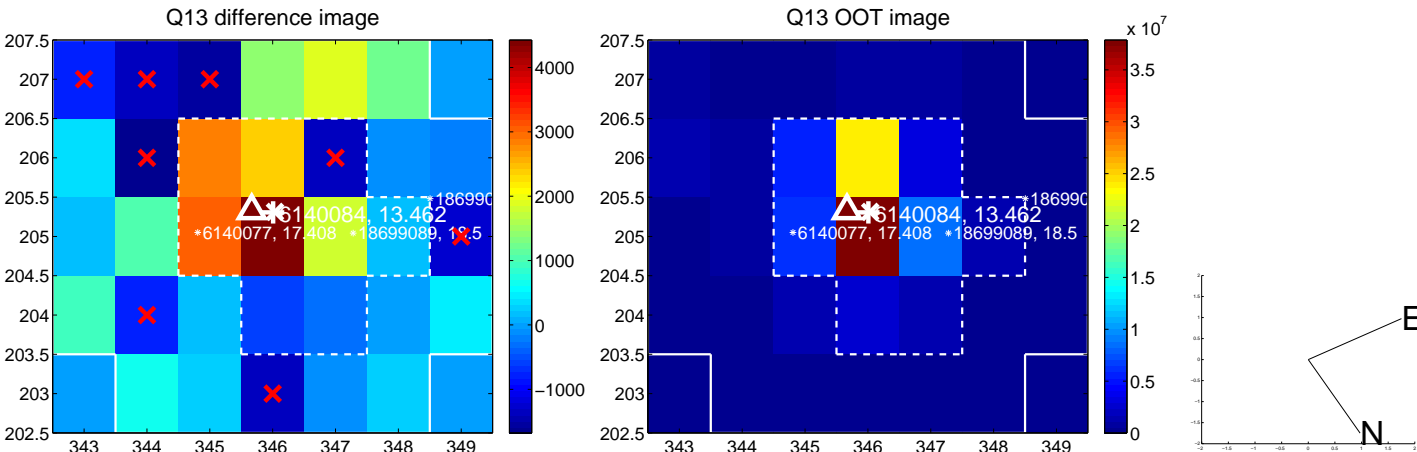
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

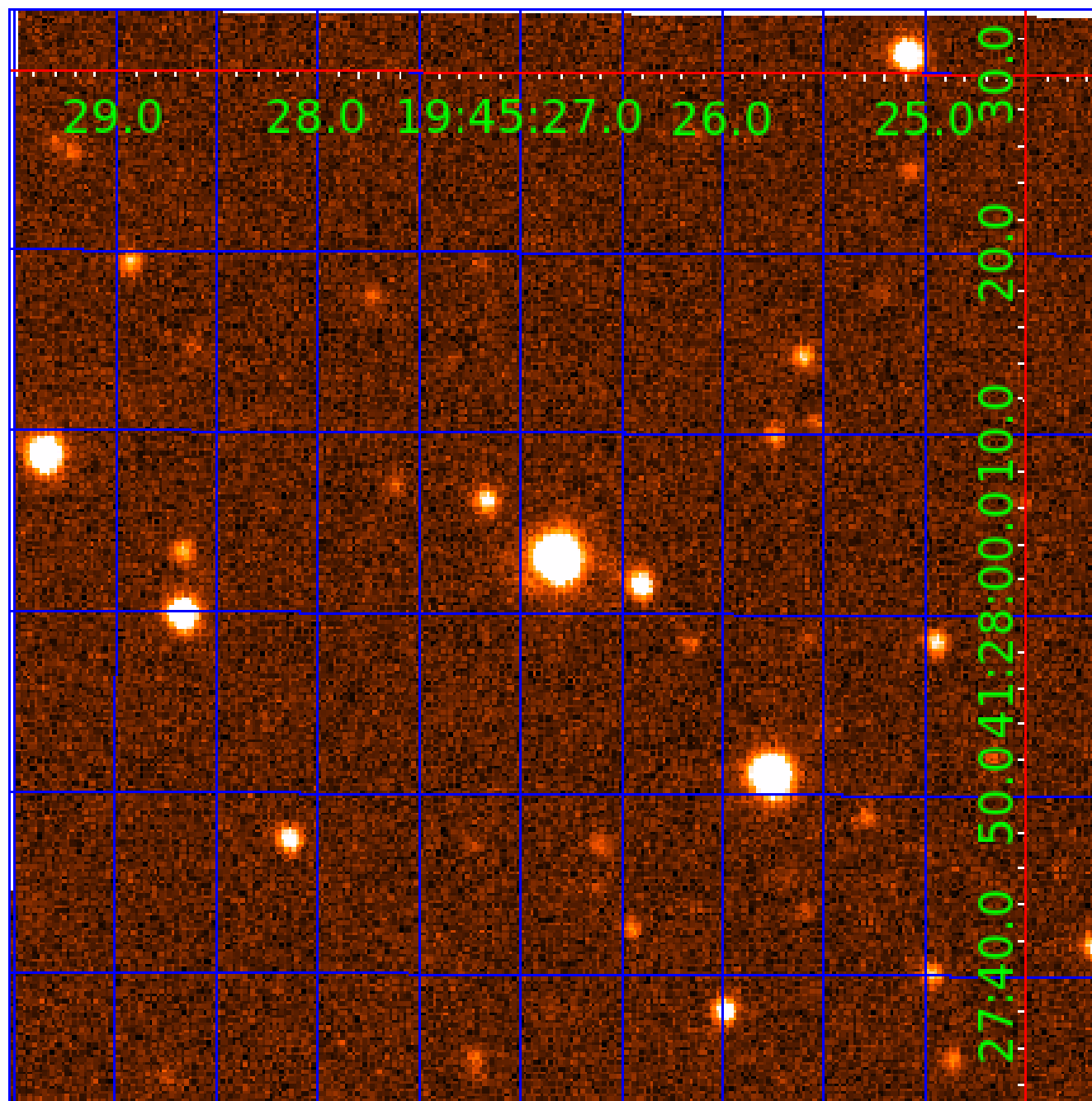






UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

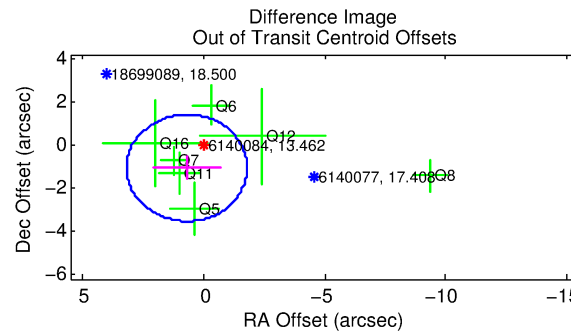
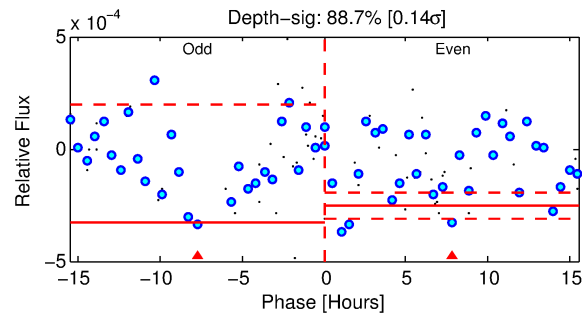
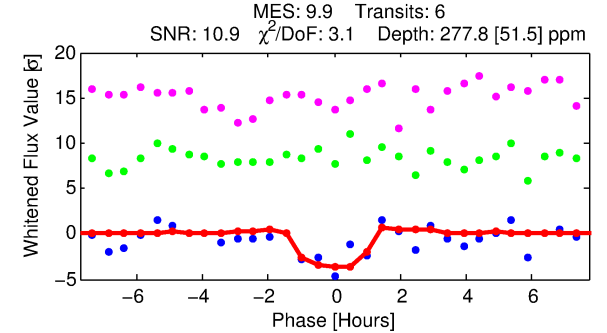
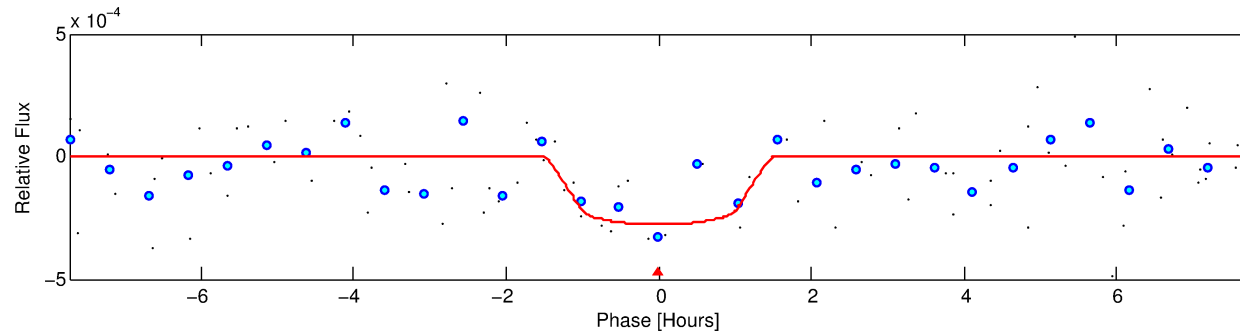
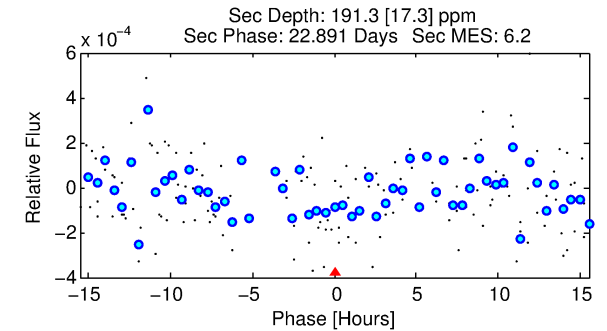
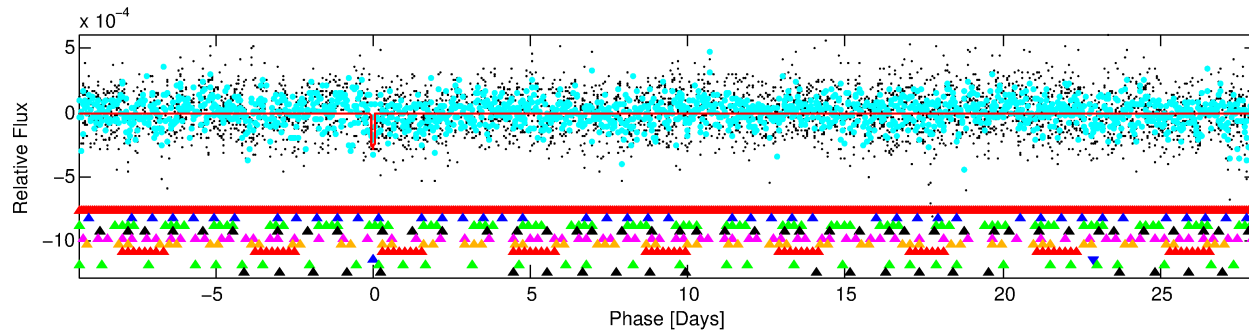
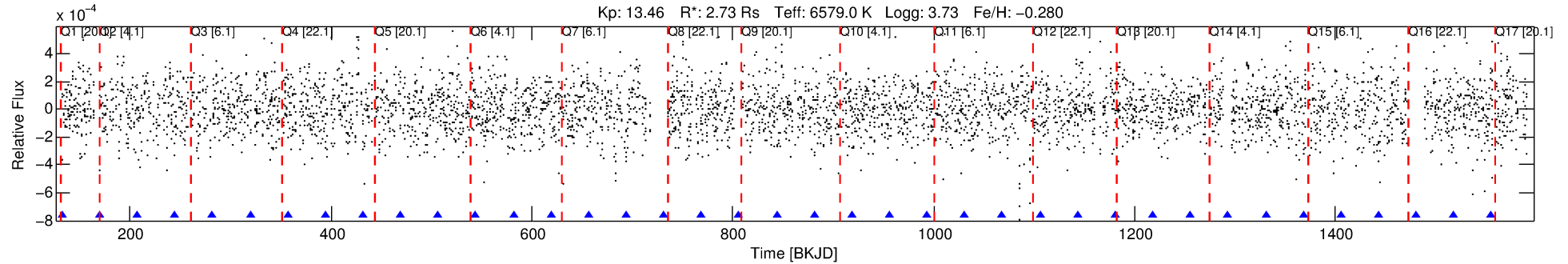
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-08

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 8 of 10 Period: 37.442 d



## DV Fit Results:

Period = 37.44168 [0.00046] d  
Epoch = 132.3727 [0.0122] BKJD  
Rp/R\* = 0.0162 [0.0213]  
a/R\* = 85.95 [623.62]  
b = 0.66 [6.31]  
Seff = 203.22 [112.00]  
Teq = 963 [133] K  
Rp = 4.82 [6.59] Re  
a = 0.2477 [0.0848] AU  
Ag = 277.61 [746.51] [0.37σ]  
Teffp = 6076 [4006] K [1.28σ]

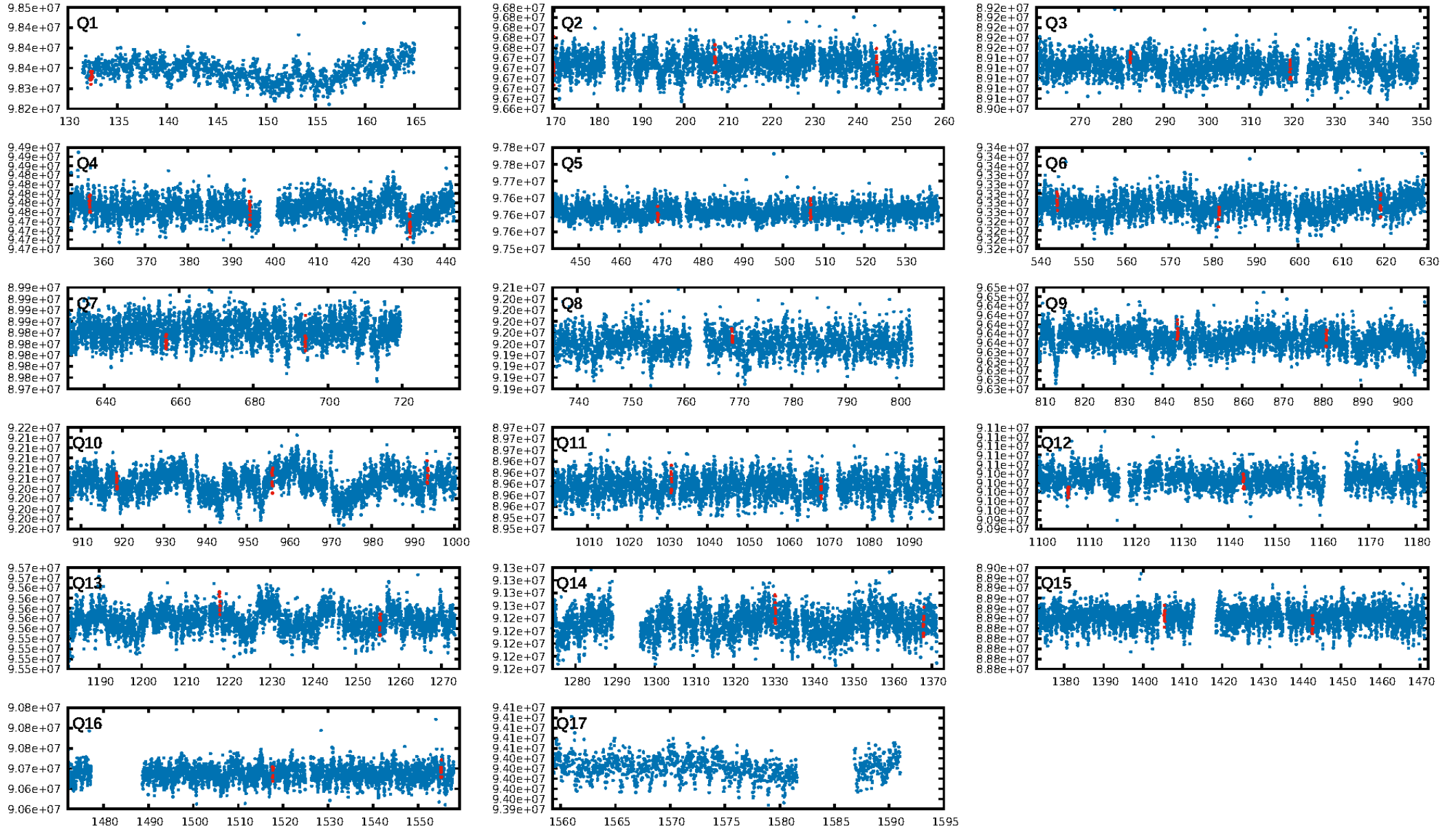
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [19.76σ]  
LongPeriod-sig: 100.0% [41.80σ]  
ModelChiSquare2-sig: 27.8%  
ModelChiSquareGof-sig: 98.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: -3.312  
Centroid-sig: 5.0%  
Centroid-so: 0.821 arcsec [1.45σ]  
OotOffset-rm: 1.266 arcsec [1.52σ]  
KicOffset-rm: 1.161 arcsec [1.52σ]  
OotOffset-st: 1/2/3/1 [7]  
KicOffset-st: 1/2/3/1 [7]  
DiffImageQuality-fgm: 0.29 [2/7]  
DiffImageOverlap-fno: 0.44 [7/16]

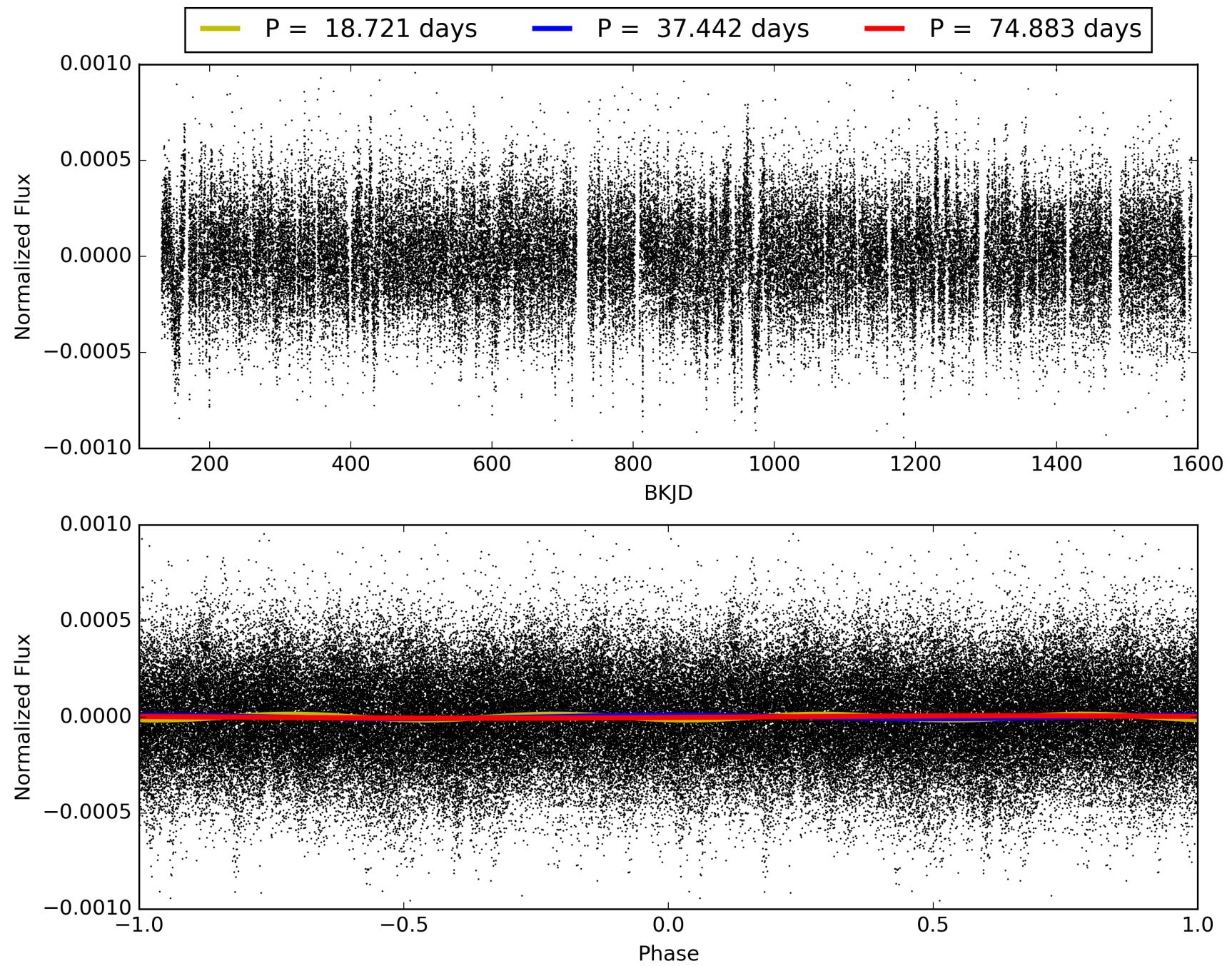
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:49 Z

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

# TCE 006140084-08, PDC Light Curves



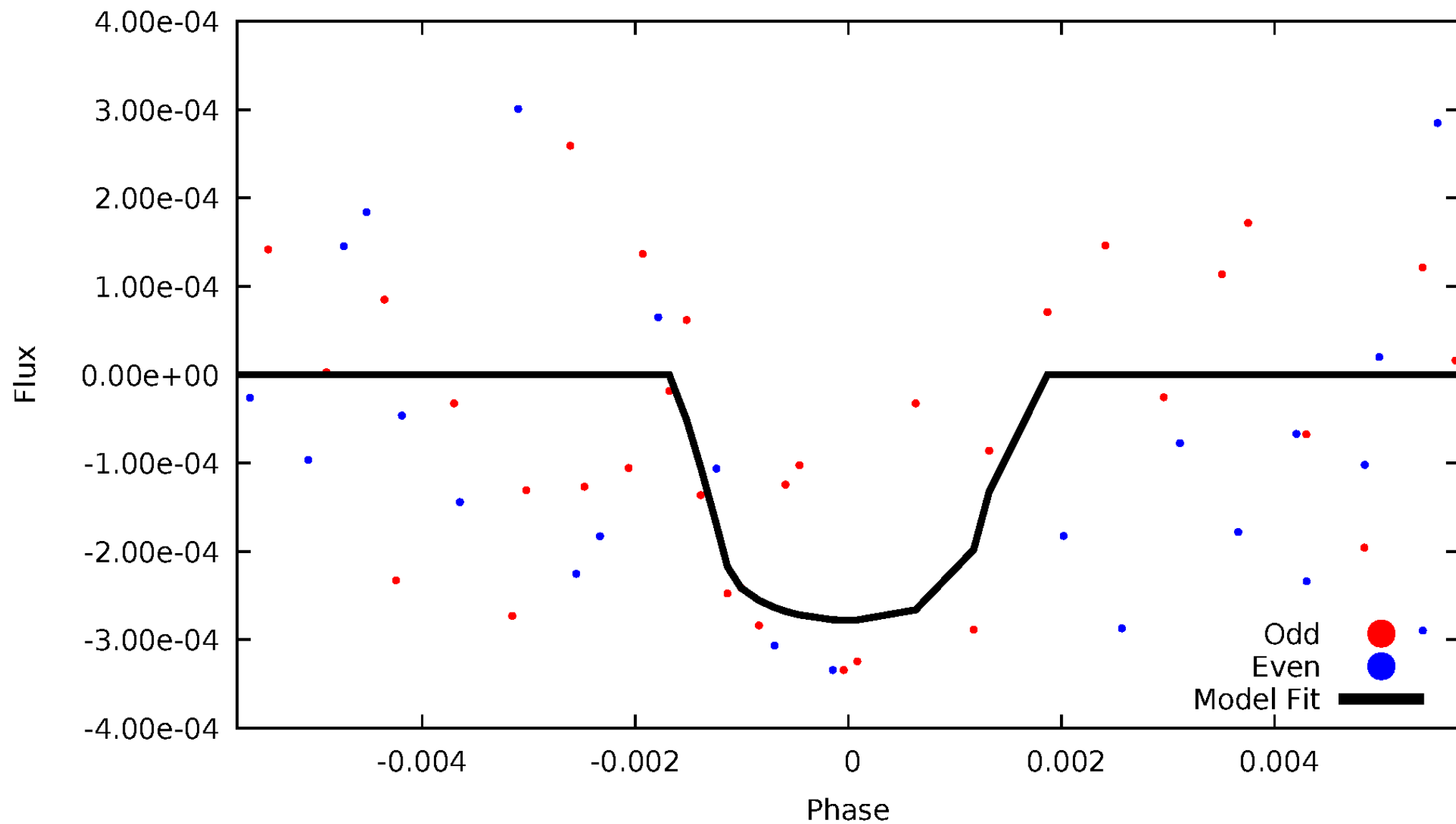
TCE 006140084-08





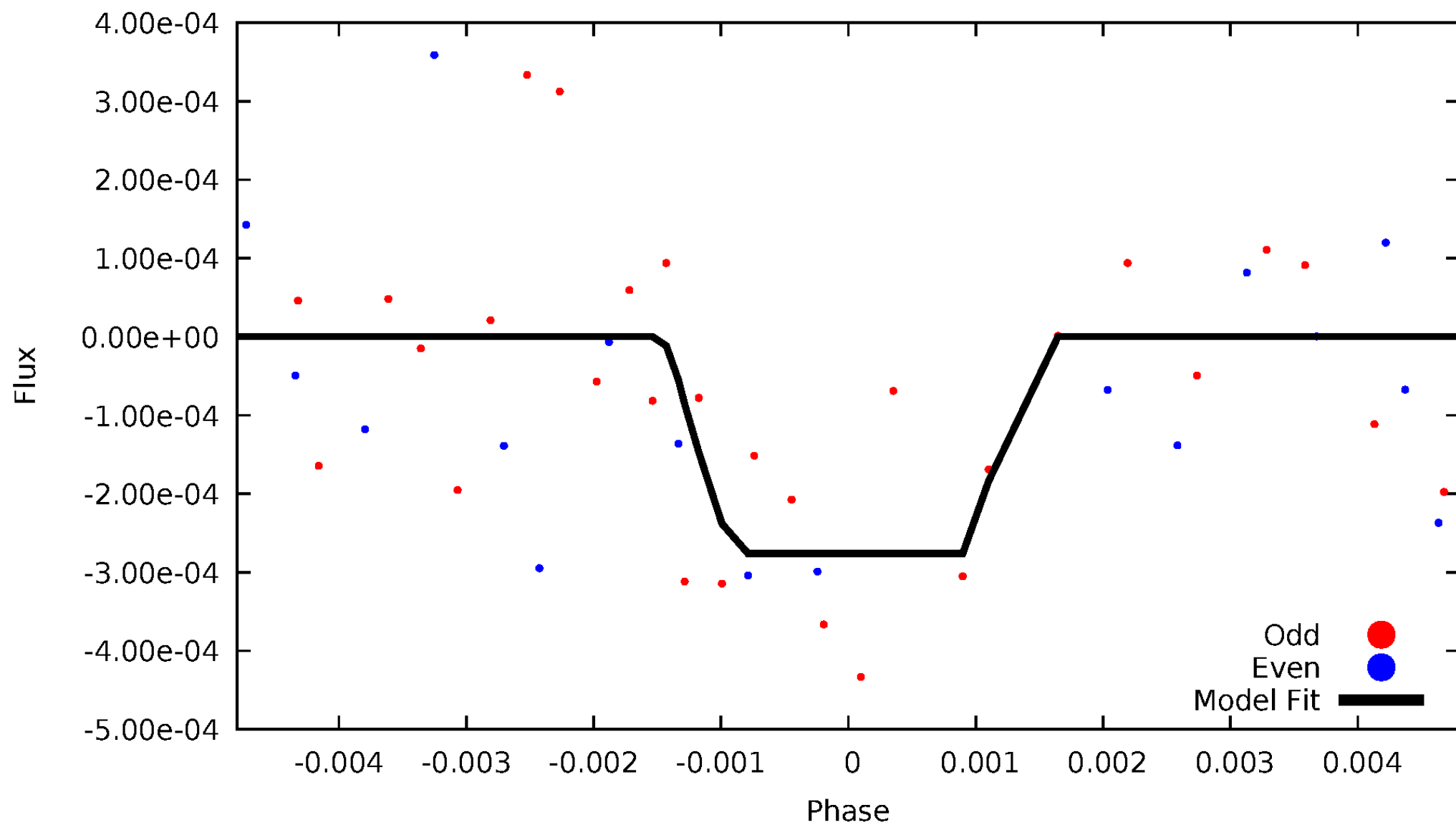
# DV Odd/Even

TCE 006140084-08



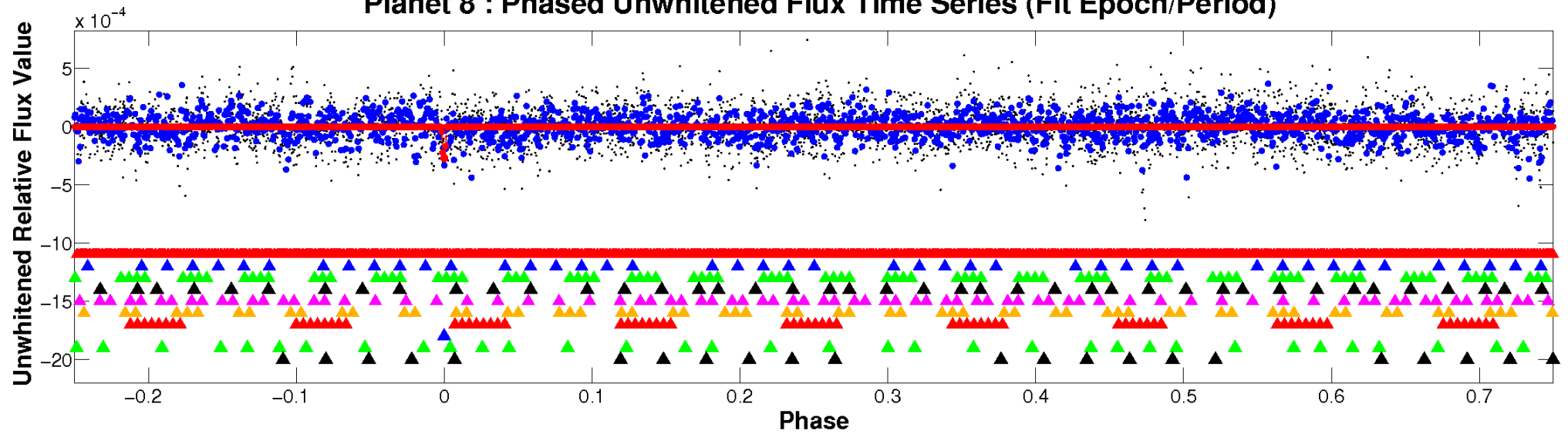
# ALT Odd/Even

TCE 006140084-08

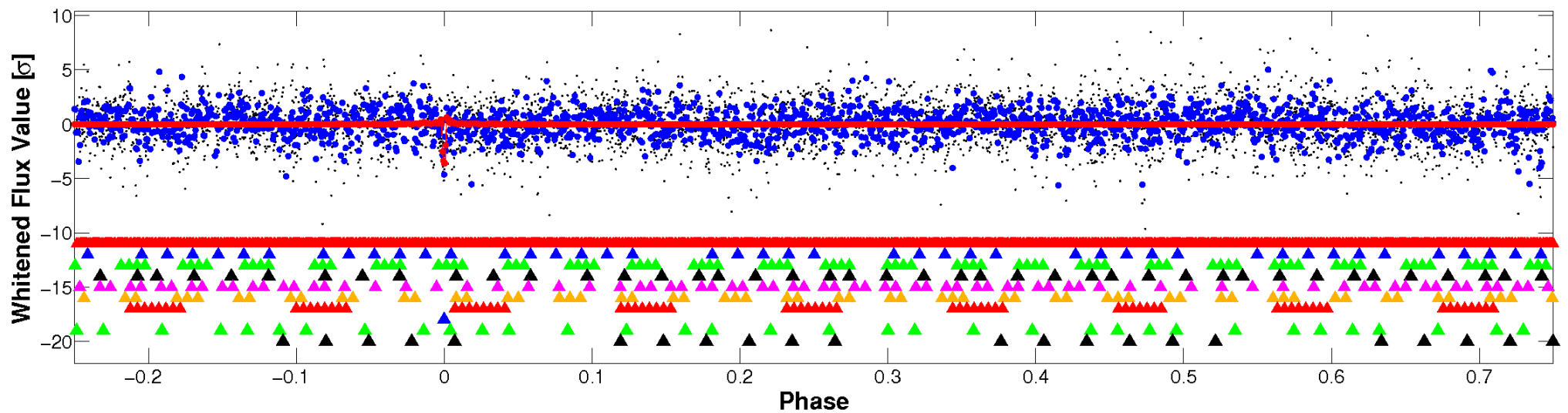


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



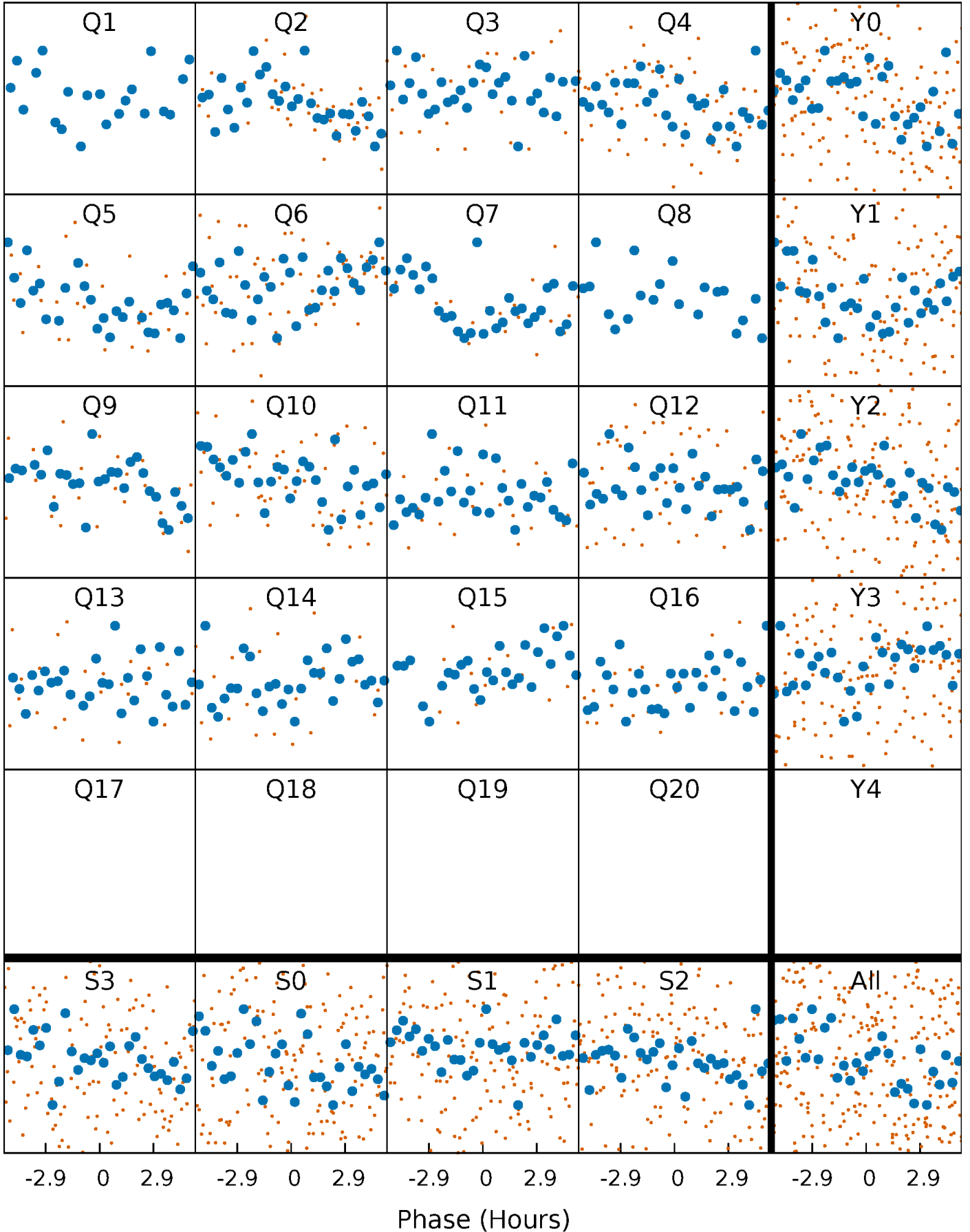
## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)





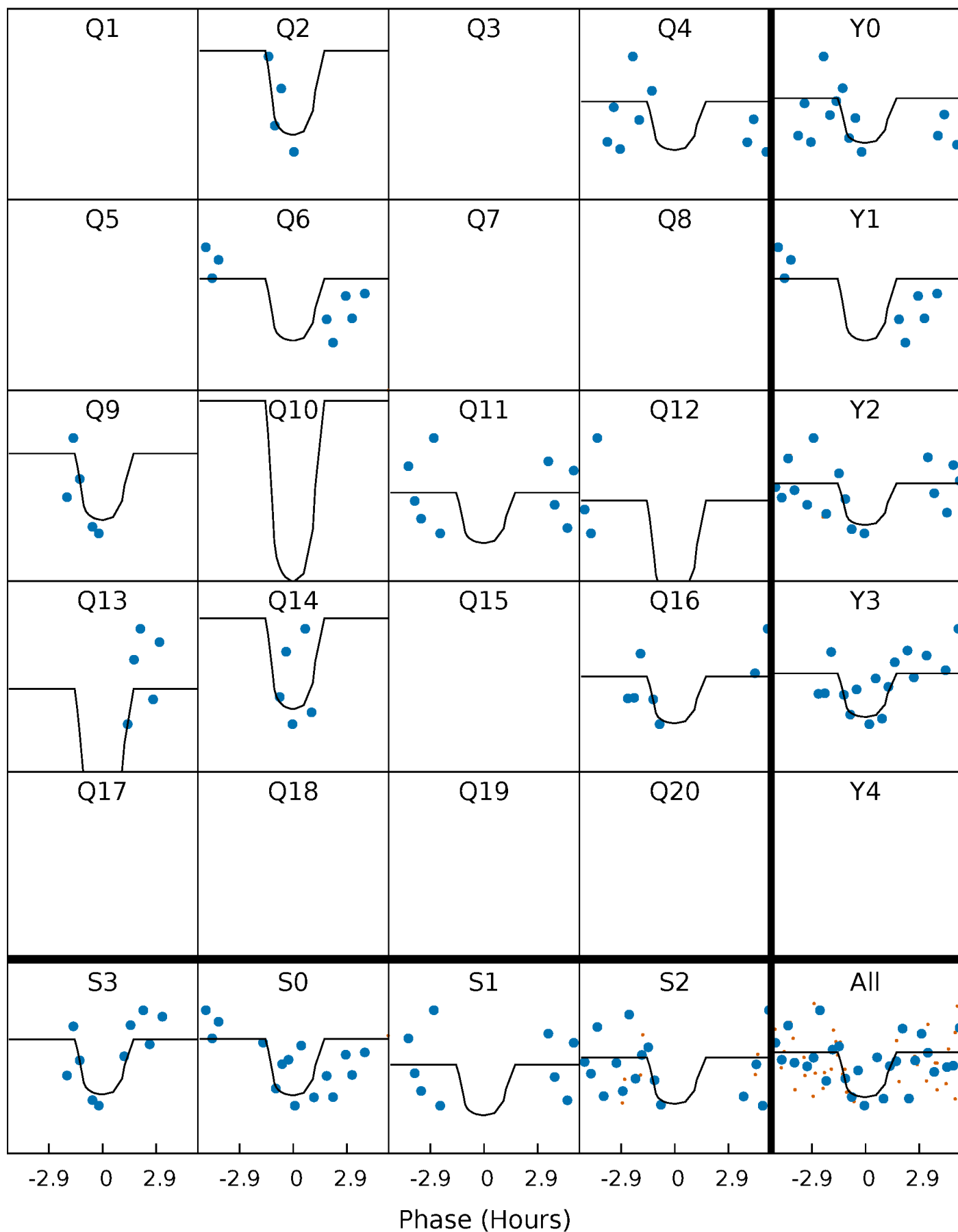
# PDC Quarter-Phased Transit Curves

TCE 006140084-08 P= 37.441680 Days  $T_0=132.372675$  (BKJD)



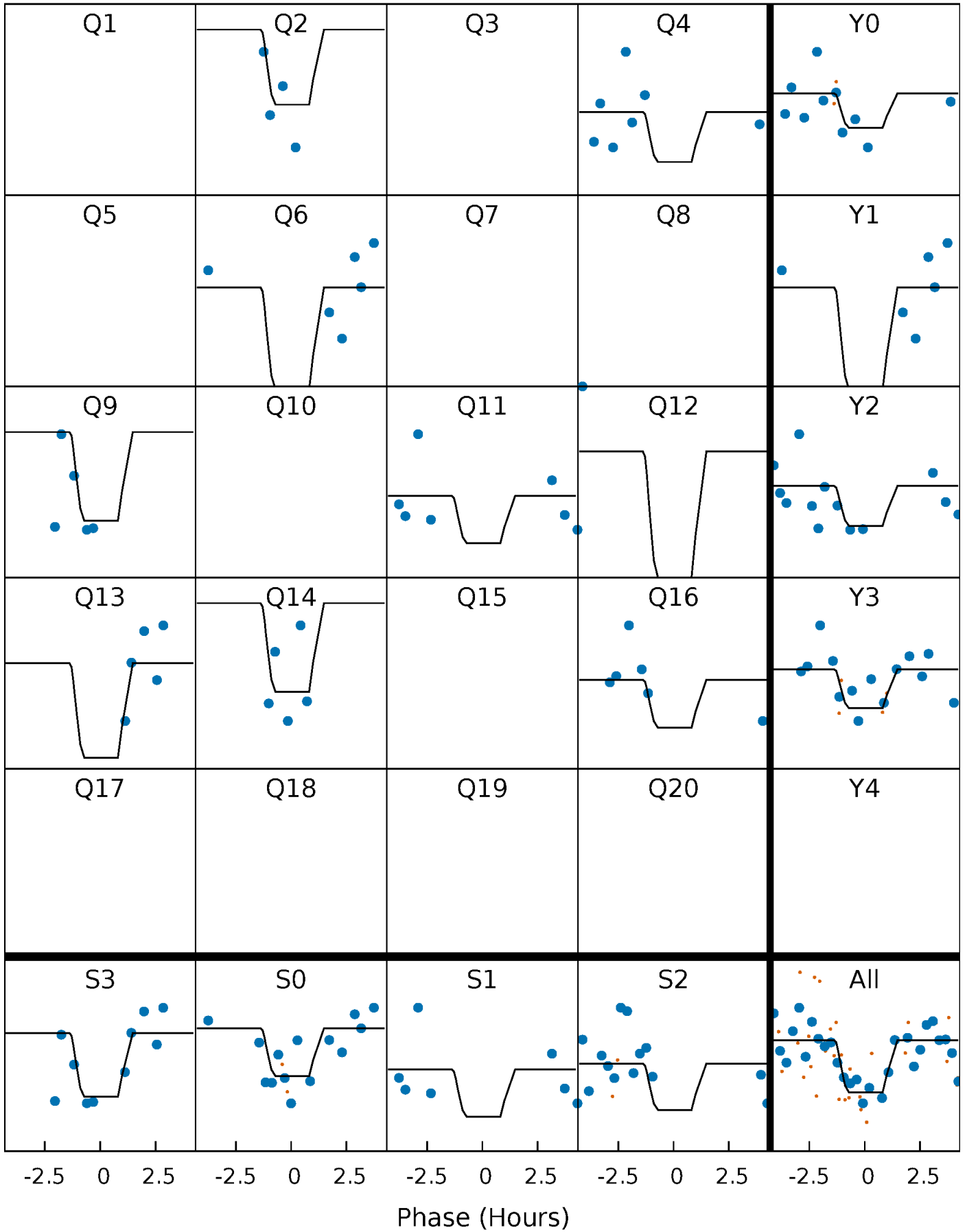
# DV Quarter-Phased Transit Curves

TCE 006140084-08 P= 37.441680 Days  $T_0=132.372675$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

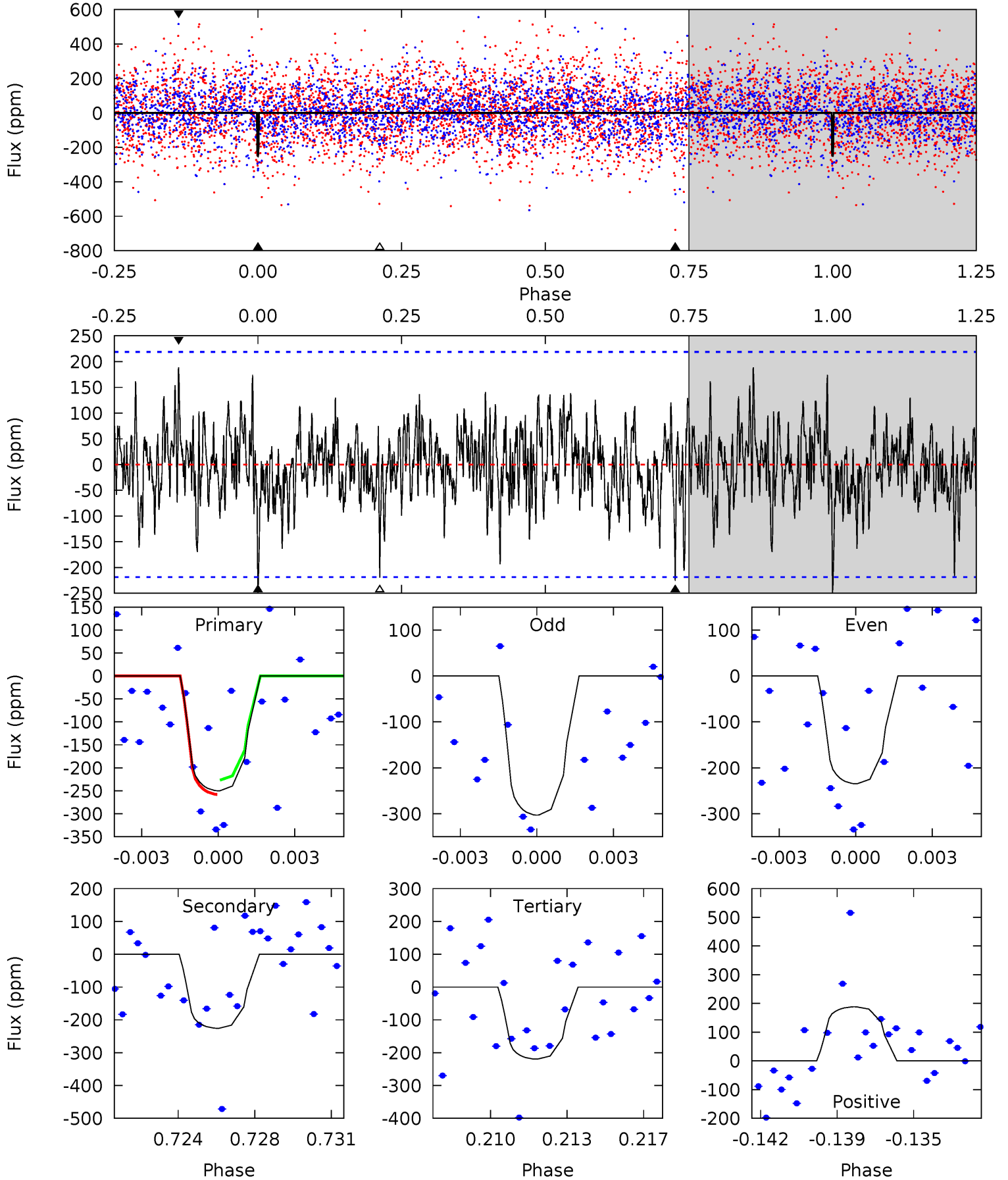
TCE 006140084-08 P= 37.442205 Days  $T_0=132.365743$  (BKJD)



# DV Model-Shift Uniqueness Test

006140084-08, P = 37.441680 Days, E = 132.372675 Days

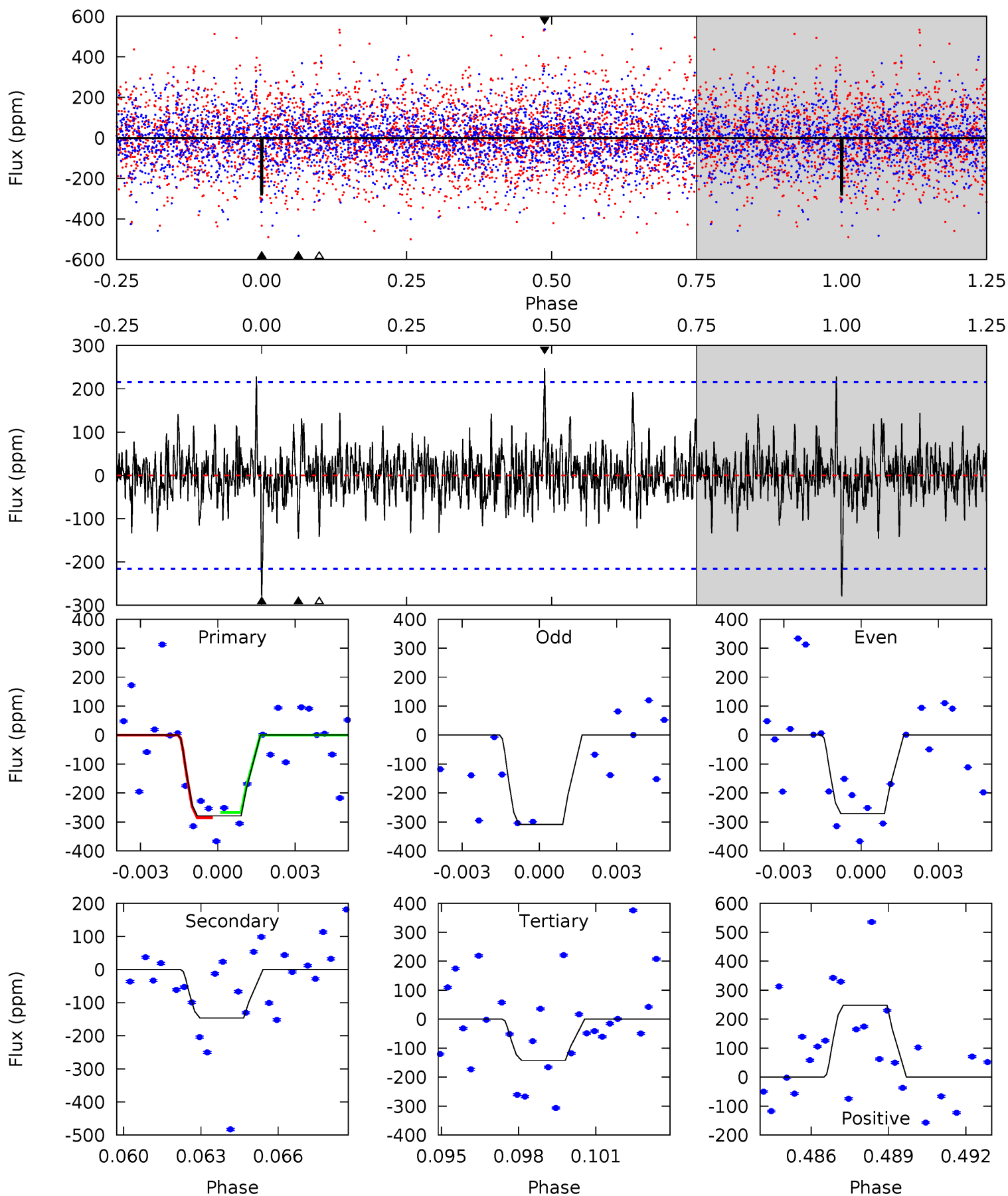
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 5.98 | 5.40 | 5.25 | 4.51 | 5.23            | 2.93            | 1.39             | 0.73    | 1.47    | 0.15    | 0.89    | 0.68    | 0.97 | 0.43  | 0.34 |



# Alt Model-Shift Uniqueness Test

006140084-08, P = 37.442205 Days, E = 132.365743 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.81 | 3.57 | 3.47 | 6.05 | 5.25            | 2.97            | 1.14             | 3.34    | 0.76    | 0.10    | -2.48   | 0.36    | 0.95 | 0.47  | 0.22 |



### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-08 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$       | $T_{obs} (K)$          | $A_{obs}$            |
|---------|---------------|------------------------|---------------------|------------------------|----------------------|
| DV      | $-226 \pm 42$ | $5.73^{+6.22}_{-3.78}$ | $1312^{+75}_{-125}$ | $5538^{+5033}_{-1368}$ | $235^{+1849}_{-181}$ |
| Alt.    | $-146 \pm 41$ | $6.11^{+6.17}_{-3.99}$ | $1316^{+72}_{-112}$ | $4921^{+3550}_{-1082}$ | $133^{+944}_{-99}$   |

$T_{max}$  = 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  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

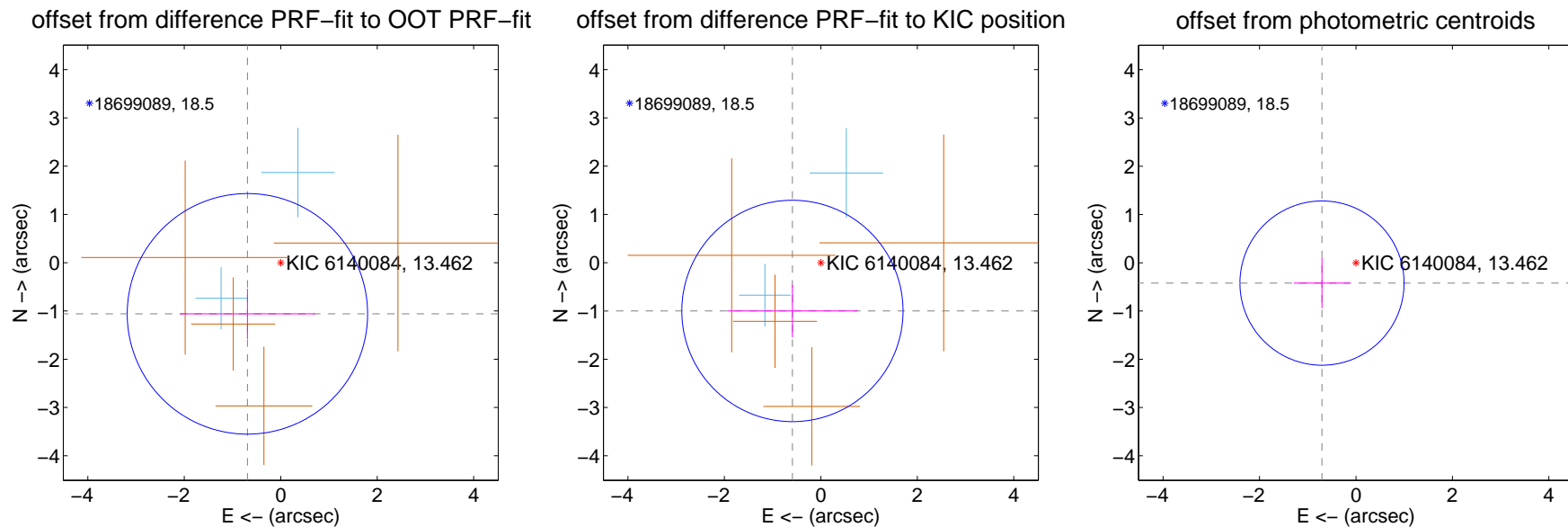
## DV Centroid Data

Supplemental centroid analysis for 006140084-08. Kepler magnitude: 13.46. Transit SNR 10.94

There are 2 quarters with good PRF difference image offsets

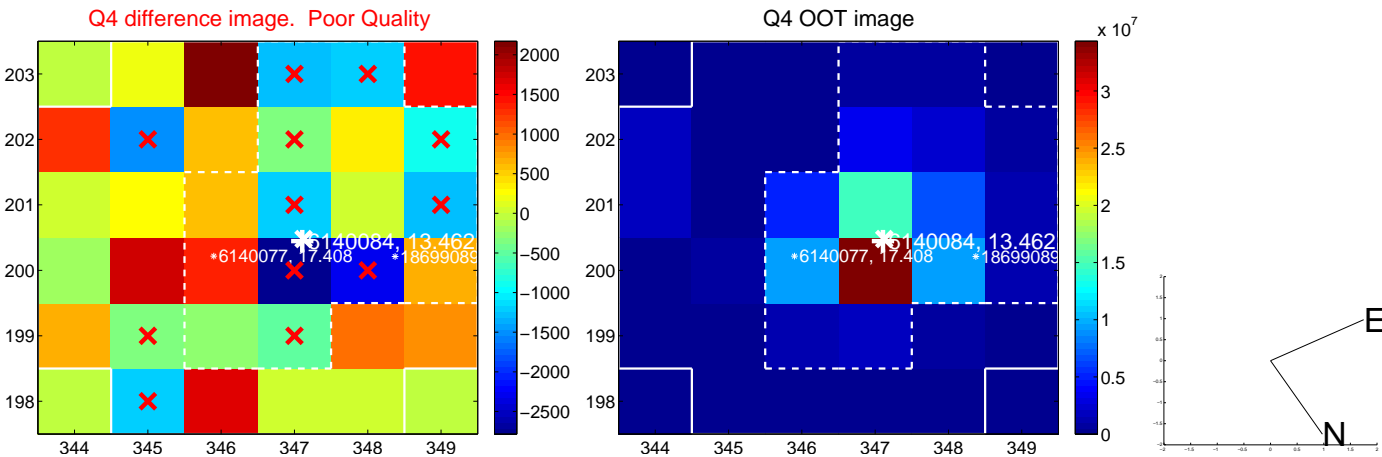
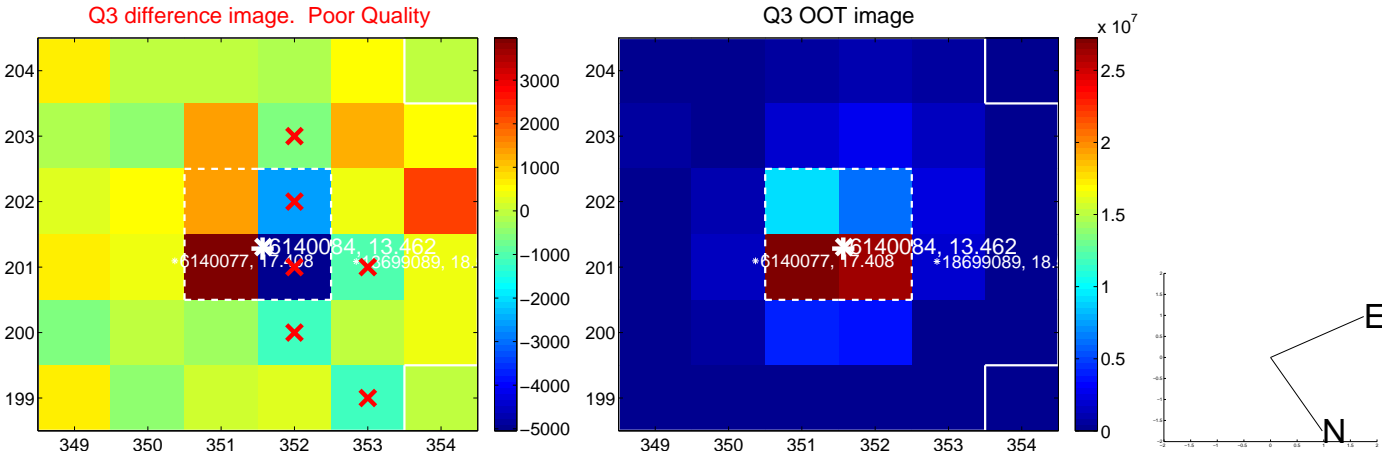
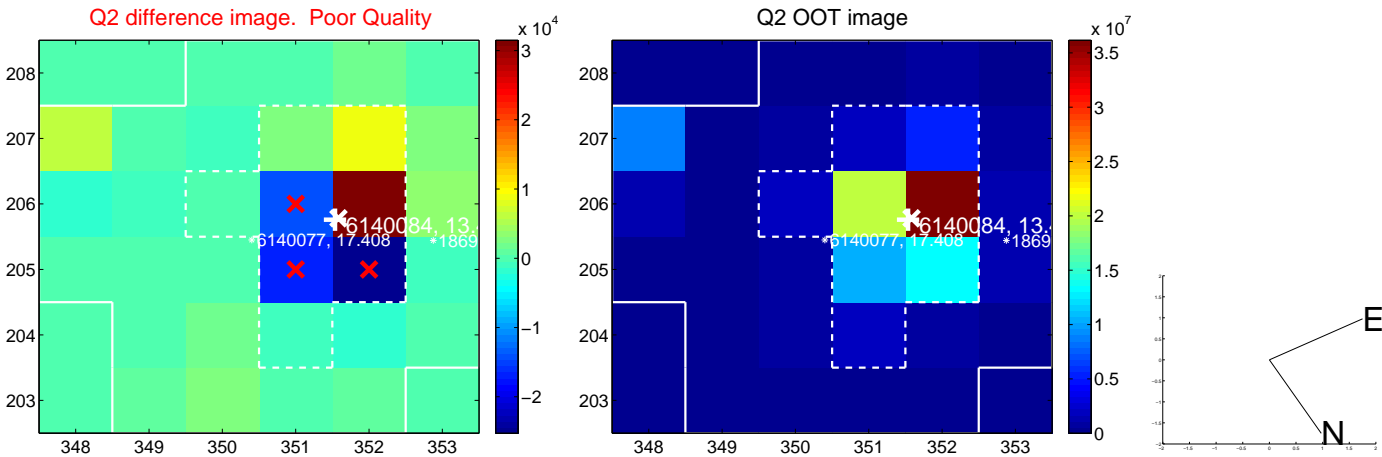
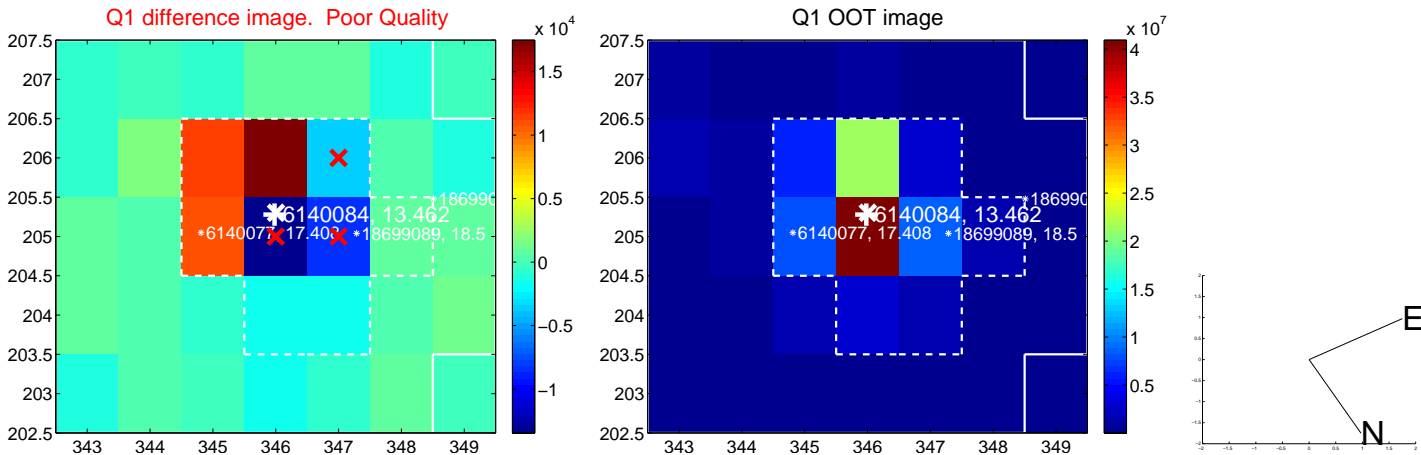
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $1.266 \pm 0.831$  | 1.52                | $0.691 \pm 1.402$ | $-1.060 \pm 0.519$ |
| PRF-fit source offset from KIC position | $1.161 \pm 0.765$  | 1.52                | $0.590 \pm 1.348$ | $-1.000 \pm 0.545$ |
| photometric centroid source offset      | $0.82 \pm 0.57$    | 1.45                | $0.70 \pm 0.58$   | $-0.42 \pm 0.52$   |



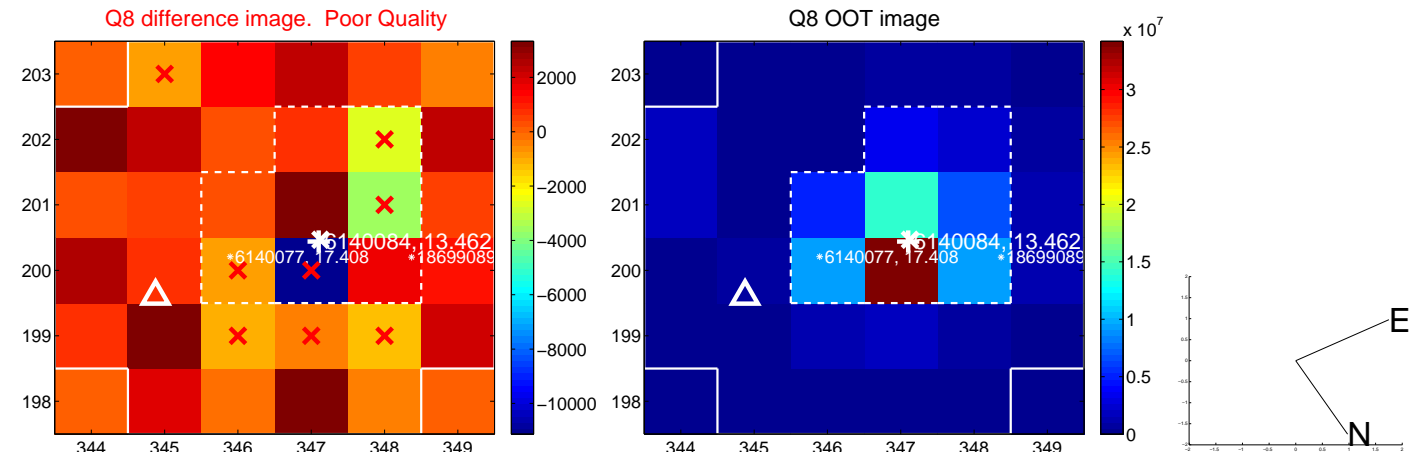
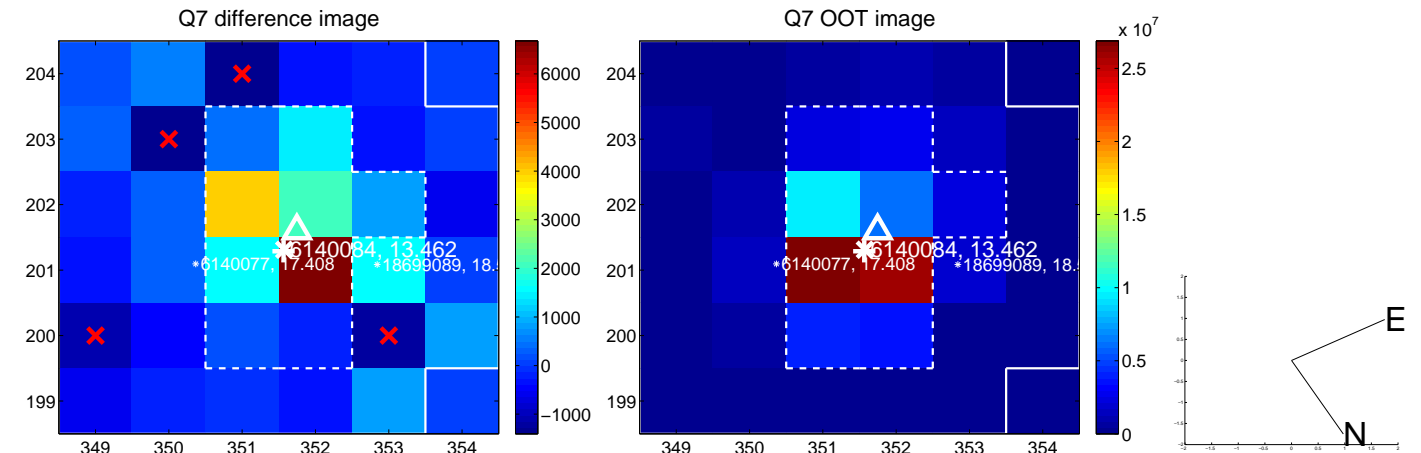
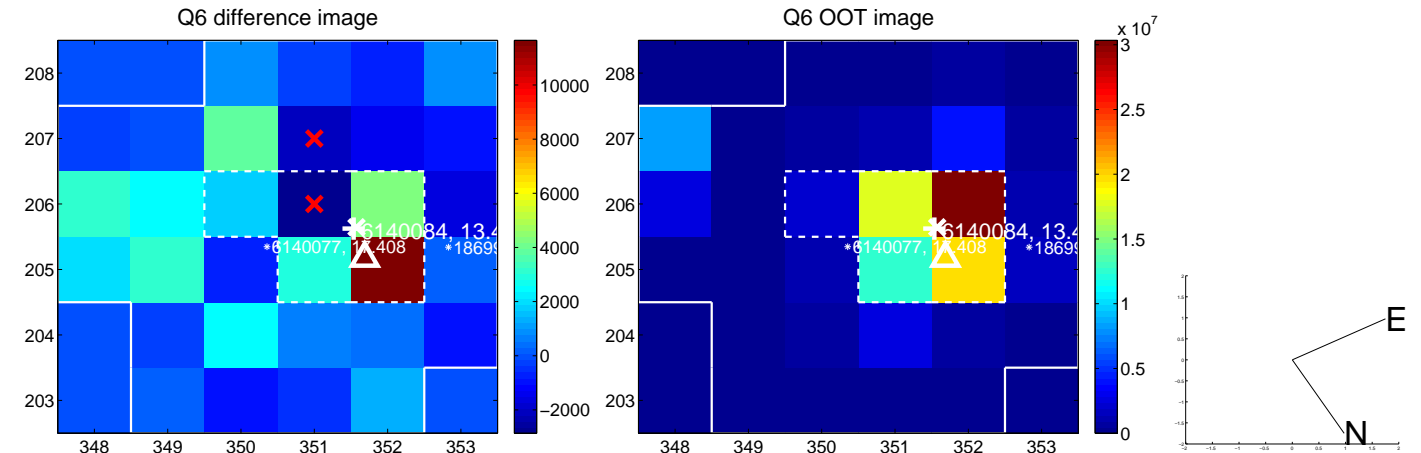
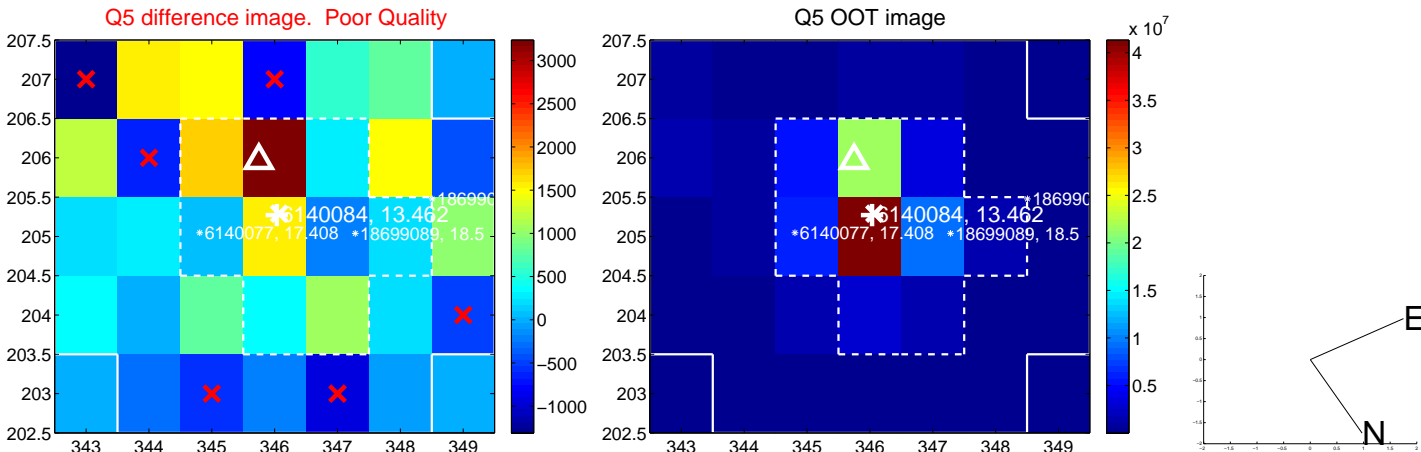
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

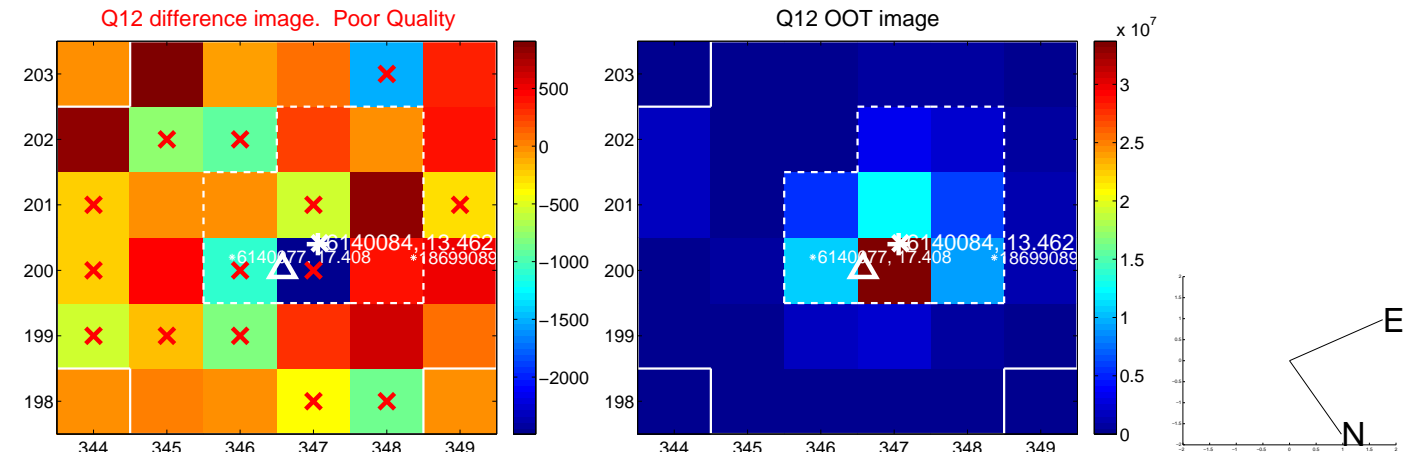
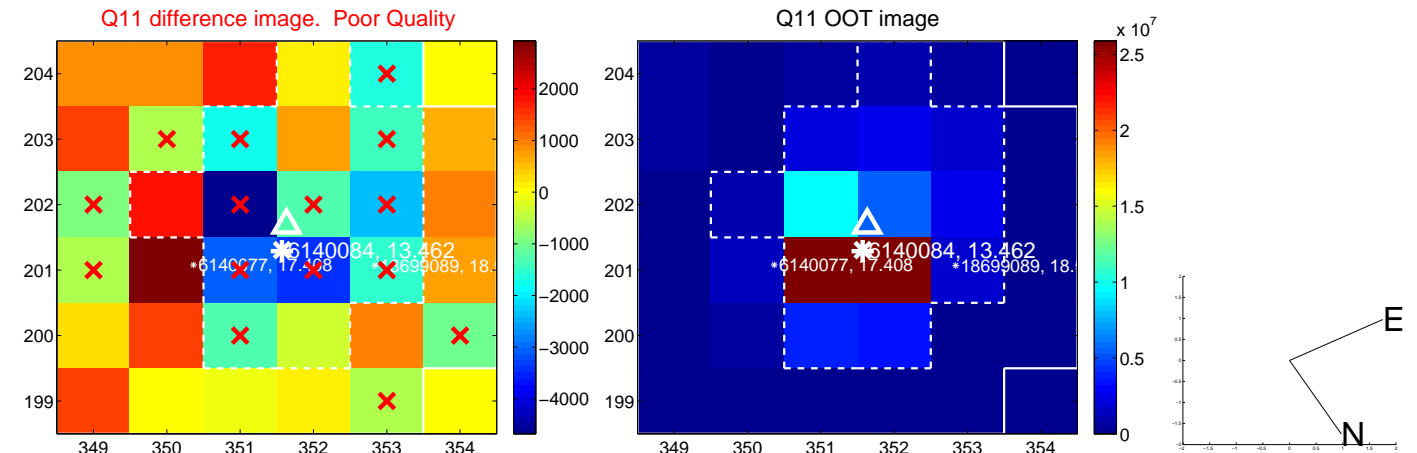
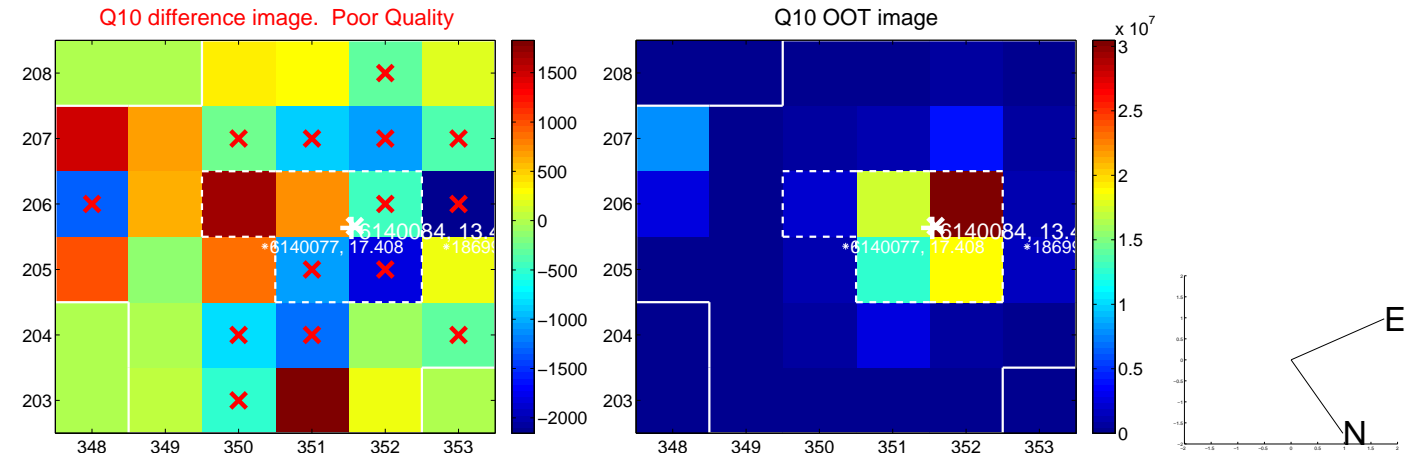
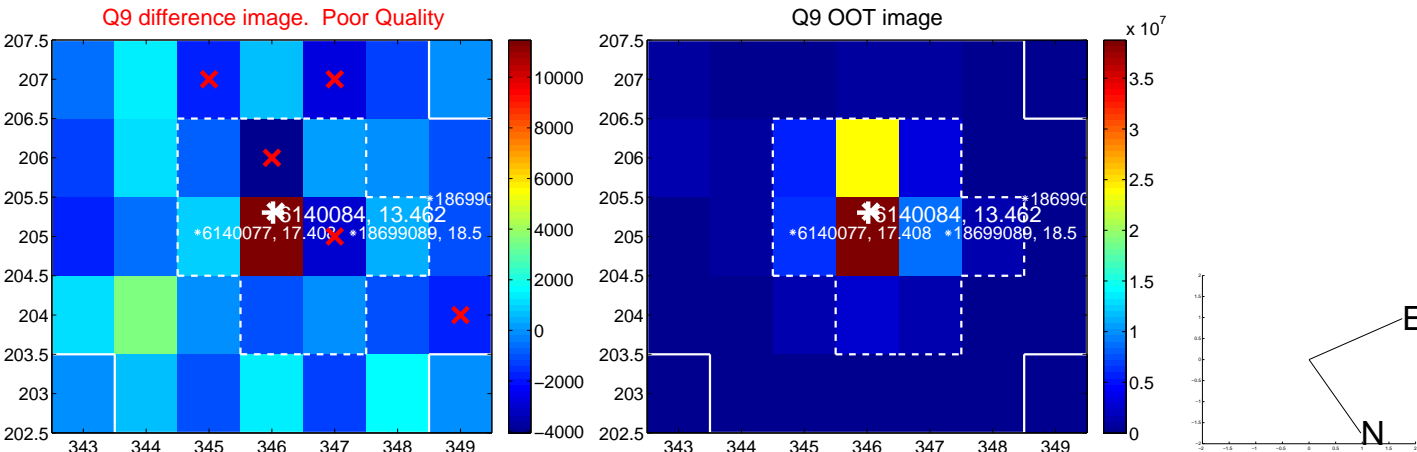




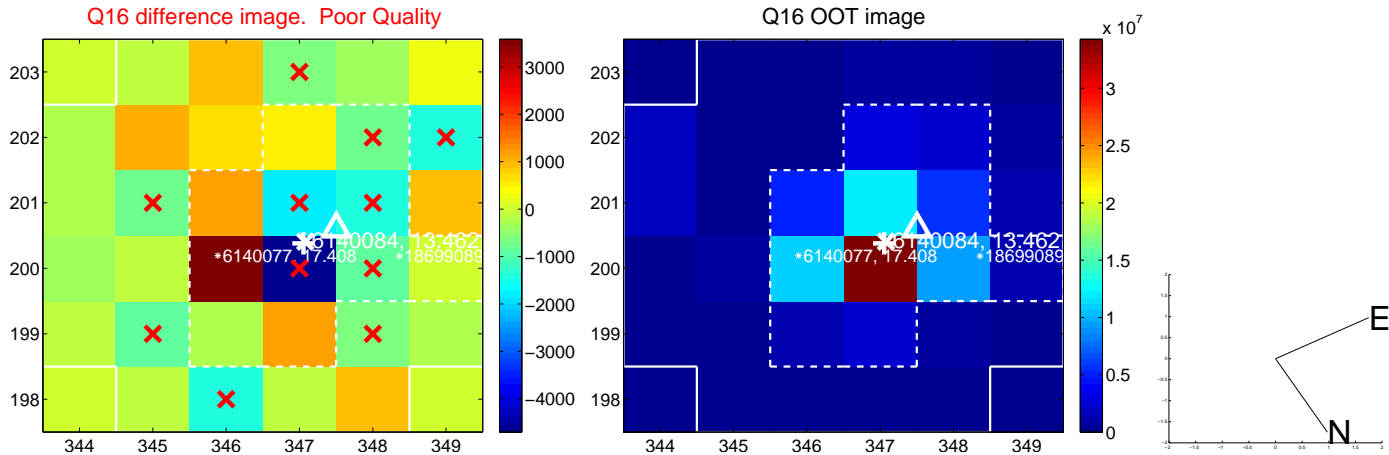
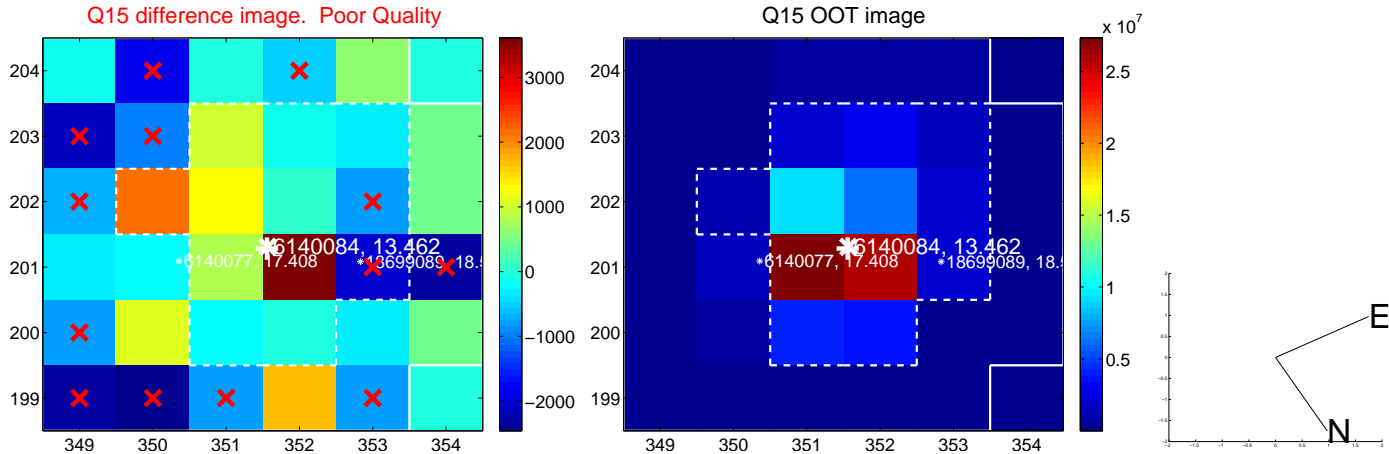
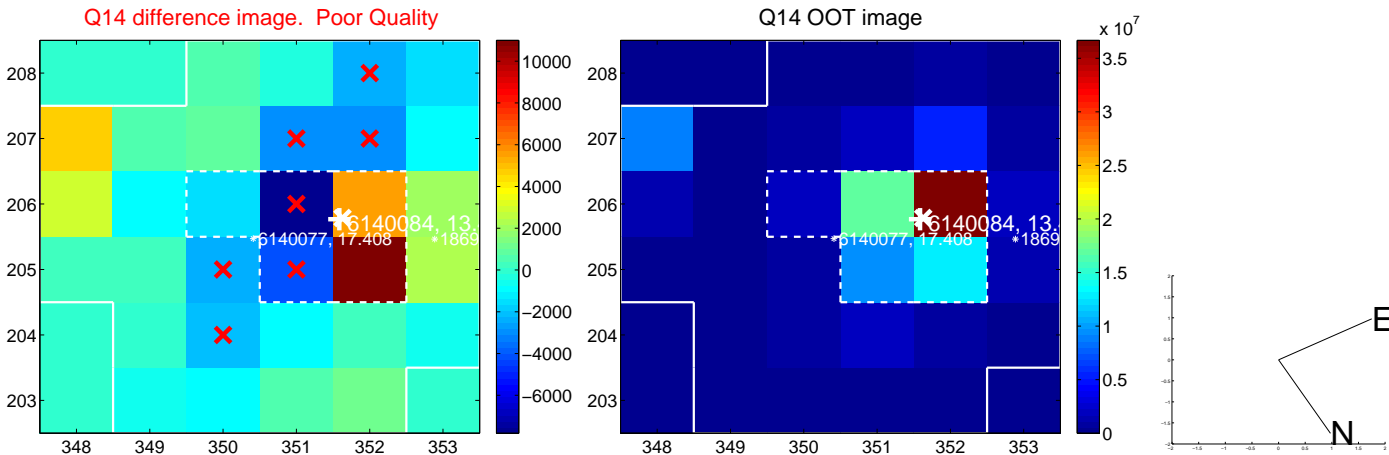
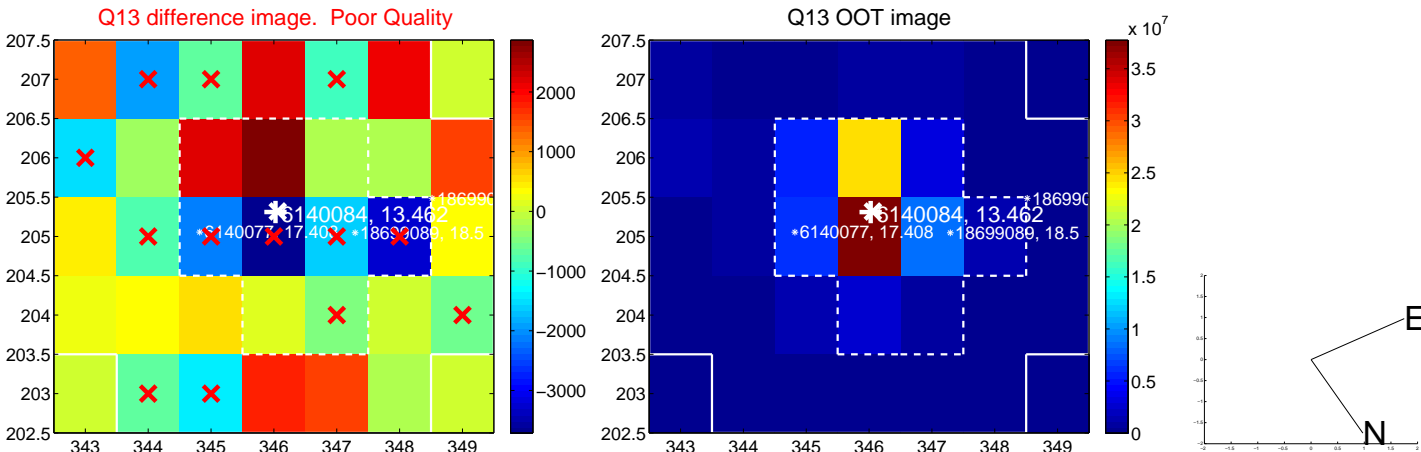
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



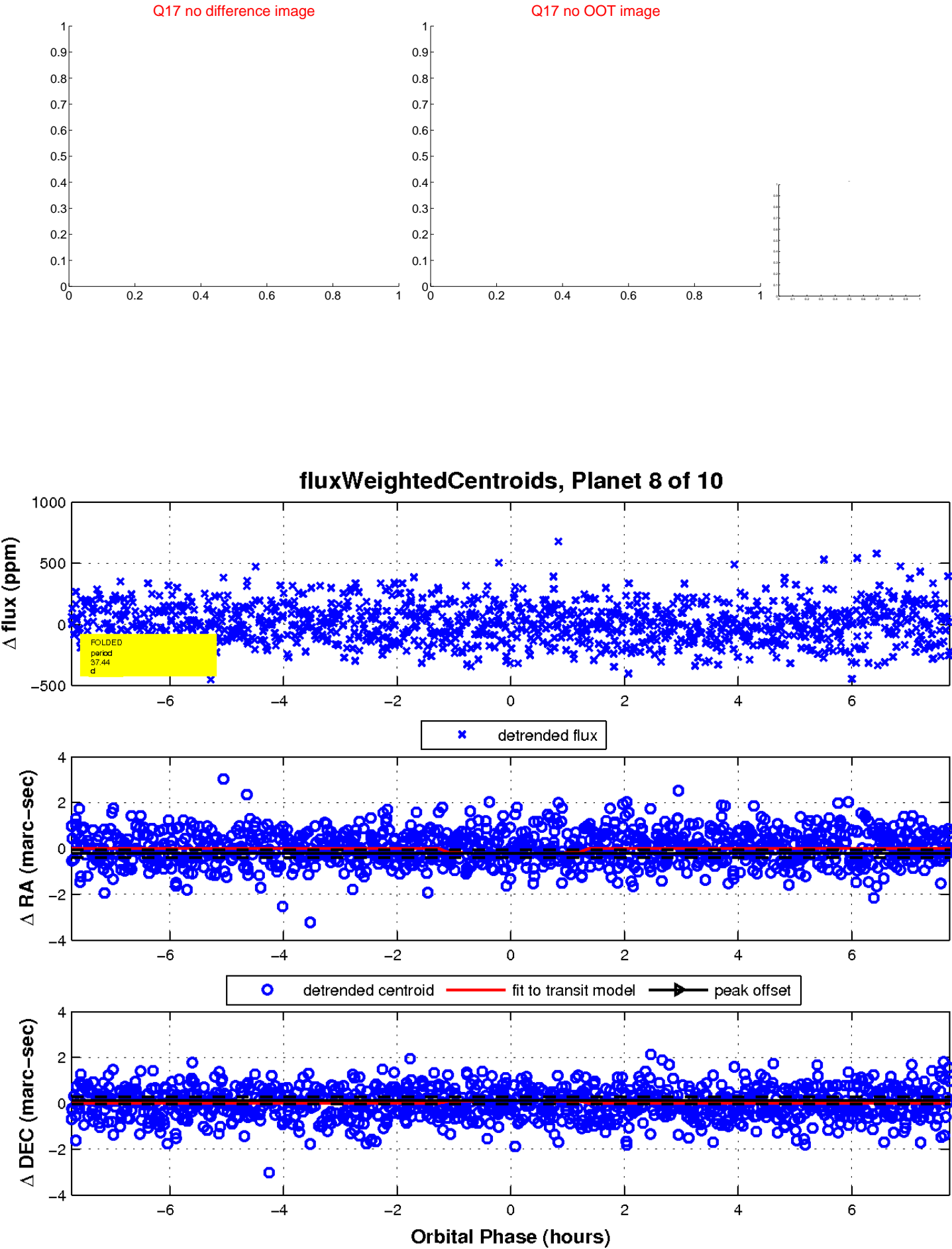
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

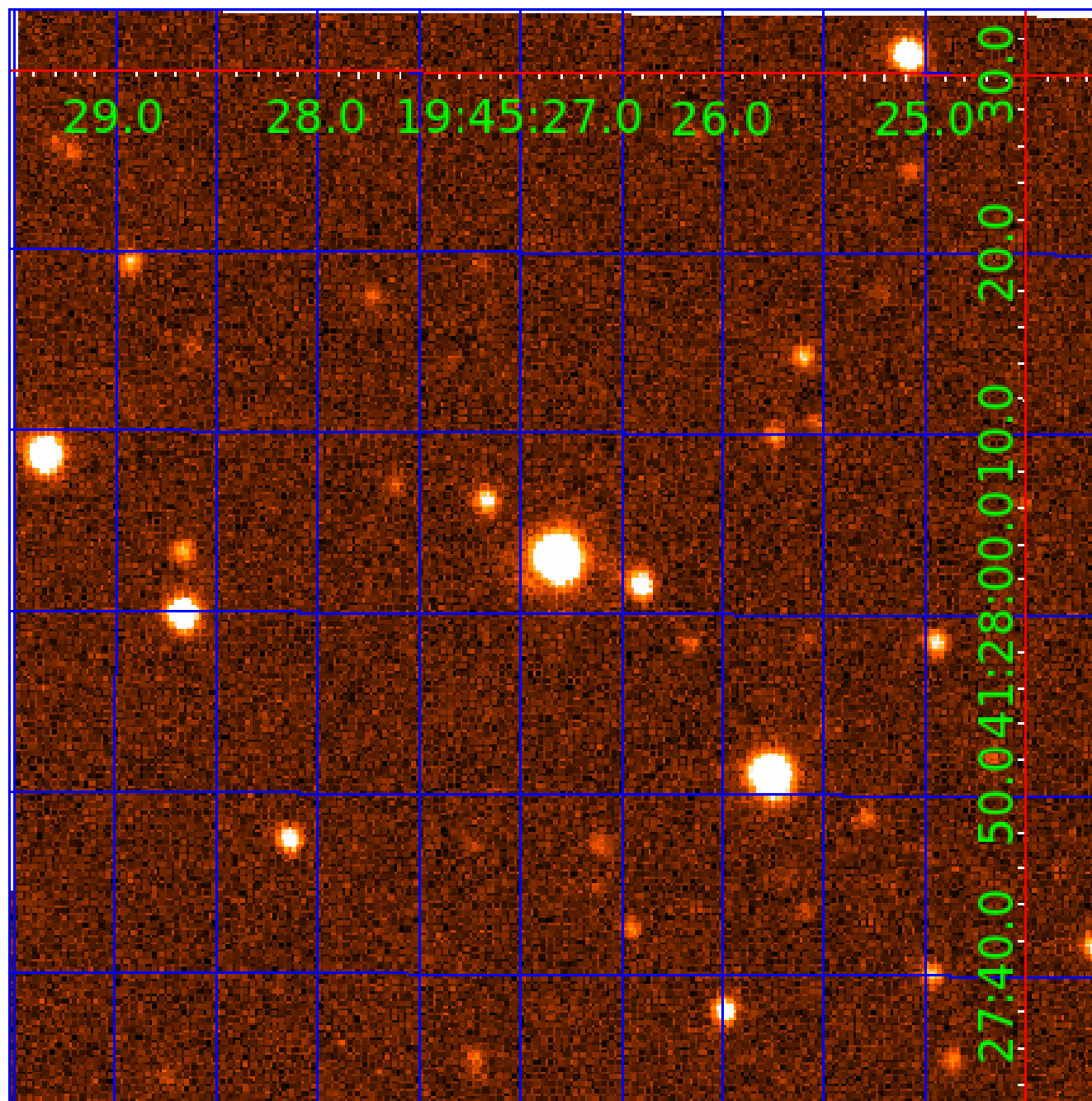


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

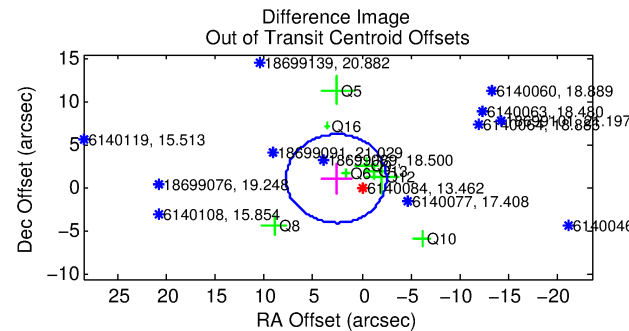
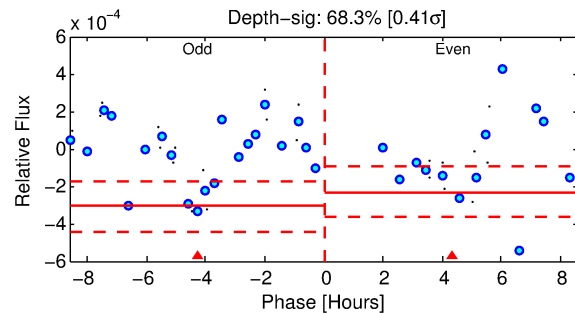
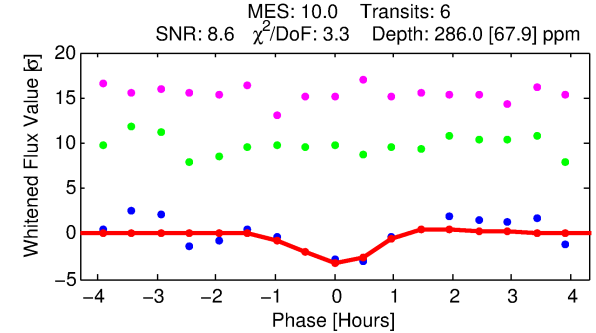
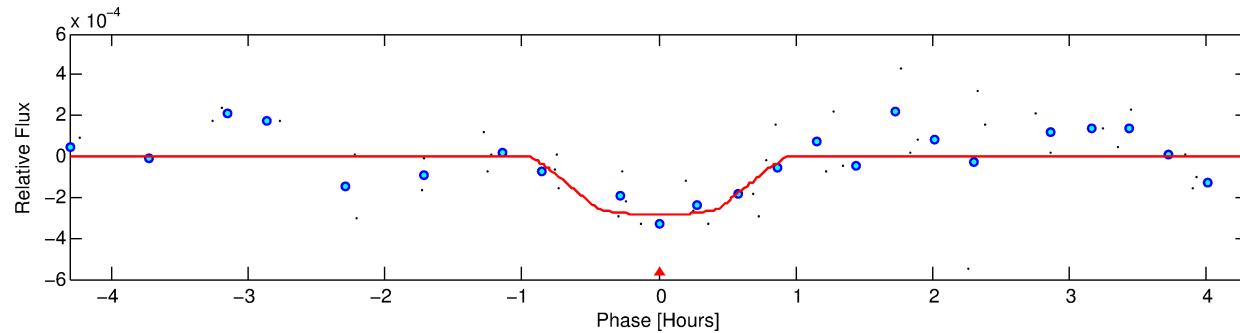
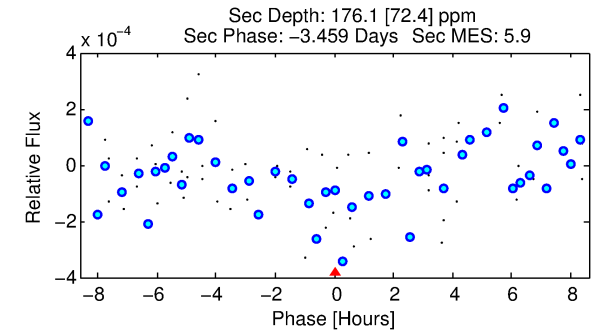
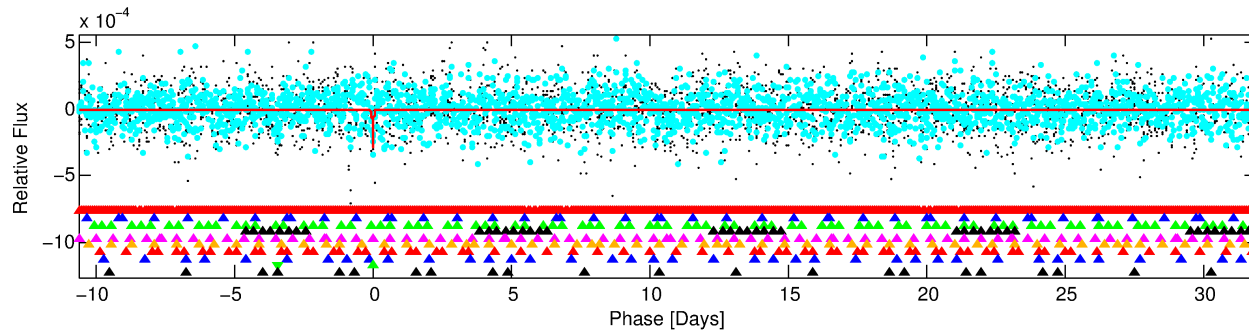
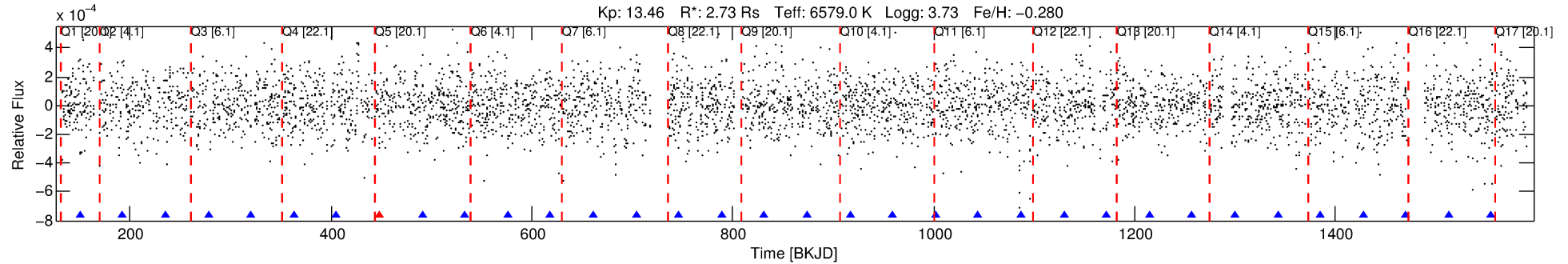
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-09

No Significant Match Found

# DV One-Page Summary

KIC: 6140084 Candidate: 9 of 10 Period: 42.578 d



## DV Fit Results:

Period = 42.57802 [0.00052] d  
Epoch = 150.2355 [0.0081] BKJD  
Rp/R\* = 0.0161 [0.0316]  
a/R\* = 198.10 [2141.67]  
b = 0.52 [15.19]  
Seff = 171.21 [94.36]  
Teq = 922 [127] K  
Rp = 4.79 [9.55] Re  
a = 0.2698 [0.0924] AU  
Ag = 307.01 [1220.68] [0.25σ]  
Teffp = 5969 [5882] K [0.86σ]

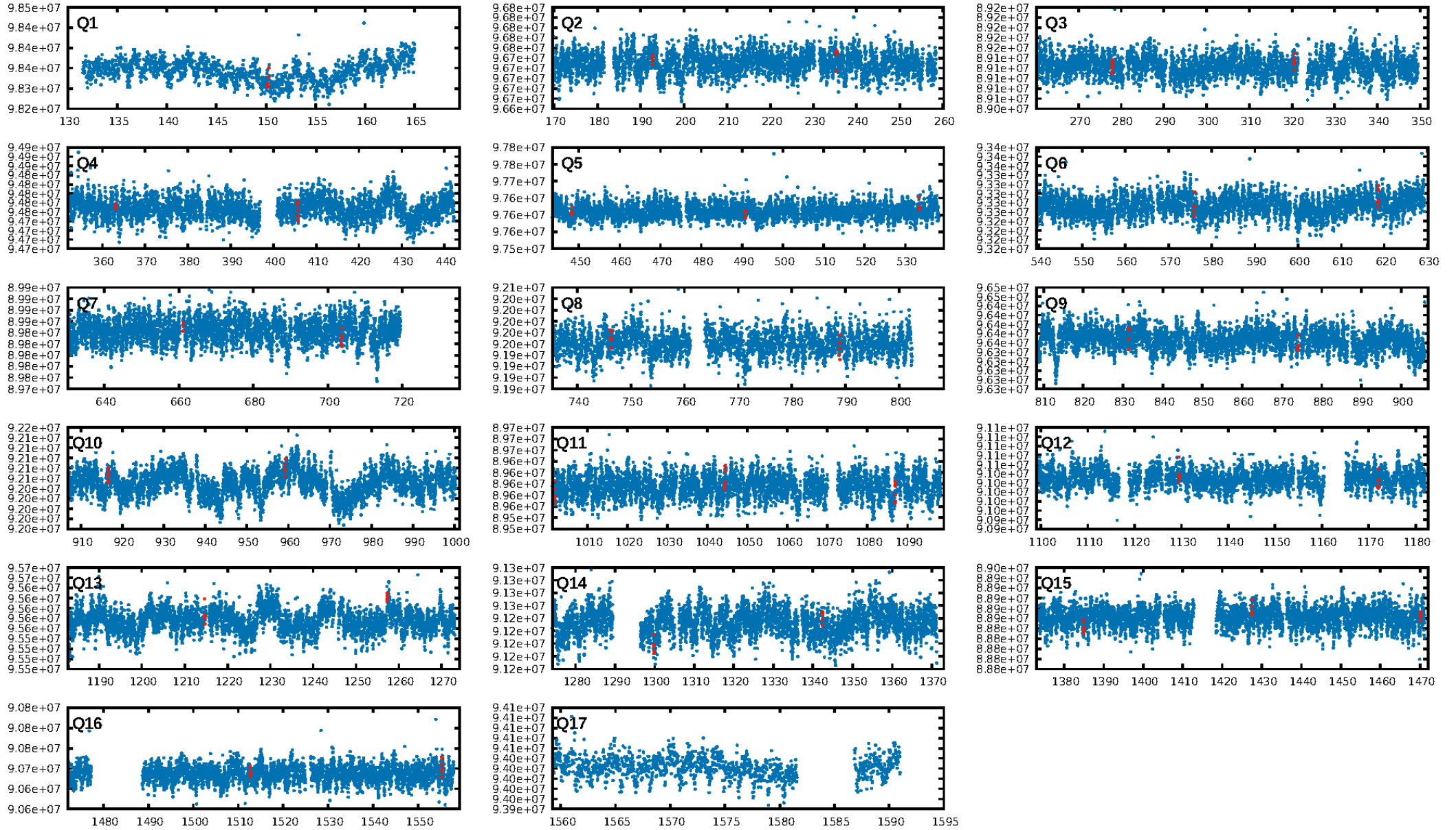
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [41.80σ]  
LongPeriod-sig: 100.0% [221.09σ]  
ModelChiSquare2-sig: 18.2%  
ModelChiSquareGof-sig: 60.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.80 [4/5]  
GhostDiagnostic-chr: 0.03899  
Centroid-sig: 48.0%  
Centroid-so: 0.468 arcsec [0.66σ]  
OotOffset-rm: 2.868 arcsec [1.68σ]  
KicOffset-rm: 2.731 arcsec [1.47σ]  
OotOffset-st: 2/0/3/3 [8]  
KicOffset-st: 2/0/3/3 [8]  
DiffImageQuality-fgm: 0.12 [1/8]  
DiffImageOverlap-fno: 0.56 [9/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:52 Z

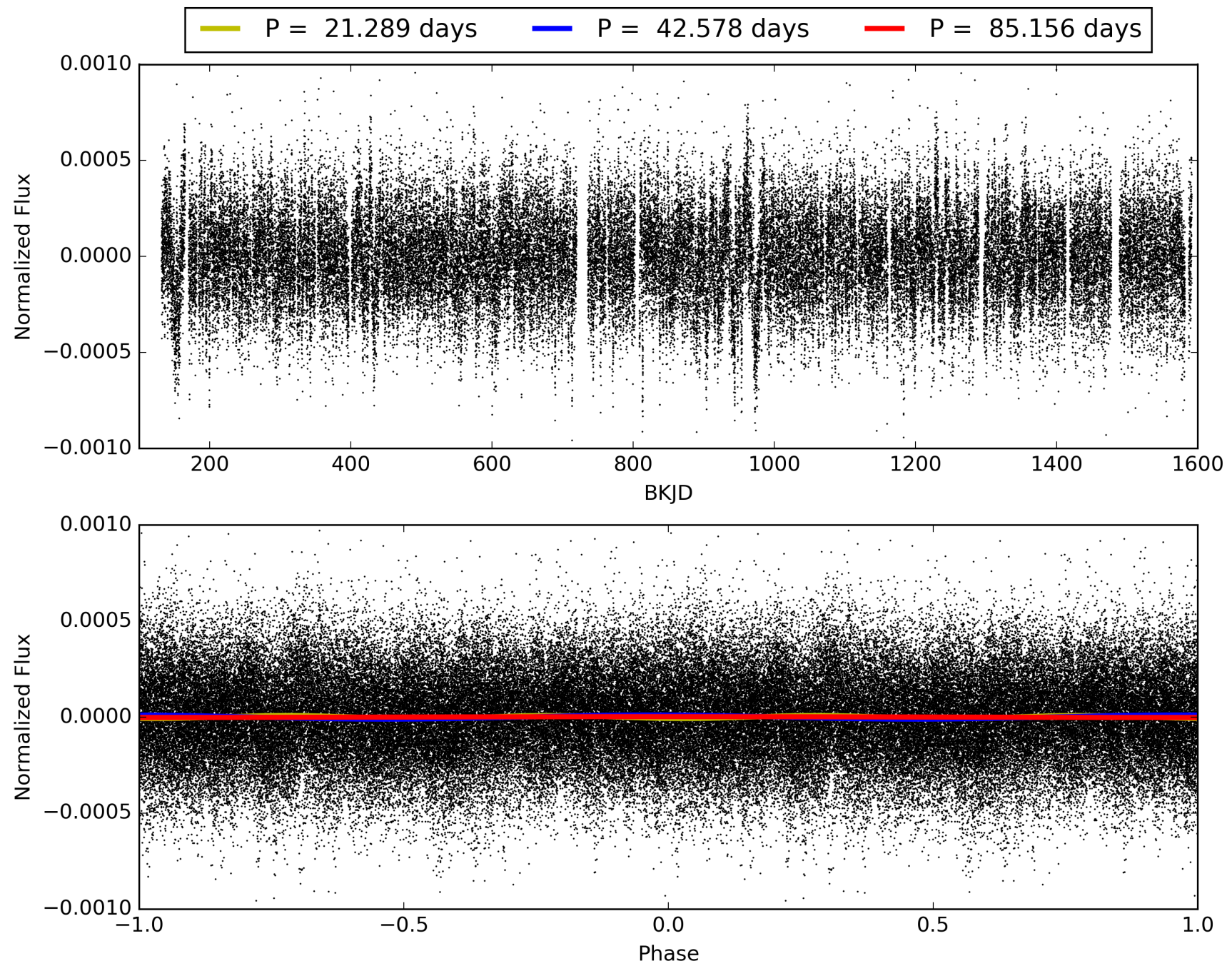
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-09, PDC Light Curves



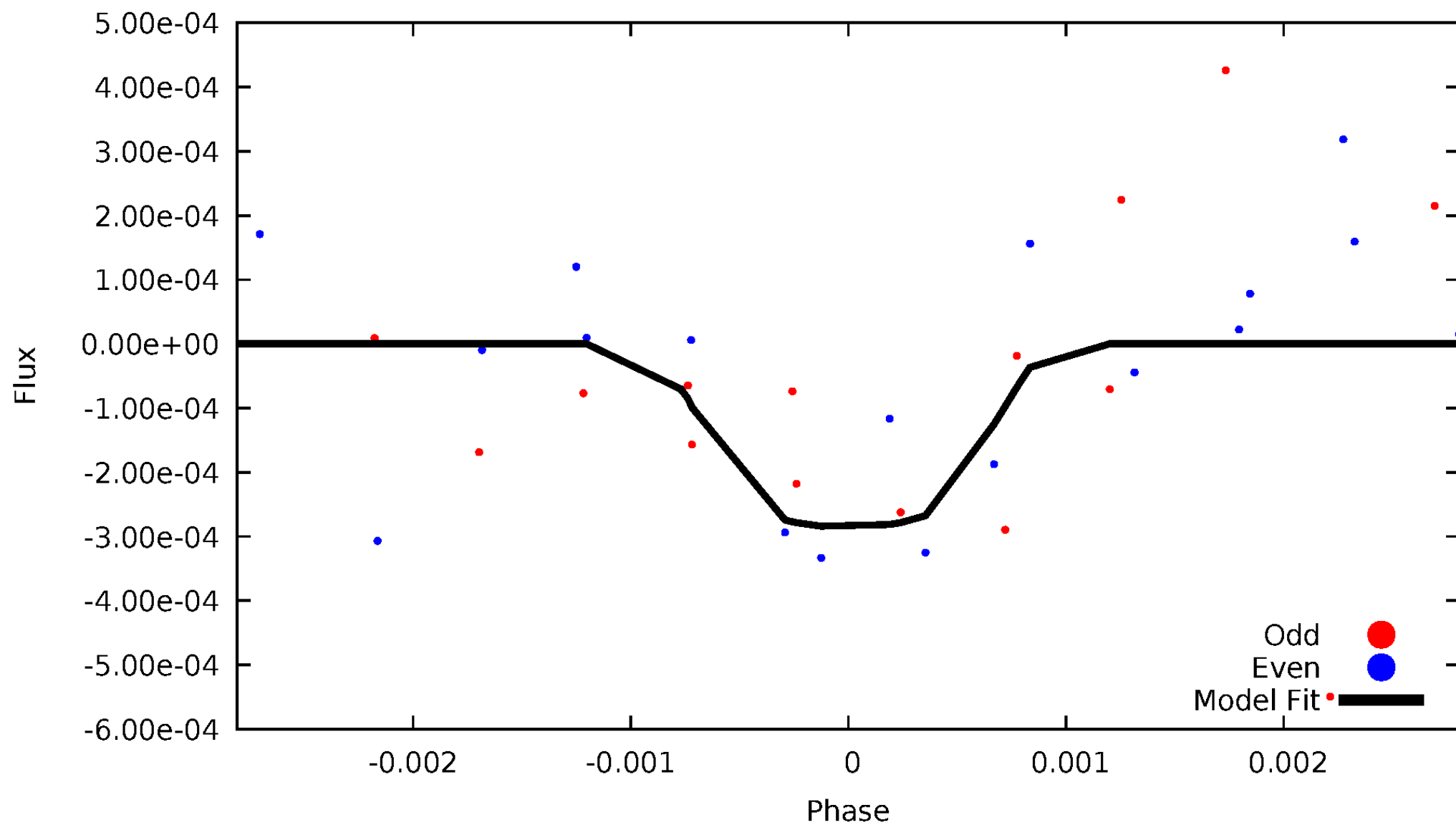


TCE 006140084-09



# DV Odd/Even

TCE 006140084-09



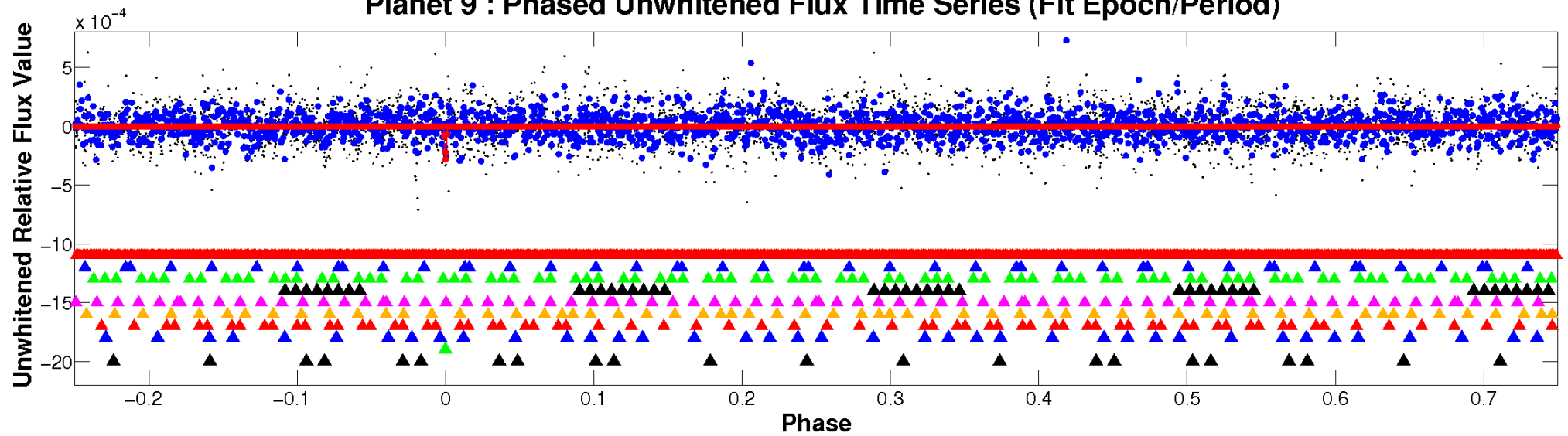


ALT Odd/Even

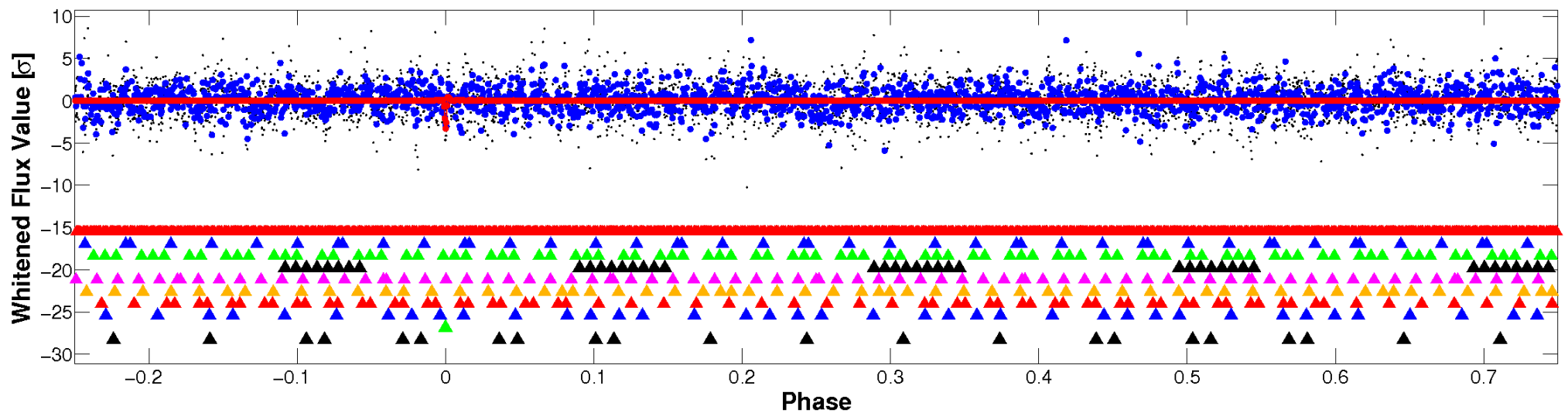
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

## Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

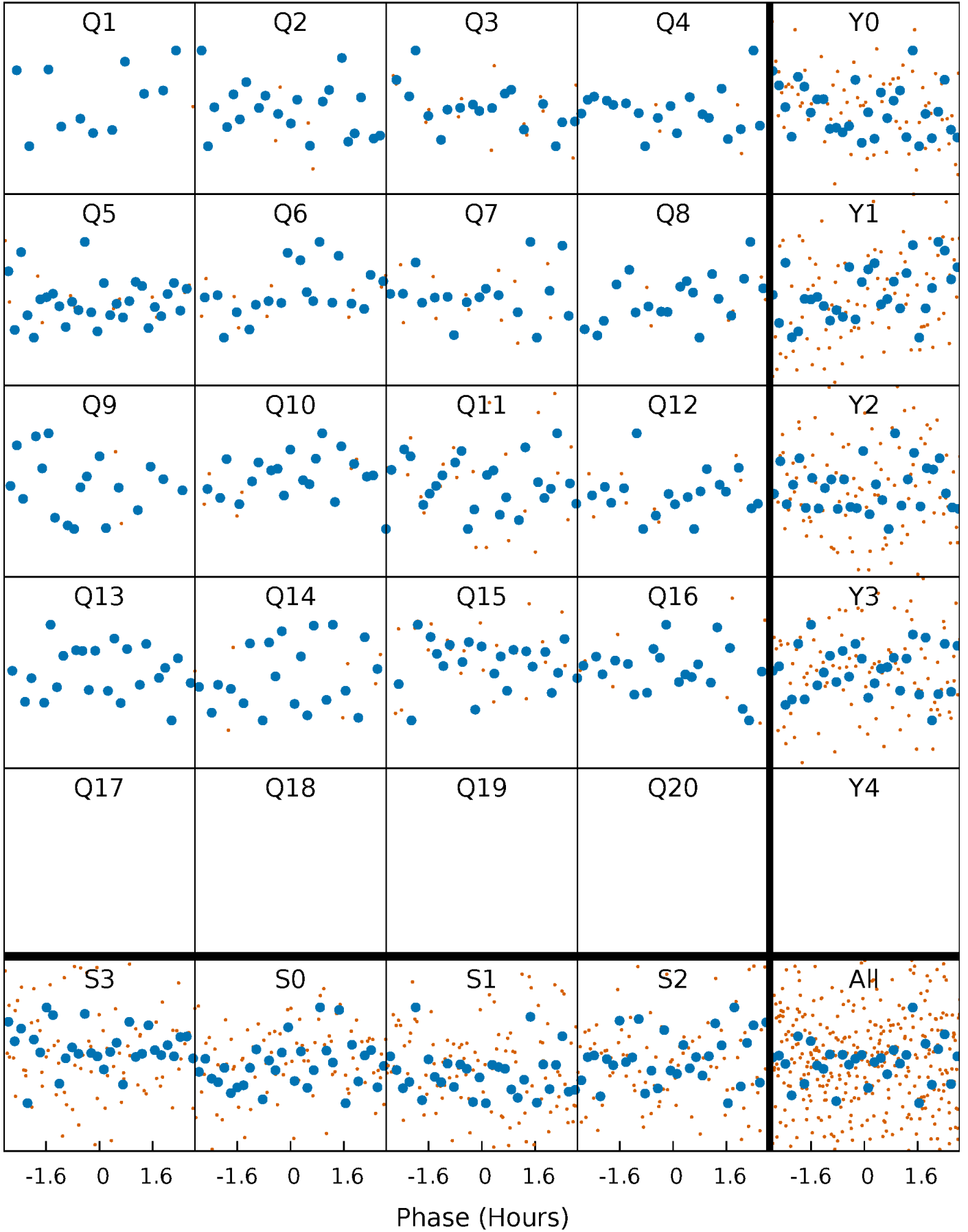


## Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)



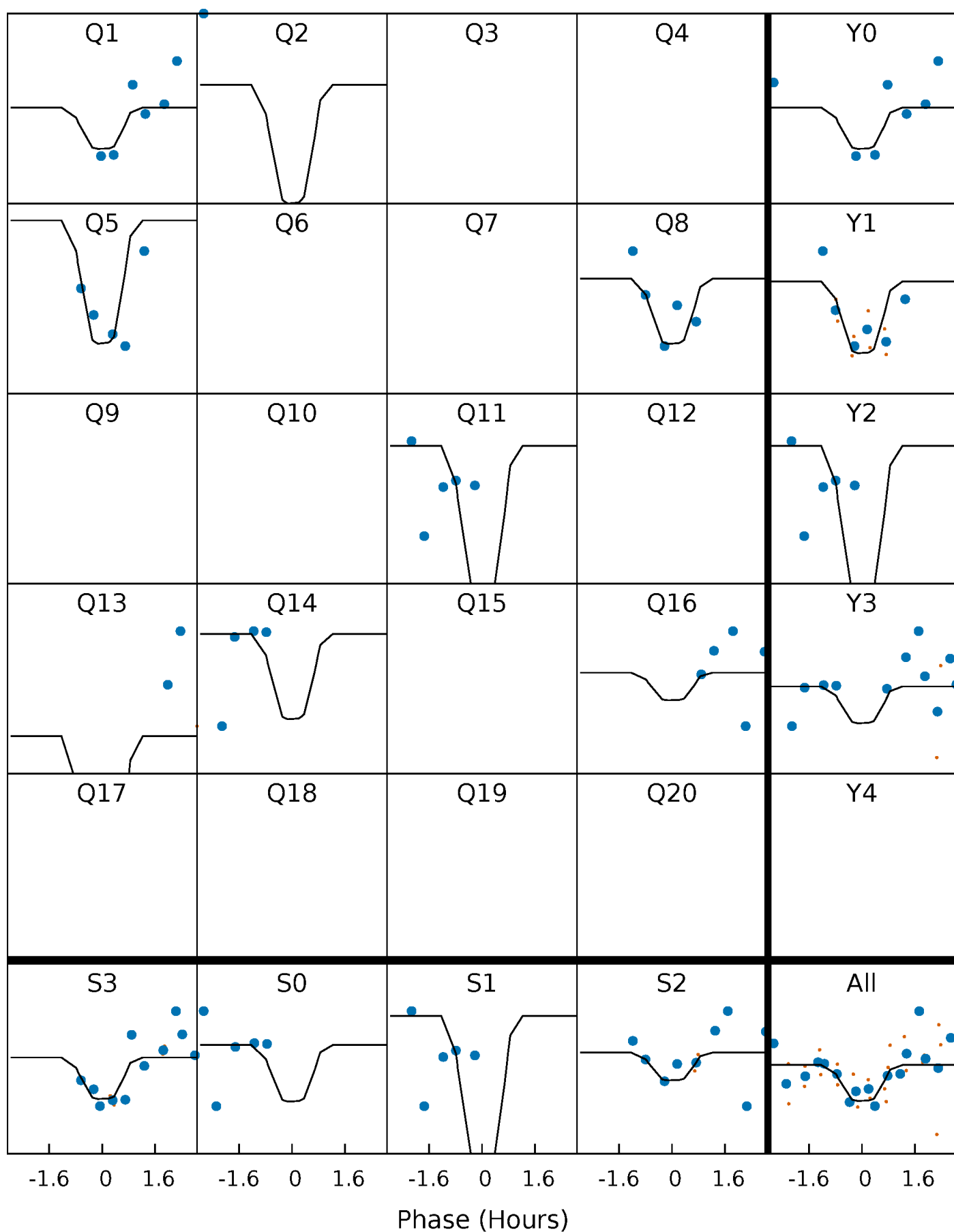
# PDC Quarter-Phased Transit Curves

TCE 006140084-09   P= 42.578021 Days    $T_0=150.235454$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 006140084-09 P= 42.578021 Days  $T_0=150.235454$  (BKJD)



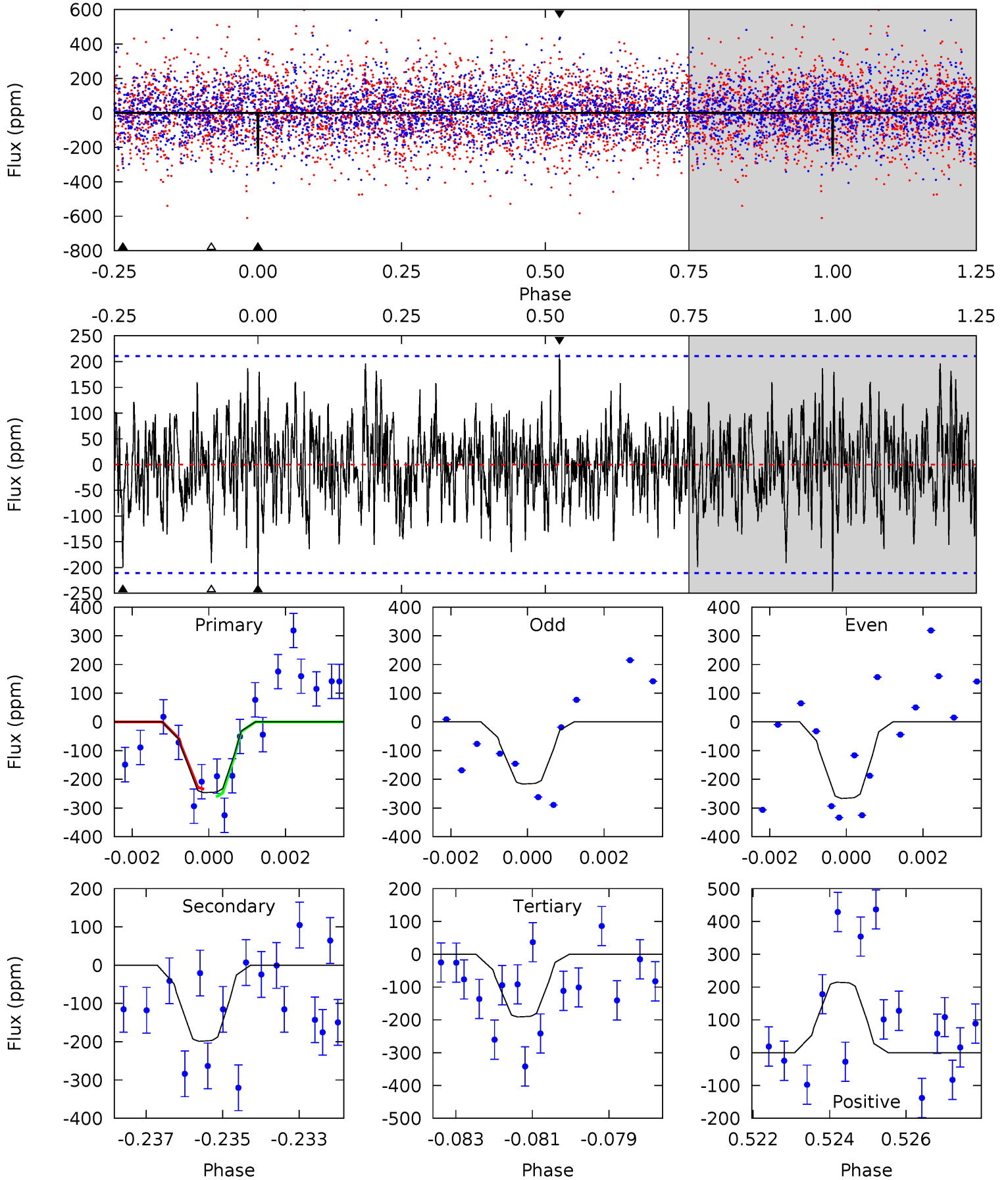
This plot does not exist for this TCE.



# DV Model-Shift Uniqueness Test

006140084-09, P = 42.578021 Days, E = 107.657433 Days

| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 6.24 | 5.03 | 4.84 | 5.44 | 5.33            | 3.09            | 1.51             | 1.41    | 0.81    | 0.19    | -0.41   | 0.63    | 0.90 | 0.47  | 0.33 |



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-09 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{max} (K)$       | $T_{obs} (K)$          | $A_{obs}$           |
|---------|---------------|------------------------|---------------------|------------------------|---------------------|
| DV      | $-199 \pm 40$ | $7.68^{+7.79}_{-5.10}$ | $1254^{+73}_{-112}$ | $4724^{+3290}_{-1006}$ | $133^{+1014}_{-99}$ |
| Alt.    | N/A           | N/A                    | N/A                 | N/A                    | N/A                 |

$T_{max}$  = 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  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

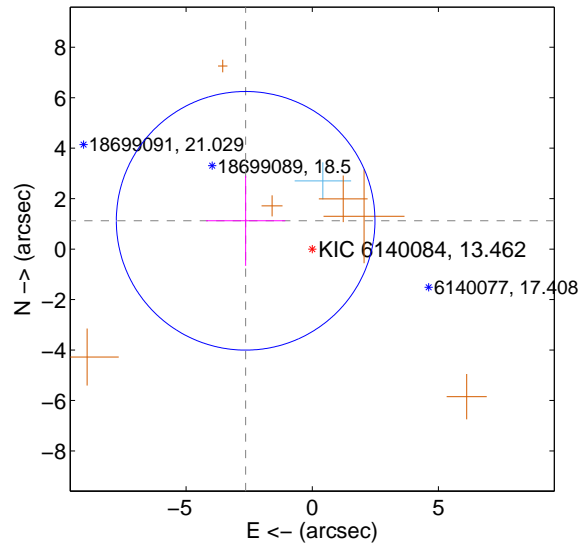
Supplemental centroid analysis for 006140084-09. Kepler magnitude: 13.46. Transit SNR 8.62

There are 1 quarters with good PRF difference image offsets

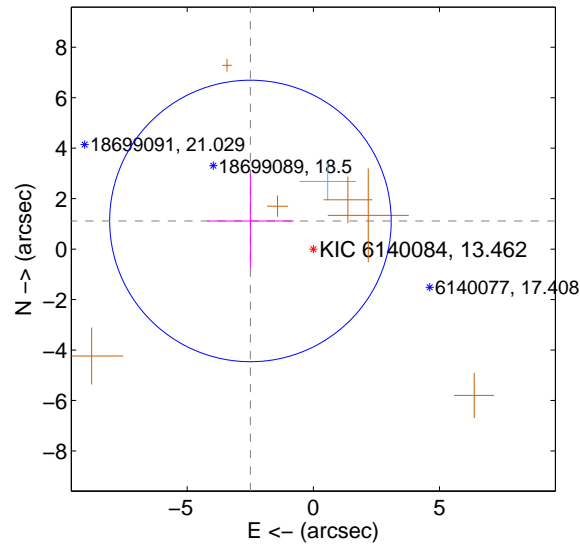
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $2.868 \pm 1.708$  | 1.68                | $2.640 \pm 1.571$ | $1.122 \pm 1.785$ |
| PRF-fit source offset from KIC position | $2.731 \pm 1.860$  | 1.47                | $2.493 \pm 1.713$ | $1.115 \pm 1.879$ |
| photometric centroid source offset      | $0.47 \pm 0.72$    | 0.66                | $0.21 \pm 0.77$   | $-0.42 \pm 0.70$  |

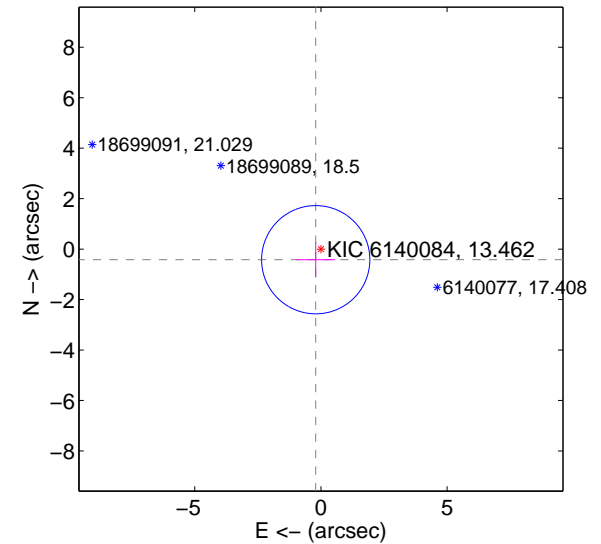
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

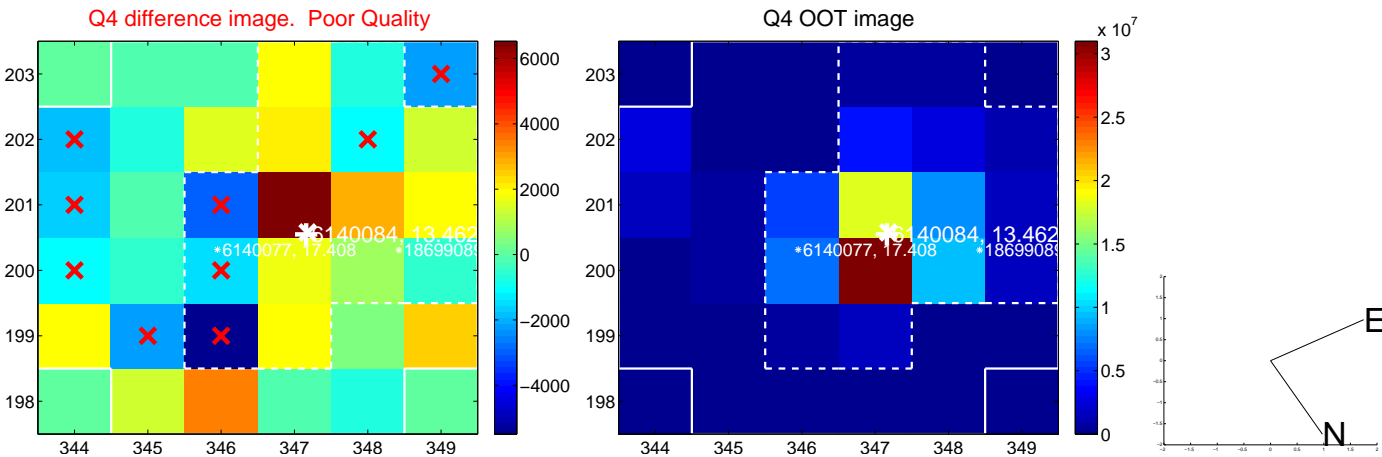
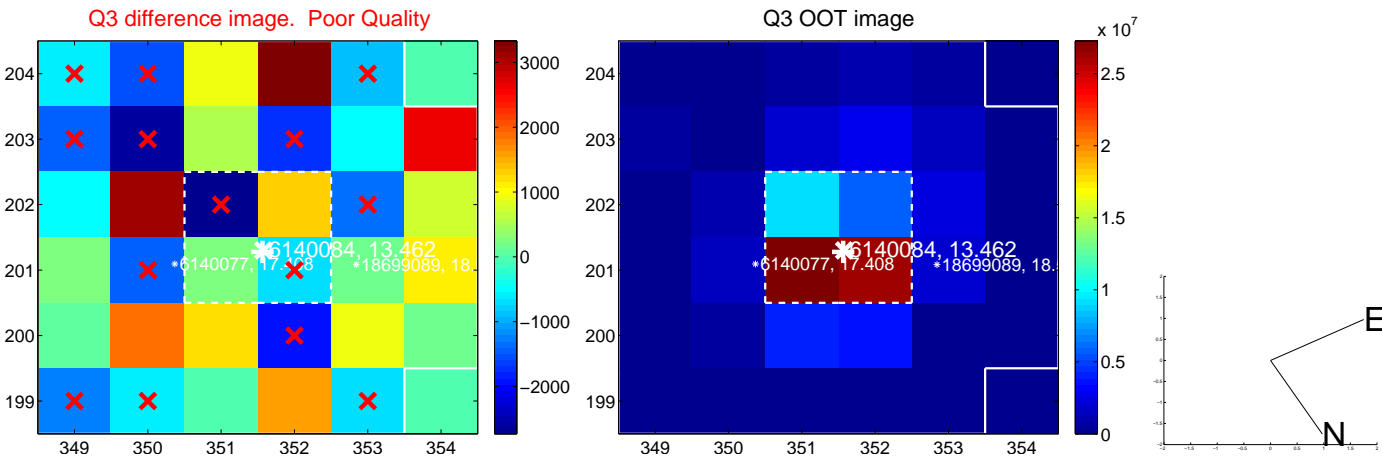
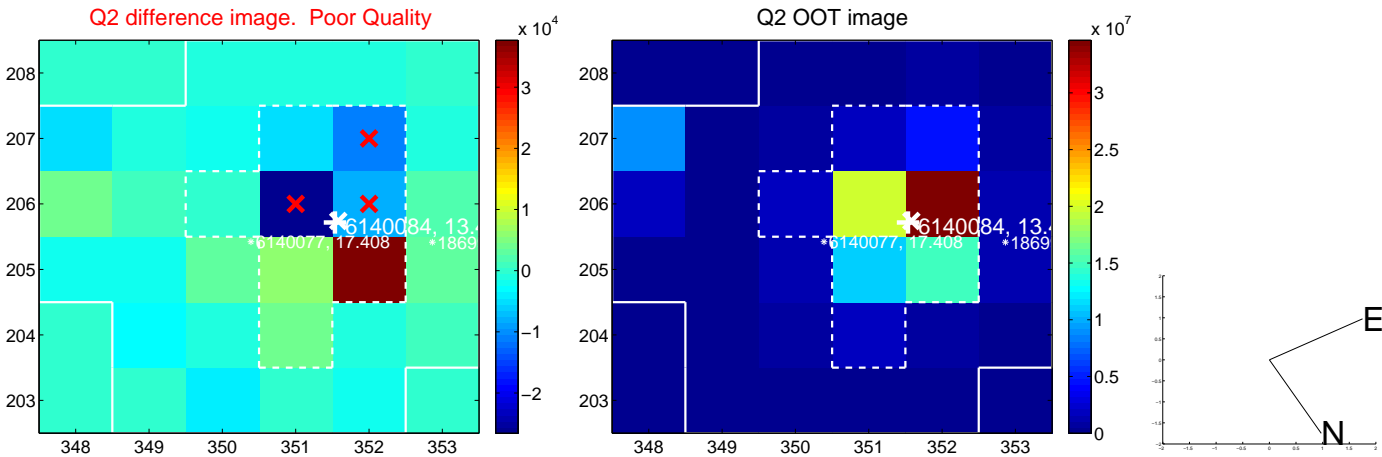
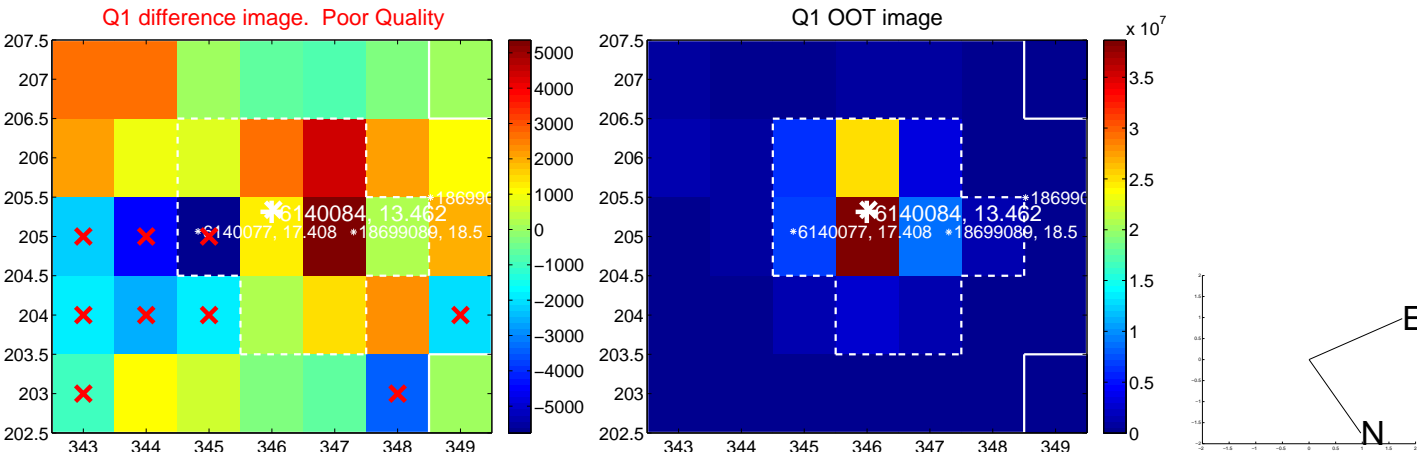


offset from photometric centroids

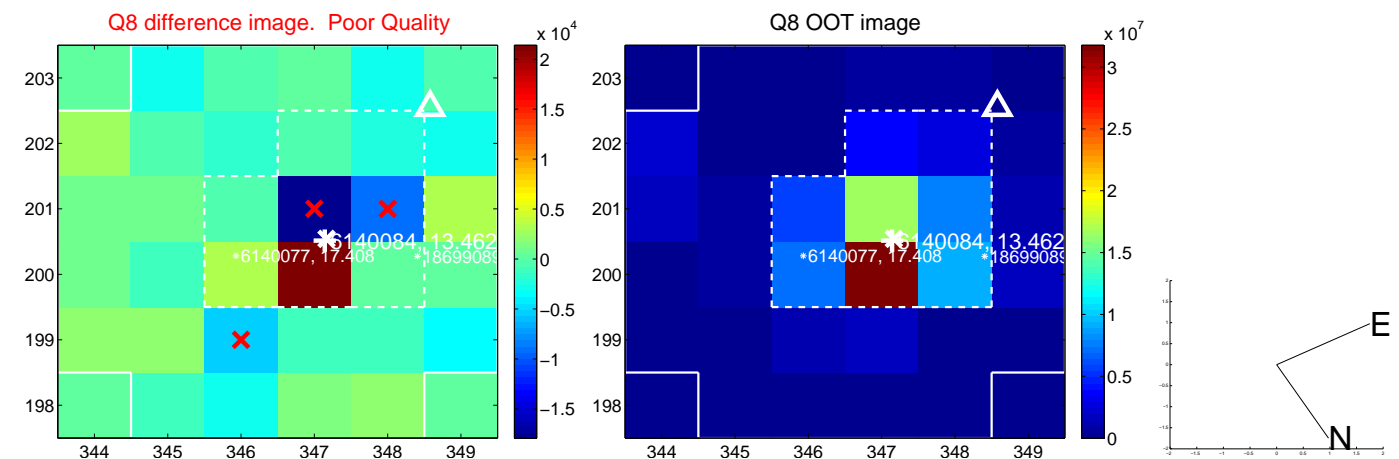
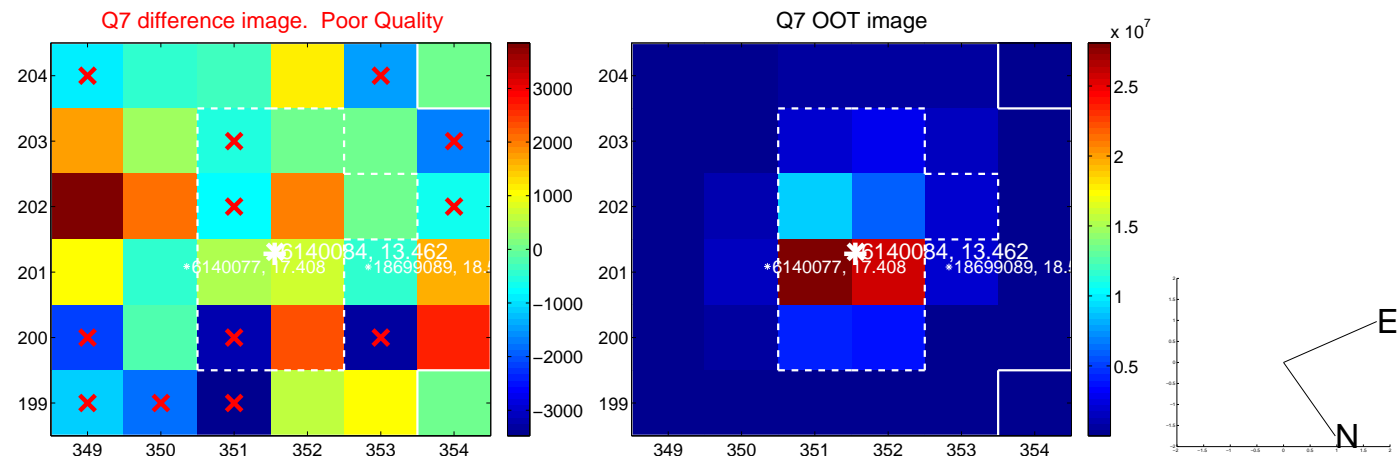
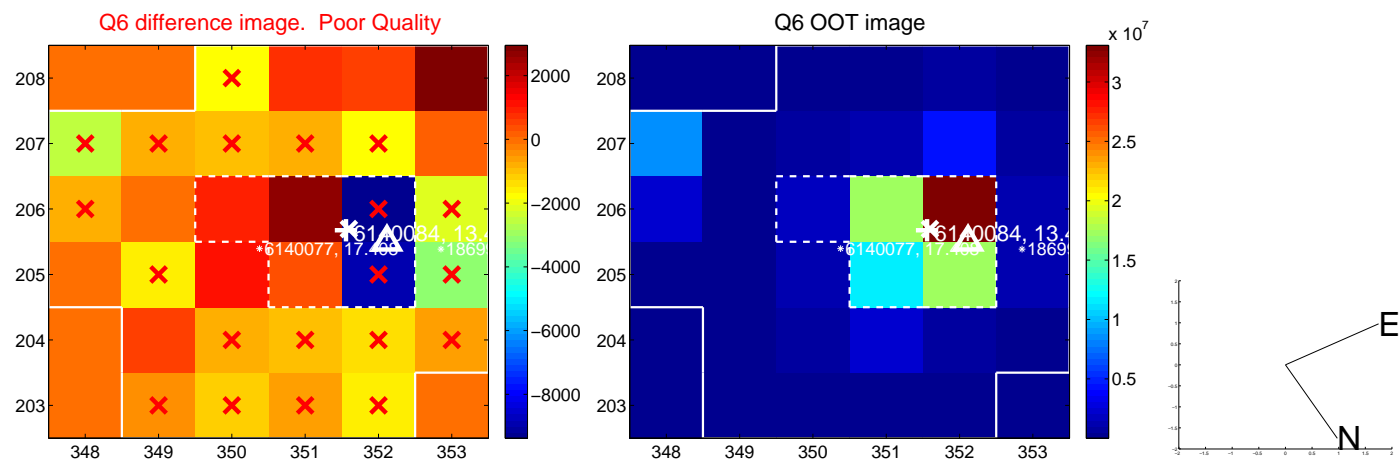
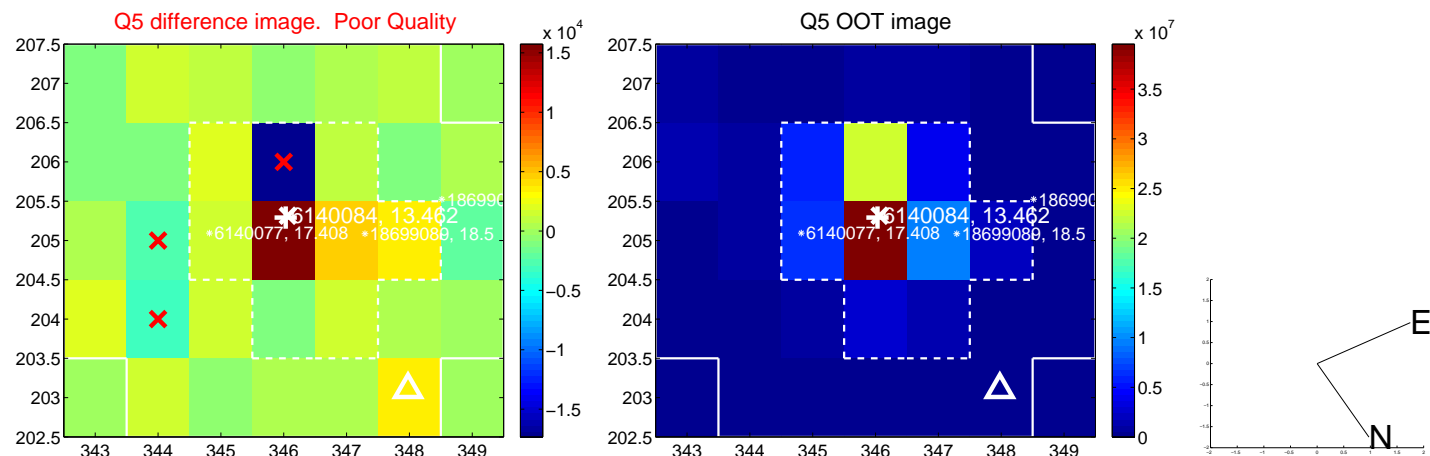


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

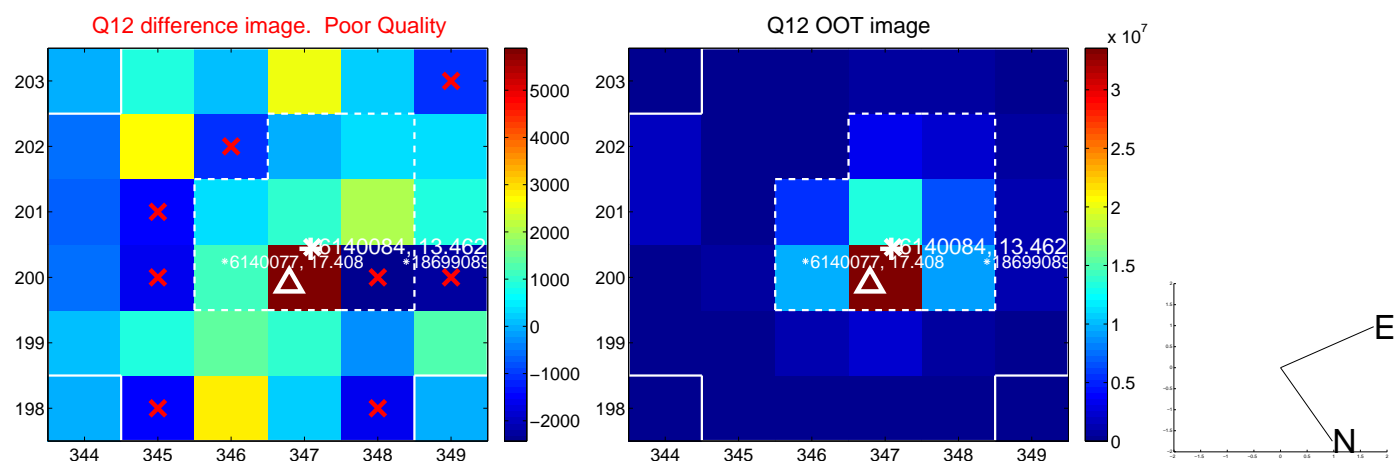
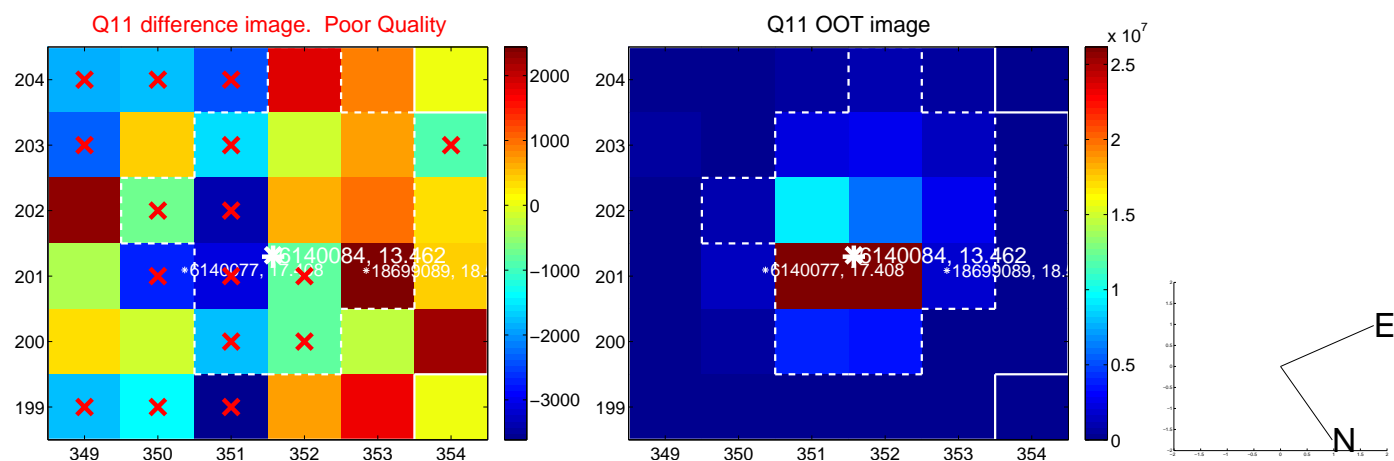
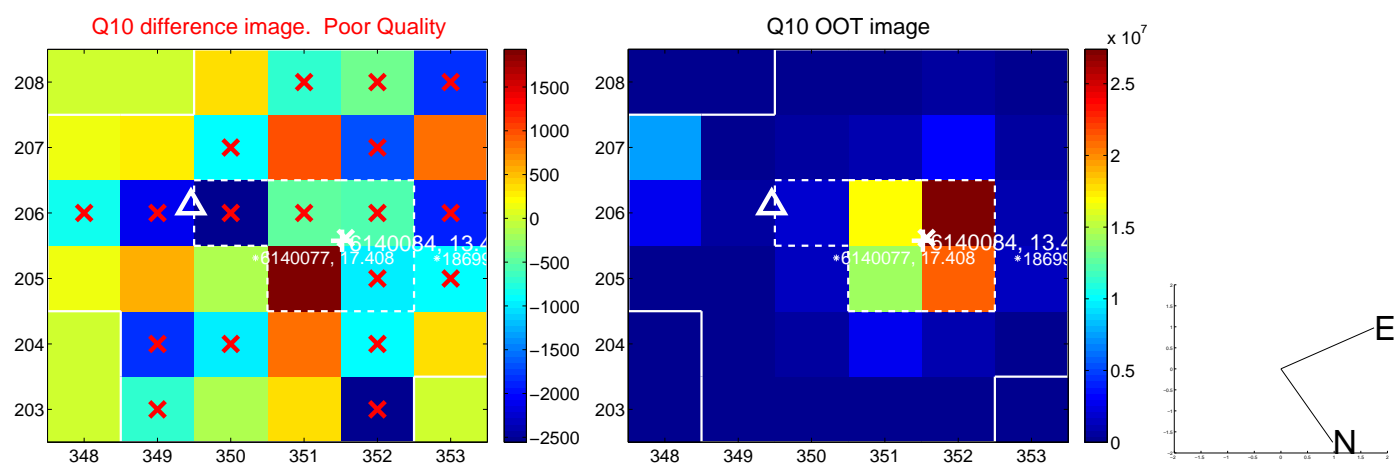
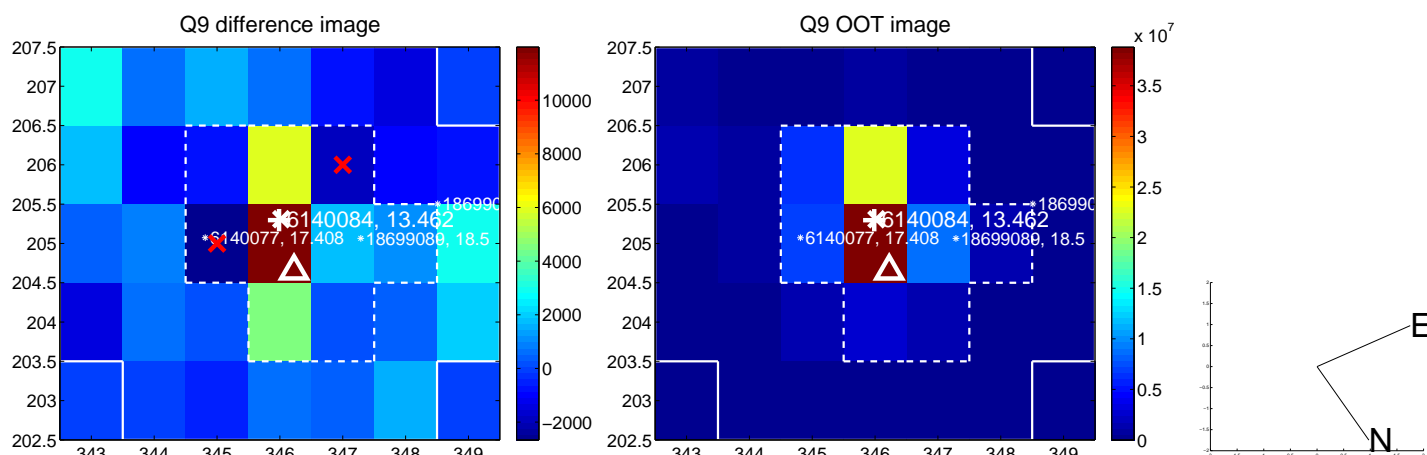
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



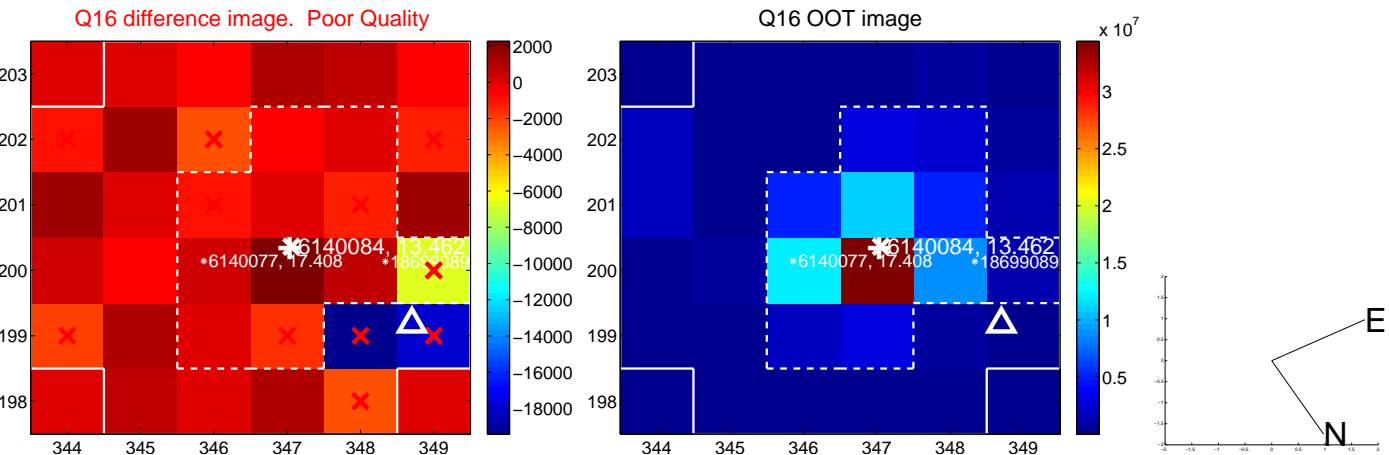
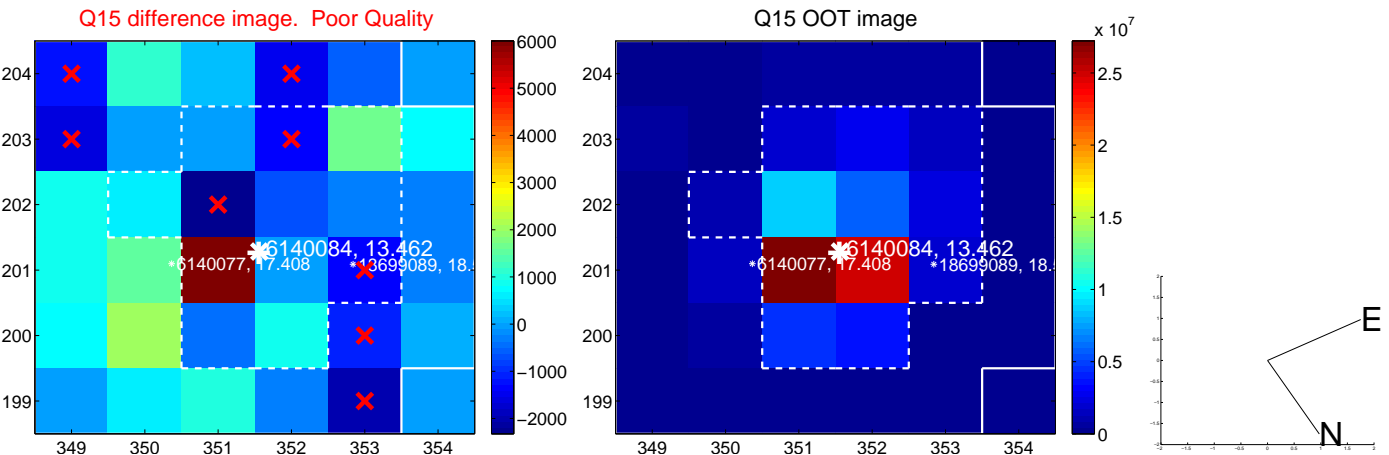
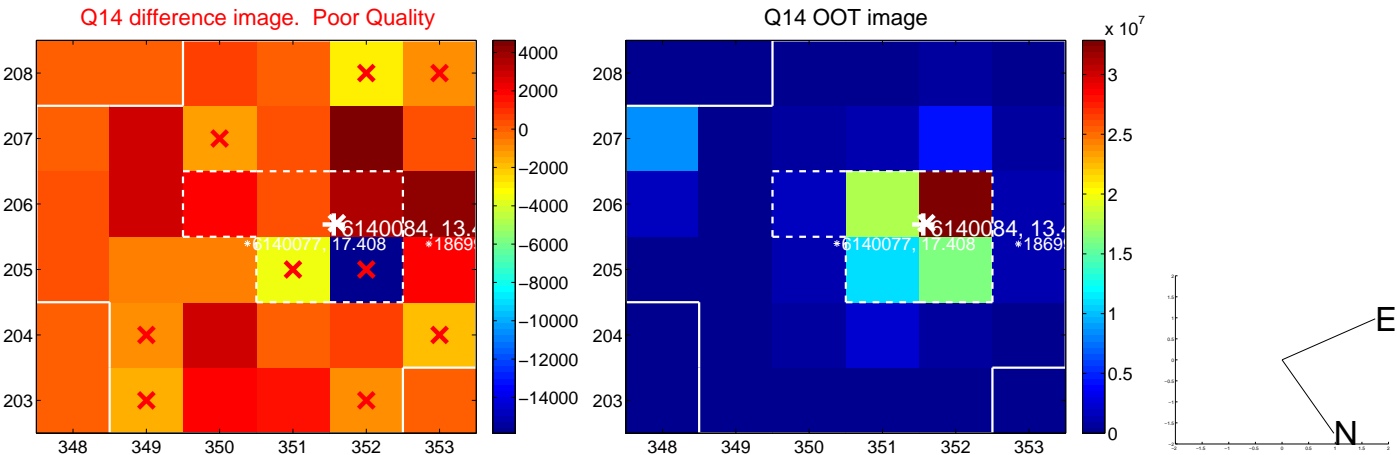
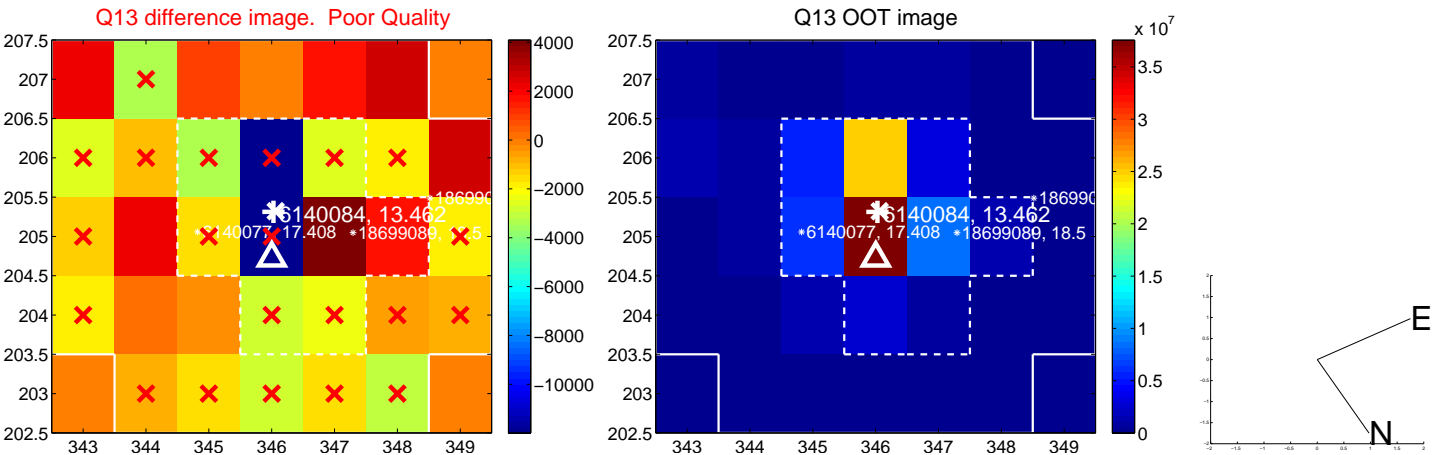
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

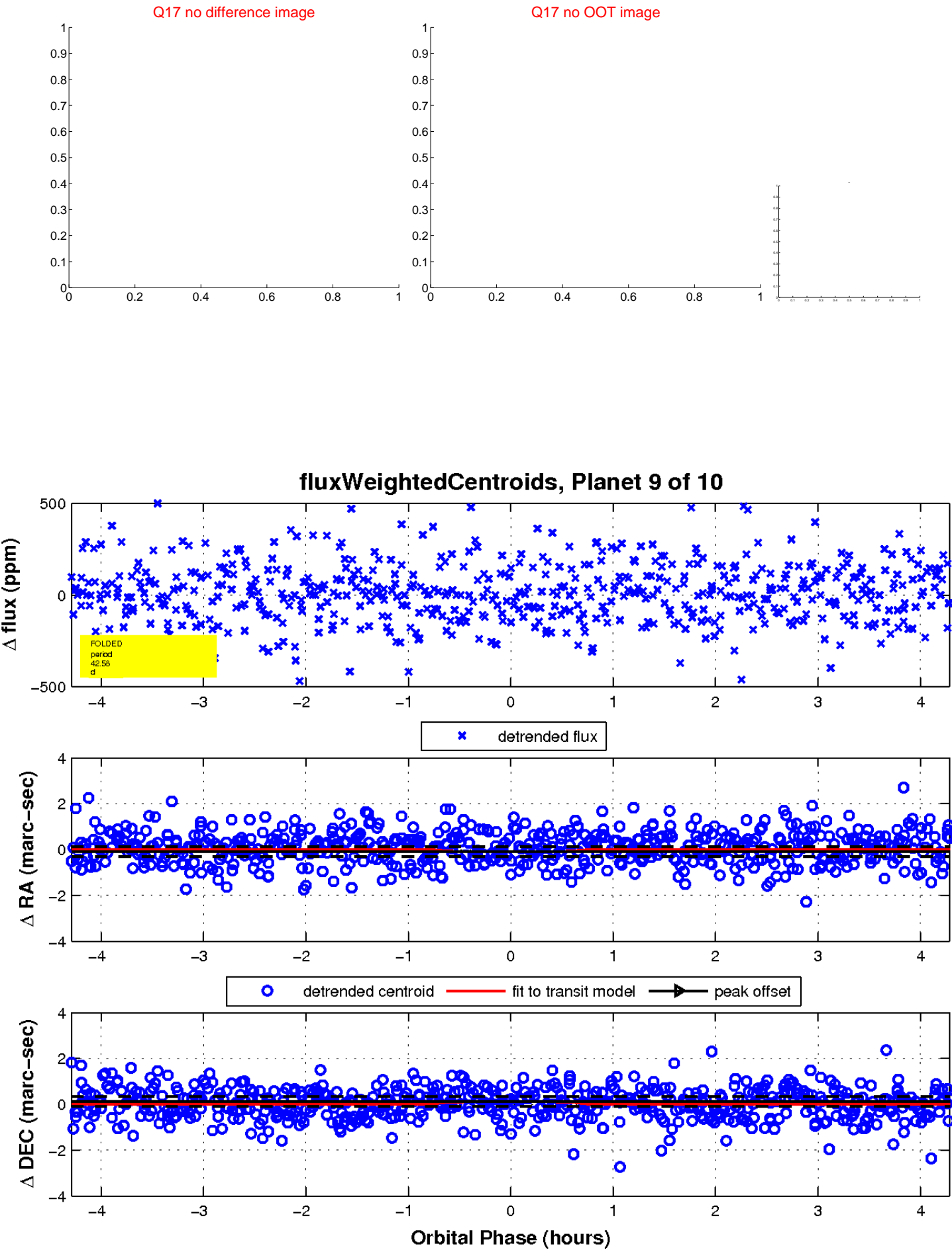


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



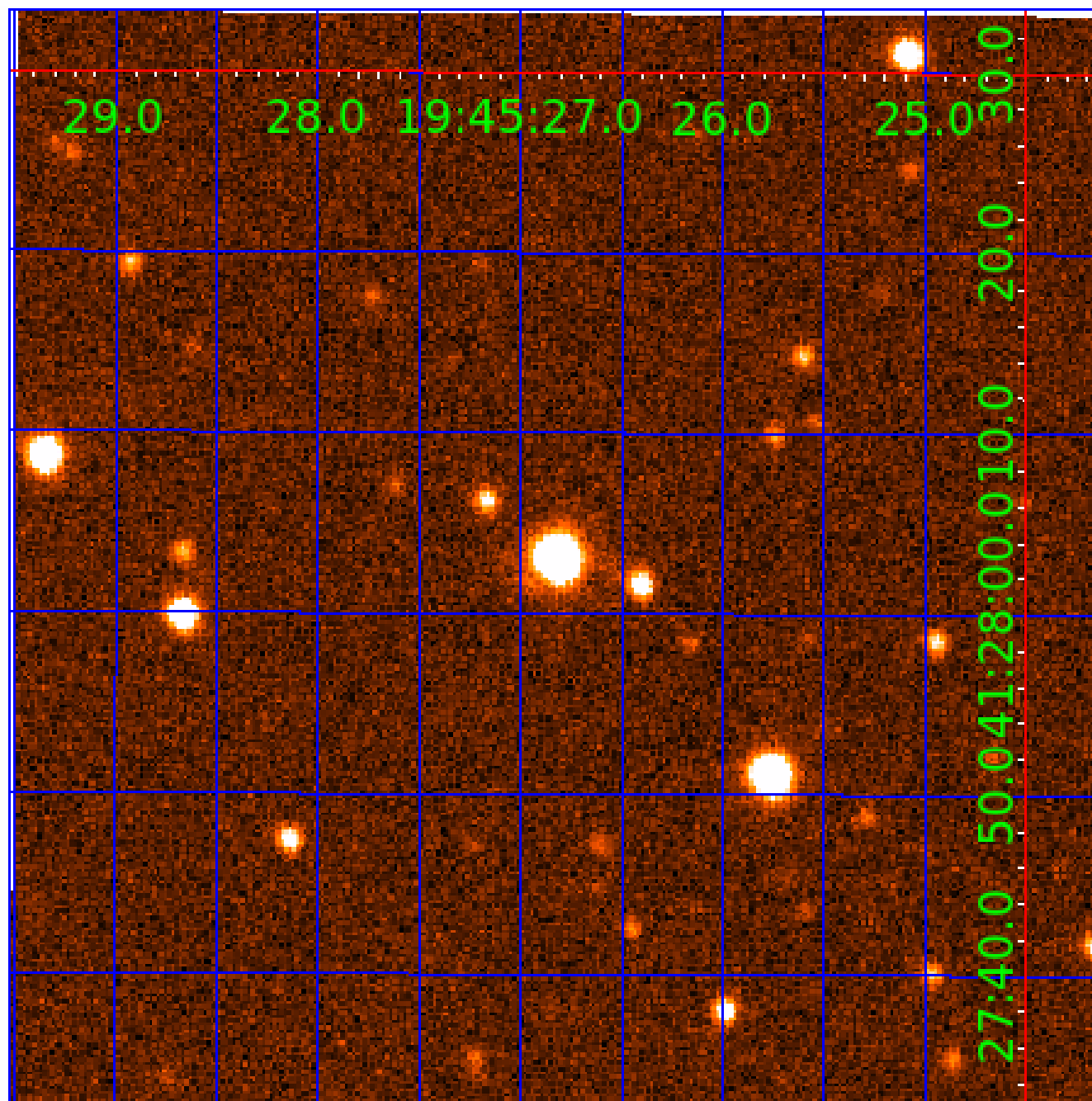


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## KIC 006140084

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 006140084-01 | OBS      | No   | 1.348478      | 132.076293   | 3.4         | 9.738            | 11.4 | 1.7  | 2.73                        | 6579            | 0.58                   | 17086.49               |
| 006140084-02 | OBS      | No   | 32.842249     | 133.913243   | 256.8       | 2.008            | 14.3 | 8.9  | 2.73                        | 6579            | 4.91                   | 242.03                 |
| 006140084-03 | OBS      | No   | 16.270261     | 145.965945   | 222.6       | 3.061            | 13.6 | 13.4 | 2.73                        | 6579            | 4.63                   | 617.43                 |
| 006140084-04 | OBS      | No   | 34.123591     | 162.540440   | 283.7       | 3.099            | 12.7 | 13.1 | 2.73                        | 6579            | 5.04                   | 229.99                 |
| 006140084-05 | OBS      | No   | 18.333370     | 148.453294   | 175.9       | 4.100            | 13.7 | 10.6 | 2.73                        | 6579            | 4.17                   | 526.57                 |
| 006140084-06 | OBS      | No   | 23.564542     | 153.889256   | 173.3       | 2.818            | 11.4 | 9.4  | 2.73                        | 6579            | 4.09                   | 376.79                 |
| 006140084-07 | OBS      | No   | 20.820935     | 132.647961   | 282.6       | 1.086            | 11.7 | 10.5 | 2.73                        | 6579            | 4.76                   | 444.40                 |
| 006140084-08 | OBS      | No   | 37.441680     | 132.372675   | 277.8       | 2.576            | 9.9  | 10.9 | 2.73                        | 6579            | 4.82                   | 203.22                 |
| 006140084-09 | OBS      | No   | 42.578021     | 150.235454   | 286.0       | 1.435            | 10.0 | 8.6  | 2.73                        | 6579            | 4.79                   | 171.21                 |
| 006140084-10 | OBS      | No   | 65.251417     | 189.342457   | 546.1       | 2.000            | 10.1 | -1.0 | 2.73                        | 6579            | 6.42                   | 96.90                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 006140084-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV   |
| 006140084-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-03 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-04 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-05 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT                        |
| 006140084-06 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS    |
| 006140084-07 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV   |
| 006140084-08 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT |
| 006140084-09 | OBS      | FP   | 0.00  | 1 | 0 | 1 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_FEW_MEAS—HALO_GHOST               |
| 006140084-10 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—NO_FITS—CENT_NOFITS                                   |

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

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

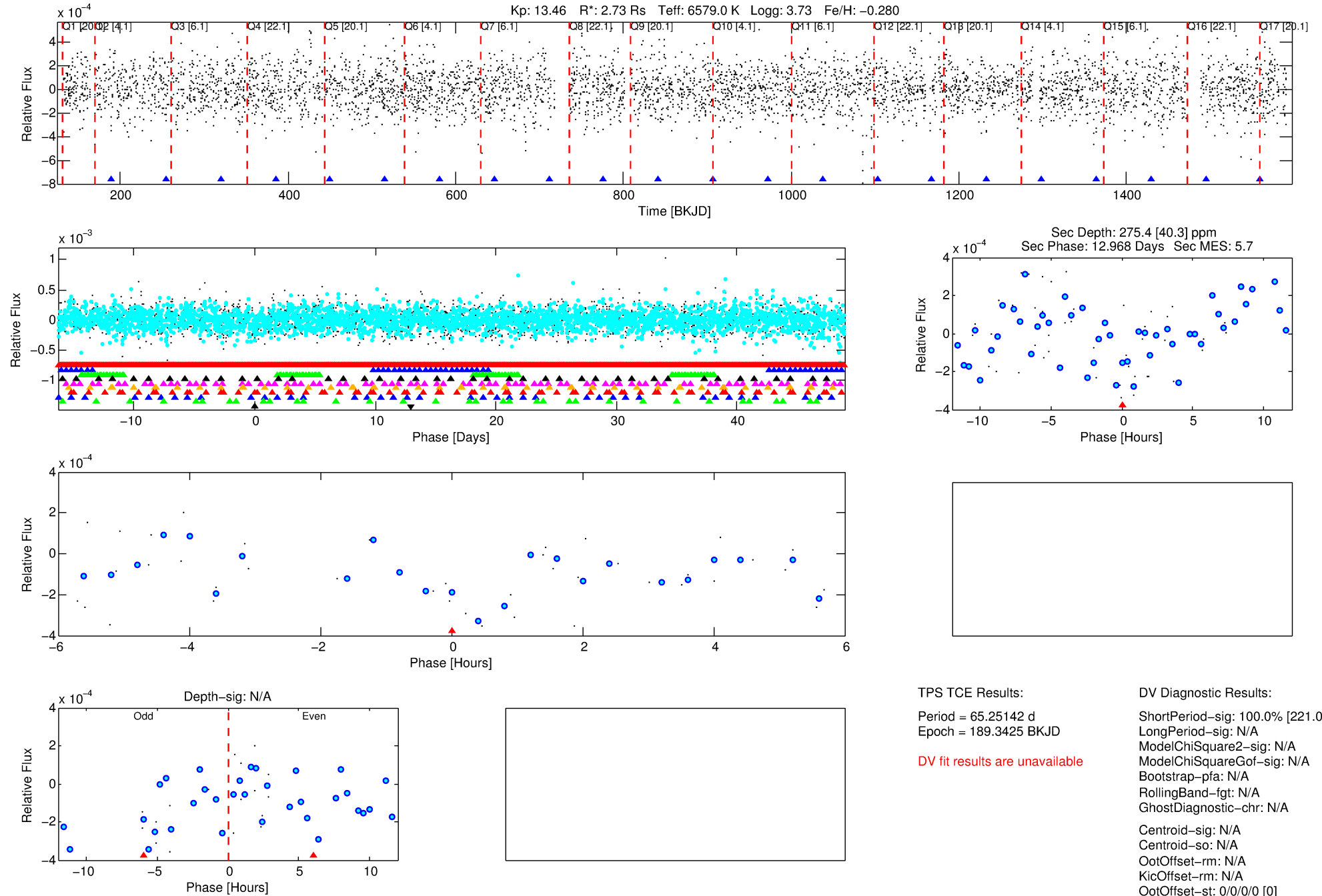
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006140084-10

No Significant Match Found

# DV One-Page Summary

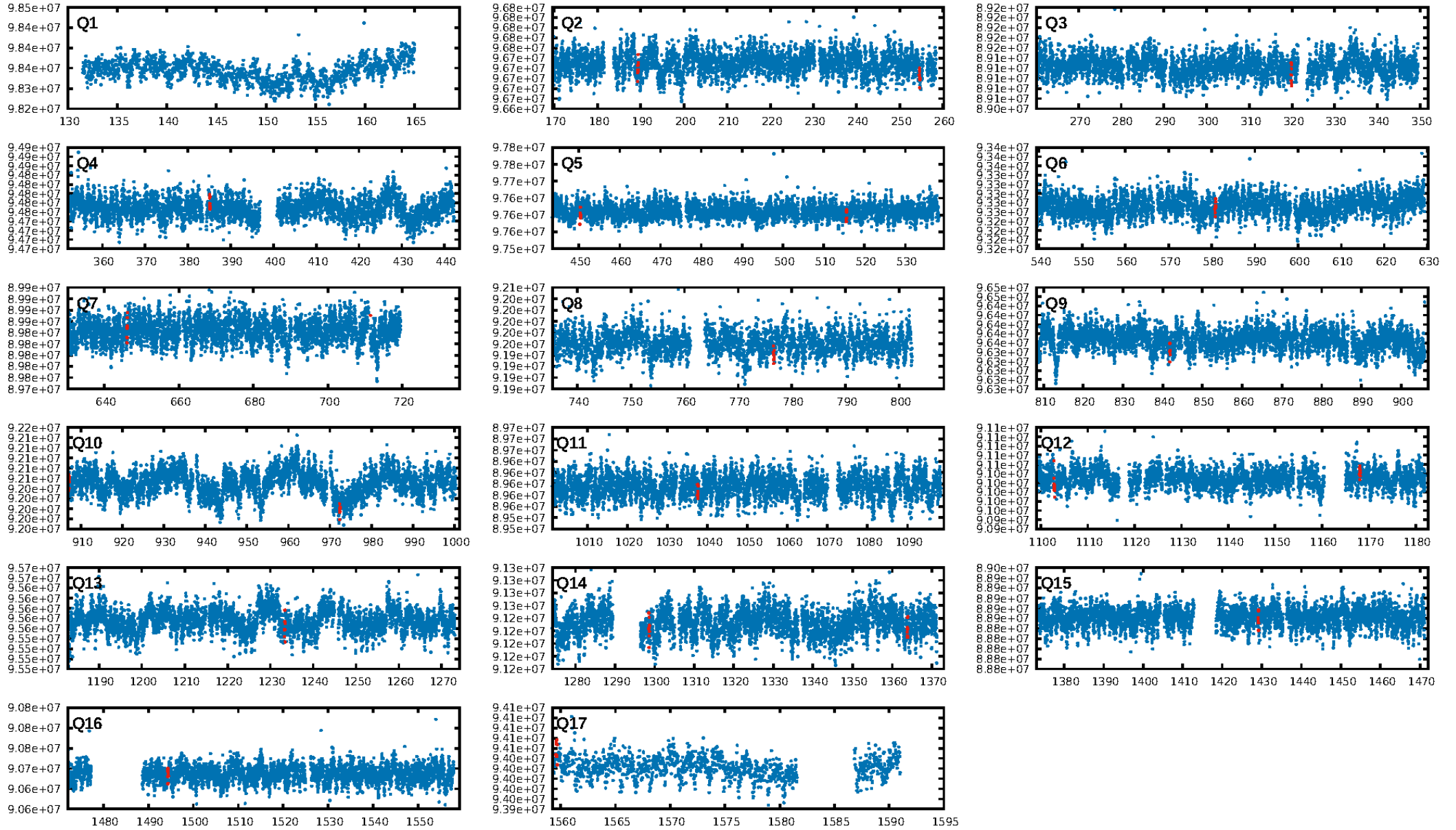
KIC: 6140084 Candidate: 10 of 10 Period: 65.251 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:12:55 Z

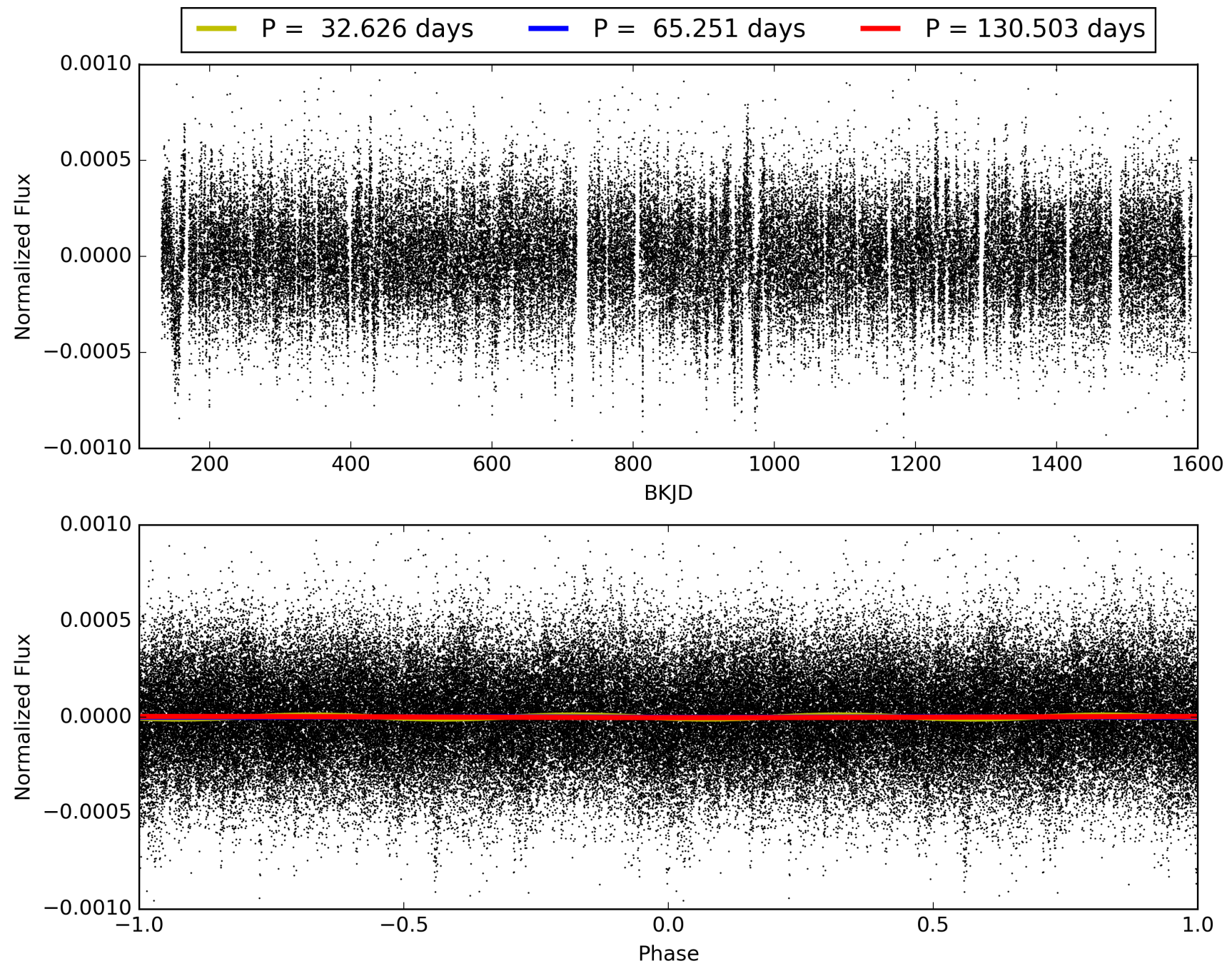
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006140084-10, PDC Light Curves



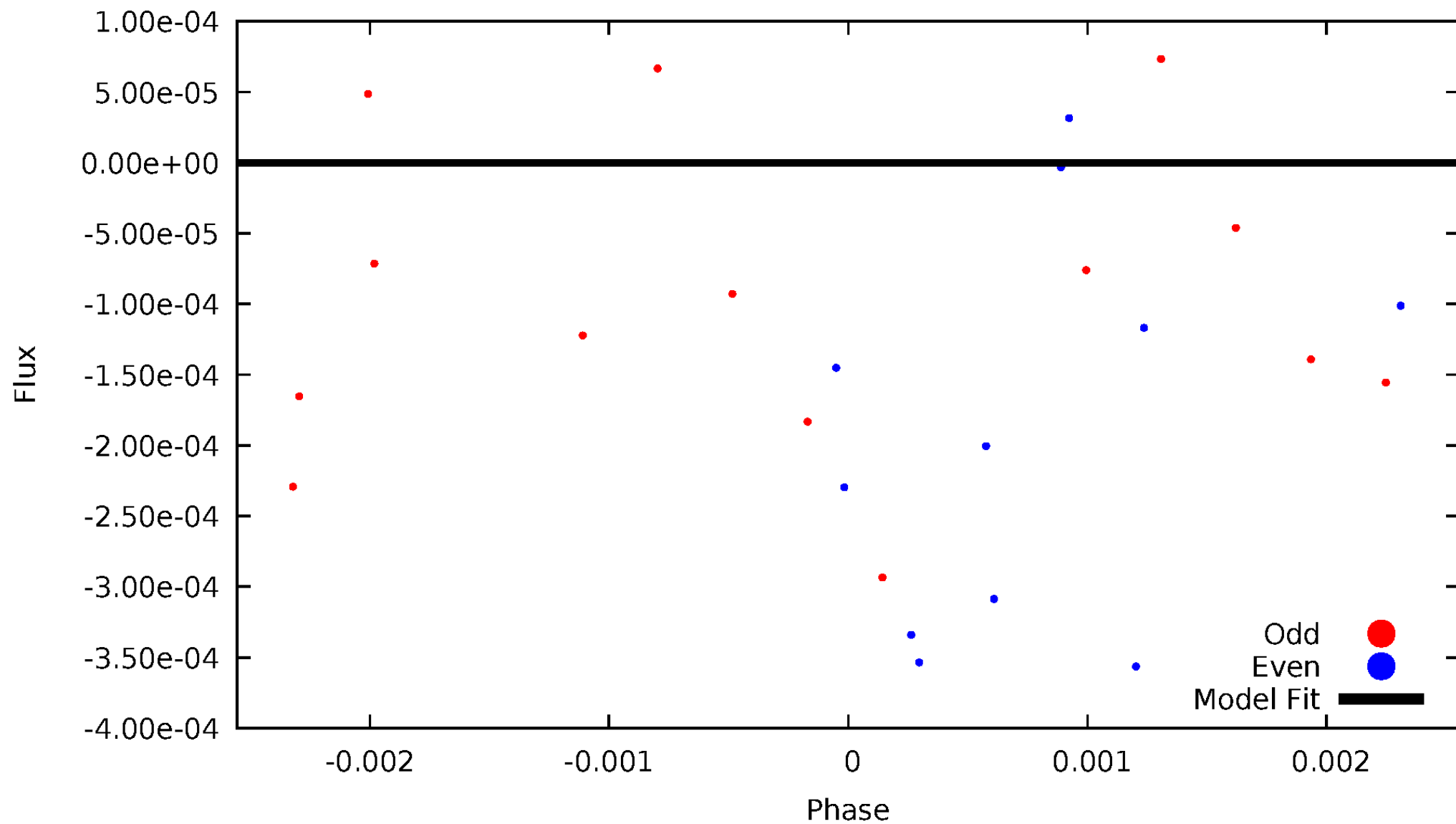


TCE 006140084-10



# DV Odd/Even

TCE 006140084-10





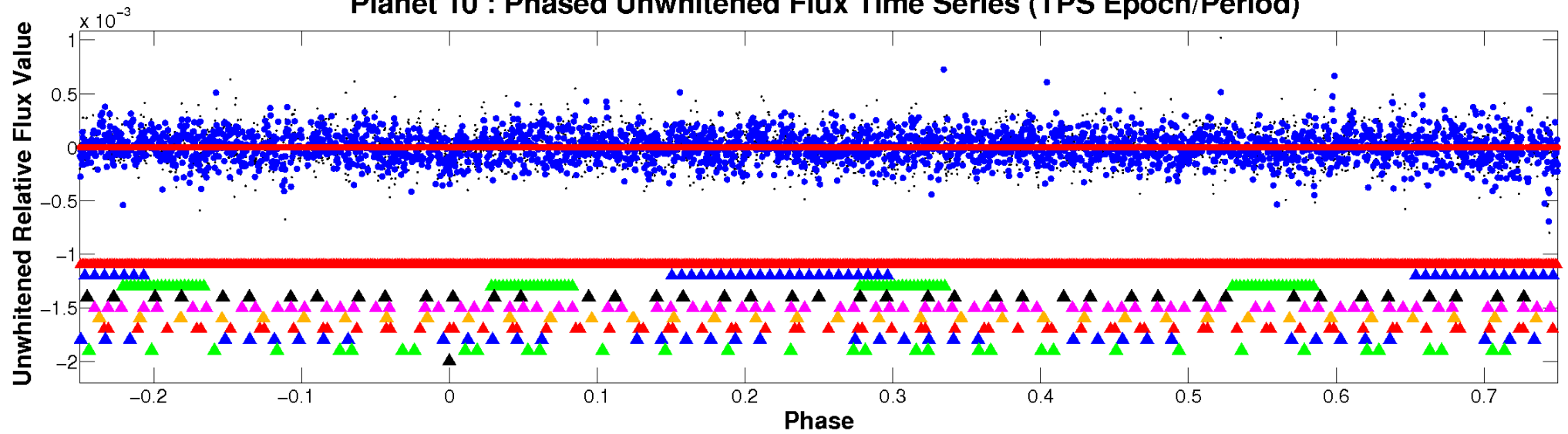


ALT Odd/Even

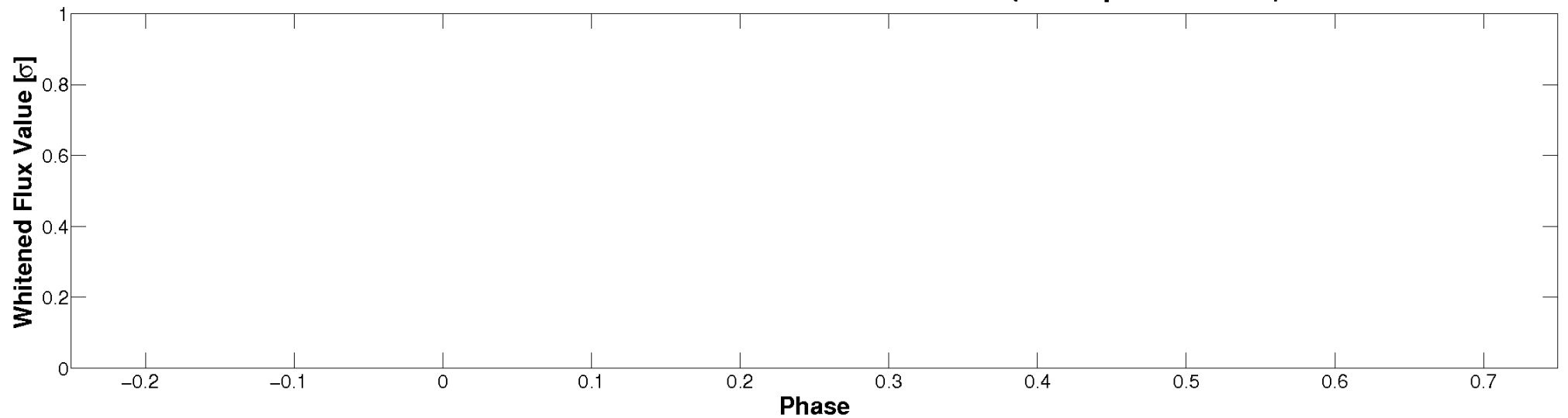
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

Planet 10 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

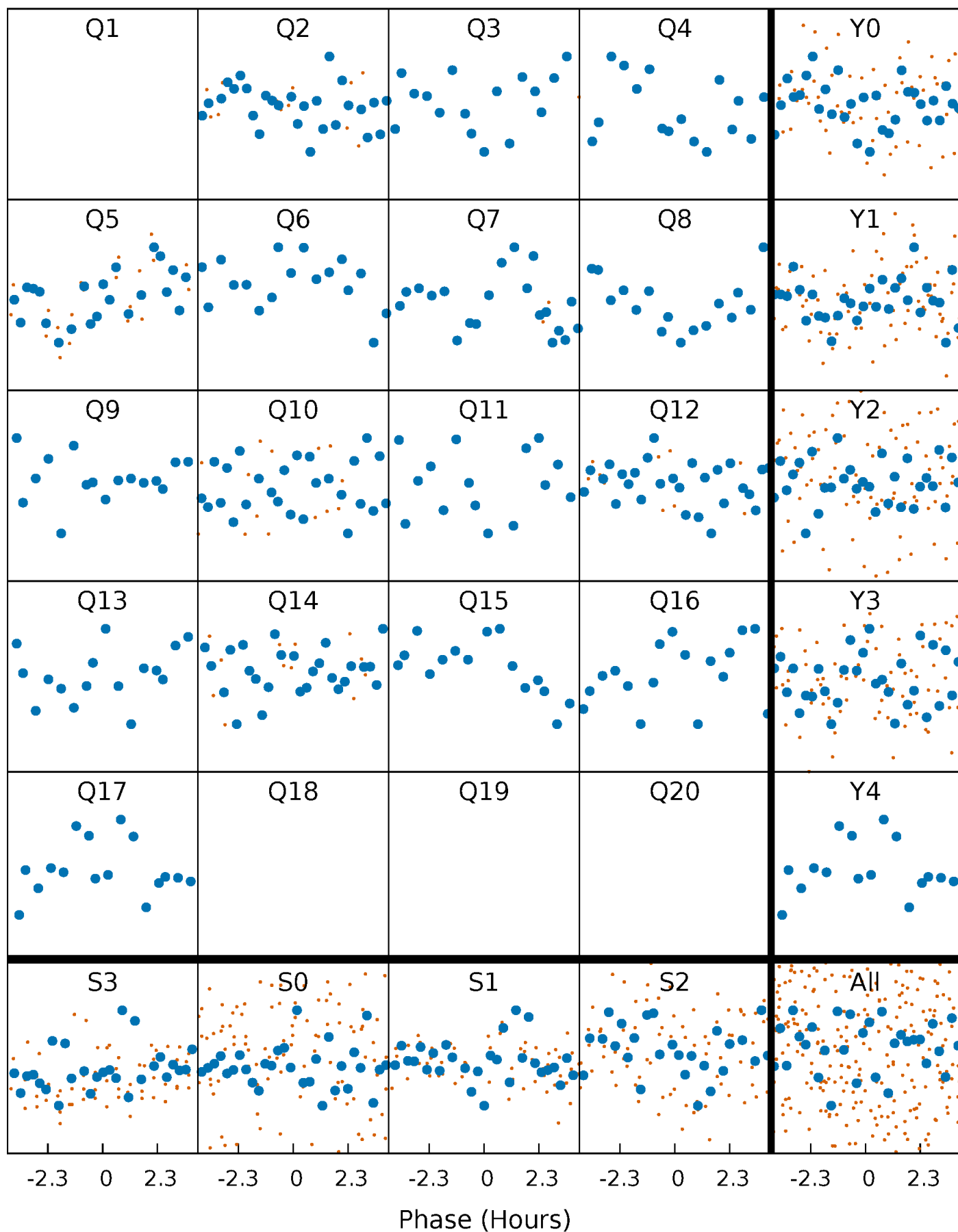


Planet 10 : Phased Whitened Flux Time Series (TPS Epoch/Period)



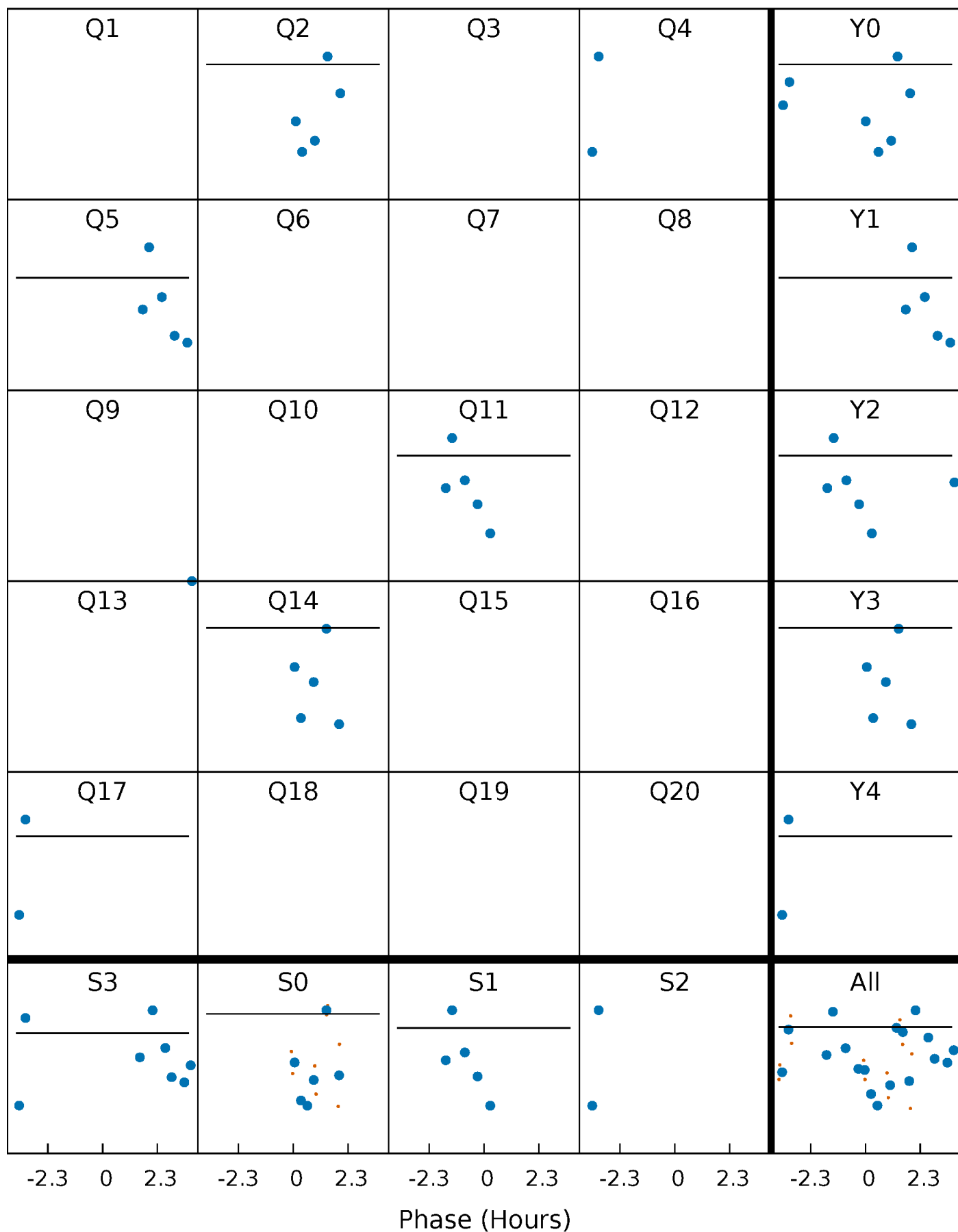
# PDC Quarter-Phased Transit Curves

TCE 006140084-10 P= 65.251417 Days  $T_0=189.342457$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 006140084-10 P= 65.251417 Days  $T_0=189.342457$  (BKJD)

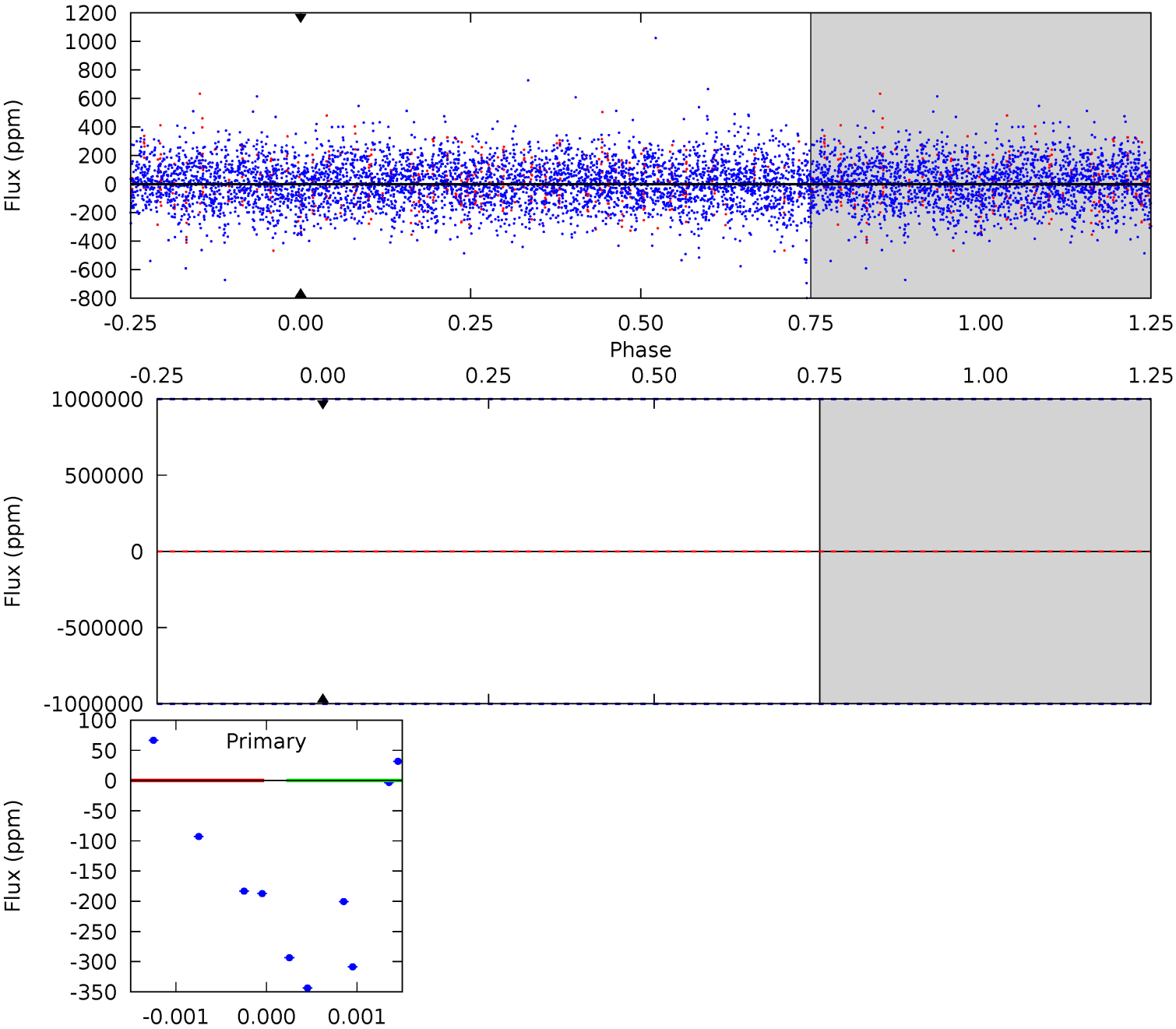


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

006140084-10, P = 65.251417 Days, E = 124.091040 Days

| Pri | Sec | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|-----|
| 0   | 0   | 0   | 0   | 1.00            | 1.00            | 1.00             | 0       | 0       | 0       | 0       | 0       | 0   | 0     | 0   |



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 006140084

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | $[\text{Fe}/\text{H}]$     | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6579^{+158}_{-198}$ | $3.727^{+0.312}_{-0.078}$ | $-0.280^{+0.300}_{-0.250}$ | $2.725^{+0.429}_{-1.000}$ | $1.443^{+0.241}_{-0.294}$ | $0.101^{+0.219}_{-0.033}$                 |
|        | +2%/-3%              | +8%/-2%                   | +107%/-89%                 | +16%/-37%                 | +17%/-20%                 | +218%/-32%                                |
| Source | PHO1                 | FLK73                     | KIC0                       | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 006140084-10 / KOI

| Detrend | Depth (ppm)     | $R_p (R_{\oplus})$        | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$      | $A_{\text{obs}}$                     |
|---------|-----------------|---------------------------|----------------------|---------------------------|--------------------------------------|
| DV      | $0 \pm 1000000$ | $20.75^{+24.39}_{-13.81}$ | $1094^{+58}_{-100}$  | $-4488^{+29980}_{-21605}$ | $-148.953^{+25056.072}_{-26565.875}$ |
| Alt.    | N/A             | N/A                       | N/A                  | N/A                       | N/A                                  |

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature  
 $T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{\text{obs}}$  = 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  $A_{\text{obs}} \gg 1.0$



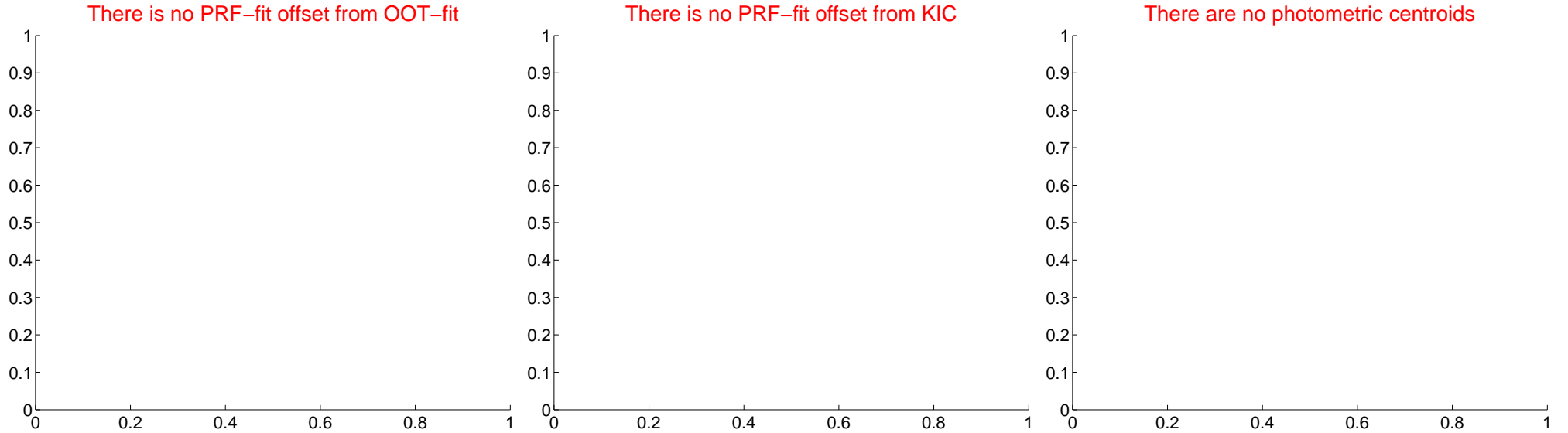
## DV Centroid Data

Supplemental centroid analysis for 006140084-10. Kepler magnitude: 13.46. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

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

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA | $\Delta$ Dec |
|---|--------------------|---------------------|-------------|--------------|
| PRF-fit source offset from OOT          | —                  | —                   | —           | —            |
| PRF-fit source offset from KIC position | —                  | —                   | —           | —            |
| photometric centroid source offset      | —                  | —                   | —           | —            |



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- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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.



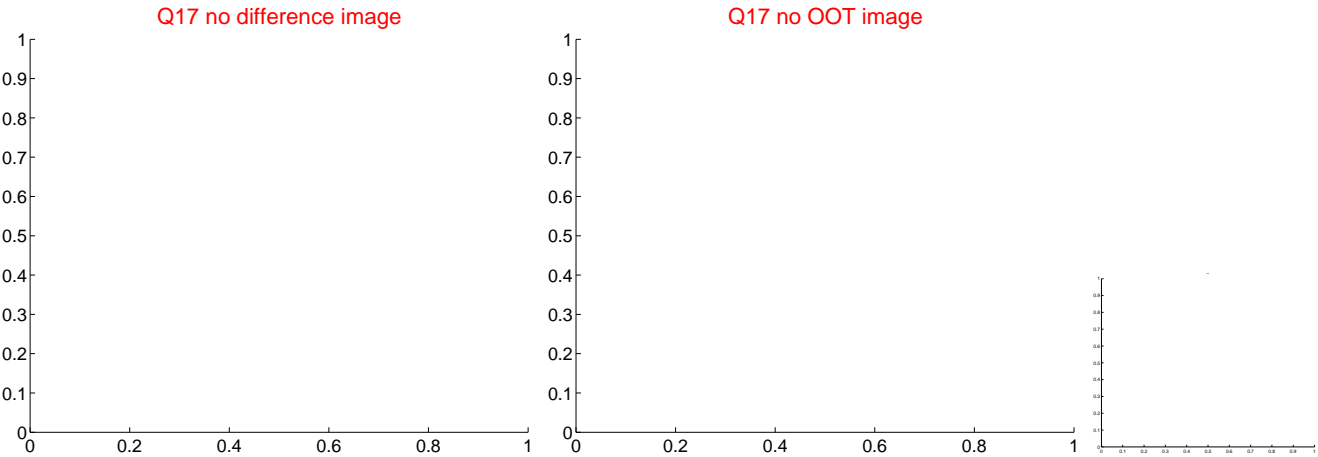
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



folded centroid time series figure for this object.

UKIRT Image

Declination

