

# KIC 007970860

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|-----|-----|-----------------------------|-----------------|------------------------|------------------------|
| 007970860-01 | OBS      | No   | 512.859690    | 302.627122   | 308.6       | 31.815           | 7.4 | 9.7 | 0.87                        | 5380            | 1.60                   | 0.39                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|--|
| 007970860-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS—CENT_FEW_DIFFS |

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

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

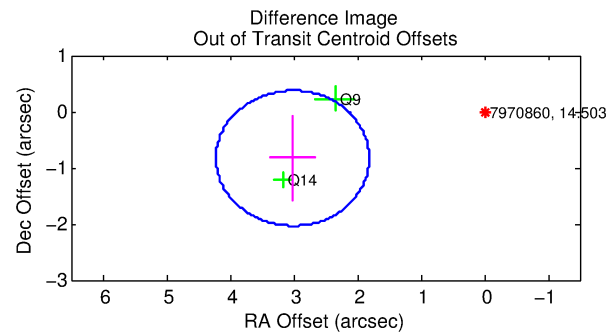
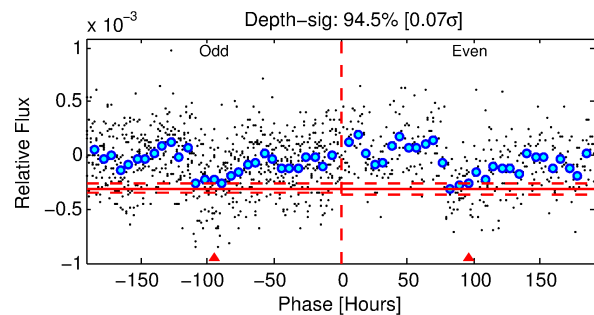
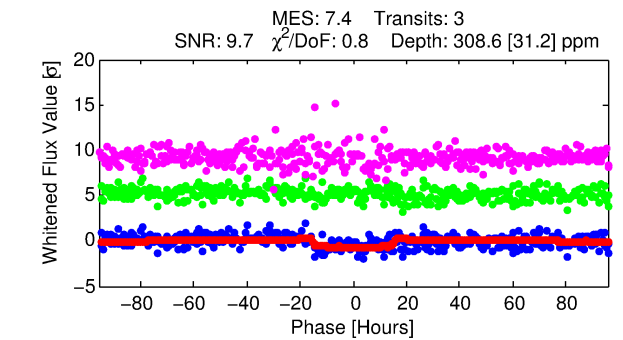
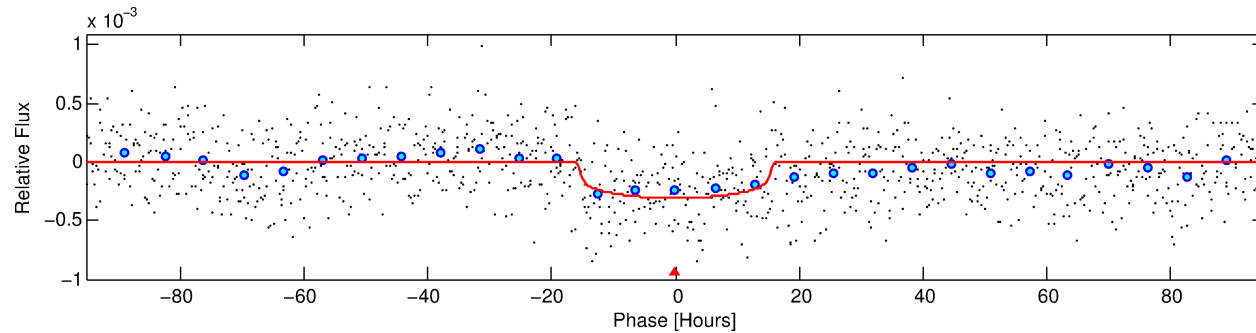
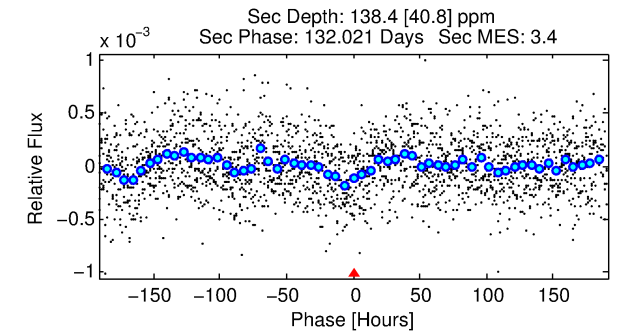
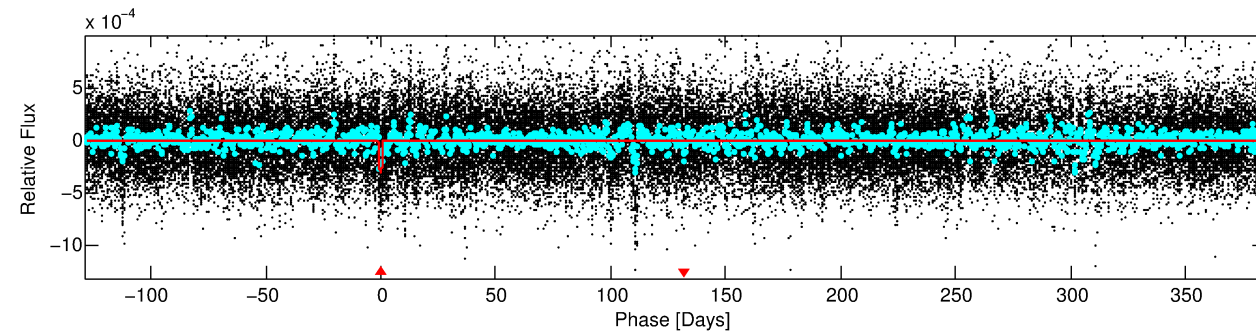
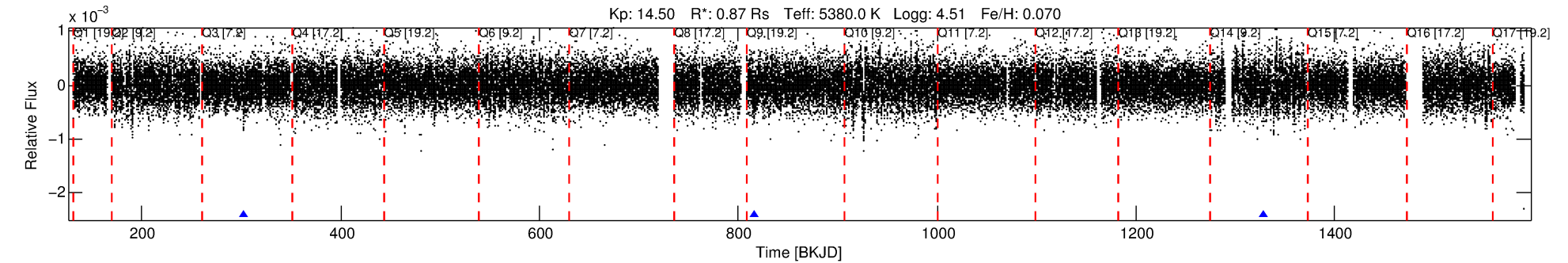
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007970860-01

No Significant Match Found

# DV One-Page Summary

KIC: 7970860 Candidate: 1 of 1 Period: 512.860 d



## DV Fit Results:

Period = 512.85969 [0.02155] d  
Epoch = 302.6271 [0.0253] BKJD  
Rp/R\* = 0.0168 [0.0044]  
a/R\* = 98.19 [98.30]  
b = 0.63 [0.96]  
Seff = 0.39 [0.11]  
Teff = 202 [14] K  
Rp = 1.60 [0.52] Re  
a = 1.2052 [0.1986] AU  
Ag = 43383.80 [28184.08] [1.54σ]  
Teffp = 4502 [692] K [6.22σ]

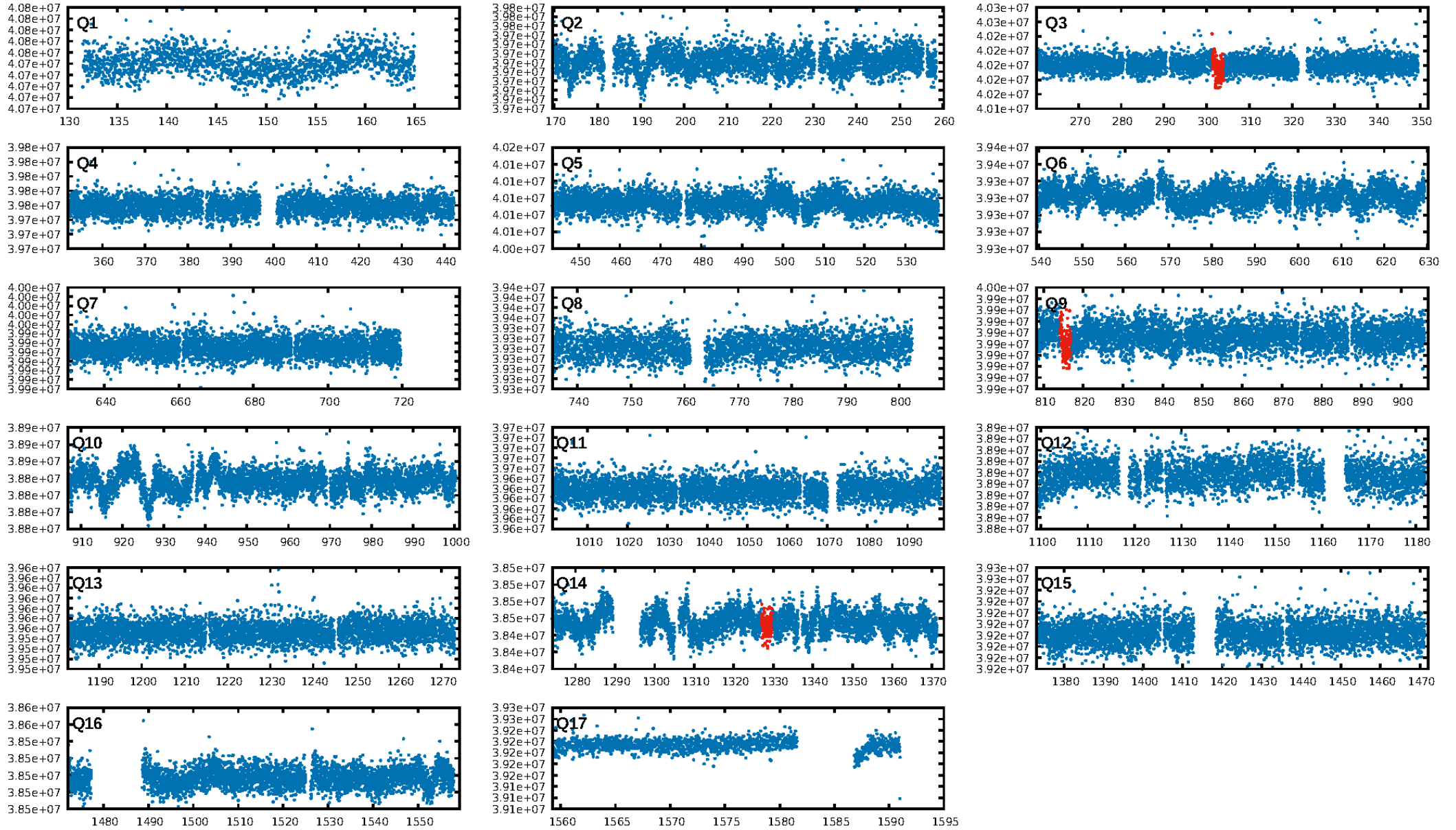
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 89.4%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.69e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 4.071  
Centroid-sig: 0.8%  
Centroid-so: 3.122 arcsec [2.80σ]  
**OotOffset-rm: 3.130 arcsec [7.80σ]**  
**KicOffset-rm: 3.123 arcsec [5.99σ]**  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

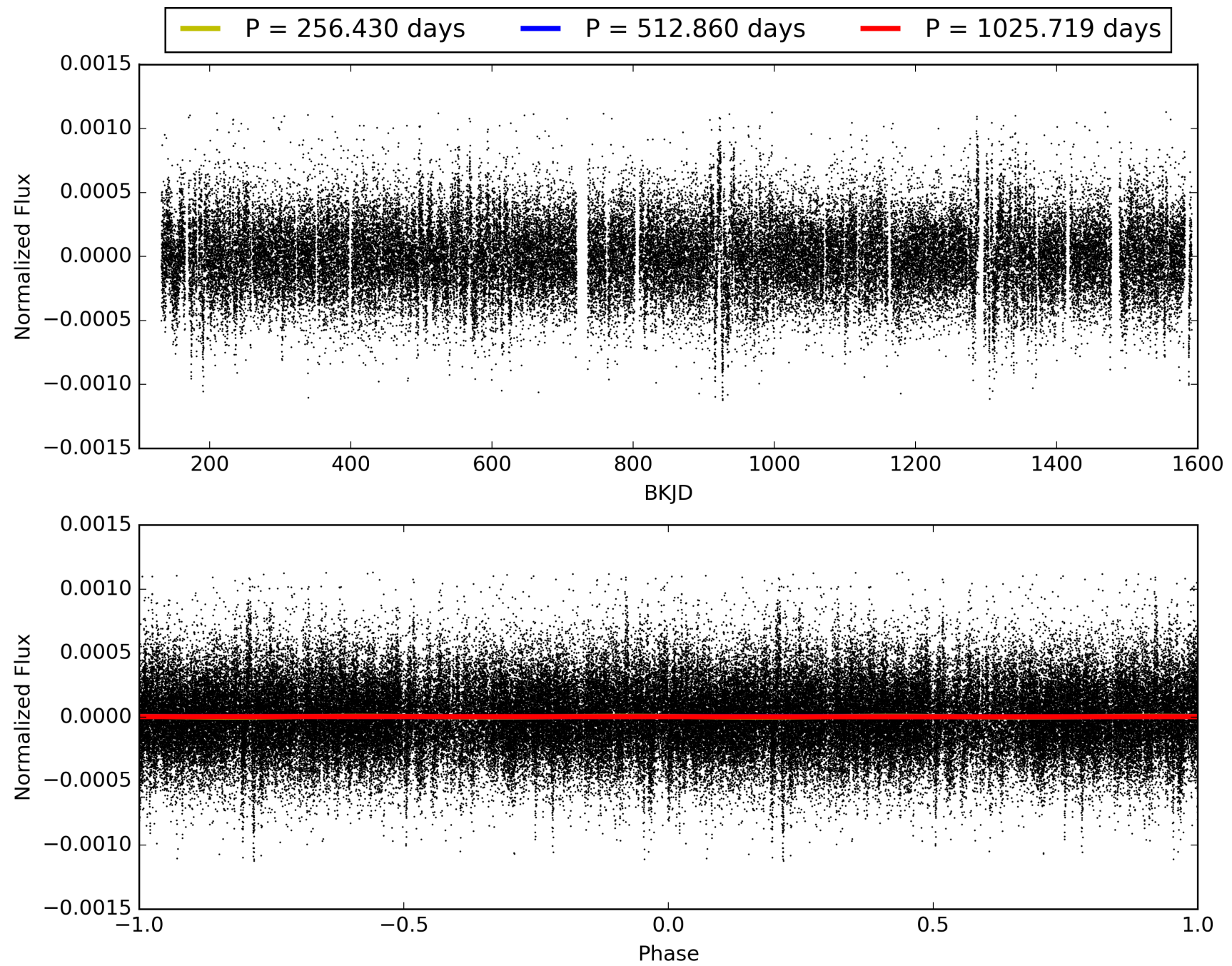
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 02:06:00 Z

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

# TCE 007970860-01, PDC Light Curves

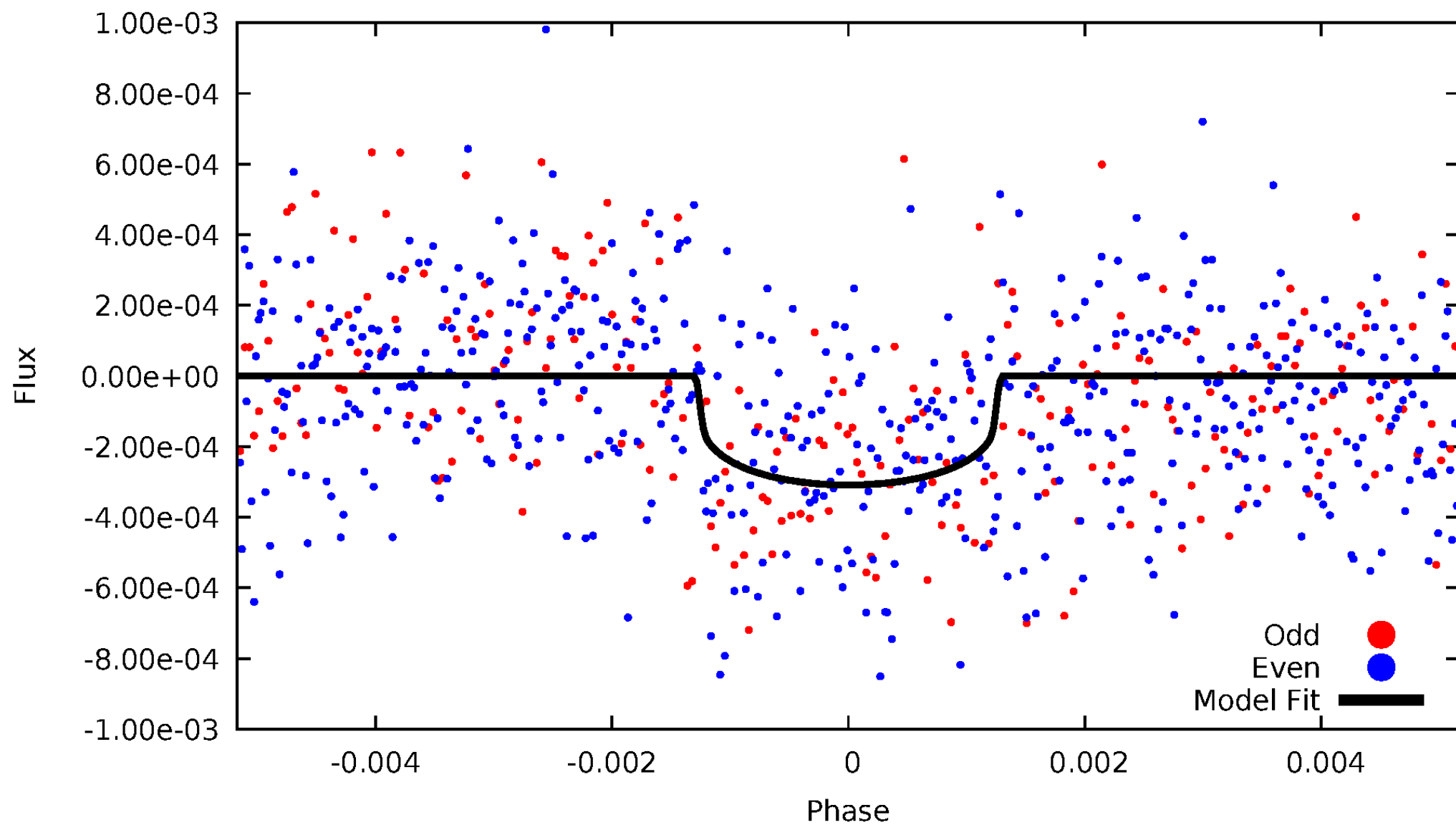


TCE 007970860-01



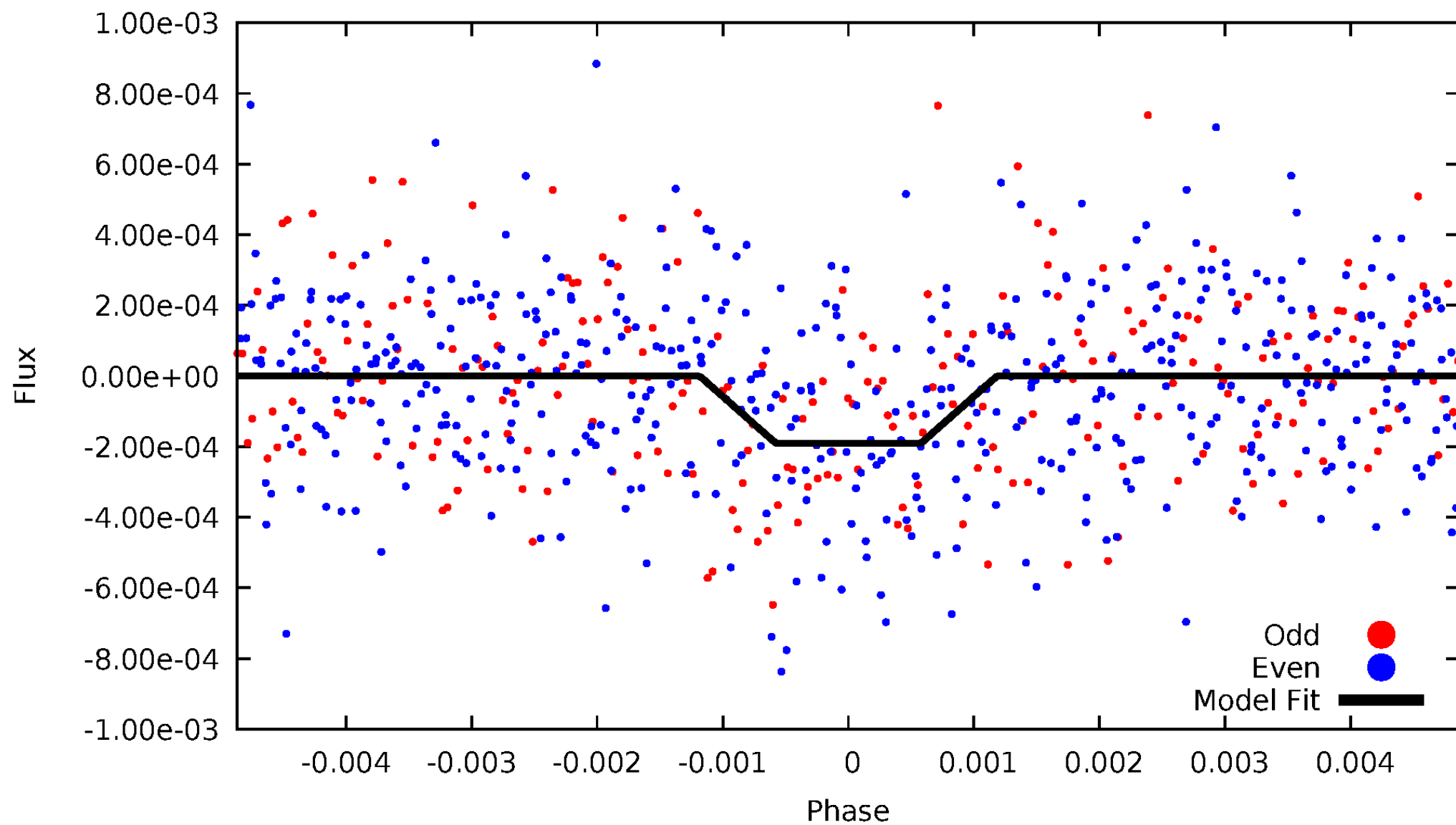
# DV Odd/Even

TCE 007970860-01



# ALT Odd/Even

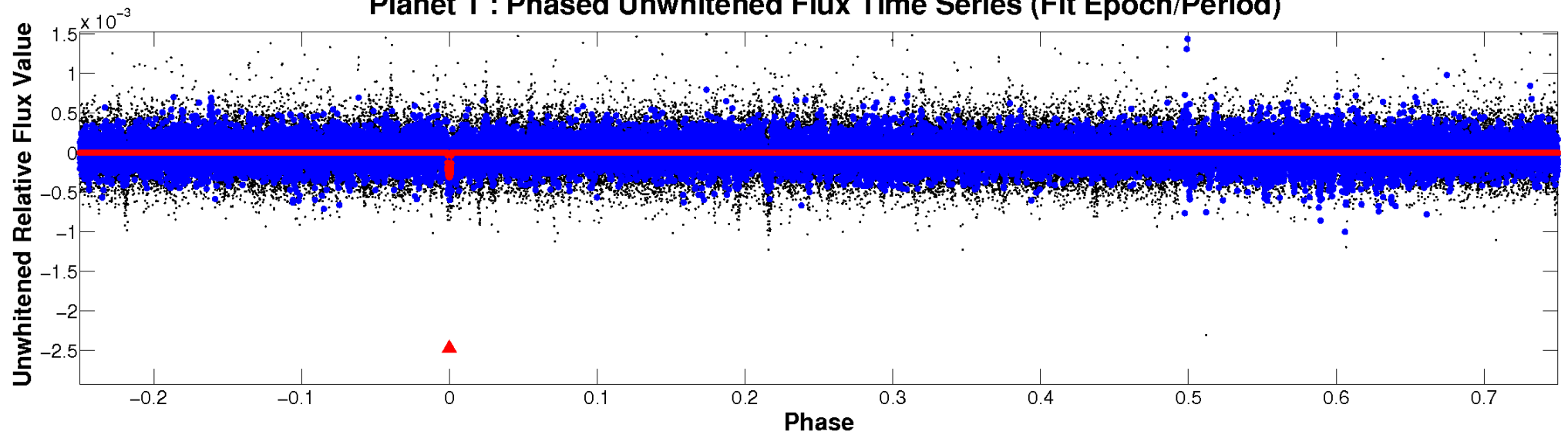
TCE 007970860-01



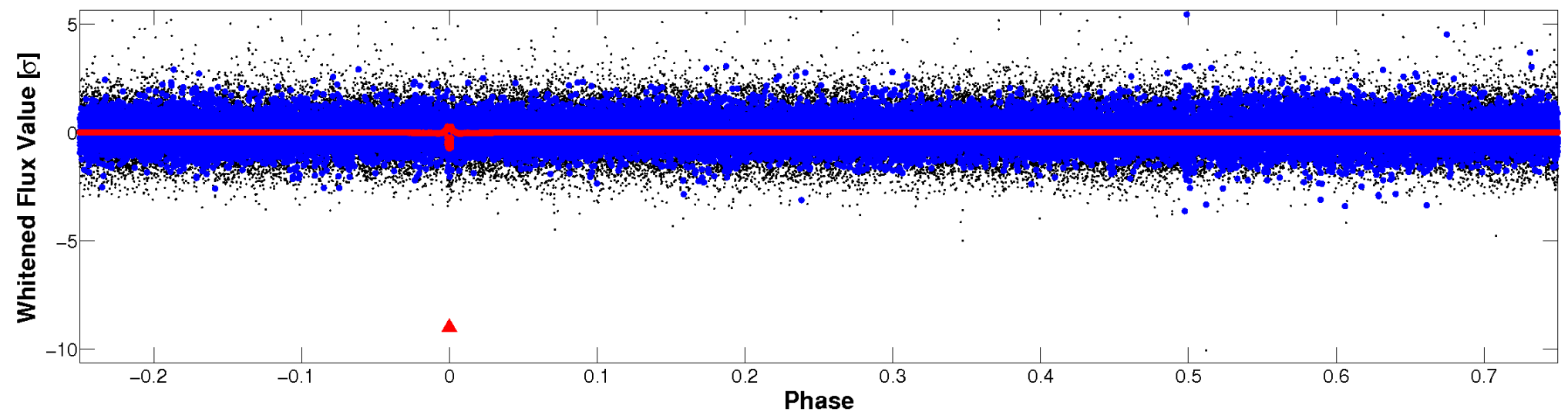


# Non-Whitened Vs. Whitened Light Curve

**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 007970860-01 P=512.859690 Days  $T_0=302.627122$  (BKJD)





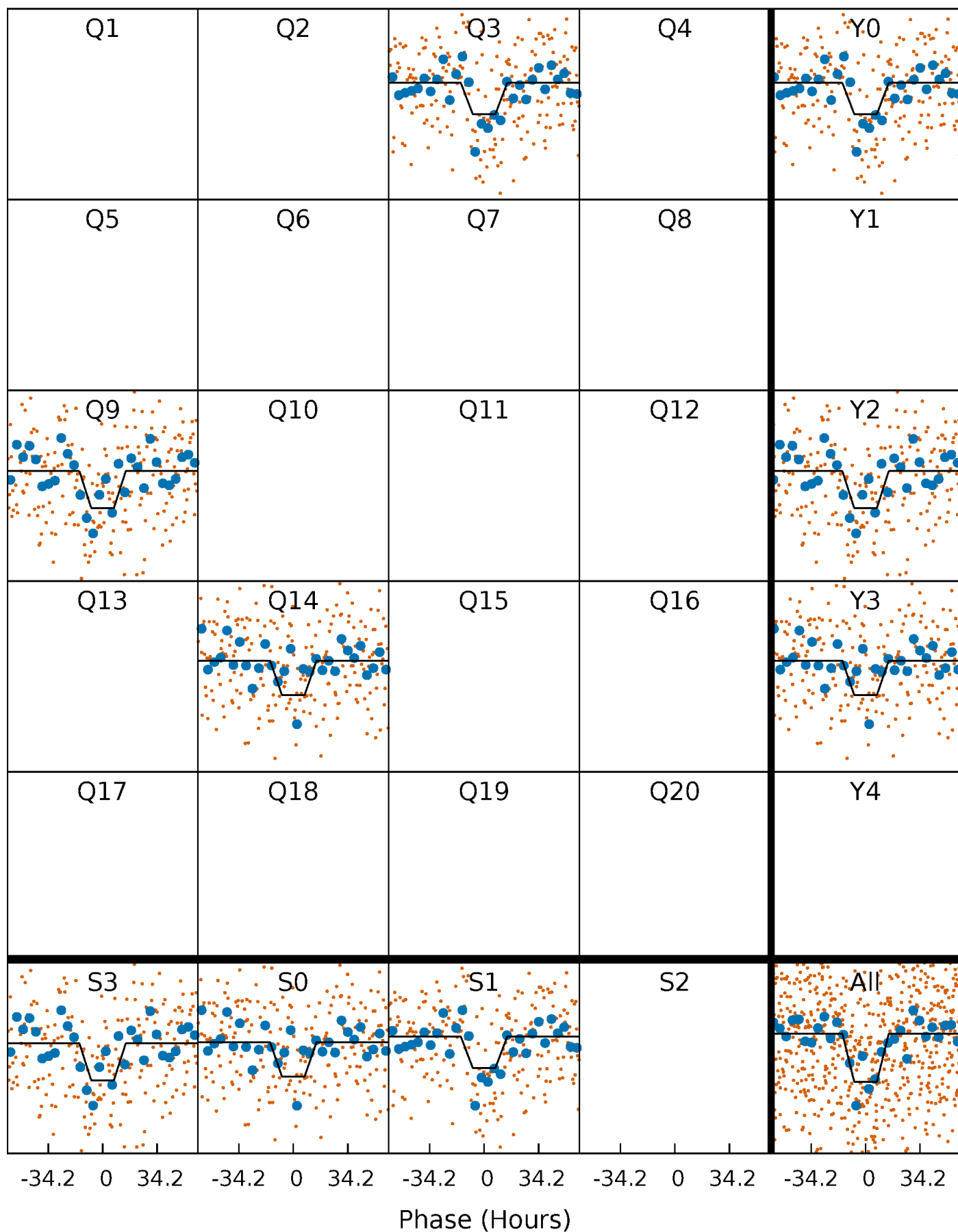
# DV Quarter-Phased Transit Curves

TCE 007970860-01 P=512.859690 Days  $T_0=302.627122$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

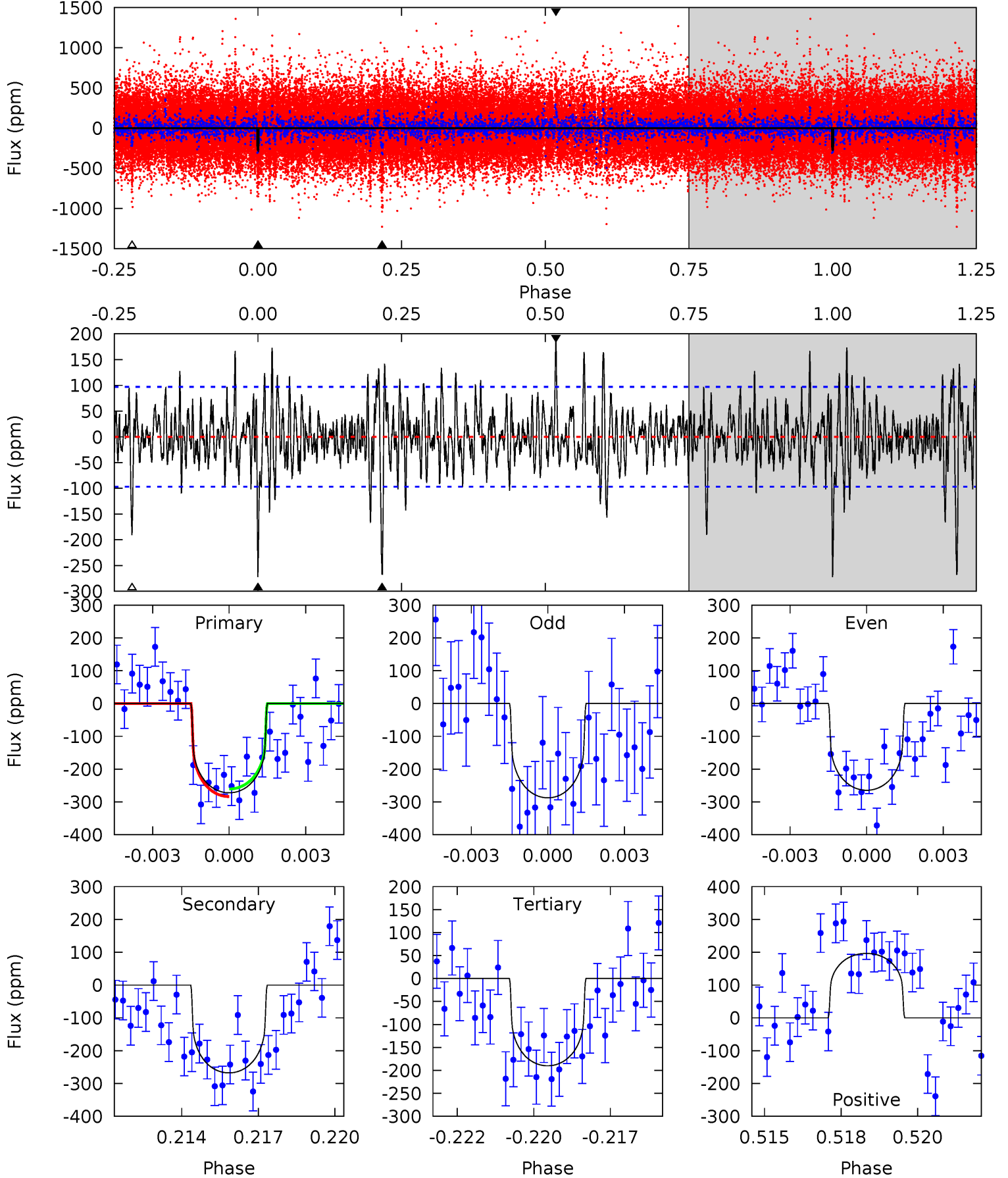
TCE 007970860-01 P=513.018580 Days  $T_0=302.344500$  (BKJD)



# DV Model-Shift Uniqueness Test

007970860-01, P = 512.859690 Days, E = 302.627122 Days

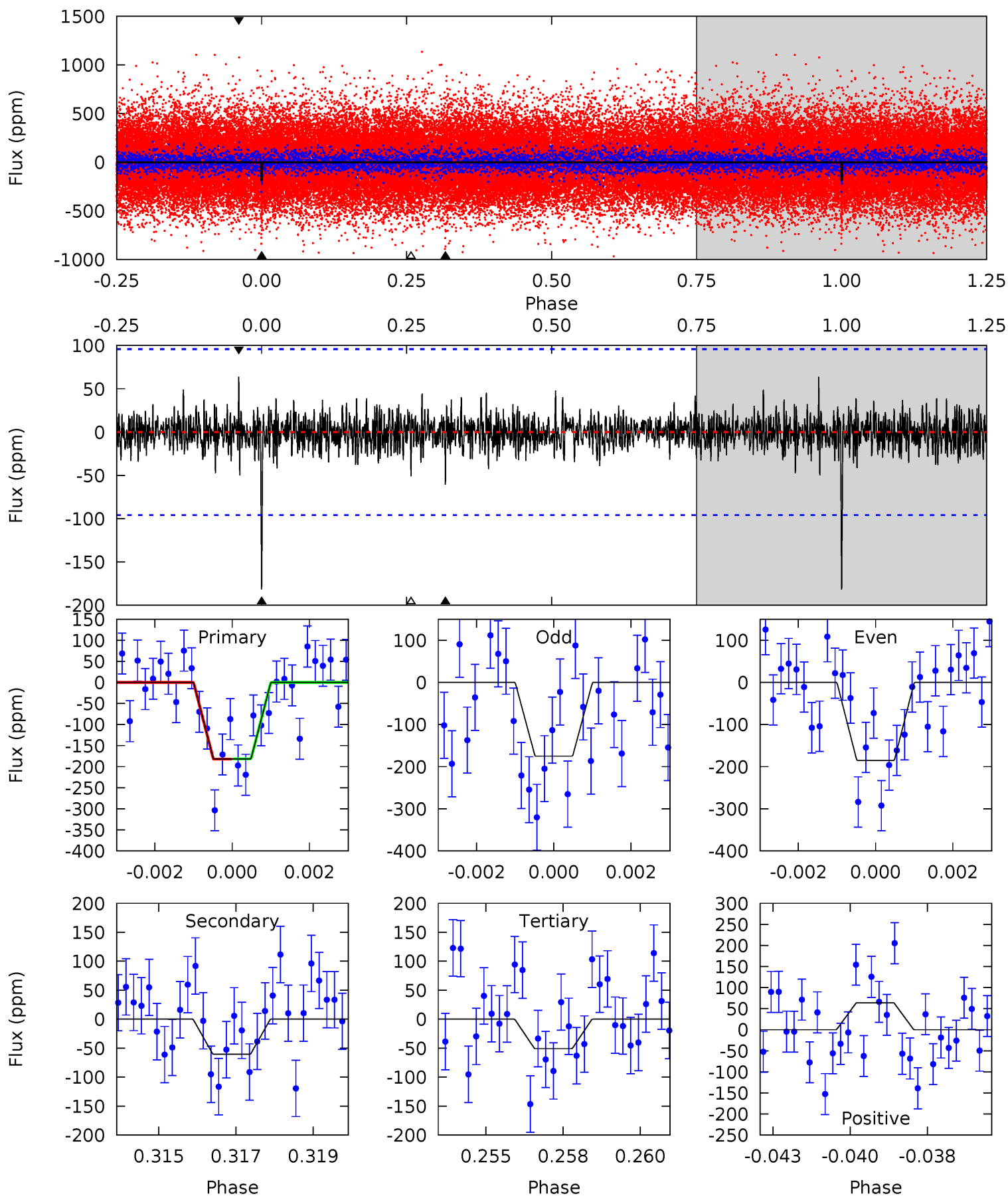
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.8 | 14.6 | 10.4 | 10.7 | 5.28            | 3.01            | 2.58             | 4.48    | 4.13    | 4.23    | 3.88    | 0.60    | 0.95 | 0.42  | 0.63 |



# Alt Model-Shift Uniqueness Test

007970860-01, P = 513.018580 Days, E = 302.344500 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 | 3.34 | 2.81 | 3.53 | 5.30            | 3.04            | 0.77             | 7.23    | 6.50    | 0.53    | -0.19   | 0.26    | 1.04 | 0.26  | 0.03 |



### Stellar Parameters For KIC 007970860

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                    | $R (R_{\odot})$           | $M(M_{\odot})$            | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5380^{+160}_{-144}$ | $4.506^{+0.057}_{-0.133}$ | $0.070^{+0.250}_{-0.300}$ | $0.871^{+0.169}_{-0.085}$ | $0.886^{+0.081}_{-0.081}$ | $1.890^{+0.550}_{-0.712}$                 |
|        | +3%/-3%              | +1%/-3%                   | +357%/-429%               | +19%/-10%                 | +9%/-9%                   | +29%/-38%                                 |
| Source | PHO1                 | KIC0                      | 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 007970860-01 / KOI

| Detrend | Depth (ppm)   | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$          |
|---------|---------------|------------------------|----------------------|----------------------|---------------------------|
| DV      | $-268 \pm 18$ | $1.66^{+0.42}_{-0.45}$ | $286^{+14}_{-12}$    | $5275^{+818}_{-489}$ | $76554^{+66952}_{-27817}$ |
| Alt.    | $-61 \pm 18$  | $1.37^{+0.43}_{-0.45}$ | $285^{+14}_{-11}$    | $4209^{+801}_{-457}$ | $25451^{+34027}_{-12473}$ |

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

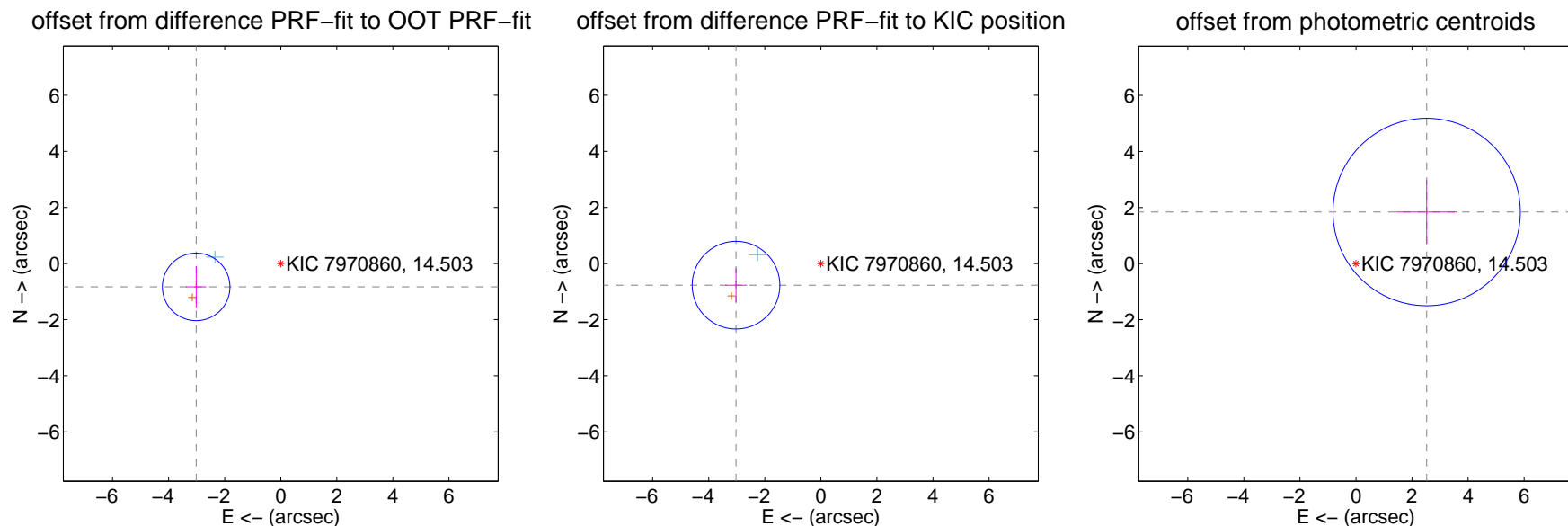
## DV Centroid Data

Supplemental centroid analysis for 007970860-01. Kepler magnitude: 14.50. Transit SNR 9.70

There are 1 quarters with good PRF difference image offsets

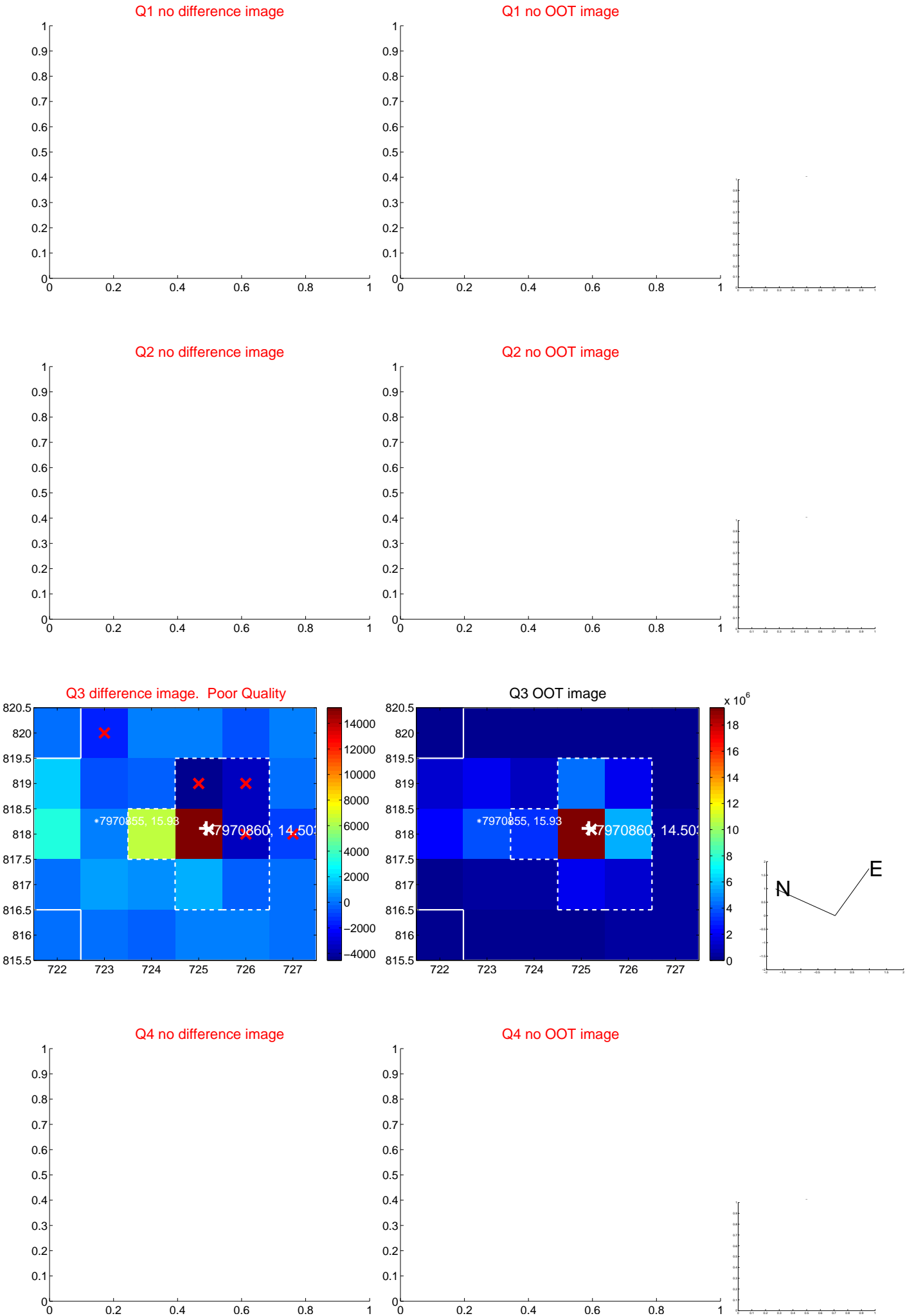
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $3.130 \pm 0.402$  | 7.80                | $3.017 \pm 0.363$ | $-0.833 \pm 0.740$ |
| PRF-fit source offset from KIC position | $3.123 \pm 0.521$  | 5.99                | $3.026 \pm 0.386$ | $-0.772 \pm 0.603$ |
| photometric centroid source offset      | $3.12 \pm 1.11$    | 2.80                | $-2.52 \pm 1.10$  | $1.84 \pm 1.14$    |



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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

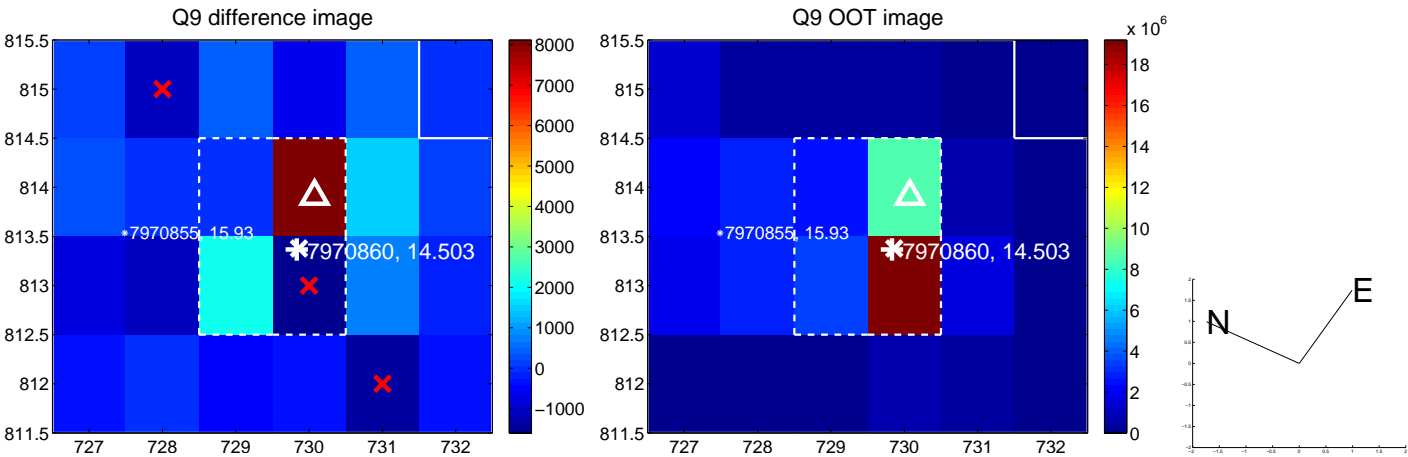




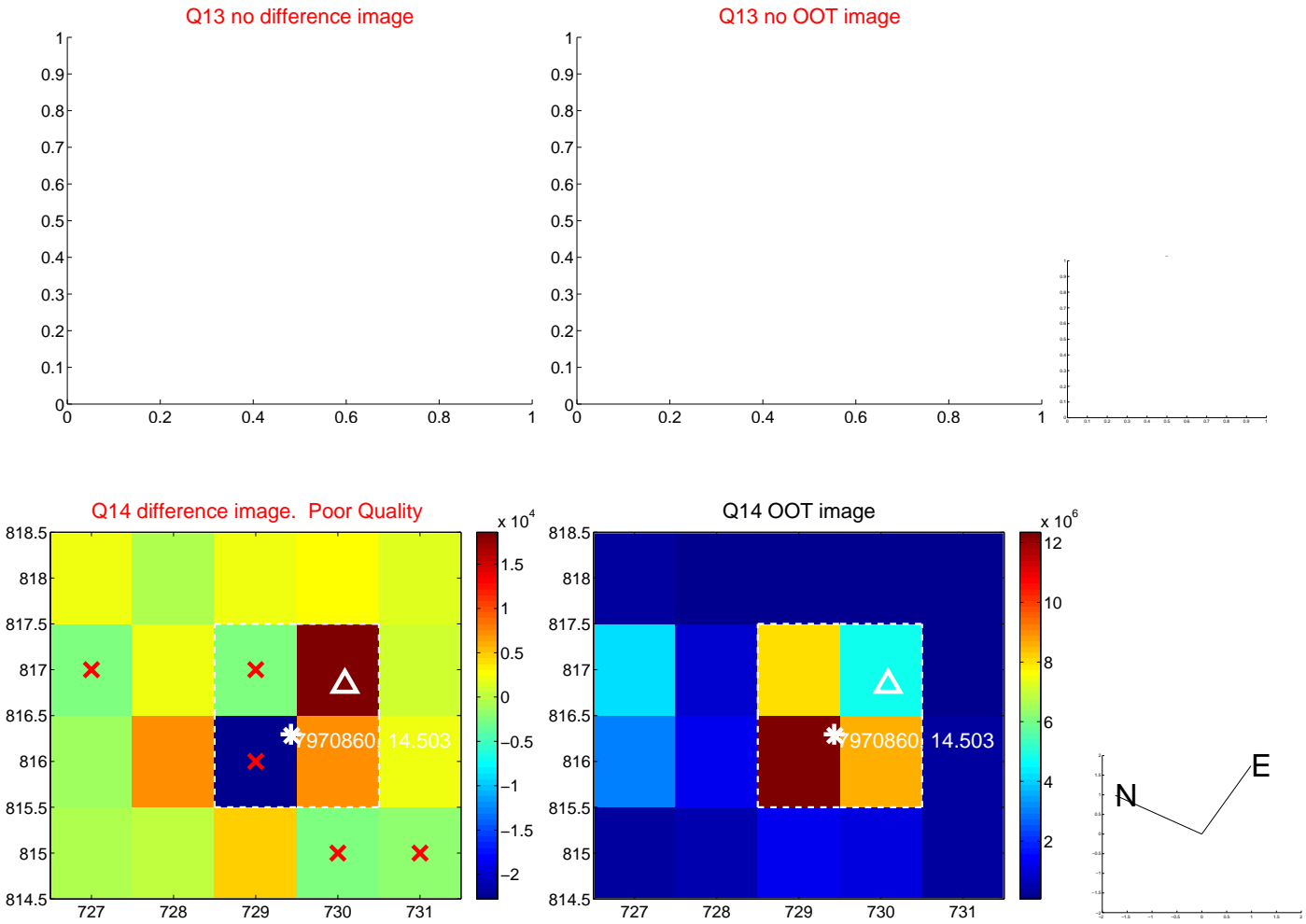
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



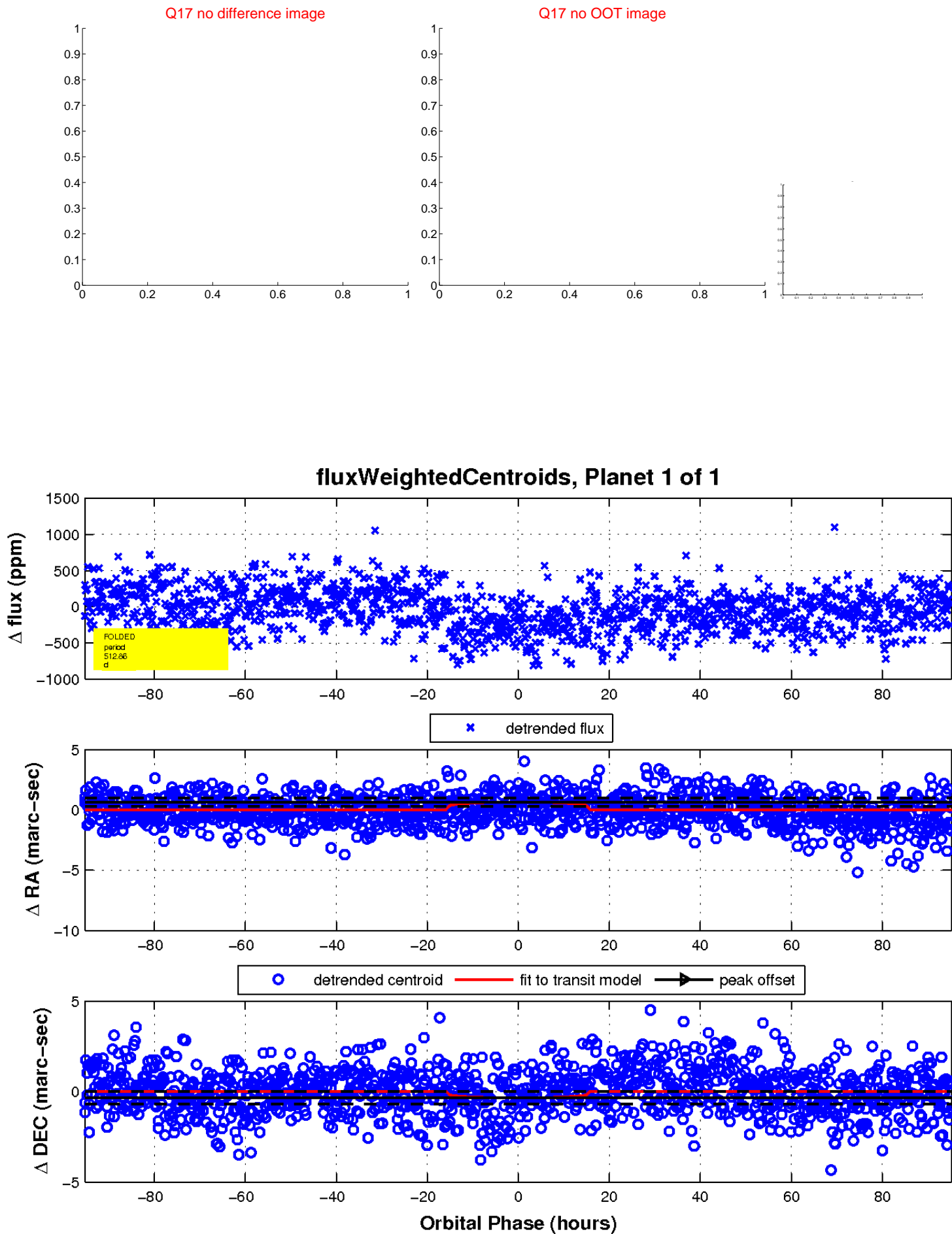
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



# UKIRT Image

Declination

