

# KIC 005866098

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005866098-01 | OBS      | No   | 0.929904      | 132.035928   | 9.2         | 3.771            | 16.3 | 16.9 | 2.63                        | 7841            | 0.90                   | 42504.34               |
| 005866098-02 | OBS      | No   | 0.930069      | 131.572258   | 5.8         | 3.530            | 11.0 | 11.0 | 2.63                        | 7841            | 0.71                   | 42494.29               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                                      |
|--------------|----------|------|-------|---|---|---|---|---|
| 005866098-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_SATURATED                 |
| 005866098-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED |

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

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

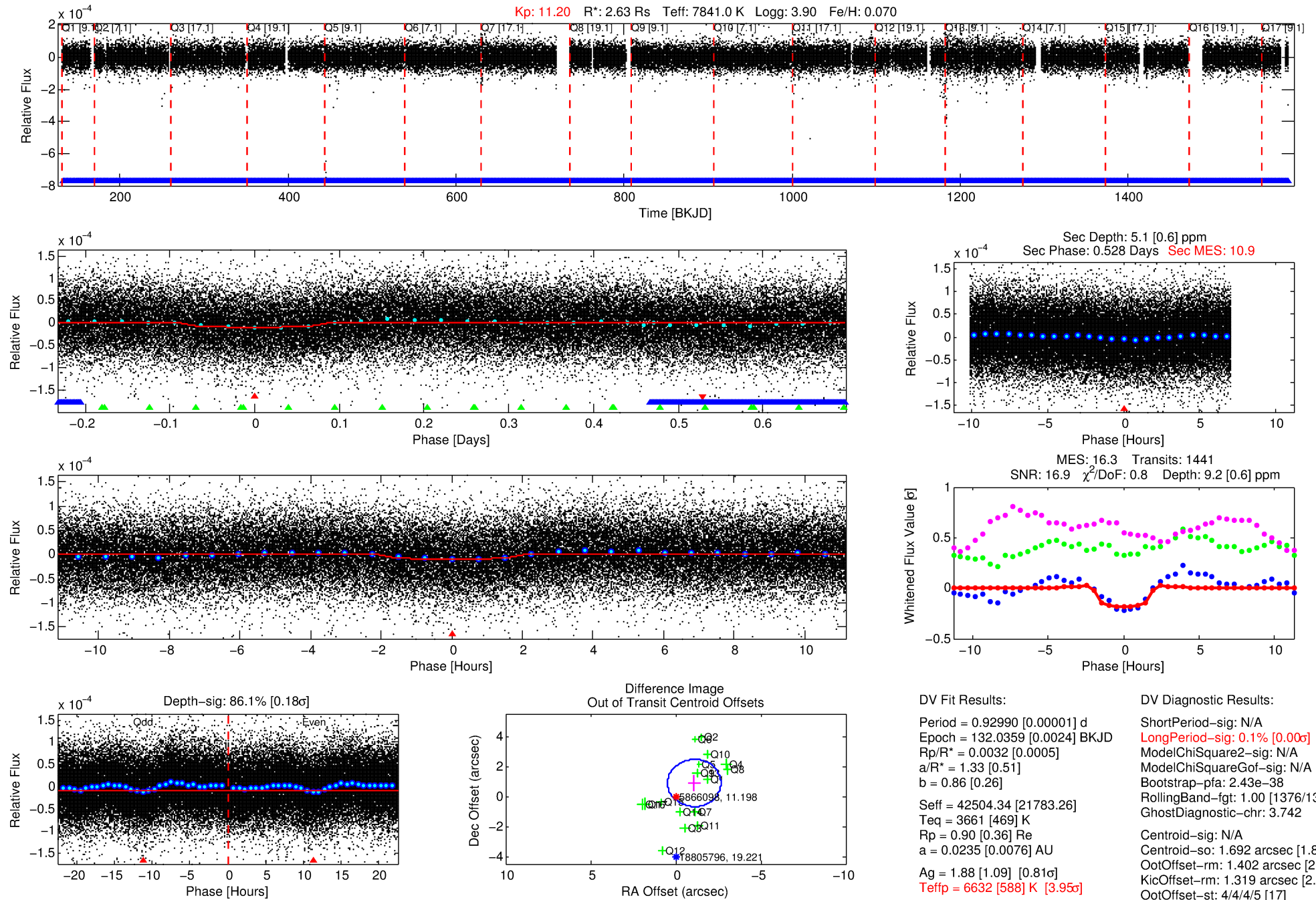
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005866098-01

No Significant Match Found

# DV One-Page Summary

KIC: 5866098 Candidate: 1 of 3 Period: 0.930 d



## DV Fit Results:

Period = 0.92990 [0.00001] d  
Epoch = 132.0359 [0.0024] BKJD  
Rp/R\* = 0.0032 [0.0005]  
a/R\* = 1.33 [0.51]  
b = 0.86 [0.26]  
Seff = 42504.34 [21783.26]  
Teff = 3661 [469] K  
Rp = 0.90 [0.36] Re  
a = 0.0235 [0.0076] AU  
Ag = 1.88 [1.09] [0.81 $\sigma$ ]  
Teffp = 6632 [588] K [3.95 $\sigma$ ]

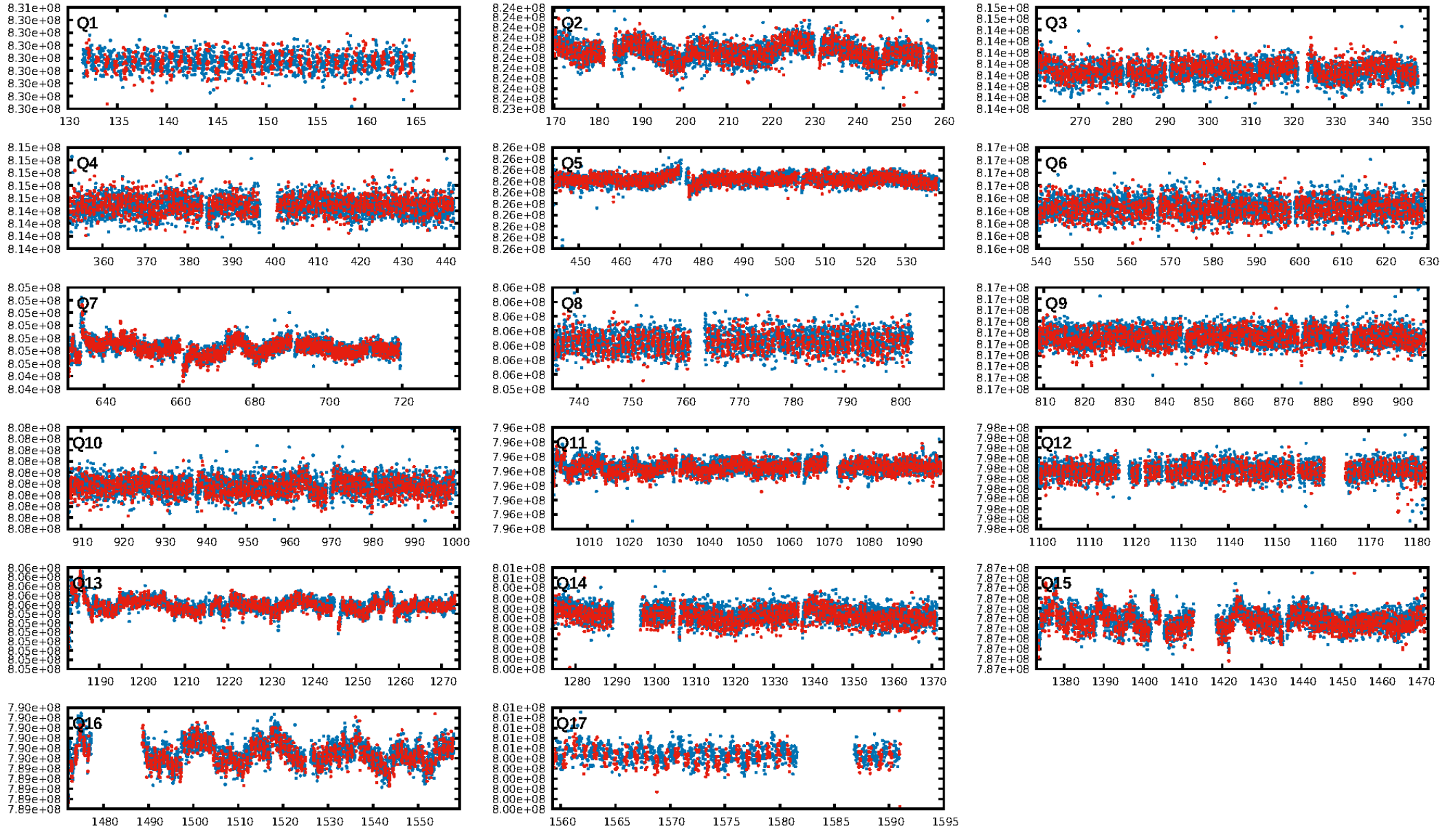
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.43e-38  
RollingBand-fgt: 1.00 [1376/1376]  
GhostDiagnostic-chr: 3.742  
Centroid-sig: N/A  
Centroid-so: 1.692 arcsec [1.83 $\sigma$ ]  
OotOffset-rm: 1.402 arcsec [2.68 $\sigma$ ]  
KicOffset-rm: 1.319 arcsec [2.71 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.82 [14/17]  
DiffImageOverlap-fno: 0.18 [3/17]

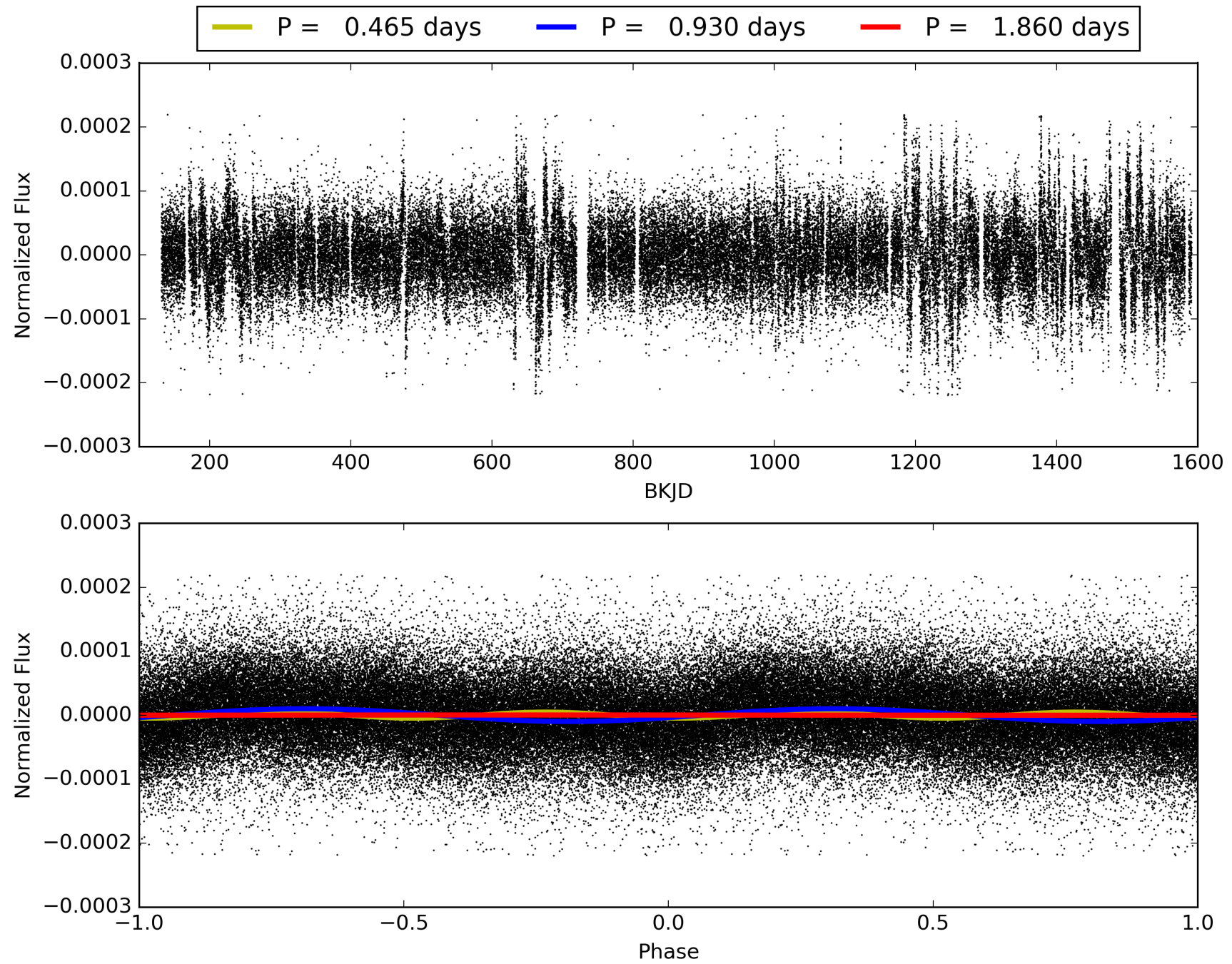
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 20:50:52 Z

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

# TCE 005866098-01, PDC Light Curves

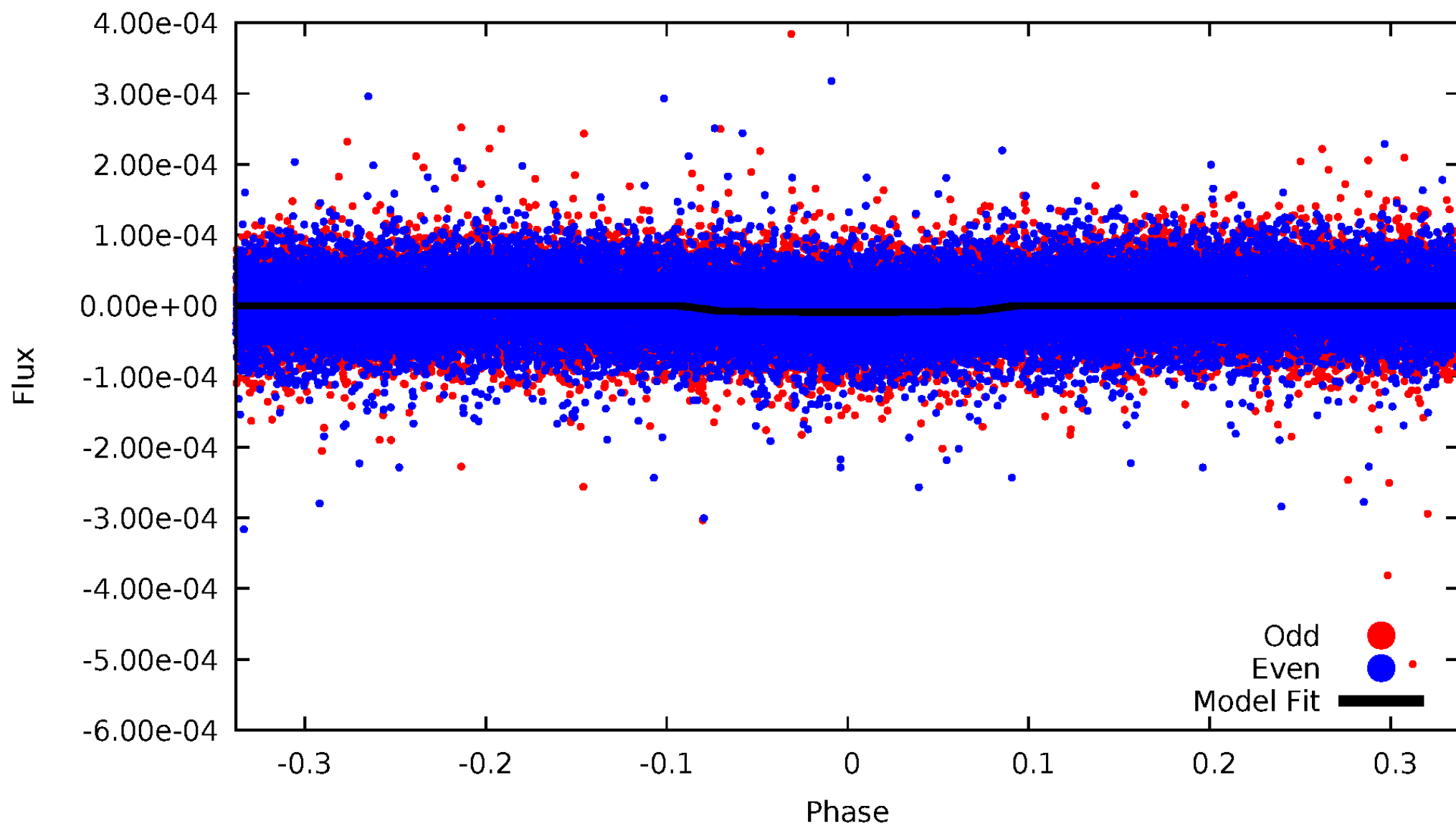


TCE 005866098-01



# DV Odd/Even

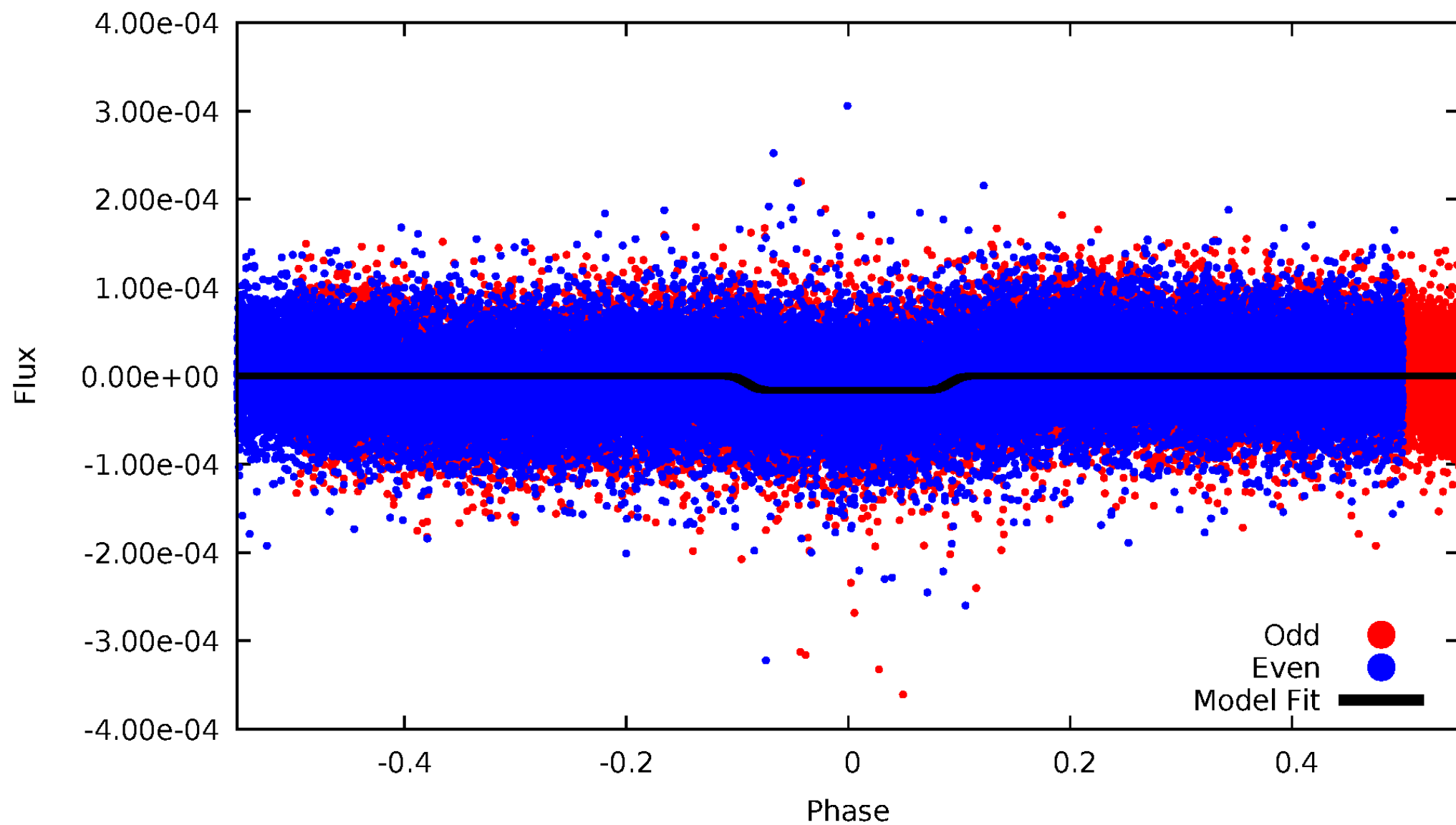
TCE 005866098-01





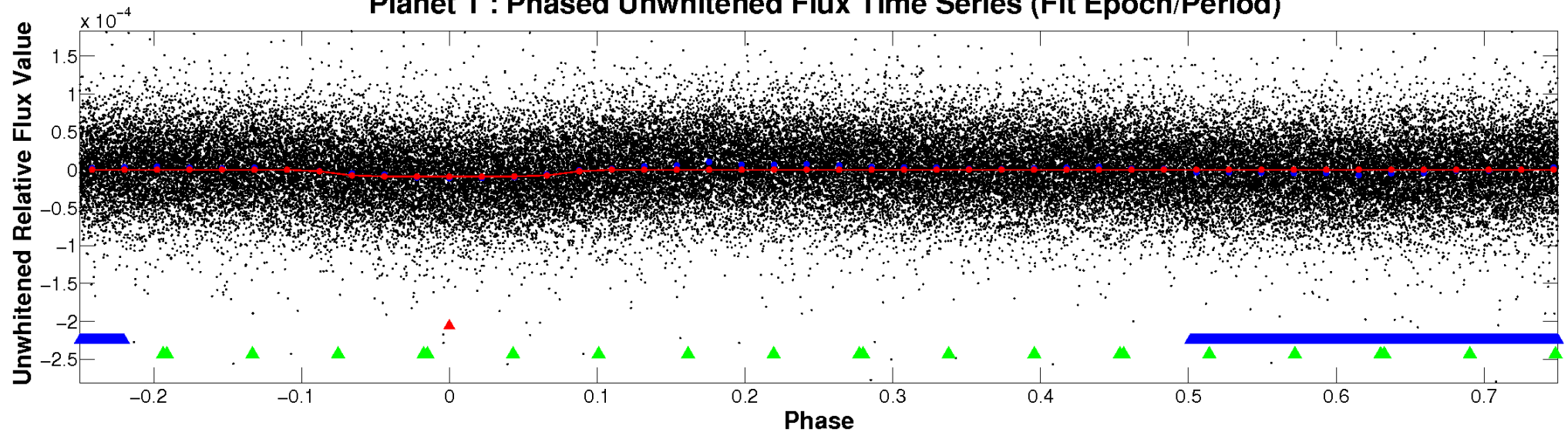
# ALT Odd/Even

TCE 005866098-01

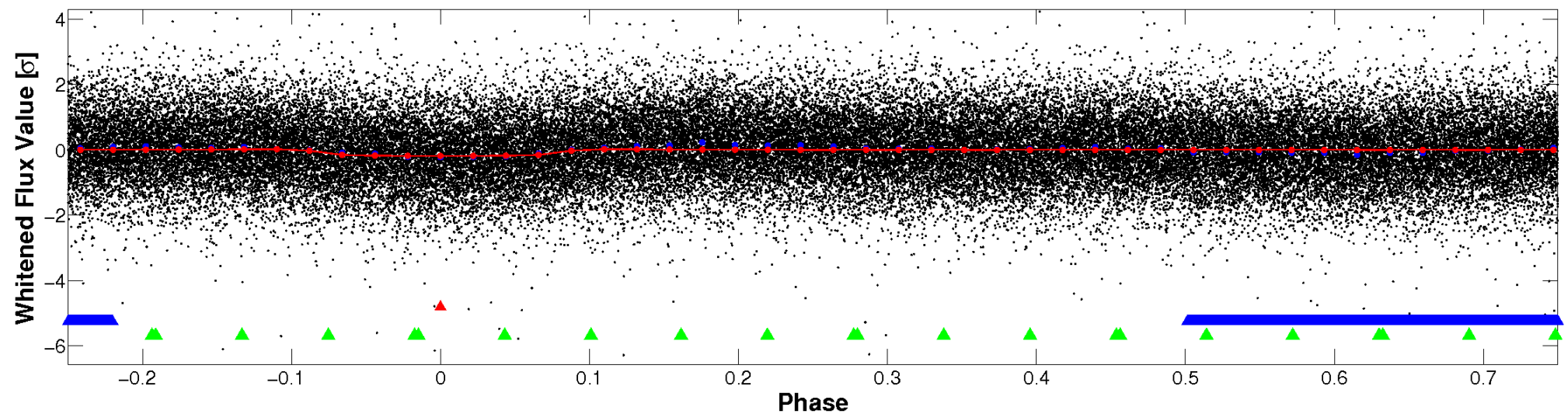


# Non-Whitened Vs. Whitened Light Curve

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

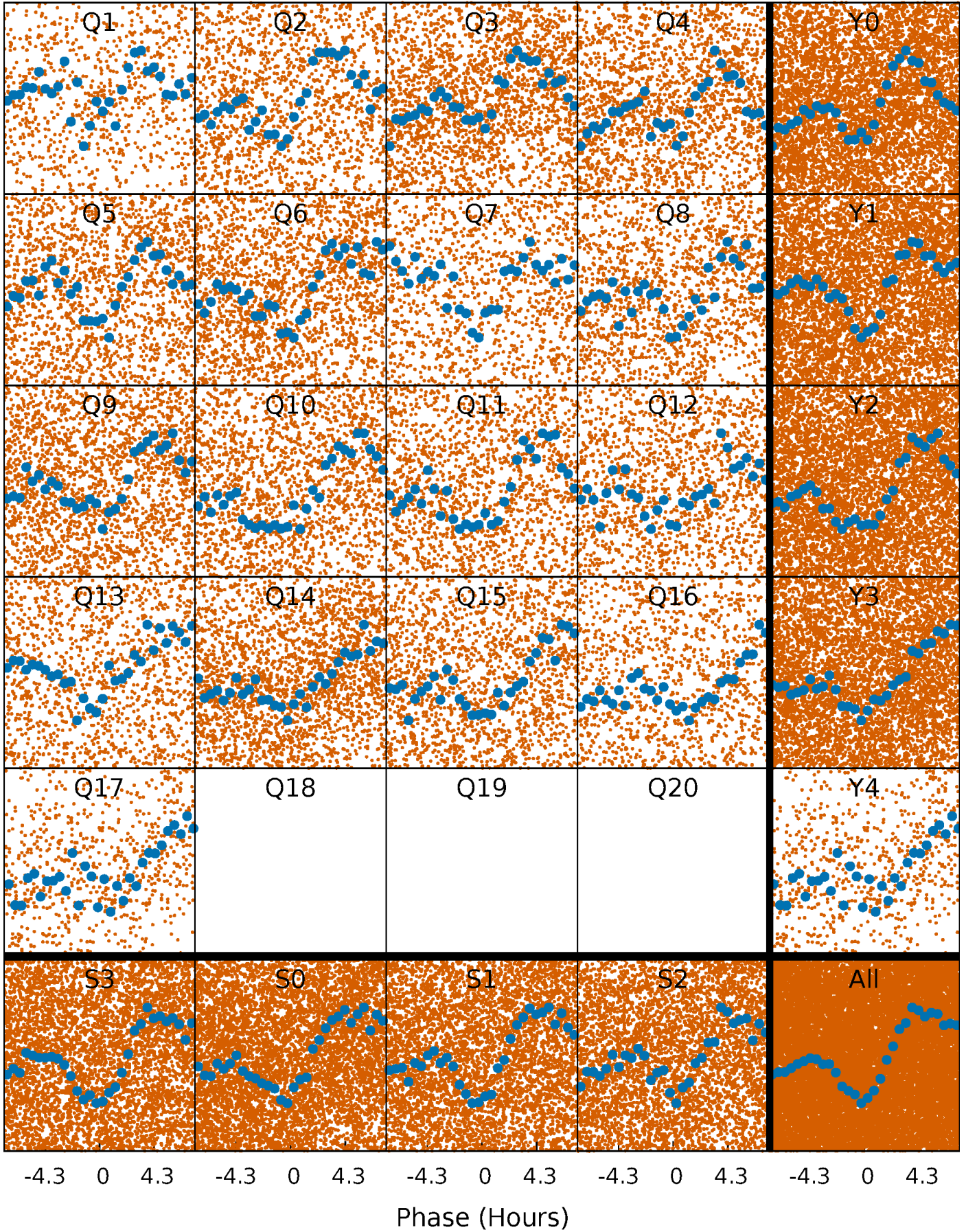


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

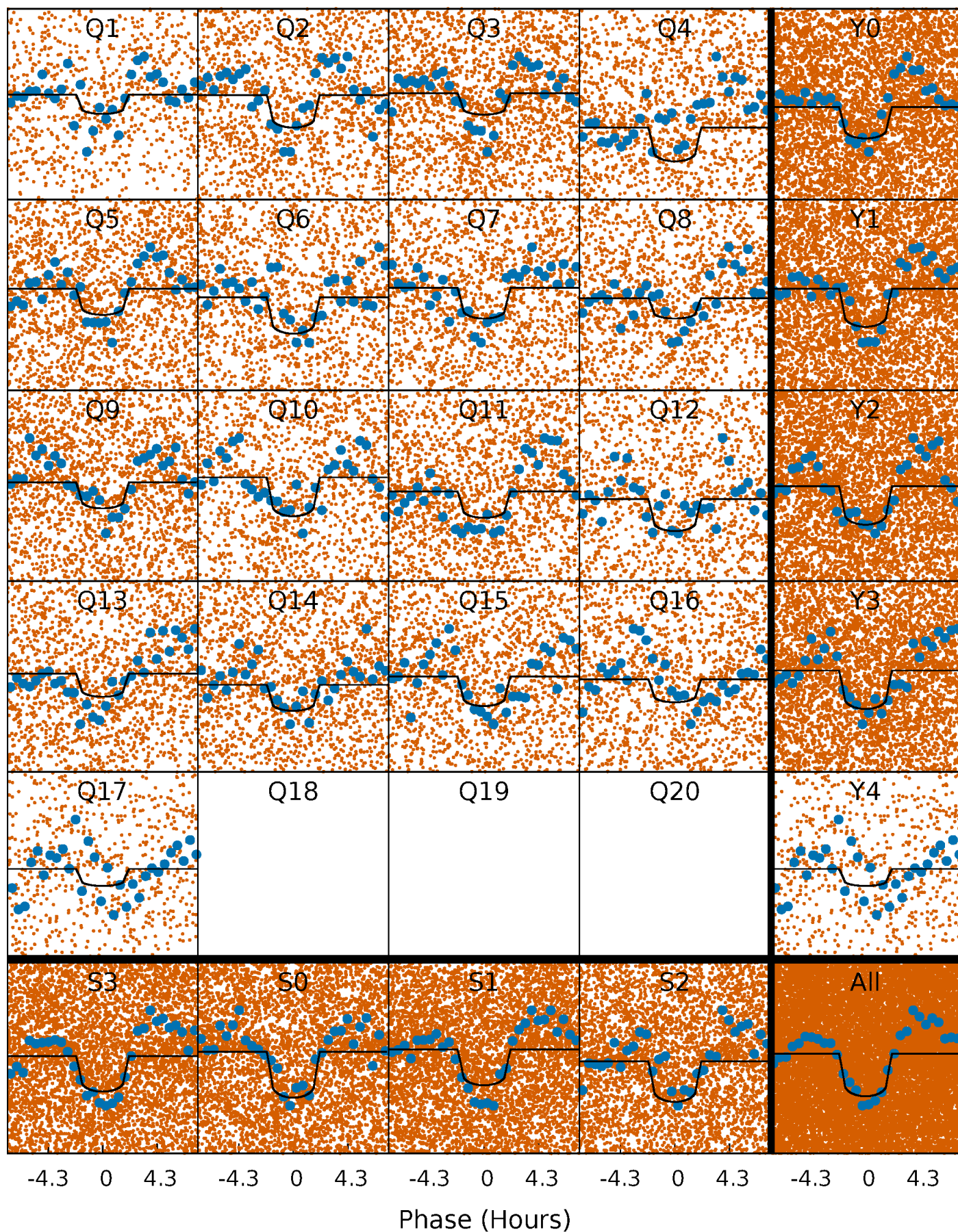
TCE 005866098-01   P= 0.929904 Days    $T_0=132.035928$  (BKJD)





# DV Quarter-Phased Transit Curves

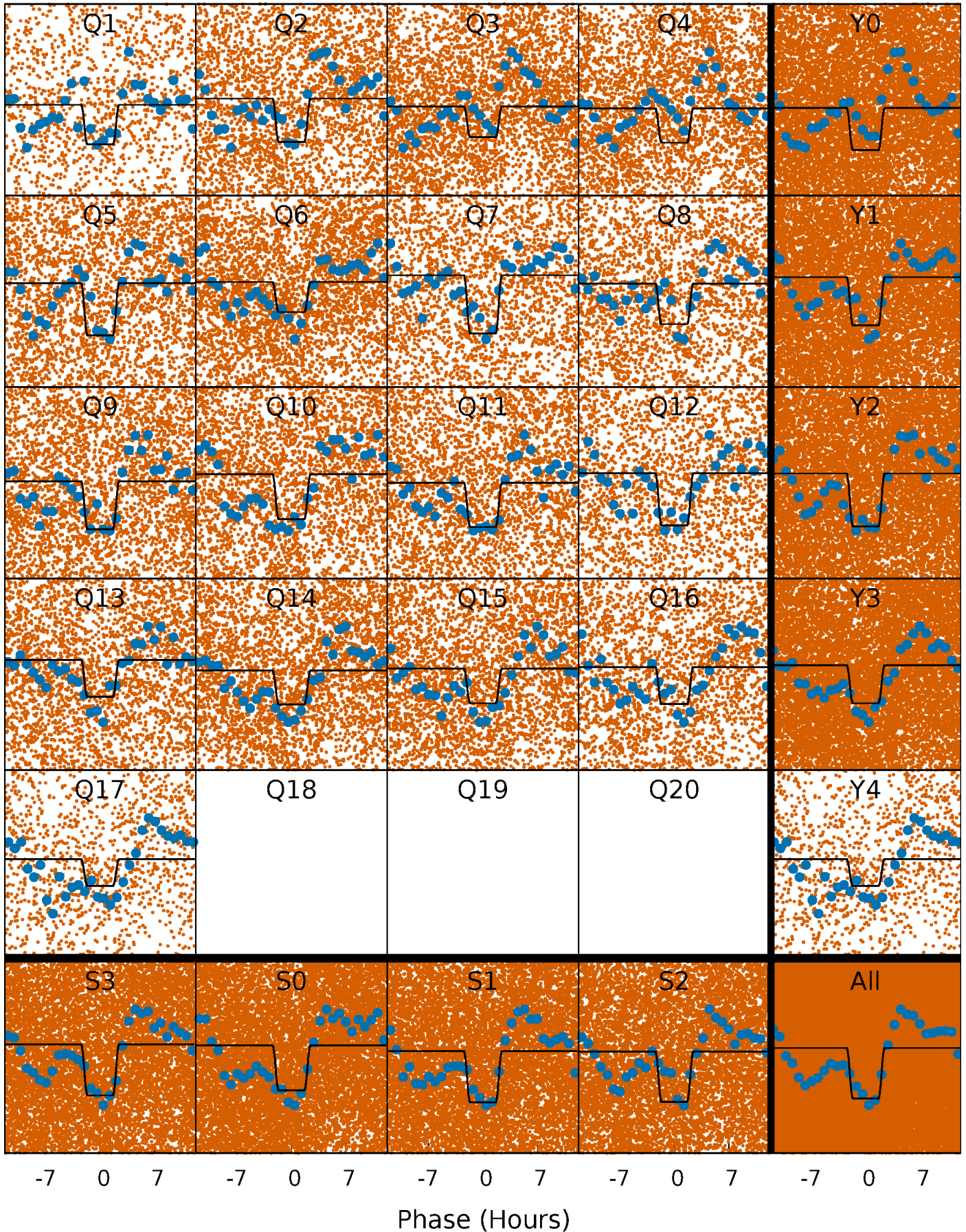
TCE 005866098-01 P= 0.929904 Days  $T_0=132.035928$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

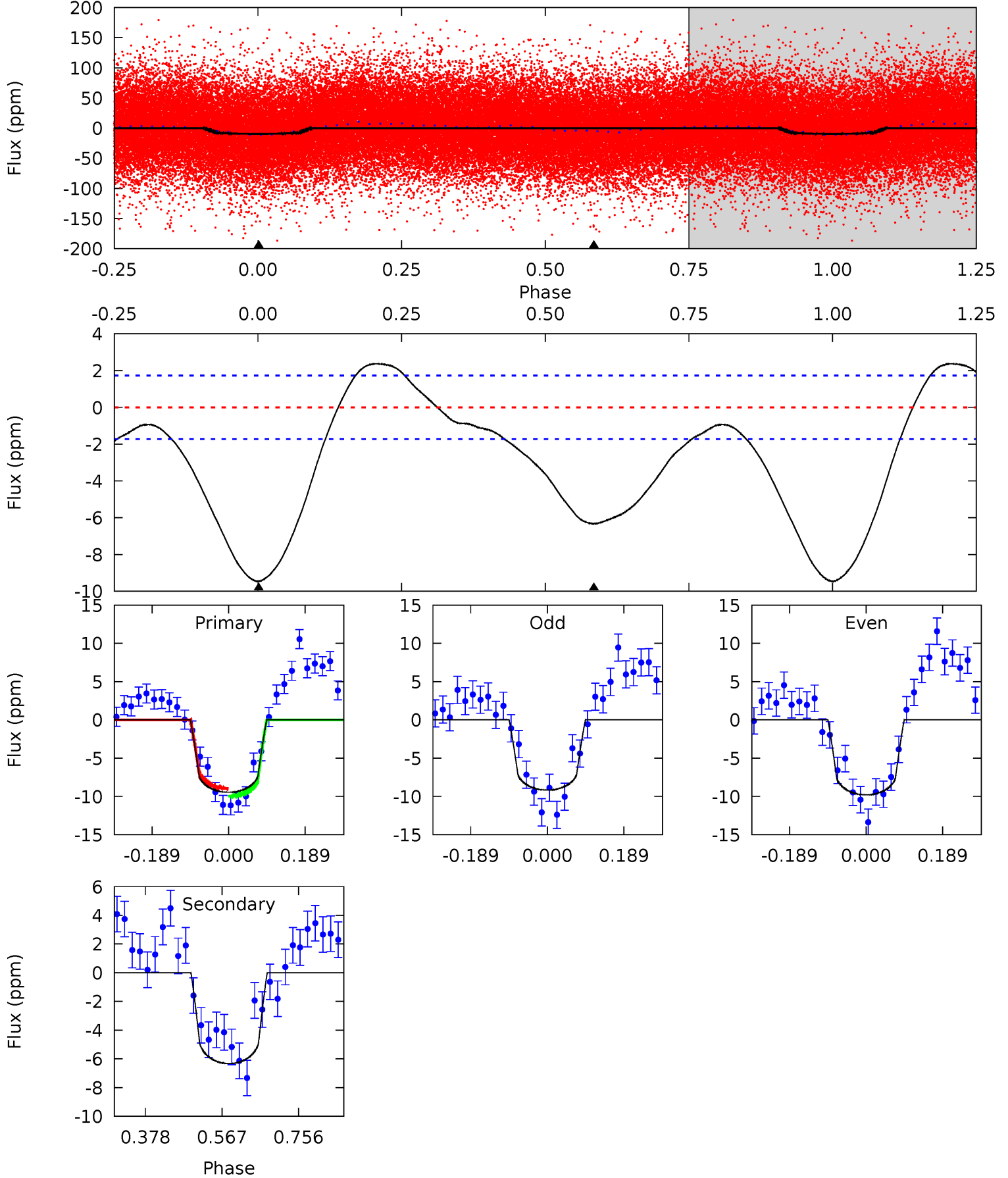
TCE 005866098-01   P= 0.929924 Days    $T_0=131.999079$  (BKJD)



# DV Model-Shift Uniqueness Test

005866098-01, P = 0.929904 Days, E = 131.106024 Days

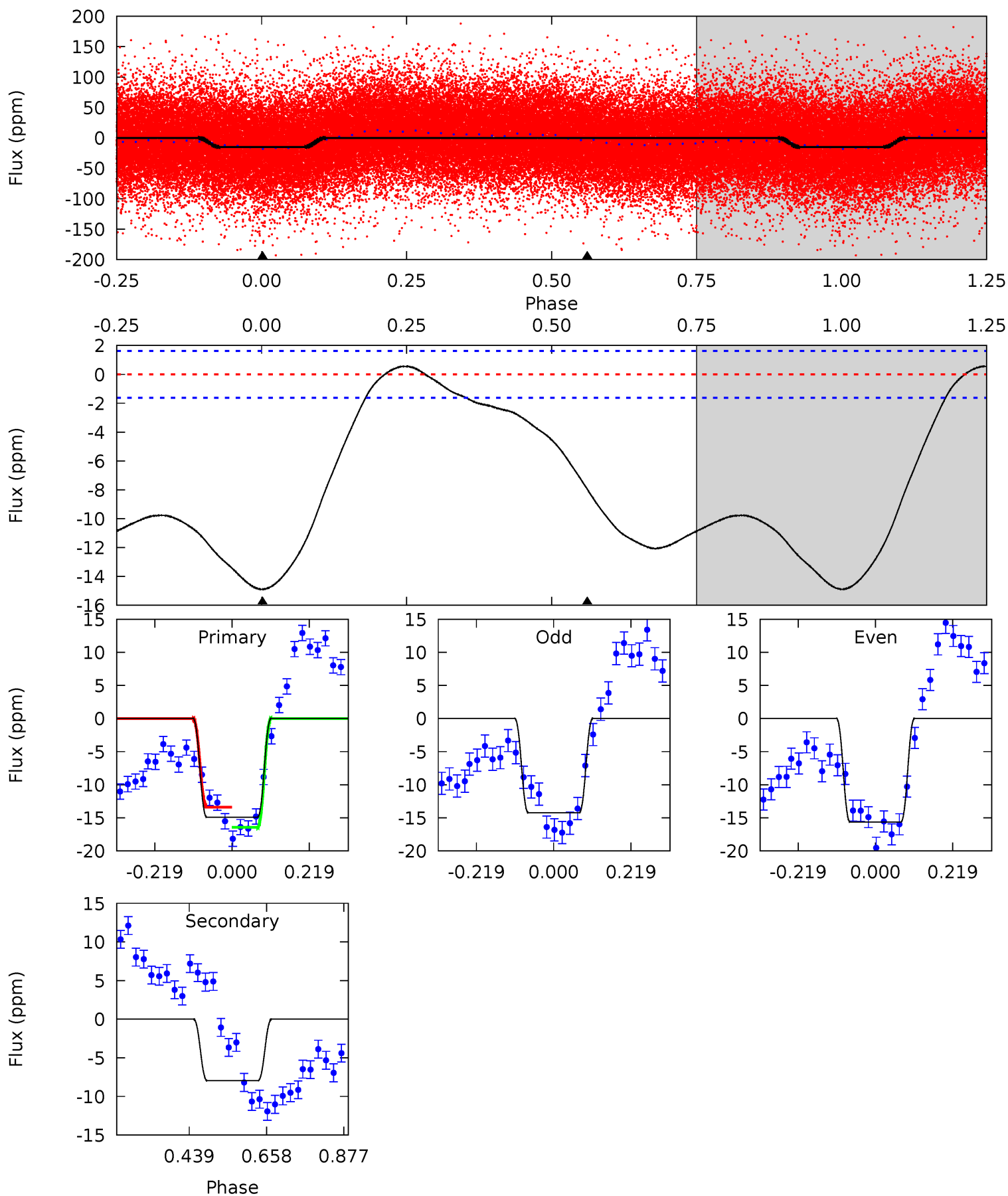
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 24.2 | 16.2 | 0   | 0   | 4.43            | 1.31            | 3.48             | 24.2    | 24.2    | 16.2    | 16.2    | 0.79    | 1.05 | 0.20  | 1.30 |



# Alt Model-Shift Uniqueness Test

005866098-01, P = 0.929924 Days, E = 131.069155 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  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 40.3 | 21.6 | 0   | 0   | 4.40            | 1.23            | 3.48             | 40.3    | 40.3    | 21.6    | 21.6    | 1.87    | 1.01 | 0.04  | 4.15 |





### Stellar Parameters For KIC 005866098

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
|        | $7841^{+216}_{-324}$ | $3.898^{+0.273}_{-0.117}$ | $0.070^{+0.200}_{-0.400}$ | $2.630^{+0.482}_{-0.964}$ | $1.993^{+0.252}_{-0.468}$ | $0.154^{+0.284}_{-0.056}$                    |
|        | +3%/-4%              | +7%/-3%                   | +286%/-571%               | +18%/-37%                 | +13%/-23%                 | +184%/-36%                                   |
| Source | KIC0                 | 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 005866098-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$ | $A_{\text{obs}}$          |
|---------|-------------|------------------------|----------------------|----------------------|---------------------------|
| DV      | $-6 \pm 0$  | $0.88^{+0.19}_{-0.20}$ | $5051^{+339}_{-462}$ | $6596^{+747}_{-547}$ | $2.500^{+1.513}_{-0.788}$ |
| Alt.    | $-8 \pm 0$  | $1.11^{+0.21}_{-0.22}$ | $4996^{+350}_{-401}$ | $6130^{+480}_{-446}$ | $1.956^{+0.909}_{-0.547}$ |

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

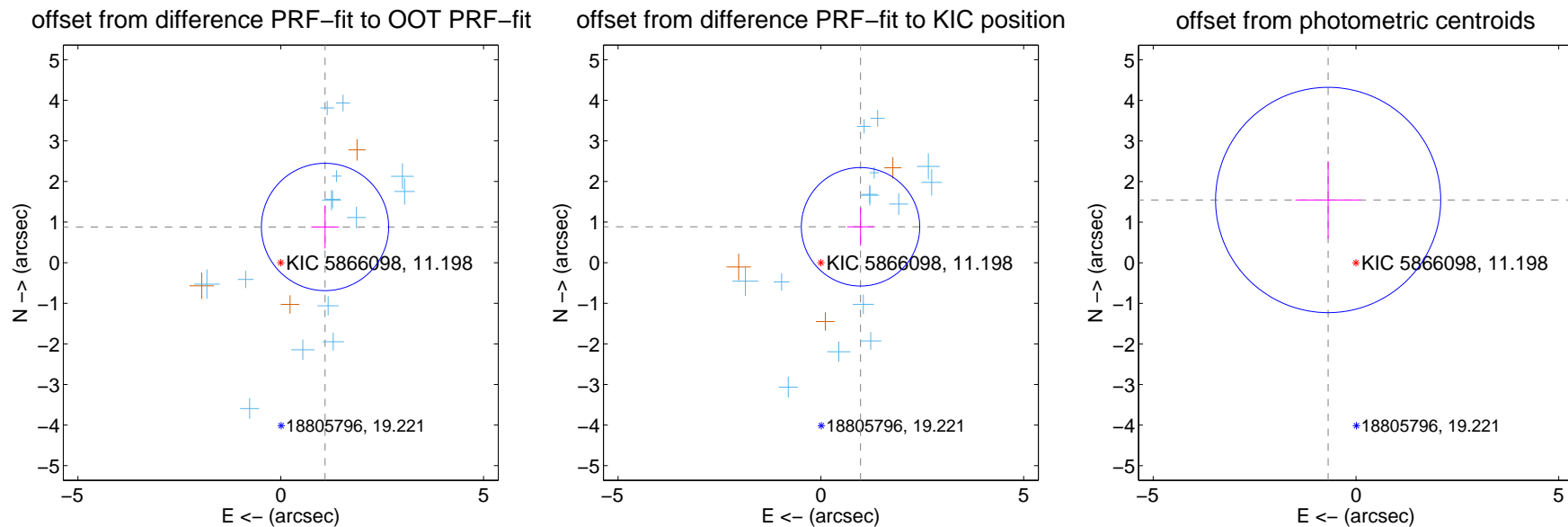
## DV Centroid Data

Supplemental centroid analysis for 005866098-01. **Kepler magnitude: 11.20.** Transit SNR 16.91

There are 14 quarters with good PRF difference image offsets

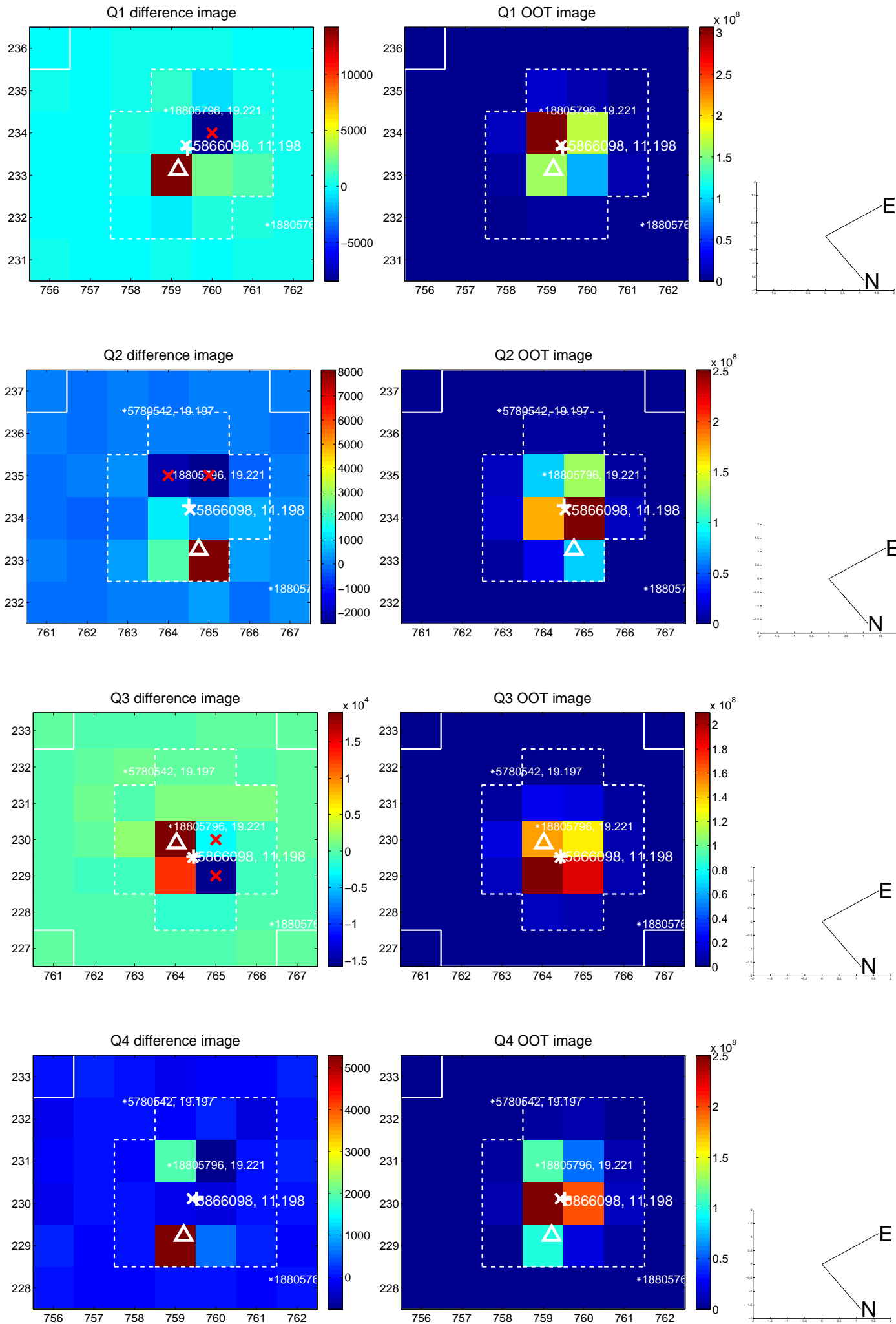
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $1.402 \pm 0.523$  | 2.68                | $-1.092 \pm 0.338$ | $0.881 \pm 0.529$ |
| PRF-fit source offset from KIC position | $1.319 \pm 0.487$  | 2.71                | $-0.978 \pm 0.327$ | $0.885 \pm 0.470$ |
| photometric centroid source offset      | $1.69 \pm 0.93$    | 1.83                | $0.69 \pm 0.81$    | $1.55 \pm 0.95$   |

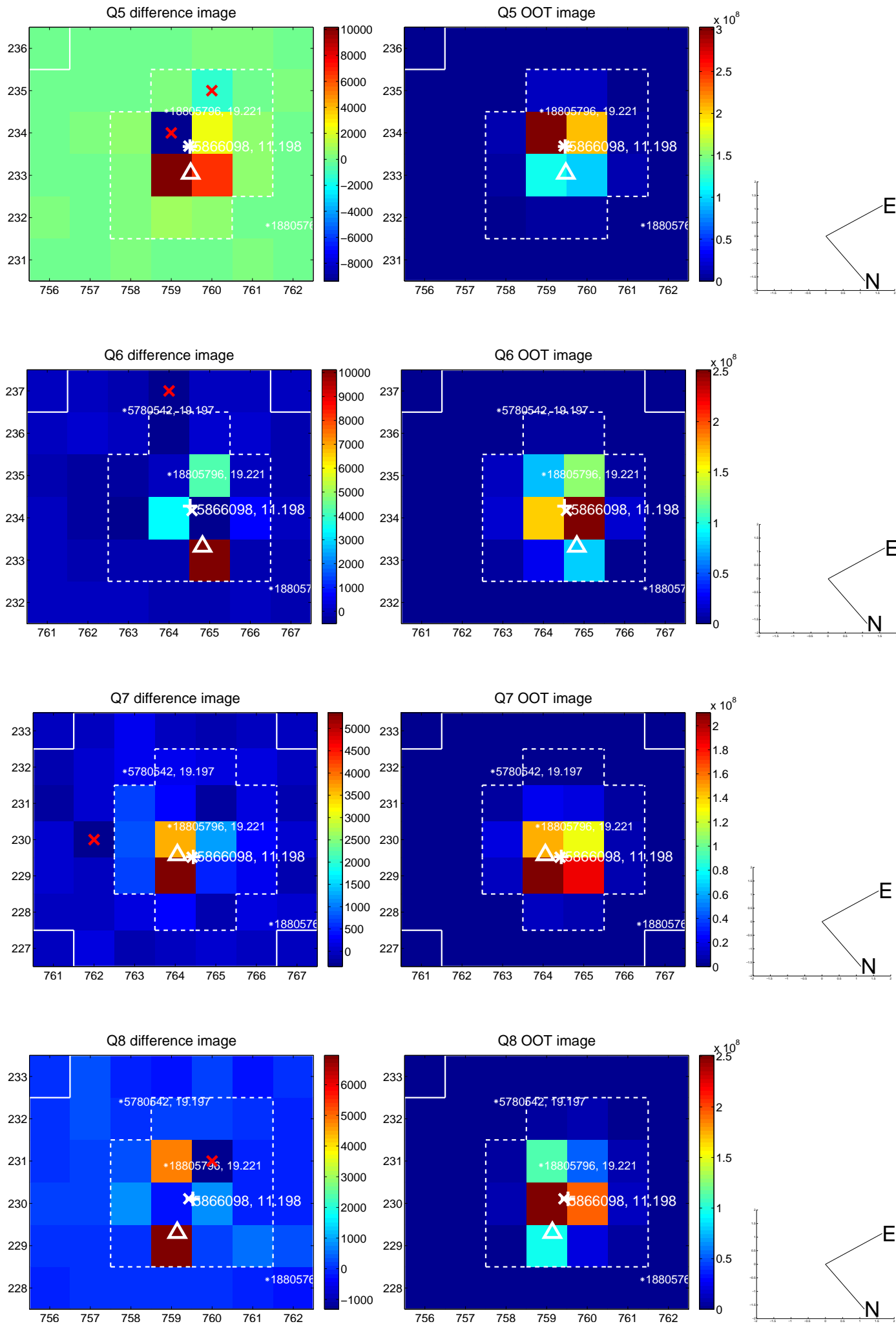


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

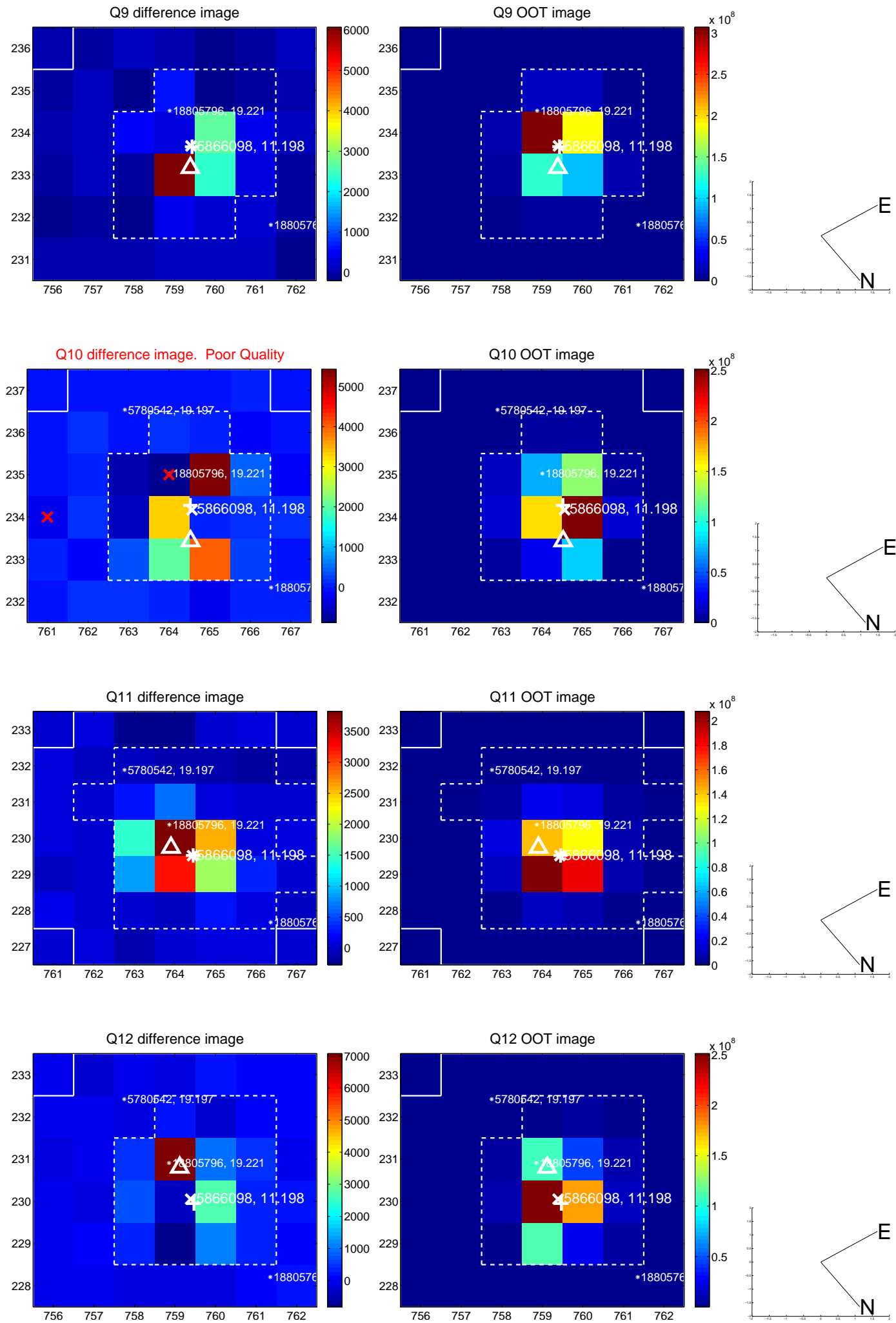


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

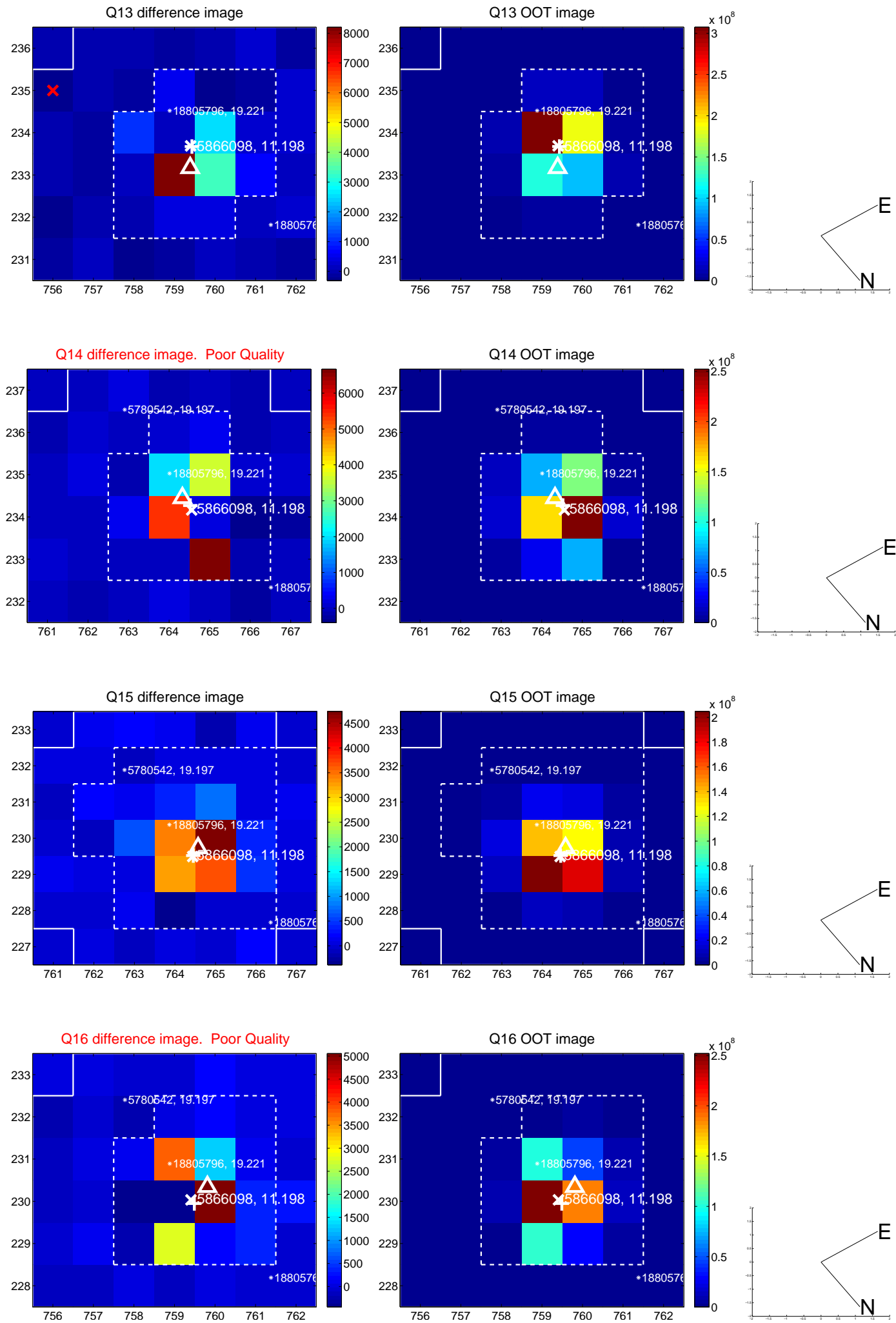




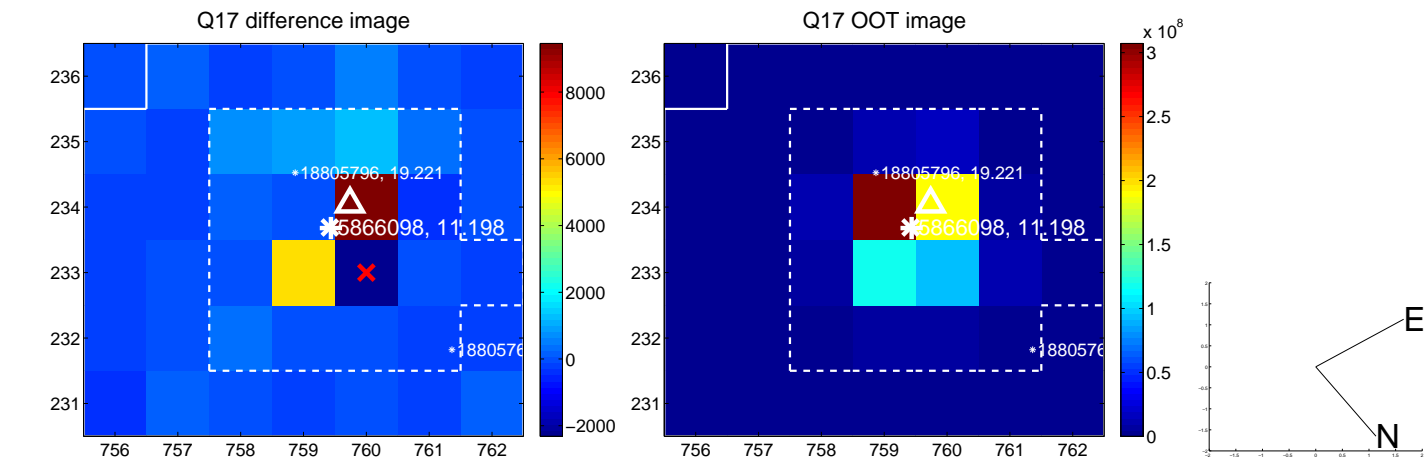
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



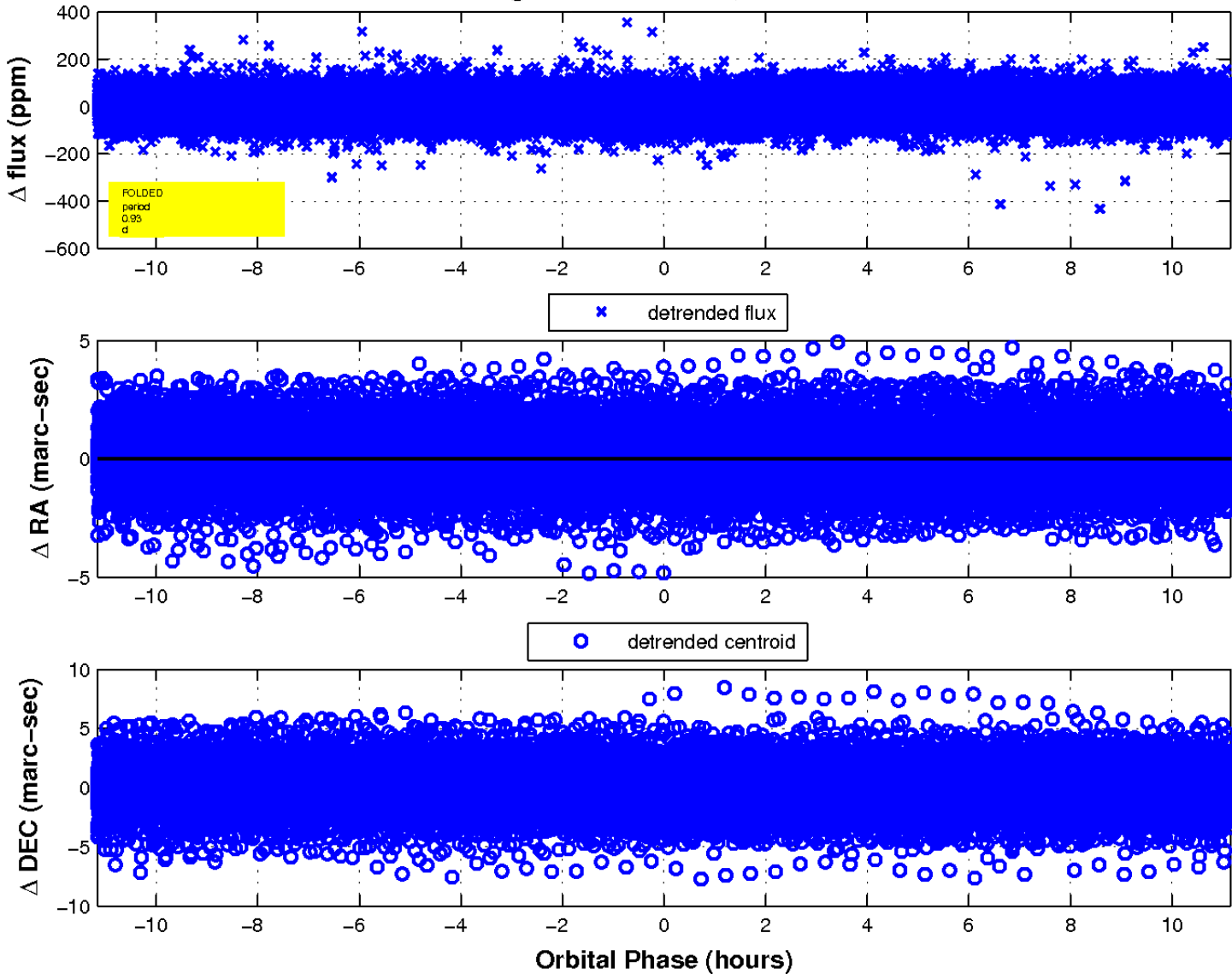
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

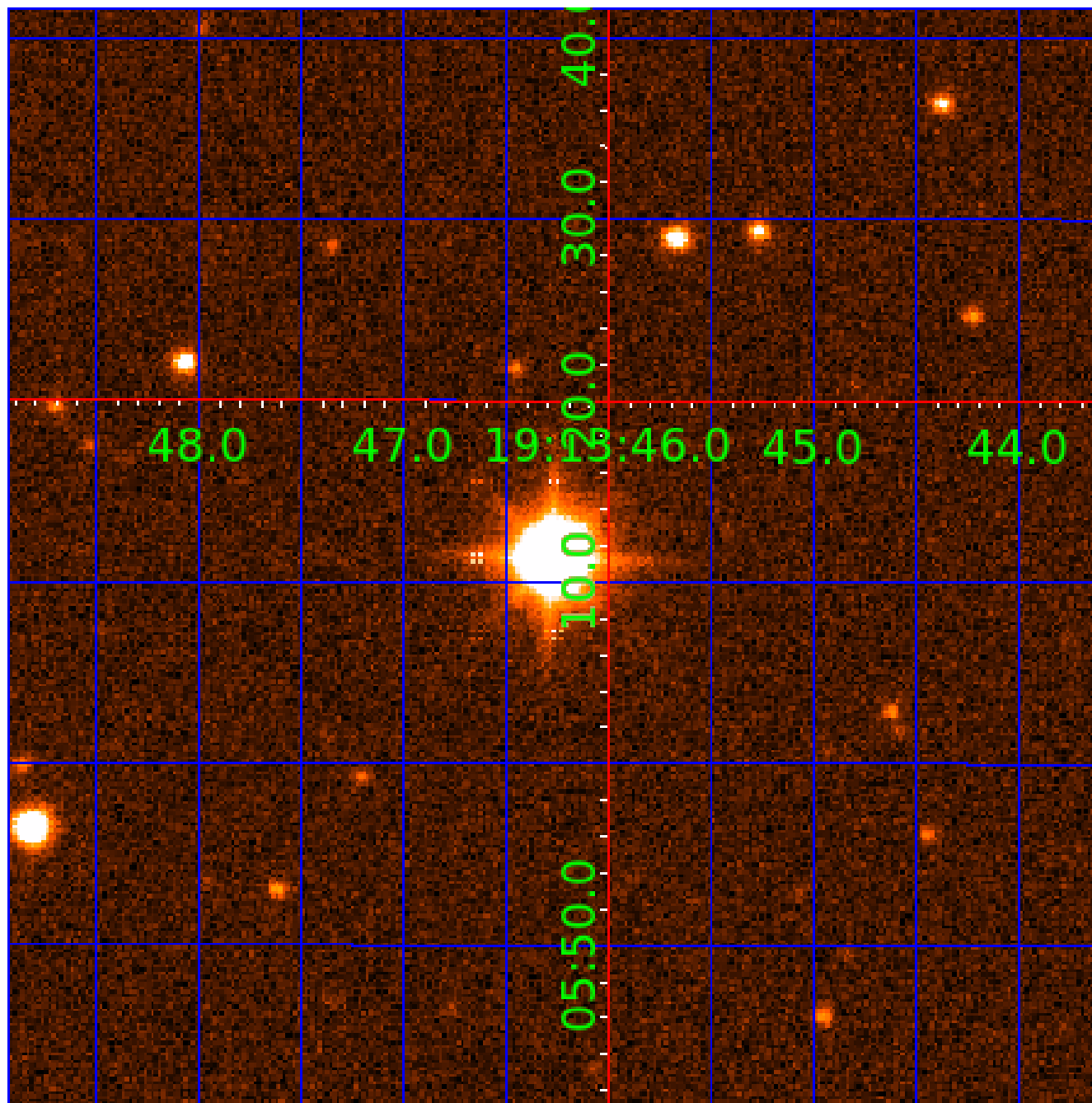


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination





# KIC 005866098

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005866098-01 | OBS      | No   | 0.929904      | 132.035928   | 9.2         | 3.771            | 16.3 | 16.9 | 2.63                        | 7841            | 0.90                   | 42504.34               |
| 005866098-02 | OBS      | No   | 0.930069      | 131.572258   | 5.8         | 3.530            | 11.0 | 11.0 | 2.63                        | 7841            | 0.71                   | 42494.29               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                                      |
|--------------|----------|------|-------|---|---|---|---|---|
| 005866098-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_SATURATED                 |
| 005866098-02 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED |

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

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

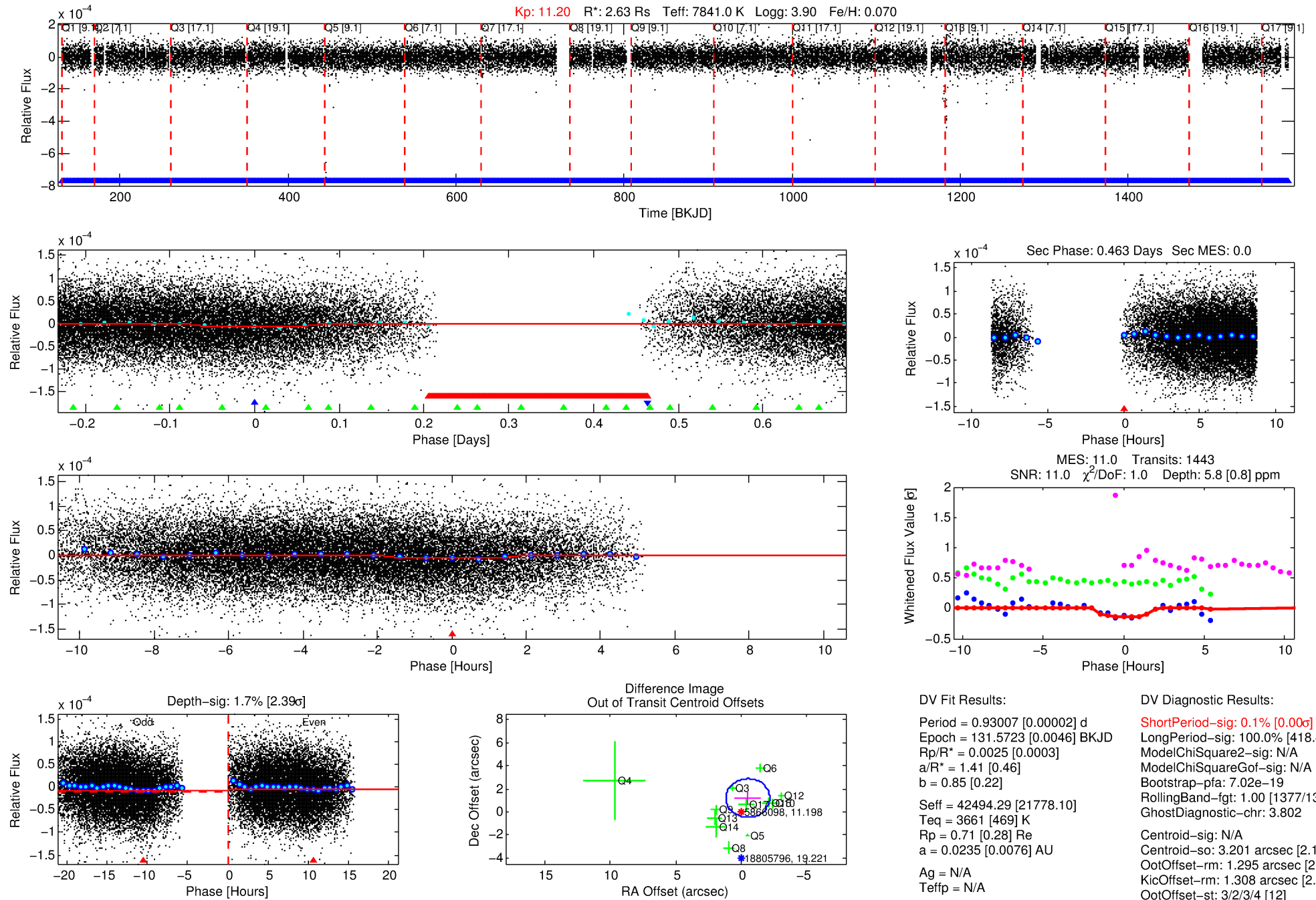
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005866098-02

No Significant Match Found

# DV One-Page Summary

KIC: 5866098 Candidate: 2 of 3 Period: 0.930 d



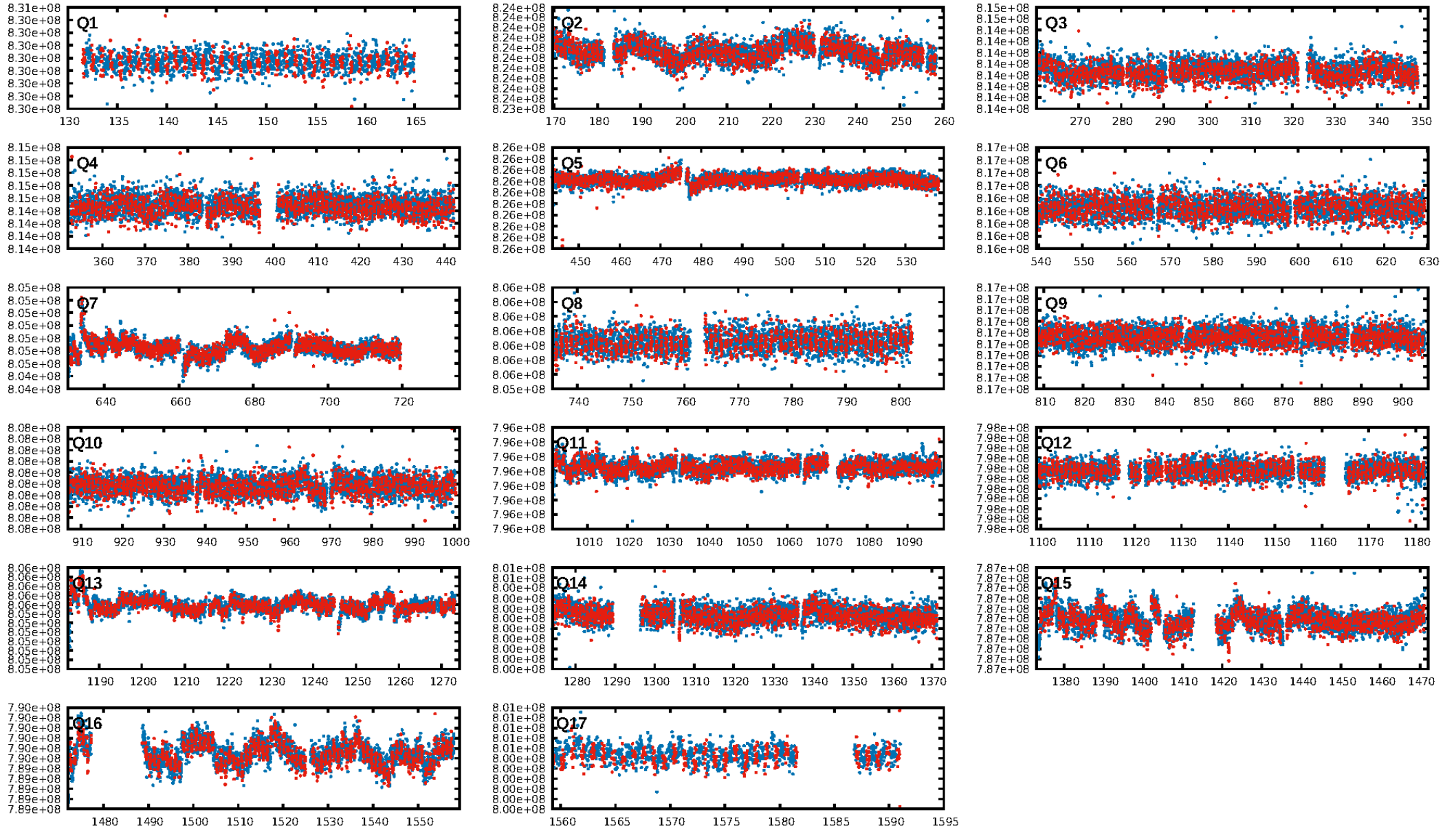
## DV Fit Results:

Period = 0.93007 [0.00002] d  
Epoch = 131.5723 [0.0046] BKJD  
Rp/R\* = 0.0025 [0.0003]  
a/R\* = 1.41 [0.46]  
b = 0.85 [0.22]  
Seff = 42494.29 [21778.10]  
Teq = 3661 [469] K  
Rp = 0.71 [0.28] Re  
a = 0.0235 [0.0076] AU  
Ag = N/A  
Teffp = N/A

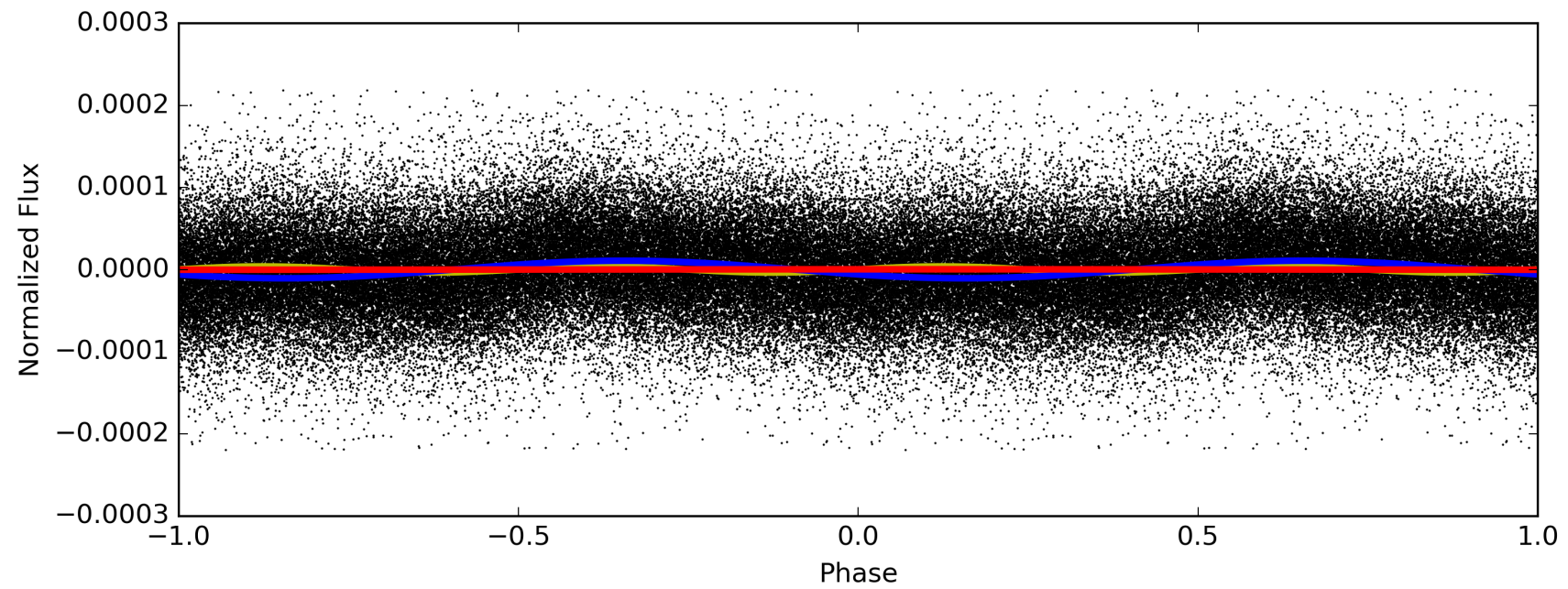
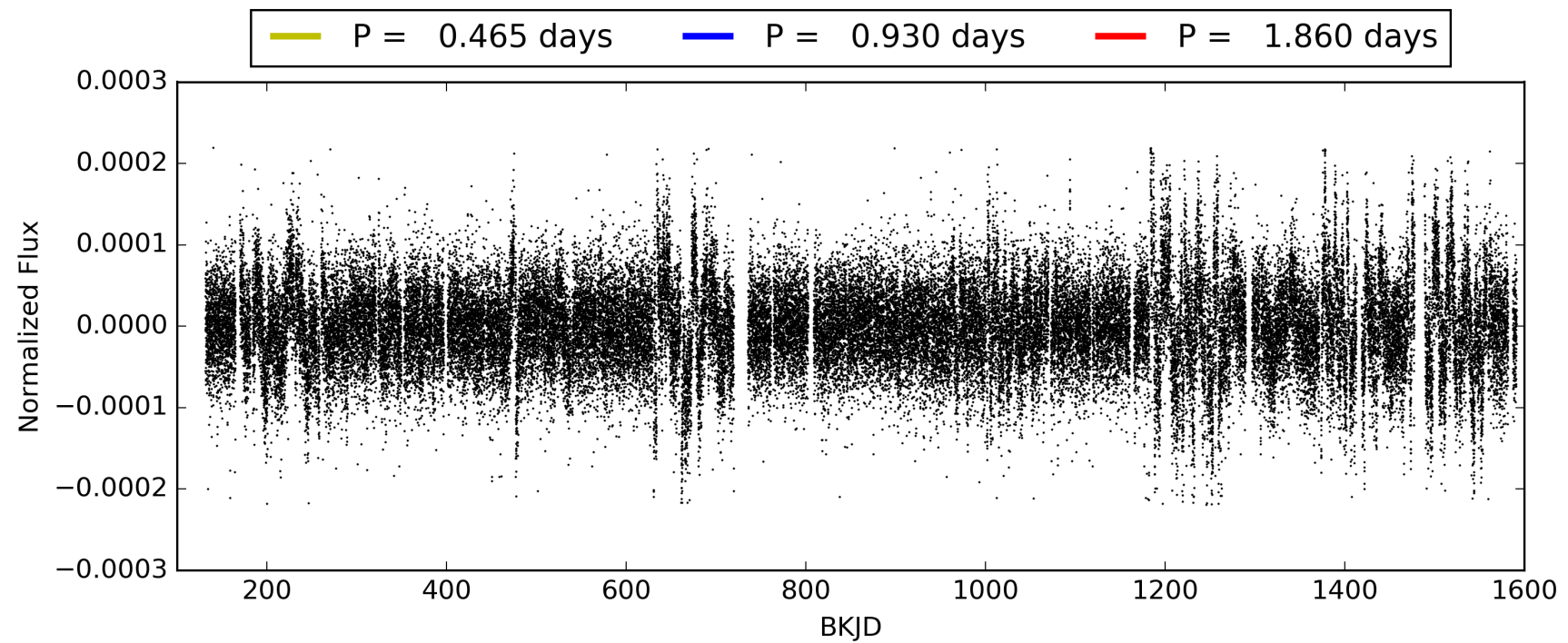
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00 $\sigma$ ]  
LongPeriod-sig: 100.0% [418.49 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.02e-19  
RollingBand-fgt: 1.00 [1377/1377]  
GhostDiagnostic-chr: 3.802  
Centroid-sig: N/A  
Centroid-so: 3.201 arcsec [2.10 $\sigma$ ]  
OotOffset-rm: 1.295 arcsec [2.32 $\sigma$ ]  
KicOffset-rm: 1.308 arcsec [2.34 $\sigma$ ]  
OotOffset-st: 3/2/3/4 [12]  
KicOffset-st: 3/2/3/4 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 0.24 [4/17]

# TCE 005866098-02, PDC Light Curves



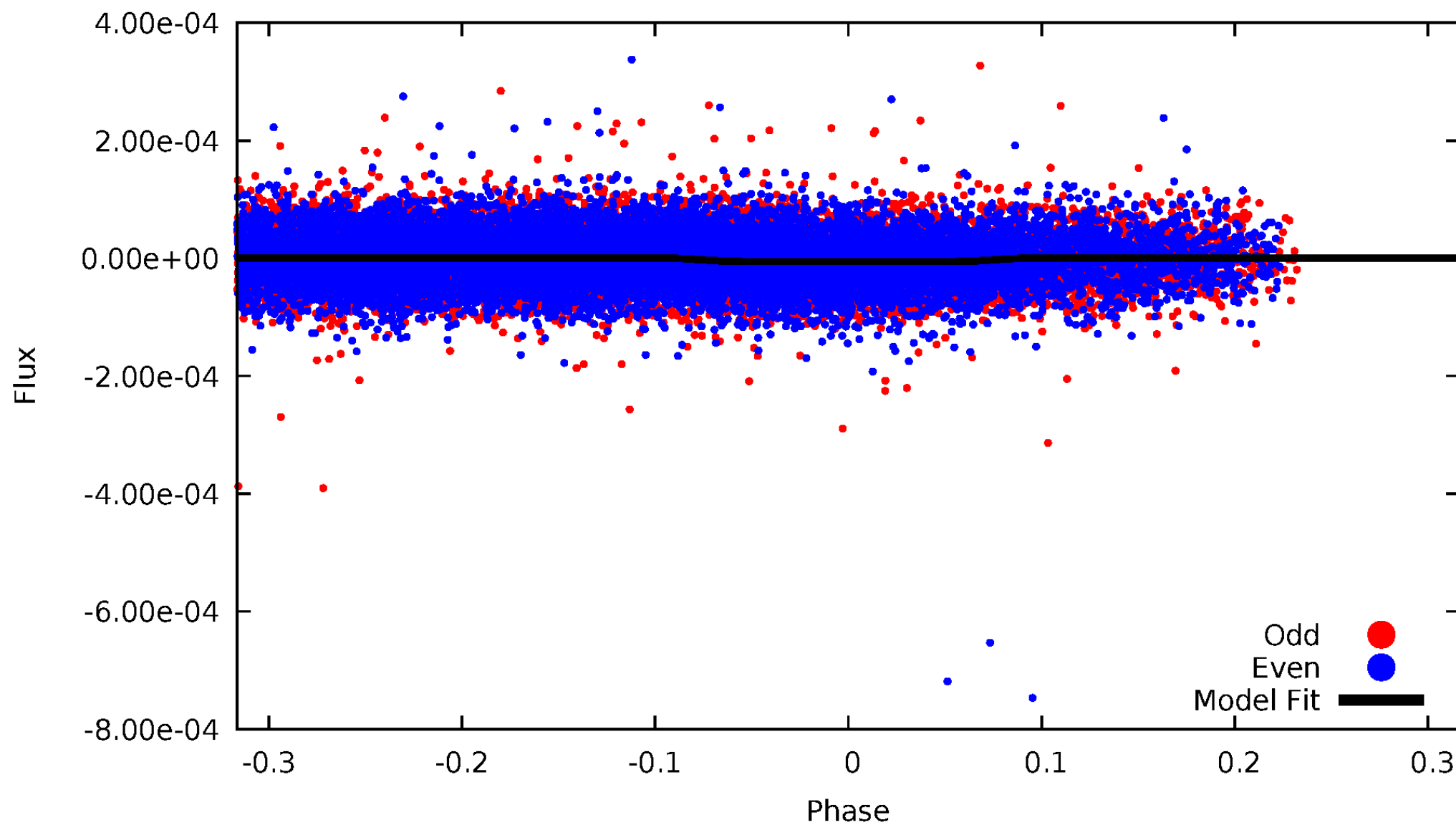
TCE 005866098-02





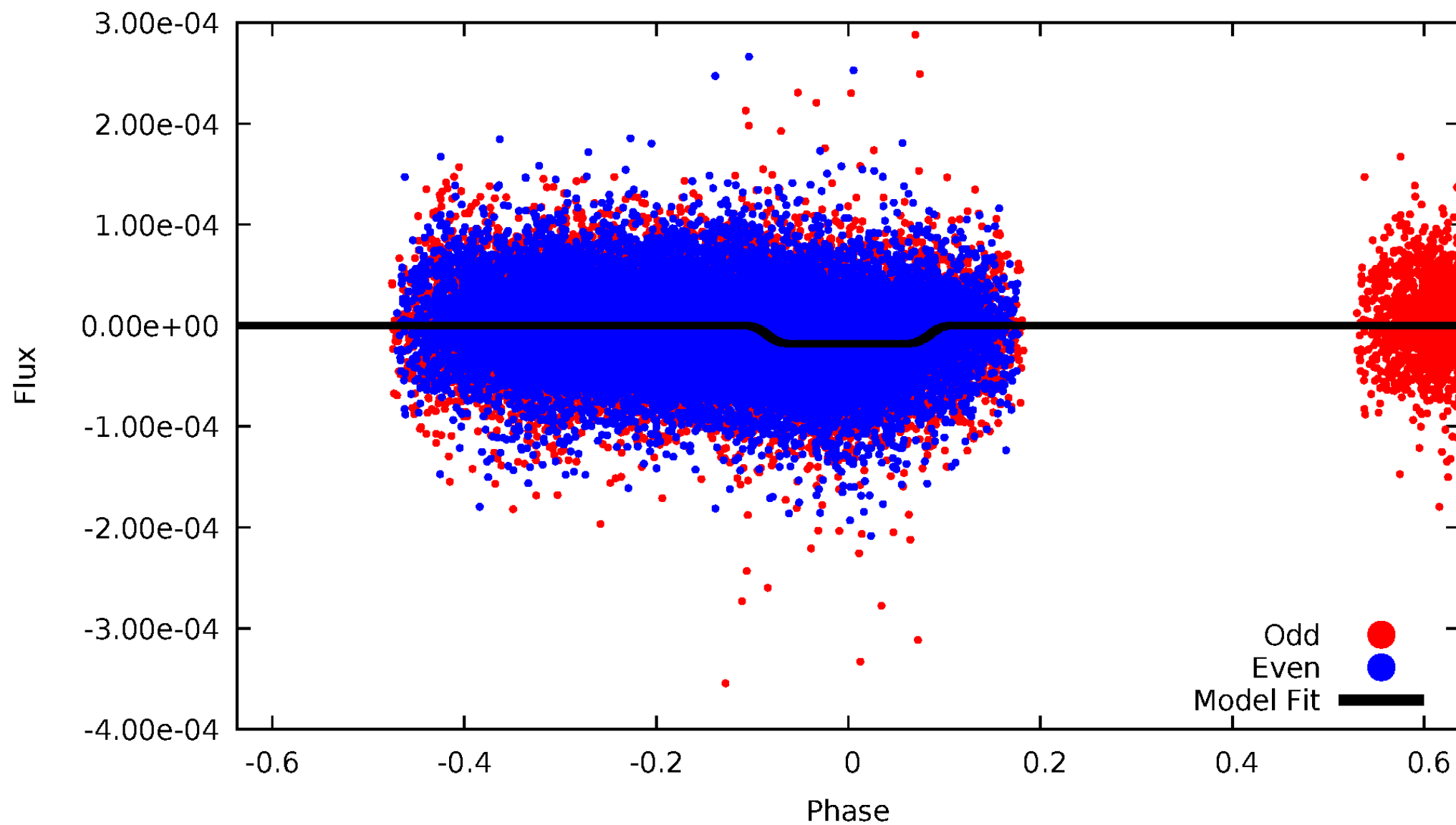
DV Odd/Even

TCE 005866098-02



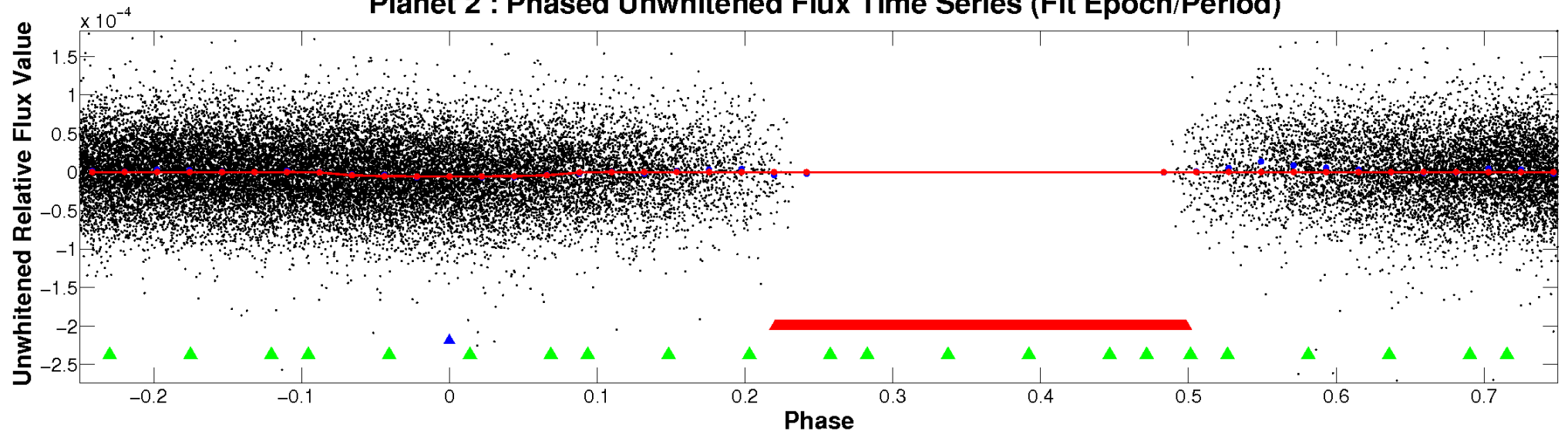
# ALT Odd/Even

TCE 005866098-02

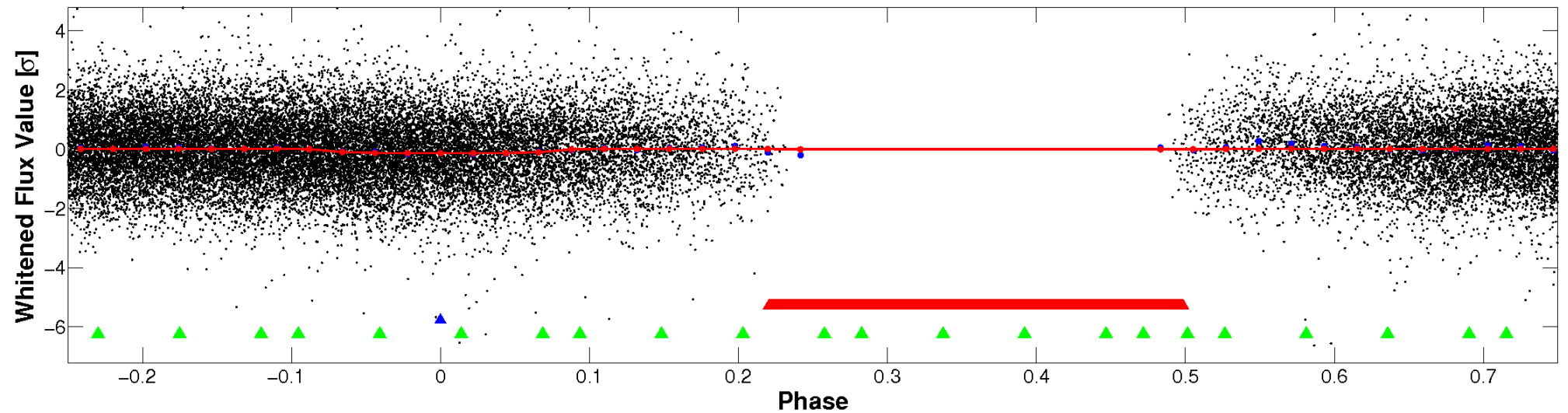


# Non-Whitened Vs. Whitened Light Curve

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

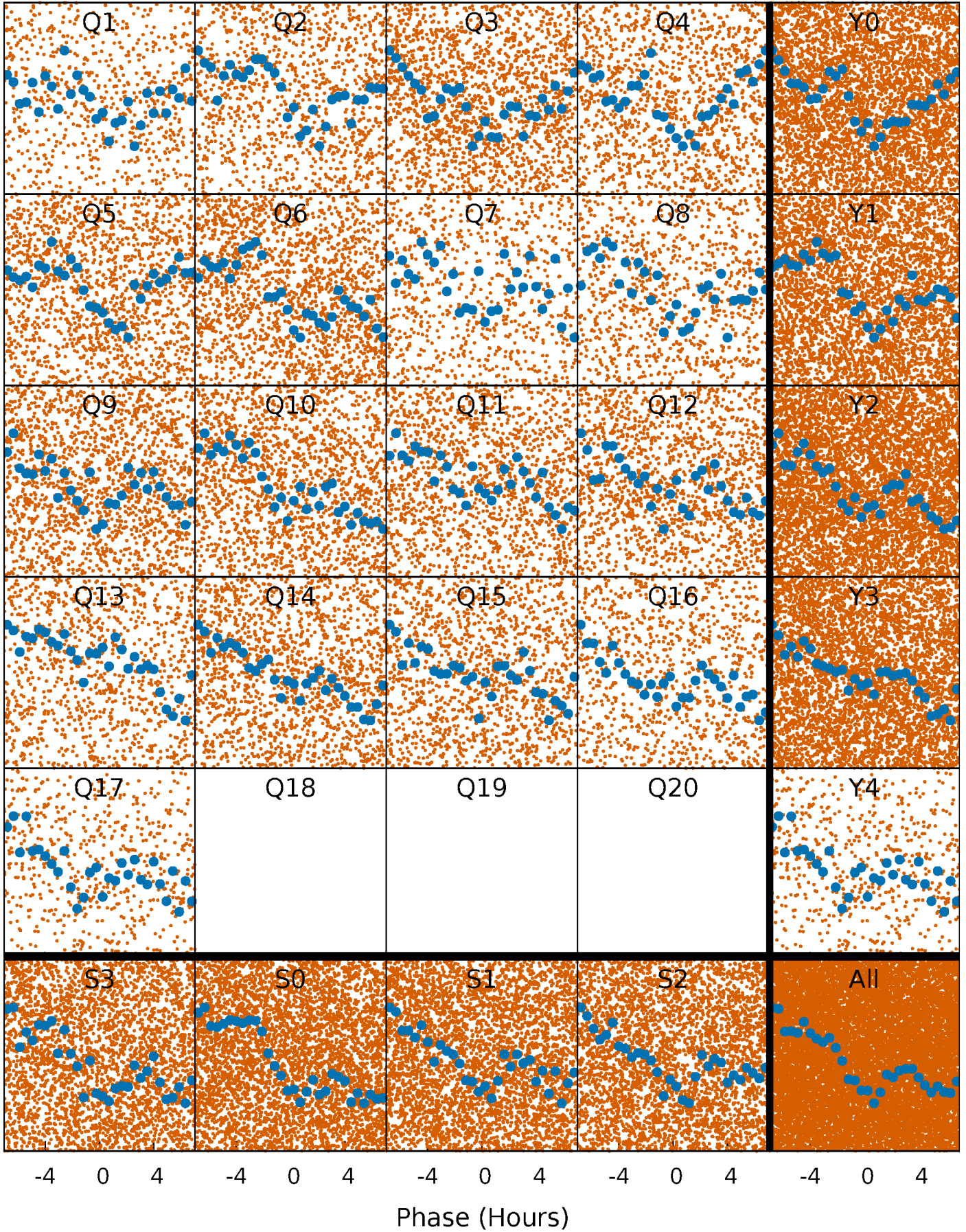


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

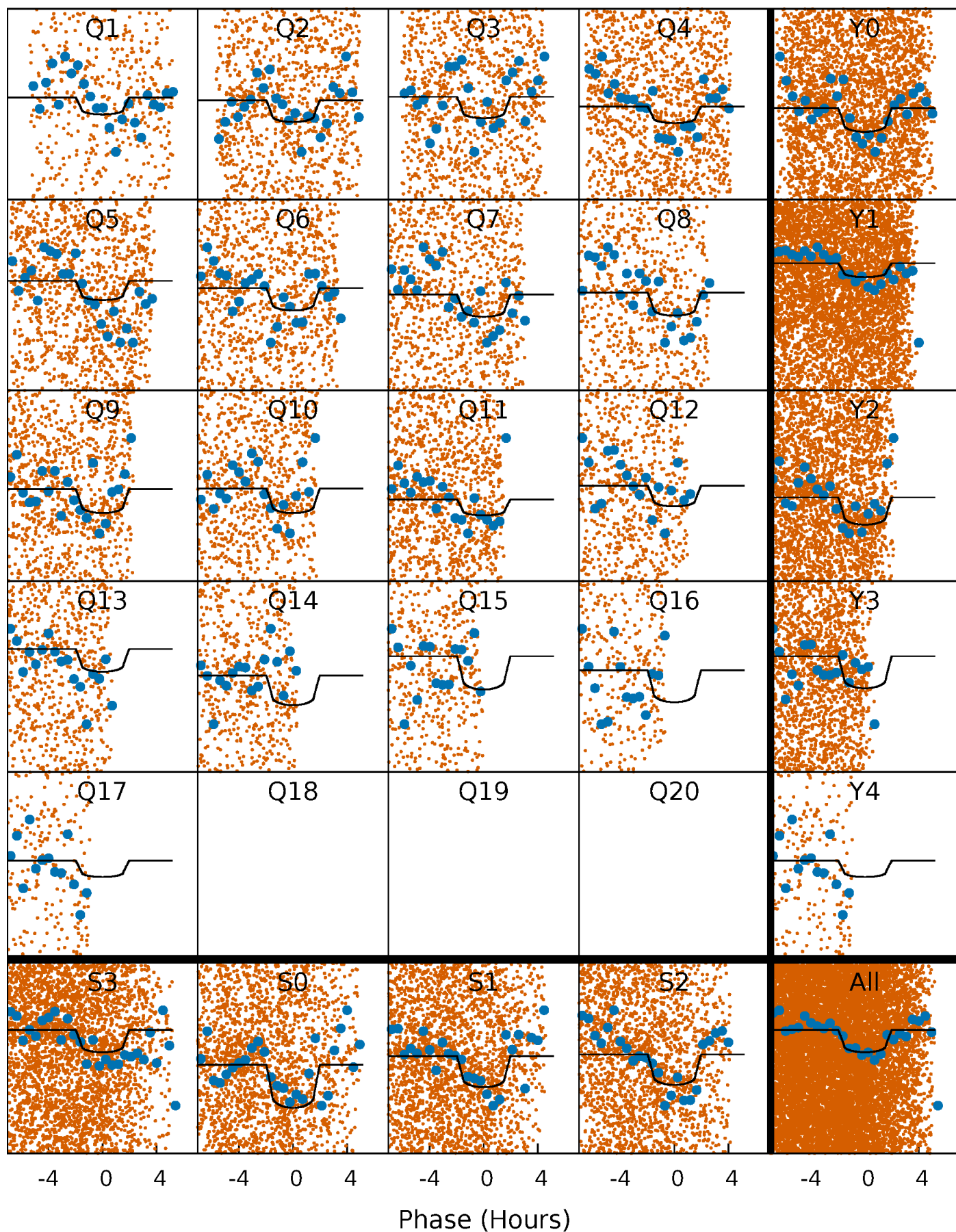
TCE 005866098-02   P= 0.930069 Days    $T_0=131.572258$  (BKJD)





# DV Quarter-Phased Transit Curves

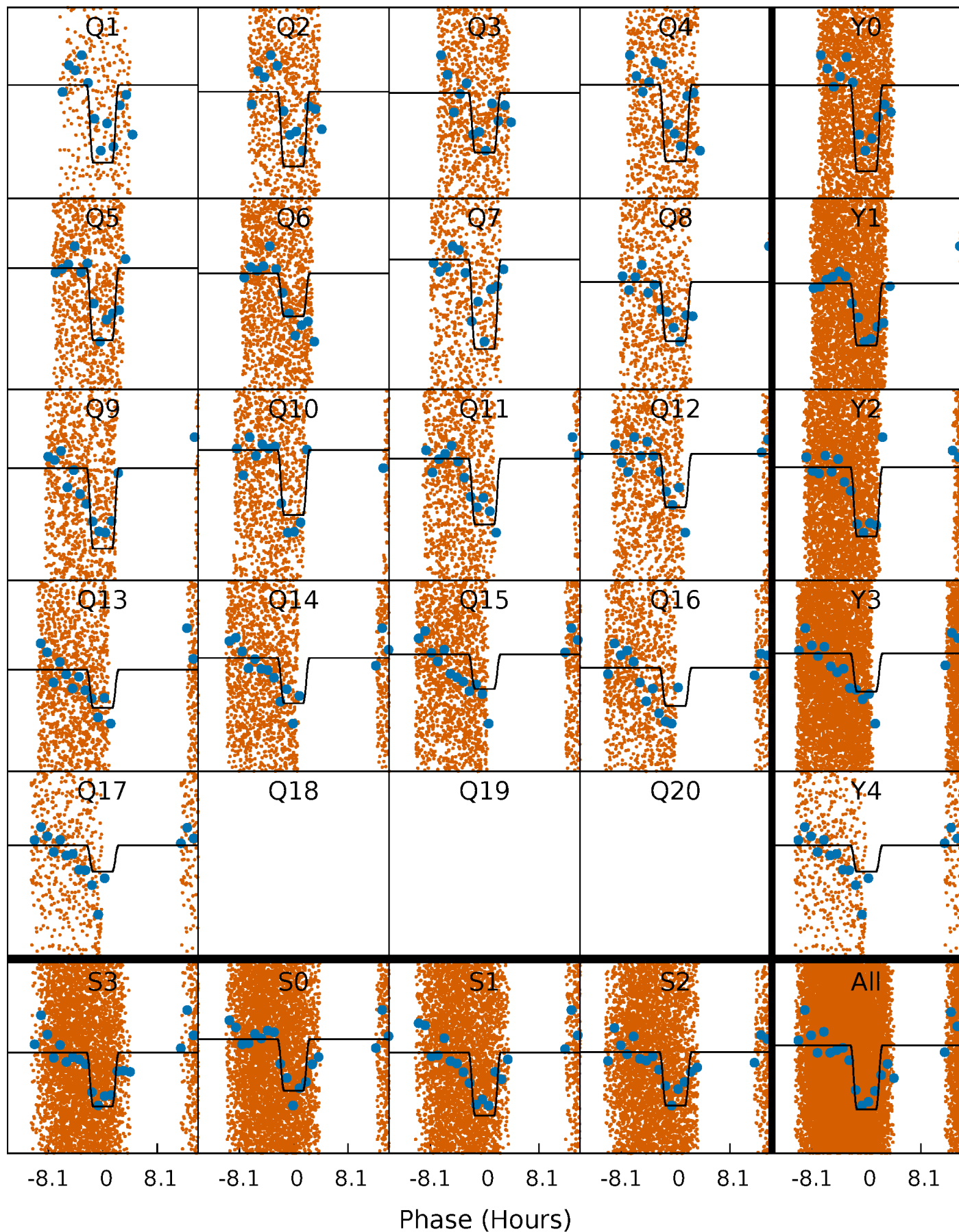
TCE 005866098-02   P= 0.930069 Days    $T_0=131.572258$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

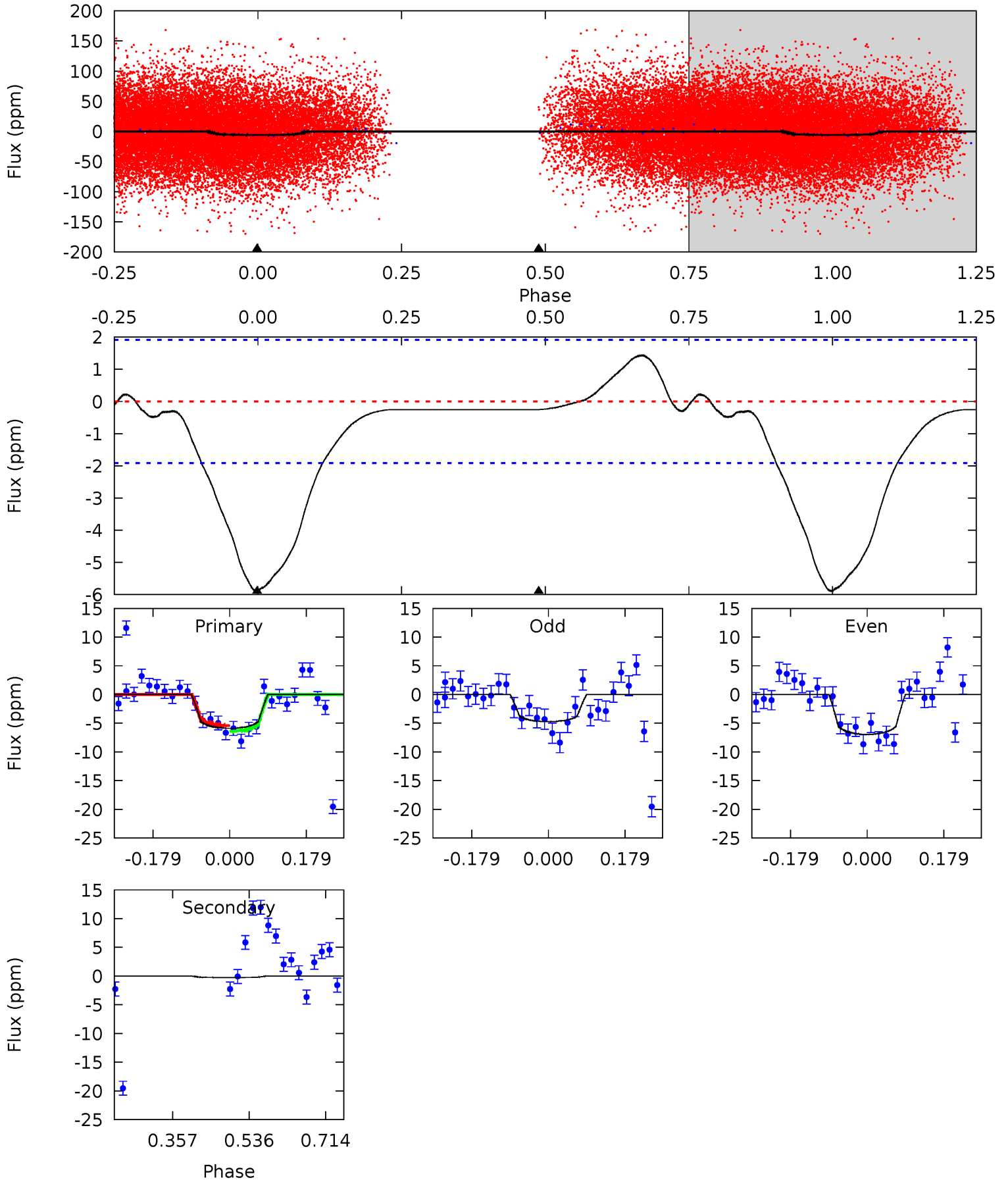
TCE 005866098-02   P= 0.930017 Days    $T_0=131.618858$  (BKJD)



# DV Model-Shift Uniqueness Test

005866098-02, P = 0.930069 Days, E = 130.642189 Days

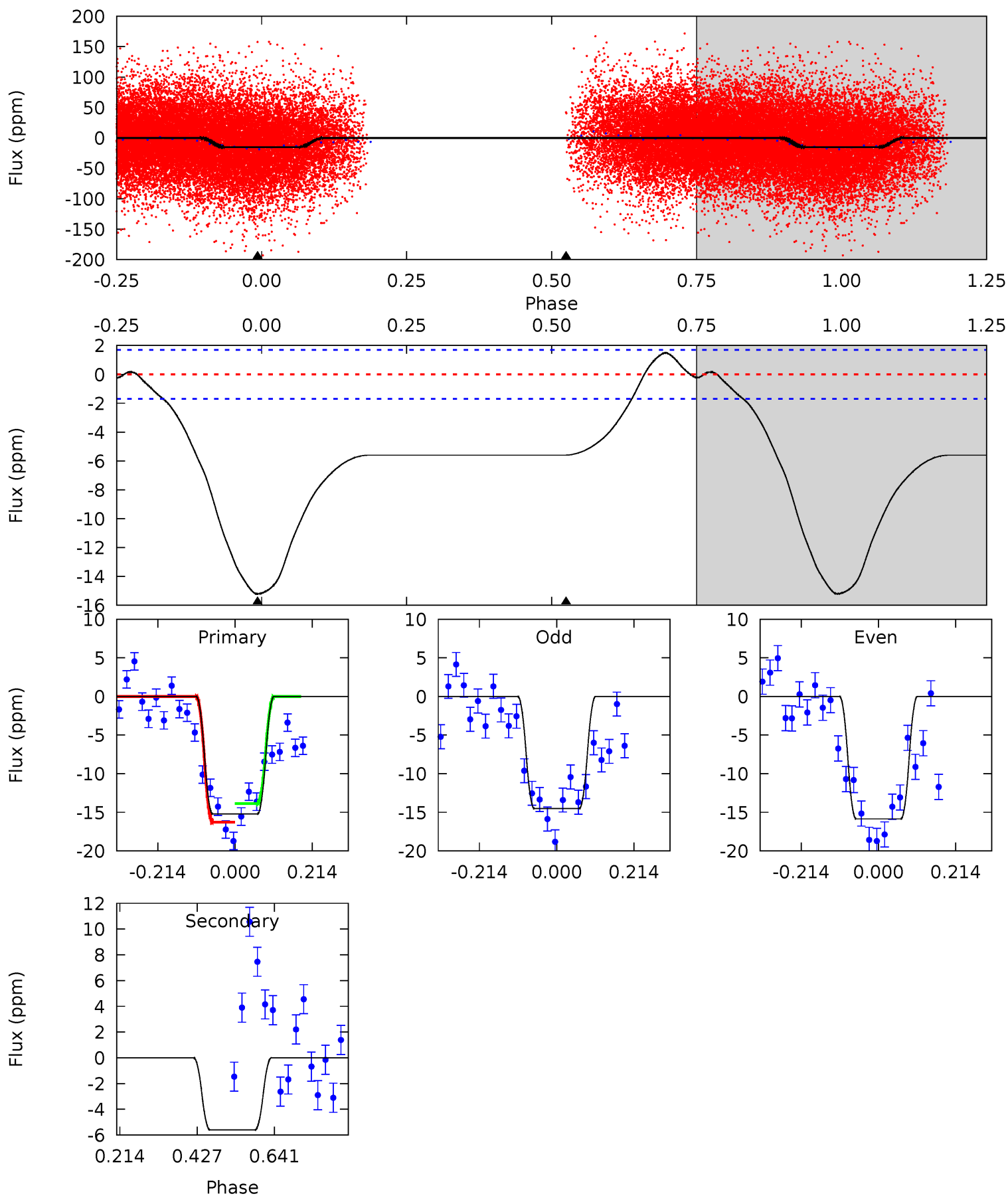
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 13.7 | 0.59 | 0   | 0   | 4.44            | 1.35            | 1.26             | 13.7    | 13.7    | 0.59    | 0.59    | 2.57    | 1.03 | 0.20  | 1.11 |



# Alt Model-Shift Uniqueness Test

005866098-02, P = 0.930017 Days, E = 130.688841 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  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 39.6 | 14.6 | 0   | 0   | 4.40            | 1.24            | 0.36             | 39.6    | 39.6    | 14.6    | 14.6    | 1.71    | 1.02 | 0.09  | 2.94 |



### Stellar Parameters For KIC 005866098

|        | $T_{\text{eff}} (K)$ | $\log(g)$                 | $[\text{Fe}/\text{H}]$    | $R (R_{\odot})$           | $M (M_{\odot})$           | $\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|--|
|        | $7841^{+216}_{-324}$ | $3.898^{+0.273}_{-0.117}$ | $0.070^{+0.200}_{-0.400}$ | $2.630^{+0.482}_{-0.964}$ | $1.993^{+0.252}_{-0.468}$ | $0.154^{+0.284}_{-0.056}$                    |
|        | +3%/-4%              | +7%/-3%                   | +286%/-571%               | +18%/-37%                 | +13%/-23%                 | +184%/-36%                                   |
| Source | KIC0                 | 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 005866098-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$     | $T_{\text{max}} (K)$ | $T_{\text{obs}} (K)$   | $A_{\text{obs}}$          |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV      | $-0 \pm 0$  | $0.69^{+0.13}_{-0.15}$ | $5034^{+343}_{-443}$ | $-3705^{+7451}_{-852}$ | $0.162^{+0.303}_{-0.269}$ |
| Alt.    | $-6 \pm 0$  | $1.18^{+0.19}_{-0.21}$ | $5047^{+333}_{-422}$ | $5358^{+326}_{-281}$   | $1.197^{+0.536}_{-0.272}$ |

$T_{\text{max}}$  = 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

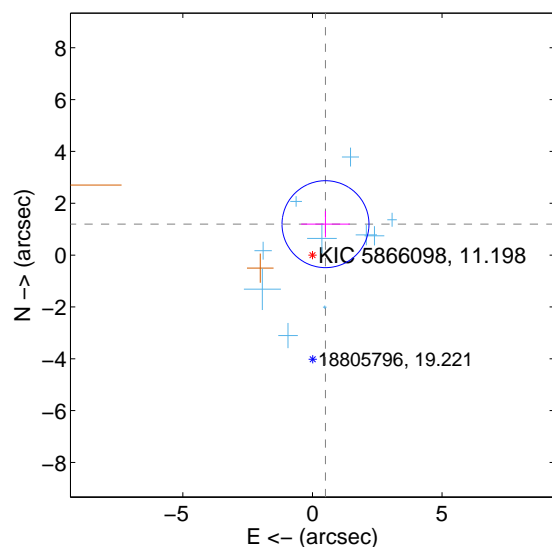
Supplemental centroid analysis for 005866098-02. **Kepler magnitude: 11.20.** Transit SNR 11.02

There are 10 quarters with good PRF difference image offsets

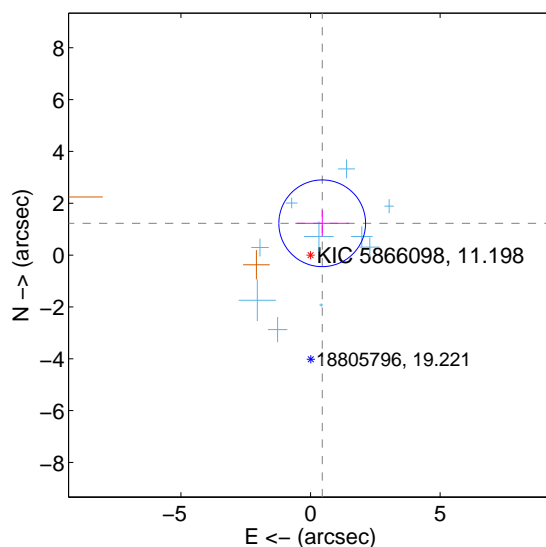
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA        | $\Delta$ Dec      |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT          | $1.295 \pm 0.559$  | 2.32                | $-0.504 \pm 0.940$ | $1.194 \pm 0.506$ |
| PRF-fit source offset from KIC position | $1.308 \pm 0.558$  | 2.34                | $-0.451 \pm 1.036$ | $1.227 \pm 0.505$ |
| photometric centroid source offset      | $3.20 \pm 1.53$    | 2.10                | $0.40 \pm 1.31$    | $3.18 \pm 1.53$   |

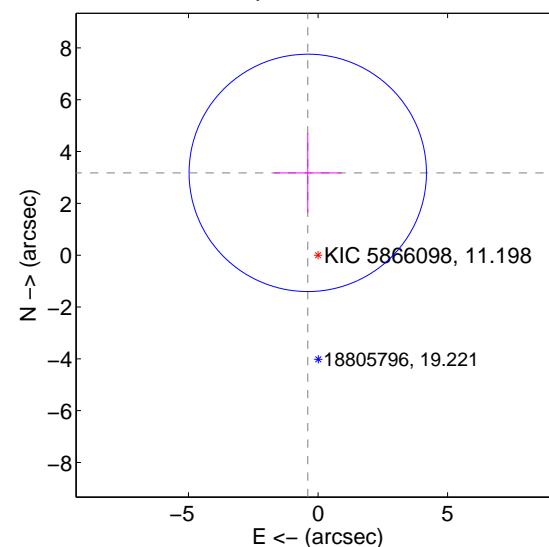
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



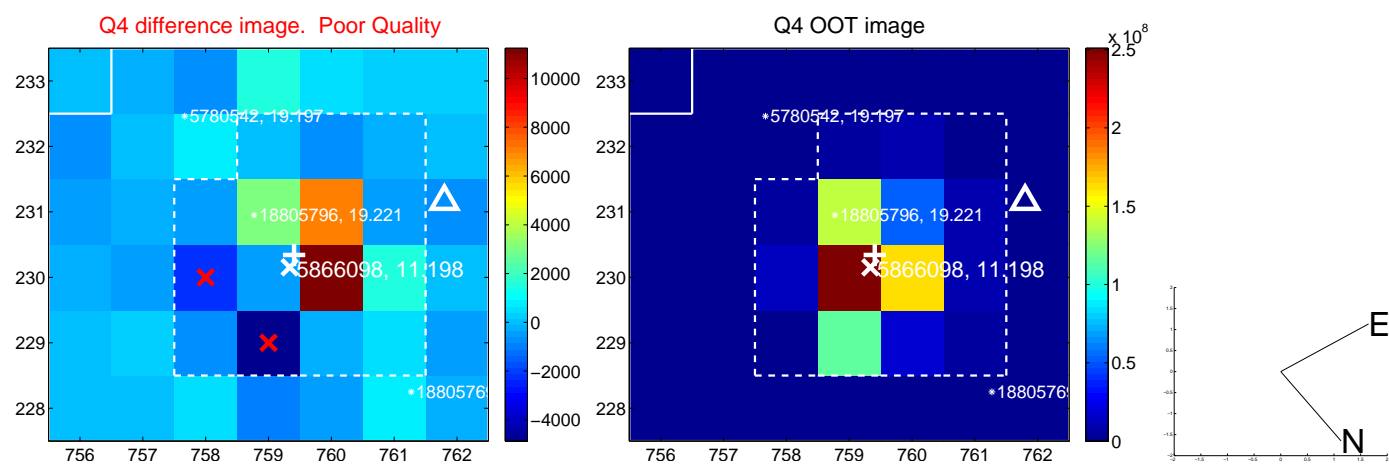
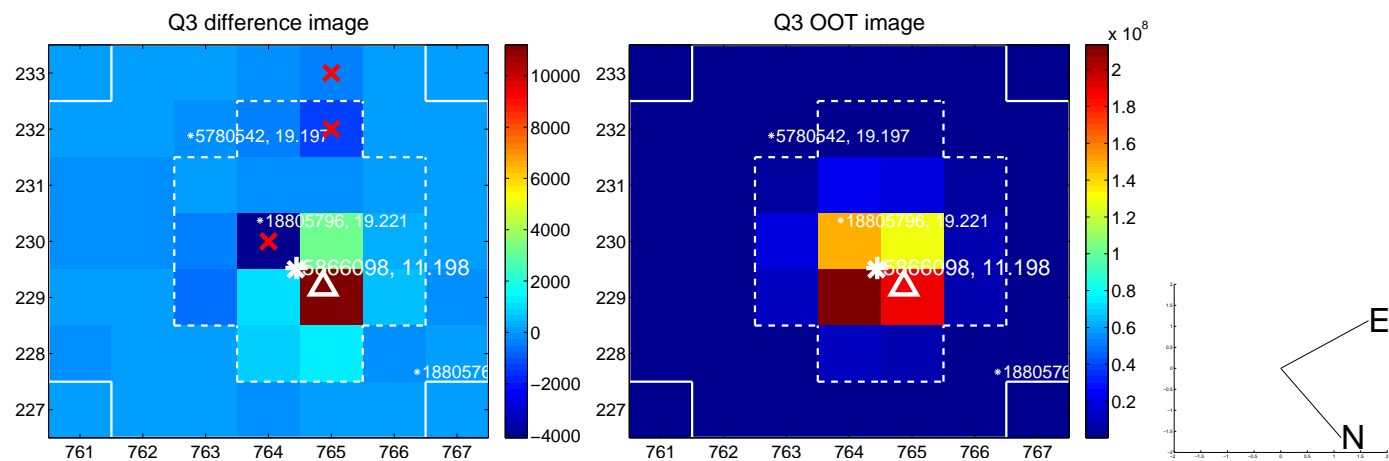
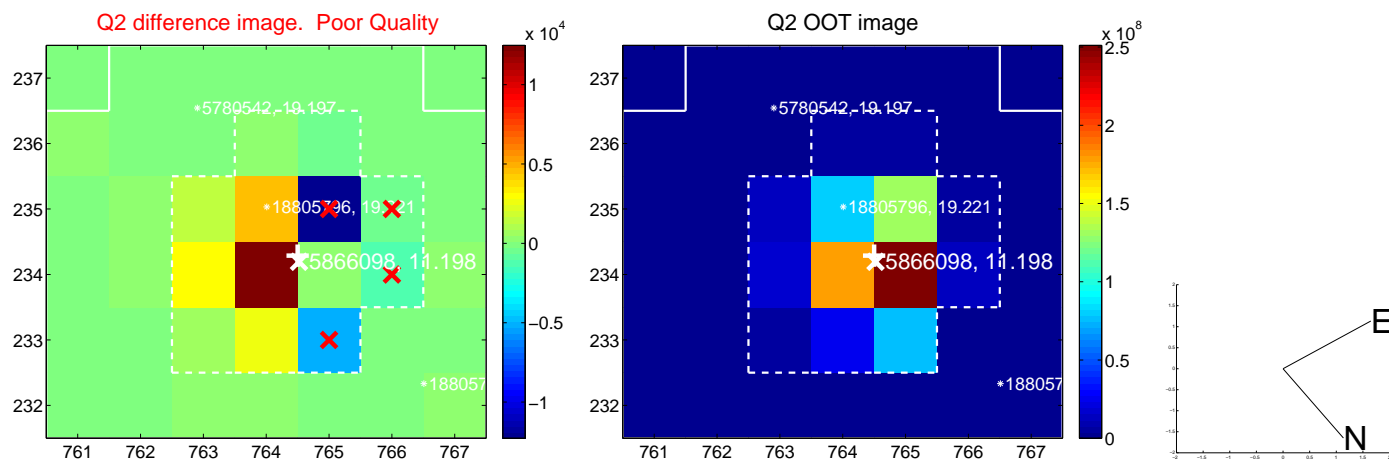
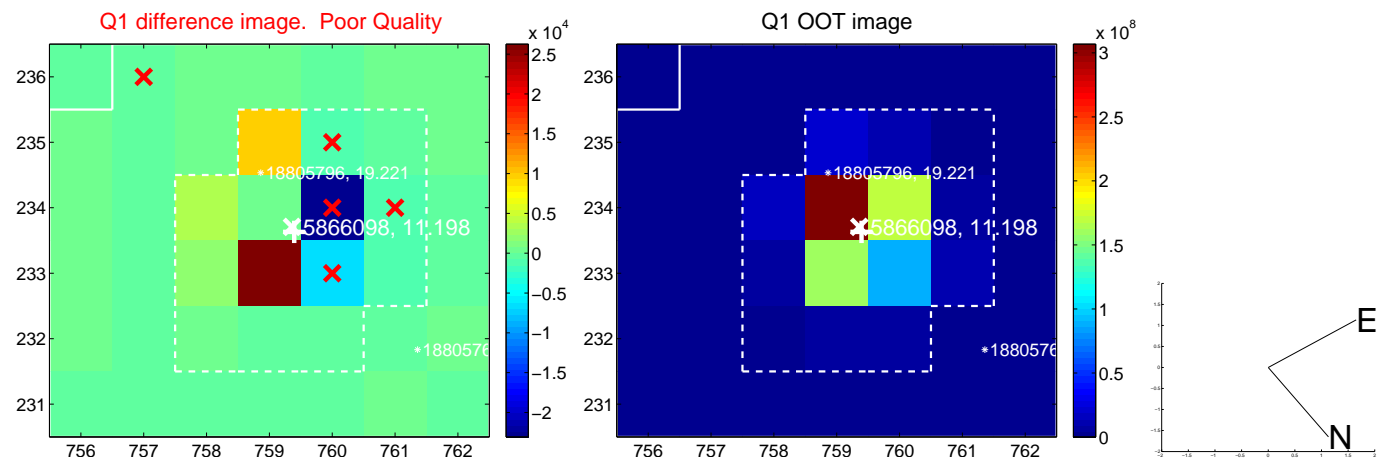
offset from photometric centroids



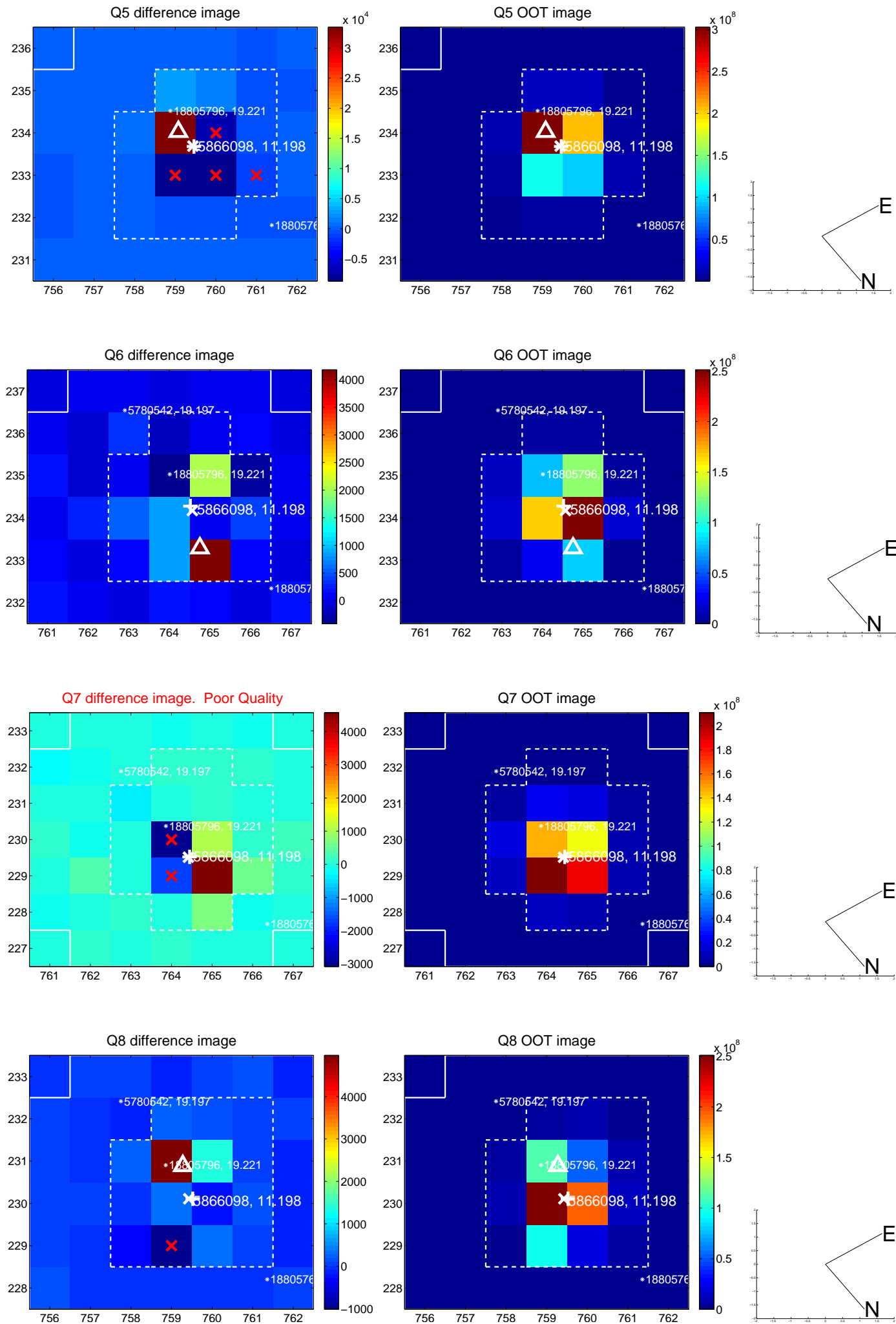
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



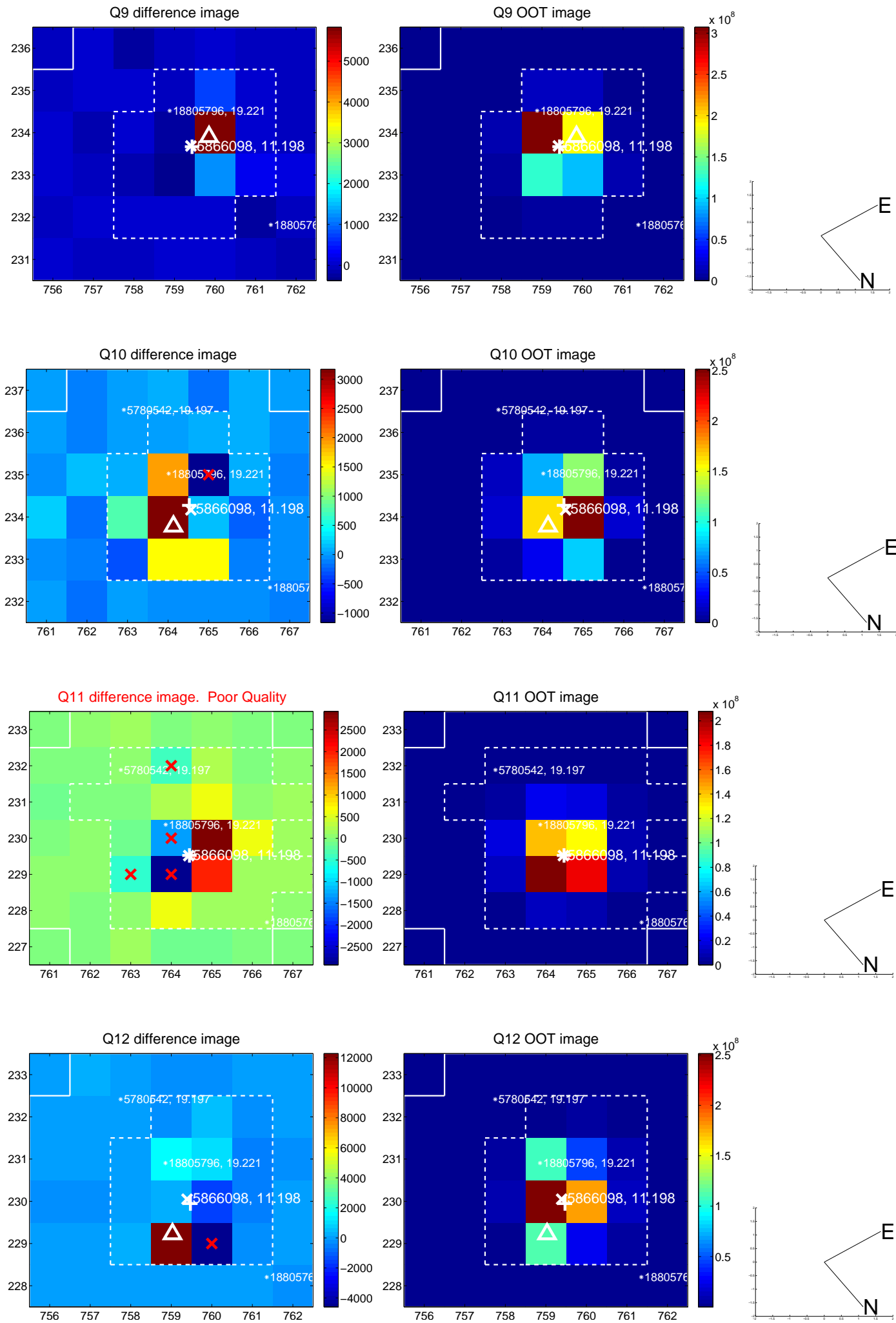
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



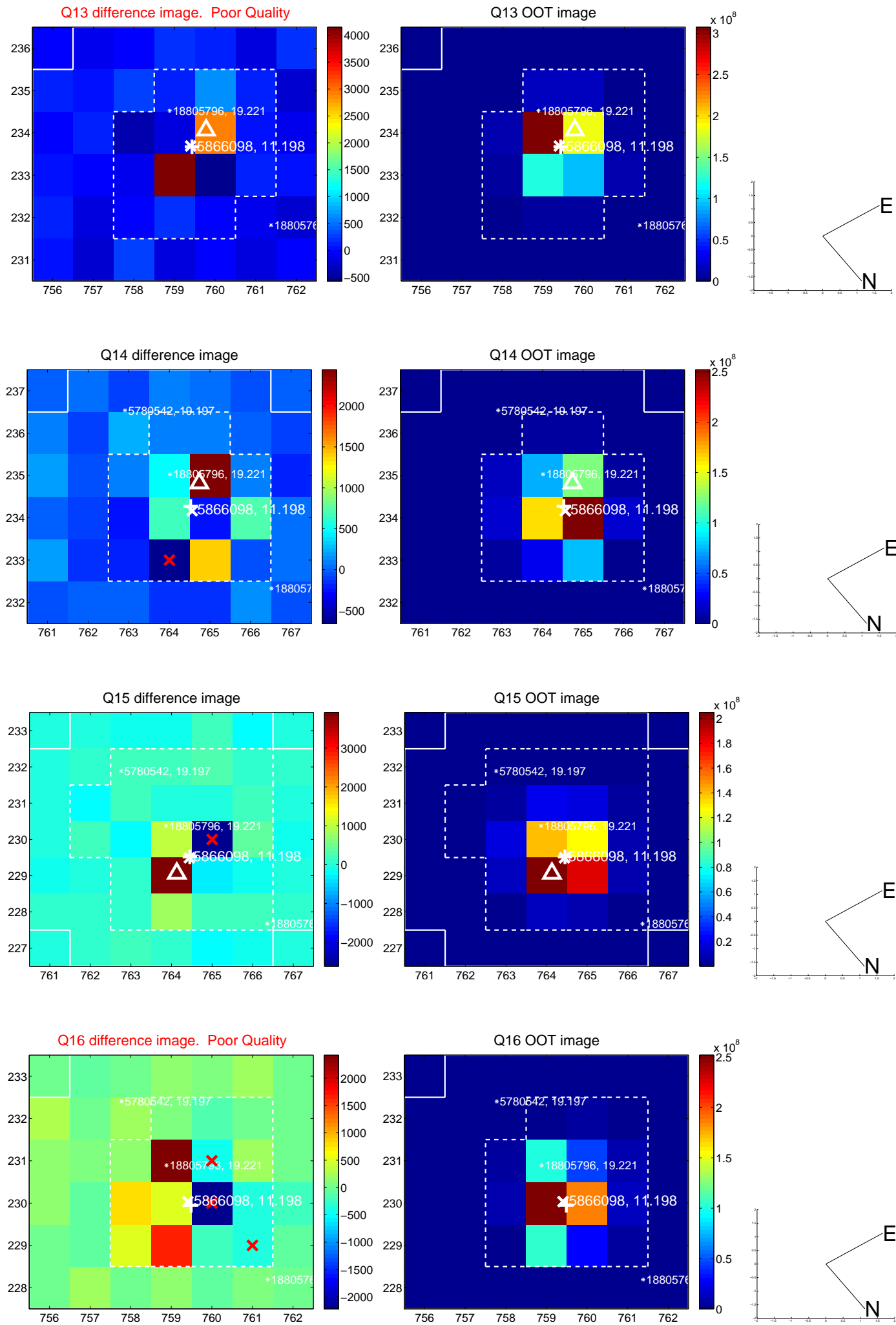
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



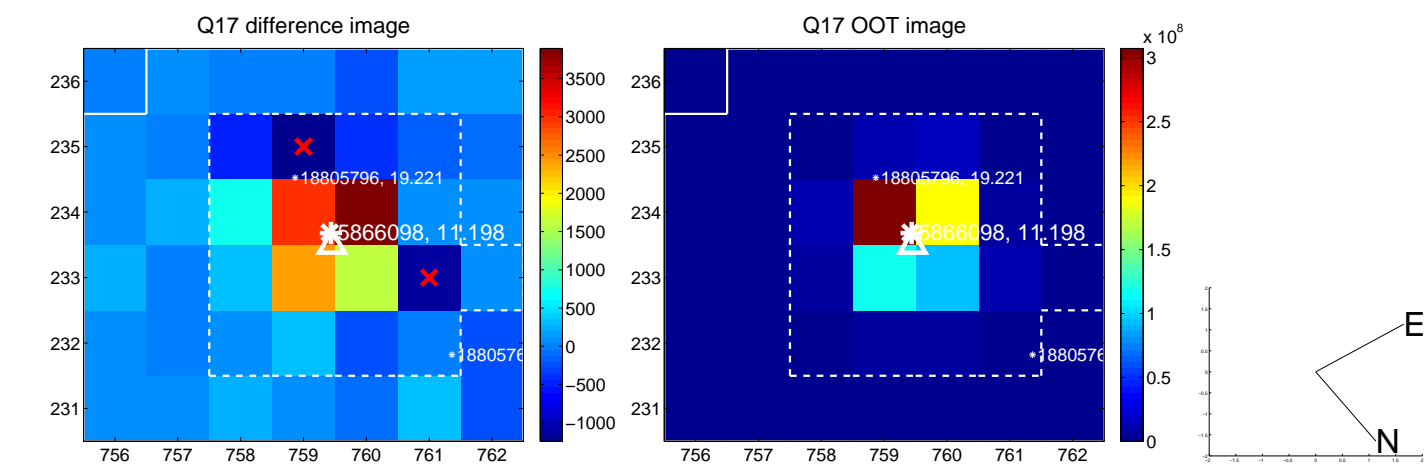
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



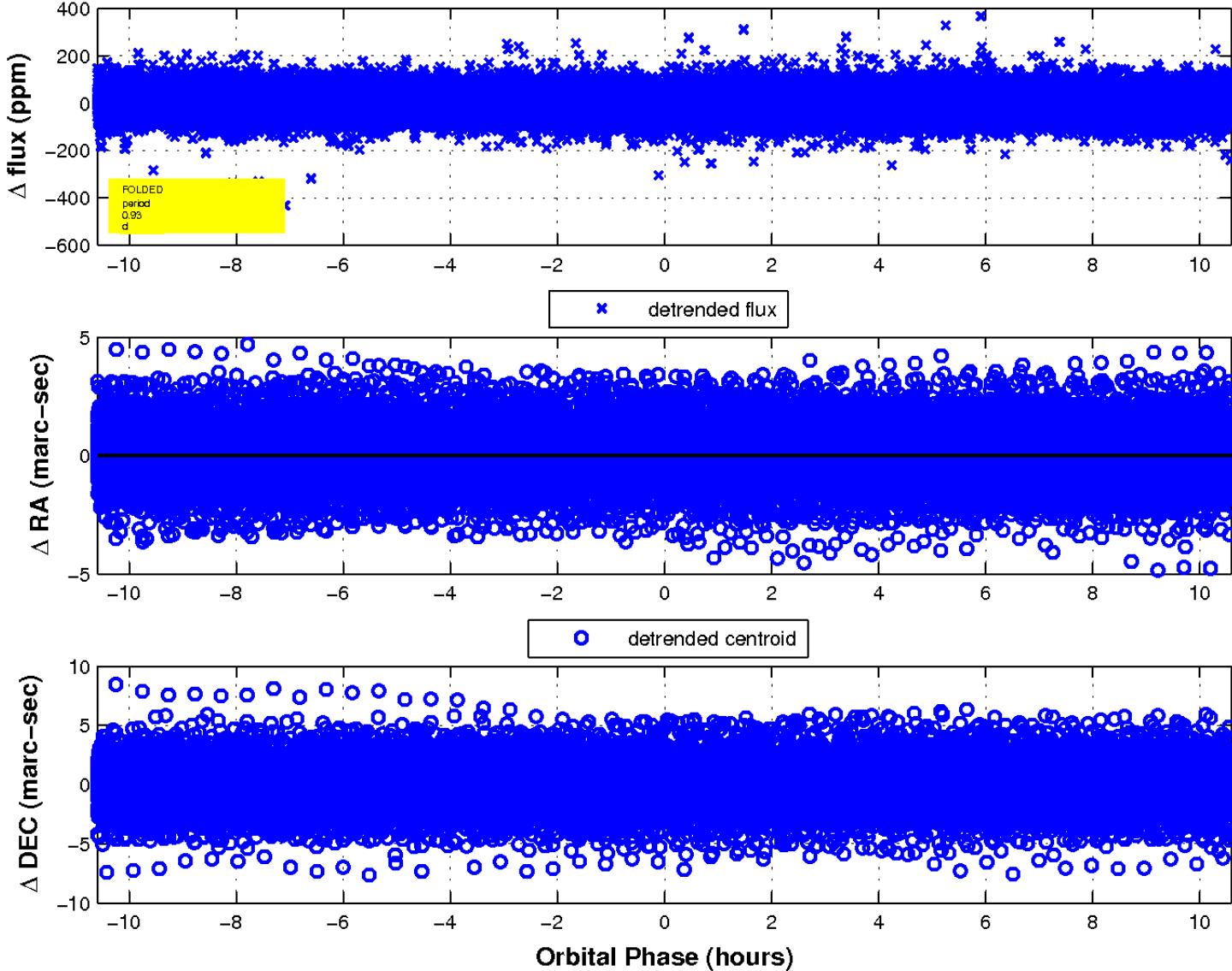
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



### fluxWeightedCentroids, Planet 2 of 3





UKIRT Image

Declination

