

KIC 010130777

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010130777-01 | OBS | No | 0.650906 | 131.802679 | 92.5 | 1.952 | 12.5 | 11.5 | 3.18 | 8262 | 3.56 | 124619.72 |
| 010130777-02 | OBS | No | 0.650900 | 132.131583 | 60.1 | 4.761 | 10.4 | 9.1 | 3.18 | 8262 | 2.83 | 124621.25 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|---|
| 010130777-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT |
| 010130777-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—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.

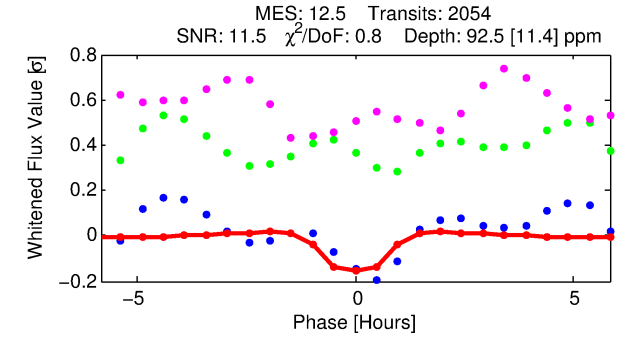
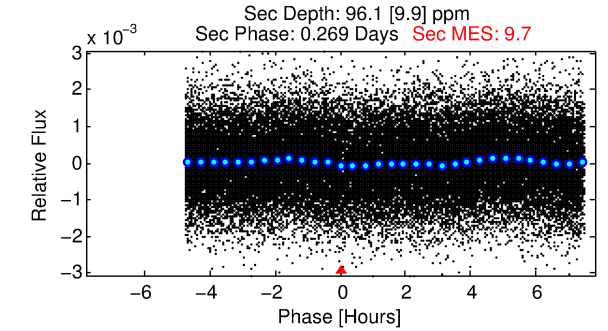
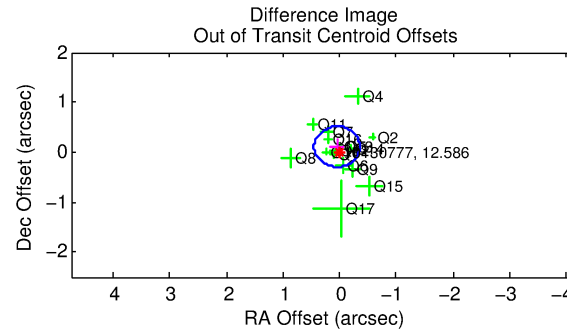
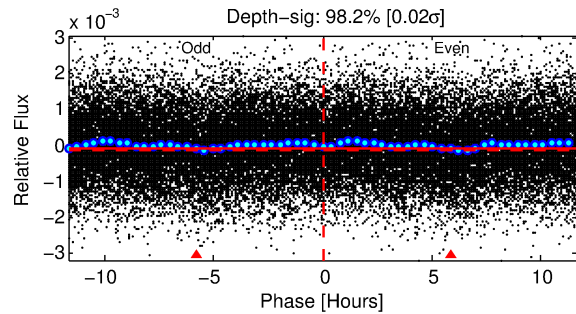
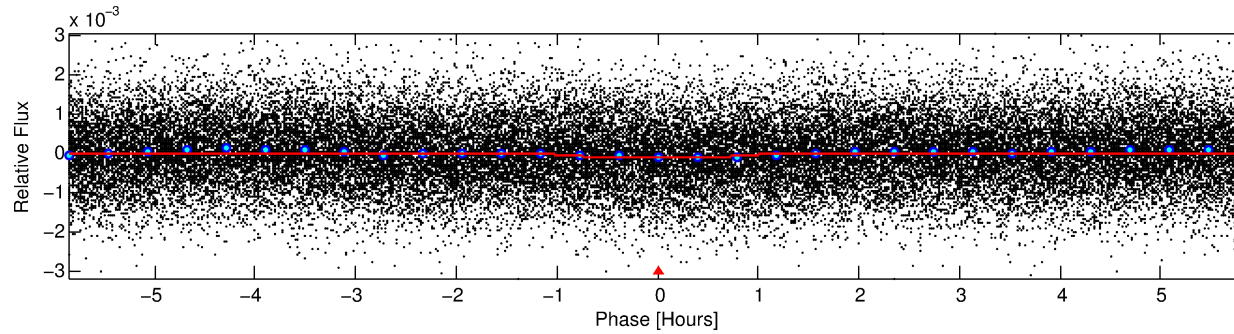
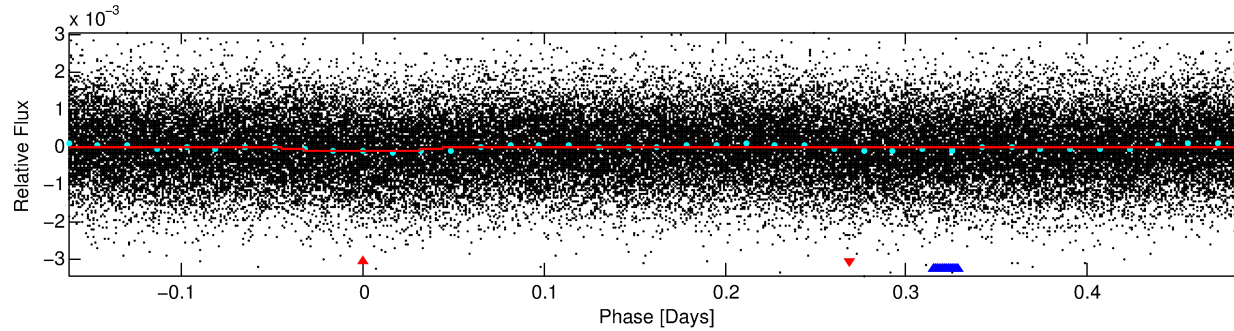
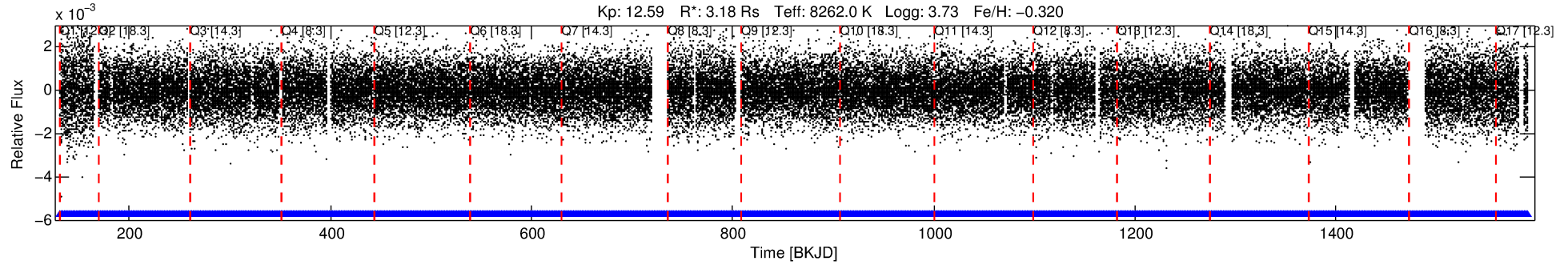
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010130777-01

No Significant Match Found

DV One-Page Summary

KIC: 10130777 Candidate: 1 of 2 Period: 0.651 d



DV Fit Results:

Period = 0.65091 [0.00001] d
Epoch = 131.8027 [0.0025] BKJD
Rp/R* = 0.0103 [0.0070]
a/R* = 1.50 [3.58]
b = 0.90 [0.92]
Seff = 124619.72 [94736.80]
Teq = 4791 [911] K
Rp = 3.56 [2.92] Re
a = 0.0184 [0.0084] AU
Ag = 1.41 [2.19] [0.19σ]
Teffp = 8075 [2765] K [1.13σ]

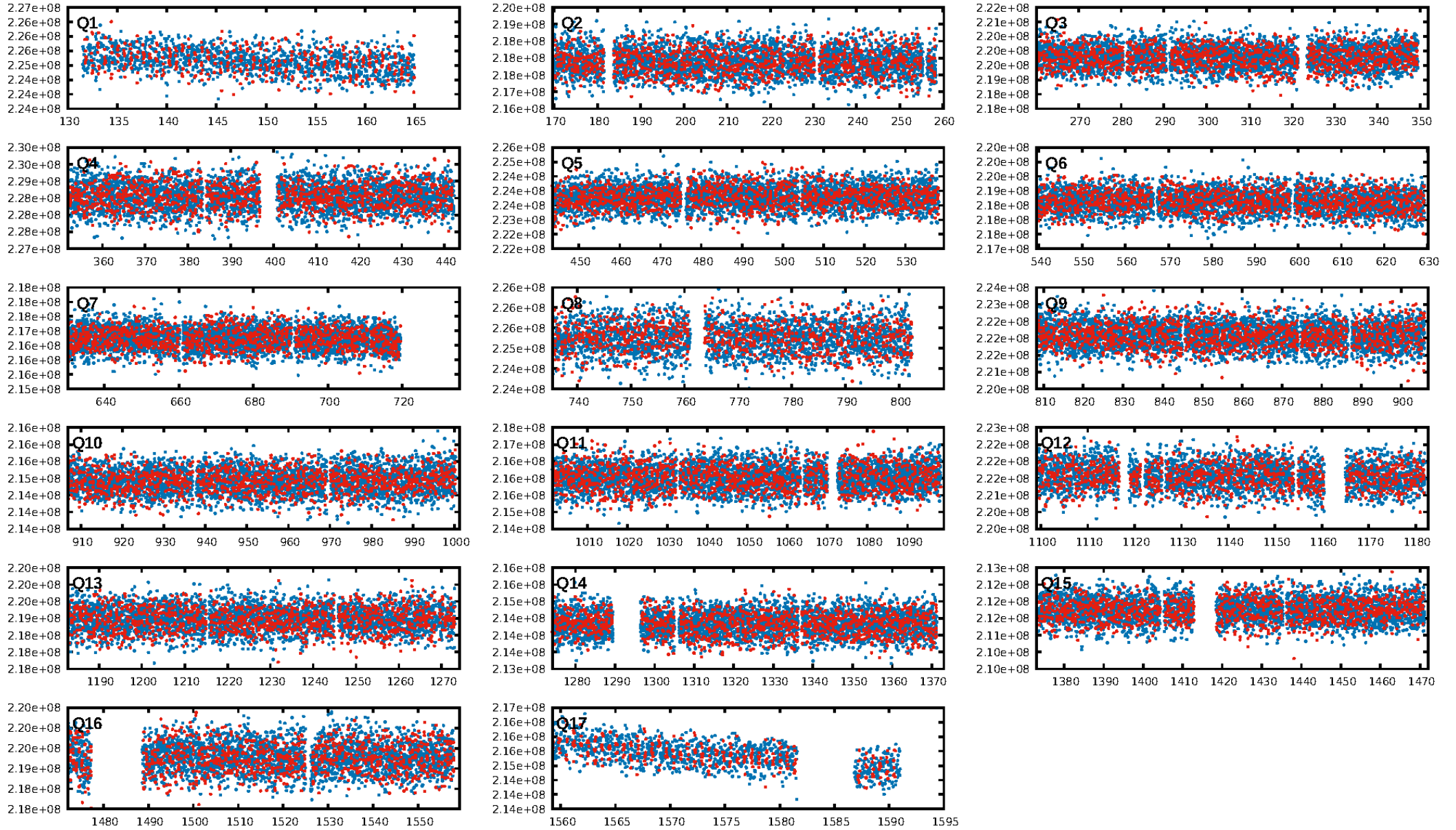
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1961/1961]
GhostDiagnostic-chr: 1.153
Centroid-sig: 0.0%
Centroid-so: 0.470 arcsec [3.48σ]
OotOffset-rm: 0.119 arcsec [0.88σ]
KicOffset-rm: 0.081 arcsec [0.63σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 0.00 [0/17]

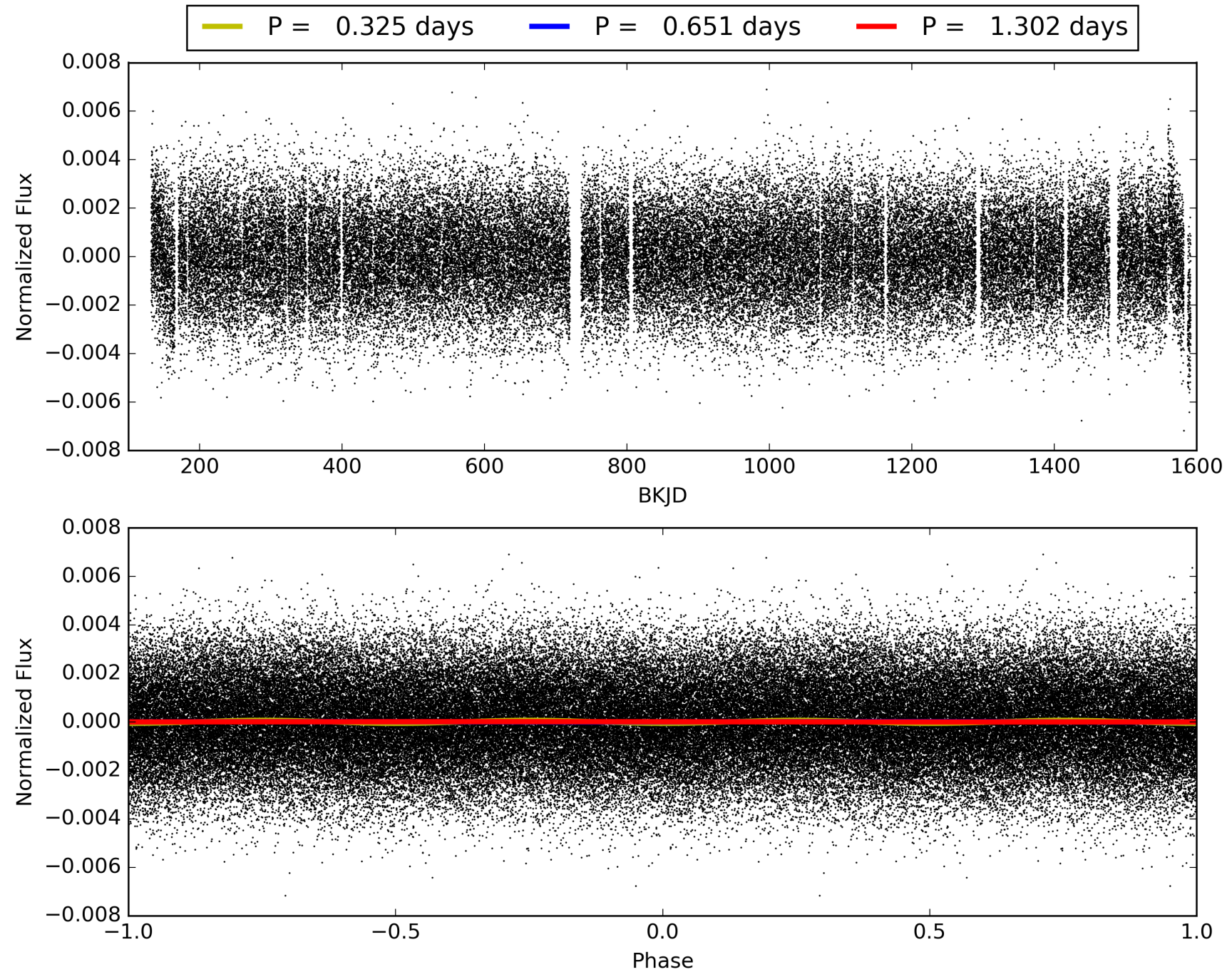
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:02:46 Z

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

TCE 010130777-01, PDC Light Curves

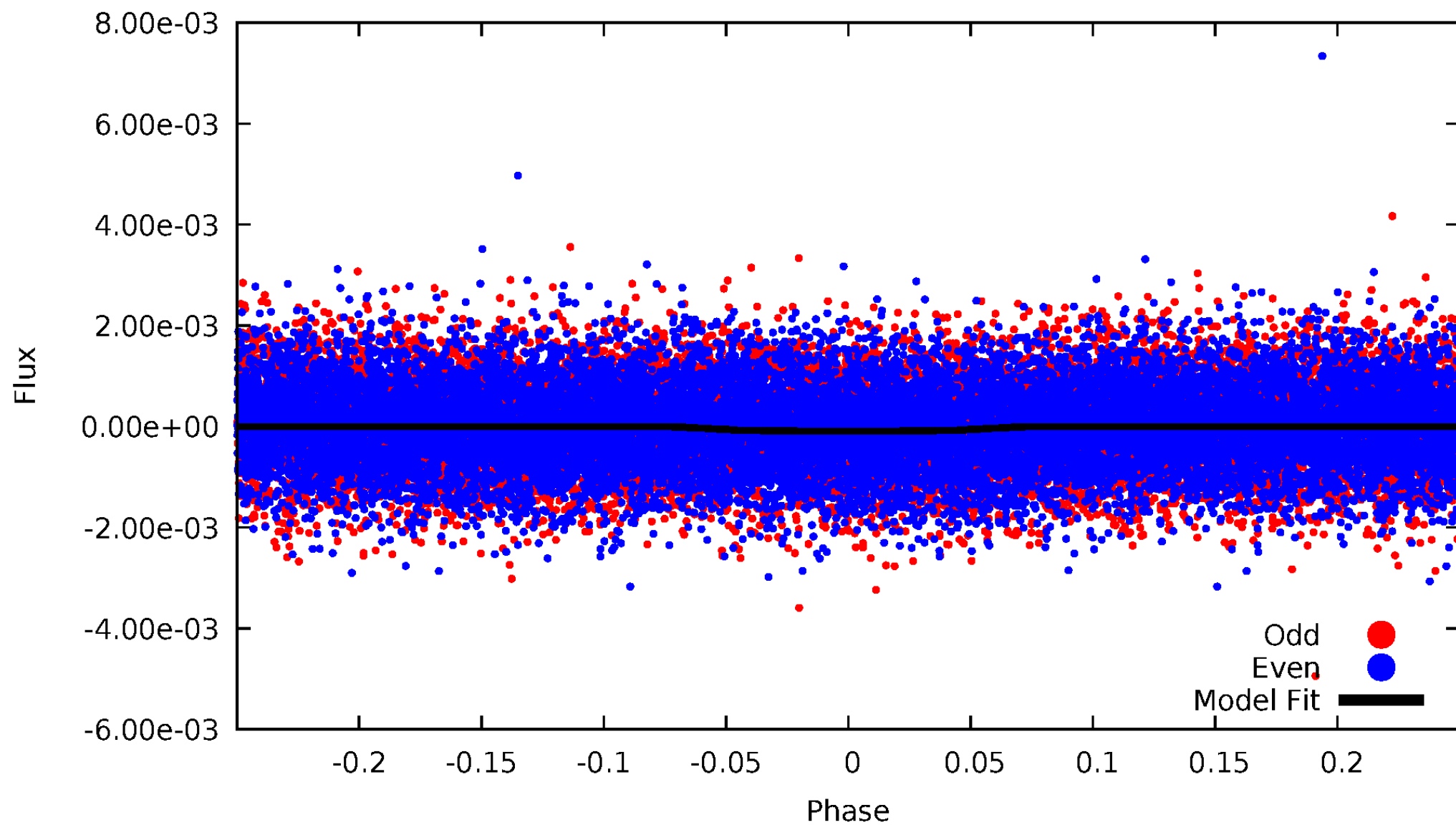


TCE 010130777-01



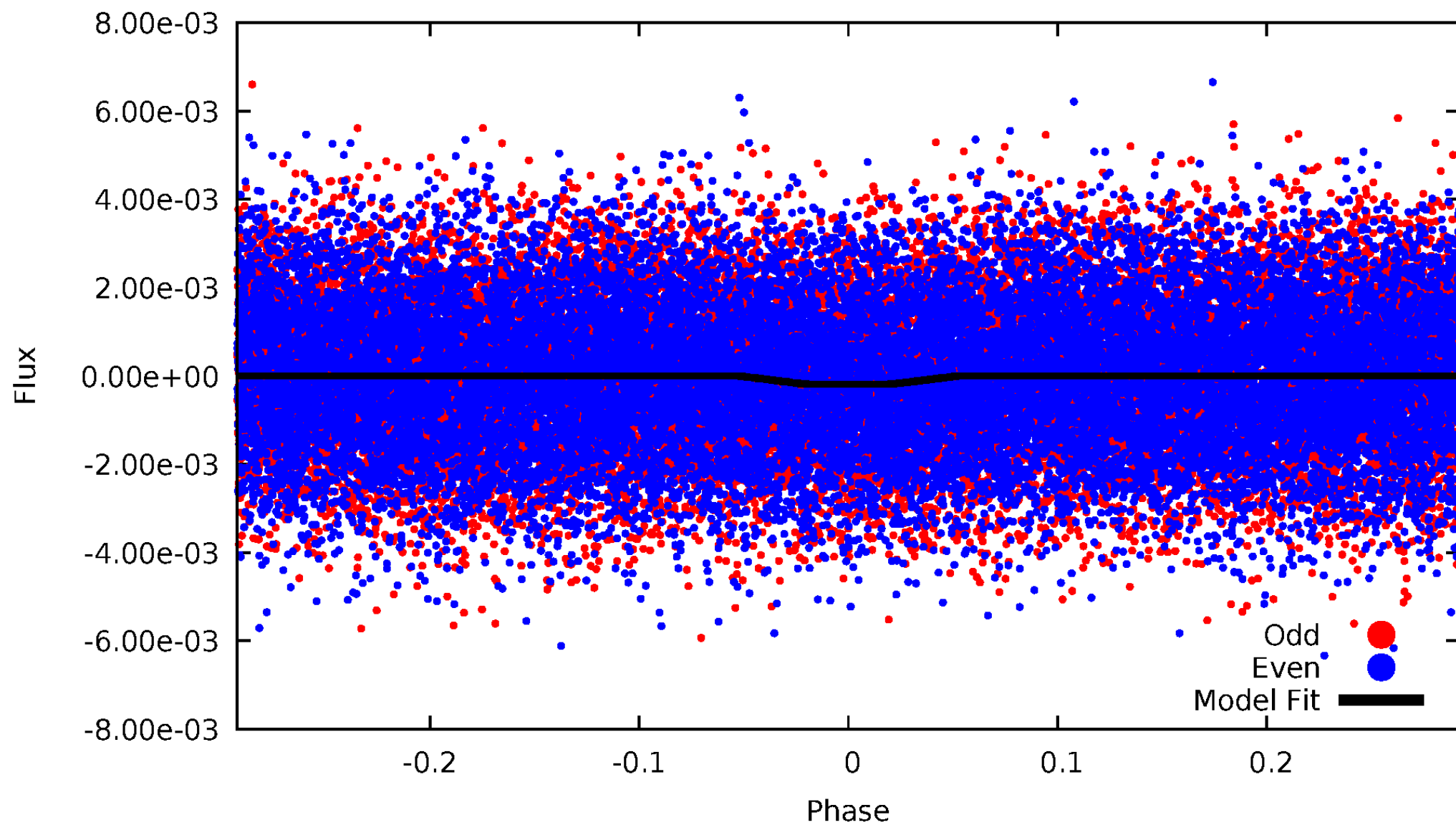
DV Odd/Even

TCE 010130777-01



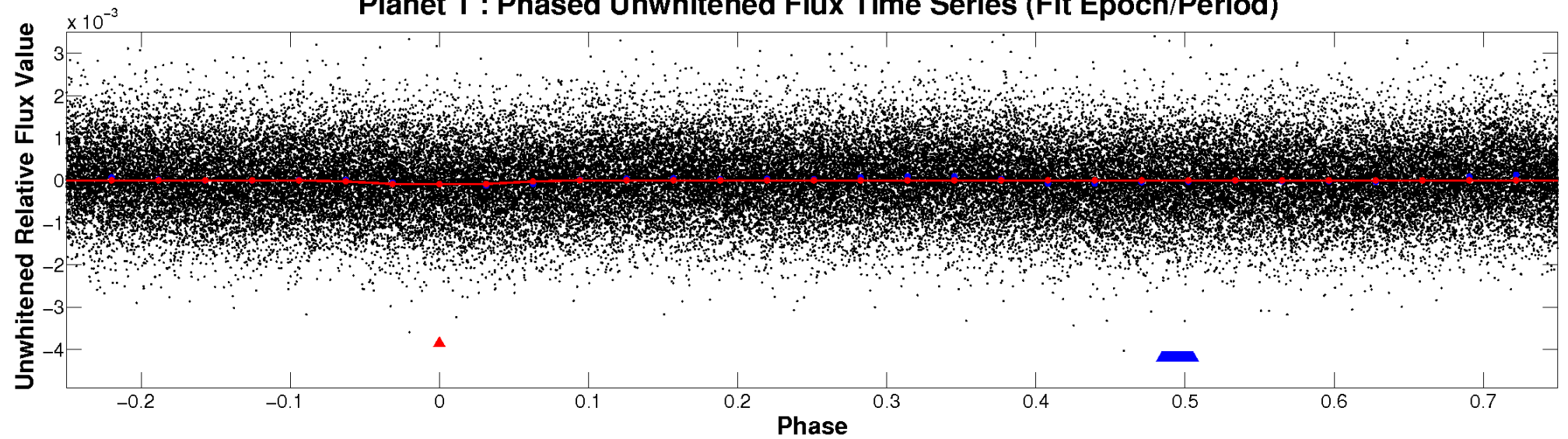
ALT Odd/Even

TCE 010130777-01

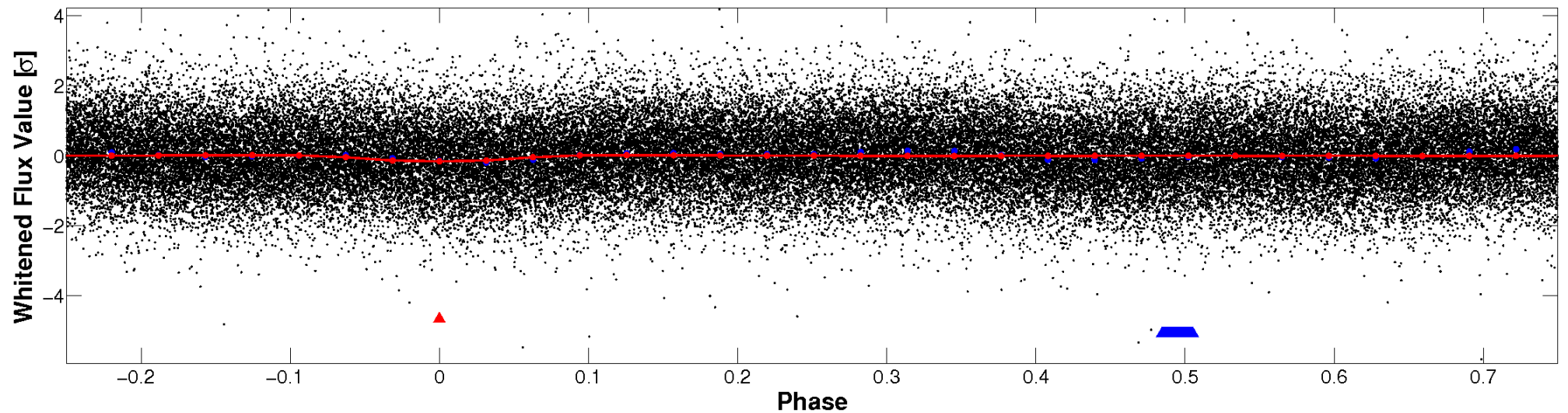


Non-Whitened Vs. Whitened Light Curve

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

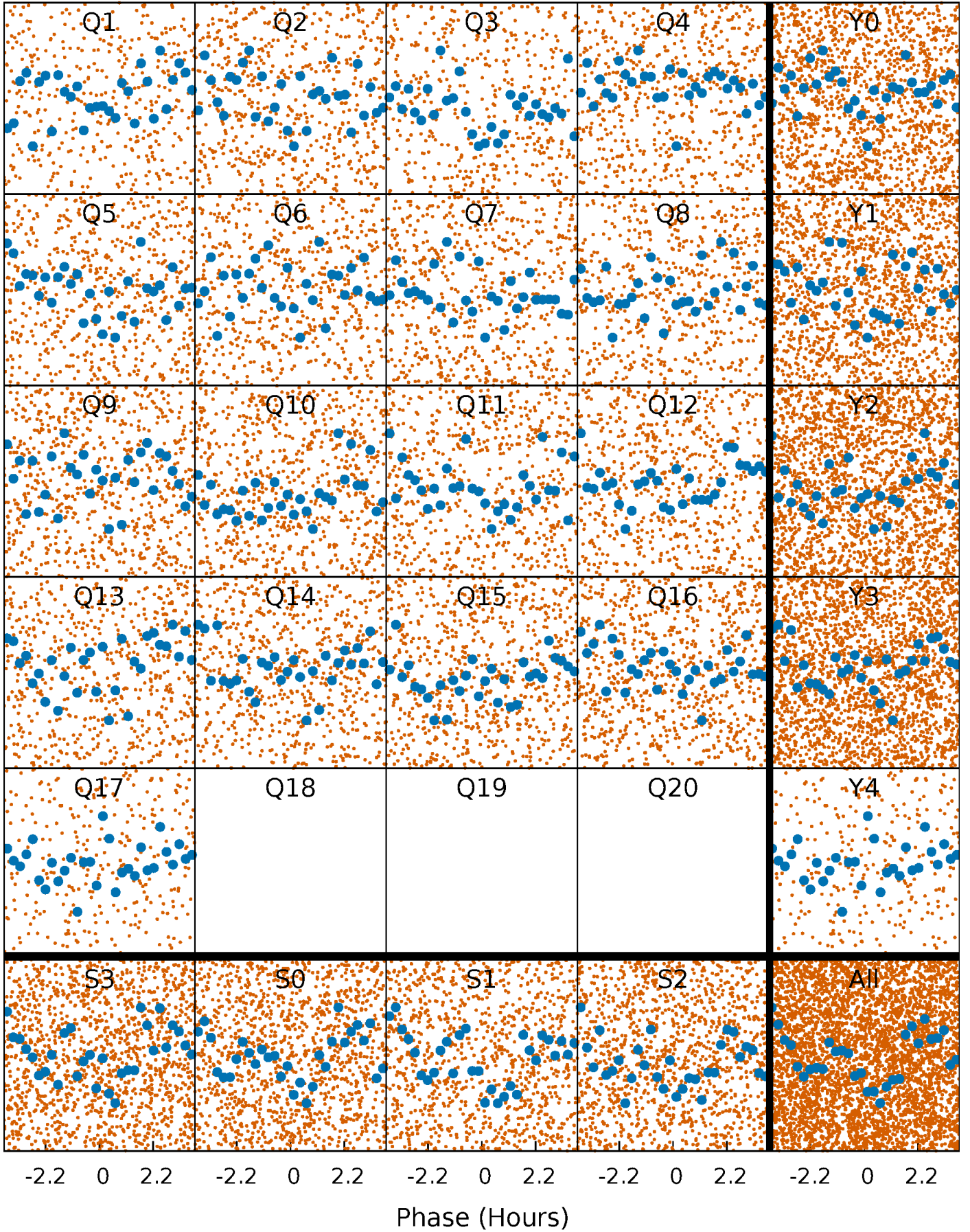


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



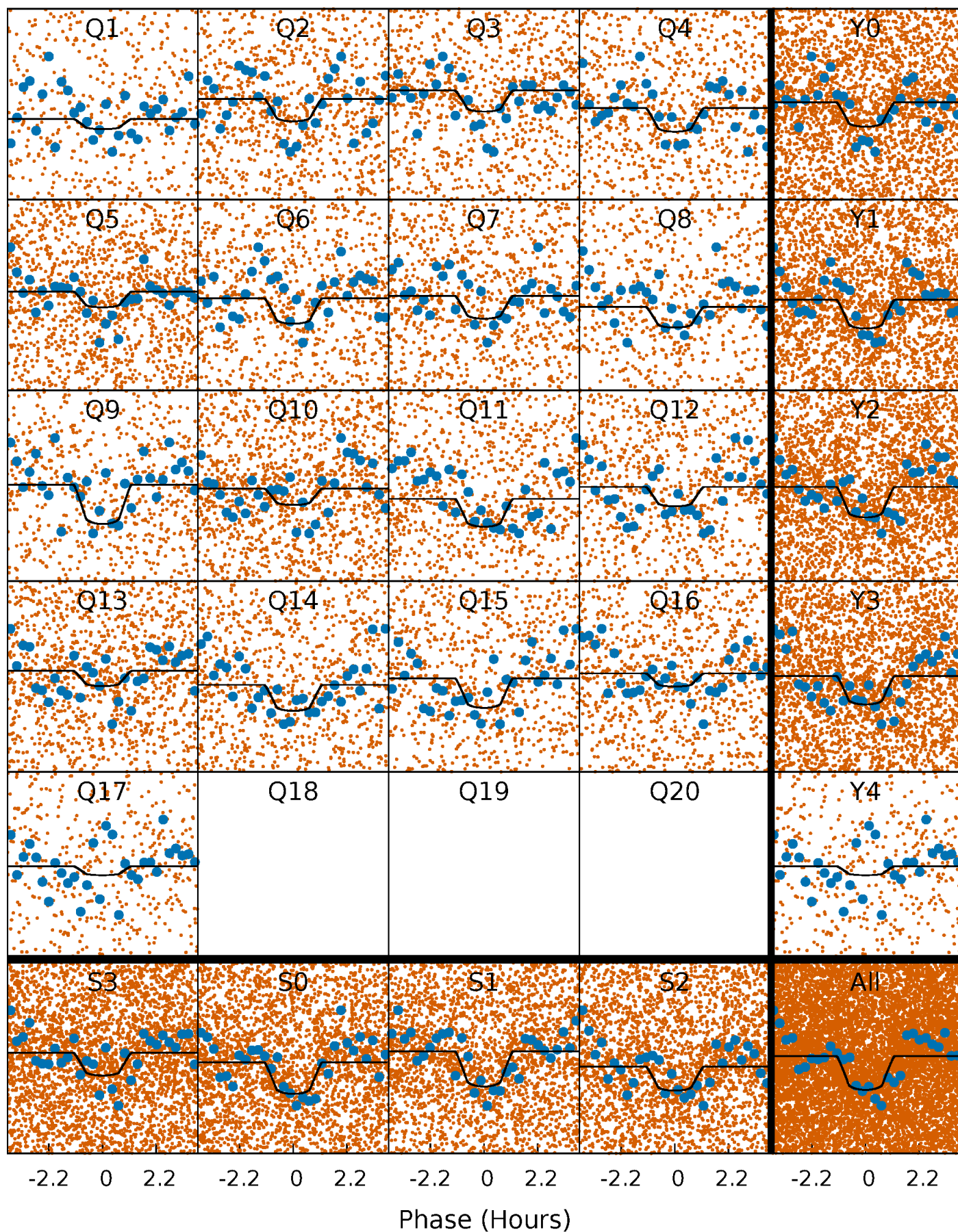
PDC Quarter-Phased Transit Curves

TCE 010130777-01 P= 0.650906 Days $T_0=131.802679$ (BKJD)



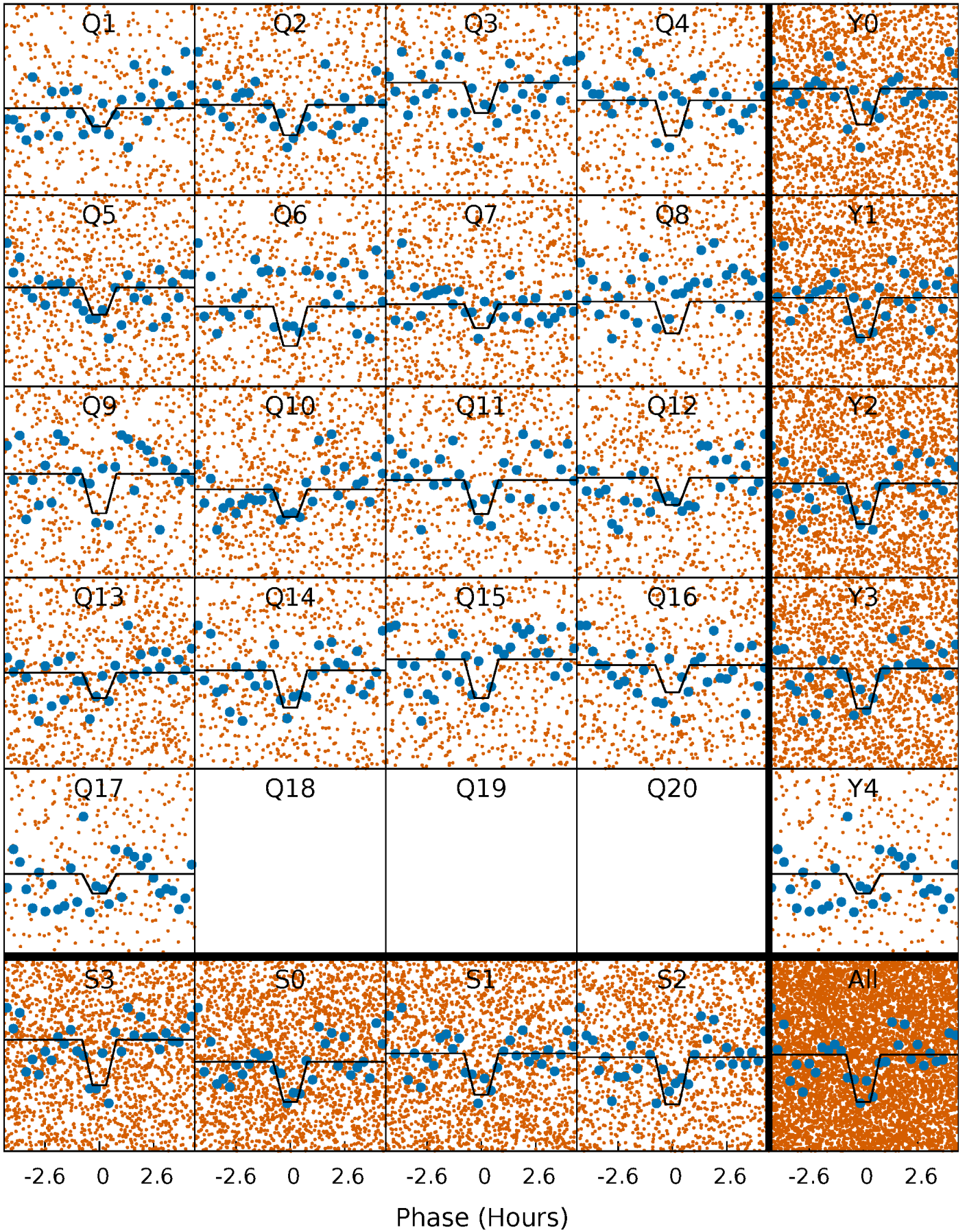
DV Quarter-Phased Transit Curves

TCE 010130777-01 P= 0.650906 Days $T_0=131.802679$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

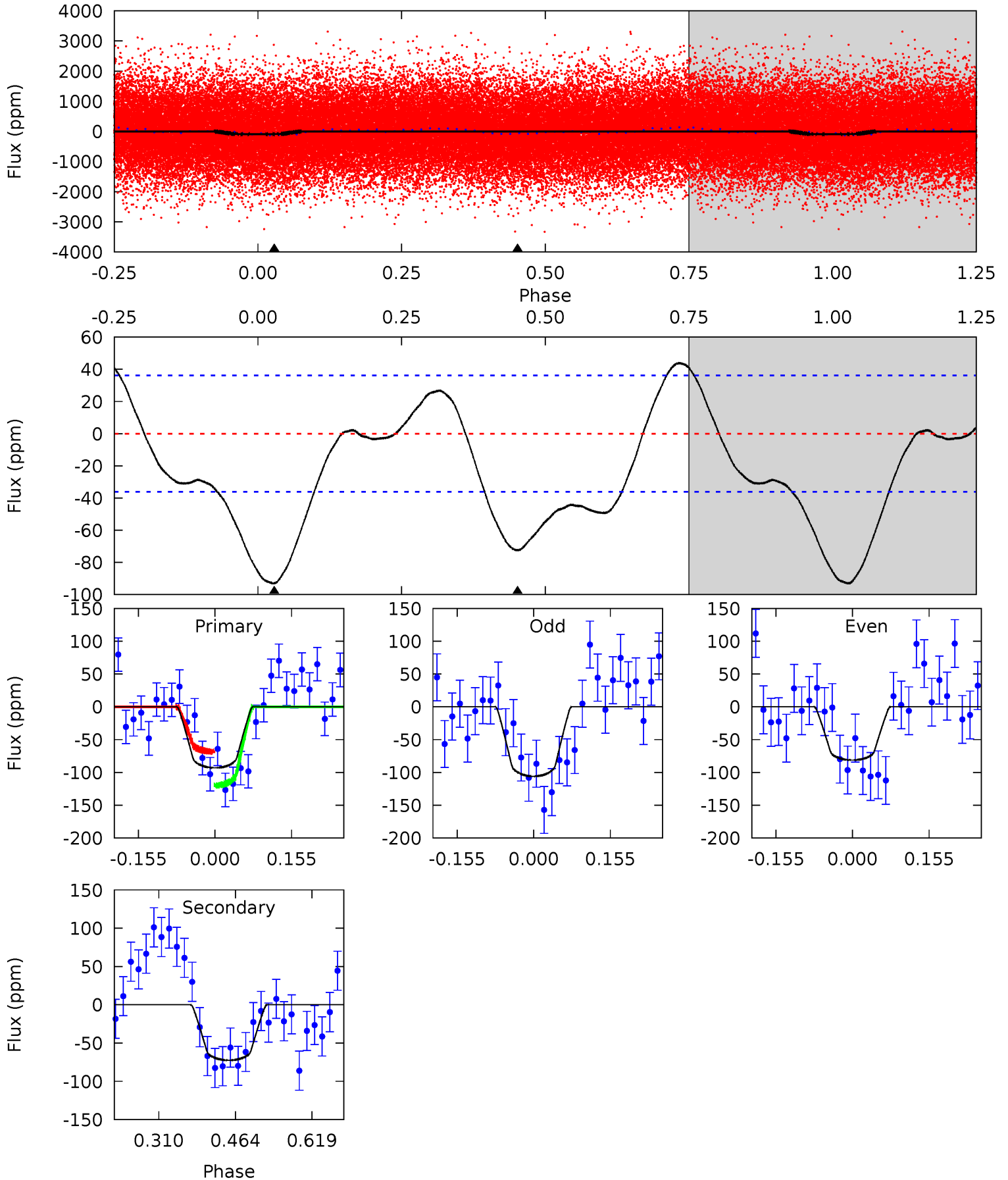
TCE 010130777-01 P= 0.650925 Days $T_0=131.802972$ (BKJD)



DV Model-Shift Uniqueness Test

010130777-01, P = 0.650906 Days, E = 131.151773 Days

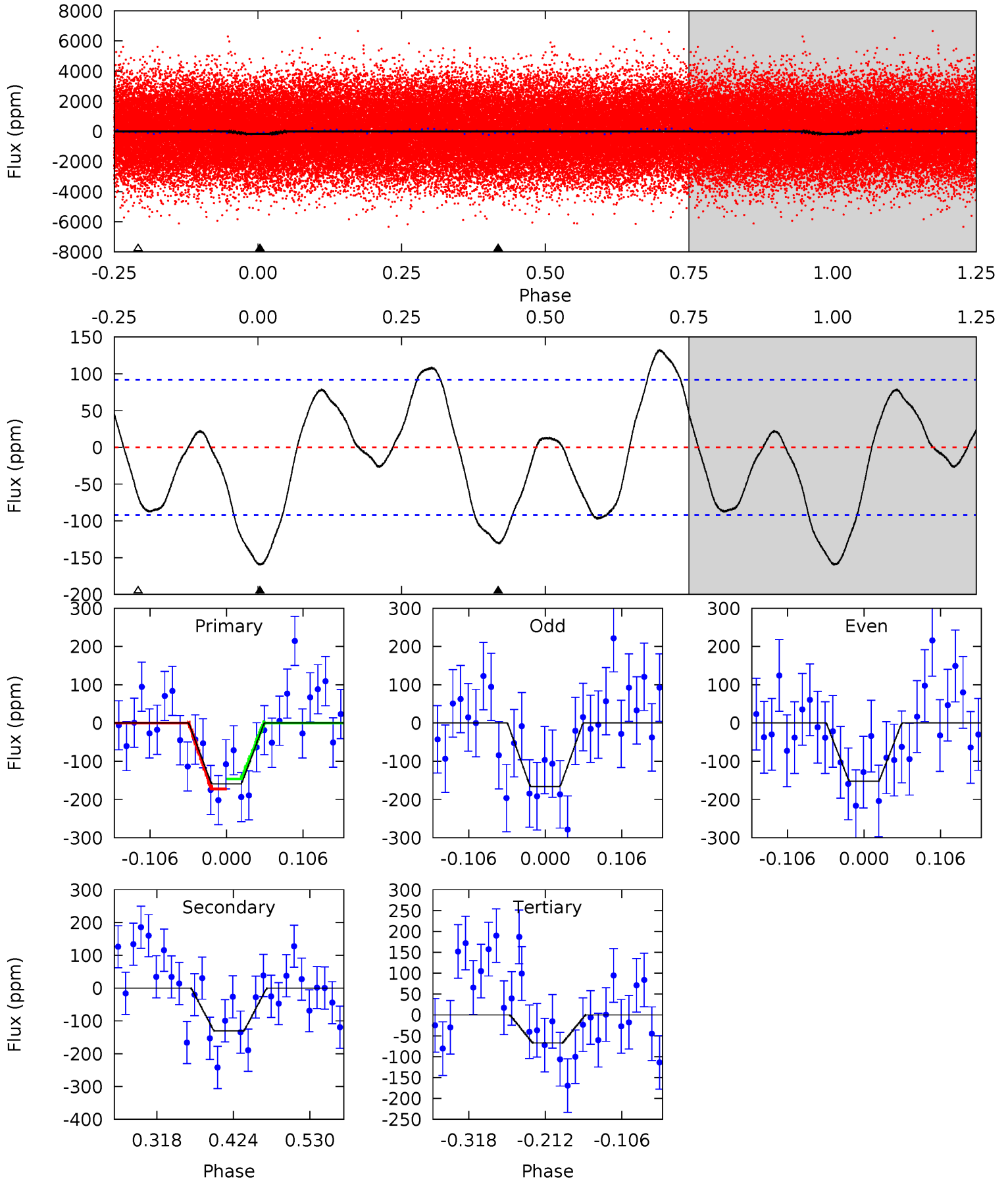
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 11.5 | 8.97 | 0 | 0 | 4.47 | 1.42 | 3.10 | 11.5 | 11.5 | 8.97 | 8.97 | 1.53 | 1.02 | 0.32 | 3.19 |



Alt Model-Shift Uniqueness Test

010130777-01, P = 0.650925 Days, E = 131.152047 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|------|------|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 7.89 | 6.48 | 3.32 | 0 | 4.55 | 1.62 | 3.32 | 4.57 | 7.89 | 3.16 | 6.48 | 0.34 | 1.03 | 0.45 | 0.65 |



Stellar Parameters For KIC 010130777

| | $T_{\text{eff}} (K)$ | $\log(g)$ | $[\text{Fe}/\text{H}]$ | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 8262^{+200}_{-343} | $3.726^{+0.440}_{-0.082}$ | $-0.320^{+0.200}_{-0.300}$ | $3.181^{+0.523}_{-1.464}$ | $1.964^{+0.330}_{-0.495}$ | $0.086^{+0.373}_{-0.023}$ |
| | +2%/-4% | +12%/-2% | +62%/-94% | +16%/-46% | +17%/-25% | +434%/-27% |
| 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 010130777-01 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|---------------|------------------------|----------------------|------------------------|---------------------------|
| DV | -72 ± 8 | $3.54^{+2.48}_{-2.06}$ | 6511^{+376}_{-675} | 6438^{+5456}_{-2427} | $1.120^{+4.792}_{-0.742}$ |
| Alt. | -131 ± 20 | $4.20^{+2.58}_{-2.18}$ | 6428^{+466}_{-773} | 6742^{+4398}_{-1808} | $1.387^{+4.650}_{-0.844}$ |

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 $A_{obs} \gg 1.0$

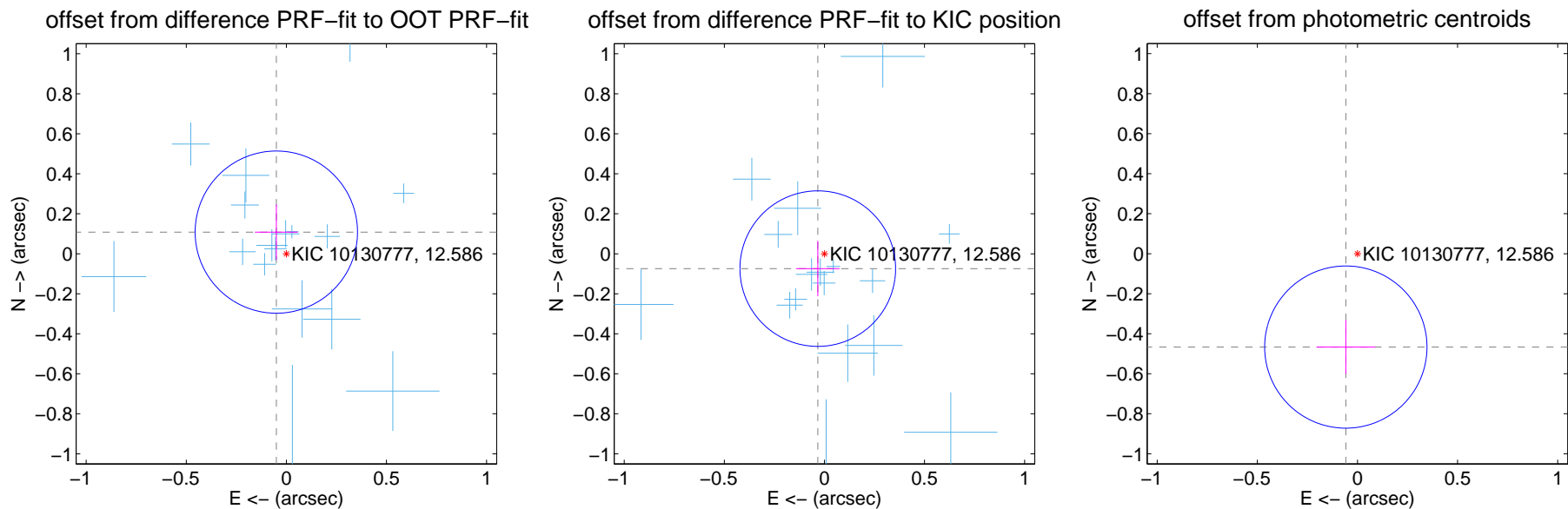
DV Centroid Data

Supplemental centroid analysis for 010130777-01. Kepler magnitude: 12.59. Transit SNR 11.48

There are 17 quarters with good PRF difference image offsets

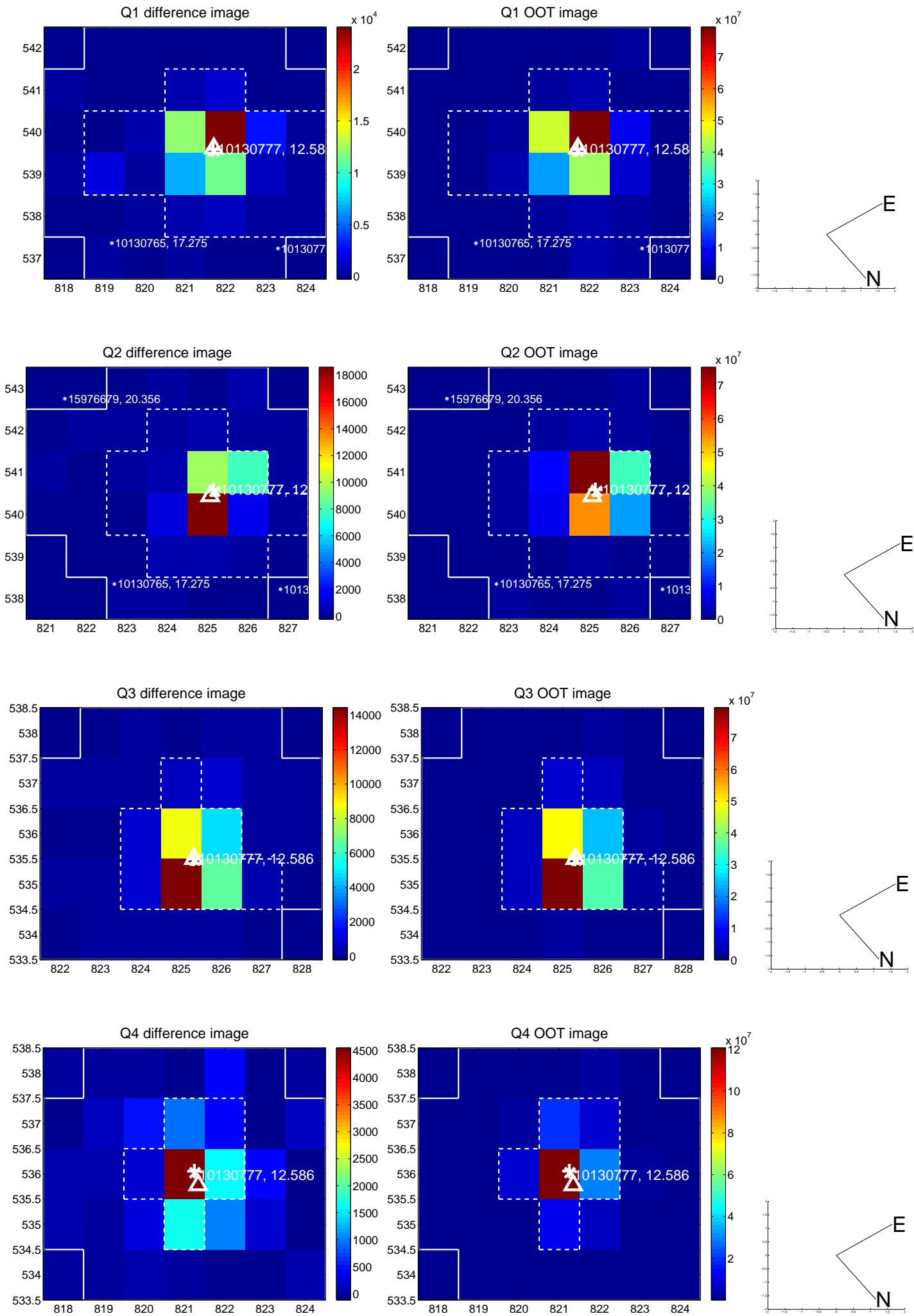
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT | 0.119 ± 0.135 | 0.88 | 0.050 ± 0.107 | 0.108 ± 0.138 |
| PRF-fit source offset from KIC position | 0.081 ± 0.130 | 0.63 | 0.033 ± 0.109 | -0.074 ± 0.138 |
| photometric centroid source offset | 0.47 ± 0.14 | 3.48 | 0.06 ± 0.15 | -0.47 ± 0.13 |

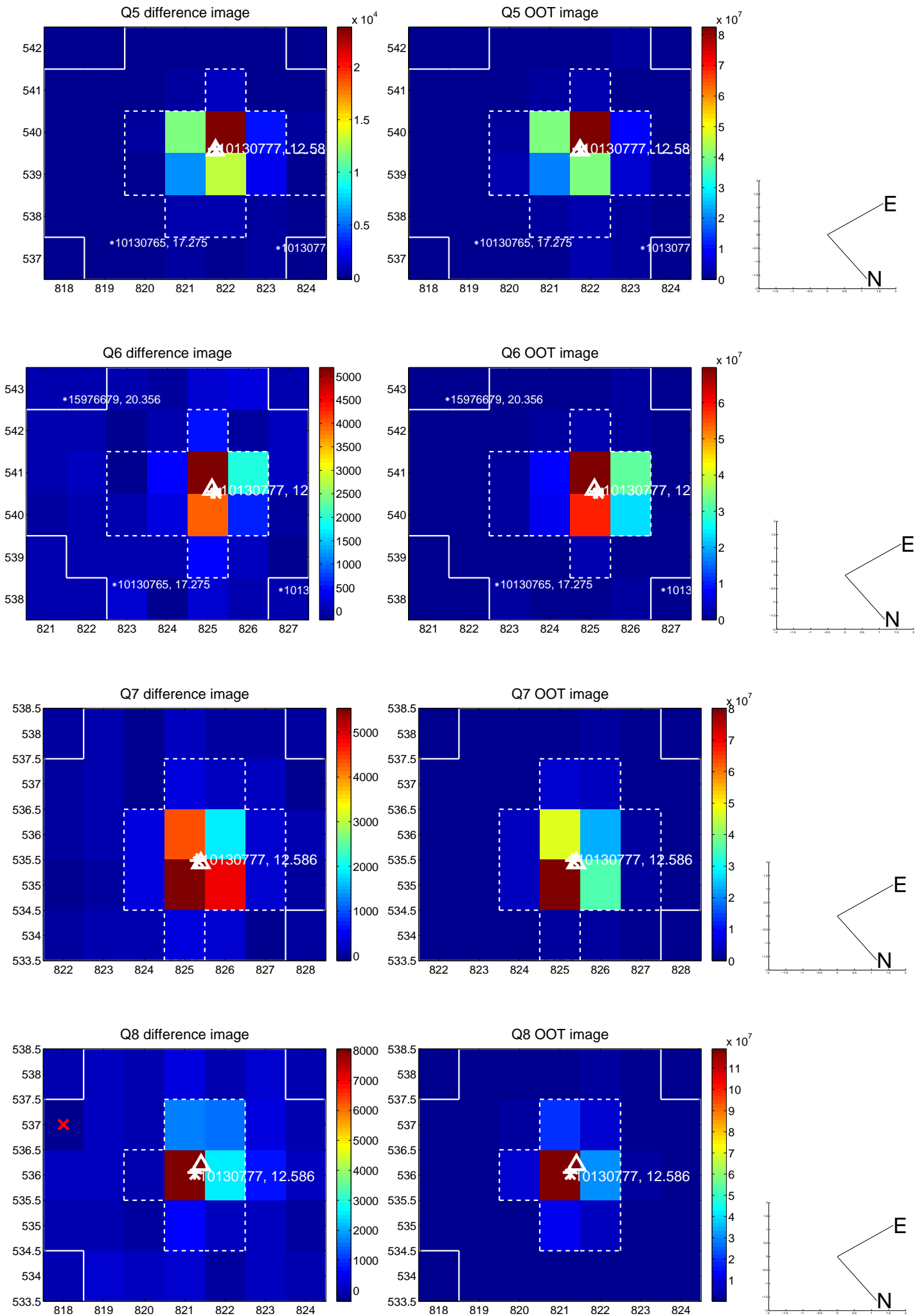


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

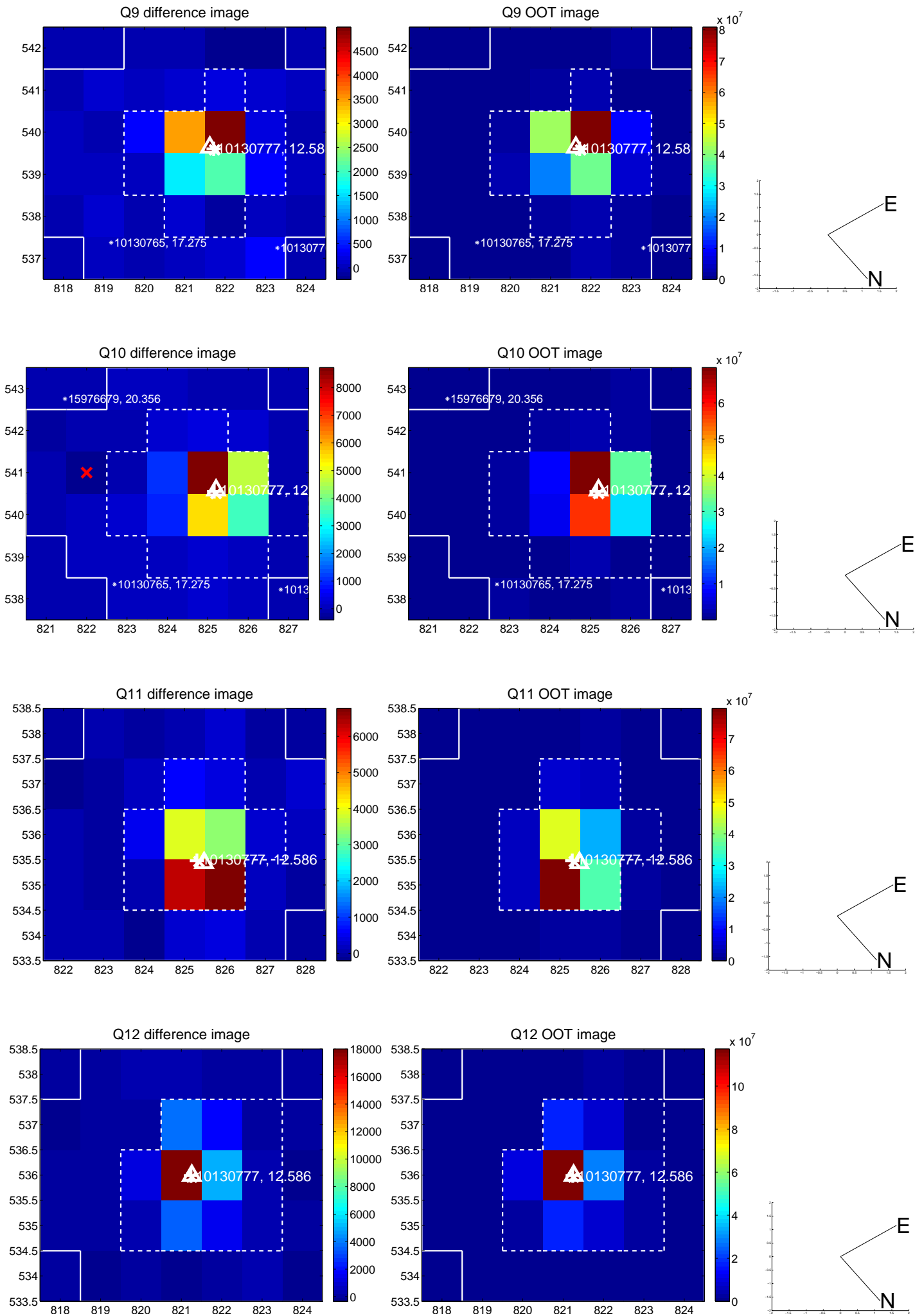
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



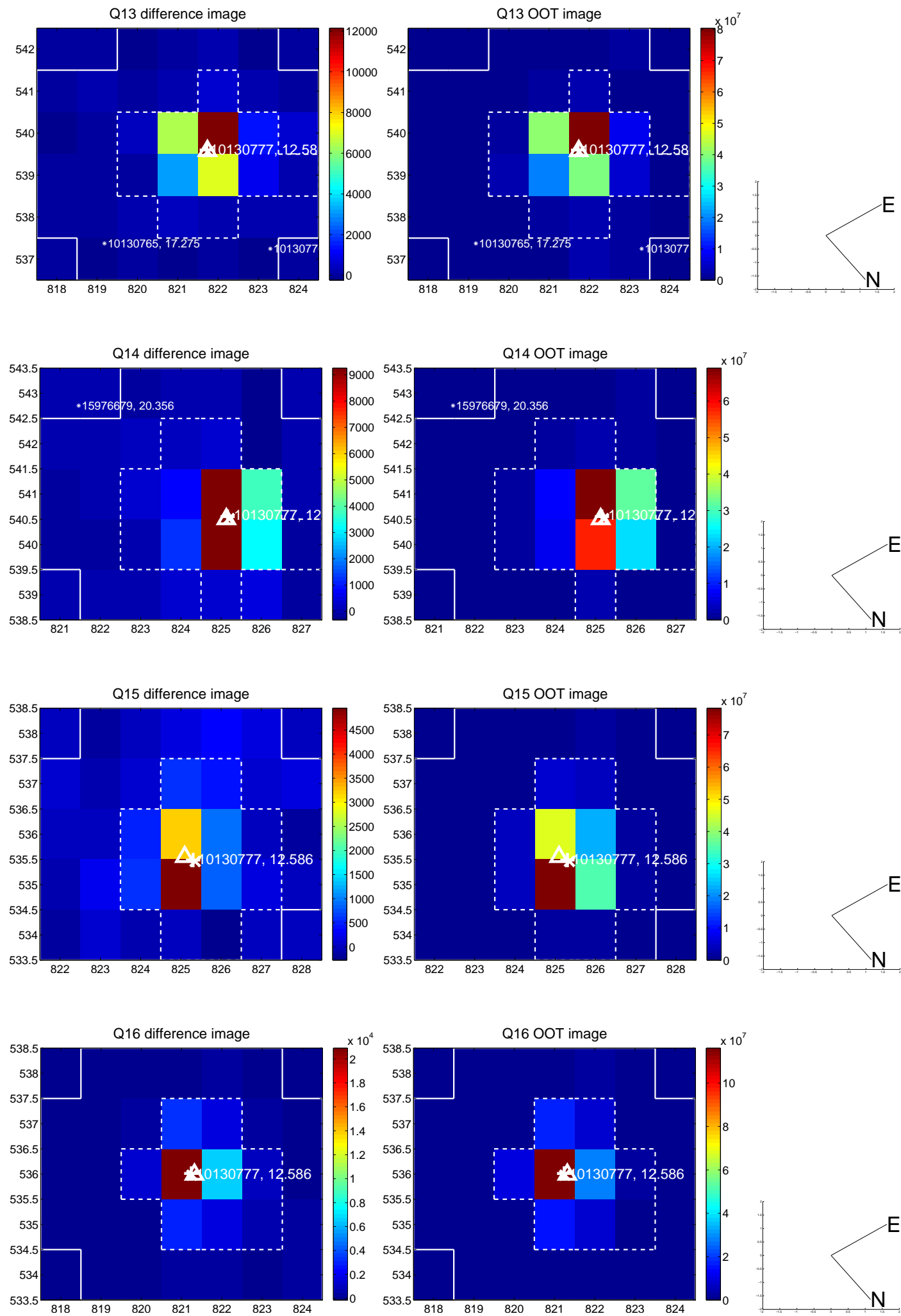
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



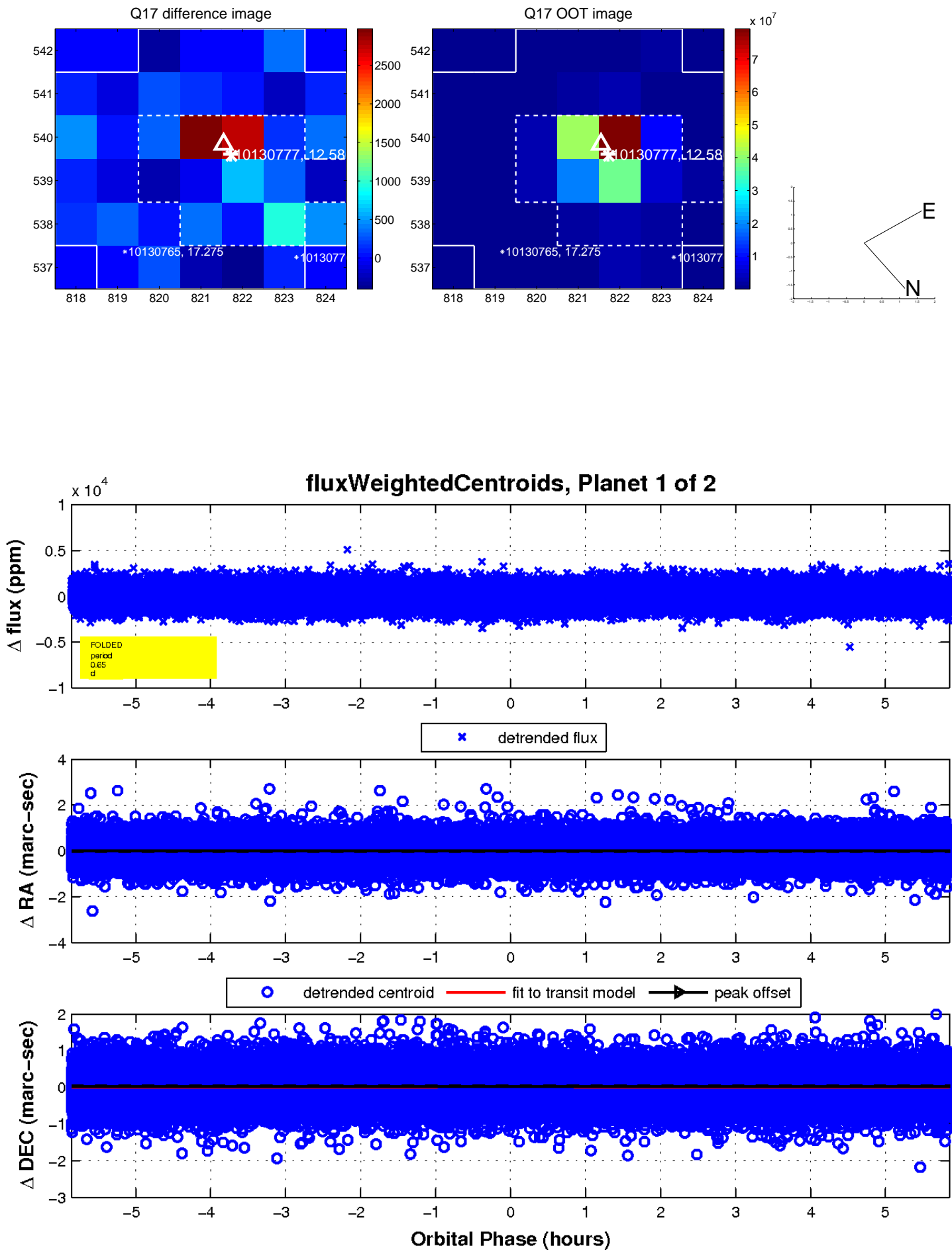
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

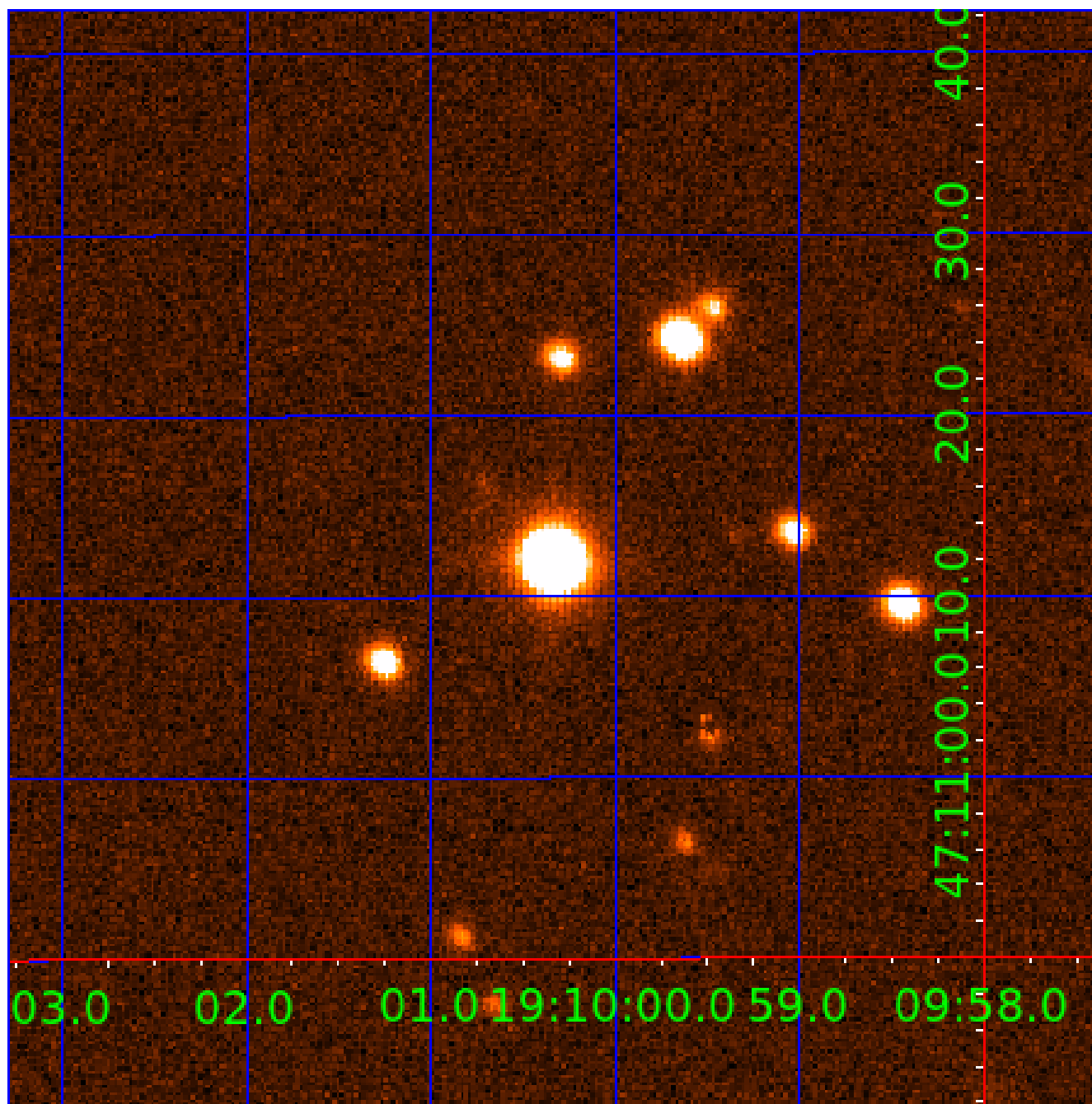


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010130777

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}) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 010130777-01 | OBS | No | 0.650906 | 131.802679 | 92.5 | 1.952 | 12.5 | 11.5 | 3.18 | 8262 | 3.56 | 124619.72 |
| 010130777-02 | OBS | No | 0.650900 | 132.131583 | 60.1 | 4.761 | 10.4 | 9.1 | 3.18 | 8262 | 2.83 | 124621.25 |

Robovetter Results

| TCE | Run Type | Disp | Score | N | S | C | E | Comments |
|--------------|----------|------|-------|---|---|---|---|--|
| 010130777-01 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT |
| 010130777-02 | OBS | FP | 0.00 | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFS |

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

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

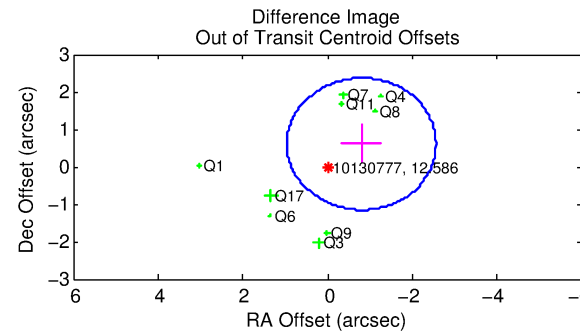
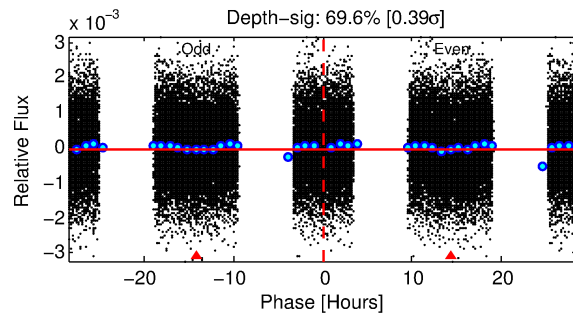
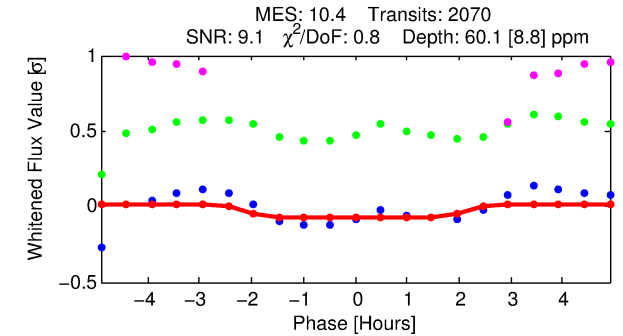
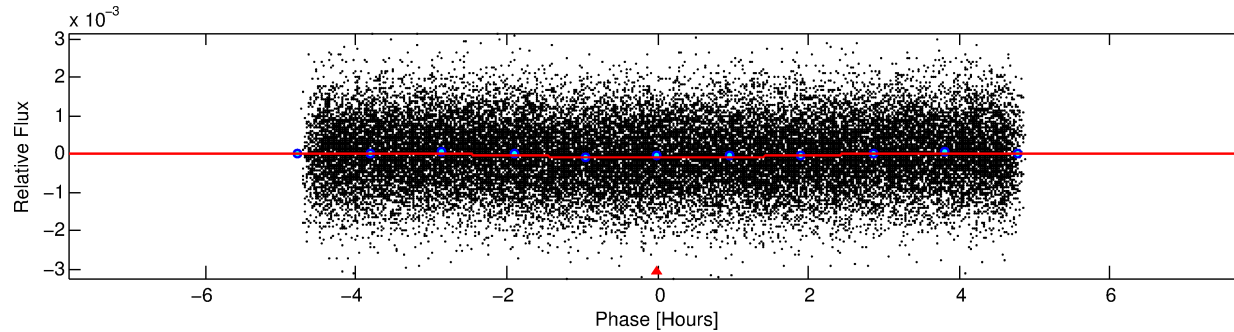
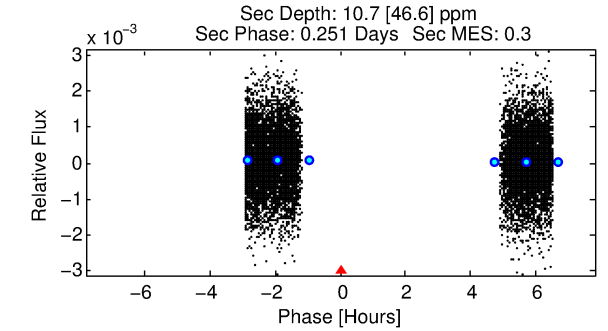
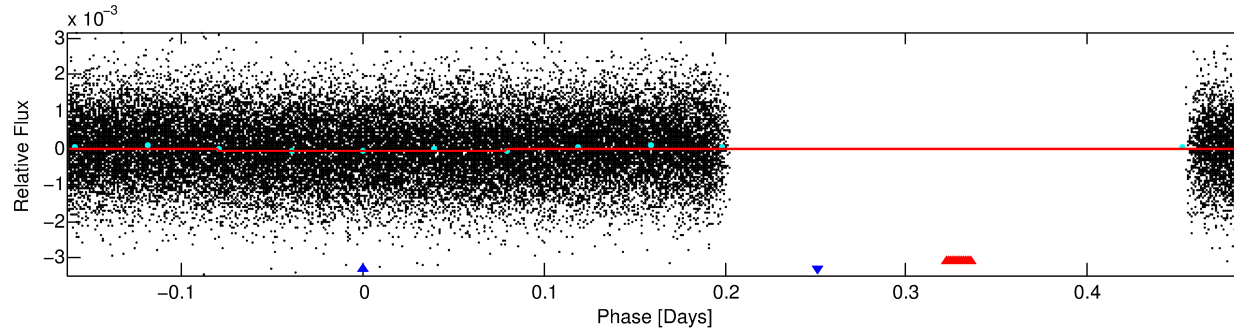
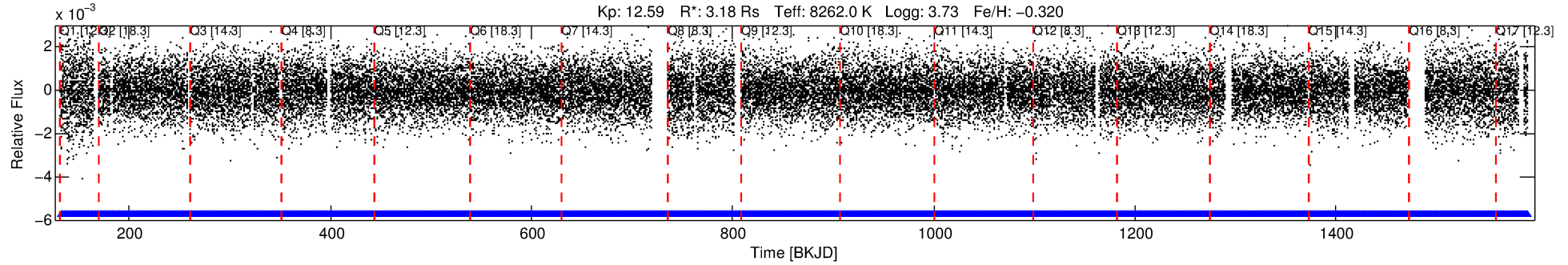
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010130777-02

No Significant Match Found

DV One-Page Summary

KIC: 10130777 Candidate: 2 of 2 Period: 0.651 d



DV Fit Results:

Period = 0.65090 [0.00001] d
Epoch = 132.1316 [0.0054] BKJD
Rp/R* = 0.0081 [0.0054]
a/R* = 1.07 [0.53]
b = 0.88 [1.09]
Seff = 124621.25 [94737.97]
Teq = 4791 [911] K
Rp = 2.83 [2.27] Re
a = 0.0184 [0.0084] AU
Ag = 0.25 [1.15] [-0.65σ]
Teffp = 5239 [5952] K [0.07σ]

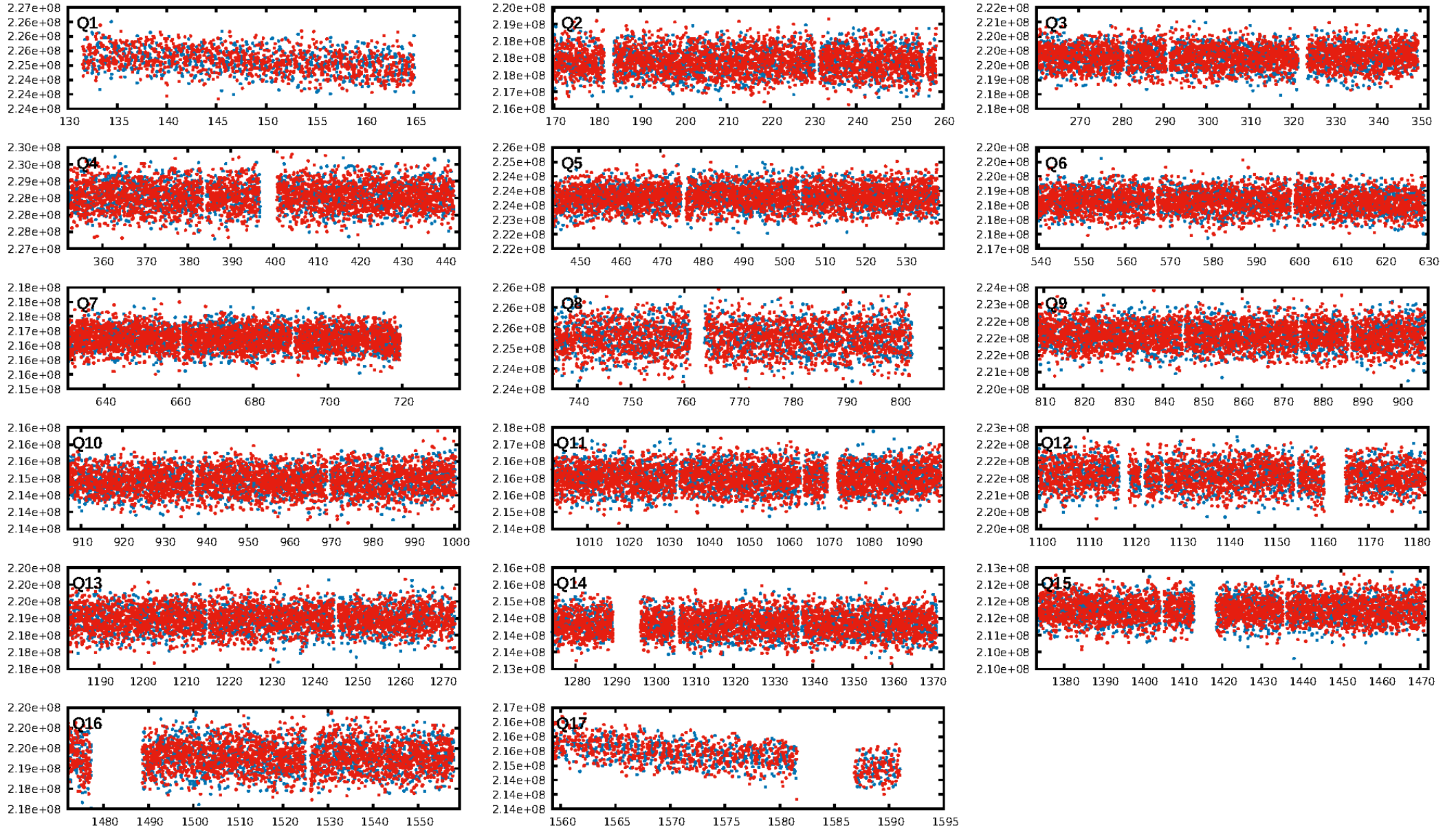
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1976/1976]
GhostDiagnostic-chr: 9.273
Centroid-sig: 48.7%
Centroid-so: 0.254 arcsec [1.86σ]
OotOffset-rm: 1.002 arcsec [1.71σ]
OotOffset-st: 1/3/2/3 [9]
KicOffset-rm: 0.925 arcsec [1.39σ]
KicOffset-st: 1/3/2/3 [9]
DiffImageQuality-fgm: 0.78 [7/9]
DiffImageOverlap-fno: 0.00 [0/17]

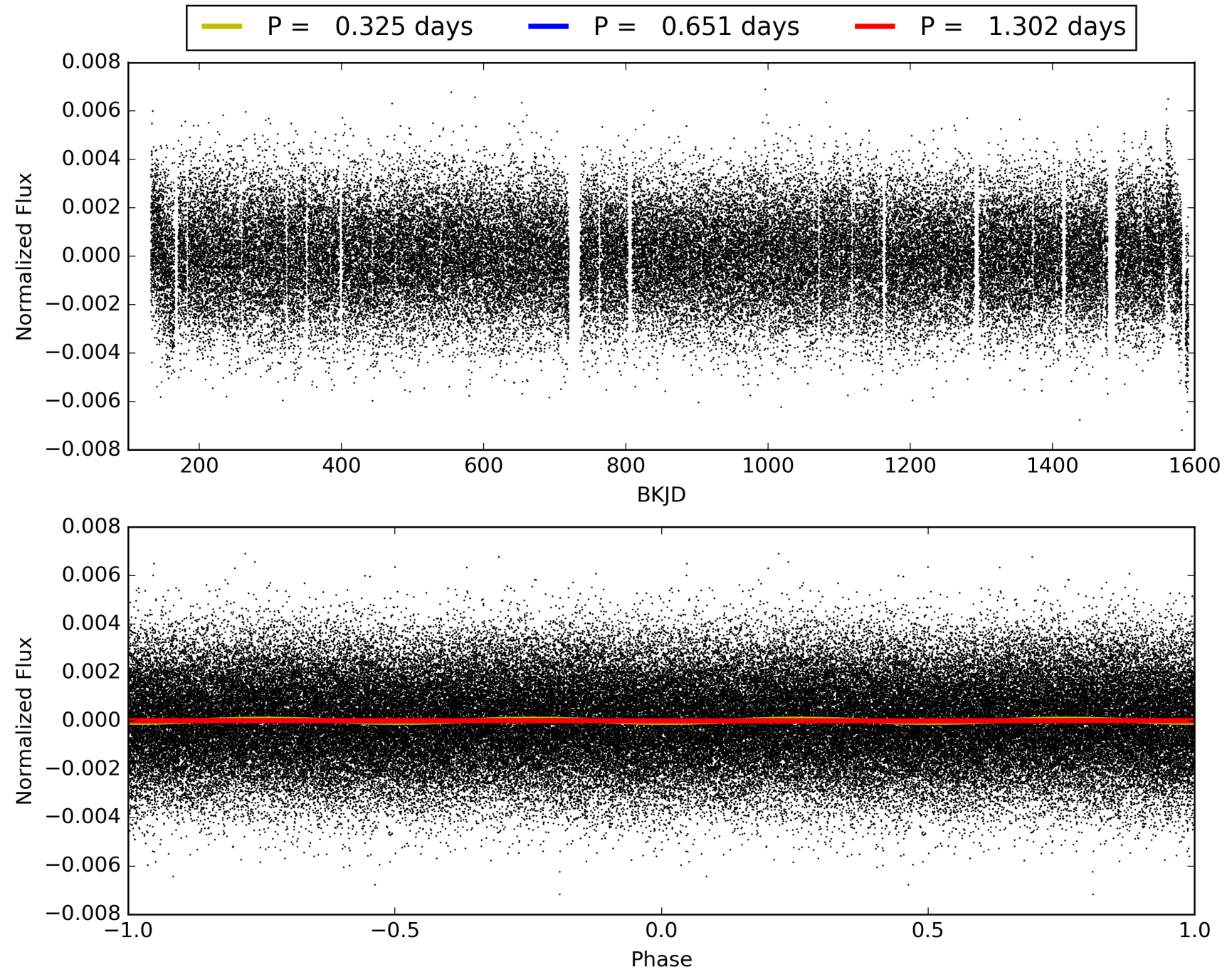
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 14:03:00 Z

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

TCE 010130777-02, PDC Light Curves

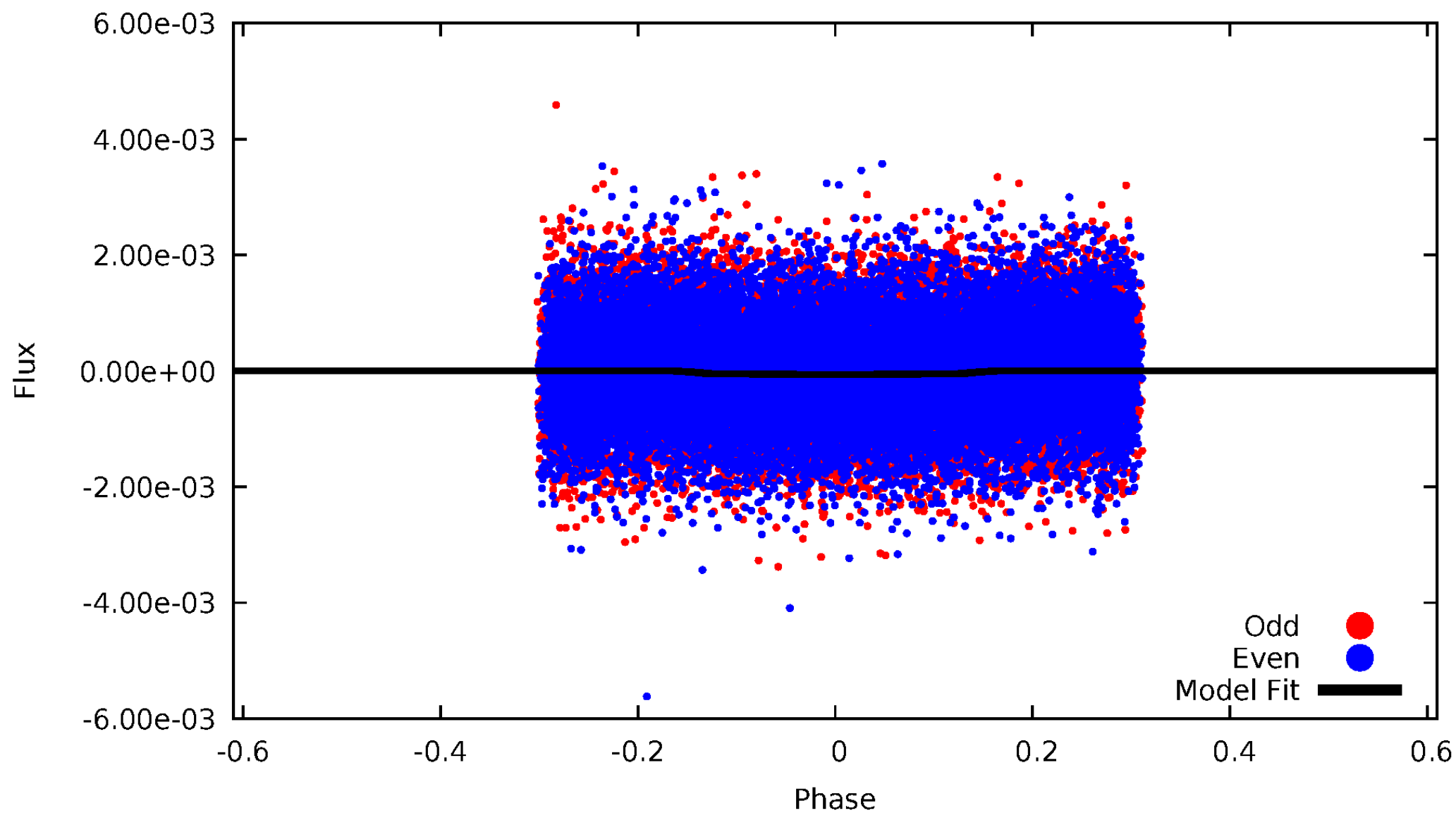


TCE 010130777-02



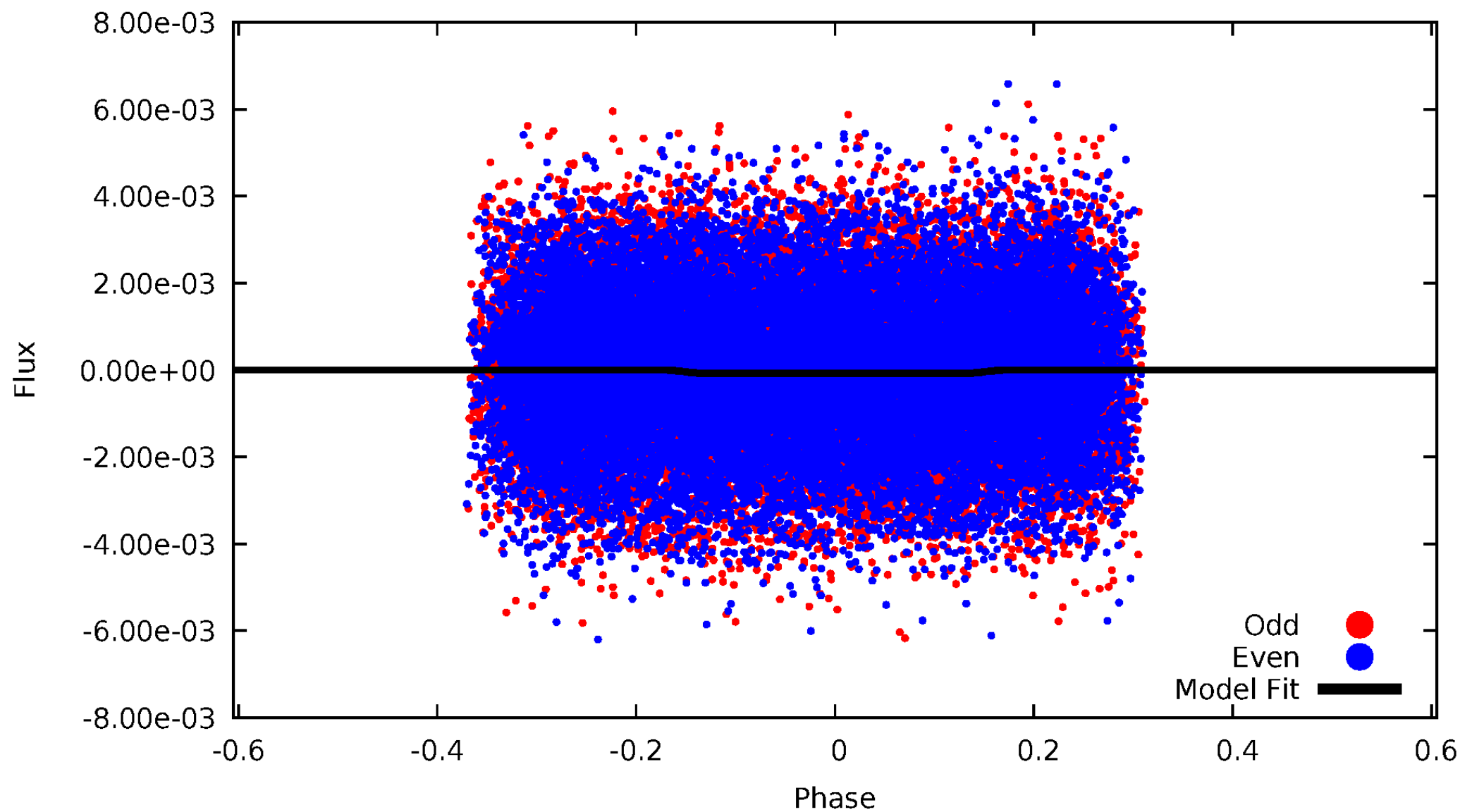
DV Odd/Even

TCE 010130777-02



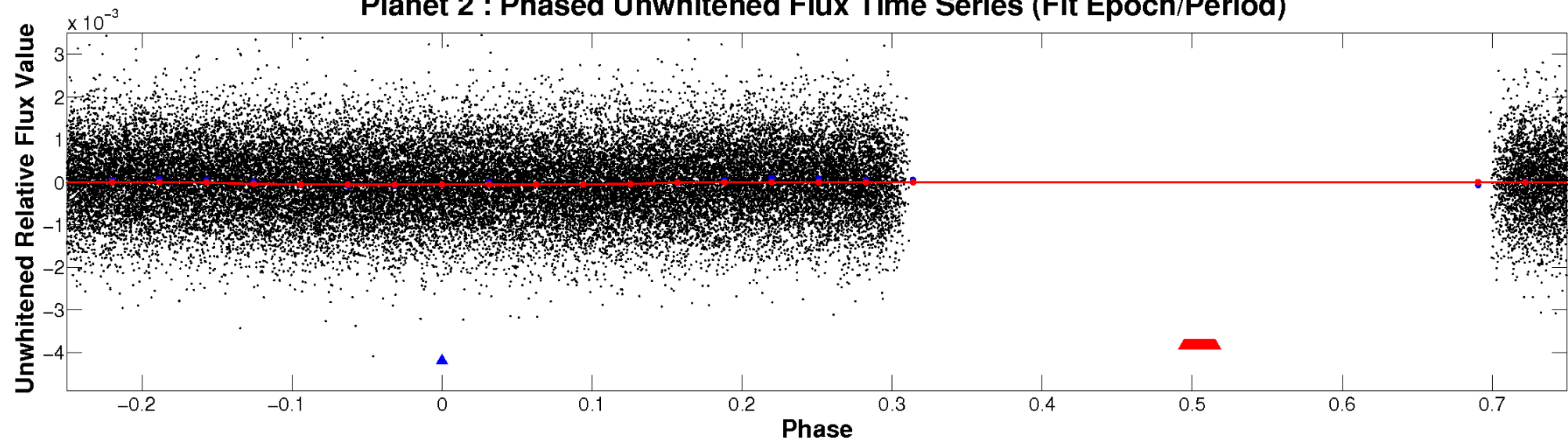
ALT Odd/Even

TCE 010130777-02

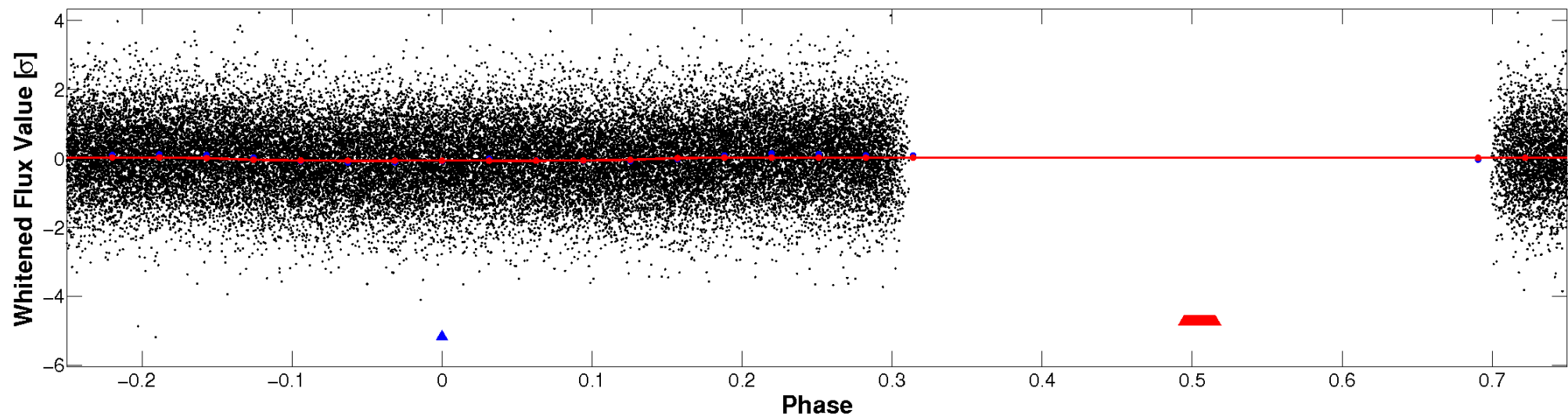


Non-Whitened Vs. Whitened Light Curve

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

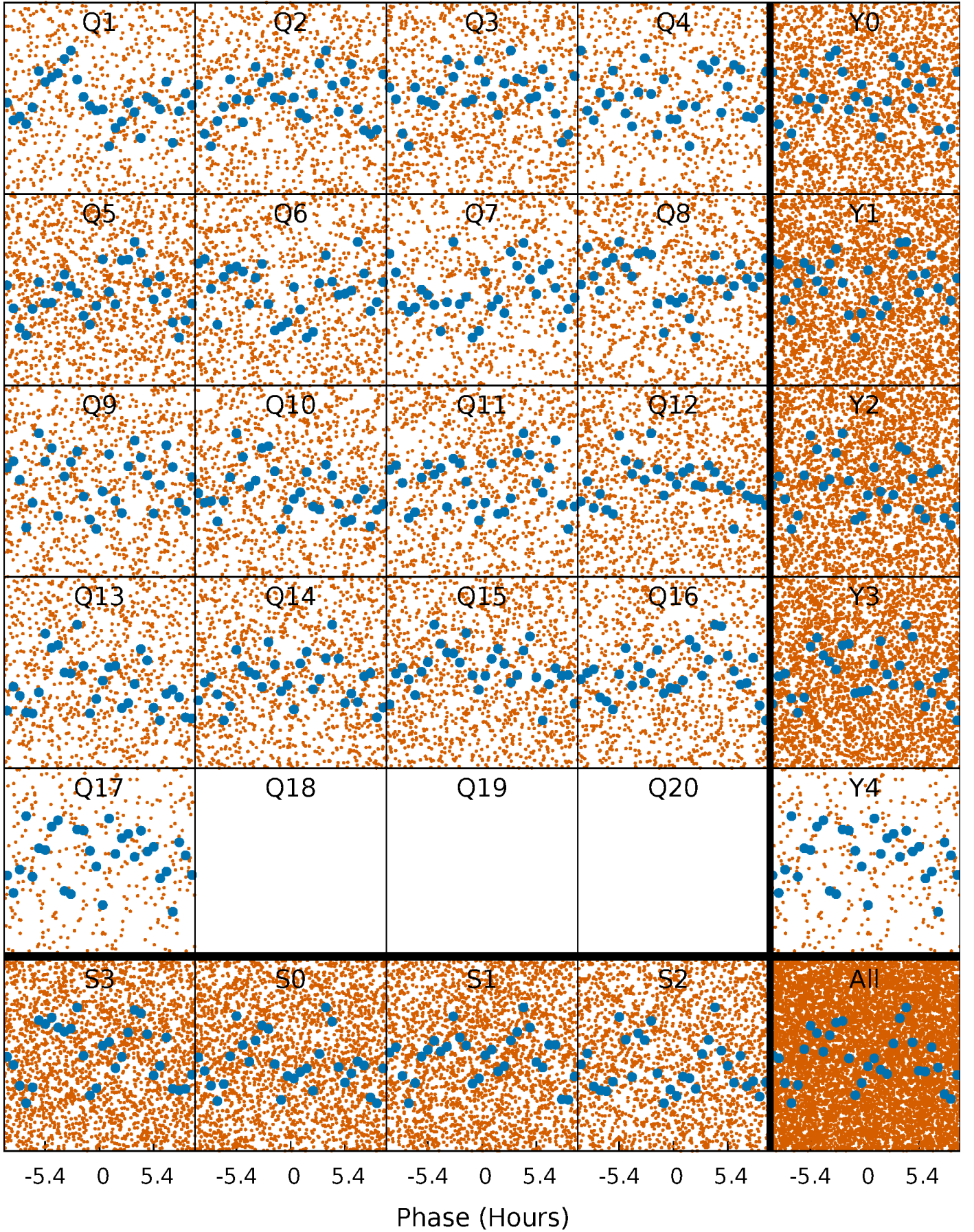


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



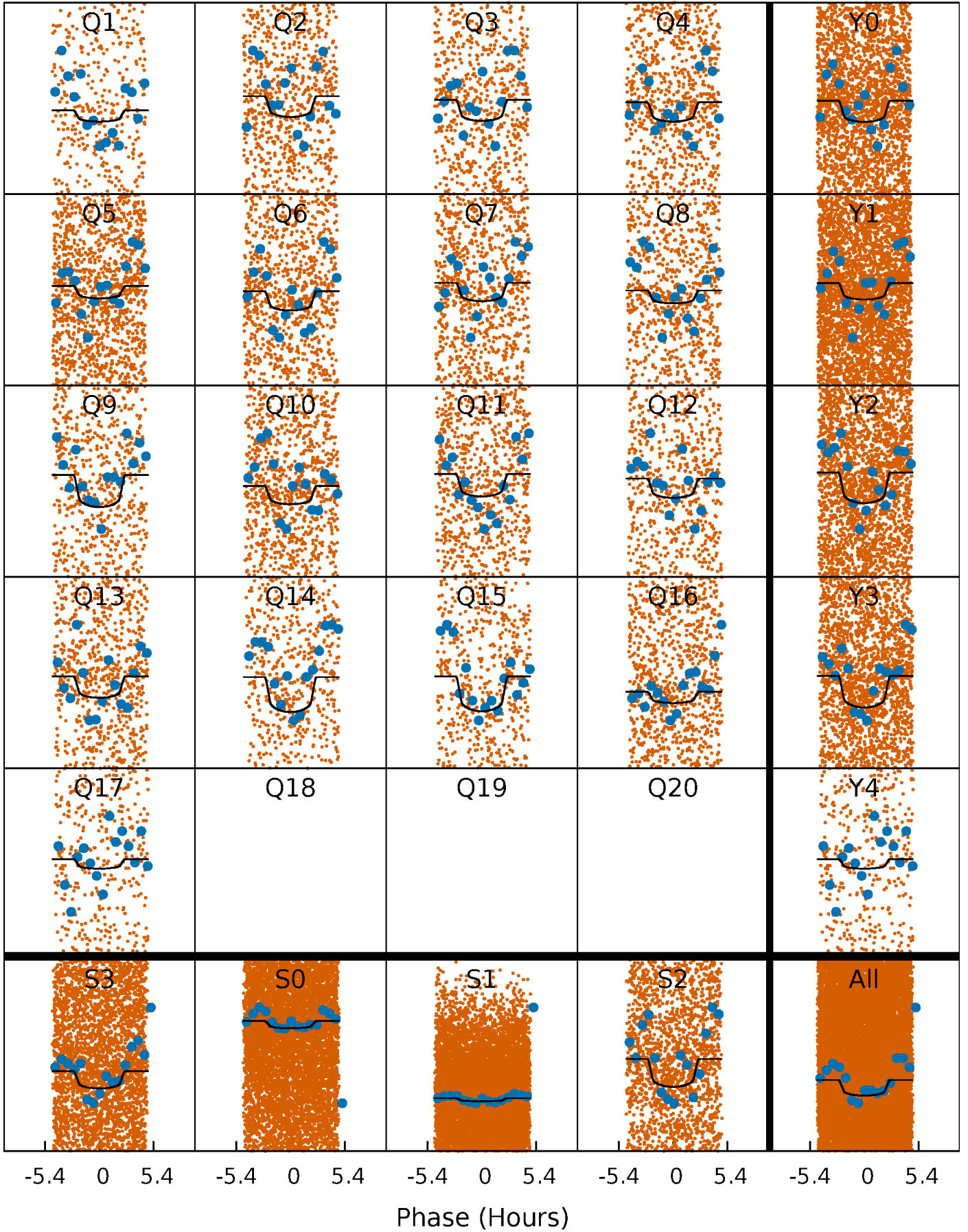
PDC Quarter-Phased Transit Curves

TCE 010130777-02 P= 0.650900 Days $T_0=132.131583$ (BKJD)



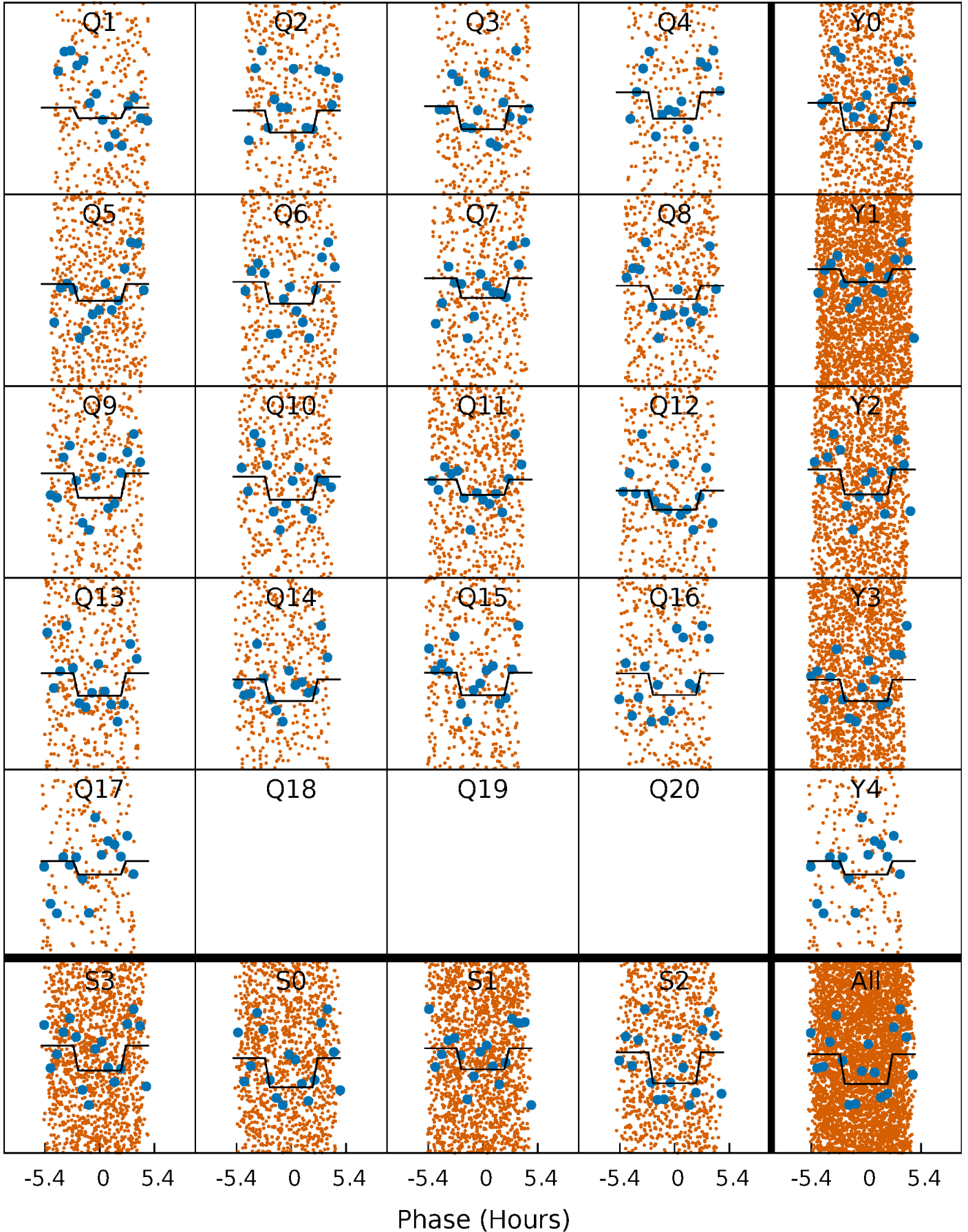
DV Quarter-Phased Transit Curves

TCE 010130777-02 $P = 0.650900$ Days $T_0 = 132.131583$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

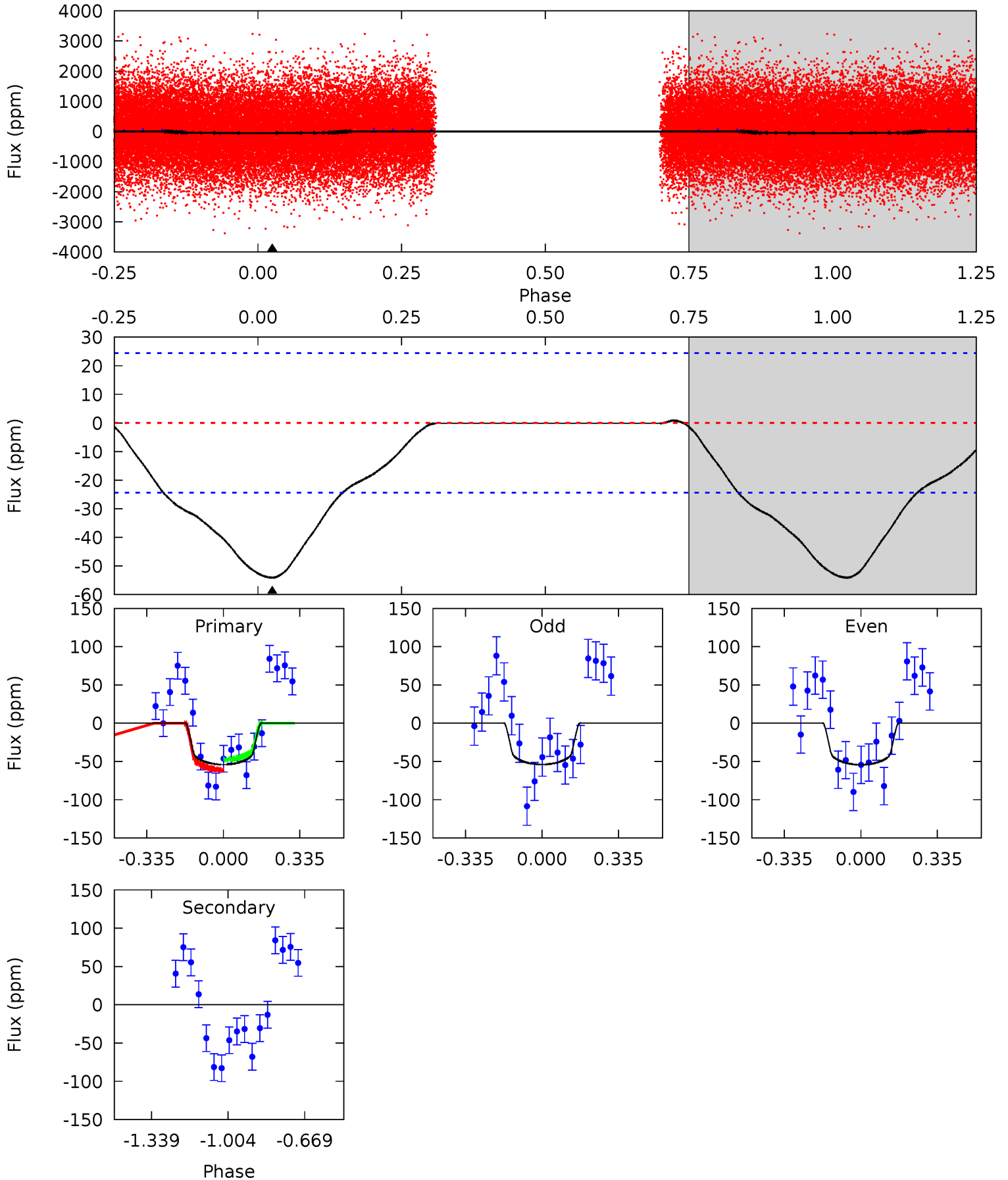
TCE 010130777-02 $P = 0.650932$ Days $T_0 = 132.118522$ (BKJD)



DV Model-Shift Uniqueness Test

010130777-02, P = 0.650900 Days, E = 131.480683 Days

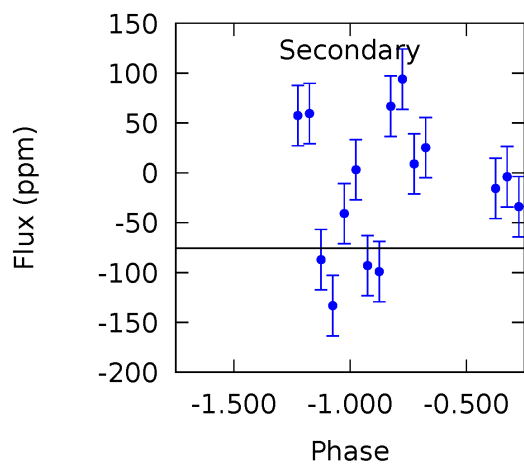
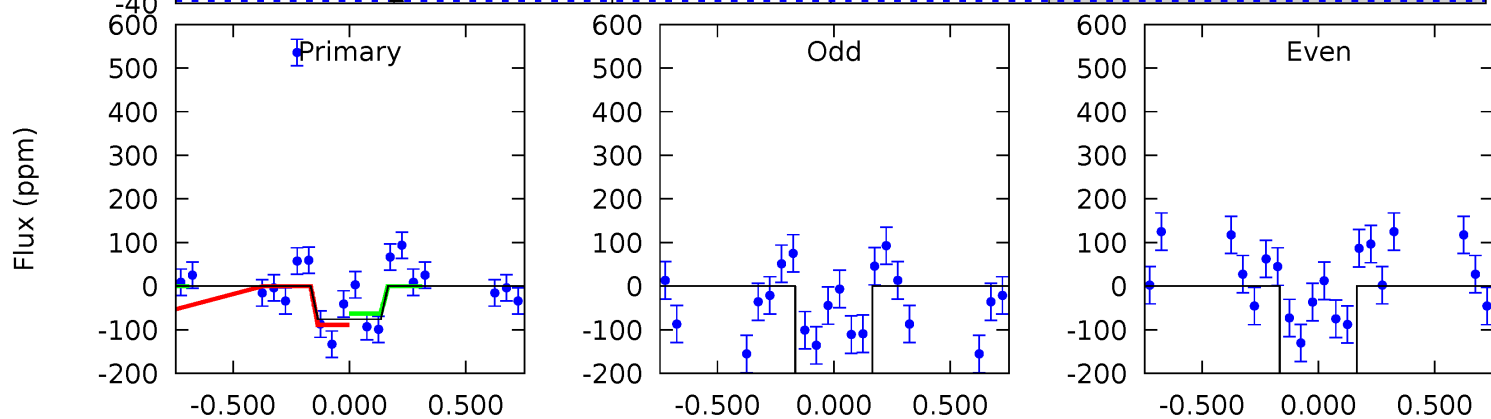
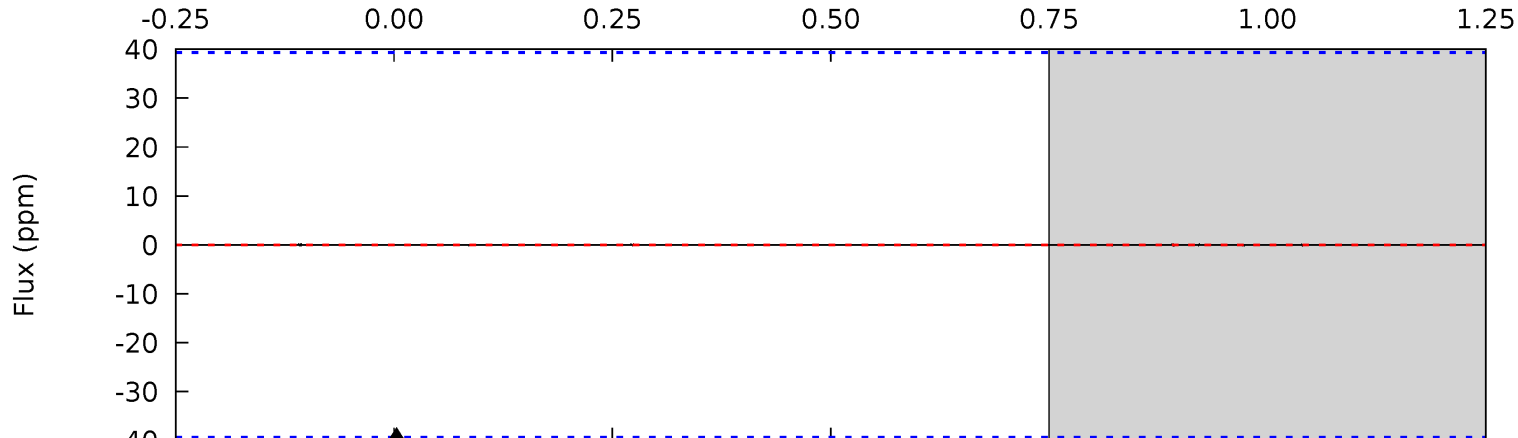
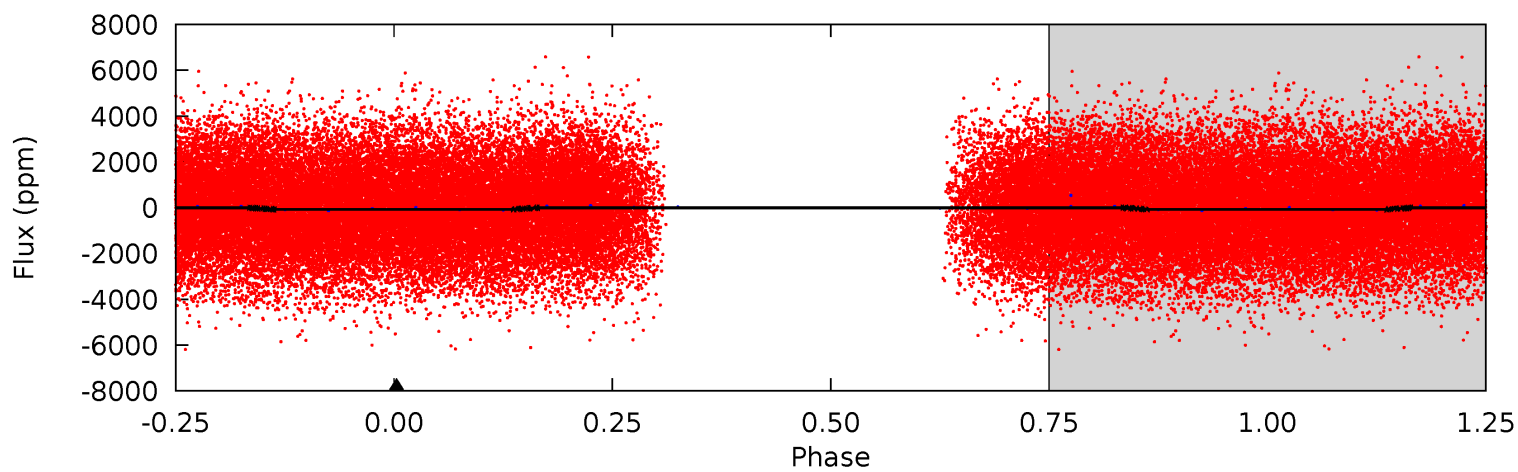
| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|------|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 9.55 | 0 | 0 | 0 | 4.30 | 0.96 | 0.18 | 9.55 | 9.55 | 0 | 0 | 0.03 | 1.07 | 0.02 | 1.21 |



Alt Model-Shift Uniqueness Test

010130777-02, P = 0.650932 Days, E = 131.467590 Days

| Pri | Sec | Ter | Pos | FA ₁ | FA ₂ | F _{Red} | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM | Shape | TAT |
|-----|-----|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|-----|-------|------|
| 0 | 0 | 0 | 0 | 4.21 | 0.67 | 0.00 | 0 | 0 | 0 | 0 | 0.00 | 0 | 0.04 | 0.00 |



Stellar Parameters For KIC 010130777

| | $T_{\text{eff}} (K)$ | $\log(g)$ | [Fe/H] | $R (R_{\odot})$ | $M (M_{\odot})$ | $p_{\star} (\text{g}\cdot\text{cm}^{-3})$ |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
| | 8262^{+200}_{-343} | $3.726^{+0.440}_{-0.082}$ | $-0.320^{+0.200}_{-0.300}$ | $3.181^{+0.523}_{-1.464}$ | $1.964^{+0.330}_{-0.495}$ | $0.086^{+0.373}_{-0.023}$ |
| | +2%/-4% | +12%/-2% | +62%/-94% | +16%/-46% | +17%/-25% | +434%/-27% |
| 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 010130777-02 / KOI

| Detrend | Depth (ppm) | $R_p (R_{\oplus})$ | $T_{max} (K)$ | $T_{obs} (K)$ | A_{obs} |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV | 0 ± 6 | $2.68^{+1.76}_{-1.49}$ | 6445^{+463}_{-753} | -5153^{+1253}_{-654} | $0.001^{+0.197}_{-0.160}$ |
| Alt. | 0 ± 9 | $2.84^{+1.98}_{-1.55}$ | 6389^{+490}_{-767} | -5053^{+8364}_{-841} | $0.012^{+0.322}_{-0.255}$ |

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 $A_{obs} \gg 1.0$

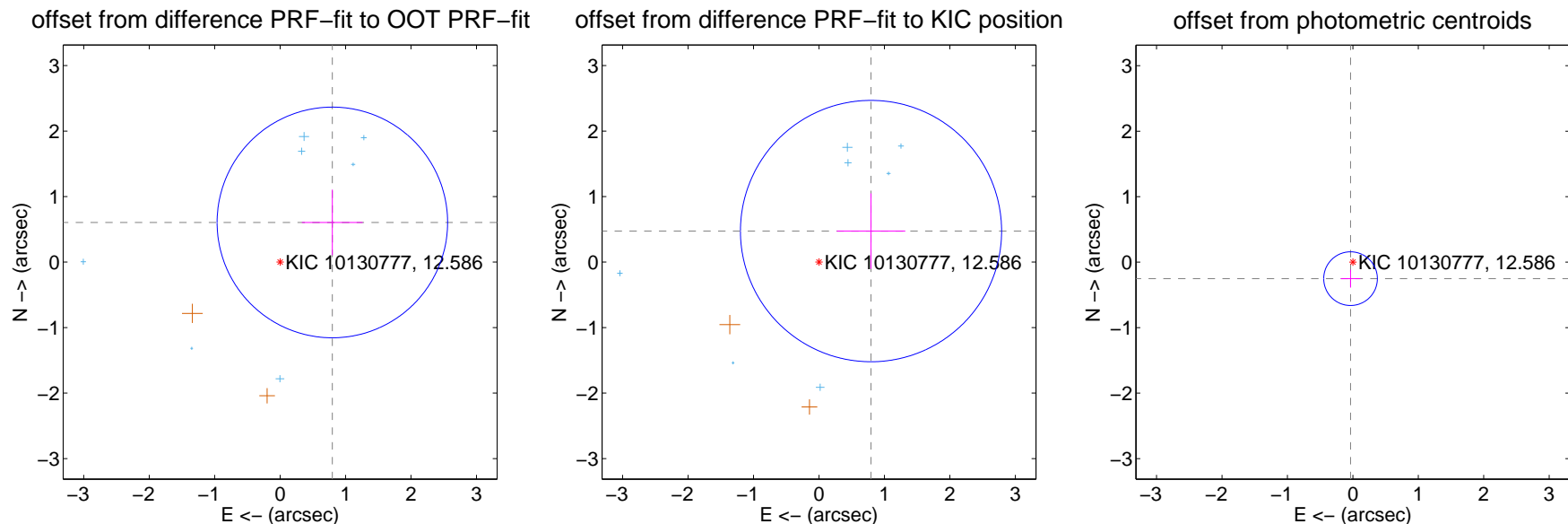
DV Centroid Data

Supplemental centroid analysis for 010130777-02. Kepler magnitude: 12.59. Transit SNR 9.07

There are 7 quarters with good PRF difference image offsets

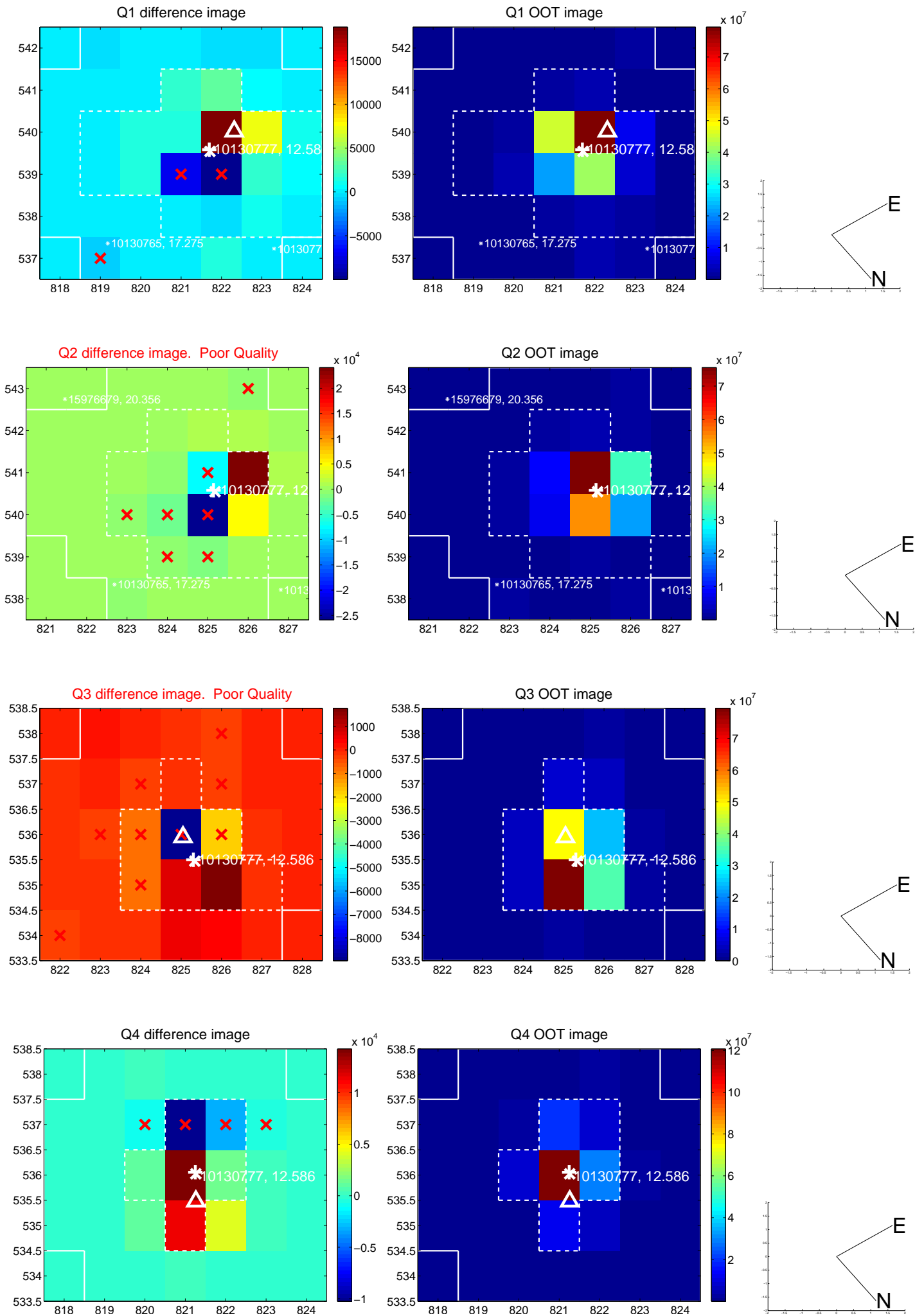
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

| | Distance in arcsec | Distance / σ | Δ RA | Δ Dec |
|---|--------------------|---------------------|--------------------|-------------------|
| PRF-fit source offset from OOT | 1.002 ± 0.587 | 1.71 | -0.798 ± 0.464 | 0.605 ± 0.501 |
| PRF-fit source offset from KIC position | 0.925 ± 0.665 | 1.39 | -0.795 ± 0.523 | 0.474 ± 0.576 |
| photometric centroid source offset | 0.25 ± 0.14 | 1.86 | 0.04 ± 0.15 | -0.25 ± 0.14 |

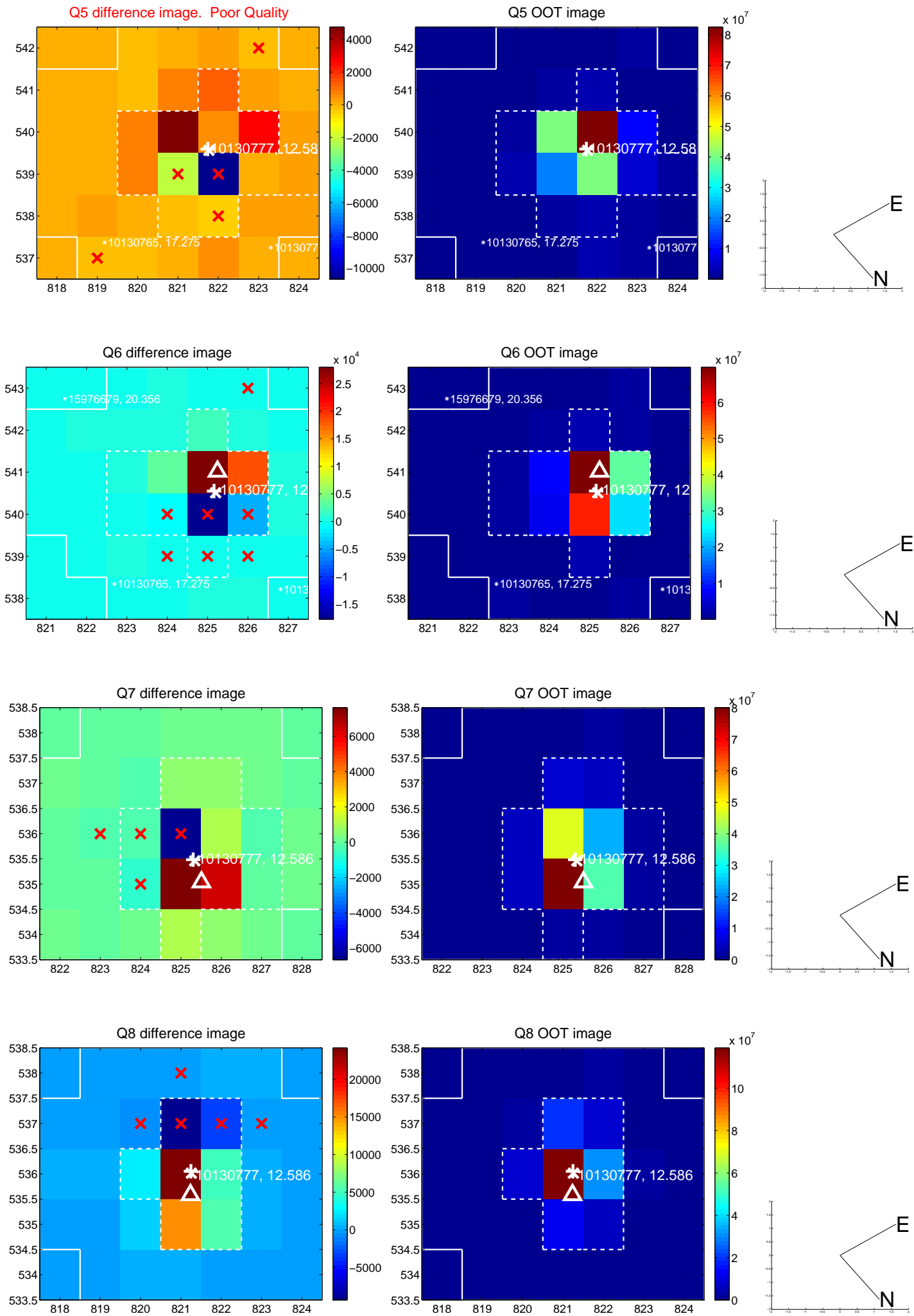


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

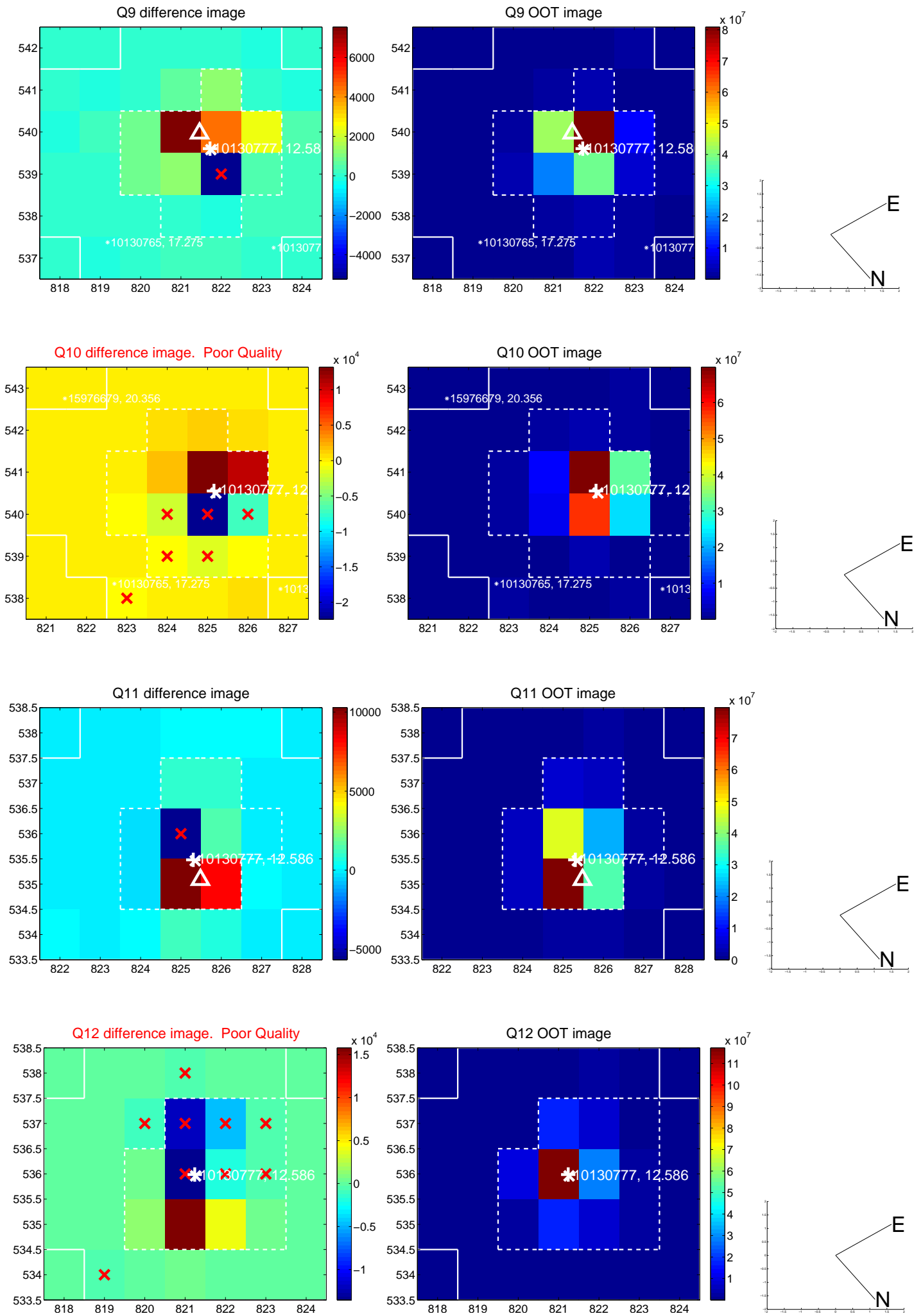
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



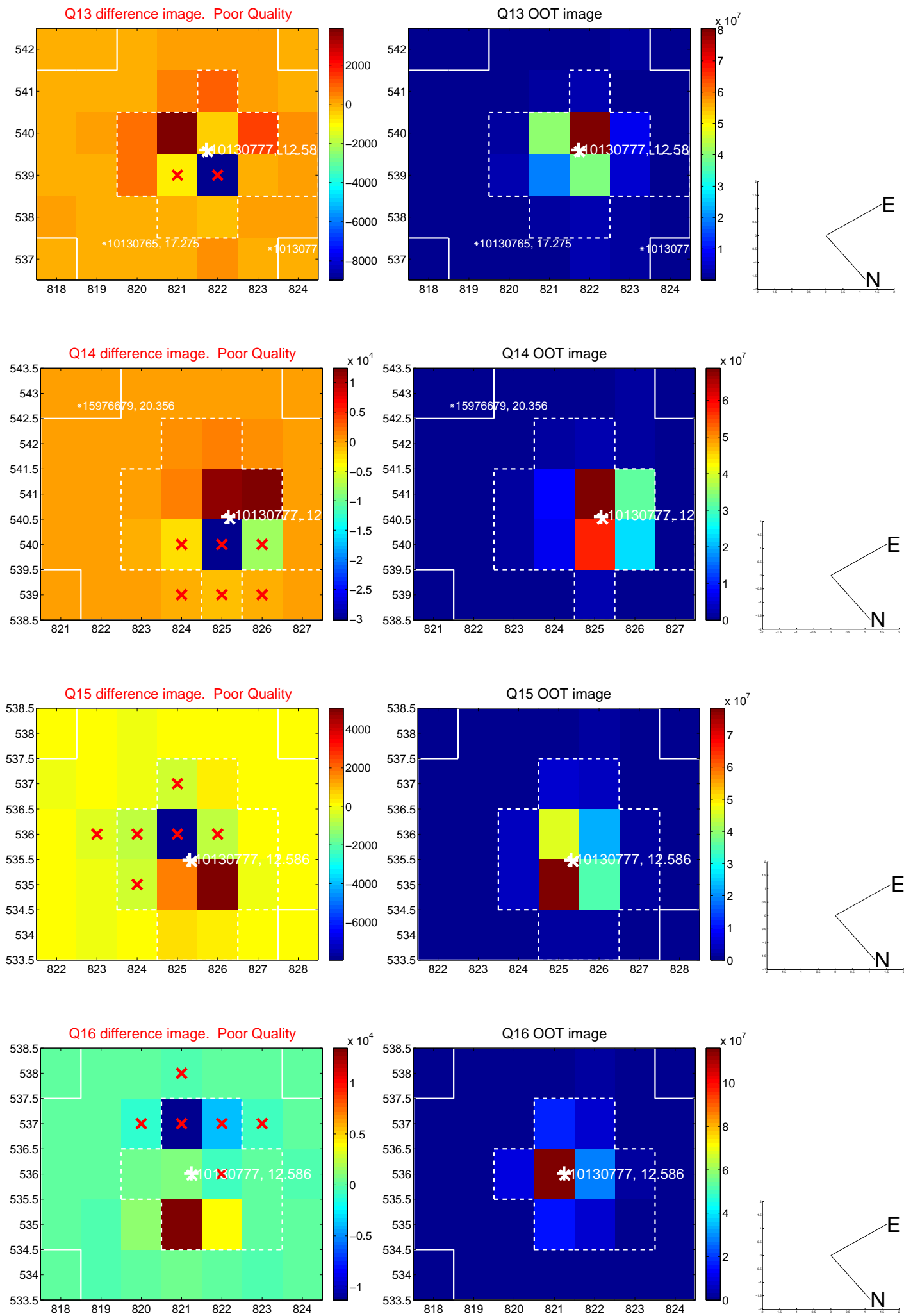
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



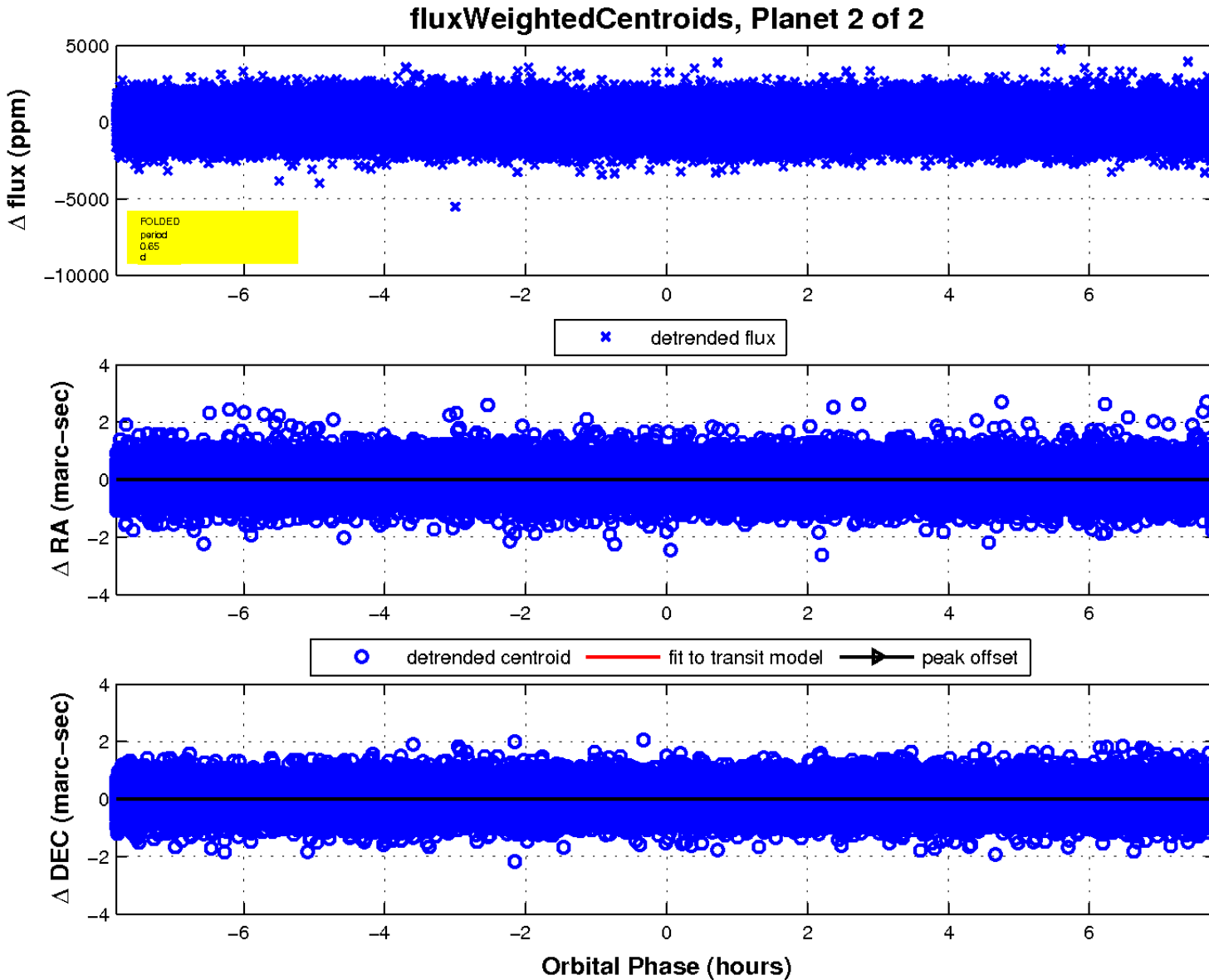
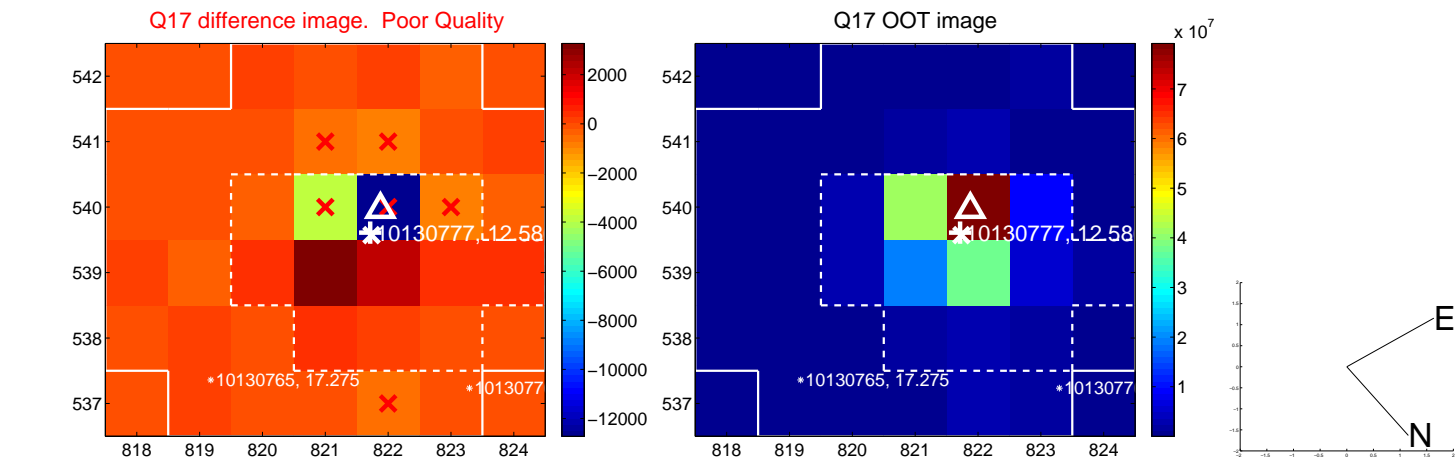
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Declination