

KIC 008456998

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})
008456998-01	OBS	No	7.531469	136.086944	83.9	11.293	11.6	10.9	1.35	5976	1.49	325.94
008456998-02	OBS	No	6.924731	138.095600	71.3	18.288	10.5	8.7	1.35	5976	1.35	364.56

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008456998-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
008456998-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV

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

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

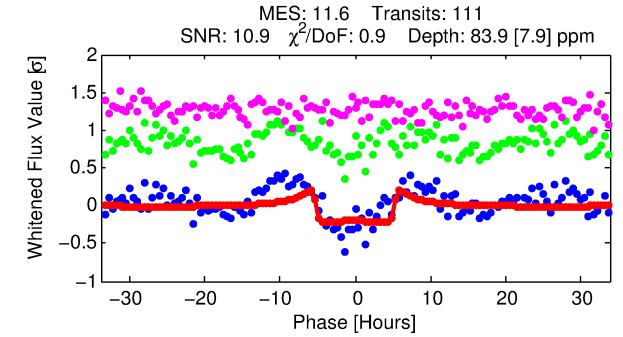
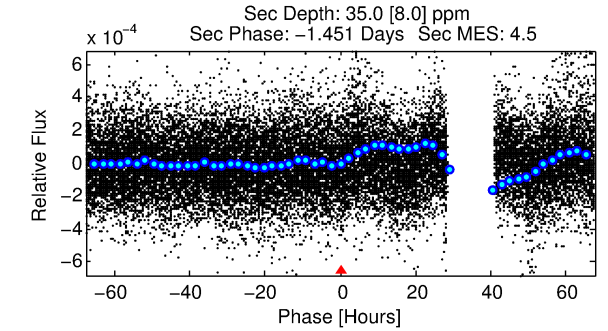
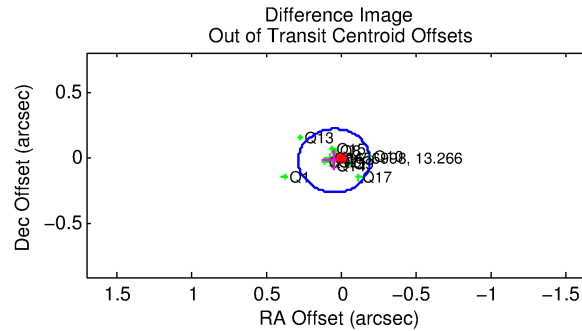
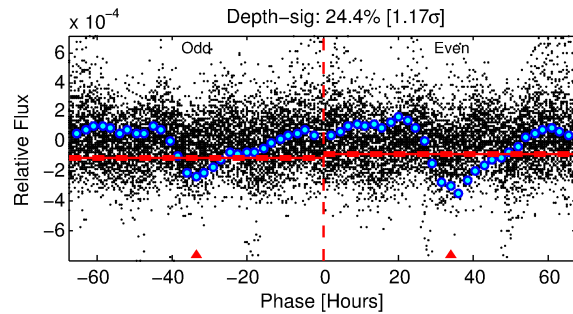
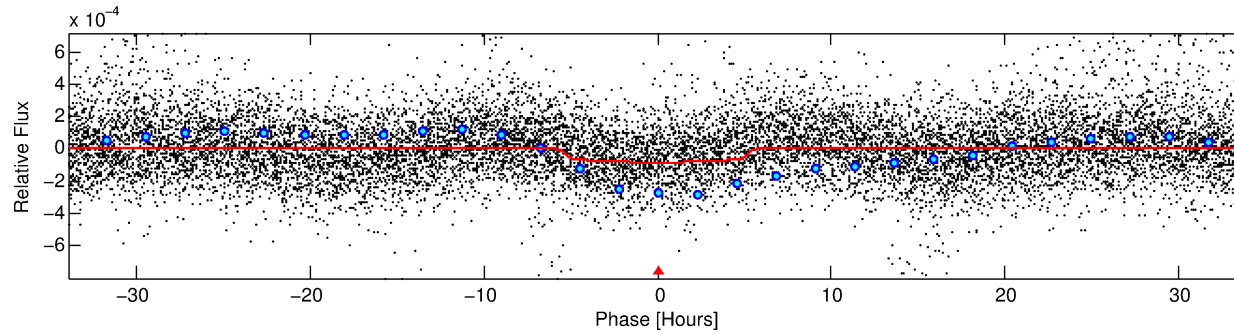
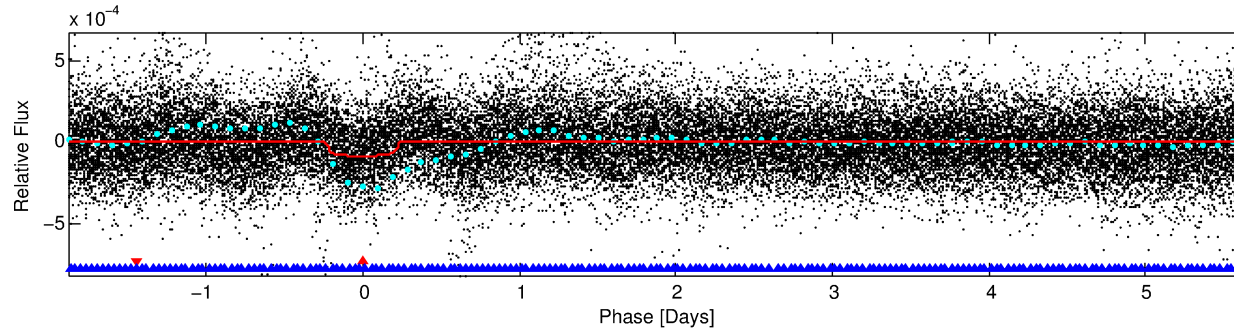
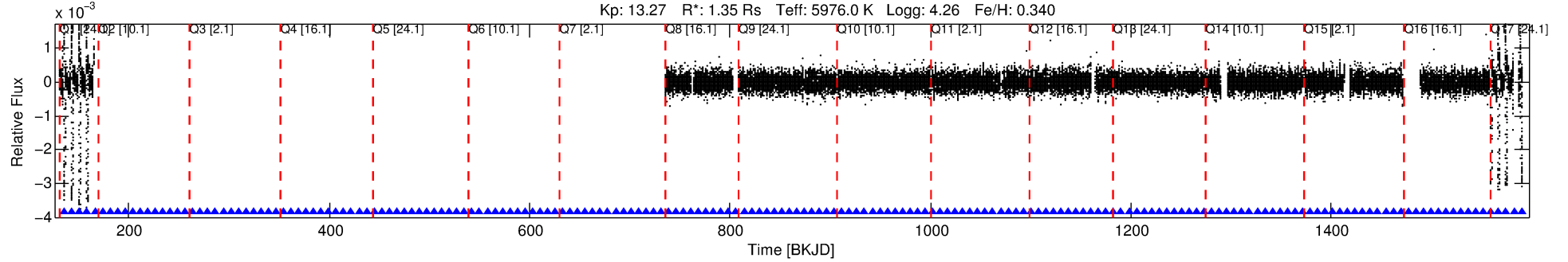
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008456998-01

No Significant Match Found

DV One-Page Summary

KIC: 8456998 Candidate: 1 of 2 Period: 7.531 d



DV Fit Results:

Period = 7.53147 [0.00010] d
Epoch = 136.0869 [0.0119] BKJD
Rp/R* = 0.0101 [0.0010]
a/R* = 2.37 [0.88]
b = 0.92 [0.08]
Seff = 325.94 [128.00]
Teq = 1083 [106] K
Rp = 1.49 [0.49] Re
a = 0.0800 [0.0203] AU
Ag = 55.30 [26.20] [2.07 σ]
Teffp = 4568 [393] K [8.56 σ]

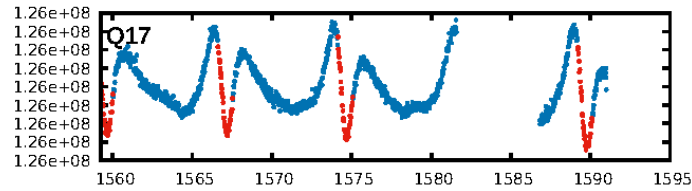
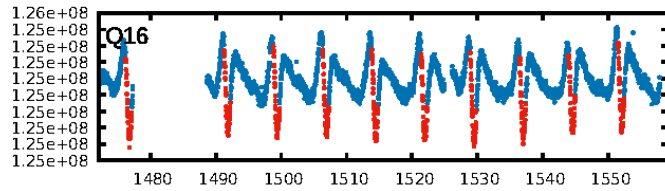
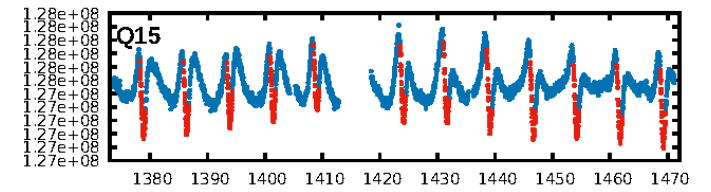
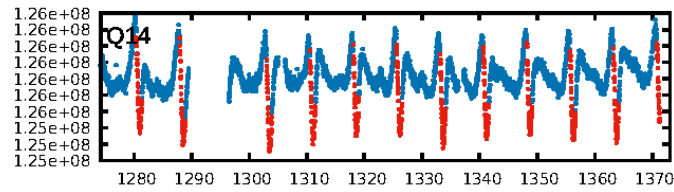
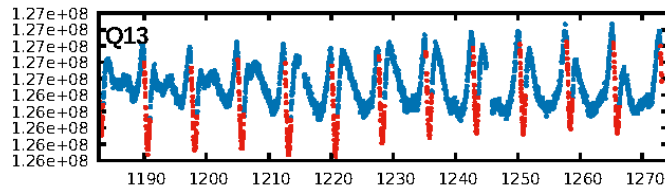
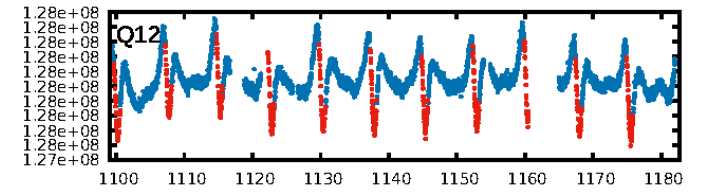
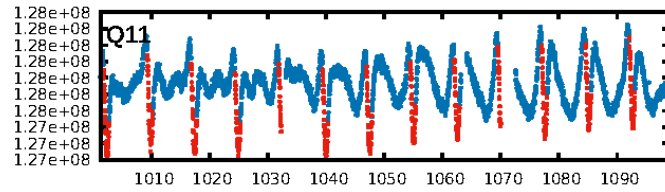
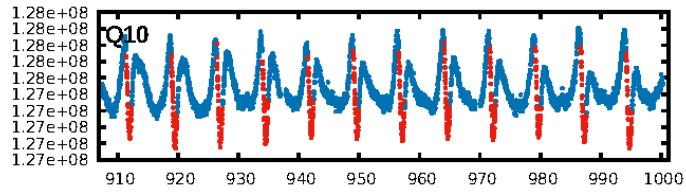
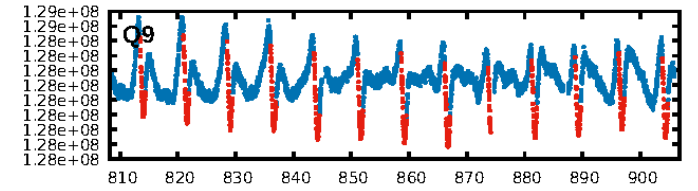
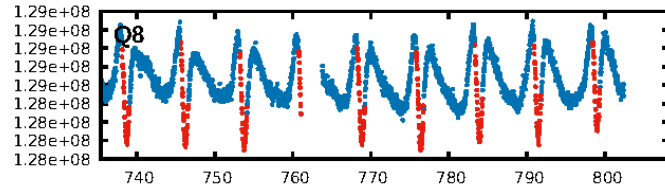
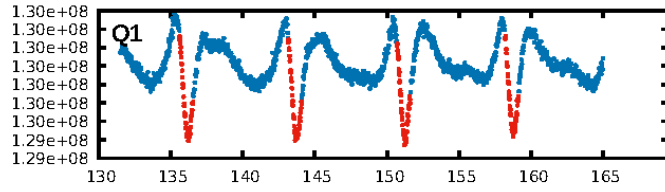
DV Diagnostic Results:

ShortPeriod-sig: 50.2% [0.68 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 3.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.08e-24
RollingBand-fgt: 1.00 [103/103]
GhostDiagnostic-chr: 1.372
Centroid-sig: 0.0%
Centroid-so: 2.137 arcsec [3.38 σ]
OotOffset-rm: 0.047 arcsec [0.59 σ]
KicOffset-rm: 0.102 arcsec [1.25 σ]
OotOffset-st: 2/2/3/4 [11]
KicOffset-st: 2/2/3/4 [11]
DiffImageQuality-fgm: 1.00 [11/11]
DiffImageOverlap-fno: 1.00 [11/11]

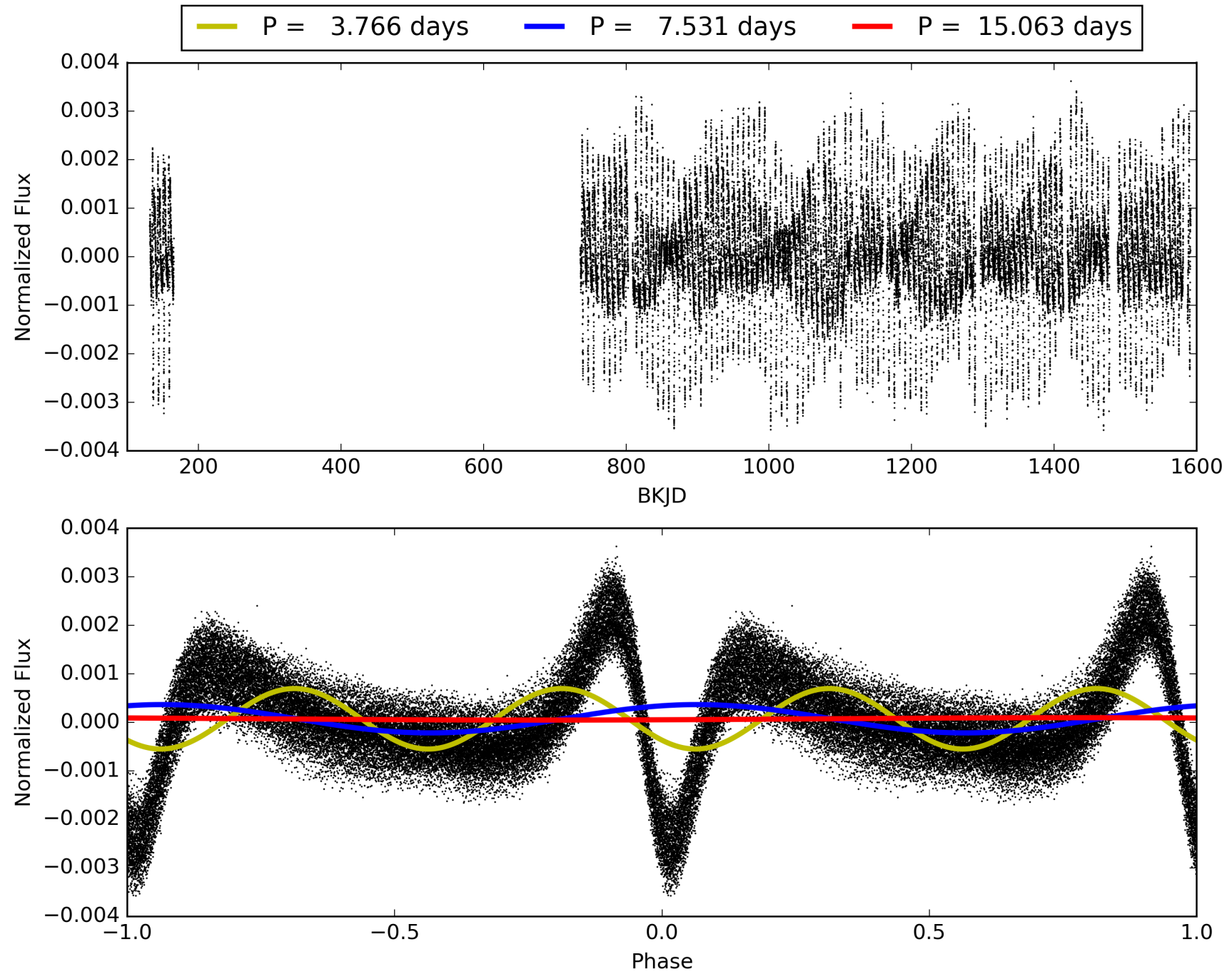
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 008456998-01, PDC Light Curves

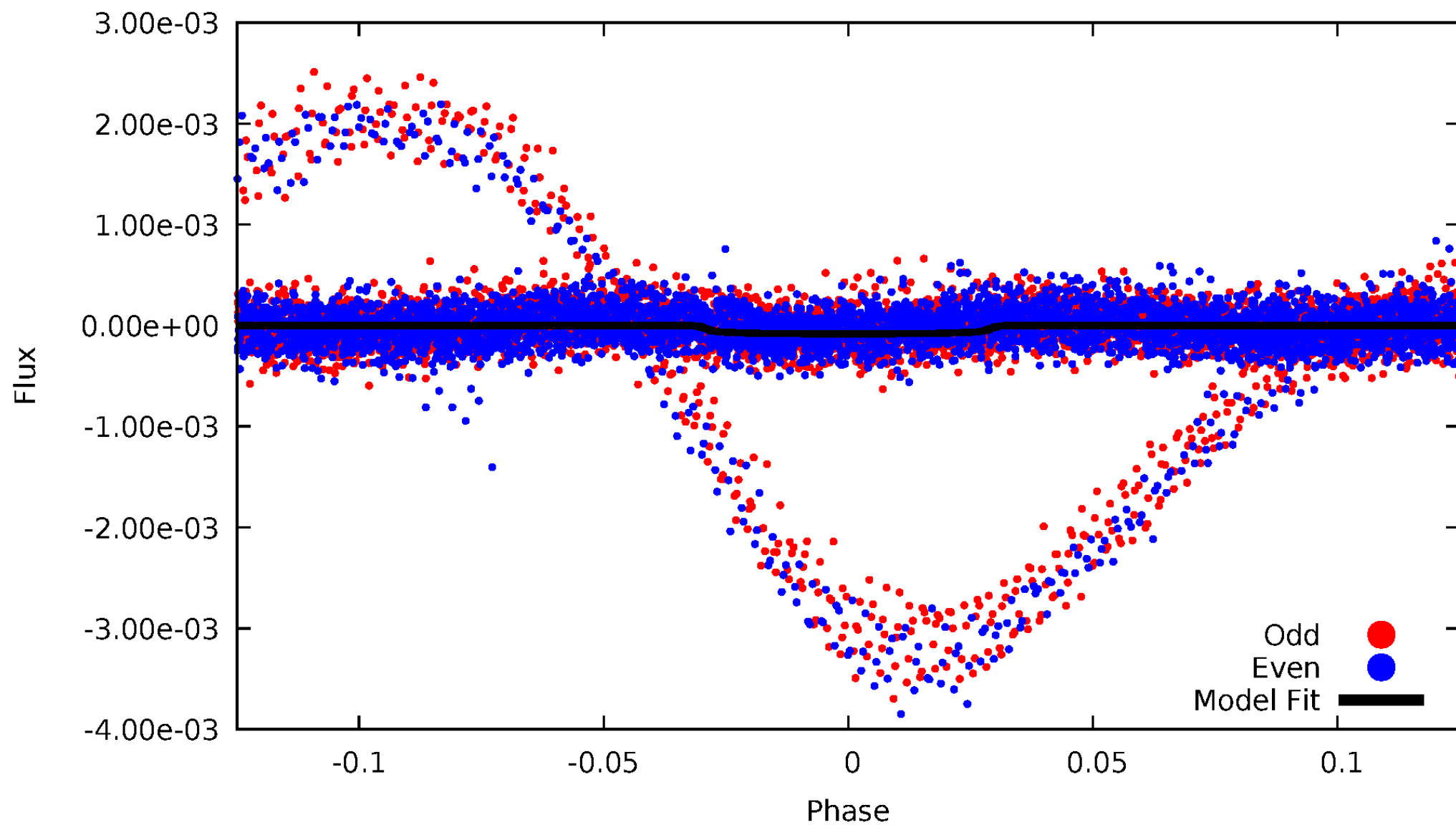


TCE 008456998-01



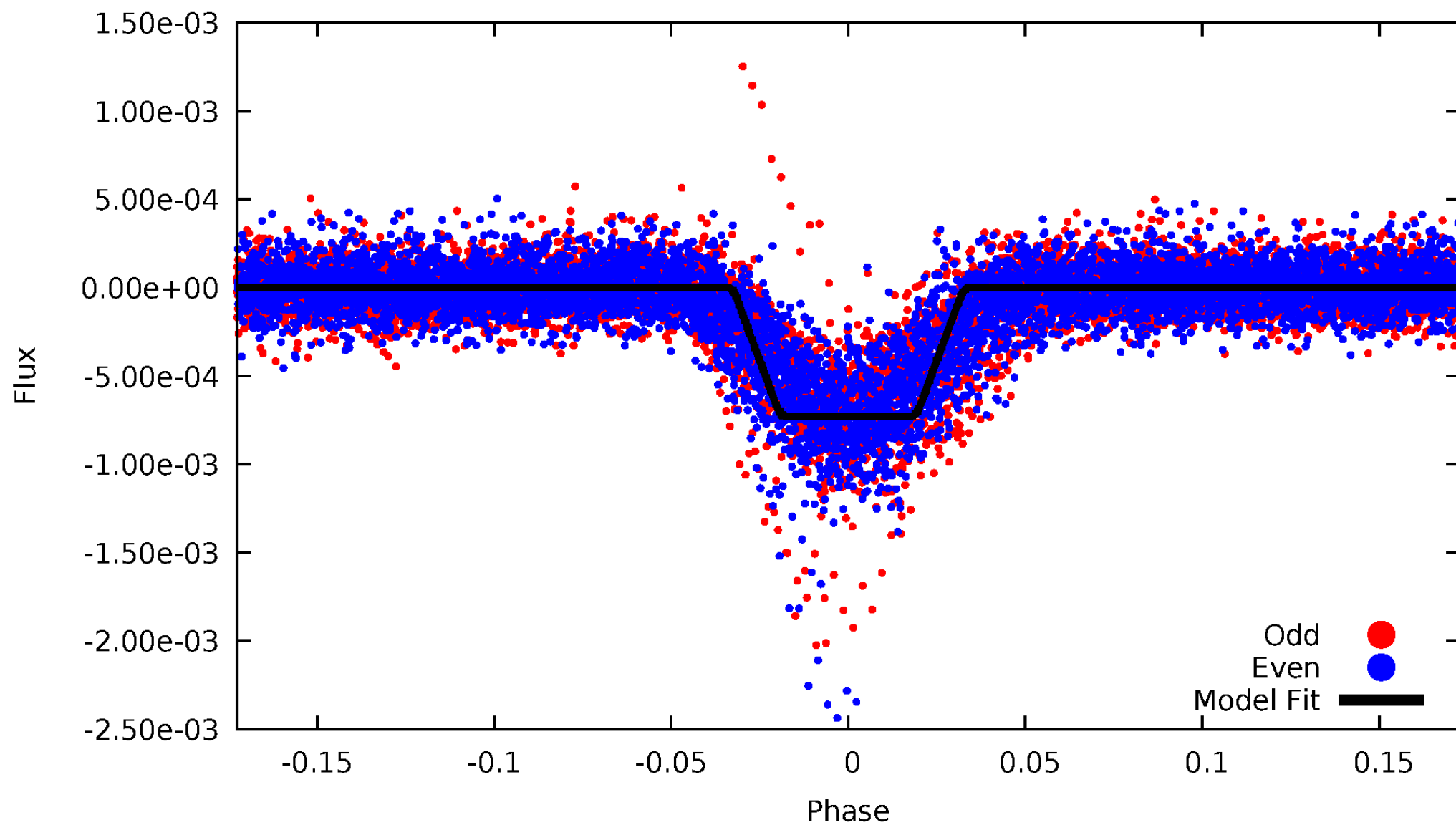
DV Odd/Even

TCE 008456998-01

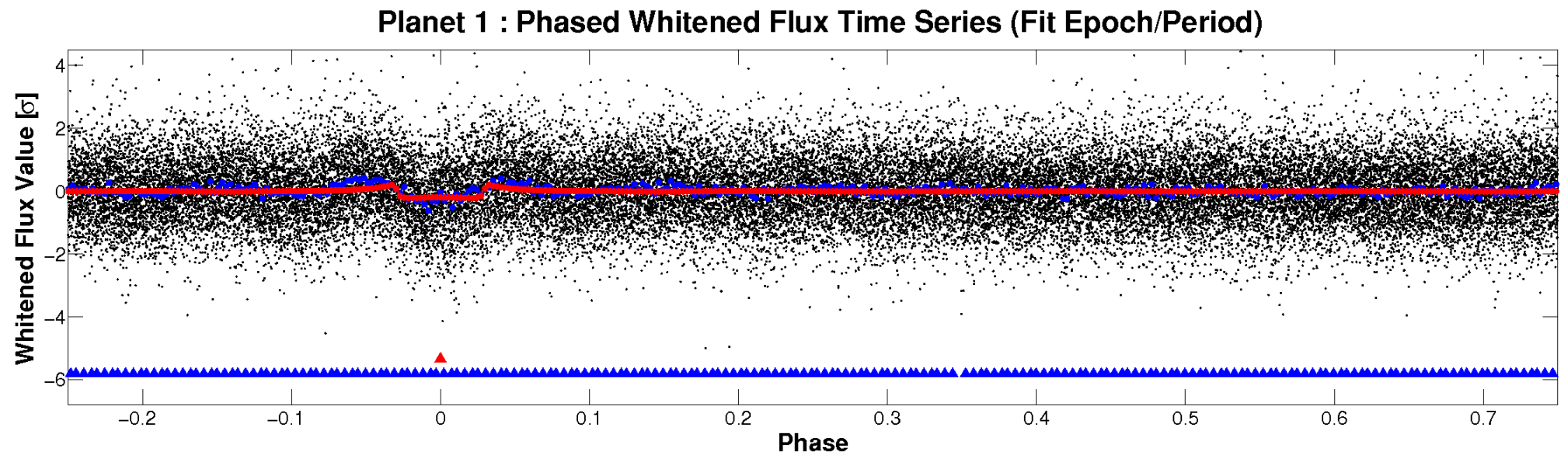
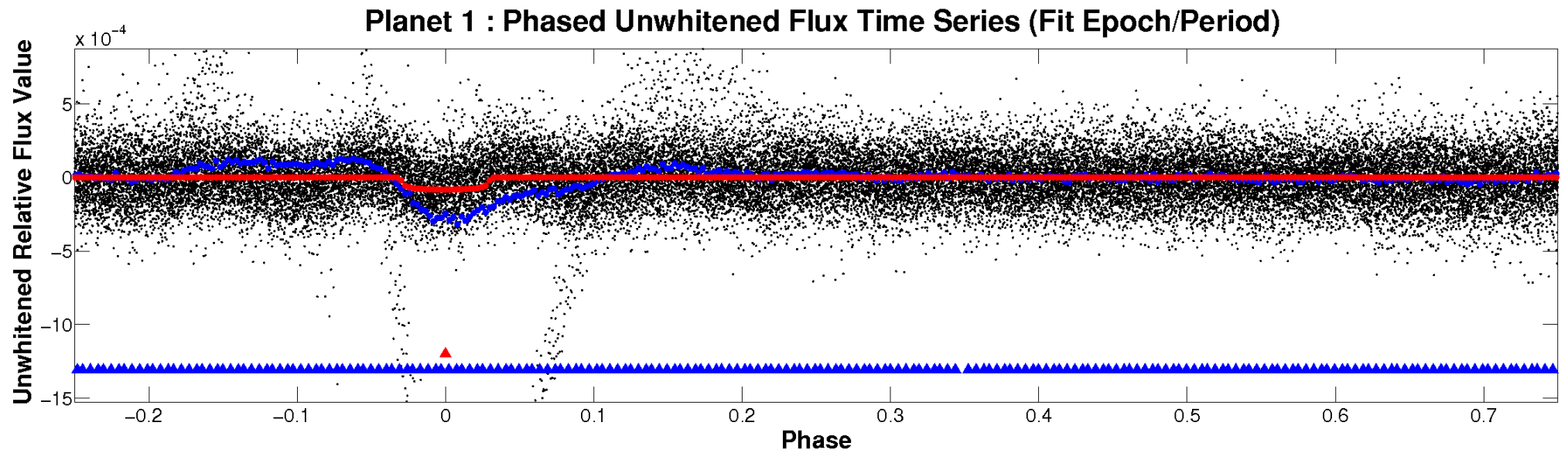


ALT Odd/Even

TCE 008456998-01

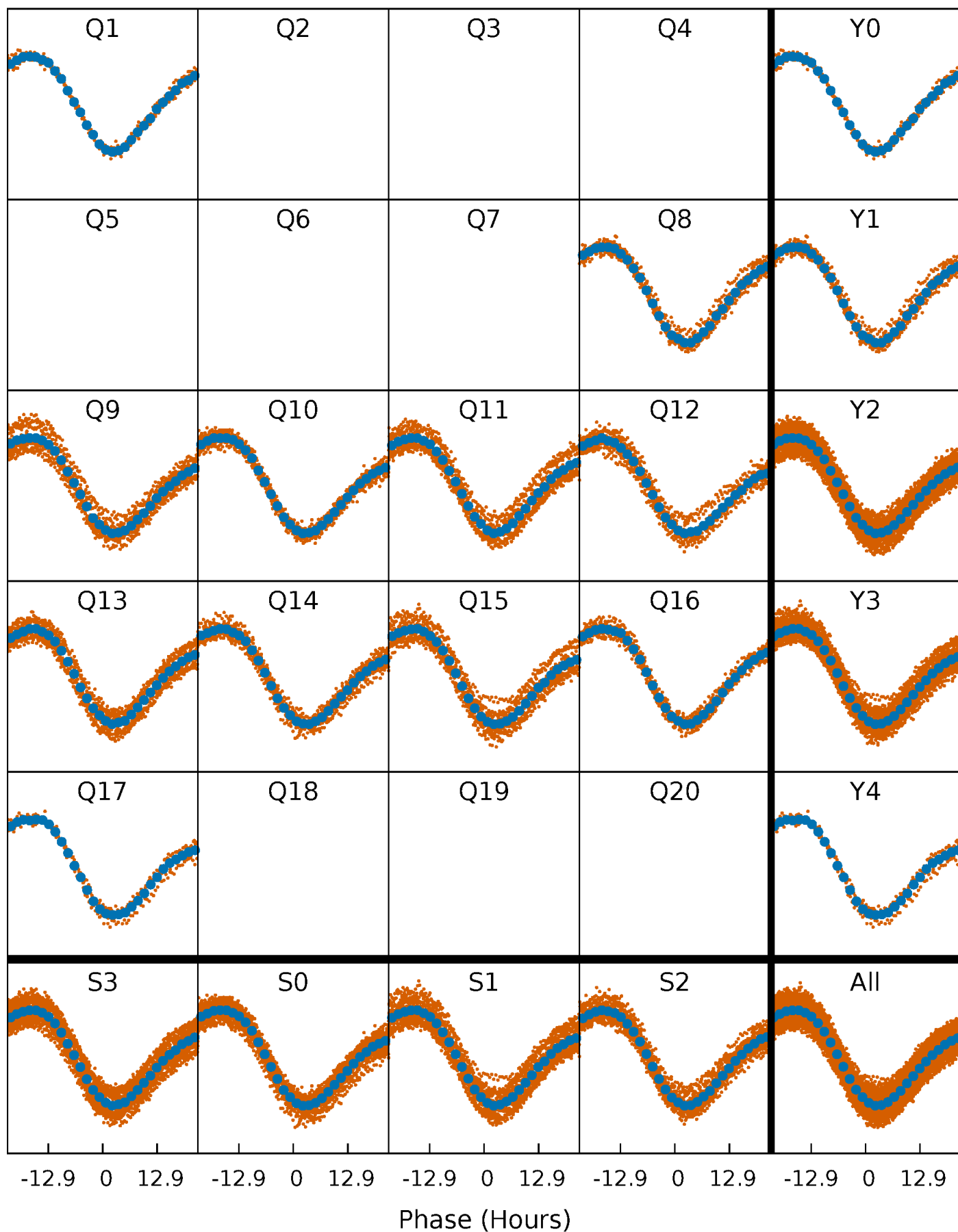


Non-Whitened Vs. Whitened Light Curve



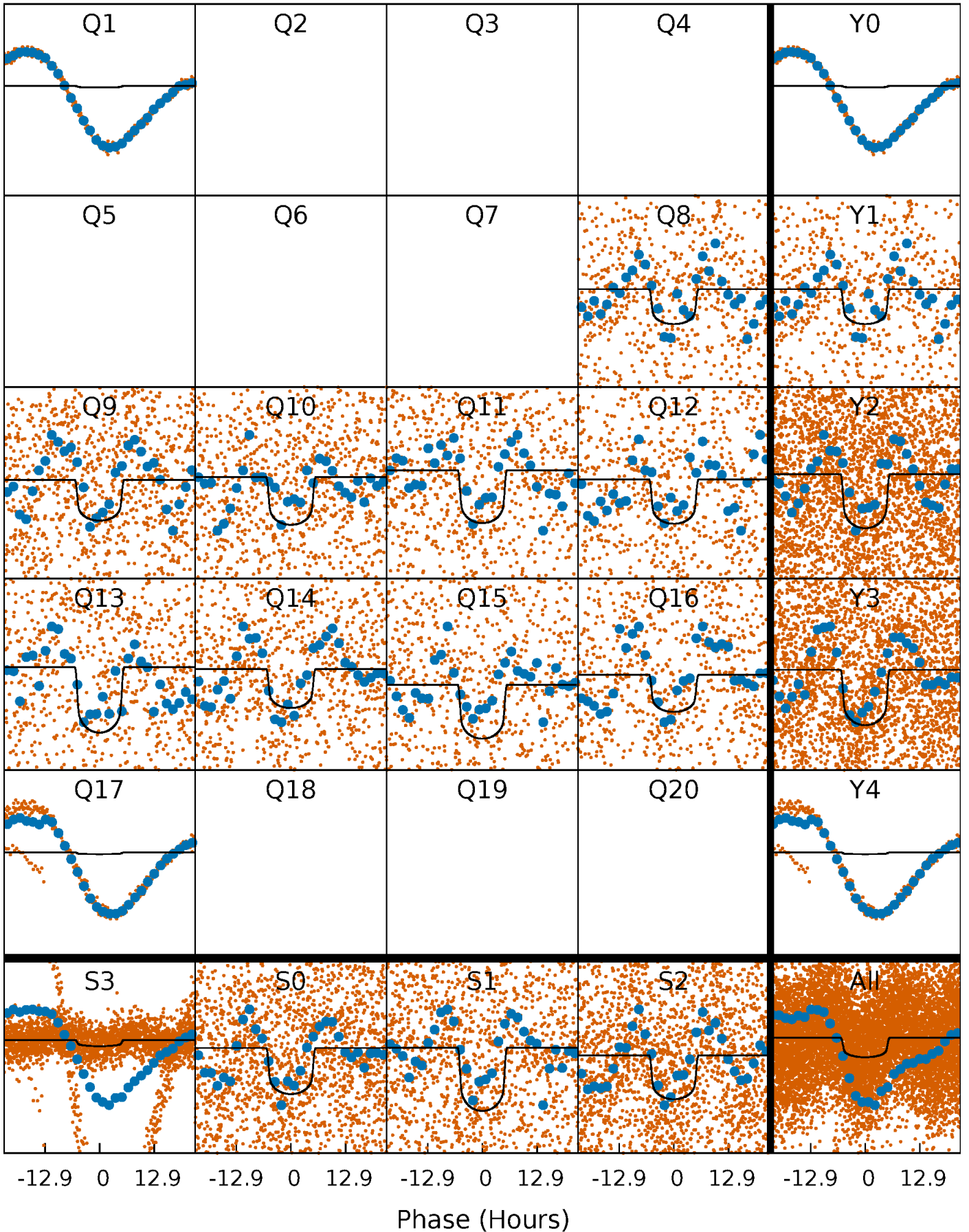
PDC Quarter-Phased Transit Curves

TCE 008456998-01 P= 7.531469 Days $T_0=136.086944$ (BKJD)



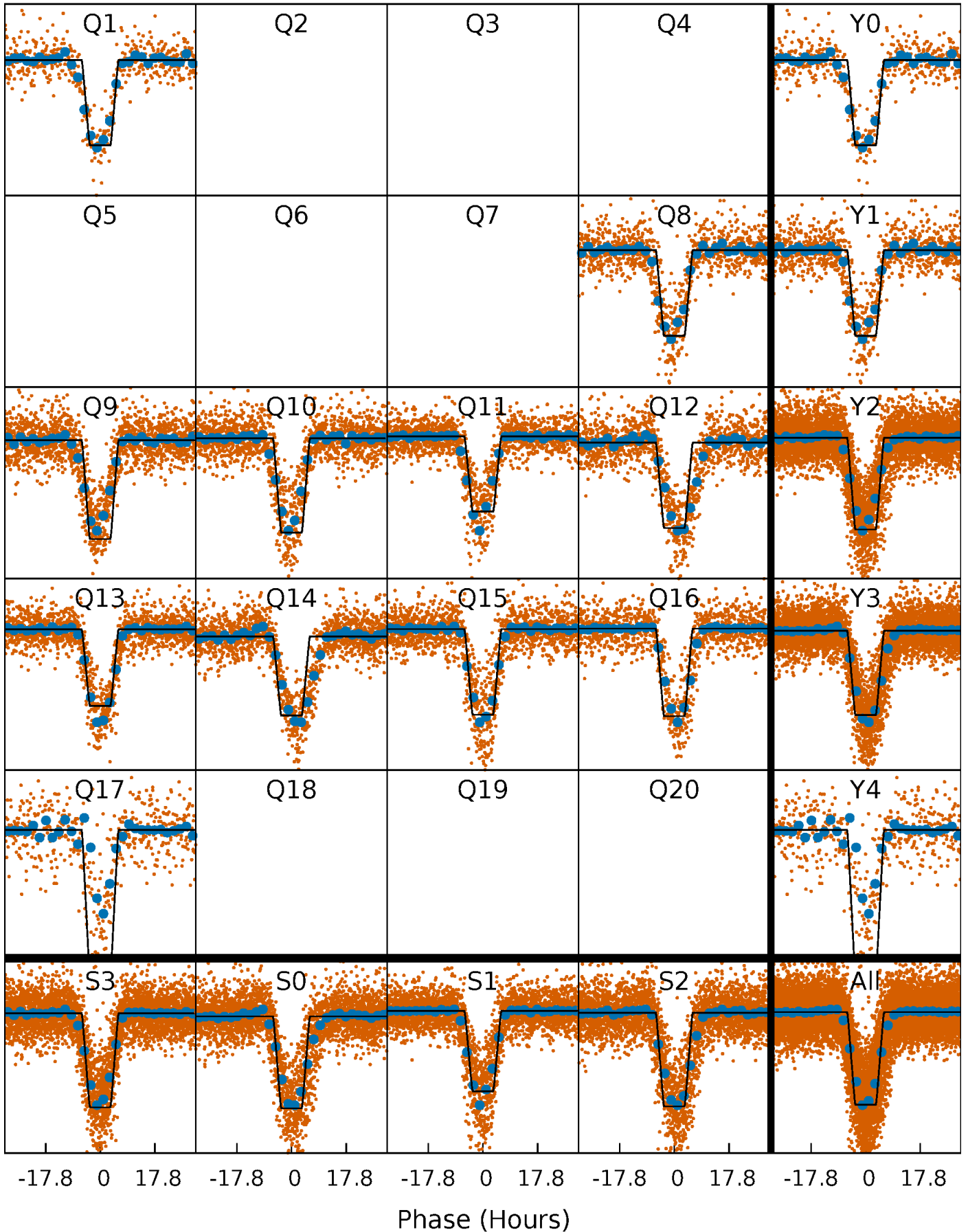
DV Quarter-Phased Transit Curves

TCE 008456998-01 P= 7.531469 Days $T_0=136.086944$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

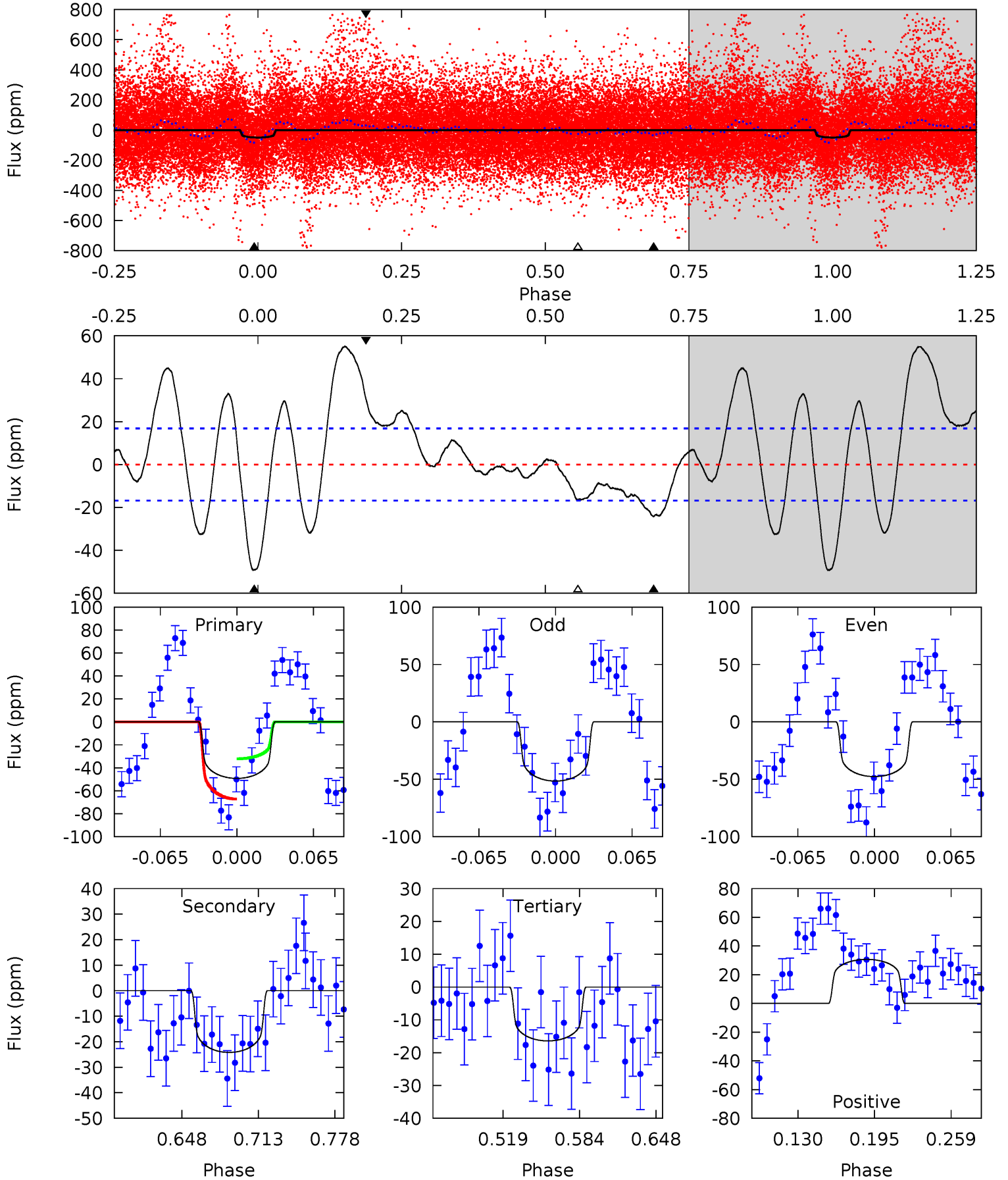
TCE 008456998-01 P= 7.530805 Days $T_0=136.148615$ (BKJD)



DV Model-Shift Uniqueness Test

008456998-01, P = 7.531469 Days, E = 128.555475 Days

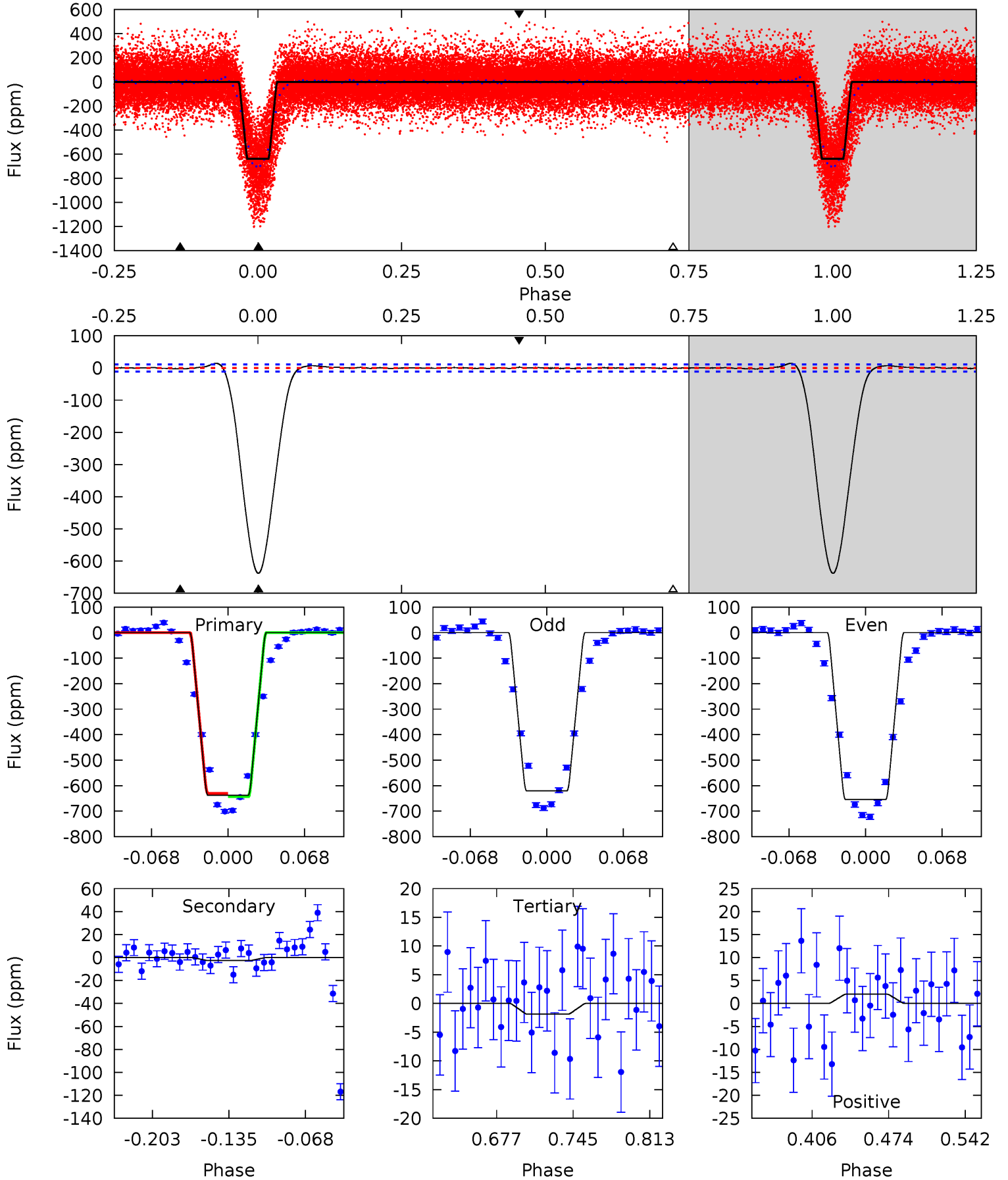
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	6.70	4.55	8.50	4.65	1.85	5.58	9.08	5.12	2.15	-1.80	0.54	4.54	0.53	4.84



Alt Model-Shift Uniqueness Test

008456998-01, P = 7.530805 Days, E = 128.617810 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
268.5	1.11	0.78	0.85	4.65	1.83	0.71	267.7	267.7	0.33	0.26	7.07	1.08	0.02	0



Stellar Parameters For KIC 008456998

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5976^{+190}_{-232}	$4.257^{+0.158}_{-0.193}$	$0.340^{+0.100}_{-0.300}$	$1.351^{+0.417}_{-0.313}$	$1.202^{+0.147}_{-0.180}$	$0.687^{+0.553}_{-0.357}$
	+3%/-4%	+4%/-5%	+29%/-88%	+31%/-23%	+12%/-15%	+81%/-52%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008456998-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-24±4	$1.50^{+0.31}_{-0.25}$	1516^{+134}_{-106}	4368^{+245}_{-222}	37^{+18}_{-12}
Alt.	-3±2	$4.00^{+0.70}_{-0.52}$	1524^{+119}_{-110}	2160^{+293}_{-4325}	$0.541^{+0.604}_{-0.479}$

T_{max} = Theoretical Maximum Planetary Temperature

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

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

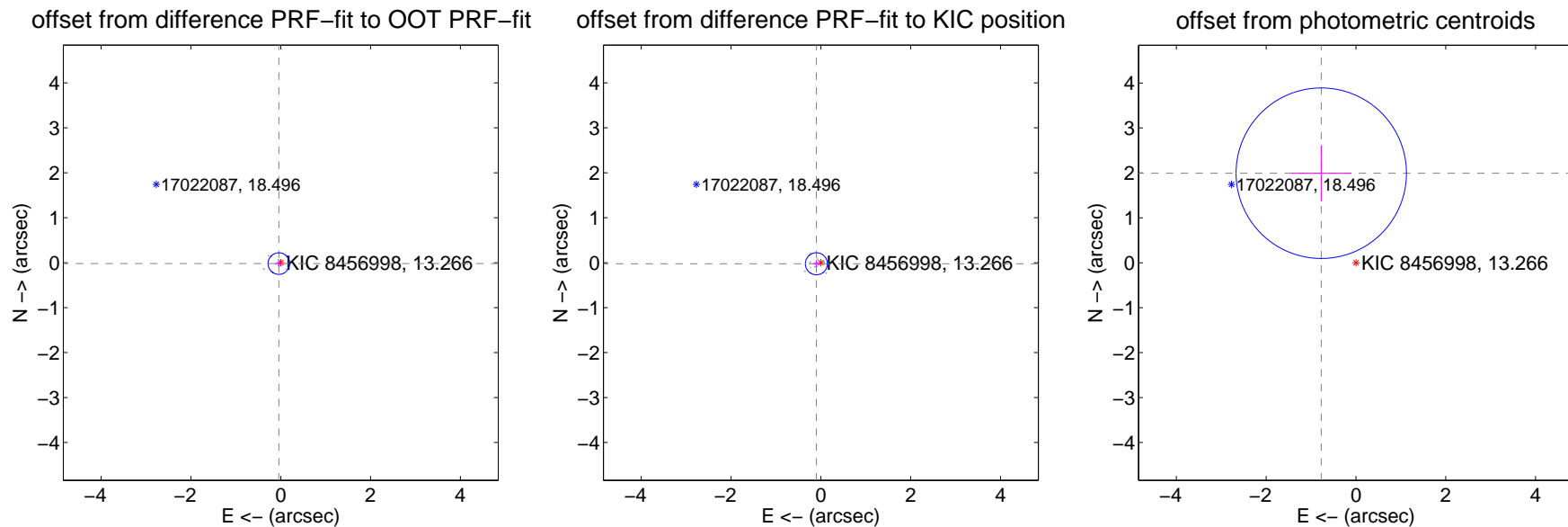
DV Centroid Data

Supplemental centroid analysis for 008456998-01. Kepler magnitude: 13.27. Transit SNR 10.93

There are 11 quarters with good PRF difference image offsets

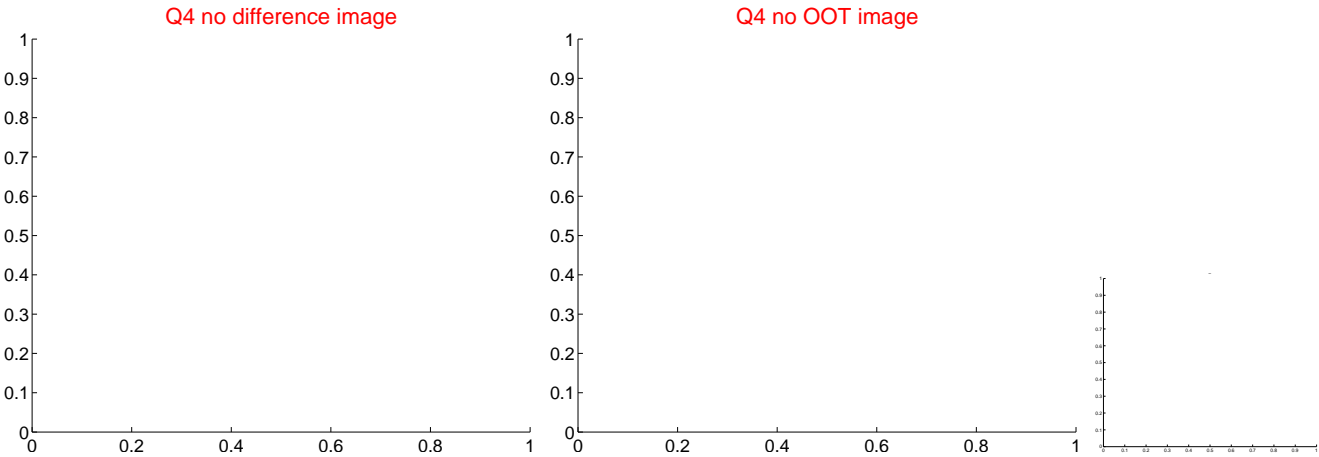
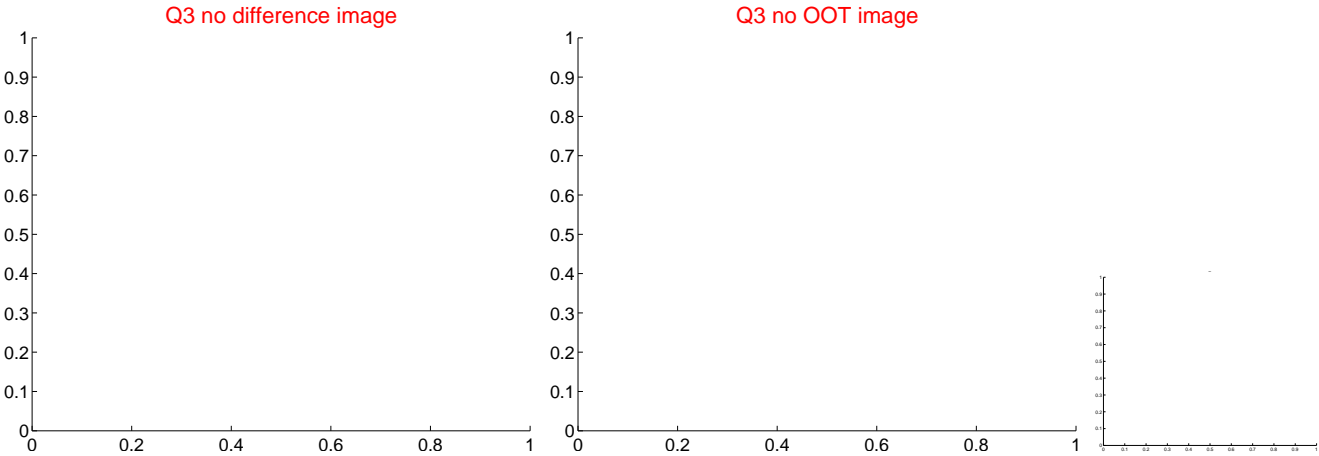
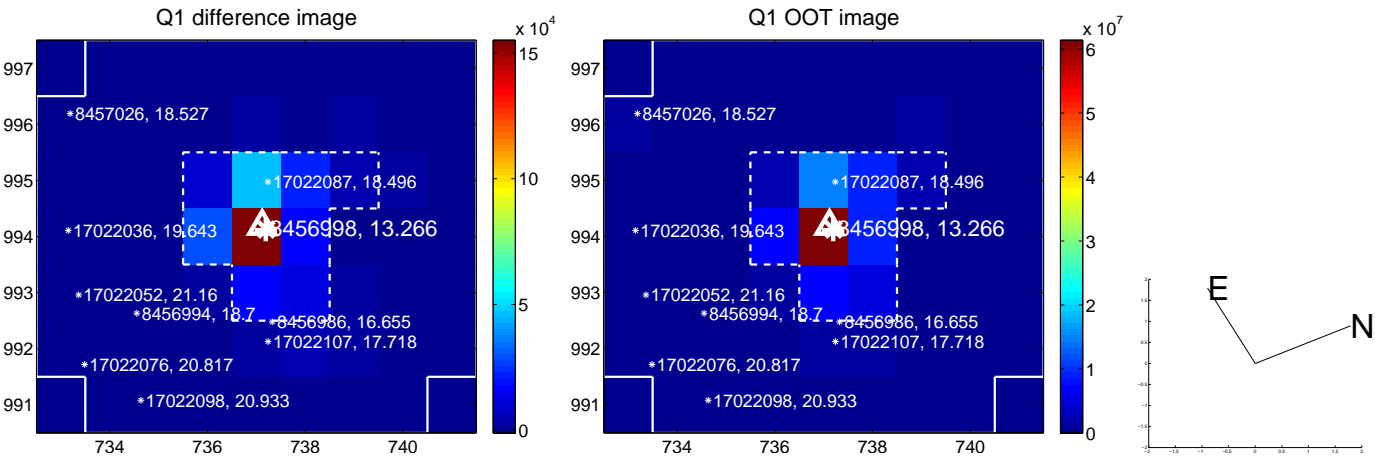
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.047 ± 0.080	0.59	0.043 ± 0.081	-0.020 ± 0.071
PRF-fit source offset from KIC position	0.102 ± 0.082	1.25	0.100 ± 0.082	-0.024 ± 0.077
photometric centroid source offset	2.14 ± 0.63	3.38	0.77 ± 0.67	1.99 ± 0.63



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.

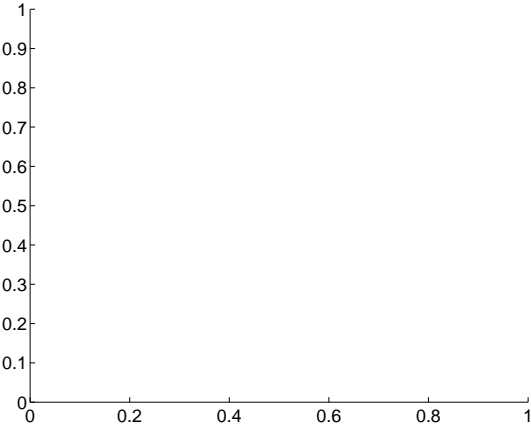
Q5 no difference image



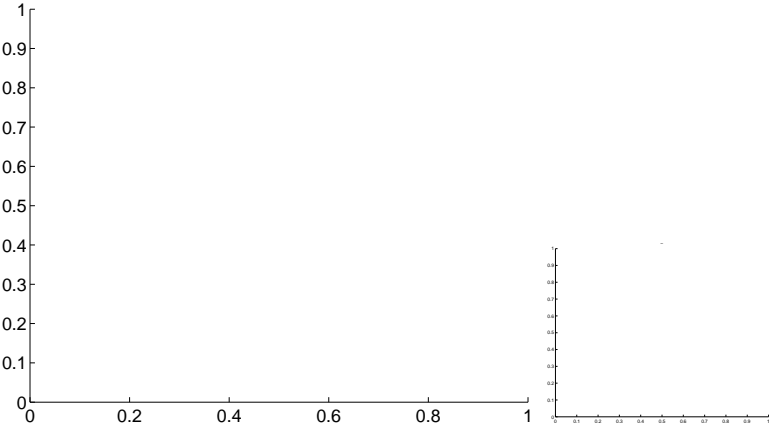
Q5 no OOT image



Q6 no difference image



Q6 no OOT image



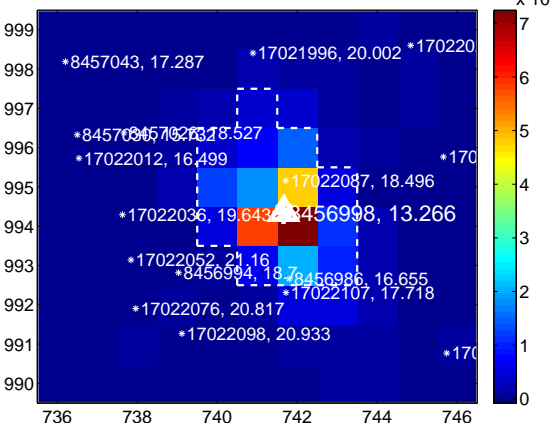
Q7 no difference image



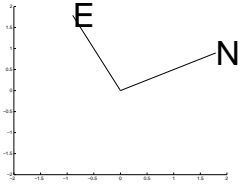
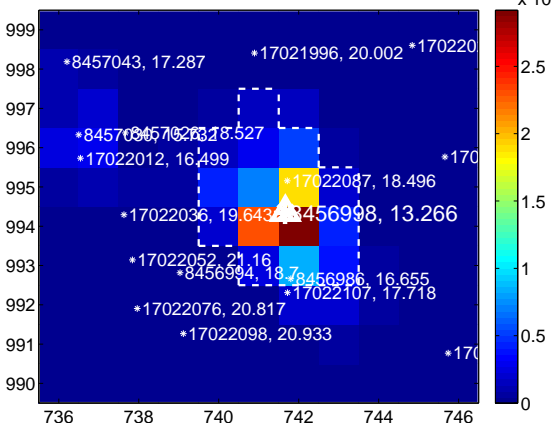
Q7 no OOT image



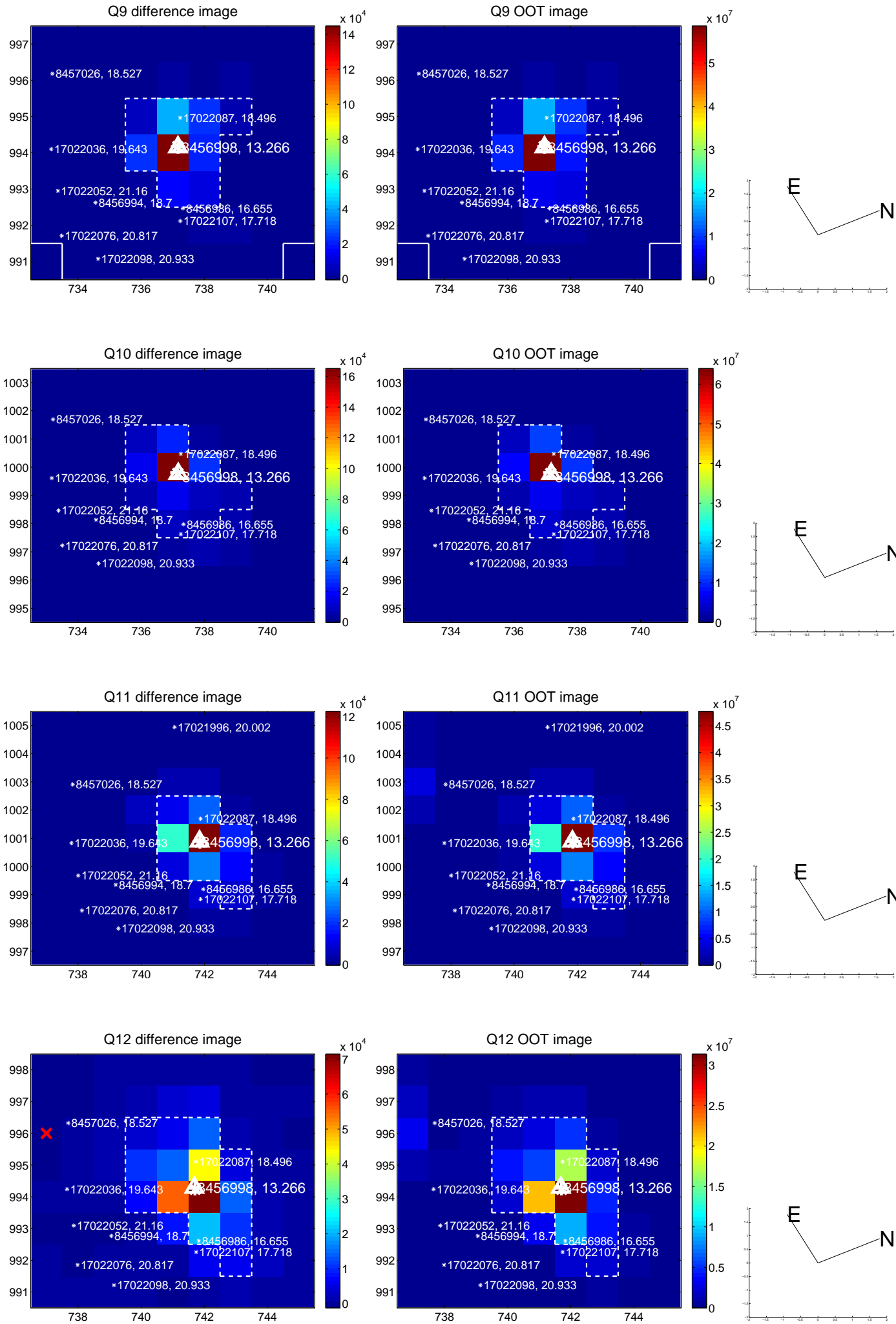
Q8 difference image



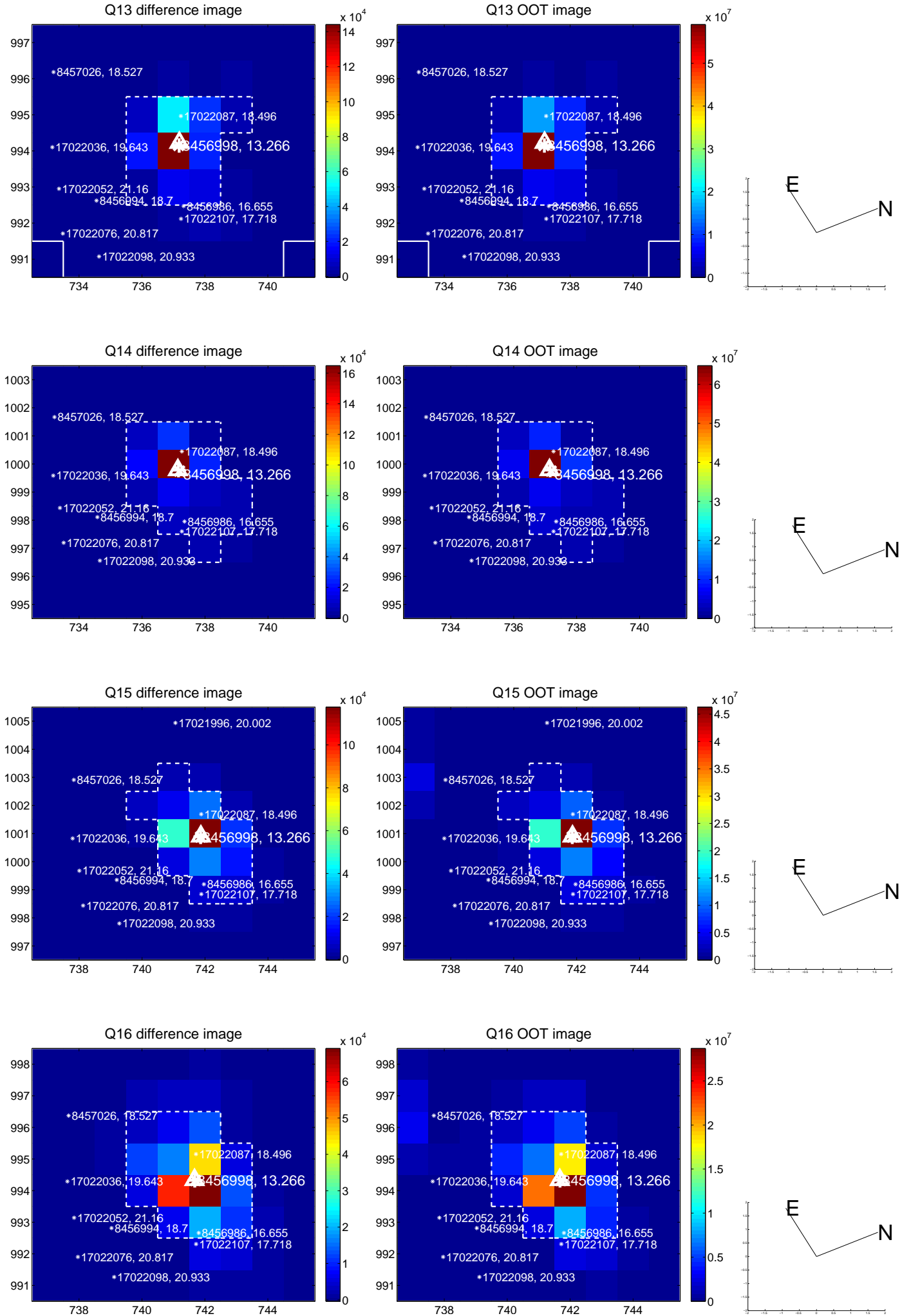
Q8 OOT image



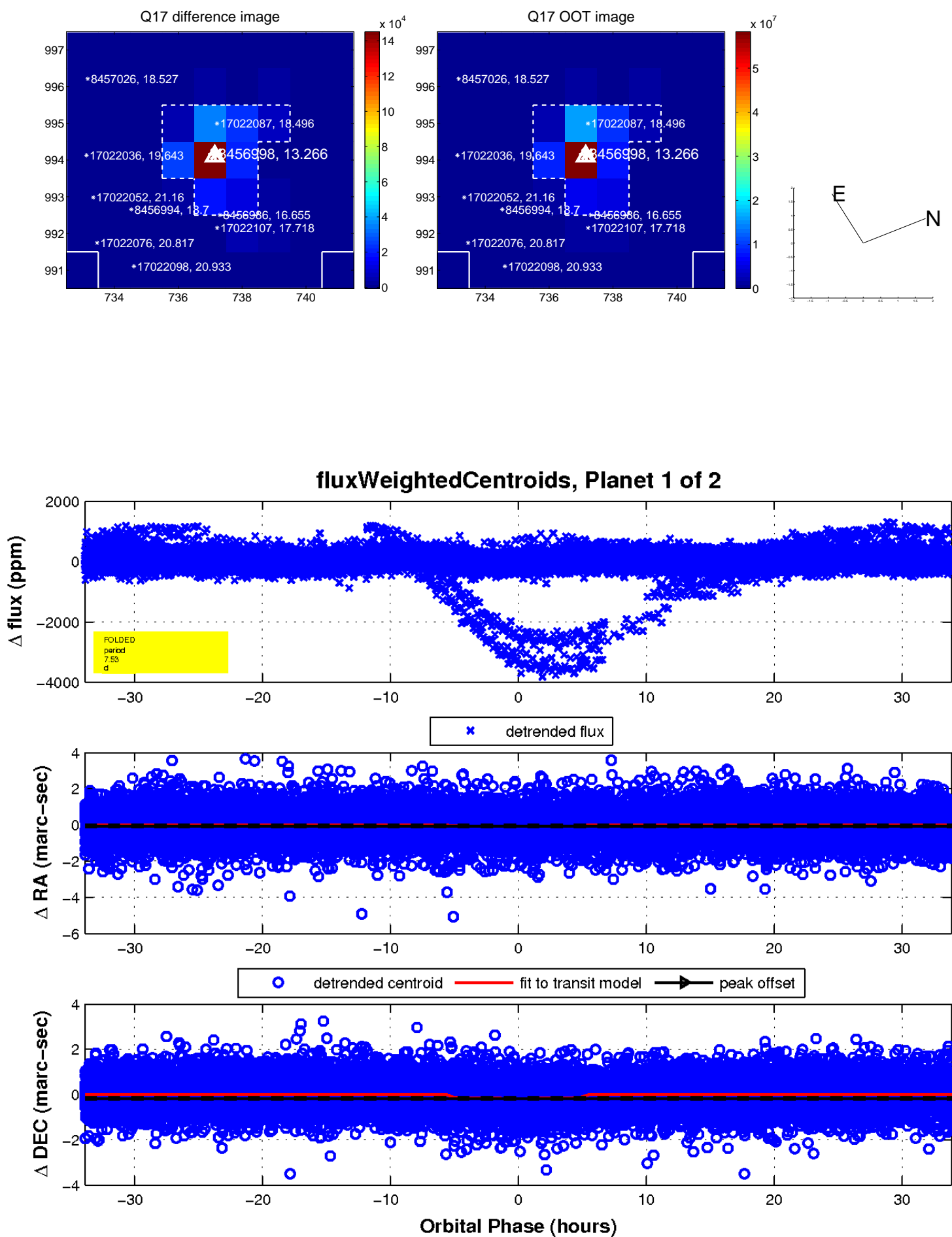
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

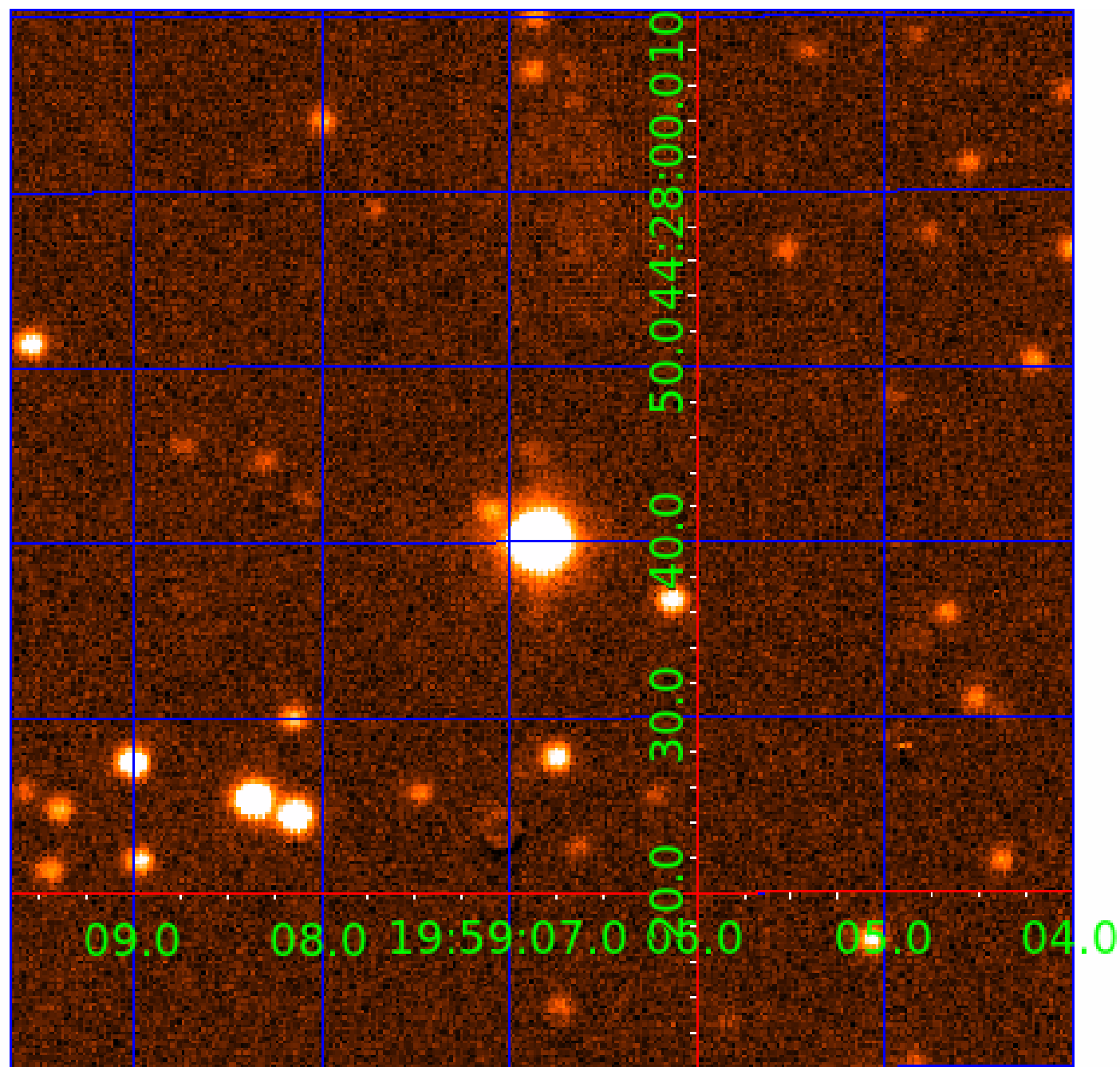


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 008456998

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})
008456998-01	OBS	No	7.531469	136.086944	83.9	11.293	11.6	10.9	1.35	5976	1.49	325.94
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008456998-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
008456998-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV

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

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

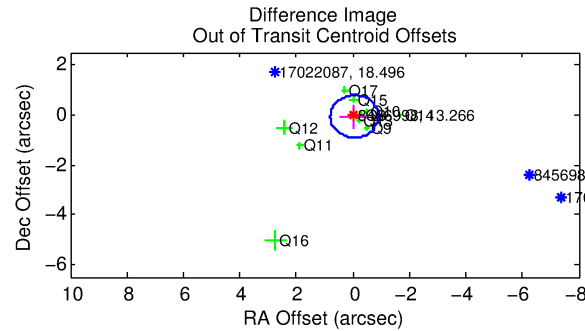
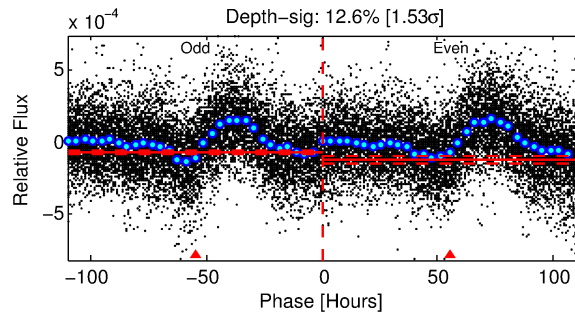
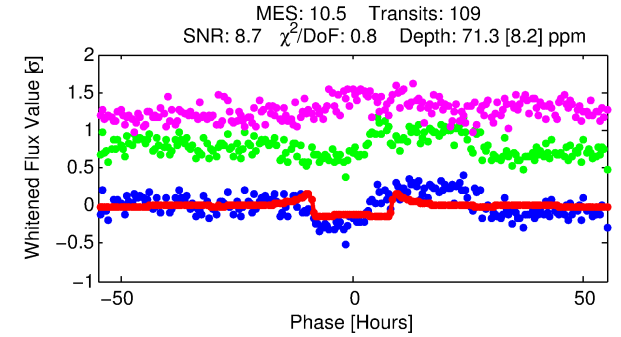
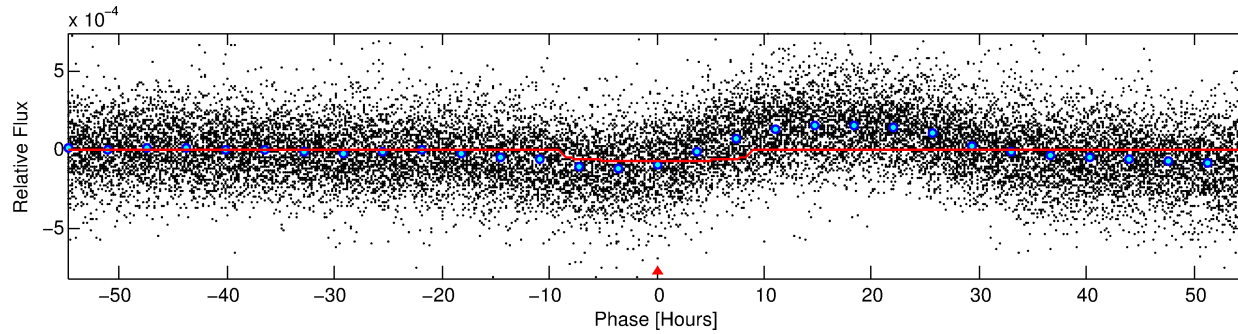
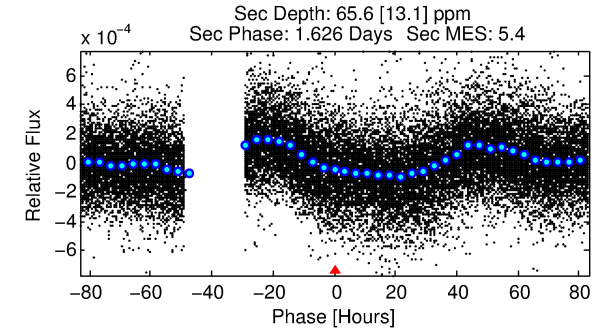
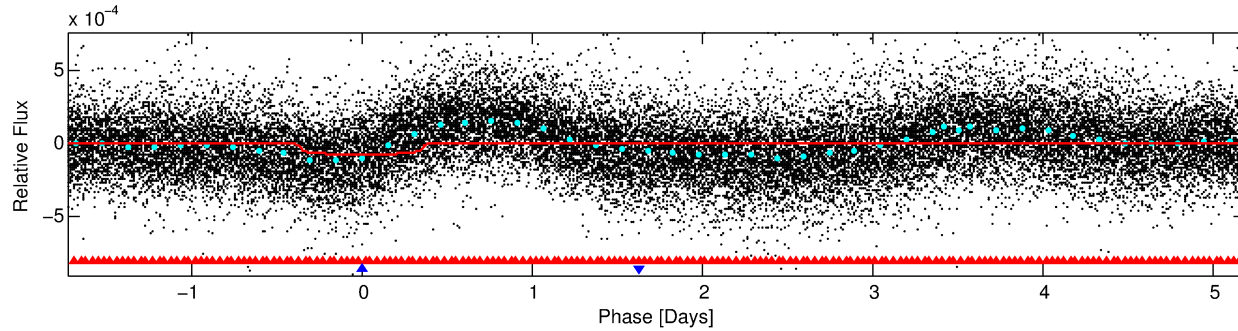
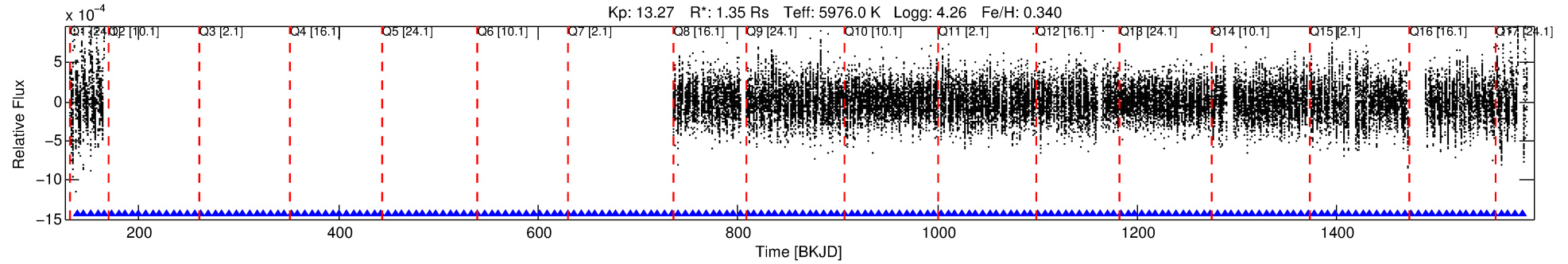
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 008456998-02

No Significant Match Found

DV One-Page Summary

KIC: 8456998 Candidate: 2 of 2 Period: 6.925 d



DV Fit Results:

Period = 6.92473 [0.00014] d
Epoch = 138.0956 [0.0185] BKJD
Rp/R* = 0.0092 [0.0010]
a/R* = 1.62 [0.43]
b = 0.90 [0.09]
Seff = 364.56 [143.17]
Teff = 1114 [109] K
Rp = 1.35 [0.44] Re
a = 0.0756 [0.0192] AU
Ag = 112.64 [52.25] [2.14σ]
Teffp = 5612 [464] K [9.44σ]

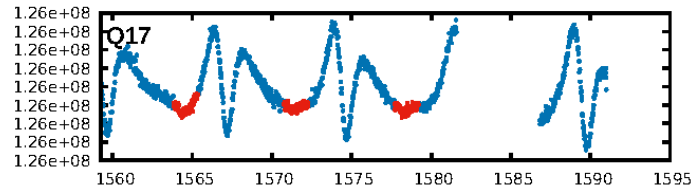
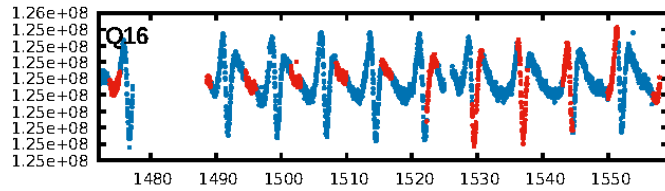
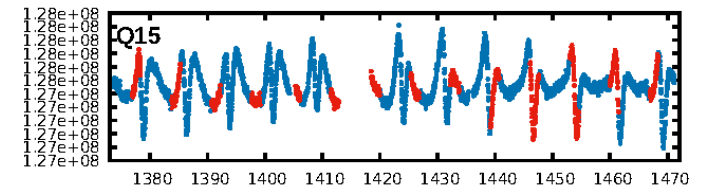
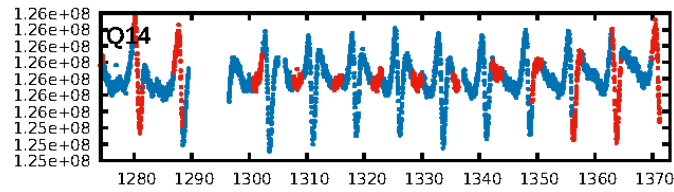
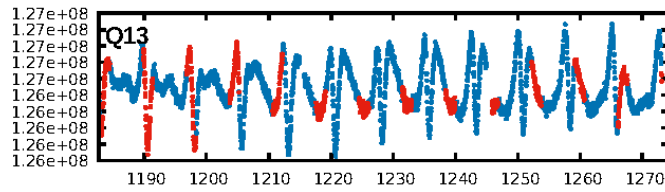
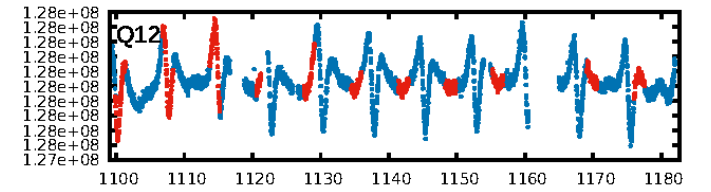
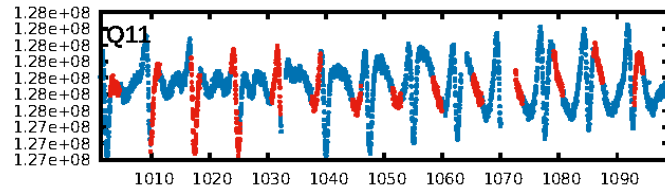
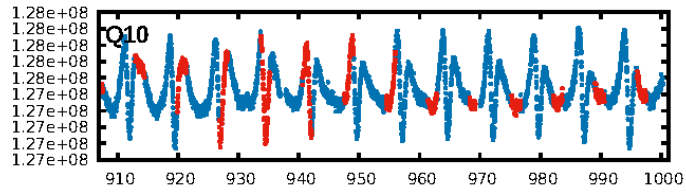
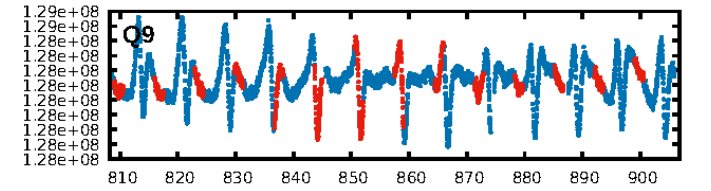
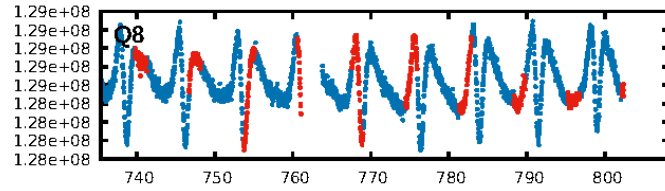
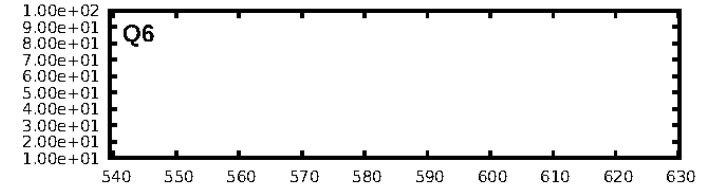
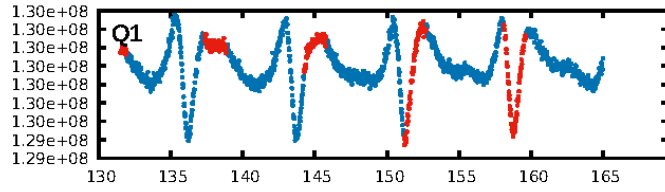
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 50.2% [0.68σ]
ModelChiSquare2-sig: 99.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 5.81e-19
RollingBand-fgt: 1.00 [102/102]
GhostDiagnostic-chr: 1.103
Centroid-sig: 0.3%
Centroid-so: 1.045 arcsec [1.73σ]
OotOffset-rm: 0.079 arcsec [0.28σ]
KicOffset-rm: 0.089 arcsec [0.22σ]
OotOffset-st: 2/2/3/3 [10]
KicOffset-st: 2/2/3/3 [10]
DiffImageQuality-fgm: 0.80 [8/10]
DiffImageOverlap-fno: 1.00 [11/11]

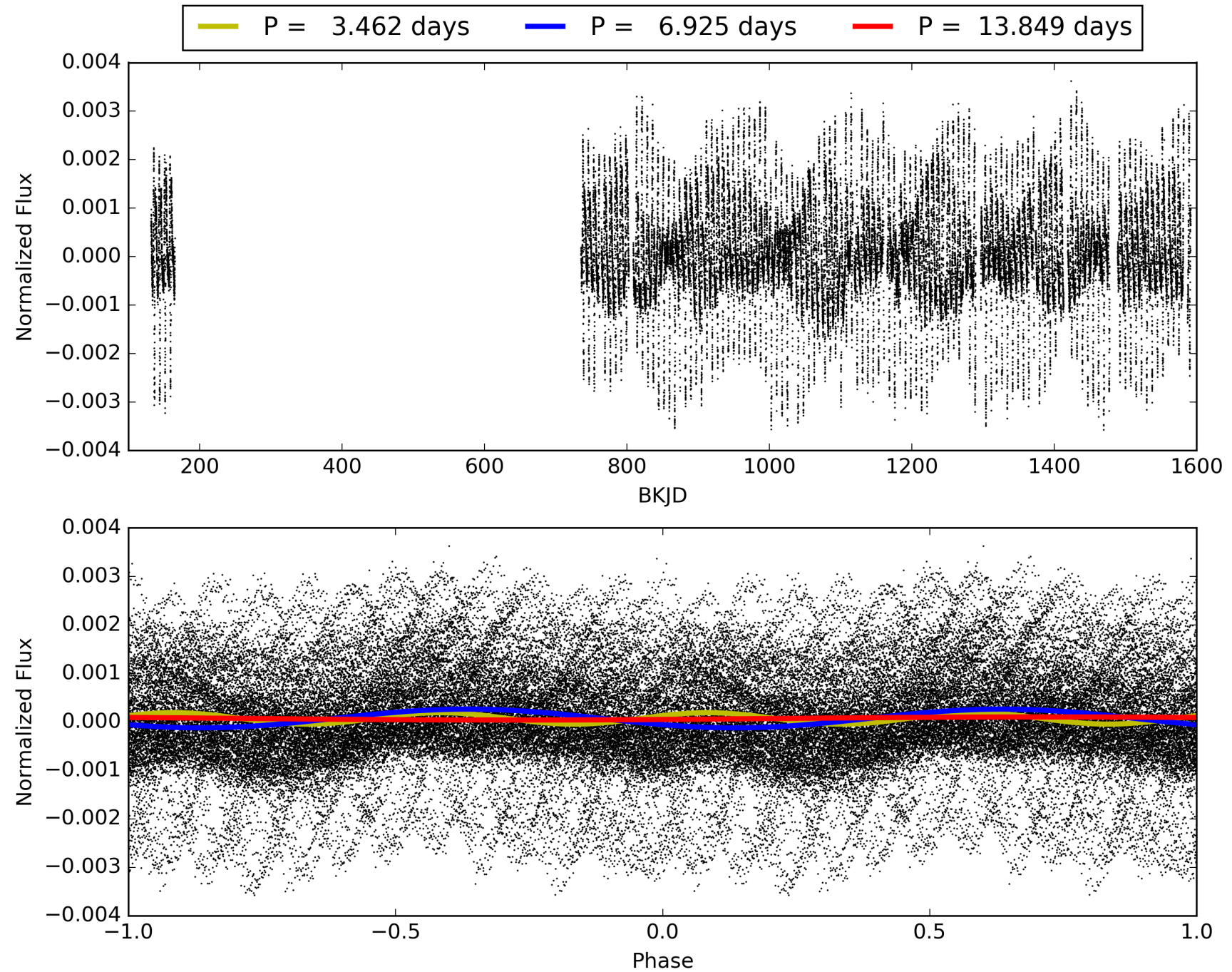
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 20:25:21 Z

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

TCE 008456998-02, PDC Light Curves

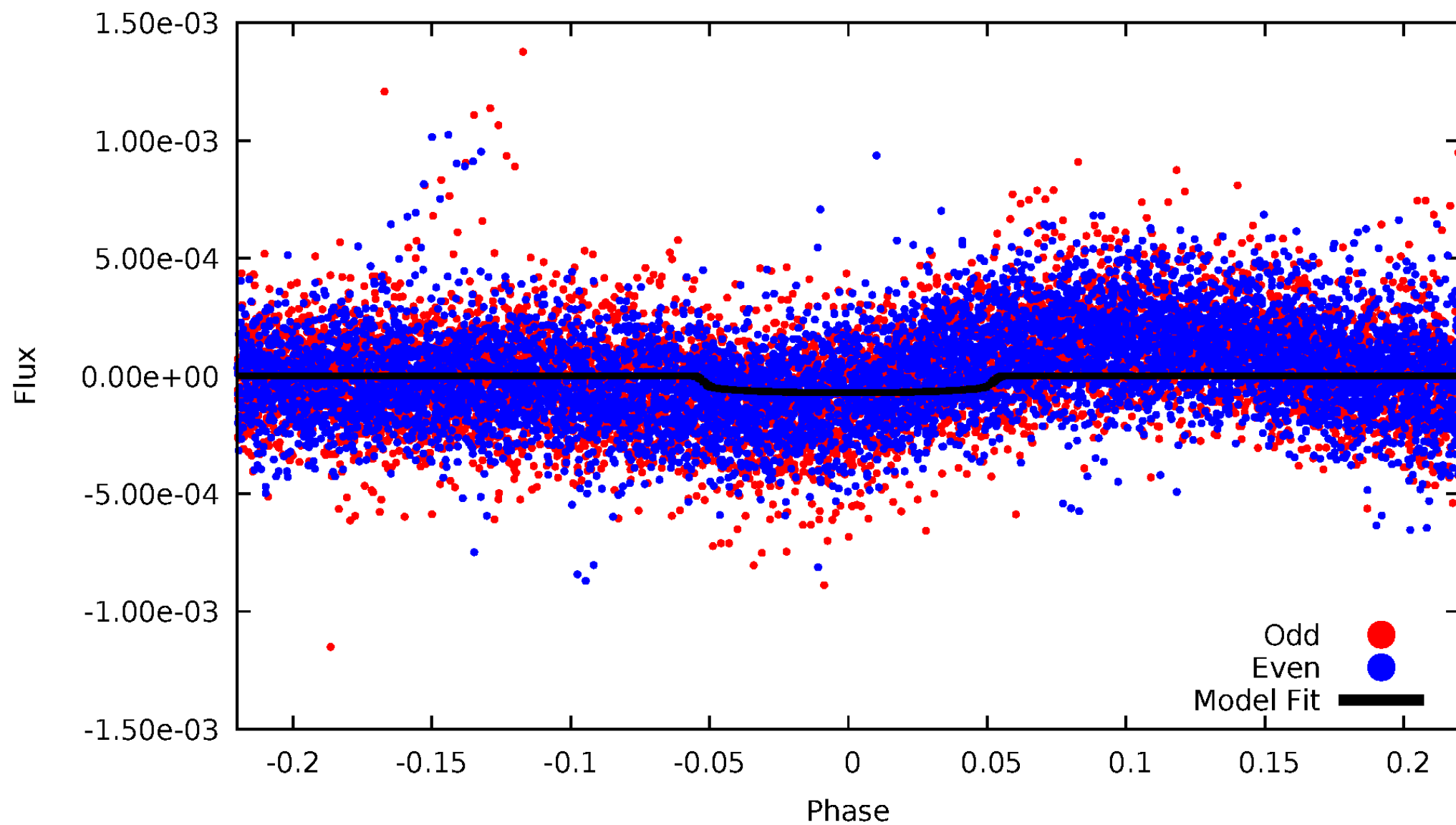


TCE 008456998-02



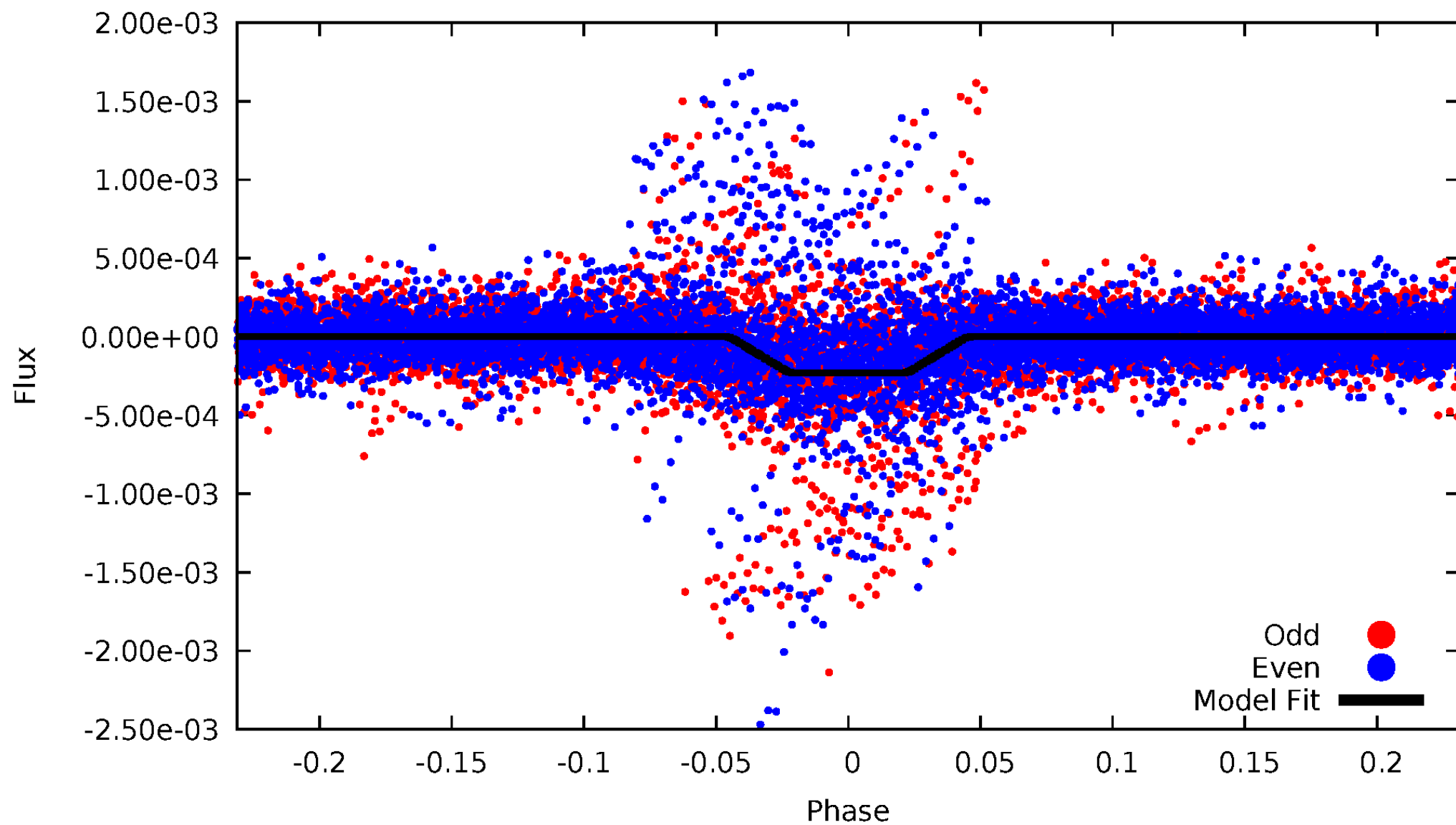
DV Odd/Even

TCE 008456998-02



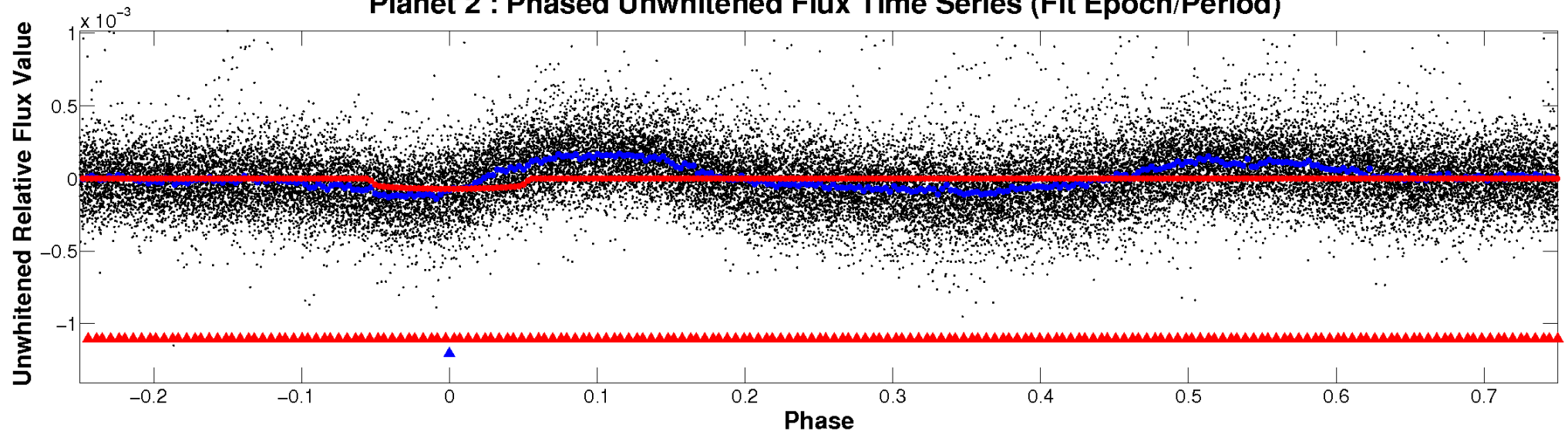
ALT Odd/Even

TCE 008456998-02

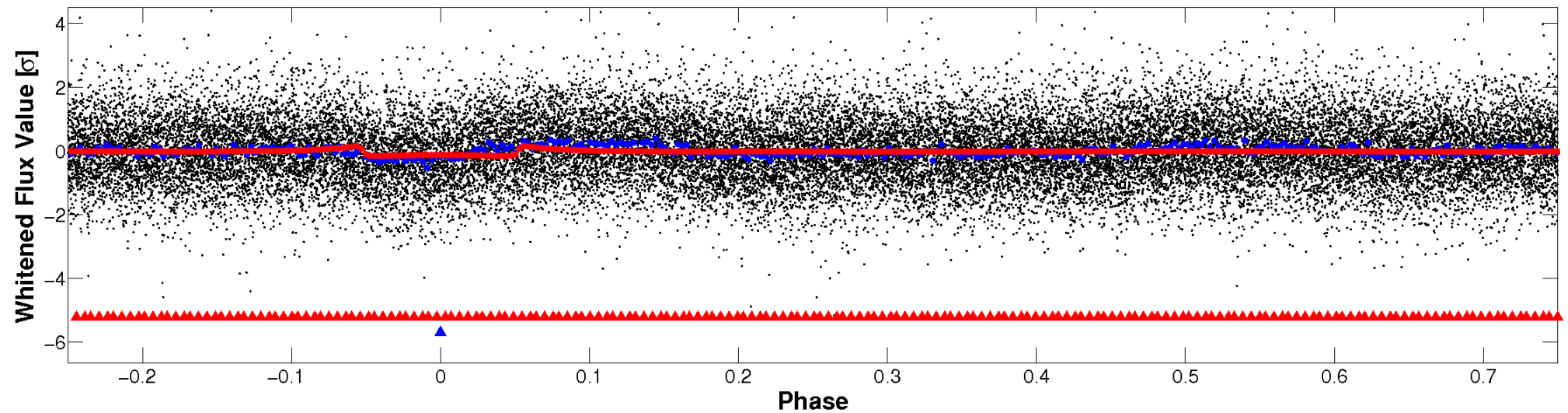


Non-Whitened Vs. Whitened Light Curve

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

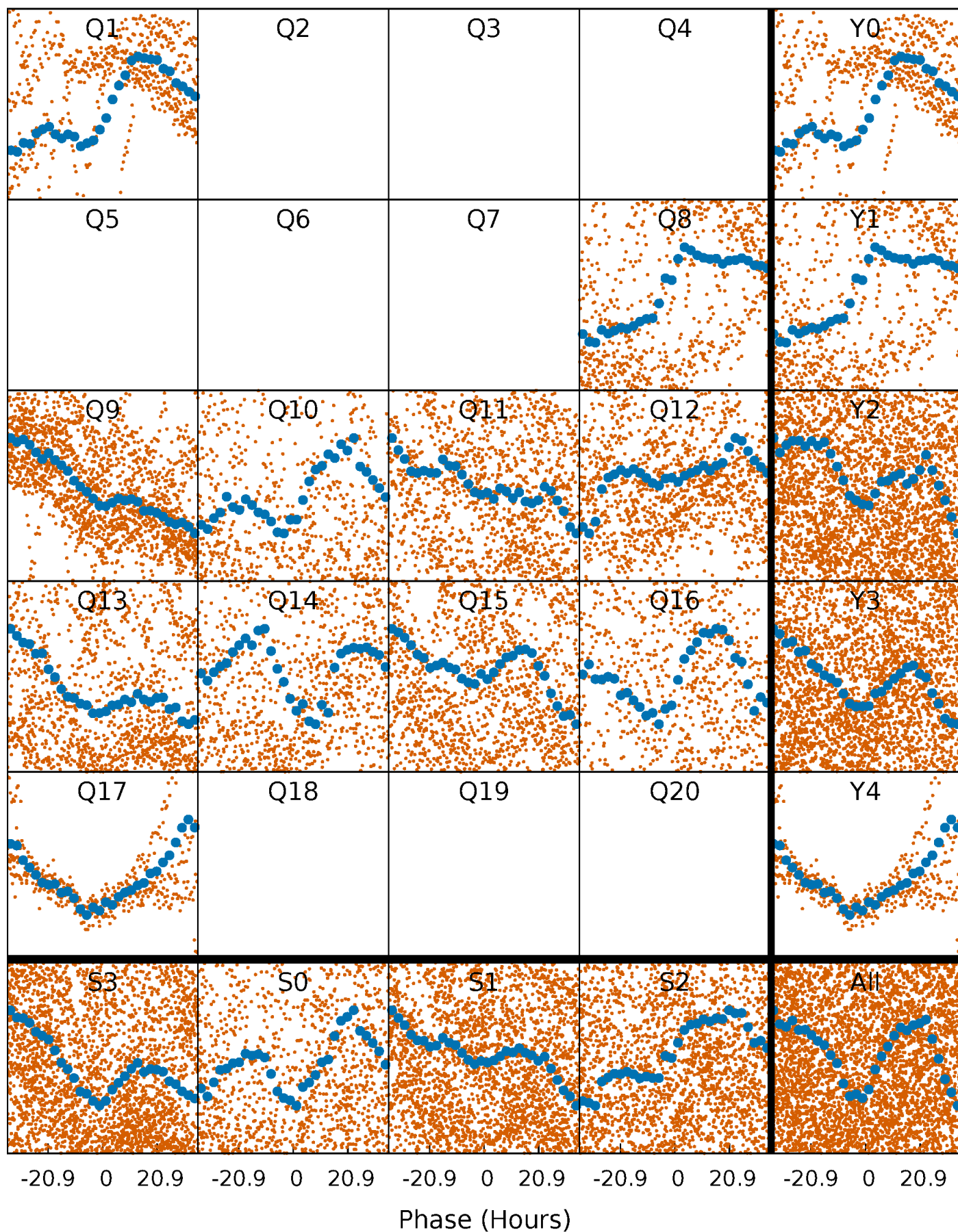


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



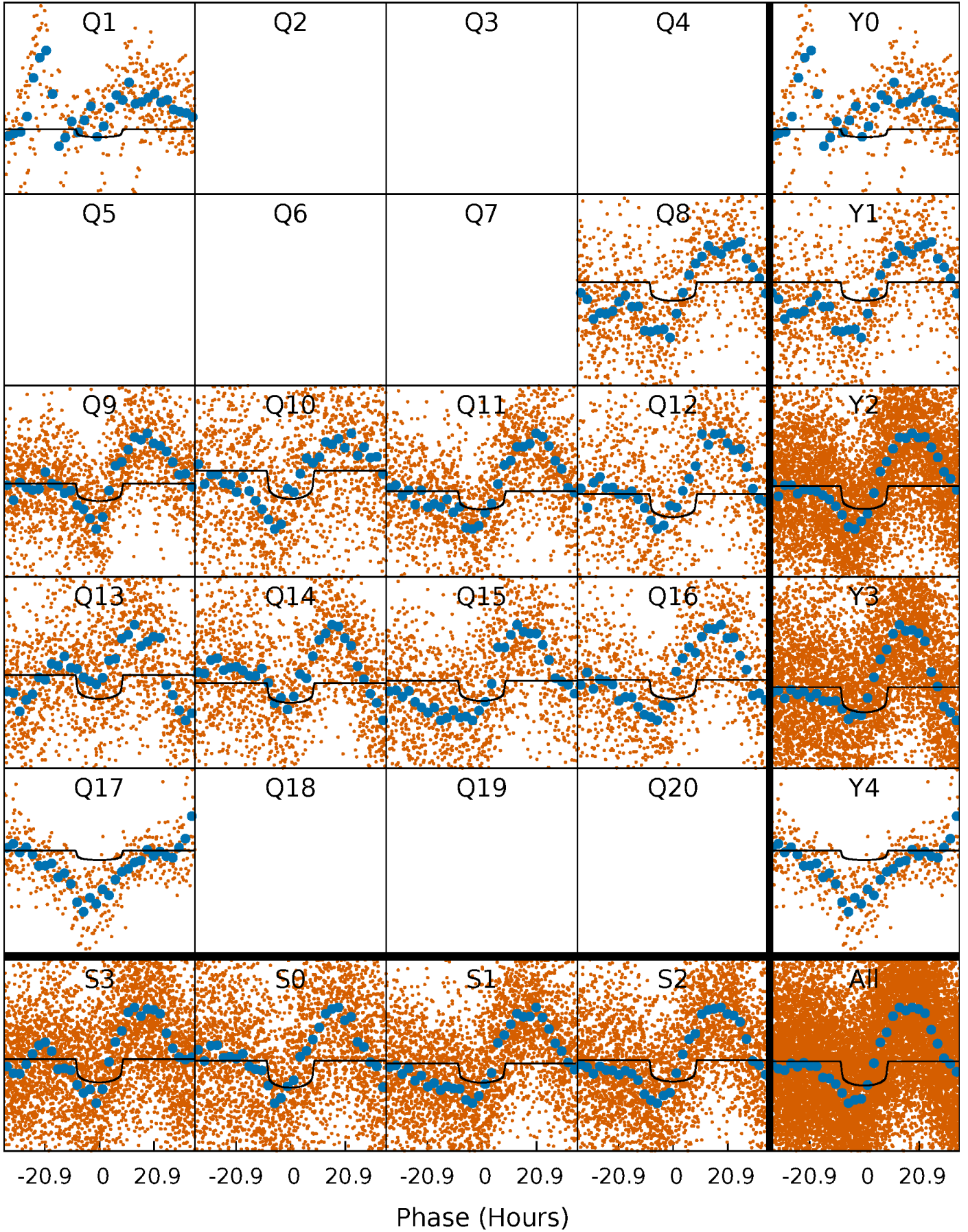
PDC Quarter-Phased Transit Curves

TCE 008456998-02 P= 6.924731 Days $T_0=138.095600$ (BKJD)



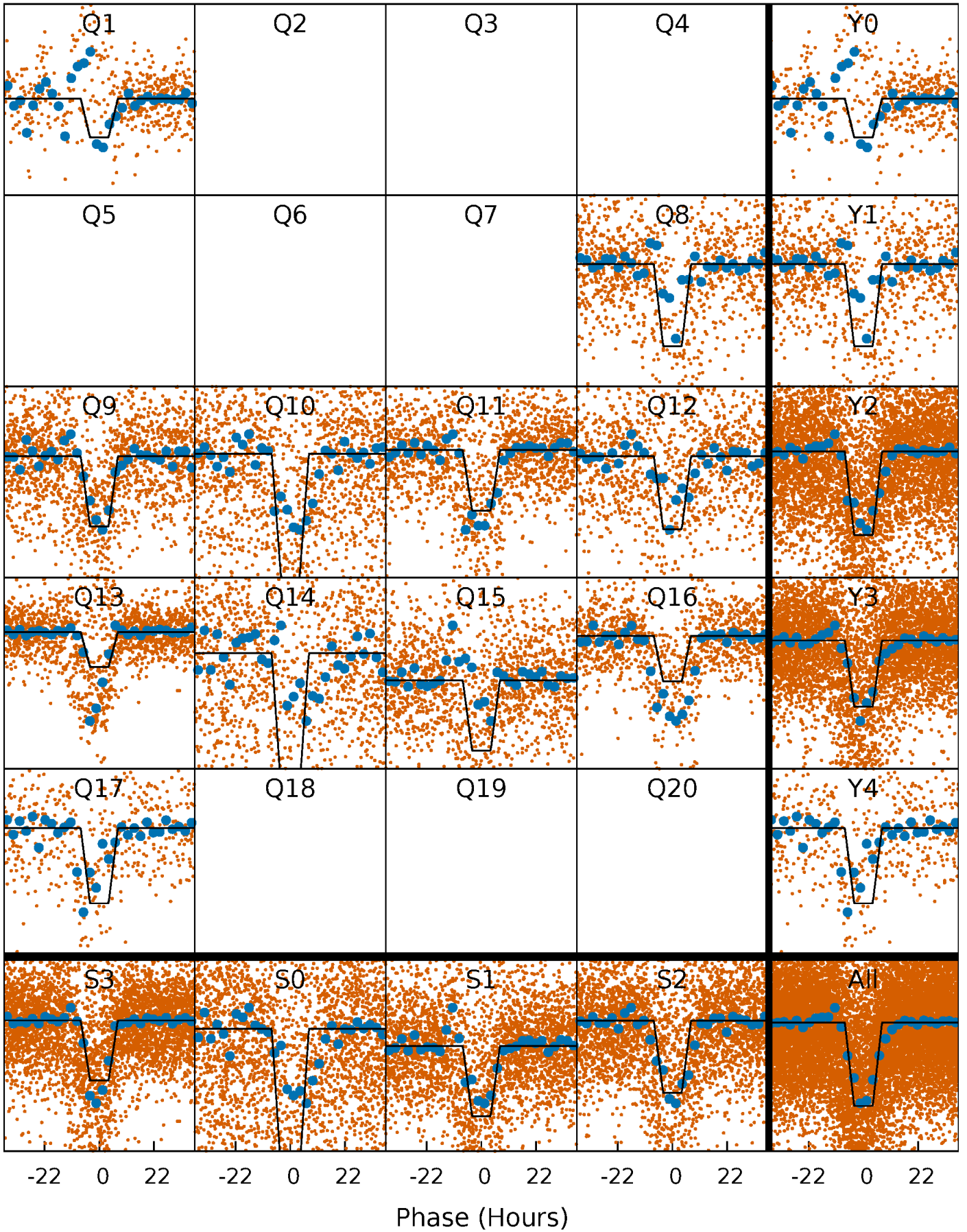
DV Quarter-Phased Transit Curves

TCE 008456998-02 $P = 6.924731$ Days $T_0 = 138.095600$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

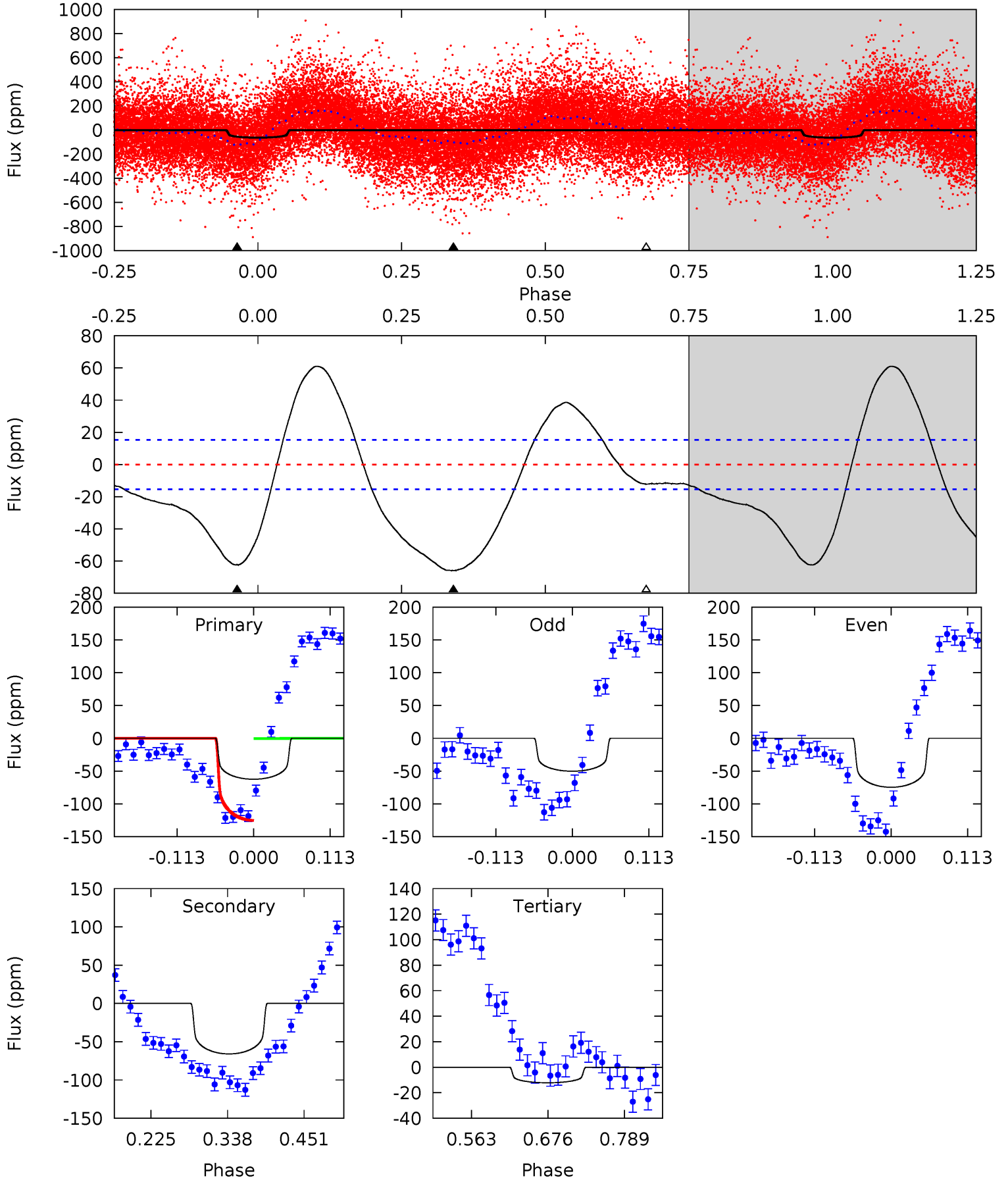
TCE 008456998-02 P= 6.924636 Days $T_0=138.092955$ (BKJD)



DV Model-Shift Uniqueness Test

008456998-02, P = 6.924731 Days, E = 131.170869 Days

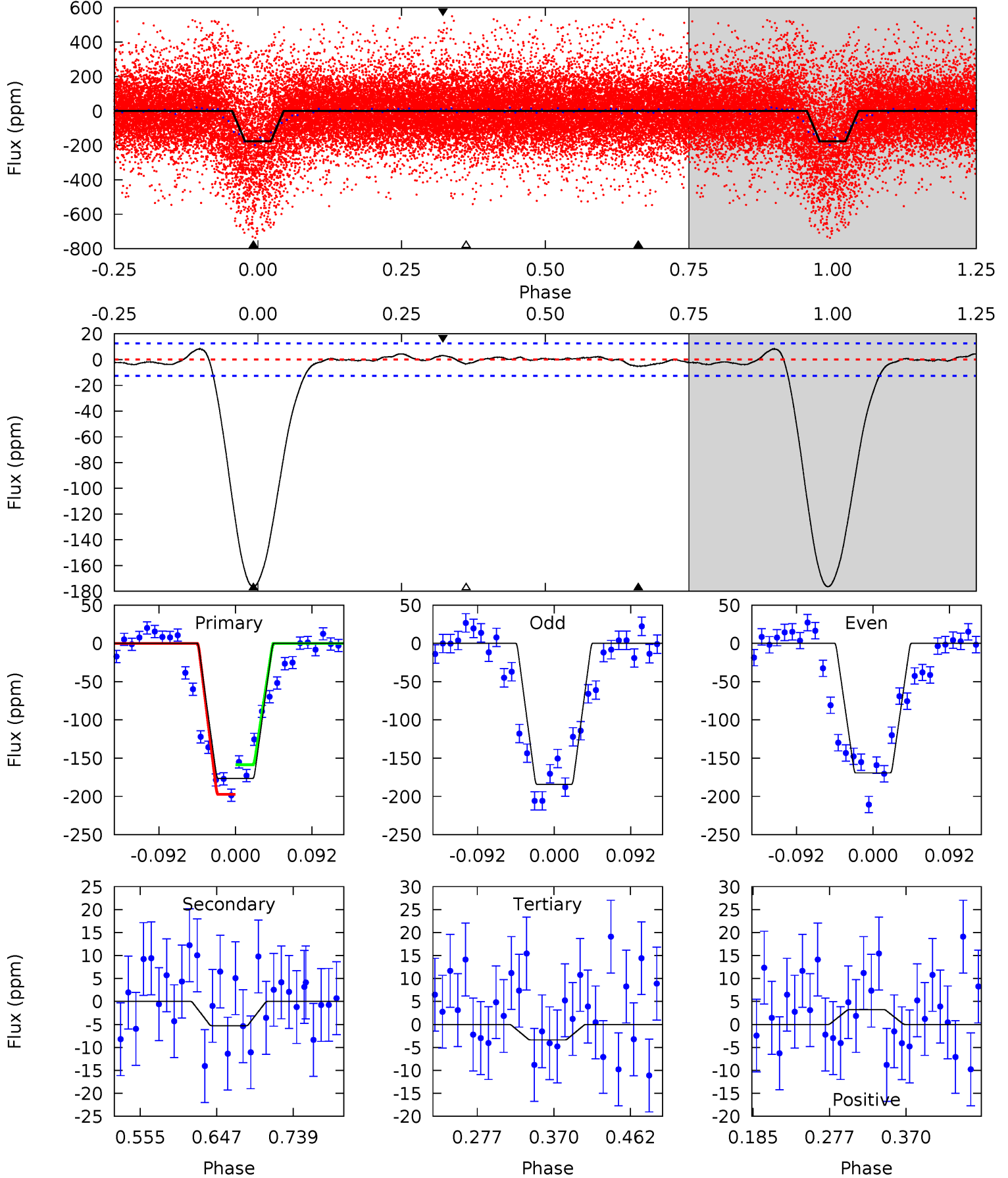
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	19.5	3.59	0	4.54	1.59	7.83	14.8	18.4	15.9	19.5	3.63	1.14	0.48	18.8



Alt Model-Shift Uniqueness Test

008456998-02, P = 6.924636 Days, E = 131.168319 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
63.9	1.91	1.22	1.17	4.58	1.68	0.86	62.7	62.8	0.69	0.74	2.69	0.50	0.04	7.00



Stellar Parameters For KIC 008456998

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5976^{+190}_{-232}	$4.257^{+0.158}_{-0.193}$	$0.340^{+0.100}_{-0.300}$	$1.351^{+0.417}_{-0.313}$	$1.202^{+0.147}_{-0.180}$	$0.687^{+0.553}_{-0.357}$
	+3%/-4%	+4%/-5%	+29%/-88%	+31%/-23%	+12%/-15%	+81%/-52%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 008456998-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-66 ± 3	$1.37^{+0.24}_{-0.22}$	1562^{+122}_{-108}	5632^{+388}_{-346}	110^{+46}_{-32}
Alt.	-5 ± 3	$2.26^{+0.38}_{-0.32}$	1563^{+126}_{-113}	2929^{+230}_{-314}	$3.021^{+2.085}_{-1.645}$

T_{max} = Theoretical Maximum Planetary Temperature

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

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

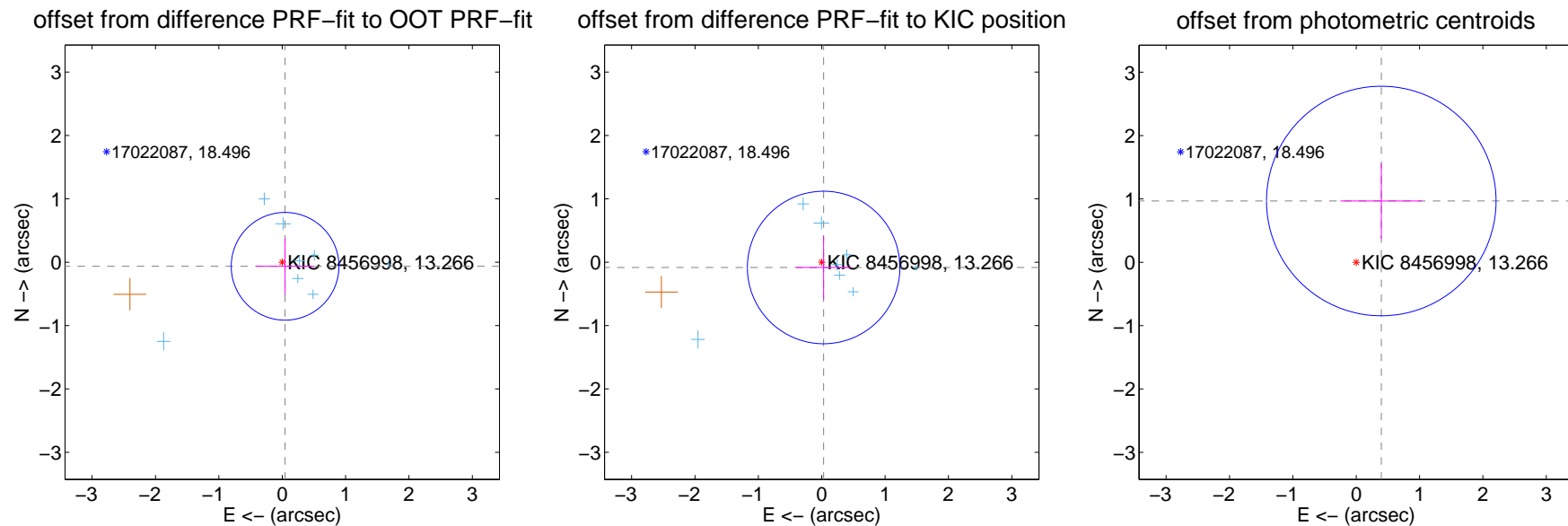
DV Centroid Data

Supplemental centroid analysis for 008456998-02. Kepler magnitude: 13.27. Transit SNR 8.71

There are 8 quarters with good PRF difference image offsets

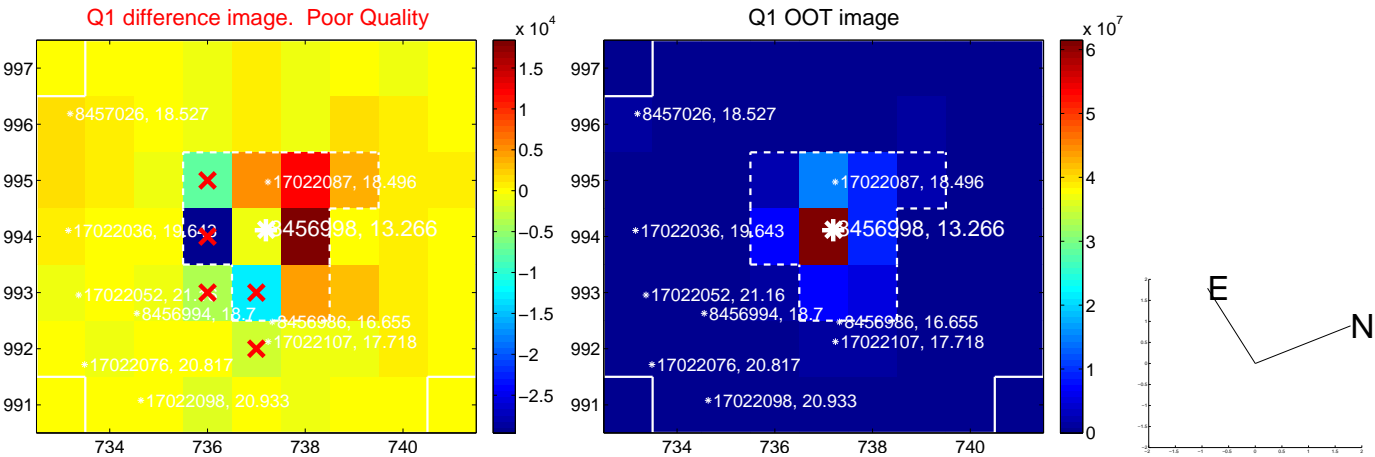
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.079 ± 0.283	0.28	-0.045 ± 0.458	-0.065 ± 0.445
PRF-fit source offset from KIC position	0.089 ± 0.401	0.22	-0.030 ± 0.433	-0.084 ± 0.497
photometric centroid source offset	1.04 ± 0.60	1.73	-0.40 ± 0.64	0.97 ± 0.60

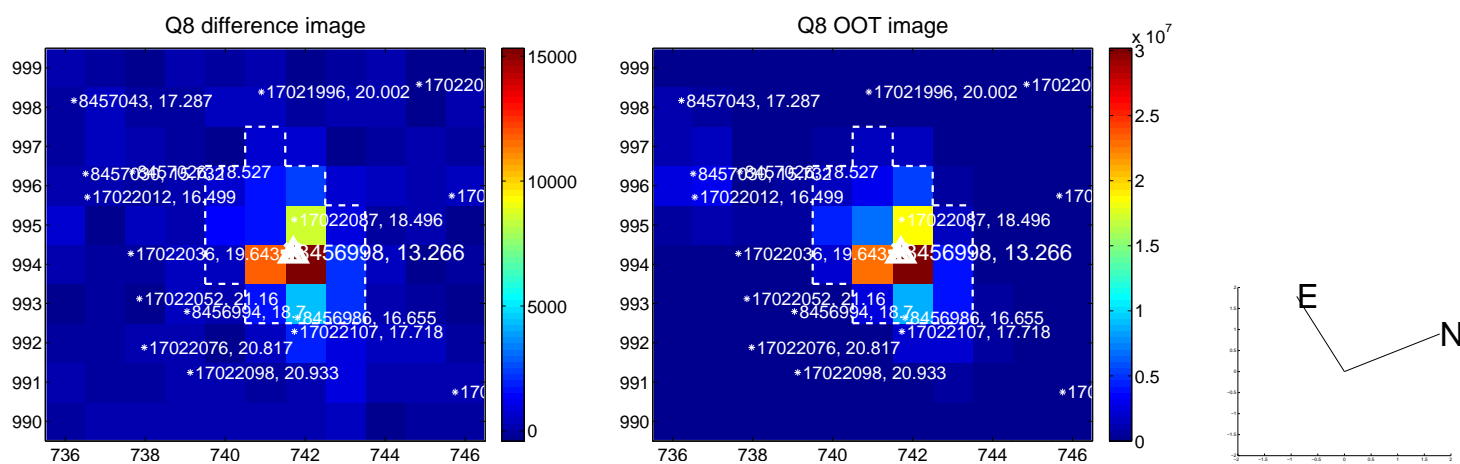
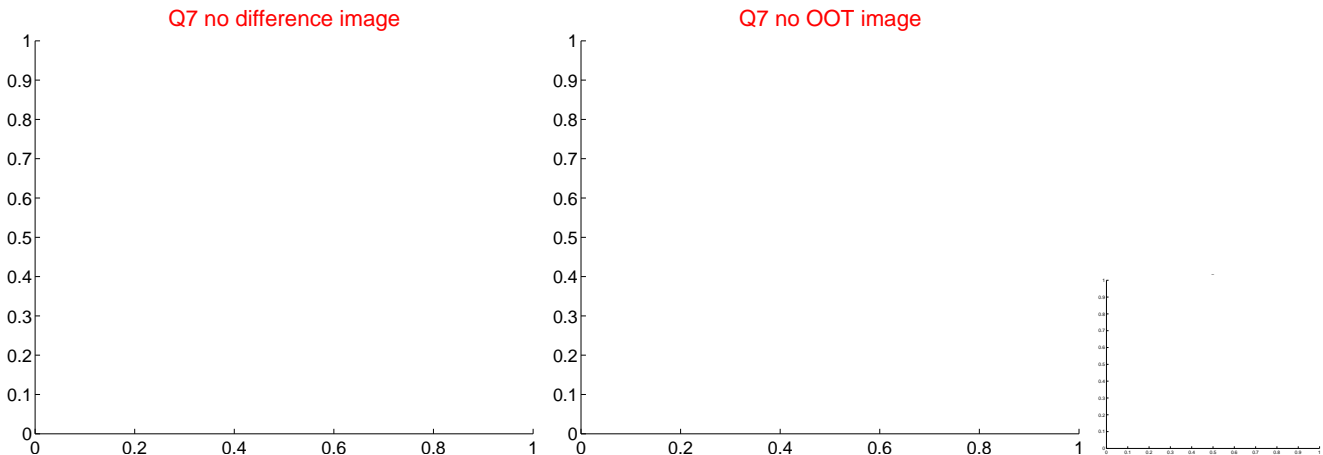
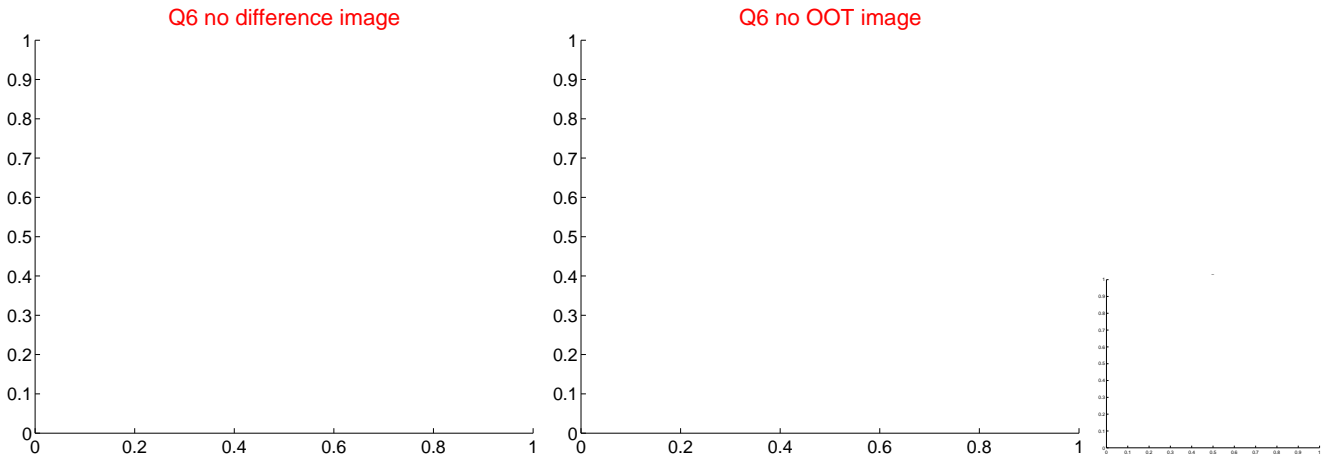
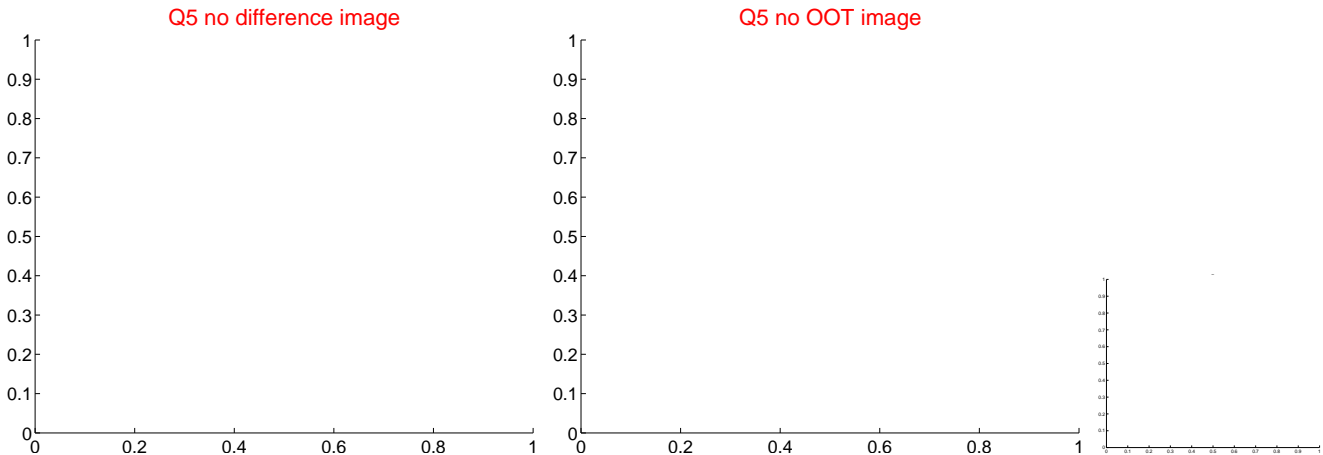


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

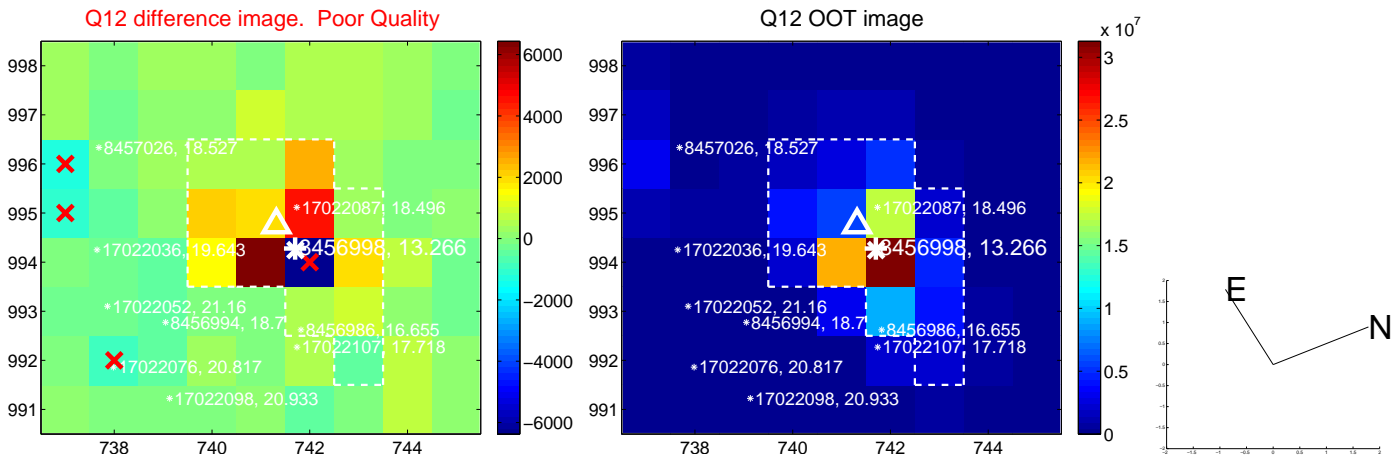
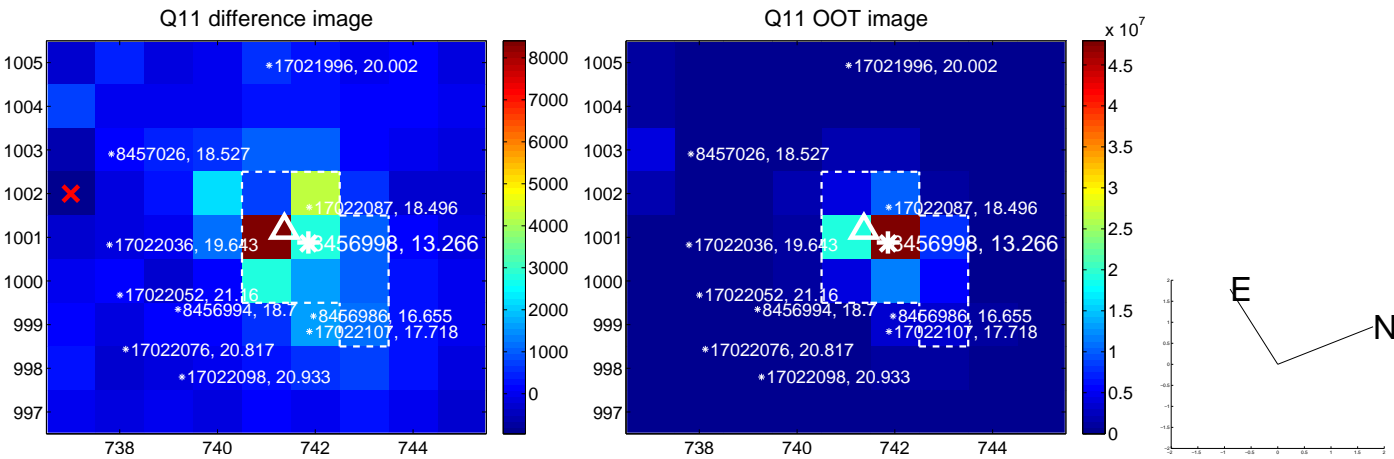
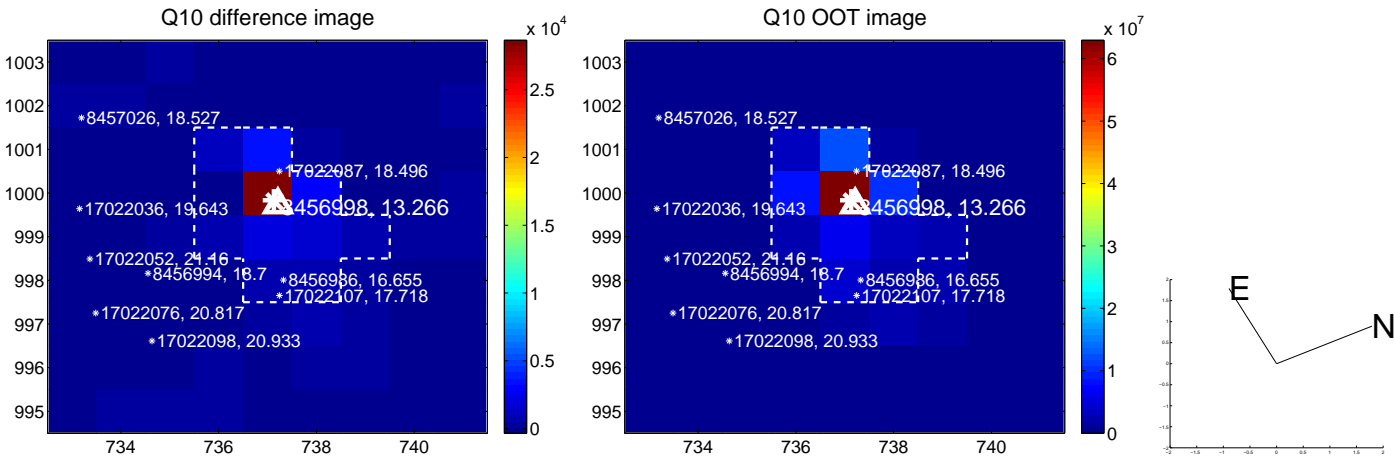
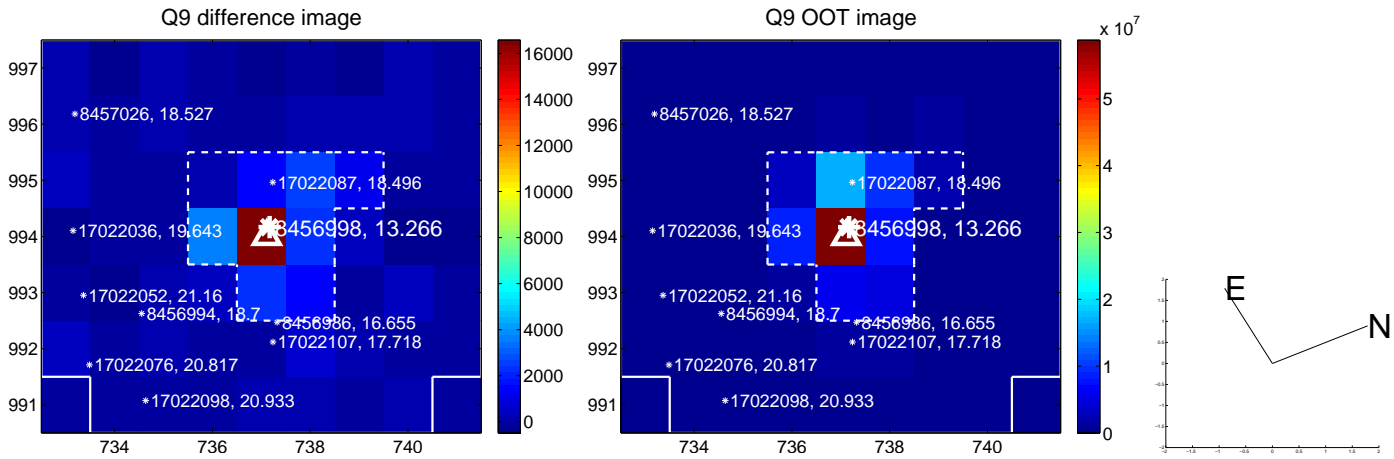
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



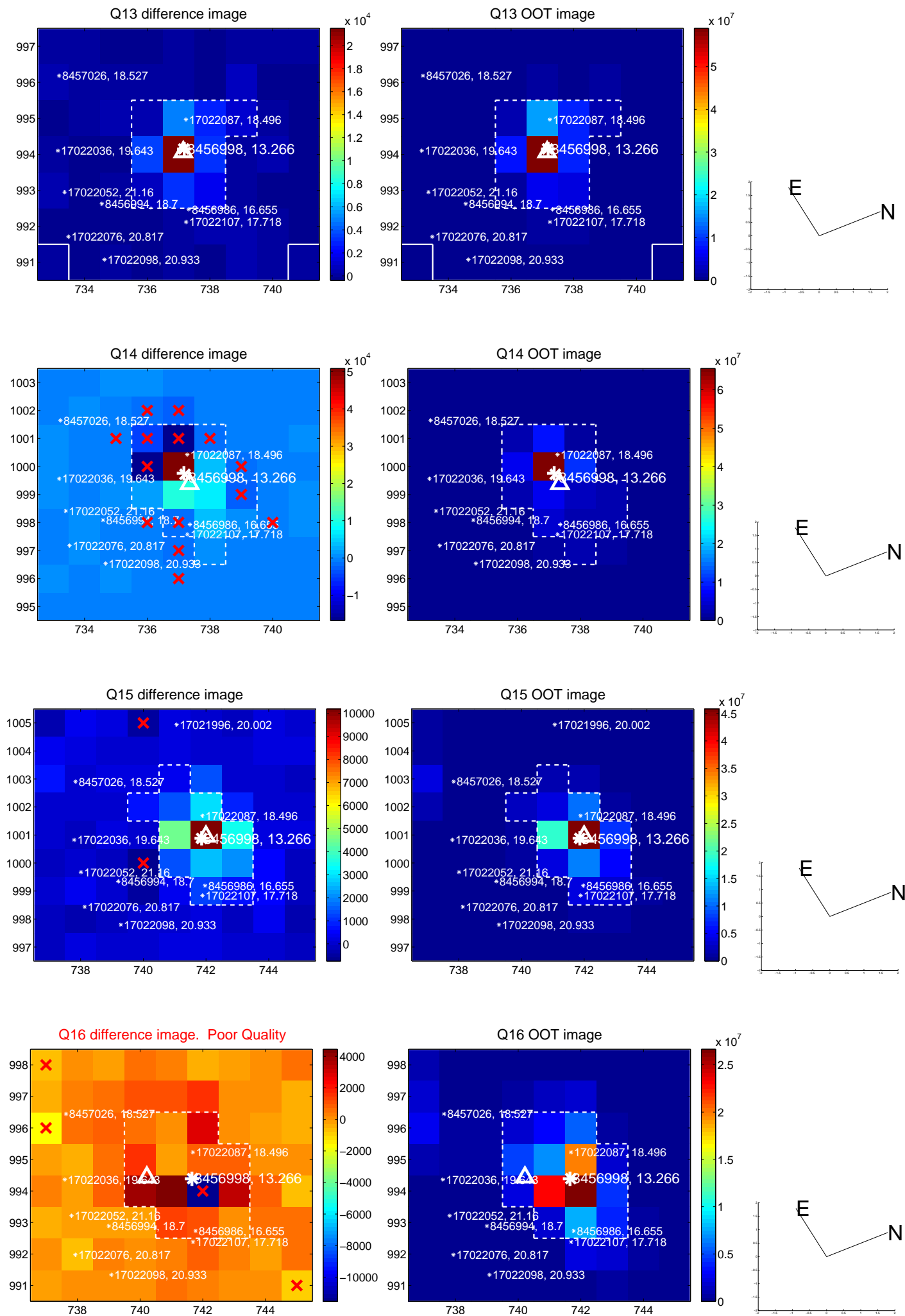
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



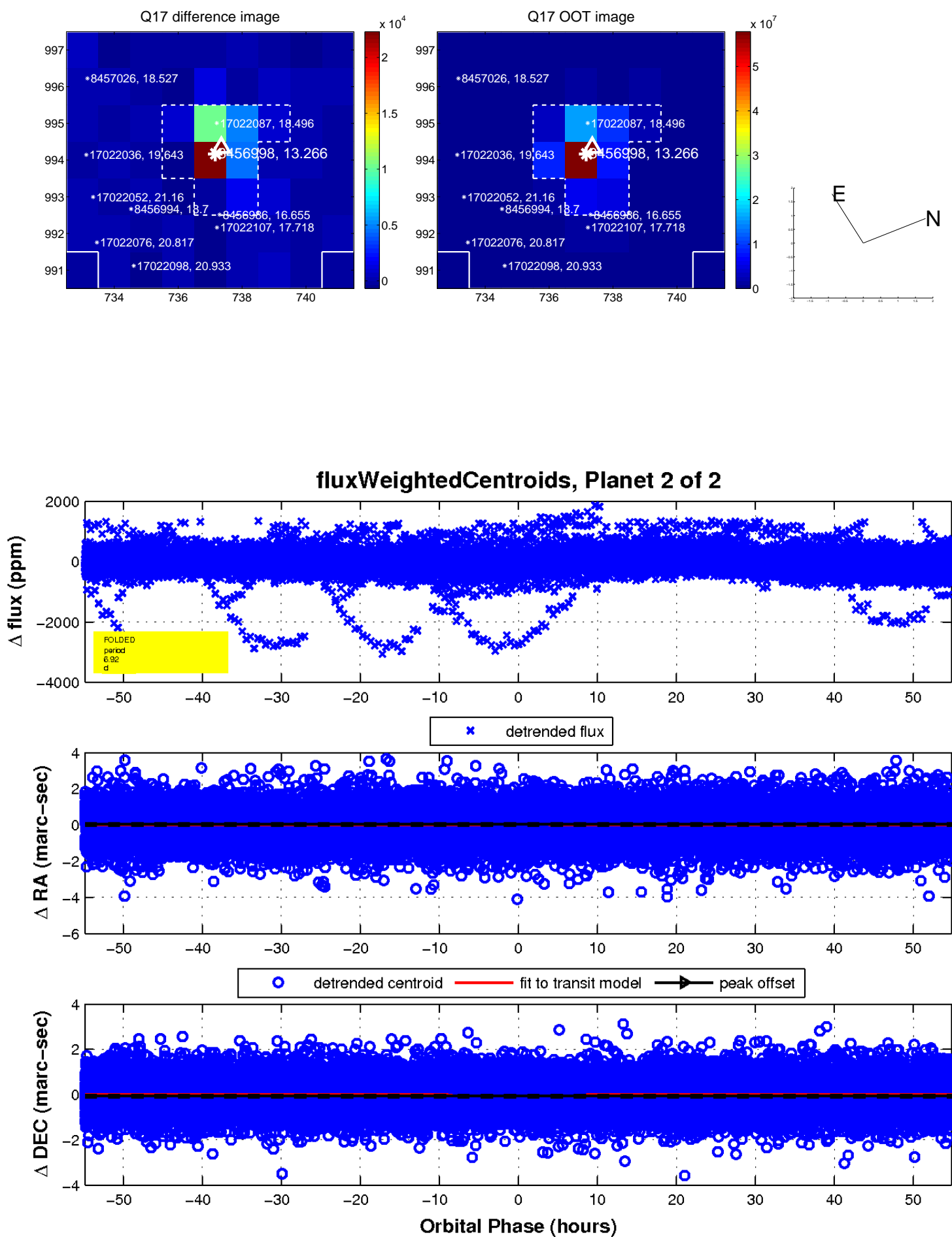
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \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

