

KIC 002157489

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})
002157489-01	OBS	No	1.357347	132.399363	11.7	6.332	12.5	10.8	3.56	7725	1.43	42612.95
002157489-02	OBS	No	477.623388	558.077368	115.9	9.399	7.9	7.6	3.56	7725	4.09	17.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157489-01	OBS	FP	0.00	1	0	0	0	LPP_DV
002157489-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

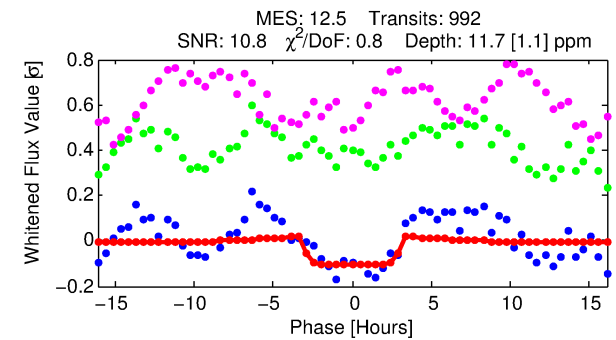
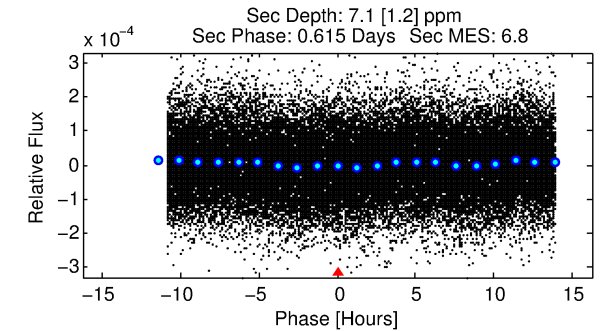
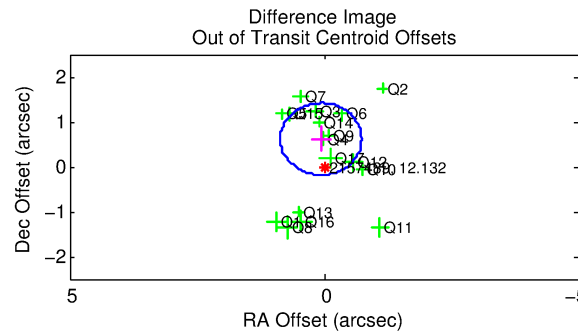
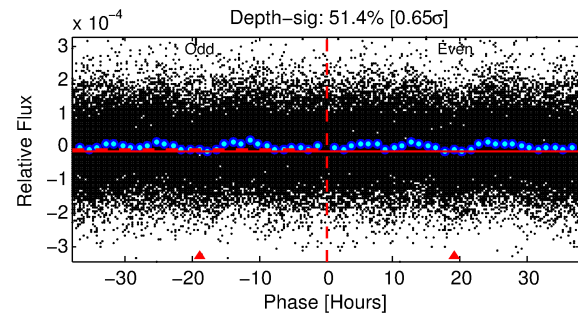
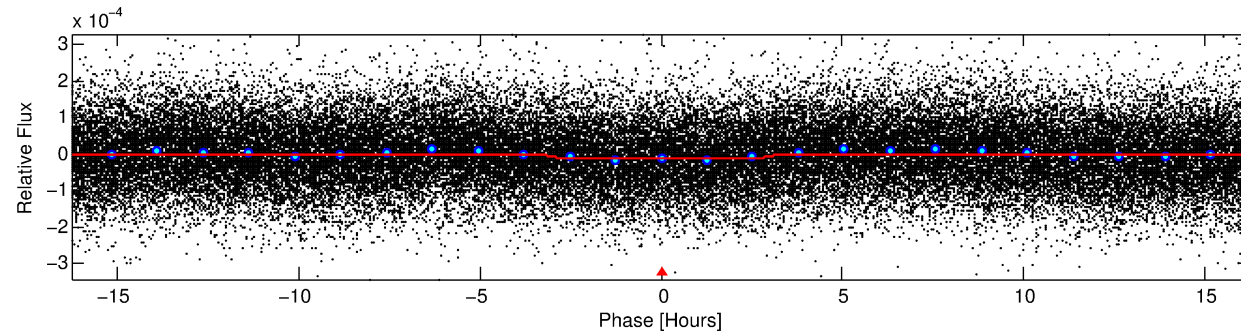
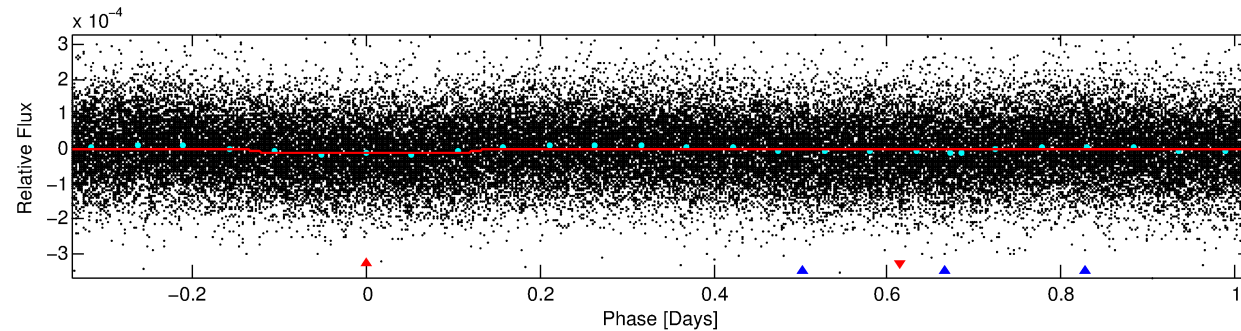
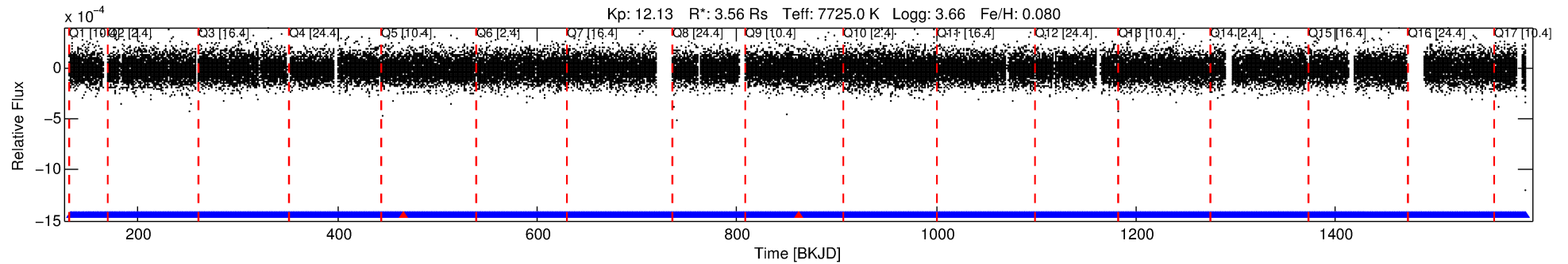
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002157489-01

No Significant Match Found

DV One-Page Summary

KIC: 2157489 Candidate: 1 of 2 Period: 1.357 d



DV Fit Results:

Period = 1.35735 [0.00002] d
Epoch = 132.3994 [0.0050] BKJD
Rp/R* = 0.0037 [0.0010]
a/R* = 1.17 [0.56]
b = 0.91 [0.34]
Seff = 42612.95 [32586.64]
Teq = 3664 [700] K
Rp = 1.43 [0.79] Re
a = 0.0308 [0.0142] AU
Ag = 1.82 [1.72] [0.47 σ]
Teffp = 6576 [1002] K [2.38 σ]

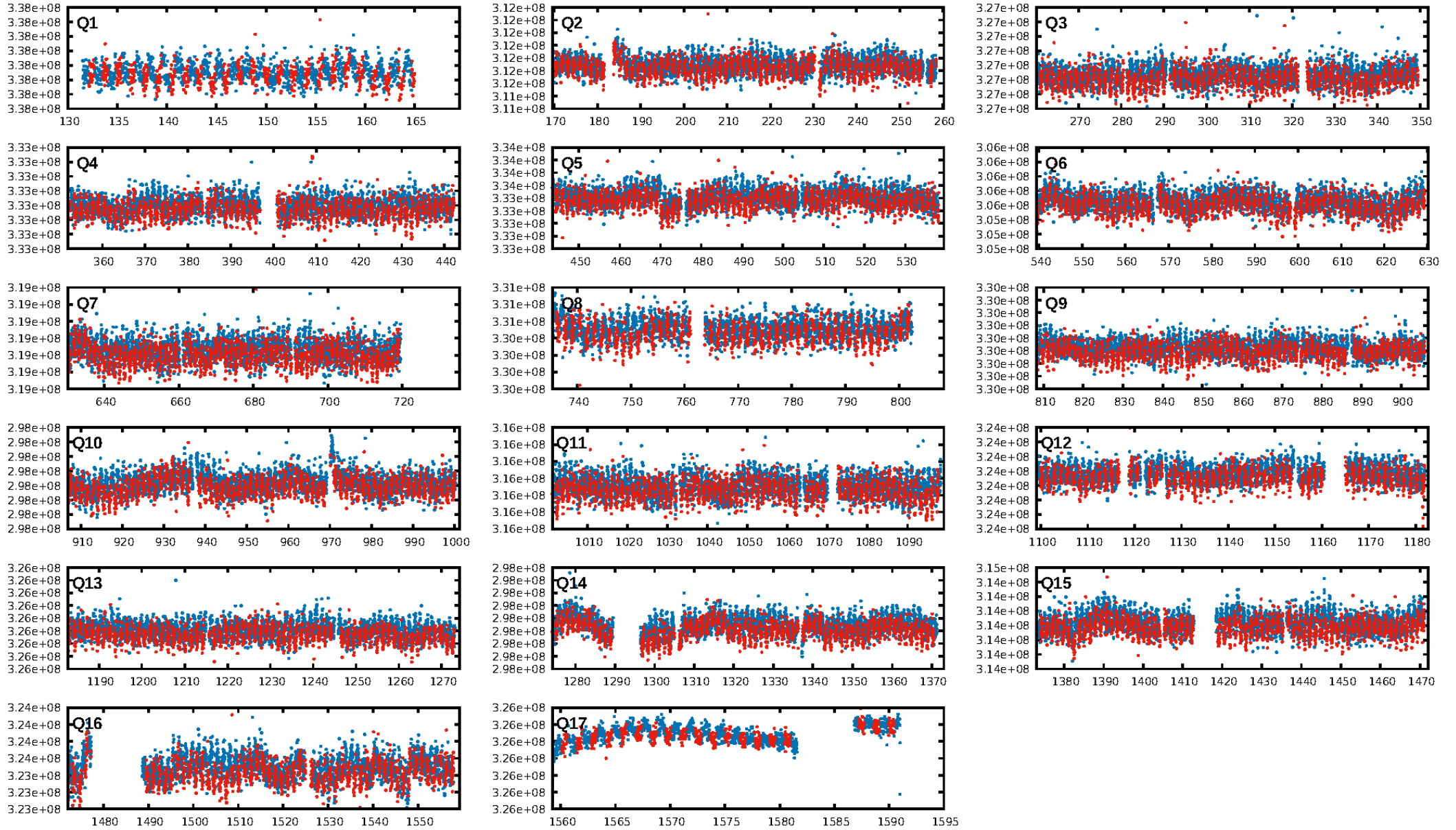
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1008.59 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.92e-26
RollingBand-fgt: 1.00 [946/948]
GhostDiagnostic-chr: 2.125
Centroid-sig: 5.8%
Centroid-so: 1.449 arcsec [1.26 σ]
OotOffset-rm: 0.619 arcsec [2.32 σ]
KicOffset-rm: 0.532 arcsec [1.97 σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

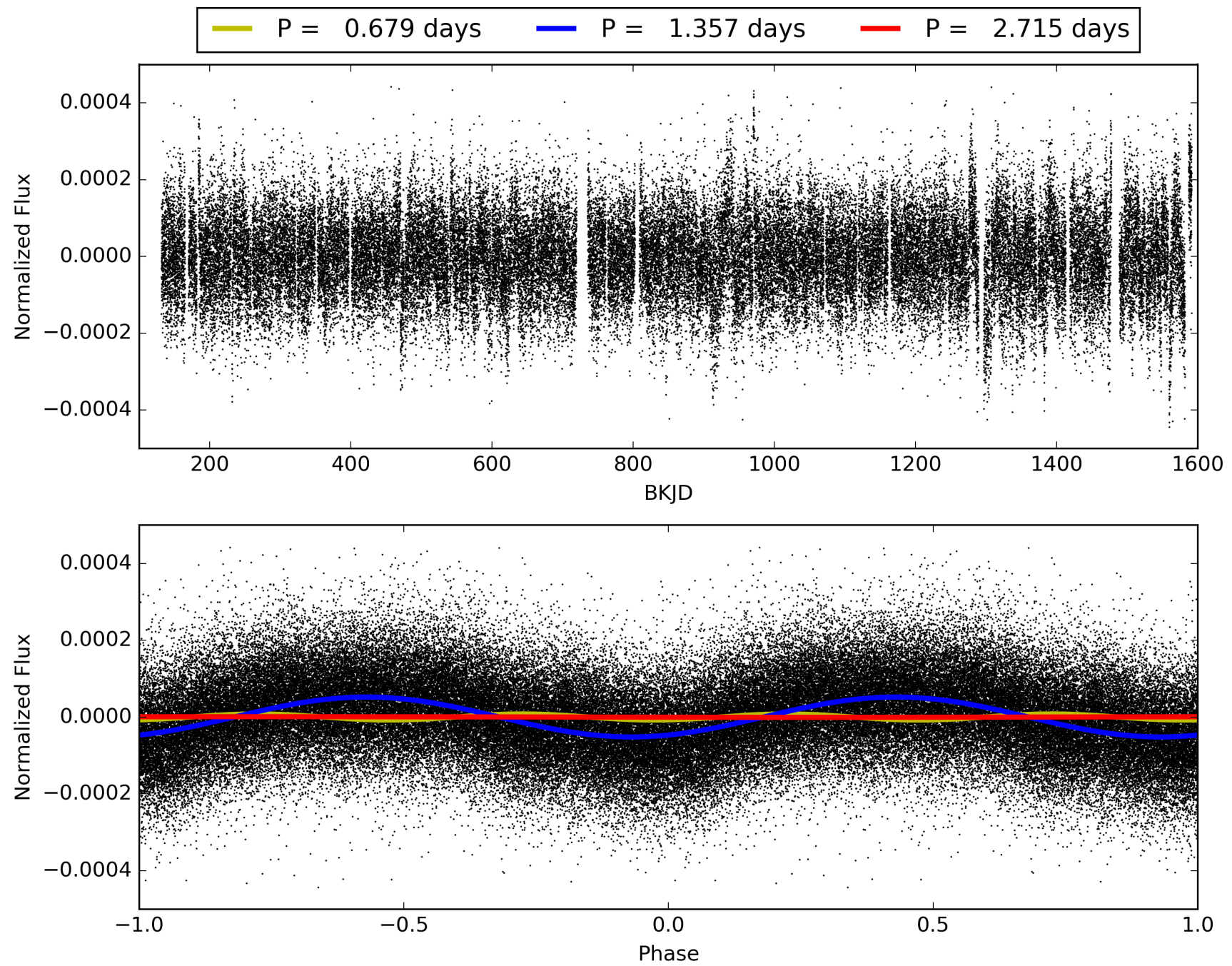
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:07:27 Z

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

TCE 002157489-01, PDC Light Curves

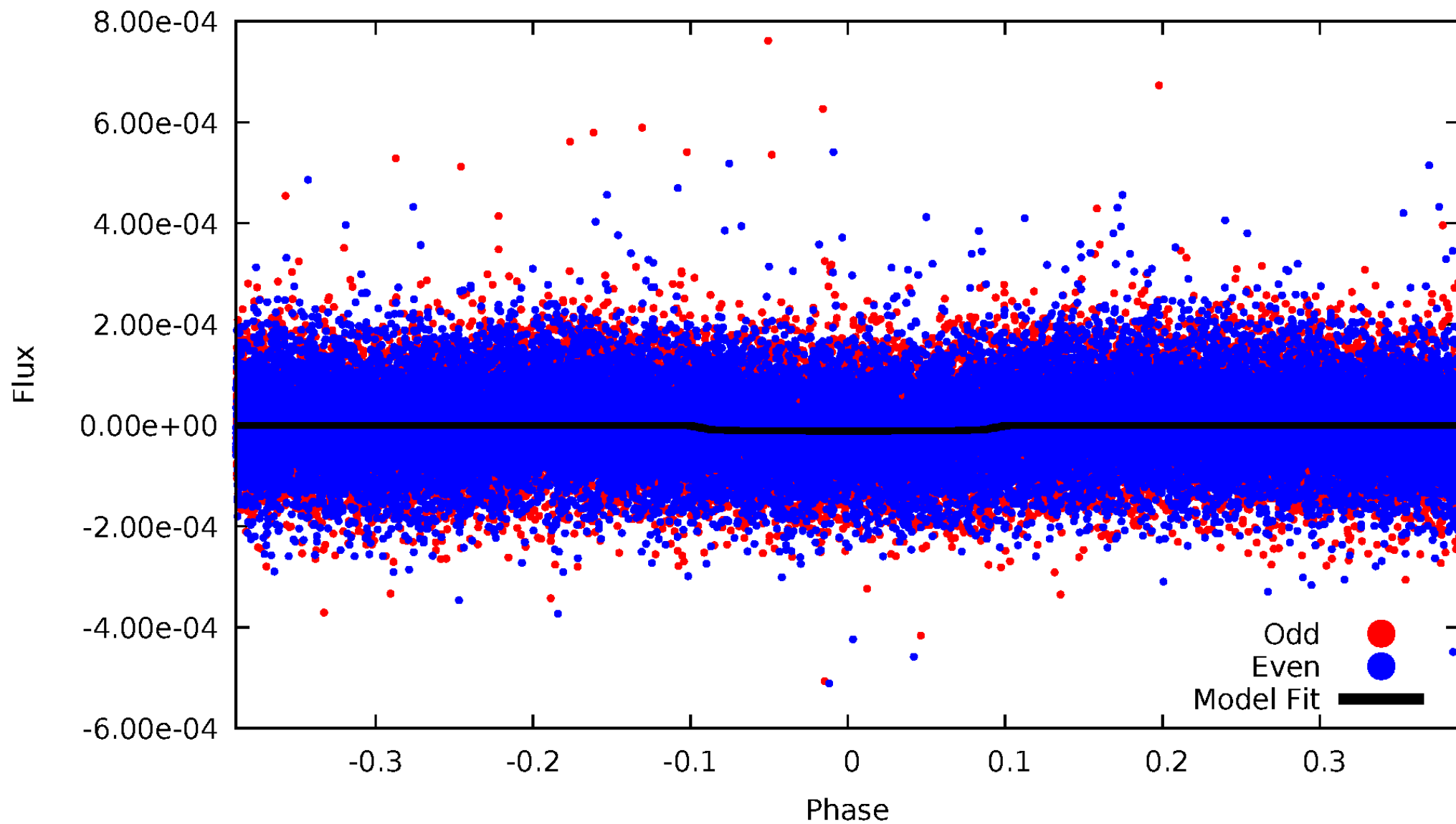


TCE 002157489-01



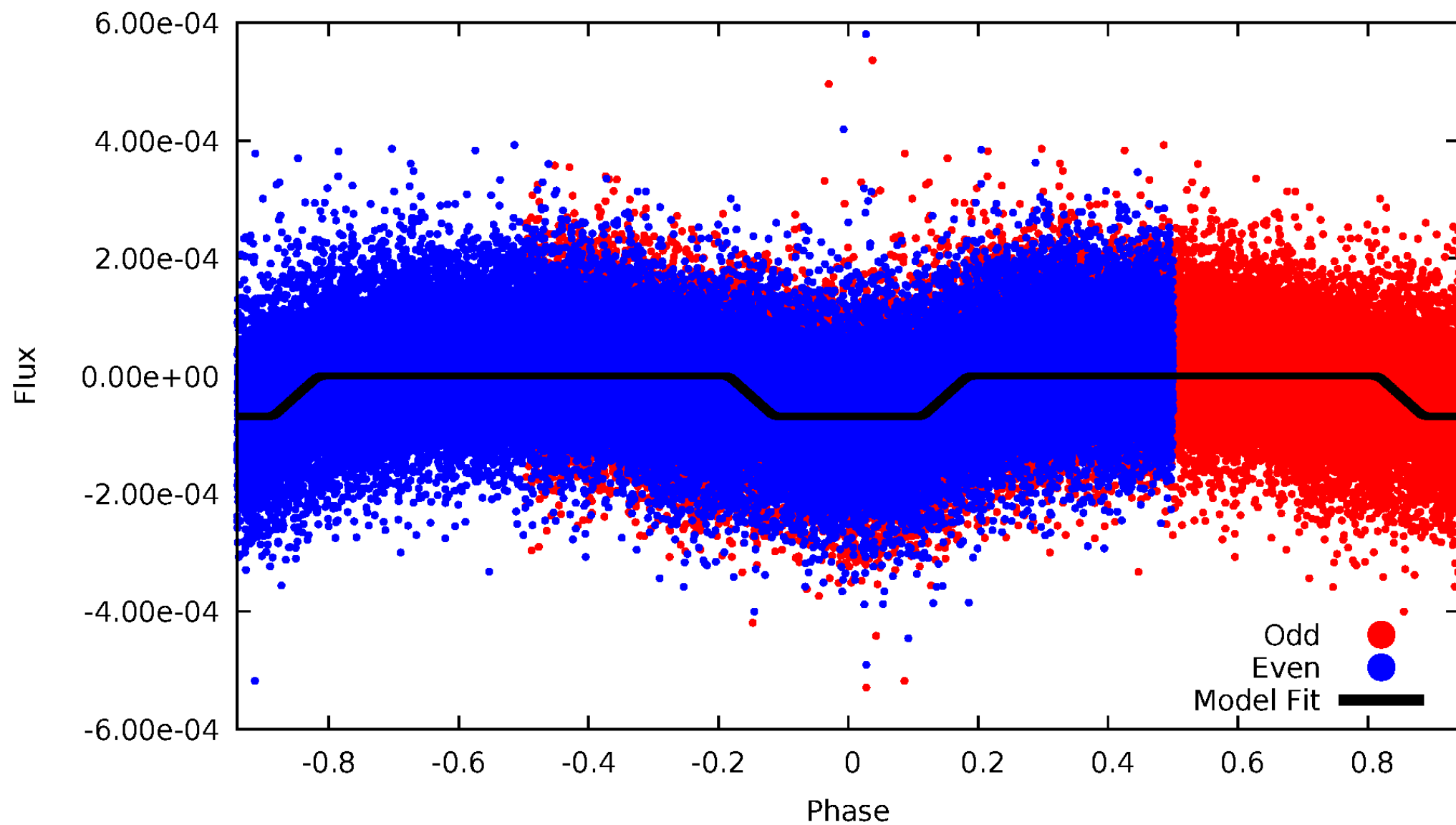
DV Odd/Even

TCE 002157489-01



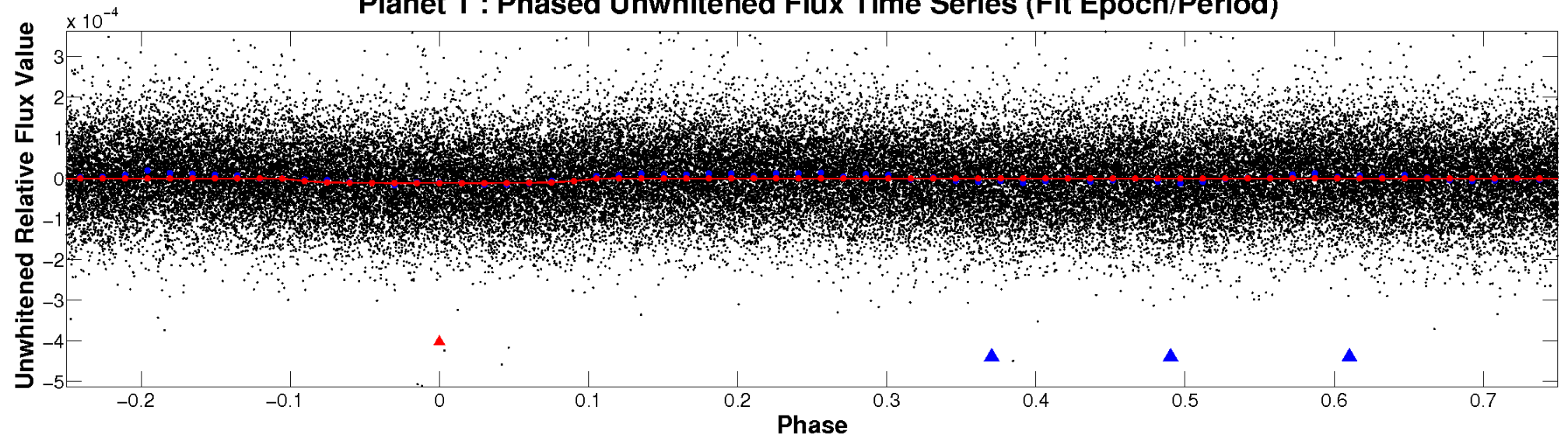
ALT Odd/Even

TCE 002157489-01

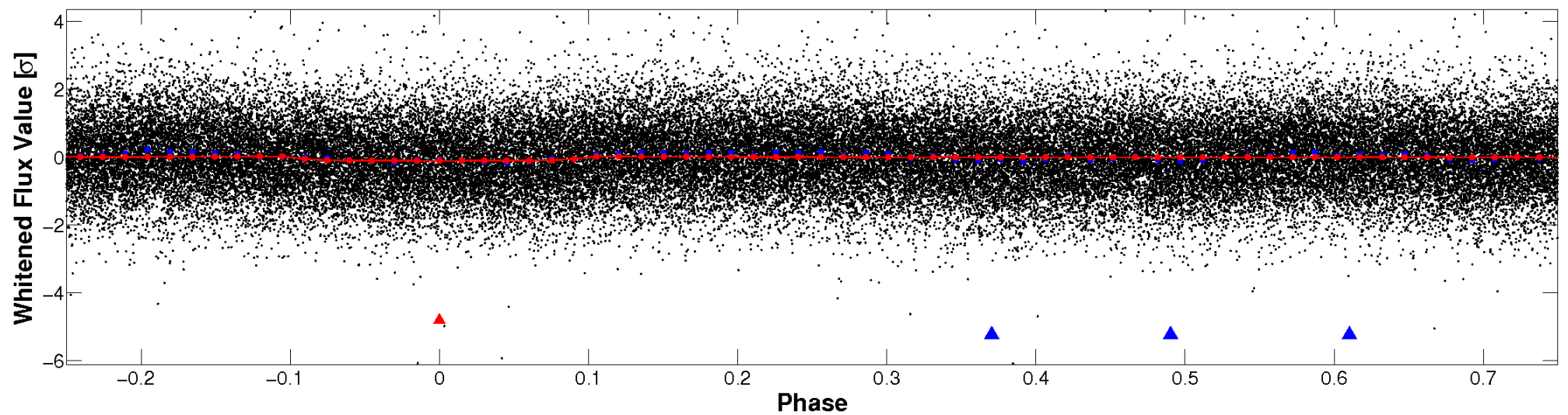


Non-Whitened Vs. Whitened Light Curve

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

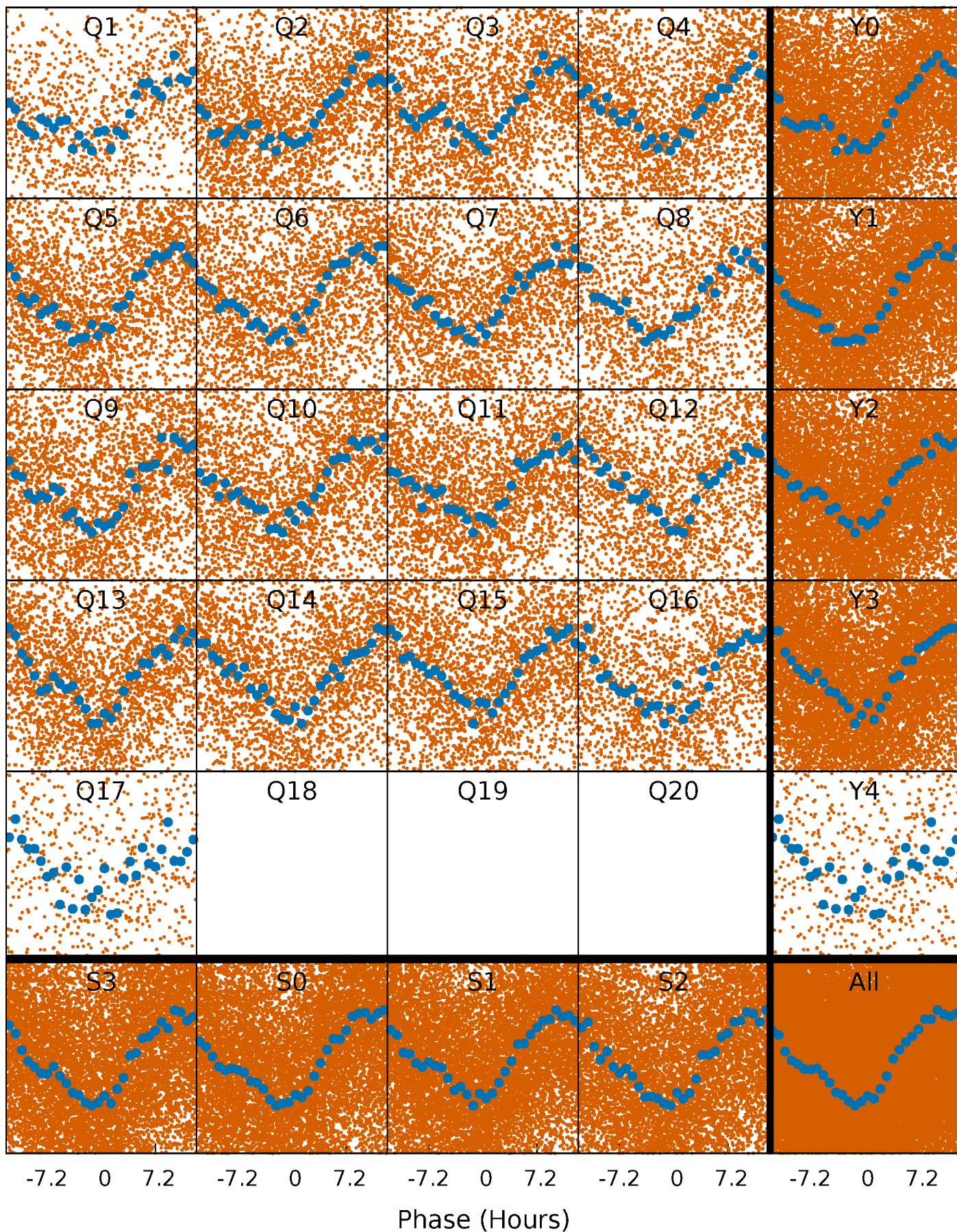


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



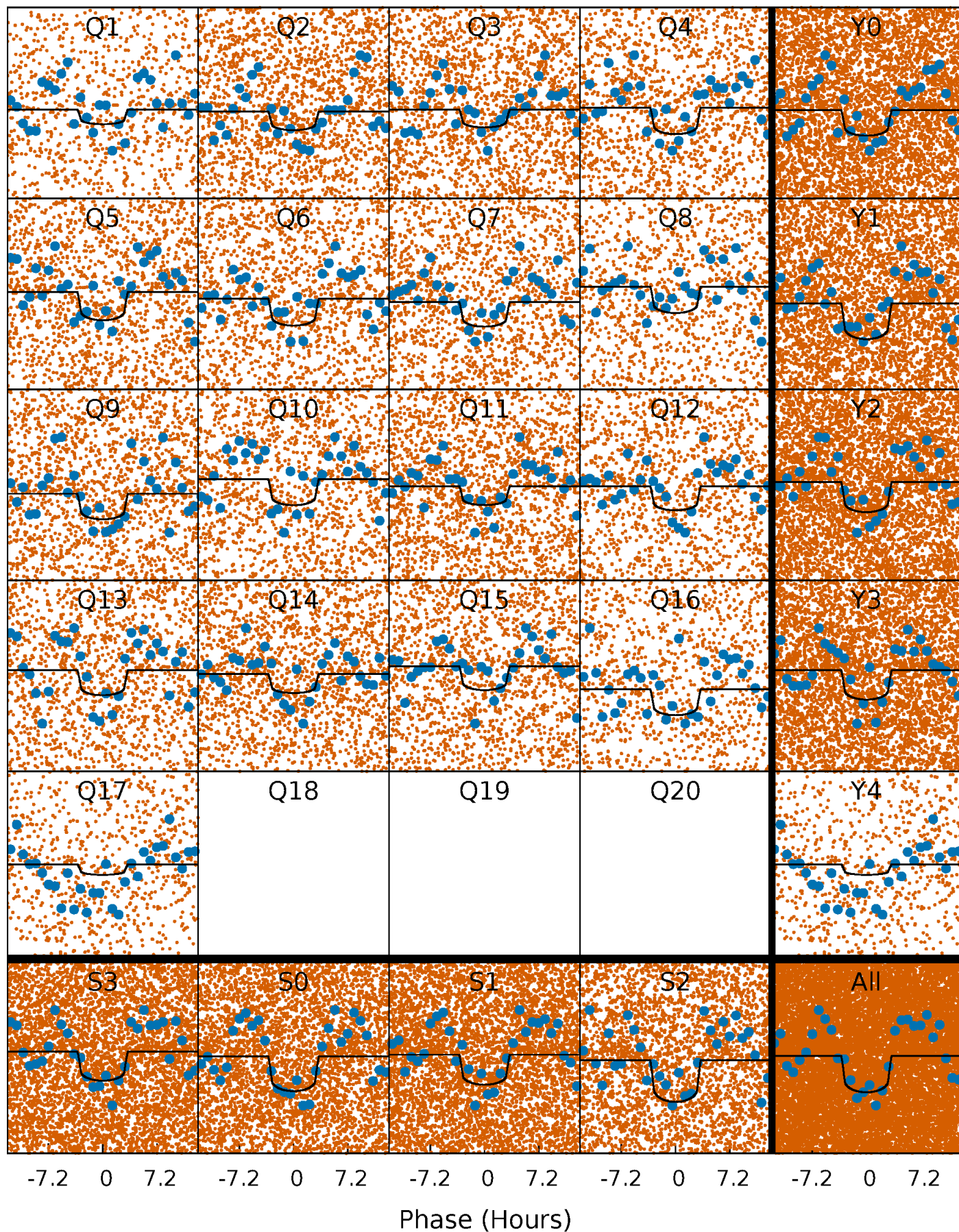
PDC Quarter-Phased Transit Curves

TCE 002157489-01 P= 1.357347 Days $T_0=132.399363$ (BKJD)



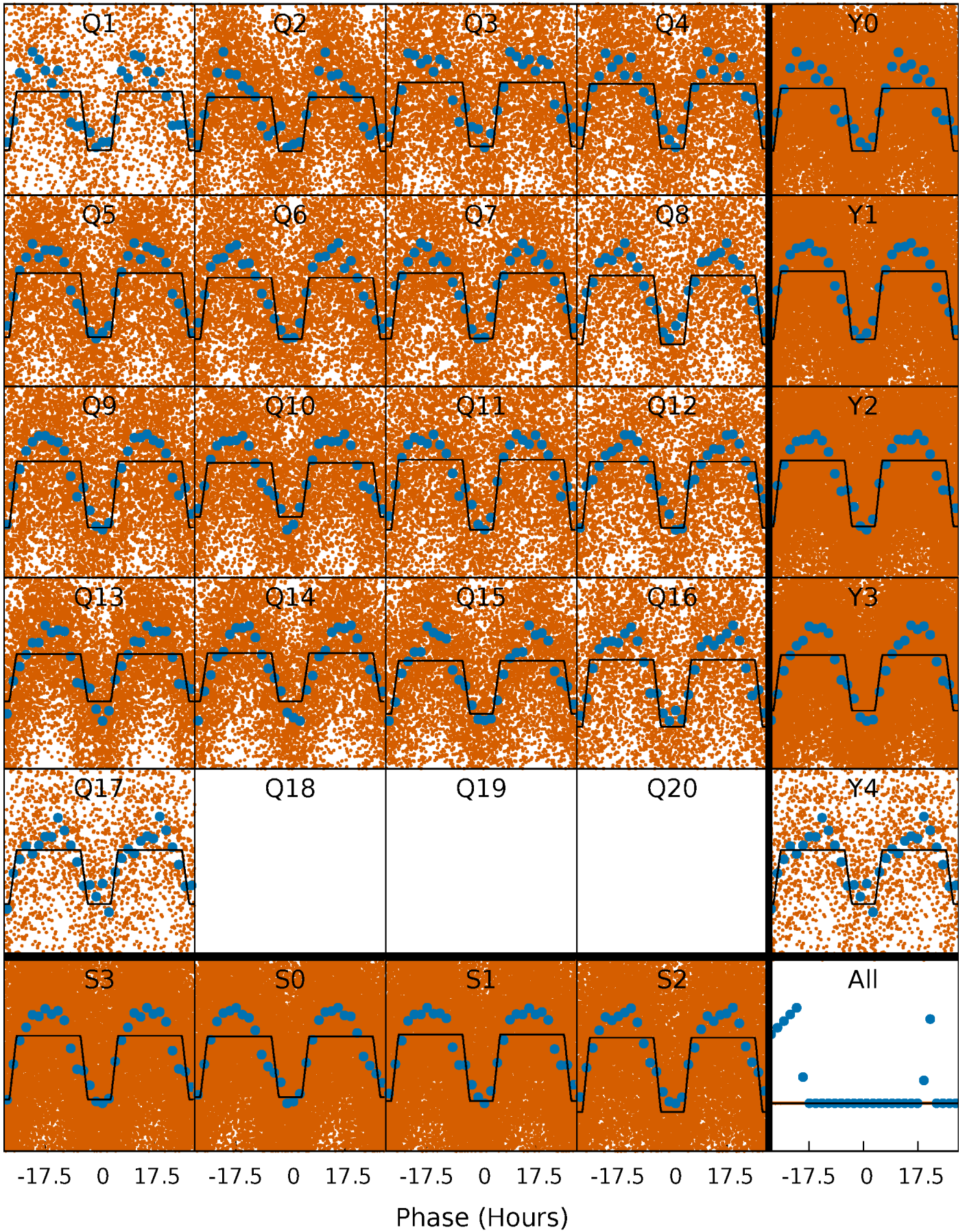
DV Quarter-Phased Transit Curves

TCE 002157489-01 P= 1.357347 Days $T_0=132.399363$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

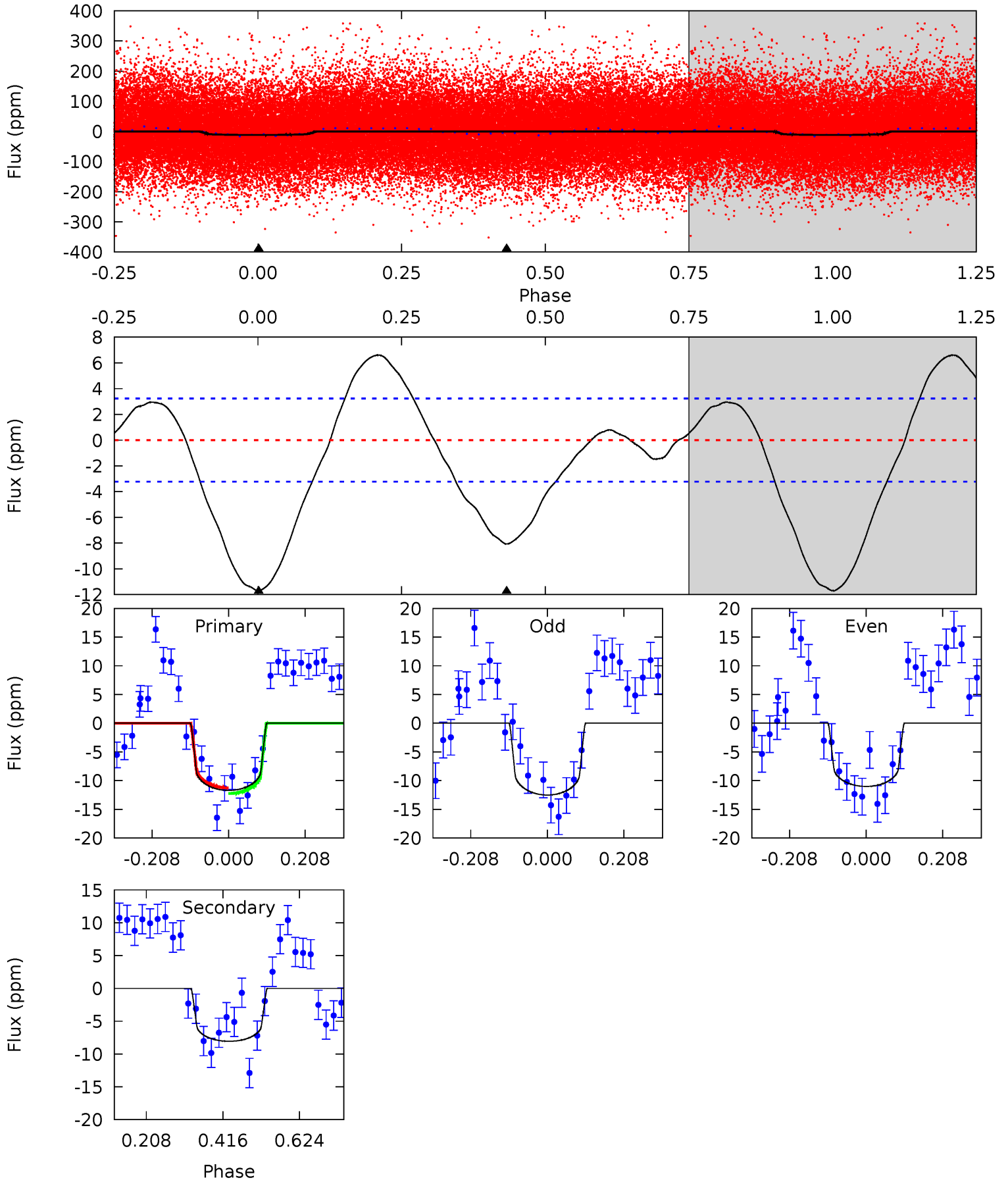
TCE 002157489-01 P= 1.357359 Days $T_0=132.336212$ (BKJD)



DV Model-Shift Uniqueness Test

002157489-01, P = 1.357347 Days, E = 131.042016 Days

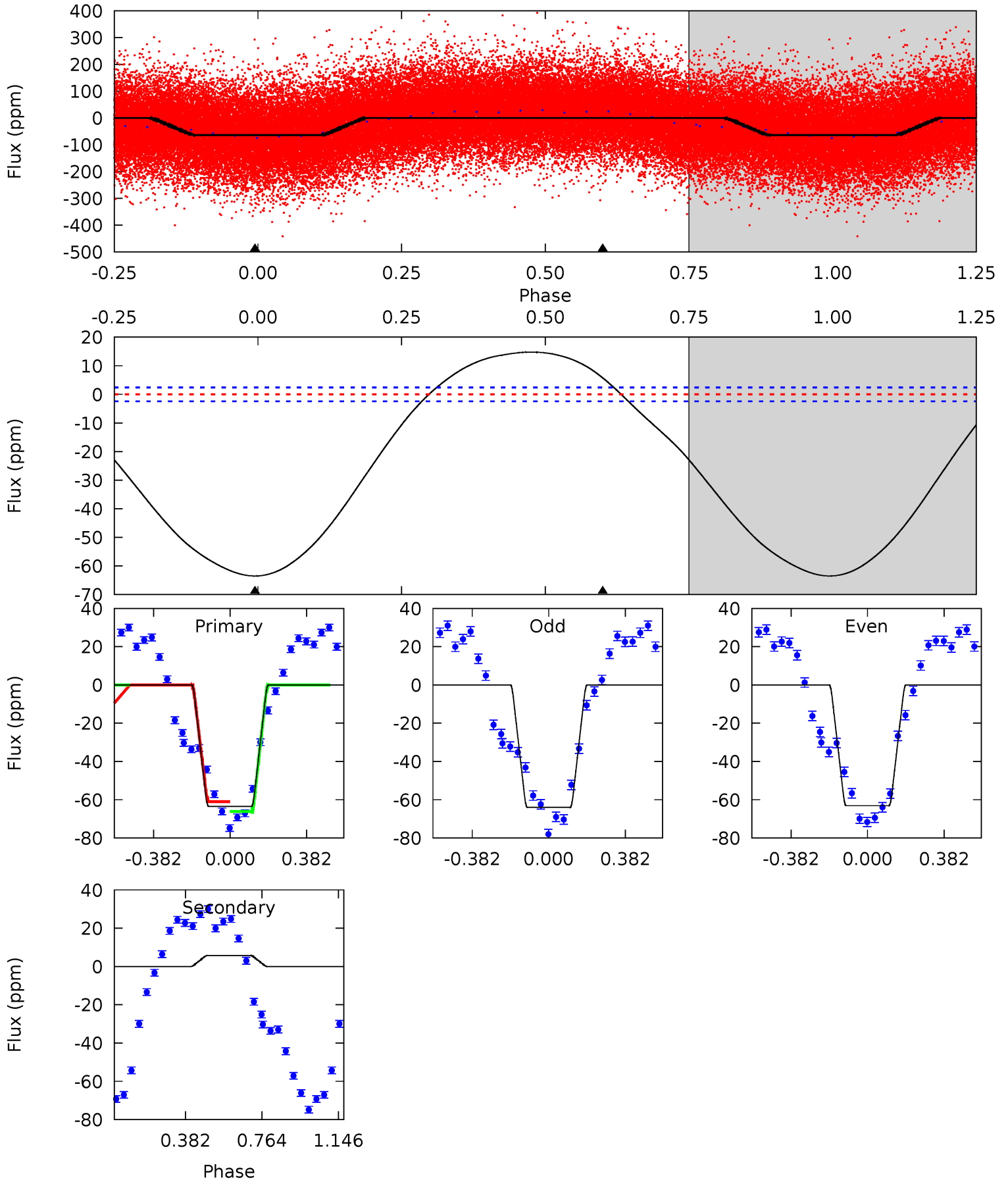
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	11.0	0	0	4.41	1.26	2.99	16.0	16.0	11.0	11.0	1.02	0.98	0.36	0.66



Alt Model-Shift Uniqueness Test

002157489-01, P = 1.357359 Days, E = 130.978853 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
112.2	-10.1	0	0	4.28	0.87	9.80	112.2	112.2	-10.1	-10.1	0.80	1.03	0.19	4.60



Stellar Parameters For KIC 002157489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7725^{+216}_{-325}	$3.660^{+0.440}_{-0.110}$	$0.080^{+0.200}_{-0.350}$	$3.556^{+0.724}_{-1.689}$	$2.107^{+0.288}_{-0.535}$	$0.066^{+0.287}_{-0.023}$
	+3%/-4%	+12%/-3%	+250%/-438%	+20%/-47%	+14%/-25%	+434%/-35%
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 002157489-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-8 ± 1	$1.30^{+0.47}_{-0.47}$	4967^{+365}_{-648}	6347^{+1673}_{-867}	$2.457^{+3.382}_{-1.120}$
Alt.	6 ± 1	$2.99^{+0.66}_{-0.80}$	4955^{+383}_{-611}	-4901^{+276}_{-240}	$-0.332^{+0.107}_{-0.259}$

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

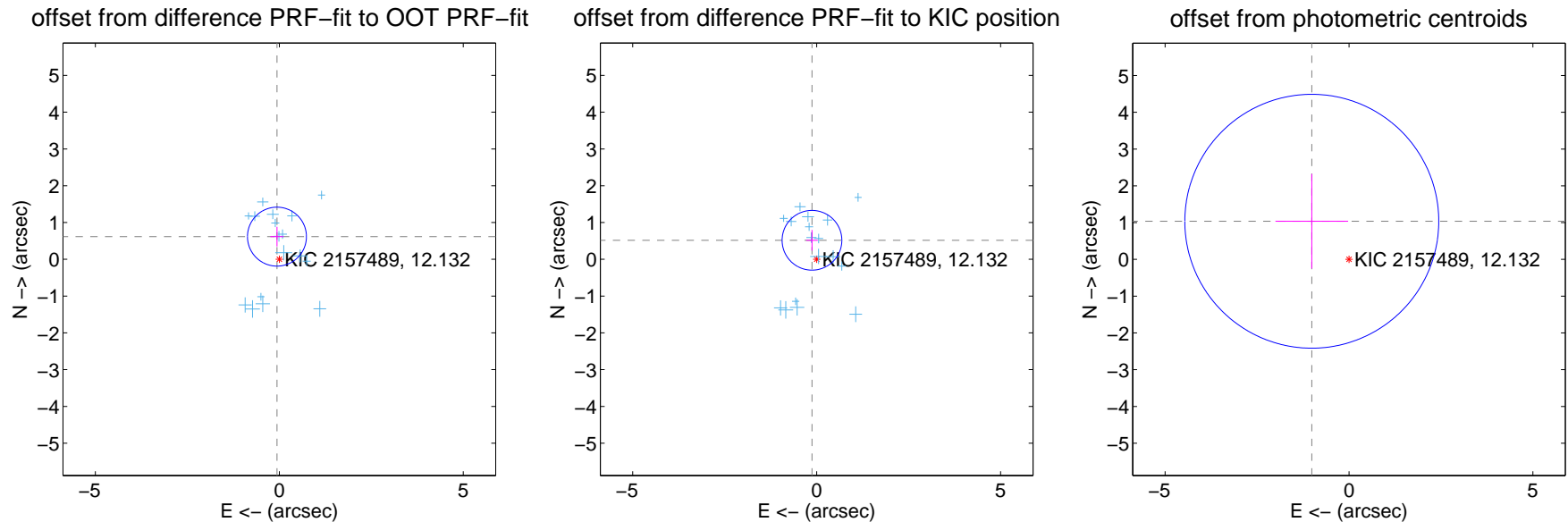
DV Centroid Data

Supplemental centroid analysis for 002157489-01. Kepler magnitude: 12.13. Transit SNR 10.83

There are 17 quarters with good PRF difference image offsets

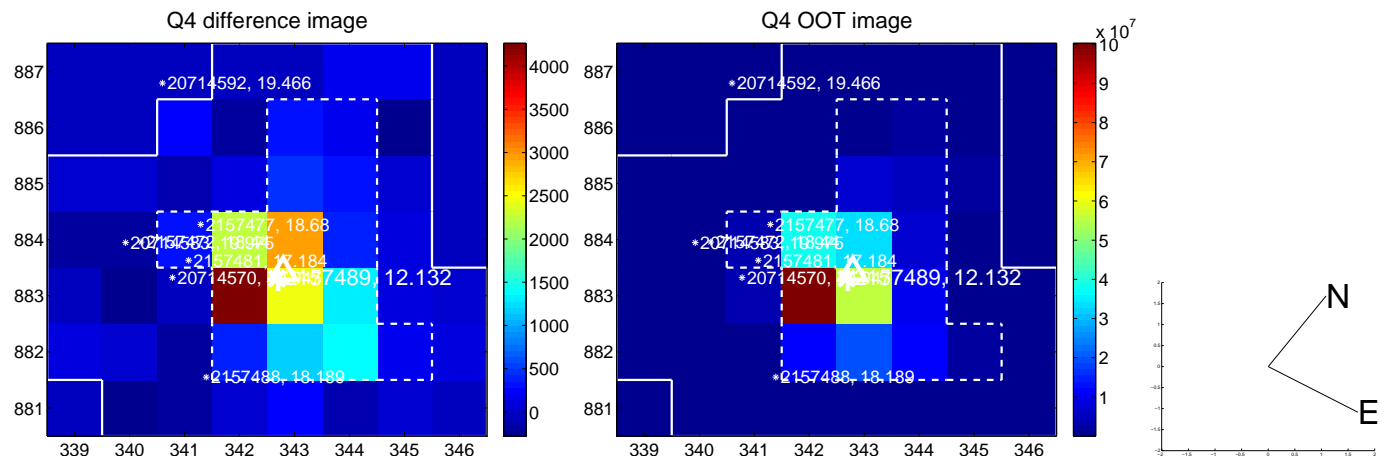
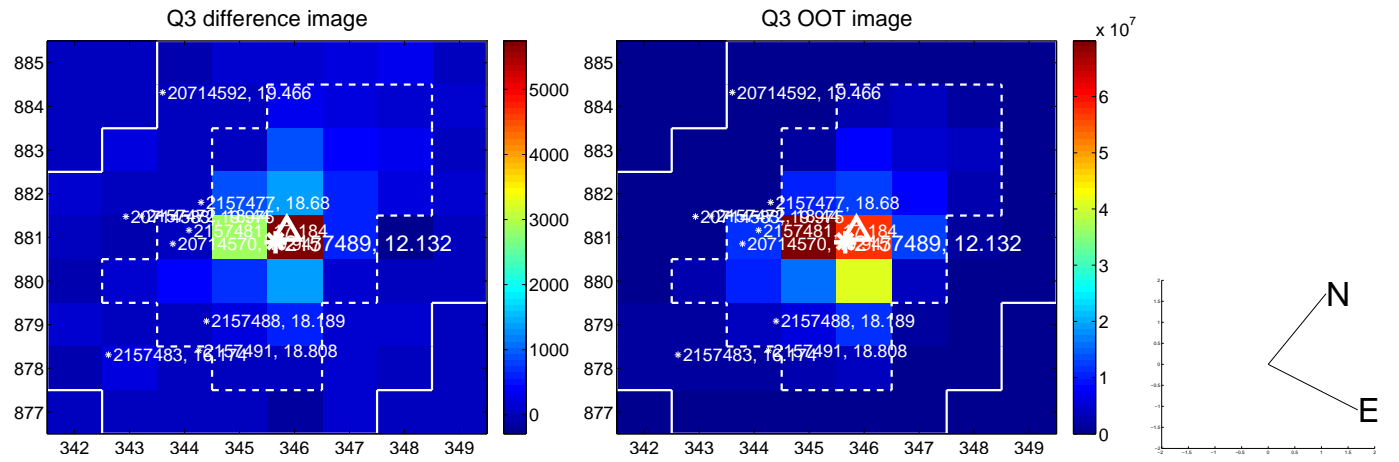
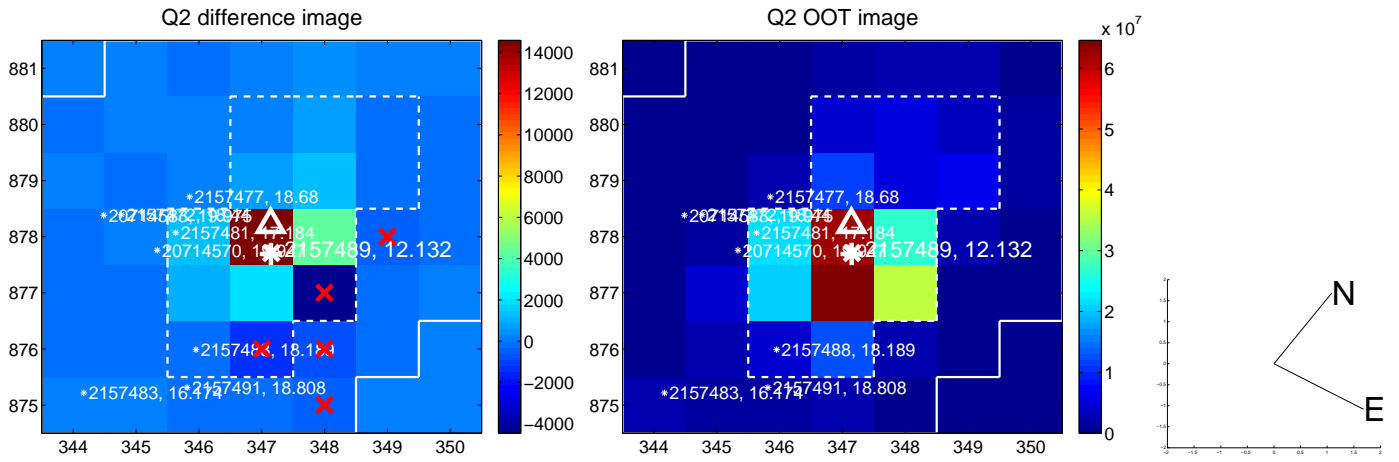
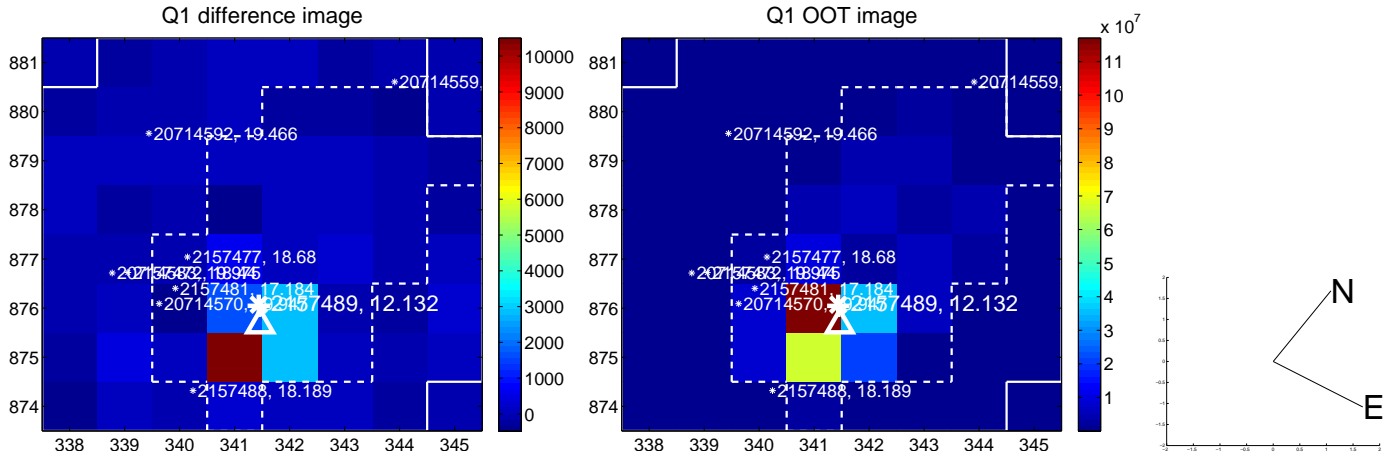
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.619 ± 0.267	2.32	0.064 ± 0.180	0.616 ± 0.268
PRF-fit source offset from KIC position	0.532 ± 0.271	1.97	0.127 ± 0.158	0.517 ± 0.282
photometric centroid source offset	1.45 ± 1.15	1.26	1.01 ± 0.99	1.04 ± 1.29

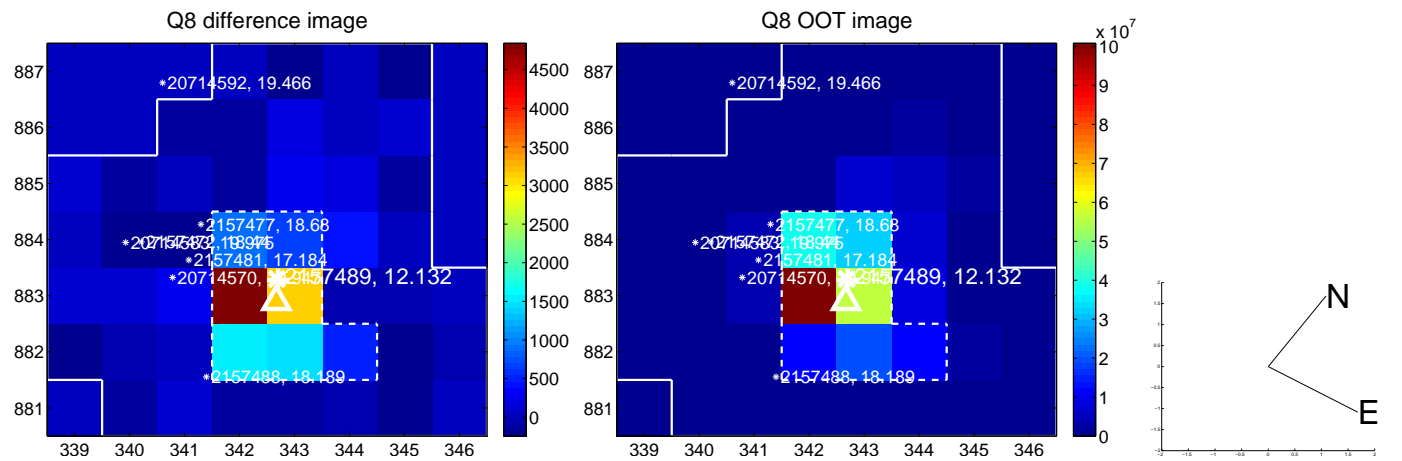
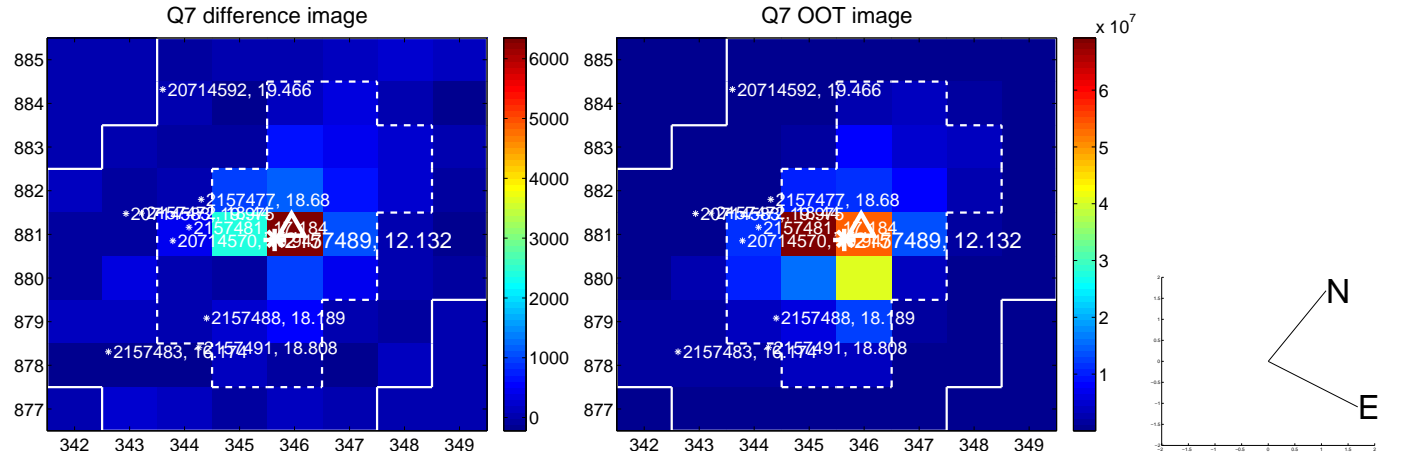
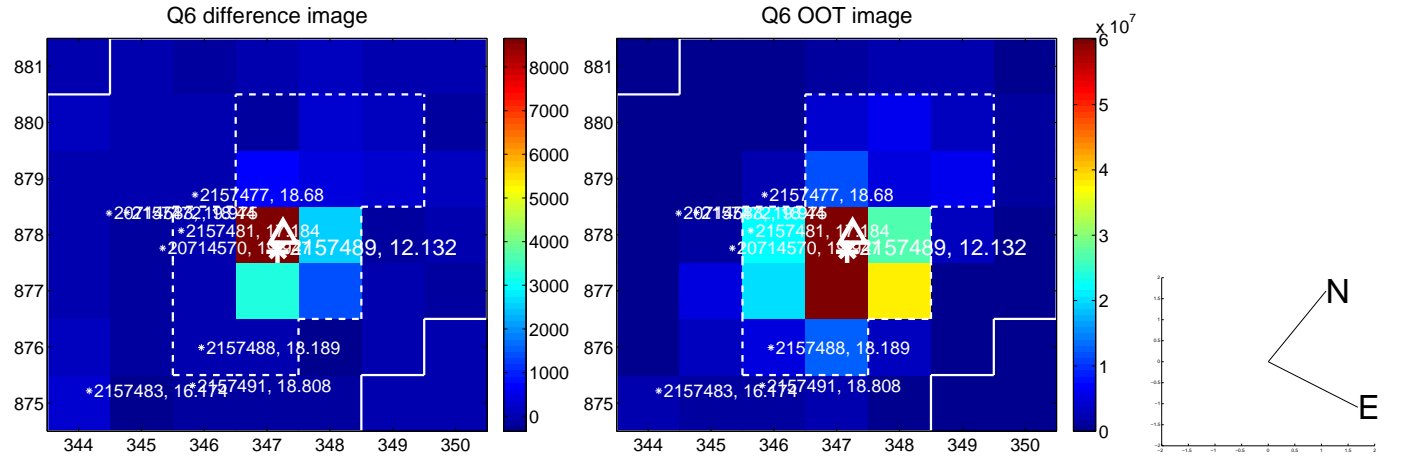
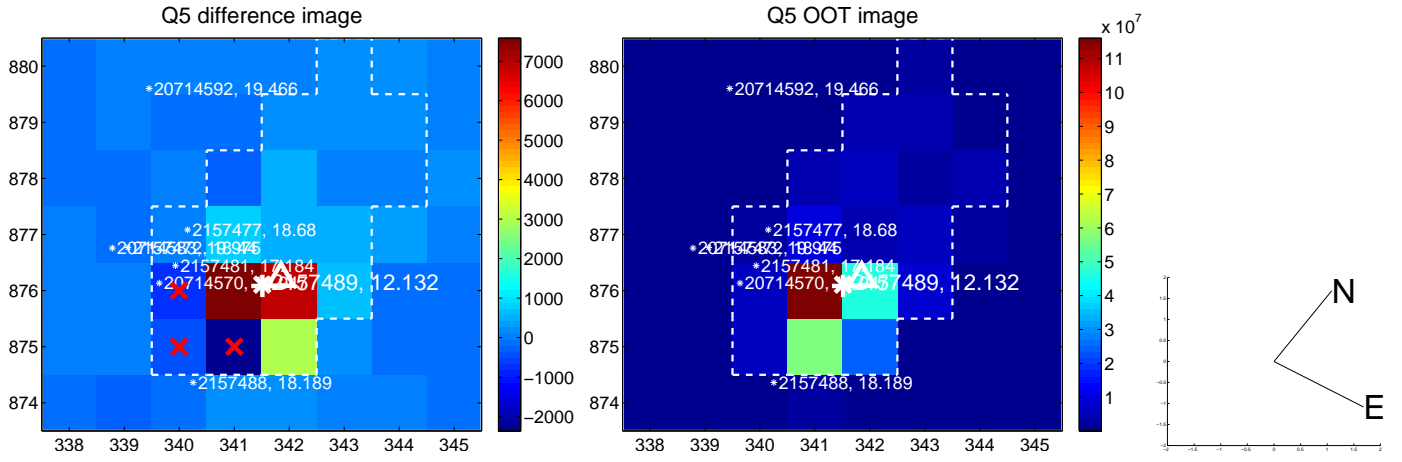


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

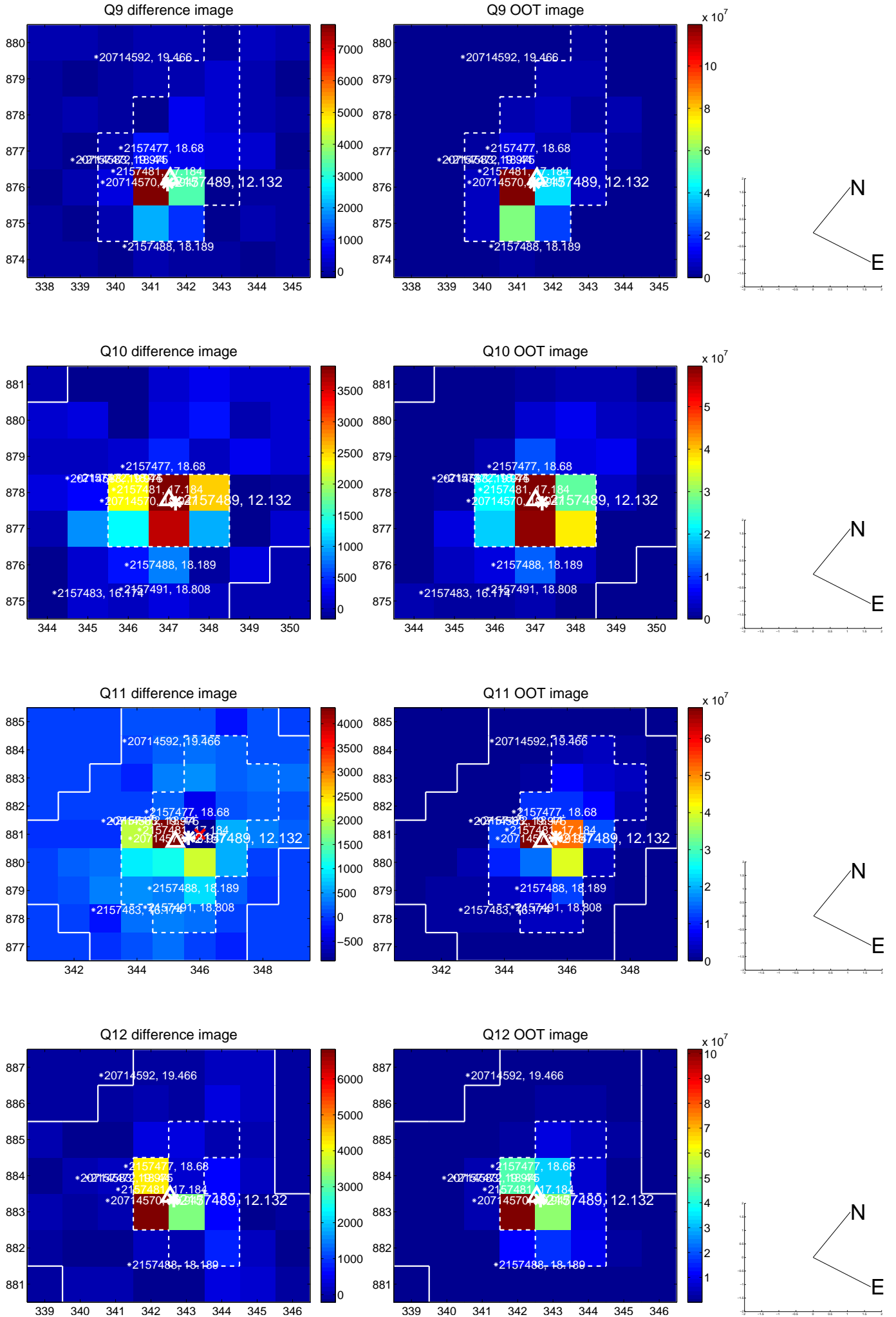
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



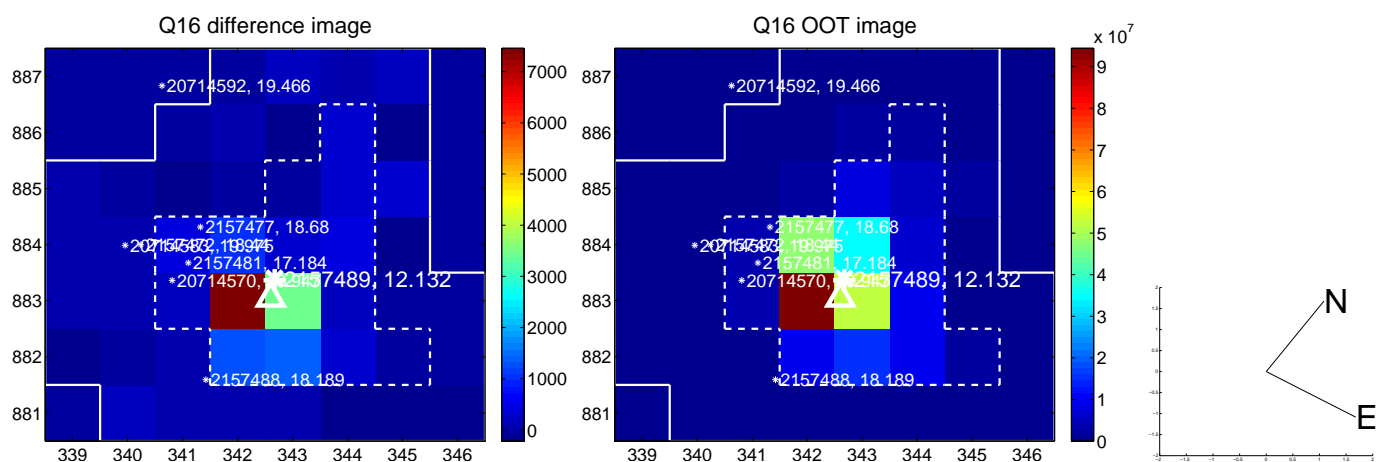
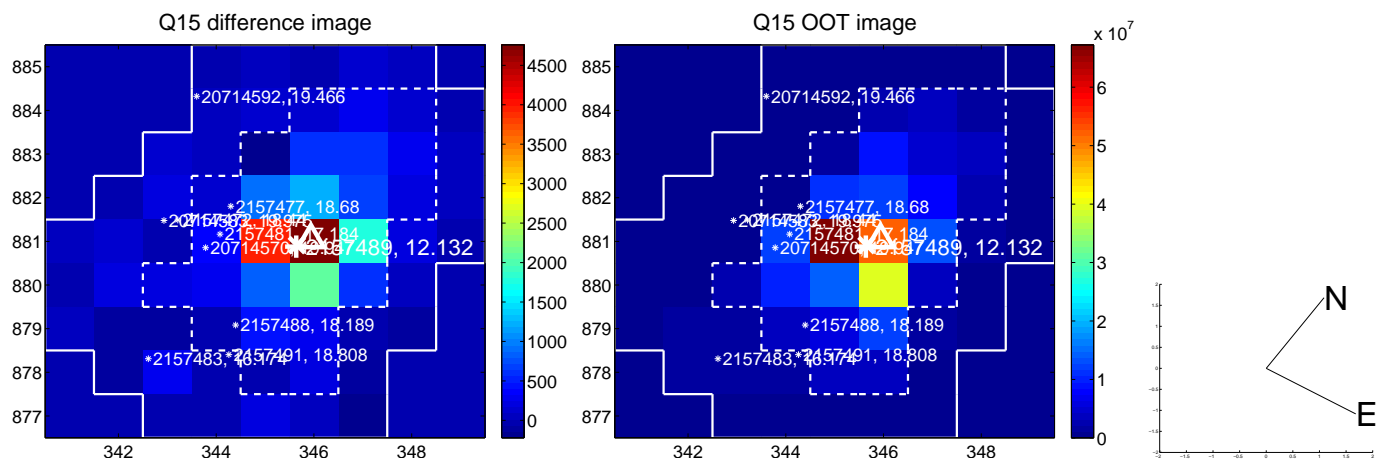
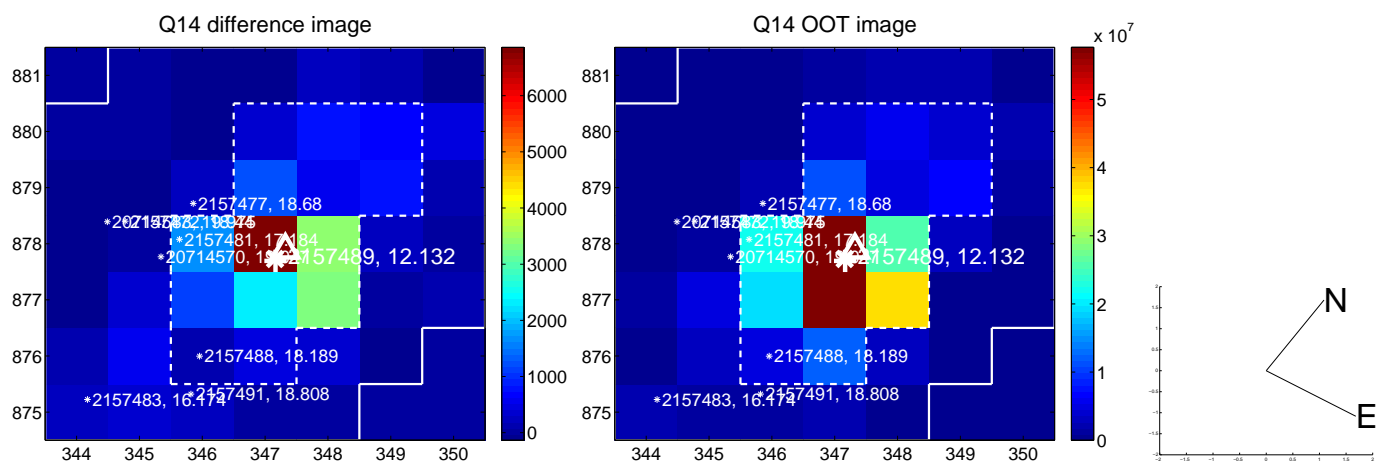
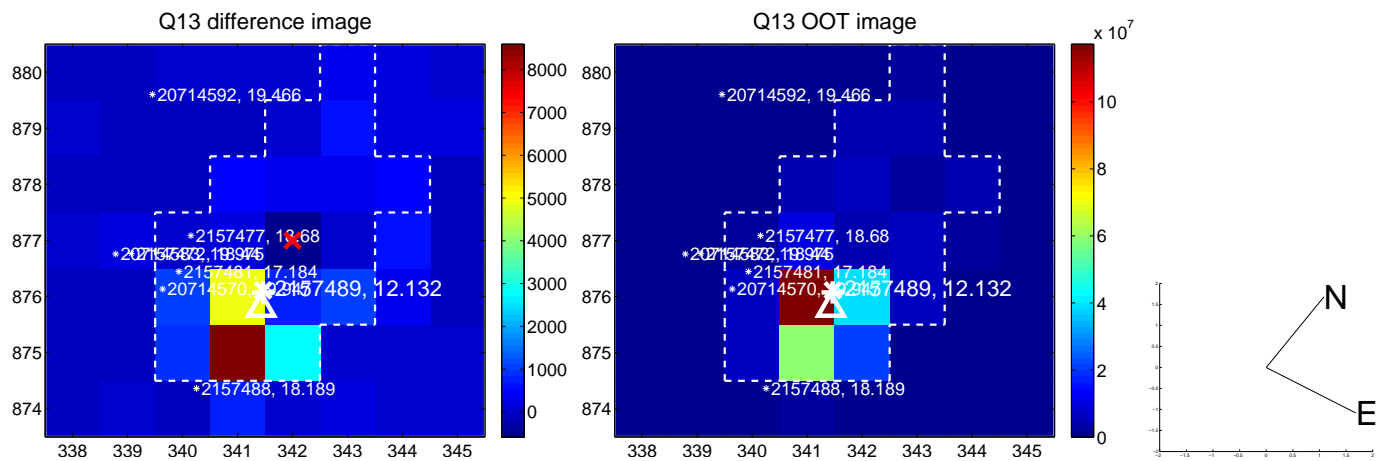
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



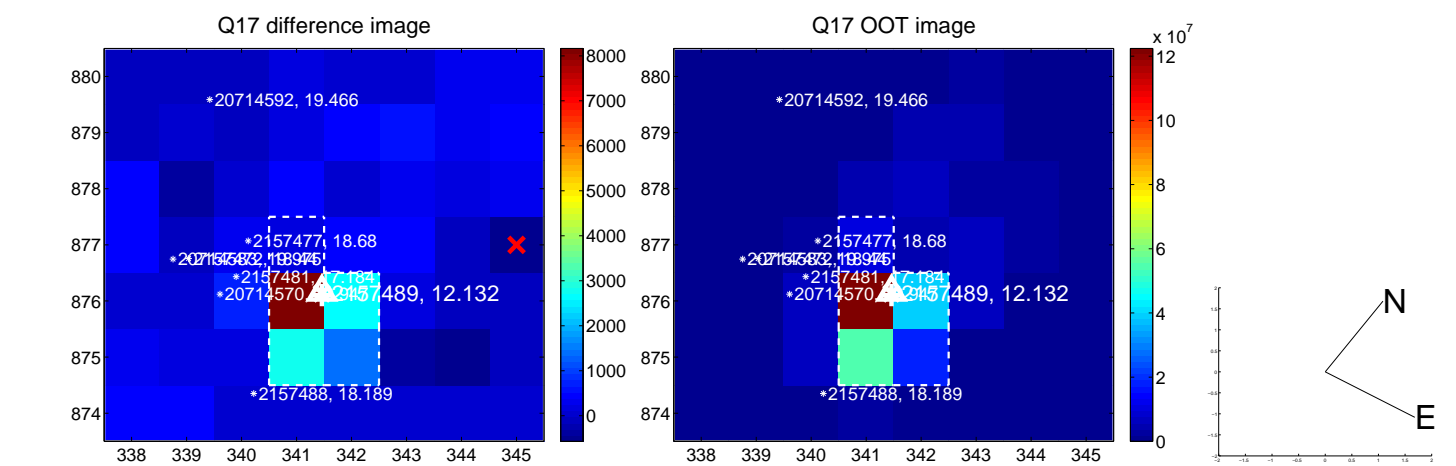
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



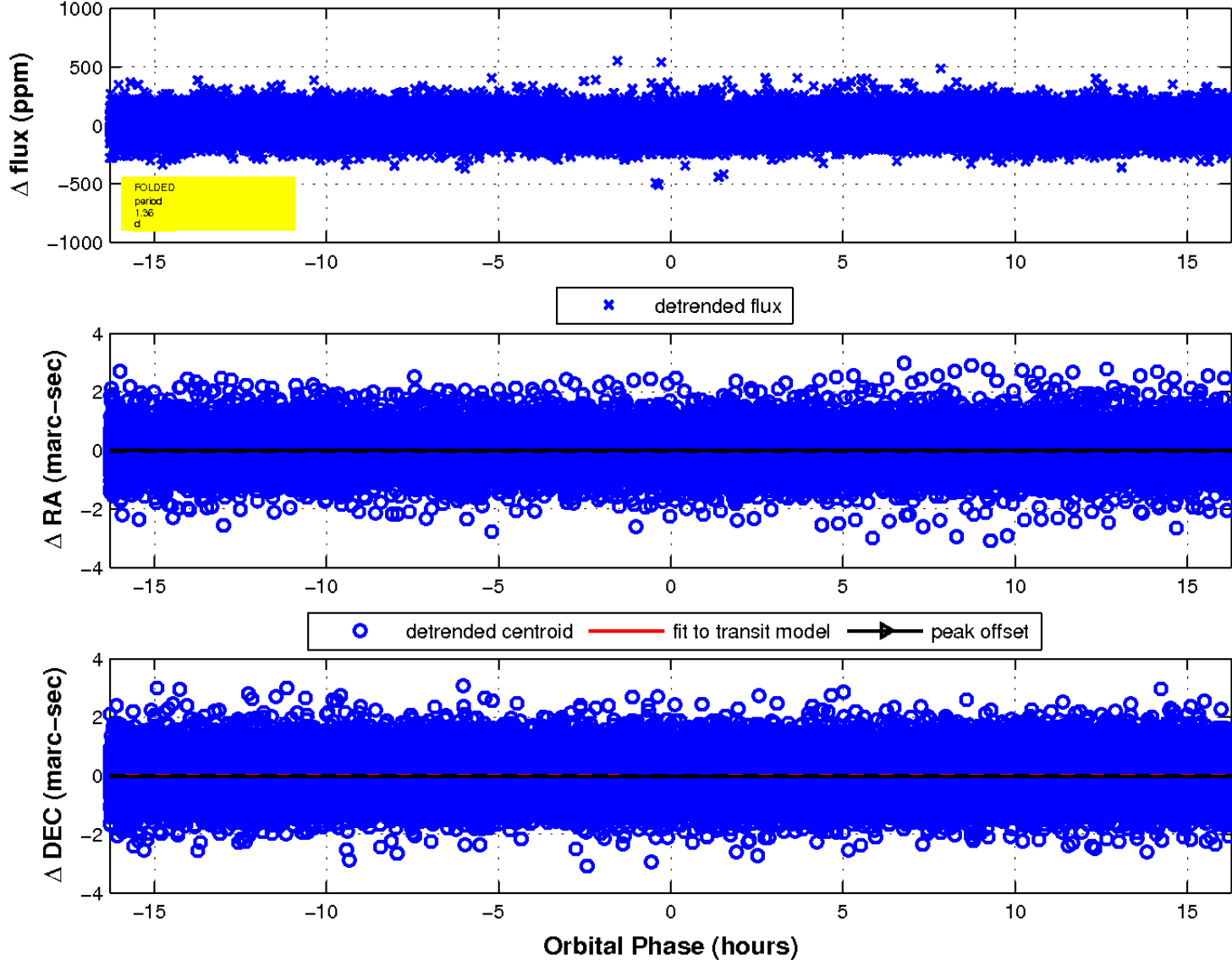
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

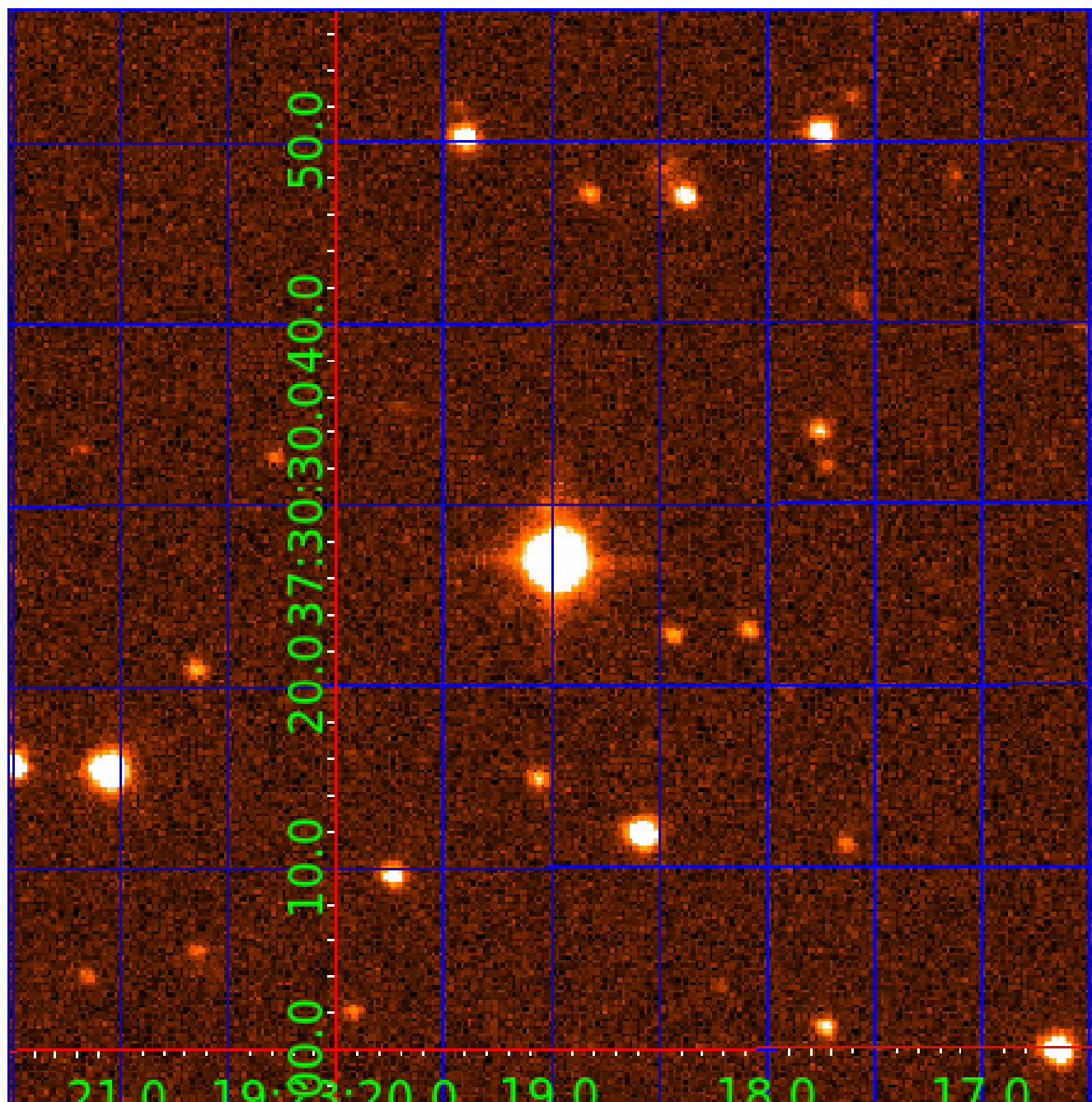


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 002157489

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})
002157489-01	OBS	No	1.357347	132.399363	11.7	6.332	12.5	10.8	3.56	7725	1.43	42612.95
002157489-02	OBS	No	477.623388	558.077368	115.9	9.399	7.9	7.6	3.56	7725	4.09	17.15

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157489-01	OBS	FP	0.00	1	0	0	0	LPP_DV
002157489-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST

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

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

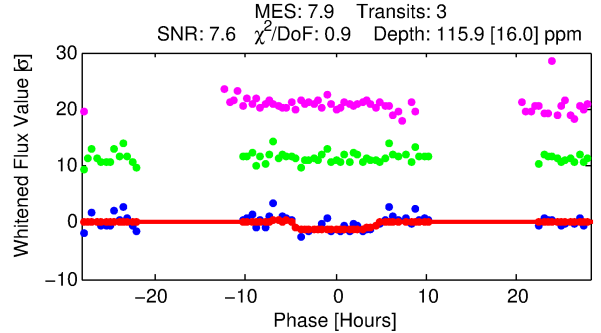
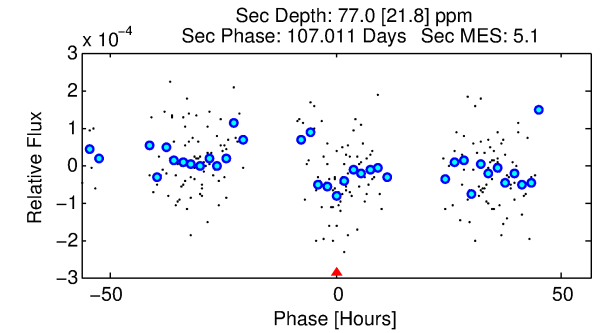
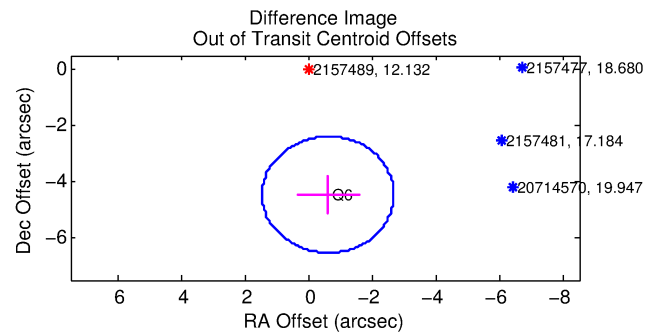
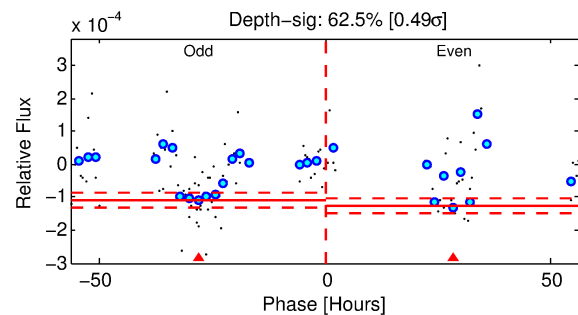
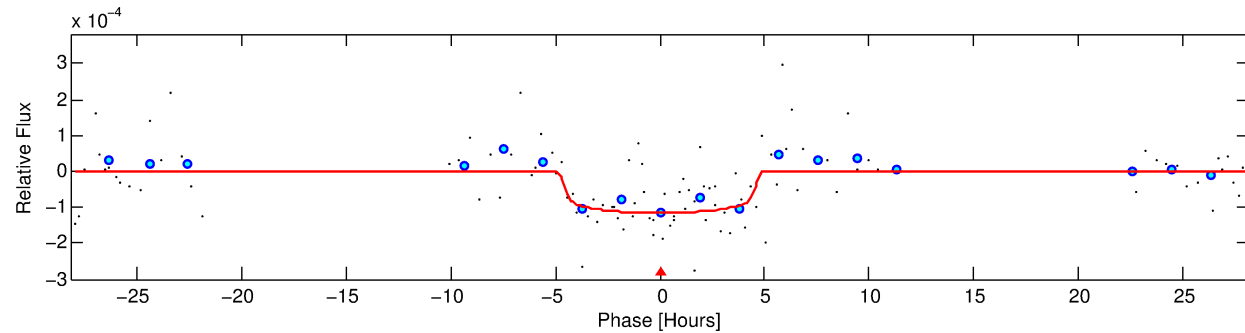
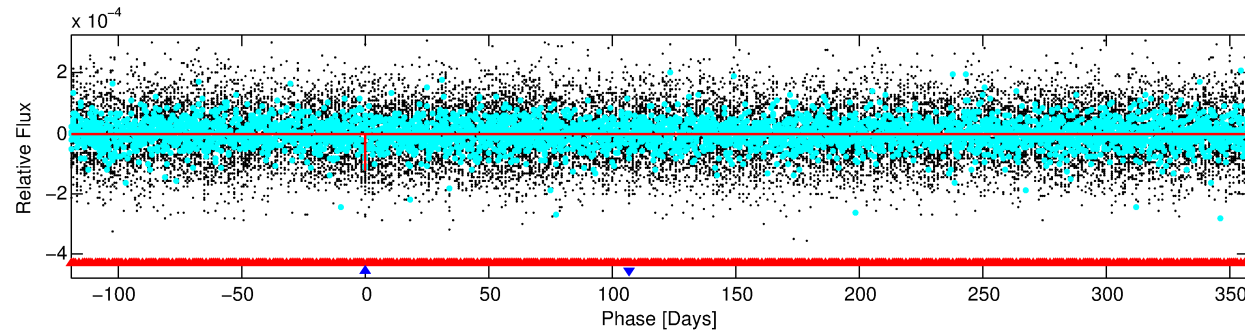
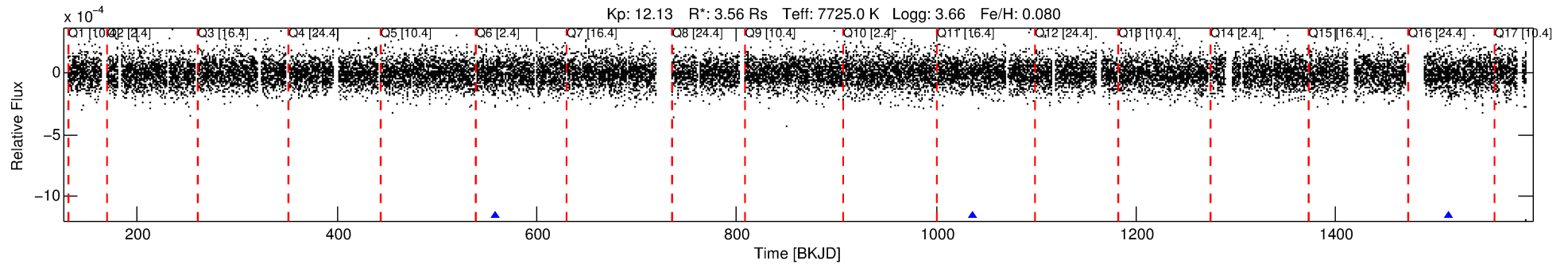
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002157489-02

No Significant Match Found

DV One-Page Summary

KIC: 2157489 Candidate: 2 of 2 Period: 477.623 d



DV Fit Results:

Period = 477.62339 [0.02056] d
Epoch = 558.0774 [0.0241] BKJD
Rp/R* = 0.0105 [0.0086]
a/R* = 285.68 [1335.21]
b = 0.69 [3.55]
Seff = 17.15 [13.12]
Teq = 519 [99] K
Rp = 4.09 [3.87] Re
a = 1.5337 [0.7100] AU
Ag = 5945.21 [10809.26] [0.55 σ]
Teffp = 7045 [2935] K [2.22 σ]

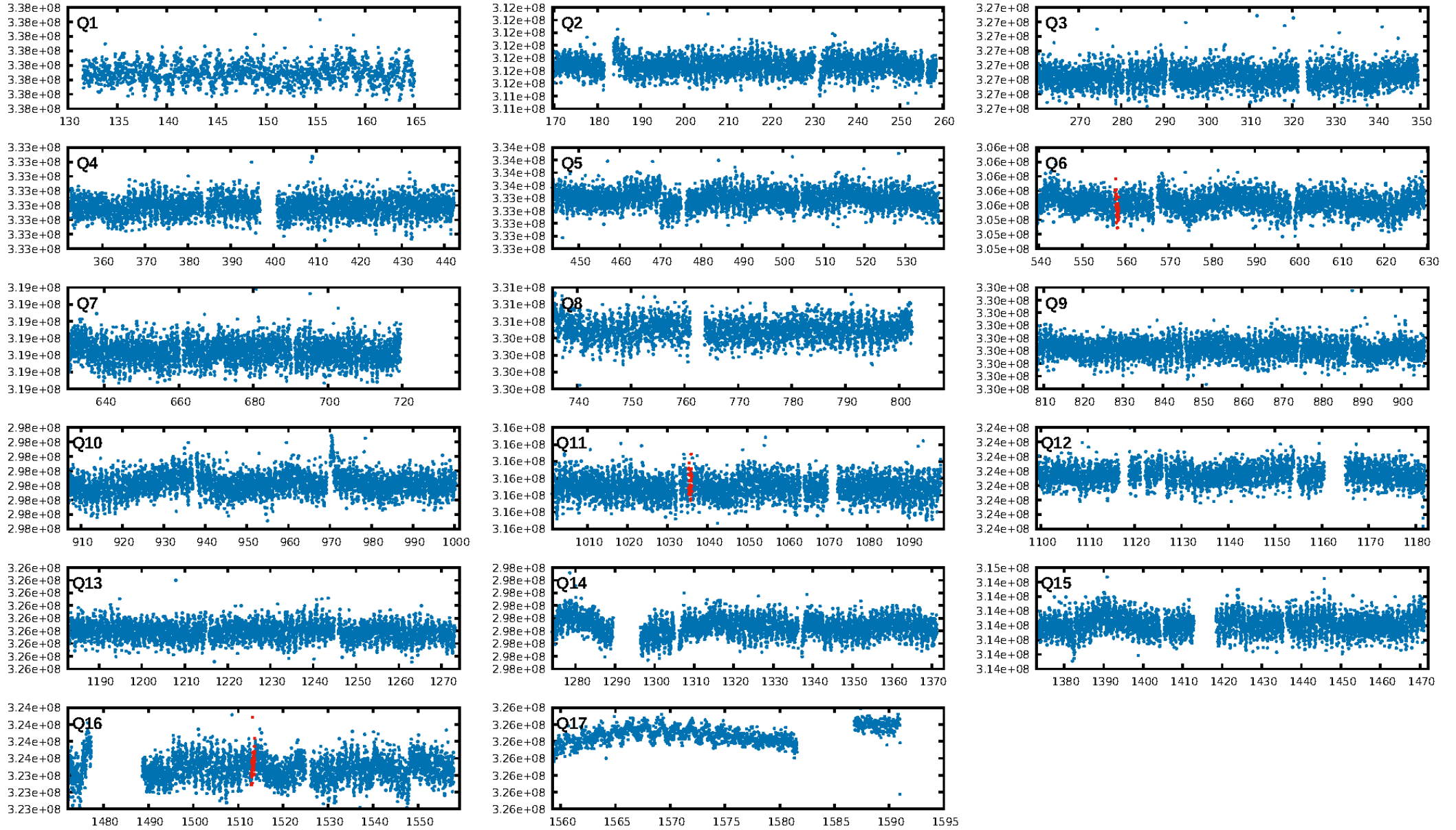
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1008.59 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 38.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.60e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.02426
Centroid-sig: 5.5%
Centroid-so: 3.513 arcsec [1.60 σ]
OotOffset-rm: 4.502 arcsec [6.53 σ]
KicOffset-rm: 4.581 arcsec [6.65 σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 0.00 [0/3]

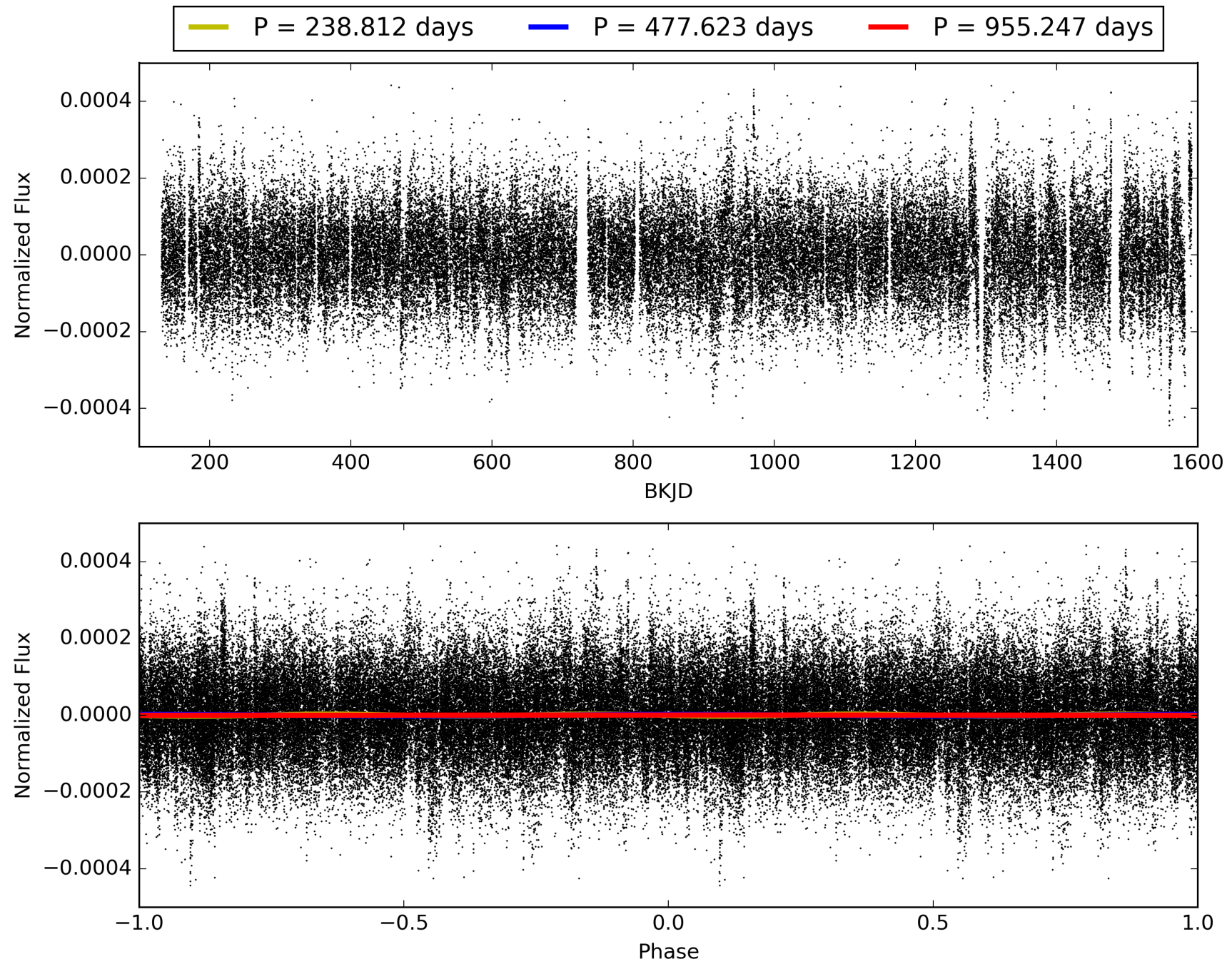
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:07:40 Z

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TCE 002157489-02, PDC Light Curves

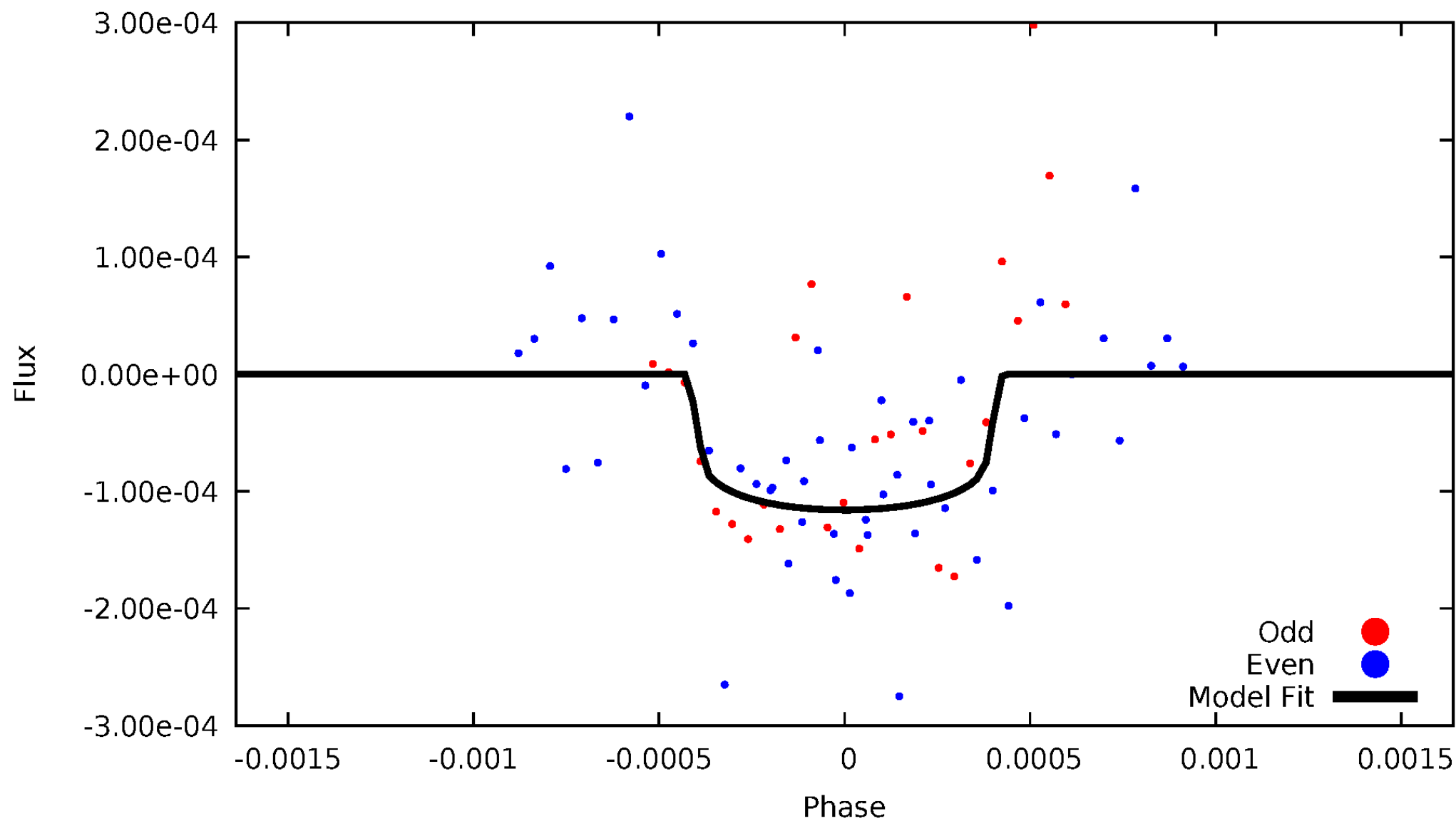


TCE 002157489-02



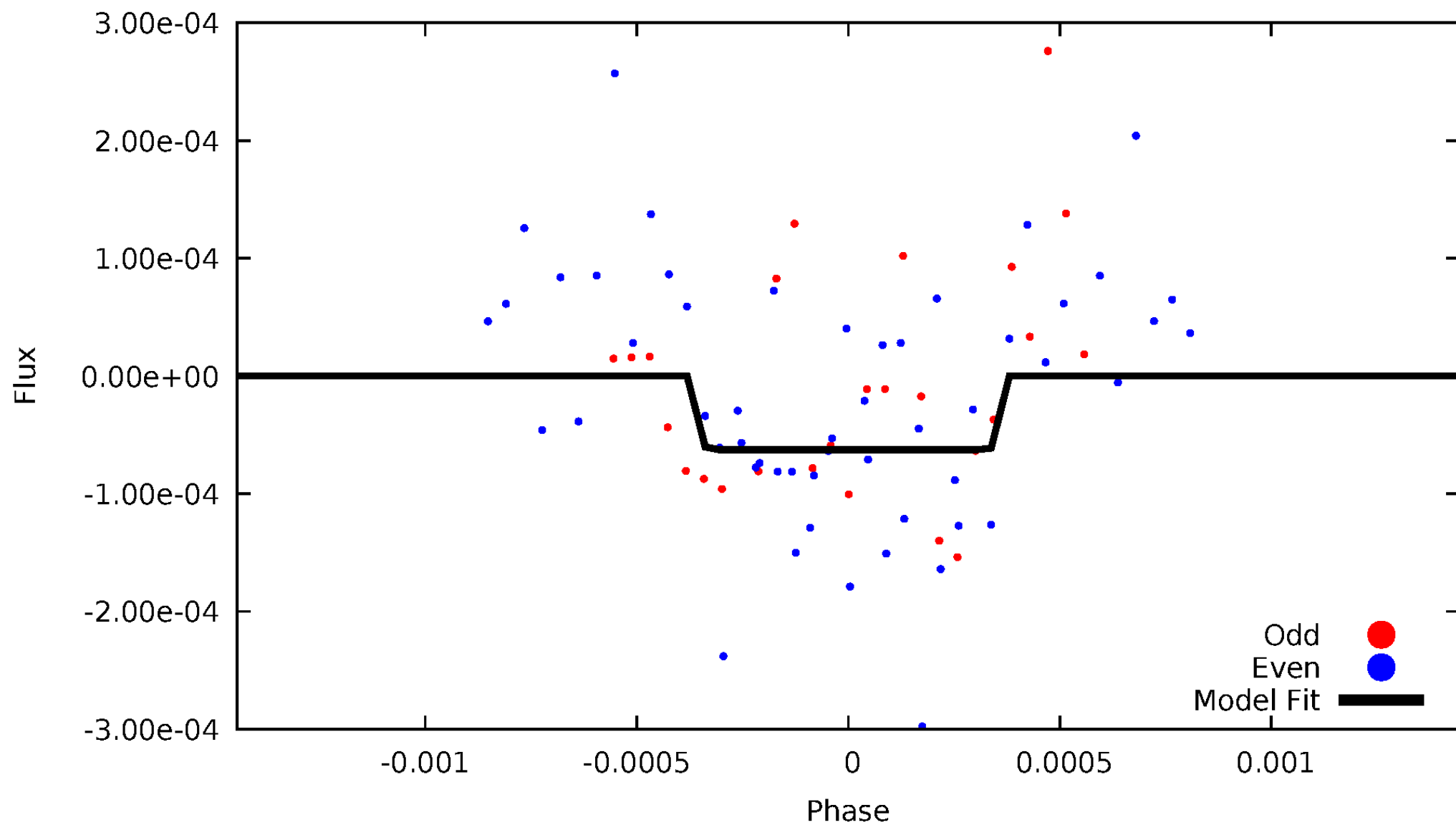
DV Odd/Even

TCE 002157489-02



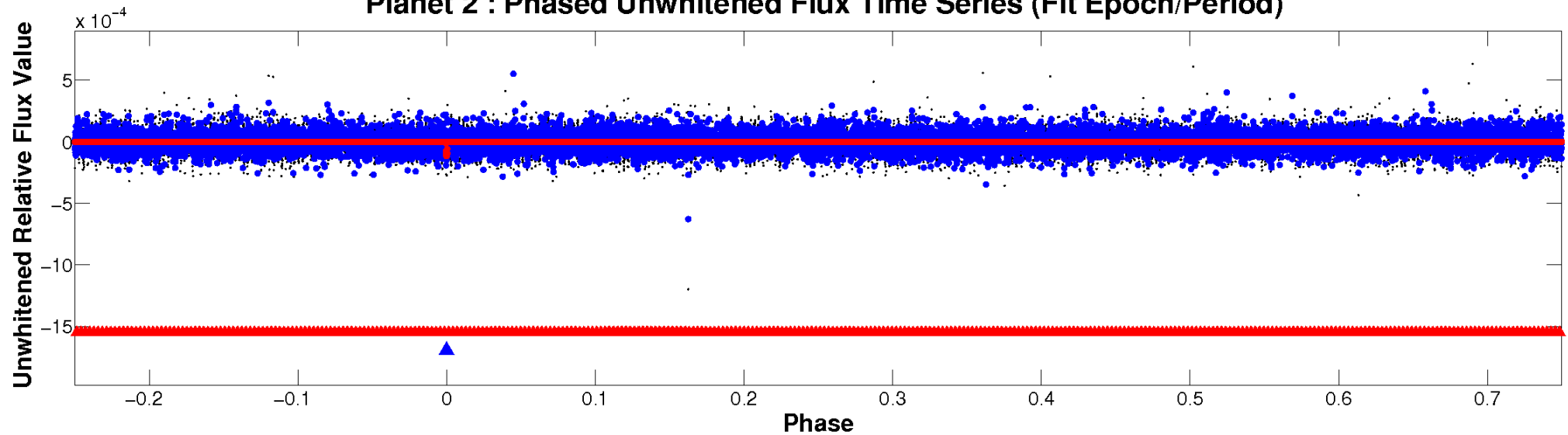
ALT Odd/Even

TCE 002157489-02

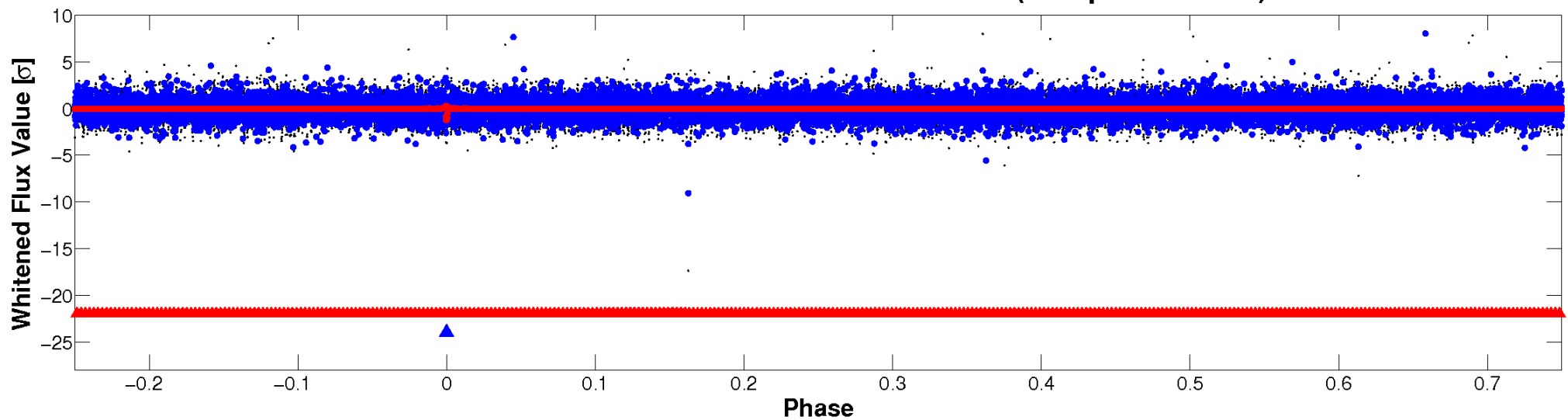


Non-Whitened Vs. Whitened Light Curve

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

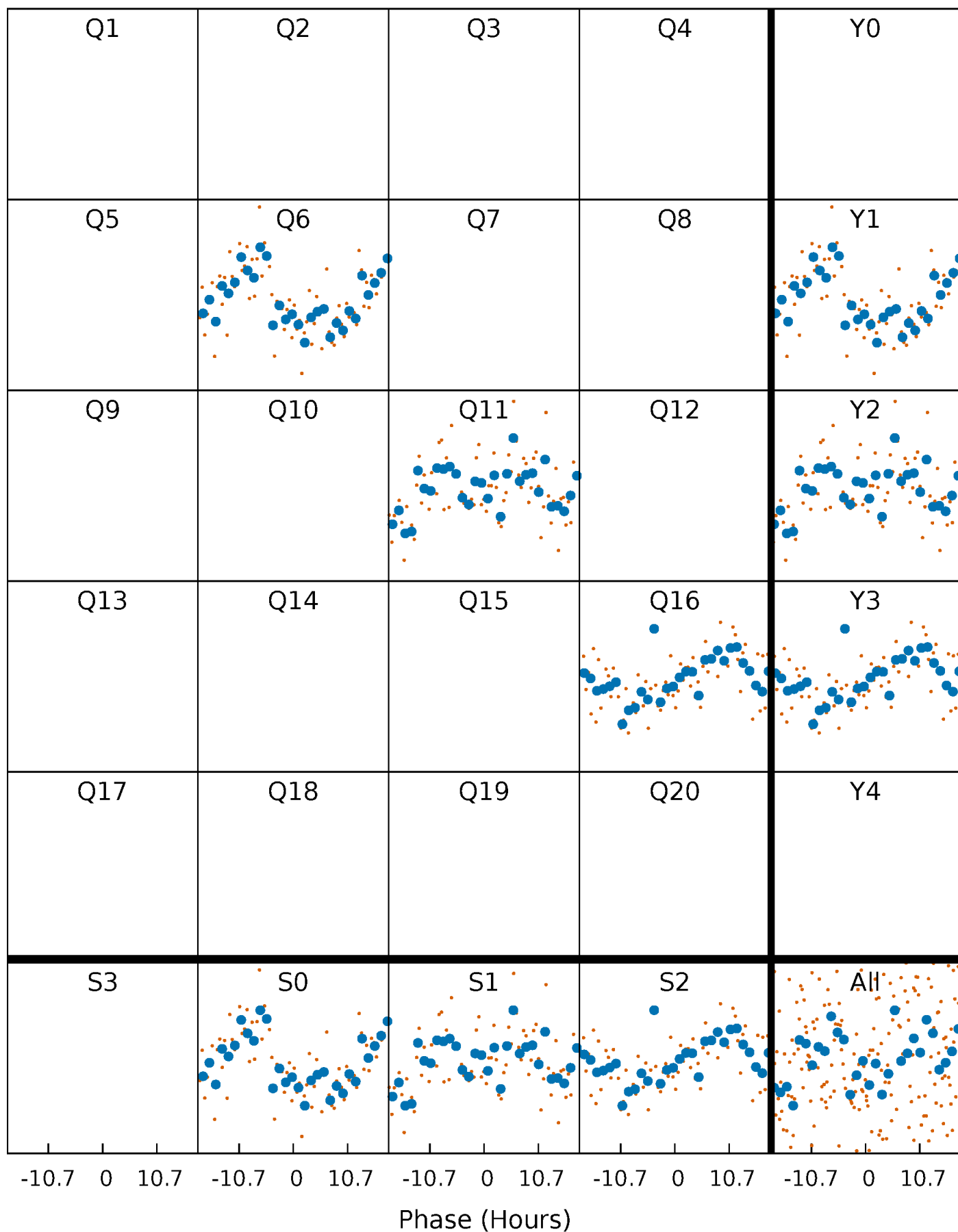


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



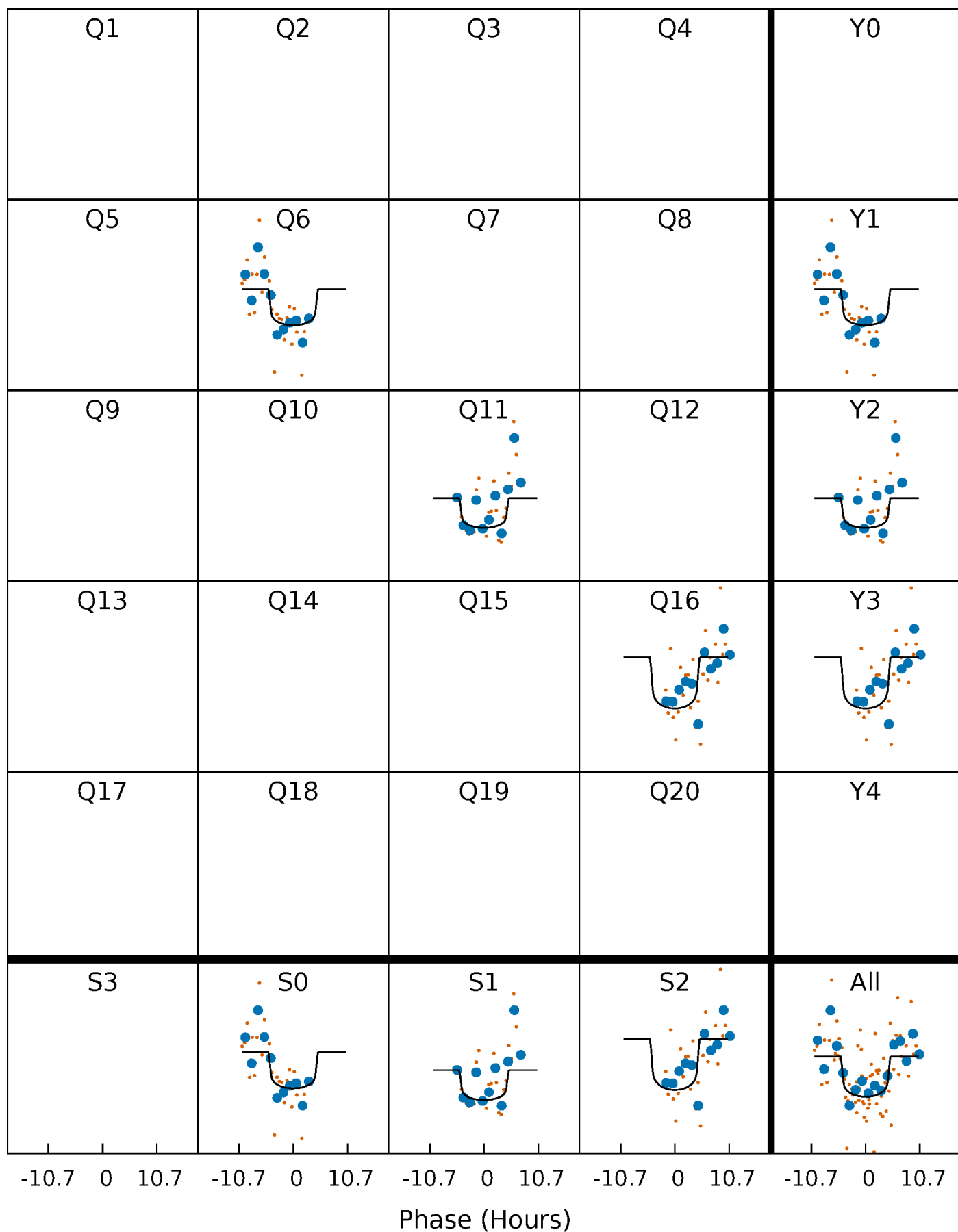
PDC Quarter-Phased Transit Curves

TCE 002157489-02 $P=477.623388$ Days $T_0=558.077368$ (BKJD)



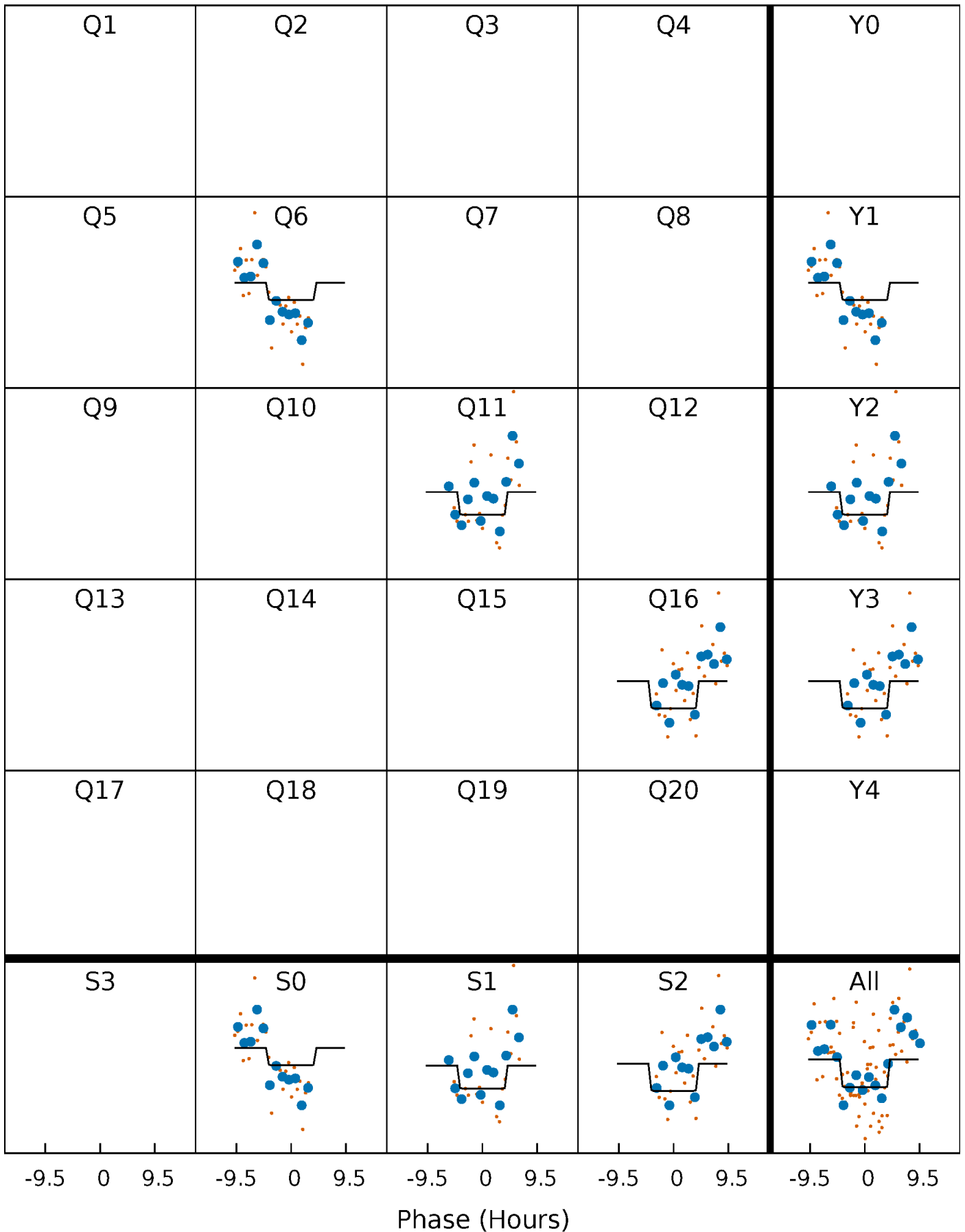
DV Quarter-Phased Transit Curves

TCE 002157489-02 P=477.623388 Days $T_0=558.077368$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

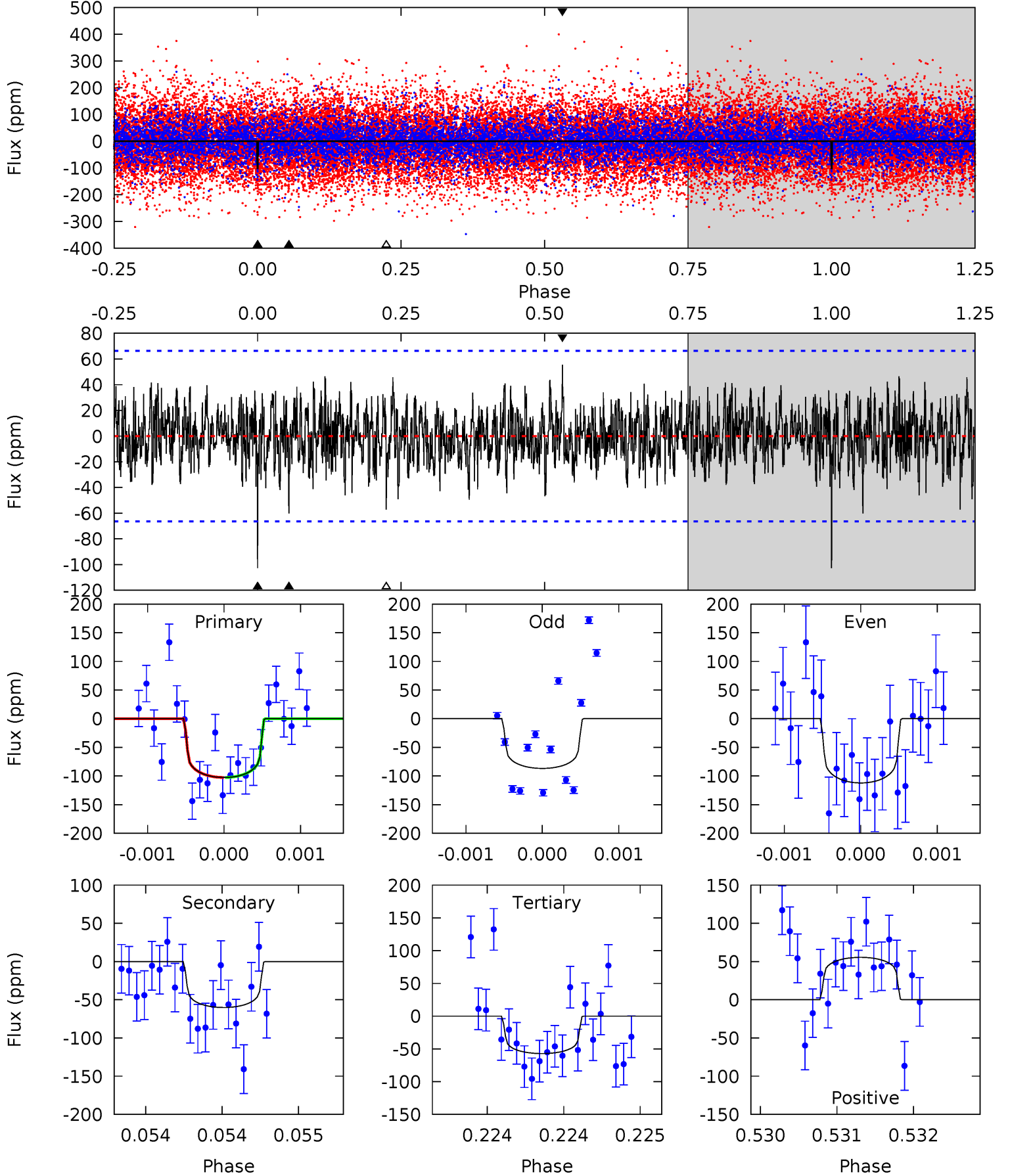
TCE 002157489-02 $P=477.654899$ Days $T_0=558.064118$ (BKJD)



DV Model-Shift Uniqueness Test

002157489-02, $P = 477.623388$ Days, $E = 80.453980$ Days

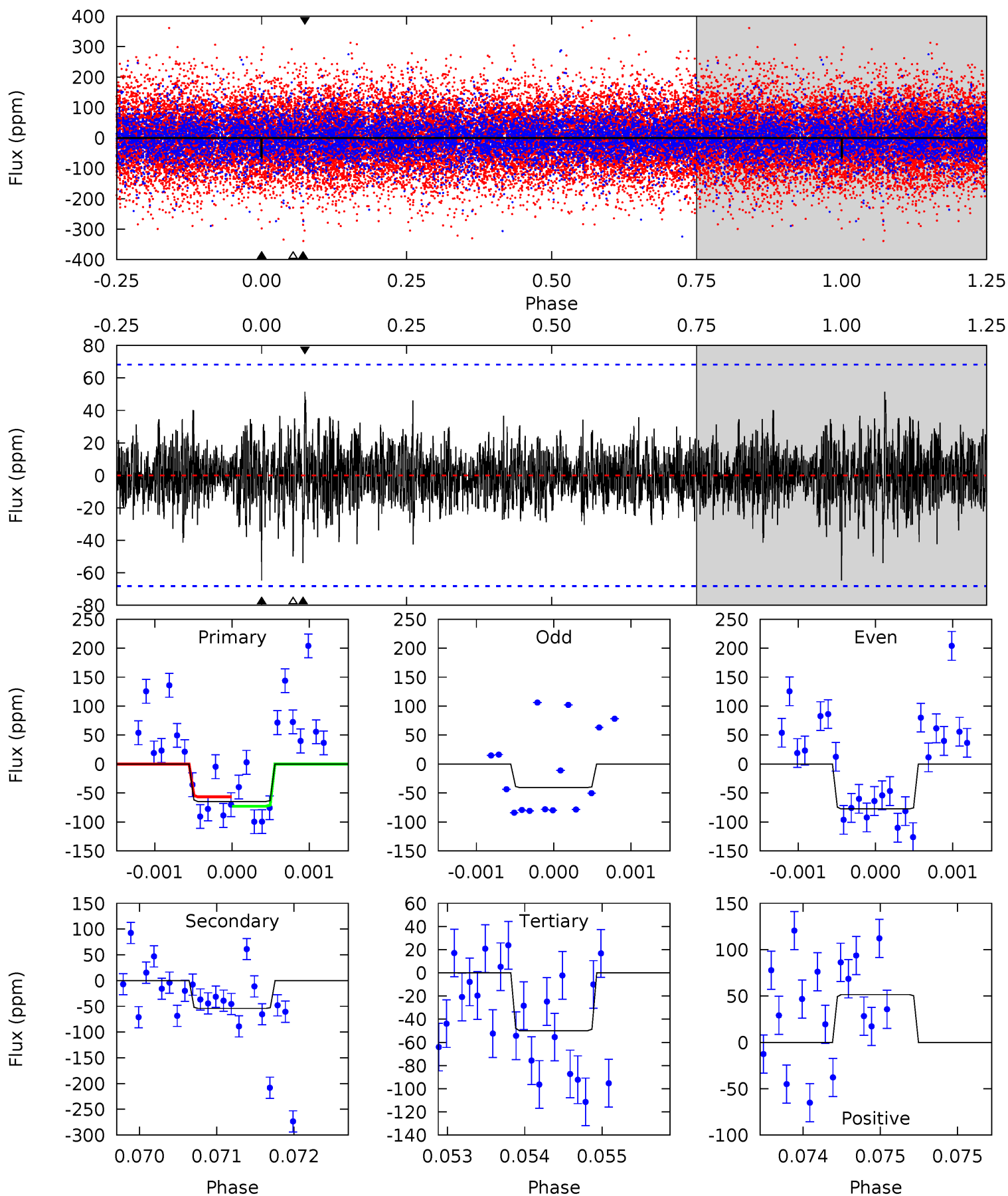
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.49	4.97	4.73	4.59	5.49	3.35	1.32	3.76	3.90	0.25	0.38	1.02	1.14	0.35	0.00



Alt Model-Shift Uniqueness Test

002157489-02, P = 477.654899 Days, E = 80.409219 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.23	4.37	4.04	4.17	5.52	3.40	0.97	1.20	1.07	0.33	0.20	1.40	1.64	0.44	0.66



Stellar Parameters For KIC 002157489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7725^{+216}_{-325}	$3.660^{+0.440}_{-0.110}$	$0.080^{+0.200}_{-0.350}$	$3.556^{+0.724}_{-1.689}$	$2.107^{+0.288}_{-0.535}$	$0.066^{+0.287}_{-0.023}$
	+3%/-4%	+12%/-3%	+250%/-438%	+20%/-47%	+14%/-25%	+434%/-35%
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 002157489-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-60 ± 12	$4.14^{+3.32}_{-2.47}$	704^{+55}_{-81}	6078^{+4295}_{-1293}	4455^{+21372}_{-3109}
Alt.	-54 ± 12	$3.40^{+2.93}_{-2.20}$	702^{+55}_{-82}	6453^{+6214}_{-1503}	5579^{+40713}_{-3874}

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 $A_{obs} \gg 1.0$

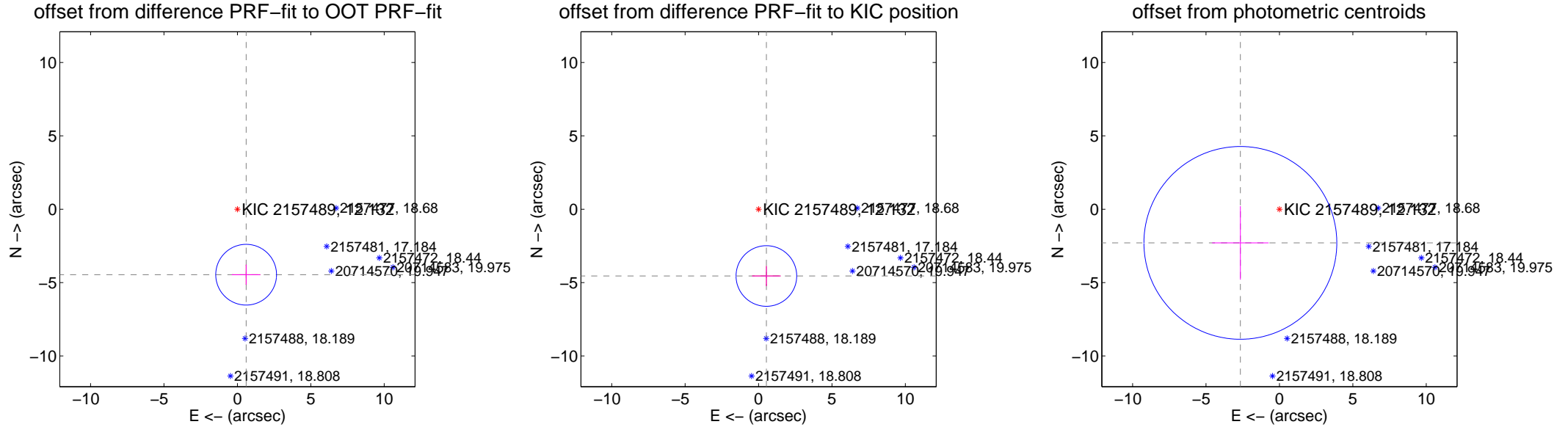
DV Centroid Data

Supplemental centroid analysis for 002157489-02. Kepler magnitude: 12.13. Transit SNR 7.55

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.502 ± 0.690	6.53	-0.596 ± 0.970	-4.462 ± 0.684
PRF-fit source offset from KIC position	4.581 ± 0.689	6.65	-0.534 ± 0.970	-4.550 ± 0.684
photometric centroid source offset	3.51 ± 2.19	1.60	2.66 ± 1.92	-2.29 ± 2.50



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.

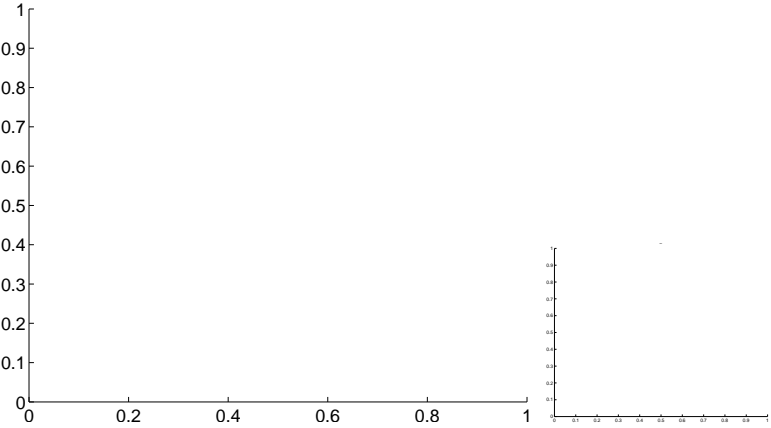


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

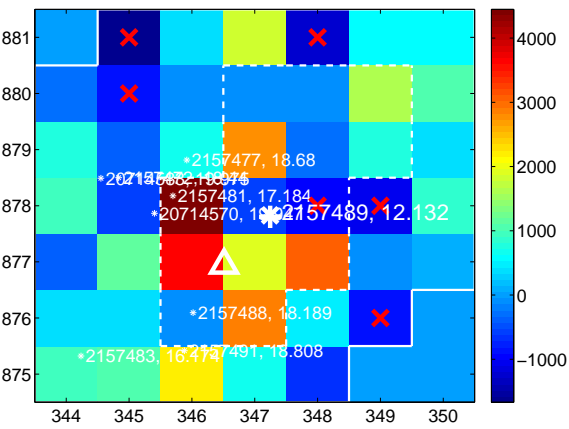
Q5 no difference image



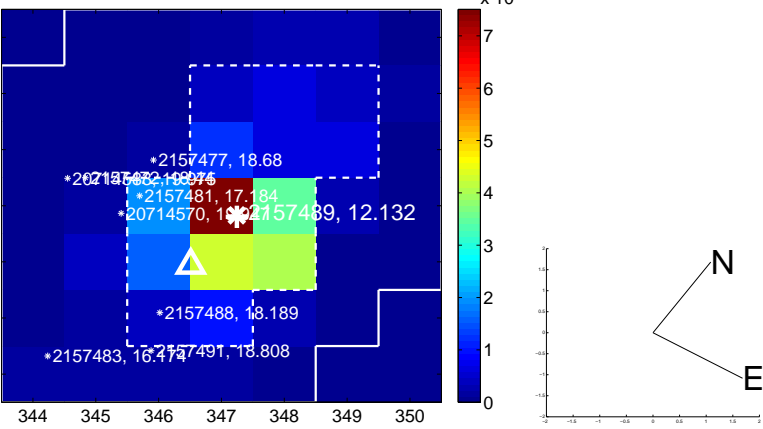
Q5 no OOT image



Q6 difference image. Poor Quality



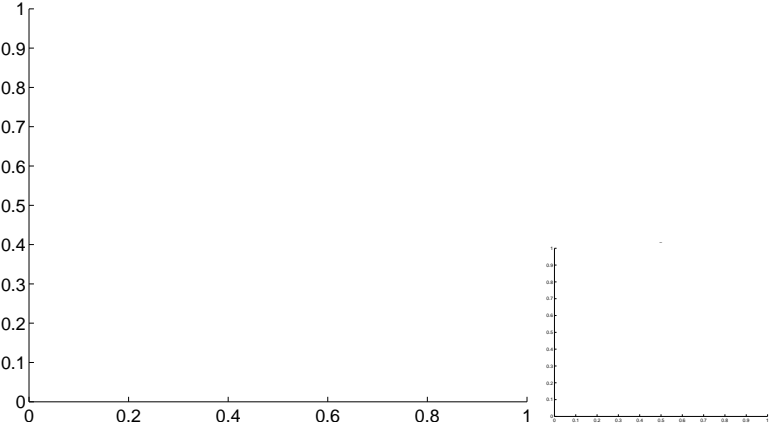
Q6 OOT image



Q7 no difference image



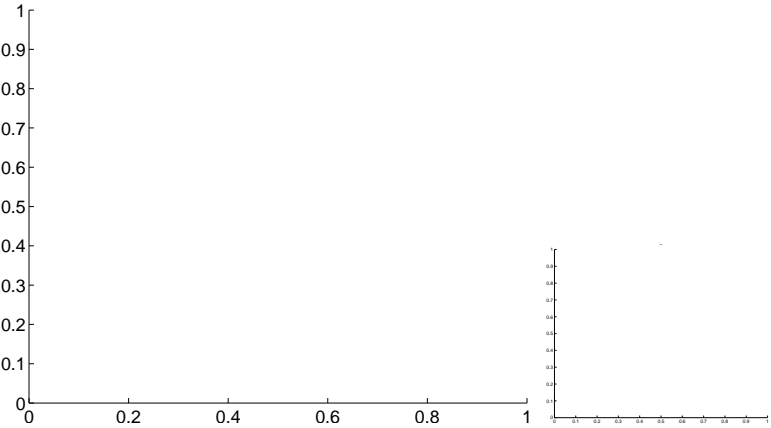
Q7 no OOT image



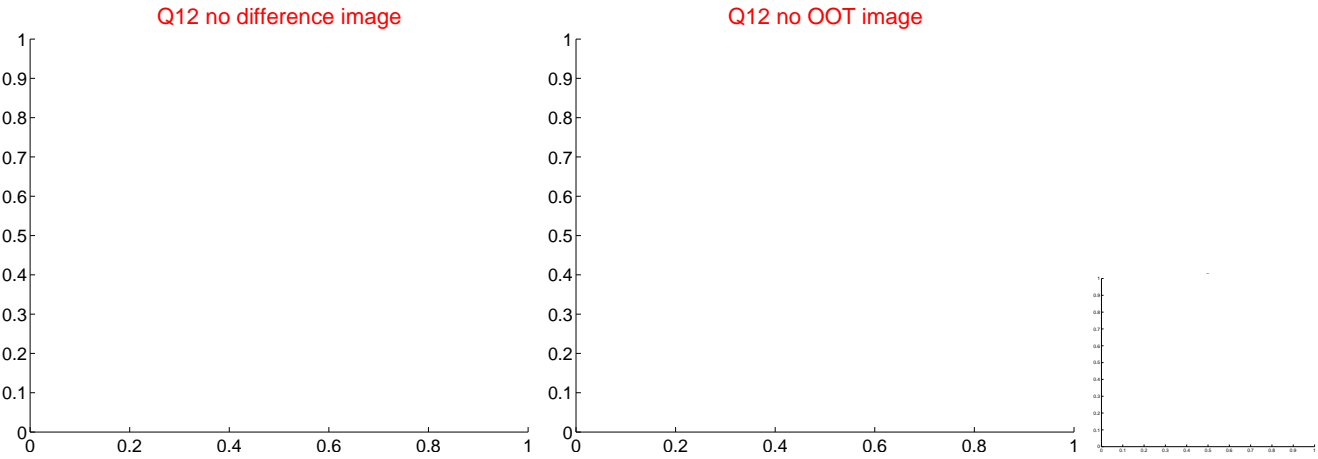
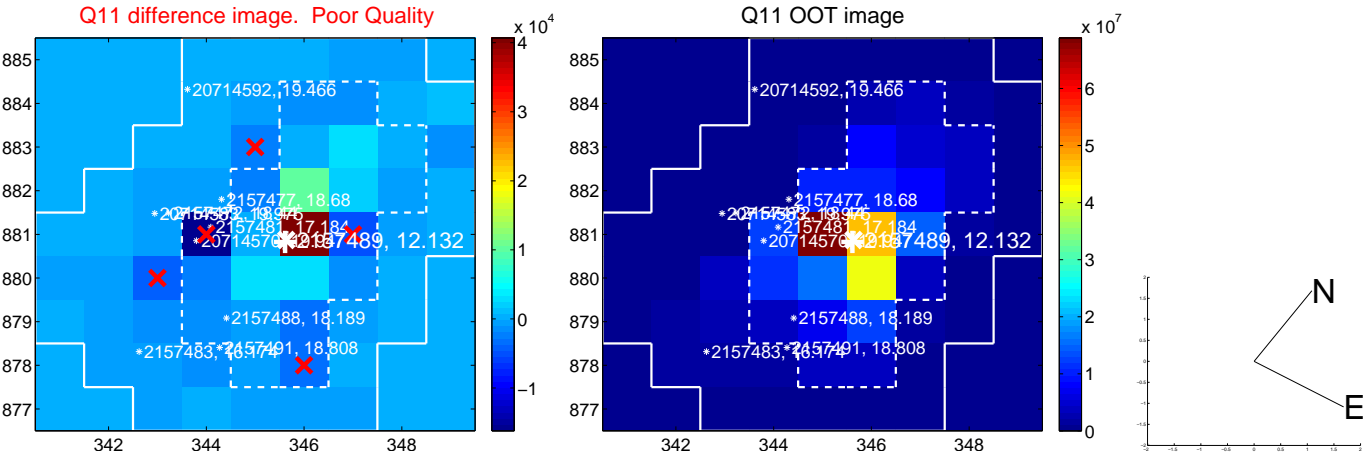
Q8 no difference image



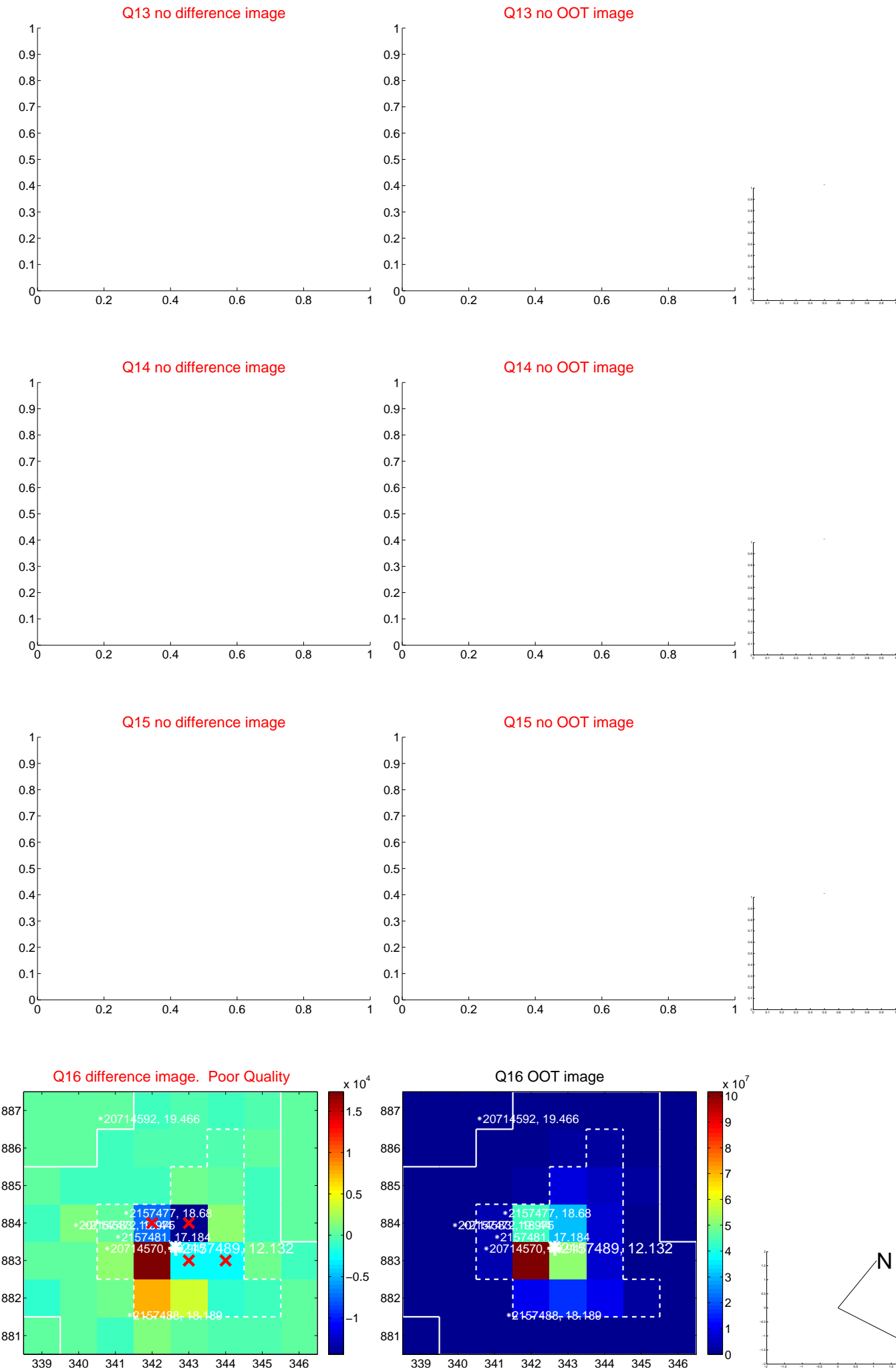
Q8 no OOT image



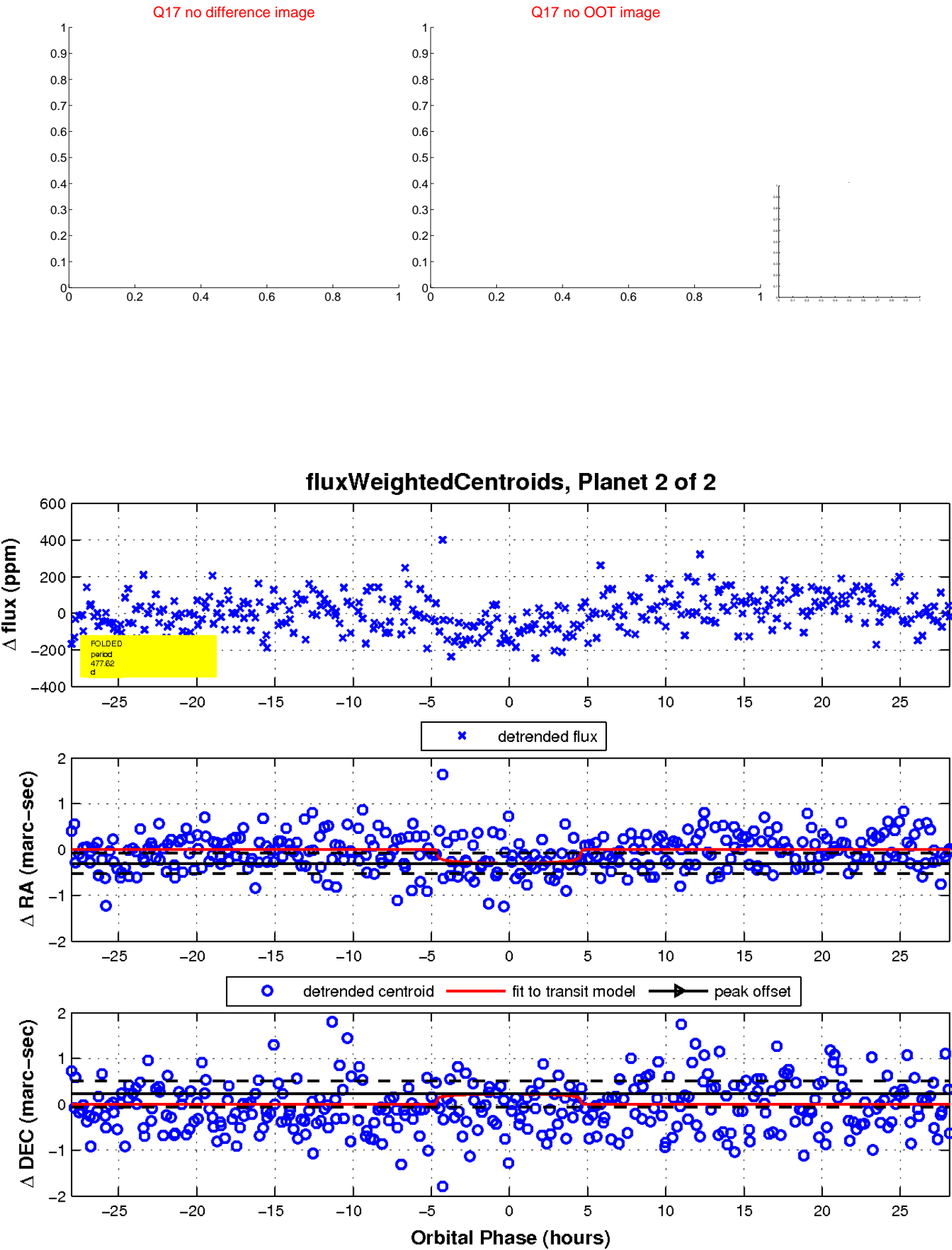
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

