

KIC 009150539

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})
009150539-01	OBS	No	576.209545	175.861046	1676.9	13.019	13.2	4.8	0.74	5596	3.12	0.34
009150539-02	OBS	No	555.077577	343.128099	2009.3	4.580	14.6	8.4	0.74	5596	3.40	0.35
009150539-03	OBS	No	438.495727	312.624865	1689.8	8.545	14.3	5.9	0.74	5596	3.09	0.49
009150539-04	OBS	No	455.108064	166.506981	1432.6	5.320	12.4	6.4	0.74	5596	3.06	0.46
009150539-05	OBS	No	343.499363	310.680576	1050.2	2.715	11.8	6.1	0.74	5596	2.70	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

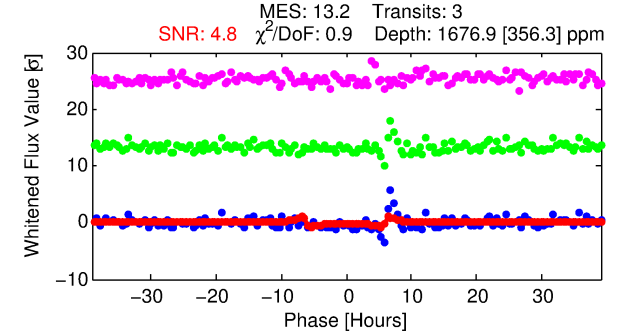
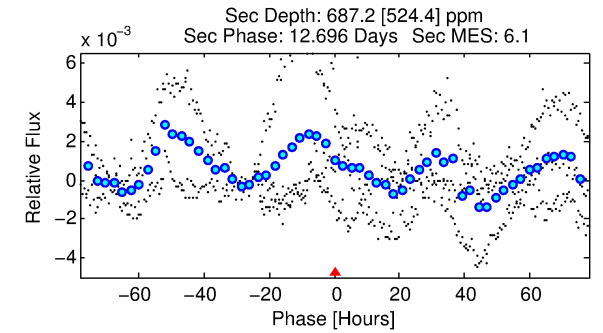
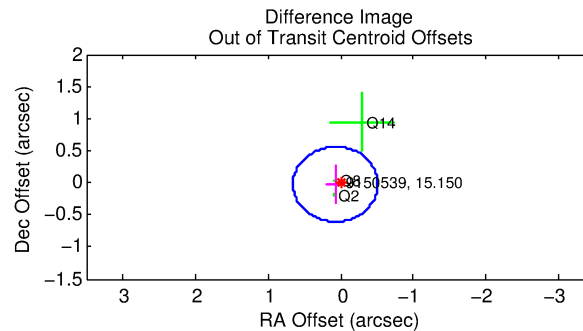
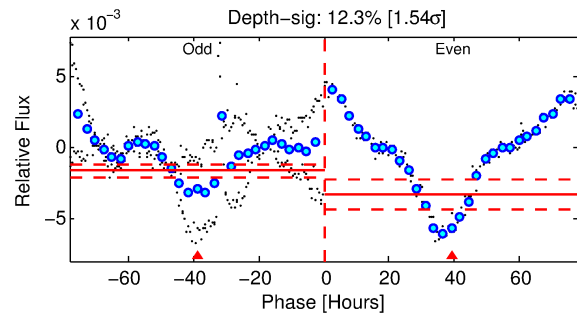
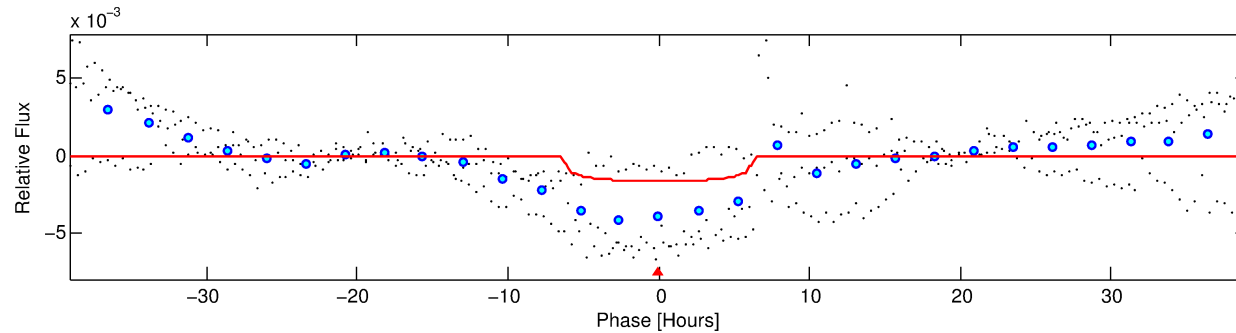
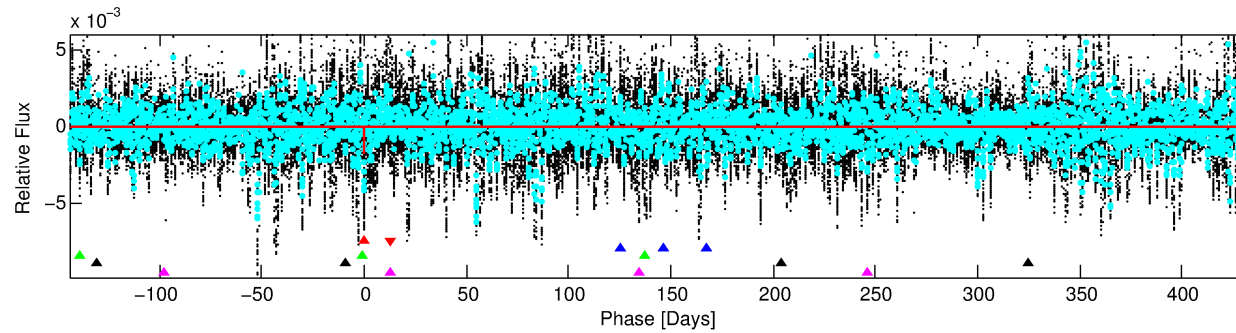
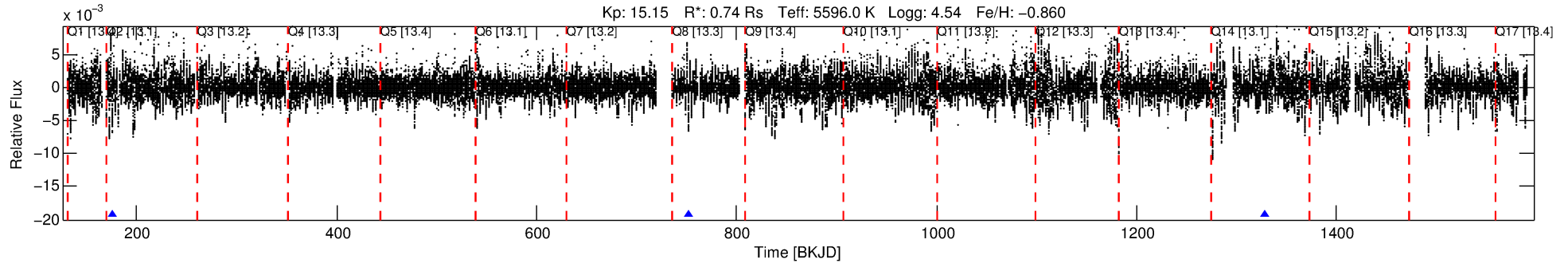
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009150539-01

No Significant Match Found

DV One-Page Summary

KIC: 9150539 Candidate: 1 of 5 Period: 576.210 d



DV Fit Results:

Period = 576.20955 [0.00681] d
Epoch = 175.8610 [0.0089] BKJD
Rp/R* = 0.0386 [0.0093]
a/R* = 304.11 [273.21]
b = 0.52 [1.26]
Seff = 0.34 [0.08]
Teq = 194 [11] K
Rp = 3.12 [0.86] Re
a = 1.1957 [0.1452] AU
Ag = 55374.02 [51093.47] [1.08 σ]
Teffp = 4609 [1051] K [4.20 σ]

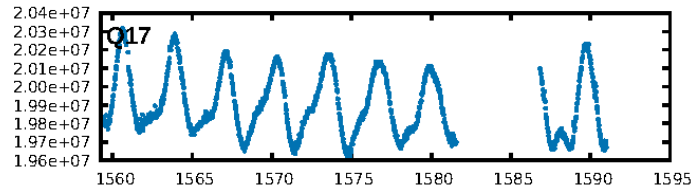
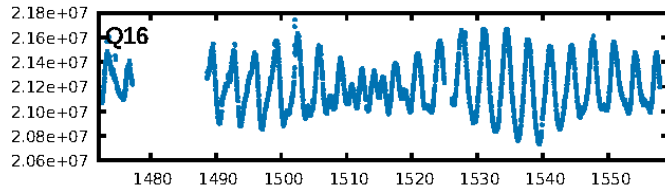
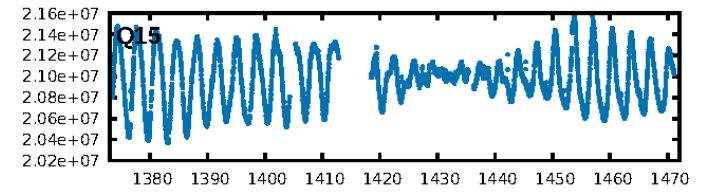
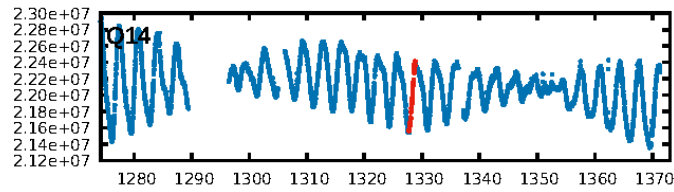
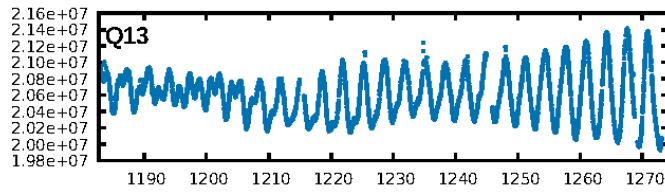
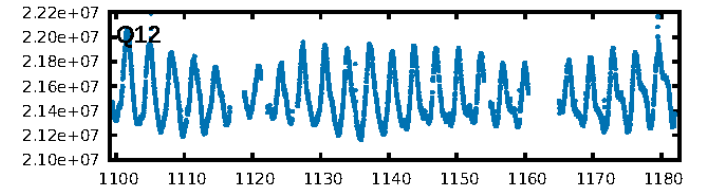
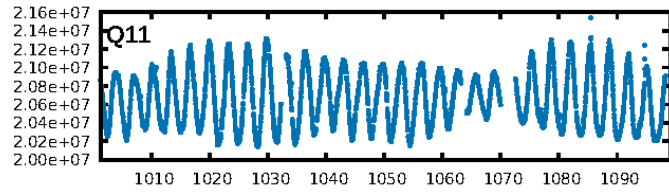
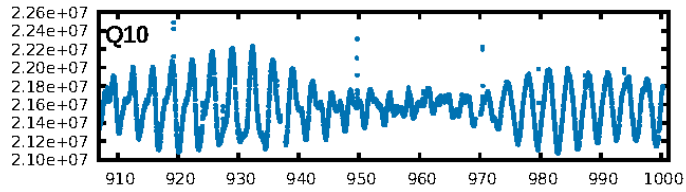
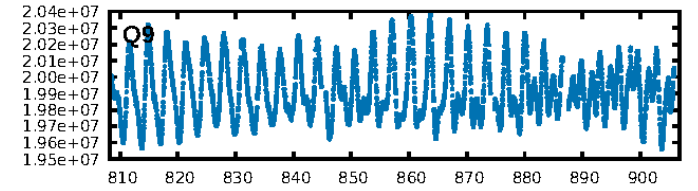
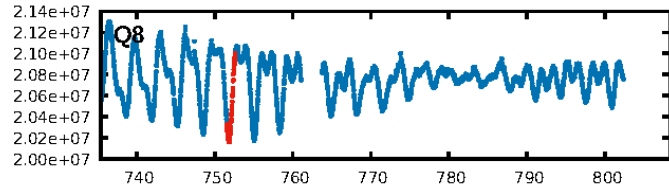
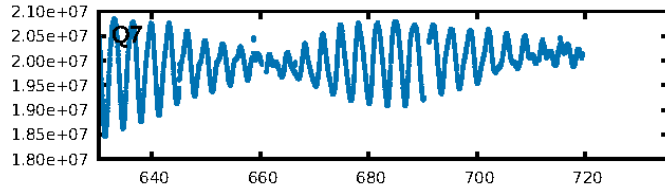
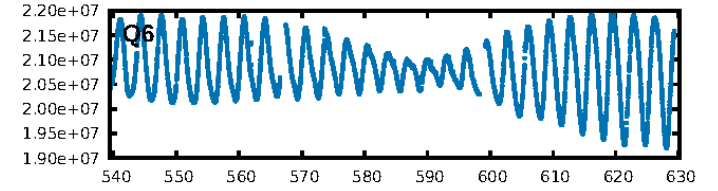
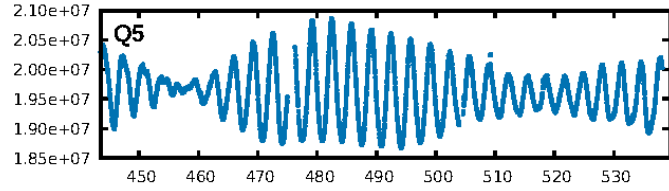
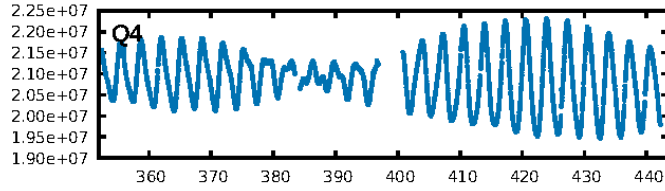
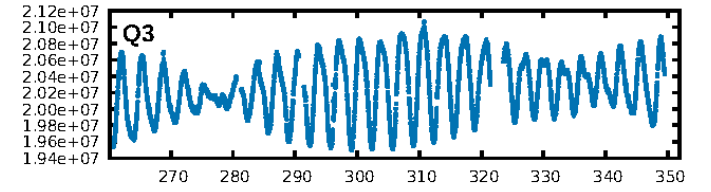
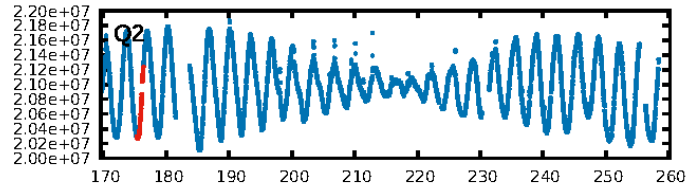
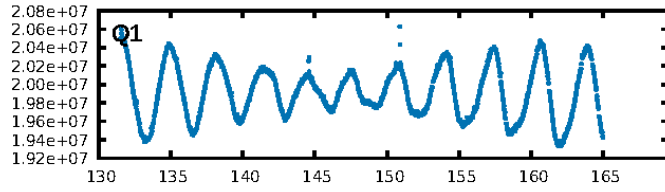
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [36.75 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 16.3%
ModelChiSquareGof-sig: 98.8%
Bootstrap-pfa: 9.53e-12
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.3034
Centroid-sig: 8.5%
Centroid-so: 0.638 arcsec [1.13 σ]
OotOffset-rm: 0.078 arcsec [0.40 σ]
KicOffset-rm: 0.091 arcsec [0.30 σ]
OotOffset-st: 2/0/1/0 [3]
KicOffset-st: 2/0/1/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

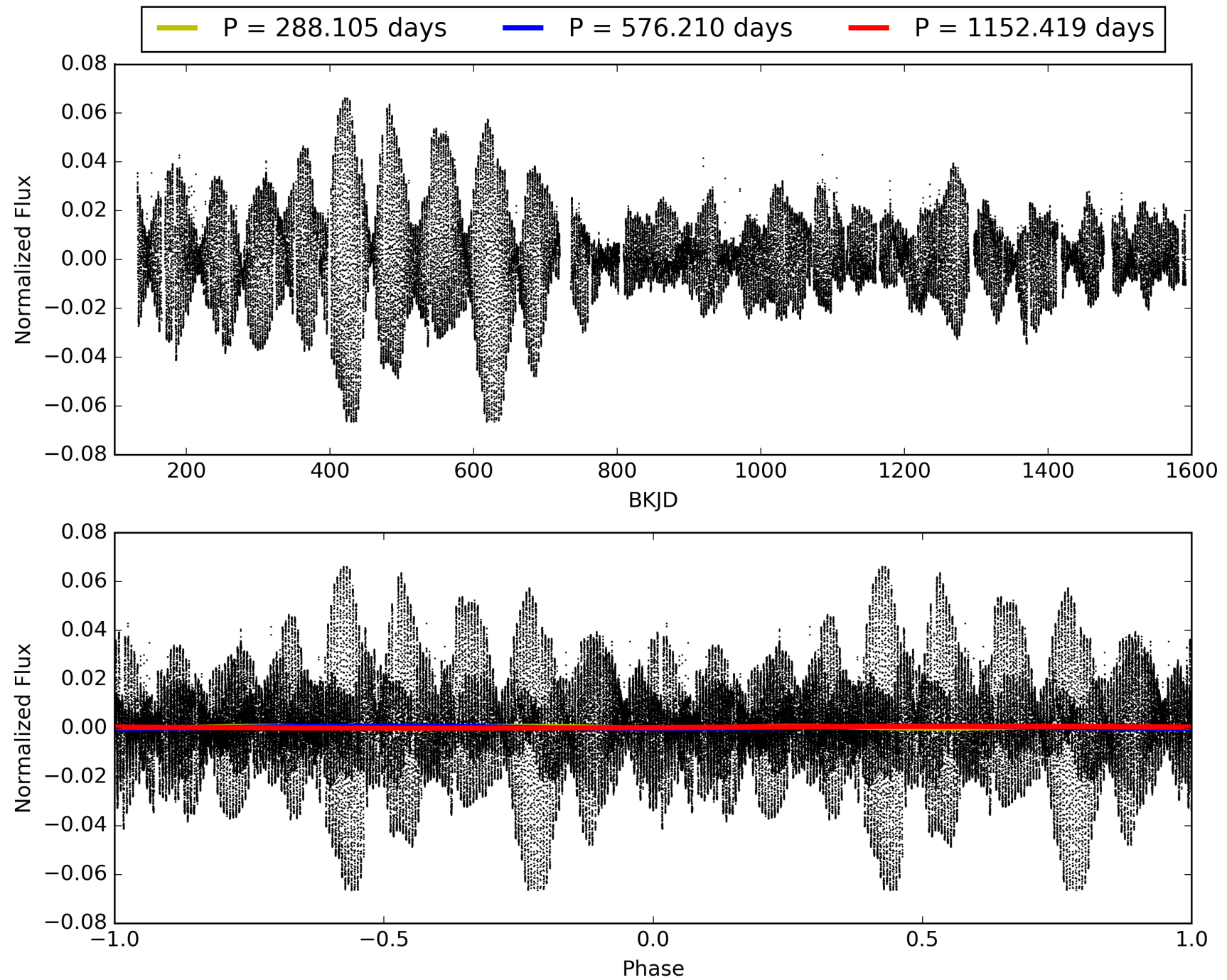
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:36:26 Z

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

TCE 009150539-01, PDC Light Curves

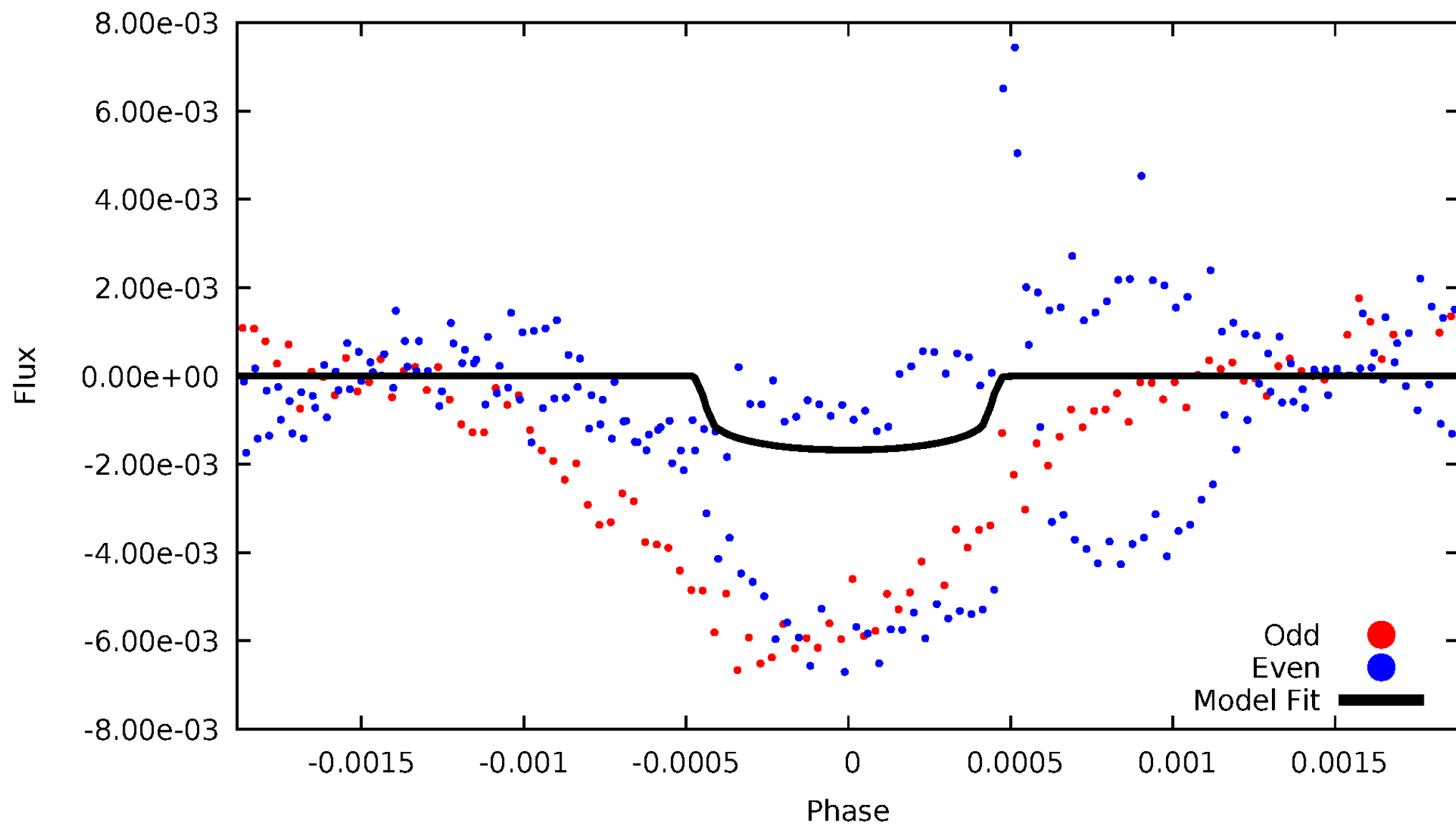


TCE 009150539-01



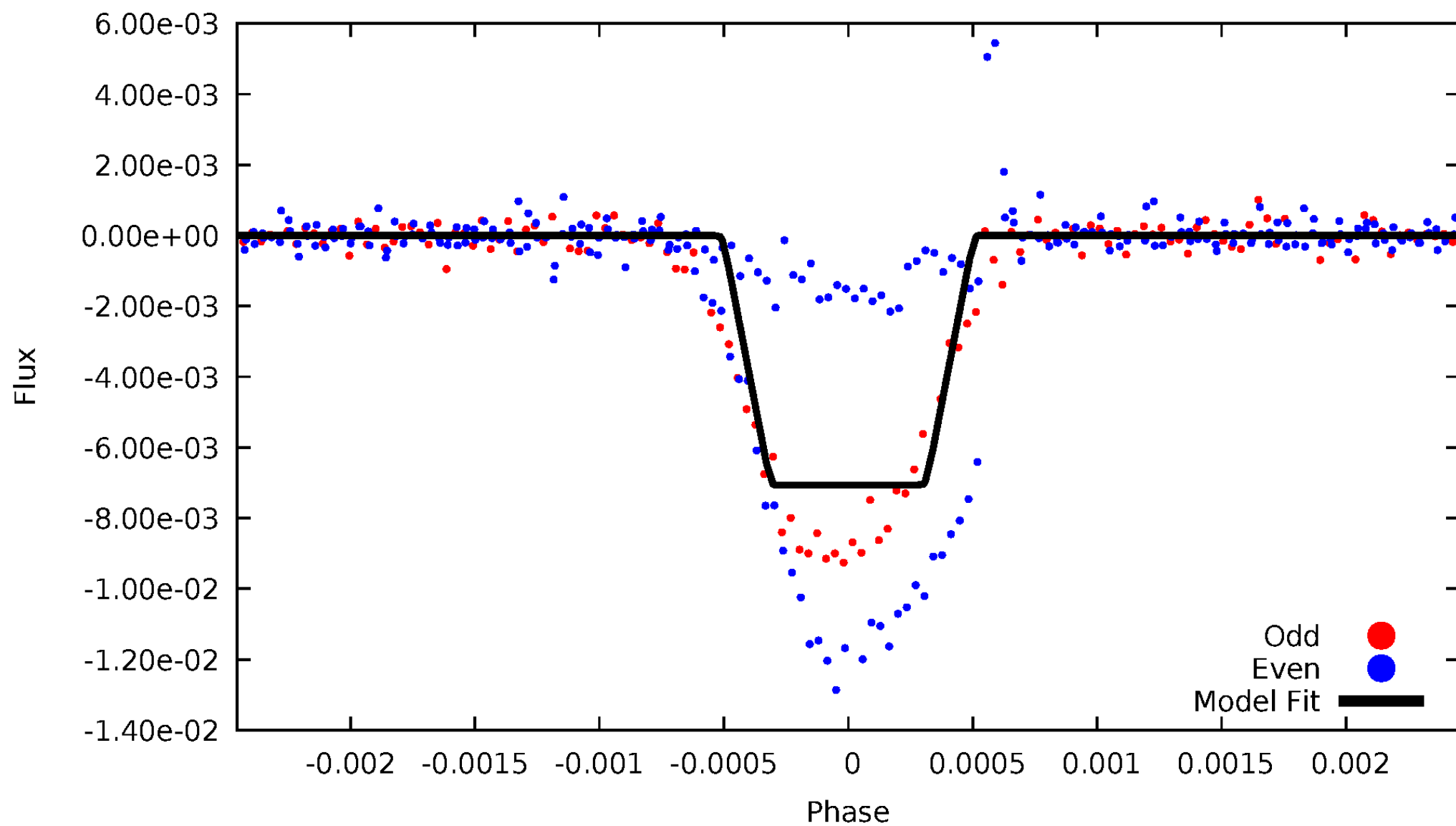
DV Odd/Even

TCE 009150539-01



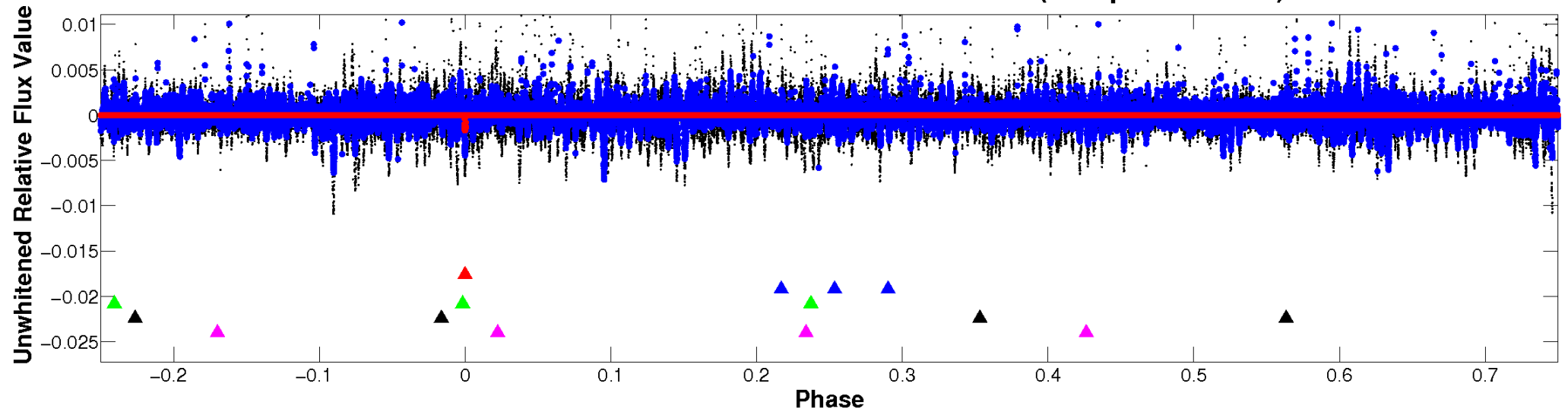
ALT Odd/Even

TCE 009150539-01

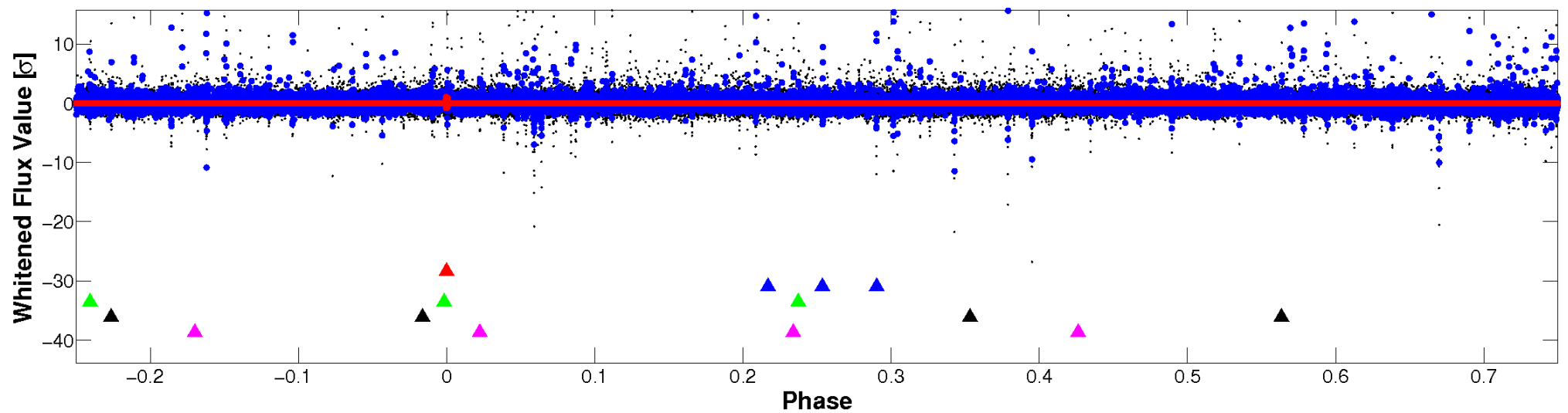


Non-Whitened Vs. Whitened Light Curve

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

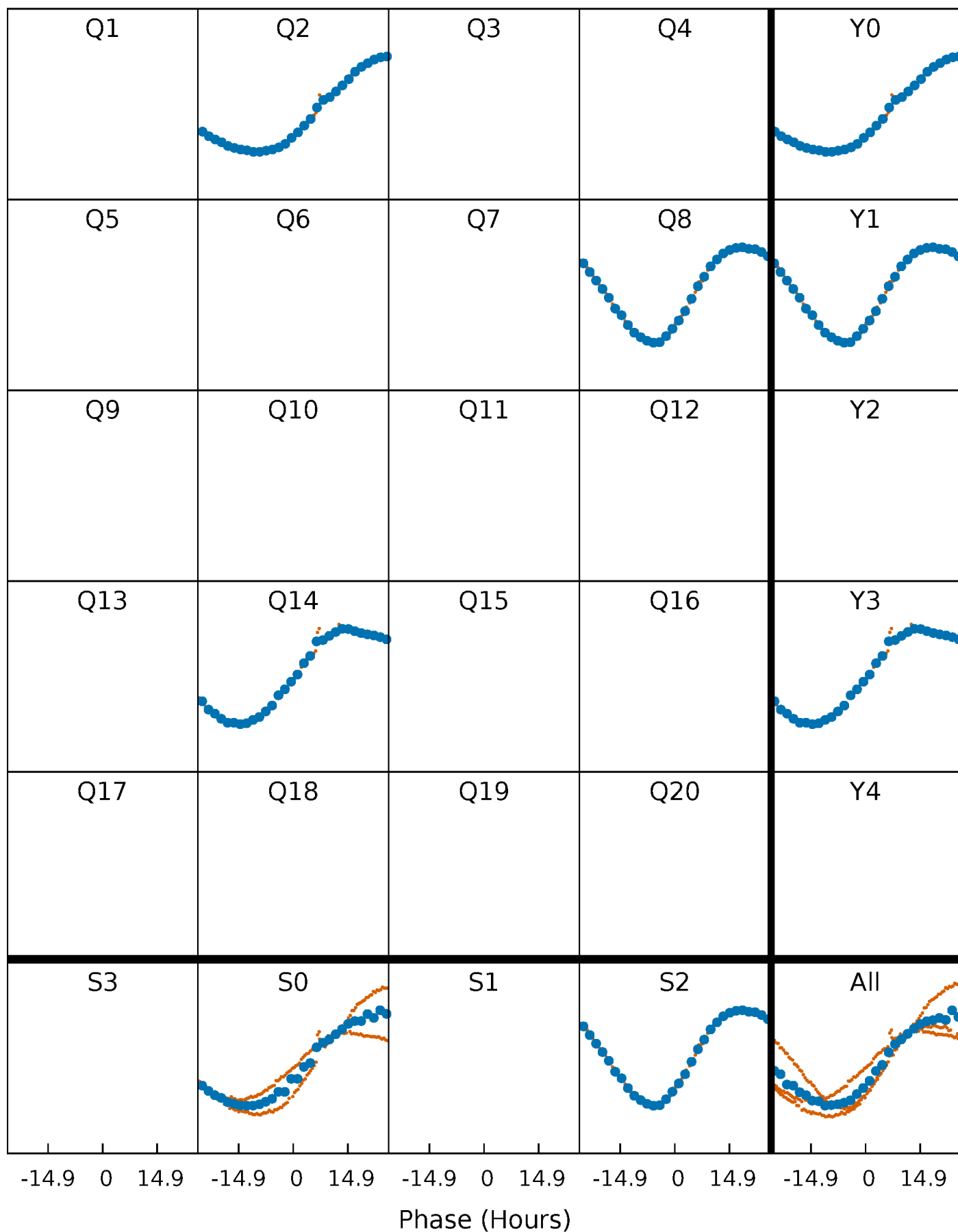


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



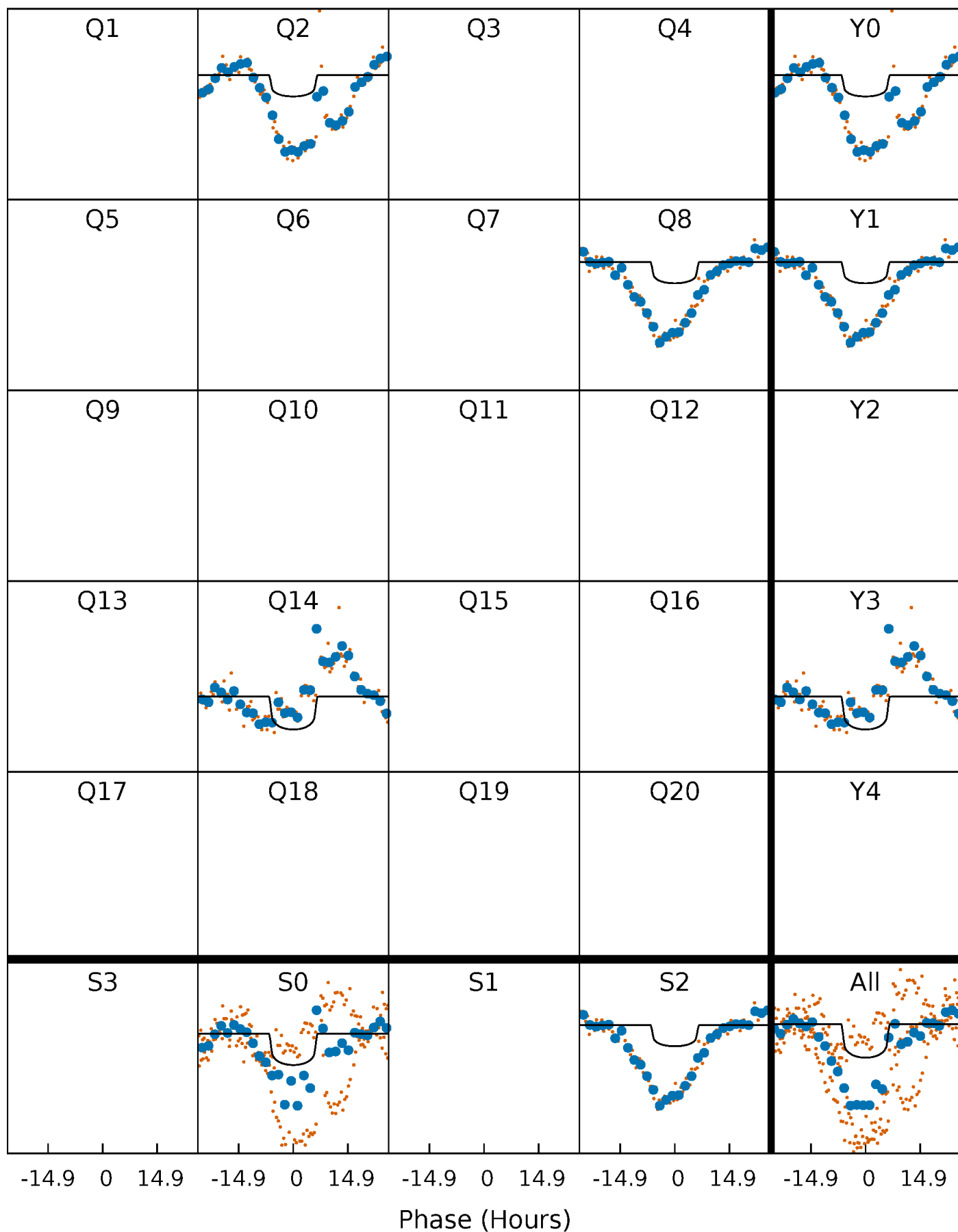
PDC Quarter-Phased Transit Curves

TCE 009150539-01 P=576.209545 Days $T_0=175.861046$ (BKJD)



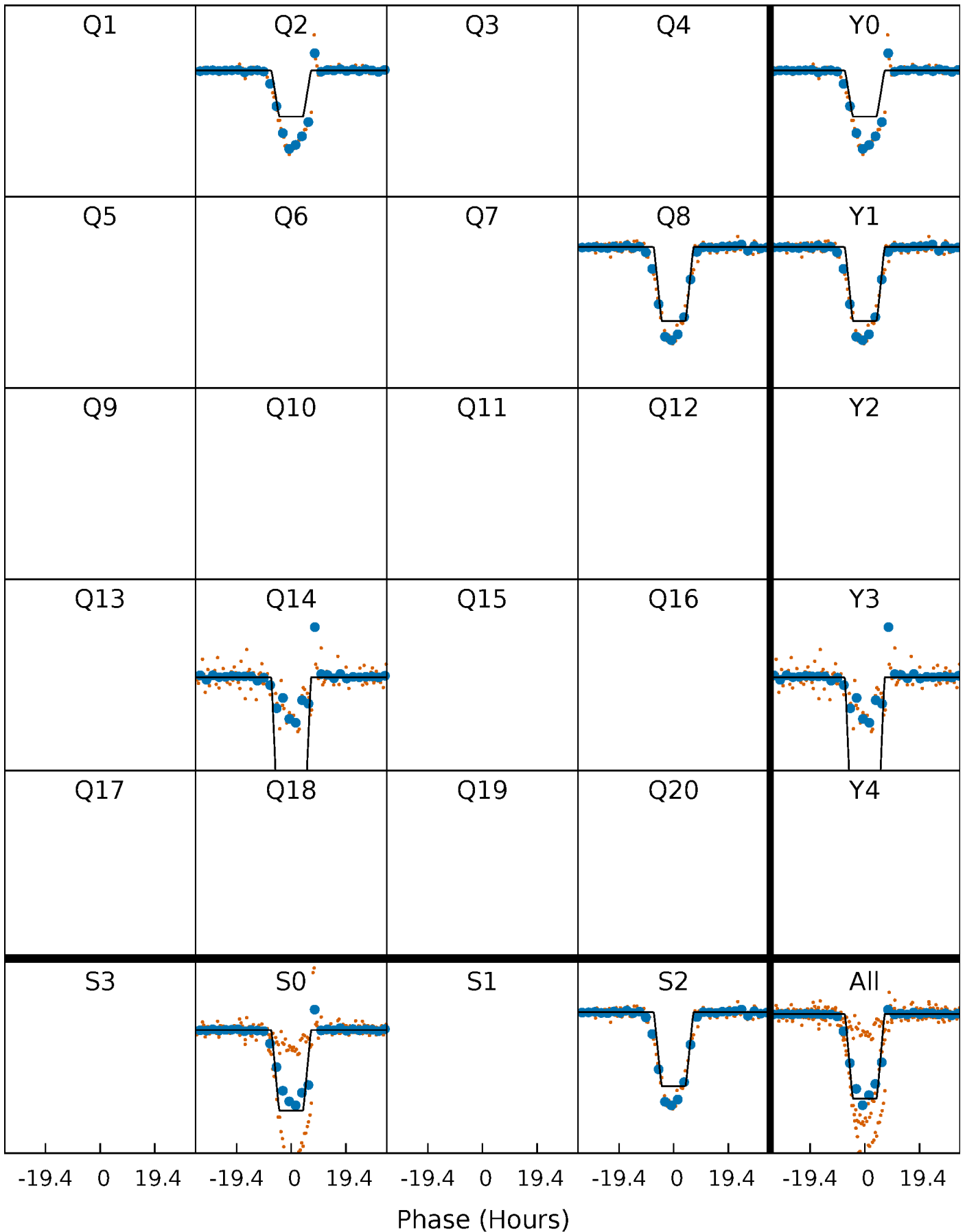
DV Quarter-Phased Transit Curves

TCE 009150539-01 P=576.209545 Days $T_0=175.861046$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

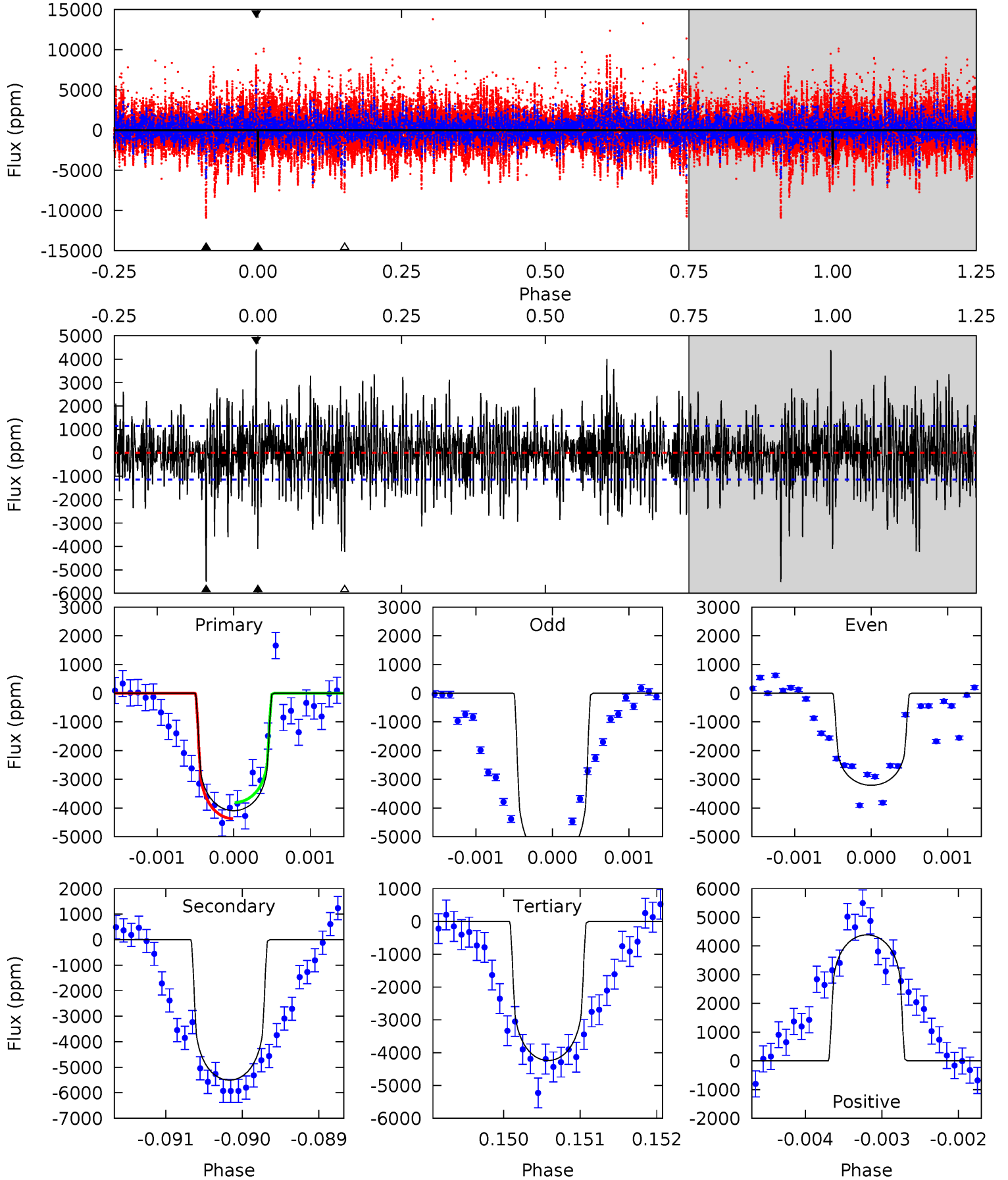
TCE 009150539-01 P=576.205958 Days $T_0=175.821550$ (BKJD)



DV Model-Shift Uniqueness Test

009150539-01, P = 576.209545 Days, E = 175.861046 Days

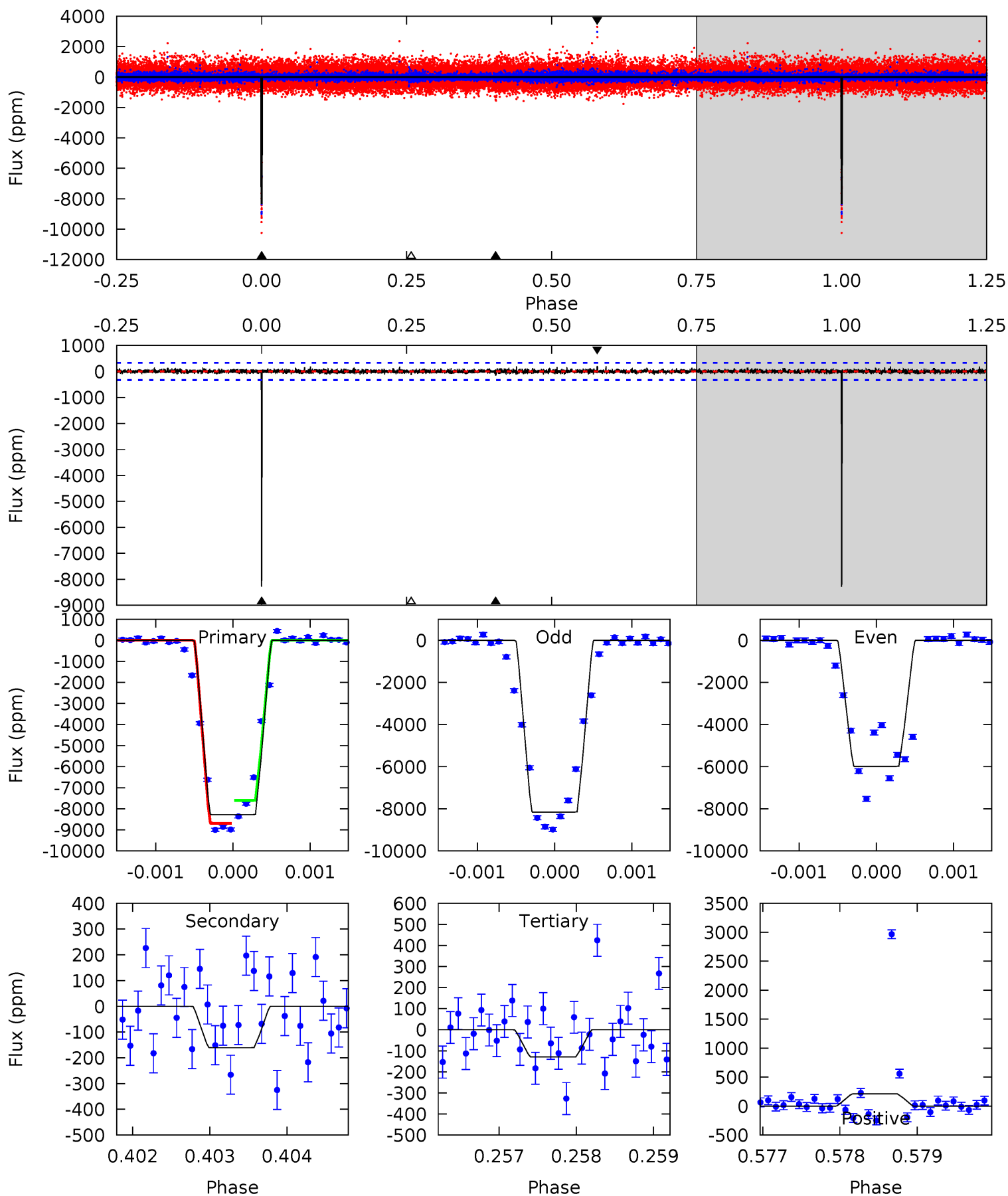
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.5	26.2	20.2	20.9	5.46	3.30	5.13	-0.69	-1.41	6.03	5.31	5.98	0.70	0.44	1.34



Alt Model-Shift Uniqueness Test

009150539-01, P = 576.205958 Days, E = 175.821550 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
136.2	2.64	2.13	3.45	5.45	3.28	0.54	134.1	132.7	0.51	-0.81	23.5	0.84	0.02	0



Stellar Parameters For KIC 009150539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5596^{+183}_{-166}	$4.535^{+0.110}_{-0.090}$	$-0.860^{+0.350}_{-0.300}$	$0.741^{+0.097}_{-0.088}$	$0.686^{+0.081}_{-0.029}$	$2.380^{+1.042}_{-0.667}$
	+3%/-3%	+2%/-2%	+41%/-35%	+13%/-12%	+12%/-4%	+44%/-28%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009150539-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-5503 ± 210	$3.08^{+0.83}_{-0.73}$	271^{+13}_{-13}	7988^{+1568}_{-1007}	$462808^{+347009}_{-175176}$
Alt.	-161 ± 61	$6.80^{+0.92}_{-0.95}$	271^{+13}_{-13}	2878^{+187}_{-196}	2710^{+1539}_{-1113}

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

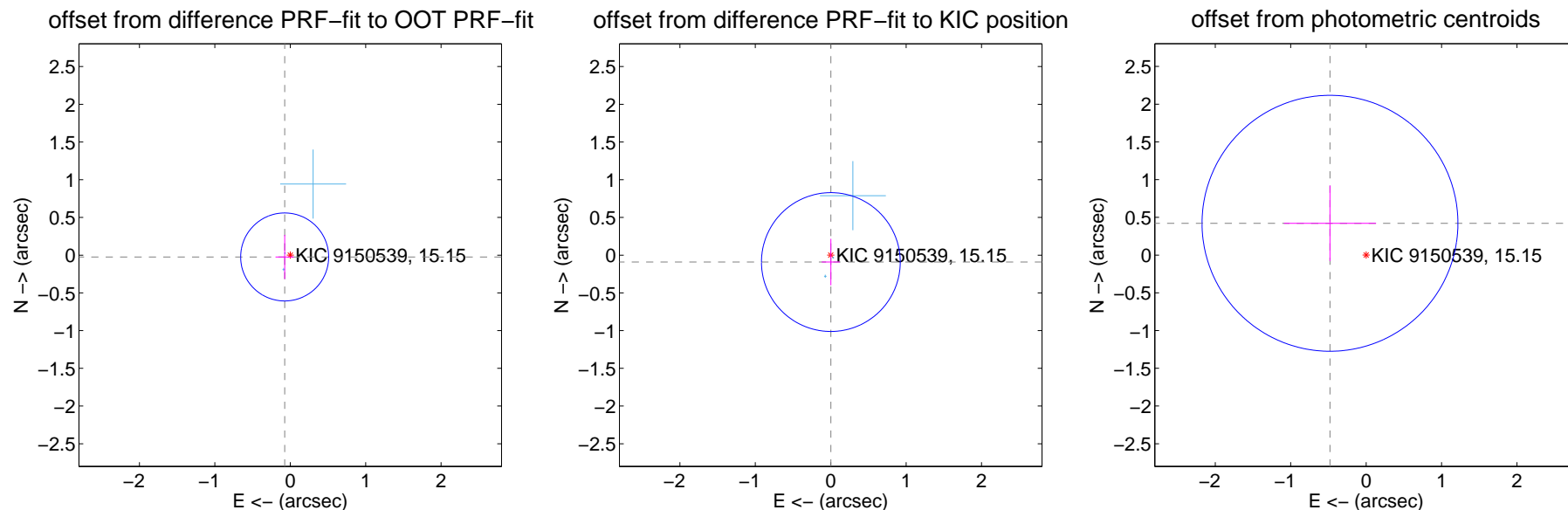
DV Centroid Data

Supplemental centroid analysis for 009150539-01. Kepler magnitude: 15.15. Transit SNR 4.77

There are 3 quarters with good PRF difference image offsets

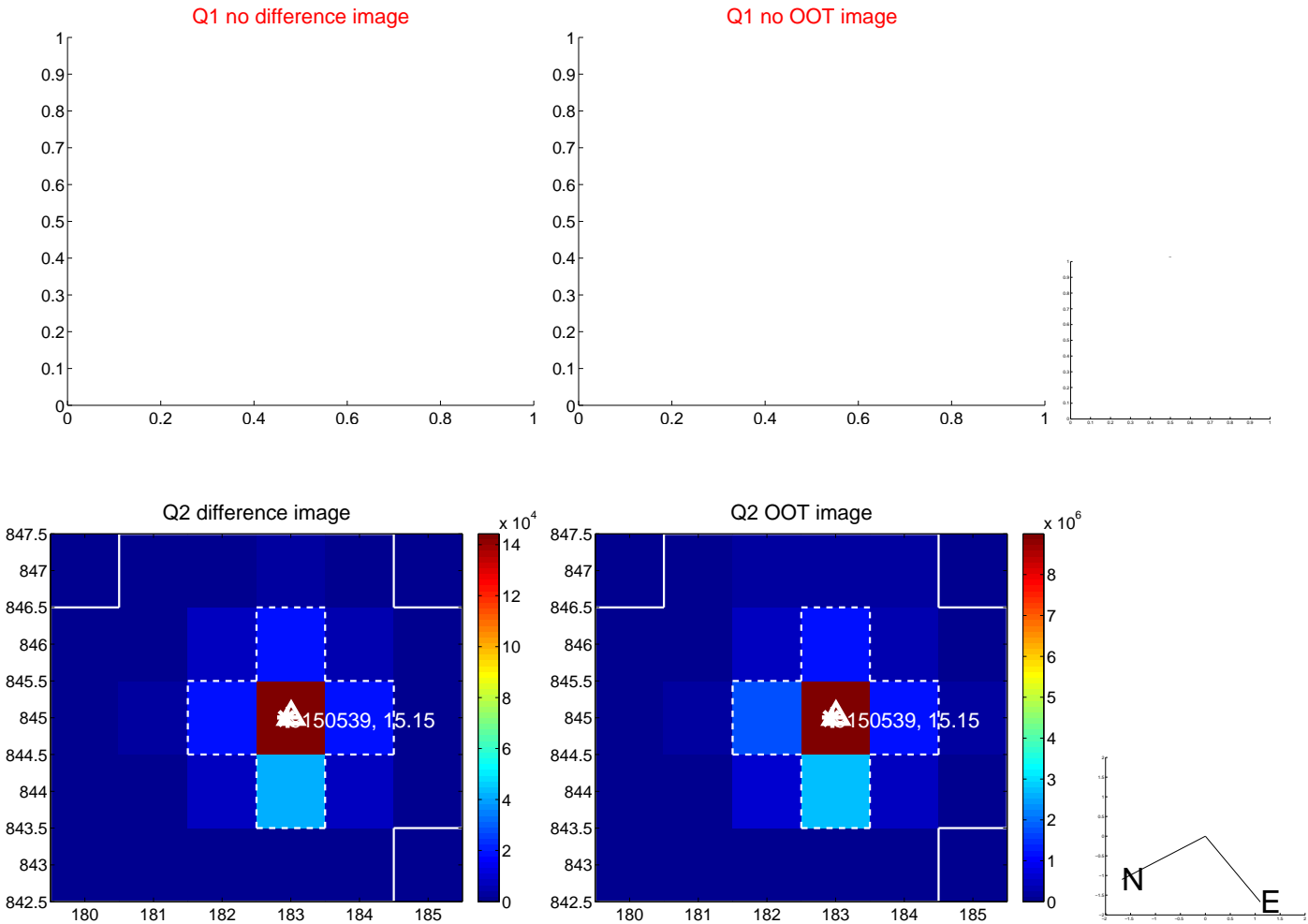
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.078 ± 0.194	0.40	0.074 ± 0.121	-0.024 ± 0.292
PRF-fit source offset from KIC position	0.091 ± 0.307	0.30	-0.002 ± 0.120	-0.091 ± 0.309
photometric centroid source offset	0.64 ± 0.57	1.13	0.48 ± 0.61	0.42 ± 0.50

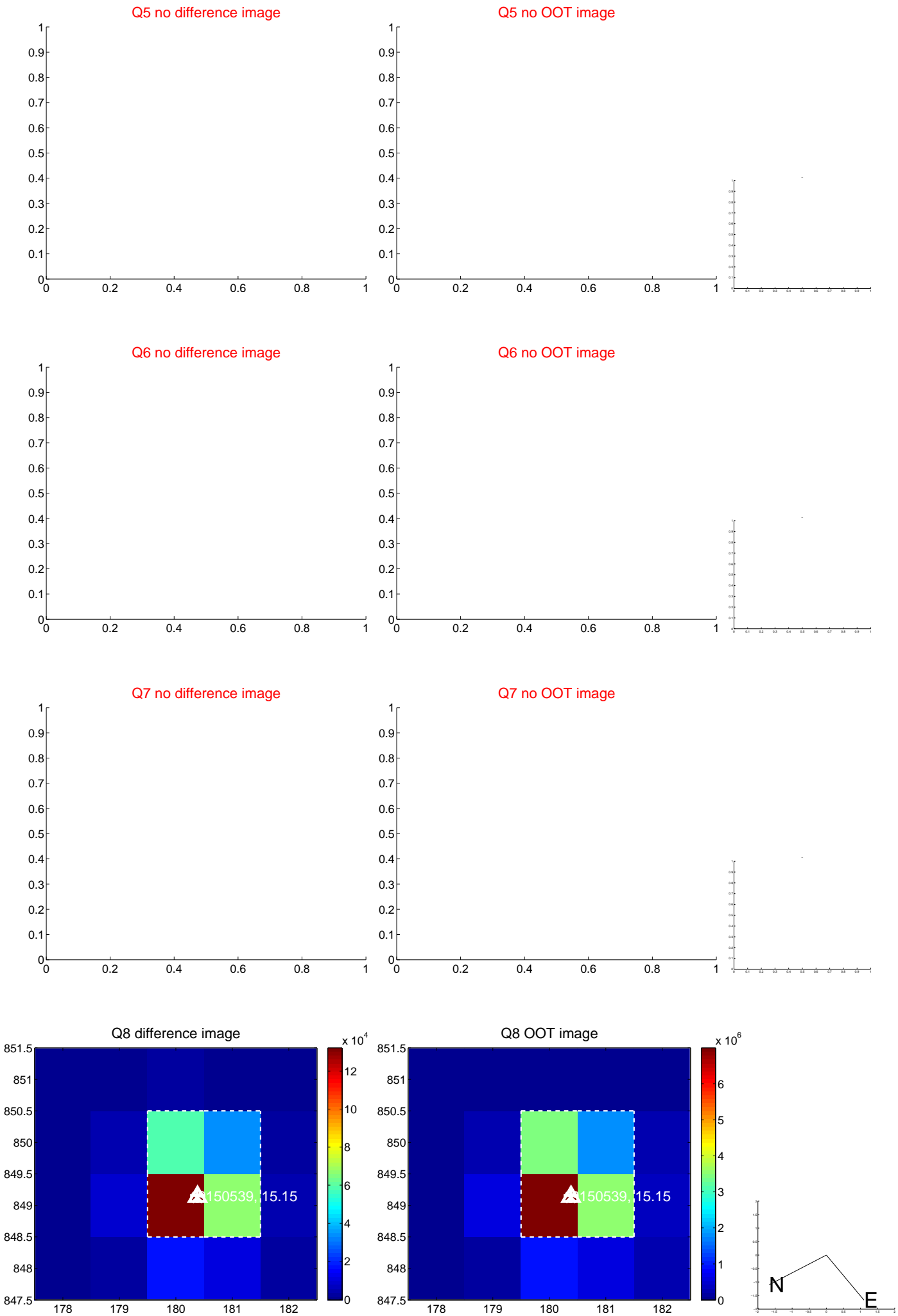


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



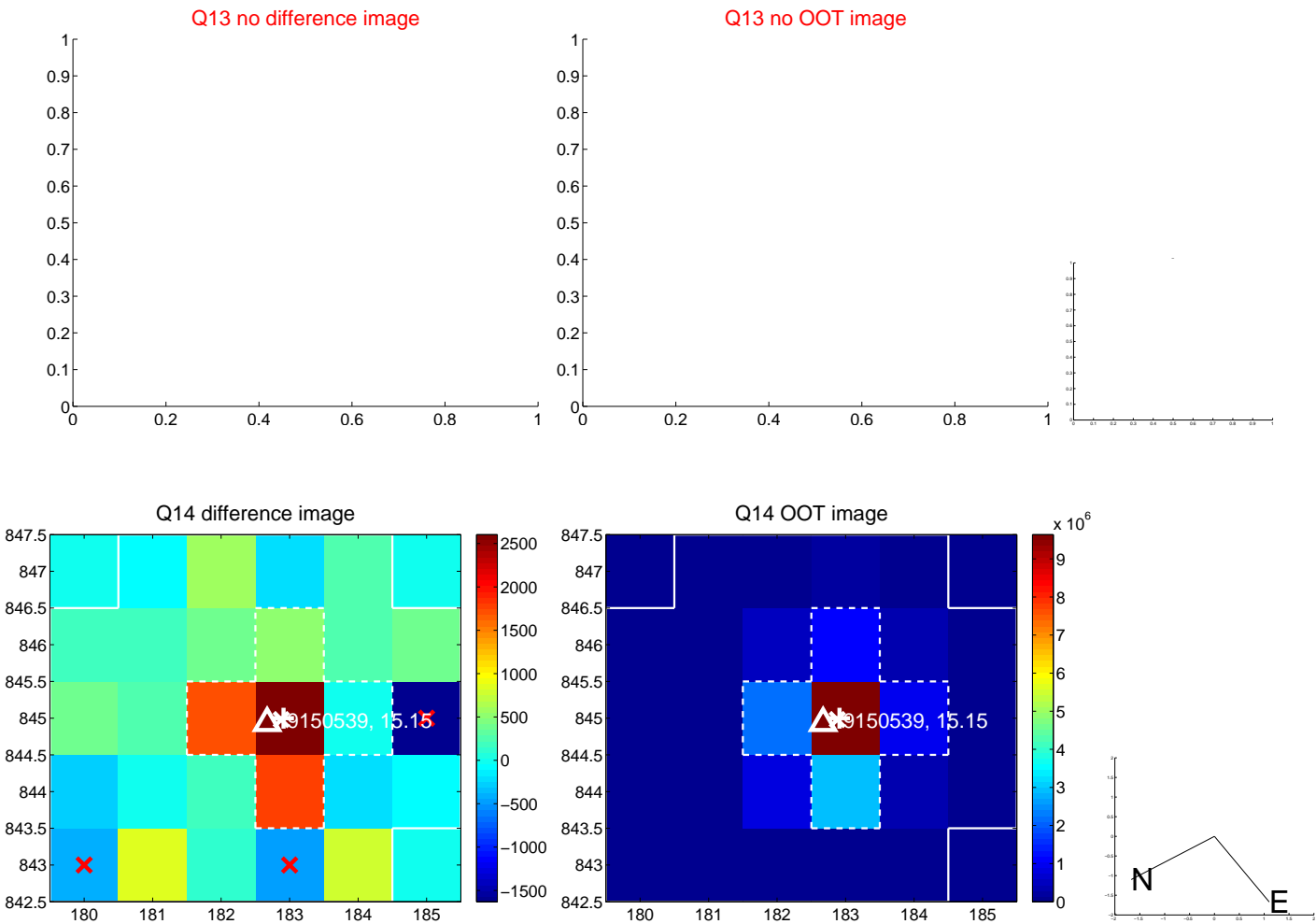
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



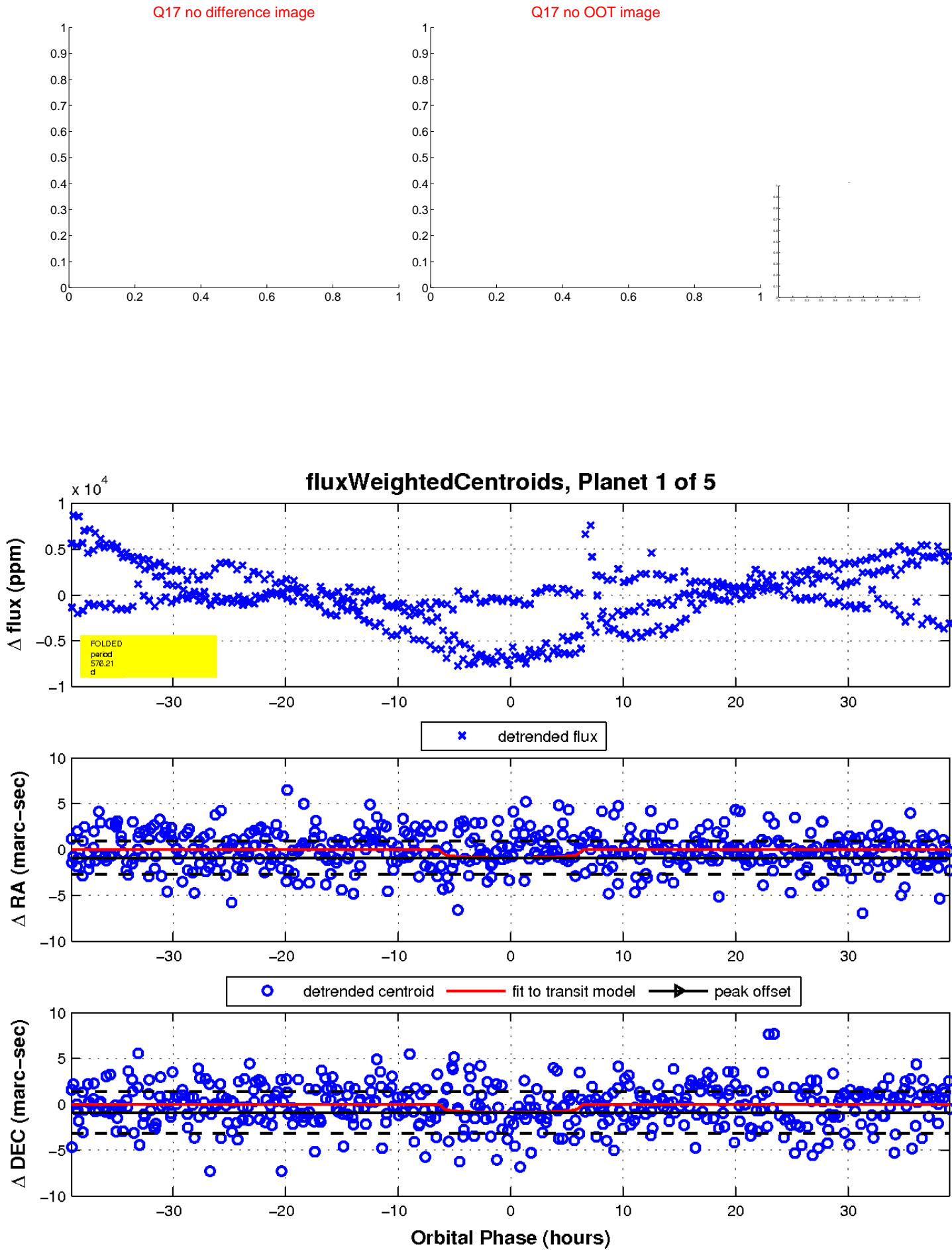
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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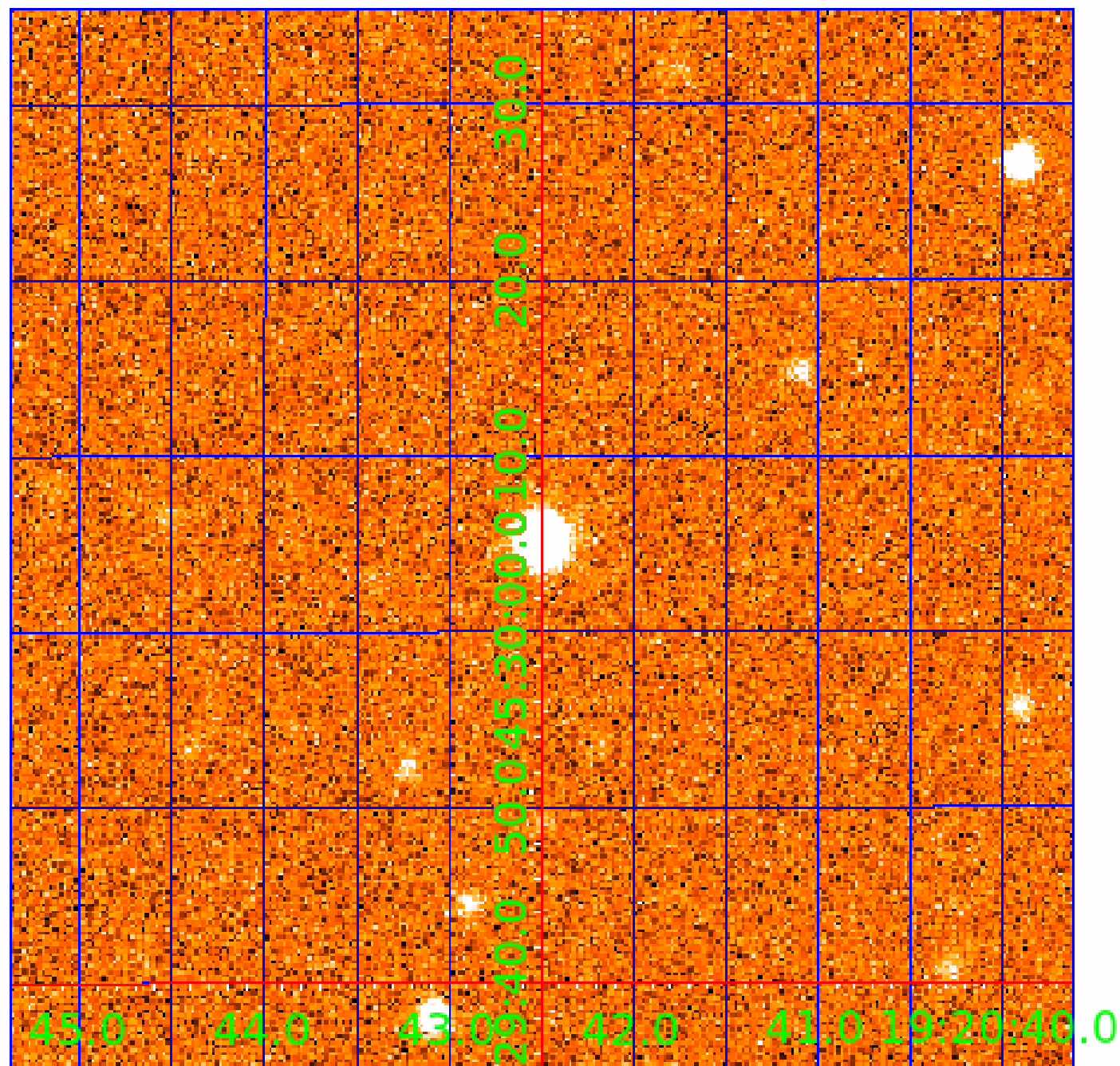


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009150539

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})
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Robovetter Results

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009150539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

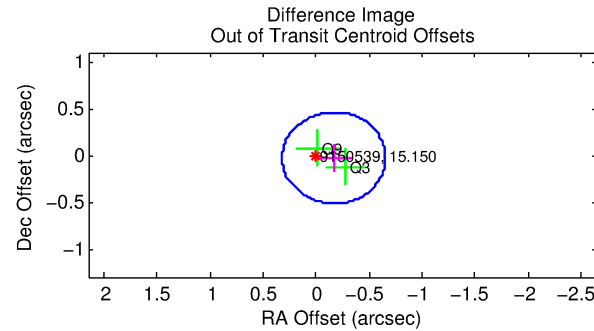
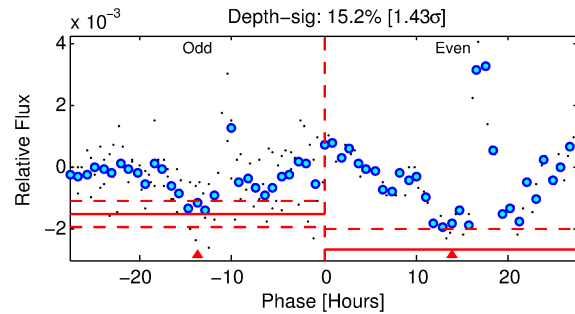
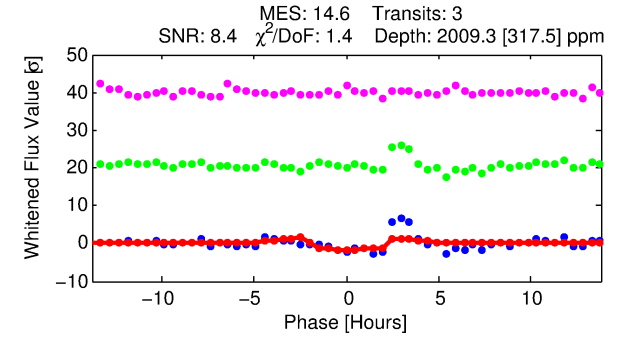
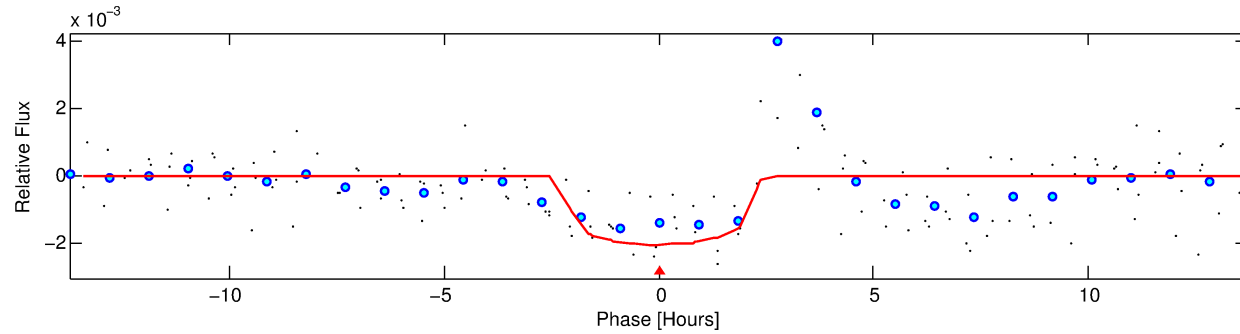
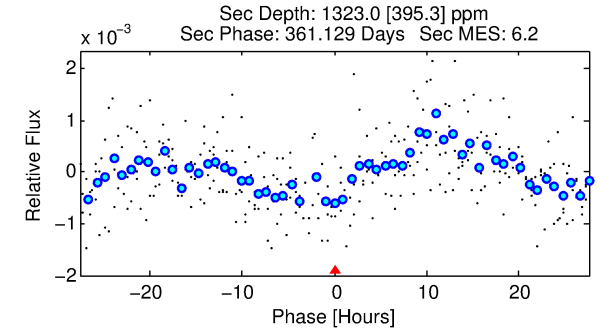
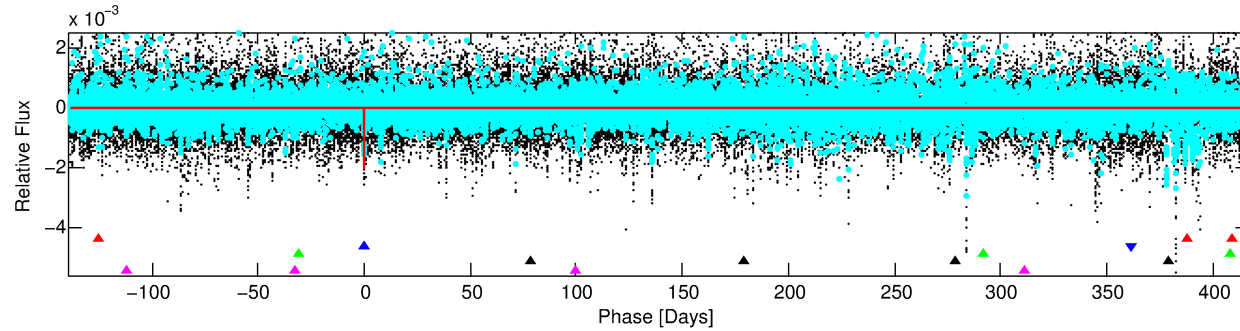
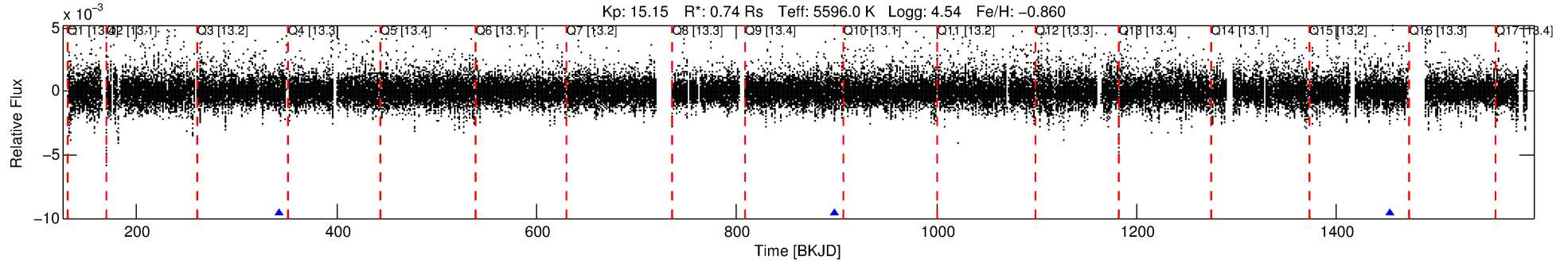
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009150539-02

No Significant Match Found

DV One-Page Summary

KIC: 9150539 Candidate: 2 of 5 Period: 555.078 d



DV Fit Results:

Period = 555.07758 [0.00613] d
Epoch = 343.1281 [0.0082] BKJD
Rp/R* = 0.0421 [0.0293]
a/R* = 855.53 [2759.38]
b = 0.48 [5.20]
Seff = 0.35 [0.08]
Teq = 197 [11] K
Rp = 3.40 [2.41] Re
a = 1.1663 [0.1416] AU
Ag = 85446.29 [122554.37] [0.70 σ]
Teffp = 5202 [1857] K [2.70 σ]

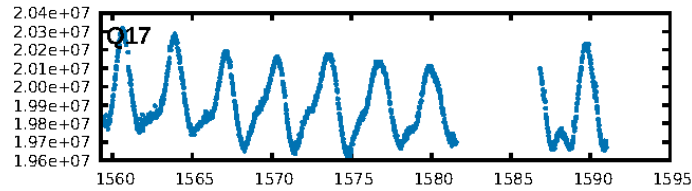
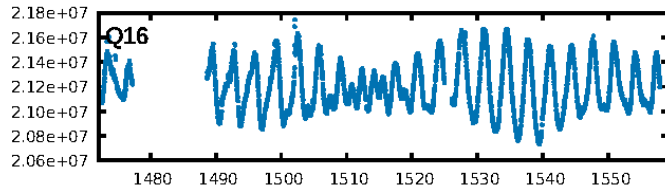
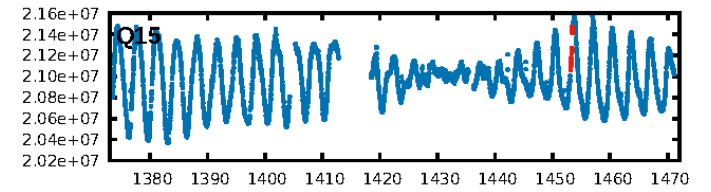
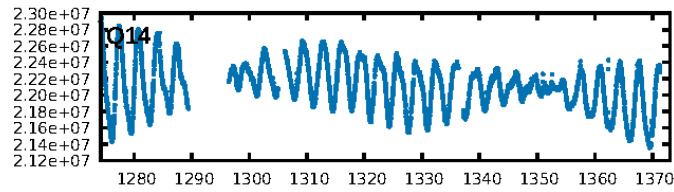
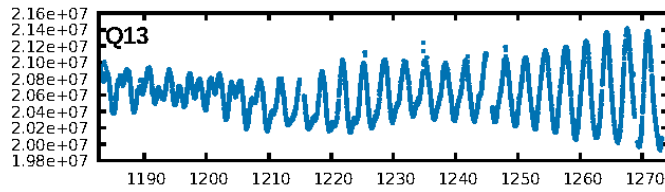
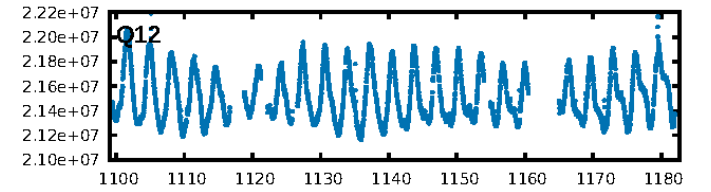
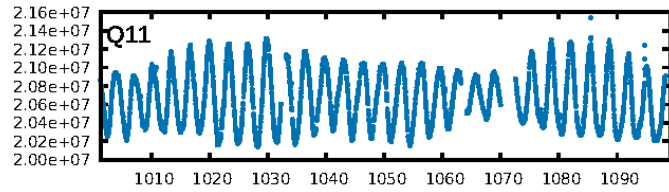
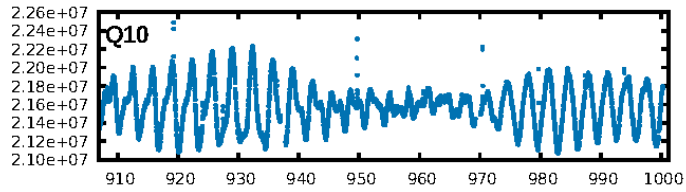
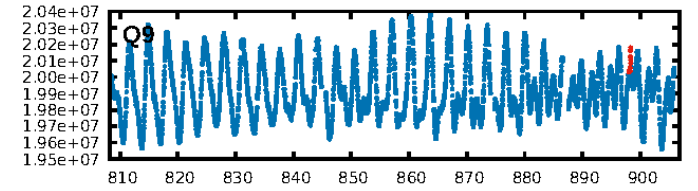
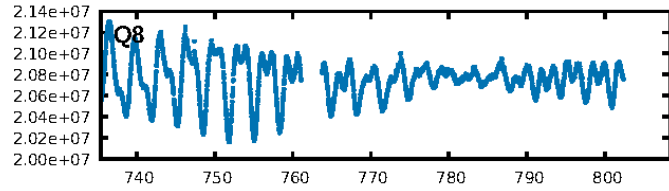
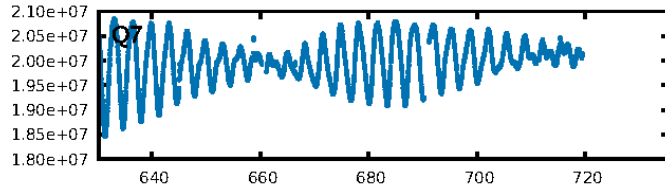
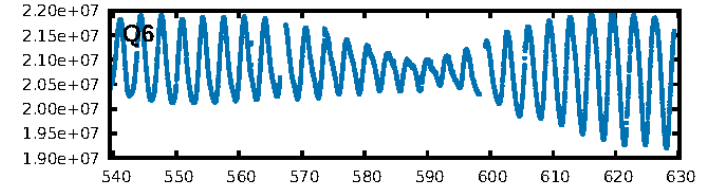
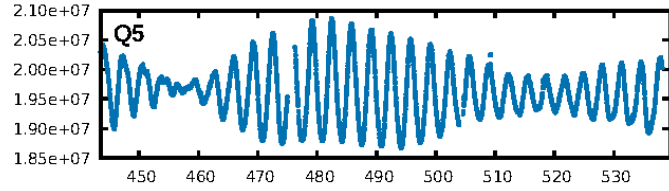
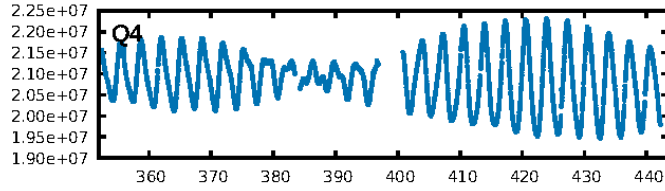
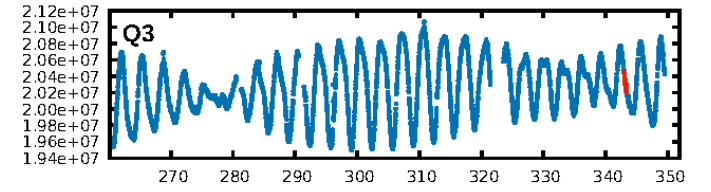
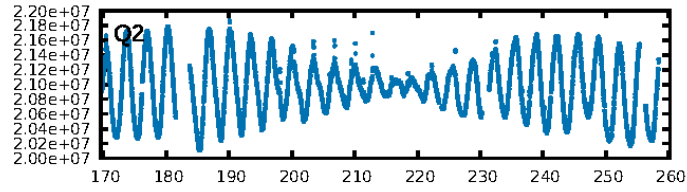
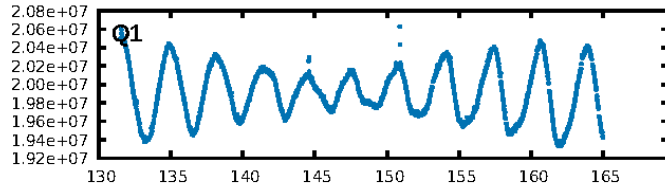
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [341.79 σ]
LongPeriod-sig: 100.0% [36.75 σ]
ModelChiSquare2-sig: 0.1%
ModelChiSquareGof-sig: 45.9%
Bootstrap-pfa: 5.82e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.2776
Centroid-sig: 62.0%
Centroid-so: 0.470 arcsec [0.58 σ]
OotOffset-rm: 0.169 arcsec [1.04 σ]
OotOffset-st: 0/1/0/1 [2]
KicOffset-rm: 0.245 arcsec [1.66 σ]
KicOffset-st: 0/1/0/1 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

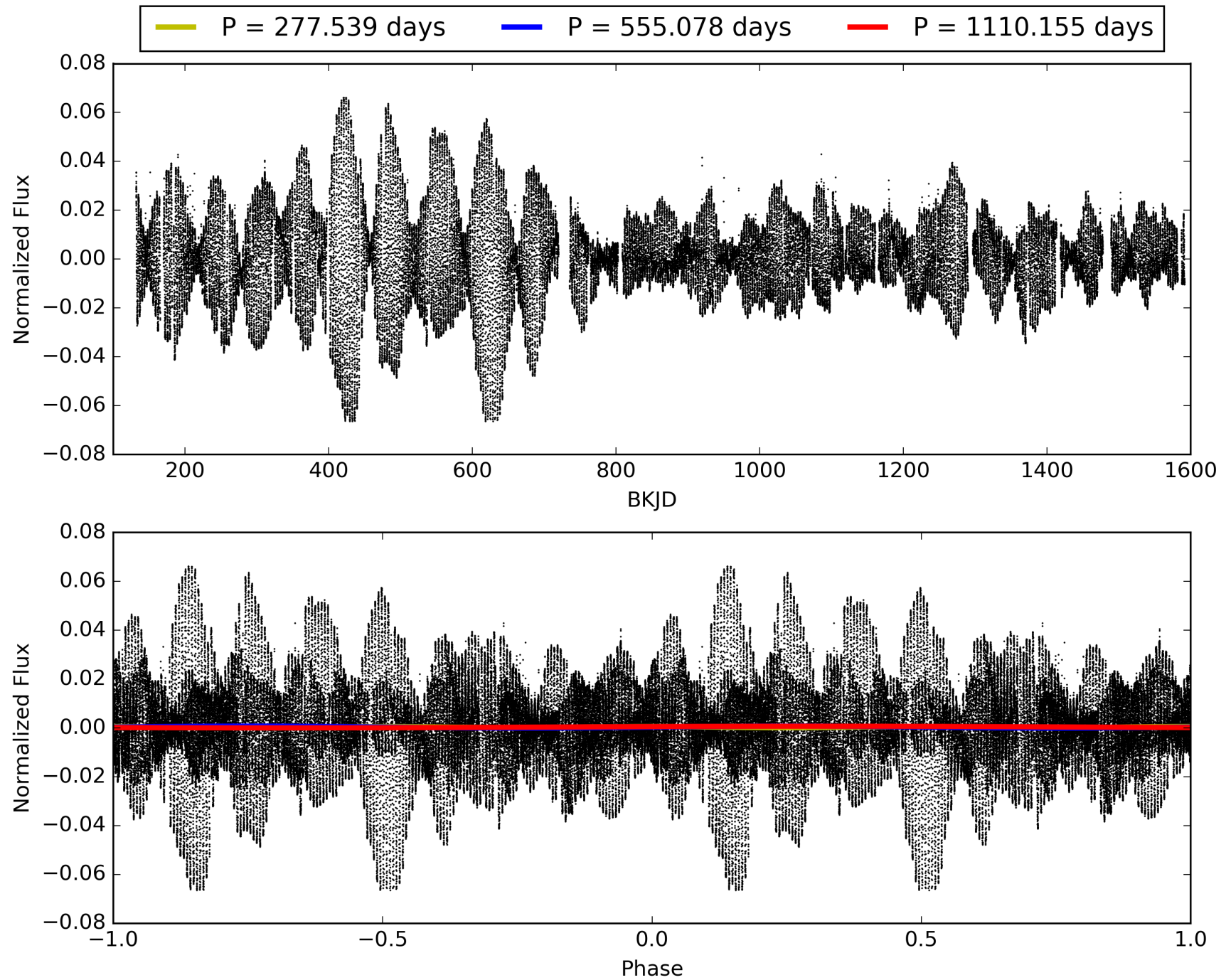
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:36:44 Z

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

TCE 009150539-02, PDC Light Curves

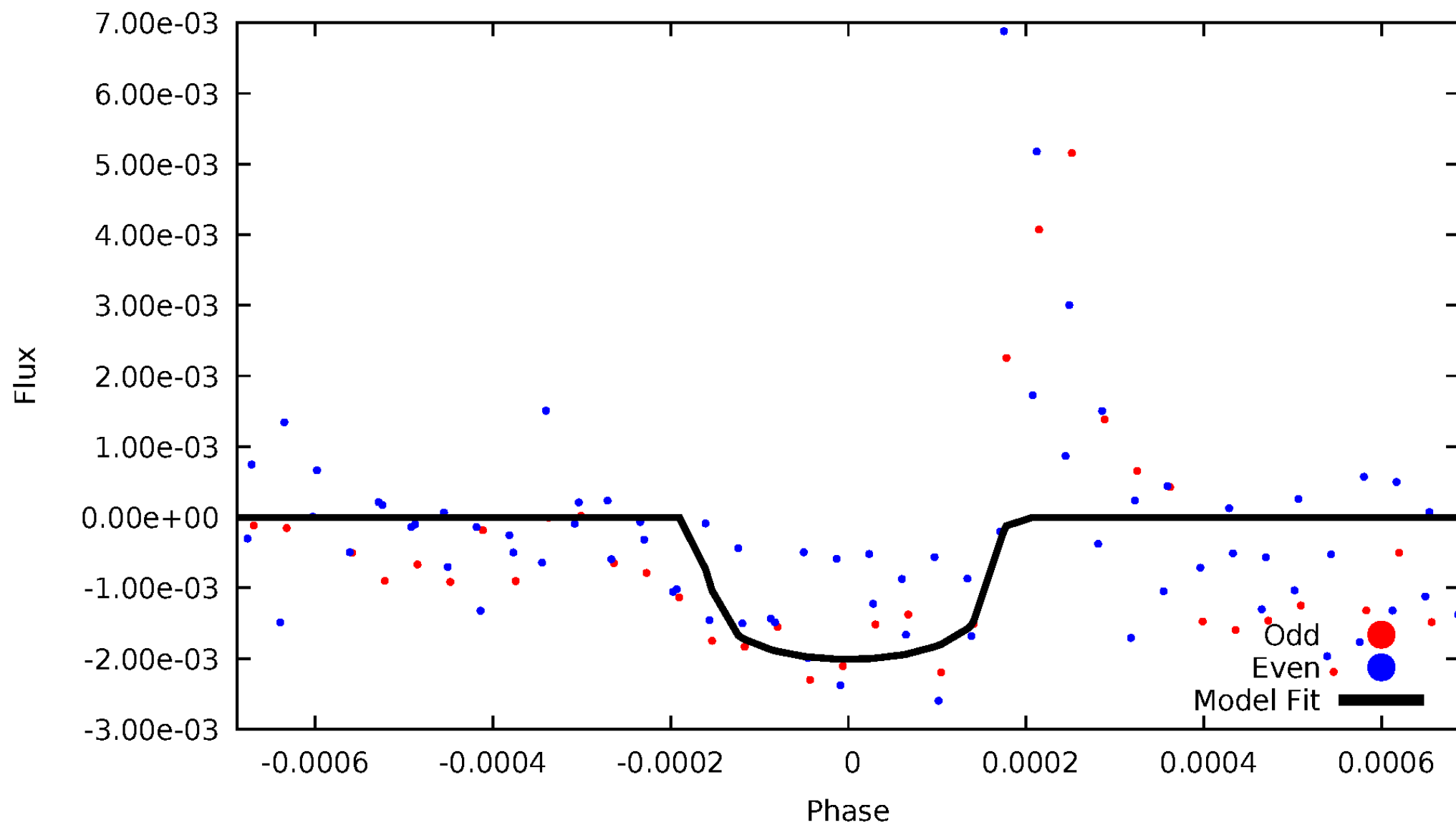


TCE 009150539-02



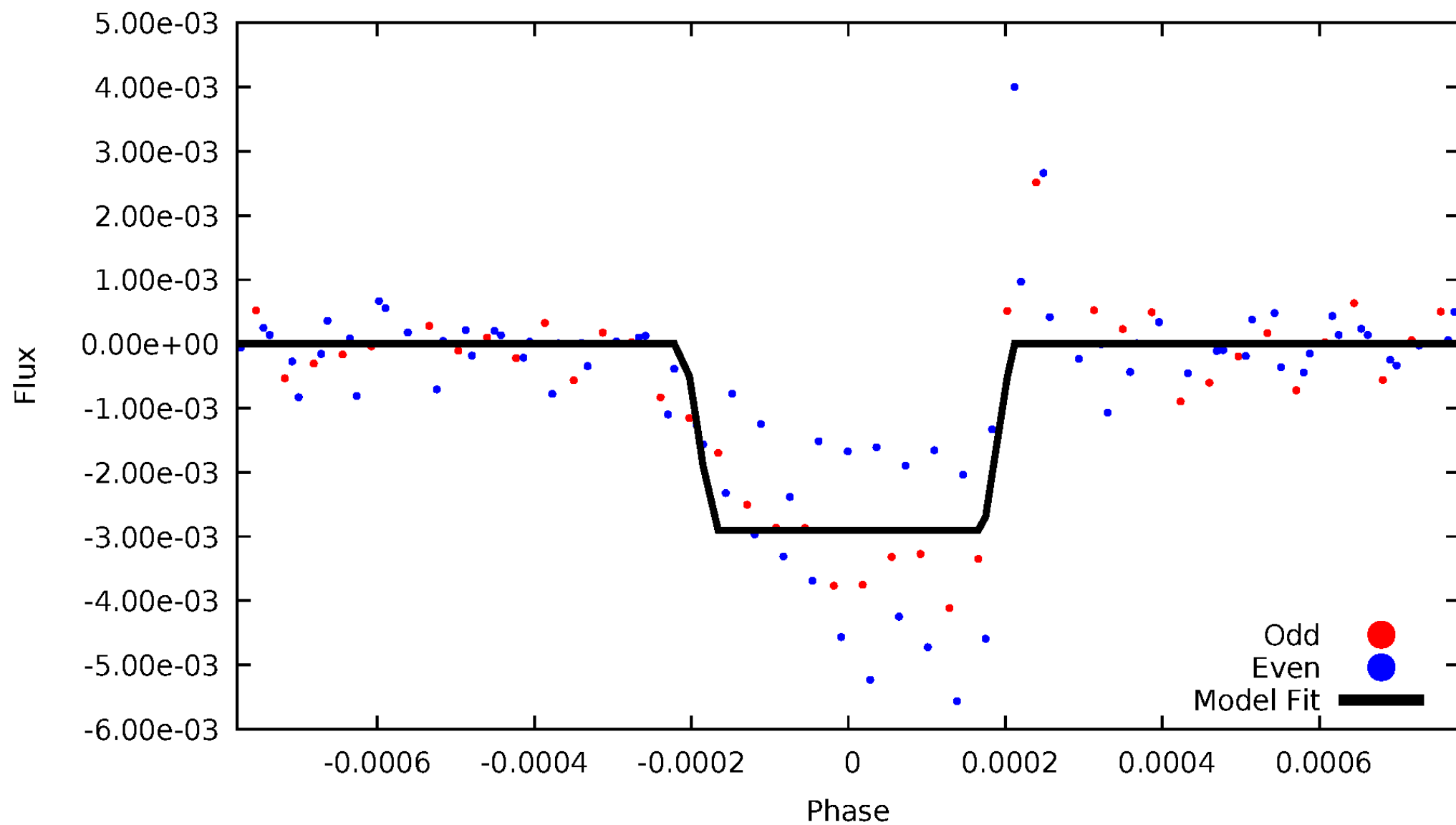
DV Odd/Even

TCE 009150539-02



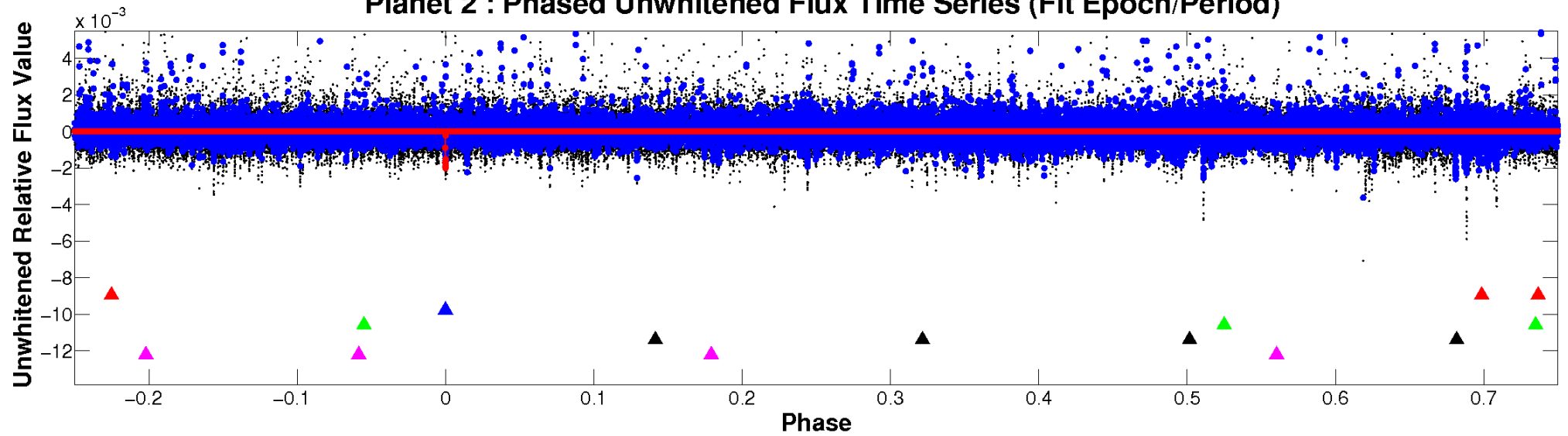
ALT Odd/Even

TCE 009150539-02

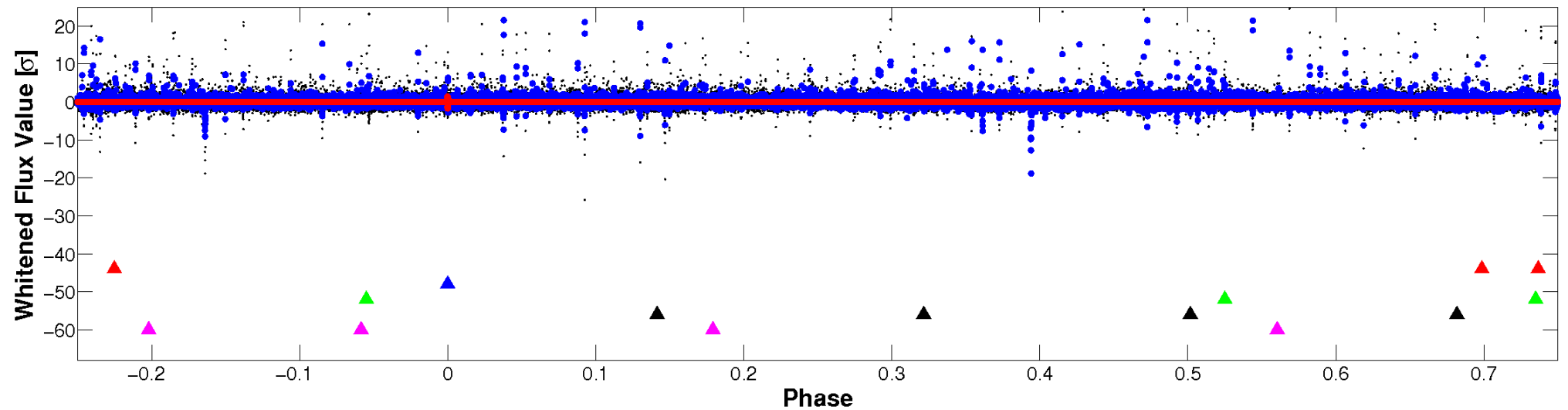


Non-Whitened Vs. Whitened Light Curve

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

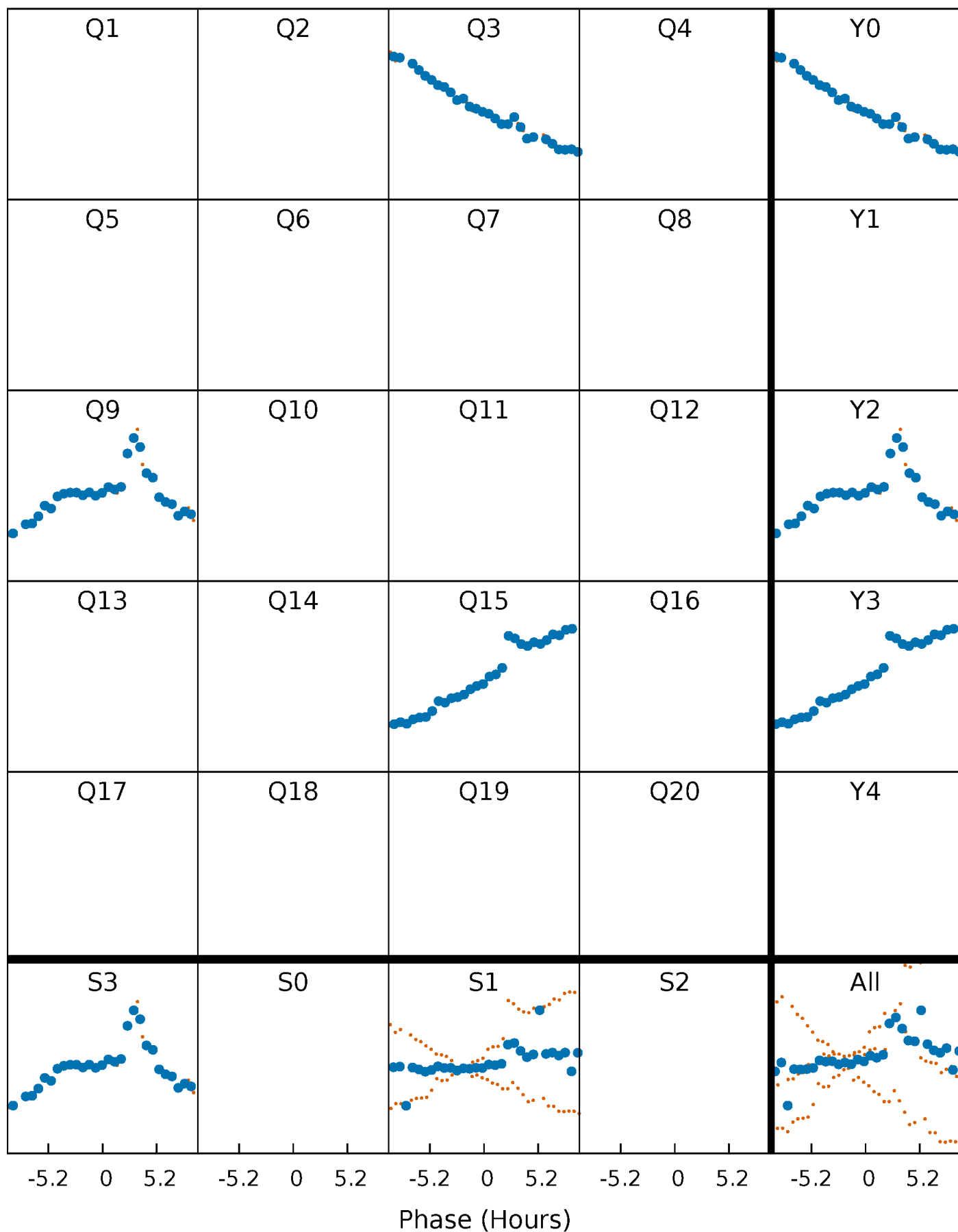


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



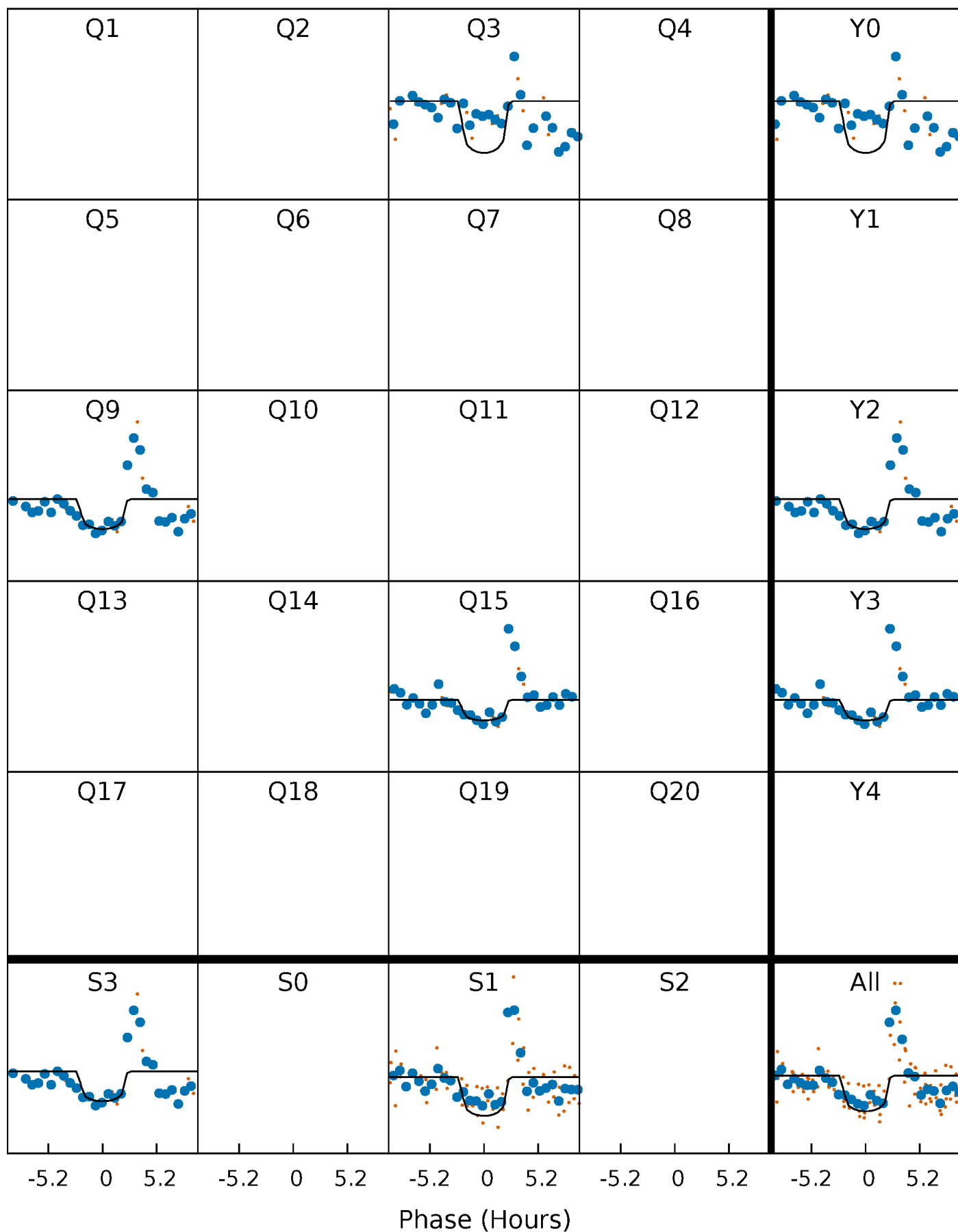
PDC Quarter-Phased Transit Curves

TCE 009150539-02 P=555.077577 Days $T_0=343.128099$ (BKJD)



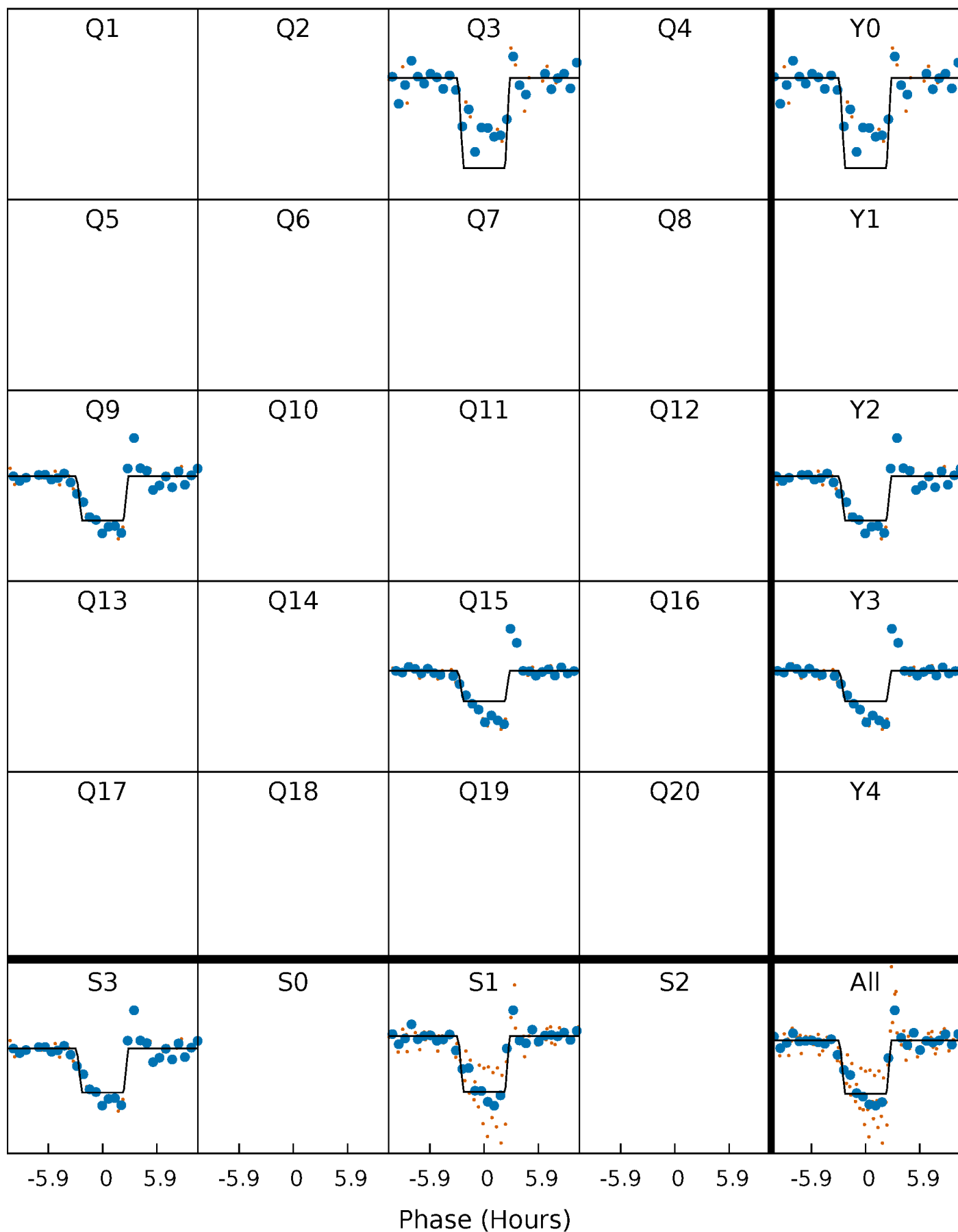
DV Quarter-Phased Transit Curves

TCE 009150539-02 P=555.077577 Days $T_0=343.128099$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

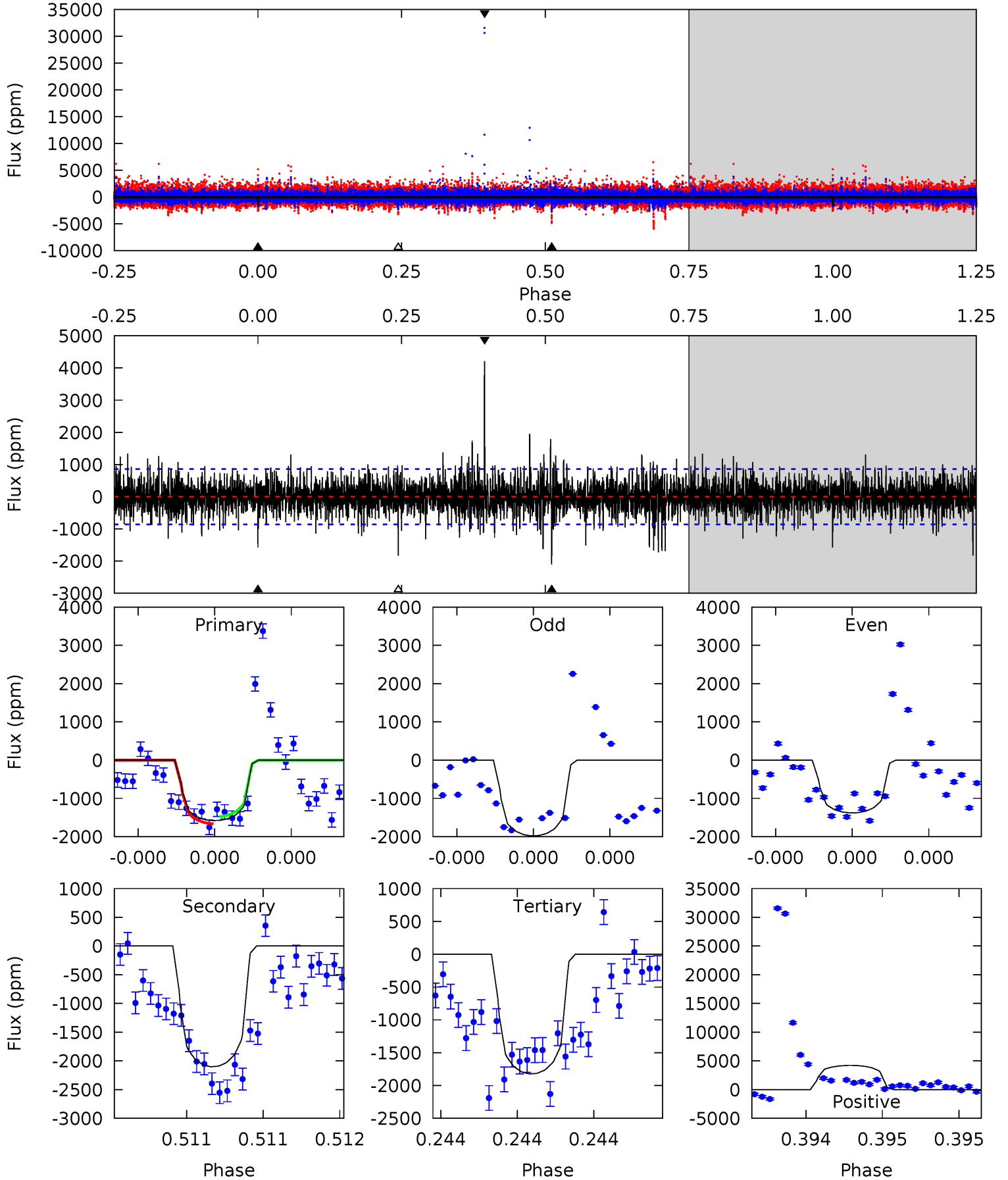
TCE 009150539-02 P=555.070846 Days $T_0=343.121214$ (BKJD)



DV Model-Shift Uniqueness Test

009150539-02, P = 555.077577 Days, E = 343.128099 Days

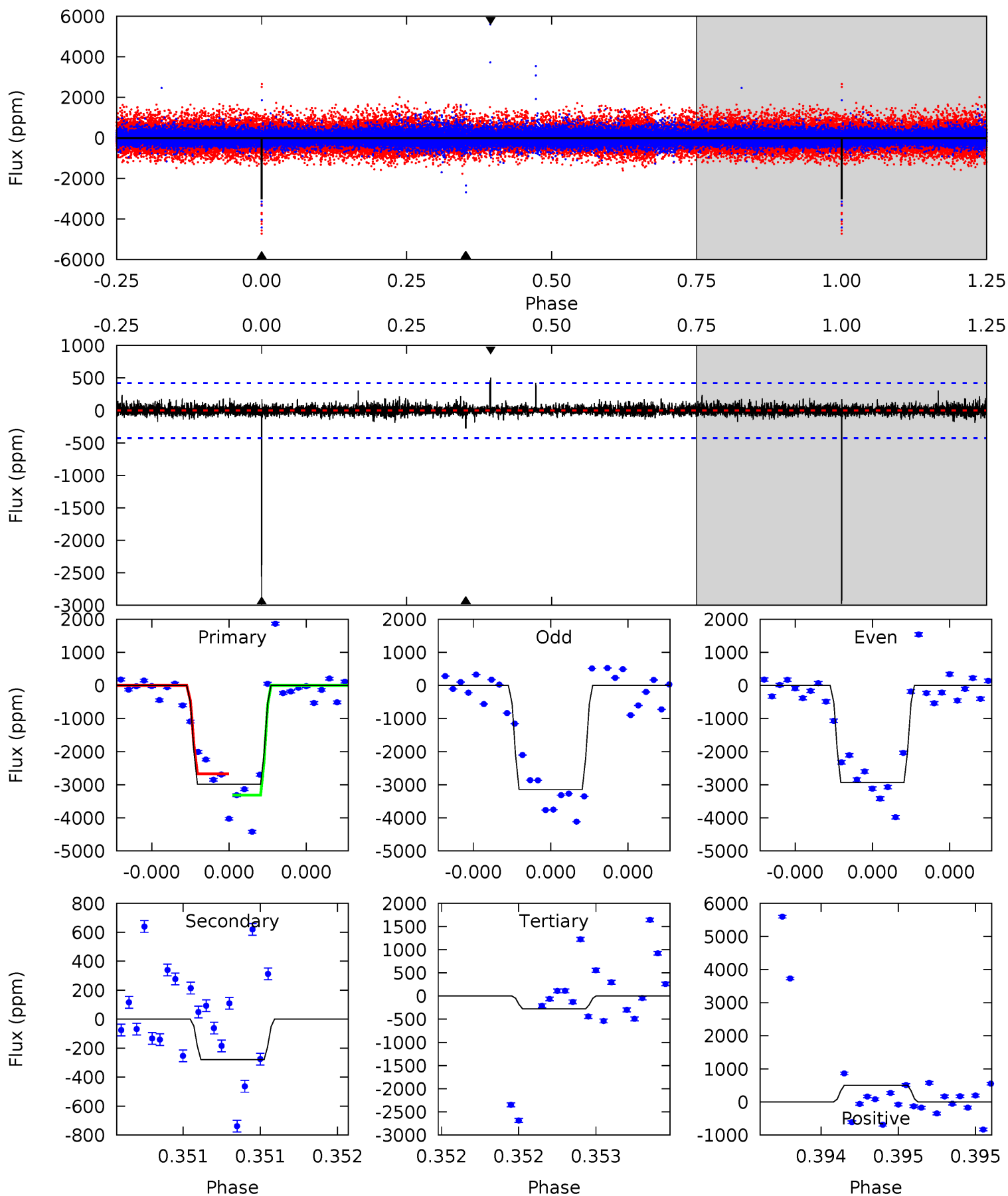
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	13.8	11.9	27.6	5.63	3.57	2.49	-1.60	-17.2	1.82	-13.8	1.64	0.82	0.67	0.60



Alt Model-Shift Uniqueness Test

009150539-02, P = 555.070846 Days, E = 343.121214 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.4	3.69	3.64	6.66	5.61	3.54	0.55	35.7	32.7	0.05	-2.98	1.39	0.95	0.14	4.22



Stellar Parameters For KIC 009150539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5596^{+183}_{-166}	$4.535^{+0.110}_{-0.090}$	$-0.860^{+0.350}_{-0.300}$	$0.741^{+0.097}_{-0.088}$	$0.686^{+0.081}_{-0.029}$	$2.380^{+1.042}_{-0.667}$
	+3%/-3%	+2%/-2%	+41%/-35%	+13%/-12%	+12%/-4%	+44%/-28%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009150539-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-2102 ± 153	$3.58^{+2.40}_{-2.03}$	275^{+13}_{-13}	5712^{+3587}_{-1074}	$125467^{+546158}_{-79717}$
Alt.	-279 ± 76	$4.41^{+2.41}_{-2.22}$	274^{+14}_{-12}	3545^{+959}_{-444}	11180^{+31200}_{-6883}

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

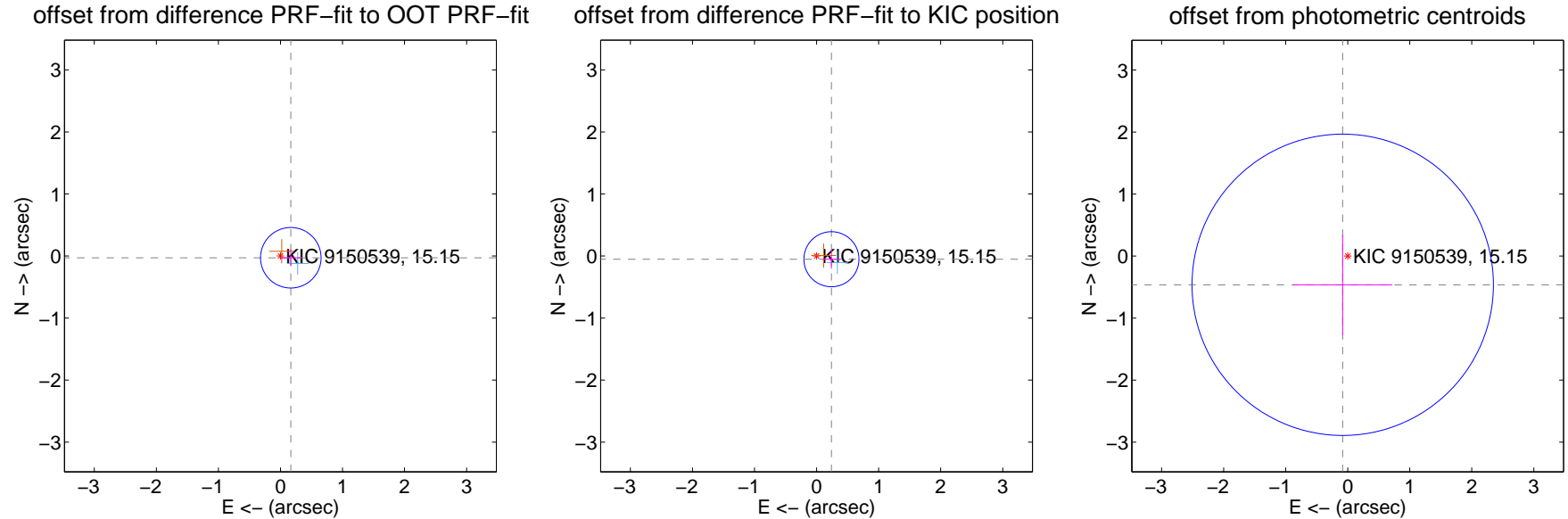
DV Centroid Data

Supplemental centroid analysis for 009150539-02. Kepler magnitude: 15.15. Transit SNR 8.43

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.169 ± 0.163	1.04	-0.167 ± 0.163	-0.028 ± 0.133
PRF-fit source offset from KIC position	0.245 ± 0.148	1.66	-0.239 ± 0.148	-0.052 ± 0.150
photometric centroid source offset	0.47 ± 0.81	0.58	0.08 ± 0.80	-0.46 ± 0.81



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.

Q1 no difference image



Q1 no OOT image



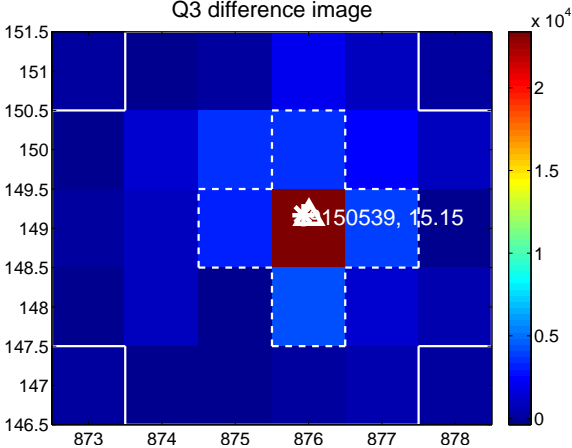
Q2 no difference image



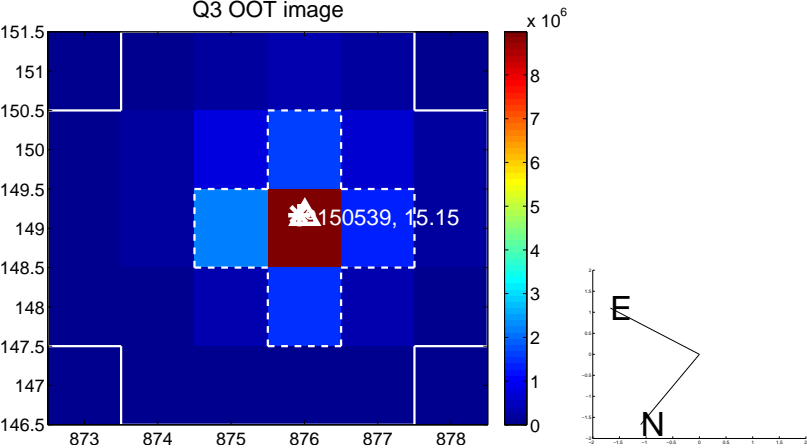
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



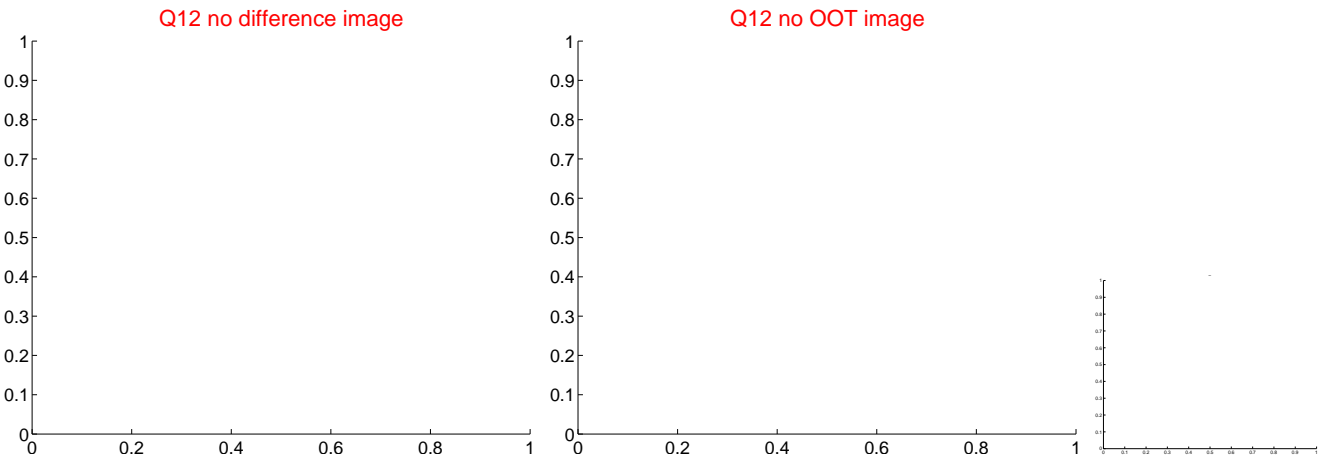
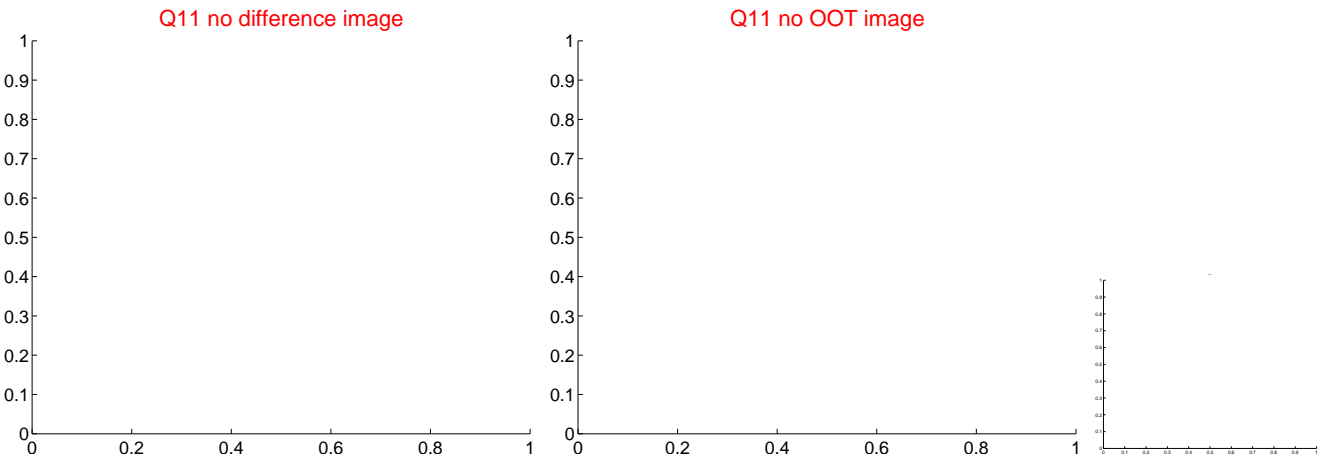
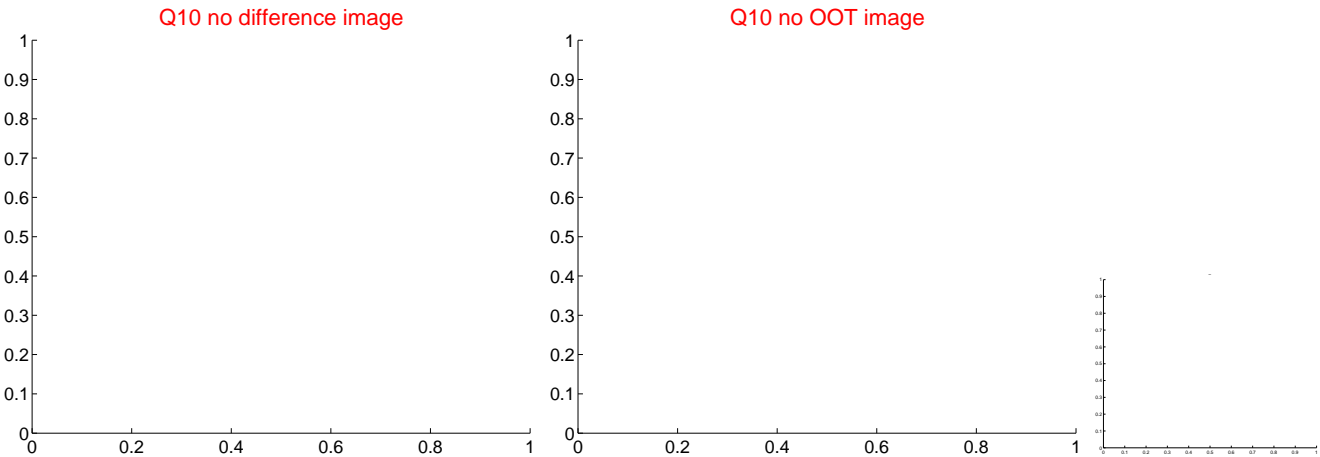
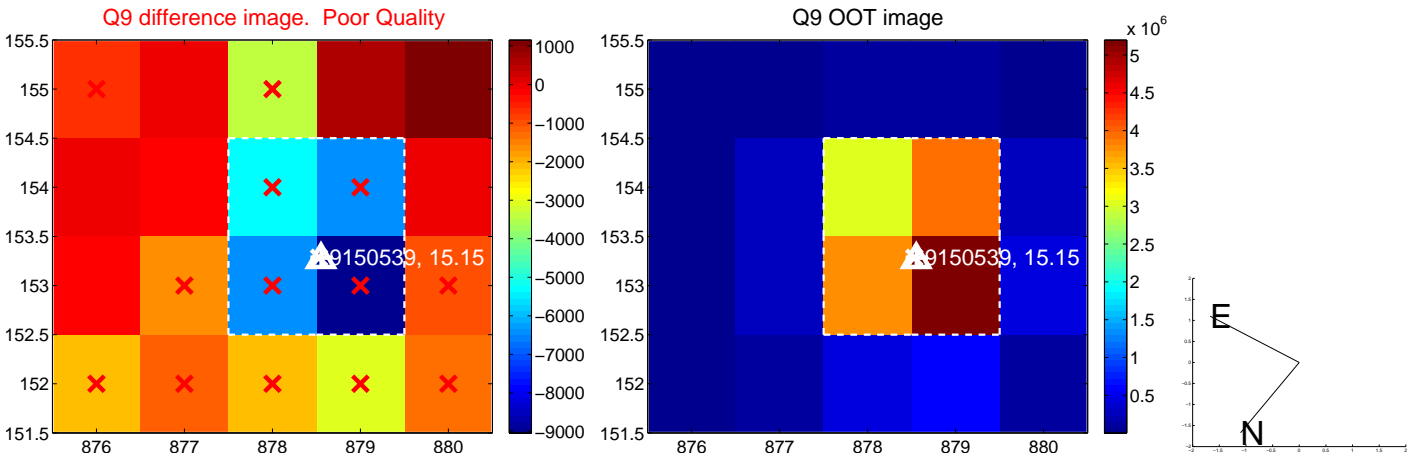
Q4 no OOT image



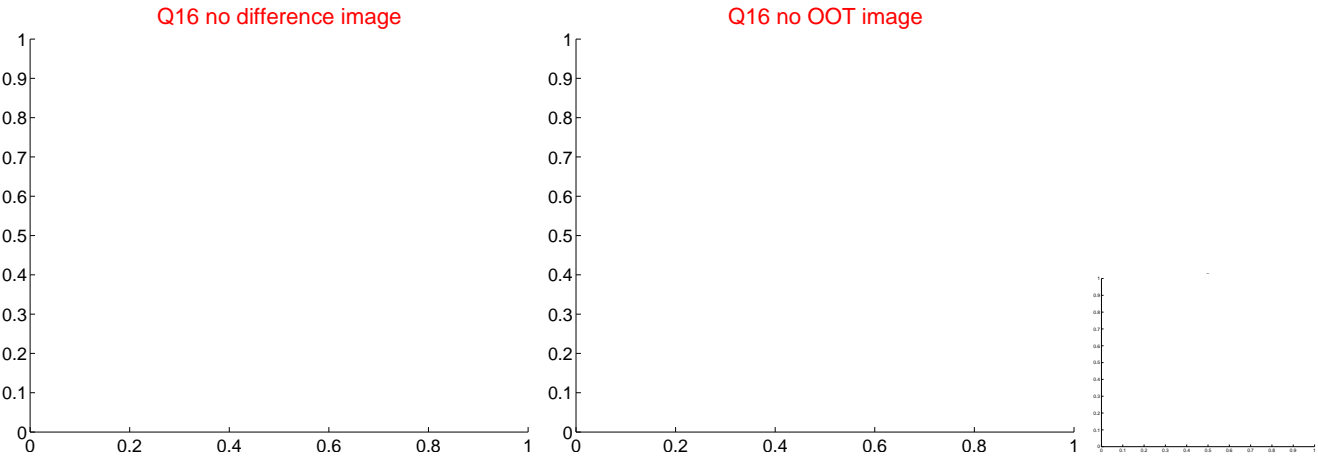
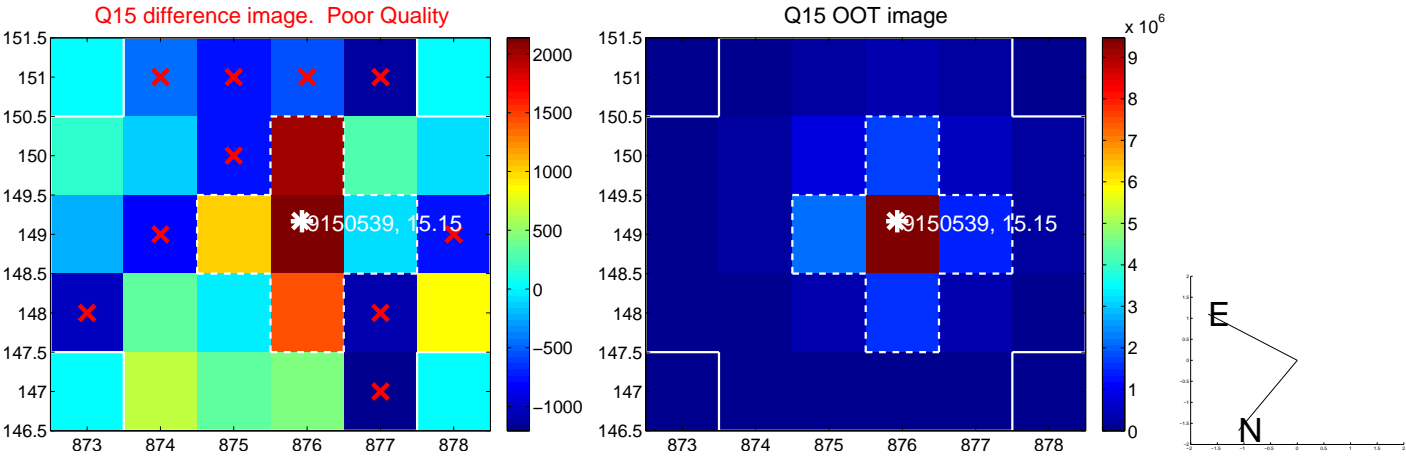
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



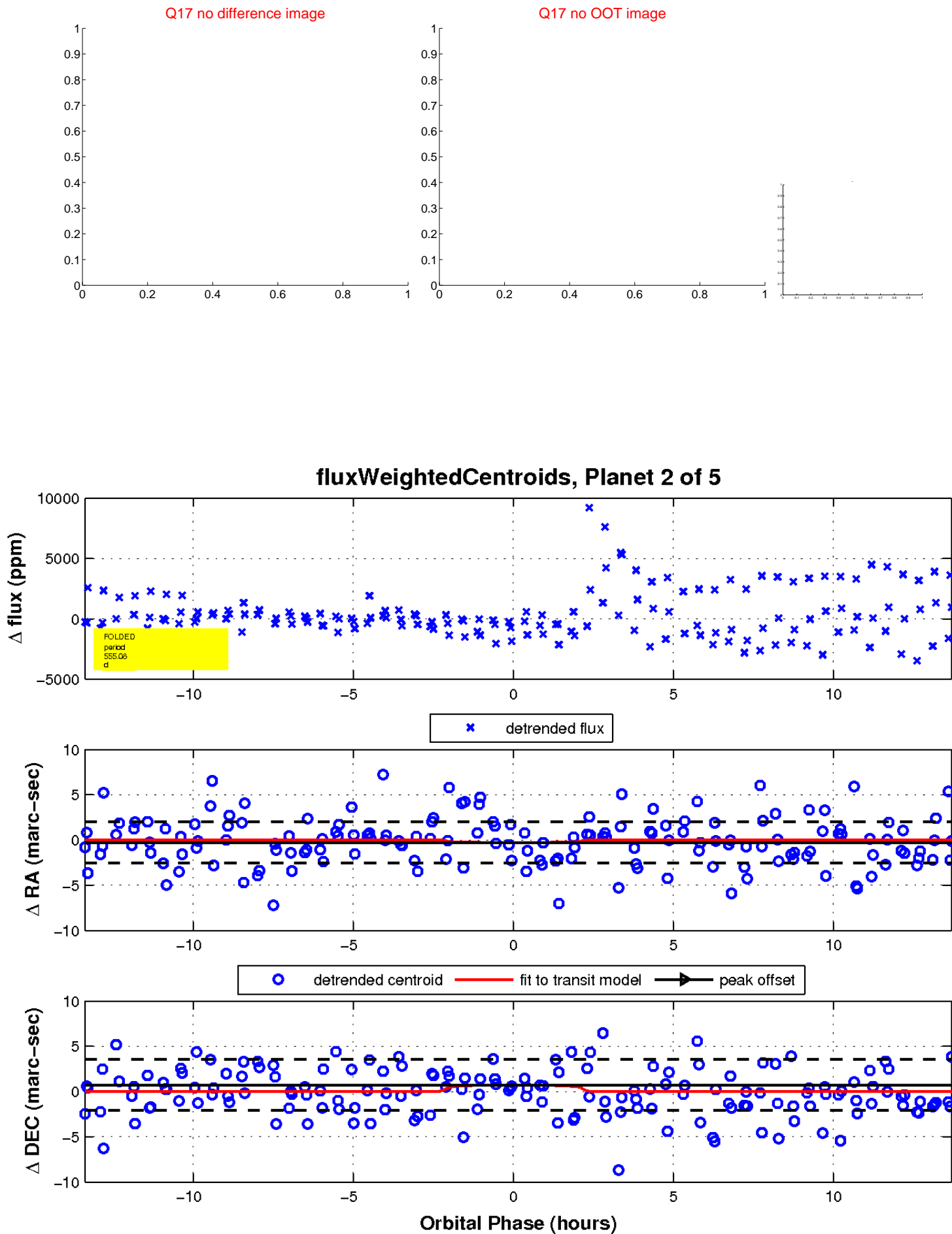
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

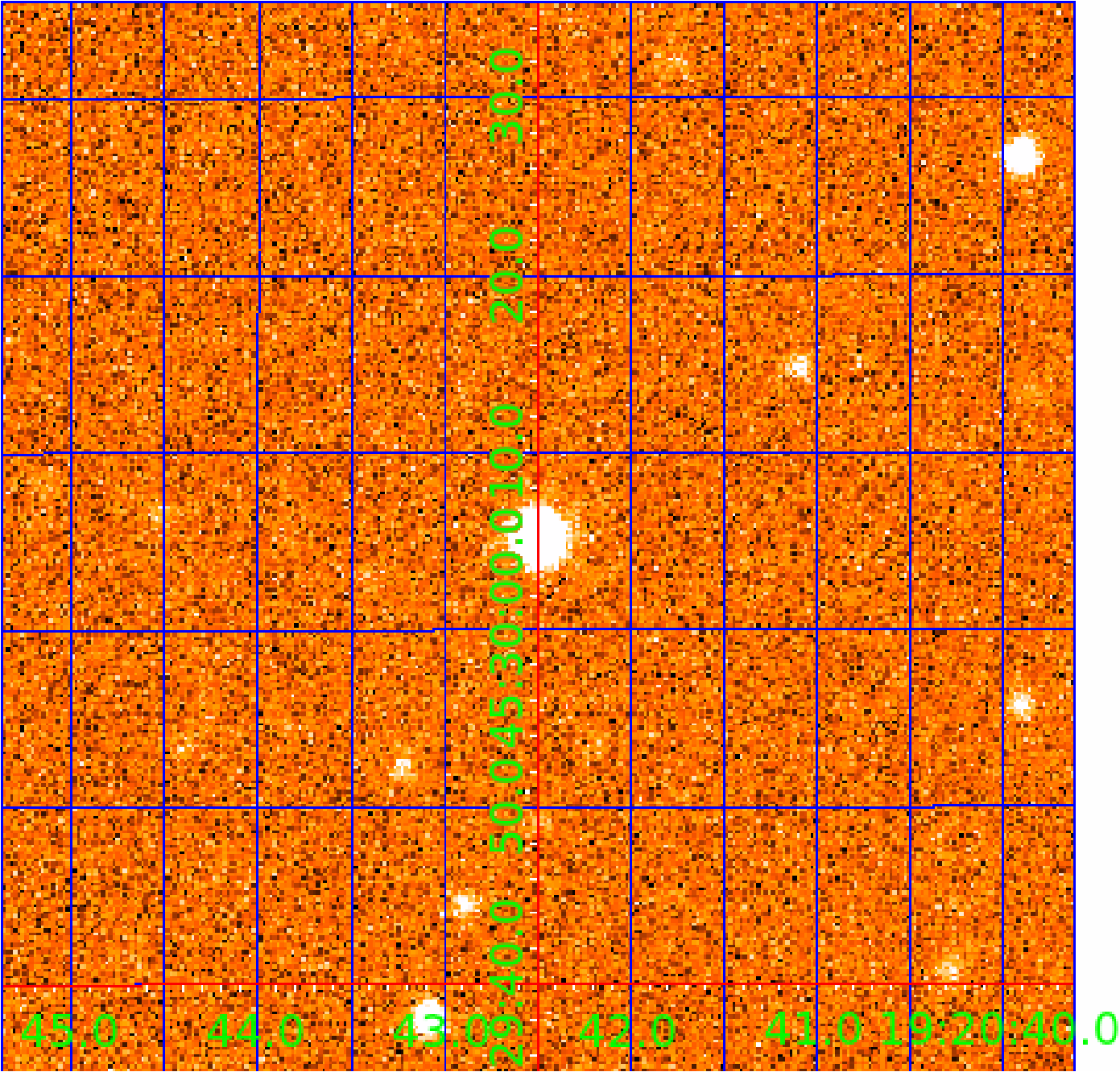


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009150539

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})
009150539-01	OBS	No	576.209545	175.861046	1676.9	13.019	13.2	4.8	0.74	5596	3.12	0.34
009150539-02	OBS	No	555.077577	343.128099	2009.3	4.580	14.6	8.4	0.74	5596	3.40	0.35
009150539-03	OBS	No	438.495727	312.624865	1689.8	8.545	14.3	5.9	0.74	5596	3.09	0.49
009150539-04	OBS	No	455.108064	166.506981	1432.6	5.320	12.4	6.4	0.74	5596	3.06	0.46
009150539-05	OBS	No	343.499363	310.680576	1050.2	2.715	11.8	6.1	0.74	5596	2.70	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

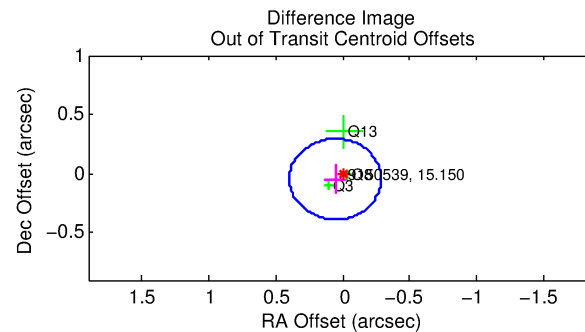
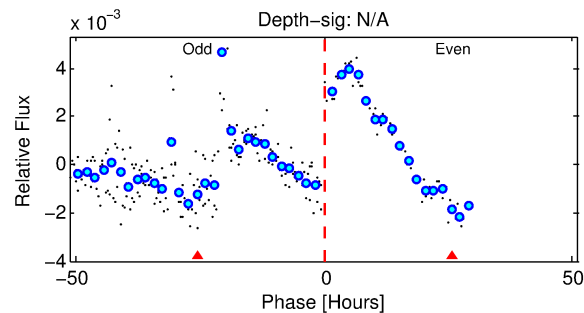
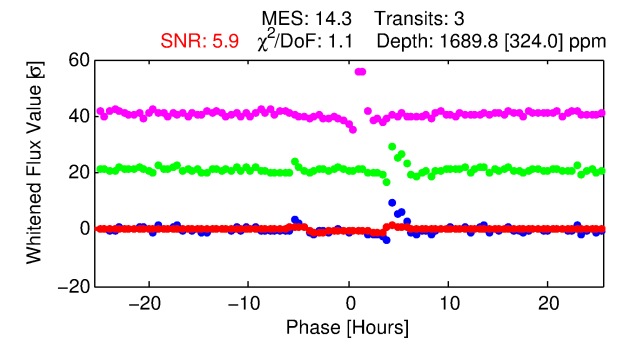
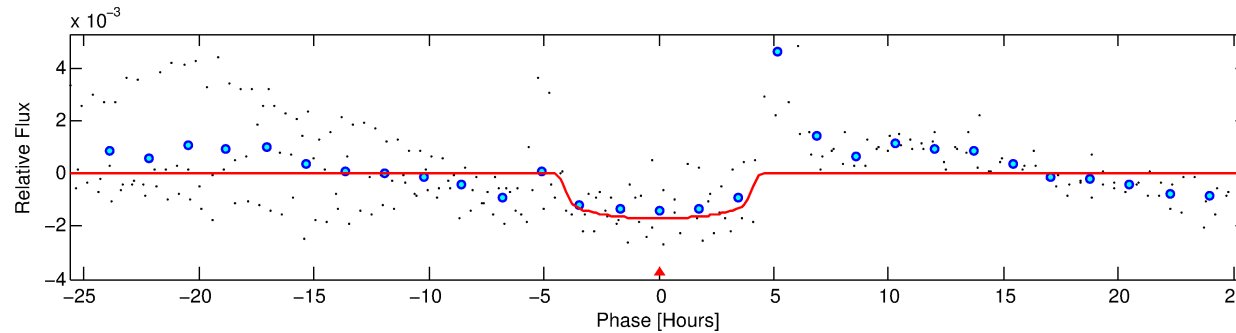
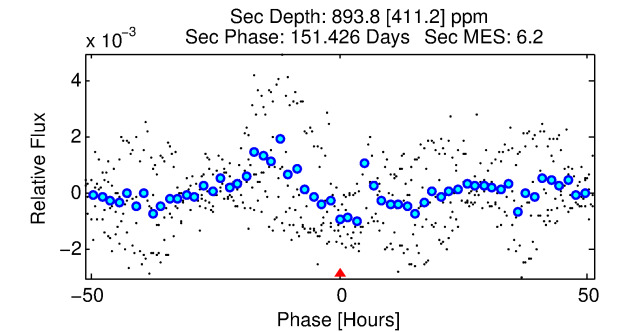
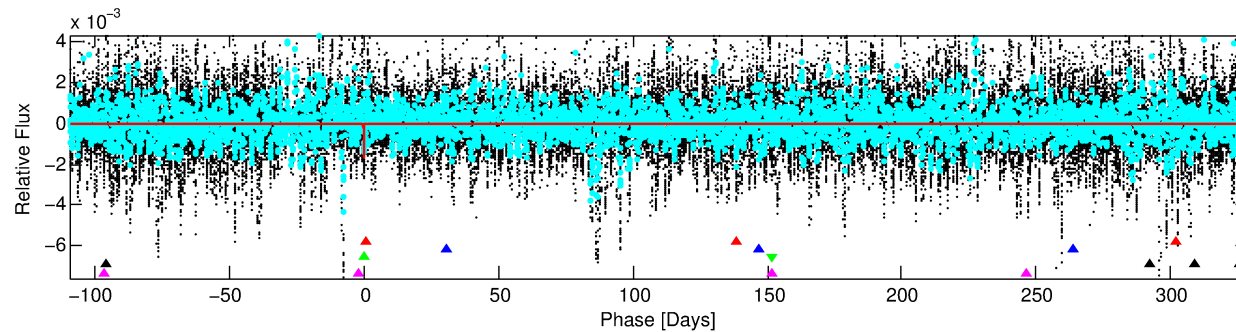
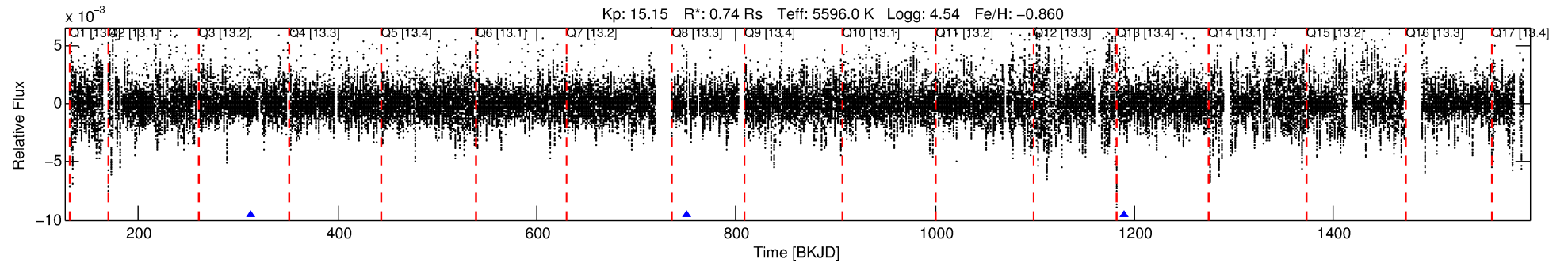
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009150539-03

No Significant Match Found

DV One-Page Summary

KIC: 9150539 Candidate: 3 of 5 Period: 438.496 d



DV Fit Results:

Period = 438.49573 [0.00664] d
Epoch = 312.6249 [0.0087] BKJD
Rp/R* = 0.0382 [0.0254]
a/R* = 376.45 [1157.01]
b = 0.39 [6.64]
Seff = 0.49 [0.11]
Teq = 213 [12] K
Rp = 3.09 [2.10] Re
a = 0.9967 [0.1210] AU
Ag = 51175.07 [72718.35] [0.70] σ
Teffp = 4950 [1750] K [2.71] σ

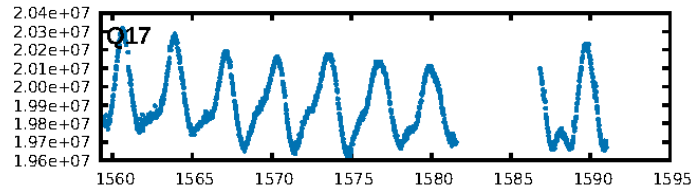
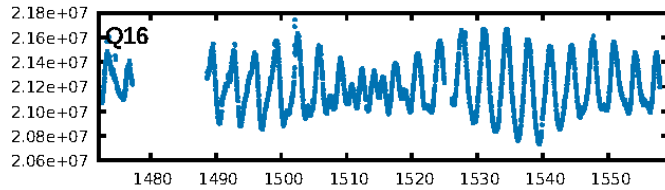
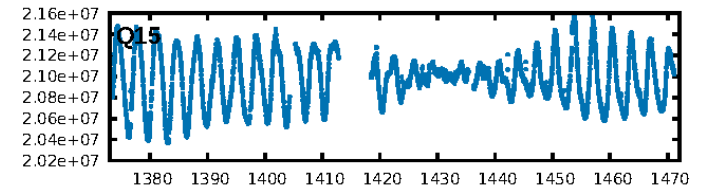
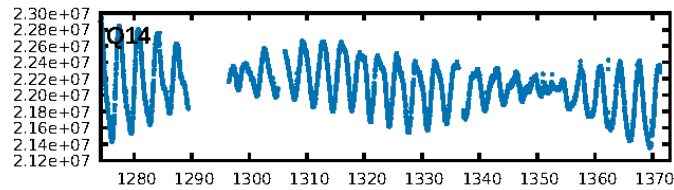
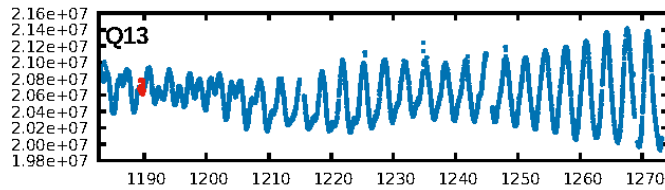
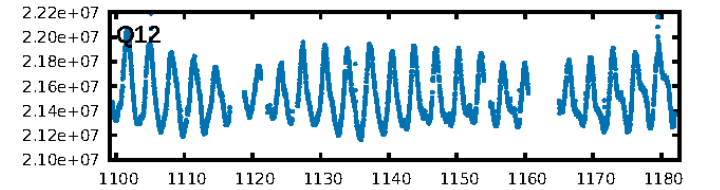
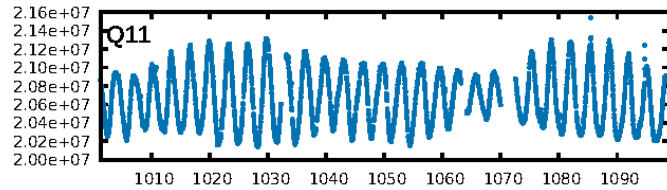
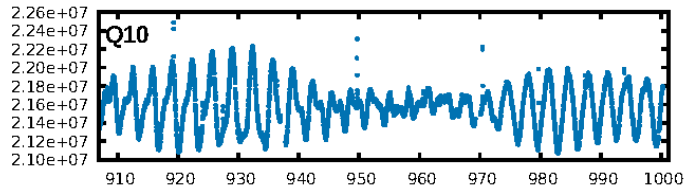
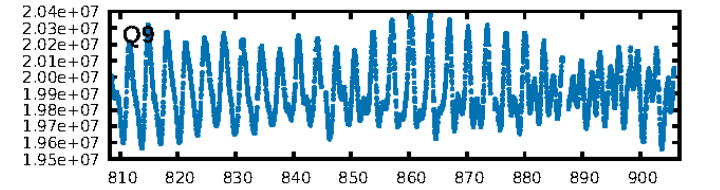
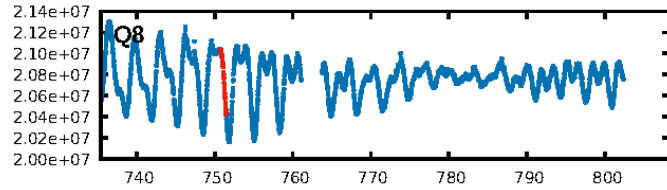
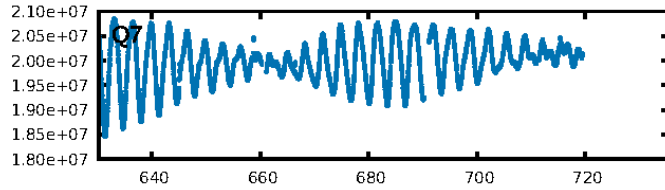
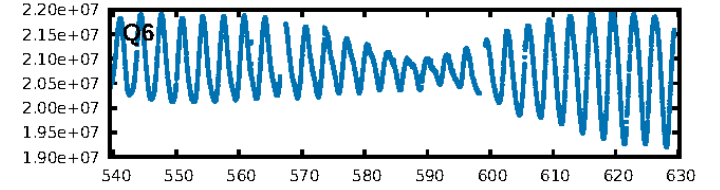
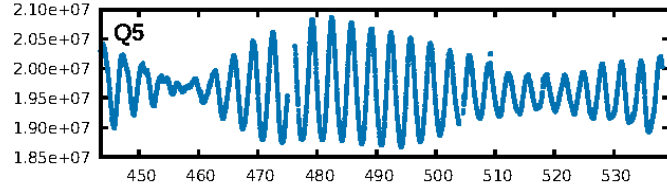
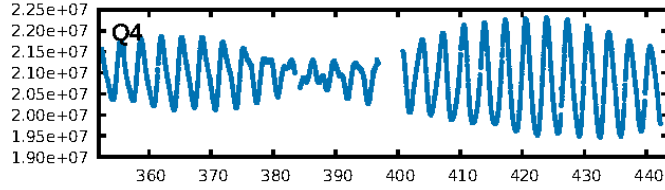
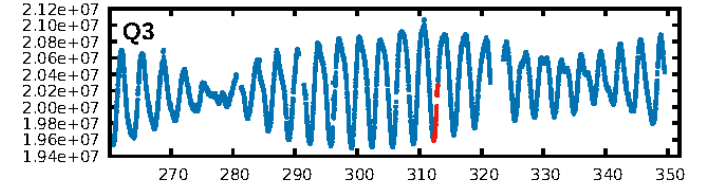
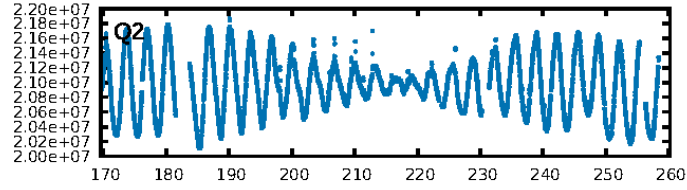
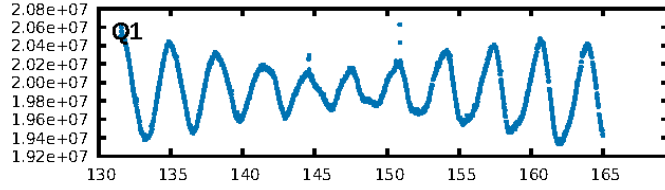
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [254.27] σ
LongPeriod-sig: 100.0% [39.61] σ
ModelChiSquare2-sig: 1.6%
ModelChiSquareGof-sig: 85.0%
Bootstrap-pfa: 1.83e-13
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.3208
Centroid-sig: 46.8%
Centroid-so: 0.611 arcsec [0.89] σ
OotOffset-rm: 0.073 arcsec [0.64] σ
KicOffset-rm: 0.079 arcsec [0.63] σ
OotOffset-st: 0/1/1/1 [3]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

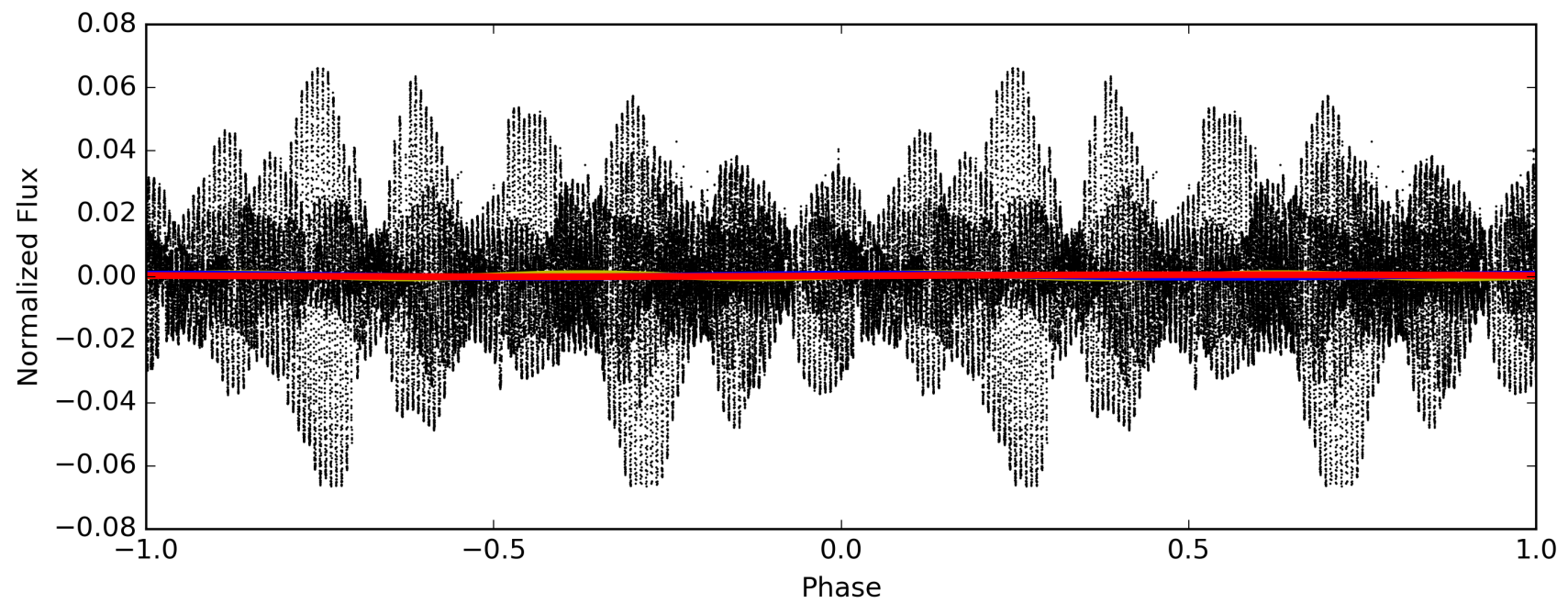
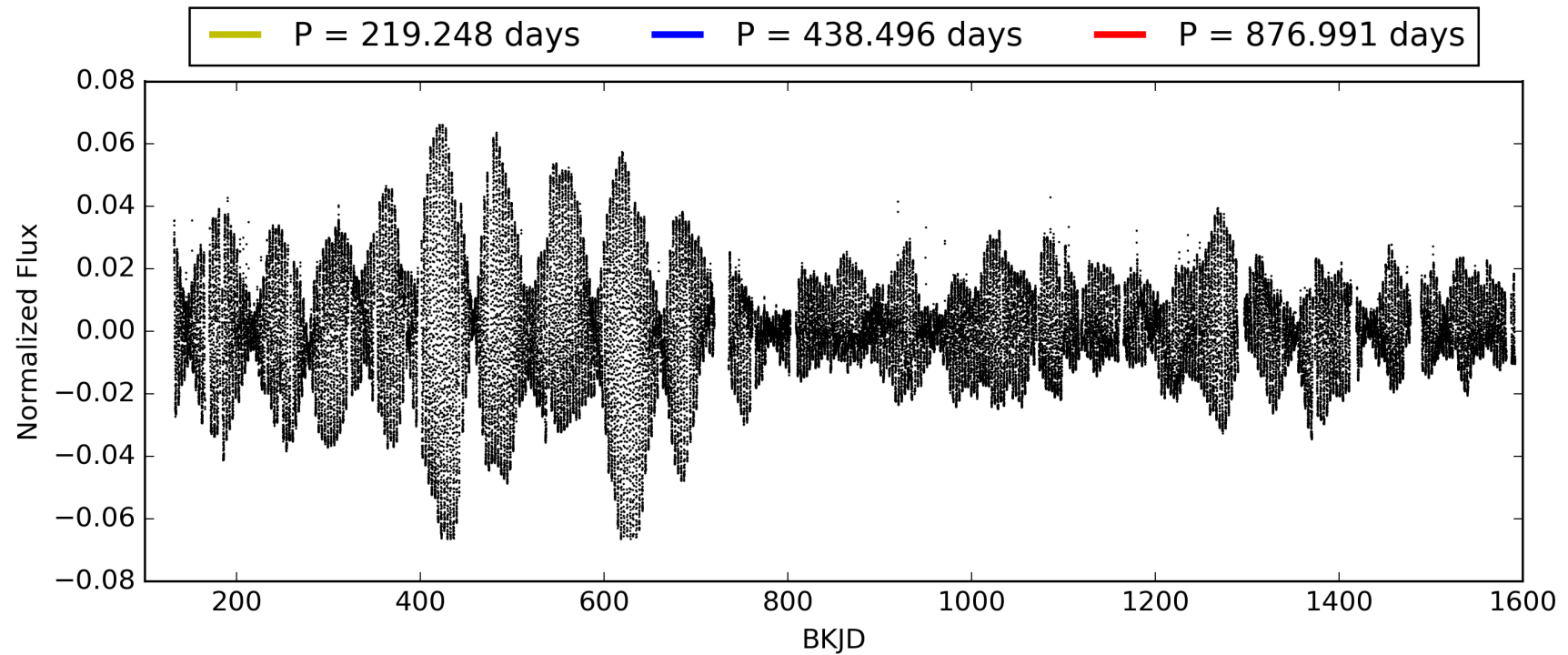
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:36:55 Z

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

TCE 009150539-03, PDC Light Curves

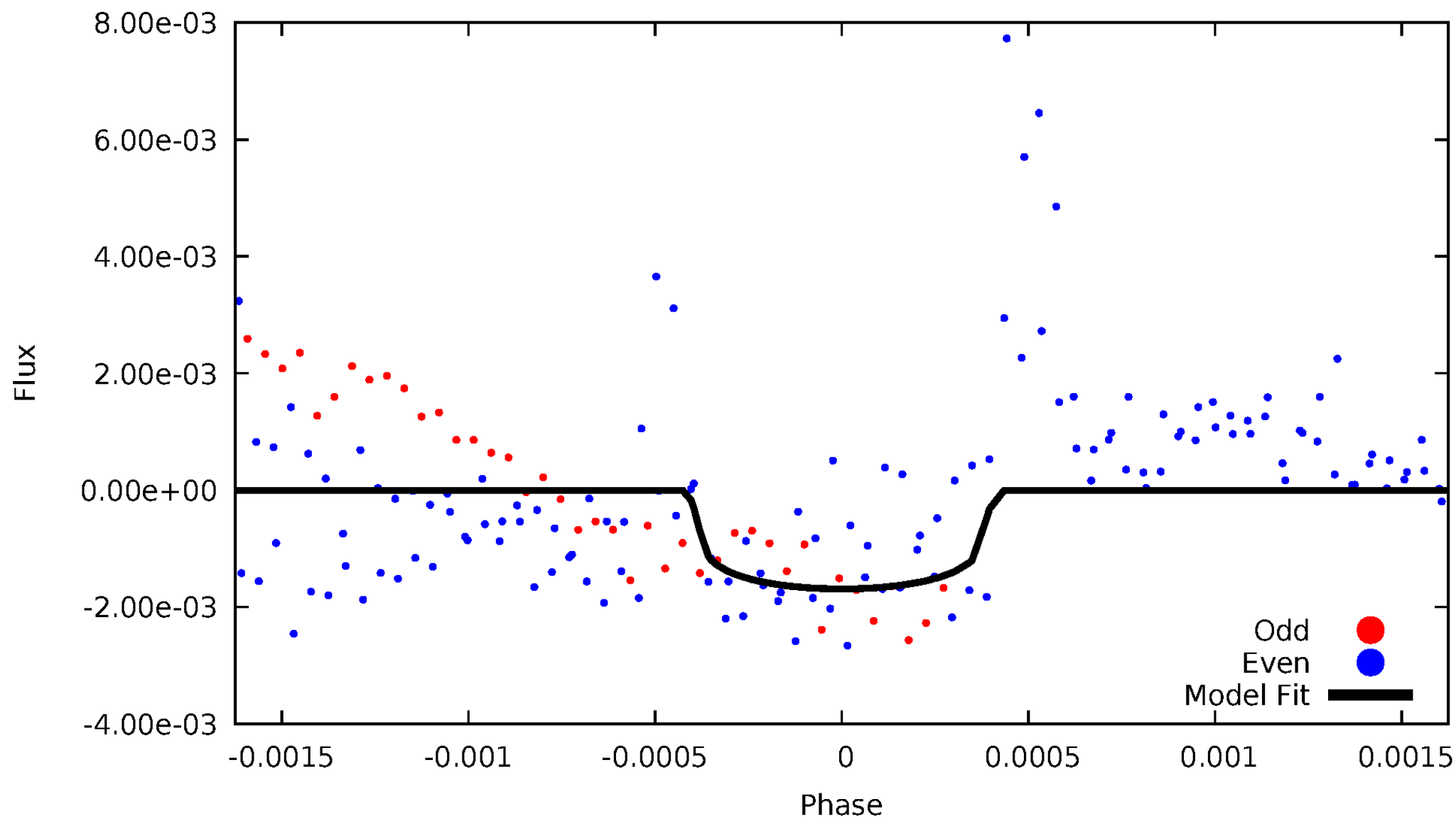


TCE 009150539-03



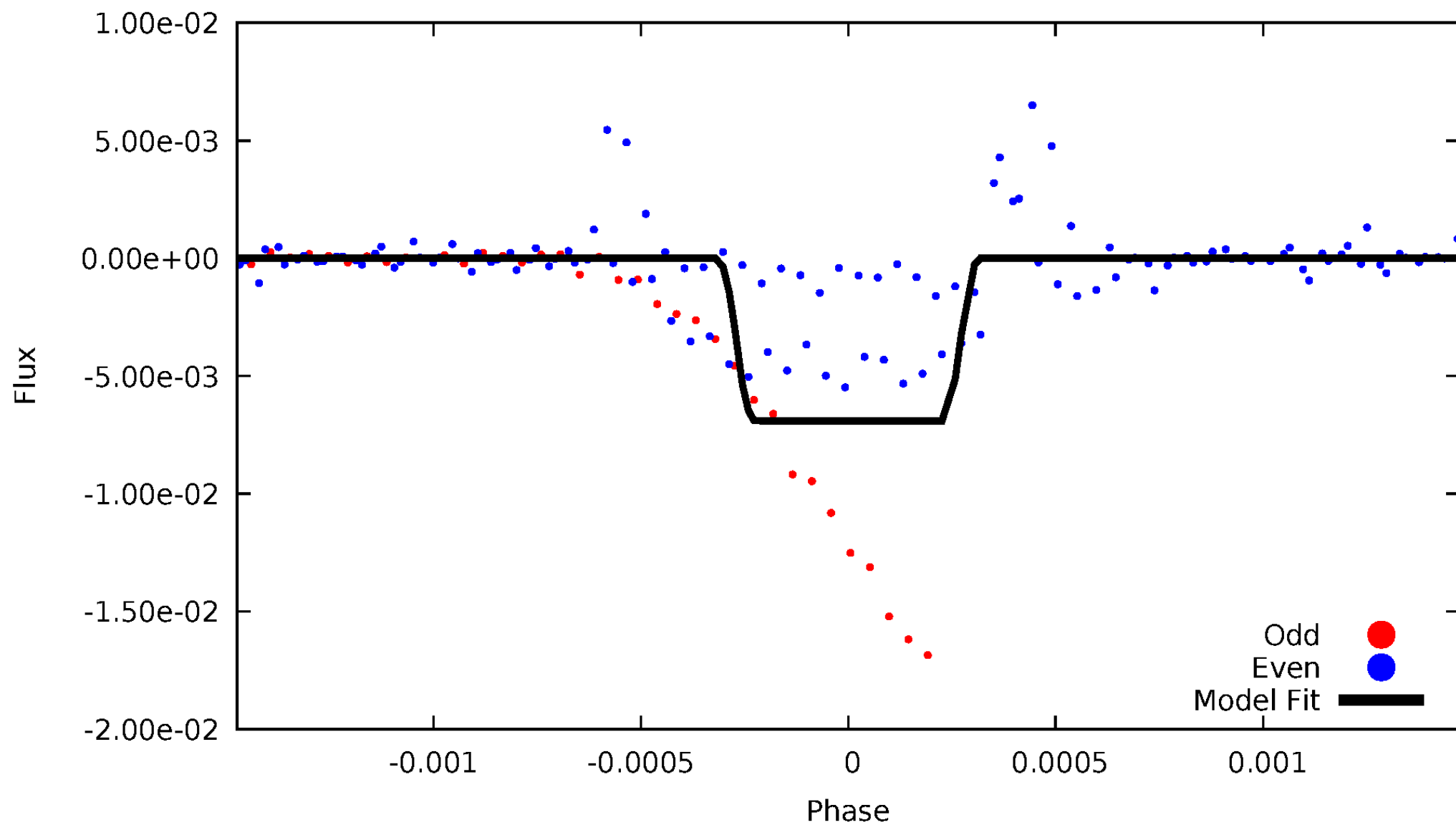
DV Odd/Even

TCE 009150539-03



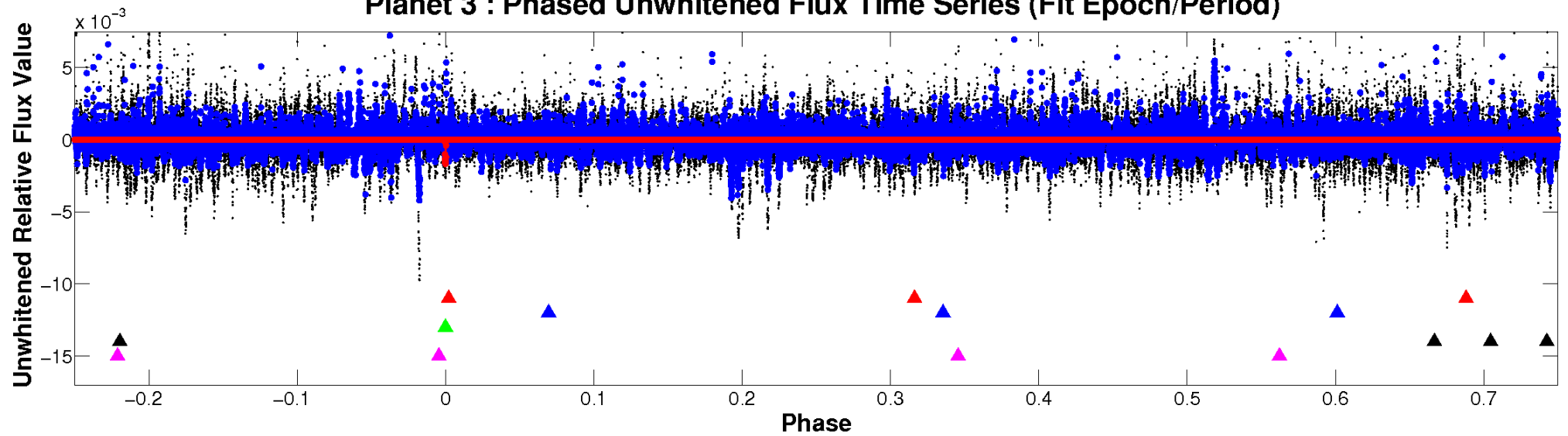
ALT Odd/Even

TCE 009150539-03

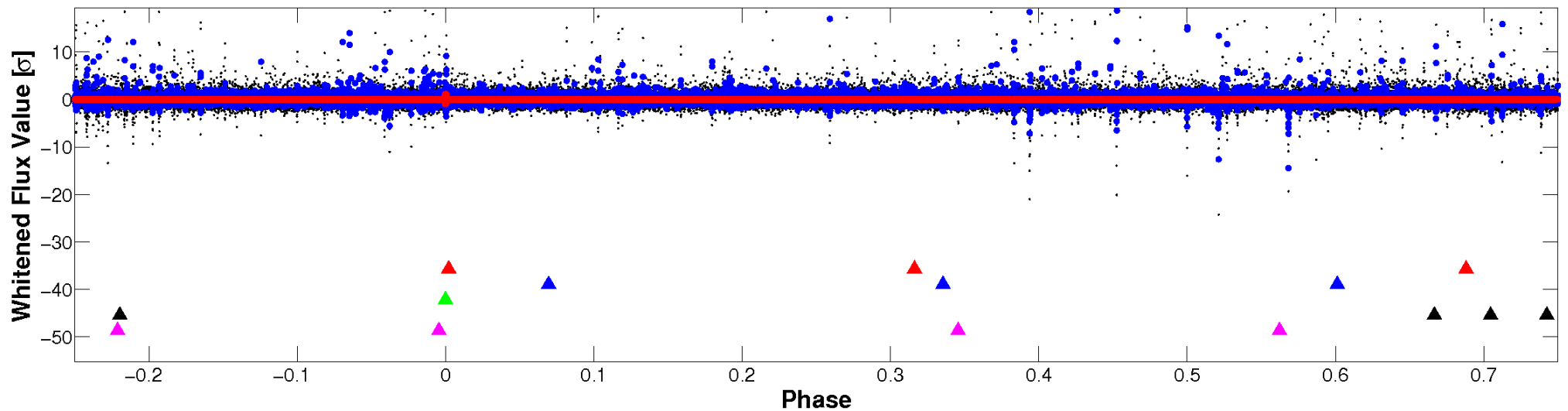


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

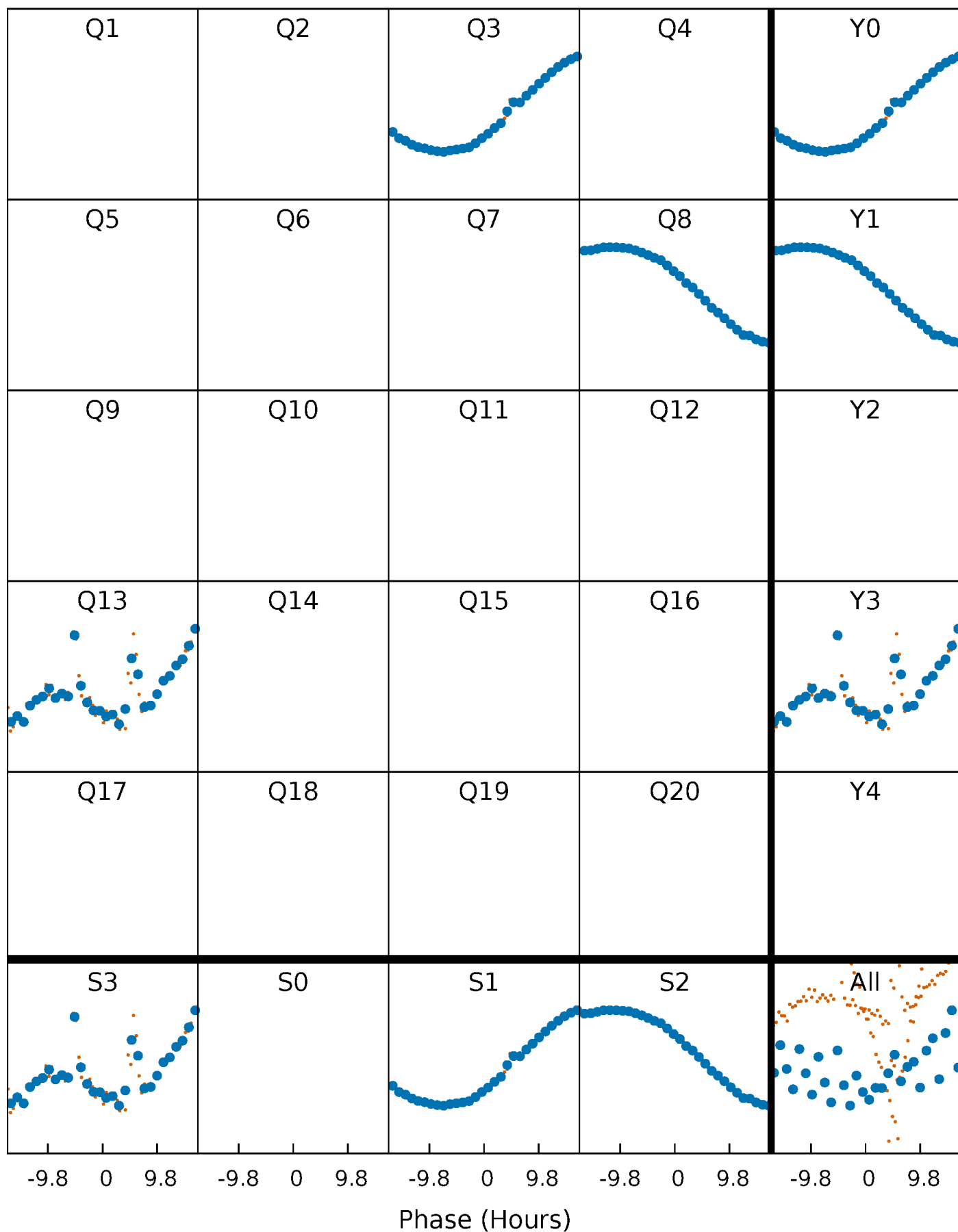


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



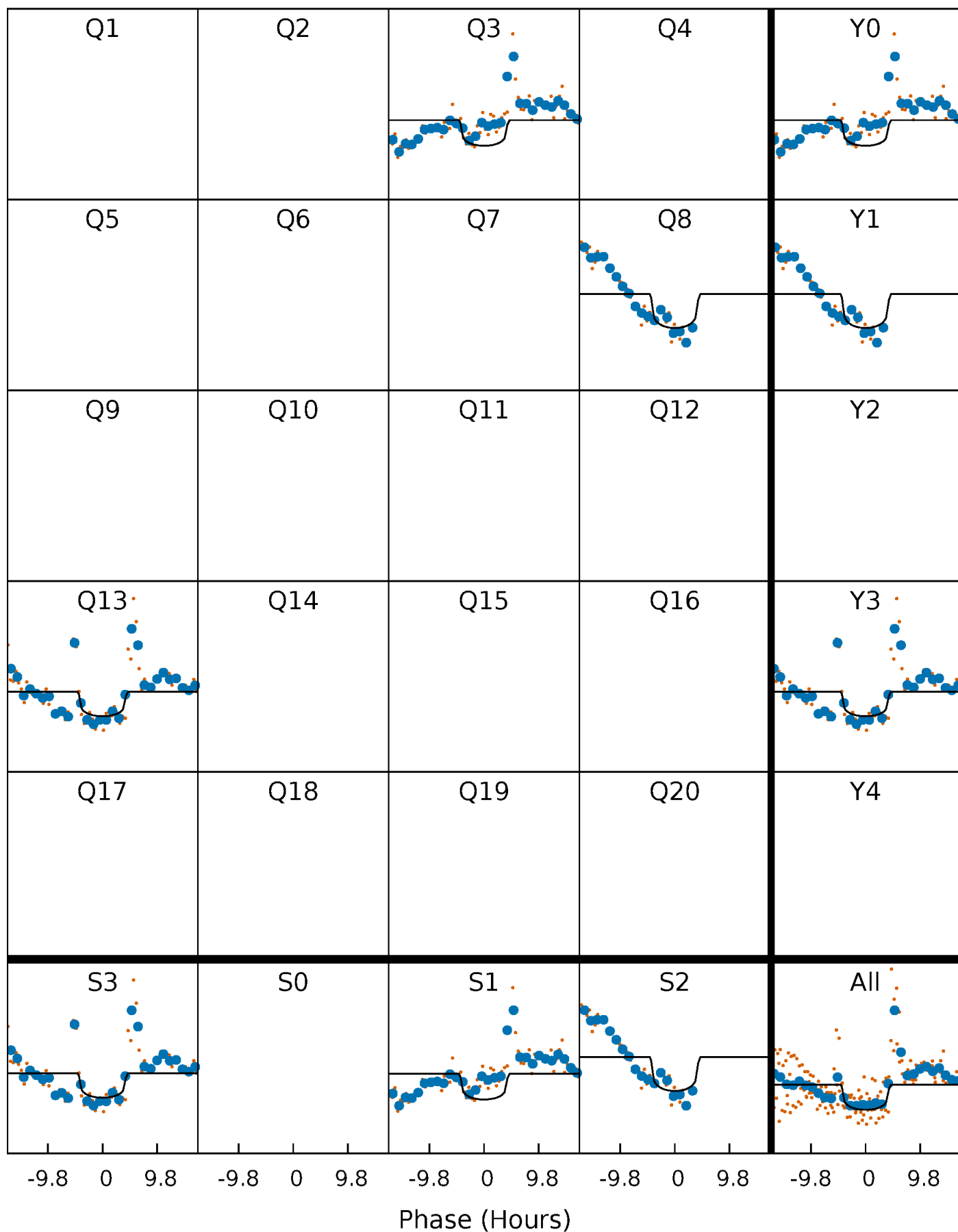
PDC Quarter-Phased Transit Curves

TCE 009150539-03 P=438.495727 Days $T_0=312.624865$ (BKJD)



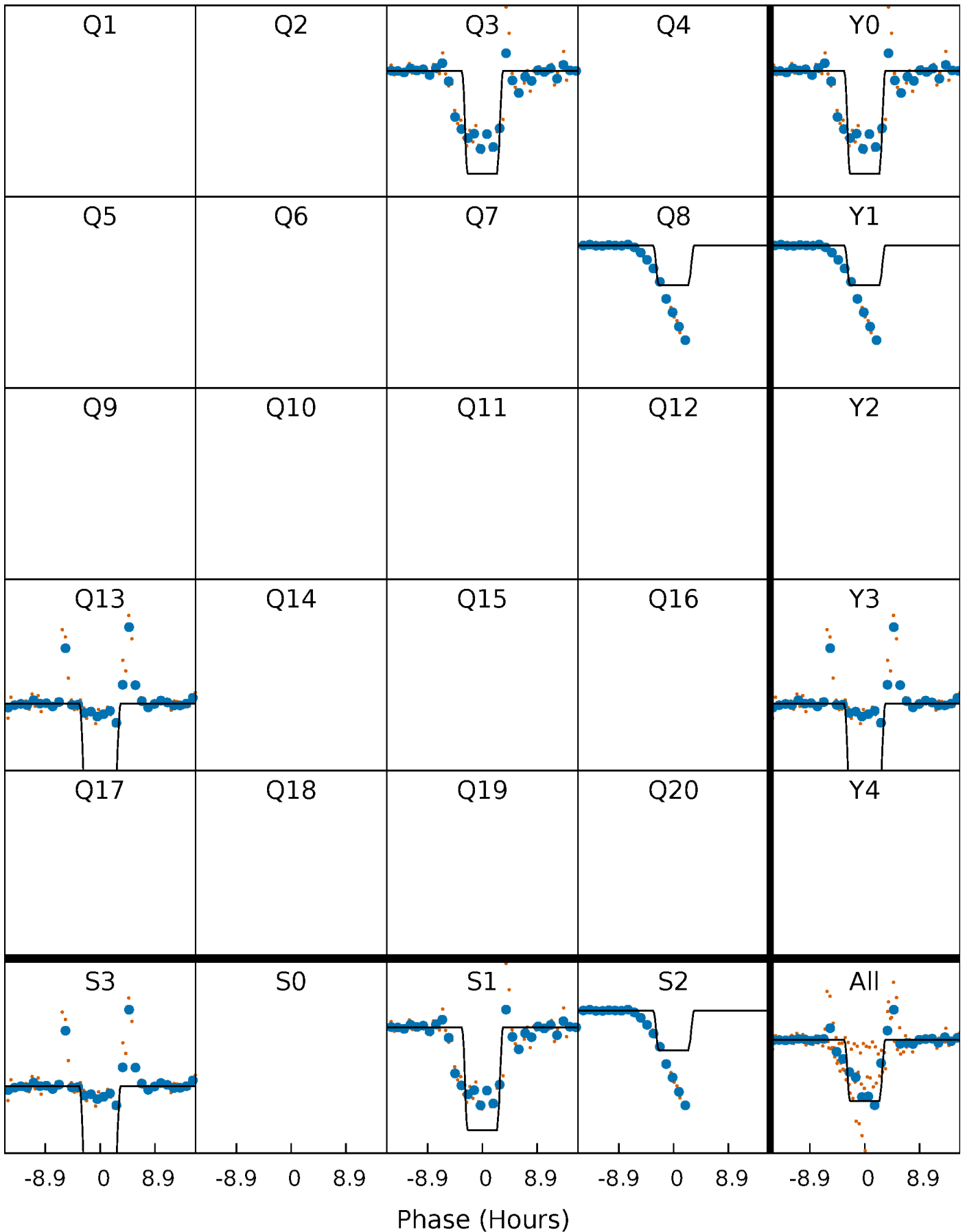
DV Quarter-Phased Transit Curves

TCE 009150539-03 $P=438.495727$ Days $T_0=312.624865$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

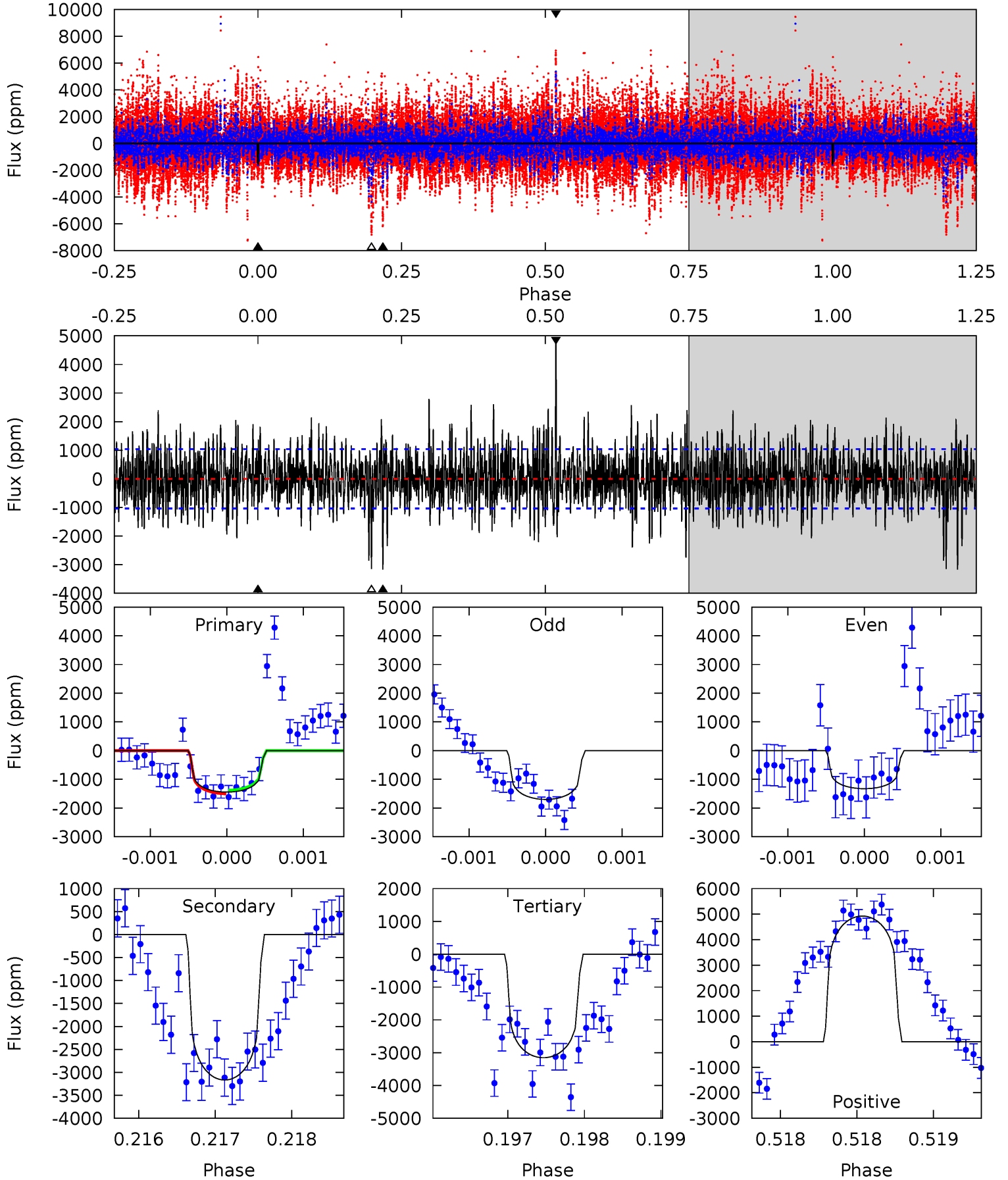
TCE 009150539-03 P=438.497386 Days $T_0=312.658702$ (BKJD)



DV Model-Shift Uniqueness Test

009150539-03, P = 438.495727 Days, E = 312.624865 Days

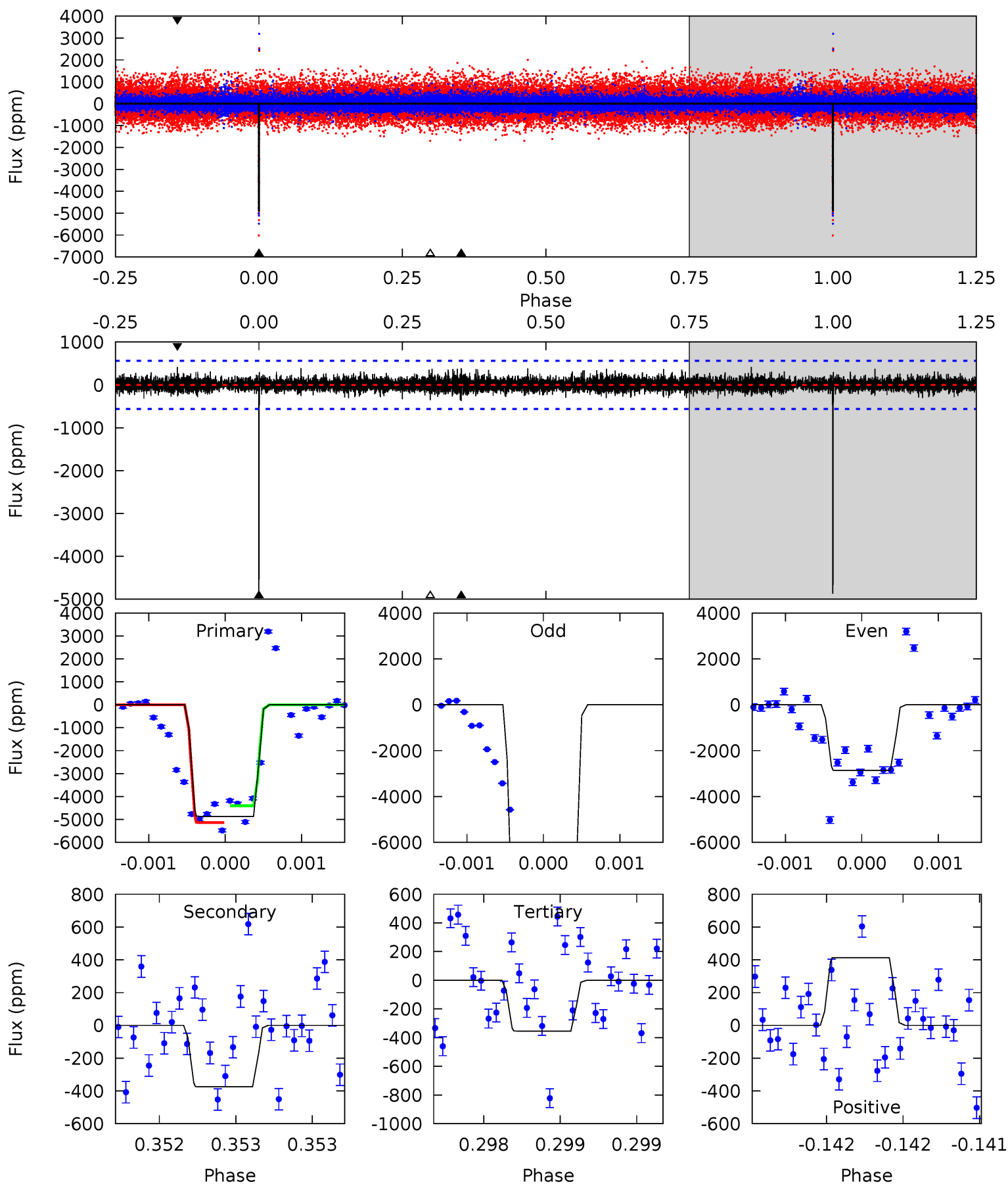
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.63	16.7	16.7	26.0	5.48	3.34	4.08	-9.02	-18.4	0.07	-9.28	0.89	0.85	0.61	0.33



Alt Model-Shift Uniqueness Test

009150539-03, P = 438.497386 Days, E = 312.658702 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.1	3.70	3.50	4.08	5.54	3.43	0.78	44.6	44.0	0.20	-0.38	63.2	1.20	0.08	3.89



Stellar Parameters For KIC 009150539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5596^{+183}_{-166}	$4.535^{+0.110}_{-0.090}$	$-0.860^{+0.350}_{-0.300}$	$0.741^{+0.097}_{-0.088}$	$0.686^{+0.081}_{-0.029}$	$2.380^{+1.042}_{-0.667}$
	+3%/-3%	+2%/-2%	+41%/-35%	+13%/-12%	+12%/-4%	+44%/-28%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009150539-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-3167 ± 189	$3.25^{+2.08}_{-1.71}$	297^{+13}_{-14}	6663^{+4055}_{-1432}	$169461^{+576785}_{-107328}$
Alt.	-375 ± 101	$6.78^{+2.12}_{-2.15}$	297^{+14}_{-13}	3254^{+415}_{-275}	4535^{+5038}_{-2108}

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

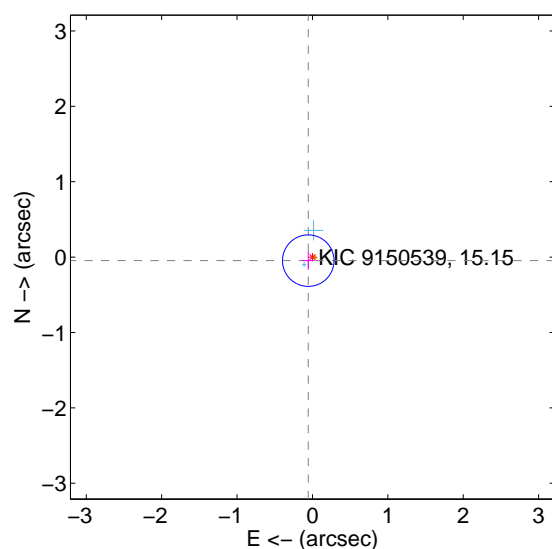
Supplemental centroid analysis for 009150539-03. Kepler magnitude: 15.15. Transit SNR 5.87

There are 2 quarters with good PRF difference image offsets

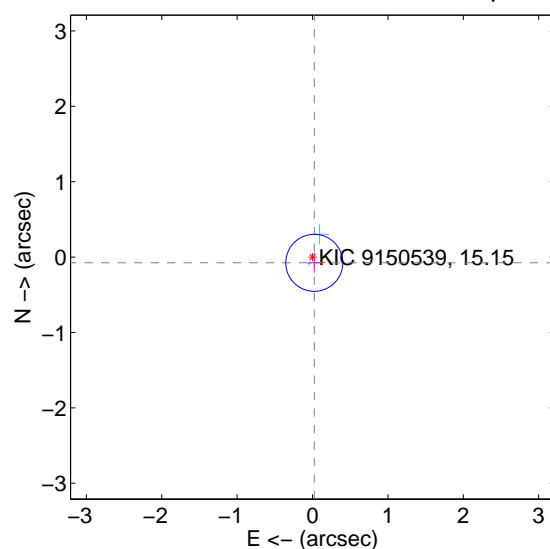
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.073 ± 0.114	0.64	0.056 ± 0.082	-0.047 ± 0.122
PRF-fit source offset from KIC position	0.079 ± 0.126	0.63	-0.023 ± 0.077	-0.076 ± 0.135
photometric centroid source offset	0.61 ± 0.69	0.89	-0.60 ± 0.69	0.11 ± 0.65

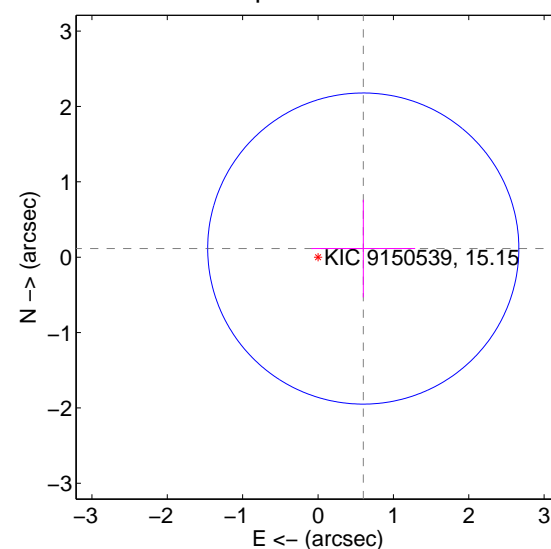
offset from difference PRF-fit to OOT PRF-fit



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- 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.

Q1 no difference image



Q1 no OOT image



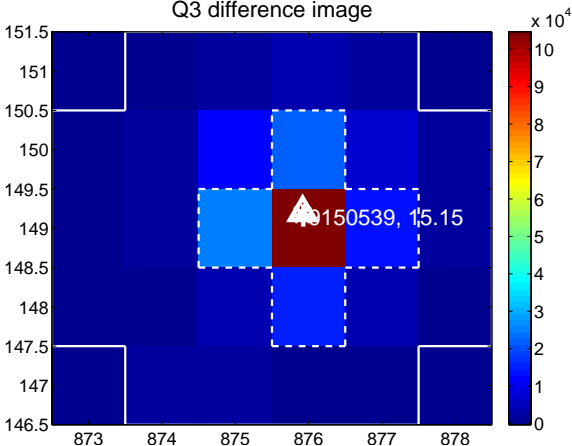
Q2 no difference image



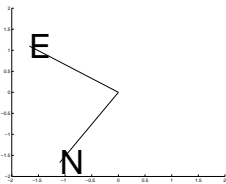
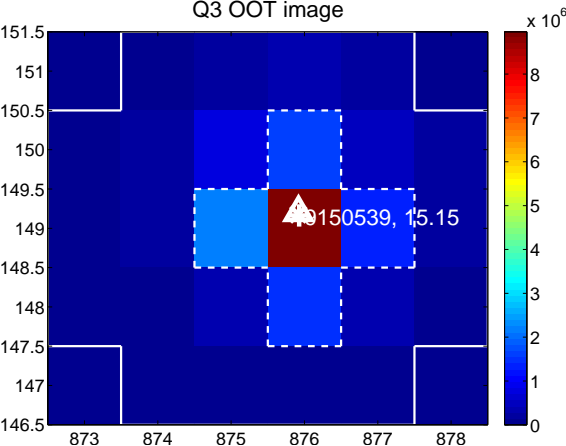
Q2 no OOT image



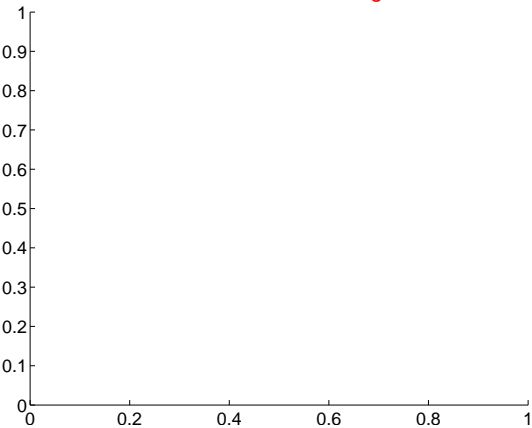
Q3 difference image



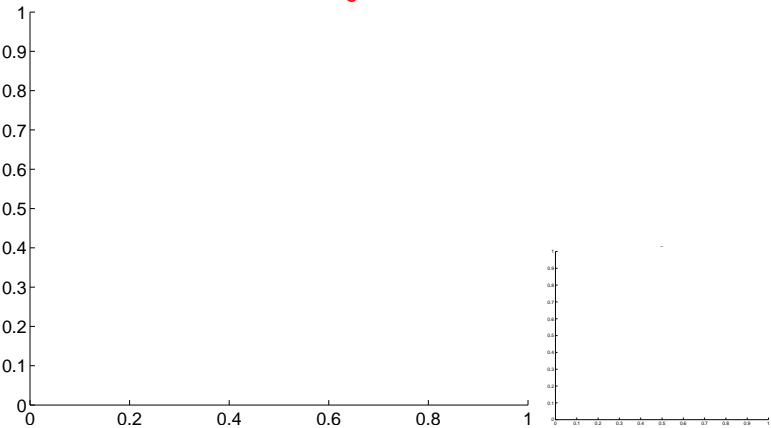
Q3 OOT image



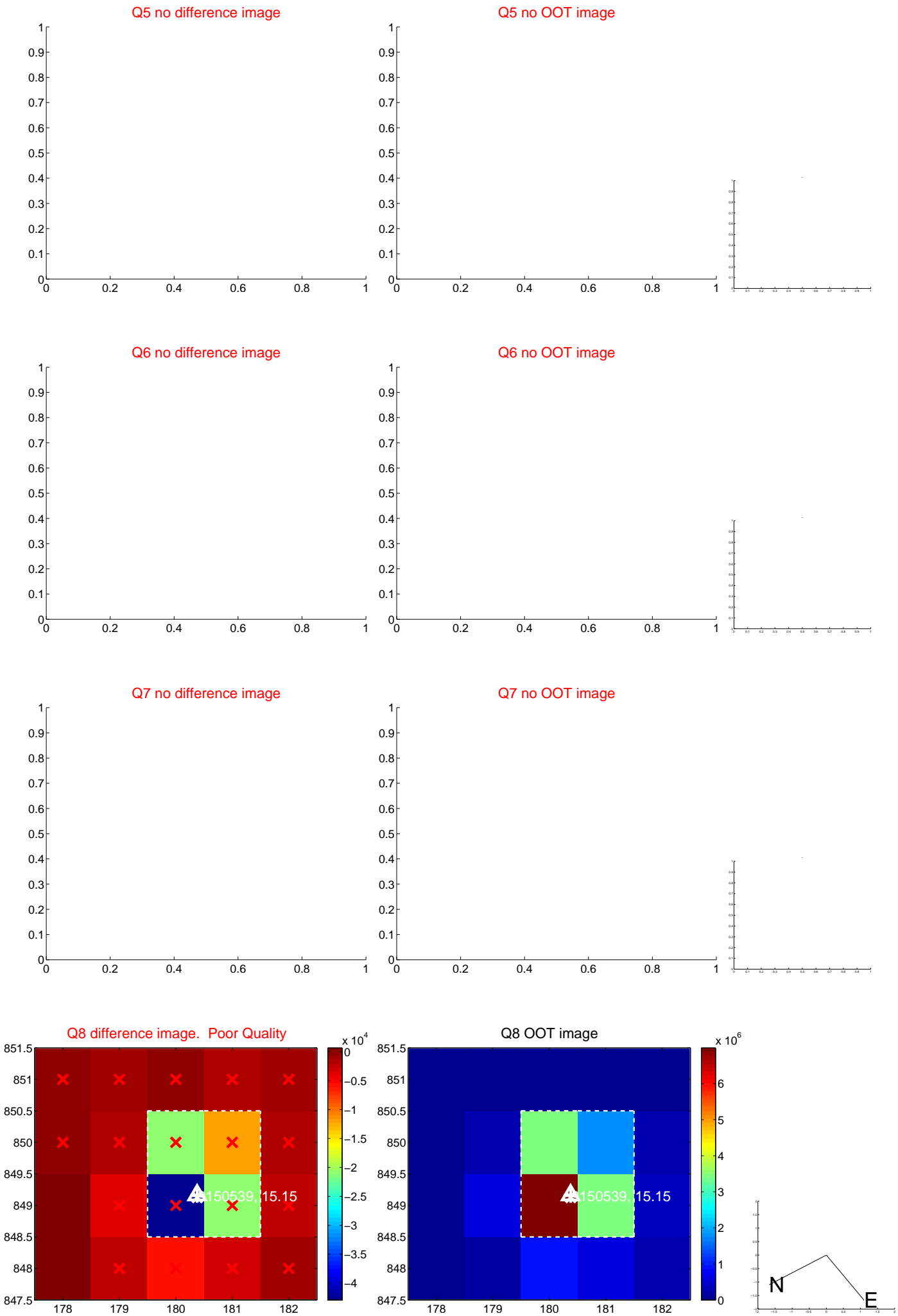
Q4 no difference image



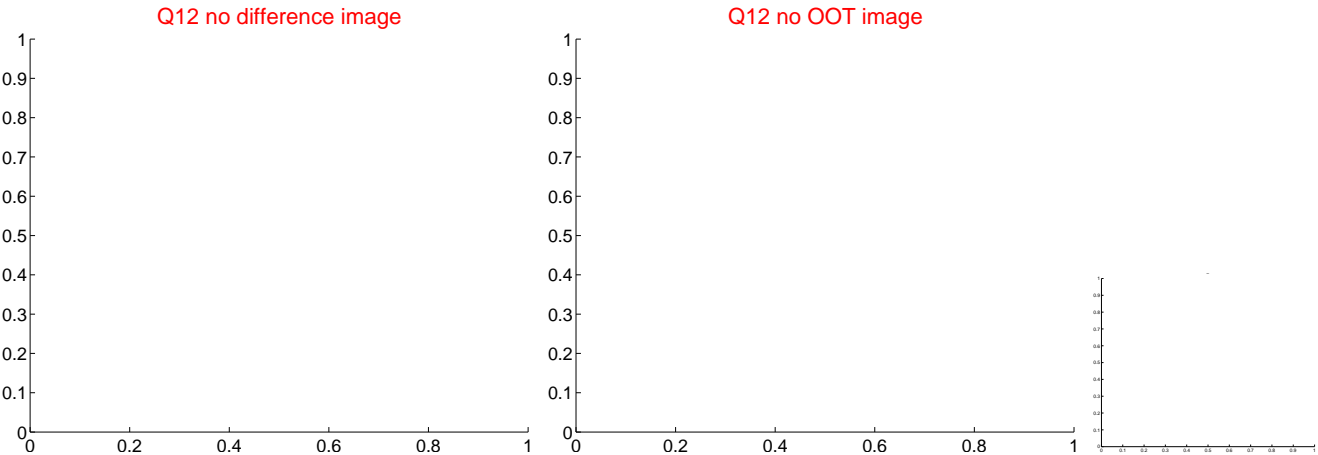
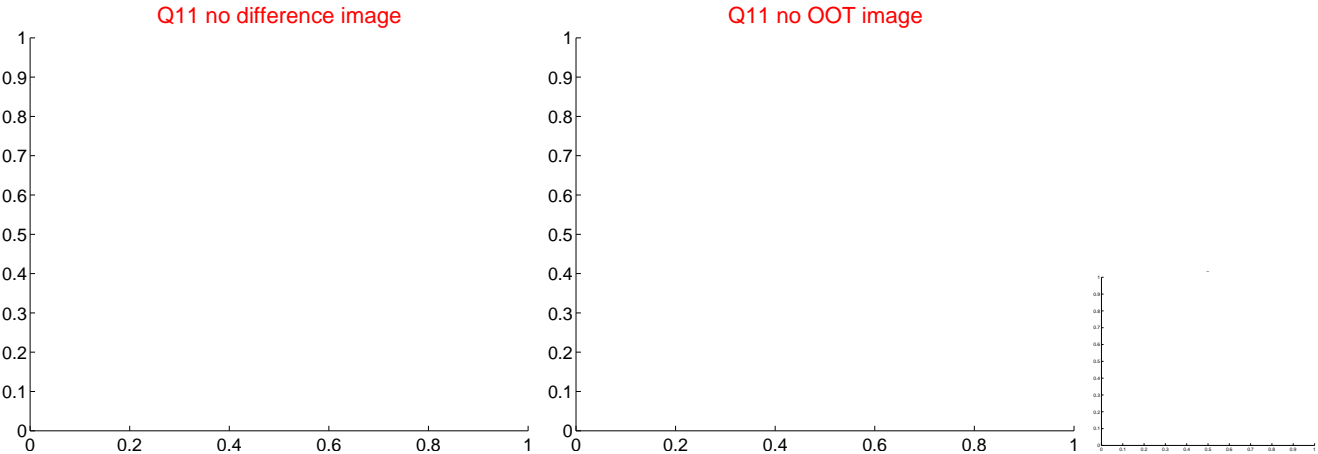
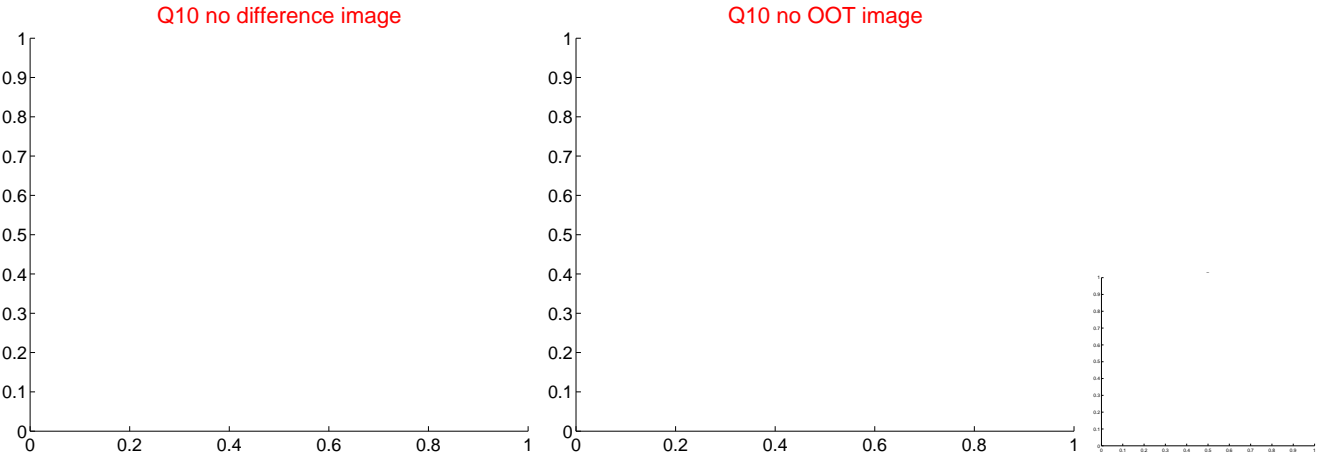
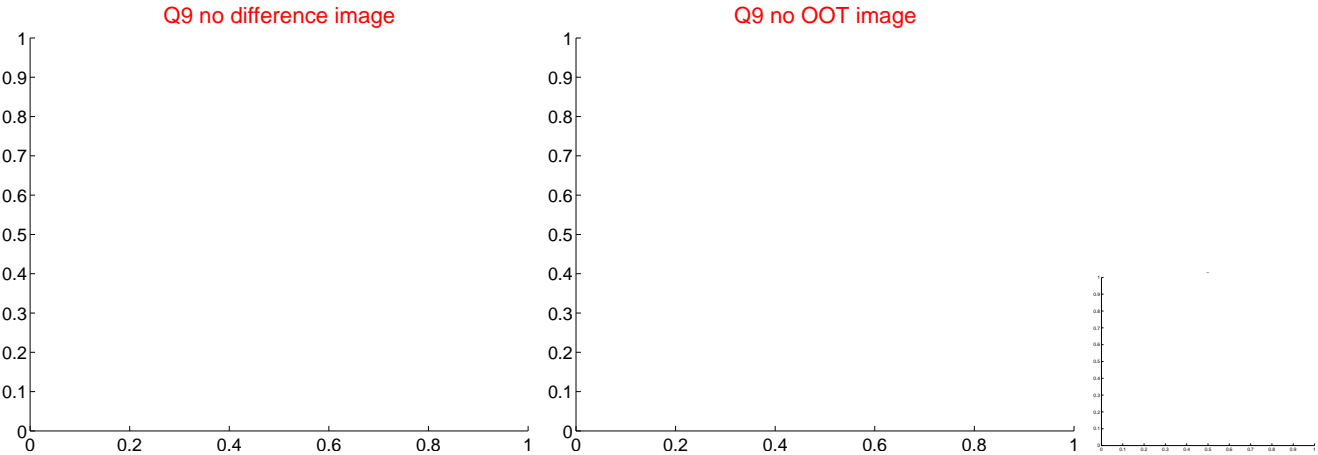
Q4 no OOT image



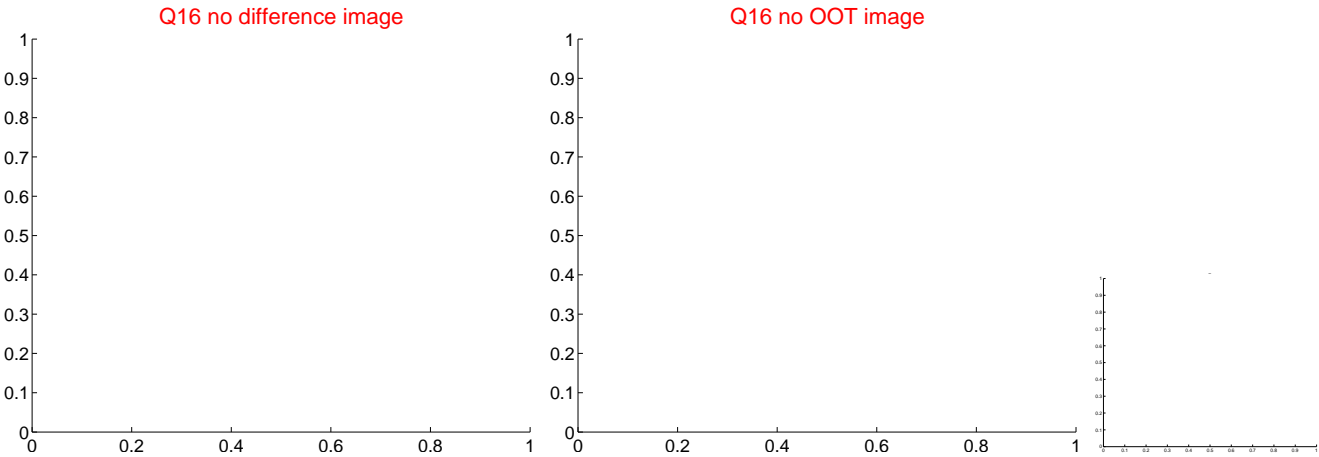
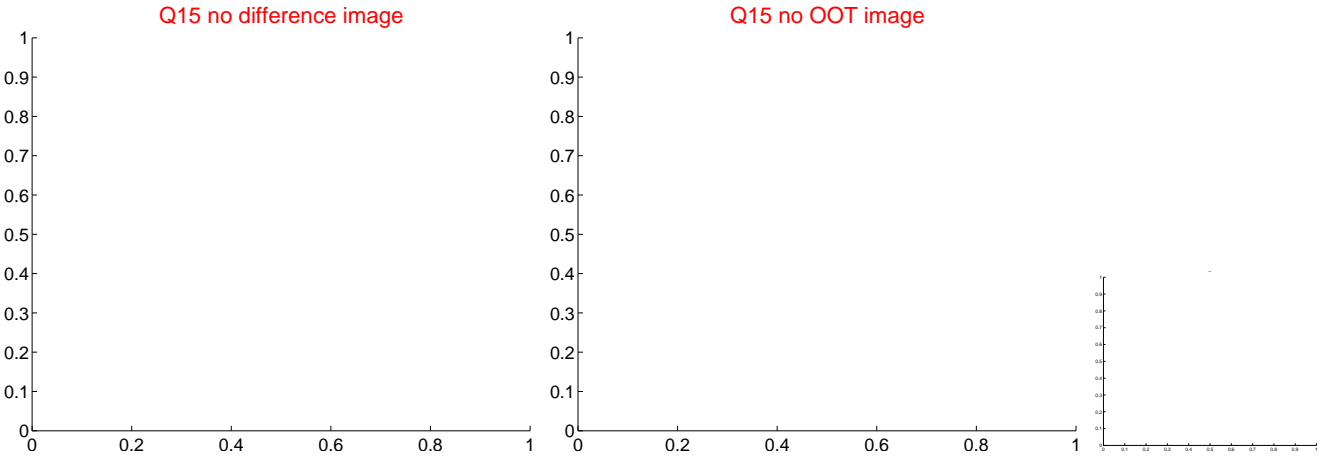
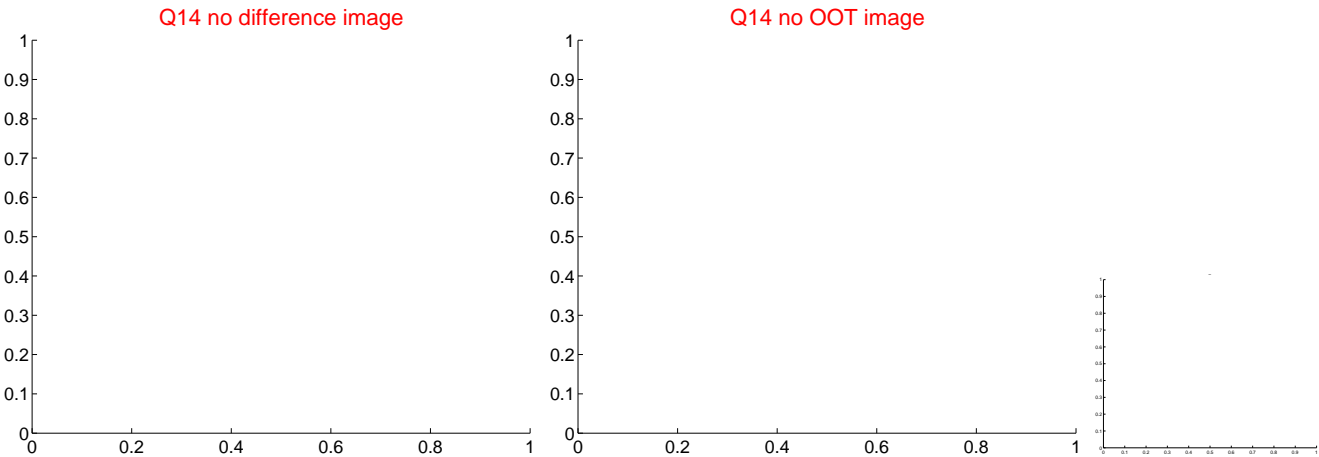
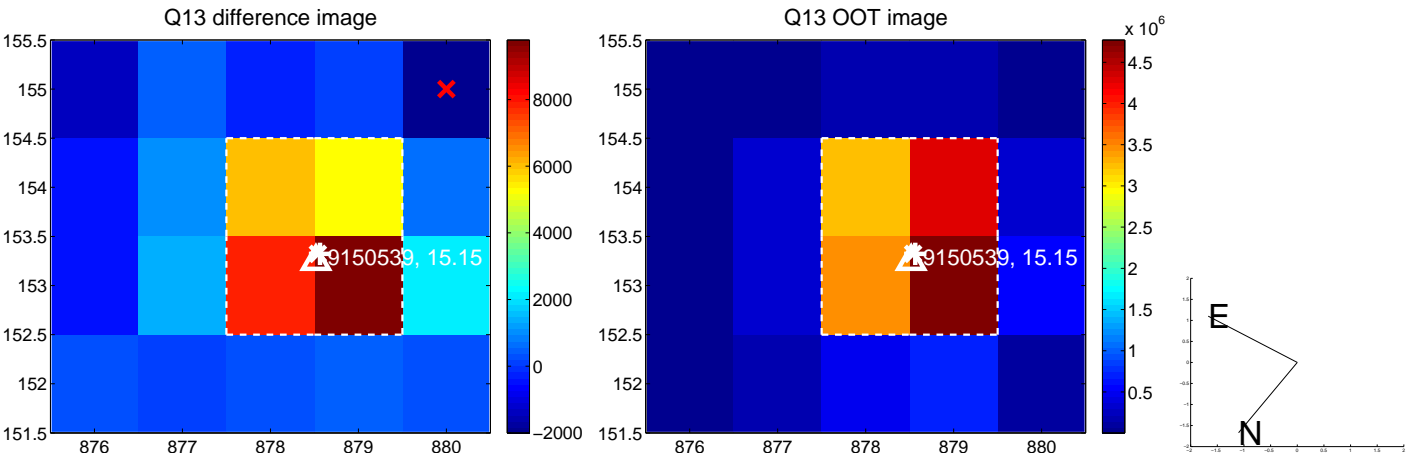
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



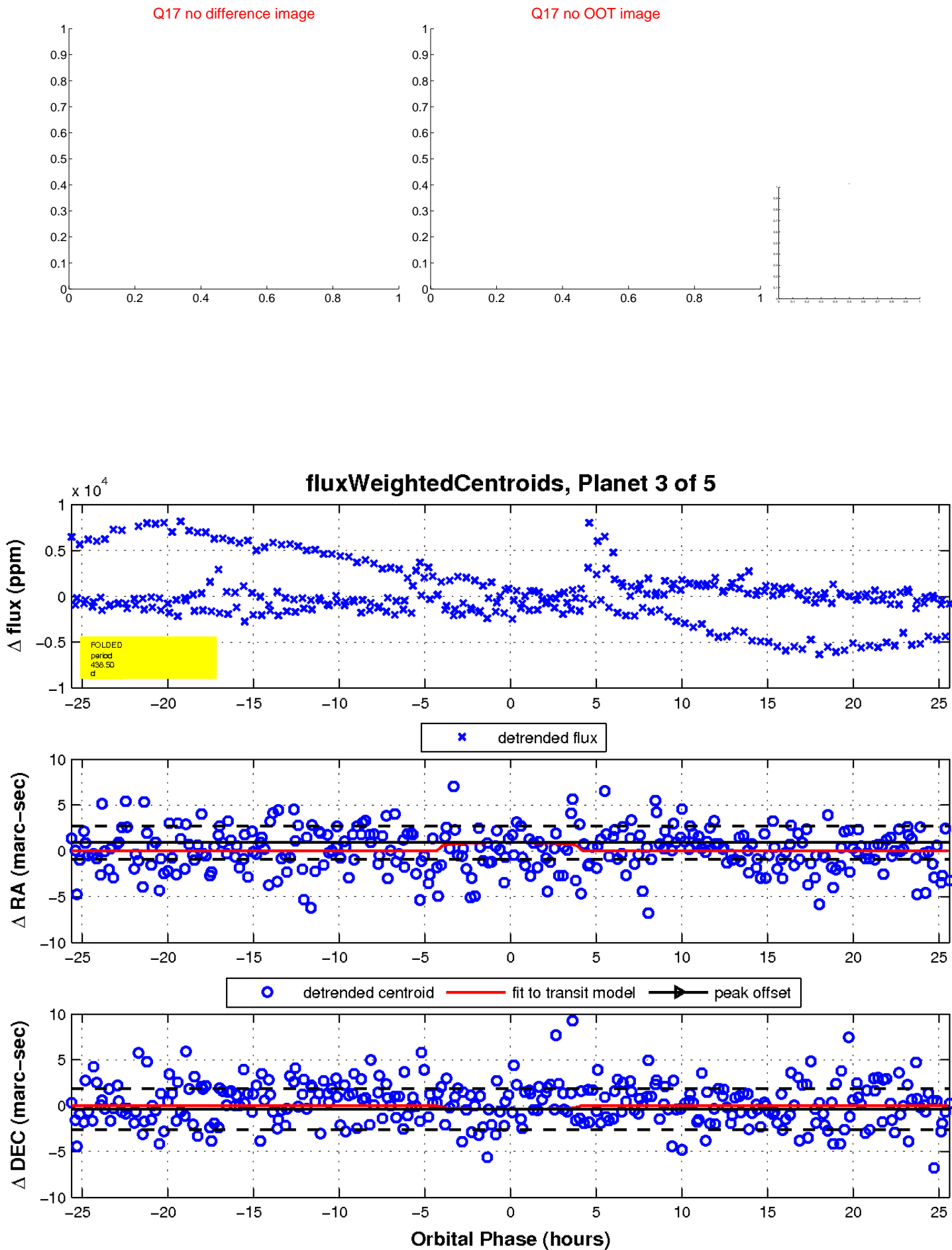
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

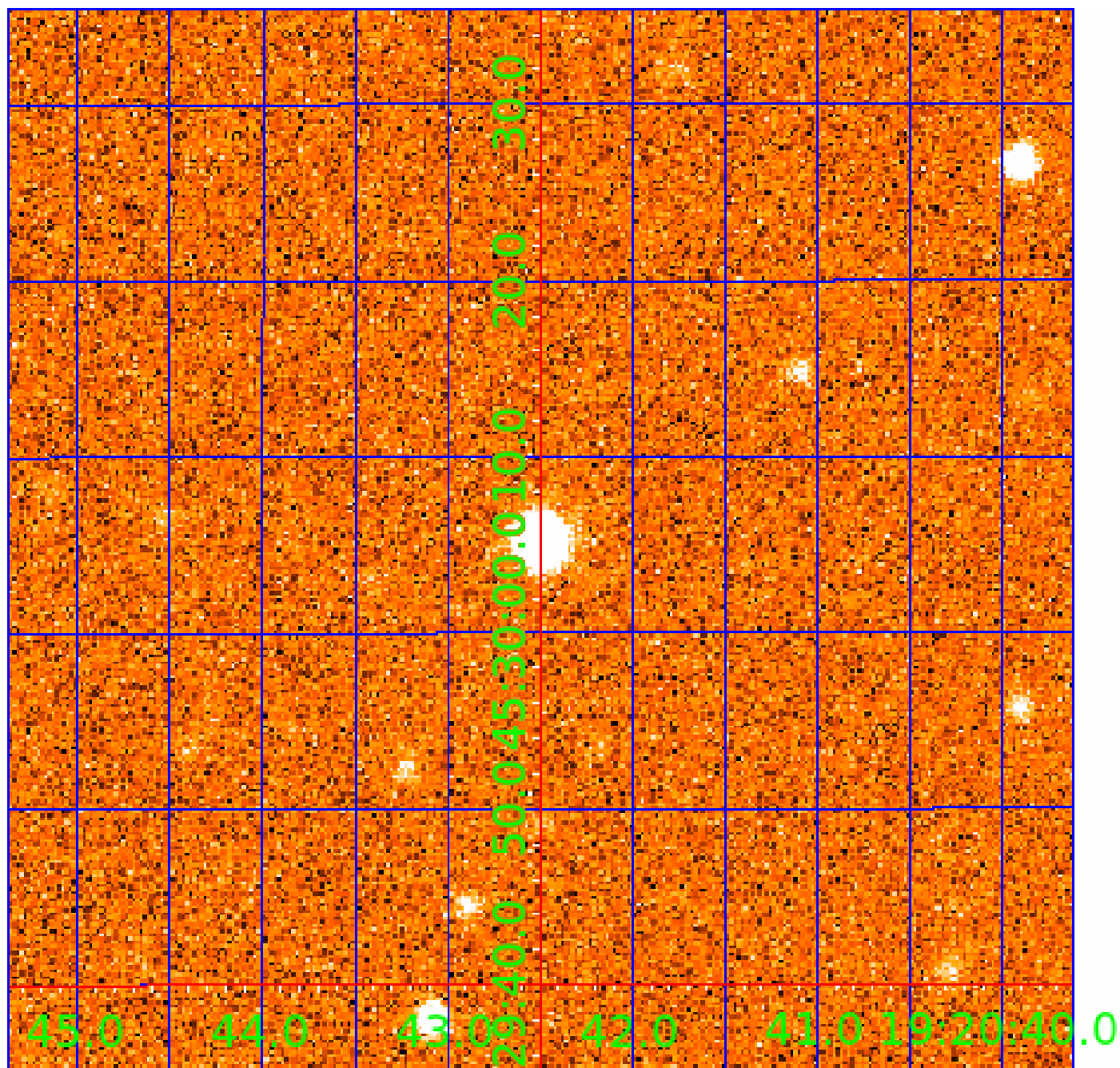


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009150539

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})
009150539-01	OBS	No	576.209545	175.861046	1676.9	13.019	13.2	4.8	0.74	5596	3.12	0.34
009150539-02	OBS	No	555.077577	343.128099	2009.3	4.580	14.6	8.4	0.74	5596	3.40	0.35
009150539-03	OBS	No	438.495727	312.624865	1689.8	8.545	14.3	5.9	0.74	5596	3.09	0.49
009150539-04	OBS	No	455.108064	166.506981	1432.6	5.320	12.4	6.4	0.74	5596	3.06	0.46
009150539-05	OBS	No	343.499363	310.680576	1050.2	2.715	11.8	6.1	0.74	5596	2.70	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

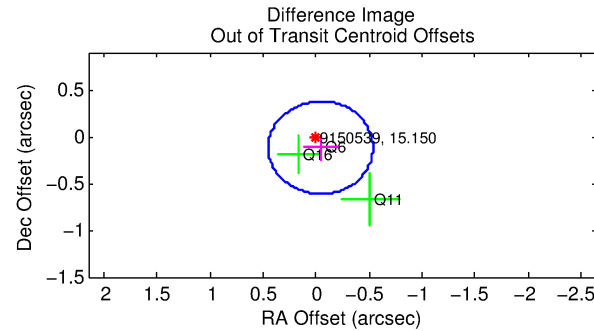
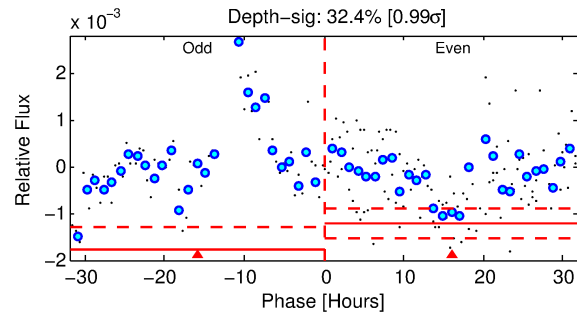
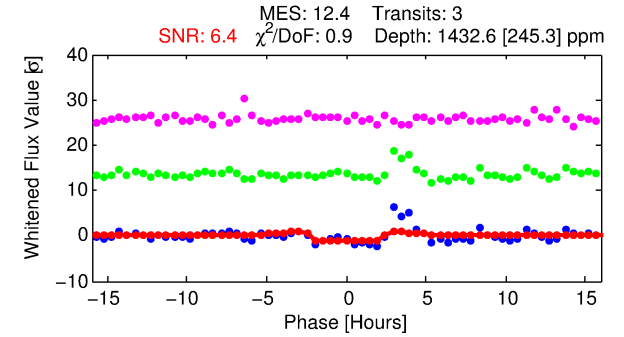
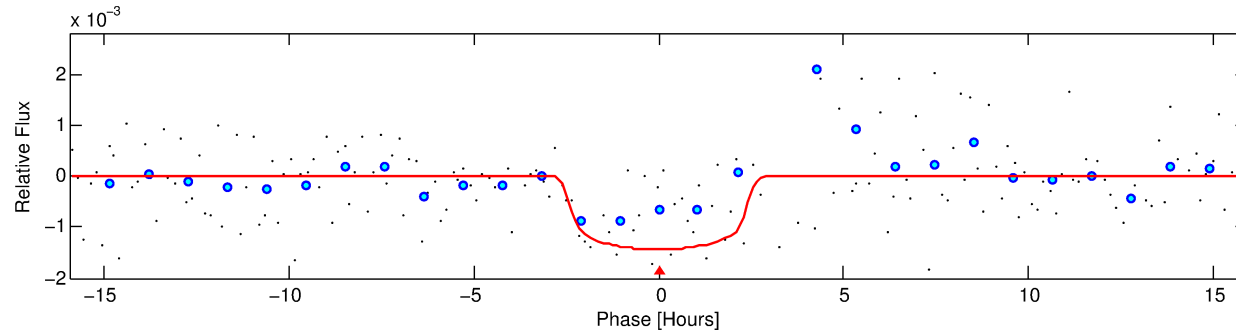
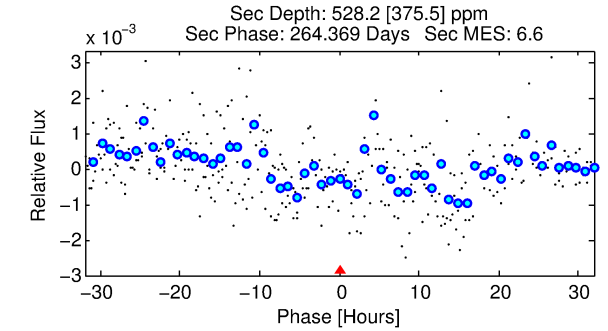
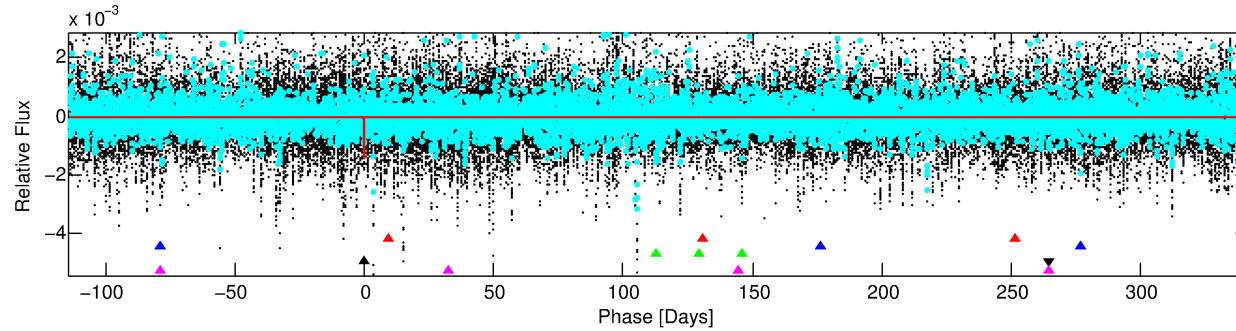
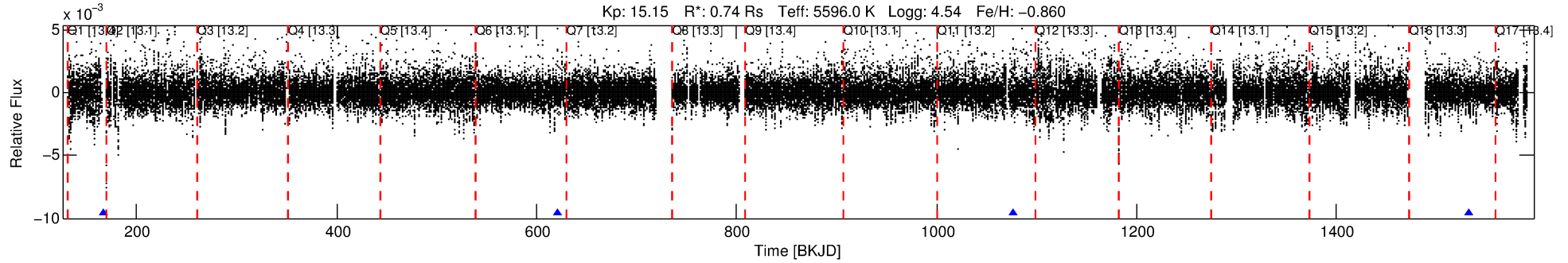
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009150539-04

No Significant Match Found

DV One-Page Summary

KIC: 9150539 Candidate: 4 of 5 Period: 455.108 d



DV Fit Results:

Period = 455.10806 [0.00636] d
Epoch = 166.5070 [0.0136] BKJD
Rp/R* = 0.0378 [0.0120]
a/R* = 459.72 [643.06]
b = 0.76 [0.77]
Seff = 0.46 [0.11]
Teq = 210 [12] K
Rp = 3.06 [1.05] Re
a = 1.0217 [0.1241] AU
Ag = 32414.51 [31521.53] [1.03 σ]
Teffp = 4362 [1050] K [3.95 σ]

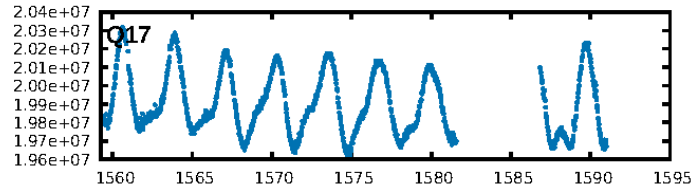
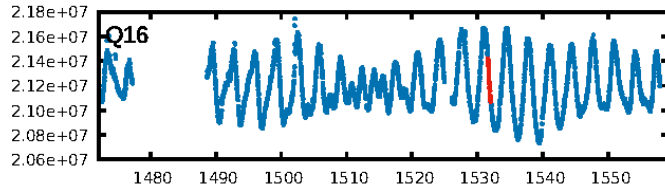
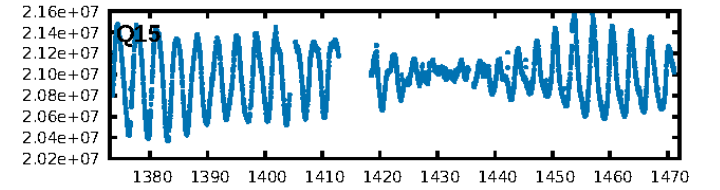
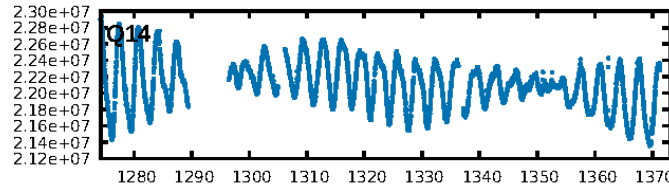
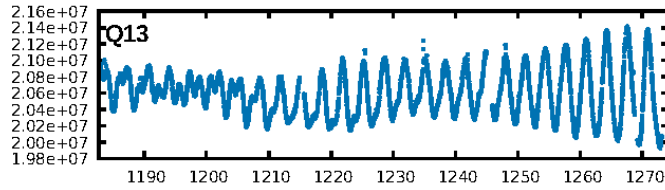
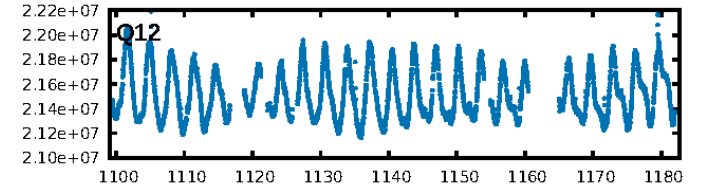
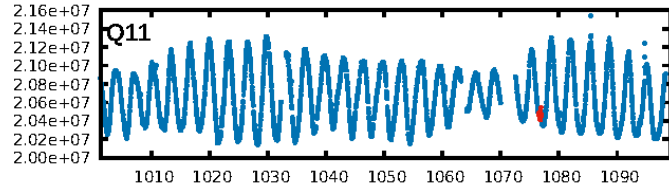
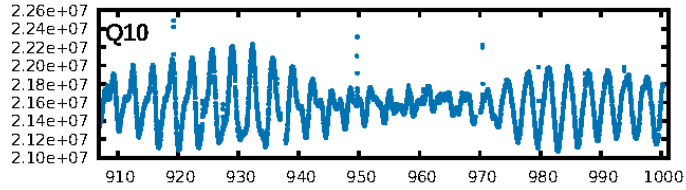
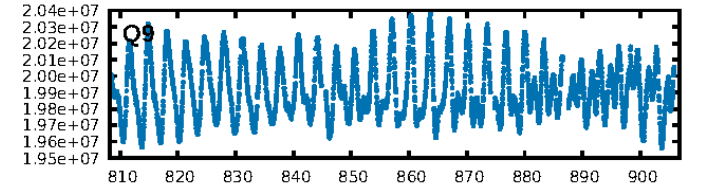
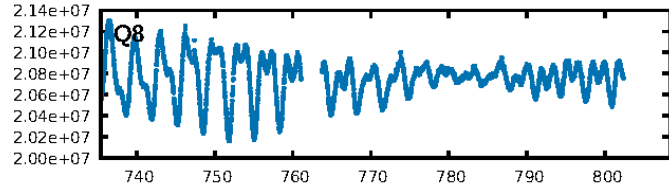
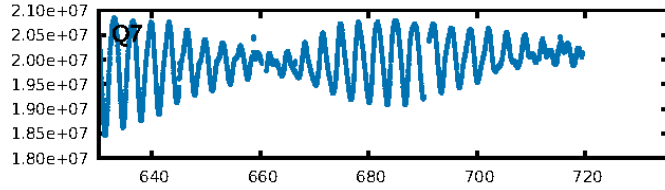
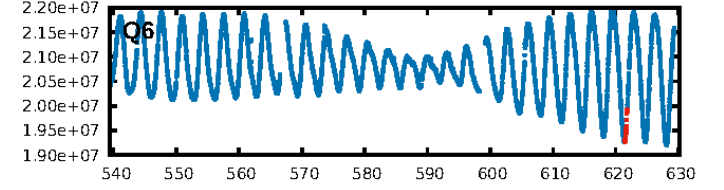
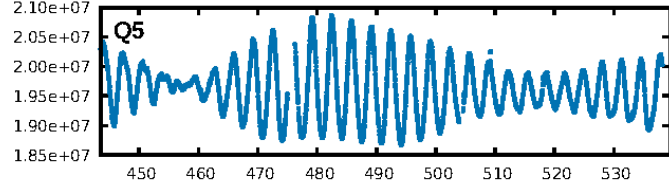
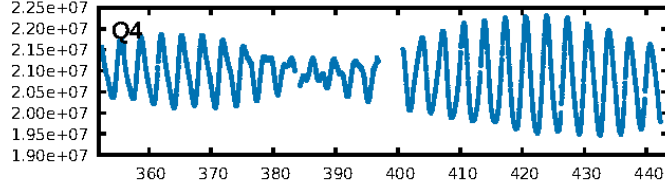
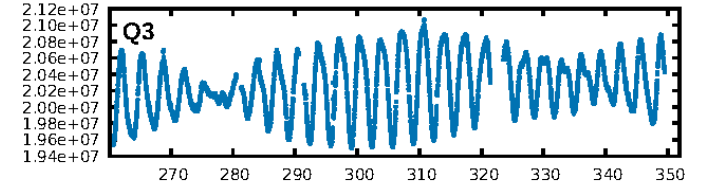
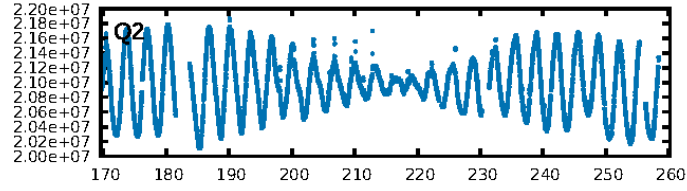
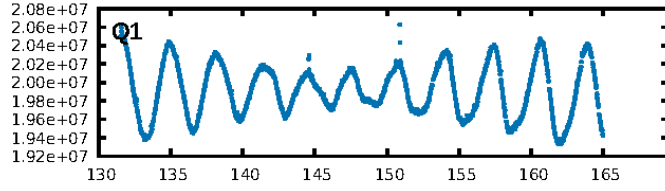
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [39.61 σ]
LongPeriod-sig: 100.0% [341.79 σ]
ModelChiSquare2-sig: 14.2%
ModelChiSquareGof-sig: 99.2%
Bootstrap-pfa: 1.04e-11
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.487
Centroid-sig: 14.1%
Centroid-so: 1.191 arcsec [1.24 σ]
OotOffset-rm: 0.126 arcsec [0.77 σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-rm: 0.239 arcsec [1.10 σ]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

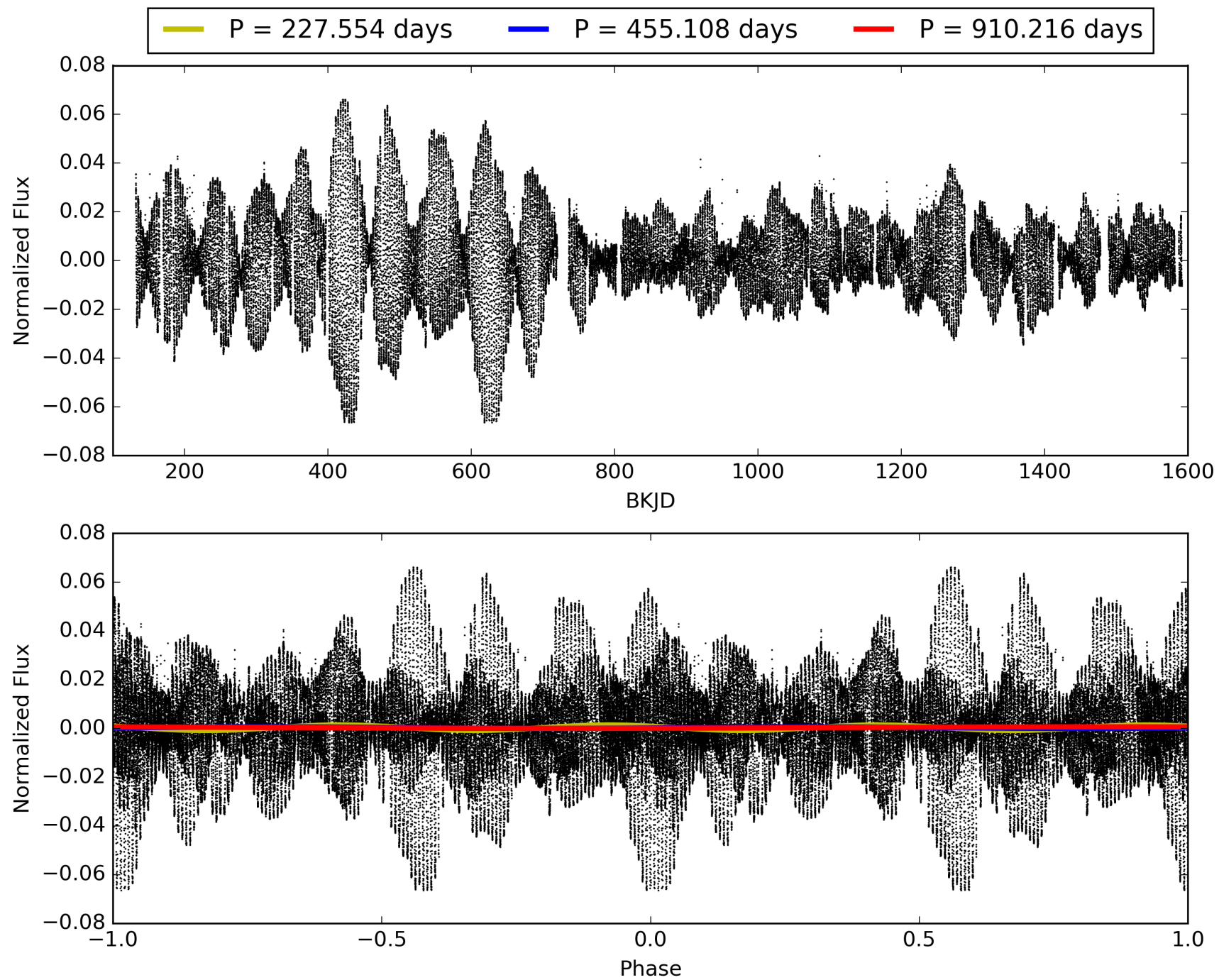
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:37:09 Z

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

TCE 009150539-04, PDC Light Curves

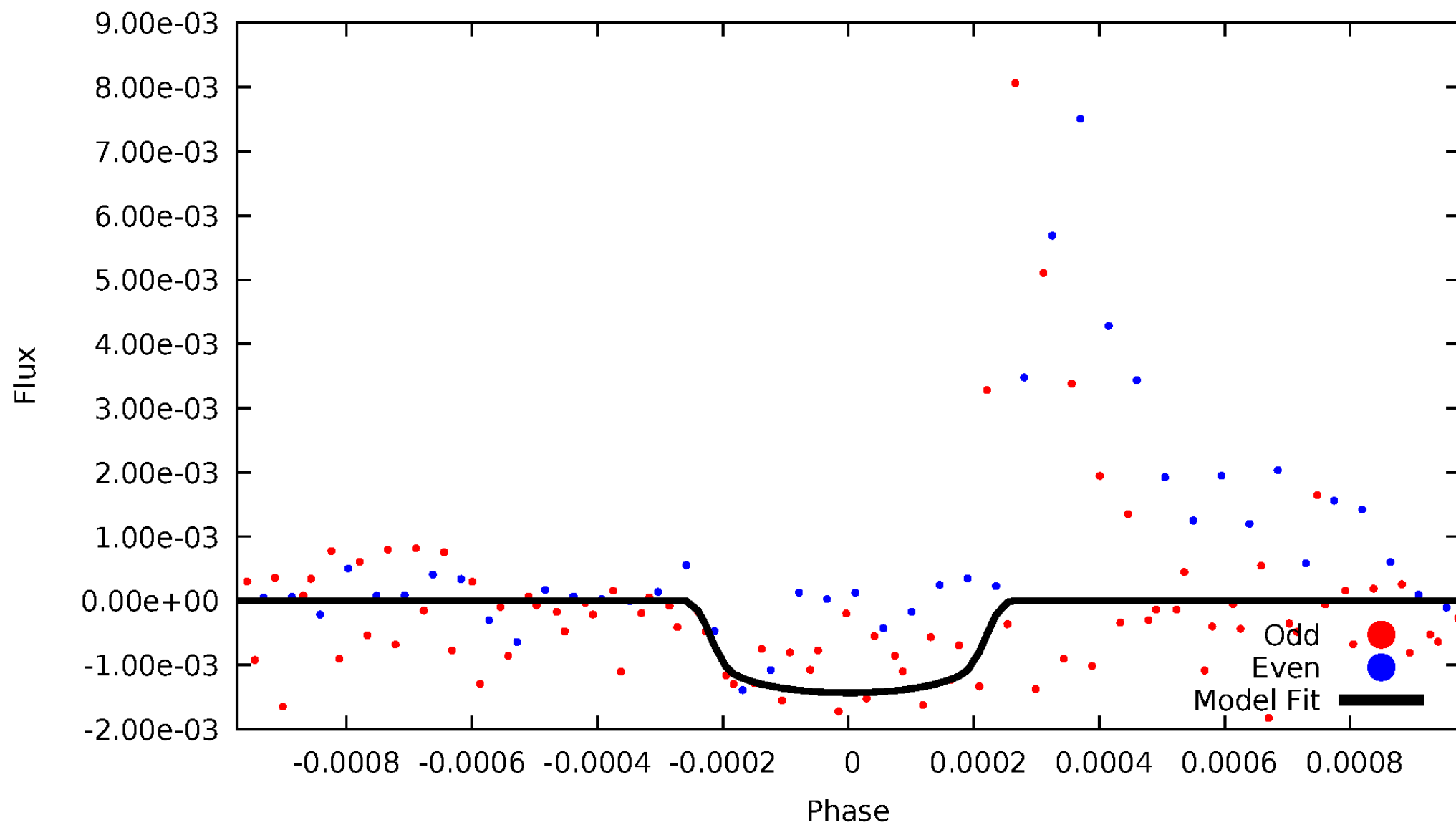


TCE 009150539-04



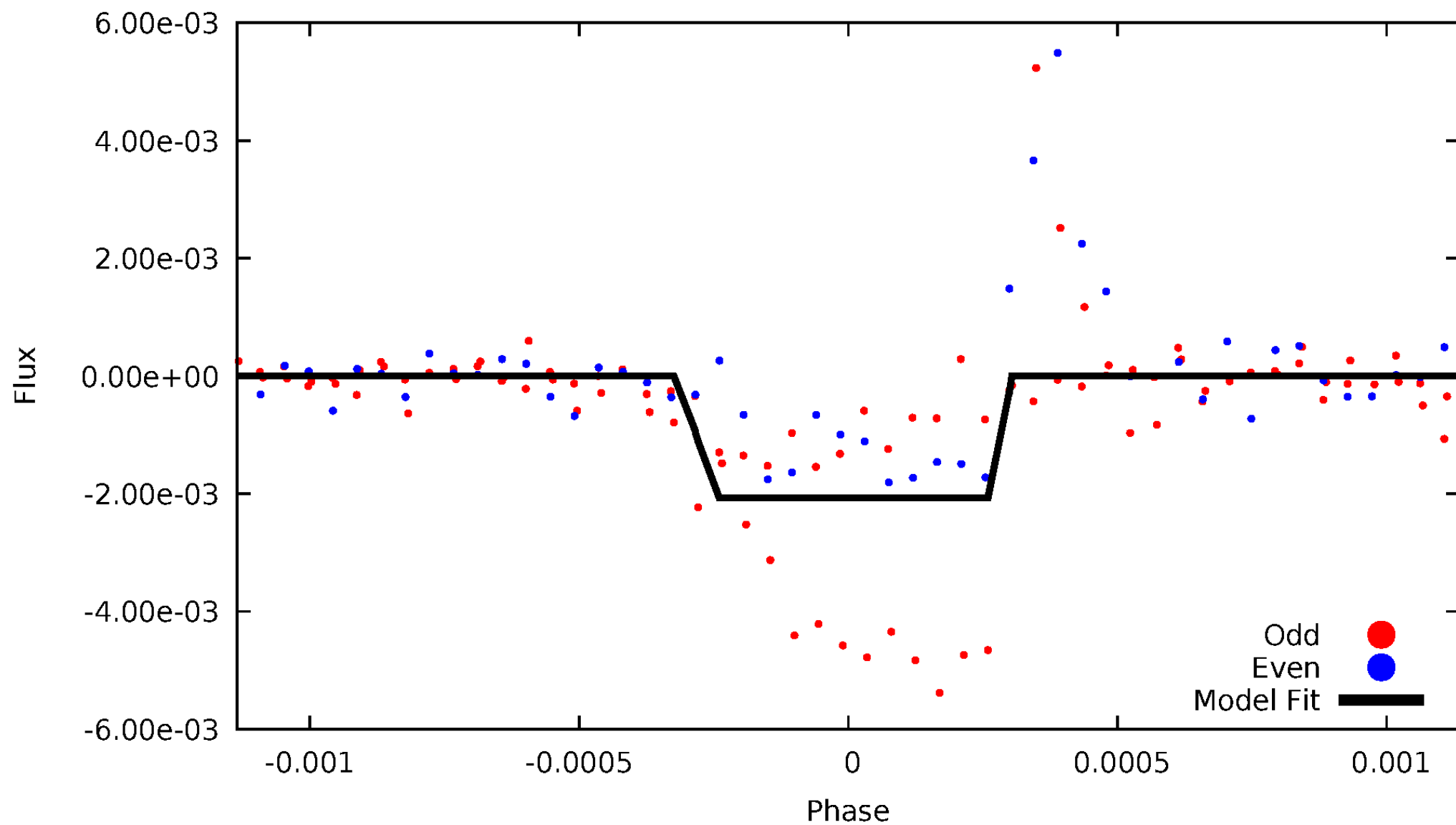
DV Odd/Even

TCE 009150539-04



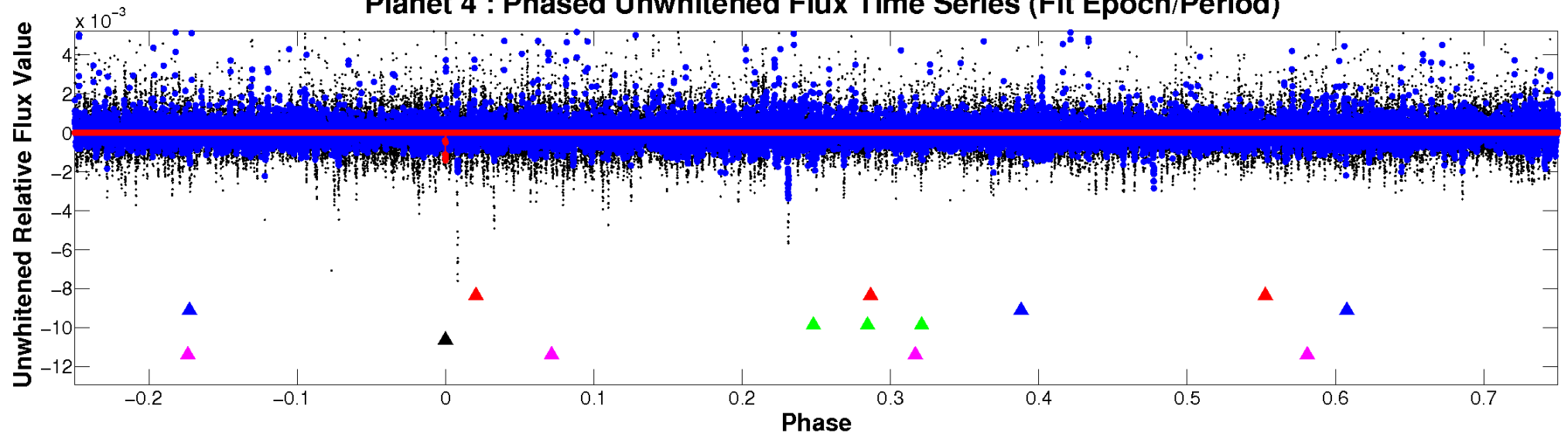
ALT Odd/Even

TCE 009150539-04

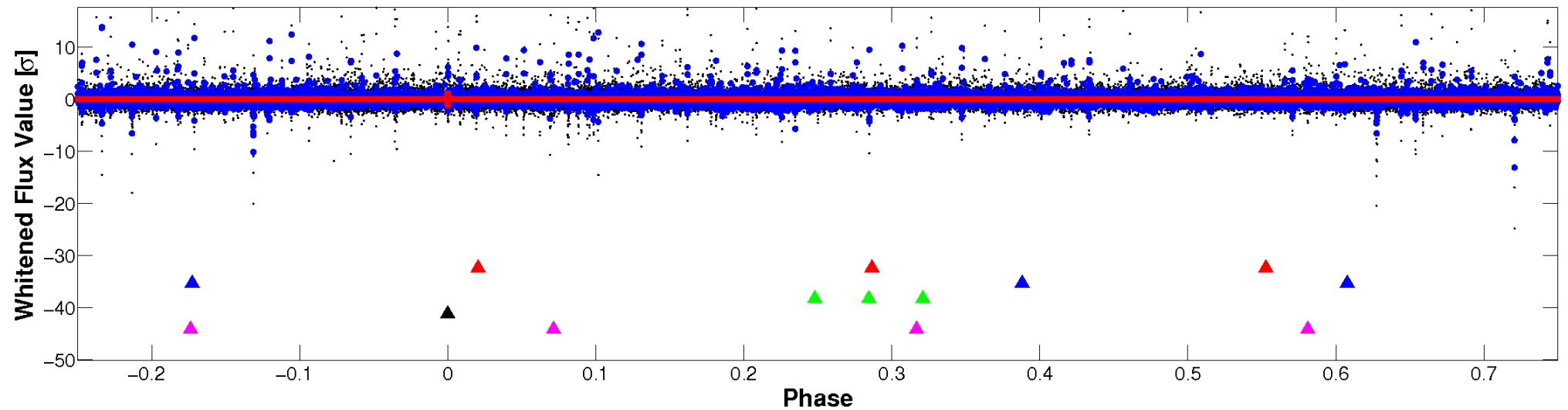


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

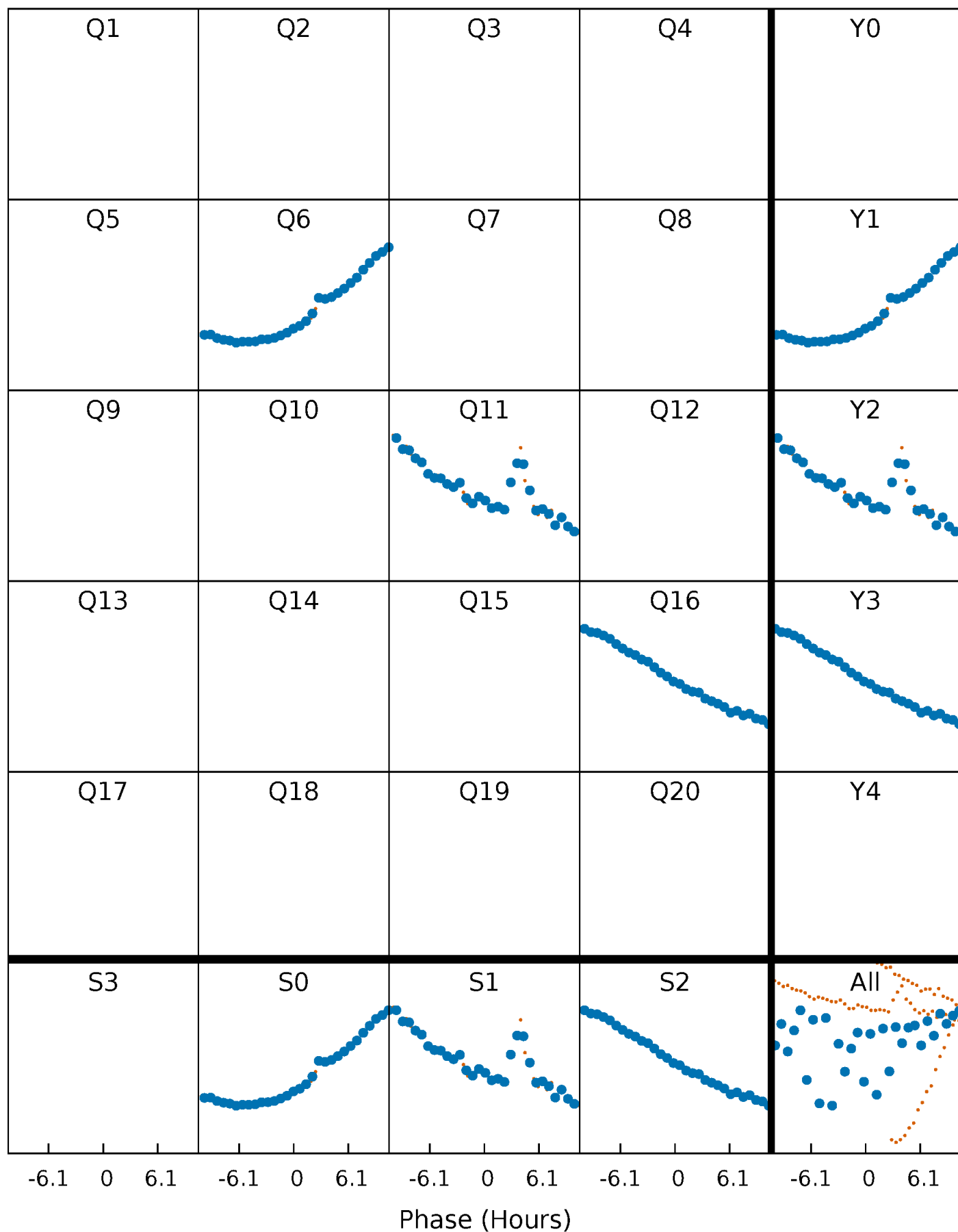


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



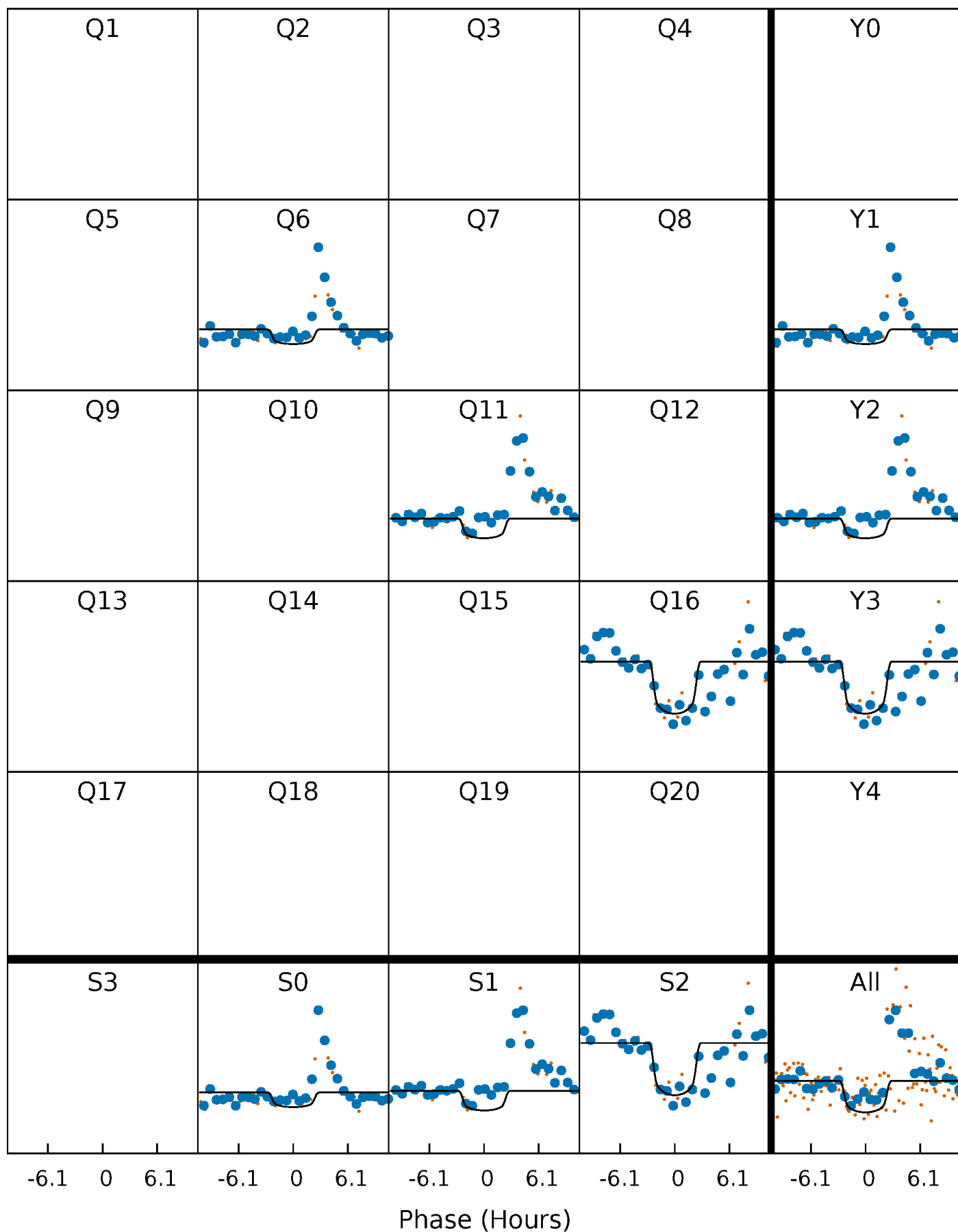
PDC Quarter-Phased Transit Curves

TCE 009150539-04 P=455.108064 Days $T_0=166.506981$ (BKJD)



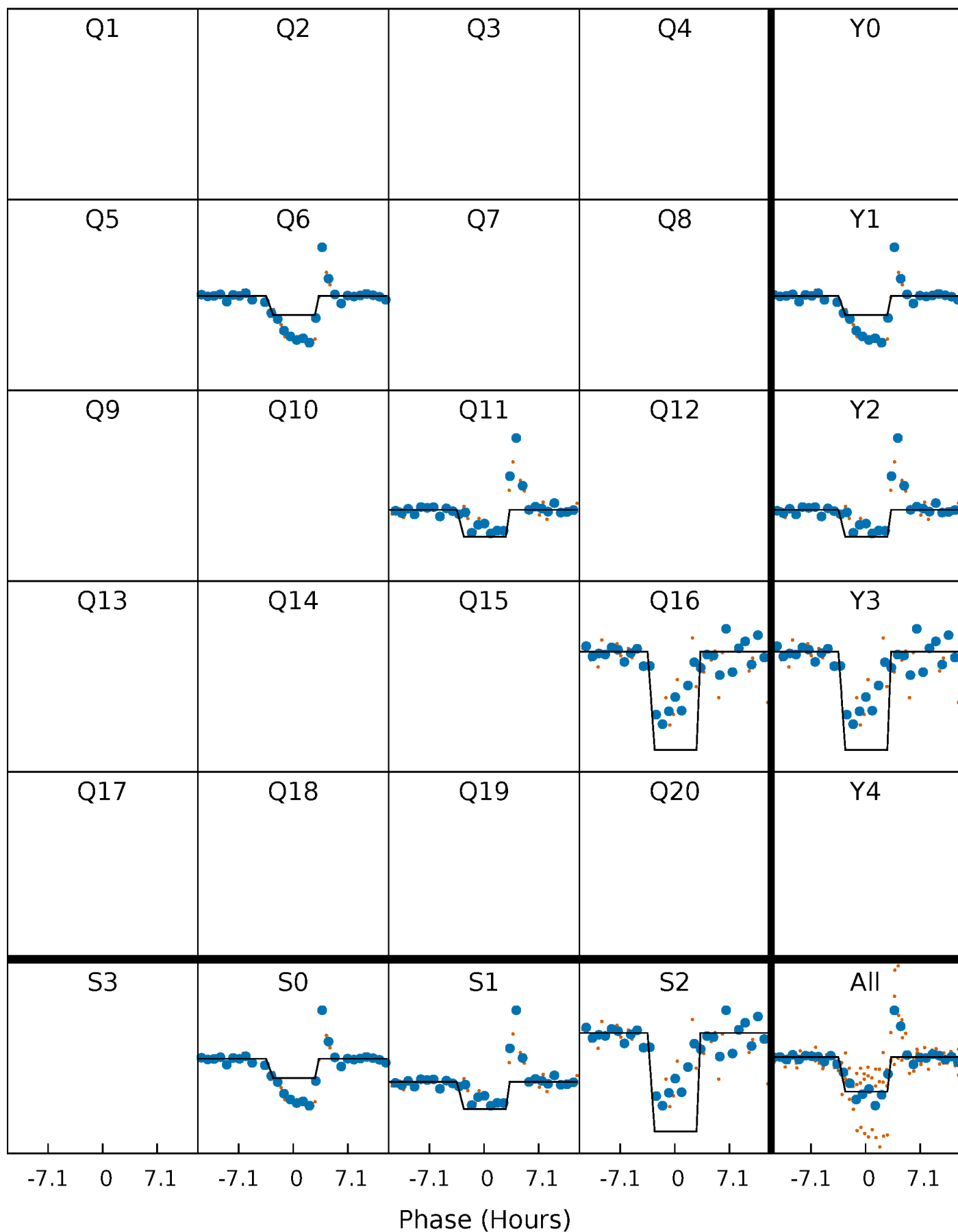
DV Quarter-Phased Transit Curves

TCE 009150539-04 P=455.108064 Days $T_0=166.506981$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

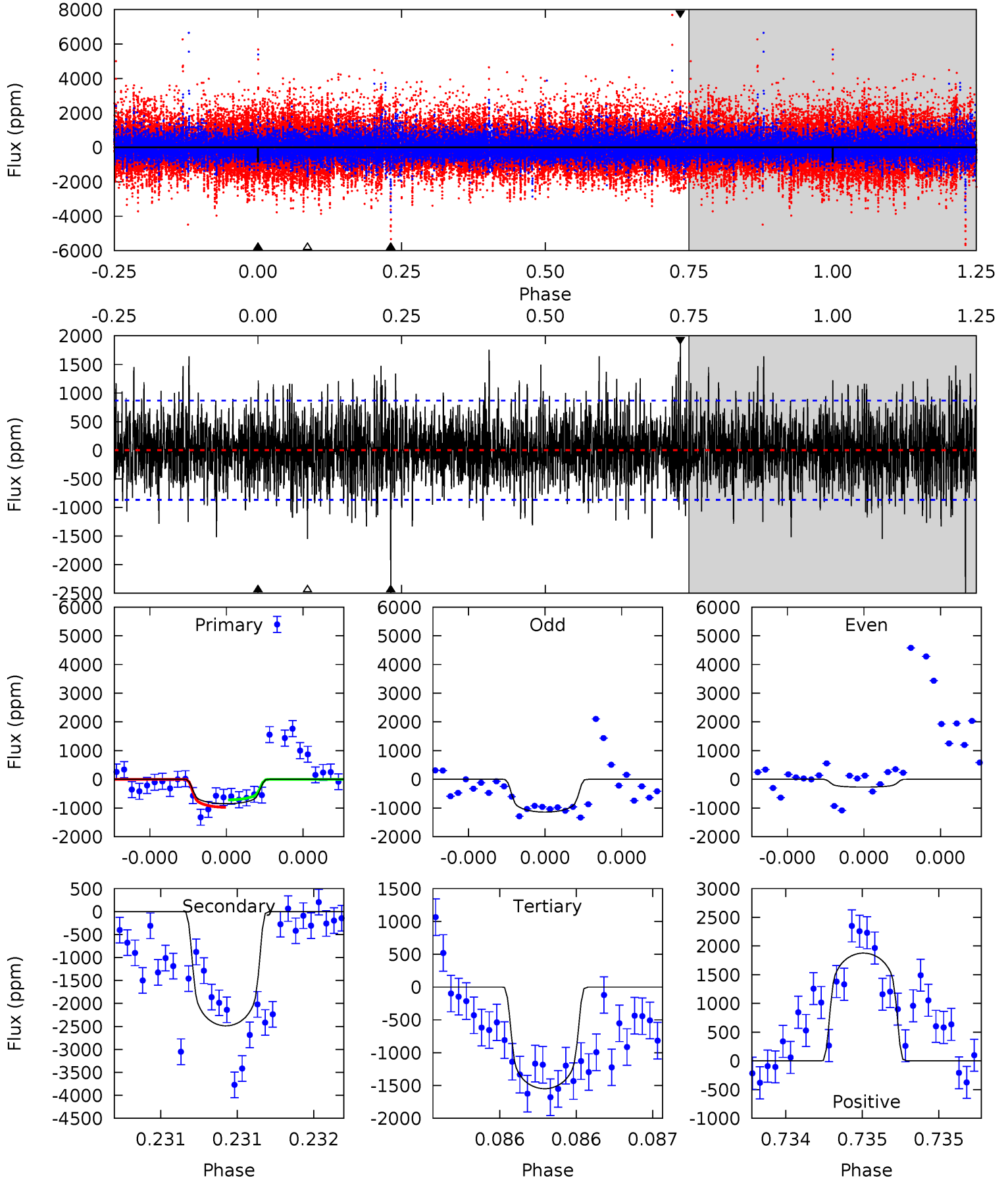
TCE 009150539-04 P=455.137115 Days $T_0=166.440188$ (BKJD)



DV Model-Shift Uniqueness Test

009150539-04, P = 455.108064 Days, E = 166.506981 Days

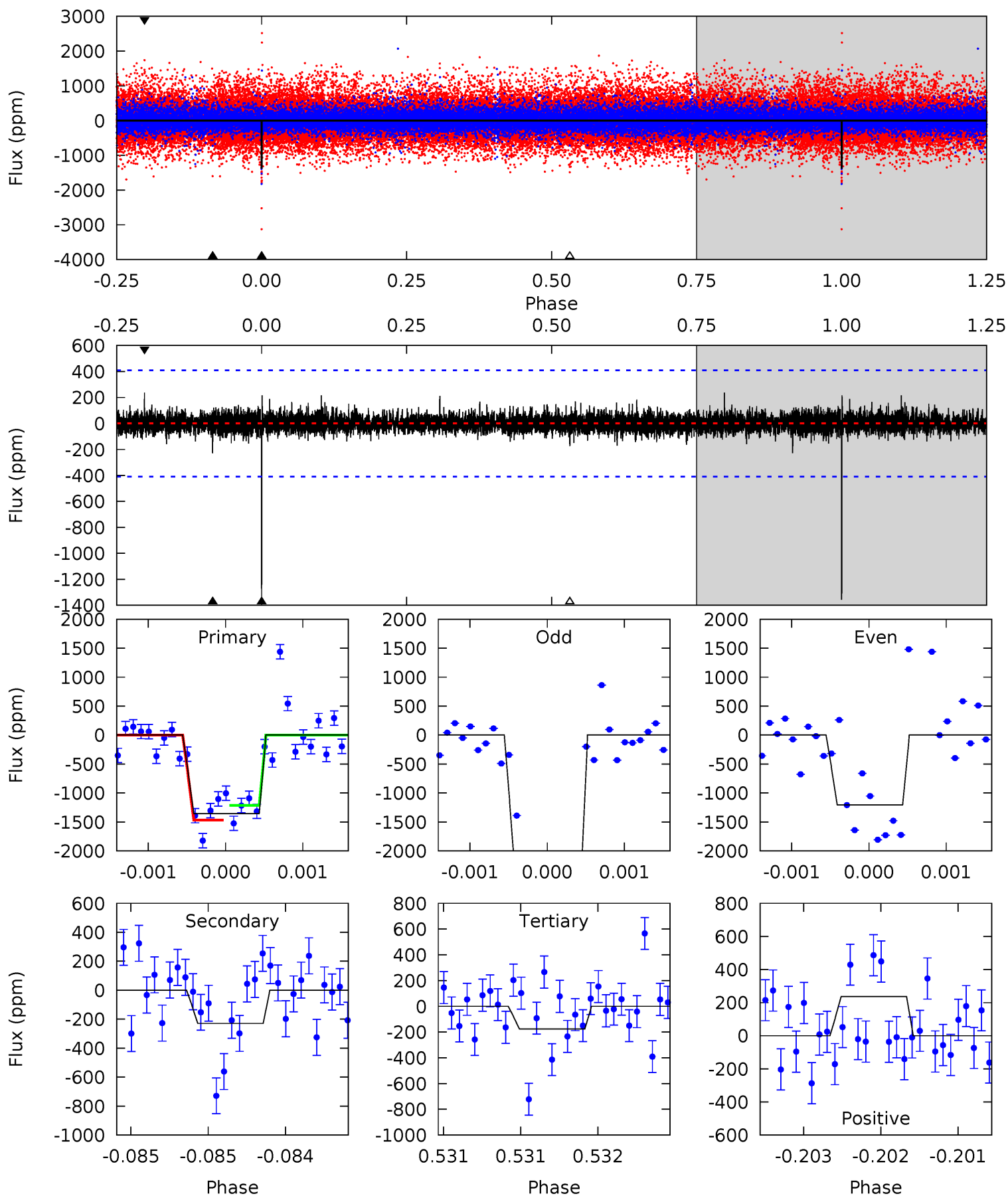
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.47	16.0	9.95	12.1	5.58	3.48	2.74	-4.48	-6.59	6.03	3.93	2.35	1.25	0.43	0.83



Alt Model-Shift Uniqueness Test

009150539-04, P = 455.137115 Days, E = 166.440188 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	3.10	2.38	3.21	5.55	3.44	0.54	16.0	15.2	0.72	-0.10	9.52	1.74	0.15	0



Stellar Parameters For KIC 009150539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5596^{+183}_{-166}	$4.535^{+0.110}_{-0.090}$	$-0.860^{+0.350}_{-0.300}$	$0.741^{+0.097}_{-0.088}$	$0.686^{+0.081}_{-0.029}$	$2.380^{+1.042}_{-0.667}$
	+3%/-3%	+2%/-2%	+41%/-35%	+13%/-12%	+12%/-4%	+44%/-28%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009150539-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2488 ± 156	$3.06^{+0.98}_{-1.02}$	293^{+15}_{-14}	6437^{+1623}_{-831}	$157119^{+202638}_{-66661}$
Alt.	-229 ± 74	$3.67^{+1.02}_{-0.94}$	293^{+13}_{-13}	3652^{+434}_{-347}	9753^{+9451}_{-4302}

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

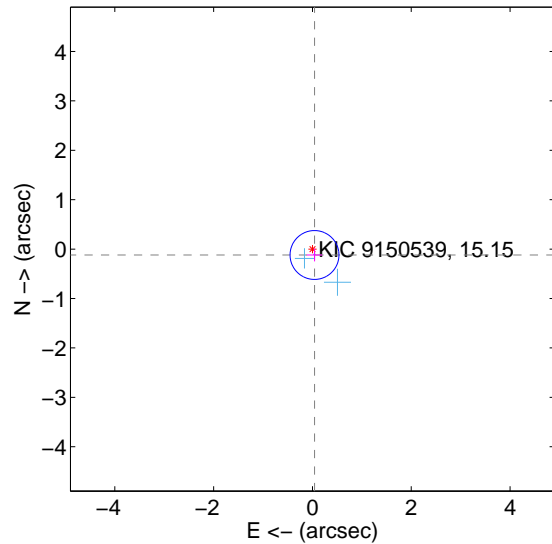
Supplemental centroid analysis for 009150539-04. Kepler magnitude: 15.15. Transit SNR 6.43

There are 3 quarters with good PRF difference image offsets

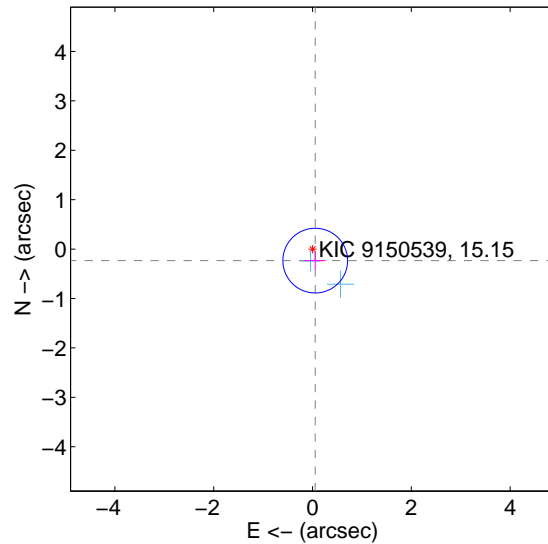
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.126 ± 0.165	0.77	-0.042 ± 0.159	-0.119 ± 0.131
PRF-fit source offset from KIC position	0.239 ± 0.218	1.10	-0.055 ± 0.212	-0.233 ± 0.180
photometric centroid source offset	1.19 ± 0.96	1.24	-0.92 ± 0.96	0.76 ± 0.98

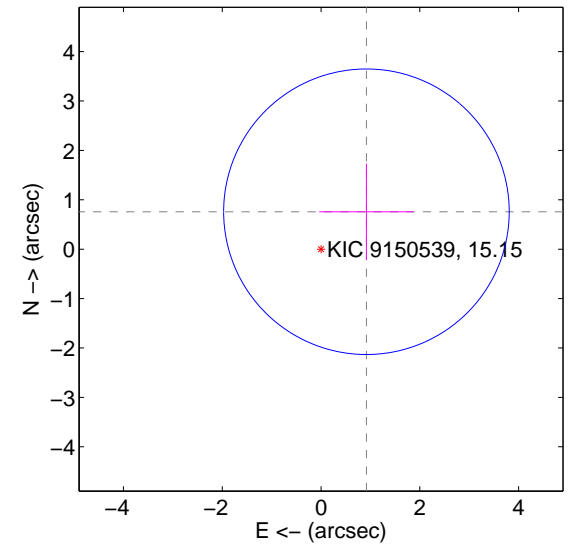
offset from difference PRF-fit to OOT PRF-fit



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- 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.

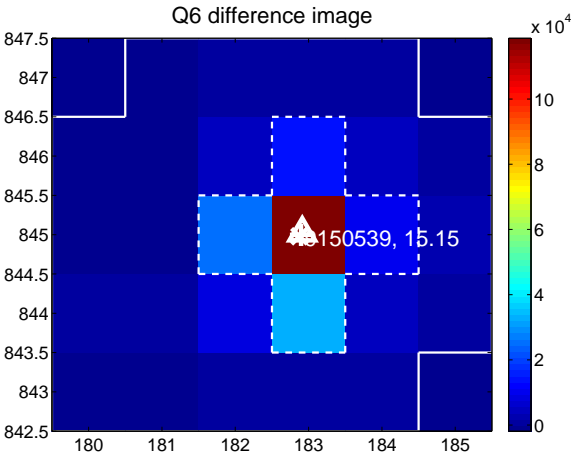
Q5 no difference image



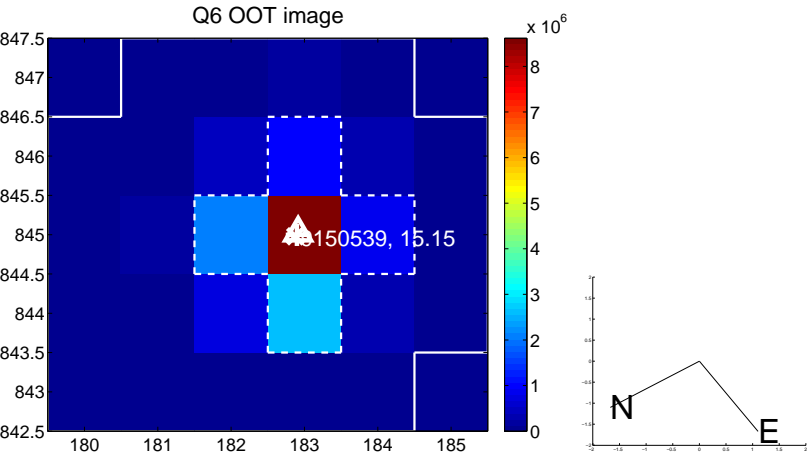
Q5 no OOT image



Q6 difference image



Q6 OOT image



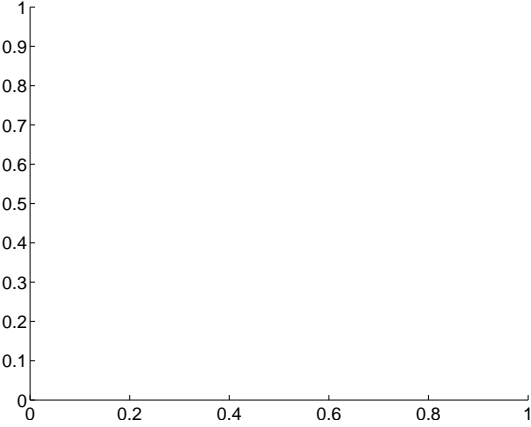
Q7 no difference image



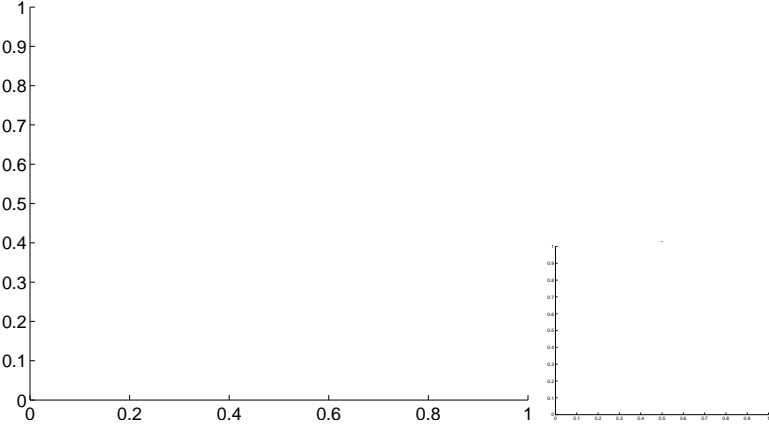
Q7 no OOT image



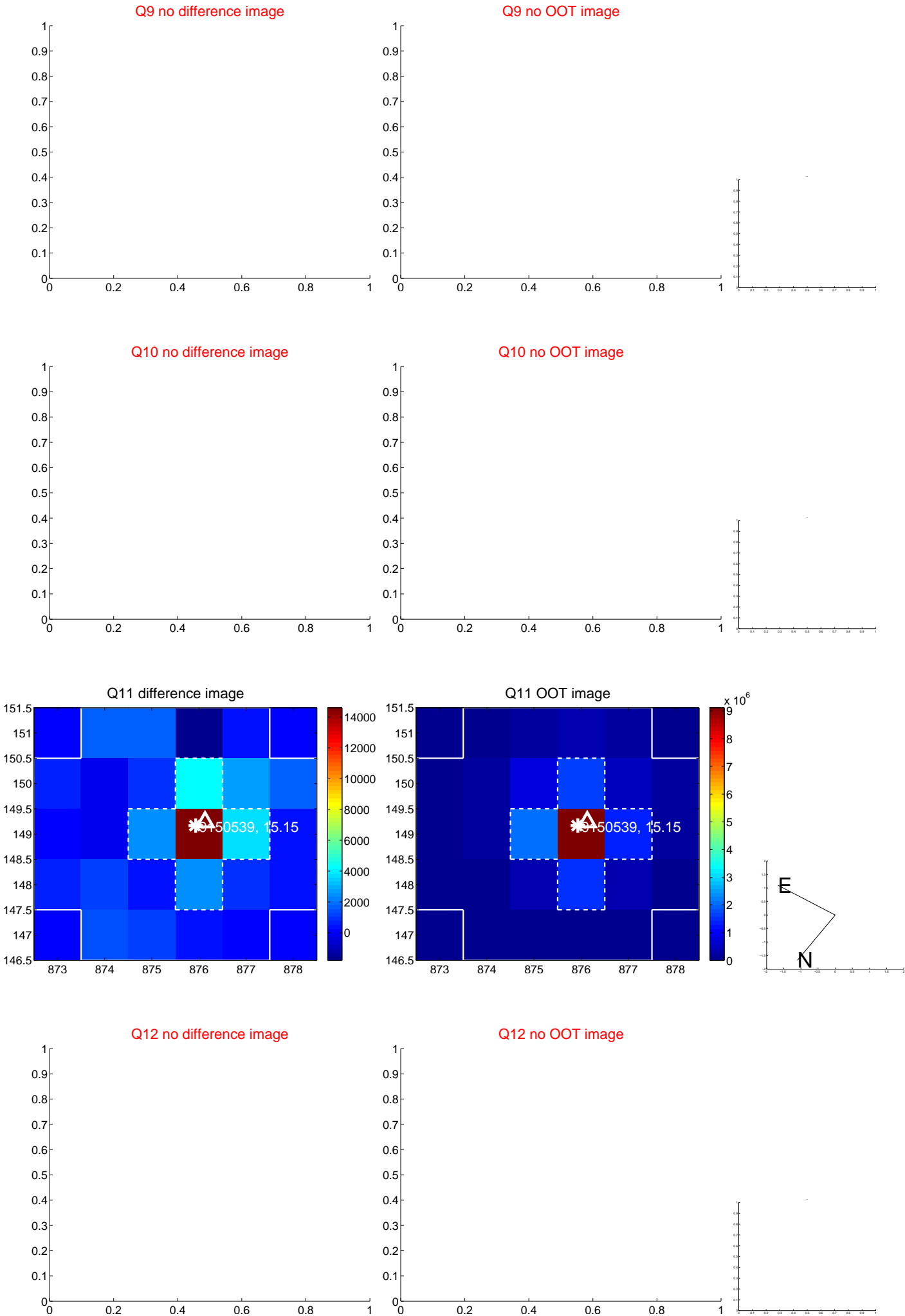
Q8 no difference image



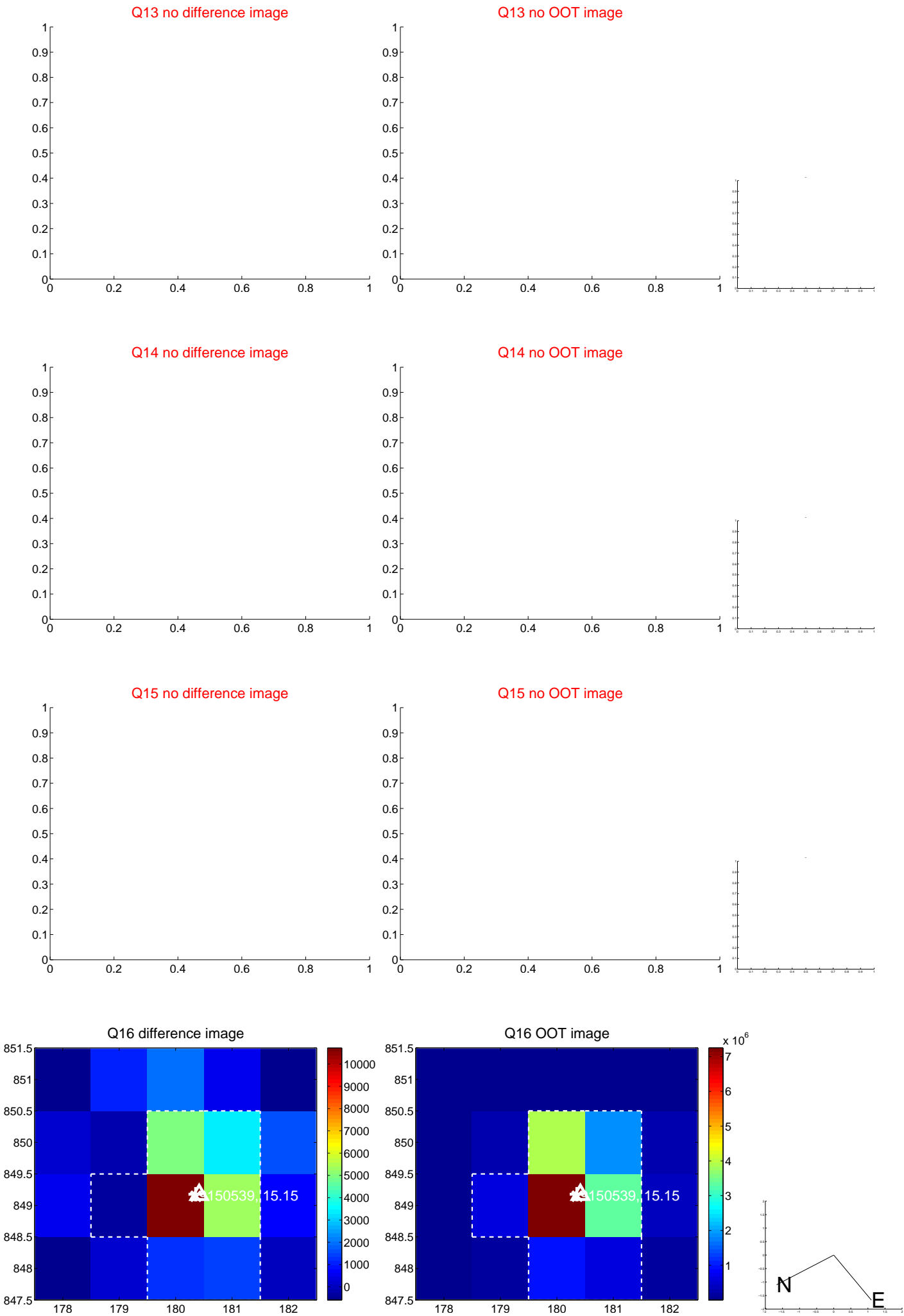
Q8 no OOT image



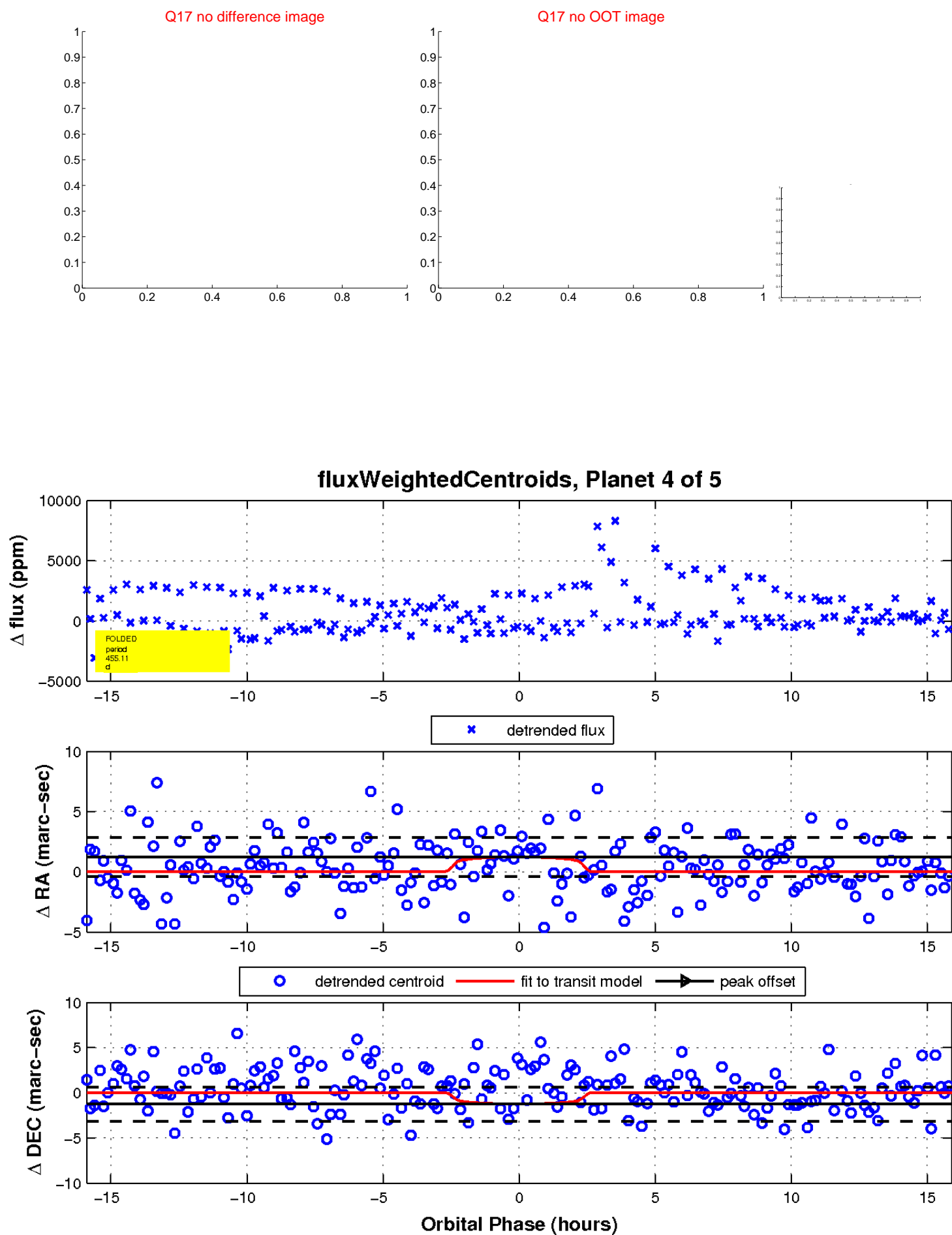
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

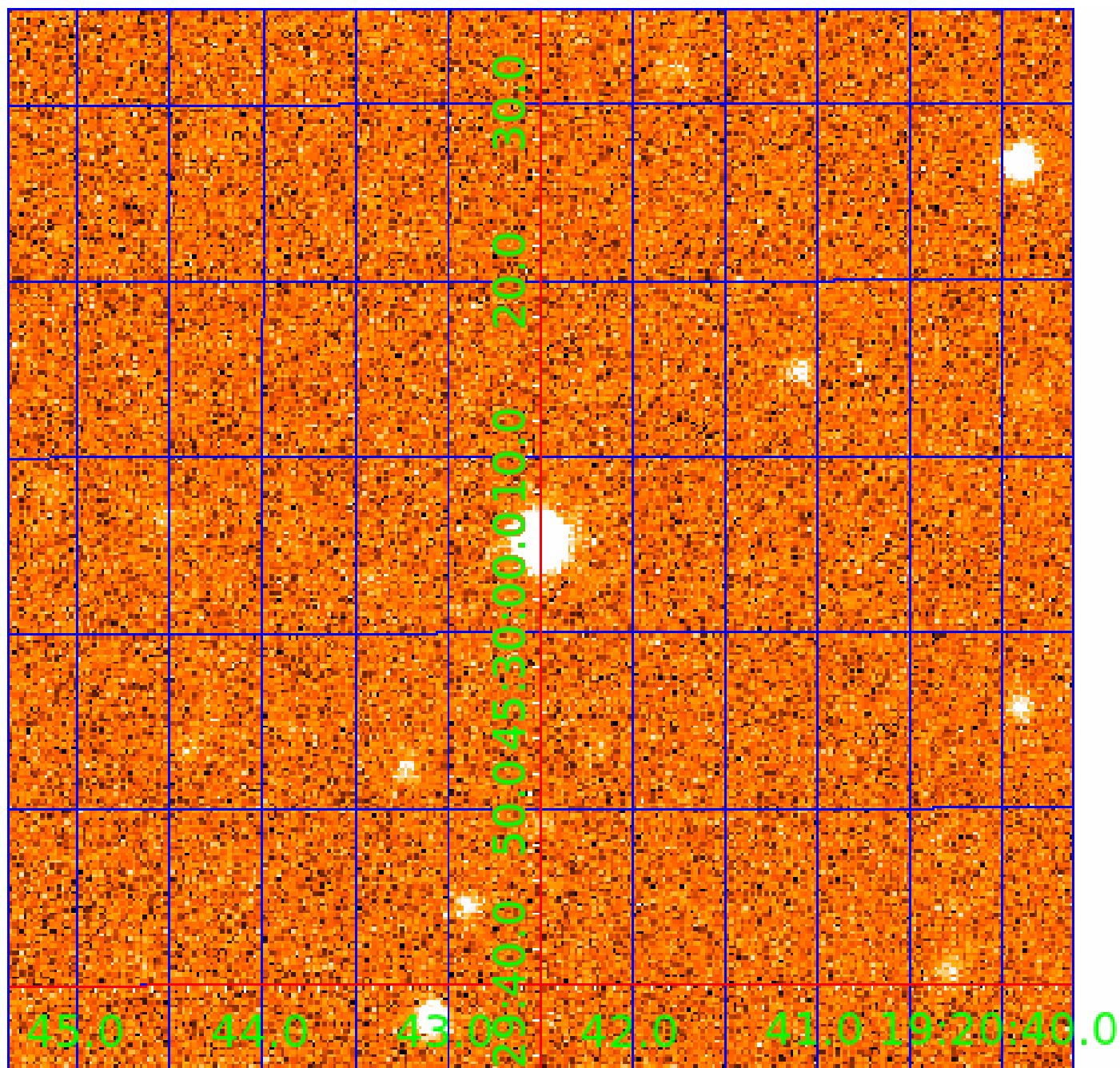


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009150539

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})
009150539-01	OBS	No	576.209545	175.861046	1676.9	13.019	13.2	4.8	0.74	5596	3.12	0.34
009150539-02	OBS	No	555.077577	343.128099	2009.3	4.580	14.6	8.4	0.74	5596	3.40	0.35
009150539-03	OBS	No	438.495727	312.624865	1689.8	8.545	14.3	5.9	0.74	5596	3.09	0.49
009150539-04	OBS	No	455.108064	166.506981	1432.6	5.320	12.4	6.4	0.74	5596	3.06	0.46
009150539-05	OBS	No	343.499363	310.680576	1050.2	2.715	11.8	6.1	0.74	5596	2.70	0.67

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009150539-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
009150539-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

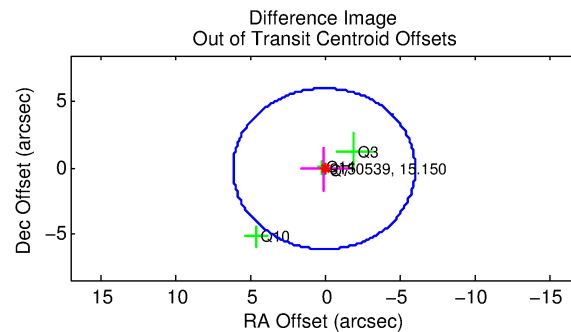
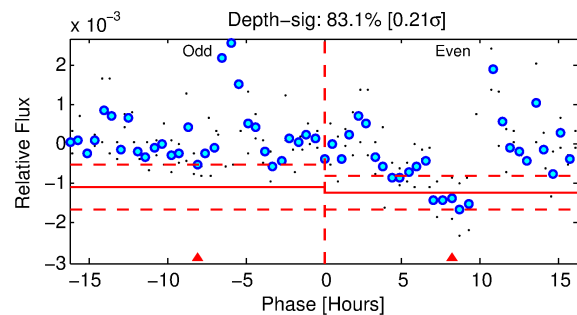
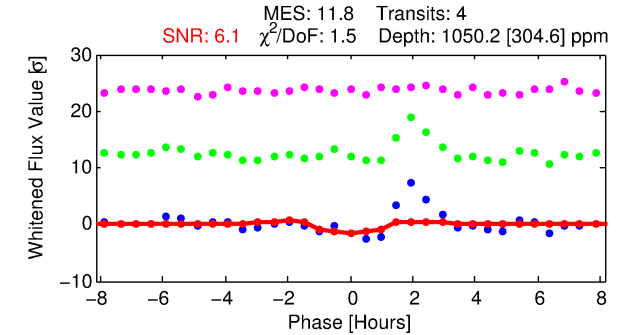
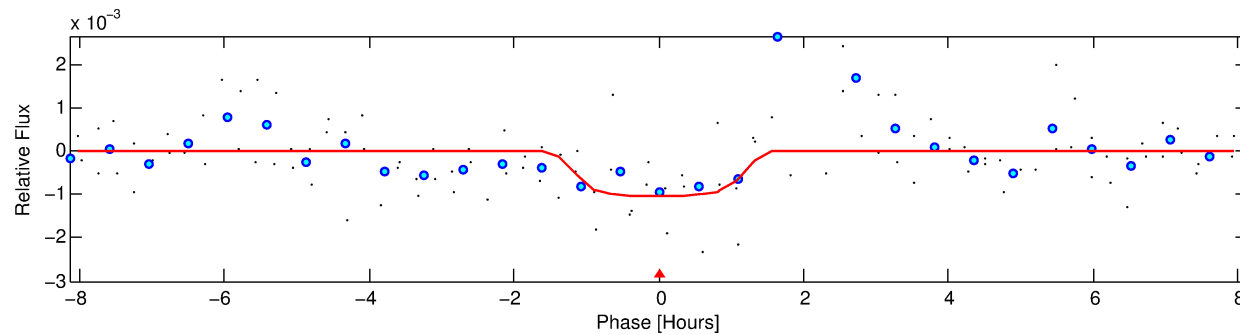
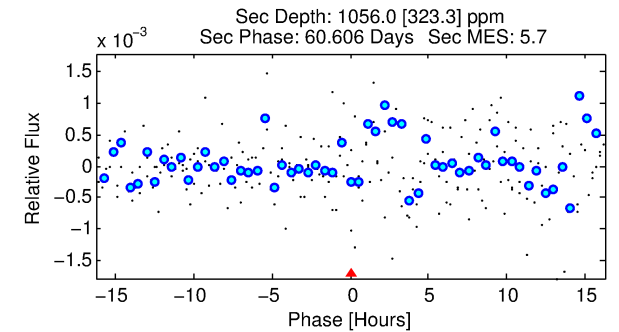
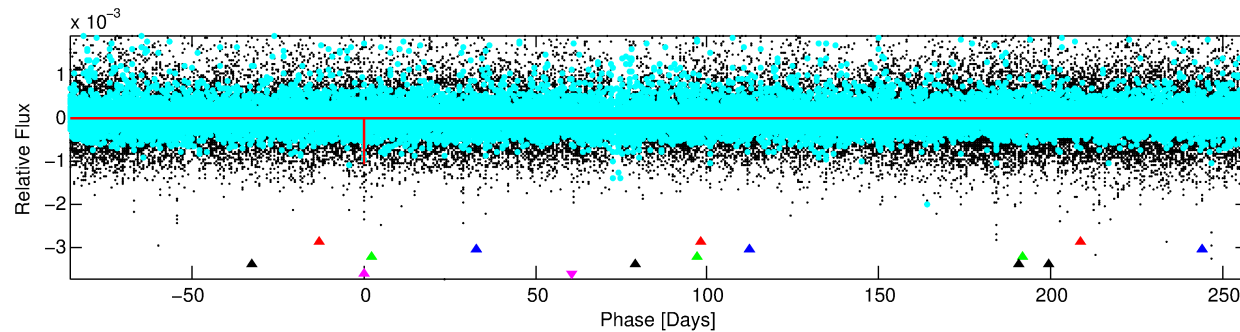
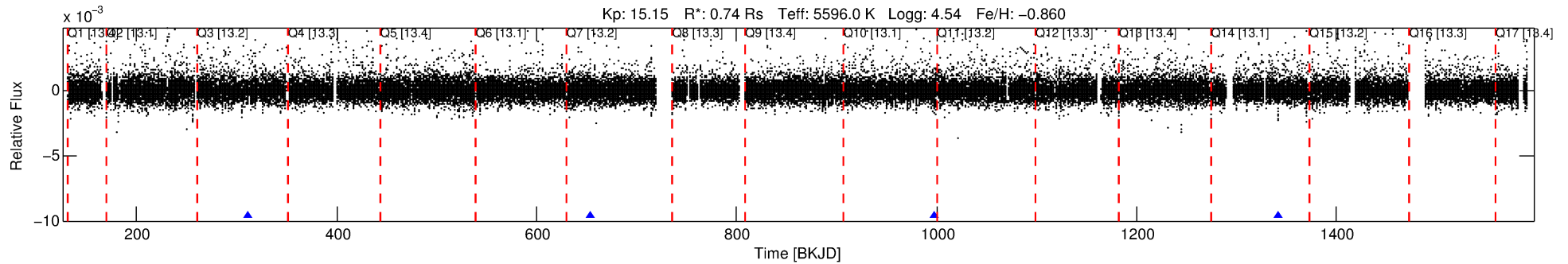
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009150539-05

No Significant Match Found

DV One-Page Summary

KIC: 9150539 Candidate: 5 of 5 Period: 343.499 d



DV Fit Results:

Period = 343.49936 [0.00513] d
Epoch = 310.6806 [0.0088] BKJD
Rp/R* = 0.0334 [0.0687]
a/R* = 593.55 [5848.64]
b = 0.83 [3.73]
Seff = 0.67 [0.16]
Teq = 231 [13] K
Rp = 2.70 [5.57] Re
a = 0.8470 [0.1028] AU
Ag = 57002.48 [235225.95] [0.24 σ]
Teffp = 5517 [5688] K [0.93 σ]

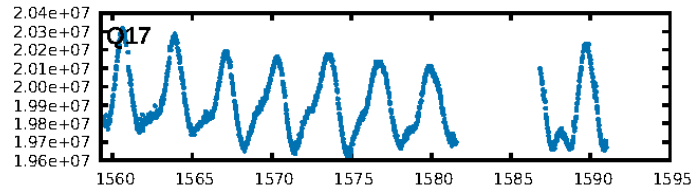
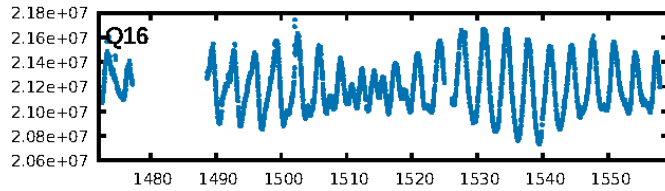
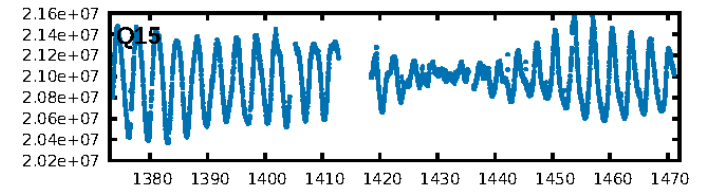
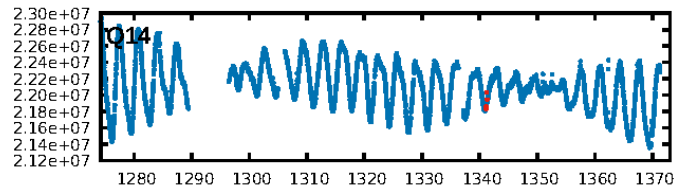
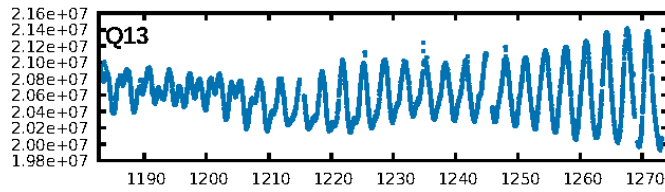
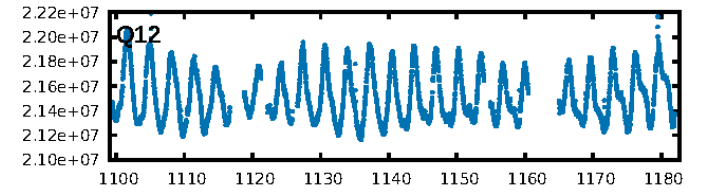
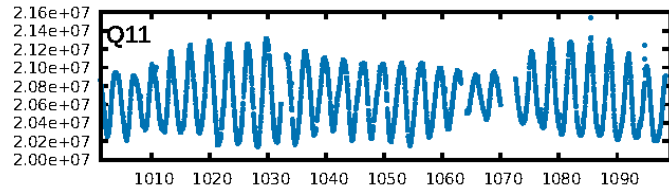
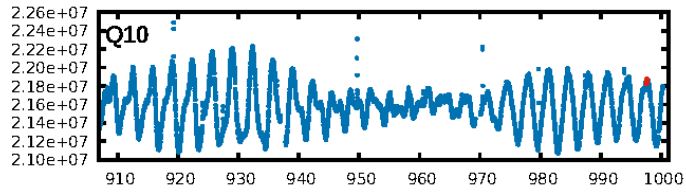
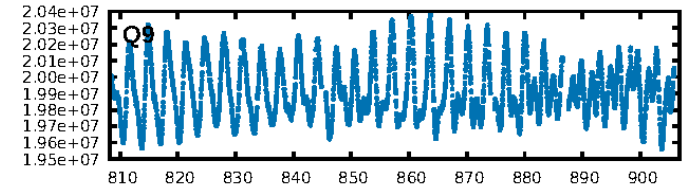
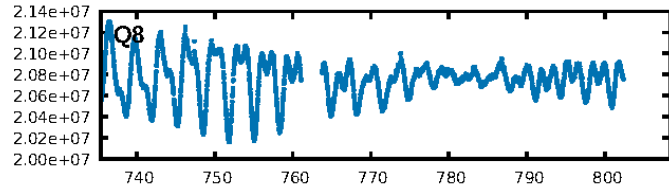
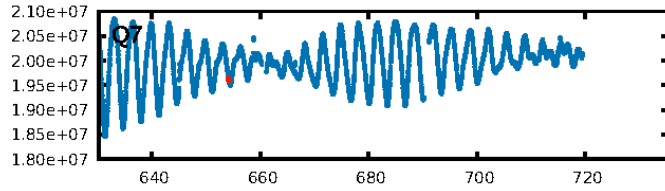
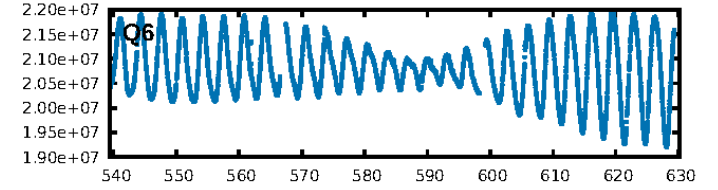
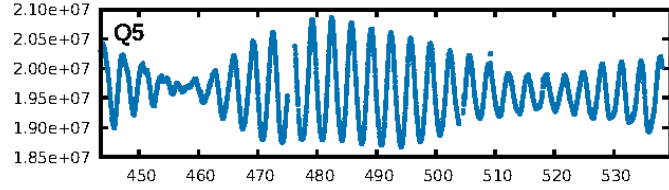
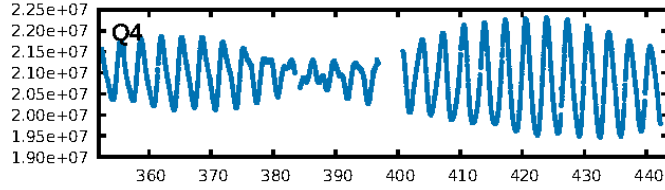
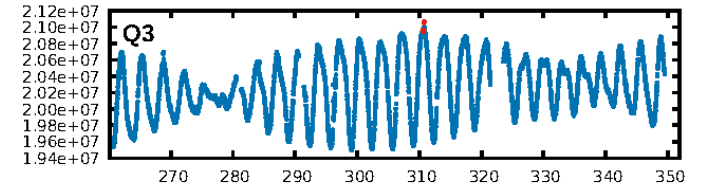
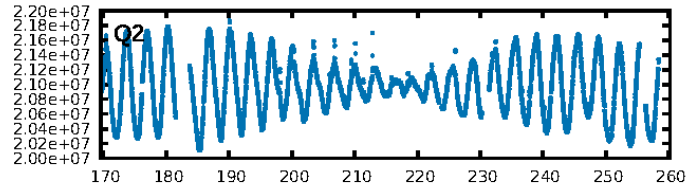
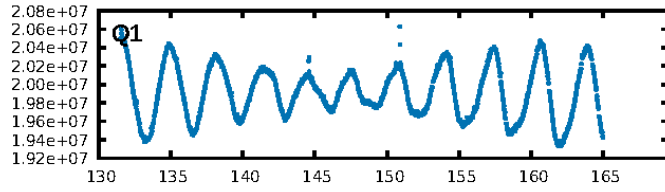
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [254.27 σ]
ModelChiSquare2-sig: 20.5%
ModelChiSquareGof-sig: 85.8%
Bootstrap-pfa: 8.44e-11
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -5.088
Centroid-sig: 5.1%
Centroid-so: 3.264 arcsec [1.85 σ]
OotOffset-rm: 0.093 arcsec [0.05 σ]
OotOffset-st: 2/2/0/0 [4]
KicOffset-rm: 0.158 arcsec [0.11 σ]
KicOffset-st: 2/2/0/0 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 1.00 [4/4]

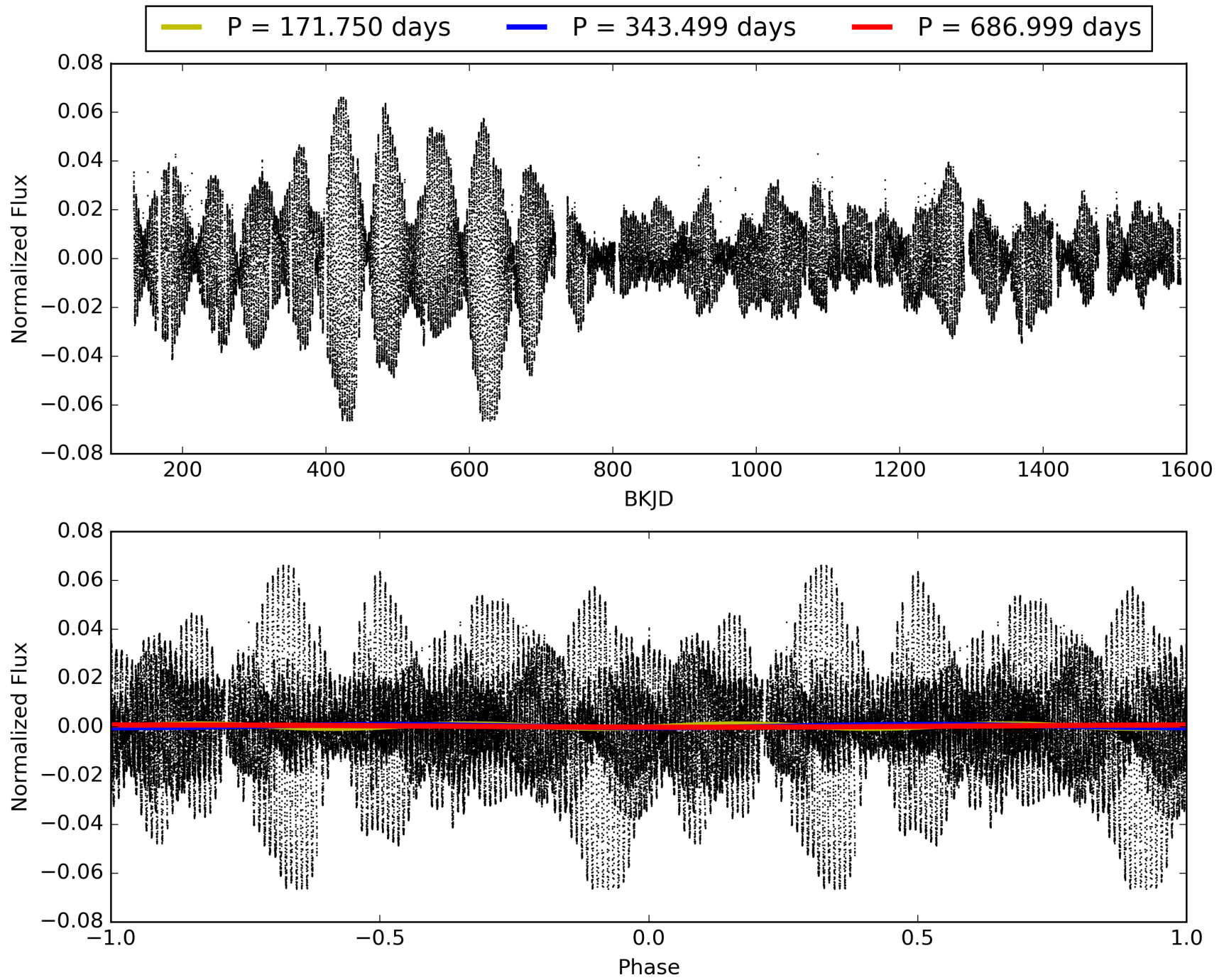
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 17:37:27 Z

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

TCE 009150539-05, PDC Light Curves

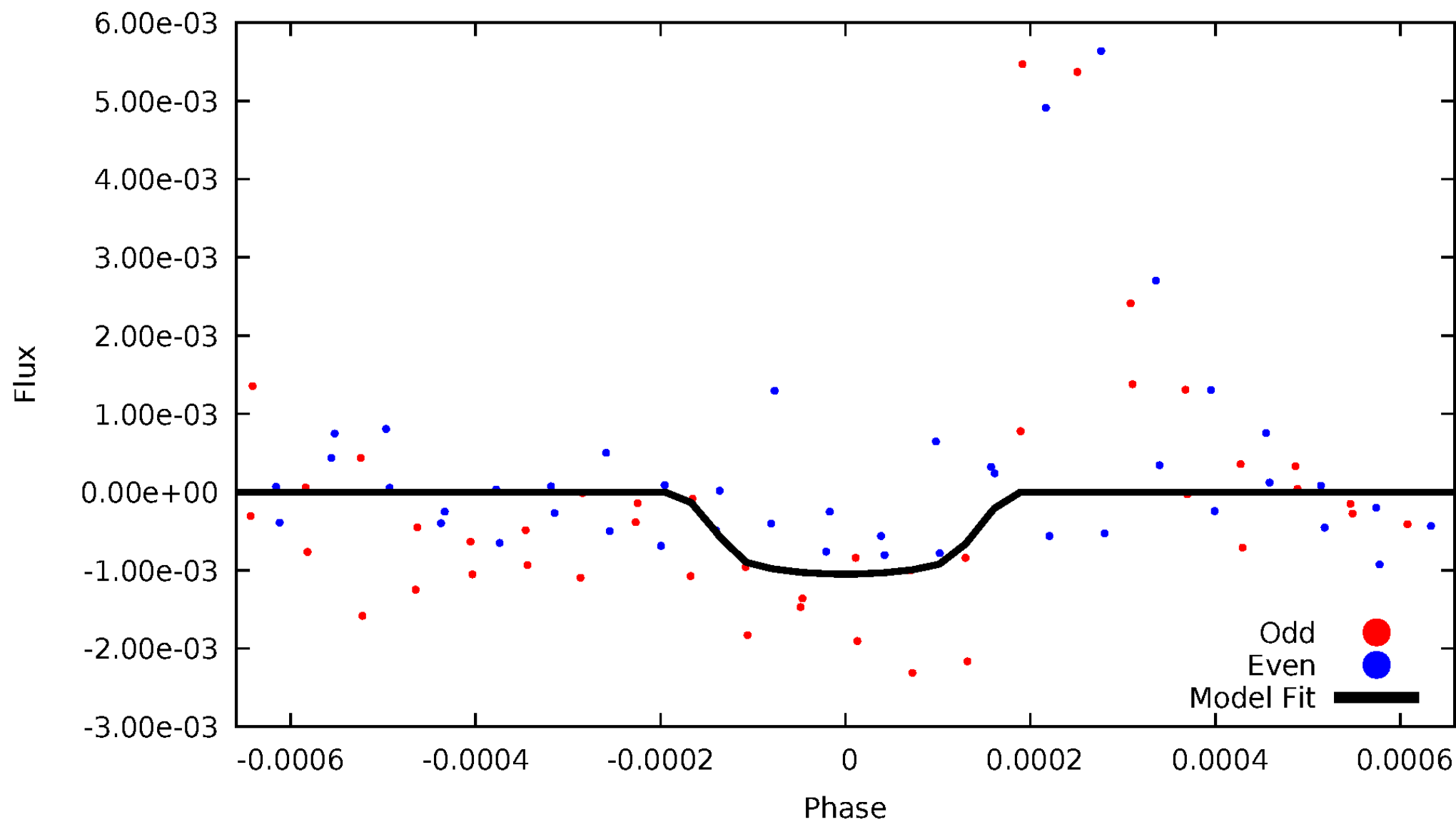


TCE 009150539-05



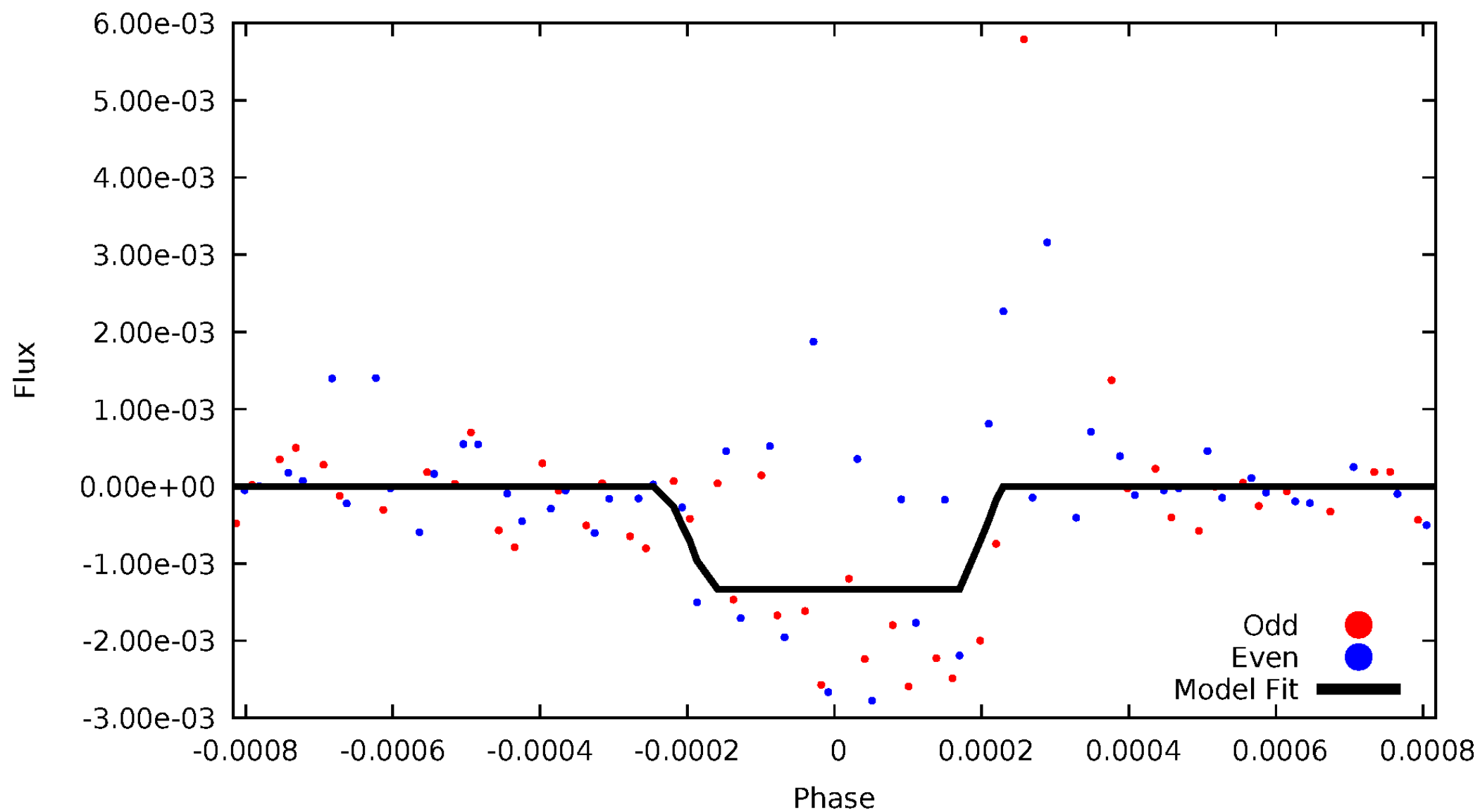
DV Odd/Even

TCE 009150539-05



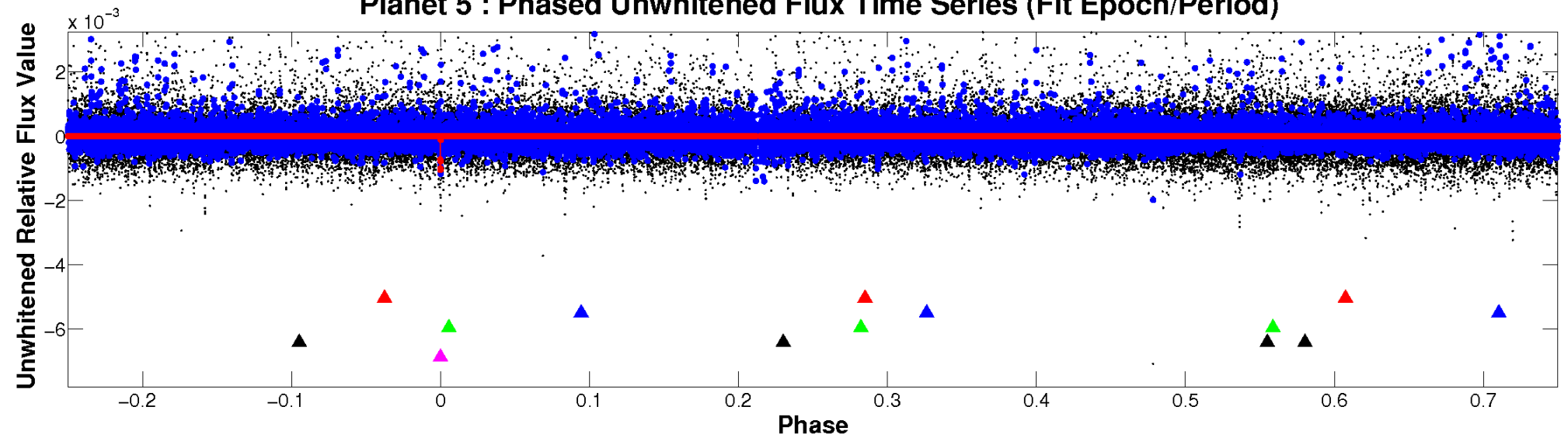
ALT Odd/Even

TCE 009150539-05

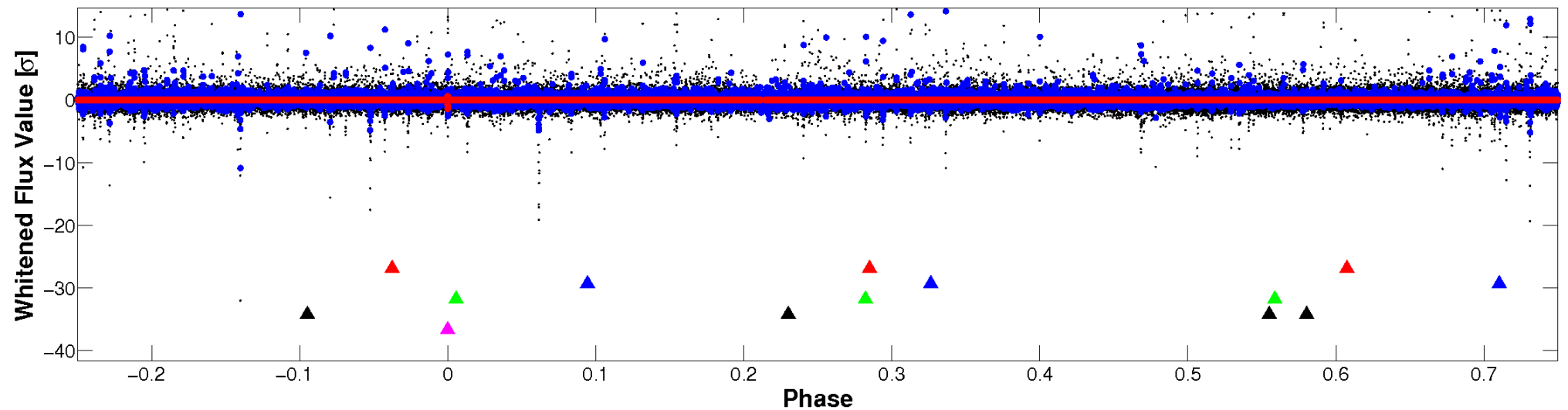


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

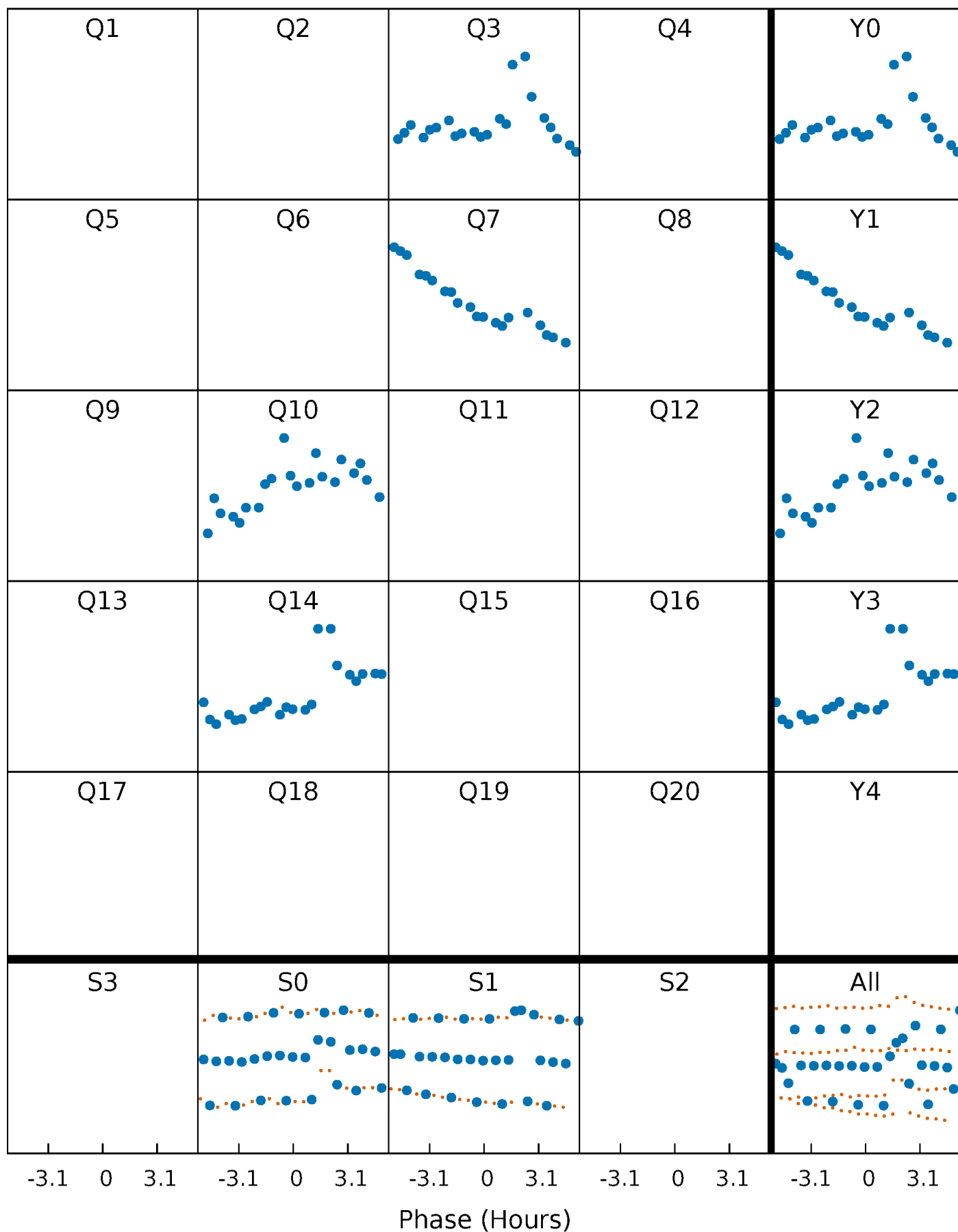


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



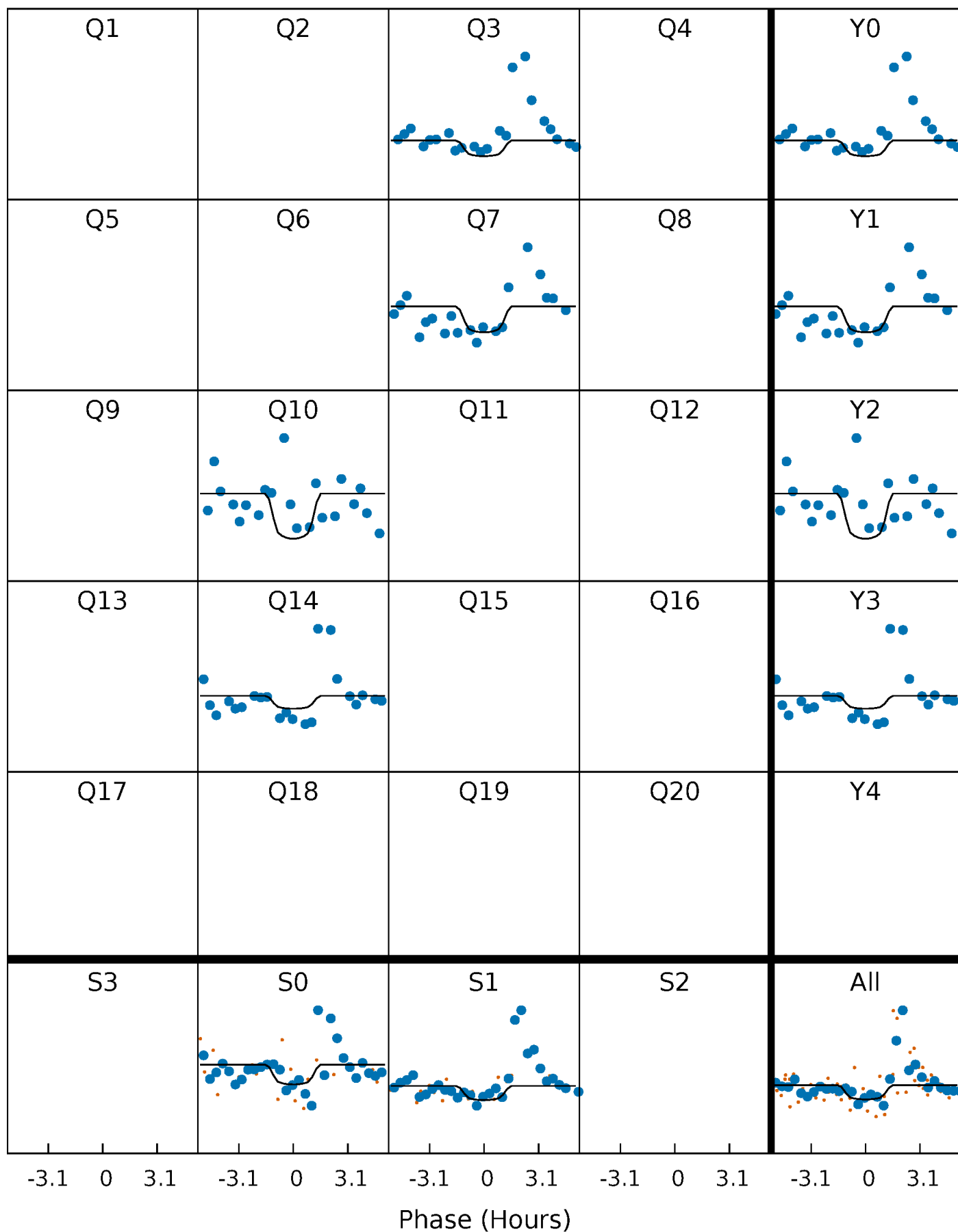
PDC Quarter-Phased Transit Curves

TCE 009150539-05 P=343.499363 Days $T_0=310.680576$ (BKJD)



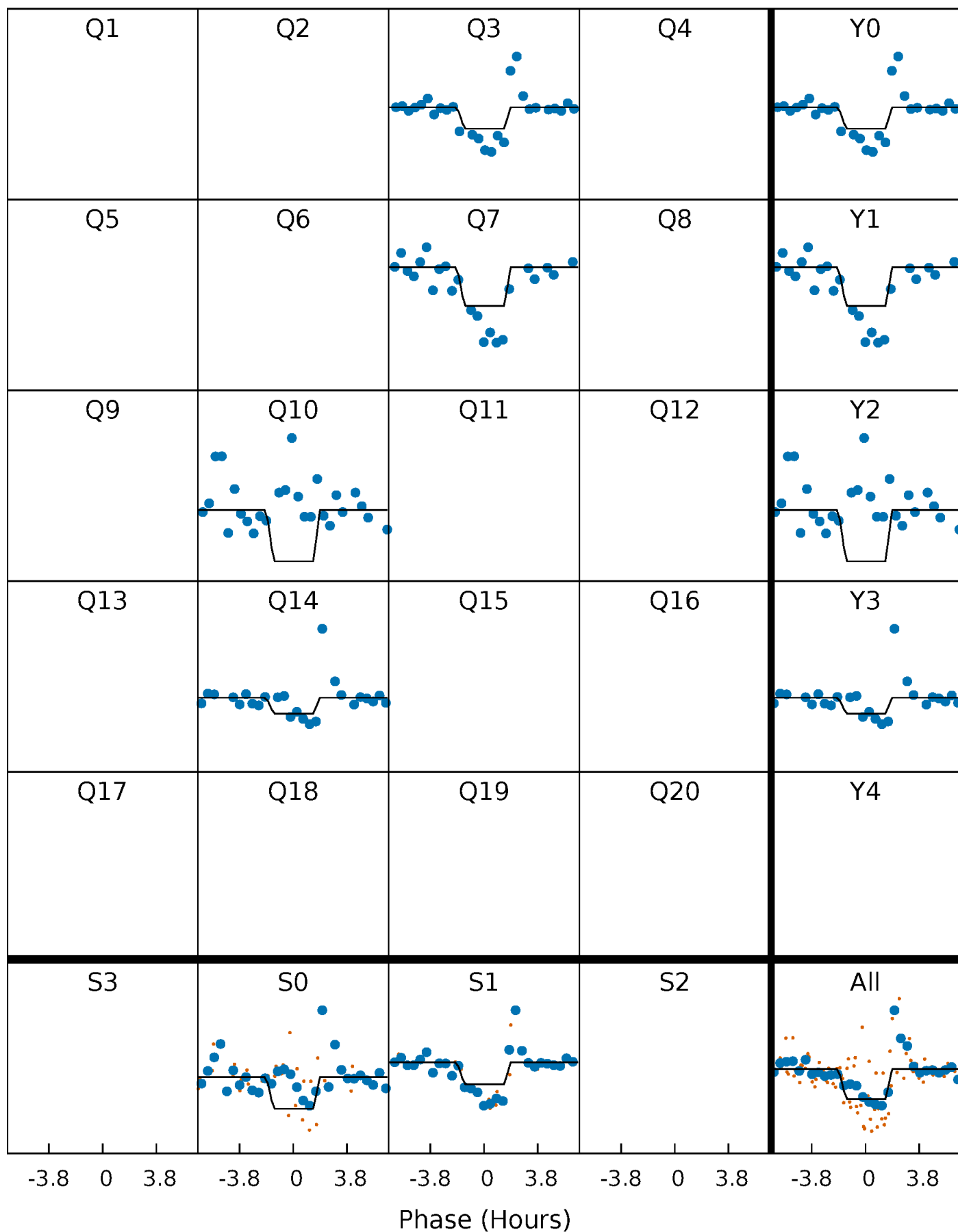
DV Quarter-Phased Transit Curves

TCE 009150539-05 $P=343.499363$ Days $T_0=310.680576$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

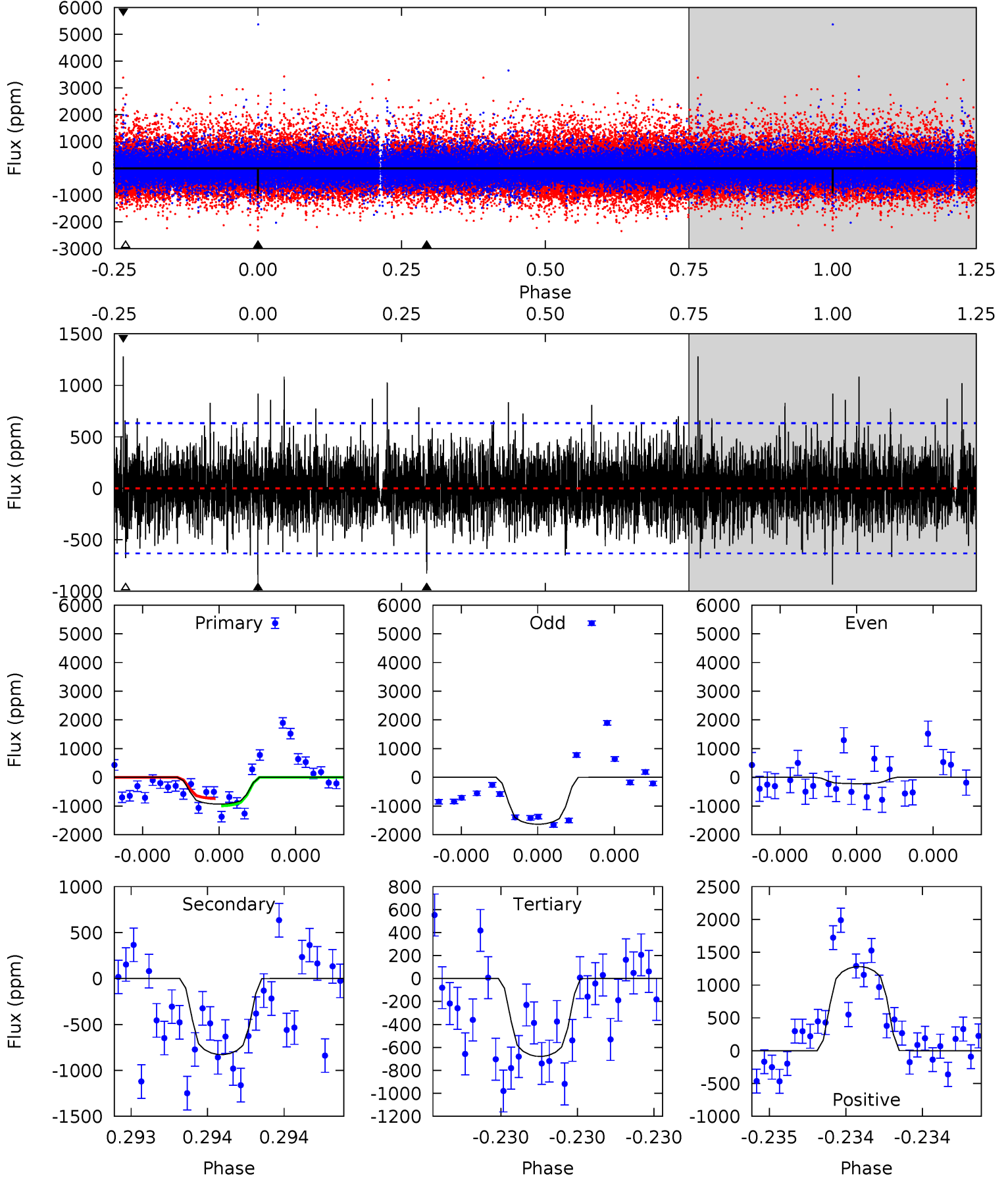
TCE 009150539-05 $P=343.493242$ Days $T_0=310.676237$ (BKJD)



DV Model-Shift Uniqueness Test

009150539-05, P = 343.499363 Days, E = 310.680576 Days

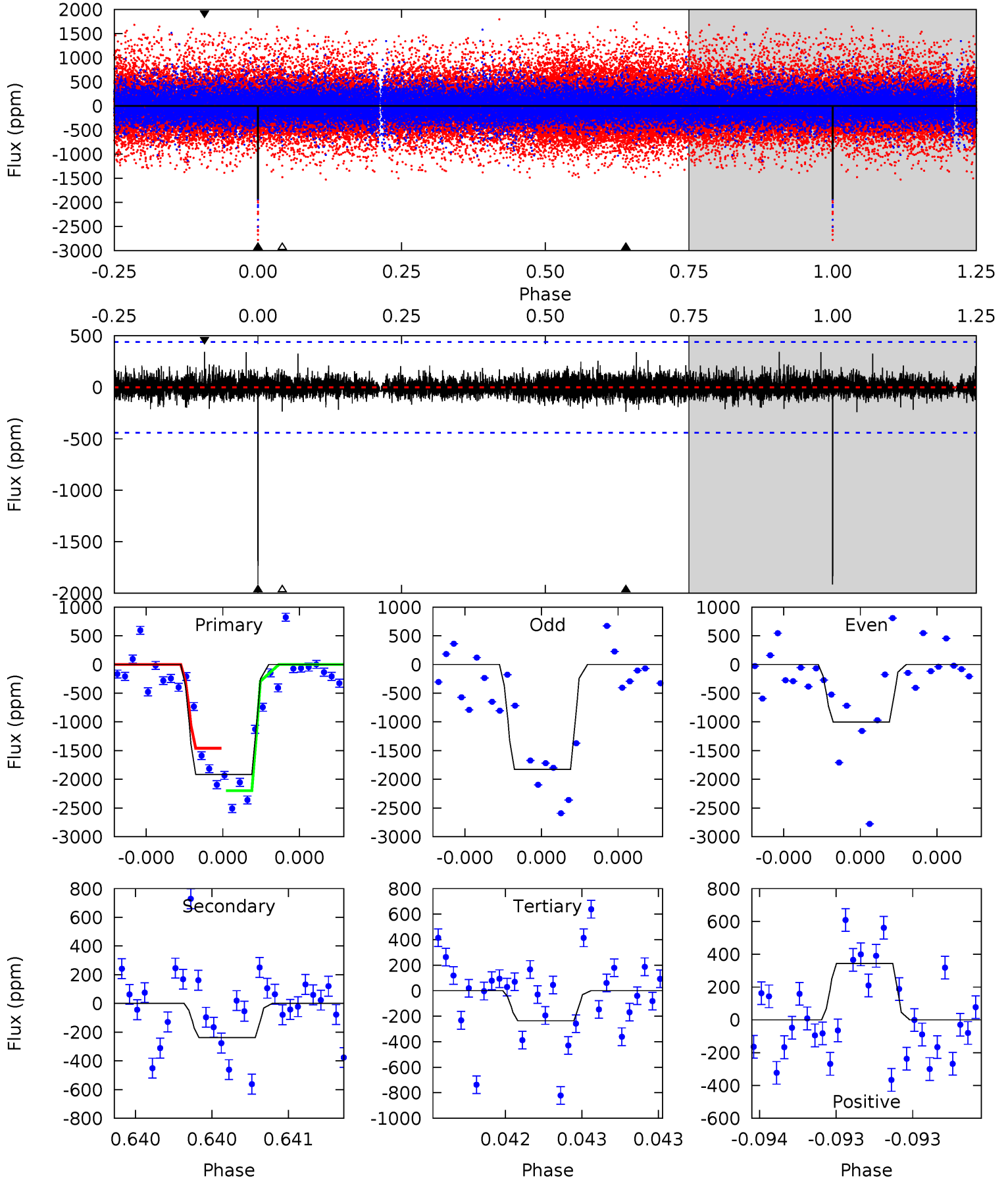
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.31	7.37	6.04	11.4	5.63	3.57	1.77	2.27	-3.10	1.33	-4.03	5.98	1.23	0.58	1.11



Alt Model-Shift Uniqueness Test

009150539-05, P = 343.493242 Days, E = 310.676237 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.3	3.03	2.99	4.37	5.59	3.51	0.72	21.3	19.9	0.04	-1.35	5.64	0.75	0.15	4.73



Stellar Parameters For KIC 009150539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5596^{+183}_{-166}	$4.535^{+0.110}_{-0.090}$	$-0.860^{+0.350}_{-0.300}$	$0.741^{+0.097}_{-0.088}$	$0.686^{+0.081}_{-0.029}$	$2.380^{+1.042}_{-0.667}$
	+3%/-3%	+2%/-2%	+41%/-35%	+13%/-12%	+12%/-4%	+44%/-28%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 009150539-05 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-828 ± 112	$4.92^{+4.46}_{-3.27}$	322^{+15}_{-15}	4111^{+2667}_{-795}	$13837^{+105851}_{-10178}$
Alt.	-239 ± 79	$5.08^{+4.78}_{-3.50}$	323^{+15}_{-15}	3298^{+1730}_{-586}	3655^{+35722}_{-2786}

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 $A_{obs} \gg 1.0$

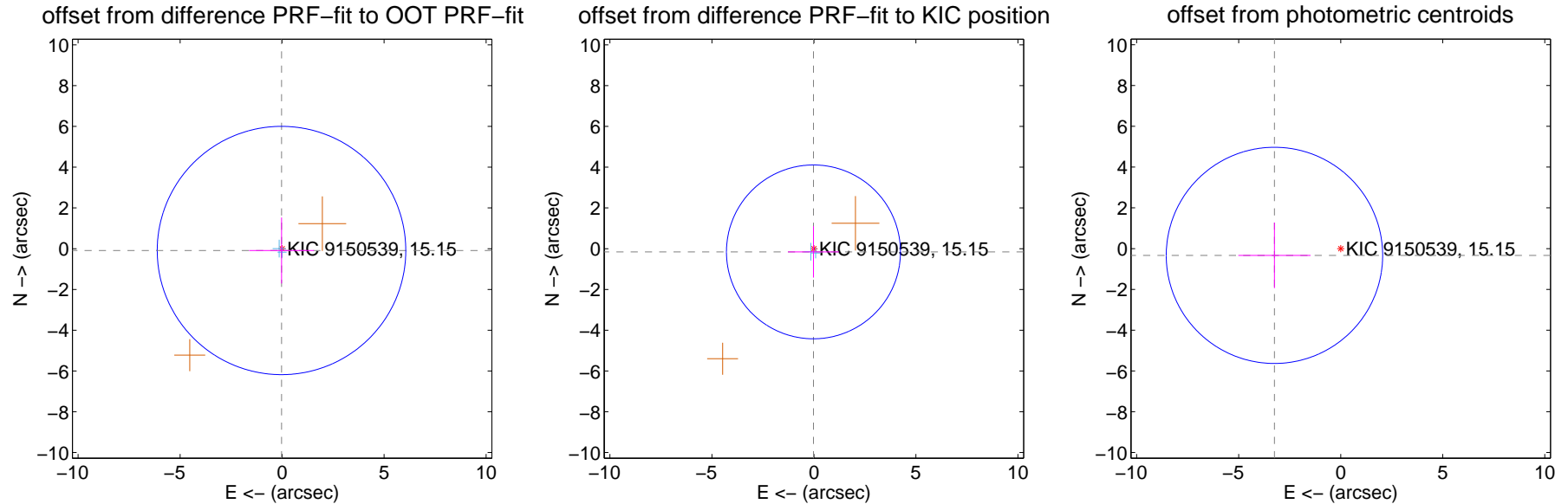
DV Centroid Data

Supplemental centroid analysis for 009150539-05. Kepler magnitude: 15.15. Transit SNR 6.09

There are 2 quarters with good PRF difference image offsets

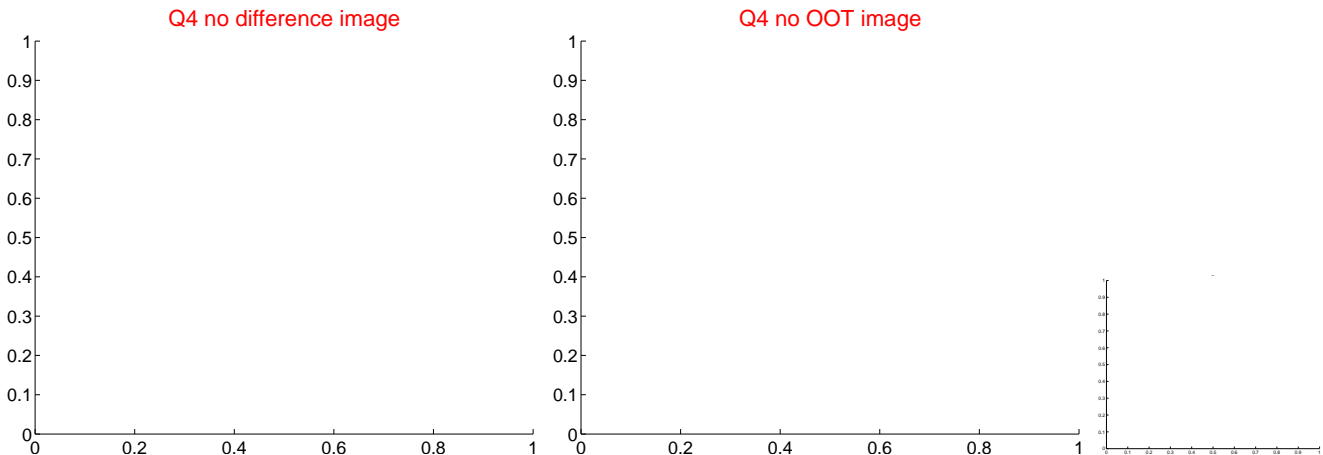
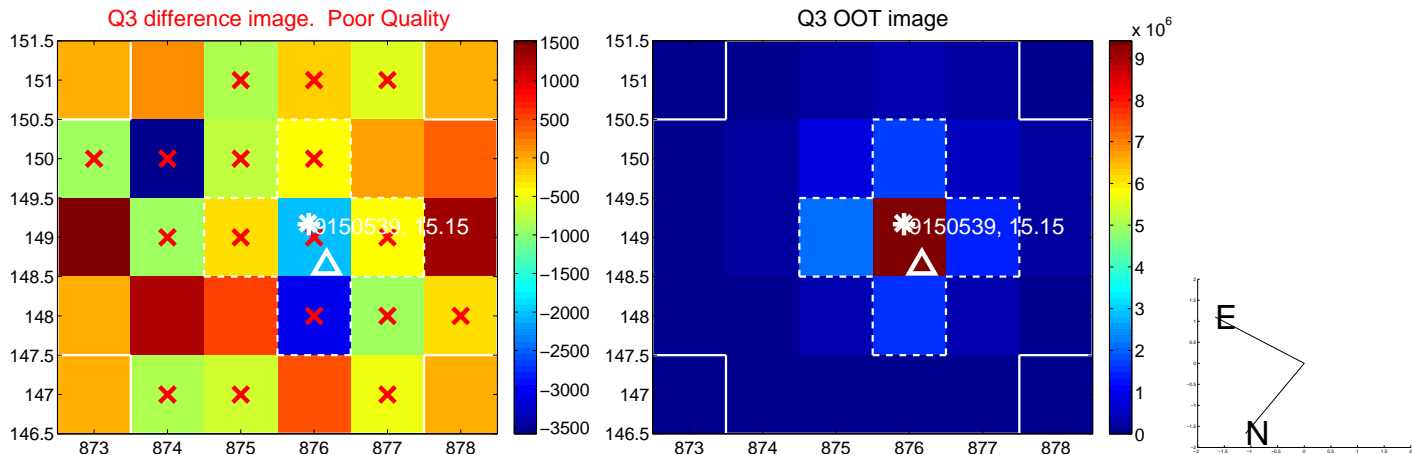
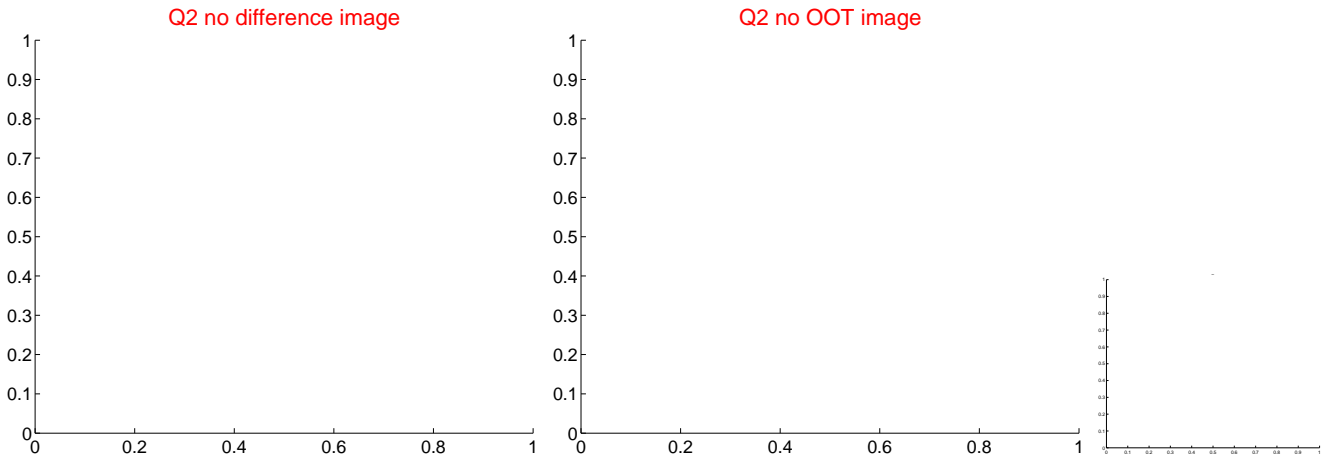
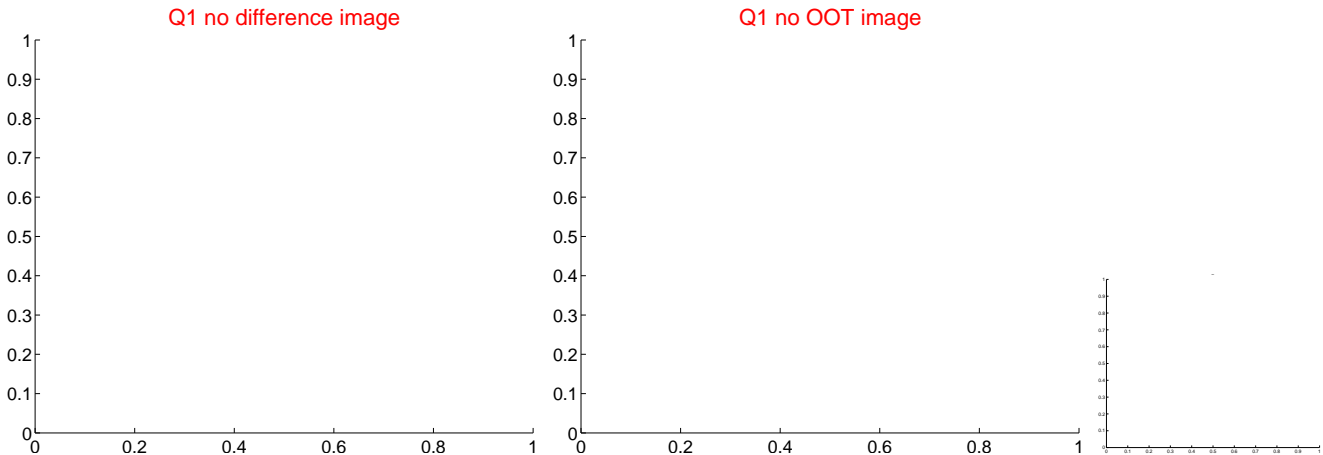
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.093 ± 2.030	0.05	0.029 ± 1.586	-0.089 ± 1.618
PRF-fit source offset from KIC position	0.158 ± 1.421	0.11	0.022 ± 1.252	-0.156 ± 1.260
photometric centroid source offset	3.26 ± 1.77	1.85	3.25 ± 1.77	-0.33 ± 1.61



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



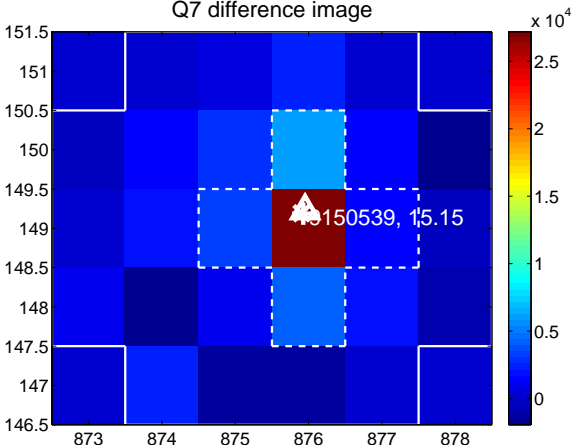
Q6 no difference image



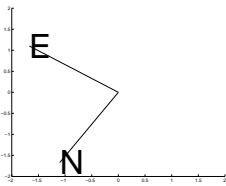
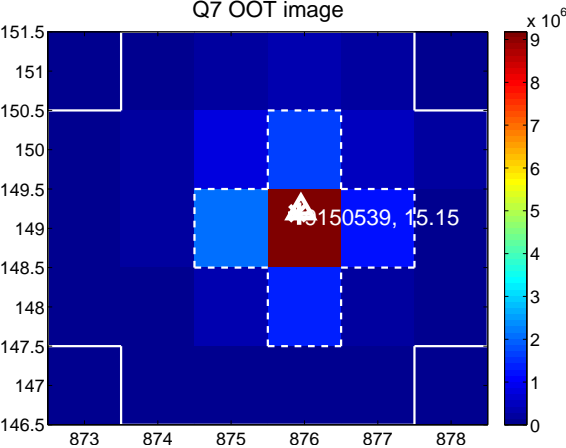
Q6 no OOT image



Q7 difference image



Q7 OOT image



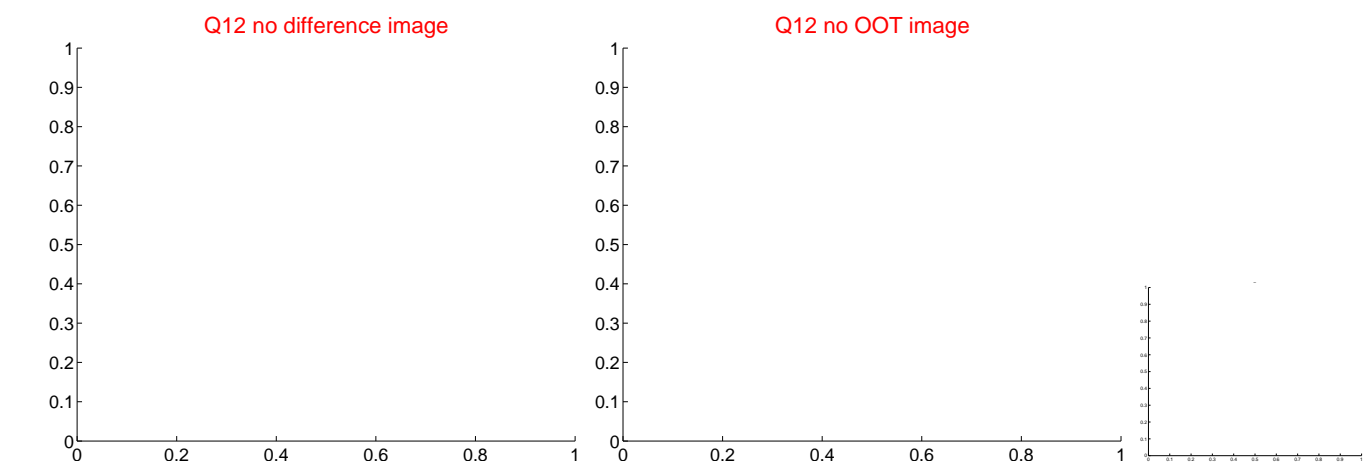
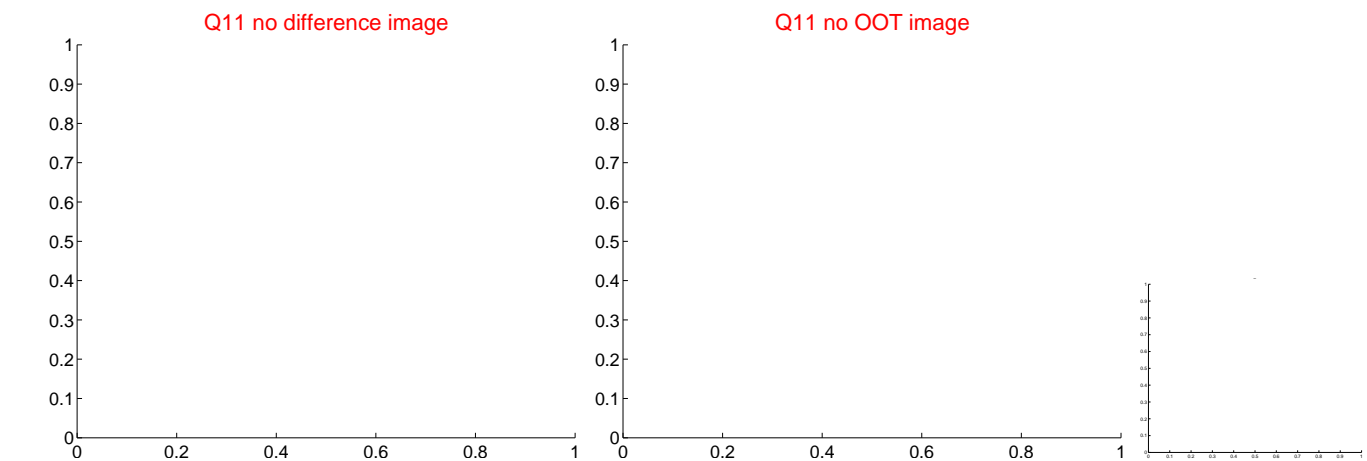
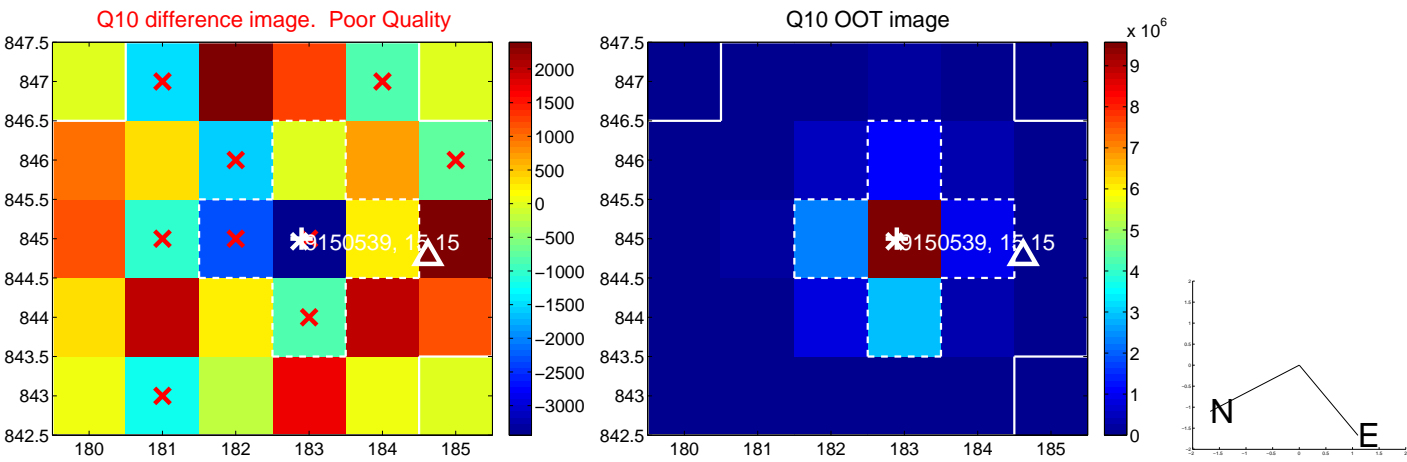
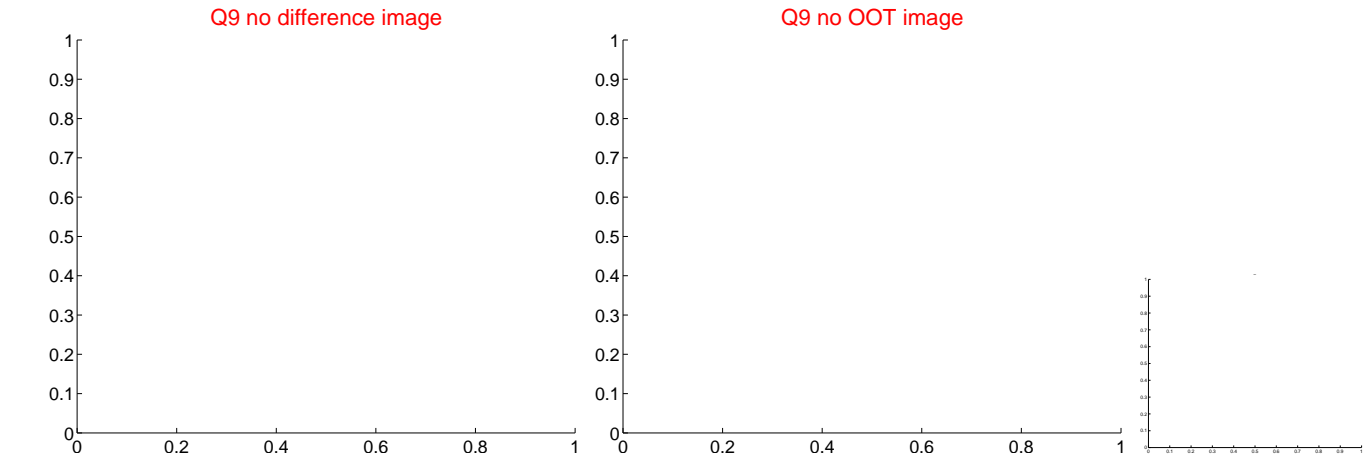
Q8 no difference image



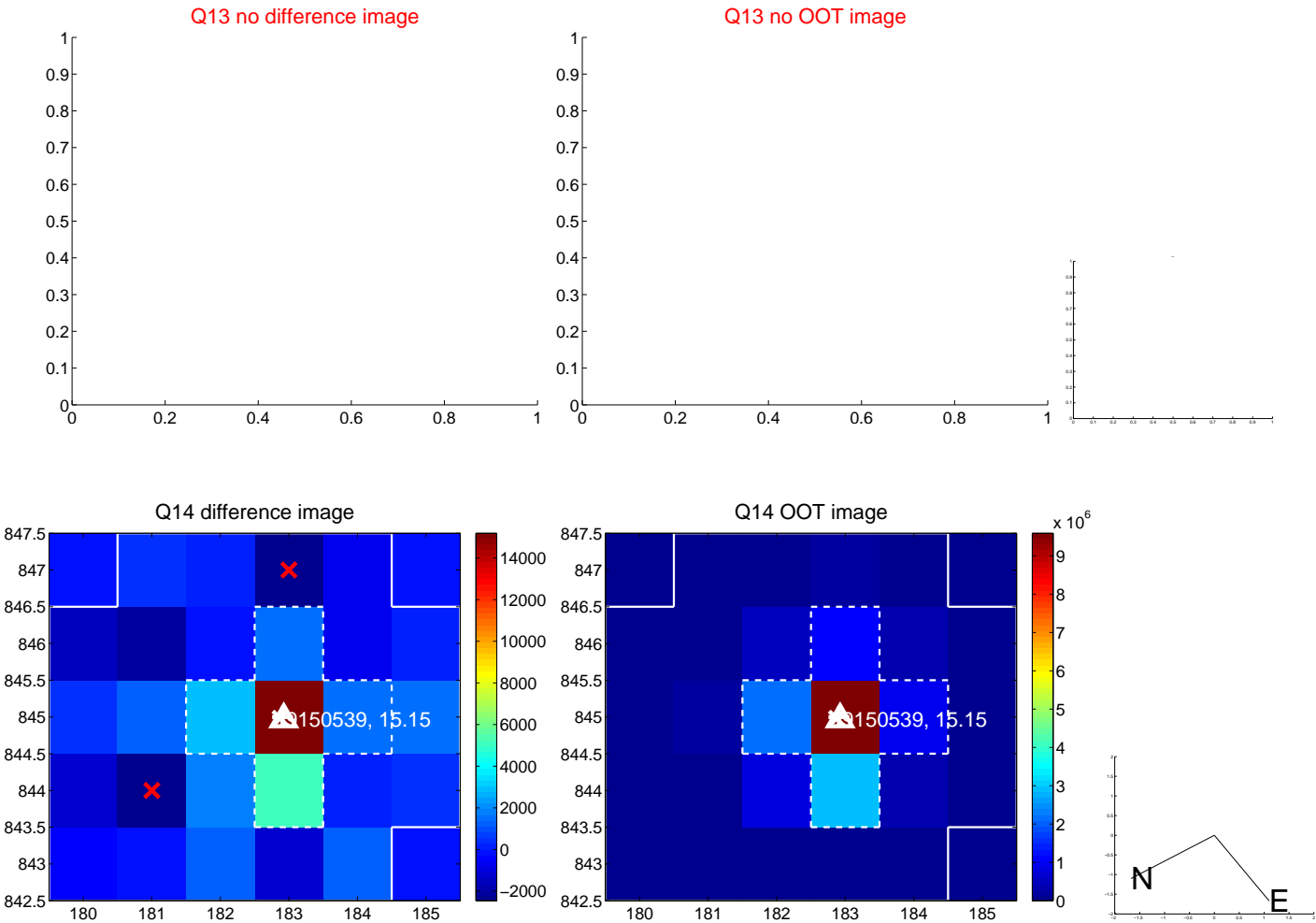
Q8 no OOT image



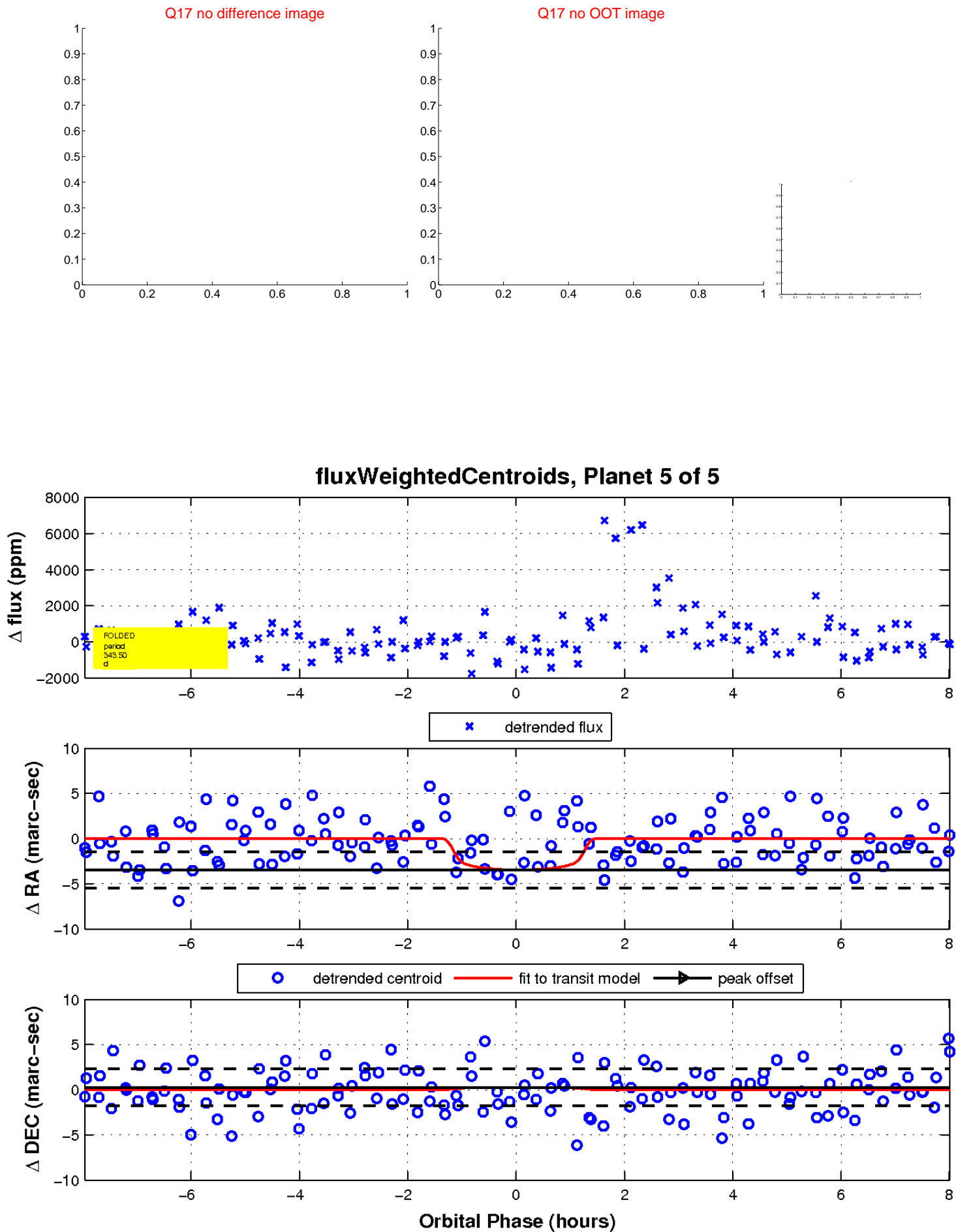
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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.



UKIRT Image

Declination

