

KIC 009777988

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})
009777988-01	OBS	No	528.772240	177.925800	74.1	15.391	10.3	10.3	4.30	9492	4.04	41.26
009777988-02	OBS	No	5.906474	136.220301	3.1	42.145	9.2	5.6	4.30	9492	0.84	16522.10

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009777988-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED
009777988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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

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

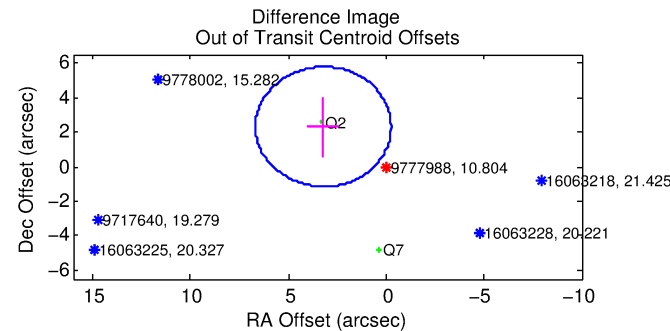
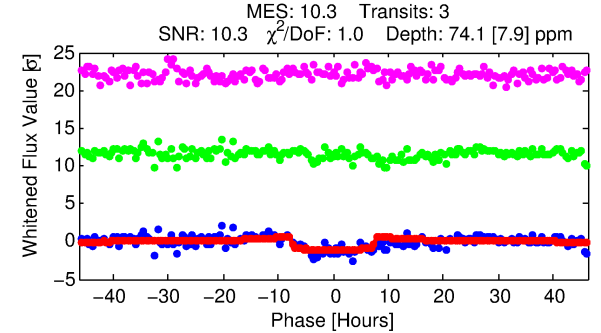
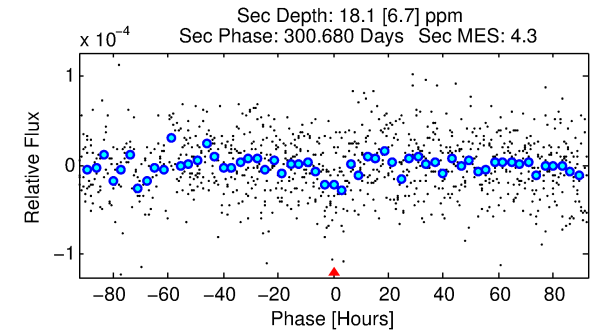
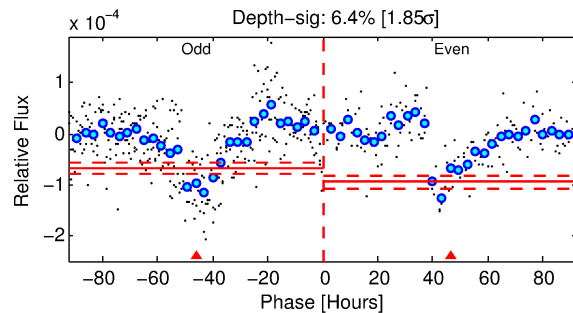
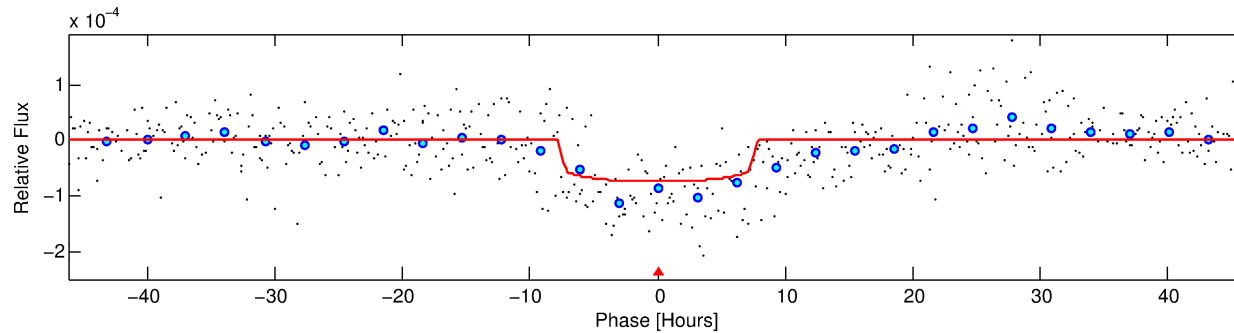
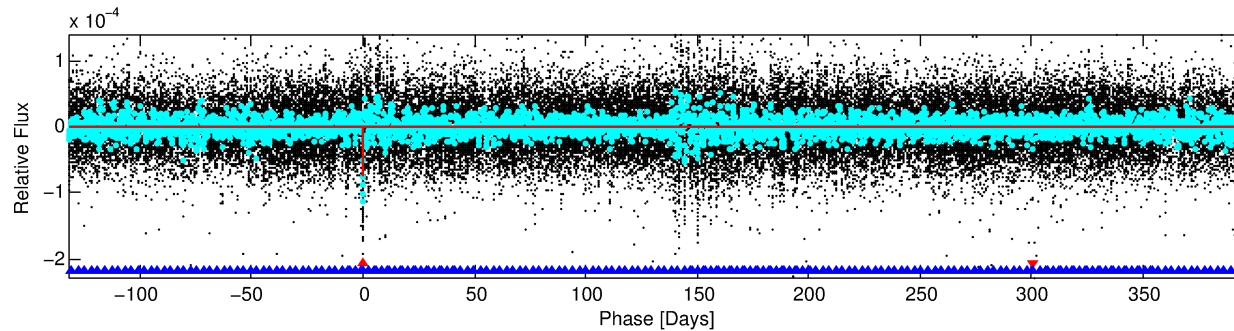
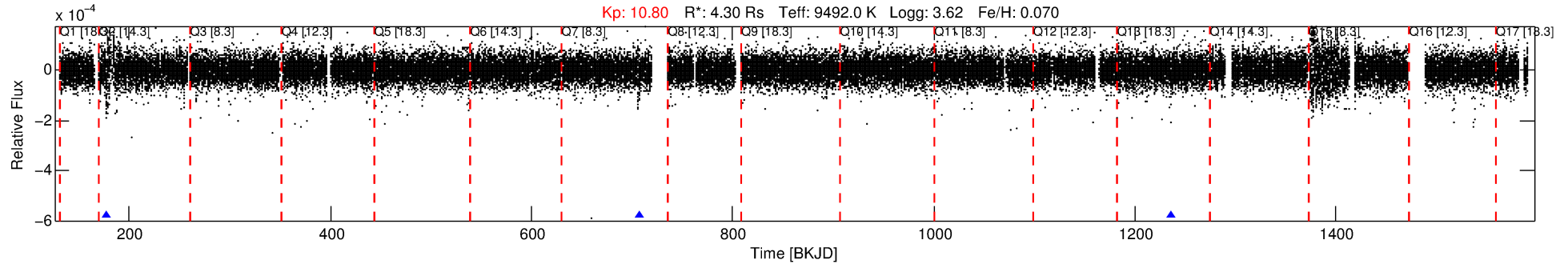
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009777988-01

No Significant Match Found

DV One-Page Summary

KIC: 9777988 Candidate: 1 of 2 Period: 528.772 d



DV Fit Results:

Period = 528.77224 [0.00909] d
 Epoch = 177.9258 [0.0119] BKJD
 Rp/R* = 0.0086 [0.0017]
 a/R* = 169.06 [227.87]
 b = 0.78 [0.69]
 Seff = 41.26 [34.41]
 Teq = 646 [135] K
 Rp = 4.04 [2.22] Re
 a = 1.8046 [0.9095] AU
 Ag = 1985.34 [1949.28] [1.02 σ]
 Teffp = 6670 [949] K [6.28 σ]

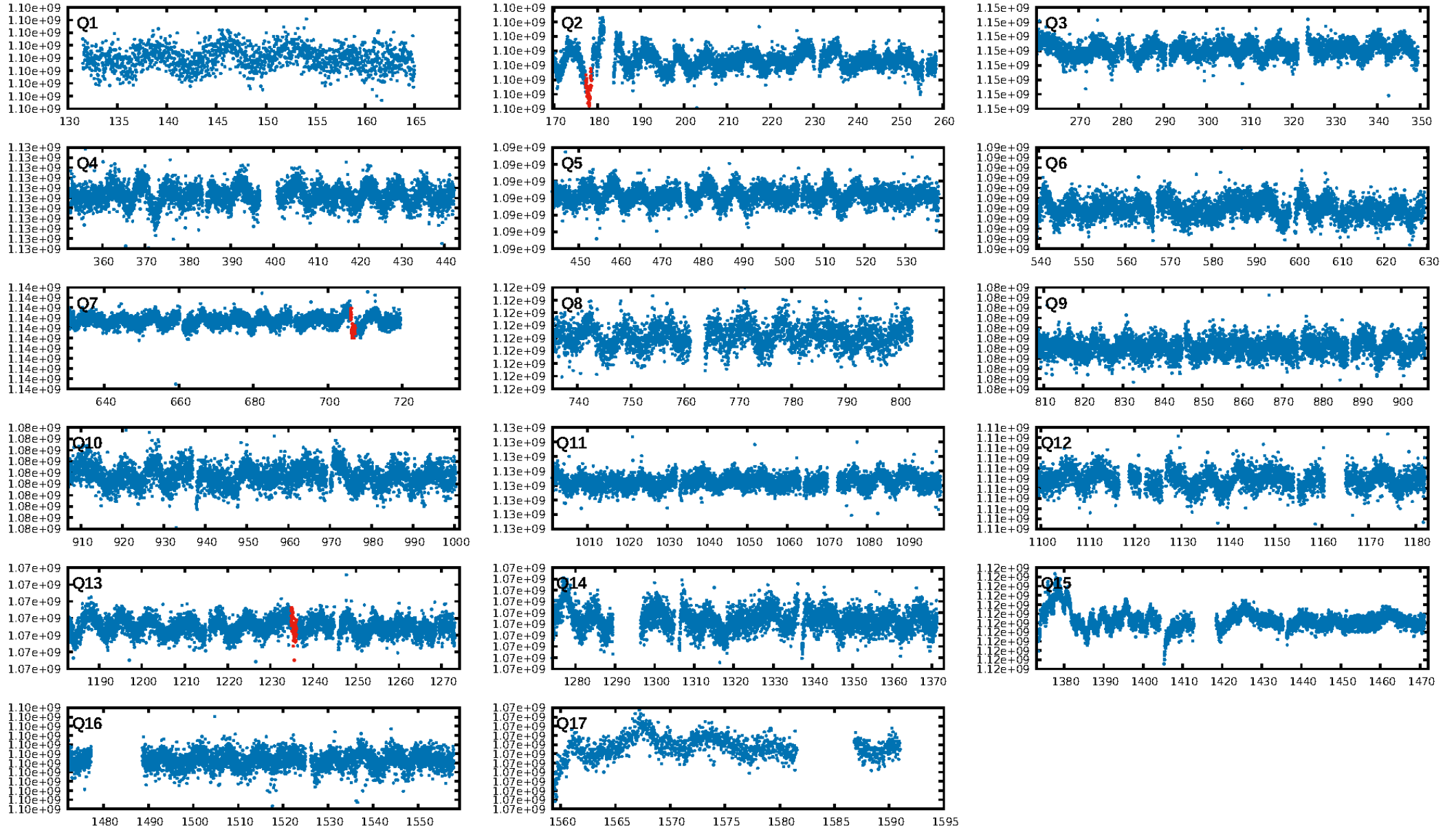
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [279.69 σ]
 LongPeriod-sig: N/A
 ModelChiSquare2-sig: 2.4%
 ModelChiSquareGof-sig: 99.8%
 Bootstrap-pfa: 8.29e-18
 RollingBand-fgt: 1.00 [3/3]
 GhostDiagnostic-chr: -2.856
 Centroid-sig: 0.5%
 Centroid-so: 4.098 arcsec [2.36 σ]
 OotOffset-rm: 3.960 arcsec [3.43 σ]
 KicOffset-rm: 4.530 arcsec [2.15 σ]
 OotOffset-st: 1/1/0/0 [2]
 KicOffset-st: 1/1/0/0 [2]
 DiffImageQuality-fgm: 0.50 [1/2]
 DiffImageOverlap-fno: 0.33 [1/3]

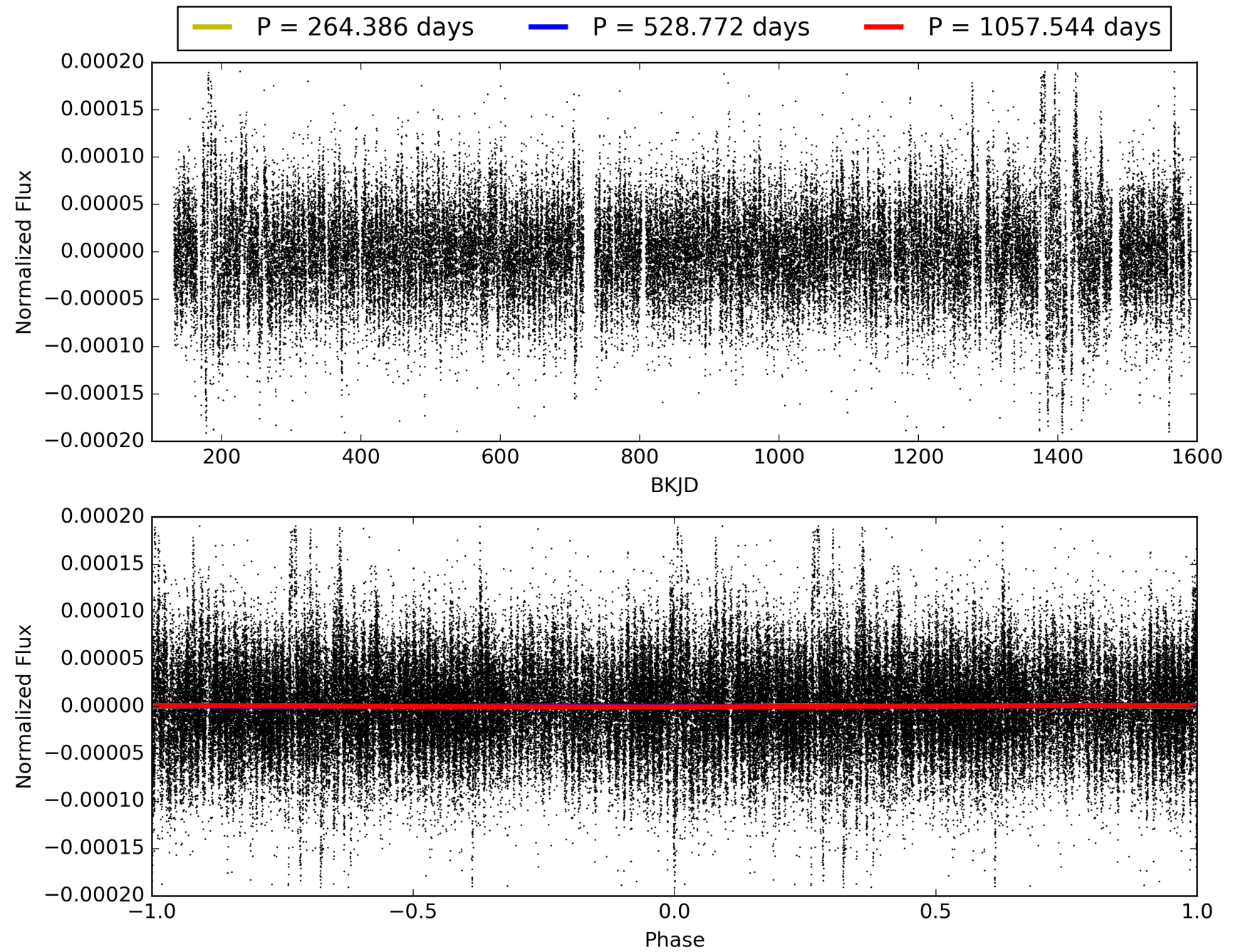
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 20:03:48 Z

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

TCE 009777988-01, PDC Light Curves

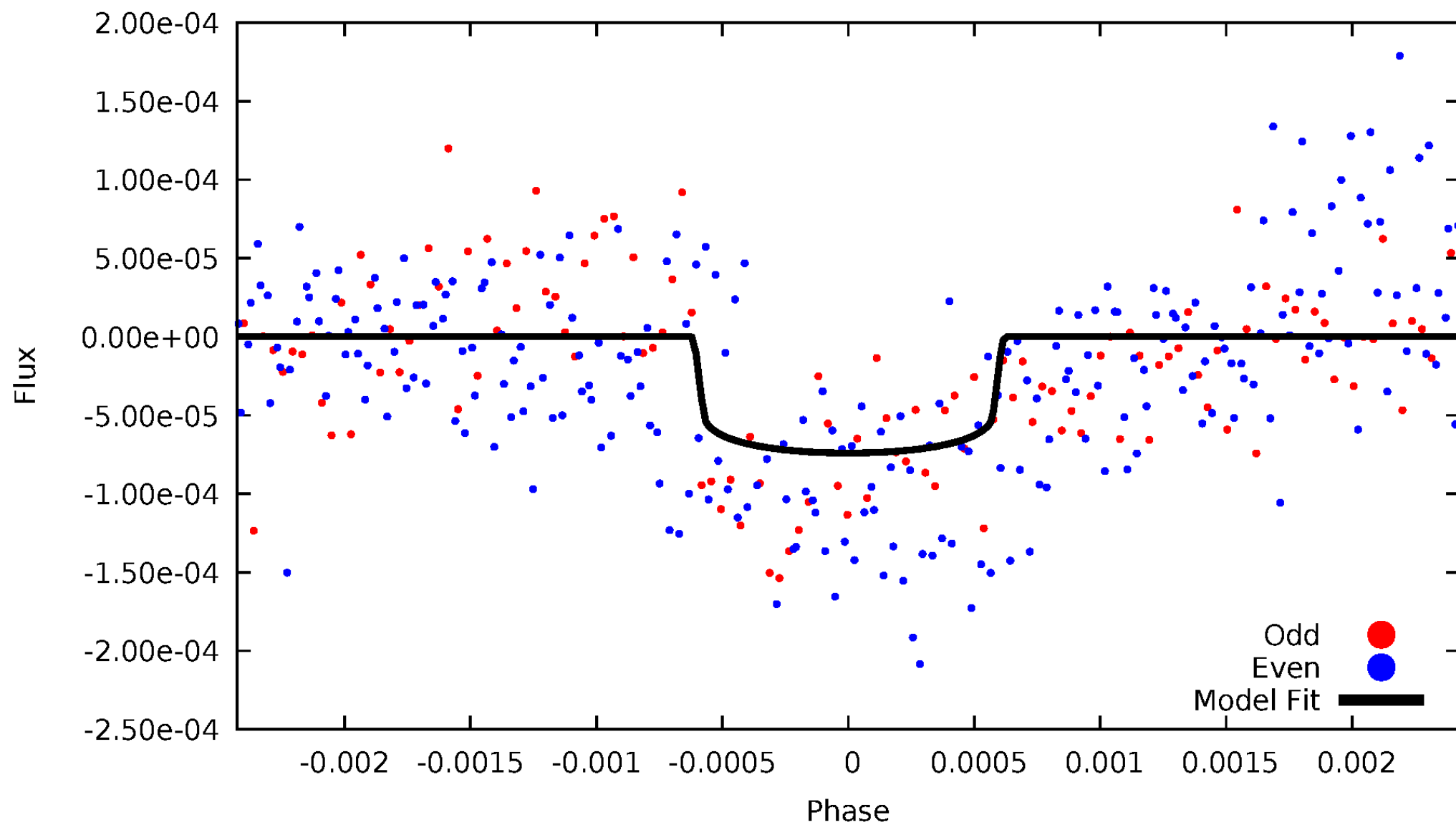


TCE 009777988-01



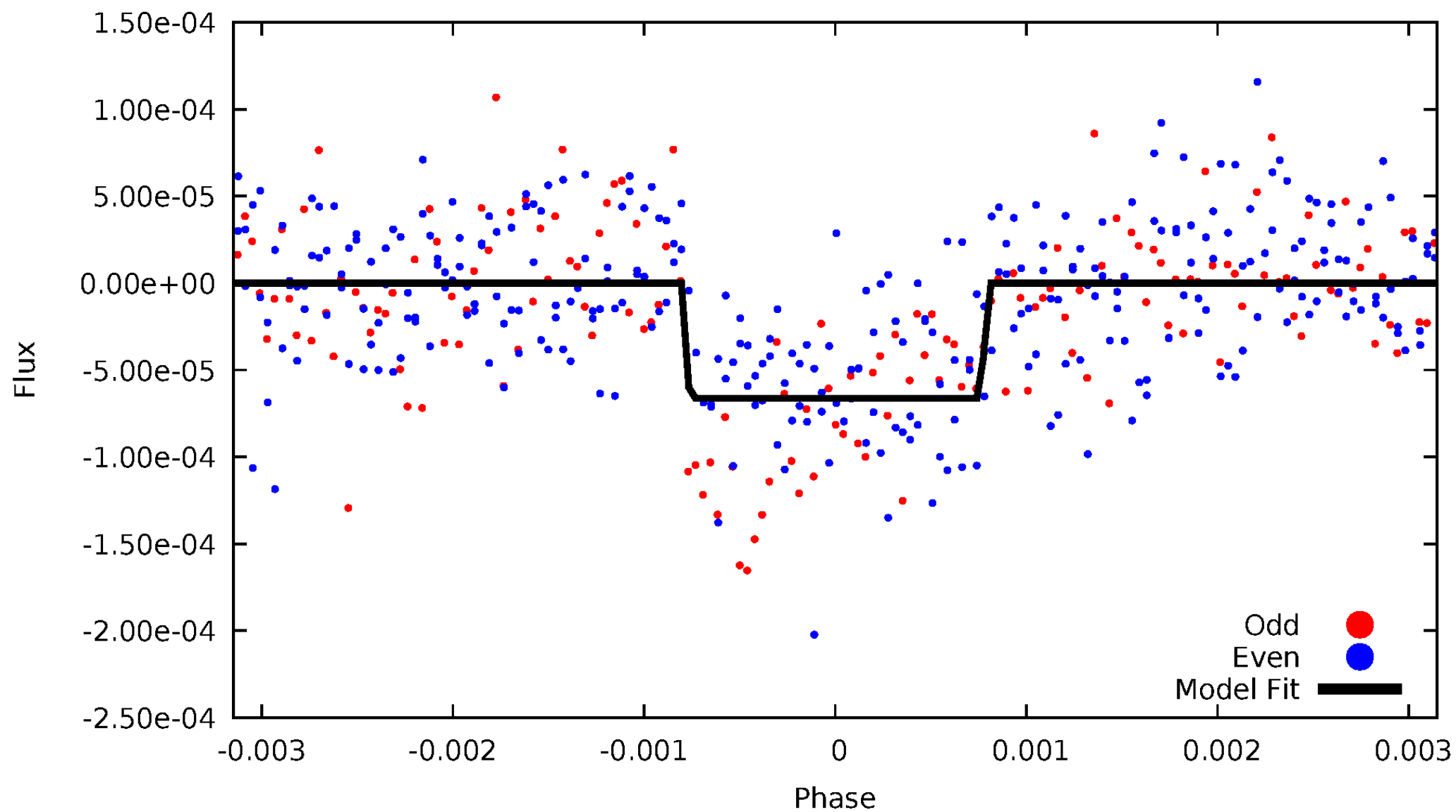
DV Odd/Even

TCE 009777988-01



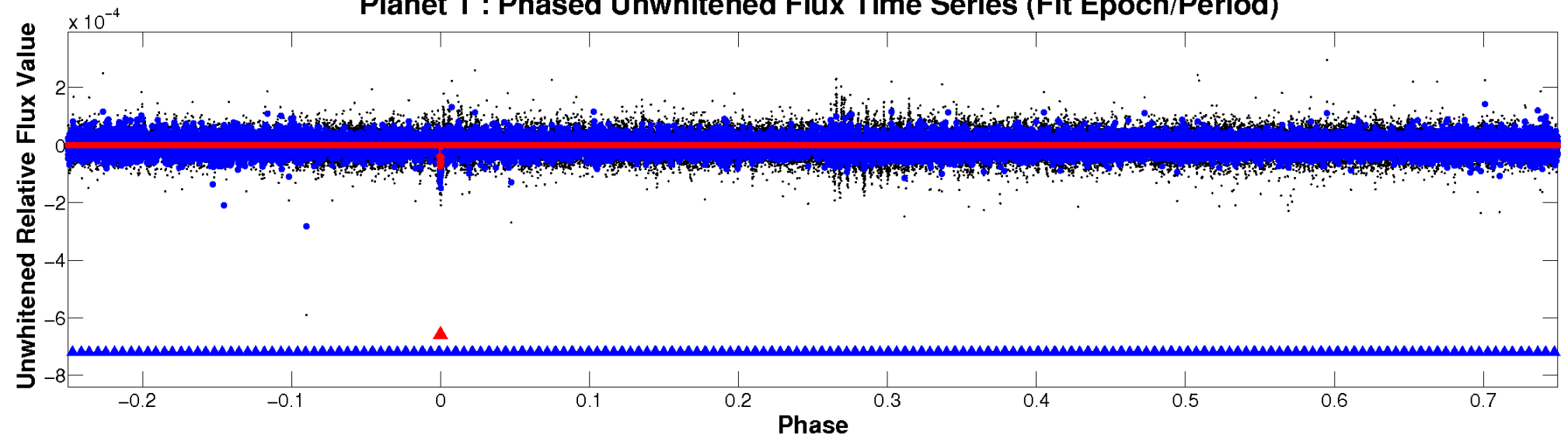
ALT Odd/Even

TCE 009777988-01

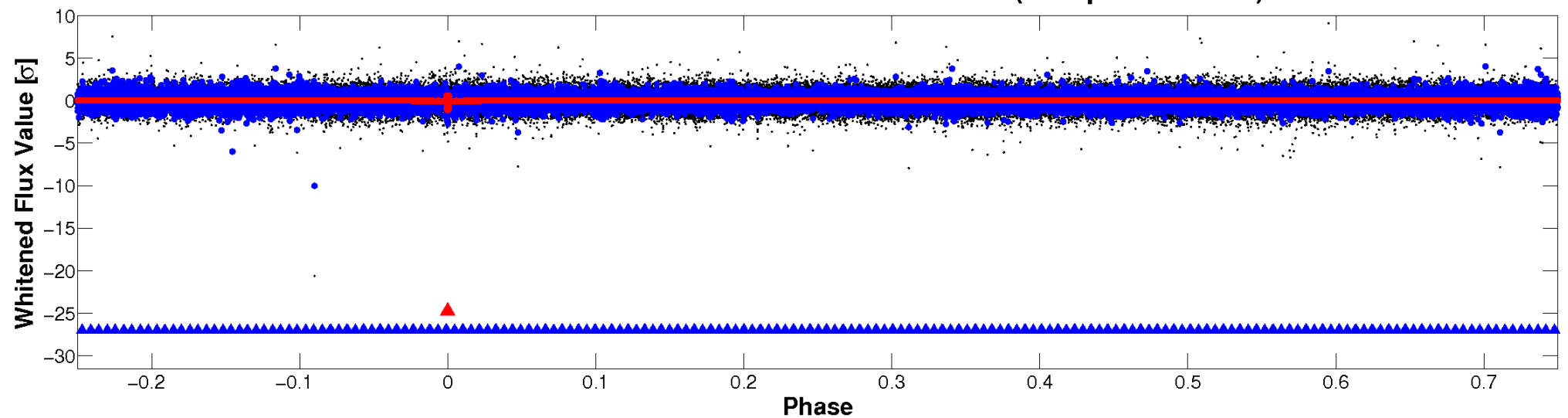


Non-Whitened Vs. Whitened Light Curve

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

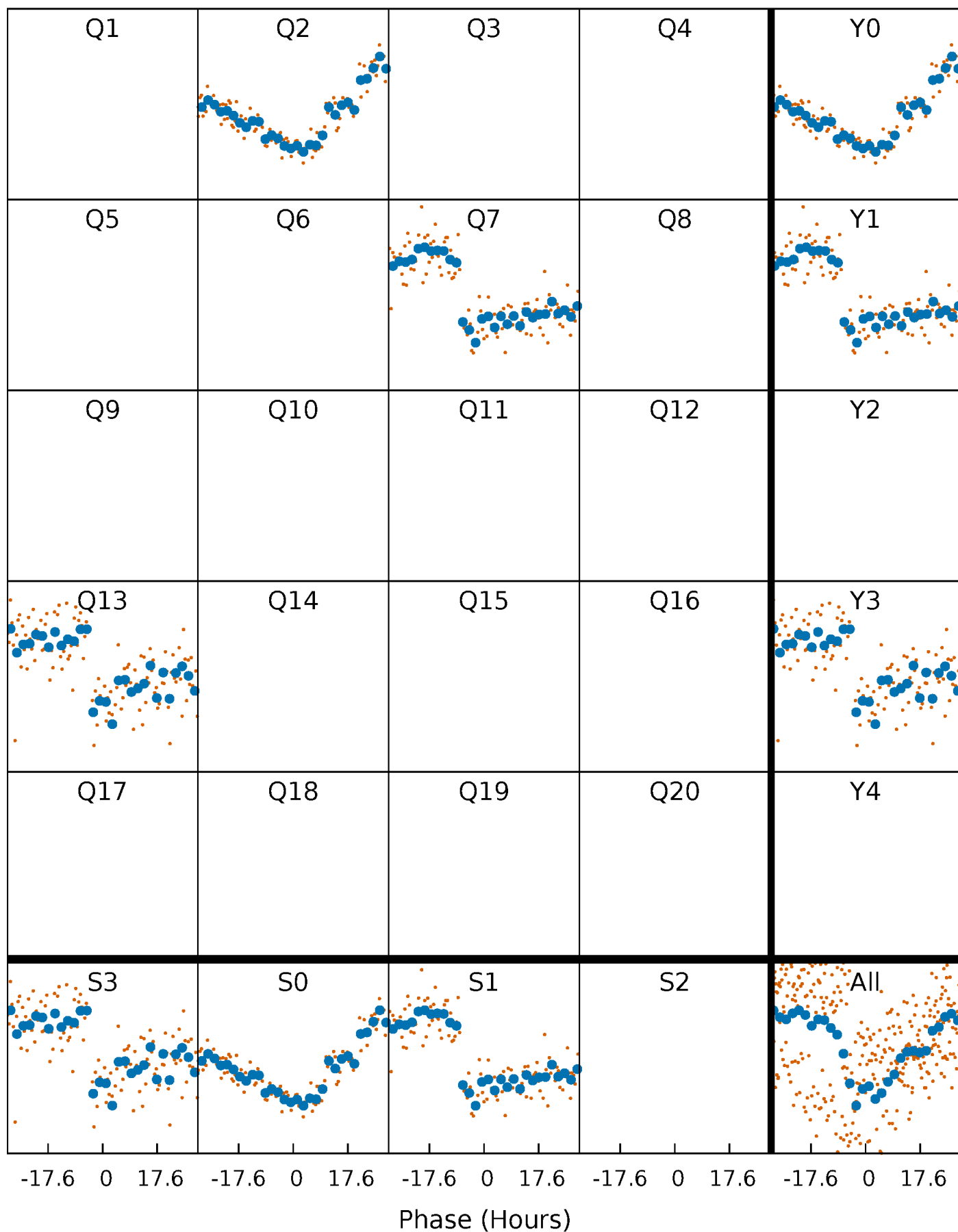


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 009777988-01 $P=528.772240$ Days $T_0=177.925800$ (BKJD)



DV Quarter-Phased Transit Curves

TCE 009777988-01 P=528.772240 Days $T_0=177.925800$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

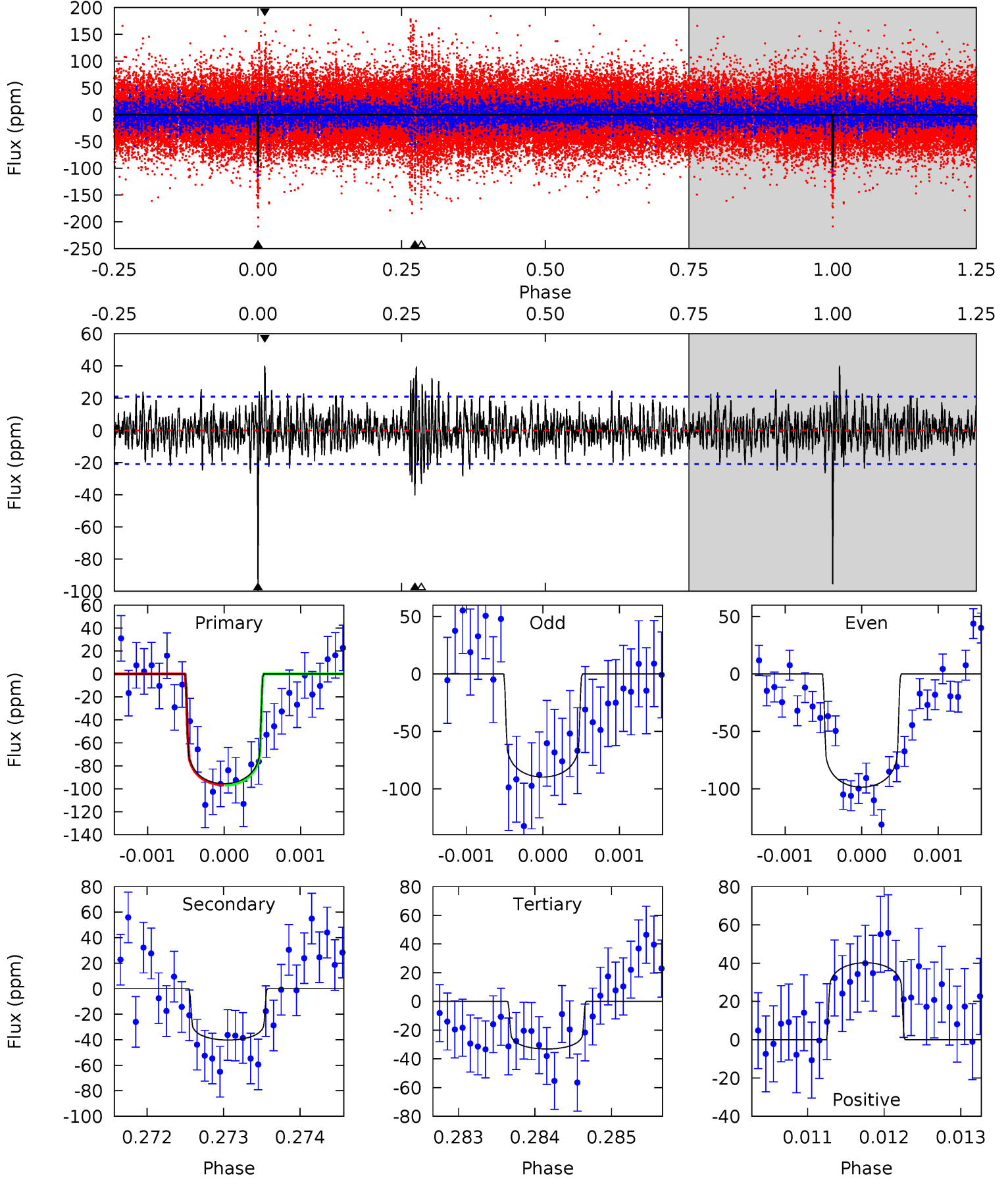
TCE 009777988-01 P=528.881833 Days $T_0=177.914692$ (BKJD)



DV Model-Shift Uniqueness Test

009777988-01, P = 528.772240 Days, E = 177.925800 Days

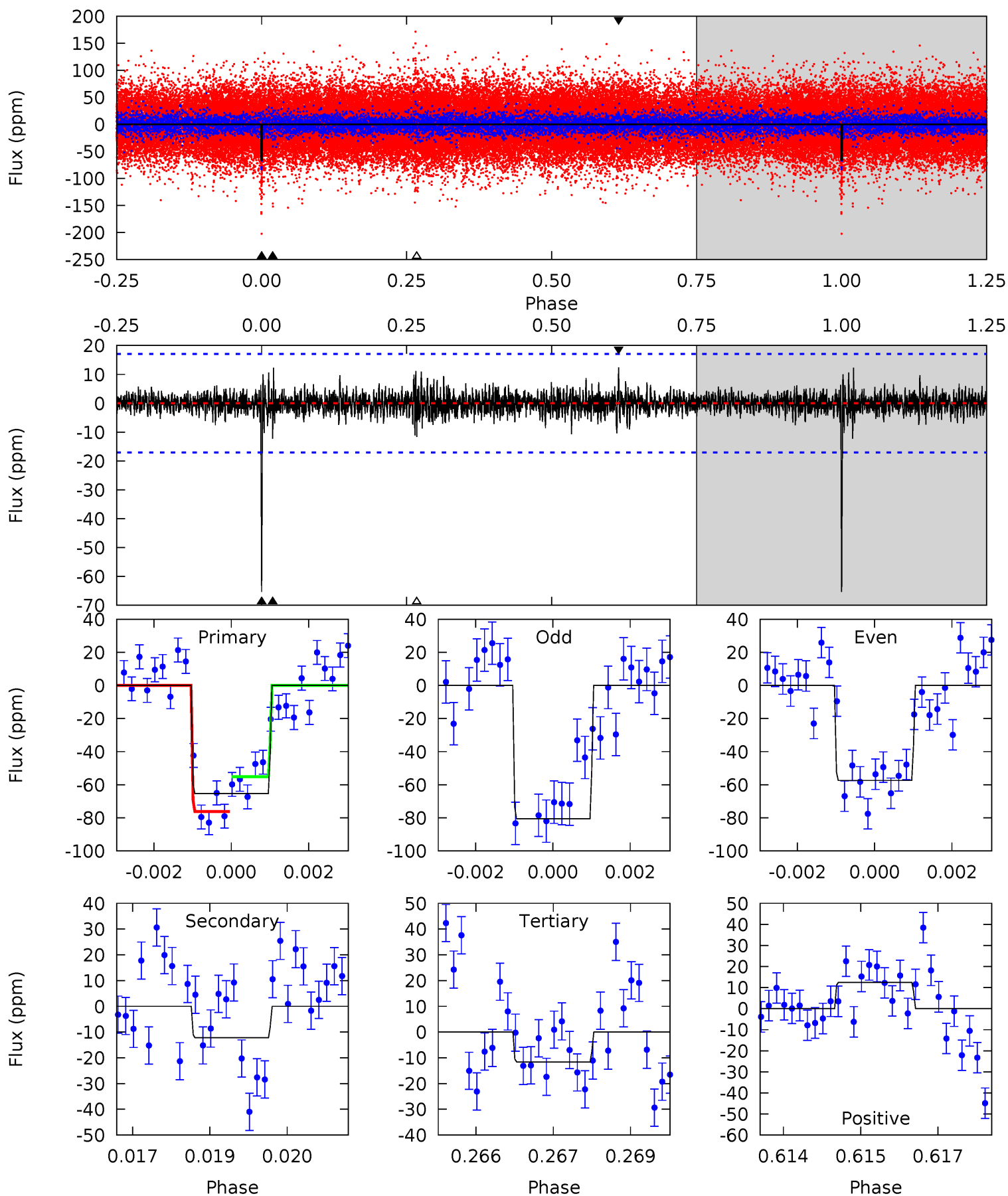
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.7	10.4	8.56	10.4	5.42	3.23	2.33	16.1	14.3	1.84	0.01	1.10	1.04	0.30	0.04



Alt Model-Shift Uniqueness Test

009777988-01, P = 528.881833 Days, E = 177.914692 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.6	3.85	3.66	3.92	5.37	3.17	0.81	17.0	16.7	0.19	-0.07	3.49	0.99	0.16	3.32



Stellar Parameters For KIC 009777988

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9492^{+297}_{-396}	$3.619^{+0.484}_{-0.085}$	$0.070^{+0.150}_{-0.700}$	$4.298^{+0.732}_{-2.196}$	$2.806^{+0.320}_{-0.960}$	$0.050^{+0.269}_{-0.014}$
	+3%/-4%	+13%/-2%	+214%/-1000%	+17%/-51%	+11%/-34%	+541%/-28%
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 009777988-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-40 ± 4	$3.62^{+1.18}_{-1.16}$	864^{+69}_{-123}	7742^{+1199}_{-867}	5536^{+5374}_{-2306}
Alt.	-12 ± 3	$3.42^{+1.04}_{-1.12}$	868^{+69}_{-111}	5821^{+802}_{-614}	1904^{+1869}_{-888}

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 $A_{obs} \gg 1.0$

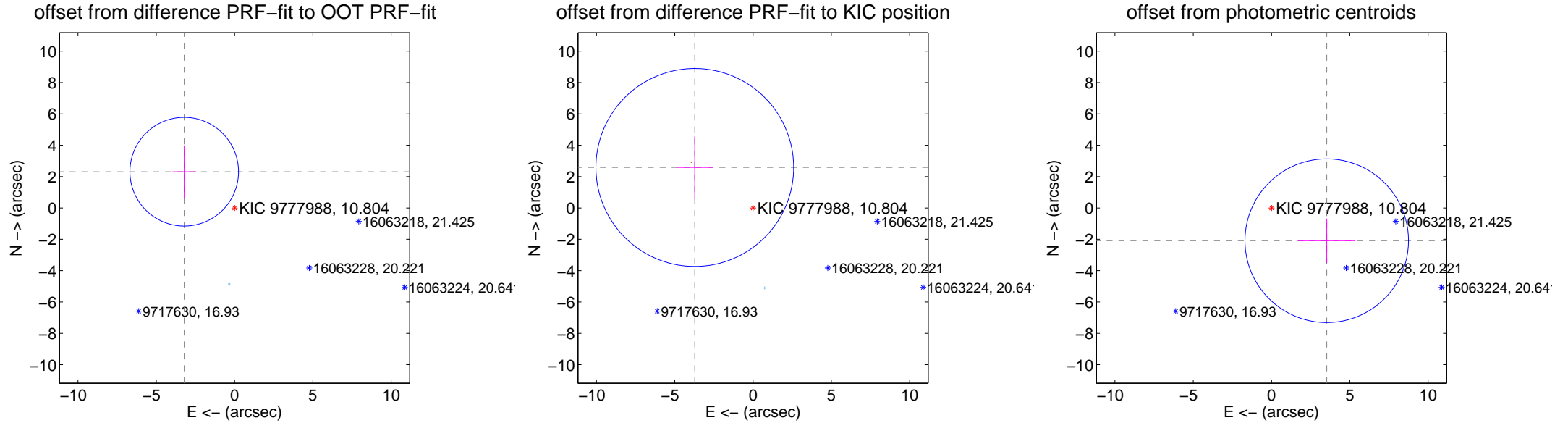
DV Centroid Data

Supplemental centroid analysis for 009777988-01. **Kepler magnitude: 10.80.** Transit SNR 10.28

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 1.12 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.960 ± 1.156	3.43	3.215 ± 0.758	2.312 ± 1.675
PRF-fit source offset from KIC position	4.530 ± 2.104	2.15	3.721 ± 1.175	2.583 ± 2.000
photometric centroid source offset	4.10 ± 1.74	2.36	-3.52 ± 1.84	-2.09 ± 1.42



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.

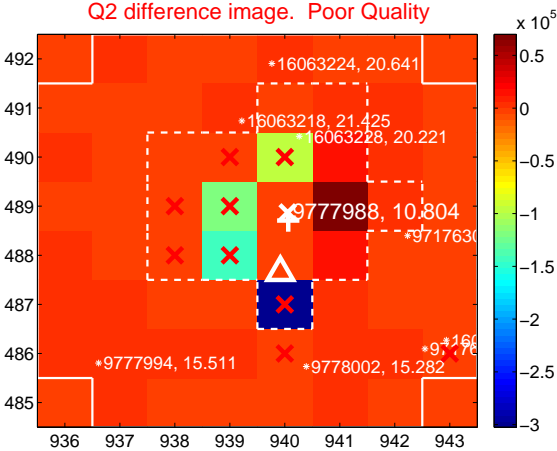
Q1 no difference image



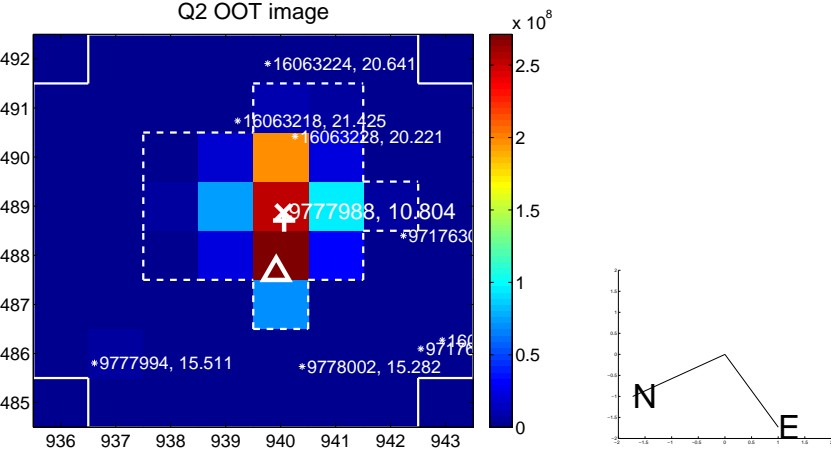
Q1 no OOT image



Q2 difference image. Poor Quality



Q2 OOT image



Q3 no difference image



Q3 no 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.

Q5 no difference image



Q5 no OOT image



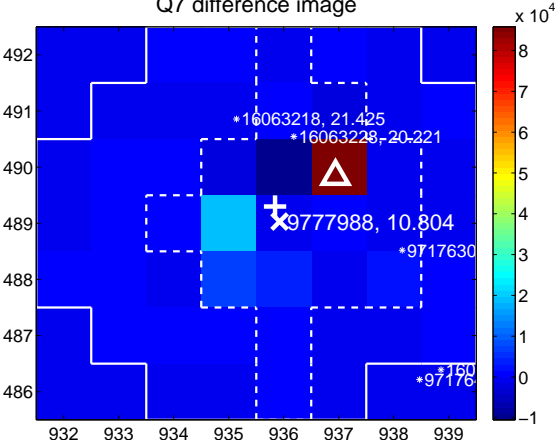
Q6 no difference image



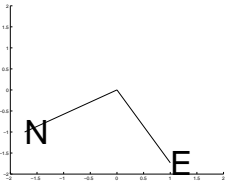
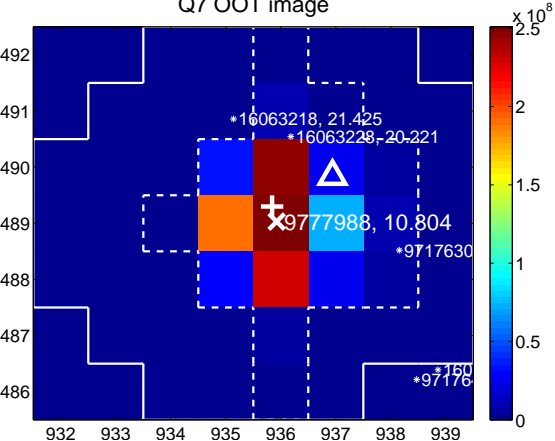
Q6 no OOT image



Q7 difference image



Q7 OOT image



Q8 no difference image



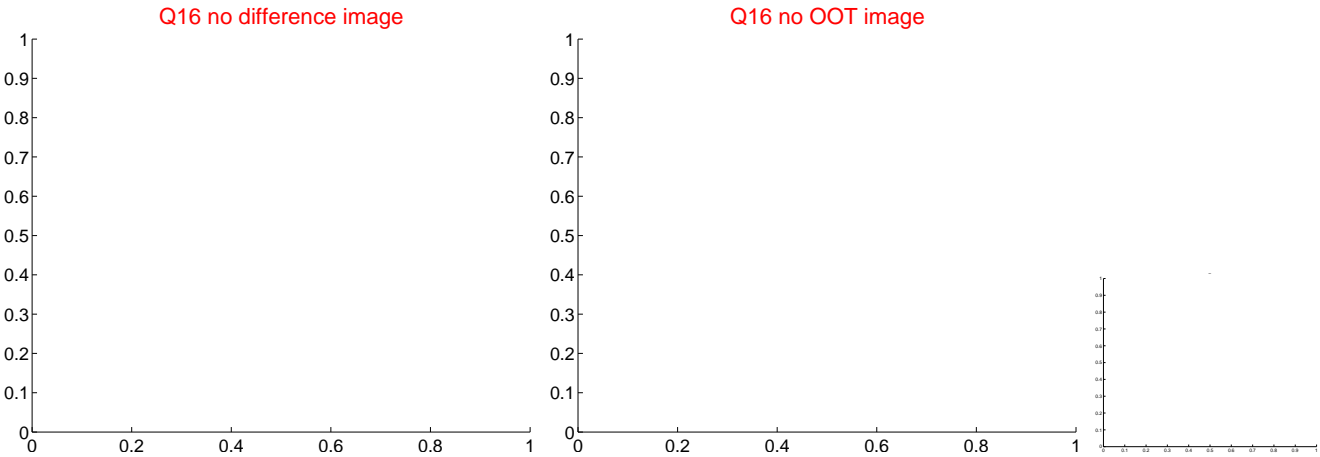
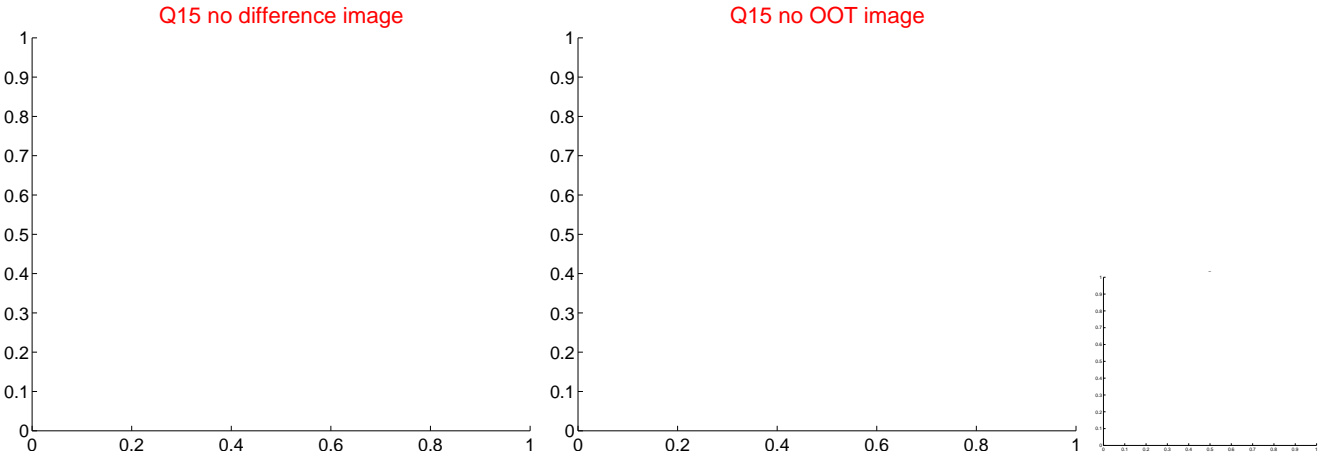
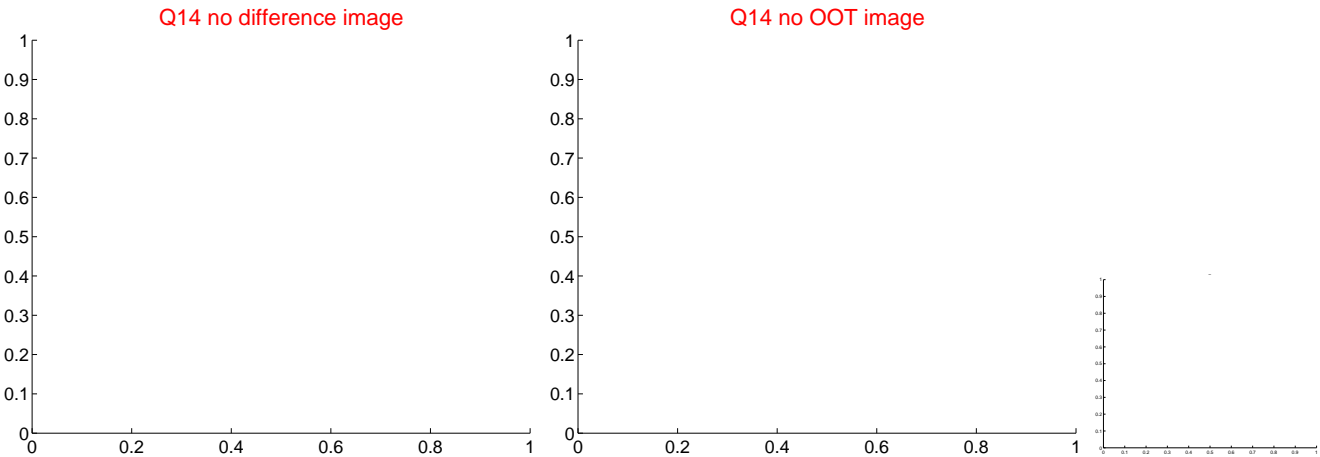
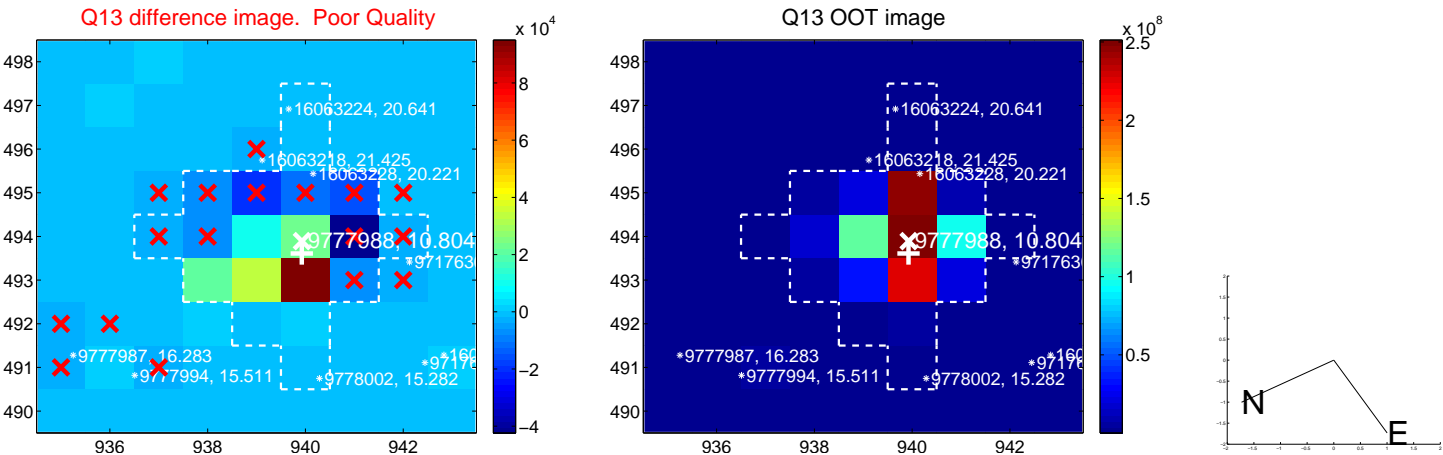
Q8 no OOT image



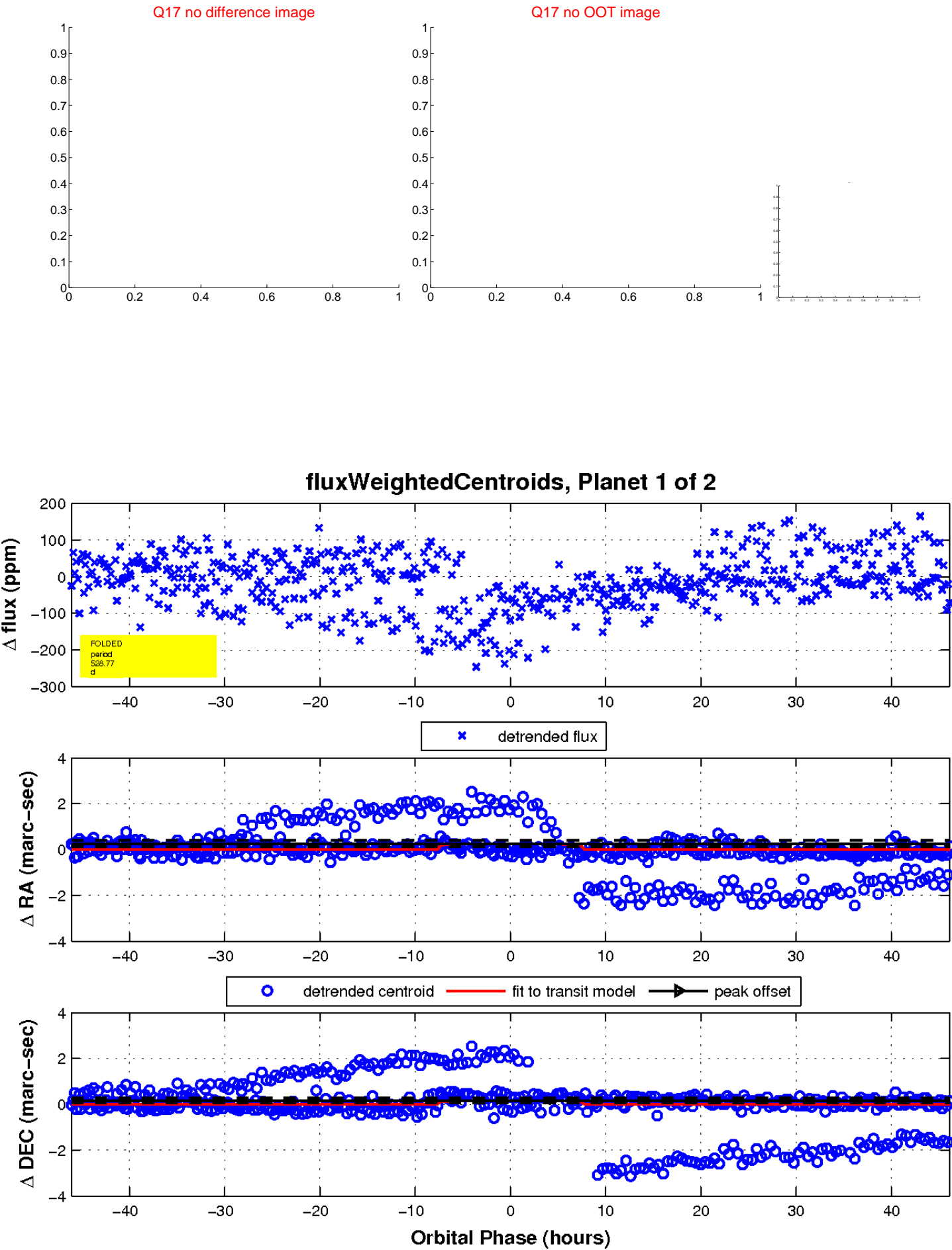
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

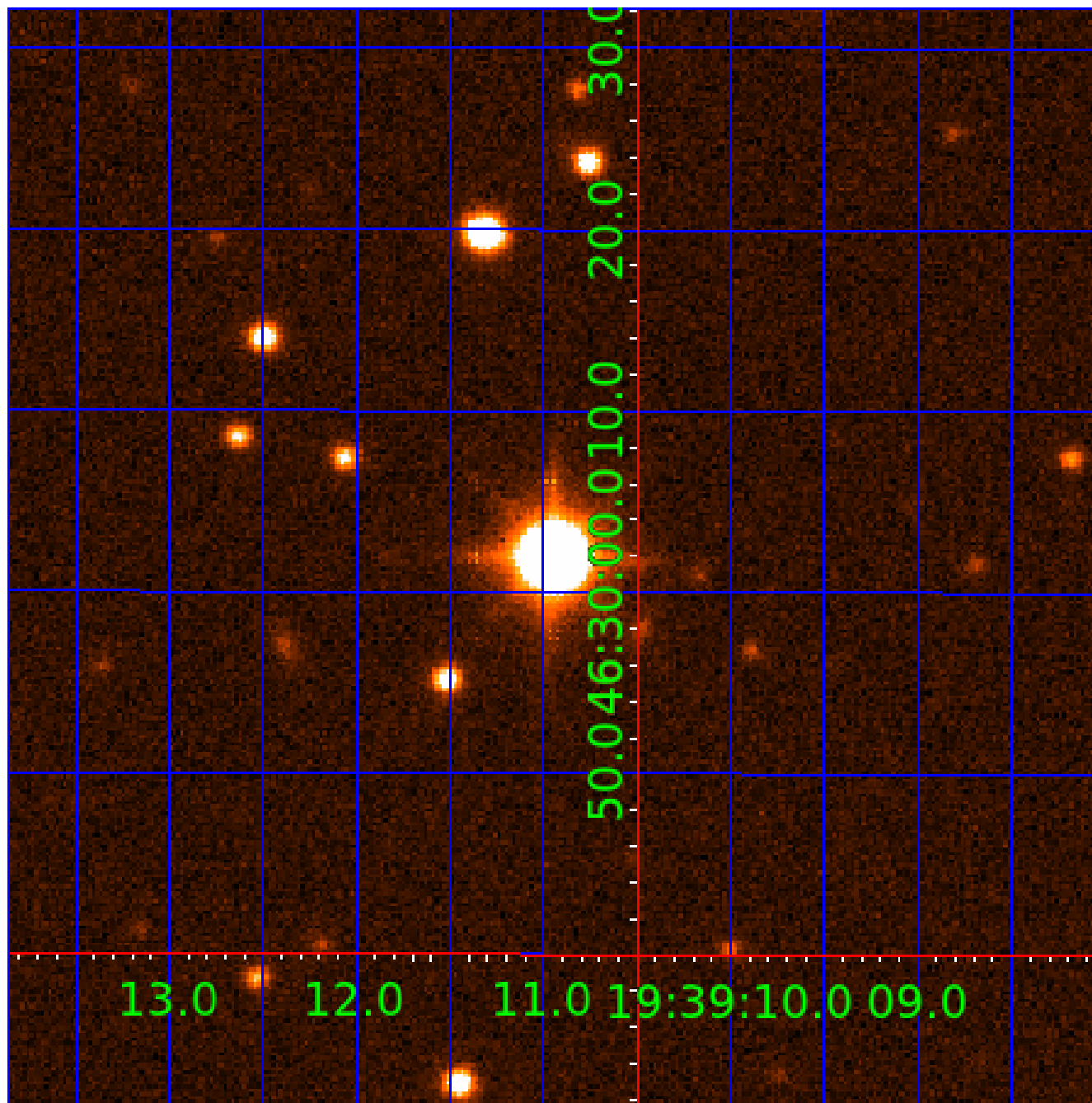


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009777988

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})
009777988-01	OBS	No	528.772240	177.925800	74.1	15.391	10.3	10.3	4.30	9492	4.04	41.26
009777988-02	OBS	No	5.906474	136.220301	3.1	42.145	9.2	5.6	4.30	9492	0.84	16522.10

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009777988-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_SATURATED
009777988-02	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED

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

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

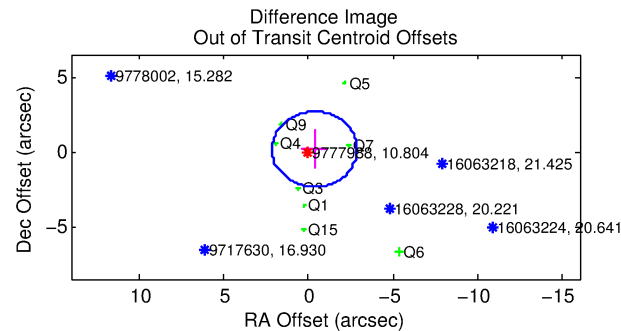
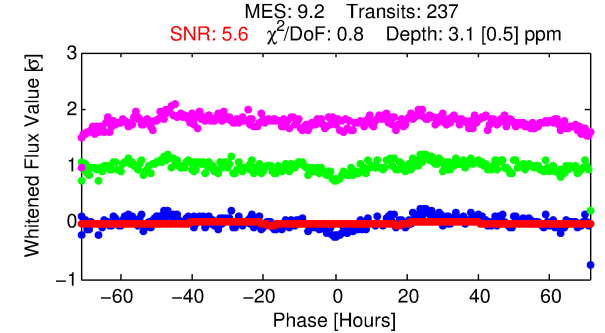
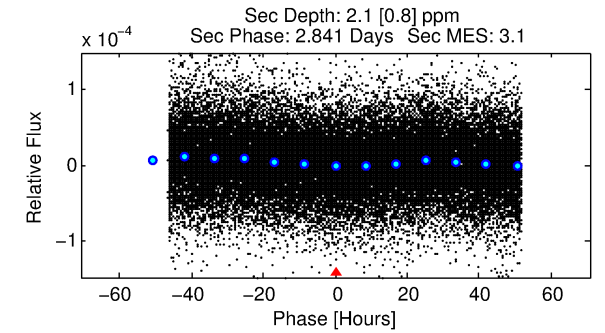
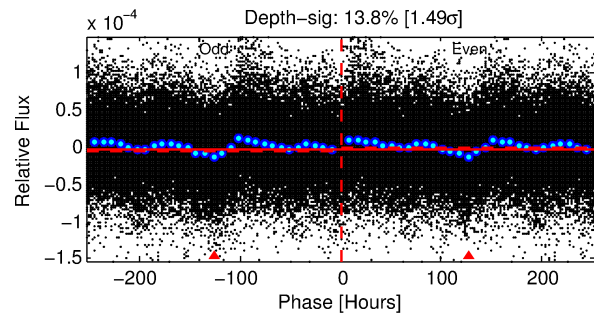
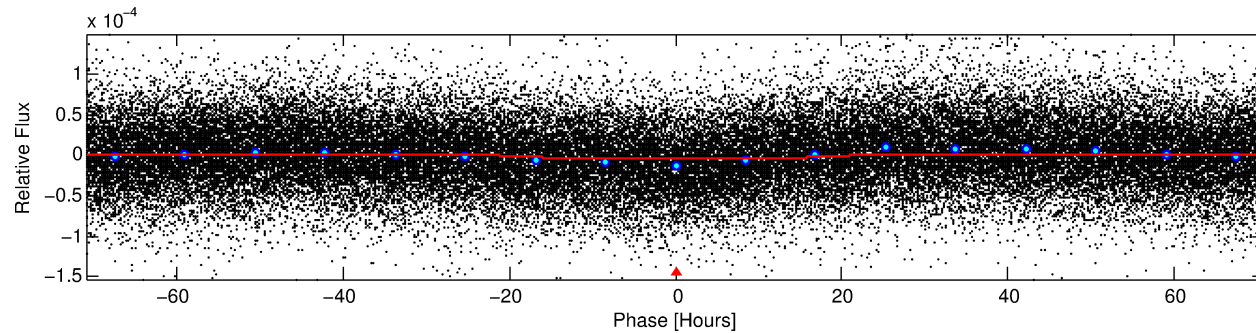
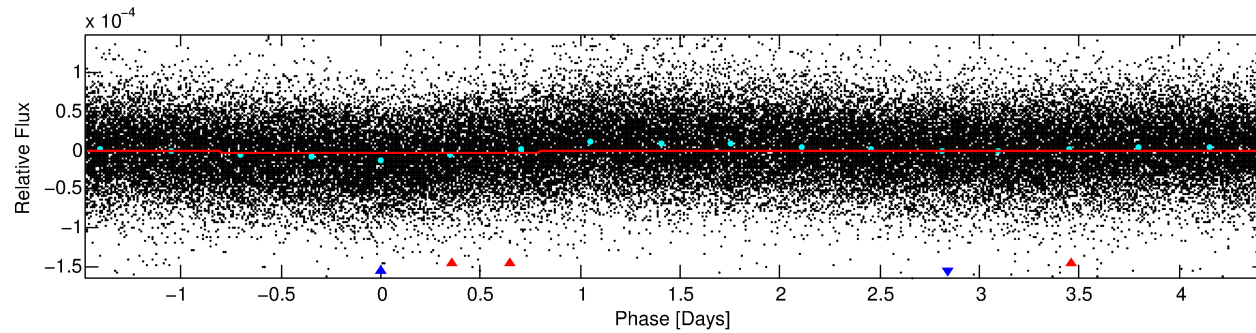
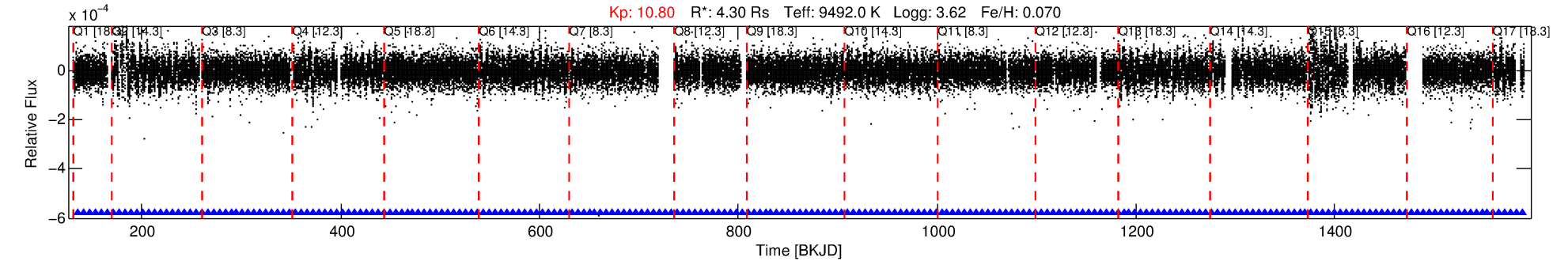
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009777988-02

No Significant Match Found

DV One-Page Summary

KIC: 9777988 Candidate: 2 of 2 Period: 5.906 d



DV Fit Results:

Period = 5.90647 [0.00025] d
Epoch = 136.2203 [0.0295] BKJD
 $R_p/R^* = 0.0018$ [0.0003]
 $a/R^* = 1.09$ [0.23]
 $b = 0.81$ [0.57]
 $\text{Seff} = 16522.10$ [13782.57]
 $\text{Teq} = 2891$ [603] K
 $R_p = 0.84$ [0.46] R_e
 $a = 0.0902$ [0.0454] AU
 $\text{Ag} = 13.32$ [13.02] [0.95 σ]
 $\text{Teff} = 8539$ [1199] K [4.21 σ]

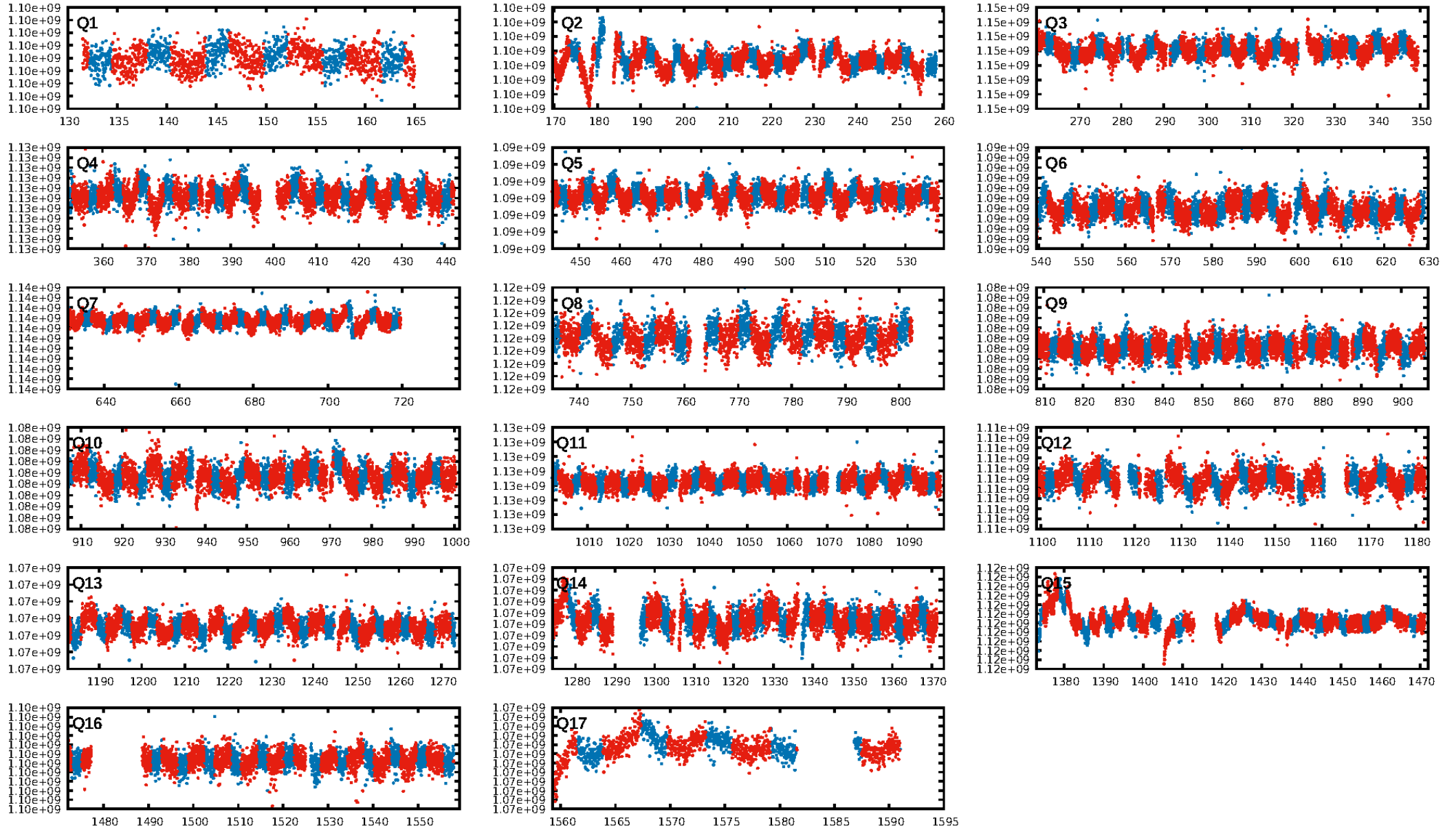
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [279.69 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.34e-18
RollingBand-fgt: 1.00 [226/226]
GhostDiagnostic-chr: N/A
Centroid-sig: N/A
Centroid-so: N/A
OotOffset-rm: 0.390 arcsec [0.47 σ]
KicOffset-rm: 0.971 arcsec [0.75 σ]
OotOffset-st: 1/3/1/3 [8]
KicOffset-st: 1/3/1/3 [8]
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DiffImageOverlap-fno: 1.00 [17/17]

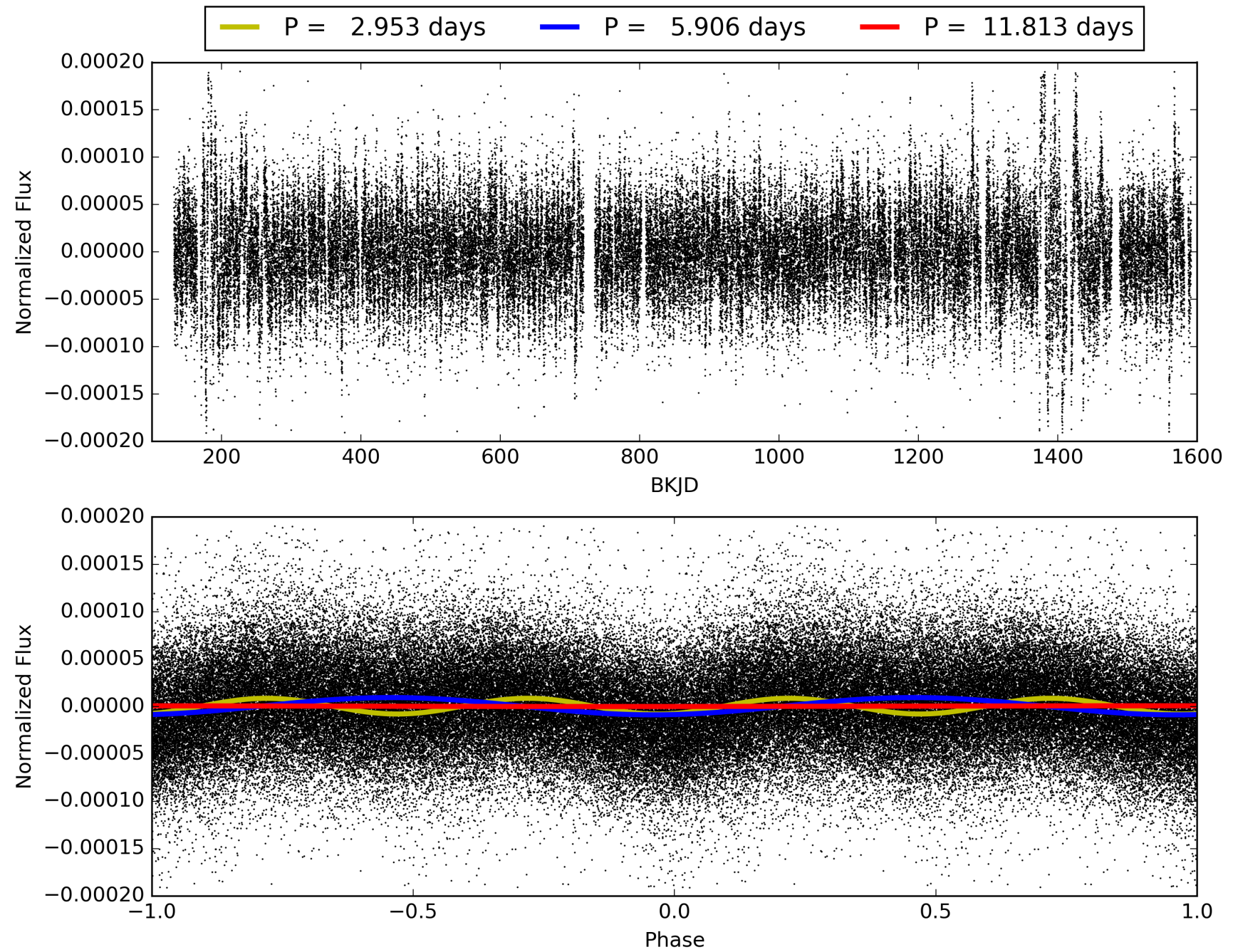
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 20:03:59 Z

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

TCE 009777988-02, PDC Light Curves

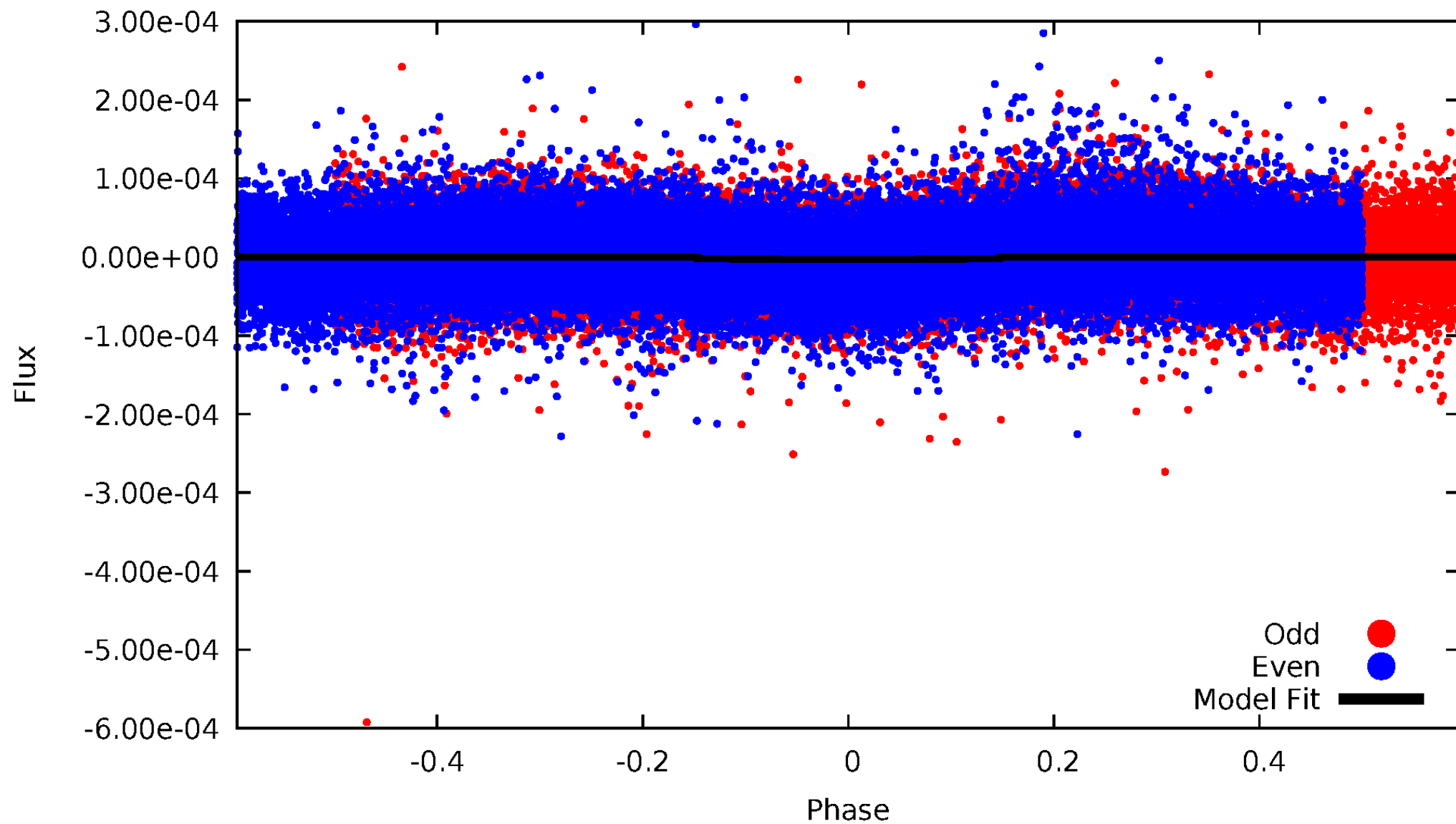


TCE 009777988-02



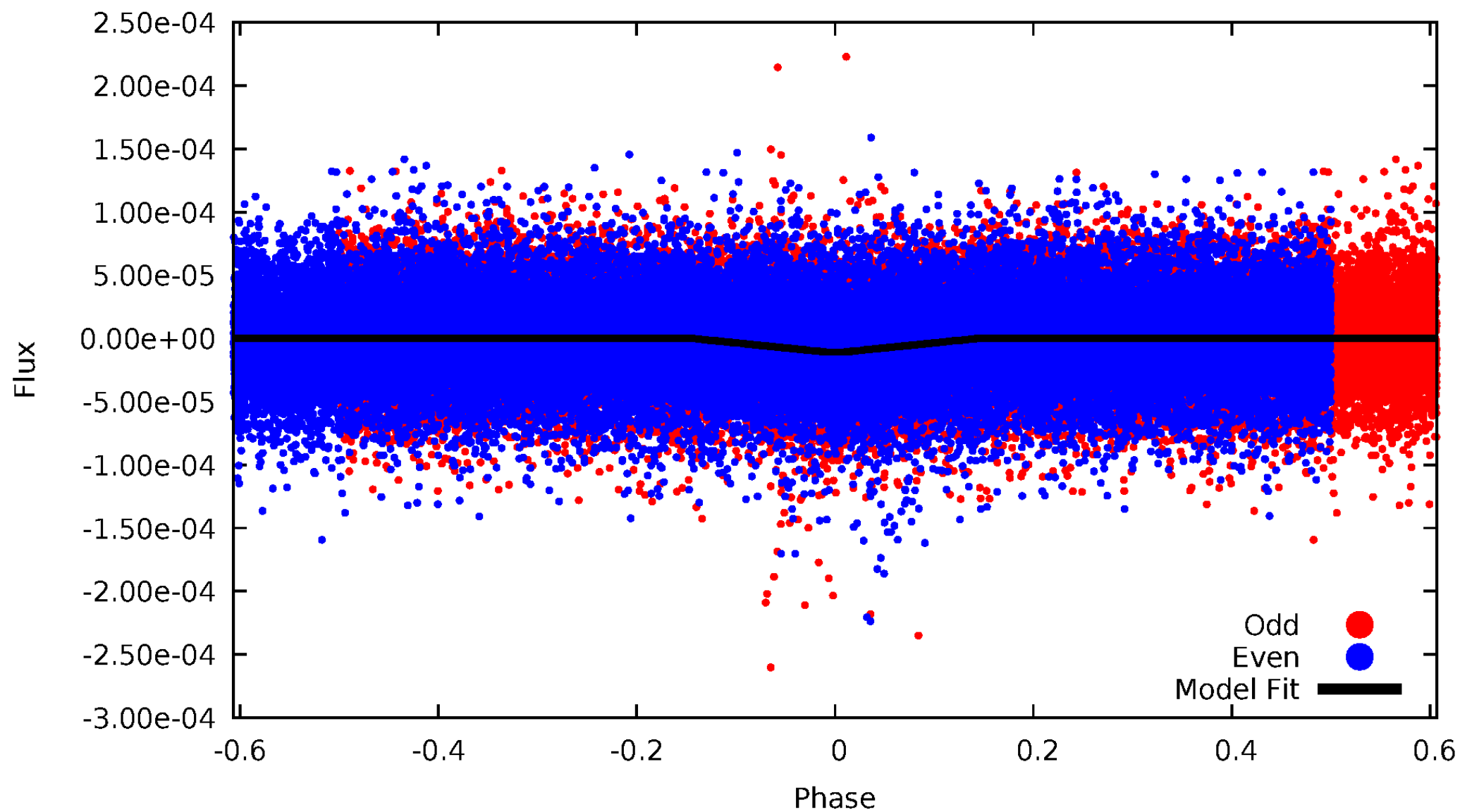
DV Odd/Even

TCE 009777988-02



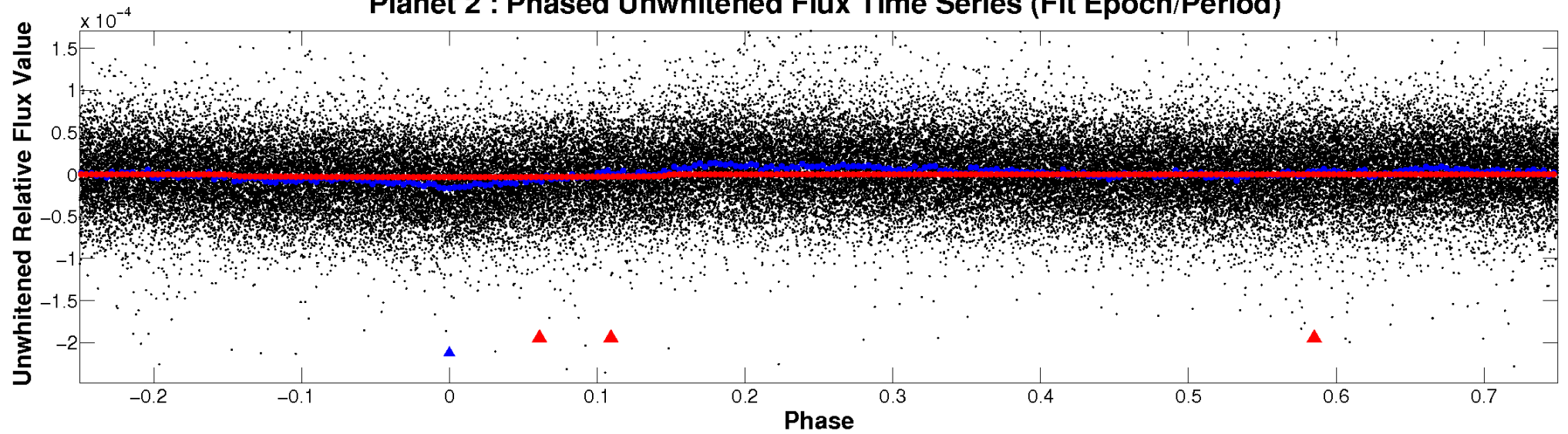
ALT Odd/Even

TCE 009777988-02

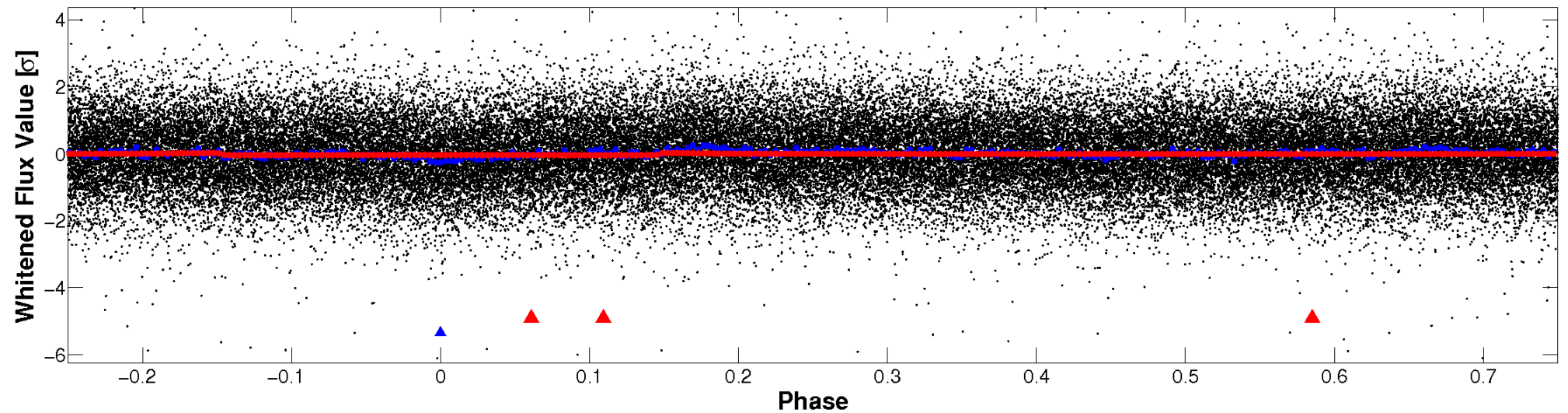


Non-Whitened Vs. Whitened Light Curve

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

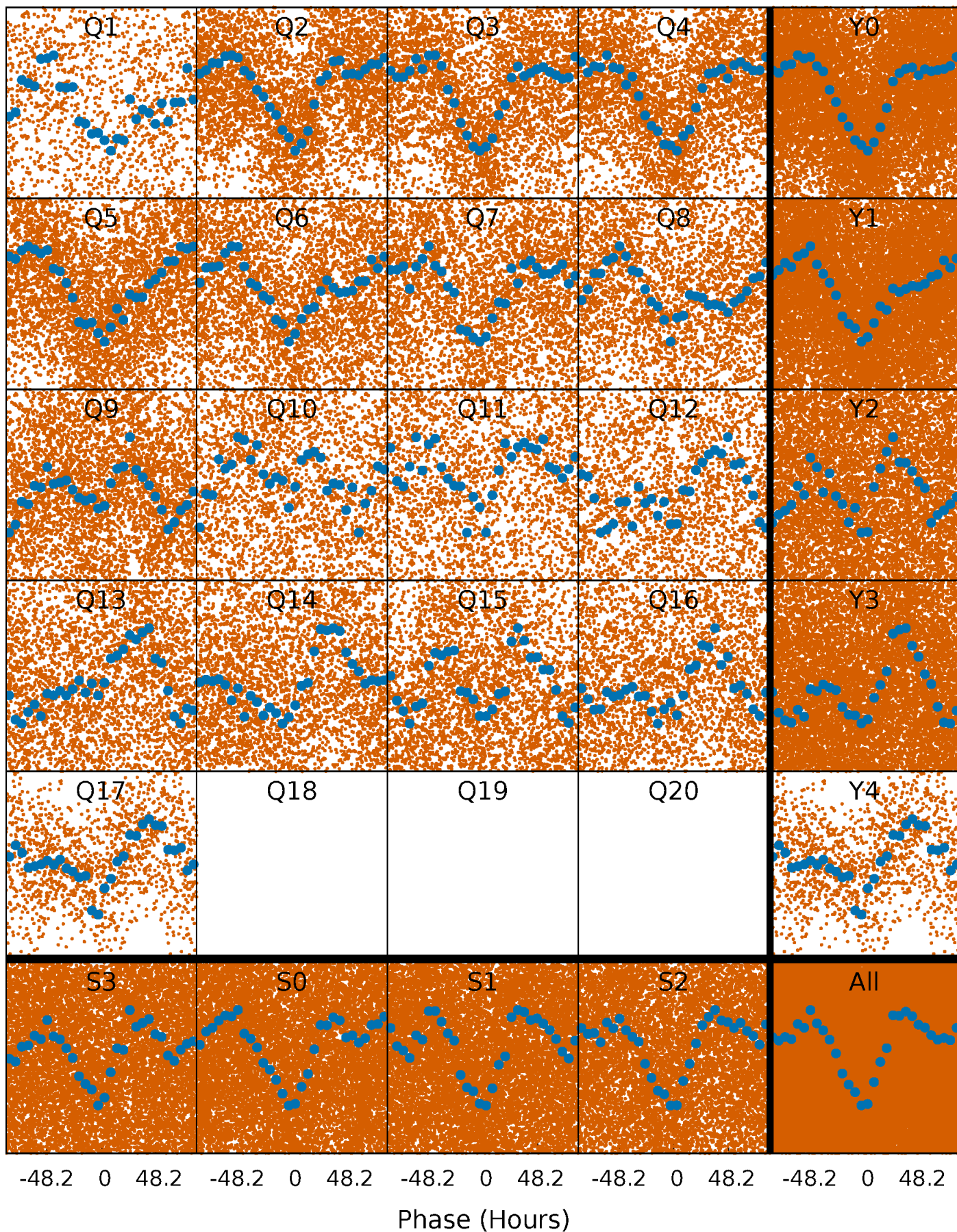


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



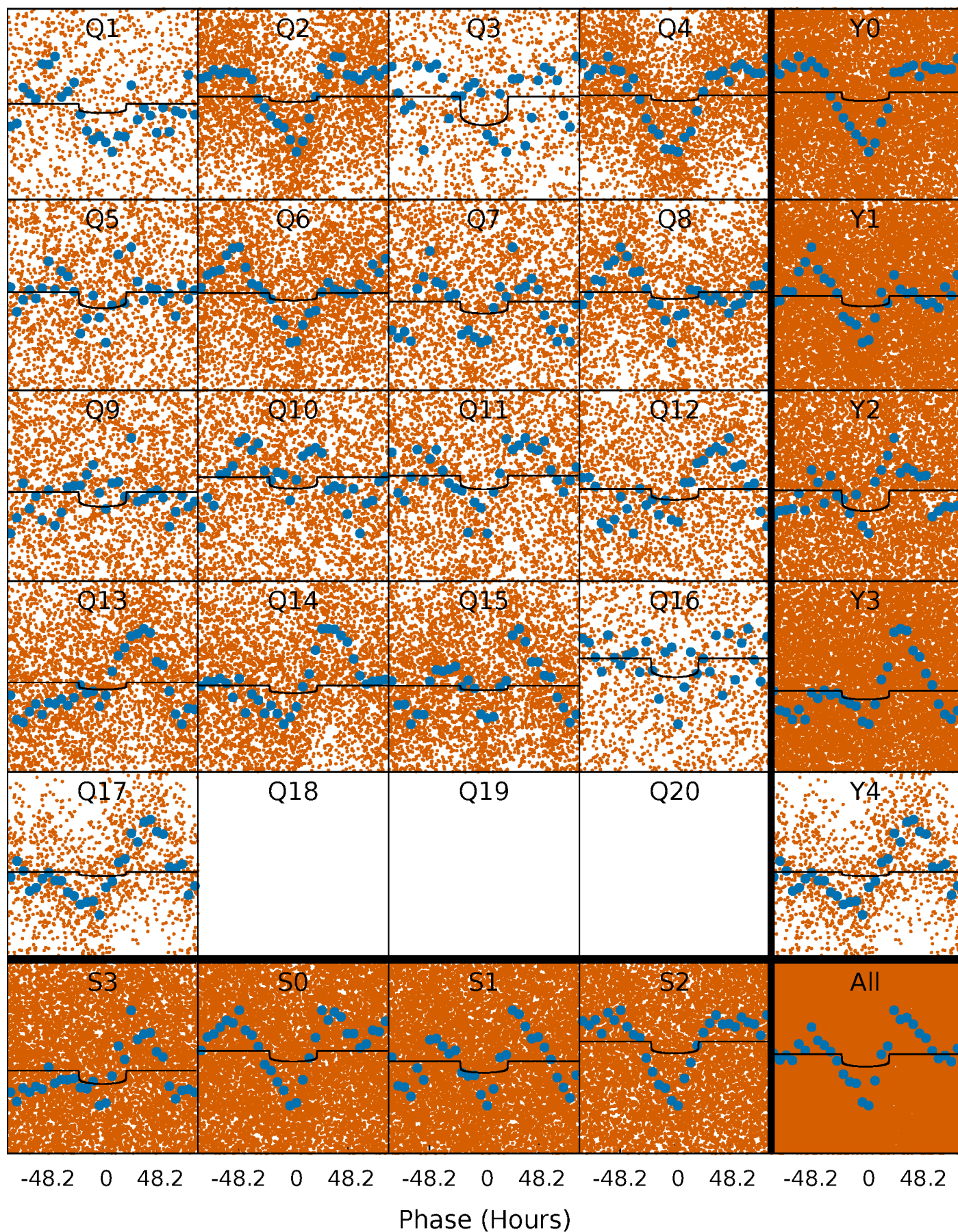
PDC Quarter-Phased Transit Curves

TCE 009777988-02 P= 5.906474 Days $T_0=136.220301$ (BKJD)



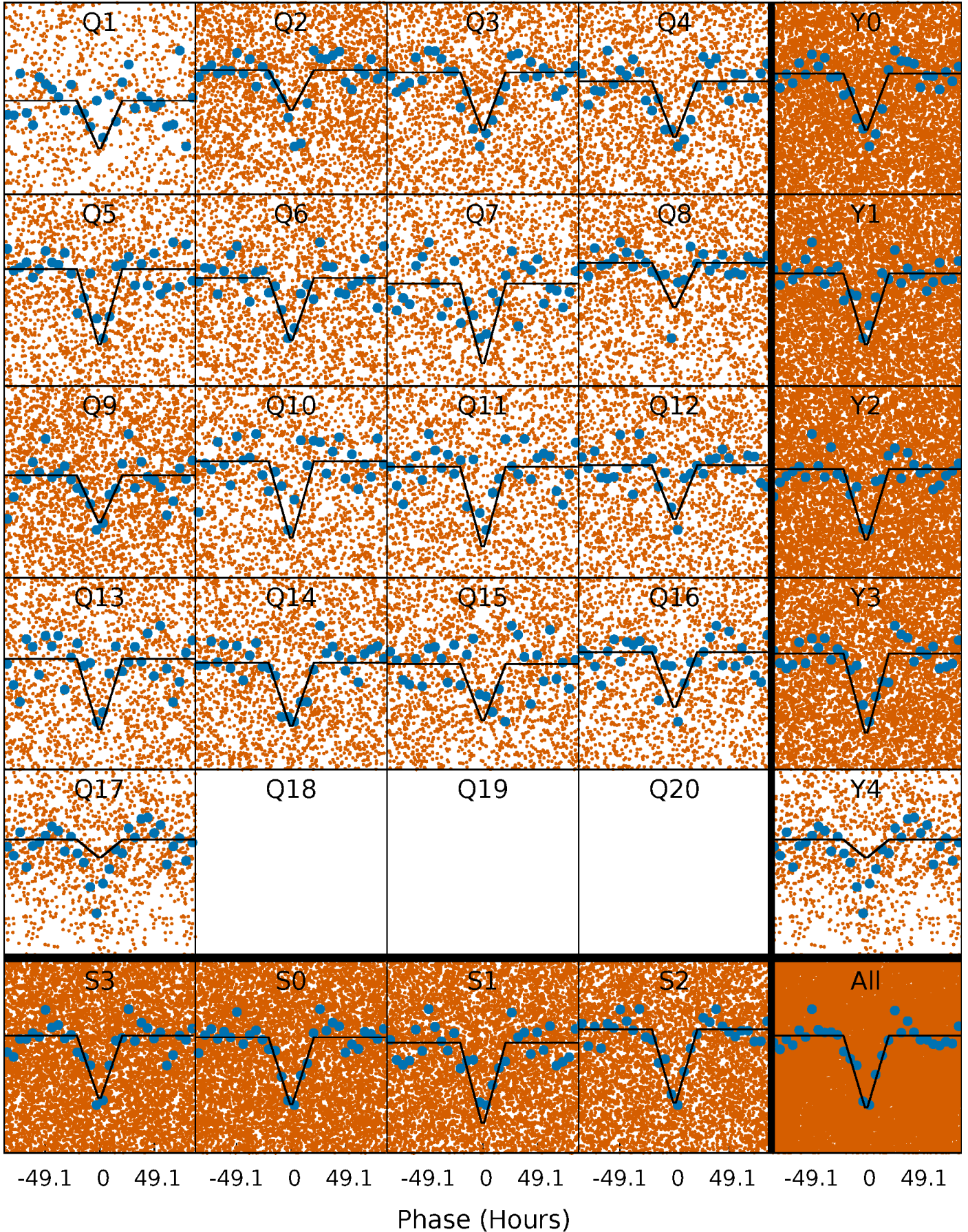
DV Quarter-Phased Transit Curves

TCE 009777988-02 P= 5.906474 Days $T_0=136.220301$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

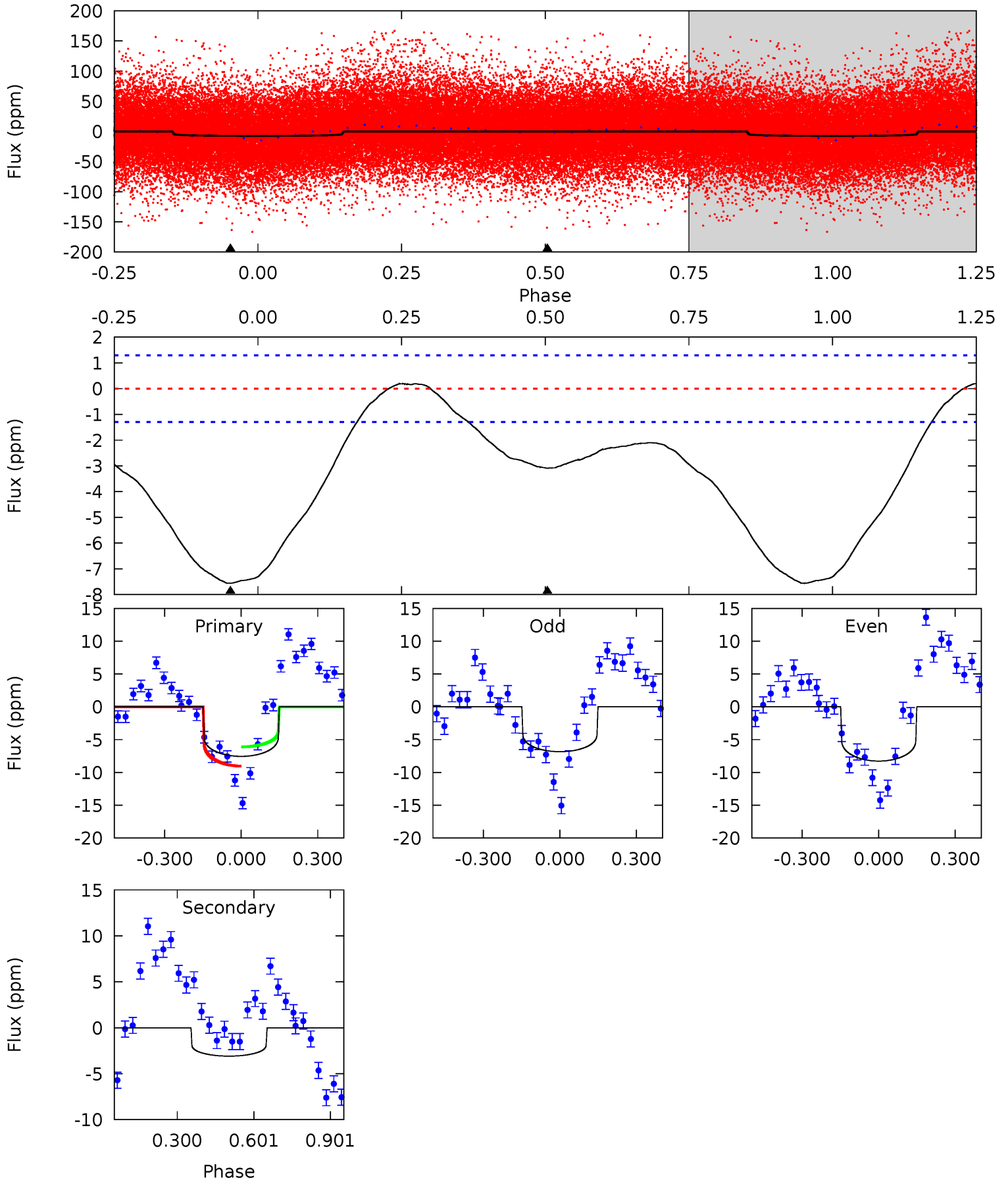
TCE 009777988-02 P= 5.906003 Days $T_0=136.303873$ (BKJD)



DV Model-Shift Uniqueness Test

009777988-02, P = 5.906474 Days, E = 130.313827 Days

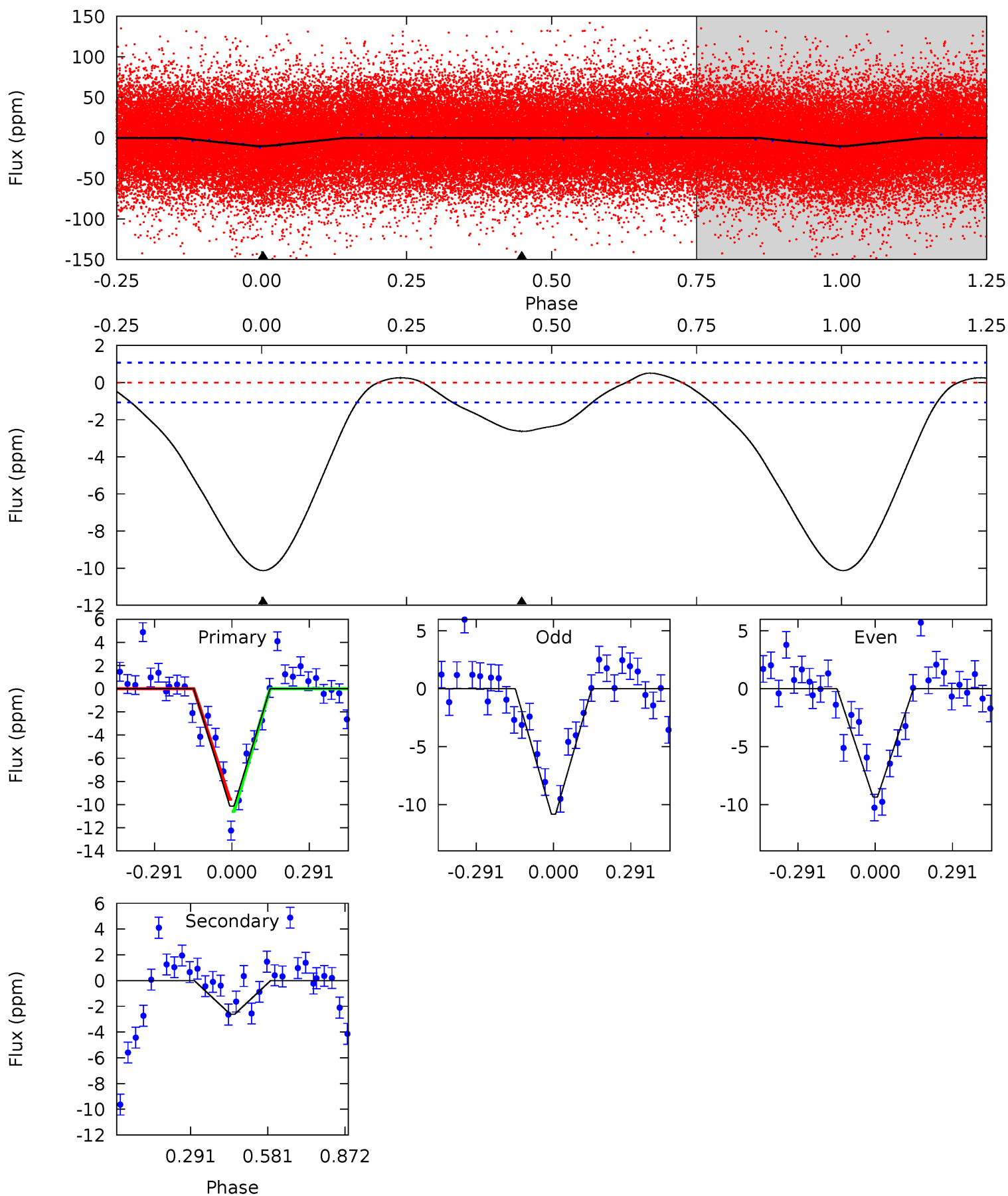
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.3	10.3	0	0	4.33	1.04	1.50	25.3	25.3	10.3	10.3	2.40	1.11	0.03	5.28



Alt Model-Shift Uniqueness Test

009777988-02, P = 5.906003 Days, E = 130.397870 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
41.0	10.6	0	0	4.34	1.06	1.90	41.0	41.0	10.6	10.6	2.95	1.47	0.05	2.04



Stellar Parameters For KIC 009777988

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9492^{+297}_{-396}	$3.619^{+0.484}_{-0.085}$	$0.070^{+0.150}_{-0.700}$	$4.298^{+0.732}_{-2.196}$	$2.806^{+0.320}_{-0.960}$	$0.050^{+0.269}_{-0.014}$
	+3%/-4%	+13%/-2%	+214%/-1000%	+17%/-51%	+11%/-34%	+541%/-28%
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 009777988-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-3 ± 0	$0.75^{+0.22}_{-0.24}$	3861^{+299}_{-515}	9318^{+1564}_{-1145}	24^{+25}_{-9}
Alt.	-3 ± 0	$1.41^{+0.30}_{-0.37}$	3861^{+286}_{-470}	6108^{+448}_{-375}	$5.849^{+4.263}_{-1.764}$

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 $A_{obs} \gg 1.0$

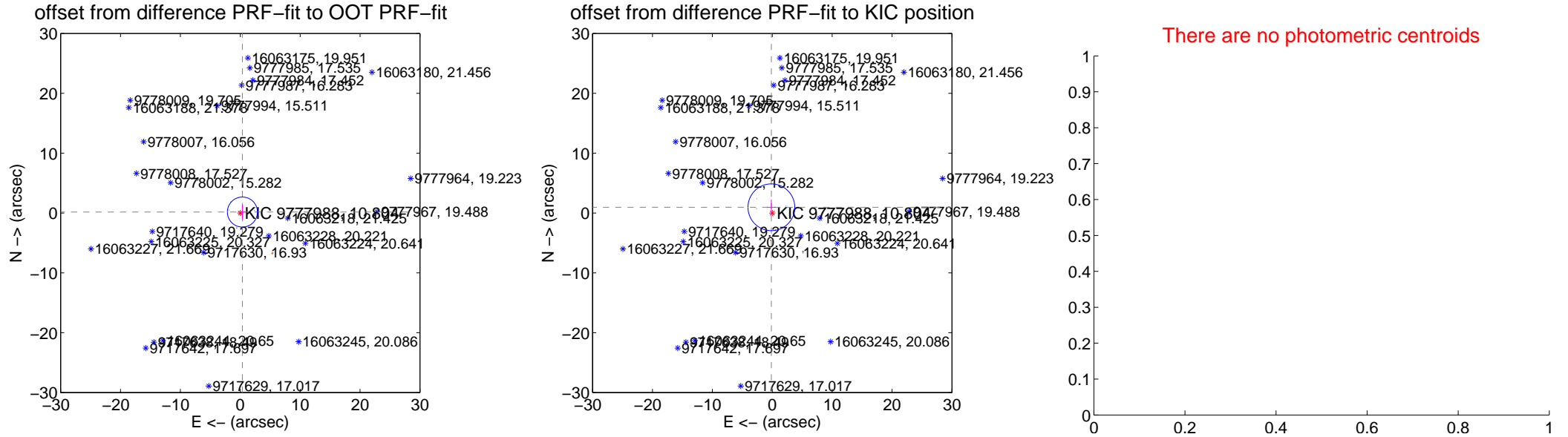
DV Centroid Data

Supplemental centroid analysis for 009777988-02. **Kepler magnitude: 10.80.** Transit SNR 5.64

There are 3 quarters with good PRF difference image offsets

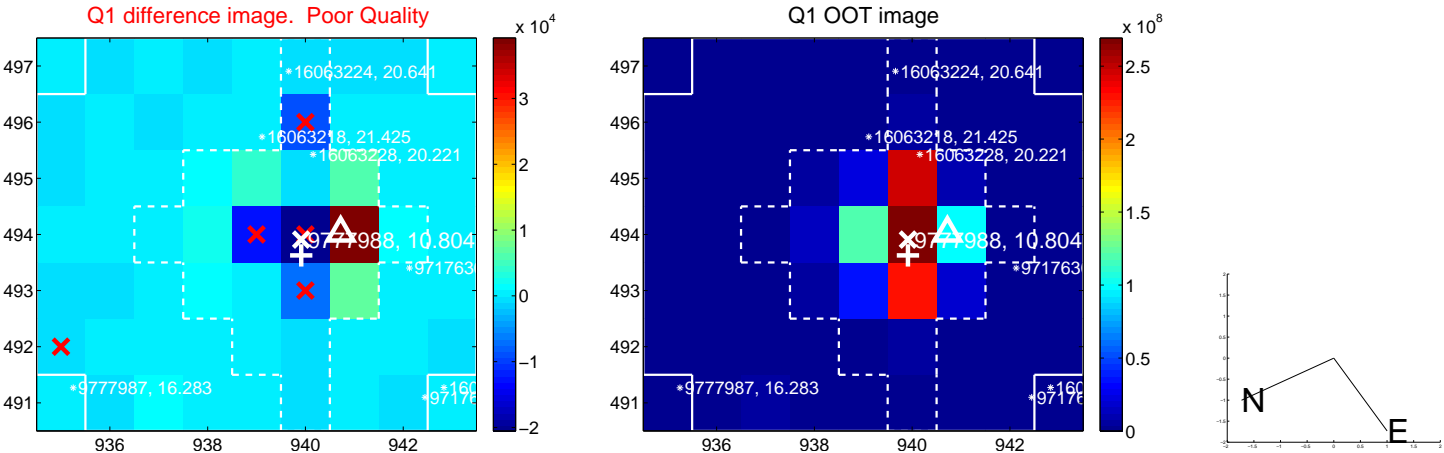
The direct PRF centroid is offset from the target star catalog position by about 0.65 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.390 ± 0.837	0.47	-0.355 ± 0.727	0.162 ± 1.235
PRF-fit source offset from KIC position	0.971 ± 1.302	0.75	0.150 ± 0.740	0.959 ± 1.313
photometric centroid source offset	—	—	—	—

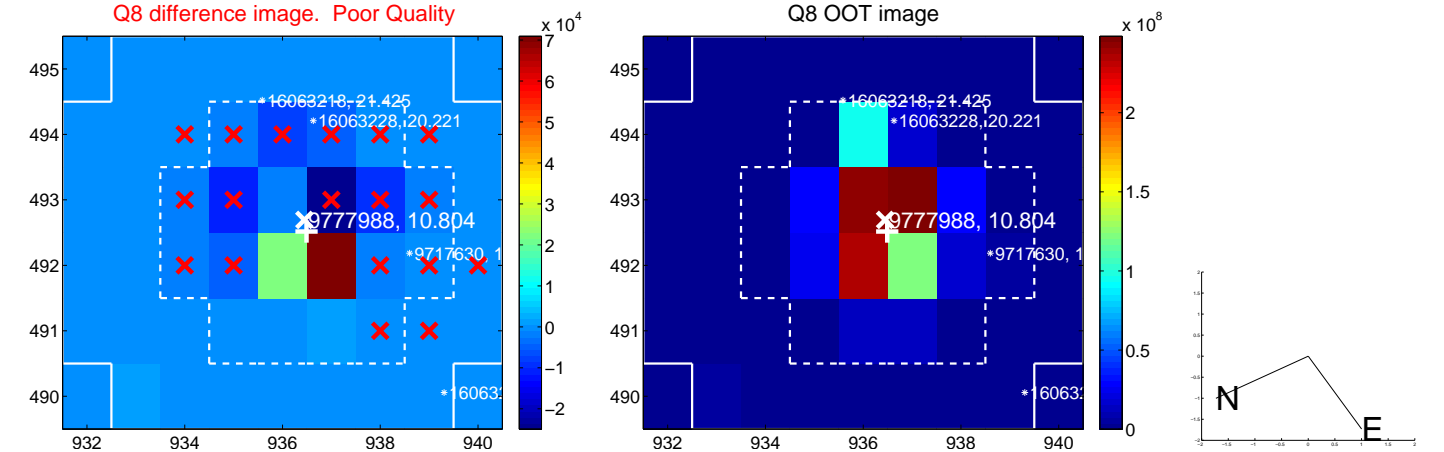
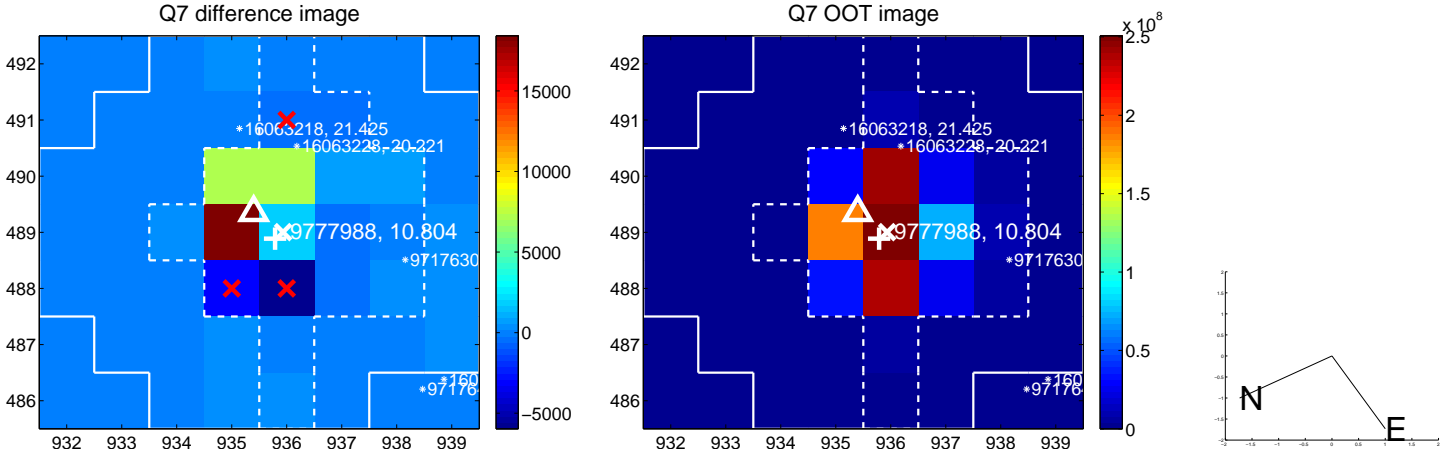
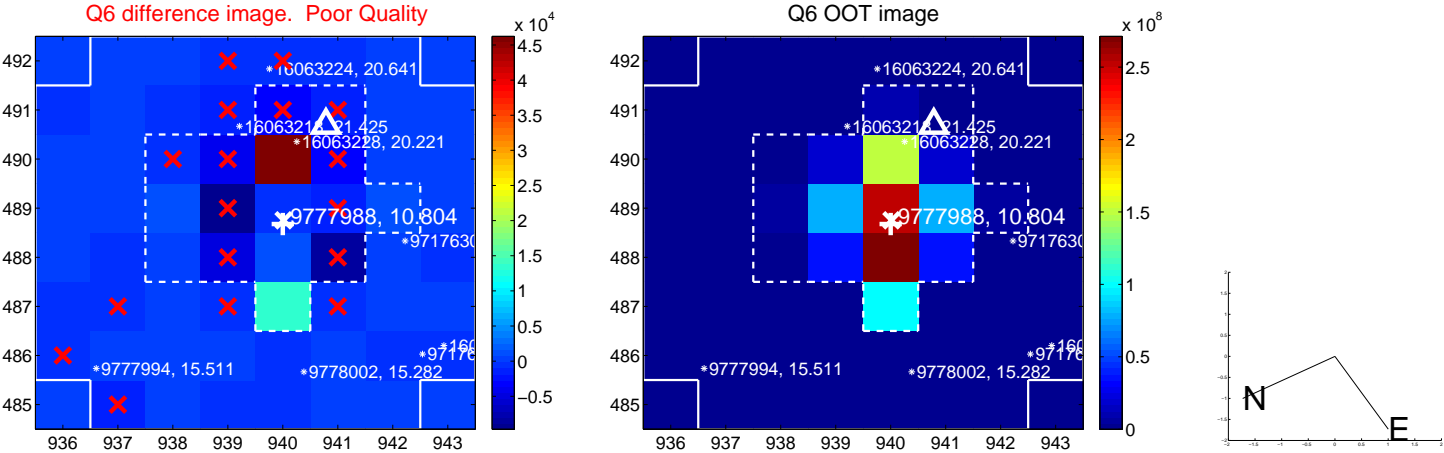
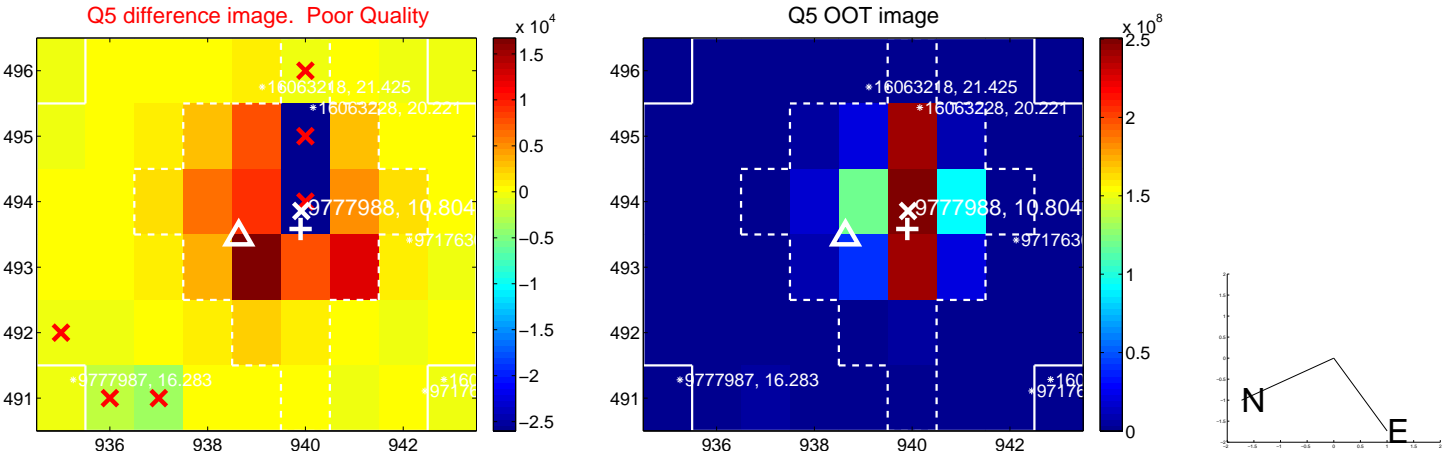


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

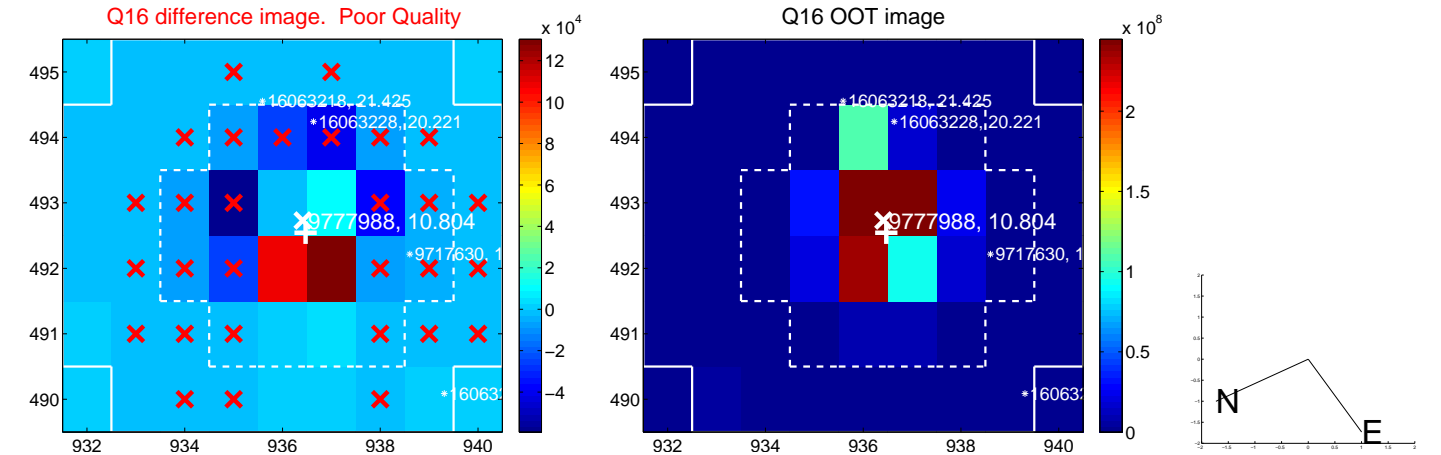
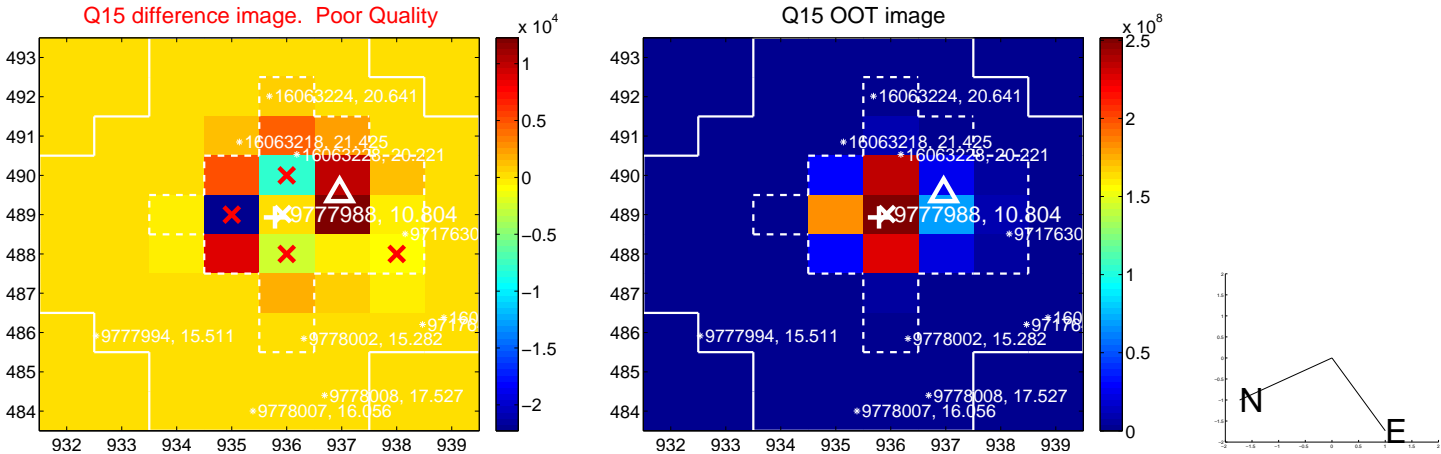
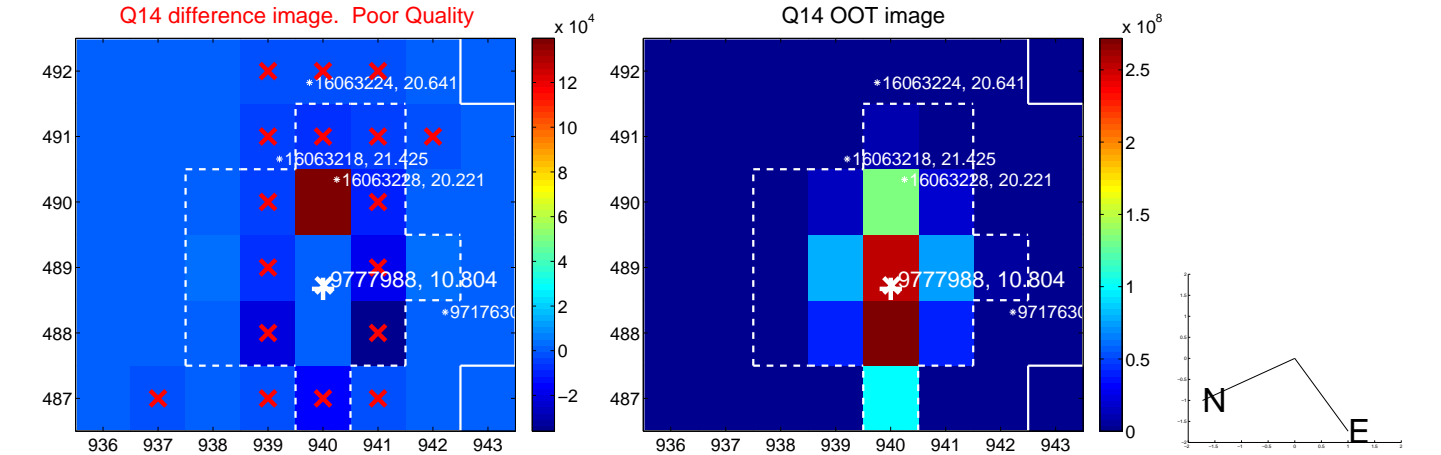
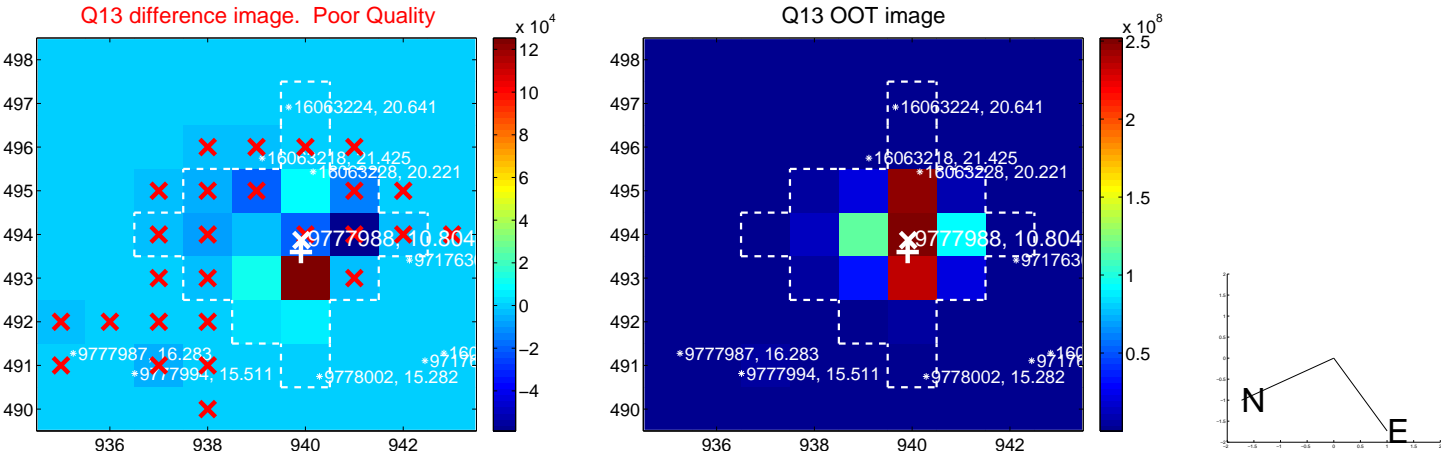
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



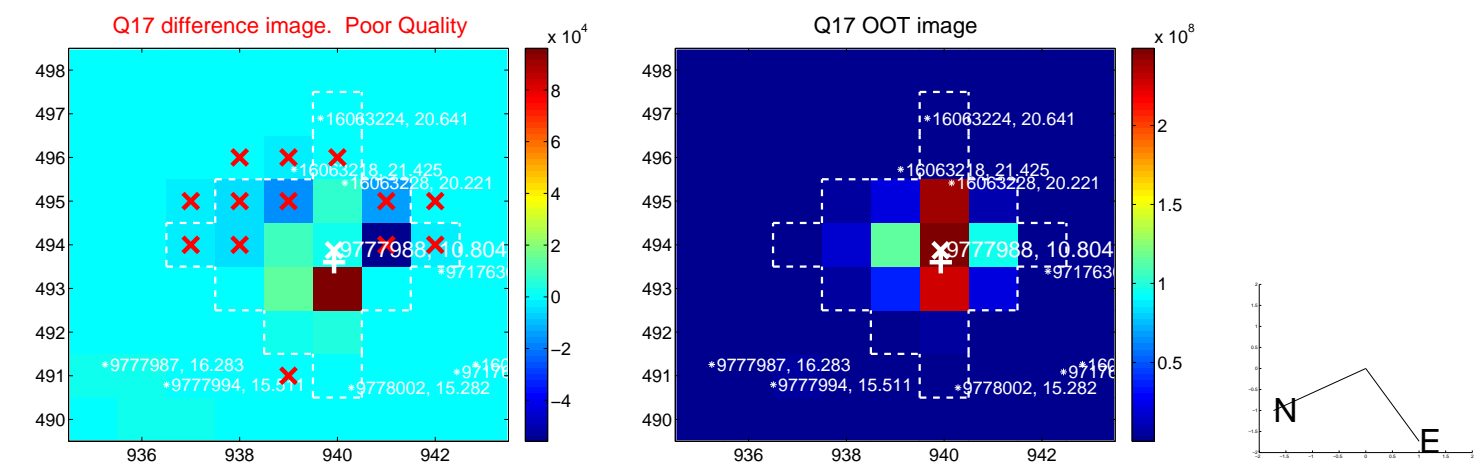
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



folded centroid time series figure for this object.

UKIRT Image

Declination

