Light Curve Analysis of the AP Dor Binary System using Ground-Based and TESS Observations

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ABSTRACT

The short-period AP Dor eclipsing binary's first in-depth and multiband photometric solutions are presented. We made use of our eight nights of ground-based at a southern hemisphere observatory, and twelve sectors of TESS observations. We extracted eight and 1322 minima from our observations and TESS, respectively. We suggested a new linear ephemeris based on the trend of orbital period variations using the Markov chain Monte Carlo (MCMC) approach. The PHysics Of Eclipsing BinariEs (PHOEBE) Python code and the MCMC approach were used for the light curve analysis. This system did not require a starspot for the light curve solutions. We calculated the absolute parameters of the system using *Gaia* DR3 parallax method. The orbital angular momentum (J_0) of the AP Dor indicates that this system is located in a region of contact binaries. According to our results, this system is an overcontact binary system with a mass ratio of 0.584, a fillout factor of 48%, and an inclination of 53°. The positions of AP Dor stars on the Hertzsprung-Russell (HR) diagram are represented.

Key words: binaries: eclipsing – method: photometric - individual (AP Dor)

1 INTRODUCTION

Eclipsing binaries are a significant astrophysical tool for investigating star formation, stellar structure, and the physical properties of stars and their evolution.

Both stars in a binary system known as an overcontact binary have exceeded their Roche lobes. Due to the tidally distorted forms of the stars, the light curve of an overcontact system is continuously changeable and is typically categorised as being of the W UMa type. Mass transfer through Lagrange points is likely to happen in such a system. Other features of them are that the temperatures of the components are roughly equal because they share a similar envelope with the same entropy (Paczyński et al. 2006).

W UMa stars also known as the low-mass eclipsing binaries consisting of ellipsoidal components with orbital periods less than 1^{day}, usually $P < 0.7^{day}$ (Poro et al. 2022b).

The AP Dor (HIP 023793) binary system has an apparent magnitude of 9.37[1] and is located in the southern hemisphere with coordinates R.A.: $05^h\ 06^m\ 45.09188^s$ and Dec: −59° 03′ 03.45465" (J2000).

This system is introduced as an EW[2] type in the VSX[3] database with an orbital period of 0.427187 days, but its orbital period is unknown in the ASAS-SN[4] catalog.

For the first time, this system is classified as a W UMa-type system or possibly a RR Lyrae star in the *HIPPARCOS* catalog. In a subsequent study, Eggen (1980) introduced it as a contact system. Then, by the Selam (2004) study, three main geometric parameters (q, f, and i) have been estimated for 64 *HIPPARCOS* catalog contact systems, including AP Dor.

The structure of the paper is as follows: Section 2 provides details on photometric observations and a data reduction method. Section 3 presents the minima and the new ephemeris of the AP Dor system. The photometric light curve solutions for the system are discussed in Section 4. Section 5 provides a description of the method used to determine absolute parameters. At the end, Section 6 includes the summary and conclusion.

2 OBSERVATION AND DATA REDUCTION

The photometric observations of AP Dor were carried out on October 24-31, 2017, and a total of 2897 images were taken in eight nights. These observations were made using the 0.60m "Helen Sawyer Hogg" (HSH) telescope at the Complejo Astronomico El Leoncito (CASLEO) Observatory, Argentina (69°18′ W, 31°48′ S, 2552m

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[1] http://simbad.cds.unistra.fr/simbad
[2] W Ursae Majoris-type eclipsing variables
[3] https://www.aavso.org/vsx/
[4] https://asas-sn.osu.edu/variables

above sea level). A CCD SBIG STL1001E and $BVRI$ standard filters were employed. The average temperature of CCD during the observation nights was −30°C. Each of the frames was 1 × 1 binned with averaged 50s exposure time for the B filter, 45s for the V filter, 40s for the R filter, and 30s for the I filter.

UCAC4 156-005107 was selected as a comparison star and TYC 8517-653-1 was chosen as a check star. The comparison star was found at R.A. $05^h\ 07^m\ 13.49^s$, Dec. −58° 59′ 58.59" (J2000) with a $V = 12.203(30)$ magnitude, while the check star was located at R.A. $05^h\ 06^m\ 35.85^s$, Dec. −58° 57′ 53.24" (J2000) with a $V = 11.57(12)$ magnitude, according to the Simbad astronomical database.

The APPHOT photometry package of the Image Reduction and Analysis Facility[5] (IRAF) was used for CCD reduction and aperture photometry.

The Transiting Exoplanet Survey Satellite (TESS) mission observed the AP Dor system in sectors 1, 4, 6, 8, 10, 13, 27, 30, 31, 32, 34, and 39. TESS data is available at the Mikulski Space Telescope Archive (MAST)[6]. The LightKurve code[7] was used to extract TESS style curves from the MAST, which had been detrended using the TESS Science Processing Operations Center (SPOC) pipeline (Jenkins et al. 2016).

3 ORBITAL PERIOD VARIATIONS

We used a Python code using a Gaussian function and the MCMC method to extract the new mid-eclipse times and uncertainty. The code is implemented in Python using the PyMC3 package (Salvatier et al. 2016). Therefore, we extracted eight mid-eclipse times, including four primary and four secondary minima, from our observations, with two times recorded for each $BVRI$ filters (Table 1). In addition, we extracted a total of 1322 minima from different sectors of TESS observations (Appendix Table A1). We found two minima from the Juryšek et al. (2017) study, and we added them as literature. Barycentric Julian Date in Barycentric Dynamical Time (BJD_{TDB}) was used to express all minimum times. We used OSU Online Astronomy Utilities[8] to convert the literature minimum times to BJD_{TDB}.

There are two different orbital periods for this system in the catalogs: in the AAVSO catalog, the value is 0.427187^d, and in the ASAS3 catalog, the value is 0.213593^d. Based on a Fourier analysis of our data, we conclude that the AAVSO catalog value is more valid. Therefore, we used the orbital period of 0.427187^d along with the minimum time from our observation as a reference ephemeris.

The O-C variations are the observed mid-eclipse times (O) from their calculated values (C) based on a reference ephemeris. Typically, a trend in these variations is the result of several separate effects working together. Figure 1 shows the O-C diagram of the AP Dor system. According to the visible trend for the O-C diagram, only a linear fit can be considered. We calculate a new ephemeris based on the MCMC method using the Emcee package in Python (Foreman-Mackey et al. 2013). We applied 20 walkers and 20,000 iterations for each walker, with a 1000 burn-in period in the MCMC sampling. Due to the linearity of the fit, the values of orbital period and minimum time were considered priors from the reference ephemeris.

The following light elements were assigned to a new revised linear ephemeris for the minima obtained from this study, TESS, and the literature:

[5] http://iraf.noao.edui
[6] http://archive.stsci.edu/tess/allproducts.html
[7] https://docs.lightkurve.org
[8] https://astroutils.astronomy.osu.edu/time/hjd2bjd.html

Table 1. Times of minima based on the ground-based $BVRI$ observations.

Min.(BJD_{TDB})	Error	Filter	Epoch	O-C
2458050.708890	0.000873	V	-11.5	-0.00086
2458052.636356	0.001302	V	-7	0.00426
2458053.701563	0.000783	I	-4.5	0.00150
2458054.770044	0.001515	I	-2	0.00201
2458055.622405	0.001227	R	0	0.00000
2458055.837207	0.001296	R	0.5	0.00121
2458056.691174	0.001276	B	2.5	0.00080
2458057.759589	0.001168	B	5	0.00125

$$BJD_{TDB}(Min.I) = 2458055.623786(3) + 0.427188944(2) \times E \quad (1)$$

where E is the integer number of orbital cycles after the reference epoch. The upper and lower limits of uncertainties for the elements in MCMC were equal.

4 LIGHT CURVE ANALYSIS

Light curve analysis of the AP Dor binary system was carried out using the PHOEBE 2.4.9 version and the MCMC approach (Prša & Zwitter 2005, Conroy et al. 2020, Poro et al. 2022a). We selected contact mode for the light curve solutions based on how the light curve appeared and the system's short orbital period.

The gravity-darkening coefficients and the bolometric albedo were assumed to be $g_1 = g_2 = 0.32$ (Lucy 1967) and $A_1 = A_2 = 0.5$ (Ruciński 1969), respectively. The limb-darkening coefficients were used as free parameters in PHOEBE, and the Castelli & Kurucz (2004) method was used to model the stellar atmosphere. Regarding the primary star's temperature input, we tried three methods and compared the results. However, based on our observational data, we set the value obtained from $B - V$ as the temperature of the primary star. So, after the required calibrations (Høg et al. 2000) we calculated $(B-V)_{APDor} = 0.428 \pm 0.013$ and the effective temperature of the primary component, T_1 was assumed as 6517 ± 121 (Eker et al. 2020). We calculated T_1 from the relationship between the primary star temperature and the orbital period of the system from the study of Poro et al. (2022b) to be 6396 ± 92. Also, the temperature of the system is determined by $Gaia$ DR2 to be 6530^{+129}_{-159}.

One of the most important input parameters to the PHOEBE code is the mass ratio. We ran a q-search with PHOEBE and then used the code's optimization tool to improve the results. As a result, preliminary analyses were improved using the MCMC method, and the uncertainty estimates were obtained (Table 2). In the MCMC approach based on the Emcee package, we applied 96 walkers and 800 iterations to each walker in the MCMC approach. It should be noted that the light curve solution for this system did not require adding a star spot.

The observed and theoretical light curves are shown in Figure 2. The corner plot that MCMC produced is displayed in Figure 3. The geometrical structure and 3D view of the AP Dor binary system are provided in Figure 4.

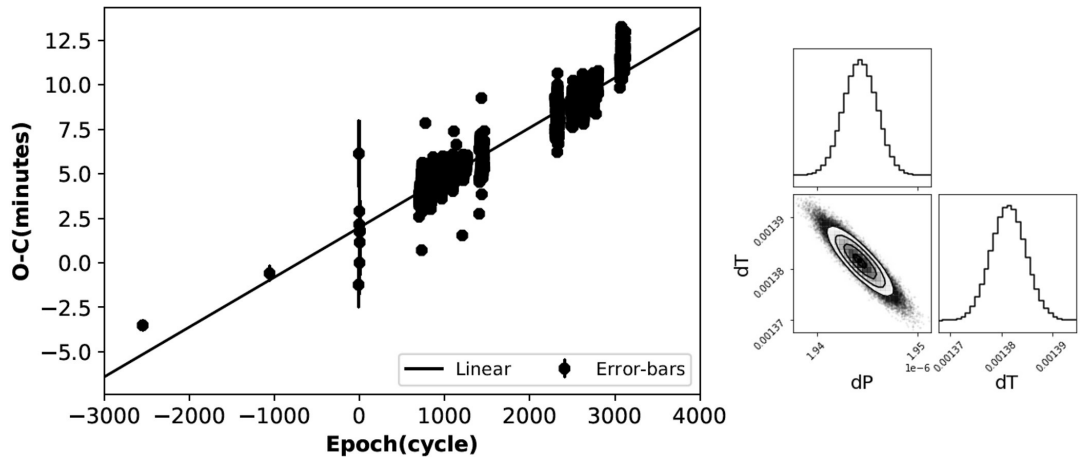

Figure 1. The O-C diagram of the AP Dor binary system is on the left, and the corner plot obtained from MCMC is on the right.

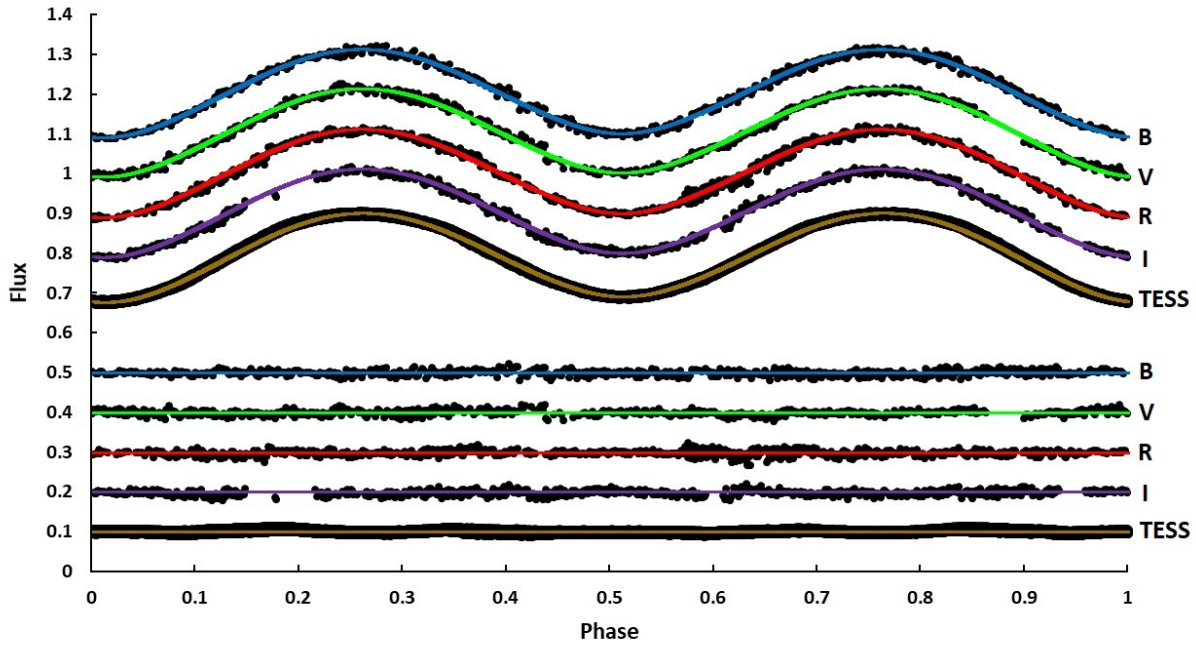

Figure 2. The observed light curves of AP Dor (black dots), and synthetic light curves obtained from light curve solutions in the $BVRI$ filters and TESS (top to bottom respectively); with respect to orbital phase, shifted arbitrarily in the relative flux.

5 ABSOLUTE PARAMETERS

When just photometric data are available, one of the possible ways for estimating absolute parameters is to use the parallax *Gaia* DR3 method. The method of calculating the parameters is described in the study of Poro et al. (2022b), and the parameters d(pc), A_v, V_{max}(mag), $l_{1,2}/l_{tot}$, $BC_{1,2}$, $T_{1,2}$, $r_{mean1,2}$, and P(day) is needed for this estimation. Accordingly, $M_{v(system)}$, $M_{v1,2}$, $M_{bol1,2}$, $L_{1,2}$, $R_{1,2}$, $a_{1,2}$, $M_{1,2}$ calculated, respectively. The separation a is the average value of a1 and a2 calculated for each component; a_1 and a_2 must be close to each other, otherwise, it is not possible to use this method to calculate absolute parameters. We utilized V_{max} = 9.34(4) from our observations, the extinction coefficient A_v = 0.035(1) from the Schlafly & Finkbeiner (2011) study, the system's distance from *Gaia* DR3 $d_{(pc)}$ = 186.402(398) to accomplish the estimation of the absolute parameters. Also, each star's bolometric magnitude was calculated using BC_1 = 0.074 and BC_2 = 0.057 from Eker et al. (2020) study. The results of the *Gaia* DR3 method for estimating the absolute parameters of the AP Dor system are given in Table 3. In addition, $M_{bol1,2}$, $logg_{1,2}$, and $a(R_\odot)$ parameters have been calculated using the following well-known equations respectively:

$$M_{bol} - M_{bol_\odot} = -2.5log(\frac{L}{L_\odot}) \quad (2)$$

$$g = G_\odot(M/R^2) \quad (3)$$

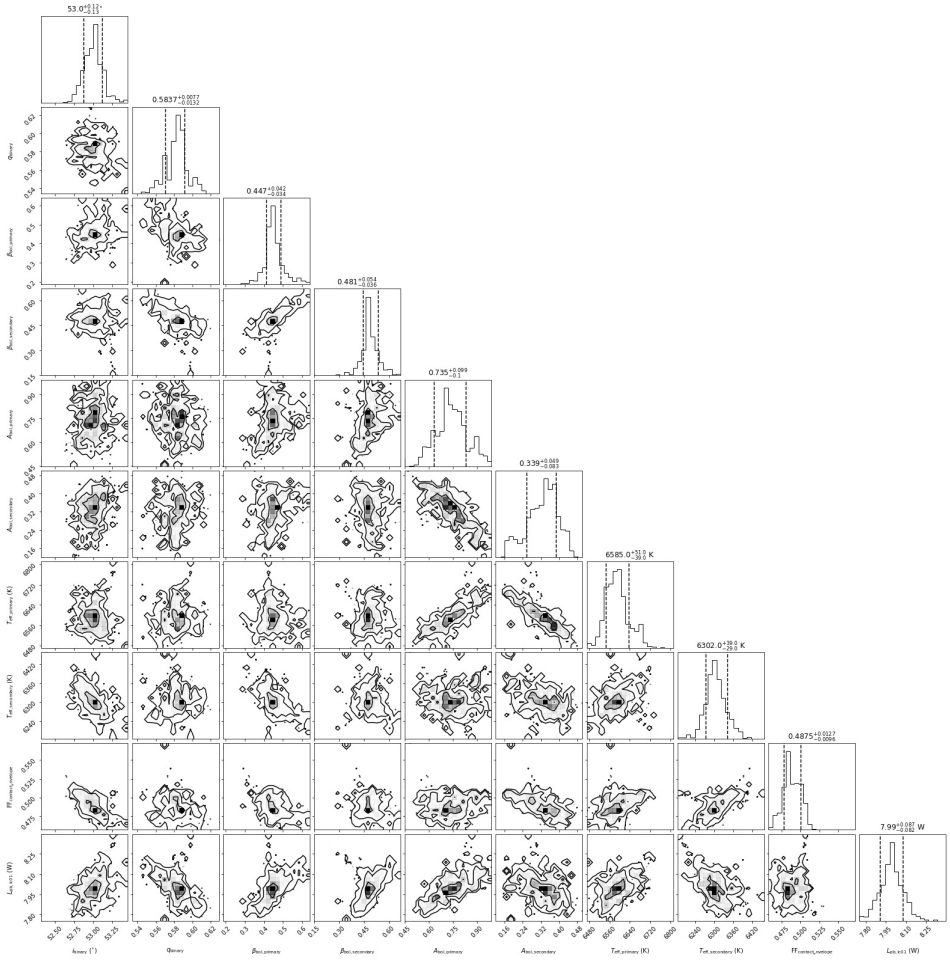

Figure 3. The corner plots of the AP Dor system was determined by MCMC modeling.

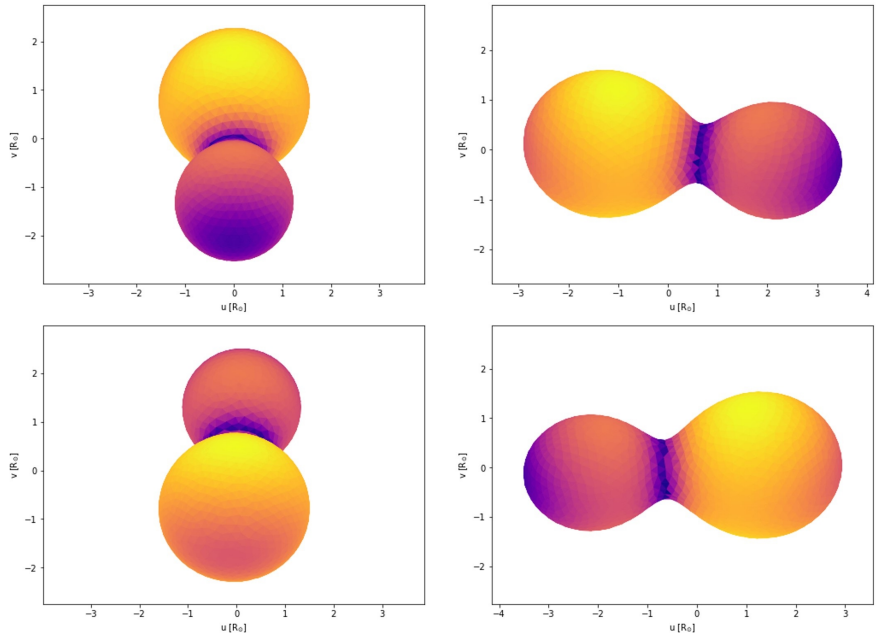

Figure 4. 3D view of the AP Dor system stars.

Table 2. Light curve solutions of AP Dor.

Parameter	Result
T_1 (K)	$6585^{+(51)}_{-(39)}$
T_2 (K)	$6302^{+(39)}_{-(29)}$
$q = M_2/M_1$	$0.584^{+(8)}_{-(13)}$
$\Omega_1 = \Omega_2$	2.866(171)
i°	$53.00^{+(12)}_{-(13)}$
f	$0.4875^{+(127)}_{-(96)}$
l_1/l_{tot}	$0.644^{+(3)}_{-(2)}$
l_2/l_{tot}	$0.356^{+(3)}_{-(2)}$
$r_{1(mean)}$	0.467(50)
$r_{2(mean)}$	0.375(41)
Phase shift	0.006(2)

Table 3. Estimation of the AP Dor's absolute parameters.

Parameter	Primary	Secondary
$M(M_\odot)$	$1.278^{+(123)}_{-(75)}$	$0.746^{+(83)}_{-(60)}$
$R(R_\odot)$	$1.360^{+(31)}_{-(31)}$	$1.113^{+(40)}_{-(10)}$
$L(L_\odot)$	3.119(85)	1.752(43)
$M_{bol}(mag)$	3.505(30)	4.131(27)
$log(g)(cgs)$	$4.277^{+(39)}_{-(24)}$	$4.218^{+(45)}_{-(34)}$
$a(R_\odot)$	$3.019^{+(30)}_{-(37)}$	

$$\frac{P^2}{4\pi^2} = \frac{a^3}{G(M_1 + M_2)} \tag{4}$$

6 CONCLUSION

The AP Dor short-period binary system was observed during a period of eight nights at a southern hemisphere observatory using *BVRI* standard filters. We extracted times of minima from our observations and TESS data and presented a new ephemeris for the system using the MCMC method. The O-C diagram displayed a linear and increasing trend.

Utilizing PHOEBE Python code and the MCMC approach, the light curves of this system were analyzed. There is a 283 K temperature difference between the two components. These temperatures indicate that the primary and secondary components' spectral types are F5 and F7, respectively (Cox 2000).

We used the *Gaia* DR3 parallax method to determine the absolute parameters of the AP Dor system.

HR and Mass-Radius ($M - R$) diagrams show the components' evolutionary state (Figure 5a,b). Both the primary and secondary stars of AP Dor lie between the Zero-Age Main Sequence (ZAMS) and the Terminal-Age Main Sequence (TAMS). The position of AP Dor on the $R_{ratio} - q$ relationship provided by Poro et al. (2022a) is also depicted in Figure 5c. In addition, the $logJ_0 - logM$ diagram shows the position of the system (Figure 5d) and this diagram shows that AP Dor is in a contact binary systems region. According to calculations, the orbital angular momentum of AP Dor has a value of 51.847 ± 0.046. This result is based on the equation presented by Eker et al. (2006) as follows:

$$J_0 = \frac{q}{(1+q)^2}\sqrt[3]{\frac{G^2}{2\pi}M^5 P} \tag{5}$$

where q is the mass ratio, M is the total mass, P is the orbital period, and G is the gravitational constant.

Selam (2004) were analysed this system with the aid of Rucinski's simplified light curve synthesis method (Rucinski 1993). As written in the conclusion section of this study, the method used for analysis is used for large databases of variables observed with moderate accuracy, as in the case of the *HIPPARCOS* mission photometry (Rucinski 1997). So, they no attempt has been made to use more sophisticated light curve solution methods. Therefore, the Selam (2004) study estimated a mass ratio $q = 0.1$, a fillout factor $f = 1$, and an inclination $i = 62.5$. According to Selam (2004)'s study, the value of the fillout factor for the AP Dor system seems unrealistic due to the difference in temperature between the components, which has not reached equilibrium.

There is a significant disparity between the findings of the Selam (2004) study and those of this investigation. The method used in the Selam (2004) study, a large number of investigated systems, and the estimation of only three main parameters show that their results are controversial.

Our results show that the short orbital period and light curve analysis of AP Dor demonstrate that it is an overcontact eclipsing binary with a fillout factor of 48.8% and a mass ratio of 0.584.

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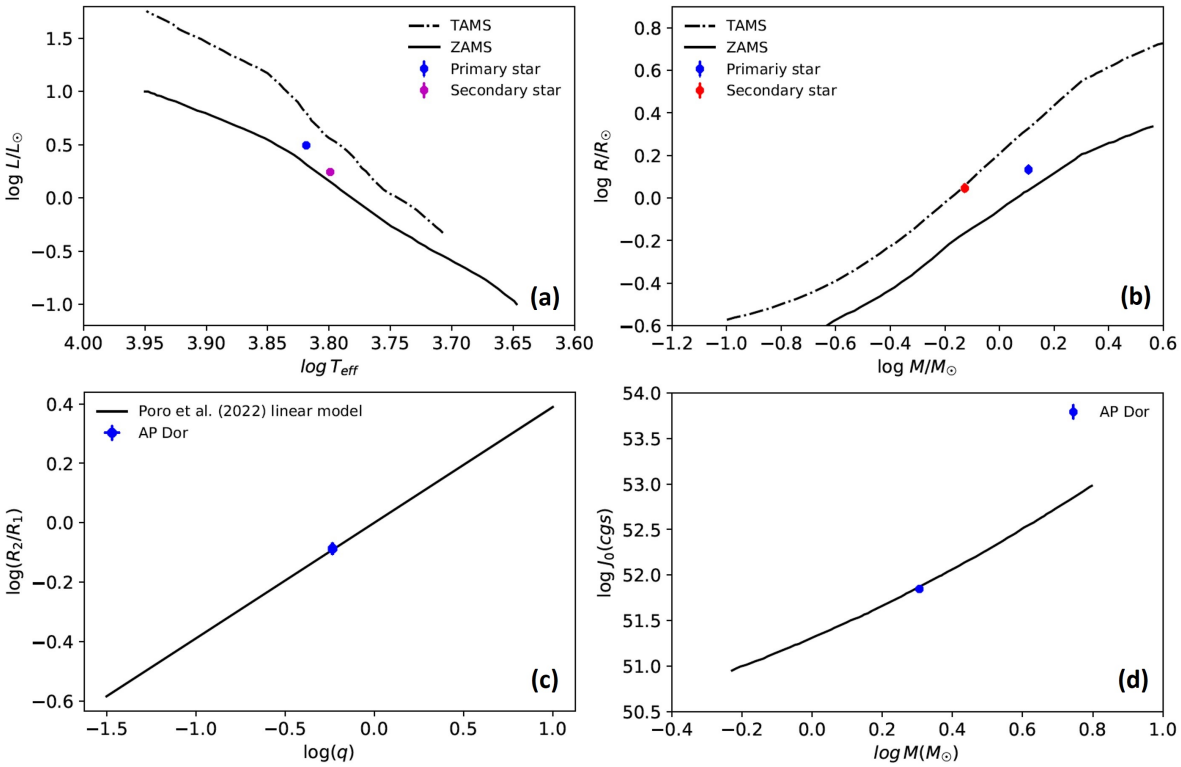

Figure 5. The position of AP Dor on the a) HR, b) $logR - logM$, c) $logR_{ratio} - logq$, d) $logJ_0 - logM$ diagrams, respectively.

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APPENDIX A: AVAILABLE MINIMA TIMES

The available minima extracted from the TESS data and literature are presented in the appendix. The first two mid-times marked with an asterisk (*) are related to the Juryšek et al. (2017) study.

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Table A1. Available mid-eclipse times of AP Dor obtained by CCD.

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2456966.7203(20)*	-2549.0	-0.00244	2458366.61655(5)	728.0	0.00201	2458380.92820(6)	761.5	0.00289
2457603.87174(30)*	-1057.5	-0.00041	2458366.83170(7)	728.5	0.00357	2458381.14208(3)	762.0	0.00318
2458354.22792(6)	699.0	0.00180	2458367.04222(11)	729.0	0.00049	2458381.35636(12)	762.5	0.00387
2458354.44207(4)	699.5	0.00236	2458368.75246(8)	733.0	0.00198	2458386.05700(12)	773.5	0.00545
2458354.65602(5)	700.0	0.00272	2458368.96785(6)	733.5	0.00378	2458386.26741(4)	774.0	0.00227
2458354.86943(5)	700.5	0.00253	2458369.17978(4)	734.0	0.00212	2458386.48194(6)	774.5	0.00320
2458355.08305(4)	701.0	0.00256	2458369.39508(6)	734.5	0.00382	2458386.69472(4)	775.0	0.00239
2458355.29637(6)	701.5	0.00228	2458369.60701(4)	735.0	0.00216	2458386.90922(5)	775.5	0.00330
2458355.51031(5)	702.0	0.00263	2458369.82214(7)	735.5	0.00370	2458387.12179(4)	776.0	0.00227
2458355.72348(5)	702.5	0.00221	2458370.03420(4)	736.0	0.00216	2458387.33637(6)	776.5	0.00326
2458355.93759(5)	703.0	0.00272	2458370.24941(6)	736.5	0.00378	2458387.54916(4)	777.0	0.00246
2458356.15074(5)	703.5	0.00228	2458370.46137(4)	737.0	0.00215	2458387.76363(6)	777.5	0.00333
2458356.36475(4)	704.0	0.00270	2458370.67670(8)	737.5	0.00388	2458387.97640(4)	778.0	0.00251
2458356.57794(6)	704.5	0.00229	2458370.88867(4)	738.0	0.00226	2458388.19083(5)	778.5	0.00335
2458356.79201(4)	705.0	0.00277	2458371.10390(10)	738.5	0.00390	2458388.40362(4)	779.0	0.00254
2458357.00510(5)	705.5	0.00227	2458371.31576(4)	739.0	0.00216	2458388.61810(6)	779.5	0.00343
2458357.21918(4)	706.0	0.00275	2458371.53104(5)	739.5	0.00385	2458388.83084(4)	780.0	0.00257
2458357.43235(5)	706.5	0.00233	2458371.74307(4)	740.0	0.00228	2458389.04537(6)	780.5	0.00351
2458357.64652(5)	707.0	0.00291	2458371.95820(7)	740.5	0.00382	2458389.25793(5)	781.0	0.00248
2458357.85967(6)	707.5	0.00246	2458372.17024(4)	741.0	0.00227	2458389.47265(5)	781.5	0.00360
2458358.07368(4)	708.0	0.00288	2458372.38543(5)	741.5	0.00386	2458389.68507(4)	782.0	0.00243
2458358.28692(5)	708.5	0.00253	2458372.59756(5)	742.0	0.00240	2458389.89979(6)	782.5	0.00356
2458358.50089(4)	709.0	0.00290	2458372.81251(6)	742.5	0.00376	2458390.11235(4)	783.0	0.00252
2458358.71392(5)	709.5	0.00234	2458373.02487(5)	743.0	0.00252	2458390.32693(5)	783.5	0.00351
2458358.92804(4)	710.0	0.00287	2458373.23959(7)	743.5	0.00365	2458390.53975(4)	784.0	0.00274
2458359.14120(6)	710.5	0.00243	2458373.45202(4)	744.0	0.00249	2458390.75398(6)	784.5	0.00337
2458359.35535(4)	711.0	0.00299	2458373.66674(8)	744.5	0.00361	2458390.96698(4)	785.0	0.00278
2458359.56850(6)	711.5	0.00254	2458373.87932(5)	745.0	0.00260	2458391.18122(5)	785.5	0.00343
2458359.78261(4)	712.0	0.00306	2458374.09363(6)	745.5	0.00332	2458391.39415(4)	786.0	0.00276
2458359.99574(6)	712.5	0.00260	2458374.30639(4)	746.0	0.00248	2458391.60837(5)	786.5	0.00339
2458360.20980(5)	713.0	0.00306	2458374.52064(5)	746.5	0.00314	2458391.82124(5)	787.0	0.00267
2458360.42296(6)	713.5	0.00263	2458374.73372(5)	747.0	0.00263	2458392.03556(5)	787.5	0.00339
2458360.63690(4)	714.0	0.00298	2458374.94765(4)	747.5	0.00296	2458392.24838(5)	788.0	0.00262
2458360.85018(6)	714.5	0.00266	2458375.16082(5)	748.0	0.00254	2458392.46256(5)	788.5	0.00321
2458361.06409(5)	715.0	0.00298	2458375.37468(4)	748.5	0.00281	2458392.67579(6)	789.0	0.00284
2458361.27753(6)	715.5	0.00283	2458375.58805(4)	749.0	0.00258	2458392.88967(5)	789.5	0.00313
2458361.49139(4)	716.0	0.00309	2458375.80190(5)	749.5	0.00284	2458393.10279(4)	790.0	0.00265
2458361.70458(5)	716.5	0.00269	2458376.01537(5)	750.0	0.00272	2458393.31675(4)	790.5	0.00302
2458361.91844(3)	717.0	0.00296	2458376.22893(4)	750.5	0.00268	2458393.53003(5)	791.0	0.00271
2458362.13195(5)	717.5	0.00287	2458376.44259(5)	751.0	0.00275	2458393.74383(4)	791.5	0.00291
2458362.34560(4)	718.0	0.00293	2458376.65599(5)	751.5	0.00255	2458393.95721(5)	792.0	0.00270
2458362.55919(5)	718.5	0.00293	2458376.86982(5)	752.0	0.00279	2458394.17095(6)	792.5	0.00285
2458362.77282(3)	719.0	0.00296	2458377.08331(4)	752.5	0.00269	2458394.38454(5)	793.0	0.00284
2458362.98643(5)	719.5	0.00298	2458377.29718(4)	753.0	0.00296	2458394.59830(6)	793.5	0.00301
2458363.19999(3)	720.0	0.00295	2458377.51049(5)	753.5	0.00268	2458394.81147(5)	794.0	0.00259
2458363.41355(6)	720.5	0.00291	2458377.72436(5)	754.0	0.00296	2458395.02554(6)	794.5	0.00306
2458363.62704(5)	721.0	0.00281	2458377.93765(6)	754.5	0.00265	2458395.23871(6)	795.0	0.00264
2458363.84087(6)	721.5	0.00304	2458378.15156(5)	755.0	0.00297	2458396.73411(8)	798.5	0.00289
2458364.05415(4)	722.0	0.00273	2458378.36490(6)	755.5	0.00272	2458396.94760(4)	799.0	0.00278
2458364.26795(5)	722.5	0.00294	2458378.57911(13)	756.0	0.00333	2458397.16114(5)	799.5	0.00273
2458364.48112(4)	723.0	0.00251	2458378.79200(5)	756.5	0.00263	2458397.37480(4)	800.0	0.00279
2458364.69522(6)	723.5	0.00302	2458379.00601(4)	757.0	0.00305	2458397.58848(5)	800.5	0.00288
2458364.90819(4)	724.0	0.00240	2458379.21909(4)	757.5	0.00253	2458397.80211(5)	801.0	0.00292
2458365.12261(6)	724.5	0.00322	2458379.43329(4)	758.0	0.00314	2458398.01565(5)	801.5	0.00286
2458365.33521(4)	725.0	0.00223	2458379.64648(5)	758.5	0.00274	2458398.22934(5)	802.0	0.00296
2458365.54983(5)	725.5	0.00326	2458379.86044(5)	759.0	0.00310	2458398.44280(5)	802.5	0.00283
2458365.76232(3)	726.0	0.00215	2458380.07374(6)	759.5	0.00281	2458398.65661(6)	803.0	0.00304
2458365.97713(6)	726.5	0.00337	2458380.28770(5)	760.0	0.00318	2458398.86977(5)	803.5	0.00261
2458366.18952(5)	727.0	0.00217	2458380.50096(7)	760.5	0.00284	2458399.08373(5)	804.0	0.00298
2458366.40441(7)	727.5	0.00346	2458380.71495(5)	761.0	0.00324	2458399.29700(5)	804.5	0.00265

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2458399.51099(5)	805.0	0.00305	2458417.02517(8)	846.0	0.00256	2458435.39453(6)	889.0	0.00288
2458399.72426(4)	805.5	0.00273	2458417.24010(8)	846.5	0.00390	2458435.60875(6)	889.5	0.00351
2458399.93824(5)	806.0	0.00311	2458417.45234(7)	847.0	0.00255	2458435.82181(5)	890.0	0.00298
2458400.15154(5)	806.5	0.00282	2458417.66712(6)	847.5	0.00373	2458468.50114(10)	966.5	0.00250
2458400.36551(4)	807.0	0.00320	2458417.87966(6)	848.0	0.00268	2458468.71501(6)	967.0	0.00278
2458400.57857(5)	807.5	0.00266	2458418.09429(7)	848.5	0.00372	2458468.92938(5)	967.5	0.00355
2458400.79269(5)	808.0	0.00319	2458418.30720(6)	849.0	0.00303	2458469.14213(4)	968.0	0.00271
2458401.00586(5)	808.5	0.00277	2458421.51138(7)	856.5	0.00331	2458469.35658(6)	968.5	0.00357
2458401.21982(5)	809.0	0.00313	2458421.72477(6)	857.0	0.00311	2458469.56938(6)	969.0	0.00277
2458401.43314(4)	809.5	0.00286	2458421.93830(6)	857.5	0.00304	2458469.78383(5)	969.5	0.00363
2458401.64704(4)	810.0	0.00317	2458424.71609(11)	864.0	0.00412	2458469.99653(5)	970.0	0.00274
2458401.86048(5)	810.5	0.00301	2458424.92848(9)	864.5	0.00291	2458470.21108(5)	970.5	0.00369
2458402.07422(4)	811.0	0.00316	2458425.14253(5)	865.0	0.00337	2458470.42376(5)	971.0	0.00278
2458402.28763(5)	811.5	0.00297	2458425.35598(7)	865.5	0.00323	2458470.63833(5)	971.5	0.00375
2458402.50141(4)	812.0	0.00316	2458425.56976(5)	866.0	0.00341	2458470.85097(5)	972.0	0.00280
2458402.71481(6)	812.5	0.00297	2458425.78325(7)	866.5	0.00331	2458471.06574(6)	972.5	0.00398
2458402.92864(4)	813.0	0.00320	2458425.99696(5)	867.0	0.00343	2458471.27822(5)	973.0	0.00286
2458403.14180(4)	813.5	0.00277	2458426.21054(6)	867.5	0.00341	2458471.49306(5)	973.5	0.00411
2458403.35570(4)	814.0	0.00308	2458426.42424(5)	868.0	0.00352	2458471.70546(6)	974.0	0.00292
2458403.56926(5)	814.5	0.00304	2458426.63776(7)	868.5	0.00345	2458471.92026(5)	974.5	0.00412
2458403.78286(4)	815.0	0.00305	2458426.85134(5)	869.0	0.00343	2458472.13264(5)	975.0	0.00291
2458403.99644(4)	815.5	0.00304	2458427.06512(7)	869.5	0.00362	2458472.34742(6)	975.5	0.00410
2458404.21002(5)	816.0	0.00302	2458427.27877(4)	870.0	0.00368	2458472.55990(5)	976.0	0.00298
2458404.42355(6)	816.5	0.00296	2458427.49232(7)	870.5	0.00363	2458472.77466(6)	976.5	0.00415
2458404.63716(5)	817.0	0.00298	2458427.70592(5)	871.0	0.00364	2458472.98711(5)	977.0	0.00301
2458404.85085(6)	817.5	0.00307	2458427.91958(7)	871.5	0.00370	2458473.20178(6)	977.5	0.00408
2458405.06446(4)	818.0	0.00309	2458428.13301(5)	872.0	0.00354	2458473.41421(5)	978.0	0.00292
2458405.27810(6)	818.5	0.00314	2458428.34694(7)	872.5	0.00388	2458473.62897(6)	978.5	0.00409
2458405.49157(4)	819.0	0.00301	2458428.56027(5)	873.0	0.00361	2458473.84138(5)	979.0	0.00290
2458405.70519(6)	819.5	0.00304	2458428.77406(7)	873.5	0.00381	2458474.05611(6)	979.5	0.00404
2458405.91891(4)	820.0	0.00316	2458428.98728(5)	874.0	0.00344	2458474.26860(6)	980.0	0.00294
2458406.13275(7)	820.5	0.00341	2458429.20104(7)	874.5	0.00360	2458474.48329(6)	980.5	0.00403
2458411.04580(11)	832.0	0.00381	2458429.41441(5)	875.0	0.00338	2458474.69582(6)	981.0	0.00297
2458411.25891(8)	832.5	0.00333	2458429.62835(8)	875.5	0.00373	2458474.91055(6)	981.5	0.00410
2458411.47157(6)	833.0	0.00239	2458429.84147(5)	876.0	0.00325	2458475.12305(5)	982.0	0.00301
2458411.68618(7)	833.5	0.00341	2458430.05535(7)	876.5	0.00354	2458475.33772(5)	982.5	0.00409
2458411.89871(6)	834.0	0.00235	2458430.26861(5)	877.0	0.00321	2458475.55025(5)	983.0	0.00302
2458412.11340(7)	834.5	0.00344	2458430.48242(7)	877.5	0.00342	2458475.76483(6)	983.5	0.00401
2458412.32597(8)	835.0	0.00242	2458430.69564(5)	878.0	0.00305	2458475.97739(5)	984.0	0.00298
2458412.54060(7)	835.5	0.00346	2458430.90965(6)	878.5	0.00347	2458476.19197(6)	984.5	0.00396
2458412.75313(6)	836.0	0.00239	2458431.12271(5)	879.0	0.00293	2458476.40451(4)	985.0	0.00291
2458412.96787(6)	836.5	0.00354	2458431.33686(6)	879.5	0.00349	2458476.61926(6)	985.5	0.00407
2458413.18001(4)	837.0	0.00209	2458431.54979(5)	880.0	0.00283	2458476.83287(16)	986.0	0.00408
2458413.39496(7)	837.5	0.00344	2458431.76396(7)	880.5	0.00340	2458478.32730(8)	989.5	0.00336
2458413.60761(5)	838.0	0.00250	2458431.97685(6)	881.0	0.00270	2458478.54060(5)	990.0	0.00306
2458413.82236(7)	838.5	0.00366	2458432.19122(8)	881.5	0.00347	2458478.75468(6)	990.5	0.00355
2458414.03489(6)	839.0	0.00259	2458432.40399(5)	882.0	0.00265	2458478.96783(4)	991.0	0.00311
2458414.24951(7)	839.5	0.00362	2458432.61854(8)	882.5	0.00361	2458479.18174(6)	991.5	0.00342
2458414.46206(6)	840.0	0.00257	2458432.83108(6)	883.0	0.00255	2458479.39504(5)	992.0	0.00313
2458414.67682(7)	840.5	0.00374	2458433.04559(7)	883.5	0.00347	2458479.60893(6)	992.5	0.00343
2458414.88913(5)	841.0	0.00246	2458433.25832(5)	884.0	0.00261	2458479.82222(4)	993.0	0.00312
2458415.10398(9)	841.5	0.00371	2458433.47281(7)	884.5	0.00350	2458480.03605(5)	993.5	0.00336
2458415.31632(6)	842.0	0.00246	2458433.68554(5)	885.0	0.00264	2458480.24943(4)	994.0	0.00315
2458415.53122(6)	842.5	0.00377	2458433.90004(6)	885.5	0.00355	2458480.46309(6)	994.5	0.00321
2458415.74342(6)	843.0	0.00237	2458434.11293(6)	886.0	0.00284	2458480.67674(4)	995.0	0.00327
2458415.95839(7)	843.5	0.00375	2458434.32714(7)	886.5	0.00346	2458480.89033(7)	995.5	0.00327
2458416.17056(5)	844.0	0.00233	2458434.54008(5)	887.0	0.00281	2458481.10400(5)	996.0	0.00334
2458416.38576(6)	844.5	0.00393	2458434.75439(6)	887.5	0.00352	2458481.31748(6)	996.5	0.00323
2458416.59794(5)	845.0	0.00252	2458434.96740(5)	888.0	0.00294	2458481.53129(4)	997.0	0.00345
2458416.81279(7)	845.5	0.00378	2458435.18146(7)	888.5	0.00341	2458481.74465(6)	997.5	0.00321

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2458481.95863(5)	998.0	0.00360	2458522.11349(5)	1092.0	0.00288	2458541.12369(7)	1136.5	0.00326
2458482.17195(6)	998.5	0.00333	2458522.32820(7)	1092.5	0.00400	2458541.33771(7)	1137.0	0.00369
2458482.38587(5)	999.0	0.00365	2458522.54076(5)	1093.0	0.00296	2458541.55082(6)	1137.5	0.00320
2458482.59910(5)	999.5	0.00329	2458522.75549(6)	1093.5	0.00410	2458541.76582(12)	1138.0	0.00461
2458482.81318(4)	1000.0	0.00378	2458522.96789(5)	1094.0	0.00291	2458571.23818(15)	1207.0	0.00107
2458483.02636(6)	1000.5	0.00336	2458523.18264(6)	1094.5	0.00406	2458571.45469(7)	1207.5	0.00398
2458483.24048(4)	1001.0	0.00389	2458523.39503(6)	1095.0	0.00286	2458571.66826(6)	1208.0	0.00396
2458483.45358(6)	1001.5	0.00339	2458523.60999(6)	1095.5	0.00423	2458571.88188(6)	1208.5	0.00399
2458483.66775(5)	1002.0	0.00397	2458523.82216(6)	1096.0	0.00280	2458572.09538(5)	1209.0	0.00389
2458483.88066(6)	1002.5	0.00329	2458524.03701(6)	1096.5	0.00406	2458572.30903(7)	1209.5	0.00395
2458484.09493(4)	1003.0	0.00396	2458524.24943(6)	1097.0	0.00289	2458572.52252(6)	1210.0	0.00385
2458484.30795(6)	1003.5	0.00339	2458524.46413(6)	1097.5	0.00399	2458572.73623(7)	1210.5	0.00396
2458484.52220(5)	1004.0	0.00405	2458524.67673(5)	1098.0	0.00300	2458572.94950(5)	1211.0	0.00364
2458484.73506(6)	1004.5	0.00331	2458524.89141(6)	1098.5	0.00409	2458573.16339(7)	1211.5	0.00393
2458484.94947(4)	1005.0	0.00413	2458525.10400(6)	1099.0	0.00308	2458573.37671(6)	1212.0	0.00366
2458485.16220(5)	1005.5	0.00327	2458525.31860(7)	1099.5	0.00409	2458573.59056(8)	1212.5	0.00392
2458485.37664(5)	1006.0	0.00411	2458525.53126(5)	1100.0	0.00316	2458573.80384(5)	1213.0	0.00360
2458485.58932(5)	1006.5	0.00320	2458525.74565(7)	1100.5	0.00395	2458574.01778(7)	1213.5	0.00395
2458485.80380(5)	1007.0	0.00409	2458525.95846(6)	1101.0	0.00317	2458574.23091(6)	1214.0	0.00349
2458486.01656(6)	1007.5	0.00325	2458526.17290(7)	1101.5	0.00401	2458574.44515(6)	1214.5	0.00413
2458486.23092(5)	1008.0	0.00402	2458526.38581(5)	1102.0	0.00333	2458574.65813(5)	1215.0	0.00352
2458486.44377(5)	1008.5	0.00328	2458526.59995(7)	1102.5	0.00388	2458574.87227(7)	1215.5	0.00407
2458486.65812(5)	1009.0	0.00403	2458526.81305(5)	1103.0	0.00338	2458575.08523(5)	1216.0	0.00343
2458486.87091(6)	1009.5	0.00323	2458527.02699(7)	1103.5	0.00373	2458575.29961(6)	1216.5	0.00422
2458487.08523(5)	1010.0	0.00395	2458527.24034(5)	1104.0	0.00349	2458575.51243(5)	1217.0	0.00345
2458487.29805(5)	1010.5	0.00318	2458527.45412(6)	1104.5	0.00367	2458575.72678(8)	1217.5	0.00420
2458487.51232(5)	1011.0	0.00386	2458527.66750(6)	1105.0	0.00346	2458575.93950(5)	1218.0	0.00333
2458487.72511(5)	1011.5	0.00305	2458527.88123(7)	1105.5	0.00360	2458576.15397(7)	1218.5	0.00421
2458487.93930(5)	1012.0	0.00365	2458528.09472(5)	1106.0	0.00349	2458576.36660(7)	1219.0	0.00324
2458488.15233(6)	1012.5	0.00309	2458528.30836(7)	1106.5	0.00354	2458576.58107(6)	1219.5	0.00412
2458488.36645(5)	1013.0	0.00361	2458528.52188(6)	1107.0	0.00347	2458576.79377(5)	1220.0	0.00322
2458488.57945(5)	1013.5	0.00302	2458528.73539(8)	1107.5	0.00338	2458577.00824(6)	1220.5	0.00410
2458488.79353(5)	1014.0	0.00351	2458528.95073(9)	1108.0	0.00513	2458577.22102(5)	1221.0	0.00329
2458489.00664(5)	1014.5	0.00302	2458535.35719(6)	1123.0	0.00378	2458577.43546(7)	1221.5	0.00413
2458489.22062(5)	1015.0	0.00341	2458535.57020(7)	1123.5	0.00320	2458577.64823(6)	1222.0	0.00331
2458489.43383(5)	1015.5	0.00303	2458535.78454(6)	1124.0	0.00395	2458577.86255(6)	1222.5	0.00404
2458489.64773(6)	1016.0	0.00333	2458535.99759(7)	1124.5	0.00340	2458578.07545(6)	1223.0	0.00334
2458489.86148(5)	1016.5	0.00349	2458536.21162(6)	1125.0	0.00384	2458578.28966(7)	1223.5	0.00396
2458517.41515(8)	1081.0	0.00360	2458536.42479(6)	1125.5	0.00342	2458578.50266(6)	1224.0	0.00337
2458517.62907(6)	1081.5	0.00392	2458536.63874(5)	1126.0	0.00377	2458578.7169(7)	1224.5	0.00401
2458517.84180(4)	1082.0	0.00306	2458536.85193(6)	1126.5	0.00337	2458578.92995(5)	1225.0	0.00347
2458518.05624(6)	1082.5	0.00391	2458537.06604(6)	1127.0	0.00389	2458579.14413(7)	1225.5	0.00406
2458518.26886(7)	1083.0	0.00293	2458537.27908(6)	1127.5	0.00333	2458579.35723(6)	1226.0	0.00356
2458518.48336(6)	1083.5	0.00384	2458537.49325(5)	1128.0	0.00391	2458579.57129(6)	1226.5	0.00403
2458518.69605(6)	1084.0	0.00294	2458537.70618(6)	1128.5	0.00325	2458579.78453(6)	1227.0	0.00368
2458518.91080(7)	1084.5	0.00409	2458537.92054(6)	1129.0	0.00401	2458579.99840(6)	1227.5	0.00395
2458519.12325(5)	1085.0	0.00295	2458538.13335(7)	1129.5	0.00323	2458580.21183(6)	1228.0	0.00379
2458519.33794(7)	1085.5	0.00405	2458538.34776(6)	1130.0	0.00404	2458580.42578(7)	1228.5	0.00415
2458519.55044(5)	1086.0	0.00295	2458538.56051(7)	1130.5	0.00320	2458580.63889(5)	1229.0	0.00366
2458519.76503(6)	1086.5	0.00395	2458538.77497(5)	1131.0	0.00407	2458580.85293(7)	1229.5	0.00411
2458519.97766(5)	1087.0	0.00299	2458538.98778(6)	1131.5	0.00328	2458581.06612(5)	1230.0	0.00371
2458520.19241(6)	1087.5	0.00414	2458539.20203(6)	1132.0	0.00394	2458581.28011(6)	1230.5	0.00410
2458520.40494(5)	1088.0	0.00308	2458539.41490(7)	1132.5	0.00322	2458581.49343(6)	1231.0	0.00383
2458520.61950(7)	1088.5	0.00405	2458539.62916(5)	1133.0	0.00388	2458585.12455(7)	1239.5	0.00386
2458520.83207(6)	1089.0	0.00302	2458539.84218(6)	1133.5	0.00331	2458585.33796(5)	1240.0	0.00368
2458521.04659(6)	1089.5	0.00395	2458540.05633(6)	1134.0	0.00387	2458585.55166(7)	1240.5	0.00378
2458521.25926(6)	1090.0	0.00303	2458540.26925(7)	1134.5	0.00319	2458585.76502(6)	1241.0	0.00355
2458521.47385(7)	1090.5	0.00402	2458540.48353(6)	1135.0	0.00388	2458585.97869(7)	1241.5	0.00362
2458521.68634(6)	1091.0	0.00292	2458540.69644(6)	1135.5	0.00320	2458586.19222(5)	1242.0	0.00356
2458521.90091(5)	1091.5	0.00389	2458540.91061(5)	1136.0	0.00377	2458586.40594(8)	1242.5	0.00369

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2458586.61954(6)	1243.0	0.00369	2458660.09531(4)	1415.0	0.00330	2458673.97905(4)	1447.5	0.00346
2458586.83314(7)	1243.5	0.00370	2458660.31026(4)	1415.5	0.00466	2458674.19367(4)	1448.0	0.00449
2458587.04670(6)	1244.0	0.00367	2458660.52243(4)	1416.0	0.00323	2458674.40625(5)	1448.5	0.00348
2458587.26025(8)	1244.5	0.00362	2458660.73756(5)	1416.5	0.00477	2458674.62080(4)	1449.0	0.00443
2458587.47406(6)	1245.0	0.00384	2458660.94972(4)	1417.0	0.00334	2458674.83346(5)	1449.5	0.00350
2458587.68748(6)	1245.5	0.00367	2458661.16481(5)	1417.5	0.00483	2458675.04803(4)	1450.0	0.00448
2458587.90116(5)	1246.0	0.00375	2458661.37690(5)	1418.0	0.00333	2458675.26075(5)	1450.5	0.00360
2458588.11461(7)	1246.5	0.00361	2458661.59205(4)	1418.5	0.00489	2458675.47523(5)	1451.0	0.00449
2458588.32839(6)	1247.0	0.00380	2458661.80422(4)	1419.0	0.00346	2458675.68810(4)	1451.5	0.00376
2458588.54174(7)	1247.5	0.00355	2458662.01933(3)	1419.5	0.00498	2458675.90234(4)	1452.0	0.00441
2458588.75563(5)	1248.0	0.00385	2458662.23135(4)	1420.0	0.00340	2458676.11530(4)	1452.5	0.00378
2458588.96889(6)	1248.5	0.00352	2458662.44639(4)	1420.5	0.00485	2458676.32953(4)	1453.0	0.00441
2458589.18291(6)	1249.0	0.00394	2458662.65867(4)	1421.0	0.00354	2458676.54270(5)	1453.5	0.00399
2458589.39619(7)	1249.5	0.00363	2458662.87369(4)	1421.5	0.00496	2458676.75661(4)	1454.0	0.00431
2458589.60999(5)	1250.0	0.00383	2458663.08594(5)	1422.0	0.00362	2458676.96992(4)	1454.5	0.00402
2458589.82338(7)	1250.5	0.00363	2458663.30093(4)	1422.5	0.00502	2458677.18388(4)	1455.0	0.00439
2458590.03719(6)	1251.0	0.00385	2458663.51308(4)	1423.0	0.00357	2458677.39723(4)	1455.5	0.00415
2458590.25062(6)	1251.5	0.00368	2458663.72806(3)	1423.5	0.00496	2458677.61107(3)	1456.0	0.00439
2458590.46445(5)	1252.0	0.00392	2458663.94036(4)	1424.0	0.00367	2458677.82454(4)	1456.5	0.00427
2458590.67779(6)	1252.5	0.00367	2458664.15524(6)	1424.5	0.00495	2458678.03823(4)	1457.0	0.00437
2458590.89167(6)	1253.0	0.00395	2458664.36759(4)	1425.0	0.00371	2458678.25187(4)	1457.5	0.00441
2458591.10494(7)	1253.5	0.00363	2458664.58228(5)	1425.5	0.00481	2458678.46525(4)	1458.0	0.00420
2458591.31885(6)	1254.0	0.00395	2458664.79484(5)	1426.0	0.00377	2458678.67905(4)	1458.5	0.00441
2458591.53222(6)	1254.5	0.00372	2458665.00960(6)	1426.5	0.00494	2458678.89253(5)	1459.0	0.00429
2458591.74604(6)	1255.0	0.00395	2458665.22205(3)	1427.0	0.00380	2458679.10642(4)	1459.5	0.00459
2458591.95942(6)	1255.5	0.00374	2458665.43656(3)	1427.5	0.00471	2458679.31974(4)	1460.0	0.00432
2458592.17331(5)	1256.0	0.00403	2458665.64935(4)	1428.0	0.00391	2458679.53368(4)	1460.5	0.00466
2458592.38665(8)	1256.5	0.00378	2458665.86387(4)	1428.5	0.00484	2458679.74681(4)	1461.0	0.00420
2458592.60043(6)	1257.0	0.00397	2458666.07657(4)	1429.0	0.00394	2458679.96091(4)	1461.5	0.00470
2458592.81400(7)	1257.5	0.00394	2458666.29085(4)	1429.5	0.00463	2458680.17389(5)	1462.0	0.00409
2458593.02765(6)	1258.0	0.00400	2458666.50384(4)	1430.0	0.00402	2458680.38810(4)	1462.5	0.00471
2458593.24128(7)	1258.5	0.00404	2458666.71783(5)	1430.5	0.00442	2458680.60100(5)	1463.0	0.00401
2458593.45482(6)	1259.0	0.00398	2458666.93107(4)	1431.0	0.00407	2458680.81534(4)	1463.5	0.00476
2458593.66855(6)	1259.5	0.00412	2458667.14480(4)	1431.5	0.00420	2458681.02801(4)	1464.0	0.00384
2458593.88194(6)	1260.0	0.00392	2458667.35835(5)	1432.0	0.00416	2458681.24247(4)	1464.5	0.00470
2458594.09571(7)	1260.5	0.00409	2458667.57421(11)	1432.5	0.00643	2458681.45516(4)	1465.0	0.00380
2458594.30914(6)	1261.0	0.00393	2458668.85201(12)	1435.5	0.00267	2458681.66968(3)	1465.5	0.00473
2458594.52285(7)	1261.5	0.00404	2458669.06727(4)	1436.0	0.00433	2458681.88222(4)	1466.0	0.00367
2458594.73636(5)	1262.0	0.00396	2458669.28032(5)	1436.5	0.00379	2458682.09728(5)	1466.5	0.00514
2458594.95019(6)	1262.5	0.00420	2458669.49464(4)	1437.0	0.00452	2459036.45024(4)	2296.0	0.00648
2458595.16357(5)	1263.0	0.00398	2458669.70739(5)	1437.5	0.00367	2459036.66265(5)	2296.5	0.00530
2458595.37734(7)	1263.5	0.00416	2458669.92179(5)	1438.0	0.00448	2459036.87739(3)	2297.0	0.00645
2458595.59068(4)	1264.0	0.00391	2458670.13450(5)	1438.5	0.00360	2459037.08967(5)	2297.5	0.00513
2458656.46283(15)	1406.5	0.00191	2458670.34894(4)	1439.0	0.00444	2459037.30446(4)	2298.0	0.00633
2458656.67780(5)	1407.0	0.00329	2458670.56159(4)	1439.5	0.00350	2459037.51684(5)	2298.5	0.00512
2458656.89255(4)	1407.5	0.00444	2458670.77615(4)	1440.0	0.00446	2459037.73174(4)	2299.0	0.00642
2458657.10490(5)	1408.0	0.00320	2458670.98869(5)	1440.5	0.00341	2459037.94390(6)	2299.5	0.00499
2458657.31976(5)	1408.5	0.00447	2458671.20328(4)	1441.0	0.00441	2459038.15892(5)	2300.0	0.00641
2458657.53204(5)	1409.0	0.00315	2458671.41582(5)	1441.5	0.00335	2459038.37117(6)	2300.5	0.00507
2458657.74694(5)	1409.5	0.00446	2458671.63058(4)	1442.0	0.00452	2459038.58603(5)	2301.0	0.00634
2458657.95938(5)	1410.0	0.00330	2458671.84294(5)	1442.5	0.00329	2459038.79829(5)	2301.5	0.00500
2458658.17405(5)	1410.5	0.00438	2458672.05769(5)	1443.0	0.00444	2459039.01306(4)	2302.0	0.00618
2458658.38658(4)	1411.0	0.00332	2458672.27025(5)	1443.5	0.00341	2459039.22536(5)	2302.5	0.00489
2458658.60126(4)	1411.5	0.00440	2458672.48488(4)	1444.0	0.00445	2459039.44024(5)	2303.0	0.00617
2458658.81377(4)	1412.0	0.00332	2458672.69738(3)	1444.5	0.00335	2459039.65261(6)	2303.5	0.00495
2458659.02847(5)	1412.5	0.00443	2458672.91200(4)	1445.0	0.00438	2459039.86721(5)	2304.0	0.00596
2458659.24094(4)	1413.0	0.00330	2458673.12455(5)	1445.5	0.00334	2459040.07969(5)	2304.5	0.00484
2458659.45578(5)	1413.5	0.00455	2458673.33933(4)	1446.0	0.00452	2459040.29438(3)	2305.0	0.00594
2458659.66811(4)	1414.0	0.00329	2458673.55178(4)	1446.5	0.00338	2459040.50696(5)	2305.5	0.00493
2458659.88298(4)	1414.5	0.00456	2458673.76652(4)	1447.0	0.00453	2459040.72152(5)	2306.0	0.00589

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2459040.93422(4)	2306.5	0.00500	2459054.81781(4)	2339.0	0.00501	2459123.16827(4)	2499.0	0.00555
2459041.14861(4)	2307.0	0.00580	2459055.03231(5)	2339.5	0.00592	2459123.38292(5)	2499.5	0.00661
2459041.36134(5)	2307.5	0.00493	2459055.24489(4)	2340.0	0.00491	2459123.59525(4)	2500.0	0.00534
2459041.57567(5)	2308.0	0.00567	2459055.45951(5)	2340.5	0.00593	2459123.81010(5)	2500.5	0.00660
2459041.78859(5)	2308.5	0.00500	2459055.67215(3)	2341.0	0.00498	2459124.02238(5)	2501.0	0.00529
2459042.00264(4)	2309.0	0.00545	2459055.88669(5)	2341.5	0.00592	2459124.23744(4)	2501.5	0.00675
2459042.21595(4)	2309.5	0.00517	2459056.09940(3)	2342.0	0.00504	2459124.44963(4)	2502.0	0.00535
2459042.42974(5)	2310.0	0.00537	2459056.31377(6)	2342.5	0.00582	2459124.66462(5)	2502.5	0.00675
2459042.64336(5)	2310.5	0.00539	2459056.52683(4)	2343.0	0.00528	2459124.87679(5)	2503.0	0.00532
2459042.85677(5)	2311.0	0.00521	2459056.74084(5)	2343.5	0.00570	2459125.09185(4)	2503.5	0.00679
2459043.07072(4)	2311.5	0.00556	2459056.95404(4)	2344.0	0.00531	2459125.30396(4)	2504.0	0.00531
2459043.28393(5)	2312.0	0.00518	2459057.16798(5)	2344.5	0.00565	2459125.51903(5)	2504.5	0.00678
2459043.49794(4)	2312.5	0.00560	2459057.38138(3)	2345.0	0.00546	2459125.73122(5)	2505.0	0.00538
2459043.71102(5)	2313.0	0.00508	2459057.59510(5)	2345.5	0.00559	2459125.94612(5)	2505.5	0.00669
2459043.92536(4)	2313.5	0.00583	2459057.80884(3)	2346.0	0.00573	2459126.15845(3)	2506.0	0.00542
2459044.13804(4)	2314.0	0.00492	2459058.02224(5)	2346.5	0.00554	2459126.37339(4)	2506.5	0.00677
2459044.35253(4)	2314.5	0.00581	2459058.23622(4)	2347.0	0.00593	2459126.58572(5)	2507.0	0.00551
2459044.56521(5)	2315.0	0.00490	2459058.44949(6)	2347.5	0.00560	2459126.80062(4)	2507.5	0.00681
2459044.77995(4)	2315.5	0.00605	2459058.66337(3)	2348.0	0.00589	2459127.01296(5)	2508.0	0.00556
2459044.99229(5)	2316.0	0.00479	2459058.87663(5)	2348.5	0.00556	2459127.22810(5)	2508.5	0.00711
2459045.20736(4)	2316.5	0.00627	2459059.09070(4)	2349.0	0.00603	2459130.43067(4)	2516.0	0.00577
2459045.41948(4)	2317.0	0.00480	2459059.30386(5)	2349.5	0.00560	2459130.64507(4)	2516.5	0.00658
2459045.63460(4)	2317.5	0.00632	2459059.51811(4)	2350.0	0.00626	2459131.07215(4)	2517.5	0.00647
2459045.84667(4)	2318.0	0.00480	2459059.73101(5)	2350.5	0.00556	2459131.28538(4)	2518.0	0.00611
2459046.06195(5)	2318.5	0.00649	2459059.94531(5)	2351.0	0.00627	2459131.49933(5)	2518.5	0.00647
2459046.27384(5)	2319.0	0.00478	2459060.15818(5)	2351.5	0.00554	2459131.71258(4)	2519.0	0.00612
2459046.48915(5)	2319.5	0.00650	2459060.37229(3)	2352.0	0.00606	2459131.92628(5)	2519.5	0.00623
2459046.70106(4)	2320.0	0.00481	2459116.11950(6)	2482.5	0.00537	2459132.13982(4)	2520.0	0.00618
2459046.91658(4)	2320.5	0.00674	2459116.33408(4)	2483.0	0.00635	2459132.35357(4)	2520.5	0.00633
2459047.12828(5)	2321.0	0.00485	2459116.54718(5)	2483.5	0.00586	2459132.56697(4)	2521.0	0.00614
2459047.34395(6)	2321.5	0.00692	2459116.76123(5)	2484.0	0.00632	2459132.78081(4)	2521.5	0.00638
2459047.55549(5)	2322.0	0.00487	2459116.97444(5)	2484.5	0.00593	2459132.99435(4)	2522.0	0.00633
2459047.77100(5)	2322.5	0.00679	2459117.18848(4)	2485.0	0.00638	2459133.20800(4)	2522.5	0.00639
2459047.98213(14)	2323.0	0.00432	2459117.40163(5)	2485.5	0.00594	2459133.42152(4)	2523.0	0.00631
2459049.26676(15)	2326.0	0.00739	2459117.61548(4)	2486.0	0.00619	2459133.63506(5)	2523.5	0.00626
2459049.47985(5)	2326.5	0.00689	2459117.82876(5)	2486.5	0.00588	2459133.84872(4)	2524.0	0.00633
2459049.69156(4)	2327.0	0.00501	2459118.04273(4)	2487.0	0.00626	2459134.06217(5)	2524.5	0.00618
2459049.90711(4)	2327.5	0.00696	2459118.25609(5)	2487.5	0.00602	2459134.27604(4)	2525.0	0.00646
2459050.11864(4)	2328.0	0.00490	2459118.46981(4)	2488.0	0.00615	2459134.48923(4)	2525.5	0.00606
2459050.33415(5)	2328.5	0.00682	2459118.68326(5)	2488.5	0.00601	2459134.70322(5)	2526.0	0.00645
2459050.54579(4)	2329.0	0.00486	2459118.89703(4)	2489.0	0.00618	2459134.91644(4)	2526.5	0.00608
2459050.76133(5)	2329.5	0.00681	2459119.11047(5)	2489.5	0.00603	2459135.13046(5)	2527.0	0.00651
2459050.97294(4)	2330.0	0.00482	2459119.32408(4)	2490.0	0.00605	2459135.34357(4)	2527.5	0.00602
2459051.18833(6)	2330.5	0.00662	2459119.53754(5)	2490.5	0.00591	2459135.55760(4)	2528.0	0.00646
2459051.40012(4)	2331.0	0.00482	2459119.75111(4)	2491.0	0.00589	2459135.77071(4)	2528.5	0.00598
2459051.61547(5)	2331.5	0.00657	2459119.96478(4)	2491.5	0.00596	2459135.98480(4)	2529.0	0.00647
2459051.82713(5)	2332.0	0.00464	2459120.17828(4)	2492.0	0.00587	2459136.19791(4)	2529.5	0.00599
2459052.04247(5)	2332.5	0.00639	2459120.39208(5)	2492.5	0.00608	2459136.41200(4)	2530.0	0.00648
2459052.25431(4)	2333.0	0.00463	2459120.60531(4)	2493.0	0.00571	2459136.62498(4)	2530.5	0.00587
2459052.46966(5)	2333.5	0.00639	2459120.81927(5)	2493.5	0.00608	2459136.83926(4)	2531.0	0.00656
2459052.68150(4)	2334.0	0.00464	2459121.03243(5)	2494.0	0.00565	2459137.05218(4)	2531.5	0.00588
2459052.89682(4)	2334.5	0.00636	2459121.24660(6)	2494.5	0.00622	2459137.26638(4)	2532.0	0.00649
2459053.10876(3)	2335.0	0.00471	2459121.45961(5)	2495.0	0.00564	2459137.47943(4)	2532.5	0.00595
2459053.32395(4)	2335.5	0.00631	2459121.67375(5)	2495.5	0.00619	2459137.69359(4)	2533.0	0.00651
2459053.53588(4)	2336.0	0.00464	2459121.88674(4)	2496.0	0.00558	2459137.90659(5)	2533.5	0.00592
2459053.75091(5)	2336.5	0.00608	2459122.10111(5)	2496.5	0.00636	2459138.12076(3)	2534.0	0.00650
2459053.96333(4)	2337.0	0.00491	2459122.31383(4)	2497.0	0.00549	2459138.33381(4)	2534.5	0.00595
2459054.17812(5)	2337.5	0.00610	2459122.52847(5)	2497.5	0.00653	2459138.54788(4)	2535.0	0.00643
2459054.39057(4)	2338.0	0.00496	2459122.74107(4)	2498.0	0.00554	2459138.76105(5)	2535.5	0.00601
2459054.60520(6)	2338.5	0.00600	2459122.95555(5)	2498.5	0.00643	2459138.97505(4)	2536.0	0.00641

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2459139.18815(4)	2536.5	0.00592	2459154.99472(5)	2573.5	0.00657	2459174.85843(4)	2620.0	0.00608
2459139.40209(4)	2537.0	0.00627	2459155.20792(4)	2574.0	0.00618	2459175.07327(5)	2620.5	0.00733
2459139.61534(4)	2537.5	0.00592	2459155.42190(4)	2574.5	0.00656	2459175.50047(4)	2621.5	0.00734
2459139.82923(4)	2538.0	0.00622	2459155.63521(4)	2575.0	0.00628	2459175.71253(5)	2622.0	0.00581
2459140.04254(5)	2538.5	0.00594	2459155.84911(4)	2575.5	0.00659	2459175.92768(5)	2622.5	0.00737
2459140.25636(4)	2539.0	0.00616	2459156.06236(4)	2576.0	0.00624	2459176.13946(4)	2623.0	0.00555
2459140.46972(5)	2539.5	0.00593	2459156.27626(5)	2576.5	0.00655	2459176.35481(5)	2623.5	0.00731
2459140.68358(5)	2540.0	0.00619	2459159.05257(4)	2583.0	0.00614	2459176.56660(5)	2624.0	0.00551
2459140.89687(4)	2540.5	0.00589	2459159.26631(5)	2583.5	0.00629	2459176.78185(4)	2624.5	0.00716
2459141.11084(3)	2541.0	0.00627	2459159.47973(4)	2584.0	0.00612	2459177.20918(5)	2625.5	0.00731
2459141.32413(5)	2541.5	0.00596	2459159.69347(4)	2584.5	0.00626	2459177.42095(4)	2626.0	0.00548
2459141.53807(4)	2542.0	0.00631	2459159.90704(4)	2585.0	0.00624	2459177.63632(4)	2626.5	0.00726
2459144.74160(5)	2549.5	0.00594	2459160.12077(5)	2585.5	0.00638	2459177.84815(4)	2627.0	0.00550
2459144.95574(4)	2550.0	0.00649	2459160.33431(4)	2586.0	0.00632	2459178.06350(5)	2627.5	0.00725
2459145.16936(5)	2550.5	0.00651	2459160.54790(5)	2586.5	0.00632	2459178.27530(4)	2628.0	0.00546
2459145.38290(3)	2551.0	0.00646	2459160.76141(5)	2587.0	0.00624	2459178.49071(4)	2628.5	0.00728
2459145.59654(4)	2551.5	0.00650	2459160.97502(5)	2587.5	0.00625	2459178.70249(4)	2629.0	0.00546
2459145.81003(4)	2552.0	0.00640	2459161.18871(4)	2588.0	0.00635	2459178.91770(5)	2629.5	0.00708
2459146.02372(4)	2552.5	0.00650	2459161.40231(4)	2588.5	0.00636	2459179.12970(4)	2630.0	0.00548
2459146.23709(4)	2553.0	0.00627	2459161.61595(4)	2589.0	0.00640	2459179.34503(8)	2630.5	0.00722
2459146.45096(4)	2553.5	0.00655	2459161.82961(5)	2589.5	0.00647	2459179.55682(4)	2631.0	0.00542
2459146.66429(4)	2554.0	0.00629	2459162.04320(4)	2590.0	0.00647	2459179.77205(4)	2631.5	0.00705
2459146.87808(5)	2554.5	0.00648	2459162.25691(4)	2590.5	0.00658	2459180.19930(4)	2632.5	0.00712
2459147.09149(4)	2555.0	0.00630	2459162.47042(4)	2591.0	0.00650	2459180.41137(5)	2633.0	0.00559
2459147.30533(5)	2555.5	0.00655	2459162.68407(5)	2591.5	0.00655	2459180.62643(4)	2633.5	0.00706
2459147.51859(4)	2556.0	0.00621	2459162.89767(5)	2592.0	0.00656	2459180.83856(4)	2634.0	0.00560
2459147.73263(5)	2556.5	0.00666	2459163.11131(5)	2592.5	0.00661	2459181.05362(4)	2634.5	0.00706
2459147.94579(4)	2557.0	0.00623	2459163.32485(5)	2593.0	0.00655	2459181.26574(4)	2635.0	0.00559
2459148.15975(4)	2557.5	0.00659	2459163.53855(5)	2593.5	0.00666	2459181.48072(5)	2635.5	0.00698
2459148.37298(5)	2558.0	0.00623	2459163.75205(5)	2594.0	0.00657	2459181.69290(4)	2636.0	0.00556
2459148.58706(5)	2558.5	0.00672	2459163.96571(5)	2594.5	0.00663	2459181.90785(5)	2636.5	0.00692
2459148.80011(4)	2559.0	0.00617	2459164.17921(5)	2595.0	0.00654	2459182.12015(4)	2637.0	0.00563
2459149.01432(5)	2559.5	0.00679	2459164.39283(5)	2595.5	0.00657	2459182.33498(5)	2637.5	0.00686
2459149.22735(4)	2560.0	0.00622	2459164.60638(4)	2596.0	0.00652	2459182.54740(4)	2638.0	0.00569
2459149.44156(4)	2560.5	0.00684	2459164.81996(5)	2596.5	0.00651	2459182.76221(5)	2638.5	0.00691
2459149.65461(5)	2561.0	0.00630	2459165.03367(4)	2597.0	0.00663	2459183.18924(4)	2639.5	0.00675
2459149.86884(4)	2561.5	0.00693	2459165.24714(5)	2597.5	0.00650	2459183.40188(3)	2640.0	0.00579
2459150.08188(4)	2562.0	0.00638	2459165.46081(4)	2598.0	0.00658	2459183.61645(5)	2640.5	0.00677
2459150.29597(5)	2562.5	0.00688	2459165.67423(5)	2598.5	0.00641	2459183.82907(5)	2641.0	0.00580
2459150.50909(4)	2563.0	0.00640	2459165.88800(4)	2599.0	0.00658	2459184.04359(4)	2641.5	0.00672
2459150.72300(4)	2563.5	0.00672	2459166.10147(5)	2599.5	0.00646	2459184.25644(5)	2642.0	0.00598
2459150.93624(4)	2564.0	0.00637	2459166.31514(4)	2600.0	0.00654	2459184.47084(4)	2642.5	0.00679
2459151.15031(5)	2564.5	0.00684	2459166.52845(5)	2600.5	0.00625	2459184.68355(4)	2643.0	0.00590
2459151.36347(4)	2565.0	0.00641	2459166.74222(4)	2601.0	0.00643	2459184.89796(5)	2643.5	0.00672
2459151.57747(5)	2565.5	0.00682	2459166.95545(5)	2601.5	0.00606	2459185.11086(5)	2644.0	0.00603
2459151.79059(4)	2566.0	0.00634	2459167.16937(5)	2602.0	0.00639	2459185.32516(5)	2644.5	0.00673
2459152.00462(5)	2566.5	0.00678	2459167.38261(6)	2602.5	0.00604	2459185.53808(5)	2645.0	0.00606
2459152.21773(4)	2567.0	0.00630	2459167.59644(4)	2603.0	0.00627	2459187.46087(4)	2649.5	0.00651
2459152.43184(5)	2567.5	0.00681	2459167.80977(5)	2603.5	0.00601	2459187.67417(4)	2650.0	0.00621
2459152.64498(4)	2568.0	0.00636	2459168.02360(3)	2604.0	0.00625	2459187.88783(5)	2650.5	0.00628
2459152.85883(5)	2568.5	0.00662	2459168.23696(5)	2604.5	0.00601	2459188.10154(4)	2651.0	0.00640
2459153.07215(4)	2569.0	0.00634	2459168.45076(4)	2605.0	0.00622	2459188.31501(4)	2651.5	0.00627
2459153.28599(5)	2569.5	0.00659	2459168.66414(5)	2605.5	0.00601	2459188.52899(3)	2652.0	0.00666
2459153.49932(4)	2570.0	0.00632	2459168.87801(4)	2606.0	0.00628	2459188.74225(6)	2652.5	0.00633
2459153.71323(5)	2570.5	0.00664	2459169.09133(6)	2606.5	0.00601	2459188.95607(5)	2653.0	0.00655
2459153.92643(4)	2571.0	0.00625	2459169.30524(4)	2607.0	0.00633	2459189.16928(5)	2653.5	0.00617
2459154.14043(4)	2571.5	0.00665	2459169.51870(6)	2607.5	0.00619	2459189.38337(4)	2654.0	0.00667
2459154.35361(4)	2572.0	0.00624	2459169.73274(4)	2608.0	0.00664	2459189.59652(6)	2654.5	0.00622
2459154.56762(5)	2572.5	0.00666	2459174.43129(4)	2619.0	0.00613	2459189.81056(4)	2655.0	0.00667
2459154.78076(4)	2573.0	0.00620	2459174.64605(5)	2619.5	0.00730	2459190.23790(4)	2656.0	0.00682

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2459190.45092(5)	2656.5	0.00625	2459233.59750(4)	2757.5	0.00694	2459250.04403(4)	2796.0	0.00677
2459190.66521(4)	2657.0	0.00695	2459233.81063(4)	2758.0	0.00648	2459250.25787(4)	2796.5	0.00702
2459190.87797(7)	2657.5	0.00611	2459234.23797(4)	2759.0	0.00663	2459250.47118(4)	2797.0	0.00674
2459191.09246(4)	2658.0	0.00701	2459234.45195(5)	2759.5	0.00702	2459250.68524(4)	2797.5	0.00720
2459191.30521(4)	2658.5	0.00617	2459234.66535(4)	2760.0	0.00682	2459250.89839(4)	2798.0	0.00676
2459191.51969(4)	2659.0	0.00705	2459234.87910(4)	2760.5	0.00698	2459251.11222(4)	2798.5	0.00700
2459191.73258(6)	2659.5	0.00635	2459235.09230(3)	2761.0	0.00659	2459251.32542(4)	2799.0	0.00660
2459191.94686(4)	2660.0	0.00703	2459235.30629(4)	2761.5	0.00698	2459251.53951(5)	2799.5	0.00710
2459192.15966(6)	2660.5	0.00624	2459235.51973(3)	2762.0	0.00683	2459251.75260(4)	2800.0	0.00659
2459192.37402(5)	2661.0	0.00701	2459235.73359(5)	2762.5	0.00710	2459251.96682(4)	2800.5	0.00722
2459192.58673(6)	2661.5	0.00612	2459235.94685(3)	2763.0	0.00676	2459252.17981(4)	2801.0	0.00662
2459192.80127(5)	2662.0	0.00707	2459236.16086(4)	2763.5	0.00718	2459252.39404(4)	2801.5	0.00725
2459193.22849(3)	2663.0	0.00710	2459236.37419(4)	2764.0	0.00692	2459252.60702(5)	2802.0	0.00664
2459193.44101(5)	2663.5	0.00603	2459236.58806(4)	2764.5	0.00719	2459252.82117(6)	2802.5	0.00720
2459193.65554(5)	2664.0	0.00697	2459236.80148(4)	2765.0	0.00702	2459253.03420(8)	2803.0	0.00663
2459194.08274(5)	2665.0	0.00698	2459237.22880(4)	2766.0	0.00715	2459253.24847(5)	2803.5	0.00731
2459194.29527(4)	2665.5	0.00592	2459237.44229(4)	2766.5	0.00705	2459253.46138(5)	2804.0	0.00663
2459194.50997(5)	2666.0	0.00702	2459237.65604(4)	2767.0	0.00721	2459253.67584(6)	2804.5	0.00749
2459194.72265(4)	2666.5	0.00611	2459237.86928(5)	2767.5	0.00685	2459362.18067(7)	3058.5	0.00683
2459194.93707(4)	2667.0	0.00694	2459238.08317(3)	2768.0	0.00715	2459362.39543(4)	3059.0	0.00799
2459195.14989(6)	2667.5	0.00616	2459238.29649(4)	2768.5	0.00688	2459362.82267(6)	3060.0	0.00805
2459195.36420(4)	2668.0	0.00688	2459238.51037(4)	2769.0	0.00716	2459363.24966(4)	3061.0	0.00785
2459195.57719(6)	2668.5	0.00628	2459238.72361(4)	2769.5	0.00681	2459363.46257(6)	3061.5	0.00716
2459195.79121(5)	2669.0	0.00670	2459238.93736(4)	2770.0	0.00696	2459363.67673(5)	3062.0	0.00773
2459196.21843(3)	2670.0	0.00673	2459239.36444(4)	2771.0	0.00686	2459363.88983(9)	3062.5	0.00724
2459196.43181(5)	2670.5	0.00652	2459239.57788(4)	2771.5	0.00670	2459364.10409(6)	3063.0	0.00790
2459196.64547(3)	2671.0	0.00659	2459239.79159(4)	2772.0	0.00682	2459364.31717(7)	3063.5	0.00739
2459196.85894(6)	2671.5	0.00646	2459240.21874(3)	2773.0	0.00678	2459364.53119(5)	3064.0	0.00782
2459197.07252(6)	2672.0	0.00645	2459240.43205(6)	2773.5	0.00650	2459364.74453(7)	3064.5	0.00756
2459197.28620(4)	2672.5	0.00654	2459240.64622(9)	2774.0	0.00708	2459364.95827(4)	3065.0	0.00771
2459197.49969(4)	2673.0	0.00643	2459242.56729(10)	2778.5	0.00581	2459365.17202(4)	3065.5	0.00787
2459197.71329(6)	2673.5	0.00644	2459242.78202(4)	2779.0	0.00694	2459365.38546(5)	3066.0	0.00771
2459197.92679(4)	2674.0	0.00635	2459243.42227(5)	2780.5	0.00641	2459365.59938(4)	3066.5	0.00804
2459198.14046(6)	2674.5	0.00642	2459243.63645(4)	2781.0	0.00700	2459365.81275(6)	3067.0	0.00782
2459198.35391(3)	2675.0	0.00628	2459243.84956(4)	2781.5	0.00651	2459366.23988(5)	3068.0	0.00776
2459198.56782(5)	2675.5	0.00660	2459244.06369(4)	2782.0	0.00705	2459366.66713(5)	3069.0	0.00782
2459198.78119(4)	2676.0	0.00637	2459244.27678(4)	2782.5	0.00655	2459366.88121(6)	3069.5	0.00831
2459199.20836(4)	2677.0	0.00636	2459244.49097(4)	2783.0	0.00714	2459367.09437(6)	3070.0	0.00788
2459199.42242(4)	2677.5	0.00682	2459244.70403(4)	2783.5	0.00661	2459367.30861(7)	3070.5	0.00852
2459199.63559(5)	2678.0	0.00640	2459244.91823(5)	2784.0	0.00722	2459367.52158(6)	3071.0	0.00790
2459199.84973(5)	2678.5	0.00695	2459245.13121(5)	2784.5	0.00660	2459367.73588(8)	3071.5	0.00860
2459229.32609(5)	2747.5	0.00740	2459245.34547(4)	2785.0	0.00727	2459367.94883(4)	3072.0	0.00796
2459229.53849(5)	2748.0	0.00621	2459245.55853(4)	2785.5	0.00674	2459368.16330(8)	3072.5	0.00884
2459229.75321(5)	2748.5	0.00734	2459245.77261(4)	2786.0	0.00722	2459368.37610(6)	3073.0	0.00804
2459229.96561(5)	2749.0	0.00614	2459246.19990(4)	2787.0	0.00733	2459368.59072(6)	3073.5	0.00907
2459230.18041(5)	2749.5	0.00735	2459246.41302(5)	2787.5	0.00685	2459368.80326(5)	3074.0	0.00802
2459230.39255(5)	2750.0	0.00589	2459246.62712(6)	2788.0	0.00736	2459369.23040(5)	3075.0	0.00797
2459230.60764(4)	2750.5	0.00739	2459246.84006(6)	2788.5	0.00671	2459369.44515(6)	3075.5	0.00913
2459230.81983(4)	2751.0	0.00599	2459247.05437(5)	2789.0	0.00742	2459369.65762(5)	3076.0	0.00800
2459231.24704(4)	2752.0	0.00601	2459247.26723(5)	2789.5	0.00669	2459369.87242(7)	3076.5	0.00921
2459231.46195(5)	2752.5	0.00733	2459247.69459(5)	2790.5	0.00686	2459370.08460(6)	3077.0	0.00780
2459231.67413(5)	2753.0	0.00591	2459247.90838(5)	2791.0	0.00706	2459370.29952(7)	3077.5	0.00912
2459231.88906(4)	2753.5	0.00725	2459248.12185(6)	2791.5	0.00693	2459370.51164(5)	3078.0	0.00765
2459232.10150(4)	2754.0	0.00610	2459248.33539(6)	2792.0	0.00688	2459370.72668(6)	3078.5	0.00910
2459232.31602(5)	2754.5	0.00702	2459248.54910(7)	2792.5	0.00700	2459370.93882(5)	3079.0	0.00764
2459232.52877(4)	2755.0	0.00618	2459248.76261(7)	2793.0	0.00691	2459371.15361(7)	3079.5	0.00884
2459232.74309(5)	2755.5	0.00691	2459248.97627(7)	2793.5	0.00698	2459371.36591(6)	3080.0	0.00755
2459232.95598(4)	2756.0	0.00620	2459249.18970(4)	2794.0	0.00682	2459371.58055(6)	3080.5	0.00859
2459233.17040(5)	2756.5	0.00703	2459249.40350(9)	2794.5	0.00702	2459371.79286(5)	3081.0	0.00731
2459233.38333(3)	2757.0	0.00637	2459249.61694(4)	2795.0	0.00687	2459372.22001(5)	3082.0	0.00727

Table 1. Continued

Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C	Min.(BJD_{TDB})	Epoch	O-C
2459372.43460(7)	3082.5	0.00827	2459378.84263(7)	3097.5	0.00849	2459384.60917(6)	3111.0	0.00801
2459372.64720(6)	3083.0	0.00727	2459379.05640(5)	3098.0	0.00867	2459384.82241(7)	3111.5	0.00765
2459372.86173(6)	3083.5	0.00821	2459379.26974(7)	3098.5	0.00842	2459385.24963(8)	3112.5	0.00769
2459373.07436(5)	3084.0	0.00725	2459379.48371(5)	3099.0	0.00879	2459385.46356(5)	3113.0	0.00802
2459373.28886(6)	3084.5	0.00815	2459379.69696(7)	3099.5	0.00845	2459385.67708(8)	3113.5	0.00795
2459373.71590(7)	3085.5	0.00801	2459380.12411(7)	3100.5	0.00841	2459386.10442(7)	3114.5	0.00810
2459373.92872(5)	3086.0	0.00723	2459380.33809(6)	3101.0	0.00880	2459386.31797(5)	3115.0	0.00806
2459374.14312(8)	3086.5	0.00804	2459380.55113(8)	3101.5	0.00824	2459386.53158(6)	3115.5	0.00808
2459374.35583(5)	3087.0	0.00716	2459380.76526(6)	3102.0	0.00878	2459386.74509(5)	3116.0	0.00799
2459374.57005(7)	3087.5	0.00778	2459381.19231(5)	3103.0	0.00864	2459387.17237(4)	3117.0	0.00809
2459376.06499(4)	3091.0	0.00757	2459381.40520(8)	3103.5	0.00794	2459387.38616(7)	3117.5	0.00828
2459376.27907(6)	3091.5	0.00805	2459381.61939(5)	3104.0	0.00854	2459387.59945(5)	3118.0	0.00798
2459376.49240(6)	3092.0	0.00779	2459381.83225(9)	3104.5	0.00780	2459387.81340(9)	3118.5	0.00834
2459376.70637(6)	3092.5	0.00817	2459382.04662(5)	3105.0	0.00858	2459388.24066(8)	3119.5	0.00841
2459376.91992(5)	3093.0	0.00812	2459382.25936(7)	3105.5	0.00773	2459388.45381(5)	3120.0	0.00796
2459377.13375(7)	3093.5	0.00836	2459382.47372(5)	3106.0	0.00849	2459388.66791(8)	3120.5	0.00847
2459377.34726(5)	3094.0	0.00828	2459382.68644(7)	3106.5	0.00762	2459388.88109(4)	3121.0	0.00806
2459377.56094(7)	3094.5	0.00836	2459382.90072(5)	3107.0	0.00831	2459389.09536(7)	3121.5	0.00873
2459377.77461(5)	3095.0	0.00844	2459383.11345(7)	3107.5	0.00744	2459389.30823(5)	3122.0	0.00801
2459378.20183(5)	3096.0	0.00847	2459383.54079(7)	3108.5	0.00760	2459389.52282(8)	3122.5	0.00901
2459378.41549(6)	3096.5	0.00854	2459383.75506(5)	3109.0	0.00827			
2459378.62924(5)	3097.0	0.00870	2459384.39504(8)	3110.5	0.00747			