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# Mapping the outer bulge with RRab stars from the VVV Survey

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**ABSTRACT**

*Context.* The VISTA Variables in the Vía Láctea (VVV) is a near-IR time-domain survey of the Galactic bulge and southern plane. One of the main goals of this survey is to reveal the 3D structure of the Milky Way through their variable stars. In particular, enormous numbers of RR Lyrae stars have been discovered in the inner regions of the bulge ($-8° \lesssim b \lesssim -1°$) by optical surveys such as OGLE and MACHO, but leaving an unexplored window of more than ~47 sq deg ($-10.0° \lesssim \ell \lesssim +10.7°$ and $-10.3° \lesssim b \lesssim -8.0°$) observed by the VVV Survey.

*Aims.* Our goal is to characterize the RR Lyrae stars in the outer bulge in terms of their periods, amplitudes, Fourier coefficients, and distances in order to evaluate the 3D structure of the bulge in this area. The distance distribution of RR Lyrae stars will be compared to that of red clump stars, which is known to trace a X-shaped structure, in order to determine whether these two different stellar populations share the same Galactic distribution.

*Methods.* A search for RR Lyrae stars was performed in more than ~47 sq deg at low Galactic latitudes ($-10.3° \lesssim b \lesssim -8.0°$). In the procedure the $\chi^2$ value and analysis of variance (AoV) statistic methods were used to determine the variability and periodic features of the light curves, respectively. To prevent misclassifications, the analysis was performed only on the fundamental mode RR Lyrae stars (RRab) owing to similarities found in the near-IR light curve shapes of contact eclipsing binaries (W UMa) and first overtone RR Lyrae stars (RRc). On the other hand, the red clump stars of the same analyzed tiles were selected, and cuts in the color-magnitude diagram were applied and the maximum distance restricted to ~20 kpc in order to construct a similar catalog in terms of distances and covered area compared to the RR Lyrae stars.

*Results.* We report the detection of more than 1000 RR Lyrae ab-type stars in the VVV Survey located in the outskirts of the Galactic bulge. A few of them are possibly associated with the Sagittarius Dwarf Spheroidal Galaxy. We calculated colours, reddening, extinction, and distances of the detected RR Lyrae stars in order to determine the outer bulge 3D structure. Our main result is that, at the low galactic latitudes mapped here, the RR Lyrae stars trace a centrally concentrated spheroidal distribution. This is a noticeably different spatial distribution to the one traced by red clump stars known to follow a bar and X-shaped structure. We estimate the completeness of our sample at 80% for $K_s \leq 15$ mag.

**Key words.** Galaxy: bulge – Galaxy: stellar content – Galaxy: structure – infrared: stars – surveys – stars: variables: RR Lyrae

## 1. Introduction

Big astronomical surveys are changing the way we understand the formation, structure and evolution of our Galaxy. Among these surveys, only a few have been able to access the inner regions of the Milky Way because of the effects of severe crowding and high interstellar extinction of these dense Galactic regions. Near- and mid-IR surveys such as 2MASS, GLIMPSE, and UKIDSS-GPS (Skrutskie et al. 2006; Benjamin et al. 2005; Lucas et al. 2008) have helped to overcome the extinction problem covering the innermost regions of the Galaxy, but the lack of multiple-epoch observations within those surveys prevents us from using them to study and characterize the large number of variable sources in the bulge. Optical time-domain surveys such as OGLE, MACHO, and EROS (Udalski et al. 2015; Alcock et al. 1996; Aubourg et al. 1993) have partially solved this problem but unfortunately the high extinction found towards the bulge line of sight restricts them from accurately mapping the innermost regions.

In response to these limitations, the VISTA Variables in the Vía Láctea (VVV) ESO public survey (Minniti et al. 2010) provides near-IR, multi-epoch photometric coverage of the inner Galaxy ($-10° \lesssim \ell \lesssim 10°$, $-10° \lesssim b \lesssim 5°$). The large near-IR coverage of the VVV survey, high spatial resolution, and depth of the survey enables comprehensive studies across the entire inner Galaxy, reaching larger distances than has ever been possible. The first stage of the VVV Survey provided full-coverage, multicolour photometry of the inner 520 sq deg of the Galaxy. These data were used for the construction of 2D and 3D extinction maps (Gonzalez et al. 2011, 2013; Schultheis et al. 2014), and metallicity gradient maps (Gonzalez et al. 2013) of the Galactic bulge.

One of the main scientific goals of the VVV Survey is to build a comprehensive 3D map of the Milky Way using well-known primary distance indicators. In this context, the first epoch of VVV observations has been used to investigate the shape of the bulge using the observed magnitude of red clump giant stars as distance indicators. Bulge studies using red clump (RC) stars have helped to unveil the overall shape of the stellar bar, confirming that the Milky Way hosts a peanut- or X-shape bulge (Wegg & Gerhard 2013; Saito et al. 2012b).

On the other hand, the ongoing variability campaign of the VVV survey now allows us to investigate the shape of the inner Galaxy using variable stars as distance estimators. Variable star searches are expected to yield many more candidates in the near future (Catelan et al. 2013a,b), allowing us to measure the extinctions and distances along the line of sight, providing another 3D view of the inner Milky Way (Dékány et al. 2013, 2015). RR Lyrae stars are particularly interesting in this context as they allow us to unequivocally trace the oldest stellar component of the Galaxy (Dékány et al. 2013; Catelan & Smith 2015). Interestingly, the distance distribution of RR Lyrae stars found by Dékány et al. (2013) follows a different shape than that traced by red clump stars. While the distances obtained from red clump stars trace closely the position angle of the bar and also the distance split along the minor axis due to the far and near arms of the X-shaped bulge, distances and radial velocities to the RR Lyrae population from Dékány et al. (2013) and Kunder et al. (2016), respectively, appear to follow a spheroidal distribution instead of the stellar bar traced by red clump stars.

In the present study we perform the search of RR Lyrae stars using VVV data and continue the analysis started by Gran et al. (2015), extending the work to 28 more VVV tiles (*b201-b228*). These regions have been not been covered by the OGLE survey yet; therefore, the RR Lyrae stars presented here are particularly important in this context. This is where the X-shaped bulge becomes most prominent, making it the ideal location to investigate how different the structures traced by these two populations are. We calculated their distances and compared their spatial distribution with respect to those derived from red clump stars.

## 2. Observations

The VVV Survey is a public ESO near-IR survey that is mapping the inner Milky Way, including the inner halo, the bulge and an adjacent section of the disk with the VISTA 4 m telescope at the ESO Paranal Observatory (Minniti et al. 2010). The survey covers a total area of 562 sq deg; and the VVV database now contains $ZYJHK_s$ photometry of about one billion sources on the VISTA system for which 2MASS coordinates have been used to construct the coordinate system, and a variability campaign in the $K_s$-band (Saito et al. 2012a; Hempel et al. 2014). See Gran et al. (2015) for more details on the instrument and their spatial configuration of the Galactic bulge and disk.

In this analysis we used data covering more than ~47 sq deg in the outer bulge ($-10.0° \lesssim \ell \lesssim +10.7°$ and $-10.3° \lesssim b \lesssim -8.0°$). This area corresponds to the VVV tiles *b201* through *b228*, obtained between April 2010 and August 2014 with 60–62 epochs in all the selected tiles. We use aperture photometry applied to the stacked images known as tiles, provided by the Cambridge Astronomical Survey Unit (CASU)[1] and setting the minimum number of epochs per star analyzed to 30 in order to achieve a better frequency analysis and avoid gaps in the light curves.

[1] http://casu.ast.cam.ac.uk/vistasp/

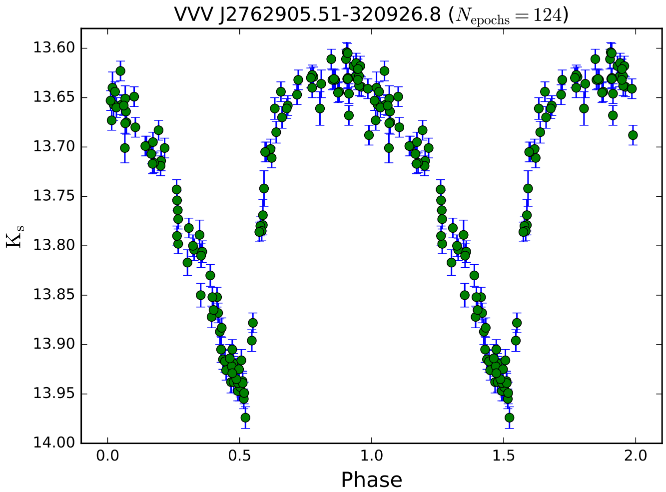


**Fig. 1.** RR Lyrae star in the overlap of two adjacent tiles (*b208* and *b222*). The light curve has the maximum number of epochs in our sample (62 × 2 = 124).

### 2.1. Detection and classification of RR Lyrae stars

We selected variable candidates by analyzing the $\chi^2$ value for all the available time series, considering the mean error-weighted magnitude as the model (e.g. a non-variable star will have values close to 0). A similar analysis was presented in Carpenter et al. (2001) to detect variable candidates. If this value exceeds the imposed cutoff of $\chi^2 = 2$ (see Gran et al. 2015), the time-series periodicities are tested by the analysis of variance (AoV) statistic (Schwarzenberg-Czerny 1989) in the RR Lyrae stars period range ($0.2 \leq P$ (days) $\leq 1.2$). After this process the light curves were visually classified.

We repeated the classification process over the 28 analyzed tiles (*b201-b228*) and checked whether there were duplicates in our catalogs. RR Lyrae stars in the intersection areas are also important in order to check the parameters derived from two independent light curves. The tiling pattern produces overlapping areas of about 7% between the tiles; Saito et al. (2012b) thus took advantage of the duplicated RR Lyrae stars in the overlapping regions by combining their data. Figure 1 shows a RRab star with the maximum number of epochs found in the intersection between the VVV tiles *b208* and *b222*. For the overlapping RR Lyrae light curves, the derived periods, amplitudes, and mean magnitudes were compared, and resulted in a distribution of the parameters that was close to zero within the errors.

In this process we assign a label to the RRab stars according to their narrow period range ($\sim 0.4 \leq P$ (days) $\leq 1.2$), near-IR amplitude ($0.2 \lesssim A_{K_s}$(mag) $\lesssim 0.5$), and characteristic asymmetric light curve shape (see Fig. 1). As reported by Alonso-García et al. (2015), in the near-IR bands there are fewer features that can be used to classify different variable types than in the optical regime. Therefore, because the light curves of the RRc stars in the near-IR mimic the behaviour of other variable classes such as W UMa contact binaries and long-period SX Phe pulsating variables, likely RRc stars ($P$ (days) $\lesssim 0.4$) are not under analysis here. In addition to the human expert classification described above, we ran the light curves through a machine-learning classifier specifically developed for the classification of RRab in the VVV Survey. The classifier is based on a set of features extracted from each light curve following a similar approach to that of Debosscher et al. (2007) and Richards et al. (2011), and will be described elsewhere

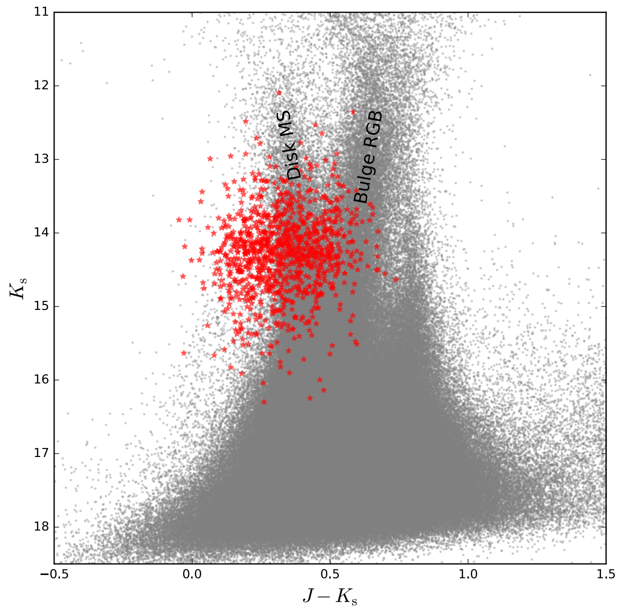


**Fig. 2.** $K_s$ vs. $(J-K_s)$ CMD of the complete catalog of RR Lyrae stars (red stars) compared with the sources in tile *b201* as background. The CMD shows two prominent features, the disk main sequence (MS) and the bulge red giant branch (RGB), which are identified in the figure.

(Elorrieta et al., in prep.). We will use a similar classifier in the near future to produce a catalog of VVV variable sources classified using automated procedures (for more details see Catelan et al. 2013b; Angeloni et al. 2014).

One of the 28 tiles explored is obliterated by the presence of a very bright star, resulting in fewer RR Lyrae discovered. Tile *b205* contains the star $\eta$ Sgr (HD 167600), which is very bright in the near-IR with $K_s \sim -1.55$ mag. Such a bright star not only saturates the detector, but also causes reflections that affect the flat fields; the resulting mosaic of this tile contains regions that are not suitable for variability searches. This is the reason why tile *b205* contains fewer RRab stars ($N_{\rm RRab} = 31$) than the rest of the tiles ($N_{\rm RRab} \sim 37$ on average).

Our RRab light curves have 60–62 data points with a median magnitude of $K_s = 14.2$ mag ($12.1 \lesssim K_s \lesssim 16.3$). At this magnitude level the completeness of the VVV source catalogues is high, with about 95% detection efficiency in less crowded fields such as the outermost bulge region (Saito et al. 2012a). On the other hand, experiments of signal detection rates based on VVV data for RRab stars reach about 90% detection when applied to light curves with 60 epochs (Catelan et al. 2013b). Therefore, we can estimate the completeness of our RRab sample as accurately as 80% for $K_s \lesssim 15$ mag, with no expected trends along the two axes, since crowding and extinction are similar across the analyzed area. At fainter magnitudes the completeness is smaller and makes it difficult to find the most distant RR Lyrae, for example the ones that may belong to the Sgr dwarf galaxy. However, we identify a few Sgr RR Lyrae candidates (see Sect. 3.1).

We also checked the completeness of our catalogue by comparing our findings with the RR Lyrae found by OGLE in a small fraction of our area which overlaps an OGLE IV field (Soszyński et al. 2014). There are 22 RR Lyrae stars with $-10.3° \lesssim b \lesssim -8.0°$ in the OGLE IV catalog, of which we will only focus on the 13 RRab stars present. In our catalog there are eight matches within $d < 1''$ in tiles *b220* and *b221*. Three of the five remaining RRab stars were not analyzed by our algorithm owing to non-stellar photometry flags or fewer epochs than the minimum required, and there were no matches at $1''$ for

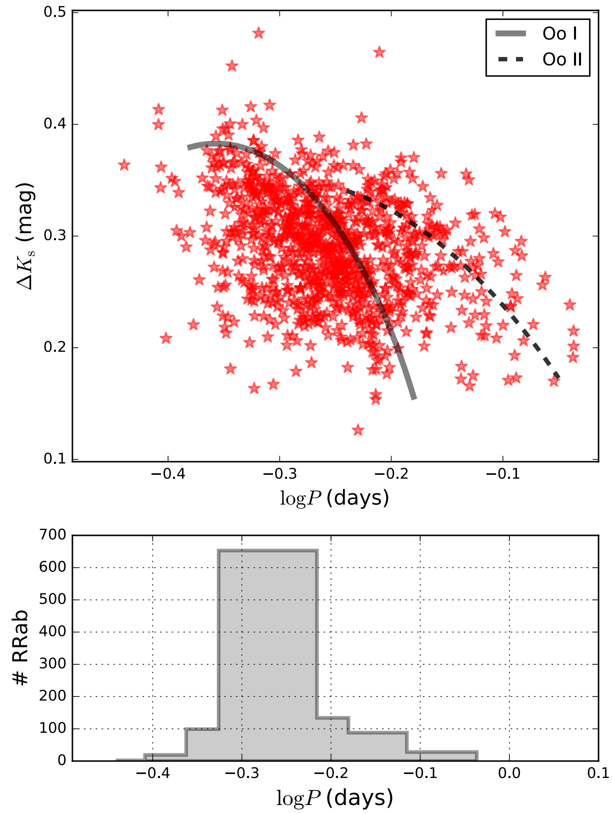


**Fig. 3.** *Top panel*: Bailey diagram of the complete RRab catalog. The OoI (solid) and OoII (dashed) lines derived by Navarrete et al. (2015) are shown. *Bottom panel*: period histogram of the 1019 RRab stars with bins adapted by the Bayesian Block algorithm (Scargle et al. 2013) through the `astroML` implementation (Vanderplas et al. 2012).

the last two RRab stars in the area in our catalog. With these corrections our completeness with respect to the OGLE survey is at least 80%. Certainly, not all of the RRab stars in the catalog are new discoveries. We match our catalog with the General Catalogue of Variable Stars (GCVS; Samus et al. 2009) and find a total of 207 matches. VVV IDs and the respective GCVS names for matching objects are presented in Appendix A. We note that none of our classified RRab stars has tagged eclipsing binary counterparts in the GCVS, even though we do not discard minor contamination due to eclipsing binaries that can mimic RRab stars. Finally, 27 of the RRab stars in the tile *b201* have already een reported y Gran et al. (2015).

## 3. Results

After accounting for the duplicates, a total of 1019 RRab stars remained in our sample. The final catalogue is presented in Appendix A. In the first step we characterized this sample in terms of its calculated magnitude-weighted $\langle K_s\rangle$, $\langle J\rangle - \langle K_s\rangle$ colour, periods, amplitudes, light curve shapes, and coordinates. Figure 2 shows the $J-K_s$ colour–magnitude diagram (CMD) for the complete RR Lyrae catalog with tile *b201* as a comparison field. The RR Lyrae stars lie in a wide range of mean-$K_s$ magnitudes owing to their distance distribution in the Galaxy, but the $J-K_s$ colour is limited between ~0.0 and 0.6, similar values to those reported by Gran et al. (2015).

In addition to the locus on the CMD, the RR Lyrae stars can be identified by their position on the Bailey diagram (Bailey 1902), which relates the amplitude of the RR Lyrae stars with the period distribution of the entire sample (Fig. 3). In this

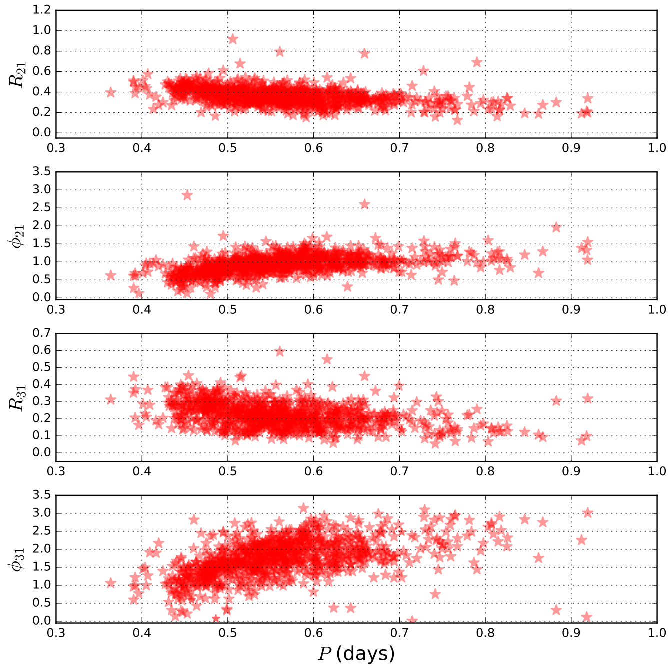

**Fig. 4.** *Top to bottom*: $R_{21}$, $\phi_{21}$, $R_{31}$, and $\phi_{31}$ coefficients of a Fourier series (sine based) using the DFF routine.

diagram we can see that our RR Lyrae stars are predominantly Oosterhoff Type I (OoI) with a minor composition of Oosterhoff Type II (OoII). We derived this composition with the Oosterhoof reference lines traced by Navarrete et al. (2015).

In addition to the period and amplitude, another characteristic feature of the RRab stars is the light curve shape, which can be described by a Fourier series. A sine decomposition up to sixth order was performed with the direct Fourier fitting (DFF) routine given by Kovács & Kupi (2007). Figure 4 shows the $R_{21}$, $\phi_{21}$, $R_{31}$, and $\phi_{31}$ coefficients as function of the period. All the Fourier components tend to be clustered in a limited region in this space (for reference see Fig. 6 of Deb & Singh 2010). There were some outliers in the distributions (e.g.: RRab with $R_{21} > 0.6$ or $\phi_{21} > 2$), which were visually inspected; some gaps in the light curve were found that have an effect on the final value.

The spatial distribution in Galactic coordinates of the catalog is shown in Fig. 5. The observations span only 2° in $b$, but more than 20° in $\ell$, resulting in the very elongated shape of the figure. Although there are no globular clusters in the analyzed area according to the Francis & Anderson (2014) catalog, their presence in nearby regions could bias the number of RR Lyrae stars found. This possible effect on our catalog was investigated on the three closest globular clusters to our sample of RRab stars. NGC 6656 is the only cluster that has associated RR Lyrae stars according to Clement et al. (2001, 2015 editiononline catalog[2]), but the closest variable is 10′ further from the cluster tidal radius ($r_t \approx 30'$) given by the 2010 version of the Harris (1996) catalog. NGC 6624 and 6637 are considered metal-rich clusters with [Fe/H] values of −0.63 and −0.77, respectively (Valenti et al. 2004, 2005). Both clusters develop a very red horizontal branch, which is the reason why they are not known to have associated RR Lyrae stars.

### 3.1. Distances and the 3D view of the outer bulge

One of the main goals of the VVV Survey is to trace the Galactic structure using variable stars in order to make the most complete 3D view of the central regions of our Galaxy (Minniti et al. 2010). The primary distance indicators are the RR Lyrae stars owing to the high number density present in the bulge area (Soszyński et al. 2014) and the tight period–luminosity (P-L) relation that they follow in near-IR bands (Longmore et al. 1990; Catelan et al. 2004). To obtain the distance values, first we must calculate the reddening and extinction values to the individual variables. The former can be obtained through the difference between the mean-apparent and absolute magnitudes of our RRab stars, given by

$$E(J-K_s) = (J-K_s) - (J-K_s)_0 = (J-K_s) - (M_J - M_{K_s}), \quad (1)$$

where $(J-K_s)_0$ is the intrinsic colour of our RRab star and $M_X$ the absolute magnitude in the $X$-band. In our analysis we adopt the P-L relations derived by Alonso-García et al. (2015) to recover the absolute magnitudes of the RR Lyrae stars in the $J$- and $K_s$-bands with $\log Z = [\mathrm{Fe/H}] - 1.765$, based on a solar metallicity of $Z_\odot = 0.017$ (Catelan et al. 2004). To calculate the $J$-band mean magnitudes for the stars in our catalog we performed a linear regression between the $J$- and $K_s$-band mean magnitudes of the RRab stars of $\omega$ Centauri studied by Navarrete et al. (2016). This analysis is needed because the VVV Survey only provides one observation in the $ZYJH$-bands. The resulting fit is given by $\langle J \rangle = 0.93 \times \langle K_s \rangle + 1.26$. As expected, the residuals are centred in 0 with a dispersion of 0.03 mag. This allows us to derive the reddening on a star-by-star basis, and also the extinction of each RRab star by adopting an extinction law (e.g. Cardelli et al. 1989).

At this point we calculate the distances given by

$$\log d = 1 + 0.2(K_{s,0} - M_{K_s}), \quad (2)$$

with $d$ the individual distance in pc to our RRab stars. Figure 6 shows the distribution of distances of the RRab stars in our catalog. The vertical line corresponds to the Galactic centre distance derived in Dékány et al. (2013) with a value of $R_0 \approx 8.33$ kpc. Our distances have a maximum frequency around $R_0$ where the centre of the distribution is, and an asymmetric shape towards the far side of the bulge because the volume observed is greater owing to the cone effect. According to their distances, some of the RR Lyrae stars may belong to the Sagittarius dwarf spheroidal (Sgr dSph) galaxy (e.g. distances around 20 kpc). Kunder & Chaboyer (2009) place the core of the Sgr dSph galaxy at ∼22–27 kpc from the Sun, but ∼4° away from our analyzed region. Even taking into account that Sgr RR Lyrae stars are mixed with the Milky Way halo variables, some RR Lyrae stars found towards these coordinates have been associated with the dwarf galaxy by MACHO (Alard 1996; Alcock et al. 1997) and OGLE (Soszyński et al. 2014).

The elongated shape of the analyzed area allows us to approximate the observation volume with a circular sector, projecting the $b$ coordinate. Figure 7 shows distances and Galactic longitude in this line-of-sight circular projection. The RR Lyrae stars tend to stay near the projected Galactic centre distance ($d \approx 8$ kpc) and the previously mentioned Sgr dSph RR Lyrae candidates are clearly visible in the $16 \leq d$ (kpc) $\leq 22$ and $\ell \geq 6°$ zone.

### 3.2. To trace or not to trace: the X-shaped problem

Many efforts have been made to study the 3D structure of the Milky Way through its stellar content. Pulsating variable stars

[2] http://www.astro.utoronto.ca/~cclement/read.html

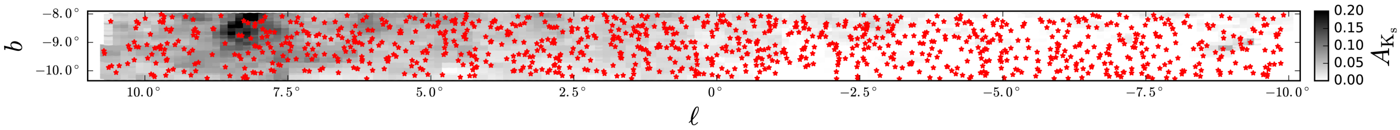


**Fig. 5.** Spatial distribution in Galactic coordinates ($\ell$, $b$) of the RRab stars found in this work.

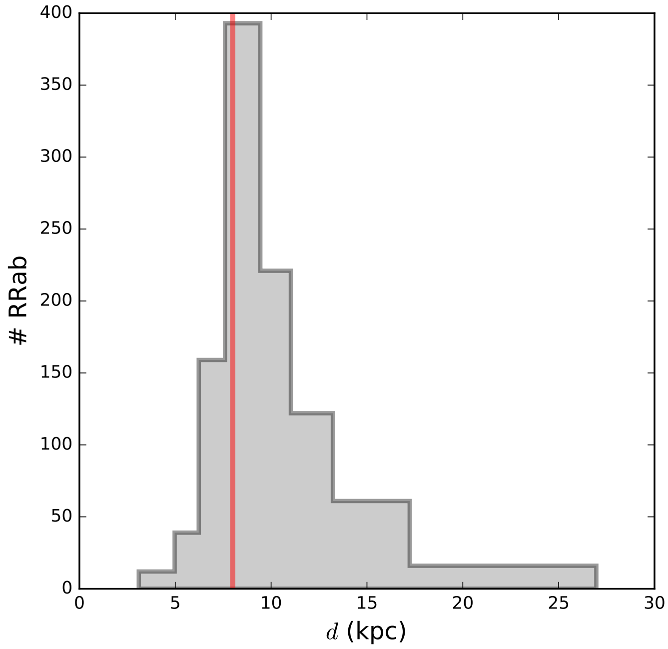


**Fig. 6.** Distribution of distances of the RR Lyrae stars found. The vertical line represents the Galactic centre derived by Dékány et al. (2013) with OGLE-III RR Lyrae stars of $R_0 \approx 8.33$ kpc.

are important distance indicators (e.g. RR Lyrae and Cepheids, among others), but in addition to this method, the red clump stars were also used in near-IR single-epoch studies to derive accurate distances to the Milky Way edge (Minniti et al. 2011), bulge (Alves 2000), or the Large Magellanic Cloud (Alves et al. 2002). This feature of the red clump stars has been used recently to discover the X-shaped structure of the Milky Way (McWilliam & Zoccali 2010; Nataf et al. 2010; Saito et al. 2011; Wegg & Gerhard 2013) that contains a bar at its central (Rattenbury et al. 2007; Gonzalez et al. 2011). This structure probably vanishes with decreasing metallicity of stars, and it is not expected in an old stellar population (Ness et al. 2012). It is clear and well studied that the red clump stars follow this barred Galactic feature, but in the RR Lyrae case there is no clear evidence for the same trend. On the one hand Pietrukowicz et al. (2012) with OGLE-III RR Lyrae stars claim the existence of the barred structure rotated about 30° with respect to the line of sight between the Sun and the Galactic centre. On the other hand, Dékány et al. (2013) completely rule out this possibility using the same dataset, but included the near-IR results of the VVV Survey.

We used our catalogue to compare the distribution of RR Lyrae at low Galactic latitude with the distribution of red clump stars in the same analyzed tiles. Both catalogues were divided into three longitude bins: $-10° < \ell < -3.5°$; $-3.5° < \ell < 3.5°$; and $3.5° < \ell < 10°$. The red clump stars were selected with the same technique described in Minniti et al. (2011) with magnitudes $K_s < 15$, effectively limiting our study to red clump stars at distances closer than ~20 kpc. The distributions of the red clump stars also include the contribution of the underlying RGB. The RGB does not change the position of the red clump, thus the distributions are suitable for our comparison purposes. Assuming an intrinsic red clump absolute magnitude $M_{K_s} = -1.55$ and an intrinsic red clump colour $(J - K_s)_0 = 0.68$, as given by Gonzalez et al. (2011) for Baade's window red clump stars, the distance equation yields

$$\mu = -5 + 5 \log d\,(\mathrm{pc}) = K_s - 0.73(J - K_s) + 2.05, \quad (3)$$

where the Cardelli et al. (1989) extinction law was assumed.

Figure 8 shows the result of the comparison between the distance distribution of red clump and RR Lyrae stars. The red vertical line shows the mean distance value of a single-Gaussian fit to the RR Lyrae in each longitude bin, namely $d_{\mathrm{RRL}} \sim 9.01$, 8.63, and 8.98 kpc, from positive to negative longitudes, respectively, with associated standard deviations of $\sigma_{\mathrm{RRL}} \sim 1.36$, 1.31, and 1.35. Clearly, the variation in the mean distance across the longitude direction is negligible for the RR Lyrae distribution. Red clump stars, on the contrary, show a single peak at $d_{\mathrm{RC}} \sim 6.8$ kpc at positive longitudes, two peaks at $d_{\mathrm{RC}} \sim 6.8$ and 9.5 kpc across the minor axis, and a single peak at $d_{\mathrm{RC}} \sim 9.4$ kpc at negative longitudes. In all three cases, a two-sample Kolmogorov-Smirnov test reveals that the distributions of red clump and RR Lyrae stars are indeed different, with higher than 98.9% probability. This strongly suggests that the red clump stars (but not the RR Lyrae) follow the main Galactic bar, flaring up into a peanut shape (or X-shape) far away from the Galactic plane. The marked difference in the distance distribution of RR Lyrae variables and red clump stars confirms at low latitudes the conclusion by Dékány et al. (2013) that RR Lyrae and RC stars trace two different components in the bulge.

## 4. Summary

A search for RR Lyrae stars was performed in more than ~47 sq deg in the outer parts of the Galactic bulge observed by the VVV Survey. In total, more than 1000 fundamental mode RR Lyrae stars were found in this area, with an estimated completeness level of 80% for $K_s \leq 15$ mag. We analyzed their periods, amplitudes, light curve shapes, and 3D positions within the Galaxy. This sample allows us to compare the distribution along the Galactic longitude of RR Lyrae and red clump stars, resulting in statistically very significant differences of more than 1.5 kpc between the peaks of both distributions. These differences prevail along the Galactic latitudes observed by the VVV Survey that shows an unchanged RR Lyrae distance distribution and a moving red clump distribution tracing the Milky Way bar. This result fully supports the work of Dékány et al. (2013) and Kunder et al. (2016), which postulates a spheroidal distribution of the RR Lyrae stars in the Galactic bulge, but does not trace the strong bar of the red clump stars. A complete view of the RR Lyrae stars over the entire Galactic bulge will be unveiled

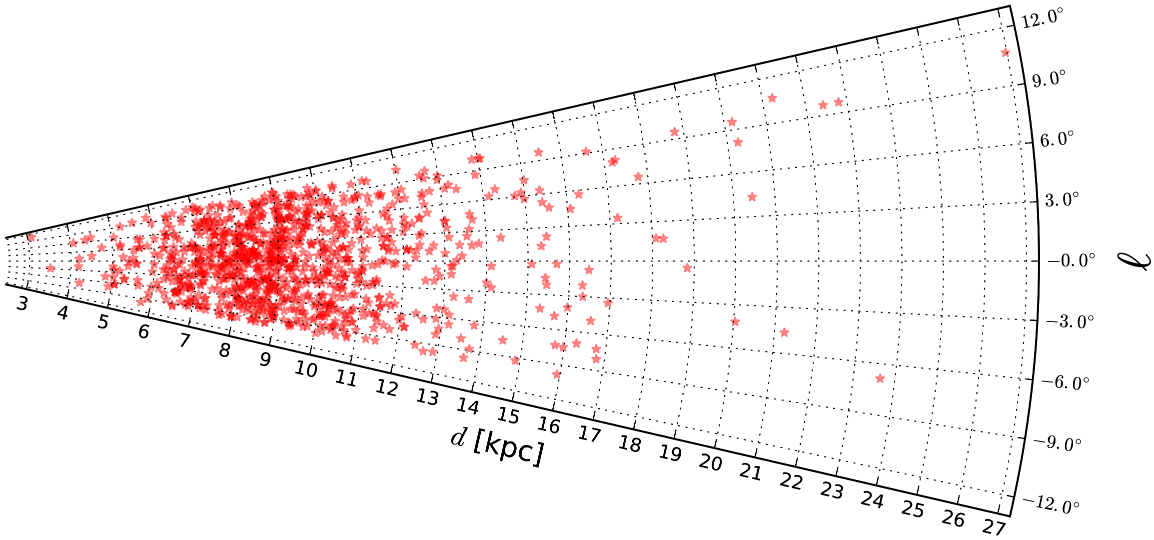


**Fig. 7.** Cone-view ($d$, $\ell$) of the analyzed area in the Galactic bulge. The sample is concentrated around the projection of the Galactic centre.

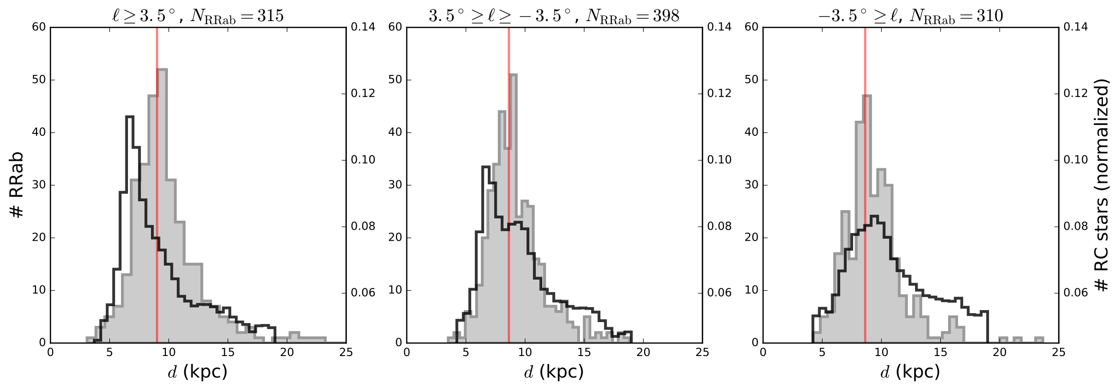


**Fig. 8.** Histogram of distances of RR Lyrae (filled) and red clump stars (steps) as function of Galactic latitude ($\ell$). The distributions of the red clump stars include also the underlying RGB, but since those do not affect the position of the red clump the distributions are suitable for our comparison purposes. The total number of red clump stars in the same areas overwhelms the number of RR Lyrae, thus the histogram showing their distribution in distance was normalized for better visualization. The vertical line represents the RR Lyrae mean distance of each region.

when fully automatic searches in the VVV Survey area is completed (Catelan et al. 2013b; Angeloni et al. 2014).

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## Appendix A: List of VVV RRab variables

Table A.1 lists the main parameters of the 1019 ab-type RR Lyrae stars discovered in this work. For each object we provide the VVV name, equatorial and Galactic coordinates, mean $K_s$-band weighted-magnitude, period, amplitude, and heliocentric distance. In Table A.2 we list the VVV RR Lyrae matching variables in the General Catalogue of Variable Stars (GCVS).

**Table A.1.** VVV RRab variables.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J175459.11−413137.1 | 17:54:59.11 | −41:31:37.1 | −9.908 | −8.039 | 14.641 | 0.472833 | 0.30 | 10.0 |
| J175601.56−412549.0 | 17:56:01.56 | −41:25:49.0 | −9.727 | −8.161 | 13.998 | 0.656728 | 0.26 | 8.8 |
| J175609.49−410752.7 | 17:56:09.49 | −41:07:52.7 | −9.451 | −8.037 | 14.009 | 0.541568 | 0.37 | 8.0 |
| J175628.40−411745.8 | 17:56:28.40 | −41:17:45.8 | −9.567 | −8.169 | 13.651 | 0.517874 | 0.32 | 6.5 |
| J175718.55−412623.3 | 17:57:18.55 | −41:26:23.3 | −9.617 | −8.376 | 14.262 | 0.481343 | 0.35 | 8.4 |
| J175727.54−414338.0 | 17:57:27.54 | −41:43:38.0 | −9.858 | −8.540 | 14.875 | 0.589605 | 0.34 | 12.7 |
| J175733.77−412426.2 | 17:57:33.77 | −41:24:26.2 | −9.565 | −8.402 | 14.465 | 0.683723 | 0.23 | 11.2 |
| J175752.28−403611.6 | 17:57:52.28 | −40:36:11.6 | −8.826 | −8.063 | 14.261 | 0.569084 | 0.32 | 9.2 |
| J175754.28−404601.9 | 17:57:54.28 | −40:46:01.9 | −8.968 | −8.148 | 14.476 | 0.617486 | 0.34 | 10.7 |
| J175819.66−414624.9 | 17:58:19.66 | −41:46:24.9 | −9.820 | −8.704 | 15.012 | 0.599208 | 0.38 | 13.6 |
| J175830.07−414442.0 | 17:58:30.07 | −41:44:42.0 | −9.778 | −8.719 | 14.348 | 0.671317 | 0.27 | 10.5 |
| J175837.43−411752.1 | 17:58:37.43 | −41:17:52.1 | −9.371 | −8.523 | 14.134 | 0.662357 | 0.28 | 9.4 |
| J175851.82−414716.9 | 17:58:51.82 | −41:47:16.9 | −9.784 | −8.799 | 14.473 | 0.628840 | 0.26 | 10.8 |
| J175852.19−412131.5 | 17:58:52.19 | −41:21:31.5 | −9.402 | −8.593 | 13.769 | 0.637263 | 0.26 | 7.7 |
| J175854.86−412915.7 | 17:58:54.86 | −41:29:15.7 | −9.513 | −8.663 | 14.283 | 0.474424 | 0.30 | 8.5 |
| J175923.54−400457.8 | 17:59:23.54 | −40:04:57.8 | −8.224 | −8.065 | 13.831 | 0.484907 | 0.32 | 6.9 |
| J175948.43−403817.5 | 17:59:48.43 | −40:38:17.5 | −8.678 | −8.402 | 15.035 | 0.392449 | 0.36 | 11.0 |
| J175955.47−403207.4 | 17:59:55.47 | −40:32:07.4 | −8.576 | −8.372 | 14.506 | 0.571716 | 0.30 | 10.4 |
| J180024.80−415822.5 | 18:00:24.80 | −41:58:22.5 | −9.808 | −9.140 | 14.087 | 0.578781 | 0.29 | 8.6 |
| J180025.54−405436.0 | 18:00:25.54 | −40:54:36.0 | −8.862 | −8.635 | 14.633 | 0.508143 | 0.28 | 10.4 |
| J180025.80−403739.7 | 18:00:25.80 | −40:37:39.7 | −8.611 | −8.500 | 14.594 | 0.548249 | 0.34 | 10.6 |
| J180031.75−400913.3 | 18:00:31.75 | −40:09:13.3 | −8.181 | −8.290 | 14.412 | 0.567270 | 0.25 | 9.9 |
| J180038.48−410734.9 | 18:00:38.48 | −41:07:34.9 | −9.035 | −8.774 | 14.036 | 0.489627 | 0.28 | 7.6 |
| J180039.53−400902.4 | 18:00:39.53 | −40:09:02.4 | −8.167 | −8.310 | 13.515 | 0.649705 | 0.31 | 6.9 |
| J180041.35−411613.9 * | 18:00:41.35 | −41:16:13.9 | −9.158 | −8.851 | 14.182 | 0.629759 | 0.36 | 9.4 |
| J180043.58−393334.9 | 18:00:43.58 | −39:33:34.9 | −7.637 | −8.037 | 14.305 | 0.600413 | 0.34 | 9.7 |
| J180047.28−420358.3 * | 18:00:47.28 | −42:03:58.3 | −9.858 | −9.246 | 13.219 | 0.604051 | 0.28 | 5.8 |
| J180051.02−395145.4 | 18:00:51.02 | −39:51:45.4 | −7.894 | −8.204 | 13.298 | 0.806959 | 0.24 | 7.0 |
| J180052.96−411645.6 | 18:00:52.96 | −41:16:45.6 | −9.149 | −8.887 | 14.448 | 0.598466 | 0.31 | 10.4 |
| J180053.51−394347.3 | 18:00:53.51 | −39:43:47.3 | −7.772 | −8.147 | 14.244 | 0.538057 | 0.34 | 8.9 |
| J180058.03−412928.6 | 18:00:58.03 | −41:29:28.6 | −9.330 | −9.002 | 15.033 | 0.495587 | 0.34 | 12.4 |
| J180059.97−401819.4 | 18:00:59.97 | −40:18:19.4 | −8.273 | −8.441 | 14.301 | 0.498925 | 0.33 | 8.8 |
| J180117.17−393923.0 | 18:01:17.17 | −39:39:23.0 | −7.670 | −8.178 | 13.988 | 0.534302 | 0.34 | 7.8 |
| J180126.10−410043.4 | 18:01:26.10 | −41:00:43.4 | −8.861 | −8.851 | 14.418 | 0.585954 | 0.27 | 10.1 |
| J180129.07−395817.7 | 18:01:29.07 | −39:58:17.7 | −7.931 | −8.363 | 14.493 | 0.583019 | 0.23 | 10.5 |
| J180133.14−420003.9 | 18:01:33.14 | −42:00:03.9 | −9.732 | −9.340 | 14.146 | 0.448021 | 0.32 | 7.7 |
| J180136.04−415026.5 | 18:01:36.04 | −41:50:26.5 | −9.584 | −9.272 | 14.728 | 0.560897 | 0.31 | 11.5 |
| J180138.52−395238.8 * | 18:01:38.52 | −39:52:38.8 | −7.833 | −8.344 | 14.184 | 0.456159 | 0.22 | 7.9 |
| J180138.91−412209.0 | 18:01:38.91 | −41:22:09.0 | −9.159 | −9.056 | 13.779 | 0.572194 | 0.27 | 7.3 |
| J180142.05−393258.3 | 18:01:42.05 | −39:32:58.3 | −7.537 | −8.197 | 15.202 | 0.566707 | 0.27 | 14.5 |
| J180203.53−400432.9 | 18:02:03.53 | −40:04:32.9 | −7.971 | −8.509 | 14.503 | 0.526078 | 0.23 | 9.9 |
| J180206.50−390151.6 | 18:02:06.50 | −39:01:51.6 | −7.039 | −8.018 | 14.054 | 0.713638 | 0.22 | 9.4 |
| J180207.98−400449.7 | 18:02:07.98 | −40:04:49.7 | −7.968 | −8.524 | 14.109 | 0.569726 | 0.25 | 8.6 |
| J180214.87−412731.0 | 18:02:14.87 | −41:27:31.0 | −9.185 | −9.197 | 14.455 | 0.535828 | 0.27 | 9.8 |
| J180214.90−391059.2 | 18:02:14.90 | −39:10:59.2 | −7.161 | −8.115 | 13.910 | 0.500065 | 0.27 | 7.3 |
| J180218.28−413322.1 * | 18:02:18.28 | −41:33:22.1 | −9.267 | −9.253 | 13.345 | 0.678049 | 0.24 | 6.5 |
| J180222.40−412829.4 | 18:02:22.40 | −41:28:29.4 | −9.188 | −9.226 | 13.970 | 0.756624 | 0.31 | 9.3 |
| J180242.19−393612.4 * | 18:02:42.19 | −39:36:12.4 | −7.491 | −8.393 | 14.712 | 0.628354 | 0.31 | 12.1 |
| J180252.00−401219.3 | 18:02:52.00 | −40:12:19.3 | −8.012 | −8.707 | 13.773 | 0.621813 | 0.35 | 7.6 |
| J180259.55−404442.6 | 18:02:59.55 | −40:44:42.6 | −8.482 | −8.983 | 14.299 | 0.472170 | 0.42 | 8.5 |
| J180307.75−421805.3 | 18:03:07.75 | −42:18:05.3 | −9.860 | −9.739 | 15.222 | 0.660982 | 0.37 | 15.9 |
| J180314.24−411102.7 | 18:03:14.24 | −41:11:02.7 | −8.851 | −9.231 | 15.214 | 0.507123 | 0.32 | 13.7 |
| J180318.09−384242.0 | 18:03:18.09 | −38:42:42.0 | −6.643 | −8.070 | 14.053 | 0.487555 | 0.29 | 7.7 |
| J180318.38−383758.1 | 18:03:18.38 | −38:37:58.1 | −6.573 | −8.033 | 13.474 | 0.711698 | 0.27 | 7.1 |
| J180318.97−412248.6 | 18:03:18.97 | −41:22:48.6 | −9.019 | −9.337 | 13.357 | 0.746910 | 0.24 | 6.9 |
| J180319.85−384537.6 | 18:03:19.85 | −38:45:37.6 | −6.684 | −8.098 | 13.943 | 0.671998 | 0.29 | 8.7 |
| J180324.07−405300.9 | 18:03:24.07 | −40:53:00.9 | −8.568 | −9.117 | 13.568 | 0.657026 | 0.28 | 7.1 |
| J180329.14−404403.2 | 18:03:29.14 | −40:44:03.2 | −8.427 | −9.061 | 13.299 | 0.745234 | 0.32 | 6.7 |

**Notes.** VVV IDs marked with a single asterisk are the objects matching a variable in the General Catalog of Variable Stars (GCVS). The corresponding GCVS names are presented in Table A.2. Three RRab stars previously discovered by OGLE-IV are marked with double asterisks, namely: J181632.17−334319.8 = OGLE-BLG-RRLYR-35577, J181727.29−335532.1 = OGLE-BLG-RRLYR-35765 and J181745.11−333025.2 = OGLE-BLG-RRLYR-35810.

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J180334.27−421303.7 | 18:03:34.27 | −42:13:03.7 | −9.746 | −9.772 | 15.045 | 0.523470 | 0.34 | 12.9 |
| J180335.31−395348.3 | 18:03:35.31 | −39:53:48.3 | −7.671 | −8.682 | 13.765 | 0.539700 | 0.29 | 7.1 |
| J180342.46−392615.5 * | 18:03:42.46 | −39:26:15.5 | −7.251 | −8.484 | 14.093 | 0.390447 | 0.41 | 6.9 |
| J180345.50−420853.7 | 18:03:45.50 | −42:08:53.7 | −9.668 | −9.770 | 14.076 | 0.511941 | 0.33 | 8.0 |
| J180346.93−390232.0 | 18:03:46.93 | −39:02:32.0 | −6.892 | −8.310 | 14.304 | 0.508466 | 0.31 | 8.9 |
| J180351.95−390948.3 * | 18:03:51.95 | −39:09:48.3 | −6.992 | −8.381 | 13.844 | 0.534605 | 0.30 | 7.3 |
| J180356.13−400120.6 | 18:03:56.13 | −40:01:20.6 | −7.751 | −8.800 | 14.646 | 0.543759 | 0.31 | 10.8 |
| J180400.42−395743.4 | 18:04:00.42 | −39:57:43.4 | −7.691 | −8.783 | 14.005 | 0.562756 | 0.30 | 8.1 |
| J180407.52−405051.7 | 18:04:07.52 | −40:50:51.7 | −8.471 | −9.221 | 14.442 | 0.534985 | 0.32 | 9.7 |
| J180407.93−410727.3 | 18:04:07.93 | −41:07:27.3 | −8.717 | −9.352 | 14.227 | 0.513896 | 0.31 | 8.6 |
| J180413.93−383310.2 | 18:04:13.93 | −38:33:10.2 | −6.415 | −8.154 | 14.822 | 0.496739 | 0.37 | 11.2 |
| J180415.38−402140.9 | 18:04:15.38 | −40:21:40.9 | −8.024 | −9.014 | 14.265 | 0.534248 | 0.37 | 8.9 |
| J180416.19−390041.6 * | 18:04:16.19 | −39:00:41.6 | −6.819 | −8.378 | 13.632 | 0.535857 | 0.24 | 6.6 |
| J180424.81−382539.8 | 18:04:24.81 | −38:25:39.8 | −6.287 | −8.126 | 13.892 | 0.437742 | 0.29 | 6.7 |
| J180426.60−420755.7 | 18:04:26.60 | −42:07:55.7 | −9.593 | −9.875 | 14.598 | 0.560774 | 0.26 | 10.8 |
| J180427.83−383712.3 | 18:04:27.83 | −38:37:12.3 | −6.453 | −8.226 | 15.328 | 0.460588 | 0.26 | 13.8 |
| J180429.41−404354.8 | 18:04:29.41 | −40:43:54.8 | −8.334 | −9.227 | 14.112 | 0.485555 | 0.35 | 7.9 |
| J180431.95−411700.5 * | 18:04:31.95 | −41:17:00.5 | −8.824 | −9.493 | 13.393 | 0.541703 | 0.30 | 5.9 |
| J180432.08−393840.2 | 18:04:32.08 | −39:38:40.2 | −7.359 | −8.723 | 15.659 | 0.439425 | 0.39 | 15.8 |
| J180433.29−382919.5 | 18:04:33.29 | −38:29:19.5 | −6.328 | −8.179 | 14.376 | 0.465643 | 0.34 | 8.8 |
| J180434.24−393614.6 | 18:04:34.24 | −39:36:14.6 | −7.320 | −8.710 | 14.395 | 0.474892 | 0.31 | 8.9 |
| J180439.18−394556.3 | 18:04:39.18 | −39:45:56.3 | −7.456 | −8.800 | 14.150 | 0.551682 | 0.31 | 8.6 |
| J180441.26−421253.4 | 18:04:41.26 | −42:12:53.4 | −9.646 | −9.954 | 14.031 | 0.638696 | 0.36 | 8.8 |
| J180457.98−383144.8 | 18:04:57.98 | −38:31:44.8 | −6.325 | −8.269 | 14.543 | 0.592550 | 0.33 | 10.8 |
| J180500.80−415330.1 | 18:05:00.80 | −41:53:30.1 | −9.327 | −9.857 | 14.000 | 0.625493 | 0.29 | 8.6 |
| J180501.55−413619.8 | 18:05:01.55 | −41:36:19.8 | −9.069 | −9.725 | 13.785 | 0.548456 | 0.29 | 7.2 |
| J180506.94−411744.6 | 18:05:06.94 | −41:17:44.6 | −8.783 | −9.596 | 13.842 | 0.786720 | 0.28 | 9.0 |
| J180508.45−385408.1 | 18:05:08.45 | −38:54:08.1 | −6.641 | −8.476 | 15.175 | 0.485512 | 0.24 | 13.2 |
| J180514.45−405946.8 | 18:05:14.45 | −40:59:46.8 | −8.504 | −9.477 | 14.254 | 0.543839 | 0.34 | 9.0 |
| J180517.94−394136.4 | 18:05:17.94 | −39:41:36.4 | −7.333 | −8.876 | 13.974 | 0.562658 | 0.26 | 8.0 |
| J180521.73−381552.2 | 18:05:21.73 | −38:15:52.2 | −6.052 | −8.213 | 14.580 | 0.577634 | 0.32 | 10.9 |
| J180522.12−392215.3 | 18:05:22.12 | −39:22:15.3 | −7.038 | −8.736 | 14.129 | 0.528594 | 0.26 | 8.3 |
| J180522.92−384605.4 | 18:05:22.92 | −38:46:05.4 | −6.499 | −8.454 | 14.095 | 0.517518 | 0.37 | 8.1 |
| J180523.00−415030.5 | 18:05:23.00 | −41:50:30.5 | −9.250 | −9.894 | 15.224 | 0.582245 | 0.33 | 14.9 |
| J180534.80−421647.8 * | 18:05:34.80 | −42:16:47.8 | −9.627 | −10.130 | 14.132 | 0.485058 | 0.23 | 8.0 |
| J180536.41−400914.8 | 18:05:36.41 | −40:09:14.8 | −7.716 | −9.144 | 14.196 | 0.540141 | 0.24 | 8.7 |
| J180537.74−421241.6 | 18:05:37.74 | −42:12:41.6 | −9.561 | −10.107 | 14.584 | 0.510837 | 0.29 | 10.2 |
| J180547.12−395054.3 | 18:05:47.12 | −39:50:54.3 | −7.427 | −9.031 | 14.787 | 0.467360 | 0.35 | 10.7 |
| J180547.69−401955.6 | 18:05:47.69 | −40:19:55.6 | −7.859 | −9.259 | 14.865 | 0.615358 | 0.19 | 12.9 |
| J180548.77−421314.0 * | 18:05:48.77 | −42:13:14.0 | −9.553 | −10.141 | 14.232 | 0.460162 | 0.35 | 8.1 |
| J180553.06−382624.7 | 18:05:53.06 | −38:26:24.7 | −6.160 | −8.386 | 14.364 | 0.557777 | 0.34 | 9.6 |
| J180555.71−421832.3 | 18:05:55.71 | −42:18:32.3 | −9.622 | −10.201 | 14.460 | 0.491162 | 0.37 | 9.4 |
| J180556.04−394418.1 * | 18:05:56.04 | −39:44:18.1 | −7.315 | −9.004 | 14.151 | 0.563990 | 0.33 | 8.7 |
| J180556.80−420223.7 | 18:05:56.80 | −42:02:23.7 | −9.378 | −10.079 | 14.230 | 0.642893 | 0.25 | 9.7 |
| J180603.18−393014.7 | 18:06:03.18 | −39:30:14.7 | −7.094 | −8.915 | 14.488 | 0.545768 | 0.28 | 10.1 |
| J180608.88−380449.7 | 18:06:08.88 | −38:04:49.7 | −5.815 | −8.262 | 14.020 | 0.499059 | 0.24 | 7.6 |
| J180610.23−381015.4 | 18:06:10.23 | −38:10:15.4 | −5.893 | −8.308 | 14.120 | 0.471076 | 0.20 | 7.8 |
| J180610.70−392742.8 | 18:06:10.70 | −39:27:42.8 | −7.045 | −8.917 | 14.252 | 0.486107 | 0.31 | 8.4 |
| J180611.40−375419.0 | 18:06:11.40 | −37:54:19.0 | −5.655 | −8.186 | 15.152 | 0.494748 | 0.17 | 13.2 |
| J180628.50−375807.5 | 18:06:28.50 | −37:58:07.5 | −5.685 | −8.266 | 14.204 | 0.505802 | 0.28 | 8.4 |
| J180631.39−400108.9 | 18:06:31.39 | −40:01:08.9 | −7.512 | −9.236 | 15.042 | 0.468733 | 0.31 | 12.1 |
| J180636.51−393543.8 * | 18:06:36.51 | −39:35:43.8 | −7.125 | −9.052 | 12.712 | 0.537527 | 0.27 | 4.2 |
| J180640.53−403848.1 | 18:06:40.53 | −40:38:48.1 | −8.062 | −9.554 | 15.580 | 0.529916 | 0.30 | 16.8 |
| J180642.69−410352.1 * | 18:06:42.69 | −41:03:52.1 | −8.434 | −9.754 | 14.264 | 0.602442 | 0.23 | 9.5 |
| J180645.52−394908.3 | 18:06:45.52 | −39:49:08.3 | −7.312 | −9.182 | 14.716 | 0.565042 | 0.24 | 11.5 |
| J180646.23−394644.8 | 18:06:46.23 | −39:46:44.8 | −7.275 | −9.166 | 13.800 | 0.912051 | 0.24 | 9.5 |
| J180649.01−414058.6 | 18:06:49.01 | −41:40:58.6 | −8.981 | −10.058 | 14.295 | 0.516761 | 0.30 | 8.9 |
| J180656.21−385517.7 * | 18:06:56.21 | −38:55:17.7 | −6.492 | −8.793 | 13.833 | 0.682757 | 0.24 | 8.3 |
| J180658.83−412738.2 | 18:06:58.83 | −41:27:38.2 | −8.766 | −9.982 | 14.638 | 0.492065 | 0.30 | 10.2 |
| J180701.43−383135.1 | 18:07:01.43 | −38:31:35.1 | −6.131 | −8.623 | 14.557 | 0.522870 | 0.36 | 10.2 |
| J180712.91−380835.2 | 18:07:12.91 | −38:08:35.2 | −5.771 | −8.477 | 14.577 | 0.424558 | 0.26 | 9.2 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J180713.57−413121.7 | 18:07:13.57 | −41:31:21.7 | −8.801 | −10.052 | 14.443 | 0.519276 | 0.21 | 9.6 |
| J180715.53−382158.1 | 18:07:15.53 | −38:21:58.1 | −5.966 | −8.589 | 14.914 | 0.445800 | 0.23 | 11.1 |
| J180718.20−400044.4 | 18:07:18.20 | −40:00:44.4 | −7.436 | −9.365 | 14.176 | 0.729320 | 0.18 | 10.1 |
| J180720.63−410313.3 | 18:07:20.63 | −41:03:13.3 | −8.368 | −9.854 | 13.387 | 0.816446 | 0.17 | 7.3 |
| J180721.68−401440.9 | 18:07:21.68 | −40:14:40.9 | −7.639 | −9.483 | 14.370 | 0.491681 | 0.28 | 9.0 |
| J180728.98−374352.8 | 18:07:28.98 | −37:43:52.8 | −5.378 | −8.330 | 14.306 | 0.611396 | 0.22 | 9.8 |
| J180731.38−392338.6 | 18:07:31.38 | −39:23:38.6 | −6.862 | −9.114 | 14.278 | 0.521222 | 0.27 | 8.9 |
| J180736.67−413337.7 | 18:07:36.67 | −41:33:37.7 | −8.801 | −10.133 | 13.537 | 0.622886 | 0.19 | 6.8 |
| J180740.20−403538.9 | 18:07:40.20 | −40:35:38.9 | −7.926 | −9.697 | 14.811 | 0.704642 | 0.30 | 13.5 |
| J180743.06−411212.5 | 18:07:43.06 | −41:12:12.5 | −8.470 | −9.986 | 13.700 | 0.605539 | 0.23 | 7.3 |
| J180755.27−400553.7 | 18:07:55.27 | −40:05:53.7 | −7.457 | −9.509 | 15.367 | 0.583989 | 0.29 | 16.0 |
| J180756.11−383429.3 | 18:07:56.11 | −38:34:29.3 | −6.090 | −8.803 | 14.206 | 0.530721 | 0.26 | 8.7 |
| J180758.88−370052.1 | 18:07:58.88 | −37:00:52.1 | −4.692 | −8.081 | 14.822 | 0.487522 | 0.25 | 11.1 |
| J180800.40−374514.8 * | 18:08:00.40 | −37:45:14.8 | −5.350 | −8.432 | 13.830 | 0.488926 | 0.34 | 6.9 |
| J180800.66−392540.5 | 18:08:00.66 | −39:25:40.5 | −6.847 | −9.214 | 14.165 | 0.499715 | 0.32 | 8.2 |
| J180801.62−371510.7 | 18:08:01.62 | −37:15:10.7 | −4.900 | −8.201 | 14.196 | 0.472306 | 0.35 | 8.1 |
| J180804.68−372205.5 * | 18:08:04.68 | −37:22:05.5 | −4.998 | −8.264 | 13.697 | 0.530400 | 0.31 | 6.8 |
| J180818.85−403316.4 | 18:08:18.85 | −40:33:16.4 | −7.833 | −9.787 | 13.742 | 0.746960 | 0.27 | 8.3 |
| J180820.91−391057.5 | 18:08:20.91 | −39:10:57.5 | −6.597 | −9.157 | 13.229 | 0.756601 | 0.28 | 6.5 |
| J180822.15−385446.0 | 18:08:22.15 | −38:54:46.0 | −6.353 | −9.036 | 14.812 | 0.567469 | 0.33 | 12.0 |
| J180823.21−372833.8 | 18:08:23.21 | −37:28:33.8 | −5.066 | −8.368 | 14.381 | 0.464149 | 0.30 | 8.8 |
| J180827.85−382240.2 | 18:08:27.85 | −38:22:40.2 | −5.865 | −8.803 | 14.199 | 0.501215 | 0.34 | 8.4 |
| J180832.53−405718.1 | 18:08:32.53 | −40:57:18.1 | −8.173 | −10.01 | 13.929 | 0.616637 | 0.33 | 8.2 |
| J180836.95−395145.5 | 18:08:36.95 | −39:51:45.5 | −7.183 | −9.518 | 14.540 | 0.478270 | 0.32 | 9.6 |
| J180836.98−405522.9 | 18:08:36.98 | −40:55:22.9 | −8.138 | −10.007 | 14.410 | 0.736323 | 0.36 | 11.4 |
| J180838.52−411116.8 | 18:08:38.52 | −41:11:16.8 | −8.375 | −10.133 | 13.506 | 0.562019 | 0.27 | 6.4 |
| J180840.45−371438.0 | 18:08:40.45 | −37:14:38.0 | −4.831 | −8.310 | 15.509 | 0.497124 | 0.35 | 15.7 |
| J180842.70−385557.8 * | 18:08:42.70 | −38:55:57.8 | −6.339 | −9.104 | 13.293 | 0.447351 | 0.34 | 5.1 |
| J180844.36−411703.5 | 18:08:44.36 | −41:17:03.5 | −8.453 | −10.194 | 14.678 | 0.493513 | 0.26 | 10.5 |
| J180846.34−395529.5 | 18:08:46.34 | −39:55:29.5 | −7.225 | −9.574 | 15.188 | 0.464755 | 0.31 | 13.0 |
| J180849.63−392831.6 | 18:08:49.63 | −39:28:31.6 | −6.816 | −9.375 | 14.274 | 0.749614 | 0.32 | 10.8 |
| J180851.52−363732.8 | 18:08:51.52 | −36:37:32.8 | −4.262 | −8.053 | 15.464 | 0.495692 | 0.30 | 15.3 |
| J180855.13−401650.0 | 18:08:55.13 | −40:16:50.0 | −7.532 | −9.763 | 14.424 | 0.577731 | 0.23 | 10.1 |
| J180856.08−372615.5 | 18:08:56.08 | −37:26:15.5 | −4.980 | −8.447 | 14.129 | 0.481726 | 0.25 | 7.9 |
| J180858.57−393240.9 | 18:08:58.57 | −39:32:40.9 | −6.865 | −9.433 | 16.293 | 0.526432 | 0.36 | 23.6 |
| J180859.74−371655.7 | 18:08:59.74 | −37:16:55.7 | −4.835 | −8.385 | 13.781 | 0.505906 | 0.23 | 6.9 |
| J180906.12−385330.9 | 18:09:06.12 | −38:53:30.9 | −6.267 | −9.152 | 14.263 | 0.443135 | 0.34 | 8.1 |
| J180907.77−403218.2 | 18:09:07.77 | −40:32:18.2 | −7.746 | −9.917 | 15.100 | 0.363689 | 0.36 | 10.9 |
| J180908.23−405758.1 * | 18:09:08.23 | −40:57:58.1 | −8.131 | −10.114 | 14.238 | 0.485446 | 0.28 | 8.4 |
| J180911.36−373841.8 | 18:09:11.36 | −37:38:41.8 | −5.141 | −8.588 | 14.843 | 0.640246 | 0.33 | 13.0 |
| J180920.21−383353.6 | 18:09:20.21 | −38:33:53.6 | −5.952 | −9.041 | 13.288 | 0.606127 | 0.26 | 6.0 |
| J180921.59−392419.5 | 18:09:21.59 | −39:24:19.5 | −6.705 | −9.434 | 14.482 | 0.693621 | 0.31 | 11.4 |
| J180921.59−404349.4 * | 18:09:21.59 | −40:43:49.4 | −7.899 | −10.044 | 14.400 | 0.660589 | 0.30 | 10.7 |
| J180922.87−390927.8 | 18:09:22.87 | −39:09:27.8 | −6.480 | −9.323 | 13.159 | 0.809363 | 0.25 | 6.5 |
| J180924.54−401447.4 | 18:09:24.54 | −40:14:47.4 | −7.458 | −9.830 | 14.258 | 0.568469 | 0.28 | 9.2 |
| J180926.28−365108.5 | 18:09:26.28 | −36:51:08.5 | −4.409 | −8.262 | 14.307 | 0.567260 | 0.28 | 9.4 |
| J180926.56−390932.1 * | 18:09:26.56 | −39:09:32.1 | −6.476 | −9.334 | 14.269 | 0.439199 | 0.35 | 8.1 |
| J180927.18−364036.6 | 18:09:27.18 | −36:40:36.6 | −4.251 | −8.183 | 14.374 | 0.472331 | 0.34 | 8.8 |
| J180927.63−383636.9 | 18:09:27.63 | −38:36:36.9 | −5.981 | −9.084 | 13.931 | 0.663033 | 0.28 | 8.5 |
| J180929.82−363652.5 | 18:09:29.82 | −36:36:52.5 | −4.191 | −8.161 | 14.796 | 0.475975 | 0.23 | 10.9 |
| J180942.17−365524.7 | 18:09:42.17 | −36:55:24.7 | −4.448 | −8.342 | 14.791 | 0.527415 | 0.22 | 11.4 |
| J180945.01−401822.3 | 18:09:45.01 | −40:18:22.3 | −7.481 | −9.915 | 13.280 | 0.600875 | 0.22 | 5.9 |
| J180949.72−364838.9 * | 18:09:49.72 | −36:48:38.9 | −4.335 | −8.312 | 13.589 | 0.535395 | 0.27 | 6.4 |
| J180951.68−392552.4 | 18:09:51.68 | −39:25:52.4 | −6.683 | −9.532 | 14.648 | 0.518374 | 0.18 | 10.6 |
| J180952.44−361626.0 | 18:09:52.44 | −36:16:26.0 | −3.851 | −8.069 | 14.147 | 0.588984 | 0.32 | 8.9 |
| J180958.42−380307.7 | 18:09:58.42 | −38:03:07.7 | −5.434 | −8.914 | 14.403 | 0.523034 | 0.25 | 9.4 |
| J181002.67−383833.0 | 18:10:02.67 | −38:38:33.0 | −5.957 | −9.200 | 13.338 | 0.522999 | 0.25 | 5.6 |
| J181011.78−384805.0 | 18:10:11.78 | −38:48:05.0 | −6.086 | −9.299 | 14.166 | 0.610139 | 0.20 | 9.2 |
| J181013.25−405607.6 | 18:10:13.25 | −40:56:07.6 | −8.008 | −10.282 | 14.903 | 0.503069 | 0.33 | 11.8 |
| J181016.09−394207.7 | 18:10:16.09 | −39:42:07.7 | −6.890 | −9.726 | 14.677 | 0.514340 | 0.29 | 10.7 |
| J181017.82−371220.7 | 18:10:17.82 | −37:12:20.7 | −4.645 | −8.578 | 16.236 | 0.454275 | 0.45 | 21.2 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J181018.92−372946.2 | 18:10:18.92 | −37:29:46.2 | −4.903 | −8.716 | 14.632 | 0.474201 | 0.25 | 10.0 |
| J181020.74−400650.8 | 18:10:20.74 | −40:06:50.8 | −7.255 | −9.928 | 14.434 | 0.531426 | 0.32 | 9.7 |
| J181022.56−404726.1 | 18:10:22.56 | −40:47:26.1 | −7.863 | −10.242 | 14.432 | 0.457733 | 0.30 | 8.9 |
| J181023.42−364335.2 | 18:10:23.42 | −36:43:35.2 | −4.207 | −8.372 | 14.146 | 0.652835 | 0.25 | 9.4 |
| J181025.95−375450.8 | 18:10:25.95 | −37:54:50.8 | −5.267 | −8.93 | 14.962 | 0.474816 | 0.36 | 11.7 |
| J181027.91−362807.1 | 18:10:27.91 | −36:28:07.1 | −3.969 | −8.265 | 13.054 | 0.814930 | 0.29 | 6.2 |
| J181031.13−383304.1 | 18:10:31.13 | −38:33:04.1 | −5.832 | −9.24 | 14.284 | 0.580869 | 0.30 | 9.4 |
| J181031.72−373419.9 | 18:10:31.72 | −37:34:19.9 | −4.952 | −8.789 | 13.864 | 0.559572 | 0.23 | 7.5 |
| J181034.26−393635.0 | 18:10:34.26 | −39:36:35.0 | −6.780 | −9.735 | 14.194 | 0.576725 | 0.18 | 9.0 |
| J181035.41−370405.7 | 18:10:35.41 | −37:04:05.7 | −4.494 | −8.566 | 14.210 | 0.470757 | 0.35 | 8.1 |
| J181036.69−393656.6 | 18:10:36.69 | −39:36:56.6 | −6.782 | −9.745 | 14.743 | 0.598695 | 0.24 | 12.0 |
| J181042.59−402037.5 | 18:10:42.59 | −40:20:37.5 | −7.430 | −10.095 | 14.071 | 0.535613 | 0.36 | 8.1 |
| J181042.93−384206.5 | 18:10:42.93 | −38:42:06.5 | −5.949 | −9.343 | 13.997 | 0.608332 | 0.30 | 8.4 |
| J181047.43−395154.1 | 18:10:47.43 | −39:51:54.1 | −6.991 | −9.890 | 14.327 | 0.648496 | 0.33 | 10.2 |
| J181053.31−385903.9 | 18:10:53.31 | −38:59:03.9 | −6.188 | −9.503 | 15.023 | 0.531237 | 0.34 | 12.9 |
| J181058.42−403002.4 | 18:10:58.42 | −40:30:02.4 | −7.549 | −10.211 | 14.172 | 0.728470 | 0.17 | 10.1 |
| J181100.35−391234.4 | 18:11:00.35 | −39:12:34.4 | −6.380 | −9.627 | 14.900 | 0.471125 | 0.25 | 11.3 |
| J181100.42−402858.9 | 18:11:00.42 | −40:28:58.9 | −7.530 | −10.209 | 14.518 | 0.543845 | 0.39 | 10.2 |
| J181103.37−401047.8 | 18:11:03.37 | −40:10:47.8 | −7.251 | −10.079 | 15.713 | 0.468878 | 0.36 | 16.8 |
| J181103.50−385054.5 * | 18:11:03.50 | −38:50:54.5 | −6.050 | −9.470 | 13.990 | 0.557296 | 0.29 | 8.0 |
| J181103.58−361356.5 | 18:11:03.58 | −36:13:56.5 | −3.702 | −8.261 | 13.977 | 0.612775 | 0.19 | 8.4 |
| J181106.66−403516.1 | 18:11:06.66 | −40:35:16.1 | −7.616 | −10.274 | 14.685 | 0.596531 | 0.30 | 11.6 |
| J181106.98−370820.3 | 18:11:06.98 | −37:08:20.3 | −4.508 | −8.692 | 14.219 | 0.543658 | 0.32 | 8.8 |
| J181108.98−381140.4 | 18:11:08.98 | −38:11:40.4 | −5.453 | −9.185 | 14.577 | 0.643468 | 0.30 | 11.5 |
| J181109.39−373847.3 | 18:11:09.39 | −37:38:47.3 | −4.960 | −8.934 | 14.213 | 0.654138 | 0.27 | 9.7 |
| J181111.94−372125.4 * | 18:11:11.94 | −37:21:25.4 | −4.696 | −8.807 | 13.657 | 0.536671 | 0.30 | 6.7 |
| J181113.24−400259.0 | 18:11:13.24 | −40:02:59.0 | −7.119 | −10.048 | 12.921 | 0.590514 | 0.25 | 4.9 |
| J181115.73−362110.3 * | 18:11:15.73 | −36:21:10.3 | −3.790 | −8.353 | 13.705 | 0.778931 | 0.28 | 8.4 |
| J181118.17−400233.8 | 18:11:18.17 | −40:02:33.8 | −7.106 | −10.058 | 13.756 | 0.438847 | 0.30 | 6.3 |
| J181120.29−373100.3 | 18:11:20.29 | −37:31:00.3 | −4.827 | −8.906 | 14.070 | 0.650893 | 0.21 | 9.0 |
| J181128.98−371318.0 | 18:11:28.98 | −37:13:18.0 | −4.548 | −8.795 | 14.232 | 0.545712 | 0.25 | 8.9 |
| J181130.26−354416.0 | 18:11:30.26 | −35:44:16.0 | −3.217 | −8.111 | 13.771 | 0.627778 | 0.31 | 7.7 |
| J181131.38−382345.4 | 18:11:31.38 | −38:23:45.4 | −5.600 | −9.343 | 14.302 | 0.675566 | 0.28 | 10.3 |
| J181133.39−392737.7 * | 18:11:33.39 | −39:27:37.7 | −6.557 | −9.836 | 13.522 | 0.583897 | 0.25 | 6.5 |
| J181134.17−394504.7 | 18:11:34.17 | −39:45:04.7 | −6.819 | −9.971 | 14.188 | 0.588228 | 0.21 | 9.1 |
| J181137.34−384605.6 | 18:11:37.34 | −38:46:05.6 | −5.927 | −9.531 | 14.119 | 0.741625 | 0.17 | 9.9 |
| J181139.52−395655.1 | 18:11:39.52 | −39:56:55.1 | −6.989 | −10.076 | 15.626 | 0.479881 | 0.48 | 16.3 |
| J181140.66−385901.0 | 18:11:40.66 | −38:59:01.0 | −6.116 | −9.639 | 13.583 | 0.491210 | 0.22 | 6.1 |
| J181144.18−372104.9 | 18:11:44.18 | −37:21:04.9 | −4.641 | −8.899 | 14.046 | 0.589150 | 0.13 | 8.5 |
| J181144.32−353244.2 | 18:11:44.32 | −35:32:44.2 | −3.023 | −8.064 | 13.740 | 0.657800 | 0.32 | 7.8 |
| J181145.07−392818.1 | 18:11:45.07 | −39:28:18.1 | −6.550 | −9.875 | 14.513 | 0.567688 | 0.27 | 10.4 |
| J181145.56−391102.8 | 18:11:45.56 | −39:11:02.8 | −6.289 | −9.745 | 14.579 | 0.520855 | 0.22 | 10.3 |
| J181147.73−384114.9 | 18:11:47.73 | −38:41:14.9 | −5.838 | −9.524 | 14.679 | 0.672948 | 0.24 | 12.4 |
| J181150.55−373047.4 | 18:11:50.55 | −37:30:47.4 | −4.777 | −8.993 | 13.320 | 0.764924 | 0.21 | 6.9 |
| J181151.47−370658.3 | 18:11:51.47 | −37:06:58.3 | −4.419 | −8.812 | 13.761 | 0.551910 | 0.26 | 7.1 |
| J181157.07−375547.6 | 18:11:57.07 | −37:55:47.6 | −5.142 | −9.203 | 14.714 | 0.543210 | 0.26 | 11.2 |
| J181158.09−372919.2 | 18:11:58.09 | −37:29:19.2 | −4.743 | −9.004 | 14.085 | 0.845780 | 0.22 | 10.5 |
| J181159.45−400019.7 | 18:11:59.45 | −40:00:19.7 | −7.011 | −10.159 | 14.421 | 0.599790 | 0.23 | 10.3 |
| J181202.26−384356.4 | 18:12:02.26 | −38:43:56.4 | −5.857 | −9.586 | 14.512 | 0.558931 | 0.29 | 10.3 |
| J181204.93−363129.9 | 18:12:04.93 | −36:31:29.9 | −3.867 | −8.579 | 15.061 | 0.570047 | 0.24 | 13.6 |
| J181206.01−391219.9 | 18:12:06.01 | −39:12:19.9 | −6.278 | −9.813 | 14.420 | 0.563517 | 0.28 | 9.9 |
| J181206.96−400454.7 | 18:12:06.96 | −40:04:54.7 | −7.069 | −10.215 | 14.324 | 0.552385 | 0.23 | 9.4 |
| J181211.71−360342.4 | 18:12:11.71 | −36:03:42.4 | −3.442 | −8.385 | 14.373 | 0.640176 | 0.24 | 10.4 |
| J181215.87−354437.1 | 18:12:15.87 | −35:44:37.1 | −3.150 | −8.250 | 14.420 | 0.539561 | 0.24 | 9.7 |
| J181215.95−394830.3 | 18:12:15.95 | −39:48:30.3 | −6.808 | −10.116 | 14.806 | 0.492764 | 0.31 | 11.1 |
| J181219.95−392207.4 | 18:12:19.95 | −39:22:07.4 | −6.405 | −9.928 | 14.883 | 0.576166 | 0.20 | 12.6 |
| J181221.81−365216.9 | 18:12:21.81 | −36:52:16.9 | −4.152 | −8.789 | 13.948 | 0.639795 | 0.20 | 8.4 |
| J181222.44−360134.7 * | 18:12:22.44 | −36:01:34.7 | −3.393 | −8.401 | 14.393 | 0.537138 | 0.28 | 9.5 |
| J181222.54−365726.0 | 18:12:22.54 | −36:57:26.0 | −4.228 | −8.831 | 14.260 | 0.543886 | 0.31 | 9.0 |
| J181230.45−352109.1 * | 18:12:30.45 | −35:21:09.1 | −2.777 | −8.113 | 13.850 | 0.485030 | 0.34 | 6.9 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J181230.46−375218.9 | 18:12:30.46 | −37:52:18.9 | −5.038 | −9.274 | 14.674 | 0.603464 | 0.34 | 11.6 |
| J181230.83−395323.9 | 18:12:30.83 | −39:53:23.9 | −6.860 | −10.196 | 13.954 | 0.652405 | 0.33 | 8.6 |
| J181237.48−350757.4 * | 18:12:37.48 | −35:07:57.4 | −2.569 | −8.032 | 13.692 | 0.477544 | 0.35 | 6.4 |
| J181240.59−364330.2 * | 18:12:40.59 | −36:43:30.2 | −3.991 | −8.777 | 14.586 | 0.445500 | 0.28 | 9.5 |
| J181241.48−370833.3 | 18:12:41.48 | −37:08:33.3 | −4.365 | −8.972 | 14.702 | 0.571893 | 0.27 | 11.5 |
| J181245.83−375541.8 | 18:12:45.83 | −37:55:41.8 | −5.066 | −9.345 | 14.875 | 0.606211 | 0.25 | 12.9 |
| J181246.22−352457.1 * | 18:12:46.22 | −35:24:57.1 | −2.808 | −8.190 | 12.353 | 0.524444 | 0.32 | 3.5 |
| J181247.62−391702.5 | 18:12:47.62 | −39:17:02.5 | −6.287 | −9.969 | 14.530 | 0.564468 | 0.29 | 10.5 |
| J181247.74−390544.2 | 18:12:47.74 | −39:05:44.2 | −6.116 | −9.883 | 13.646 | 0.531912 | 0.32 | 6.6 |
| J181250.96−362307.2 | 18:12:50.96 | −36:23:07.2 | −3.670 | −8.652 | 14.130 | 0.602519 | 0.22 | 8.9 |
| J181251.10−393101.4 | 18:12:51.10 | −39:31:01.4 | −6.493 | −10.084 | 14.166 | 0.917979 | 0.19 | 11.4 |
| J181251.43−384629.8 | 18:12:51.43 | −38:46:29.8 | −5.821 | −9.748 | 14.369 | 0.629426 | 0.24 | 10.3 |
| J181251.85−383309.2 | 18:12:51.85 | −38:33:09.2 | −5.620 | −9.648 | 13.940 | 0.764368 | 0.23 | 9.3 |
| J181252.56−383242.3 | 18:12:52.56 | −38:32:42.3 | −5.612 | −9.646 | 14.293 | 0.557476 | 0.28 | 9.3 |
| J181256.59−381912.2 | 18:12:56.59 | −38:19:12.2 | −5.403 | −9.556 | 13.905 | 0.591478 | 0.22 | 7.9 |
| J181300.08−362149.5 * | 18:13:00.08 | −36:21:49.5 | −3.636 | −8.669 | 14.132 | 0.523733 | 0.32 | 8.3 |
| J181300.84−353924.8 | 18:13:00.84 | −35:39:24.8 | −3.001 | −8.345 | 15.313 | 0.638574 | 0.26 | 16.3 |
| J181301.40−375149.8 | 18:13:01.40 | −37:51:49.8 | −4.984 | −9.361 | 13.671 | 0.526518 | 0.24 | 6.7 |
| J181306.46−373238.6 | 18:13:06.46 | −37:32:38.6 | −4.688 | −9.230 | 13.808 | 0.532229 | 0.28 | 7.1 |
| J181306.57−354528.3 * | 18:13:06.57 | −35:45:28.3 | −3.083 | −8.409 | 13.955 | 0.594375 | 0.26 | 8.1 |
| J181307.24−373449.5 | 18:13:07.24 | −37:34:49.5 | −4.720 | −9.249 | 14.496 | 0.509359 | 0.21 | 9.7 |
| J181309.06−364700.2 | 18:13:09.06 | −36:47:00.2 | −4.000 | −8.889 | 15.360 | 0.588263 | 0.23 | 16.0 |
| J181309.33−372501.6 | 18:13:09.33 | −37:25:01.6 | −4.569 | −9.180 | 14.342 | 0.504370 | 0.31 | 9.0 |
| J181316.33−380958.9 | 18:13:16.33 | −38:09:58.9 | −5.234 | −9.543 | 14.121 | 0.630728 | 0.27 | 9.1 |
| J181330.63−354714.7 * | 18:13:30.63 | −35:47:14.7 | −3.071 | −8.495 | 13.615 | 0.825110 | 0.30 | 8.3 |
| J181331.48−373248.5 | 18:13:31.48 | −37:32:48.5 | −4.652 | −9.304 | 14.344 | 0.687673 | 0.24 | 10.6 |
| J181333.94−362436.3 | 18:13:33.94 | −36:24:36.3 | −3.625 | −8.791 | 13.767 | 0.615684 | 0.46 | 7.6 |
| J181335.48−390257.1 | 18:13:35.48 | −39:02:57.1 | −6.003 | −10.000 | 14.505 | 0.556632 | 0.31 | 10.3 |
| J181345.63−375455.2 * | 18:13:45.63 | −37:54:55.2 | −4.963 | −9.514 | 13.761 | 0.413310 | 0.29 | 6.1 |
| J181349.89−392931.4 * | 18:13:49.89 | −39:29:31.4 | −6.383 | −10.242 | 14.052 | 0.601830 | 0.25 | 8.6 |
| J181350.68−390037.6 | 18:13:50.68 | −39:00:37.6 | −5.946 | −10.026 | 14.557 | 0.522463 | 0.28 | 10.2 |
| J181352.23−352030.4 | 18:13:52.23 | −35:20:30.4 | −2.637 | −8.354 | 14.073 | 0.504500 | 0.23 | 7.9 |
| J181352.62−361430.8 * | 18:13:52.62 | −36:14:30.8 | −3.445 | −8.770 | 13.919 | 0.444735 | 0.34 | 6.8 |
| J181356.78−373218.7 | 18:13:56.78 | −37:32:18.7 | −4.606 | −9.375 | 12.964 | 0.650030 | 0.30 | 5.3 |
| J181357.32−351854.9 | 18:13:57.32 | −35:18:54.9 | −2.605 | −8.358 | 14.311 | 0.754245 | 0.27 | 11.0 |
| J181359.06−363846.1 * | 18:13:59.06 | −36:38:46.1 | −3.799 | −8.974 | 13.793 | 0.470396 | 0.36 | 6.6 |
| J181402.22−372154.2 | 18:14:02.22 | −37:21:54.2 | −4.441 | −9.312 | 14.236 | 0.449275 | 0.30 | 8.0 |
| J181402.44−363624.9 * | 18:14:02.44 | −36:36:24.9 | −3.758 | −8.966 | 14.009 | 0.582086 | 0.27 | 8.3 |
| J181403.26−380355.7 * | 18:14:03.26 | −38:03:55.7 | −5.072 | −9.634 | 13.499 | 0.659326 | 0.35 | 6.9 |
| J181403.91−354833.5 | 18:14:03.91 | −35:48:33.5 | −3.039 | −8.605 | 14.767 | 0.511535 | 0.33 | 11.1 |
| J181405.00−371112.5 | 18:14:05.00 | −37:11:12.5 | −4.276 | −9.239 | 14.079 | 0.512049 | 0.36 | 8.0 |
| J181407.27−353413.8 | 18:14:07.27 | −35:34:13.8 | −2.819 | −8.505 | 14.124 | 0.585514 | 0.29 | 8.8 |
| J181411.54−354613.3 | 18:14:11.54 | −35:46:13.3 | −2.992 | −8.610 | 13.983 | 0.651279 | 0.31 | 8.7 |
| J181412.23−384017.6 | 18:14:12.23 | −38:40:17.6 | −5.607 | −9.935 | 13.996 | 0.882535 | 0.17 | 10.3 |
| J181415.16−345714.6 * | 18:14:15.16 | −34:57:14.6 | −2.253 | −8.245 | 13.738 | 0.567183 | 0.29 | 7.2 |
| J181416.91−360644.7 | 18:14:16.91 | −36:06:44.7 | −3.291 | −8.783 | 14.110 | 0.570363 | 0.25 | 8.6 |
| J181418.46−375722.1 | 18:14:18.46 | −37:57:22.1 | −4.950 | −9.629 | 14.210 | 0.542868 | 0.32 | 8.8 |
| J181418.96−352242.8 * | 18:14:18.96 | −35:22:42.8 | −2.628 | −8.452 | 14.046 | 0.396421 | 0.21 | 6.8 |
| J181426.56−351449.5 * | 18:14:26.56 | −35:14:49.5 | −2.498 | −8.414 | 14.454 | 0.455158 | 0.35 | 9.0 |
| J181429.19−380014.5 | 18:14:29.19 | −38:00:14.5 | −4.977 | −9.682 | 15.484 | 0.562430 | 0.26 | 16.6 |
| J181429.52−391731.0 | 18:14:29.52 | −39:17:31.0 | −6.143 | −10.265 | 14.380 | 0.596969 | 0.28 | 10.0 |
| J181429.77−384405.0 | 18:14:29.77 | −38:44:05.0 | −5.638 | −10.014 | 14.049 | 0.807422 | 0.24 | 10.1 |
| J181430.58−352336.0 | 18:14:30.58 | −35:23:36.0 | −2.623 | −8.494 | 14.279 | 0.547151 | 0.32 | 9.1 |
| J181433.66−355455.0 * | 18:14:33.66 | −35:54:55.0 | −3.087 | −8.743 | 14.194 | 0.508839 | 0.25 | 8.4 |
| J181434.68−345906.3 * | 18:14:34.68 | −34:59:06.3 | −2.250 | −8.319 | 14.686 | 0.489179 | 0.24 | 10.4 |
| J181442.25−363044.3 | 18:14:42.25 | −36:30:44.3 | −3.611 | −9.041 | 14.689 | 0.487439 | 0.30 | 10.4 |
| J181444.37−373821.4 | 18:14:44.37 | −37:38:21.4 | −4.625 | −9.561 | 14.652 | 0.474841 | 0.39 | 10.1 |
| J181445.81−352035.6 * | 18:14:45.81 | −35:20:35.6 | −2.554 | −8.517 | 13.676 | 0.609567 | 0.35 | 7.2 |
| J181445.97−362705.8 * | 18:14:45.97 | −36:27:05.8 | −3.551 | −9.025 | 14.378 | 0.474532 | 0.34 | 8.9 |
| J181446.70−352456.3 | 18:14:46.70 | −35:24:56.3 | −2.618 | −8.553 | 14.037 | 0.546305 | 0.25 | 8.1 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J181447.56−374749.2 | 18:14:47.56 | −37:47:49.2 | −4.762 | −9.642 | 13.129 | 0.561060 | 0.28 | 5.3 |
| J181458.41−351324.8 * | 18:14:58.41 | −35:13:24.8 | −2.427 | −8.500 | 14.389 | 0.520159 | 0.30 | 9.4 |
| J181505.11−374522.4 | 18:15:05.11 | −37:45:22.4 | −4.699 | −9.675 | 14.087 | 0.781305 | 0.32 | 10.1 |
| J181505.80−390448.3 | 18:15:05.80 | −39:04:48.3 | −5.897 | −10.274 | 14.016 | 0.644749 | 0.32 | 8.8 |
| J181506.49−345411.4 * | 18:15:06.49 | −34:54:11.4 | −2.126 | −8.377 | 15.189 | 0.536993 | 0.30 | 14.0 |
| J181507.09−382029.1 | 18:15:07.09 | −38:20:29.1 | −5.226 | −9.945 | 13.714 | 0.620582 | 0.28 | 7.4 |
| J181507.57−350118.7 | 18:15:07.57 | −35:01:18.7 | −2.231 | −8.435 | 14.615 | 0.566248 | 0.32 | 10.9 |
| J181507.97−364323.7 * | 18:15:07.97 | −36:43:23.7 | −3.762 | −9.214 | 14.142 | 0.546263 | 0.27 | 8.5 |
| J181510.34−382330.9 * | 18:15:10.34 | −38:23:30.9 | −5.266 | −9.978 | 14.586 | 0.456704 | 0.37 | 9.6 |
| J181519.07−341436.7 | 18:15:19.07 | −34:14:36.7 | −1.514 | −8.112 | 14.675 | 0.475048 | 0.31 | 10.2 |
| J181519.98−365402.8 * | 18:15:19.98 | −36:54:02.8 | −3.903 | −9.331 | 13.821 | 0.452614 | 0.38 | 6.6 |
| J181521.94−344201.2 * | 18:15:21.94 | −34:42:01.2 | −1.919 | −8.331 | 14.032 | 0.549354 | 0.28 | 8.1 |
| J181522.33−354724.8 | 18:15:22.33 | −35:47:24.8 | −2.899 | −8.832 | 14.273 | 0.589477 | 0.25 | 9.5 |
| J181523.03−382850.0 | 18:15:23.03 | −38:28:50.0 | −5.328 | −10.055 | 13.821 | 0.480247 | 0.32 | 6.8 |
| J181525.60−384533.4 | 18:15:25.60 | −38:45:33.4 | −5.577 | −10.187 | 13.583 | 0.612329 | 0.22 | 6.9 |
| J181529.19−360538.7 * | 18:15:29.19 | −36:05:38.7 | −3.162 | −8.991 | 13.800 | 0.617086 | 0.33 | 7.7 |
| J181529.48−352734.5 | 18:15:29.48 | −35:27:34.5 | −2.590 | −8.702 | 13.871 | 0.918999 | 0.22 | 9.9 |
| J181530.80−380609.8 | 18:15:30.80 | −38:06:09.8 | −4.974 | −9.907 | 14.409 | 0.790170 | 0.32 | 11.8 |
| J181531.81−360828.3 | 18:15:31.81 | −36:08:28.3 | −3.200 | −9.020 | 14.499 | 0.527757 | 0.31 | 9.9 |
| J181534.62−354126.4 | 18:15:34.62 | −35:41:26.4 | −2.790 | −8.823 | 13.744 | 0.542023 | 0.26 | 7.0 |
| J181535.05−344202.4 * | 18:15:35.05 | −34:42:02.4 | −1.899 | −8.371 | 14.085 | 0.483075 | 0.37 | 7.8 |
| J181544.14−372806.6 * | 18:15:44.14 | −37:28:06.6 | −4.379 | −9.659 | 12.953 | 0.555133 | 0.27 | 4.8 |
| J181554.37−374658.5 | 18:15:54.37 | −37:46:58.5 | −4.649 | −9.832 | 14.085 | 0.573895 | 0.26 | 8.5 |
| J181556.68−341822.9 | 18:15:56.68 | −34:18:22.9 | −1.510 | −8.256 | 15.353 | 0.553934 | 0.29 | 15.4 |
| J181558.80−352754.8 * | 18:15:58.80 | −35:27:54.8 | −2.549 | −8.793 | 14.750 | 0.532122 | 0.29 | 11.3 |
| J181558.88−344456.9 | 18:15:58.88 | −34:44:56.9 | −1.905 | −8.466 | 13.500 | 0.553085 | 0.29 | 6.3 |
| J181605.98−382259.4 * | 18:16:05.98 | −38:22:59.4 | −5.175 | −10.136 | 13.705 | 0.679648 | 0.26 | 7.8 |
| J181610.53−342233.3 | 18:16:10.53 | −34:22:33.3 | −1.551 | −8.331 | 14.042 | 0.651988 | 0.28 | 8.9 |
| J181614.93−364712.9 * | 18:16:14.93 | −36:47:12.9 | −3.716 | −9.442 | 15.289 | 0.441985 | 0.38 | 13.2 |
| J181617.59−365626.5 * | 18:16:17.59 | −36:56:26.5 | −3.851 | −9.520 | 13.631 | 0.634192 | 0.26 | 7.2 |
| J181619.68−353803.8 * | 18:16:19.68 | −35:38:03.8 | −2.669 | −8.933 | 13.268 | 0.474672 | 0.30 | 5.2 |
| J181620.17−363931.6 | 18:16:20.17 | −36:39:31.6 | −3.592 | −9.400 | 14.135 | 0.596819 | 0.25 | 8.9 |
| J181622.34−360017.3 | 18:16:22.34 | −36:00:17.3 | −2.998 | −9.110 | 14.368 | 0.605301 | 0.21 | 10.0 |
| J181624.45−341312.6 | 18:16:24.45 | −34:13:12.6 | −1.389 | −8.302 | 15.166 | 0.488091 | 0.35 | 13.2 |
| J181629.04−351629.9 * | 18:16:29.04 | −35:16:29.9 | −2.330 | −8.798 | 13.740 | 0.681566 | 0.30 | 7.9 |
| J181629.52−352507.5 * | 18:16:29.52 | −35:25:07.5 | −2.459 | −8.865 | 13.475 | 0.512702 | 0.32 | 6.0 |
| J181631.23−351726.8 * | 18:16:31.23 | −35:17:26.8 | −2.341 | −8.812 | 13.904 | 0.481900 | 0.32 | 7.1 |
| J181632.17−334319.8 ** | 18:16:32.17 | −33:43:19.8 | −0.929 | −8.097 | 14.315 | 0.547981 | 0.32 | 9.3 |
| J181632.30−334141.8 * | 18:16:32.30 | −33:41:41.8 | −0.904 | −8.085 | 14.015 | 0.499880 | 0.32 | 7.6 |
| J181634.05−362901.3 | 18:16:34.05 | −36:29:01.3 | −3.413 | −9.362 | 15.820 | 0.434575 | 0.29 | 17.0 |
| J181640.87−354614.0 * | 18:16:40.87 | −35:46:14.0 | −2.758 | −9.059 | 13.964 | 0.657761 | 0.31 | 8.6 |
| J181643.25−340122.3 * | 18:16:43.25 | −34:01:22.3 | −1.181 | −8.269 | 14.394 | 0.605631 | 0.35 | 10.2 |
| J181644.94−375311.3 | 18:16:44.94 | −37:53:11.3 | −4.666 | −10.027 | 14.225 | 0.529928 | 0.29 | 8.7 |
| J181645.55−333359.5 * | 18:16:45.55 | −33:33:59.5 | −0.768 | −8.067 | 14.310 | 0.473458 | 0.32 | 8.6 |
| J181645.58−335150.3 | 18:16:45.58 | −33:51:50.3 | −1.035 | −8.203 | 14.517 | 0.532439 | 0.32 | 10.1 |
| J181649.66−352017.7 * | 18:16:49.66 | −35:20:17.7 | −2.355 | −8.889 | 13.979 | 0.497953 | 0.34 | 7.5 |
| J181650.07−342516.7 | 18:16:50.07 | −34:25:16.7 | −1.529 | −8.472 | 14.601 | 0.503398 | 0.29 | 10.2 |
| J181652.16−344627.5 | 18:16:52.16 | −34:46:27.5 | −1.843 | −8.640 | 13.435 | 0.575245 | 0.26 | 6.2 |
| J181652.89−375727.9 * | 18:16:52.89 | −37:57:27.9 | −4.719 | −10.082 | 13.407 | 0.488081 | 0.34 | 5.6 |
| J181654.67−343116.3 | 18:16:54.67 | −34:31:16.3 | −1.611 | −8.532 | 15.224 | 0.445230 | 0.41 | 12.9 |
| J181657.56−381809.1 * | 18:16:57.56 | −38:18:09.1 | −5.025 | −10.250 | 13.851 | 0.656495 | 0.28 | 8.2 |
| J181657.76−353708.8 | 18:16:57.76 | −35:37:08.8 | −2.595 | −9.041 | 14.274 | 0.583475 | 0.23 | 9.4 |
| J181658.01−342536.1 | 18:16:58.01 | −34:25:36.1 | −1.521 | −8.499 | 14.354 | 0.560834 | 0.27 | 9.6 |
| J181700.49−341727.9 * | 18:17:00.49 | −34:17:27.9 | −1.395 | −8.445 | 14.650 | 0.453256 | 0.36 | 9.8 |
| J181704.07−355439.0 | 18:17:04.07 | −35:54:39.0 | −2.849 | −9.192 | 14.660 | 0.540368 | 0.30 | 10.9 |
| J181704.56−375124.0 | 18:17:04.56 | −37:51:24.0 | −4.610 | −10.071 | 14.652 | 0.494868 | 0.26 | 10.3 |
| J181705.48−331940.9 | 18:17:05.48 | −33:19:40.9 | −0.522 | −8.019 | 13.591 | 0.553302 | 0.32 | 6.6 |
| J181706.67−341613.8 * | 18:17:06.67 | −34:16:13.8 | −1.367 | −8.454 | 13.919 | 0.684266 | 0.26 | 8.6 |
| J181709.51−344730.4 | 18:17:09.51 | −34:47:30.4 | −1.831 | −8.700 | 14.595 | 0.497045 | 0.25 | 10.1 |
| J181711.65−365037.6 | 18:17:11.65 | −36:50:37.6 | −3.681 | −9.637 | 14.782 | 0.458781 | 0.37 | 10.6 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | ℓ (deg) | b (deg) | ⟨$K_s$⟩ (mag) | P (days) | Amplitude (mag) | d (kpc) |
|---|---|---|---|---|---|---|---|---|
| J181713.34−372529.4 | 18:17:13.34 | −37:25:29.4 | −4.205 | −9.903 | 14.074 | 0.611086 | 0.16 | 8.8 |
| J181718.08−375812.6 | 18:17:18.08 | −37:58:12.6 | −4.693 | −10.162 | 14.277 | 0.577264 | 0.33 | 9.4 |
| J181723.79−371424.2 | 18:17:23.79 | −37:14:24.2 | −4.022 | −9.851 | 14.357 | 0.520143 | 0.32 | 9.2 |
| J181724.11−371520.9 | 18:17:24.11 | −37:15:20.9 | −4.035 | −9.859 | 14.776 | 0.556967 | 0.29 | 11.7 |
| J181724.66−345352.6 | 18:17:24.66 | −34:53:52.6 | −1.903 | −8.795 | 14.332 | 0.462888 | 0.29 | 8.5 |
| J181725.42−334742.4 * | 18:17:25.42 | −33:47:42.4 | −0.909 | −8.295 | 13.950 | 0.534068 | 0.20 | 7.7 |
| J181726.05−361312.1 * | 18:17:26.05 | −36:13:12.1 | −3.094 | −9.398 | 13.709 | 0.707879 | 0.30 | 7.9 |
| J181727.29−335532.1 ** | 18:17:27.29 | −33:55:32.1 | −1.024 | −8.360 | 13.612 | 0.675320 | 0.20 | 7.4 |
| J181727.55−354403.3 * | 18:17:27.55 | −35:44:03.3 | −2.653 | −9.183 | 14.252 | 0.623970 | 0.30 | 9.7 |
| J181733.97−353109.9 * | 18:17:33.97 | −35:31:09.9 | −2.449 | −9.105 | 14.094 | 0.602439 | 0.33 | 8.8 |
| J181742.23−344836.6 * | 18:17:42.23 | −34:48:36.6 | −1.796 | −8.809 | 12.531 | 0.619138 | 0.35 | 4.2 |
| J181745.11−333025.2 ** | 18:17:45.11 | −33:30:25.2 | −0.619 | −8.224 | 14.951 | 0.505283 | 0.30 | 12.1 |
| J181745.70−333214.2 * | 18:17:45.70 | −33:32:14.2 | −0.645 | −8.239 | 14.915 | 0.440511 | 0.24 | 11.0 |
| J181746.66−335654.5 * | 18:17:46.66 | −33:56:54.5 | −1.013 | −8.430 | 13.849 | 0.567769 | 0.27 | 7.5 |
| J181747.66−342504.7 | 18:17:47.66 | −34:25:04.7 | −1.434 | −8.647 | 14.181 | 0.623088 | 0.31 | 9.3 |
| J181749.89−335146.2 * | 18:17:49.89 | −33:51:46.2 | −0.931 | −8.401 | 14.726 | 0.686168 | 0.31 | 12.8 |
| J181749.93−344116.0 | 18:17:49.93 | −34:41:16.0 | −1.674 | −8.776 | 14.168 | 0.531098 | 0.24 | 8.5 |
| J181750.90−360357.6 * | 18:17:50.90 | −36:03:57.6 | −2.917 | −9.403 | 15.054 | 0.405131 | 0.30 | 11.3 |
| J181752.16−372251.6 * | 18:17:52.16 | −37:22:51.6 | −4.107 | −9.998 | 14.290 | 0.450187 | 0.27 | 8.2 |
| J181752.57−354131.3 | 18:17:52.57 | −35:41:31.3 | −2.576 | −9.240 | 15.398 | 0.452464 | 0.40 | 14.1 |
| J181752.60−331543.8 | 18:17:52.60 | −33:15:43.8 | −0.387 | −8.135 | 14.912 | 0.468960 | 0.24 | 11.4 |
| J181802.62−374619.9 | 18:18:02.62 | −37:46:19.9 | −4.446 | −10.204 | 14.031 | 0.552614 | 0.28 | 8.1 |
| J181805.35−325841.8 | 18:18:05.35 | −32:58:41.8 | −0.111 | −8.045 | 14.522 | 0.593349 | 0.41 | 10.7 |
| J181805.66−363810.4 * | 18:18:05.66 | −36:38:10.4 | −3.411 | −9.704 | 14.522 | 0.574538 | 0.28 | 10.5 |
| J181806.34−370306.8 | 18:18:06.34 | −37:03:06.8 | −3.787 | −9.893 | 13.694 | 0.596986 | 0.26 | 7.2 |
| J181807.82−361359.6 * | 18:18:07.82 | −36:13:59.6 | −3.042 | −9.530 | 13.803 | 0.452860 | 0.38 | 6.5 |
| J181808.39−341844.2 * | 18:18:08.39 | −34:18:44.2 | −1.306 | −8.662 | 13.006 | 0.643832 | 0.33 | 5.4 |
| J181809.19−352945.0 | 18:18:09.19 | −35:29:45.0 | −2.373 | −9.201 | 14.424 | 0.569671 | 0.31 | 10.0 |
| J181810.15−373707.4 | 18:18:10.15 | −37:37:07.4 | −4.296 | −10.158 | 14.581 | 0.571327 | 0.31 | 10.8 |
| J181811.59−350633.2 * | 18:18:11.59 | −35:06:33.2 | −2.020 | −9.034 | 14.707 | 0.473711 | 0.34 | 10.4 |
| J181812.84−351121.0 | 18:18:12.84 | −35:11:21.0 | −2.090 | −9.073 | 13.648 | 0.615635 | 0.20 | 7.2 |
| J181812.89−372939.2 | 18:18:12.89 | −37:29:39.2 | −4.178 | −10.110 | 15.892 | 0.554961 | 0.34 | 20.0 |
| J181814.52−325645.4 * | 18:18:14.52 | −32:56:45.4 | −0.067 | −8.059 | 14.226 | 0.464313 | 0.28 | 8.1 |
| J181817.14−361754.9 * | 18:18:17.14 | −36:17:54.9 | −3.087 | −9.587 | 14.724 | 0.480716 | 0.33 | 10.5 |
| J181819.94−363905.2 | 18:18:19.94 | −36:39:05.2 | −3.403 | −9.754 | 13.326 | 0.656439 | 0.25 | 6.3 |
| J181820.31−363721.3 | 18:18:20.31 | −36:37:21.3 | −3.376 | −9.742 | 13.853 | 0.693900 | 0.25 | 8.4 |
| J181824.70−363713.1 * | 18:18:24.70 | −36:37:13.1 | −3.367 | −9.754 | 13.962 | 0.619276 | 0.34 | 8.4 |
| J181825.62−374652.8 | 18:18:25.62 | −37:46:52.8 | −4.420 | −10.276 | 13.132 | 0.509510 | 0.30 | 5.0 |
| J181826.01−363824.1 | 18:18:26.01 | −36:38:24.1 | −3.383 | −9.767 | 13.506 | 0.607478 | 0.20 | 6.6 |
| J181829.96−335611.7 | 18:18:29.96 | −33:56:11.7 | −0.934 | −8.558 | 14.001 | 0.616835 | 0.27 | 8.5 |
| J181831.18−341728.6 | 18:18:31.18 | −34:17:28.6 | −1.251 | −8.723 | 13.866 | 0.565563 | 0.25 | 7.6 |
| J181832.29−333757.2 | 18:18:32.29 | −33:37:57.2 | −0.656 | −8.427 | 14.107 | 0.599797 | 0.27 | 8.8 |
| J181833.18−350456.0 | 18:18:33.18 | −35:04:56.0 | −1.962 | −9.087 | 13.805 | 0.527582 | 0.22 | 7.1 |
| J181838.33−351351.3 * | 18:18:38.33 | −35:13:51.3 | −2.088 | −9.170 | 14.339 | 0.686243 | 0.32 | 10.6 |
| J181843.83−335631.3 | 18:18:43.83 | −33:56:31.3 | −0.917 | −8.603 | 13.477 | 0.570402 | 0.28 | 6.3 |
| J181845.54−324431.1 | 18:18:45.54 | −32:44:31.1 | 0.166 | −8.062 | 13.791 | 0.629378 | 0.22 | 7.8 |
| J181851.35−330614.5 | 18:18:51.35 | −33:06:14.5 | −0.150 | −8.245 | 13.260 | 0.516041 | 0.28 | 5.4 |
| J181852.52−344107.2 * | 18:18:52.52 | −34:41:07.2 | −1.573 | −8.967 | 13.954 | 0.576515 | 0.26 | 8.0 |
| J181857.42−330033.9 * | 18:18:57.42 | −33:00:33.9 | −0.055 | −8.221 | 14.048 | 0.528505 | 0.29 | 8.0 |
| J181903.62−351425.7 | 18:19:03.62 | −35:14:25.7 | −2.058 | −9.251 | 15.040 | 0.813829 | 0.19 | 16.3 |
| J181908.93−335354.1 * | 18:19:08.93 | −33:53:54.1 | −0.837 | −8.661 | 14.543 | 0.479322 | 0.32 | 9.6 |
| J181910.10−331205.4 | 18:19:10.10 | −33:12:05.4 | −0.208 | −8.348 | 14.071 | 0.493905 | 0.25 | 7.8 |
| J181910.91−330421.6 * | 18:19:10.91 | −33:04:21.6 | −0.090 | −8.292 | 13.811 | 0.510326 | 0.31 | 7.0 |
| J181913.13−353545.5 | 18:19:13.13 | −35:35:45.5 | −2.365 | −9.440 | 13.762 | 0.572931 | 0.27 | 7.3 |
| J181916.58−354855.4 * | 18:19:16.58 | −35:48:55.4 | −2.558 | −9.549 | 14.723 | 0.553814 | 0.38 | 11.4 |
| J181917.03−331351.5 * | 18:19:17.03 | −33:13:51.5 | −0.223 | −8.383 | 14.682 | 0.468064 | 0.36 | 10.2 |
| J181917.76−361647.4 * | 18:19:17.76 | −36:16:47.4 | −2.977 | −9.760 | 13.537 | 0.607648 | 0.33 | 6.7 |
| J181918.16−365404.2 | 18:19:18.16 | −36:54:04.2 | −3.541 | −10.039 | 14.325 | 0.490595 | 0.30 | 8.8 |
| J181919.44−363429.4 * | 18:19:19.44 | −36:34:29.4 | −3.243 | −9.897 | 14.314 | 0.496934 | 0.34 | 8.8 |
| J181923.06−323720.0 | 18:19:23.06 | −32:37:20.0 | 0.334 | −8.124 | 14.246 | 0.535957 | 0.30 | 8.9 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J181923.70−352208.4 * | 18:19:23.70 | −35:22:08.4 | −2.143 | −9.370 | 15.270 | 0.406951 | 0.34 | 12.5 |
| J181926.21−362655.4 | 18:19:26.21 | −36:26:55.4 | −3.118 | −9.861 | 14.527 | 0.544556 | 0.23 | 10.2 |
| J181926.95−345327.4 * | 18:19:26.95 | −34:53:27.4 | −1.705 | −9.164 | 13.466 | 0.601815 | 0.27 | 6.5 |
| J181934.58−371913.7 | 18:19:34.58 | −37:19:13.7 | −3.898 | −10.275 | 13.895 | 0.645403 | 0.24 | 8.3 |
| J181934.72−355159.1 | 18:19:34.72 | −35:51:59.1 | −2.577 | −9.626 | 13.798 | 0.589247 | 0.25 | 7.5 |
| J181938.68−323528.0 | 18:19:38.68 | −32:35:28.0 | 0.388 | −8.159 | 14.433 | 0.829071 | 0.21 | 12.3 |
| J181940.69−352213.3 | 18:19:40.69 | −35:22:13.3 | −2.118 | −9.422 | 15.299 | 0.583611 | 0.23 | 15.5 |
| J181942.46−330138.6 | 18:19:42.46 | −33:01:38.6 | 0.001 | −8.369 | 14.765 | 0.550170 | 0.32 | 11.6 |
| J181942.60−325059.2 | 18:19:42.60 | −32:50:59.2 | 0.161 | −8.289 | 13.790 | 0.626041 | 0.24 | 7.7 |
| J181947.89−370911.6 | 18:19:47.89 | −37:09:11.6 | −3.726 | −10.24 | 14.417 | 0.483823 | 0.29 | 9.1 |
| J181948.47−344444.2 | 18:19:48.47 | −34:44:44.2 | −1.540 | −9.165 | 14.813 | 0.475213 | 0.29 | 10.9 |
| J181949.50−333508.8 | 18:19:49.50 | −33:35:08.8 | −0.491 | −8.644 | 15.14 | 0.501794 | 0.24 | 13.2 |
| J181950.31−332444.7 | 18:19:50.31 | −33:24:44.7 | −0.333 | −8.568 | 13.941 | 0.783883 | 0.21 | 9.4 |
| J181954.41−324748.5 | 18:19:54.41 | −32:47:48.5 | 0.228 | −8.302 | 14.032 | 0.559394 | 0.24 | 8.2 |
| J182002.81−353303.4 | 18:20:02.81 | −35:33:03.4 | −2.247 | −9.570 | 14.753 | 0.538297 | 0.29 | 11.4 |
| J182004.97−355809.5 | 18:20:04.97 | −35:58:09.5 | −2.624 | −9.764 | 14.456 | 0.534345 | 0.32 | 9.8 |
| J182007.65−344558.4 * | 18:20:07.65 | −34:45:58.4 | −1.529 | −9.233 | 14.702 | 0.489582 | 0.34 | 10.5 |
| J182011.73−322258.3 | 18:20:11.73 | −32:22:58.3 | 0.628 | −8.168 | 14.148 | 0.511687 | 0.33 | 8.2 |
| J182012.03−354837.4 * | 18:20:12.03 | −35:48:37.4 | −2.468 | −9.714 | 13.057 | 0.545292 | 0.29 | 5.0 |
| J182017.11−344434.0 | 18:20:17.11 | −34:44:34.0 | −1.493 | −9.251 | 14.220 | 0.589237 | 0.27 | 9.2 |
| J182017.52−352722.1 * | 18:20:17.52 | −35:27:22.1 | −2.139 | −9.572 | 13.821 | 0.591975 | 0.33 | 7.6 |
| J182022.62−330607.9 | 18:20:22.62 | −33:06:07.9 | −0.002 | −8.528 | 14.429 | 0.468187 | 0.33 | 9.0 |
| J182030.40−325128.9 | 18:20:30.40 | −32:51:28.9 | 0.230 | −8.442 | 14.199 | 0.759065 | 0.27 | 10.5 |
| J182030.62−345803.8 | 18:20:30.62 | −34:58:03.8 | −1.676 | −9.393 | 14.540 | 0.600759 | 0.26 | 10.9 |
| J182033.23−315746.5 | 18:20:33.23 | −31:57:46.5 | 1.041 | −8.045 | 14.171 | 0.626060 | 0.22 | 9.3 |
| J182035.35−322632.4 | 18:20:35.35 | −32:26:32.4 | 0.613 | −8.269 | 14.489 | 0.480705 | 0.35 | 9.4 |
| J182037.48−335458.0 * | 18:20:37.48 | −33:54:58.0 | −0.713 | −8.942 | 14.004 | 0.435692 | 0.36 | 7.1 |
| J182038.80−341525.6 * | 18:20:38.80 | −34:15:25.6 | −1.020 | −9.099 | 14.194 | 0.605451 | 0.26 | 9.2 |
| J182043.49−361309.0 | 18:20:43.49 | −36:13:09.0 | −2.792 | −9.991 | 14.353 | 0.467854 | 0.37 | 8.7 |
| J182044.58−352919.2 | 18:20:44.58 | −35:29:19.2 | −2.127 | −9.669 | 15.066 | 0.503593 | 0.27 | 12.7 |
| J182053.23−355135.9 * | 18:20:53.23 | −35:51:35.9 | −2.451 | −9.861 | 13.992 | 0.531898 | 0.22 | 7.8 |
| J182055.80−335539.8 * | 18:20:55.80 | −33:55:39.8 | −0.695 | −9.004 | 14.122 | 0.476669 | 0.35 | 7.8 |
| J182055.93−342729.1 | 18:20:55.93 | −34:27:29.1 | −1.175 | −9.242 | 14.522 | 0.599481 | 0.31 | 10.8 |
| J182058.26−333521.6 | 18:20:58.26 | −33:35:21.6 | −0.385 | −8.859 | 14.811 | 0.544324 | 0.26 | 11.8 |
| J182059.72−334555.2 | 18:20:59.72 | −33:45:55.2 | −0.542 | −8.943 | 14.385 | 0.624859 | 0.32 | 10.3 |
| J182059.77−333350.6 | 18:20:59.77 | −33:33:50.6 | −0.360 | −8.852 | 13.533 | 0.652857 | 0.25 | 7.0 |
| J182100.49−330417.3 | 18:21:00.49 | −33:04:17.3 | 0.086 | −8.632 | 14.370 | 0.623873 | 0.23 | 10.2 |
| J182102.18−334829.5 * | 18:21:02.18 | −33:48:29.5 | −0.577 | −8.969 | 13.285 | 0.534502 | 0.29 | 5.6 |
| J182106.50−314952.8 | 18:21:06.50 | −31:49:52.8 | 1.213 | −8.090 | 14.074 | 0.571569 | 0.29 | 8.4 |
| J182107.83−335646.1 * | 18:21:07.83 | −33:56:46.1 | −0.693 | −9.049 | 13.517 | 0.437311 | 0.36 | 5.6 |
| J182109.83−364205.6 * | 18:21:09.83 | −36:42:05.6 | −3.191 | −10.284 | 14.289 | 0.552859 | 0.33 | 9.2 |
| J182111.41−314347.1 * | 18:21:11.41 | −31:43:47.1 | 1.313 | −8.059 | 14.636 | 0.564503 | 0.30 | 11.0 |
| J182112.51−323530.4 | 18:21:12.51 | −32:35:30.4 | 0.538 | −8.453 | 15.129 | 0.522630 | 0.22 | 13.4 |
| J182115.76−332658.4 | 18:21:15.76 | −33:26:58.4 | −0.231 | −8.850 | 14.677 | 0.619333 | 0.29 | 11.8 |
| J182119.09−353204.7 | 18:21:19.09 | −35:32:04.7 | −2.115 | −9.794 | 13.307 | 0.746993 | 0.18 | 6.7 |
| J182120.41−341205.1 | 18:21:20.41 | −34:12:05.1 | −0.904 | −9.202 | 14.192 | 0.678528 | 0.21 | 9.8 |
| J182122.11−362101.9 | 18:21:22.11 | −36:21:01.9 | −2.853 | −10.166 | 13.839 | 0.729884 | 0.23 | 8.6 |
| J182123.64−345030.5 | 18:21:23.64 | −34:50:30.5 | −1.479 | −9.499 | 14.457 | 0.571765 | 0.29 | 10.2 |
| J182126.33−342835.5 | 18:21:26.33 | −34:28:35.5 | −1.144 | −9.344 | 14.107 | 0.554911 | 0.28 | 8.4 |
| J182128.21−345613.2 | 18:21:28.21 | −34:56:13.2 | −1.559 | −9.555 | 14.280 | 0.512818 | 0.30 | 8.8 |
| J182129.07−343230.6 | 18:21:29.07 | −34:32:30.6 | −1.199 | −9.381 | 13.922 | 0.541501 | 0.22 | 7.6 |
| J182129.15−315014.7 | 18:21:29.15 | −31:50:14.7 | 1.245 | −8.164 | 14.570 | 0.463979 | 0.40 | 9.6 |
| J182129.94−321151.5 * | 18:21:29.94 | −32:11:51.5 | 0.921 | −8.329 | 13.805 | 0.556502 | 0.32 | 7.3 |
| J182132.70−312954.0 | 18:21:32.70 | −31:29:54.0 | 1.556 | −8.021 | 14.282 | 0.458739 | 0.33 | 8.3 |
| J182138.46−330910.3 | 18:21:38.46 | −33:09:10.3 | 0.073 | −8.787 | 14.273 | 0.456171 | 0.30 | 8.2 |
| J182142.25−334005.2 | 18:21:42.25 | −33:40:05.2 | −0.387 | −9.031 | 14.143 | 0.585484 | 0.31 | 8.8 |
| J182144.95−340940.9 * | 18:21:44.95 | −34:09:40.9 | −0.829 | −9.260 | 13.922 | 0.474940 | 0.34 | 7.1 |
| J182150.94−313614.3 * | 18:21:50.94 | −31:36:14.3 | 1.490 | −8.127 | 12.989 | 0.470252 | 0.32 | 4.5 |
| J182151.52−340554.6 * | 18:21:51.52 | −34:05:54.6 | −0.762 | −9.252 | 14.432 | 0.443005 | 0.36 | 8.8 |
| J182153.77−342410.7 * | 18:21:53.77 | −34:24:10.7 | −1.035 | −9.395 | 13.788 | 0.567302 | 0.25 | 7.3 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J182154.23−345156.0 | 18:21:54.23 | −34:51:56.0 | −1.454 | −9.603 | 14.256 | 0.542029 | 0.24 | 9.0 |
| J182157.52−322432.2 | 18:21:57.52 | −32:24:32.2 | 0.775 | −8.512 | 14.413 | 0.570558 | 0.26 | 9.9 |
| J182200.35−322139.1 * | 18:22:00.35 | −32:21:39.1 | 0.823 | −8.499 | 15.004 | 0.552370 | 0.35 | 13.0 |
| J182201.27−334837.7 | 18:22:01.27 | −33:48:37.7 | −0.486 | −9.153 | 15.140 | 0.569133 | 0.21 | 14.1 |
| J182204.24−350828.6 | 18:22:04.24 | −35:08:28.6 | −1.689 | −9.756 | 13.981 | 0.560444 | 0.25 | 8.0 |
| J182209.13−340440.9 * | 18:22:09.13 | −34:04:40.9 | −0.716 | −9.297 | 14.331 | 0.540690 | 0.30 | 9.3 |
| J182209.79−321623.3 * | 18:22:09.79 | −32:16:23.3 | 0.917 | −8.489 | 14.036 | 0.566502 | 0.32 | 8.3 |
| J182212.34−343822.8 * | 18:22:12.34 | −34:38:22.8 | −1.220 | −9.558 | 13.982 | 0.583505 | 0.38 | 8.2 |
| J182219.23−320547.9 | 18:22:19.23 | −32:05:47.9 | 1.092 | −8.439 | 14.803 | 0.625904 | 0.20 | 12.6 |
| J182219.90−321936.8 * | 18:22:19.90 | −32:19:36.8 | 0.885 | −8.545 | 14.250 | 0.437738 | 0.27 | 8.0 |
| J182221.12−360109.1 | 18:22:21.12 | −36:01:09.1 | −2.462 | −10.197 | 13.976 | 0.463379 | 0.32 | 7.2 |
| J182222.95−311917.3 | 18:22:22.95 | −31:19:17.3 | 1.797 | −8.100 | 14.468 | 0.816553 | 0.26 | 12.4 |
| J182225.05−310753.9 * | 18:22:25.05 | −31:07:53.9 | 1.971 | −8.021 | 13.919 | 0.431326 | 0.38 | 6.7 |
| J182225.80−353709.4 | 18:22:25.80 | −35:37:09.4 | −2.090 | −10.034 | 14.354 | 0.597054 | 0.28 | 9.9 |
| J182227.66−350457.5 | 18:22:27.66 | −35:04:57.5 | −1.599 | −9.802 | 14.495 | 0.595086 | 0.20 | 10.6 |
| J182229.70−315351.6 | 18:22:29.70 | −31:53:51.6 | 1.288 | −8.382 | 14.587 | 0.496165 | 0.32 | 10.0 |
| J182230.30−323249.7 | 18:22:30.30 | −32:32:49.7 | 0.703 | −8.677 | 14.198 | 0.663993 | 0.23 | 9.7 |
| J182231.09−312237.5 * | 18:22:31.09 | −31:22:37.5 | 1.760 | −8.151 | 14.159 | 0.560636 | 0.27 | 8.7 |
| J182234.43−312937.8 | 18:22:34.43 | −31:29:37.8 | 1.660 | −8.215 | 14.107 | 0.505738 | 0.30 | 8.0 |
| J182234.81−342039.2 | 18:22:34.81 | −34:20:39.2 | −0.917 | −9.495 | 14.045 | 0.591048 | 0.25 | 8.5 |
| J182238.52−333105.5 * | 18:22:38.52 | −33:31:05.5 | −0.163 | −9.138 | 14.337 | 0.520172 | 0.24 | 9.1 |
| J182239.12−311226.6 * | 18:22:39.12 | −31:12:26.6 | 1.926 | −8.100 | 13.973 | 0.463222 | 0.37 | 7.2 |
| J182242.39−334600.7 | 18:22:42.39 | −33:46:00.7 | −0.382 | −9.261 | 13.935 | 0.740662 | 0.22 | 9.1 |
| J182243.13−315352.7 * | 18:22:43.13 | −31:53:52.7 | 1.310 | −8.425 | 14.278 | 0.529661 | 0.29 | 8.9 |
| J182245.05−344516.3 | 18:22:45.05 | −34:45:16.3 | −1.274 | −9.709 | 14.688 | 0.539200 | 0.23 | 11.0 |
| J182245.23−360331.8 * | 18:22:45.23 | −36:03:31.8 | −2.461 | −10.287 | 14.111 | 0.484856 | 0.27 | 7.9 |
| J182245.98−323042.2 | 18:22:45.98 | −32:30:42.2 | 0.760 | −8.710 | 14.705 | 0.472932 | 0.24 | 10.3 |
| J182248.34−350357.8 | 18:22:48.34 | −35:03:57.8 | −1.552 | −9.858 | 13.100 | 0.520327 | 0.30 | 5.0 |
| J182249.08−315002.6 | 18:22:49.08 | −31:50:02.6 | 1.377 | −8.415 | 14.116 | 0.558329 | 0.29 | 8.5 |
| J182250.01−322322.8 | 18:22:50.01 | −32:23:22.8 | 0.877 | −8.668 | 13.426 | 0.740543 | 0.35 | 7.1 |
| J182251.81−313412.0 * | 18:22:51.81 | −31:34:12.0 | 1.619 | −8.304 | 13.564 | 0.537086 | 0.26 | 6.4 |
| J182257.57−335758.3 | 18:22:57.57 | −33:57:58.3 | −0.539 | −9.397 | 14.830 | 0.658633 | 0.25 | 13.2 |
| J182302.20−335723.9 * | 18:23:02.20 | −33:57:23.9 | −0.523 | −9.407 | 14.922 | 0.454223 | 0.30 | 11.2 |
| J182303.88−320110.0 * | 18:23:03.88 | −32:01:10.0 | 1.233 | −8.545 | 14.902 | 0.492776 | 0.31 | 11.6 |
| J182304.31−332916.4 | 18:23:04.31 | −33:29:16.4 | −0.095 | −9.205 | 14.246 | 0.750604 | 0.26 | 10.6 |
| J182305.31−343303.0 * | 18:23:05.31 | −34:33:03.0 | −1.058 | −9.681 | 14.444 | 0.669004 | 0.30 | 11.0 |
| J182305.40−342713.2 | 18:23:05.40 | −34:27:13.2 | −0.969 | −9.638 | 13.988 | 0.561041 | 0.26 | 8.0 |
| J182308.58−341138.0 * | 18:23:08.58 | −34:11:38.0 | −0.728 | −9.532 | 13.189 | 0.670084 | 0.26 | 6.0 |
| J182309.73−325812.2 | 18:23:09.73 | −32:58:12.2 | 0.383 | −8.990 | 14.331 | 0.475552 | 0.16 | 8.7 |
| J182313.77−341617.6 * | 18:23:13.77 | −34:16:17.6 | −0.791 | −9.583 | 13.680 | 0.601341 | 0.35 | 7.2 |
| J182315.13−334148.2 | 18:23:15.13 | −33:41:48.2 | −0.267 | −9.331 | 15.229 | 0.594360 | 0.32 | 15.1 |
| J182315.19−314745.3 * | 18:23:15.19 | −31:47:45.3 | 1.453 | −8.480 | 14.808 | 0.536406 | 0.27 | 11.6 |
| J182317.32−325428.2 * | 18:23:17.32 | −32:54:28.2 | 0.451 | −8.986 | 14.729 | 0.520657 | 0.30 | 11.0 |
| J182317.92−311656.0 * | 18:23:17.92 | −31:16:56.0 | 1.921 | −8.257 | 14.241 | 0.463960 | 0.30 | 8.2 |
| J182318.14−305958.9 | 18:23:18.14 | −30:59:58.9 | 2.176 | −8.131 | 14.124 | 0.606402 | 0.22 | 8.9 |
| J182320.10−333533.8 * | 18:23:20.10 | −33:35:33.8 | −0.165 | −9.300 | 13.903 | 0.699433 | 0.36 | 8.7 |
| J182324.38−331254.1 | 18:23:24.38 | −33:12:54.1 | 0.184 | −9.145 | 14.382 | 0.527412 | 0.31 | 9.4 |
| J182326.53−305406.0 | 18:23:26.53 | −30:54:06.0 | 2.278 | −8.113 | 14.343 | 0.516919 | 0.27 | 9.1 |
| J182331.06−354353.1 | 18:23:31.06 | −35:43:53.1 | −2.093 | −10.282 | 14.172 | 0.730818 | 0.29 | 10.1 |
| J182335.61−310104.8 | 18:23:35.61 | −31:01:04.8 | 2.188 | −8.194 | 15.248 | 0.610728 | 0.30 | 15.5 |
| J182338.91−341148.1 * | 18:23:38.91 | −34:11:48.1 | −0.684 | −9.627 | 13.433 | 0.645082 | 0.23 | 6.6 |
| J182339.95−324655.5 | 18:23:39.95 | −32:46:55.5 | 0.601 | −9.000 | 13.437 | 0.608010 | 0.26 | 6.4 |
| J182341.44−312549.7 * | 18:23:41.44 | −31:25:49.7 | 1.826 | −8.399 | 14.318 | 0.522633 | 0.27 | 9.1 |
| J182342.10−320423.4 | 18:23:42.10 | −32:04:23.4 | 1.246 | −8.690 | 13.411 | 0.572702 | 0.30 | 6.1 |
| J182345.70−315420.3 * | 18:23:45.70 | −31:54:20.3 | 1.403 | −8.626 | 14.079 | 0.447602 | 0.22 | 7.4 |
| J182345.83−315214.5 | 18:23:45.83 | −31:52:14.5 | 1.435 | −8.611 | 14.015 | 0.535097 | 0.33 | 7.9 |
| J182350.13−335639.4 * | 18:23:50.13 | −33:56:39.4 | −0.437 | −9.550 | 14.241 | 0.473344 | 0.25 | 8.3 |
| J182350.17−305256.7 | 18:23:50.17 | −30:52:56.7 | 2.334 | −8.180 | 14.416 | 0.522974 | 0.30 | 9.5 |
| J182355.87−323731.7 | 18:23:55.87 | −32:37:31.7 | 0.768 | −8.980 | 13.084 | 0.625512 | 0.24 | 5.5 |
| J182356.27−320723.9 * | 18:23:56.27 | −32:07:23.9 | 1.223 | −8.757 | 13.732 | 0.470526 | 0.35 | 6.4 |

**Table A.1.** continued

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J182400.52−315930.3 | 18:24:00.52 | −31:59:30.3 | 1.349 | −8.711 | 15.387 | 0.530904 | 0.33 | 15.3 |
| J182402.88−330313.4 | 18:24:02.88 | −33:03:13.4 | 0.391 | −9.193 | 14.490 | 0.603573 | 0.30 | 10.6 |
| J182405.17−342148.9 | 18:24:05.17 | −34:21:48.9 | −0.795 | −9.782 | 13.999 | 0.537014 | 0.26 | 7.9 |
| J182405.27−313547.9 * | 18:24:05.27 | −31:35:47.9 | 1.714 | −8.549 | 14.168 | 0.515063 | 0.31 | 8.4 |
| J182410.61−325402.0 | 18:24:10.61 | −32:54:02.0 | 0.542 | −9.149 | 14.440 | 0.573694 | 0.26 | 10.1 |
| J182411.73−302708.1 | 18:24:11.73 | −30:27:08.1 | 2.757 | −8.055 | 14.620 | 0.473788 | 0.36 | 9.9 |
| J182416.45−325426.8 | 18:24:16.45 | −32:54:26.8 | 0.545 | −9.171 | 13.982 | 0.483269 | 0.30 | 7.4 |
| J182417.26−333034.6 | 18:24:17.26 | −33:30:34.6 | −0.000 | −9.441 | 13.783 | 0.563393 | 0.31 | 7.3 |
| J182418.43−343055.4 * | 18:24:18.43 | −34:30:55.4 | −0.913 | −9.890 | 14.527 | 0.564528 | 0.28 | 10.4 |
| J182421.20−314537.3 | 18:24:21.20 | −31:45:37.3 | 1.592 | −8.673 | 15.230 | 0.493408 | 0.33 | 13.7 |
| J182423.75−323912.0 * | 18:24:23.75 | −32:39:12.0 | 0.787 | −9.080 | 14.068 | 0.568544 | 0.21 | 8.4 |
| J182424.45−341657.6 * | 18:24:24.45 | −34:16:57.6 | −0.692 | −9.806 | 14.303 | 0.524002 | 0.28 | 9.0 |
| J182427.70−315252.5 * | 18:24:27.70 | −31:52:52.5 | 1.493 | −8.748 | 14.588 | 0.557001 | 0.32 | 10.7 |
| J182429.56−304152.8 | 18:24:29.56 | −30:41:52.8 | 2.565 | −8.223 | 14.539 | 0.521436 | 0.34 | 10.1 |
| J182434.52−312942.4 | 18:24:34.52 | −31:29:42.4 | 1.853 | −8.596 | 13.872 | 0.480206 | 0.30 | 7.0 |
| J182437.59−300923.1 | 18:24:37.59 | −30:09:23.1 | 3.066 | −8.004 | 14.957 | 0.531333 | 0.37 | 12.5 |
| J182440.84−342827.2 | 18:24:40.84 | −34:28:27.2 | −0.841 | −9.941 | 14.342 | 0.550343 | 0.29 | 9.4 |
| J182441.83−324524.7 * | 18:24:41.83 | −32:45:24.7 | 0.722 | −9.183 | 14.176 | 0.527961 | 0.33 | 8.5 |
| J182445.92−320258.6 * | 18:24:45.92 | −32:02:58.6 | 1.369 | −8.881 | 14.338 | 0.511776 | 0.30 | 9.0 |
| J182447.41−325009.0 | 18:24:47.41 | −32:50:09.0 | 0.659 | −9.236 | 13.987 | 0.535326 | 0.34 | 7.8 |
| J182449.18−322704.7 | 18:24:49.18 | −32:27:04.7 | 1.011 | −9.070 | 14.130 | 0.544808 | 0.26 | 8.5 |
| J182451.06−340703.4 | 18:24:51.06 | −34:07:03.4 | −0.500 | −9.815 | 15.634 | 0.623393 | 0.25 | 18.8 |
| J182455.32−331043.6 | 18:24:55.32 | −33:10:43.6 | 0.360 | −9.413 | 14.166 | 0.587058 | 0.26 | 9.0 |
| J182456.37−344158.5 * | 18:24:56.37 | −34:41:58.5 | −1.022 | −10.088 | 13.732 | 0.535269 | 0.32 | 6.9 |
| J182501.64−323712.8 | 18:25:01.64 | −32:37:12.8 | 0.877 | −9.185 | 14.089 | 0.607161 | 0.18 | 8.8 |
| J182502.15−332926.7 | 18:25:02.15 | −33:29:26.7 | 0.087 | −9.573 | 14.809 | 0.522656 | 0.25 | 11.5 |
| J182507.13−323025.5 | 18:25:07.13 | −32:30:25.5 | 0.989 | −9.151 | 14.096 | 0.507882 | 0.34 | 8.0 |
| J182507.66−331200.3 | 18:25:07.66 | −33:12:00.3 | 0.360 | −9.461 | 14.409 | 0.652371 | 0.27 | 10.7 |
| J182508.46−310451.3 * | 18:25:08.46 | −31:04:51.3 | 2.282 | −8.519 | 14.271 | 0.528510 | 0.31 | 8.9 |
| J182509.55−322852.0 | 18:25:09.55 | −32:28:52.0 | 1.016 | −9.148 | 13.758 | 0.702716 | 0.27 | 8.1 |
| J182510.15−332547.6 * | 18:25:10.15 | −33:25:47.6 | 0.155 | −9.571 | 14.308 | 0.519095 | 0.30 | 9.0 |
| J182512.86−313713.6 | 18:25:12.86 | −31:37:13.6 | 1.801 | −8.774 | 14.880 | 0.493223 | 0.34 | 11.5 |
| J182515.85−314307.1 | 18:25:15.85 | −31:43:07.1 | 1.717 | −8.828 | 14.360 | 0.624496 | 0.33 | 10.2 |
| J182518.77−342627.4 | 18:25:18.77 | −34:26:27.4 | −0.752 | −10.044 | 15.437 | 0.580120 | 0.24 | 16.5 |
| J182522.33−322803.5 | 18:25:22.33 | −32:28:03.5 | 1.048 | −9.182 | 13.245 | 0.498788 | 0.24 | 5.3 |
| J182522.56−333047.8 * | 18:25:22.56 | −33:30:47.8 | 0.099 | −9.646 | 14.073 | 0.539255 | 0.34 | 8.2 |
| J182523.31−314242.1 | 18:25:23.31 | −31:42:42.1 | 1.735 | −8.848 | 15.472 | 0.668901 | 0.30 | 18.1 |
| J182524.55−305632.3 * | 18:25:24.55 | −30:56:32.3 | 2.433 | −8.508 | 14.353 | 0.643124 | 0.33 | 10.3 |
| J182527.87−333306.2 * | 18:25:27.87 | −33:33:06.2 | 0.072 | −9.680 | 14.019 | 0.678785 | 0.25 | 9.0 |
| J182531.20−305030.6 * | 18:25:31.20 | −30:50:30.6 | 2.535 | −8.484 | 14.411 | 0.554115 | 0.25 | 9.8 |
| J182532.01−300107.2 * | 18:25:32.01 | −30:01:07.2 | 3.280 | −8.118 | 13.283 | 0.551809 | 0.32 | 5.7 |
| J182532.83−305056.7 * | 18:25:32.83 | −30:50:56.7 | 2.531 | −8.493 | 14.302 | 0.564149 | 0.22 | 9.4 |
| J182534.29−313918.6 | 18:25:34.29 | −31:39:18.6 | 1.804 | −8.858 | 14.723 | 0.482623 | 0.28 | 10.6 |
| J182537.23−301959.3 | 18:25:37.23 | −30:19:59.3 | 3.004 | −8.276 | 13.491 | 0.588256 | 0.28 | 6.5 |
| J182538.37−295919.2 | 18:25:38.37 | −29:59:19.2 | 3.317 | −8.125 | 14.146 | 0.536907 | 0.30 | 8.5 |
| J182538.73−310836.5 * | 18:25:38.73 | −31:08:36.5 | 2.274 | −8.643 | 14.359 | 0.692789 | 0.30 | 10.8 |
| J182541.00−314838.5 * | 18:25:41.00 | −31:48:38.5 | 1.674 | −8.948 | 13.429 | 0.542820 | 0.30 | 6.0 |
| J182543.27−341255.4 | 18:25:43.27 | −34:12:55.4 | −0.509 | −10.020 | 13.826 | 0.602439 | 0.24 | 7.7 |
| J182543.95−340010.3 | 18:25:43.95 | −34:00:10.3 | −0.314 | −9.929 | 14.146 | 0.514020 | 0.33 | 8.3 |
| J182544.94−330651.3 | 18:25:44.94 | −33:06:51.3 | 0.497 | −9.540 | 14.359 | 0.502833 | 0.27 | 9.0 |
| J182546.72−331638.3 | 18:25:46.72 | −33:16:38.3 | 0.351 | −9.617 | 13.846 | 0.509204 | 0.33 | 7.1 |
| J182547.88−294930.4 | 18:25:47.88 | −29:49:30.4 | 3.480 | −8.082 | 14.273 | 0.528164 | 0.30 | 8.9 |
| J182548.30−313947.8 * | 18:25:48.30 | −31:39:47.8 | 1.819 | −8.906 | 13.545 | 0.571442 | 0.36 | 6.5 |
| J182549.95−311804.1 | 18:25:49.95 | −31:18:04.1 | 2.150 | −8.750 | 13.878 | 0.563409 | 0.27 | 7.6 |
| J182556.09−321250.0 | 18:25:56.09 | −32:12:50.0 | 1.332 | −9.175 | 14.883 | 0.537141 | 0.23 | 12.1 |
| J182556.37−320926.8 * | 18:25:56.37 | −32:09:26.8 | 1.384 | −9.151 | 13.727 | 0.640578 | 0.32 | 7.6 |
| J182558.42−303555.0 | 18:25:58.42 | −30:35:55.0 | 2.799 | −8.463 | 14.939 | 0.475527 | 0.28 | 11.6 |
| J182558.66−333527.9 * | 18:25:58.66 | −33:35:27.9 | 0.084 | −9.793 | 14.256 | 0.537678 | 0.29 | 8.9 |
| J182605.38−321939.7 * | 18:26:05.38 | −32:19:39.7 | 1.244 | −9.255 | 14.798 | 0.587475 | 0.31 | 12.2 |
| J182606.29−305412.3 | 18:26:06.29 | −30:54:12.3 | 2.536 | −8.624 | 14.284 | 0.513302 | 0.27 | 8.8 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J182607.09−321309.4 | 18:26:07.09 | −32:13:09.4 | 1.345 | −9.213 | 14.328 | 0.490855 | 0.30 | 8.8 |
| J182607.78−312211.2 * | 18:26:07.78 | −31:22:11.2 | 2.116 | −8.837 | 13.731 | 0.595912 | 0.27 | 7.3 |
| J182608.84−303346.1 | 18:26:08.84 | −30:33:46.1 | 2.848 | −8.480 | 13.765 | 0.493715 | 0.24 | 6.7 |
| J182609.06−334753.2 | 18:26:09.06 | −33:47:53.2 | −0.088 | −9.916 | 14.122 | 0.697725 | 0.31 | 9.6 |
| J182609.53−321657.6 | 18:26:09.53 | −32:16:57.6 | 1.291 | −9.248 | 14.581 | 0.534625 | 0.35 | 10.4 |
| J182609.71−302815.0 | 18:26:09.71 | −30:28:15.0 | 2.933 | −8.442 | 13.827 | 0.643770 | 0.37 | 8.0 |
| J182613.54−303101.2 | 18:26:13.54 | −30:31:01.2 | 2.897 | −8.475 | 14.107 | 0.639313 | 0.28 | 9.1 |
| J182615.34−311358.0 | 18:26:15.34 | −31:13:58.0 | 2.252 | −8.800 | 14.382 | 0.485307 | 0.34 | 9.0 |
| J182622.04−342942.5 * | 18:26:22.04 | −34:29:42.5 | −0.705 | −10.263 | 14.005 | 0.477439 | 0.34 | 7.4 |
| J182627.39−322459.8 | 18:26:27.39 | −32:24:59.8 | 1.198 | −9.364 | 14.754 | 0.624672 | 0.30 | 12.3 |
| J182627.79−304558.7 | 18:26:27.79 | −30:45:58.7 | 2.695 | −8.632 | 13.930 | 0.443626 | 0.38 | 6.9 |
| J182627.86−332124.7 * | 18:26:27.86 | −33:21:24.7 | 0.343 | −9.781 | 14.611 | 0.409182 | 0.30 | 9.1 |
| J182629.13−335625.3 | 18:26:29.13 | −33:56:25.3 | −0.187 | −10.041 | 14.184 | 0.559946 | 0.26 | 8.8 |
| J182631.34−300210.2 | 18:26:31.34 | −30:02:10.2 | 3.361 | −8.317 | 14.744 | 0.531141 | 0.23 | 11.2 |
| J182631.38−325030.6 | 18:26:31.38 | −32:50:30.6 | 0.817 | −9.565 | 13.993 | 0.611636 | 0.18 | 8.4 |
| J182632.31−314222.7 * | 18:26:32.31 | −31:42:22.7 | 1.850 | −9.065 | 14.233 | 0.533296 | 0.26 | 8.8 |
| J182636.17−322629.1 | 18:26:36.17 | −32:26:29.1 | 1.189 | −9.403 | 14.434 | 0.594569 | 0.21 | 10.3 |
| J182645.41−314838.8 * | 18:26:45.41 | −31:48:38.8 | 1.776 | −9.153 | 14.247 | 0.483908 | 0.33 | 8.4 |
| J182650.14−310954.7 * | 18:26:50.14 | −31:09:54.7 | 2.370 | −8.881 | 13.974 | 0.580077 | 0.29 | 8.1 |
| J182655.52−325844.0 | 18:26:55.52 | −32:58:44.0 | 0.730 | −9.701 | 12.981 | 0.416512 | 0.30 | 4.2 |
| J182655.74−295956.1 | 18:26:55.74 | −29:59:56.1 | 3.434 | −8.379 | 14.149 | 0.616101 | 0.34 | 9.1 |
| J182700.00−340417.5 | 18:27:00.00 | −34:04:17.5 | −0.259 | −10.195 | 15.319 | 0.589598 | 0.30 | 15.7 |
| J182706.06−295149.4 | 18:27:06.06 | −29:51:49.4 | 3.574 | −8.352 | 14.702 | 0.488993 | 0.21 | 10.5 |
| J182711.26−293150.5 | 18:27:11.26 | −29:31:50.5 | 3.883 | −8.219 | 14.604 | 0.534614 | 0.31 | 10.5 |
| J182715.28−295654.2 | 18:27:15.28 | −29:56:54.2 | 3.512 | −8.419 | 14.824 | 0.653992 | 0.25 | 13.1 |
| J182717.98−331954.4 | 18:27:17.98 | −33:19:54.4 | 0.444 | −9.927 | 14.355 | 0.513735 | 0.32 | 9.1 |
| J182718.43−285937.0 * | 18:27:18.43 | −28:59:37.0 | 4.380 | −8.002 | 13.918 | 0.693611 | 0.33 | 8.7 |
| J182719.92−293305.1 | 18:27:19.92 | −29:33:05.1 | 3.878 | −8.257 | 12.782 | 0.624945 | 0.33 | 4.7 |
| J182723.88−321408.8 * | 18:27:23.88 | −32:14:08.8 | 1.451 | −9.463 | 14.087 | 0.535149 | 0.19 | 8.2 |
| J182724.85−311030.6 | 18:27:24.85 | −31:10:30.6 | 2.416 | −8.996 | 14.142 | 0.498030 | 0.33 | 8.1 |
| J182726.29−332519.9 | 18:27:26.29 | −33:25:19.9 | 0.374 | −9.992 | 13.836 | 0.626060 | 0.27 | 7.9 |
| J182728.38−334444.1 * | 18:27:28.38 | −33:44:44.1 | 0.082 | −10.14 | 15.173 | 0.493632 | 0.36 | 13.3 |
| J182729.91−335147.1 | 18:27:29.91 | −33:51:47.1 | −0.023 | −10.196 | 13.743 | 0.664991 | 0.25 | 7.8 |
| J182730.35−320024.7 | 18:27:30.35 | −32:00:24.7 | 1.670 | −9.382 | 14.889 | 0.643091 | 0.24 | 13.4 |
| J182731.27−315856.3 | 18:27:31.27 | −31:58:56.3 | 1.693 | −9.374 | 15.542 | 0.639337 | 0.22 | 18.3 |
| J182733.11−322845.3 * | 18:27:33.11 | −32:28:45.3 | 1.244 | −9.599 | 14.077 | 0.558541 | 0.30 | 8.4 |
| J182733.14−331057.0 * | 18:27:33.14 | −33:10:57.0 | 0.603 | −9.908 | 14.177 | 0.487500 | 0.32 | 8.1 |
| J182735.49−293132.2 | 18:27:35.49 | −29:31:32.2 | 3.927 | −8.296 | 14.007 | 0.584505 | 0.30 | 8.3 |
| J182737.93−333604.6 | 18:27:37.93 | −33:36:04.6 | 0.228 | −10.107 | 13.448 | 0.607024 | 0.20 | 6.4 |
| J182742.02−333032.0 | 18:27:42.02 | −33:30:32.0 | 0.319 | −10.079 | 13.757 | 0.492363 | 0.25 | 6.7 |
| J182743.30−290221.1 | 18:27:43.30 | −29:02:21.1 | 4.380 | −8.104 | 14.239 | 0.537845 | 0.29 | 8.9 |
| J182745.01−312201.4 | 18:27:45.01 | −31:22:01.4 | 2.274 | −9.146 | 14.277 | 0.446076 | 0.28 | 8.2 |
| J182748.74−333149.7 * | 18:27:48.74 | −33:31:49.7 | 0.310 | −10.110 | 14.147 | 0.524216 | 0.38 | 8.4 |
| J182748.94−332826.0 | 18:27:48.94 | −33:28:26.0 | 0.362 | −10.086 | 14.217 | 0.540570 | 0.34 | 8.8 |
| J182750.07−291747.4 | 18:27:50.07 | −29:17:47.4 | 4.158 | −8.241 | 14.255 | 0.475663 | 0.32 | 8.4 |
| J182754.52−304513.0 | 18:27:54.52 | −30:45:13.0 | 2.846 | −8.904 | 14.233 | 0.508730 | 0.20 | 8.6 |
| J182800.86−294426.6 | 18:28:00.86 | −29:44:26.6 | 3.774 | −8.474 | 14.601 | 0.594099 | 0.25 | 11.1 |
| J182801.66−331118.4 * | 18:28:01.66 | −33:11:18.4 | 0.642 | −10.000 | 14.042 | 0.554896 | 0.31 | 8.2 |
| J182802.20−323429.1 | 18:28:02.20 | −32:34:29.1 | 1.203 | −9.733 | 13.588 | 0.734446 | 0.26 | 7.6 |
| J182805.83−303916.6 | 18:28:05.83 | −30:39:16.6 | 2.954 | −8.897 | 13.904 | 0.518065 | 0.30 | 7.4 |
| J182805.92−290328.0 | 18:28:05.92 | −29:03:28.0 | 4.400 | −8.186 | 14.844 | 0.439228 | 0.34 | 10.6 |
| J182808.70−320319.5 | 18:28:08.70 | −32:03:19.5 | 1.686 | −9.525 | 14.796 | 0.639672 | 0.30 | 12.7 |
| J182814.13−320518.7 | 18:28:14.13 | −32:05:18.7 | 1.664 | −9.557 | 14.244 | 0.683667 | 0.33 | 10.1 |
| J182814.98−332949.7 | 18:28:14.98 | −33:29:49.7 | 0.381 | −10.177 | 13.459 | 0.590455 | 0.22 | 6.4 |
| J182817.73−293419.3 | 18:28:17.73 | −29:34:19.3 | 3.954 | −8.453 | 14.694 | 0.569684 | 0.22 | 11.4 |
| J182818.27−295349.9 | 18:28:18.27 | −29:53:49.9 | 3.661 | −8.600 | 14.796 | 0.550982 | 0.28 | 11.7 |
| J182818.95−294210.4 | 18:28:18.95 | −29:42:10.4 | 3.838 | −8.516 | 13.879 | 0.677746 | 0.30 | 8.4 |
| J182824.55−291328.3 * | 18:28:24.55 | −29:13:28.3 | 4.280 | −8.321 | 13.091 | 0.559538 | 0.28 | 5.2 |
| J182825.18−304859.7 | 18:28:25.18 | −30:48:59.7 | 2.838 | −9.030 | 15.109 | 0.459897 | 0.28 | 12.4 |
| J182826.80−304618.4 | 18:28:26.80 | −30:46:18.4 | 2.882 | −9.016 | 14.520 | 0.479108 | 0.38 | 9.5 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J182828.73−330519.7 * | 18:28:28.73 | −33:05:19.7 | 0.775 | −10.042 | 13.838 | 0.580134 | 0.32 | 7.6 |
| J182829.11−295836.2 | 18:28:29.11 | −29:58:36.2 | 3.606 | −8.670 | 14.601 | 0.544609 | 0.32 | 10.6 |
| J182829.60−285430.9 | 18:28:29.60 | −28:54:30.9 | 4.574 | −8.196 | 14.077 | 0.475703 | 0.24 | 7.7 |
| J182829.65−303455.0 | 18:28:29.65 | −30:34:55.0 | 3.059 | −8.941 | 14.385 | 0.635021 | 0.26 | 10.4 |
| J182831.16−283358.6 | 18:28:31.16 | −28:33:58.6 | 4.886 | −8.048 | 14.523 | 0.501339 | 0.35 | 9.8 |
| J182831.99−311120.0 * | 18:28:31.99 | −31:11:20.0 | 2.511 | −9.217 | 15.116 | 0.506837 | 0.26 | 13.1 |
| J182833.53−284322.2 | 18:28:33.53 | −28:43:22.2 | 4.748 | −8.126 | 15.018 | 0.759659 | 0.21 | 15.6 |
| J182839.23−322348.4 * | 18:28:39.23 | −32:23:48.4 | 1.423 | −9.772 | 14.087 | 0.509315 | 0.26 | 8.0 |
| J182842.86−324040.5 | 18:28:42.86 | −32:40:40.5 | 1.172 | −9.906 | 14.745 | 0.583376 | 0.28 | 11.8 |
| J182842.87−295751.5 | 18:28:42.87 | −29:57:51.5 | 3.640 | −8.709 | 14.990 | 0.445537 | 0.27 | 11.5 |
| J182846.73−312239.8 | 18:28:46.73 | −31:22:39.8 | 2.363 | −9.347 | 14.176 | 0.589018 | 0.24 | 9.0 |
| J182847.97−290533.2 | 18:28:47.97 | −29:05:33.2 | 4.438 | −8.338 | 14.001 | 0.569376 | 0.30 | 8.1 |
| J182848.51−285237.2 | 18:28:48.51 | −28:52:37.2 | 4.634 | −8.244 | 13.600 | 0.503692 | 0.35 | 6.3 |
| J182849.89−291848.5 | 18:28:49.89 | −29:18:48.5 | 4.241 | −8.443 | 13.637 | 0.655261 | 0.36 | 7.4 |
| J182852.02−295715.5 | 18:28:52.02 | −29:57:15.5 | 3.664 | −8.735 | 14.753 | 0.390274 | 0.40 | 9.5 |
| J182852.12−282200.5 | 18:28:52.12 | −28:22:00.5 | 5.101 | −8.028 | 14.173 | 0.481837 | 0.36 | 8.1 |
| J182852.35−323916.3 * | 18:28:52.35 | −32:39:16.3 | 1.208 | −9.926 | 14.247 | 0.527629 | 0.27 | 8.8 |
| J182853.34−312151.2 * | 18:28:53.34 | −31:21:51.2 | 2.386 | −9.362 | 14.449 | 0.449386 | 0.34 | 8.9 |
| J182853.82−325251.9 * | 18:28:53.82 | −32:52:51.9 | 1.004 | −10.030 | 14.172 | 0.567524 | 0.30 | 8.8 |
| J182903.73−285810.0 | 18:29:03.73 | −28:58:10.0 | 4.575 | −8.335 | 14.618 | 0.445788 | 0.36 | 9.6 |
| J182905.19−331315.6 | 18:29:05.19 | −33:13:15.6 | 0.711 | −10.214 | 13.990 | 0.628587 | 0.23 | 8.5 |
| J182905.21−312636.2 * | 18:29:05.21 | −31:26:36.2 | 2.332 | −9.435 | 14.426 | 0.547876 | 0.37 | 9.8 |
| J182905.60−303255.3 | 18:29:05.60 | −30:32:55.3 | 3.147 | −9.042 | 13.964 | 0.577297 | 0.30 | 8.1 |
| J182912.14−311354.2 | 18:29:12.14 | −31:13:54.2 | 2.536 | −9.364 | 15.011 | 0.591307 | 0.24 | 13.5 |
| J182922.41−301939.4 | 18:29:22.41 | −30:19:39.4 | 3.374 | −8.998 | 14.179 | 0.469728 | 0.35 | 8.0 |
| J182923.84−303933.9 | 18:29:23.84 | −30:39:33.9 | 3.075 | −9.149 | 14.175 | 0.482551 | 0.31 | 8.1 |
| J182926.73−284124.0 | 18:29:26.73 | −28:41:24.0 | 4.866 | −8.285 | 14.417 | 0.485154 | 0.29 | 9.1 |
| J182930.05−284122.8 | 18:29:30.05 | −28:41:22.8 | 4.871 | −8.296 | 13.743 | 0.612486 | 0.23 | 7.5 |
| J182931.66−322656.1 | 18:29:31.66 | −32:26:56.1 | 1.457 | −9.960 | 13.985 | 0.511444 | 0.31 | 7.6 |
| J182932.16−300956.8 * | 18:29:32.16 | −30:09:56.8 | 3.537 | −8.958 | 13.572 | 0.452104 | 0.35 | 5.8 |
| J182935.49−291532.8 | 18:29:35.49 | −29:15:32.8 | 4.365 | −8.567 | 14.036 | 0.529532 | 0.24 | 8.0 |
| J182937.37−320407.5 | 18:29:37.37 | −32:04:07.5 | 1.813 | −9.812 | 14.175 | 0.514485 | 0.21 | 8.4 |
| J182939.23−313815.8 | 18:29:39.23 | −31:38:15.8 | 2.209 | −9.629 | 14.765 | 0.564487 | 0.36 | 11.7 |
| J182943.45−281544.2 | 18:29:43.45 | −28:15:44.2 | 5.280 | −8.149 | 14.625 | 0.733886 | 0.25 | 12.6 |
| J182943.52−280931.5 | 18:29:43.52 | −28:09:31.5 | 5.374 | −8.103 | 14.417 | 0.512792 | 0.29 | 9.4 |
| J182948.34−312426.7 | 18:29:48.34 | −31:24:26.7 | 2.434 | −9.557 | 13.232 | 0.866927 | 0.26 | 7.0 |
| J182950.65−282501.1 | 18:29:50.65 | −28:25:01.1 | 5.152 | −8.242 | 14.507 | 0.623395 | 0.25 | 10.9 |
| J182951.59−304539.5 | 18:29:51.59 | −30:45:39.5 | 3.027 | −9.283 | 14.135 | 0.583284 | 0.36 | 8.8 |
| J182951.68−310506.1 * | 18:29:51.68 | −31:05:06.1 | 2.732 | −9.426 | 13.413 | 0.861943 | 0.26 | 7.7 |
| J182954.03−310517.6 * | 18:29:54.03 | −31:05:17.6 | 2.733 | −9.435 | 13.884 | 0.478565 | 0.34 | 7.0 |
| J182954.34−293903.5 | 18:29:54.34 | −29:39:03.5 | 4.040 | −8.802 | 14.052 | 0.565368 | 0.29 | 8.3 |
| J183003.83−284318.0 | 18:30:03.83 | −28:43:18.0 | 4.898 | −8.421 | 14.403 | 0.654420 | 0.28 | 10.7 |
| J183005.63−303944.9 | 18:30:05.63 | −30:39:44.9 | 3.139 | −9.285 | 13.913 | 0.565723 | 0.35 | 7.8 |
| J183009.43−290306.2 | 18:30:09.43 | −29:03:06.2 | 4.608 | −8.586 | 14.316 | 0.560808 | 0.38 | 9.4 |
| J183010.90−323112.6 * | 18:30:10.90 | −32:31:12.6 | 1.453 | −10.116 | 14.389 | 0.598483 | 0.26 | 10.1 |
| J183011.13−290410.1 | 18:30:11.13 | −29:04:10.1 | 4.595 | −8.599 | 14.244 | 0.578700 | 0.25 | 9.2 |
| J183013.78−291717.9 | 18:30:13.78 | −29:17:17.9 | 4.401 | −8.705 | 14.778 | 0.448593 | 0.40 | 10.4 |
| J183016.58−284047.4 | 18:30:16.58 | −28:40:47.4 | 4.957 | −8.444 | 14.917 | 0.518850 | 0.27 | 12.1 |
| J183016.66−283514.5 * | 18:30:16.66 | −28:35:14.5 | 5.041 | −8.403 | 13.489 | 0.599934 | 0.33 | 6.5 |
| J183021.35−294827.5 | 18:30:21.35 | −29:48:27.5 | 3.942 | −8.959 | 15.053 | 0.463678 | 0.26 | 12.1 |
| J183022.51−310555.8 | 18:30:22.51 | −31:05:55.8 | 2.769 | −9.531 | 14.998 | 0.441312 | 0.25 | 11.5 |
| J183025.64−305556.1 * | 18:30:25.64 | −30:55:56.1 | 2.926 | −9.468 | 14.392 | 0.448175 | 0.26 | 8.6 |
| J183026.50−281016.7 | 18:30:26.50 | −28:10:16.7 | 5.433 | −8.250 | 14.582 | 0.547339 | 0.30 | 10.6 |
| J183027.57−300103.9 * | 18:30:27.57 | −30:01:03.9 | 3.761 | −9.072 | 13.414 | 0.419562 | 0.22 | 5.2 |
| J183028.22−283518.7 | 18:30:28.22 | −28:35:18.7 | 5.059 | −8.441 | 14.124 | 0.473981 | 0.36 | 7.8 |
| J183030.86−294823.7 | 18:30:30.86 | −29:48:23.7 | 3.958 | −8.989 | 14.846 | 0.456486 | 0.31 | 10.9 |
| J183034.09−285655.7 | 18:30:34.09 | −28:56:55.7 | 4.742 | −8.621 | 15.136 | 0.535667 | 0.24 | 13.6 |
| J183034.83−310409.1 | 18:30:34.83 | −31:04:09.1 | 2.815 | −9.558 | 14.284 | 0.520313 | 0.28 | 8.9 |
| J183037.40−303115.2 | 18:30:37.40 | −30:31:15.2 | 3.319 | −9.325 | 13.973 | 0.509980 | 0.25 | 7.6 |
| J183038.43−291811.5 | 18:30:38.43 | −29:18:11.5 | 4.427 | −8.792 | 14.197 | 0.462299 | 0.31 | 8.0 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | ℓ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J183045.33−322237.8 * | 18:30:45.33 | −32:22:37.8 | 1.638 | −10.162 | 14.691 | 0.490333 | 0.34 | 10.5 |
| J183048.73−310954.4 * | 18:30:48.73 | −31:09:54.4 | 2.750 | −9.644 | 14.274 | 0.491565 | 0.35 | 8.6 |
| J183051.28−320058.4 | 18:30:51.28 | −32:00:58.4 | 1.977 | −10.024 | 14.302 | 0.549064 | 0.28 | 9.2 |
| J183054.75−292227.6 | 18:30:54.75 | −29:22:27.6 | 4.389 | −8.876 | 14.108 | 0.578777 | 0.30 | 8.6 |
| J183055.00−285232.1 | 18:30:55.00 | −28:52:32.1 | 4.842 | −8.656 | 14.646 | 0.698880 | 0.28 | 12.4 |
| J183056.63−323329.3 | 18:30:56.63 | −32:33:29.3 | 1.490 | −10.277 | 14.543 | 0.624707 | 0.24 | 11.1 |
| J183059.06−285330.6 | 18:30:59.06 | −28:53:30.6 | 4.834 | −8.677 | 14.322 | 0.506598 | 0.30 | 8.9 |
| J183100.49−315343.2 | 18:31:00.49 | −31:53:43.2 | 2.102 | −10.001 | 14.139 | 0.392082 | 0.34 | 7.1 |
| J183101.91−274613.8 | 18:31:01.91 | −27:46:13.8 | 5.855 | −8.189 | 13.549 | 0.658814 | 0.30 | 7.1 |
| J183104.34−321729.7 * | 18:31:04.34 | −32:17:29.7 | 1.745 | −10.185 | 15.298 | 0.474944 | 0.38 | 13.8 |
| J183108.75−320339.2 | 18:31:08.75 | −32:03:39.2 | 1.963 | −10.099 | 14.230 | 0.688231 | 0.30 | 10.1 |
| J183108.87−285835.5 | 18:31:08.87 | −28:58:35.5 | 4.773 | −8.746 | 14.825 | 0.533058 | 0.35 | 11.7 |
| J183108.87−304114.9 | 18:31:08.87 | −30:41:14.9 | 3.217 | −9.500 | 14.235 | 0.550694 | 0.27 | 9.0 |
| J183109.14−303201.9 | 18:31:09.14 | −30:32:01.9 | 3.358 | −9.433 | 14.632 | 0.429954 | 0.30 | 9.5 |
| J183111.89−314114.2 * | 18:31:11.89 | −31:41:14.2 | 2.310 | −9.946 | 14.263 | 0.635292 | 0.29 | 9.8 |
| J183112.60−314441.3 * | 18:31:12.60 | −31:44:41.3 | 2.258 | −9.974 | 14.875 | 0.743810 | 0.28 | 14.4 |
| J183113.14−272928.2 | 18:31:13.14 | −27:29:28.2 | 6.126 | −8.102 | 14.179 | 0.477213 | 0.34 | 8.1 |
| J183114.34−275222.7 | 18:31:14.34 | −27:52:22.7 | 5.783 | −8.275 | 13.870 | 0.682715 | 0.30 | 8.4 |
| J183117.20−303841.9 | 18:31:17.20 | −30:38:41.9 | 3.269 | −9.508 | 14.250 | 0.555596 | 0.31 | 9.1 |
| J183118.16−302610.9 | 18:31:18.16 | −30:26:10.9 | 3.461 | −9.420 | 15.637 | 0.524742 | 0.29 | 17.2 |
| J183127.38−312529.0 | 18:31:27.38 | −31:25:29.0 | 2.574 | −9.881 | 13.859 | 0.549583 | 0.23 | 7.5 |
| J183130.82−310906.1 | 18:31:30.82 | −31:09:06.1 | 2.829 | −9.773 | 14.795 | 0.541460 | 0.34 | 11.6 |
| J183135.26−282845.5 | 18:31:35.26 | −28:28:45.5 | 5.268 | −8.613 | 15.516 | 0.477546 | 0.34 | 15.4 |
| J183139.79−291340.0 | 18:31:39.79 | −29:13:40.0 | 4.595 | −8.958 | 14.330 | 0.427241 | 0.35 | 8.2 |
| J183142.15−271014.3 | 18:31:42.15 | −27:10:14.3 | 6.464 | −8.055 | 14.012 | 0.680851 | 0.31 | 9.0 |
| J183142.46−275158.3 | 18:31:42.46 | −27:51:58.3 | 5.835 | −8.365 | 14.354 | 0.608280 | 0.24 | 10.0 |
| J183143.82−310912.2 | 18:31:43.82 | −31:09:12.2 | 2.848 | −9.816 | 13.567 | 0.614726 | 0.29 | 6.9 |
| J183143.93−290401.4 | 18:31:43.93 | −29:04:01.4 | 4.748 | −8.901 | 14.073 | 0.457924 | 0.33 | 7.5 |
| J183145.02−302244.0 | 18:31:45.02 | −30:22:44.0 | 3.556 | −9.481 | 13.832 | 0.593257 | 0.32 | 7.7 |
| J183146.55−280021.1 | 18:31:46.55 | −28:00:21.1 | 5.715 | −8.441 | 13.360 | 0.818357 | 0.24 | 7.3 |
| J183149.86−311535.4 * | 18:31:49.86 | −31:15:35.4 | 2.760 | −9.882 | 13.786 | 0.584505 | 0.30 | 7.4 |
| J183150.02−272911.1 | 18:31:50.02 | −27:29:11.1 | 6.192 | −8.222 | 14.310 | 0.601417 | 0.34 | 9.7 |
| J183155.75−280031.7 | 18:31:55.75 | −28:00:31.7 | 5.728 | −8.472 | 15.372 | 0.516097 | 0.34 | 15.0 |
| J183159.32−281402.2 | 18:31:59.32 | −28:14:02.2 | 5.530 | −8.584 | 14.507 | 0.489275 | 0.34 | 9.6 |
| J183200.43−304608.2 | 18:32:00.43 | −30:46:08.2 | 3.225 | −9.701 | 14.729 | 0.767371 | 0.22 | 13.6 |
| J183204.38−294047.5 | 18:32:04.38 | −29:40:47.5 | 4.224 | −9.237 | 15.031 | 0.481561 | 0.34 | 12.2 |
| J183211.63−291936.9 | 18:32:11.63 | −29:19:36.9 | 4.557 | −9.106 | 14.324 | 0.533732 | 0.30 | 9.2 |
| J183217.84−281643.3 | 18:32:17.84 | −28:16:43.3 | 5.519 | −8.664 | 13.862 | 0.553983 | 0.21 | 7.5 |
| J183217.85−290824.1 | 18:32:17.85 | −29:08:24.1 | 4.737 | −9.044 | 14.964 | 0.526072 | 0.27 | 12.4 |
| J183220.66−295731.3 | 18:32:20.66 | −29:57:31.3 | 3.996 | −9.413 | 14.533 | 0.545464 | 0.23 | 10.3 |
| J183221.31−281514.8 | 18:32:21.31 | −28:15:14.8 | 5.547 | −8.665 | 14.123 | 0.465731 | 0.32 | 7.7 |
| J183223.20−301859.2 | 18:32:23.20 | −30:18:59.2 | 3.674 | −9.577 | 14.255 | 0.550903 | 0.22 | 9.0 |
| J183230.45−302800.7 | 18:32:30.45 | −30:28:00.7 | 3.548 | −9.666 | 14.549 | 0.431090 | 0.31 | 9.1 |
| J183232.37−310924.2 * | 18:32:32.37 | −31:09:24.2 | 2.921 | −9.973 | 13.716 | 0.552746 | 0.31 | 7.0 |
| J183234.91−312018.5 * | 18:32:34.91 | −31:20:18.5 | 2.759 | −10.06 | 13.403 | 0.472979 | 0.26 | 5.5 |
| J183240.12−313547.4 * | 18:32:40.12 | −31:35:47.4 | 2.531 | −10.189 | 13.834 | 0.549556 | 0.33 | 7.4 |
| J183240.57−311648.1 | 18:32:40.57 | −31:16:48.1 | 2.821 | −10.053 | 13.261 | 0.678348 | 0.21 | 6.3 |
| J183243.41−310142.7 | 18:32:43.41 | −31:01:42.7 | 3.056 | −9.953 | 13.879 | 0.803200 | 0.17 | 9.2 |
| J183245.79−304813.1 | 18:32:45.79 | −30:48:13.1 | 3.265 | −9.863 | 14.003 | 0.610348 | 0.31 | 8.5 |
| J183251.66−293858.2 | 18:32:51.66 | −29:38:58.2 | 4.328 | −9.378 | 14.378 | 0.497673 | 0.34 | 9.1 |
| J183253.51−272737.5 | 18:32:53.51 | −27:27:37.5 | 6.320 | −8.420 | 15.191 | 0.545200 | 0.30 | 14.1 |
| J183255.64−274735.8 | 18:32:55.64 | −27:47:35.8 | 6.022 | −8.575 | 14.277 | 0.543889 | 0.26 | 9.1 |
| J183255.91−312612.9 * | 18:32:55.91 | −31:26:12.9 | 2.702 | −10.170 | 14.731 | 0.516177 | 0.32 | 11.0 |
| J183256.52−291057.2 | 18:32:56.52 | −29:10:57.2 | 4.761 | −9.189 | 14.508 | 0.573763 | 0.30 | 10.4 |
| J183257.86−310942.3 | 18:32:57.86 | −31:09:42.3 | 2.957 | −10.057 | 13.193 | 0.714531 | 0.27 | 6.2 |
| J183259.83−270500.9 | 18:32:59.83 | −27:05:00.9 | 6.672 | −8.274 | 14.313 | 0.552364 | 0.33 | 9.3 |
| J183300.69−270500.9 | 18:33:00.69 | −27:05:00.9 | 6.674 | −8.277 | 14.283 | 0.616333 | 0.23 | 9.7 |
| J183302.25−274314.3 | 18:33:02.25 | −27:43:14.3 | 6.099 | −8.564 | 15.255 | 0.557432 | 0.31 | 14.8 |
| J183302.59−304209.0 | 18:33:02.59 | −30:42:09.0 | 3.384 | −9.873 | 14.887 | 0.529911 | 0.33 | 12.0 |
| J183305.31−294625.5 | 18:33:05.31 | −29:46:25.5 | 4.236 | −9.477 | 15.095 | 0.511491 | 0.32 | 13.0 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J183307.09−305707.5 | 18:33:07.09 | −30:57:07.5 | 3.163 | −9.996 | 14.411 | 0.521722 | 0.24 | 9.5 |
| J183308.14−294313.4 | 18:33:08.14 | −29:43:13.4 | 4.290 | −9.463 | 14.784 | 0.489764 | 0.32 | 11.0 |
| J183310.92−285537.8 | 18:33:10.92 | −28:55:37.8 | 5.017 | −9.124 | 14.227 | 0.643360 | 0.28 | 9.7 |
| J183317.23−264230.6 | 18:33:17.23 | −26:42:30.6 | 7.041 | −8.166 | 14.440 | 0.549345 | 0.29 | 9.9 |
| J183317.54−283543.8 | 18:33:17.54 | −28:35:43.8 | 5.329 | −9.000 | 14.733 | 0.574082 | 0.26 | 11.6 |
| J183320.37−293233.8 | 18:33:20.37 | −29:32:33.8 | 4.471 | −9.425 | 14.814 | 0.477637 | 0.40 | 11.0 |
| J183323.16−264255.1 | 18:33:23.16 | −26:42:55.1 | 7.045 | −8.189 | 13.898 | 0.556929 | 0.25 | 7.7 |
| J183329.46−265556.3 | 18:33:29.46 | −26:55:56.3 | 6.859 | −8.306 | 14.577 | 0.477158 | 0.32 | 9.8 |
| J183330.94−300211.6 | 18:33:30.94 | −30:02:11.6 | 4.038 | −9.675 | 14.349 | 0.565764 | 0.26 | 9.6 |
| J183331.70−295124.4 | 18:33:31.70 | −29:51:24.4 | 4.203 | −9.599 | 14.454 | 0.453579 | 0.30 | 9.0 |
| J183336.62−304302.6 | 18:33:36.62 | −30:43:02.6 | 3.424 | −9.989 | 14.153 | 0.475934 | 0.27 | 8.0 |
| J183339.12−271619.3 | 18:33:39.12 | −27:16:19.3 | 6.567 | −8.488 | 14.494 | 0.446630 | 0.37 | 9.1 |
| J183339.91−291657.1 | 18:33:39.91 | −29:16:57.1 | 4.740 | −9.375 | 14.375 | 0.554813 | 0.26 | 9.6 |
| J183340.77−262621.4 | 18:33:40.77 | −26:26:21.4 | 7.324 | −8.125 | 13.632 | 0.663064 | 0.30 | 7.4 |
| J183346.56−305515.9 | 18:33:46.56 | −30:55:15.9 | 3.254 | −10.109 | 14.215 | 0.572666 | 0.27 | 9.1 |
| J183349.90−273848.9 | 18:33:49.90 | −27:38:48.9 | 6.244 | −8.690 | 14.007 | 0.559425 | 0.29 | 8.1 |
| J183350.72−303700.4 | 18:33:50.72 | −30:37:00.4 | 3.539 | −9.991 | 14.664 | 0.401218 | 0.35 | 9.3 |
| J183353.87−273040.6 | 18:33:53.87 | −27:30:40.6 | 6.374 | −8.643 | 14.047 | 0.452798 | 0.18 | 7.4 |
| J183354.26−301027.8 | 18:33:54.26 | −30:10:27.8 | 3.949 | −9.810 | 14.315 | 0.643840 | 0.37 | 10.1 |
| J183357.37−285558.7 | 18:33:57.37 | −28:55:58.7 | 5.087 | −9.279 | 13.527 | 0.499555 | 0.30 | 6.0 |
| J183357.86−291636.2 | 18:33:57.86 | −29:16:36.2 | 4.774 | −9.431 | 14.544 | 0.431934 | 0.34 | 9.1 |
| J183358.62−303613.5 | 18:33:58.62 | −30:36:13.5 | 3.563 | −10.011 | 13.668 | 0.566739 | 0.32 | 6.9 |
| J183403.35−271603.2 | 18:34:03.35 | −27:16:03.2 | 6.611 | −8.567 | 14.199 | 0.520592 | 0.39 | 8.5 |
| J183403.44−261031.5 | 18:34:03.44 | −26:10:31.5 | 7.601 | −8.084 | 14.187 | 0.456886 | 0.34 | 7.9 |
| J183406.43−275509.2 | 18:34:06.43 | −27:55:09.2 | 6.024 | −8.864 | 13.652 | 0.648433 | 0.27 | 7.4 |
| J183406.84−282111.3 | 18:34:06.84 | −28:21:11.3 | 5.630 | −9.056 | 14.201 | 0.659387 | 0.30 | 9.7 |
| J183415.06−285924.7 | 18:34:15.06 | −28:59:24.7 | 5.063 | −9.362 | 14.832 | 0.482868 | 0.38 | 11.1 |
| J183418.19−280737.2 | 18:34:18.19 | −28:07:37.2 | 5.854 | −8.994 | 13.990 | 0.589057 | 0.24 | 8.2 |
| J183419.46−293532.9 | 18:34:19.46 | −29:35:32.9 | 4.521 | −9.639 | 13.354 | 0.692852 | 0.31 | 6.6 |
| J183420.99−295104.5 | 18:34:20.99 | −29:51:04.5 | 4.287 | −9.757 | 13.691 | 0.742975 | 0.30 | 8.1 |
| J183421.43−262902.6 | 18:34:21.43 | −26:29:02.6 | 7.351 | −8.281 | 14.221 | 0.571759 | 0.25 | 9.1 |
| J183422.19−285454.1 | 18:34:22.19 | −28:54:54.1 | 5.143 | −9.353 | 14.303 | 0.466057 | 0.26 | 8.5 |
| J183429.88−282753.6 | 18:34:29.88 | −28:27:53.6 | 5.566 | −9.181 | 13.726 | 0.456608 | 0.33 | 6.3 |
| J183430.19−273715.5 | 18:34:30.19 | −27:37:15.5 | 6.334 | −8.812 | 13.290 | 0.664531 | 0.28 | 6.3 |
| J183432.82−262329.3 | 18:34:32.82 | −26:23:29.3 | 7.454 | −8.278 | 13.993 | 0.539095 | 0.22 | 7.9 |
| J183434.61−263624.5 | 18:34:34.61 | −26:36:24.5 | 7.262 | −8.380 | 14.324 | 0.566049 | 0.24 | 9.5 |
| J183436.96−295836.1 | 18:34:36.96 | −29:58:36.1 | 4.197 | −9.863 | 14.967 | 0.627837 | 0.30 | 13.7 |
| J183439.69−275612.1 | 18:34:39.69 | −27:56:12.1 | 6.062 | −8.982 | 14.810 | 0.448815 | 0.21 | 10.6 |
| J183441.36−255504.9 | 18:34:41.36 | −25:55:04.9 | 7.897 | −8.097 | 14.539 | 0.606487 | 0.27 | 10.9 |
| J183444.28−283746.1 | 18:34:44.28 | −28:37:46.1 | 5.439 | −9.300 | 14.194 | 0.500153 | 0.29 | 8.3 |
| J183445.11−295804.3 | 18:34:45.11 | −29:58:04.3 | 4.218 | −9.886 | 14.184 | 0.474032 | 0.26 | 8.1 |
| J183446.57−294358.1 | 18:34:46.57 | −29:43:58.1 | 4.436 | −9.789 | 14.360 | 0.608543 | 0.21 | 10.0 |
| J183447.68−272020.2 | 18:34:47.68 | −27:20:20.2 | 6.619 | −8.746 | 14.253 | 0.628674 | 0.18 | 9.7 |
| J183451.76−280735.9 | 18:34:51.76 | −28:07:35.9 | 5.909 | −9.105 | 14.098 | 0.533439 | 0.24 | 8.2 |
| J183457.98−273947.0 | 18:34:57.98 | −27:39:47.0 | 6.341 | −8.922 | 13.911 | 0.543030 | 0.22 | 7.6 |
| J183502.27−272617.7 | 18:35:02.27 | −27:26:17.7 | 6.553 | −8.838 | 15.524 | 0.617577 | 0.32 | 17.8 |
| J183509.57−295734.4 | 18:35:09.57 | −29:57:34.4 | 4.265 | −9.962 | 14.890 | 0.530217 | 0.28 | 12.0 |
| J183509.77−274702.3 | 18:35:09.77 | −27:47:02.3 | 6.251 | −9.014 | 14.259 | 0.571719 | 0.34 | 9.2 |
| J183511.21−274402.4 | 18:35:11.21 | −27:44:02.4 | 6.298 | −8.997 | 14.724 | 0.435724 | 0.37 | 10.0 |
| J183511.48−295741.8 | 18:35:11.48 | −29:57:41.8 | 4.266 | −9.969 | 13.782 | 0.626833 | 0.30 | 7.7 |
| J183515.08−274151.2 | 18:35:15.08 | −27:41:51.2 | 6.338 | −8.994 | 15.382 | 0.507344 | 0.34 | 14.9 |
| J183518.04−275113.6 | 18:35:18.04 | −27:51:13.6 | 6.201 | −9.072 | 13.956 | 0.749968 | 0.23 | 9.2 |
| J183519.42−270140.2 | 18:35:19.42 | −27:01:40.2 | 6.954 | −8.715 | 14.552 | 0.484611 | 0.27 | 9.7 |
| J183520.98−264403.7 | 18:35:20.98 | −26:44:03.7 | 7.223 | −8.591 | 12.774 | 0.570321 | 0.28 | 4.5 |
| J183521.33−273504.6 | 18:35:21.33 | −27:35:04.6 | 6.451 | −8.965 | 14.055 | 0.694758 | 0.27 | 9.3 |
| J183522.29−255628.6 | 18:35:22.29 | −25:56:28.6 | 7.945 | −8.245 | 14.505 | 0.433903 | 0.34 | 9.0 |
| J183523.79−290434.4 | 18:35:23.79 | −29:04:34.4 | 5.095 | −9.625 | 13.803 | 0.532484 | 0.26 | 7.1 |
| J183531.73−265000.3 | 18:35:31.73 | −26:50:00.3 | 7.151 | −8.670 | 14.784 | 0.590479 | 0.30 | 12.1 |
| J183531.85−255505.1 | 18:35:31.85 | −25:55:05.1 | 7.982 | −8.267 | 15.098 | 0.522316 | 0.34 | 13.2 |
| J183532.11−270932.9 | 18:35:32.11 | −27:09:32.9 | 6.856 | −8.815 | 14.331 | 0.511091 | 0.24 | 9.0 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J183532.33−264853.6 | 18:35:32.33 | −26:48:53.6 | 7.169 | −8.664 | 14.838 | 0.490952 | 0.42 | 11.3 |
| J183536.59−271717.0 | 18:35:36.59 | −27:17:17.0 | 6.746 | −8.886 | 13.882 | 0.494130 | 0.33 | 7.1 |
| J183538.81−270026.8 | 18:35:38.81 | −27:00:26.8 | 7.005 | −8.770 | 14.268 | 0.501819 | 0.33 | 8.6 |
| J183540.25−282947.5 | 18:35:40.25 | −28:29:47.5 | 5.651 | −9.427 | 15.527 | 0.524981 | 0.37 | 16.3 |
| J183549.58−265310.4 | 18:35:49.58 | −26:53:10.4 | 7.133 | −8.753 | 13.977 | 0.531082 | 0.29 | 7.7 |
| J183551.71−280526.9 | 18:35:51.71 | −28:05:26.9 | 6.039 | −9.288 | 14.130 | 0.534291 | 0.32 | 8.4 |
| J183552.08−283355.0 | 18:35:52.08 | −28:33:55.0 | 5.607 | −9.496 | 14.608 | 0.633413 | 0.26 | 11.6 |
| J183553.52−285226.5 | 18:35:53.52 | −28:52:26.5 | 5.328 | −9.635 | 13.439 | 0.473979 | 0.25 | 5.6 |
| J183555.23−264001.0 | 18:35:55.23 | −26:40:01.0 | 7.341 | −8.676 | 13.850 | 0.561337 | 0.31 | 7.5 |
| J183557.69−300435.0 | 18:35:57.69 | −30:04:35.0 | 4.234 | −10.169 | 14.852 | 0.633770 | 0.28 | 13.0 |
| J183559.35−253902.2 | 18:35:59.35 | −25:39:02.2 | 8.270 | −8.242 | 14.316 | 0.540856 | 0.23 | 9.2 |
| J183559.48−255209.2 | 18:35:59.48 | −25:52:09.2 | 8.072 | −8.339 | 14.498 | 0.539820 | 0.34 | 10.1 |
| J183603.14−274241.1 | 18:36:03.14 | −27:42:41.1 | 6.404 | −9.160 | 14.468 | 0.463633 | 0.34 | 9.1 |
| J183603.36−251259.9 | 18:36:03.36 | −25:12:59.9 | 8.670 | −8.063 | 14.639 | 0.760104 | 0.25 | 13.0 |
| J183604.22−285849.9 | 18:36:04.22 | −28:58:49.9 | 5.248 | −9.716 | 13.509 | 0.454806 | 0.36 | 5.7 |
| J183607.93−254444.4 | 18:36:07.93 | −25:44:44.4 | 8.199 | −8.313 | 14.215 | 0.601728 | 0.31 | 9.3 |
| J183610.30−300015.5 | 18:36:10.30 | −30:00:15.5 | 4.320 | −10.179 | 15.631 | 0.728051 | 0.27 | 20.5 |
| J183615.30−282749.6 | 18:36:15.30 | −28:27:49.6 | 5.737 | −9.528 | 14.541 | 0.548917 | 0.26 | 10.4 |
| J183622.86−255419.0 | 18:36:22.86 | −25:54:19.0 | 8.079 | −8.433 | 14.176 | 0.632495 | 0.33 | 9.4 |
| J183623.19−273727.3 | 18:36:23.19 | −27:37:27.3 | 6.516 | −9.188 | 14.202 | 0.498331 | 0.25 | 8.3 |
| J183630.19−260416.8 | 18:36:30.19 | −26:04:16.8 | 7.940 | −8.531 | 14.545 | 0.635538 | 0.33 | 11.2 |
| J183631.12−282642.3 | 18:36:31.12 | −28:26:42.3 | 5.780 | −9.572 | 14.320 | 0.446445 | 0.25 | 8.3 |
| J183632.74−274934.1 | 18:36:32.74 | −27:49:34.1 | 6.348 | −9.308 | 14.602 | 0.580659 | 0.25 | 11.0 |
| J183633.32−261812.5 | 18:36:33.32 | −26:18:12.5 | 7.735 | −8.643 | 13.744 | 0.551794 | 0.29 | 7.1 |
| J183637.80−261326.3 | 18:36:37.80 | −26:13:26.3 | 7.814 | −8.624 | 13.975 | 0.652197 | 0.33 | 8.6 |
| J183639.37−263830.5 | 18:36:39.37 | −26:38:30.5 | 7.437 | −8.812 | 14.940 | 0.616314 | 0.32 | 13.4 |
| J183641.34−295240.6 | 18:36:41.34 | −29:52:40.6 | 4.485 | −10.225 | 15.371 | 0.587979 | 0.34 | 16.1 |
| J183642.73−285702.3 | 18:36:42.73 | −28:57:02.3 | 5.337 | −9.830 | 14.438 | 0.613279 | 0.29 | 10.5 |
| J183645.95−290719.9 | 18:36:45.95 | −29:07:19.9 | 5.185 | −9.914 | 14.260 | 0.496818 | 0.22 | 8.6 |
| J183646.44−260949.1 | 18:36:46.44 | −26:09:49.1 | 7.883 | −8.626 | 14.138 | 0.651479 | 0.29 | 9.4 |
| J183647.27−271023.3 | 18:36:47.27 | −27:10:23.3 | 6.966 | −9.071 | 13.861 | 0.679750 | 0.32 | 8.4 |
| J183648.96−283002.5 | 18:36:48.96 | −28:30:02.5 | 5.758 | −9.655 | 14.431 | 0.519486 | 0.24 | 9.5 |
| J183650.56−283053.6 | 18:36:50.56 | −28:30:53.6 | 5.748 | −9.666 | 13.805 | 0.449168 | 0.35 | 6.5 |
| J183651.78−274217.4 | 18:36:51.78 | −27:42:17.4 | 6.489 | −9.318 | 14.623 | 0.504714 | 0.34 | 10.3 |
| J183652.36−291045.1 * | 18:36:52.36 | −29:10:45.1 | 5.143 | −9.960 | 14.018 | 0.507056 | 0.31 | 7.7 |
| J183652.69−263438.9 | 18:36:52.69 | −26:34:38.9 | 7.518 | −8.829 | 14.228 | 0.625168 | 0.18 | 9.6 |
| J183657.71−293355.0 | 18:36:57.71 | −29:33:55.0 | 4.798 | −10.144 | 14.155 | 0.446674 | 0.29 | 7.7 |
| J183704.40−280207.6 | 18:37:04.40 | −28:02:07.6 | 6.208 | −9.504 | 14.901 | 0.568253 | 0.28 | 12.6 |
| J183706.09−270025.5 | 18:37:06.09 | −27:00:25.5 | 7.149 | −9.061 | 13.844 | 0.563276 | 0.31 | 7.5 |
| J183720.13−244102.7 | 18:37:20.13 | −24:41:02.7 | 9.282 | −8.088 | 14.421 | 0.445665 | 0.40 | 8.7 |
| J183721.62−244030.9 | 18:37:21.62 | −24:40:30.9 | 9.293 | −8.089 | 14.494 | 0.474280 | 0.34 | 9.4 |
| J183721.98−261507.8 | 18:37:21.98 | −26:15:07.8 | 7.862 | −8.784 | 14.358 | 0.495955 | 0.33 | 9.0 |
| J183724.25−291959.0 | 18:37:24.25 | −29:19:59.0 | 5.053 | −10.131 | 13.979 | 0.543472 | 0.29 | 7.9 |
| J183728.91−280519.1 | 18:37:28.91 | −28:05:19.1 | 6.199 | −9.608 | 14.287 | 0.538407 | 0.26 | 9.1 |
| J183731.20−245034.5 | 18:37:31.20 | −24:50:34.5 | 9.157 | −8.196 | 14.445 | 0.525100 | 0.31 | 9.7 |
| J183734.88−264207.7 | 18:37:34.88 | −26:42:07.7 | 7.474 | −9.024 | 14.197 | 0.539779 | 0.25 | 8.7 |
| J183739.34−263809.3 | 18:37:39.34 | −26:38:09.3 | 7.541 | −9.010 | 14.421 | 0.597001 | 0.27 | 10.2 |
| J183739.98−270929.9 | 18:37:39.98 | −27:09:29.9 | 7.066 | −9.241 | 13.834 | 0.526222 | 0.29 | 7.2 |
| J183742.09−261129.5 | 18:37:42.09 | −26:11:29.5 | 7.950 | −8.825 | 14.114 | 0.626889 | 0.27 | 9.1 |
| J183743.97−280637.3 | 18:37:43.97 | −28:06:37.3 | 6.204 | −9.668 | 14.726 | 0.580171 | 0.33 | 11.7 |
| J183746.16−281530.6 * | 18:37:46.16 | −28:15:30.6 | 6.072 | −9.739 | 12.484 | 0.616724 | 0.30 | 4.1 |
| J183749.08−270132.8 | 18:37:49.08 | −27:01:32.8 | 7.202 | −9.213 | 13.787 | 0.449214 | 0.30 | 6.5 |
| J183751.34−273558.5 | 18:37:51.34 | −27:35:58.5 | 6.682 | −9.470 | 13.562 | 0.643878 | 0.23 | 7.0 |
| J183752.27−242843.7 | 18:37:52.27 | −24:28:43.7 | 9.523 | −8.107 | 15.747 | 0.560620 | 0.36 | 18.8 |
| J183752.43−241606.3 | 18:37:52.43 | −24:16:06.3 | 9.714 | −8.015 | 13.582 | 0.655394 | 0.27 | 7.2 |
| J183757.11−264651.1 | 18:37:57.11 | −26:46:51.1 | 7.439 | −9.133 | 15.318 | 0.544695 | 0.25 | 15.0 |
| J183758.37−272458.6 | 18:37:58.37 | −27:24:58.6 | 6.861 | −9.414 | 13.706 | 0.588564 | 0.30 | 7.2 |
| J183758.88−290835.4 | 18:37:58.88 | −29:08:35.4 | 5.282 | −10.163 | 14.271 | 0.539540 | 0.36 | 9.0 |
| J183804.05−283412.9 | 18:38:04.05 | −28:34:12.9 | 5.815 | −9.933 | 14.474 | 0.582992 | 0.29 | 10.4 |
| J183804.26−242037.6 | 18:38:04.26 | −24:20:37.6 | 9.665 | −8.088 | 13.855 | 0.585929 | 0.30 | 7.7 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | $\ell$ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J183804.87−263637.9 | 18:38:04.87 | −26:36:37.9 | 7.607 | −9.085 | 13.827 | 0.558887 | 0.27 | 7.4 |
| J183805.70−285735.7 | 18:38:05.70 | −28:57:35.7 | 5.461 | −10.106 | 14.879 | 0.451048 | 0.39 | 11.0 |
| J183806.30−275403.1 | 18:38:06.30 | −27:54:03.1 | 6.431 | −9.651 | 12.921 | 0.619721 | 0.25 | 5.1 |
| J183807.96−251732.7 | 18:38:07.96 | −25:17:32.7 | 8.811 | −8.518 | 13.542 | 0.487524 | 0.32 | 6.0 |
| J183808.34−255105.2 | 18:38:08.34 | −25:51:05.2 | 8.303 | −8.765 | 14.117 | 0.523390 | 0.25 | 8.2 |
| J183808.50−251840.5 | 18:38:08.50 | −25:18:40.5 | 8.795 | −8.528 | 14.690 | 0.463188 | 0.33 | 10.2 |
| J183809.59−274127.0 * | 18:38:09.59 | −27:41:27.0 | 6.628 | −9.571 | 12.648 | 0.601971 | 0.31 | 4.4 |
| J183811.49−254750.0 | 18:38:11.49 | −25:47:50.0 | 8.358 | −8.752 | 14.071 | 0.471930 | 0.34 | 7.6 |
| J183813.05−260150.1 | 18:38:13.05 | −26:01:50.1 | 8.148 | −8.859 | 14.628 | 0.562107 | 0.31 | 10.9 |
| J183821.06−262228.8 | 18:38:21.06 | −26:22:28.8 | 7.848 | −9.036 | 14.378 | 0.568085 | 0.25 | 9.8 |
| J183826.23−242232.8 | 18:38:26.23 | −24:22:32.8 | 9.674 | −8.177 | 13.411 | 0.611090 | 0.15 | 6.4 |
| J183828.67−271733.4 | 18:38:28.67 | −27:17:33.4 | 7.023 | −9.461 | 14.306 | 0.525845 | 0.30 | 9.0 |
| J183831.98−274415.4 | 18:38:31.98 | −27:44:15.4 | 6.622 | −9.665 | 14.300 | 0.562933 | 0.27 | 9.3 |
| J183837.59−270935.9 | 18:38:37.59 | −27:09:35.9 | 7.159 | −9.434 | 14.768 | 0.451853 | 0.33 | 10.4 |
| J183838.87−264954.3 | 18:38:38.87 | −26:49:54.3 | 7.461 | −9.295 | 14.801 | 0.620151 | 0.34 | 12.6 |
| J183840.44−282441.5 | 18:38:40.44 | −28:24:41.5 | 6.019 | −9.985 | 14.457 | 0.497555 | 0.31 | 9.4 |
| J183844.77−250104.7 | 18:38:44.77 | −25:01:04.7 | 9.122 | −8.523 | 15.426 | 0.594781 | 0.26 | 16.6 |
| J183849.17−262830.3 | 18:38:49.17 | −26:28:30.3 | 7.803 | −9.174 | 14.032 | 0.586342 | 0.26 | 8.4 |
| J183855.27−242143.9 | 18:38:55.27 | −24:21:43.9 | 9.735 | −8.270 | 15.509 | 0.484700 | 0.40 | 15.5 |
| J183855.30−242519.5 | 18:38:55.30 | −24:25:19.5 | 9.681 | −8.296 | 14.526 | 0.563523 | 0.24 | 10.4 |
| J183855.85−280435.5 | 18:38:55.85 | −28:04:35.5 | 6.350 | −9.891 | 15.255 | 0.600842 | 0.32 | 15.4 |
| J183857.43−280903.5 | 18:38:57.43 | −28:09:03.5 | 6.285 | −9.929 | 14.339 | 0.625821 | 0.34 | 10.1 |
| J183857.75−280924.0 | 18:38:57.75 | −28:09:24.0 | 6.280 | −9.932 | 13.690 | 0.634317 | 0.35 | 7.4 |
| J183858.09−240456.9 | 18:38:58.09 | −24:04:56.9 | 9.993 | −8.157 | 13.992 | 0.518285 | 0.32 | 7.7 |
| J183902.75−250127.3 | 18:39:02.75 | −25:01:27.3 | 9.146 | −8.586 | 14.383 | 0.577711 | 0.33 | 9.9 |
| J183907.71−271801.4 | 18:39:07.71 | −27:18:01.4 | 7.080 | −9.595 | 14.875 | 0.578339 | 0.28 | 12.5 |
| J183908.74−261217.2 | 18:39:08.74 | −26:12:17.2 | 8.082 | −9.122 | 14.584 | 0.521360 | 0.31 | 10.3 |
| J183910.27−261427.4 | 18:39:10.27 | −26:14:27.4 | 8.051 | −9.143 | 13.333 | 0.658384 | 0.27 | 6.4 |
| J183911.30−250716.6 | 18:39:11.30 | −25:07:16.6 | 9.072 | −8.658 | 13.083 | 0.573984 | 0.30 | 5.2 |
| J183911.70−261839.8 | 18:39:11.70 | −26:18:39.8 | 7.990 | −9.179 | 14.754 | 0.550097 | 0.25 | 11.5 |
| J183911.71−261839.9 | 18:39:11.71 | −26:18:39.9 | 7.990 | −9.179 | 14.766 | 0.550152 | 0.27 | 11.6 |
| J183925.64−263539.0 | 18:39:25.64 | −26:35:39.0 | 7.754 | −9.349 | 13.627 | 0.645332 | 0.31 | 7.3 |
| J183934.41−243912.9 | 18:39:34.41 | −24:39:12.9 | 9.536 | −8.531 | 15.989 | 0.515841 | 0.34 | 20.2 |
| J183936.92−270303.2 | 18:39:36.92 | −27:03:03.2 | 7.355 | −9.585 | 13.840 | 0.531604 | 0.33 | 7.3 |
| J183937.15−264757.8 | 18:39:37.15 | −26:47:57.8 | 7.586 | −9.476 | 15.110 | 0.483211 | 0.25 | 12.7 |
| J183940.84−250520.2 | 18:39:40.84 | −25:05:20.2 | 9.151 | −8.744 | 13.968 | 0.720088 | 0.31 | 9.1 |
| J183940.98−235940.2 | 18:39:40.98 | −23:59:40.2 | 10.146 | −8.264 | 13.594 | 0.450388 | 0.23 | 5.9 |
| J183945.14−243437.9 | 18:39:45.14 | −24:34:37.9 | 9.624 | −8.534 | 14.071 | 0.577207 | 0.28 | 8.5 |
| J183947.11−262523.7 | 18:39:47.11 | −26:25:23.7 | 7.945 | −9.347 | 15.599 | 0.543449 | 0.35 | 17.2 |
| J183947.73−254231.6 | 18:39:47.73 | −25:42:31.6 | 8.598 | −9.038 | 15.217 | 0.514846 | 0.27 | 13.9 |
| J183953.19−240313.8 | 18:39:53.19 | −24:03:13.8 | 10.113 | −8.332 | 15.142 | 0.563688 | 0.32 | 14.1 |
| J183954.51−251028.9 | 18:39:54.51 | −25:10:28.9 | 9.096 | −8.828 | 13.933 | 0.794553 | 0.22 | 9.4 |
| J183955.80−243958.9 | 18:39:55.80 | −24:39:58.9 | 9.560 | −8.610 | 13.104 | 0.624103 | 0.36 | 5.5 |
| J184001.55−265607.3 | 18:40:01.55 | −26:56:07.3 | 7.501 | −9.617 | 14.148 | 0.539843 | 0.30 | 8.5 |
| J184003.37−273620.4 | 18:40:03.37 | −27:36:20.4 | 6.891 | −9.913 | 14.205 | 0.506937 | 0.32 | 8.4 |
| J184004.91−282649.8 | 18:40:04.91 | −28:26:49.8 | 6.121 | −10.279 | 14.219 | 0.490504 | 0.34 | 8.3 |
| J184009.98−275459.7 | 18:40:09.98 | −27:54:59.7 | 6.616 | −10.068 | 14.502 | 0.724475 | 0.29 | 11.8 |
| J184022.02−261246.8 | 18:40:22.02 | −26:12:46.8 | 8.195 | −9.373 | 14.753 | 0.601931 | 0.27 | 12.1 |
| J184022.63−273535.6 | 18:40:22.63 | −27:35:35.6 | 6.933 | −9.971 | 15.281 | 0.514104 | 0.25 | 14.3 |
| J184031.05−233527.1 | 18:40:31.05 | −23:35:27.1 | 10.597 | −8.258 | 14.143 | 0.601927 | 0.20 | 9.0 |
| J184036.15−240501.7 | 18:40:36.15 | −24:05:01.7 | 10.158 | −8.492 | 13.936 | 0.582632 | 0.24 | 8.0 |
| J184055.96−272625.5 | 18:40:55.96 | −27:26:25.5 | 7.127 | −10.017 | 14.093 | 0.585964 | 0.26 | 8.6 |
| J184058.67−264439.7 | 18:40:58.67 | −26:44:39.7 | 7.769 | −9.726 | 14.684 | 0.590528 | 0.36 | 11.6 |
| J184058.91−272129.5 | 18:40:58.91 | −27:21:29.5 | 7.207 | −9.991 | 14.830 | 0.554069 | 0.36 | 12.0 |
| J184100.13−242427.8 | 18:41:00.13 | −24:24:27.8 | 9.904 | −8.716 | 14.259 | 0.552175 | 0.31 | 9.1 |
| J184100.66−245640.7 | 18:41:00.66 | −24:56:40.7 | 9.416 | −8.952 | 14.853 | 0.591642 | 0.22 | 12.5 |
| J184100.87−265144.8 | 18:41:00.87 | −26:51:44.8 | 7.664 | −9.784 | 14.938 | 0.594166 | 0.33 | 13.1 |
| J184101.61−262339.9 | 18:41:01.61 | −26:23:39.9 | 8.094 | −9.585 | 15.301 | 0.714771 | 0.25 | 17.3 |
| J184101.73−260135.9 | 18:41:01.73 | −26:01:35.9 | 8.430 | −9.426 | 14.028 | 0.682170 | 0.23 | 9.1 |
| J184101.77−260630.8 | 18:41:01.77 | −26:06:30.8 | 8.355 | −9.461 | 14.489 | 0.607124 | 0.32 | 10.7 |

**Table A.1.** continued.

| VVV ID | RA (J2000.0) hh:mm:ss.ss | Dec (J2000.0) dd:mm:ss.s | ℓ (deg) | $b$ (deg) | $\langle K_s \rangle$ (mag) | $P$ (days) | Amplitude (mag) | $d$ (kpc) |
|---|---|---|---|---|---|---|---|---|
| J184102.15−265412.7 | 18:41:02.15 | −26:54:12.7 | 7.629 | −9.806 | 14.674 | 0.513695 | 0.31 | 10.7 |
| J184125.74−261120.4 | 18:41:25.74 | −26:11:20.4 | 8.321 | −9.577 | 14.278 | 0.568870 | 0.27 | 9.3 |
| J184138.49−245701.6 | 18:41:38.49 | −24:57:01.6 | 9.473 | −9.083 | 14.317 | 0.572793 | 0.26 | 9.5 |
| J184142.59−244830.3 | 18:41:42.59 | −24:48:30.3 | 9.610 | −9.035 | 14.385 | 0.576399 | 0.26 | 9.9 |
| J184147.89−254048.9 | 18:41:47.89 | −25:40:48.9 | 8.823 | −9.432 | 13.910 | 0.691290 | 0.27 | 8.6 |
| J184149.39−251819.0 | 18:41:49.39 | −25:18:19.0 | 9.168 | −9.274 | 13.812 | 0.642426 | 0.25 | 7.9 |
| J184155.80−250922.8 | 18:41:55.80 | −25:09:22.8 | 9.314 | −9.231 | 13.503 | 0.564953 | 0.32 | 6.4 |
| J184201.50−264955.2 | 18:42:01.50 | −26:49:55.2 | 7.791 | −9.975 | 14.528 | 0.605012 | 0.20 | 10.9 |
| J184205.46−265325.6 | 18:42:05.46 | −26:53:25.6 | 7.744 | −10.013 | 14.273 | 0.632239 | 0.24 | 9.8 |
| J184214.98−244428.8 | 18:42:14.98 | −24:44:28.8 | 9.725 | −9.117 | 14.284 | 0.651347 | 0.32 | 10.0 |
| J184214.98−244428.9 | 18:42:14.98 | −24:44:28.9 | 9.725 | −9.117 | 14.281 | 0.651360 | 0.29 | 10.0 |
| J184219.71−251756.3 | 18:42:19.71 | −25:17:56.3 | 9.224 | −9.375 | 14.076 | 0.579818 | 0.26 | 8.5 |
| J184219.71−251756.5 | 18:42:19.71 | −25:17:56.5 | 9.224 | −9.375 | 14.087 | 0.579821 | 0.21 | 8.6 |
| J184231.55−244354.5 | 18:42:31.55 | −24:43:54.5 | 9.761 | −9.169 | 14.640 | 0.550712 | 0.27 | 10.9 |
| J184234.04−243047.4 | 18:42:34.04 | −24:30:47.4 | 9.965 | −9.082 | 14.599 | 0.528111 | 0.32 | 10.4 |
| J184236.62−241630.9 | 18:42:36.62 | −24:16:30.9 | 10.186 | −8.988 | 13.948 | 0.516198 | 0.24 | 7.5 |
| J184238.29−245140.4 | 18:42:38.29 | −24:51:40.4 | 9.654 | −9.248 | 16.130 | 0.569278 | 0.31 | 22.8 |
| J184238.84−262334.5 | 18:42:38.84 | −26:23:34.5 | 8.254 | −9.911 | 14.775 | 0.499758 | 0.27 | 11.0 |
| J184242.32−244715.0 | 18:42:42.32 | −24:47:15.0 | 9.728 | −9.230 | 14.167 | 0.650280 | 0.27 | 9.5 |
| J184247.34−264254.4 | 18:42:47.34 | −26:42:54.4 | 7.972 | −10.078 | 14.253 | 0.919261 | 0.20 | 11.9 |
| J184247.49−244122.0 | 18:42:47.49 | −24:41:22.0 | 9.826 | −9.205 | 14.181 | 0.634675 | 0.30 | 9.4 |
| J184257.69−263500.0 | 18:42:57.69 | −26:35:00.0 | 8.110 | −10.057 | 15.815 | 0.606612 | 0.31 | 20.3 |
| J184257.83−263728.6 | 18:42:57.83 | −26:37:28.6 | 8.072 | −10.075 | 13.713 | 0.516710 | 0.32 | 6.7 |
| J184306.98−260422.5 | 18:43:06.98 | −26:04:22.5 | 8.593 | −9.869 | 13.777 | 0.763744 | 0.30 | 8.6 |
| J184310.26−242512.7 | 18:43:10.26 | −24:25:12.7 | 10.110 | −9.166 | 13.534 | 0.575848 | 0.28 | 6.5 |
| J184311.98−242224.3 | 18:43:11.98 | −24:22:24.3 | 10.155 | −9.151 | 15.097 | 0.583867 | 0.27 | 14.0 |
| J184311.98−242224.4 | 18:43:11.98 | −24:22:24.4 | 10.155 | −9.151 | 15.073 | 0.583870 | 0.28 | 13.9 |
| J184317.97−245445.5 | 18:43:17.97 | −24:54:45.5 | 9.673 | −9.405 | 13.907 | 0.702578 | 0.30 | 8.7 |
| J184319.31−241434.0 | 18:43:19.31 | −24:14:34.0 | 10.287 | −9.120 | 13.671 | 0.593867 | 0.24 | 7.1 |
| J184322.05−253505.1 | 18:43:22.05 | −25:35:05.1 | 9.065 | −9.710 | 14.495 | 0.825893 | 0.28 | 12.6 |
| J184341.60−253310.2 | 18:43:41.60 | −25:33:10.2 | 9.126 | −9.762 | 13.716 | 0.797703 | 0.30 | 8.5 |
| J184342.80−263056.3 | 18:43:42.80 | −26:30:56.3 | 8.245 | −10.18 | 14.771 | 0.434228 | 0.32 | 10.2 |
| J184345.08−244416.5 | 18:43:45.08 | −24:44:16.5 | 9.878 | −9.422 | 13.743 | 0.607489 | 0.31 | 7.4 |
| J184345.36−241857.9 | 18:43:45.36 | −24:18:57.9 | 10.264 | −9.241 | 14.302 | 0.617113 | 0.24 | 9.8 |
| J184356.24−250258.5 | 18:43:56.24 | −25:02:58.5 | 9.611 | −9.595 | 14.132 | 0.502434 | 0.33 | 8.1 |
| J184402.41−263508.0 | 18:44:02.41 | −26:35:08.0 | 8.213 | −10.276 | 14.227 | 0.500238 | 0.30 | 8.5 |
| J184402.44−263049.2 | 18:44:02.44 | −26:30:49.2 | 8.279 | −10.245 | 14.569 | 0.494587 | 0.27 | 9.9 |
| J184408.15−250322.6 | 18:44:08.15 | −25:03:22.6 | 9.625 | −9.638 | 14.245 | 0.551213 | 0.31 | 9.0 |
| J184412.37−261630.4 | 18:44:12.37 | −26:16:30.4 | 8.514 | −10.176 | 13.927 | 0.509583 | 0.33 | 7.4 |
| J184425.88−244355.6 | 18:44:25.88 | −24:43:55.6 | 9.951 | −9.559 | 14.707 | 0.543266 | 0.32 | 11.2 |
| J184438.62−254017.8 | 18:44:38.62 | −25:40:17.8 | 9.111 | −10.007 | 15.252 | 0.440556 | 0.37 | 13.0 |
| J184450.77−235622.9 | 18:44:50.77 | −23:56:22.9 | 10.716 | −9.302 | 16.244 | 0.701346 | 0.30 | 27.0 |
| J184451.05−245604.8 | 18:44:51.05 | −24:56:04.8 | 9.807 | −9.732 | 14.340 | 0.767607 | 0.24 | 11.3 |
| J184506.49−243253.3 | 18:45:06.49 | −24:32:53.3 | 10.186 | −9.618 | 14.450 | 0.440176 | 0.36 | 8.8 |
| J184507.09−252959.1 | 18:45:07.09 | −25:29:59.1 | 9.315 | −10.03 | 14.390 | 0.403729 | 0.35 | 8.2 |
| J184508.79−251748.4 | 18:45:08.79 | −25:17:48.4 | 9.504 | −9.948 | 14.203 | 0.560708 | 0.27 | 8.9 |
| J184511.06−235916.9 | 18:45:11.06 | −23:59:16.9 | 10.706 | −9.392 | 12.096 | 0.524332 | 0.30 | 3.1 |
| J184518.06−255731.3 | 18:45:18.06 | −25:57:31.3 | 8.912 | −10.263 | 13.566 | 0.591930 | 0.29 | 6.7 |
| J184523.37−253935.3 | 18:45:23.37 | −25:39:35.3 | 9.195 | −10.153 | 14.620 | 0.460344 | 0.30 | 9.8 |
| J184528.73−251435.5 | 18:45:28.73 | −25:14:35.5 | 9.586 | −9.993 | 13.903 | 0.480314 | 0.38 | 7.1 |
| J184550.48−243009.2 | 18:45:50.48 | −24:30:09.2 | 10.301 | −9.749 | 13.678 | 0.556034 | 0.28 | 6.9 |
| J184614.16−251619.1 | 18:46:14.16 | −25:16:19.1 | 9.634 | −10.160 | 15.908 | 0.673292 | 0.34 | 22.4 |
| J184624.70−242411.0 | 18:46:24.70 | −24:24:11.0 | 10.449 | −9.824 | 14.299 | 0.526457 | 0.23 | 9.0 |
| J184634.15−250138.2 | 18:46:34.15 | −25:01:38.2 | 9.892 | −10.124 | 14.463 | 0.485661 | 0.32 | 9.3 |
| J184636.94−250436.4 | 18:46:36.94 | −25:04:36.4 | 9.851 | −10.154 | 13.868 | 0.513152 | 0.31 | 7.2 |
| J184640.86−241711.2 | 18:46:40.86 | −24:17:11.2 | 10.582 | −9.829 | 13.674 | 0.583652 | 0.28 | 7.0 |
| J184647.80−250704.2 | 18:46:47.80 | −25:07:04.2 | 9.831 | −10.209 | 14.806 | 0.630227 | 0.31 | 12.7 |
| J184659.80−241551.8 | 18:46:59.80 | −24:15:51.8 | 10.634 | −9.885 | 16.035 | 0.543925 | 0.24 | 21.2 |
| J184727.28−242721.0 | 18:47:27.28 | −24:27:21.0 | 10.504 | −10.061 | 14.548 | 0.717916 | 0.27 | 12.0 |

**Table A.2.** 207 VVV RRab matching a variable in the General Catalog of Variable Stars (GCVS).

| VVV ID | GCVS name | VVV ID | GCVS name | VVV ID | GCVS name |
|---|---|---|---|---|---|
| J2701020.22−411613.9 | V0462 CrA | J2741313.37−375727.9 | IP CrA | J2755443.71−341148.1 | V2539 Sgr |
| J2701149.18−420358.3 | V0463 CrA | J2741423.44−381809.1 | V0536 CrA | J2755521.67−312549.7 | V3212 Sgr |
| J2702437.84−395238.8 | LM CrA | J2741507.38−341727.9 | V2874 Sgr | J2755625.55−315420.3 | V3216 Sgr |
| J2703434.23−413322.1 | V0469 CrA | J2741640.08−341613.8 | V2878 Sgr | J2755732.00−335639.4 | V3213 Sgr |
| J2704032.86−393612.4 | LT CrA | J2742121.33−334742.4 | V2896 Sgr | J2755903.99−320723.9 | V2540 Sgr |
| J2705536.91−392615.5 | MV CrA | J2742130.69−361312.1 | V2889 Sgr | J2760118.99−313547.9 | V3232 Sgr |
| J2705759.29−390948.3 | MY CrA | J2742153.30−354403.3 | V2890 Sgr | J2760406.80−325426.8 | V3242 Sgr |
| J2710402.86−390041.6 | NR CrA | J2742329.54−353109.9 | V2899 Sgr | J2760436.45−343055.4 | V3237 Sgr |
| J2710759.32−411700.5 | V0482 CrA | J2742533.40−344836.6 | V0715 Sgr | J2760556.25−323912.0 | V3248 Sgr |
| J2712342.04−421647.8 | V0483 CrA | J2742625.55−333214.2 | V2914 Sgr | J2760606.68−341657.6 | V3244 Sgr |
| J2712711.57−421314.0 | V0486 CrA | J2742639.96−335654.5 | V2912 Sgr | J2760655.55−315252.5 | V3253 Sgr |
| J2712900.58−394418.1 | OS CrA | J2742728.37−335146.2 | V2920 Sgr | J2761027.42−324524.7 | V3258 Sgr |
| J2713907.68−393543.8 | OX CrA | J2742743.43−360357.6 | V2910 Sgr | J2761128.83−320258.6 | V3243 Sgr |
| J2714040.42−410352.1 | V0398 CrA | J2742802.34−372251.6 | IQ CrA | J2761405.62−344158.5 | V2541 Sgr |
| J2714403.10−385517.7 | V0399 CrA | J2743124.89−363810.4 | V2930 Sgr | J2761706.92−310451.3 | V3287 Sgr |
| J2720006.03−374514.8 | GK CrA | J2743157.25−361359.6 | V2933 Sgr | J2761732.22−332547.6 | V3281 Sgr |
| J2720110.20−372205.5 | GO CrA | J2743205.87−341844.2 | V2514 Sgr | J2762038.45−333047.8 | V3292 Sgr |
| J2721040.55−385557.8 | PY CrA | J2743253.79−350633.2 | V2938 Sgr | J2762108.32−305632.3 | V3301 Sgr |
| J2721703.45−405758.1 | V0499 CrA | J2743337.74−325645.4 | V2516 Sgr | J2762158.12−333306.2 | V3298 Sgr |
| J2722023.79−404349.4 | QV CrA | J2743417.14−361754.9 | V2941 Sgr | J2762248.05−305030.6 | V3304 Sgr |
| J2722138.38−390932.1 | QX CrA | J2743610.45−363713.1 | V2950 Sgr | J2762300.12−300107.2 | V1606 Sgr |
| J2722725.85−364838.9 | V0636 Sgr | J2743934.92−351351.3 | V2967 Sgr | J2762312.42−305056.7 | V3306 Sgr |
| J2724552.44−385054.5 | V0506 CrA | J2744307.84−344107.2 | V2978 Sgr | J2762441.01−310836.5 | V3309 Sgr |
| J2724759.12−372125.4 | HN CrA | J2744421.33−330033.9 | V2990 Sgr | J2762515.00−314838.5 | V3310 Sgr |
| J2724855.95−362110.3 | V0650 Sgr | J2744713.95−335354.1 | V2995 Sgr | J2762704.57−313947.8 | V1607 Sgr |
| J2725320.81−392737.7 | V0344 CrA | J2744743.71−330421.6 | V3010 Sgr | J2762905.51−320926.8 | V2545 Sgr |
| J2730536.57−360134.7 | V2632 Sgr | J2744908.67−354855.4 | V3000 Sgr | J2762939.84−333527.9 | V3317 Sgr |
| J2730736.80−352109.1 | V2635 Sgr | J2744915.47−331351.5 | V3015 Sgr | J2763120.75−321939.7 | V3320 Sgr |
| J2730922.26−350757.4 | V2639 Sgr | J2744926.42−361647.4 | V3001 Sgr | J2763156.71−312211.2 | V3323 Sgr |
| J2731008.91−364330.2 | V2637 Sgr | J2744951.66−363429.4 | V3004 Sgr | J2763530.59−342942.5 | V3327 Sgr |
| J2731133.29−352457.1 | V0666 Sgr | J2745055.55−352208.4 | V3016 Sgr | J2763657.89−332124.7 | V3330 Sgr |
| J2731501.17−362149.5 | V0667 Sgr | J2745144.30−345327.4 | V2519 Sgr | J2763804.58−314222.7 | V3336 Sgr |
| J2731638.55−354528.3 | V2663 Sgr | J2750154.72−344558.4 | V3053 Sgr | J2764121.09−314838.8 | V3344 Sgr |
| J2732239.38−354714.7 | V2686 Sgr | J2750300.47−354837.4 | V2523 Sgr | J2764232.11−310954.7 | V3346 Sgr |
| J2732624.49−375455.2 | HU CrA | J2750422.74−352722.1 | V3060 Sgr | J2764936.45−285937.0 | V1302 Sgr |
| J2732728.37−392931.4 | V0355 CrA | J2750922.26−335458.0 | V1186 Sgr | J2765058.13−321408.8 | V3357 Sgr |
| J2732809.37−361430.8 | V0677 Sgr | J2750941.96−341525.6 | V3078 Sgr | J2765205.63−334444.1 | V3358 Sgr |
| J2732945.94−363846.1 | V0678 Sgr | J2751318.41−355135.9 | V3090 Sgr | J2765316.64−322845.3 | V2550 Sgr |
| J2733036.67−363624.9 | V3906 Sgr | J2751357.07−335539.8 | V3093 Sgr | J2765317.11−331057.0 | V3364 Sgr |
| J2733048.87−380355.7 | HX CrA | J2751532.70−334829.5 | V1597 Sgr | J2765711.13−333149.7 | V3372 Sgr |
| J2733347.46−345714.6 | V2727 Sgr | J2751657.42−335646.1 | V1598 Sgr | J2770024.84−331118.4 | V3377 Sgr |
| J2733444.42−352242.8 | V2728 Sgr | J2751727.49−364205.6 | V3096 Sgr | J2770608.32−291328.3 | V2555 Sgr |
| J2733638.45−351449.5 | V2734 Sgr | J2751751.21−314347.1 | V3109 Sgr | J2770710.90−330519.7 | V2554 Sgr |
| J2733824.84−355455.0 | V2739 Sgr | J2752229.17−321151.5 | V1600 Sgr | J2770759.88−311120.0 | V3399 Sgr |
| J2733840.20−345906.3 | V2744 Sgr | J2752614.30−340940.9 | V1859 Sgr | J2770948.40−322348.4 | V3402 Sgr |
| J2734127.19−352035.6 | V2753 Sgr | J2752744.07−313614.3 | V1291 Sgr | J2771305.28−323916.3 | V3410 Sgr |
| J2734129.53−362705.8 | V2748 Sgr | J2752752.85−340554.6 | V3140 Sgr | J2771320.04−312151.2 | V3414 Sgr |
| J2734436.09−351324.8 | V2758 Sgr | J2752826.49−342410.7 | V3141 Sgr | J2771327.30−325251.9 | V1611 Sgr |
| J2734637.38−345411.4 | V2770 Sgr | J2753005.28−322139.1 | V3150 Sgr | J2771618.16−312636.2 | V3419 Sgr |
| J2734659.51−364323.7 | V2767 Sgr | J2753217.00−340440.9 | V3152 Sgr | J2772302.34−300956.8 | V2564 Sgr |
| J2734735.04−382330.9 | V0364 CrA | J2753226.84−321623.3 | V3153 Sgr | J2772755.20−310506.1 | V2566 Sgr |
| J2734959.70−365402.8 | V0694 Sgr | J2753305.16−343822.8 | V1292 Sgr | J2772830.47−310517.6 | V2567 Sgr |
| J2735029.17−344201.2 | V2780 Sgr | J2753458.47−321936.8 | V3162 Sgr | J2773243.47−323112.6 | V3456 Sgr |
| J2735217.92−360538.7 | V0695 Sgr | J2753615.82−310753.9 | V2535 Sgr | J2773409.84−283514.5 | V1620 Sgr |
| J2735345.71−344202.4 | V0696 Sgr | J2753746.29−312237.5 | V3169 Sgr | J2773624.61−305556.1 | V3468 Sgr |
| J2735602.11−372806.6 | XX CrA | J2753937.74−333105.5 | V3170 Sgr | J2773653.55−300103.9 | V1621 Sgr |
| J2735942.07−352754.8 | V2806 Sgr | J2753946.75−311226.6 | V3173 Sgr | J2774119.92−322237.8 | V2355 Sgr |
| J2740129.76−382259.4 | V0533 CrA | J2754046.99−315352.7 | V3174 Sgr | J2774210.91−310954.4 | V3477 Sgr |
| J2740343.90−364712.9 | V2821 Sgr | J2754118.51−360331.8 | V3168 Sgr | J2774605.04−321729.7 | V3484 Sgr |
| J2740423.85−365626.5 | V0700 Sgr | J2754257.08−313412.0 | V3178 Sgr | J2774758.36−314114.2 | V3489 Sgr |

**Notes.** VVV IDs and the respective GCVS names are presented.

**Table A.2.** continued.

| VVV ID | GCVS name | VVV ID | GCVS name | VVV ID | GCVS name |
|---|---|---|---|---|---|
| J2740455.20−353803.8 | V0702 Sgr | J2754533.05−335723.9 | V3180 Sgr | J2774809.03−314441.3 | V3490 Sgr |
| J2740715.58−351629.9 | V0706 Sgr | J2754558.25−320110.0 | V3188 Sgr | J2775727.88−311535.4 | V2574 Sgr |
| J2740722.74−352507.5 | V0707 Sgr | J2754619.69−343303.0 | V3183 Sgr | J2780805.50−310924.2 | V1625 Sgr |
| J2740748.40−351726.8 | V0708 Sgr | J2754708.67−341138.0 | V3186 Sgr | J2780843.71−312018.5 | V2582 Sgr |
| J2740804.45−334141.8 | V2844 Sgr | J2754826.49−341617.6 | V1295 Sgr | J2781001.76−313547.4 | V2583 Sgr |
| J2741013.01−354614.0 | V2846 Sgr | J2754847.92−314745.3 | V3193 Sgr | J2781358.59−312612.9 | V3539 Sgr |
| J2741048.75−340122.3 | V2852 Sgr | J2754919.80−325428.2 | V3191 Sgr | J2791305.39−291045.1 | V2597 Sgr |
| J2741123.21−333359.5 | V2859 Sgr | J2754928.83−311656.0 | V3197 Sgr | J2792632.46−281530.6 | V1201 Sgr |
| J2741224.96−352017.7 | V2857 Sgr | J2755001.53−333533.8 | V3192 Sgr | J2793223.91−274127.0 | V2374 Sgr |