VVVX Survey - ESO Phase 3 - Data Release 2

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Data Collection	VVVX
Release Number	2
Data Provider	Philip Lucas et al.
Date	23.6.2021

Abstract

The VVVX Survey data delivered to ESO includes the VISTA tile and pawprint images and single band catalogues that were processed by the Cambridge Astronomical Survey Unit (CASU). The data are from ESO programme 198.B-2004, with the VIRCAM instrument, using JHKs filters. The total sky coverage is c.1540 sq. deg, typically covered in all 3 of the J, H and Ks filters, save for very few exceptions where an image failed quality control. The J-band data benefit from double the exposure time (2 separate exposures appearing as 2 separate files) in order to increase the useful depth for construction of colour-magnitude diagrams (CMDs).

Overview of Observations

VVVX is an extension of the VVV time domain survey in area and in time. Primarily, VVVX is a time domain survey of the portions of the southern Galactic plane that were not covered by VVV. In addition, VVVX includes a small number of epochs in the original VVV survey area, taken in order to extend the time baseline for (i) significantly improved proper motion precision and (ii) monitoring of long term variable stars and transient events.

This Phase 3 release contains observations taken between 20180402 and 20191002. We refer to this product as DR2. All the data were processed with v1.5 of the CASU pipeline. This benefits from improved photometric calibration, relative to v1.3, and a fix to a bug in the illumination correction. This release is not the final word on absolute photometric calibration of VVV and some deficiencies are known to exist in the most crowded inner bulge fields. The forthcoming VVV/VICAL procedure (L. Smith et al. in prep.) will address the crowded-field issue noted in Hajdu et al.(2020).

The VVVX DR2 data correspond to both multi-filter JHKs “master data” taken in reasonably good observing conditions and time series Ks data. Quality cuts on the “master data” included: (i) seeing<1.0”, 1.1” and 1.2”, in Ks, H and J respectively; (ii) zero point magnitudes within 0.15 of the seasonal average value. The data were taken in 3 types of OB: (i) JHKs OBs in which all filters for a given 1.5°×1.1° VISTA tile were observed within ~1 hour (ii) J-only OBs, observed in order to double the exposure time in that filter, (iii) Ks-only OBs, in which a group of 4 adjacent tiles were observed to provide an epoch of time series photometry. Due to the restriction on OB duration the J-only OBs had to be separate from the JHKs OBs, for a given tile. The intention in a future band-merged release is to coadd the 2 J-band images of each tile and separately coadd the time series Ks images for each tile, in order to increase the useful depth of the Ks vs J-Ks CMDs. Some OBs of both types were repeated due to marginal or changing observing conditions at the telescope. Additional observations

from these OBs (in any or all filters) are included in this release if the data subsequently passed quality control by the survey team.

We note that VVVX J-band observations within each OB have longer exposure times than the VVV observations. Individual stars are typically covered by 2 of the 6 VISTA pawprints in the tiling pattern (separated by a few minutes in time) leading to a total time on-source in each OB of 120 s (J), 48s (H) and 16s (Ks). VVVX time series Ks data have 16 s time on source for stars covered by 2 pawprints, the same as VVV. For comparison, the VVV multi-colour disc OB data (denoted "d[tile no.]") had 80s per filter and the VVV multi-colour bulge OB data (denoted "b[tile no.]") had 48 s (J), 16 s (H), 16 s (Ks).

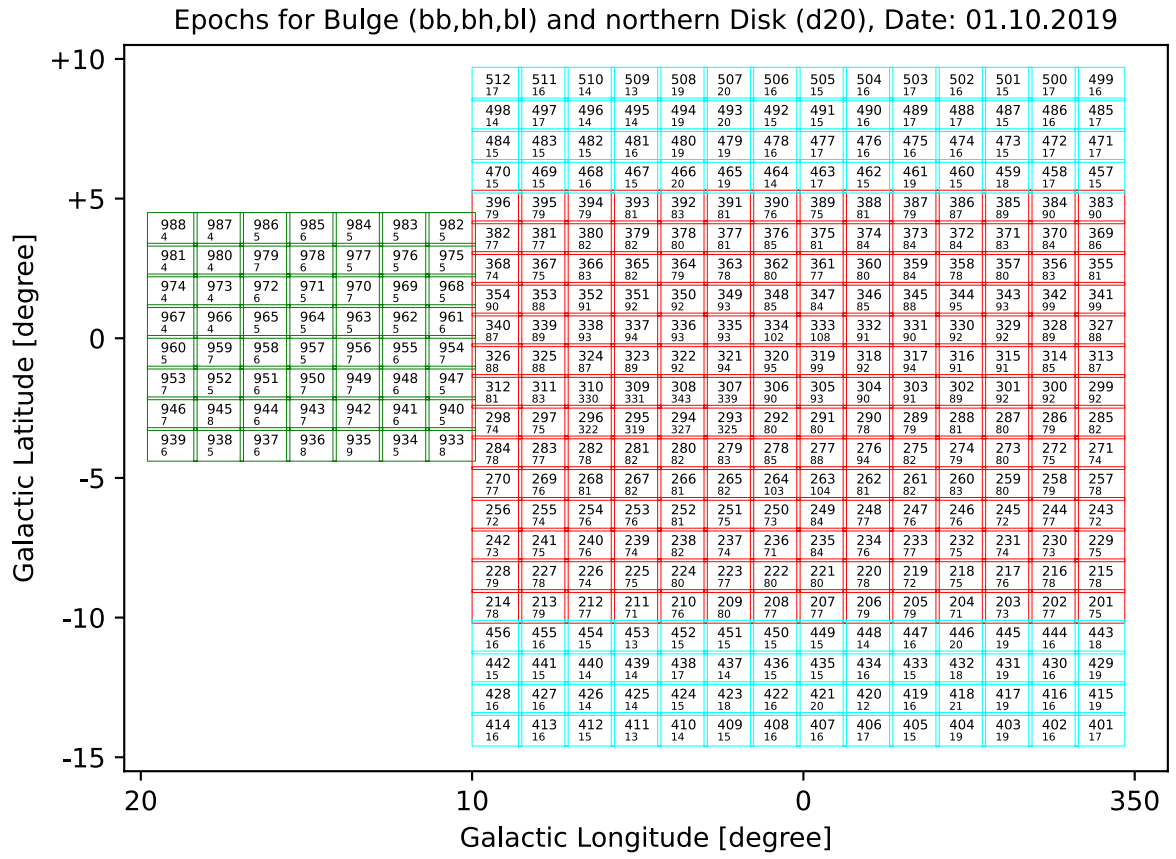
The list for this Phase 3 release DR2 has 10776 tile images plus their associated weight maps and single-band source catalogues. In addition, the release contains: (i) the 64716 pawprint images and their associated weight maps that were used to create the tile images; (ii) the single band source catalogues derived from the pawprint images. The total data volume is 13.37 TB in compressed format and approximately double that volume when uncompressed. Quality control of such a large dataset is never perfect, so visual inspection of the images is always recommended when studying individual sources.

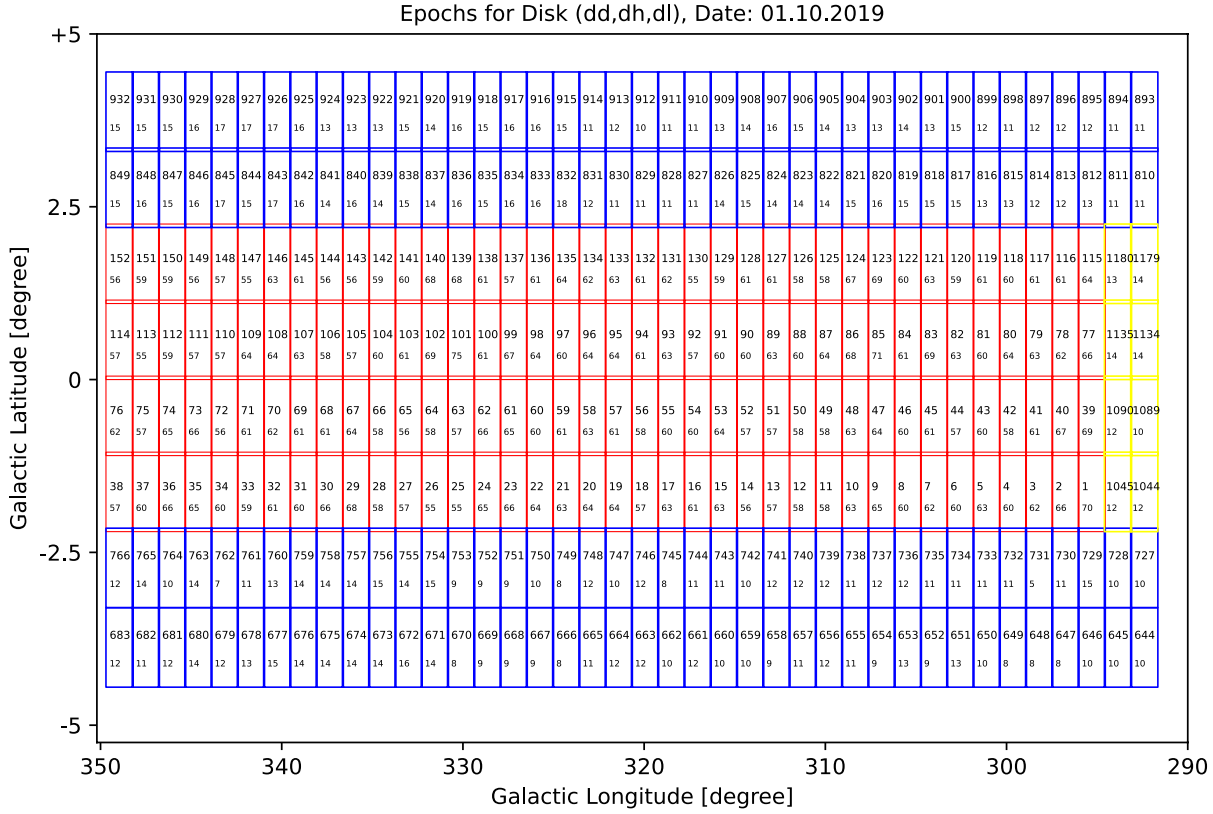
Previous Releases

VVVX DR1 contained data from the multi-colour (JHKs) OBs and J-only OBs, all of which were taken between July 2016 and August 2017. Since VVVX DR2 contains only data taken after 2 April 2018, the survey data in Ks that were taken prior to April 2018 remain to be released. At the present time we are working to release these data as soon as possible, in order to provide a continuous time series.

The VVVX extension in area

The VVVX photometric dataset is divided into different disc and bulge tiles. The original VVV tile nomenclature goes from d001 to d152 in the disk (4 rows of tiles at longitudes 295° to 350°), and from b201 to b396 in the bulge (longitudes 350° to 10°). In VVVX the bulge region is extended at higher and lower latitudes (see Figure 1), including new tiles labeled b401 to b512. The new areas of the VVVX disc region are labeled e601 to e988. These new disc areas are located (i) at longitudes 10° to 20° (8 rows of tiles, partially overlapping with UKIDSS) and (ii) at longitudes 230° to 350°, comprising 8 rows of tiles at 230° to 295° and 2 rows of tiles above and 2 rows below the original VVV disc area at 295° to 350°.
The coordinates of the tile centers available in this release are listed in Table 1. A map of the available data is shown in Figure 1. Each rectangle indicates the location of a tile. There are small overlaps between adjacent tiles.


Epochs for Bulge (bb,bh,bl) and northern Disk (d20), Date: 01.10.2019
Galactic Latitude [degree]
Galactic Longitude [degree]
+10
+5
0
-5
-10
-15
20
10
0
350


Epochs for Disk (dd,dh,dl), Date: 01.10.2019
Galactic Latitude [degree]
Galactic Longitude [degree]
+5
2.5
0
-2.5
-5
350
340
330
320
310
300
290

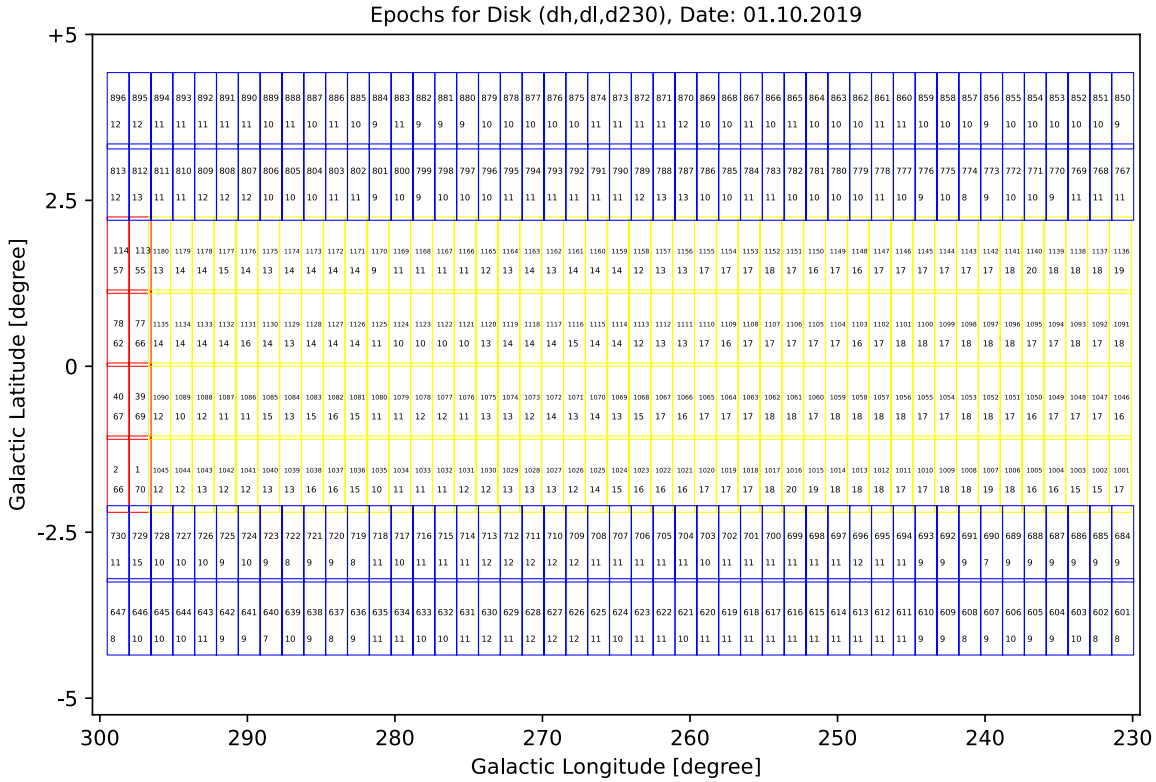


Figure 1(a-c). Maps of VVVX DR2 sky coverage and the number of Ks epochs for each tile, including data earlier in VVVX and the VVV survey. In each tile, the lower number is the number of Ks epochs and the upper number is the unique tile ID number. The new VVVX fields are coloured green, blue and yellow and the original VVV area is coloured red. A few additional epochs per tile were also obtained in the original VVV area.

Release Content

TABLE 1: Coordinates of VVVX DR2 tiles.

ID	RA	Dec	Longitude	Latitude
b0401	18:25:30.4	-43:37:47.9	350.77	-14.00
b0402	18:28:46.2	-42:18:07.7	352.27	-14.00
b0403	18:31:56.7	-40:58:19.1	353.77	-14.00
b0404	18:35:02.2	-39:38:25.4	355.27	-14.00
b0405	18:38:03.2	-38:18:27.6	356.77	-14.00
b0406	18:41:00.4	-36:58:28.4	358.27	-14.00
b0407	18:43:53.7	-35:38:22.9	359.77	-14.00
b0408	18:46:43.6	-34:18:17.1	1.27	-14.00
b0409	18:49:31.3	-32:58:08.6	2.77	-14.00
b0410	18:52:16.0	-31:38:00.3	4.27	-14.00
b0411	18:54:58.3	-30:17:54.2	5.77	-14.00
b0412	18:57:38.6	-28:57:46.7	7.27	-14.00
b0413	19:00:17.2	-27:37:42.0	8.77	-14.00
b0414	19:02:54.2	-26:17:36.8	10.27	-14.00

b0415	18:20:02.3	-43:10:30.8	350.76	-12.91
b0416	18:23:23.8	-41:51:23.7	352.26	-12.91
b0417	18:26:39.3	-40:32:10.3	353.75	-12.91
b0418	18:29:49.8	-39:12:46.6	355.24	-12.91
b0419	18:32:55.7	-37:53:18.7	356.74	-12.91
b0420	18:35:57.1	-36:33:46.4	358.23	-12.91
b0421	18:38:54.3	-35:14:07.7	359.73	-12.91
b0422	18:41:48.8	-33:54:25.4	1.22	-12.91
b0423	18:44:39.6	-32:34:42.8	2.71	-12.91
b0424	18:47:27.8	-31:14:57.4	4.21	-12.91
b0425	18:50:13.5	-29:55:10.7	5.70	-12.91
b0426	18:52:57.0	-28:35:23.9	7.20	-12.91
b0427	18:55:38.3	-27:15:35.9	8.69	-12.91
b0428	18:58:17.9	-25:55:50.8	10.18	-12.91
b0429	18:14:39.2	-42:42:15.4	350.76	-11.81
b0430	18:18:05.9	-41:23:44.4	352.25	-11.81
b0431	18:21:26.4	-40:05:01.6	353.73	-11.81
b0432	18:24:41.4	-38:46:11.8	355.22	-11.81
b0433	18:27:51.5	-37:27:12.8	356.71	-11.81
b0434	18:30:57.1	-36:08:07.3	358.20	-11.81
b0435	18:33:58.9	-34:48:55.4	359.69	-11.81
b0436	18:36:56.7	-33:29:40.2	1.17	-11.81
b0437	18:39:51.1	-32:10:19.1	2.66	-11.81
b0438	18:42:42.7	-30:50:57.5	4.15	-11.81
b0439	18:45:31.4	-29:31:32.6	5.64	-11.81
b0440	18:48:17.7	-28:12:06.1	7.13	-11.81
b0441	18:51:01.9	-26:52:38.4	8.61	-11.81
b0442	18:53:44.1	-25:33:11.8	10.10	-11.81
b0443	18:09:21.1	-42:13:04.4	350.76	-10.72
b0444	18:12:52.6	-40:55:07.6	352.24	-10.72
b0445	18:16:17.9	-39:36:58.3	353.72	-10.72
b0446	18:19:37.4	-38:18:38.6	355.20	-10.72
b0447	18:22:51.5	-37:00:10.2	356.69	-10.72
b0448	18:26:01.3	-35:41:31.9	358.17	-10.72
b0449	18:29:06.6	-34:22:48.9	359.65	-10.72
b0450	18:32:08.0	-33:03:57.5	1.13	-10.72
b0451	18:35:06.0	-31:45:01.4	2.62	-10.72
b0452	18:38:00.7	-30:26:01.8	4.10	-10.72
b0453	18:40:52.3	-29:06:58.3	5.58	-10.72
b0454	18:43:41.4	-27:47:52.3	7.06	-10.72
b0455	18:46:28.2	-26:28:44.0	8.55	-10.72
b0456	18:49:12.9	-25:09:34.0	10.03	-10.72

b0457	16:59:44.5	-33:25:05.8	350.75	5.55
b0458	17:03:58.2	-32:15:33.7	352.21	5.55
b0459	17:08:04.4	-31:05:20.4	353.68	5.55
b0460	17:12:04.0	-29:54:37.1	355.15	5.55
b0461	17:15:57.1	-28:43:15.7	356.61	5.55
b0462	17:19:43.9	-27:31:23.0	358.08	5.55
b0463	17:23:25.4	-26:19:00.4	359.55	5.55
b0464	17:27:01.2	-25:06:10.5	1.01	5.55
b0465	17:30:32.2	-23:52:53.2	2.48	5.55
b0466	17:33:58.2	-22:39:11.8	3.95	5.55
b0467	17:37:19.8	-21:25:08.3	5.41	5.55
b0468	17:40:37.3	-20:10:42.0	6.88	5.55
b0469	17:43:51.1	-18:55:56.5	8.35	5.55
b0470	17:47:01.0	-17:40:50.6	9.81	5.55
b0471	16:55:38.6	-32:44:34.7	350.75	6.64
b0472	16:59:53.5	-31:35:34.4	352.22	6.64
b0473	17:04:01.2	-30:25:51.6	353.69	6.64
b0474	17:08:02.0	-29:15:32.6	355.16	6.64
b0475	17:11:56.4	-28:04:36.6	356.63	6.64
b0476	17:15:44.6	-26:53:07.7	358.10	6.64
b0477	17:19:27.2	-25:41:08.1	359.57	6.64
b0478	17:23:04.4	-24:28:39.0	1.04	6.64
b0479	17:26:36.7	-23:15:43.8	2.51	6.64
b0480	17:30:04.1	-22:02:21.8	3.98	6.64
b0481	17:33:26.7	-20:48:30.5	5.45	6.64
b0482	17:36:45.3	-19:34:19.9	6.92	6.64
b0483	17:40:00.0	-18:19:49.8	8.39	6.64
b0484	17:43:10.9	-17:04:55.9	9.86	6.64
b0485	16:51:36.5	-32:03:36.7	350.75	7.74
b0486	16:55:52.4	-30:55:03.2	352.22	7.74
b0487	17:00:01.3	-29:45:51.1	353.70	7.74
b0488	17:04:03.2	-28:35:56.0	355.17	7.74
b0489	17:07:58.7	-27:25:25.8	356.64	7.74
b0490	17:11:48.4	-26:14:20.0	358.12	7.74
b0491	17:15:32.1	-25:02:41.8	359.59	7.74
b0492	17:19:10.6	-23:50:34.0	1.06	7.74
b0493	17:22:44.0	-22:37:58.7	2.54	7.73
b0494	17:26:12.4	-21:24:53.9	4.01	7.73
b0495	17:29:36.2	-20:11:18.4	5.48	7.74
b0496	17:32:55.8	-18:57:25.2	6.96	7.74
b0497	17:36:11.3	-17:43:06.3	8.43	7.74
b0498	17:39:23.2	-16:28:26.4	9.91	7.74

b0499	16:47:37.9	-31:22:07.9	350.75	8.83
b0500	16:51:54.9	-30:14:02.2	352.23	8.83
b0501	16:56:04.9	-29:05:16.4	353.71	8.83
b0502	17:00:07.9	-27:55:48.5	355.18	8.83
b0503	17:04:04.6	-26:45:42.2	356.66	8.83
b0504	17:07:55.2	-25:35:00.3	358.14	8.83
b0505	17:11:40.2	-24:23:43.6	359.62	8.83
b0506	17:15:19.7	-23:11:54.8	1.10	8.83
b0507	17:18:41.7	-22:03:41.2	2.49	8.83
b0508	17:22:11.5	-20:50:54.9	3.97	8.83
b0509	17:25:36.5	-19:37:42.8	5.45	8.83
b0510	17:28:57.4	-18:24:02.6	6.92	8.83
b0511	17:32:14.1	-17:10:00.0	8.40	8.83
b0512	17:35:26.9	-15:55:32.9	9.88	8.83
b201	18:04:24.6	-41:44:37.1	350.75	-9.69
b202	18:08:00.4	-40:27:14.4	352.23	-9.69
b203	18:11:29.7	-39:09:36.8	353.71	-9.69
b204	18:14:53.2	-37:51:46.1	355.19	-9.69
b205	18:18:11.4	-36:33:47.4	356.66	-9.69
b206	18:21:24.5	-35:15:35.3	358.14	-9.69
b207	18:24:33.3	-33:57:15.6	359.62	-9.69
b208	18:27:37.9	-32:38:50.7	1.10	-9.69
b209	18:30:38.8	-31:20:16.2	2.58	-9.69
b210	18:33:36.3	-30:01:38.3	4.05	-9.69
b211	18:36:30.9	-28:42:55.3	5.53	-9.69
b212	18:39:22.4	-27:24:09.2	7.01	-9.69
b213	18:42:11.6	-26:05:18.5	8.49	-9.69
b214	18:44:58.5	-24:46:25.8	9.97	-9.69
b215	17:59:16.2	-41:13:39.0	350.75	-8.60
b216	18:02:56.3	-39:56:51.8	352.22	-8.60
b217	18:06:29.7	-38:39:46.5	353.70	-8.60
b218	18:09:57.1	-37:22:29.3	355.17	-8.60
b219	18:13:19.0	-36:04:59.0	356.65	-8.60
b220	18:16:35.7	-34:47:18.4	358.12	-8.60
b221	18:19:47.9	-33:29:24.9	359.59	-8.60
b222	18:22:55.8	-32:11:25.3	1.07	-8.60
b223	18:25:59.7	-30:53:16.1	2.54	-8.60
b224	18:29:00.1	-29:35:01.7	4.01	-8.60
b225	18:31:57.3	-28:16:38.8	5.49	-8.60
b226	18:34:51.5	-26:58:11.9	6.96	-8.60
b227	18:37:43.0	-25:39:39.4	8.43	-8.60
b228	18:40:32.2	-24:21:04.7	9.91	-8.60

b229	17:54:12.7	-40:41:50.2	350.75	-7.50
b230	17:57:56.8	-39:25:38.8	352.22	-7.50
b231	18:01:34.2	-38:09:05.1	353.69	-7.50
b232	18:05:05.2	-36:52:20.5	355.16	-7.50
b233	18:08:30.6	-35:35:20.4	356.63	-7.50
b234	18:11:50.7	-34:18:06.9	358.10	-7.50
b235	18:15:06.0	-33:00:42.1	359.57	-7.50
b236	18:18:16.9	-31:43:07.1	1.04	-7.50
b237	18:21:23.9	-30:25:23.8	2.51	-7.50
b238	18:24:27.0	-29:07:28.7	3.98	-7.50
b239	18:27:26.8	-27:49:28.2	5.45	-7.50
b240	18:30:23.4	-26:31:21.5	6.92	-7.50
b241	18:33:17.3	-25:13:09.2	8.39	-7.50
b242	18:36:08.7	-23:54:53.2	9.86	-7.50
b243	17:49:14.1	-40:09:11.5	350.75	-6.41
b244	17:53:01.8	-38:53:34.3	352.21	-6.41
b245	17:56:42.9	-37:37:36.0	353.68	-6.41
b246	18:00:17.4	-36:21:23.9	355.15	-6.41
b247	18:03:46.1	-35:04:52.9	356.61	-6.41
b248	18:07:09.4	-33:48:09.1	358.08	-6.41
b249	18:10:27.7	-32:31:11.1	359.55	-6.41
b250	18:13:41.5	-31:14:00.1	1.01	-6.41
b251	18:16:51.2	-29:56:40.6	2.48	-6.41
b252	18:19:57.0	-28:39:08.9	3.95	-6.41
b253	18:22:59.2	-27:21:31.1	5.41	-6.41
b254	18:25:58.2	-26:03:44.4	6.88	-6.41
b255	18:28:54.2	-24:45:50.2	8.35	-6.41
b256	18:31:47.7	-23:27:49.8	9.81	-6.41
b257	17:44:20.4	-39:35:44.7	350.75	-5.32
b258	17:48:11.7	-38:20:44.3	352.21	-5.32
b259	17:51:55.8	-37:05:19.1	353.67	-5.32
b260	17:55:33.7	-35:49:37.9	355.14	-5.32
b261	17:59:05.4	-34:33:35.2	356.60	-5.32
b262	18:02:31.8	-33:17:18.8	358.07	-5.32
b263	18:05:53.0	-32:00:47.1	359.53	-5.32
b264	18:09:09.5	-30:44:02.4	0.99	-5.32
b265	18:12:21.8	-29:27:07.7	2.46	-5.32
b266	18:15:30.0	-28:09:59.8	3.92	-5.32
b267	18:18:34.6	-26:52:41.3	5.39	-5.32
b268	18:21:35.8	-25:35:13.1	6.85	-5.32
b269	18:24:34.0	-24:17:37.8	8.31	-5.32
b270	18:27:29.4	-22:59:56.9	9.78	-5.32

b271	17:39:31.4	-39:01:32.6	350.74	-4.23
b272	17:43:25.9	-37:47:07.5	352.21	-4.23
b273	17:47:13.2	-36:32:14.5	353.67	-4.23
b274	17:50:53.9	-35:17:05.4	355.13	-4.23
b275	17:54:28.7	-34:01:34.0	356.59	-4.23
b276	17:57:57.7	-32:45:43.6	358.05	-4.23
b277	18:01:21.8	-31:29:38.7	359.52	-4.23
b278	18:04:40.9	-30:13:19.3	0.98	-4.23
b279	18:07:55.5	-28:56:46.3	2.44	-4.23
b280	18:11:06.2	-27:40:02.2	3.90	-4.23
b281	18:14:12.9	-26:23:05.2	5.36	-4.23
b282	18:17:16.2	-25:05:55.7	6.83	-4.23
b283	18:20:16.5	-23:48:41.7	8.29	-4.23
b284	18:23:13.7	-22:31:16.9	9.75	-4.23
b285	17:34:47.2	-38:26:34.5	350.74	-3.13
b286	17:38:44.6	-37:12:43.7	352.20	-3.14
b287	17:42:34.8	-35:58:26.3	353.66	-3.14
b288	17:46:18.4	-34:43:46.2	355.12	-3.14
b289	17:49:55.8	-33:28:43.1	356.58	-3.14
b290	17:53:27.5	-32:13:22.3	358.04	-3.14
b291	17:56:54.0	-30:57:43.9	359.51	-3.14
b292	18:00:15.5	-29:41:50.3	0.97	-3.14
b293	18:03:32.5	-28:25:38.6	2.43	-3.13
b294	18:06:45.3	-27:09:17.2	3.89	-3.14
b295	18:09:54.2	-25:52:39.5	5.35	-3.14
b296	18:12:59.5	-24:35:53.3	6.81	-3.14
b297	18:16:01.7	-23:18:54.5	8.27	-3.14
b298	18:19:00.7	-22:01:46.7	9.73	-3.14
b299	17:30:07.8	-37:50:55.0	350.74	-2.04
b300	17:34:07.8	-36:37:36.3	352.20	-2.04
b301	17:38:00.6	-35:23:52.0	353.66	-2.04
b302	17:41:46.8	-34:09:41.5	355.12	-2.04
b303	17:45:26.9	-32:55:09.0	356.58	-2.04
b304	17:49:01.0	-31:40:15.5	358.04	-2.04
b305	17:52:29.7	-30:25:04.3	359.50	-2.04
b306	17:55:53.5	-29:09:33.8	0.96	-2.04
b307	17:59:12.8	-27:53:47.2	2.42	-2.04
b308	18:02:27.7	-26:37:45.5	3.88	-2.04
b309	18:05:38.6	-25:21:30.2	5.34	-2.04
b310	18:08:45.9	-24:05:01.5	6.79	-2.04
b311	18:11:49.6	-22:48:20.3	8.25	-2.04
b312	18:14:50.3	-21:31:29.3	9.71	-2.04

b313	17:25:32.8	-37:14:33.5	350.74	-0.95
b314	17:29:35.3	-36:01:48.8	352.20	-0.95
b315	17:33:30.6	-34:48:34.7	353.66	-0.95
b316	17:37:19.3	-33:34:58.0	355.12	-0.95
b317	17:41:01.6	-32:20:52.3	356.58	-0.95
b318	17:44:37.9	-31:06:28.0	358.04	-0.95
b319	17:48:08.9	-29:51:40.5	359.49	-0.95
b320	17:51:35.0	-28:36:35.0	0.95	-0.95
b321	17:54:56.2	-27:21:09.9	2.41	-0.95
b322	17:58:13.0	-26:05:30.5	3.87	-0.95
b323	18:01:25.8	-24:49:35.2	5.33	-0.95
b324	18:04:34.7	-23:33:24.6	6.79	-0.95
b325	18:07:40.3	-22:17:02.4	8.25	-0.95
b326	18:10:42.6	-21:00:27.4	9.71	-0.95
b327	17:21:02.1	-36:37:30.4	350.74	0.14
b328	17:25:07.0	-35:25:20.3	352.20	0.14
b329	17:29:04.5	-34:12:39.2	353.66	0.14
b330	17:32:55.4	-32:59:30.1	355.12	0.14
b331	17:36:40.0	-31:45:55.7	356.58	0.14
b332	17:40:18.5	-30:31:57.5	358.04	0.14
b333	17:43:51.5	-29:17:35.2	359.49	0.14
b334	17:47:19.5	-28:02:53.3	0.95	0.14
b335	17:50:42.7	-26:47:51.8	2.41	0.14
b336	17:54:01.4	-25:32:32.4	3.87	0.14
b337	17:57:15.9	-24:16:56.4	5.33	0.14
b338	18:00:26.5	-23:01:05.5	6.79	0.14
b339	18:03:33.7	-21:44:58.7	8.25	0.14
b340	18:06:37.5	-20:28:41.0	9.71	0.14
b341	17:16:36.1	-35:59:50.0	350.74	1.23
b342	17:20:42.9	-34:48:13.2	352.20	1.23
b343	17:24:42.6	-33:36:04.0	353.66	1.23
b344	17:28:35.5	-32:23:23.0	355.12	1.23
b345	17:32:22.0	-31:10:17.0	356.58	1.23
b346	17:36:02.6	-29:56:45.4	358.04	1.23
b347	17:39:37.5	-28:42:48.9	359.50	1.23
b348	17:43:07.3	-27:28:30.7	0.96	1.23
b349	17:46:32.3	-26:13:50.6	2.42	1.23
b350	17:49:52.7	-24:58:51.9	3.88	1.23
b351	17:53:08.9	-23:43:35.4	5.34	1.23
b352	17:56:21.0	-22:28:02.1	6.79	1.23
b353	17:59:29.7	-21:12:14.0	8.25	1.23
b354	18:02:35.0	-19:56:11.1	9.71	1.23

b355	17:12:14.0	-35:21:34.8	350.74	2.33
b356	17:16:22.9	-34:10:28.2	352.20	2.33
b357	17:20:24.5	-32:58:49.6	353.66	2.33
b358	17:24:19.3	-31:46:39.5	355.12	2.33
b359	17:28:07.6	-30:34:00.2	356.58	2.33
b360	17:31:50.0	-29:20:53.8	358.04	2.33
b361	17:35:26.8	-28:07:24.0	359.50	2.33
b362	17:38:58.3	-26:53:27.6	0.96	2.33
b363	17:42:25.1	-25:39:09.2	2.43	2.33
b364	17:45:47.0	-24:24:29.4	3.89	2.33
b365	17:49:04.6	-23:09:34.7	5.35	2.33
b366	17:52:18.3	-21:54:18.8	6.81	2.33
b367	17:55:28.4	-20:38:47.2	8.27	2.33
b368	17:58:34.9	-19:22:58.9	9.73	2.33
b369	17:07:56.3	-34:42:40.6	350.74	3.42
b370	17:12:06.9	-33:32:07.3	352.21	3.42
b371	17:16:10.2	-32:20:59.8	353.67	3.42
b372	17:20:06.7	-31:09:19.6	355.13	3.42
b373	17:23:56.8	-29:57:08.3	356.59	3.42
b374	17:27:41.0	-28:44:26.6	358.05	3.42
b375	17:31:19.4	-27:31:19.6	359.51	3.42
b376	17:34:52.5	-26:17:44.9	0.98	3.42
b377	17:38:20.6	-25:03:50.2	2.44	3.42
b378	17:41:44.2	-23:49:31.2	3.90	3.42
b379	17:45:03.3	-22:34:50.1	5.36	3.42
b380	17:48:18.4	-21:19:51.8	6.82	3.42
b381	17:51:29.7	-20:04:37.3	8.29	3.42
b382	17:54:37.5	-18:49:02.6	9.75	3.42
b383	17:03:42.7	-34:03:13.6	350.74	4.51
b384	17:07:54.8	-32:53:10.6	352.21	4.51
b385	17:11:59.8	-31:42:34.1	353.67	4.51
b386	17:15:57.9	-30:31:21.5	355.14	4.51
b387	17:19:49.6	-29:19:35.5	356.60	4.51
b388	17:23:35.2	-28:07:21.5	358.06	4.51
b389	17:27:15.2	-26:54:35.2	359.53	4.51
b390	17:31:06.1	-25:47:39.9	0.94	4.40
b391	17:34:15.9	-24:29:06.6	2.43	4.51
b392	17:37:40.8	-23:15:08.4	3.90	4.51
b393	17:41:01.3	-22:00:49.8	5.36	4.51
b394	17:44:17.7	-20:46:07.0	6.82	4.51
b395	17:47:30.3	-19:31:09.0	8.29	4.51
b396	17:50:39.3	-18:15:47.9	9.75	4.51

d001	11:43:27.7	-63:31:38.4	295.44	-1.65
d002	11:56:15.4	-63:52:20.1	296.90	-1.65
d003	12:09:20.0	-64:08:44.8	298.36	-1.65
d004	12:22:38.0	-64:20:43.8	299.82	-1.65
d005	12:36:05.4	-64:28:14.1	301.28	-1.65
d006	12:49:37.9	-64:31:09.1	302.74	-1.65
d007	13:03:11.0	-64:29:27.0	304.20	-1.65
d008	13:16:40.2	-64:23:10.2	305.66	-1.65
d009	13:30:01.3	-64:12:22.0	307.11	-1.65
d010	13:43:09.7	-63:57:06.0	308.57	-1.65
d011	13:56:02.3	-63:37:33.6	310.03	-1.65
d012	14:08:35.5	-63:13:50.2	311.49	-1.65
d013	14:20:47.0	-62:46:07.5	312.95	-1.65
d014	14:32:34.6	-62:14:40.9	314.41	-1.65
d015	14:43:54.4	-61:38:30.5	315.87	-1.63
d016	14:54:40.7	-61:02:04.2	317.30	-1.65
d017	15:05:10.5	-60:20:38.3	318.76	-1.65
d018	15:15:13.5	-59:36:15.5	320.22	-1.65
d019	15:24:50.1	-58:49:12.9	321.68	-1.65
d020	15:34:00.9	-57:59:40.0	323.14	-1.65
d021	15:42:46.3	-57:07:47.5	324.59	-1.65
d022	15:51:07.9	-56:13:46.2	326.05	-1.65
d023	15:59:06.1	-55:17:48.4	327.51	-1.65
d024	16:06:42.3	-54:20:02.2	328.97	-1.65
d025	16:13:57.6	-53:20:35.8	330.43	-1.65
d026	16:20:53.2	-52:19:37.0	331.89	-1.65
d027	16:27:30.4	-51:17:14.6	333.35	-1.65
d028	16:33:49.9	-50:13:33.7	334.81	-1.65
d029	16:39:53.1	-49:08:43.0	336.27	-1.65
d030	16:45:41.0	-48:02:46.4	337.73	-1.65
d031	16:51:14.5	-46:55:47.3	339.19	-1.65
d032	16:56:34.5	-45:47:53.8	340.64	-1.65
d033	17:01:41.8	-44:39:10.2	342.10	-1.65
d034	17:06:37.9	-43:29:37.6	343.56	-1.65
d035	17:11:22.7	-42:19:22.5	345.02	-1.65
d036	17:15:57.3	-41:08:27.6	346.48	-1.65
d037	17:20:22.6	-39:56:53.4	347.94	-1.65
d038	17:24:38.8	-38:44:46.9	349.40	-1.65
d039	11:45:55.1	-62:28:15.7	295.44	-0.56
d040	11:58:16.9	-62:48:11.7	296.90	-0.56
d041	12:10:53.6	-63:04:02.2	298.36	-0.56
d042	12:23:42.3	-63:15:35.7	299.82	-0.56

d043	12:36:39.4	-63:22:49.6	301.28	-0.56
d044	12:49:41.1	-63:25:36.5	302.74	-0.56
d045	13:02:43.2	-63:24:00.3	304.19	-0.56
d046	13:15:41.9	-63:17:58.5	305.65	-0.56
d047	13:28:33.1	-63:07:33.6	307.11	-0.56
d048	13:41:13.5	-62:52:53.3	308.57	-0.56
d049	13:53:39.5	-62:34:01.1	310.03	-0.56
d050	14:05:48.4	-62:11:09.1	311.49	-0.56
d051	14:17:37.6	-61:44:27.0	312.95	-0.56
d052	14:29:05.3	-61:14:00.0	314.41	-0.56
d053	14:40:10.1	-60:40:07.2	315.86	-0.56
d054	14:50:50.8	-60:02:53.6	317.32	-0.56
d055	15:01:07.1	-59:22:37.4	318.78	-0.56
d056	15:10:58.8	-58:39:27.6	320.24	-0.56
d057	15:20:25.7	-57:53:34.9	321.70	-0.56
d058	15:29:28.7	-57:05:14.1	323.16	-0.56
d059	15:38:08.0	-56:14:33.1	324.62	-0.56
d060	15:46:24.8	-55:21:42.3	326.07	-0.56
d061	15:54:19.3	-54:26:53.3	327.53	-0.56
d062	16:01:53.0	-53:30:13.2	328.99	-0.56
d063	16:09:06.6	-52:31:52.3	330.45	-0.56
d064	16:16:01.4	-51:31:57.2	331.91	-0.56
d065	16:22:38.3	-50:30:36.0	333.37	-0.56
d066	16:28:58.2	-49:27:53.2	334.83	-0.56
d067	16:35:02.2	-48:23:58.1	336.29	-0.56
d068	16:40:51.3	-47:18:56.8	337.74	-0.56
d069	16:46:26.4	-46:12:49.8	339.20	-0.56
d070	16:51:48.2	-45:05:46.2	340.66	-0.56
d071	16:56:57.5	-43:57:50.1	342.12	-0.56
d072	17:01:55.4	-42:49:03.3	343.58	-0.56
d073	17:06:42.7	-41:39:30.3	345.04	-0.56
d074	17:11:19.5	-40:29:16.7	346.50	-0.56
d075	17:15:47.2	-39:18:22.5	347.95	-0.56
d076	17:20:05.9	-38:06:51.8	349.41	-0.56
d077	11:48:12.5	-61:24:45.8	295.44	0.54
d078	12:00:10.2	-61:44:01.9	296.90	0.54
d079	12:12:21.2	-61:59:18.6	298.36	0.54
d080	12:24:42.9	-62:10:27.1	299.82	0.54
d081	12:37:12.2	-62:17:22.9	301.28	0.54
d082	12:49:45.5	-62:20:04.7	302.74	0.54
d083	13:02:19.1	-62:18:32.3	304.20	0.54
d084	13:14:49.7	-62:12:42.4	305.65	0.54

d085	13:27:13.9	-62:02:40.9	307.11	0.54
d086	13:39:27.8	-61:48:30.3	308.57	0.54
d087	13:51:29.2	-61:30:18.1	310.03	0.54
d088	14:03:15.1	-61:08:11.8	311.49	0.54
d089	14:14:43.6	-60:42:19.2	312.95	0.54
d090	14:25:52.4	-60:12:52.0	314.41	0.54
d091	14:36:40.2	-59:39:59.0	315.87	0.54
d092	14:47:06.3	-59:03:53.1	317.33	0.54
d093	14:57:09.5	-58:24:42.4	318.78	0.54
d094	15:06:50.2	-57:42:41.6	320.24	0.54
d095	15:16:07.9	-56:57:59.3	321.70	0.54
d096	15:25:03.2	-56:10:47.3	323.16	0.54
d097	15:33:36.6	-55:21:16.6	324.62	0.54
d098	15:41:48.3	-54:29:34.8	326.08	0.54
d099	15:49:39.1	-53:35:52.2	327.54	0.54
d100	15:57:10.1	-52:40:18.7	329.00	0.54
d101	16:04:22.1	-51:43:01.9	330.46	0.54
d102	16:11:15.8	-50:44:08.2	331.91	0.54
d103	16:17:52.1	-49:43:47.8	333.37	0.54
d104	16:24:12.2	-48:42:03.9	334.83	0.54
d105	16:30:16.9	-47:39:04.6	336.29	0.54
d106	16:36:06.9	-46:34:55.5	337.75	0.54
d107	16:41:43.0	-45:29:41.3	339.21	0.54
d108	16:47:06.5	-44:23:26.6	340.67	0.54
d109	16:52:17.6	-43:16:16.8	342.13	0.54
d110	16:57:17.4	-42:08:15.0	343.58	0.54
d111	17:02:06.6	-40:59:24.8	345.04	0.54
d112	17:06:45.7	-39:49:51.7	346.50	0.54
d113	17:11:15.4	-38:39:37.1	347.96	0.54
d114	17:15:36.2	-37:28:41.9	349.42	0.54
d115	11:50:21.1	-60:21:07.1	295.44	1.63
d116	12:01:56.3	-60:39:45.1	296.90	1.63
d117	12:13:43.4	-60:54:30.7	298.36	1.63
d118	12:25:40.3	-61:05:14.9	299.82	1.63
d119	12:37:43.9	-61:11:57.6	301.28	1.63
d120	12:49:50.9	-61:14:34.6	302.74	1.63
d121	13:01:58.4	-61:13:02.7	304.20	1.63
d122	13:14:03.2	-61:07:25.7	305.66	1.63
d123	13:26:01.7	-60:57:42.7	307.12	1.63
d124	13:37:51.7	-60:44:00.3	308.58	1.63
d125	13:49:30.5	-60:26:23.6	310.04	1.63
d126	14:00:55.0	-60:04:57.8	311.50	1.63

d127	14:12:03.5	-59:39:52.4	312.96	1.63
d128	14:22:54.2	-59:11:18.5	314.42	1.63
d129	14:33:25.9	-58:39:22.5	315.88	1.63
d130	14:43:37.4	-58:04:15.4	317.34	1.63
d131	14:53:28.4	-57:26:08.8	318.80	1.63
d132	15:02:58.1	-56:45:11.6	320.26	1.63
d133	15:12:06.4	-56:01:34.1	321.72	1.63
d134	15:20:53.9	-55:15:27.6	323.17	1.63
d135	15:29:20.6	-54:27:00.7	324.63	1.63
d136	15:37:27.2	-53:36:24.6	326.09	1.63
d137	15:45:14.0	-52:43:46.2	327.55	1.63
d138	15:52:41.8	-51:49:15.1	329.01	1.63
d139	15:59:51.3	-50:52:59.2	330.47	1.63
d140	16:06:43.4	-49:55:05.5	331.93	1.63
d141	16:13:18.8	-48:55:41.1	333.39	1.63
d142	16:19:38.5	-47:54:54.5	334.85	1.63
d143	16:25:43.2	-46:52:48.2	336.31	1.63
d144	16:31:33.7	-45:49:30.7	337.77	1.63
d145	16:37:10.6	-44:45:06.0	339.23	1.63
d146	16:42:35.1	-43:39:39.1	340.69	1.63
d147	16:47:47.7	-42:33:14.1	342.15	1.63
d148	16:52:48.9	-41:25:55.2	343.61	1.63
d149	16:57:39.6	-40:17:47.8	345.07	1.63
d150	17:02:20.4	-39:08:53.2	346.53	1.63
d151	17:06:51.8	-37:59:15.2	347.99	1.63
d152	17:11:14.6	-36:48:57.4	349.45	1.63
e0601	07:09:58.1	-16:59:27.1	230.14	-3.70
e0602	07:12:46.6	-18:17:11.7	231.61	-3.70
e0603	07:15:37.1	-19:34:48.6	233.07	-3.70
e0604	07:18:29.8	-20:52:21.9	234.53	-3.70
e0605	07:21:25.0	-22:09:45.6	235.99	-3.70
e0606	07:24:22.8	-23:27:03.7	237.45	-3.70
e0607	07:27:23.7	-24:44:12.6	238.91	-3.70
e0608	07:30:27.6	-26:01:10.2	240.37	-3.70
e0609	07:33:35.2	-27:17:58.7	241.83	-3.70
e0610	07:36:46.5	-28:34:33.1	243.29	-3.70
e0611	07:40:01.9	-29:50:57.2	244.75	-3.70
e0612	07:43:21.7	-31:07:06.6	246.22	-3.70
e0613	07:46:46.5	-32:22:59.3	247.68	-3.70
e0614	07:50:16.2	-33:38:37.1	249.14	-3.70
e0615	07:53:51.9	-34:53:54.7	250.60	-3.70
e0616	07:57:33.4	-36:08:52.8	252.06	-3.70

e0617	08:01:21.5	-37:23:29.4	253.52	-3.70
e0618	08:05:16.7	-38:37:42.6	254.98	-3.70
e0619	08:09:19.4	-39:51:28.9	256.44	-3.70
e0620	08:13:30.4	-41:04:48.6	257.90	-3.70
e0621	08:17:50.1	-42:17:37.8	259.37	-3.70
e0622	08:22:19.4	-43:29:52.3	260.83	-3.70
e0623	08:26:58.9	-44:41:31.2	262.29	-3.70
e0624	08:31:49.5	-45:52:31.2	263.75	-3.70
e0625	08:36:52.0	-47:02:48.8	265.21	-3.70
e0626	08:42:07.4	-48:12:19.1	266.67	-3.70
e0627	08:47:36.3	-49:20:59.8	268.13	-3.70
e0628	08:53:20.3	-50:28:43.3	269.59	-3.70
e0629	08:59:20.2	-51:35:27.2	271.05	-3.70
e0630	09:05:37.3	-52:41:03.8	272.51	-3.70
e0631	09:12:12.9	-53:45:27.8	273.98	-3.70
e0632	09:19:08.3	-54:48:32.4	275.44	-3.70
e0633	09:26:24.9	-55:50:08.3	276.90	-3.70
e0634	09:34:04.0	-56:50:11.5	278.36	-3.70
e0635	09:42:07.6	-57:48:28.2	279.82	-3.70
e0636	09:50:36.4	-58:44:50.2	281.28	-3.70
e0637	09:59:32.6	-59:39:09.1	282.74	-3.70
e0638	10:08:56.9	-60:31:09.5	284.20	-3.70
e0639	10:18:48.9	-61:20:33.8	285.66	-3.70
e0640	10:29:15.0	-62:07:27.2	287.13	-3.70
e0641	10:40:10.7	-62:51:16.9	288.59	-3.70
e0642	10:51:37.9	-63:31:56.5	290.05	-3.70
e0643	11:03:36.4	-64:09:06.1	291.51	-3.70
e0644	11:16:05.7	-64:42:35.9	292.97	-3.70
e0645	11:29:03.6	-65:12:03.3	294.43	-3.70
e0646	11:42:29.1	-65:37:23.9	295.89	-3.70
e0647	11:56:18.1	-65:58:15.7	297.35	-3.70
e0648	12:10:27.3	-66:14:29.3	298.81	-3.70
e0649	12:24:51.7	-66:25:58.2	300.27	-3.70
e0650	12:39:26.3	-66:32:31.3	301.74	-3.70
e0651	12:54:06.0	-66:34:06.3	303.20	-3.70
e0652	13:08:44.4	-66:30:43.6	304.66	-3.70
e0653	13:23:16.1	-66:22:22.1	306.12	-3.70
e0654	13:37:35.5	-66:09:10.1	307.58	-3.70
e0655	13:51:37.8	-65:51:11.9	309.04	-3.70
e0656	14:05:18.5	-65:28:41.9	310.50	-3.70
e0657	14:18:34.2	-65:01:50.6	311.96	-3.70
e0658	14:31:22.2	-64:30:53.1	313.42	-3.70

e0659	14:43:40.4	-63:56:00.5	314.89	-3.70
e0660	14:55:27.7	-63:17:34.5	316.35	-3.70
e0661	15:06:43.7	-62:35:45.8	317.81	-3.70
e0662	15:17:27.7	-61:50:47.1	319.27	-3.70
e0663	15:27:40.9	-61:02:58.6	320.73	-3.70
e0664	15:37:23.9	-60:12:32.2	322.19	-3.70
e0665	15:46:37.8	-59:19:40.8	323.65	-3.70
e0666	15:55:23.7	-58:24:36.1	325.11	-3.70
e0667	16:03:43.2	-57:27:31.6	326.57	-3.70
e0668	16:11:37.7	-56:28:34.2	328.04	-3.70
e0669	16:19:08.6	-55:27:57.7	329.50	-3.70
e0670	16:26:17.3	-54:25:47.4	330.96	-3.70
e0671	16:33:05.3	-53:22:13.1	332.42	-3.70
e0672	16:39:34.4	-52:17:19.7	333.88	-3.70
e0673	16:45:45.2	-51:11:18.2	335.34	-3.70
e0674	16:51:39.2	-50:04:12.2	336.80	-3.70
e0675	16:57:17.7	-48:56:07.9	338.26	-3.70
e0676	17:02:41.2	-47:47:12.2	339.72	-3.70
e0677	17:07:51.7	-46:37:23.3	341.18	-3.70
e0678	17:12:49.7	-45:26:51.5	342.65	-3.70
e0679	17:17:36.2	-44:15:36.2	344.11	-3.70
e0680	17:22:11.9	-43:03:40.2	345.57	-3.70
e0681	17:26:37.6	-41:51:15.4	347.03	-3.70
e0682	17:30:54.2	-40:38:14.8	348.49	-3.70
e0683	17:35:02.1	-39:24:45.2	349.95	-3.70
e0684	07:14:01.0	-16:29:15.5	230.14	-2.61
e0685	07:16:50.8	-17:46:47.9	231.60	-2.61
e0686	07:19:42.7	-19:04:12.5	233.06	-2.61
e0687	07:22:36.9	-20:21:28.8	234.52	-2.61
e0688	07:25:33.6	-21:38:38.4	235.98	-2.61
e0689	07:28:33.2	-22:55:40.7	237.44	-2.61
e0690	07:31:35.7	-24:12:29.2	238.90	-2.61
e0691	07:34:41.6	-25:29:08.7	240.36	-2.61
e0692	07:37:51.1	-26:45:36.5	241.82	-2.61
e0693	07:41:04.5	-28:01:52.6	243.28	-2.61
e0694	07:44:22.0	-29:17:52.1	244.74	-2.61
e0695	07:47:44.1	-30:33:36.8	246.20	-2.61
e0696	07:51:11.3	-31:49:04.4	247.66	-2.61
e0697	07:54:43.6	-33:04:13.7	249.12	-2.61
e0698	07:58:21.5	-34:19:03.5	250.58	-2.61
e0699	08:02:05.7	-35:33:30.8	252.04	-2.61
e0700	08:05:56.4	-36:47:35.9	253.50	-2.61

e0701	08:09:54.4	-38:01:14.3	254.96	-2.61
e0702	08:13:59.8	-39:14:26.1	256.42	-2.61
e0703	08:18:13.6	-40:27:06.5	257.88	-2.61
e0704	08:22:36.1	-41:39:14.8	259.34	-2.61
e0705	08:27:08.2	-42:50:48.9	260.80	-2.61
e0706	08:31:50.5	-44:01:44.2	262.26	-2.61
e0707	08:36:43.6	-45:11:58.1	263.72	-2.61
e0708	08:41:48.6	-46:21:28.2	265.18	-2.61
e0709	08:47:06.3	-47:30:07.7	266.64	-2.61
e0710	08:52:37.6	-48:37:53.1	268.10	-2.61
e0711	08:58:23.4	-49:44:41.7	269.56	-2.61
e0712	09:04:24.9	-50:50:26.2	271.02	-2.61
e0713	09:10:43.0	-51:55:04.2	272.48	-2.61
e0714	09:17:19.1	-52:58:23.3	273.93	-2.61
e0715	09:24:14.3	-54:00:22.9	275.39	-2.61
e0716	09:31:29.9	-55:00:51.0	276.85	-2.61
e0717	09:39:07.2	-55:59:43.0	278.31	-2.61
e0718	09:47:07.4	-56:56:49.2	279.77	-2.61
e0719	09:55:32.0	-57:51:58.8	281.23	-2.61
e0720	10:04:21.7	-58:44:59.0	282.69	-2.61
e0721	10:13:38.4	-59:35:45.4	284.15	-2.61
e0722	10:23:20.2	-60:23:59.2	285.61	-2.61
e0723	10:33:34.3	-61:09:31.6	287.07	-2.61
e0724	10:44:15.4	-61:52:08.6	288.53	-2.61
e0725	10:55:25.1	-62:31:36.3	289.99	-2.61
e0726	11:07:03.5	-63:07:38.5	291.45	-2.61
e0727	11:19:09.4	-63:40:05.2	292.91	-2.61
e0728	11:31:41.6	-64:08:38.8	294.37	-2.61
e0729	11:44:37.9	-64:33:09.2	295.83	-2.61
e0729	11:57:55.1	-64:53:24.8	297.29	-2.61
e0730	12:11:30.5	-65:09:12.2	298.75	-2.61
e0732	12:25:19.6	-65:20:22.1	300.21	-2.61
e0733	12:39:17.9	-65:26:53.6	301.67	-2.61
e0734	12:53:20.7	-65:28:36.0	303.13	-2.61
e0734	14:50:32.0	-62:21:14.0	316.27	-2.61
e0735	13:07:22.5	-65:25:35.8	304.59	-2.61
e0736	13:21:18.9	-65:17:47.8	306.05	-2.61
e0737	13:35:04.7	-65:05:20.4	307.51	-2.61
e0738	13:48:35.5	-64:48:20.0	308.97	-2.61
e0739	14:01:47.5	-64:26:55.5	310.43	-2.61
e0740	14:14:37.4	-64:01:19.1	311.89	-2.61
e0741	14:27:02.6	-63:31:39.5	313.35	-2.61

e0742	14:39:01.2	-62:58:14.2	314.81	-2.61
e0744	15:01:21.3	-61:40:51.0	317.71	-2.59
e0745	15:11:54.4	-60:57:30.3	319.16	-2.59
e0746	15:21:59.7	-60:11:16.7	320.63	-2.59
e0747	15:31:37.1	-59:22:27.3	322.09	-2.60
e0748	15:40:47.1	-58:30:52.5	323.55	-2.59
e0749	15:49:39.8	-57:37:11.2	325.03	-2.61
e0750	15:57:57.8	-56:41:30.7	326.49	-2.61
e0751	16:05:51.5	-55:43:55.7	327.95	-2.61
e0752	16:13:22.7	-54:44:35.9	329.41	-2.61
e0753	16:20:32.6	-53:43:42.8	330.86	-2.61
e0754	16:27:22.7	-52:41:21.2	332.32	-2.61
e0755	16:33:53.9	-51:37:39.7	333.78	-2.61
e0756	16:40:07.3	-50:32:44.2	335.24	-2.61
e0757	16:46:04.5	-49:26:42.0	336.70	-2.61
e0758	16:51:46.1	-48:19:36.1	338.16	-2.61
e0759	16:57:13.5	-47:11:35.8	339.62	-2.61
e0760	17:02:27.7	-46:02:41.0	341.08	-2.61
e0761	17:07:29.4	-44:53:01.6	342.54	-2.61
e0762	17:12:19.8	-43:42:34.9	344.00	-2.61
e0763	17:16:59.0	-42:31:29.1	345.46	-2.61
e0764	17:21:28.4	-41:19:44.8	346.92	-2.61
e0765	17:25:48.5	-40:07:26.8	348.38	-2.61
e0766	17:30:00.0	-38:54:37.8	349.84	-2.61
e0767	07:33:24.6	-13:58:43.3	230.14	2.70
e0768	07:36:19.8	-15:15:20.8	231.60	2.70
e0769	07:39:17.6	-16:31:44.5	233.07	2.70
e0770	07:42:18.0	-17:47:56.9	234.53	2.70
e0771	07:45:21.4	-19:03:56.2	235.99	2.70
e0772	07:48:28.2	-20:19:39.5	237.45	2.70
e0773	07:51:38.2	-21:35:08.3	238.91	2.70
e0774	07:54:52.1	-22:50:18.9	240.37	2.70
e0775	07:58:09.9	-24:05:12.0	241.83	2.70
e0776	08:01:32.0	-25:19:45.9	243.29	2.70
e0777	08:04:58.7	-26:33:58.9	244.75	2.70
e0778	08:08:30.2	-27:47:47.3	246.21	2.70
e0779	08:12:07.0	-29:01:13.0	247.67	2.70
e0780	08:15:49.5	-30:14:13.2	249.13	2.70
e07807	08:44:57.2	-38:30:17.3	259.36	2.70
e0781	08:19:37.8	-31:26:47.7	250.60	2.70
e0782	08:23:32.5	-32:38:50.0	252.06	2.70
e0783	08:27:34.2	-33:50:20.5	253.52	2.70

e0784	08:31:42.9	-35:01:17.9	254.98	2.70
e0785	08:35:59.3	-36:11:39.6	256.44	2.70
e0786	08:40:23.9	-37:21:20.5	257.90	2.70
e0788	08:49:39.7	-39:38:36.2	260.82	2.70
e0789	08:54:32.2	-40:46:03.0	262.28	2.70
e0790	08:59:35.1	-41:52:36.5	263.74	2.70
e0791	09:04:48.9	-42:58:15.7	265.20	2.70
e0792	09:10:14.6	-44:02:56.6	266.66	2.70
e0793	09:15:52.6	-45:06:32.0	268.12	2.70
e0794	09:21:43.8	-46:08:57.4	269.59	2.70
e0795	09:27:48.7	-47:10:08.3	271.05	2.70
e0796	09:34:08.2	-48:10:00.5	272.51	2.70
e0797	09:40:43.1	-49:08:25.0	273.97	2.70
e0798	09:47:33.9	-50:05:17.9	275.43	2.70
e0799	09:54:41.5	-51:00:34.1	276.89	2.70
e0800	10:02:06.6	-51:54:01.5	278.35	2.70
e0801	10:09:49.9	-52:45:33.7	279.81	2.70
e0802	10:17:51.7	-53:35:05.4	281.27	2.70
e0803	10:26:12.9	-54:22:24.5	282.73	2.70
e0804	10:34:53.4	-55:07:24.4	284.19	2.70
e0805	10:43:53.7	-55:49:53.9	285.65	2.70
e0806	10:53:13.7	-56:29:45.1	287.12	2.70
e0807	11:02:53.3	-57:06:49.1	288.58	2.70
e0808	11:12:52.1	-57:40:52.9	290.04	2.70
e0809	11:23:09.5	-58:11:47.3	291.50	2.70
e0810	11:33:44.1	-58:39:25.9	292.96	2.70
e0811	11:44:35.0	-59:03:39.3	294.42	2.70
e0812	11:55:40.4	-59:24:14.6	295.88	2.70
e0813	12:06:58.3	-59:41:12.0	297.34	2.70
e0814	12:18:26.7	-59:54:19.6	298.80	2.70
e0816	12:41:44.3	-60:08:49.1	301.72	2.70
e0817	12:53:28.1	-60:10:09.1	303.18	2.70
e0818	13:05:11.4	-60:07:26.0	304.65	2.70
e0819	13:16:51.2	-60:00:47.0	306.11	2.70
e0820	13:28:24.9	-59:50:13.6	307.57	2.70
e0821	13:39:50.0	-59:35:46.5	309.03	2.70
e0822	13:50:51.6	-59:18:37.1	310.46	2.69
e0823	14:01:52.1	-58:56:48.1	311.92	2.69
e0824	14:12:37.9	-58:31:28.8	313.38	2.69
e0825	14:23:07.2	-58:02:35.3	314.84	2.69
e0826	14:33:19.6	-57:30:39.9	316.30	2.69
e0827	14:43:21.9	-56:54:19.5	317.79	2.70

e0828	14:52:54.8	-56:16:17.0	319.25	2.70
e0829	15:02:08.0	-55:35:29.6	320.71	2.70
e0830	15:11:01.4	-54:52:06.8	322.18	2.70
e0831	15:19:35.3	-54:06:17.2	323.64	2.70
e0832	15:27:49.5	-53:18:11.8	325.10	2.70
e0833	15:35:45.1	-52:27:57.4	326.56	2.70
e0834	15:43:21.9	-51:35:42.9	328.02	2.70
e0835	15:50:40.9	-50:41:37.3	329.48	2.70
e0836	15:57:42.5	-49:45:49.1	330.94	2.70
e0837	16:04:27.8	-48:48:22.1	332.40	2.70
e0838	16:10:57.4	-47:49:25.9	333.86	2.70
e0839	16:17:11.6	-46:49:06.5	335.32	2.70
e0840	16:23:11.6	-45:47:27.5	336.78	2.70
e0841	16:28:58.4	-44:44:38.0	338.24	2.70
e0842	16:34:32.0	-43:40:39.4	339.71	2.70
e0843	16:39:53.6	-42:35:41.1	341.17	2.70
e0844	16:45:03.4	-41:29:41.0	342.63	2.70
e0845	16:50:02.6	-40:22:47.2	344.09	2.70
e0846	16:54:51.6	-39:15:05.4	345.55	2.70
e0847	16:59:31.0	-38:06:33.7	347.01	2.70
e0848	17:04:01.1	-36:57:19.1	348.47	2.70
e0849	17:08:23.0	-35:47:23.2	349.93	2.70
e0850	07:37:20.8	-13:27:03.0	230.14	3.79
e0851	07:40:17.0	-14:43:29.5	231.61	3.79
e0851	12:30:02.8	-60:03:32.2	300.26	2.70
e0852	07:43:15.7	-15:59:43.3	233.07	3.79
e0853	07:46:17.3	-17:15:44.0	234.53	3.79
e0854	07:49:22.0	-18:31:27.5	235.99	3.79
e0855	07:52:29.8	-19:46:56.7	237.46	3.79
e0856	07:55:41.4	-21:02:08.1	238.92	3.79
e0857	07:58:56.6	-22:17:02.4	240.38	3.79
e0858	08:02:15.9	-23:31:36.5	241.84	3.79
e0859	08:05:39.4	-24:45:50.5	243.31	3.79
e0860	08:09:07.8	-25:59:42.5	244.77	3.79
e0861	08:12:41.1	-27:13:09.0	246.23	3.79
e0862	08:16:19.6	-28:26:10.5	247.70	3.79
e0863	08:20:03.8	-29:38:43.5	249.16	3.79
e0864	08:23:54.0	-30:50:50.5	250.62	3.79
e0865	08:27:50.5	-32:02:24.2	252.08	3.79
e0866	08:31:53.9	-33:13:24.7	253.55	3.79
e0867	08:36:04.5	-34:23:49.8	255.01	3.79
e0868	08:40:22.8	-35:33:36.1	256.47	3.79

e0869	08:44:49.2	-36:42:42.3	257.93	3.79
e0870	08:49:24.1	-37:51:01.3	259.40	3.79
e0871	08:54:08.5	-38:58:38.3	260.86	3.79
e0872	08:59:02.5	-40:05:22.7	262.32	3.79
e0873	09:04:06.9	-41:11:12.8	263.78	3.79
e0874	09:09:22.1	-42:16:05.5	265.25	3.79
e0875	09:14:48.7	-43:19:58.6	266.71	3.79
e0876	09:20:27.6	-44:22:42.9	268.17	3.79
e0877	09:26:19.2	-45:24:15.3	269.63	3.79
e0878	09:32:24.3	-46:24:33.7	271.10	3.79
e0879	09:38:43.5	-47:23:26.9	272.56	3.79
e0880	09:45:17.5	-48:20:55.6	274.02	3.79
e0881	09:52:07.1	-49:16:47.9	275.48	3.79
e0882	09:59:12.7	-50:11:00.3	276.95	3.79
e0883	10:06:35.0	-51:03:24.4	278.41	3.79
e0884	10:14:14.6	-51:53:53.1	279.87	3.79
e0885	10:22:11.9	-52:42:17.8	281.34	3.79
e0886	10:30:27.4	-53:28:30.4	282.80	3.79
e0887	10:39:01.2	-54:12:22.9	284.26	3.79
e0888	10:47:53.5	-54:53:46.2	285.72	3.79
e0889	10:57:04.1	-55:32:31.5	287.19	3.79
e0890	11:06:32.9	-56:08:29.0	288.65	3.79
e0891	11:16:19.4	-56:41:28.8	290.11	3.79
e0892	11:26:22.9	-57:11:25.3	291.57	3.79
e0893	11:36:42.3	-57:38:07.0	293.04	3.79
e0894	11:47:16.5	-58:01:23.7	294.50	3.79
e0895	11:58:03.7	-58:21:13.9	295.96	3.79
e0896	12:09:02.3	-58:37:25.7	297.42	3.79
e0897	12:20:10.2	-58:49:54.8	298.89	3.79
e0898	12:31:25.1	-58:58:39.1	300.35	3.79
e0899	12:42:44.5	-59:03:31.3	301.81	3.79
e0900	12:54:05.9	-59:04:33.0	303.27	3.79
e0901	13:05:26.7	-59:01:43.0	304.74	3.79
e0902	13:16:44.3	-58:55:02.9	306.20	3.79
e0903	13:27:56.3	-58:44:31.1	307.66	3.79
e0904	13:39:00.0	-58:30:16.5	309.13	3.79
e0905	13:49:40.8	-58:13:09.2	310.56	3.79
e0906	14:00:23.1	-57:51:50.5	312.02	3.79
e0907	14:10:51.1	-57:27:03.5	313.48	3.78
e0908	14:21:03.9	-56:58:44.5	314.95	3.79
e0909	14:30:58.8	-56:27:26.4	316.41	3.79
e0910	14:40:48.4	-55:51:59.0	317.90	3.79

e0911	14:50:08.8	-55:14:41.8	319.36	3.79
e0912	14:59:10.9	-54:34:40.8	320.83	3.79
e0913	15:07:54.5	-53:52:08.5	322.29	3.79
e0914	15:16:19.6	-53:07:09.7	323.75	3.79
e0915	15:24:26.5	-52:19:52.2	325.21	3.79
e0916	15:32:15.5	-51:30:28.9	326.68	3.79
e0917	15:39:46.7	-50:39:06.0	328.14	3.79
e0918	15:47:01.3	-49:45:49.4	329.60	3.79
e0919	15:53:59.3	-48:50:49.8	331.06	3.79
e0920	16:00:41.4	-47:54:11.5	332.53	3.79
e0921	16:07:08.4	-46:56:02.0	333.99	3.79
e0922	16:13:21.1	-45:56:27.5	335.45	3.79
e0923	16:19:19.7	-44:55:34.8	336.91	3.79
e0924	16:25:05.2	-43:53:27.5	338.38	3.79
e0925	16:30:38.4	-42:50:11.7	339.84	3.79
e0926	16:35:59.6	-41:45:50.1	341.30	3.79
e0927	16:41:09.6	-40:40:29.9	342.77	3.79
e0928	16:46:09.0	-39:34:14.0	344.23	3.79
e0929	16:50:58.4	-38:27:04.6	345.69	3.79
e0930	16:55:38.1	-37:19:07.0	347.15	3.79
e0931	17:00:09.2	-36:10:24.0	348.62	3.79
e0932	17:04:31.8	-35:00:59.0	350.08	3.79
e0933	18:23:34.7	-21:26:33.8	10.74	-3.80
e0934	18:26:28.4	-20:09:02.8	12.21	-3.80
e0935	18:29:19.6	-18:51:24.9	13.67	-3.80
e0936	18:32:08.8	-17:33:42.5	15.13	-3.80
e0937	18:34:56.1	-16:15:55.2	16.59	-3.80
e0938	18:37:41.7	-14:58:04.9	18.05	-3.80
e0939	18:40:25.9	-13:40:09.6	19.51	-3.80
e0940	18:19:26.3	-20:55:55.3	10.74	-2.71
e0941	18:22:21.3	-19:38:41.2	12.20	-2.71
e0942	18:25:14.1	-18:21:16.7	13.66	-2.71
e0943	18:28:04.5	-17:03:48.0	15.12	-2.71
e0944	18:30:53.0	-15:46:12.0	16.58	-2.71
e0945	18:33:39.9	-14:28:29.8	18.04	-2.71
e0946	18:36:25.2	-13:10:45.1	19.50	-2.71
e0947	18:15:19.3	-20:24:56.4	10.74	-1.61
e0948	18:18:15.8	-19:07:55.9	12.20	-1.61
e0949	18:21:09.9	-17:50:45.9	13.66	-1.61
e0950	18:24:01.8	-16:33:28.2	15.12	-1.61
e0951	18:26:51.5	-15:16:03.7	16.58	-1.61
e0952	18:29:39.3	-13:58:32.9	18.04	-1.61

e0953	18:32:25.1	-12:40:55.5	19.50	-1.61
e0954	18:11:14.3	-19:53:34.0	10.74	-0.52
e0955	18:14:12.2	-18:36:47.3	12.20	-0.52
e0956	18:17:07.5	-17:19:50.9	13.66	-0.52
e0957	18:20:00.6	-16:02:45.3	15.12	-0.52
e0958	18:22:51.3	-14:45:31.9	16.58	-0.52
e0959	18:25:40.3	-13:28:11.0	18.04	-0.52
e0960	18:28:27.4	-12:10:43.9	19.49	-0.52
e0961	18:07:10.7	-19:21:49.2	10.74	0.57
e0962	18:10:10.0	-18:05:16.9	12.20	0.57
e0963	18:13:06.6	-16:48:33.1	13.66	0.57
e0964	18:16:00.7	-15:31:39.9	15.12	0.57
e0965	18:18:52.6	-14:14:37.5	16.58	0.57
e0966	18:21:42.5	-12:57:25.9	18.04	0.57
e0967	18:24:30.6	-11:40:07.4	19.50	0.57
e0968	18:03:08.9	-18:49:45.2	10.74	1.66
e0969	18:06:09.4	-17:33:25.1	12.20	1.66
e0970	18:09:07.1	-16:16:54.7	13.66	1.66
e0971	18:12:02.3	-15:00:12.7	15.12	1.66
e0972	18:14:55.3	-13:43:19.6	16.58	1.66
e0973	18:17:46.1	-12:26:18.2	18.04	1.66
e0974	18:20:34.9	-11:09:06.3	19.50	1.66
e0975	17:59:08.6	-18:17:20.0	10.74	2.75
e0976	18:02:10.4	-17:01:14.1	12.20	2.75
e0977	18:05:09.2	-15:44:53.4	13.67	2.75
e0978	18:08:05.5	-14:28:21.7	15.13	2.75
e0979	18:10:59.3	-13:11:40.8	16.59	2.75
e0980	18:13:51.0	-11:54:46.4	18.05	2.75
e0981	18:16:40.6	-10:37:44.0	19.51	2.75
e0982	17:55:09.9	-17:44:36.4	10.74	3.85
e0983	17:58:12.7	-16:28:41.4	12.21	3.85
e0984	18:01:12.6	-15:12:34.1	13.67	3.85
e0985	18:04:09.9	-13:56:13.7	15.13	3.85
e0986	18:07:04.6	-12:39:40.0	16.60	3.85
e0987	18:09:57.1	-11:22:55.9	18.06	3.85
e0988	18:12:47.4	-10:06:00.2	19.52	3.85
e1001	07:17:33.0	-16:02:31.3	230.14	-1.65
e1002	07:20:23.8	-17:19:53.5	231.60	-1.65
e1003	07:23:16.9	-18:37:07.1	233.06	-1.65
e1004	07:26:12.3	-19:54:11.8	234.52	-1.65
e1005	07:29:10.4	-21:11:07.0	235.98	-1.65
e1006	07:32:11.3	-22:27:53.6	237.44	-1.65

e1007	07:35:15.5	-23:44:28.6	238.90	-1.65
e1008	07:38:22.9	-25:00:51.6	240.36	-1.65
e1009	07:41:34.1	-26:17:01.8	241.81	-1.65
e1010	07:44:49.1	-27:32:58.4	243.27	-1.65
e1011	07:48:08.5	-28:48:39.2	244.73	-1.65
e1012	07:51:32.6	-30:04:02.6	246.19	-1.65
e1013	07:55:01.5	-31:19:07.7	247.65	-1.65
e1014	07:58:35.7	-32:33:53.5	249.11	-1.65
e1015	08:02:16.0	-33:48:16.7	250.57	-1.65
e1016	08:06:02.3	-35:02:18.2	252.03	-1.65
e1017	08:09:55.2	-36:15:55.4	253.49	-1.65
e1018	08:13:55.2	-37:29:05.0	254.95	-1.65
e1019	08:18:03.0	-38:41:44.6	256.40	-1.65
e1020	08:22:19.0	-39:53:52.6	257.86	-1.65
e1021	08:26:43.8	-41:05:27.8	259.32	-1.65
e1022	08:31:18.1	-42:16:25.4	260.78	-1.65
e1023	08:36:02.5	-43:26:40.8	262.24	-1.65
e1024	08:40:58.0	-44:36:15.0	263.70	-1.65
e1025	08:46:04.9	-45:45:02.7	265.16	-1.65
e1026	08:51:24.4	-46:52:56.9	266.62	-1.65
e1027	08:56:57.3	-47:59:57.6	268.08	-1.65
e1028	09:02:44.6	-49:05:57.1	269.54	-1.65
e1029	09:08:47.1	-50:10:52.0	270.99	-1.65
e1030	09:15:05.9	-51:14:34.1	272.45	-1.65
e1031	09:21:42.3	-52:17:01.1	273.91	-1.65
e1032	09:28:37.0	-53:18:03.7	275.37	-1.65
e1033	09:35:51.5	-54:17:33.4	276.83	-1.65
e1034	09:43:26.8	-55:15:26.0	278.29	-1.65
e1035	09:51:24.2	-56:11:29.6	279.75	-1.65
e1036	09:59:44.4	-57:05:33.5	281.21	-1.65
e1037	10:08:29.2	-57:57:31.7	282.67	-1.65
e1038	10:17:38.8	-58:47:13.2	284.13	-1.65
e1039	10:27:14.1	-59:34:21.0	285.58	-1.65
e1040	10:37:16.4	-60:18:49.6	287.04	-1.65
e1041	10:47:45.1	-61:00:22.9	288.50	-1.65
e1042	10:58:40.2	-61:38:49.1	289.96	-1.65
e1043	11:10:02.1	-62:13:55.6	291.42	-1.65
e1044	11:21:49.0	-62:45:27.3	292.88	-1.65
e1045	11:34:00.1	-63:13:14.5	294.34	-1.65
e1046	07:21:33.6	-15:31:48.1	230.14	-0.56
e1047	07:24:25.6	-16:48:58.1	231.60	-0.56
e1048	07:27:20.0	-18:05:59.6	233.06	-0.56

e1049	07:30:16.7	-19:22:51.5	234.52	-0.56
e1050	07:33:16.2	-20:39:33.1	235.98	-0.56
e1051	07:36:18.7	-21:56:02.2	237.44	-0.56
e1052	07:39:24.4	-23:12:19.7	238.89	-0.56
e1053	07:42:33.6	-24:28:23.6	240.35	-0.56
e1054	07:45:46.6	-25:44:14.2	241.81	-0.56
e1055	07:49:03.5	-26:59:49.9	243.27	-0.56
e1056	07:52:25.0	-28:15:07.3	244.73	-0.56
e1057	07:55:50.9	-29:30:07.5	246.19	-0.56
e1058	07:59:22.1	-30:44:47.2	247.65	-0.56
e1059	08:02:58.7	-31:59:05.9	249.11	-0.56
e1060	08:06:41.0	-33:13:01.6	250.56	-0.56
e1061	08:10:29.6	-34:26:33.1	252.02	-0.56
e1062	08:14:24.8	-35:39:38.5	253.48	-0.56
e1063	08:18:27.5	-36:52:13.8	254.94	-0.56
e1064	08:22:37.6	-38:04:17.9	256.40	-0.56
e1065	08:26:55.9	-39:15:49.5	257.86	-0.56
e1066	08:31:23.3	-40:26:44.2	259.32	-0.56
e1067	08:35:59.8	-41:37:01.7	260.77	-0.56
e1068	08:40:46.6	-42:46:34.2	262.23	-0.56
e1069	08:45:44.1	-43:55:22.4	263.69	-0.56
e1070	08:50:53.0	-45:03:22.2	265.15	-0.56
e1071	08:56:14.3	-46:10:27.0	266.61	-0.56
e1072	09:01:48.8	-47:16:35.8	268.07	-0.56
e1073	09:07:37.4	-48:21:42.0	269.53	-0.56
e1074	09:13:40.9	-49:25:39.2	270.99	-0.56
e1075	09:20:00.3	-50:28:22.4	272.44	-0.56
e1076	09:26:36.5	-51:29:47.1	273.90	-0.56
e1077	09:33:30.6	-52:29:45.4	275.36	-0.56
e1078	09:40:43.7	-53:28:08.9	276.82	-0.56
e1079	09:48:16.5	-54:24:53.5	278.28	-0.56
e1080	09:56:10.3	-55:19:46.2	279.74	-0.56
e1081	10:04:26.2	-56:12:41.0	281.20	-0.56
e1082	10:13:04.7	-57:03:27.4	282.65	-0.56
e1083	10:22:07.0	-57:51:55.0	284.11	-0.56
e1084	10:31:33.1	-58:37:52.3	285.57	-0.56
e1085	10:41:23.4	-59:21:06.4	287.03	-0.56
e1086	10:51:39.3	-60:01:32.1	288.49	-0.56
e1087	11:02:19.0	-60:38:49.2	289.95	-0.56
e1088	11:13:23.1	-61:12:52.1	291.41	-0.56
e1089	11:24:49.9	-61:43:24.8	292.87	-0.56
e1090	11:36:38.3	-62:10:15.7	294.32	-0.56

e1091	07:25:33.0	-15:00:51.4	230.14	0.54
e1092	07:28:26.2	-16:17:47.8	231.60	0.54
e1093	07:31:21.7	-17:34:37.9	233.06	0.54
e1094	07:34:19.8	-18:51:14.8	234.52	0.54
e1095	07:37:20.7	-20:07:42.6	235.98	0.54
e1096	07:40:24.6	-21:23:55.8	237.44	0.54
e1097	07:43:32.0	-22:39:56.7	238.90	0.54
e1098	07:46:42.6	-23:55:43.7	240.35	0.54
e1099	07:49:57.4	-25:11:13.8	241.81	0.54
e1100	07:53:16.1	-26:26:28.4	243.27	0.54
e1101	07:56:39.3	-27:41:24.6	244.73	0.54
e1102	08:00:07.4	-28:55:59.9	246.19	0.54
e1103	08:03:40.4	-30:10:14.3	247.65	0.54
e1104	08:07:19.1	-31:24:06.7	249.11	0.54
e1105	08:11:03.7	-32:37:34.5	250.57	0.54
e1106	08:14:54.4	-33:50:35.8	252.03	0.54
e1107	08:18:51.9	-35:03:10.1	253.48	0.54
e1108	08:22:56.7	-36:15:12.4	254.94	0.54
e1109	08:27:09.0	-37:26:41.2	256.40	0.54
e1110	08:31:29.7	-38:37:35.6	257.86	0.54
e1111	08:35:59.2	-39:47:52.6	259.32	0.54
e1112	08:40:37.9	-40:57:26.6	260.78	0.54
e1113	08:45:26.6	-42:06:18.5	262.24	0.54
e1114	08:50:26.2	-43:14:20.6	263.70	0.54
e1115	08:55:37.2	-44:21:32.5	265.16	0.54
e1116	09:01:00.1	-45:27:48.6	266.61	0.54
e1117	09:06:36.1	-46:33:05.3	268.07	0.54
e1118	09:12:25.5	-47:37:15.7	269.53	0.54
e1119	09:18:29.5	-48:40:17.1	270.99	0.54
e1120	09:24:49.4	-49:42:02.9	272.45	0.54
e1121	09:31:25.3	-50:42:26.6	273.91	0.54
e1122	09:38:18.5	-51:41:22.7	275.37	0.54
e1123	09:45:29.9	-52:38:42.1	276.83	0.54
e1124	09:53:00.2	-53:34:19.9	278.28	0.54
e1125	10:00:50.7	-54:28:04.2	279.74	0.54
e1126	10:09:01.8	-55:19:50.0	281.20	0.54
e1127	10:17:34.2	-56:09:24.5	282.66	0.54
e1128	10:26:28.9	-56:56:40.7	284.12	0.54
e1129	10:35:46.0	-57:41:27.4	285.58	0.54
e1130	10:45:26.2	-58:23:34.0	287.04	0.54
e1131	10:55:29.1	-59:02:48.3	288.50	0.54
e1132	11:05:54.0	-59:39:00.6	289.96	0.54

e1133	11:16:41.6	-60:11:59.5	291.42	0.54
e1134	11:27:49.5	-60:41:32.5	292.87	0.54
e1135	11:39:17.4	-61:07:32.3	294.33	0.54
e1136	07:29:31.4	-14:29:37.2	230.14	1.63
e1137	07:32:25.6	-15:46:24.2	231.60	1.63
e1138	07:35:22.3	-17:03:01.8	233.06	1.63
e1139	07:38:21.6	-18:19:26.6	234.52	1.63
e1140	07:41:23.9	-19:35:38.1	235.98	1.63
e1141	07:44:29.2	-20:51:37.3	237.44	1.63
e1142	07:47:37.8	-22:07:20.3	238.90	1.63
e1143	07:50:50.1	-23:22:50.0	240.36	1.63
e1144	07:54:06.6	-24:38:01.6	241.82	1.63
e1145	07:57:26.9	-25:52:55.0	243.28	1.63
e1146	08:00:52.0	-27:07:28.4	244.74	1.63
e1147	08:04:21.8	-28:21:42.1	246.20	1.63
e1148	08:07:56.9	-29:35:31.9	247.66	1.63
e1149	08:11:37.4	-30:48:56.6	249.12	1.63
e1150	08:15:24.0	-32:01:56.6	250.58	1.63
e1151	08:19:16.8	-33:14:29.5	252.04	1.63
e1152	08:23:16.3	-34:26:30.2	253.50	1.63
e1153	08:27:23.3	-35:38:00.9	254.96	1.63
e1154	08:31:37.8	-36:48:54.8	256.42	1.63
e1155	08:36:00.4	-37:59:12.6	257.87	1.63
e1156	08:40:31.9	-39:08:50.5	259.33	1.63
e1157	08:45:12.8	-40:17:45.6	260.79	1.63
e1158	08:50:03.4	-41:25:53.3	262.25	1.63
e1159	08:55:04.6	-42:33:12.2	263.71	1.63
e1160	09:00:17.2	-43:39:36.1	265.17	1.63
e1161	09:05:41.6	-44:45:02.9	266.63	1.63
e1162	09:11:18.7	-45:49:27.5	268.09	1.63
e1163	09:17:08.9	-46:52:43.1	269.55	1.63
e1164	09:23:13.8	-47:54:50.8	271.01	1.63
e1165	09:29:33.4	-48:55:38.7	272.47	1.63
e1166	09:36:08.9	-49:55:02.7	273.93	1.63
e1167	09:43:01.0	-50:52:56.6	275.39	1.63
e1168	09:50:10.4	-51:49:13.2	276.85	1.63
e1169	09:57:38.4	-52:43:43.3	278.31	1.63
e1170	10:05:25.0	-53:36:21.6	279.77	1.63
e1171	10:13:31.4	-54:26:58.9	281.23	1.63
e1172	10:21:58.0	-55:15:25.6	282.69	1.63
e1173	10:30:45.7	-56:01:33.4	284.15	1.63
e1174	10:39:54.3	-56:45:10.6	285.61	1.63

e1175	10:49:24.0	-57:26:07.3	287.07	1.63
e1176	10:59:14.8	-58:04:15.8	288.53	1.63
e1177	11:09:26.4	-58:39:21.6	289.99	1.63
e1178	11:19:57.7	-59:11:17.2	291.45	1.63

The files for DR2 include images and their respective photometry catalogues that have passed the Quality Control (QC). We make a distinction between single filter source lists, which are part of this release, and merged multi-band photometric catalogues, which are a distinct data product.

Release Notes

Data Reduction and Calibration

This DR2 is based on the CASU version v1.5 pipeline, which produces publication quality results provided that appropriate checks are made. The main changes to the pipeline since version 1.3 (used for the VVV data) are as follows.

(i) The nightly photometric calibration (based on the 2MASS Point Source Catalogue) benefits from new improved colour transformations from 2MASS to VIRCAM, including a better treatment of the effect of interstellar extinction on the transformations. (For full details see Gonzalez Fernandez et al., 2018, MNRAS, 474, 5459).

(ii) A bug in the illumination correction has been fixed.

Full details of the data pipeline procedure and the version changes can be found at: http://apm49.ast.cam.ac.uk/surveys-projects/vista/data-processing/

The photometric and astrometric calibrations are both derived from the 2MASS Point Source Catalogue. The photometric calibration includes an additional colour term designed to correct for the effect of interstellar extinction on the 2MASS to VISTA/VIRCAM photometric transformations. The typical photometric calibration precision in the J, H and Ks passbands is now 2% (see Gonzalez Fernandez et al. 2018). Fields with slightly poorer than average photometric calibration in J, H or Ks are due mainly to poor and changing weather conditions, which will be apparent from the zero points and the seeing given in the FITS catalogue headers. The exception is the innermost bulge fields (see below under Known Issues).

Most users will wish to use aperture 1, aperture 2 or aperture 3 magnitudes, which correspond to aperture diameters of 1.0, √2 and 2.0 arcsec respectively. The trade off is between a smaller and more accurate aperture correction for larger apertures vs. increased effects of overlapping apertures on the photometry in crowded fields. The CASU aperture photometry does attempt to deblend the fluxes of adjacent sources with overlapping apertures but the results are not as good as profile fitting photometry (which is much more computationally intensive). Consequently, some users may wish to do their own profile fitting photometry on small portions of the images in this release, in the more crowded fields (see e.g., Mauro et al. 2013, RMexAA, 49, 189). Profile fitting photometry products are planned for a future VVVX release.

The team has worked on the quality control using the v1.5 data, as detailed below.

The VVVX saturation limit ranges between Ks=10-11.5 mag depending on seeing and sky background, with some variation amongst 16 VIRCAM detectors also. For brighter magnitudes the 2MASS photometry should be preferred. The photometric limit is typically Ks=17.5 mag.

The photometric catalogues contain calibrated aperture photometry, and the limiting magnitudes correspond to the aperture photometry.

Data Quality

The same words of caution as before apply as in VVV releases: even though we checked the images for defects, we are still identifying images that need to be reprocessed or reacquired.

The Quality Control for the Phase 3 data checked for variations in sky background in the tile images (by visual inspection of all the JHKs master tiles) and performed cuts on seeing, zero points, ellipticity and astrometric quality (based on the r.m.s. residuals to the fit) at tile level. We also cut tiles with gross changes in seeing or zero point between the 6 pawprints that make up each tile. We note that low level non-uniformities in the sky background do not affect the stellar photometry but might inhibit visual searches for clusters or nebulae.

Known Issues

1) There are a number of well known image defects intrinsic to VISTA, e.g. holes in some of the arrays and bright streaks caused by reflections of stars located just off the edge of an array. These defects are documented in the peer-reviewed paper describing the telescope and camera (Sutherland et al. 2015, A&A, 575, A25) and they are illustrated with pictures in the CASU web page located at: casu.ast.cam.ac.uk/surveys-projects/vista/technical/known-issues.

2) The 2MASS-based calibration in all filters is less reliable in the most crowded inner bulge fields, approximately at Galactic coordinates $-6° < l < 6°$, $-3° < b < 2.5°$, see Hajdu et al.(2020). An improved "VICAL" calibration procedure (L. Smith et al., in prep.) has recently been implemented for VVV and VVVX PSF photometry products in the area of the original VVV survey. VICAL effectively uses field overlaps to provide a more uniform calibration that is anchored to uncrowded fields with low extinction in the lower bulge. We plan to supply these products to ESO in the near future. For the most part they will supersede this DR2 release in the original VVV survey area, except for stars at or above the saturation limit. PSF photometry products will be supplied for the full VVVX area when the survey is complete.

Data Format

File Types

There are 6 types of file, all in FITS format. Tile images (file names ending in "_st_tl.fits.fz"), associated weight maps (file names ending in "_st_tl_conf.fits.fz") and tile catalogues (file names ending in "_st_tl_cat.fits"). Also, there are pawprint images (filenames ending in "_st.fits.fz"), their associated weight maps (file names ending in "_st_conf.fits.fz") and the pawprint catalogues (file names ending in "_st_cat.fits"). The pawprint images are in multi-extension FITS format with 1 extension for each of the 16 VISTA/VIRCAM arrays plus an initial header with whole-pawprint data.

Calibrated magnitudes can be derived from the various aperture fluxes in the catalogues using the equation:
CalMag = MAGZPT – 2.5log10(AperfluxN/DIT) – 0.05(Airmass-1) - APCORN

where the capitalised variables are quantities available in the FITS catalogue headers and the "N" in AperfluxN and APCORN (the aperture flux and aperture correction terms) should be replaced with the chosen photometric aperture number (see list of columns below).
Airmass = 0.5(AIRM START + AIRM END).

Catalogue Columns

1	Seq No.	running number for ease of reference, in strict order of image detections
2	Isophotal flux	standard definition of summed flux within detection isophote, apart from detection filter is used to define pixel connectivity and hence which pixels to include. This helps to reduce edge effects for all isophotally derived parameters.
3	X coord	intensity-weighted isophotal centre-of-gravity in X
4	Error in X	estimate of centroid error
5	Y coord	intensity-weighted isophotal centre-of-gravity in Y
6	Error in Y	estimate of centroid error
7	Gaussian sigma	these are derived from the three general intensity-weighted second moments
8	Ellipticity	the equivalence between them and a generalised elliptical Gaussian
9	Position angle	Orientation (east of north) of the elliptical Gaussian, in degrees
10	Areal profile 1	number of pixels above a series of threshold levels relative to local sky.
11	Areal profile 2	levels are set at T, 2T, 4T, 8T . . . 128T where T is the threshold. These
12	Areal profile 3	can be thought of as a sort of poor man's radial profile. Note that for now deblended, i.e. overlapping images, only the first areal profile is
13	Areal profile 4	computed and the rest are set to -1, flagging the difficulty of computing accurate profiles
14	Areal profile 5	
15	Areal profile 6	
16	Areal profile 7	for blended images this parameter is used to flag the start of the sequence of the deblended components by setting the first in the
17	Areal profile 8	sequence to 0

18	Peak height	in counts relative to local value of sky – also zeroth order aperture flux
19	Error in pkht	
20	Aperture flux 1	The aperture fluxes are sky-corrected integrals (summations) with a soft-edge (ie. pro-rata flux division for boundary pixels). However, for overlapping images they are more subtle than this since they are in practice simultaneously fitted top-hat functions, to minimise the effects of crowding. Images external to the blend are also flagged and not included in the large radius summations. Aperture 1 has a 1.0 arcsec diameter. Each successive aperture increases in size by a factor of sqrt(2) for apertures 1 to 7.
21	Error in flux	
22	Aperture flux 2	Flux in a 1.414 arcsec diameter aperture.
23	Error in flux	
24	Aperture flux 3	Flux in a 2 arcsec diameter aperture.
25	Error in flux	
26	Aperture flux 4	Flux in a 2.282 arcsec diameter aperture.
27	Error in flux	
28	Aperture flux 5	Flux in a 4 arcsec diameter aperture.
29	Error in flux	
30	Aperture flux 6	Flux in a 4.564 arcsec diameter aperture.
31	Error in flux	
32	Aperture flux 7	Flux in an 8 arcsec diameter aperture.
33	Error in flux	
34	Aperture flux 8	Flux in a 10 arcsec diameter aperture.
35	Error in flux	
36	Aperture flux 9	Flux in a 12 arcsec diameter aperture.
37	Error in flux	
38	Aperture flux 10	Flux in a 14 arcsec diameter aperture.
39	Error in flux	
40	Aperture flux 11	Flux in a 16 arcsec diameter aperture.
41	Error in flux	
42	Aperture flux 12	Flux in a 20 arcsec diameter aperture.
43	Error in flux	
44	Aperture flux 13	Flux in a 24 arcsec diameter aperture.
45	Error in flux	
46	Petrosian radius	rp as defined in Yasuda et al. 2001 AJ 112, 1104
47	Kron radius	rk as defined in Bertin and Arnouts 1996 A&A Supp 117, 393
48	Hall radius	rh image scale radius eg. Hall & Mackay 1984 MNRAS 210, 979
49	Petrosian flux	flux within circular aperture to k x rp with k=2
50	Error in flux	
51	Kron flux	
52	Error in flux	
53	Hall flux	
54	Error in flux	

55	Error bit flag	bit pattern listing various processing error flags initially set to the no. of bad pixels within aperture 3 (the 2 arcsec diameter aperture) - note this can be fractional due to soft-edged apertures
56	Sky level	local interpolated sky level from background tracker
57	Sky rms	local estimate of variation in sky level around image
58	Av conf	average confidence level within default rcore aperture useful for spotting spurious outliers in various parameter selection spaces
59	RA	Sexagesimal RA and Dec explicitly put in columns for overlay programs that cannot, in general, understand astrometric solution coefficients. Note real*4 storage precision accurate only to 50 mas.
60	Dec	Astrometry can be derived more precisely from the WCS in the header and XY in columns 5 and 6.
61	Classification	Flag indicating most probable morphological classification: eg. -1 stellar, +1 non-stellar, 0 noise, -2 borderline stellar (Saturated images can be flagged by comparing the peak height + local sky with the SATURATE keyword in the header.)
62	Statistic	
63	MJDoff	Offset (in minutes) of the median epoch of observation of each object from the integer Modified Julian Date of the catalogue given by header keyword MJD_DAY. The epoch is MJD_DAY + MJDoff.
64	Blank64	
65	Blank65	
66	Blank66	
67	Blank67	
68	Blank68	
69	Blank69	
70	Blank70	
71	Blank71	
72	Blank72	
73	Blank73	
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76	Blank76	
77	Blank77	
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79	Blank79	
80	Blank80	

Acknowledgments

Please use the following statement in your articles when using these data: Based on data products from VVVX Survey observations made with the VISTA telescope at the ESO Paranal Observatory under programme ID 198.B-2004.

If the access to the ESO Science Archive Facility services was helpful for you research, please also include the following acknowledgement:

- "This research has made use of the services of the ESO Science Archive Facility."

Further Details

More detailed information can be found at: - the CASU webpages
http://casu.ast.cam.ac.uk/surveys-projects/vista/

- by contacting the VVV/VVVX Science Team Members listed at the survey webpage

http://vvvsurvey.org

- the VVV Science Team papers:

D. Minniti, P. W. Lucas, J. P. Emerson, R. K. Saito, M. Hempel, P. Pietrukowicz, A. V. Ahumada, M. V. Alonso, J. Alonso-García, J. I. Arias, R. M. Bandyopadhyay, R. H. Barbá, L. R. Bedin, E. Bica, J. Borissova, L. Bronfman, M. Catelan, J. J. Clariá, N. Cross, R. de Grijs, I. Dékány, J. E. Drew, C. Fariña, C. Feinstein, E. Fernández Lajús, R. C. Gamen, D. Geisler, W. Gieren, B. Goldman, O. González, G. Gunthardt, S. Gurovich, N. C. Hambly, M. J. Irwin, V. D. Ivanov, A. Jordán, E. Kerins, K. Kinemuchi, R. Kurtev, M. López-Corredoira, T. Maccarone, N. Masetti, D. Merlo, M. Messineo, I. F. Mirabel, L. Monaco, L. Morelli, N. Padilla, M. C. Parisi, G. Pignata, M. Rejkuba, A. Roman-Lopes, S. E. Sale, M. R. Schreiber, A. C. Schröder, M. Smith, L. Sodré Jr., M. Soto, M. Tamura, C. Tappert, M. A. Thompson, I. Toledo, M. Zoccali, "VISTA Variables in the Via Lactea (VVV): The public ESO near-IR variability survey of the Milky Way", 2010, New Astronomy, 15, 433 (arXiv:0912.1056)

R. Saito, M. Hempel, J. Alonso-García, I. Toledo, J. Borissova, O. González, J. C. Beamin, D. Minniti, P. Lucas, J. Emerson, A. Ahumada, S. Aigrain, M. V. Alonso, E. de Amôres, R. Angeloni, J. Arias, R. Bandyopadhyay, R. Barbá, B. Barbuy, G. Baume, L. Bedin, E. Bica, L. Bronfman, G. Carraro, M. Catelan, J. J. Clariá, C. Contreras, N. Cross, C. Davis, R. de Grijs, I. Dékány, J. Drew, C. Fariña, C. Feinstein, E. Fernández Lajús, S. Folkes, R. Gamen, D. Geisler, W. Gieren, B. Goldman, A. Gosling, G. Gunthardt, S. Gurovich, N. Hambly, M. Hanson, M. Hoare, M. Irwin, V. Ivanov, A. Jordán, E. Kerins, K. Kinemuchi, R. Kurtev, A. Longmore, M. López-Corredoira, T. Maccarone, E. Martín, N. Masetti, R. Mennickent, D. Merlo, M. Messineo, F. Mirabel, L. Monaco, C. Moni Bidin, L. Morelli, N. Padilla, T. Palma, M. C. Parisi, Q. Parker, D. Pavani, P. Pietrukowicz, G. Pietrzynski, G. Pignata, M. Rejkuba, A. Rojas, A. Roman-Lopes, M. T. Ruiz, S. Sale, I. Saviane, M. Schreiber, A. Schröder, S. Sharma, M. Smith, L. Sodré Jr., M. Soto, A. Stephens, M. Tamura, C. Tappert, M. Thompson, E. Valenti, L. Vanzi, W. Weidmann, M. Zoccali; "VISTA Variables in the Via Lactea: current status and first results", 2010, The Messenger, 141, 24

M. Catelan, D. Minniti, P. W. Lucas, J. Alonso-García, R. Angeloni, J. C. Beamín, C. Bonatto, J. Borissova, C. Contreras, N. Cross, I. Dekany, J. P. Emerson, S. Eyheramendi, D. Geisler, E. Gonzalez-Solares, K. Helminiak, M. Hempel, M. J. Irwin, V. D. Ivanov, A. Jordan, R. Kerins, R. Kurtev, F. Mauro, C. Moni-Bidin, C. Navarrete, P. Perez, K. Pichara, M. Read, M. Rejkuba, R. K. Saito, S. E. Sale, I. Toledo, "The Vista Variables in the Via Lactea (VVV) ESO Public Survey: Current Status and First Results", 2011, in Carnegie Observatories Astrophysics Series (ed. Andrew McWilliam), Volume 5, p. 145 (arXiv:1105.1119)

R. K. Saito, M. Hempel, D. Minniti, P. W. Lucas, M. Rejkuba, I. Toledo, O. A. Gonzalez, J. Alonso-Garcia, M. J. Irwin, E. Gonzalez-Solares, S. T. Hodgkin, J. R. Lewis, N. Cross, V. D. Ivanov, E. Kerins, J. P. Emerson, M. Soto, E. B. Amores, S. Gurovich, I. Dékány, R. Angeloni, J. C. Beamin, M. Catelan, N. Padilla, M. Zoccali, P. Pietrukowicz, C. Moni-Bidin, F. Mauro, D. Geisler, S. L. Folkes, S. E. Sale, J. Borissova, R. Kurtev, A. V. Ahumada, M. V. Alonso, A. Adamson, J. I. Arias, R. M. Bandyopadhyay, R. H. Barbá, B. Barbuy, G. L. Baume, L. R. Bedin, R. Benjamin, E. Bica, C. Bonatto, L. Bronfman, G. Carraro, A. N. Chene, J. J. Clariá, J. R. A. Clarke, C. Contreras, A. Corvillon, R. de Grijs, B. Dias, J. E. Drew, C. Fariña, C. Feinstein, E. Fernández Lajús, R. C. Gamen, W. Gieren, B. Goldman, C. Gonzalez-Fernandez, R. J. J. Grand, G. Gunthardt, N. C. Hambly, M. M. Hanson, K. Helminiak, M. G. Hoare, L. Huckvale, A. Jordán, K. Kinemuchi, M. López-Corredoira, T. Maccarone, D. Majaess, E. Martin, N. Masetti, R. E. Mennickent, I. F. Mirabel, L. Monaco, L. Morelli, V.

Motta, T. Palma, M. C. Parisi, Q. Parker, F. Peñaloza, G. Pietrzynski, G. Pignata, B. Popesku, M. A. Read, A. Roman-Lopes, M. T. Ruiz, I. Saviane, M. R. Schreiber, A. C. Schröder, S. Sharma, M. D. Smith, L. Sodre Jr., J. Stead, A. W. Stephens, M. Tamura, C. Tappert, M. A. Thompson, E. Valenti, L. Vanzi, N. A. Walton, W. Weidmann, and A. Zijlstra, "VVV DR1: The First Data Release of the Milky Way Bulge and Southern Plane from the Near-Infrared ESO Public Survey VISTA Variables in the Vıa Lactea", 2012, Astronomy & Astrophysics, 537, A107 (arXiv:1111.5511)

F. Mauro, C. Moni Bidin, A.-N. Chené, D. Geisler, J. Alonso-García, J. Borissova, G. Carraro, "The VVV-SkZ pipeline: an automatic PSF-fitting photometric pipeline for the VVV survey", 2013, Revista Mexicana de Astronomía y Astrofísica Vol. 49, 189 (arXiv:1303.1824)