VVV Survey - ESO Phase 3 - Data Release 4.2

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Data Collection	VVV
Release Number	4.2
Data Provider	Dante Minniti
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Abstract

The VVV Survey data delivered to ESO in this "DR4.2" release of the "VVV" Data Collection includes the two-epoch ZYJHKs band-merged tile catalogues that were created by the Wide Field Astronomy Unit (WFAU) at the Royal Observatory, Edinburgh, using single-band catalogues created from the tile images by the Cambridge Astronomical Survey Unit (CASU). These data files were uploaded via the Phase 3 tool to the ESO Archive in July 2020**.** The data are from ESO programme 179.B-2002, with the VIRCAM instrument, using ZYJHKs filters, with total sky coverage of 540 sq. deg.

Overview of Observations

This Phase 3 release contains observations up to 26 September 2015 with all the approved data from CASU v1.3 pipeline reduction, including images and merged source catalogs. We refer to this release as DR4.2, building on the single band catalogues (known as "source lists" in ESO parlance) and tile images and pawprint images released in DR4.1.

DR4.2 replaces the previous releases of band-merged tile catalogues in DR2 that were derived from the CASU v1.1 or v1.2 pipelines. DR4.2 provides additional data: the band-merged catalogues now include two separate epochs of contemporaneous JHKs photometry and two separate epochs of contemporaneous ZY photometry. There are also two significant improvements to the data quality compared to the earlier pipelines: (1) the improved photometric calibration procedures implemented in the v1.3 pipeline; (2) more extensive Quality Control (QC) to identify bad data. Despite these improvements, this release is not the final word on absolute photometric calibration on of VVV and some deficiencies are known to exist in the more crowded inner bulge fields. Further improvements have been made, first with the v1.5 pipeline (Gonzalez-Fernandez et al. 2018) and more recently the forthcoming VVV/VICAL procedure (L. Smith et al. in prep.) which fixes the crowded-field issue noted in Hajdu et al.(2020).

The file list for DR4.2 has 348 band-merged catalogues. The list also includes 7 single-band source lists and associated images that were included in order to provide complete provenance data for the band-merged catalogues because they were missing from DR4.1. In total the band-merged catalogues comprise 505 GB of data in uncompressed FITS format..

The VVV photometric dataset is divided into different disk and bulge tiles. The tile nomenclature goes from d001 to d152 in the disk, and from b201 to b396 in the bulge. The coordinates of the tile centers are listed in Tables 1 and 2 below, for the bulge and disk, respectively. These Tables contain the tile ID, Equatorial coordinates RA and DEC (J2000), and Galactic coordinates l and b in degrees. The map with the field IDs is shown in Figures 1a and 1b, overlapped on the extinction map of the inner Milky Way from Schlegel et al. 1997.

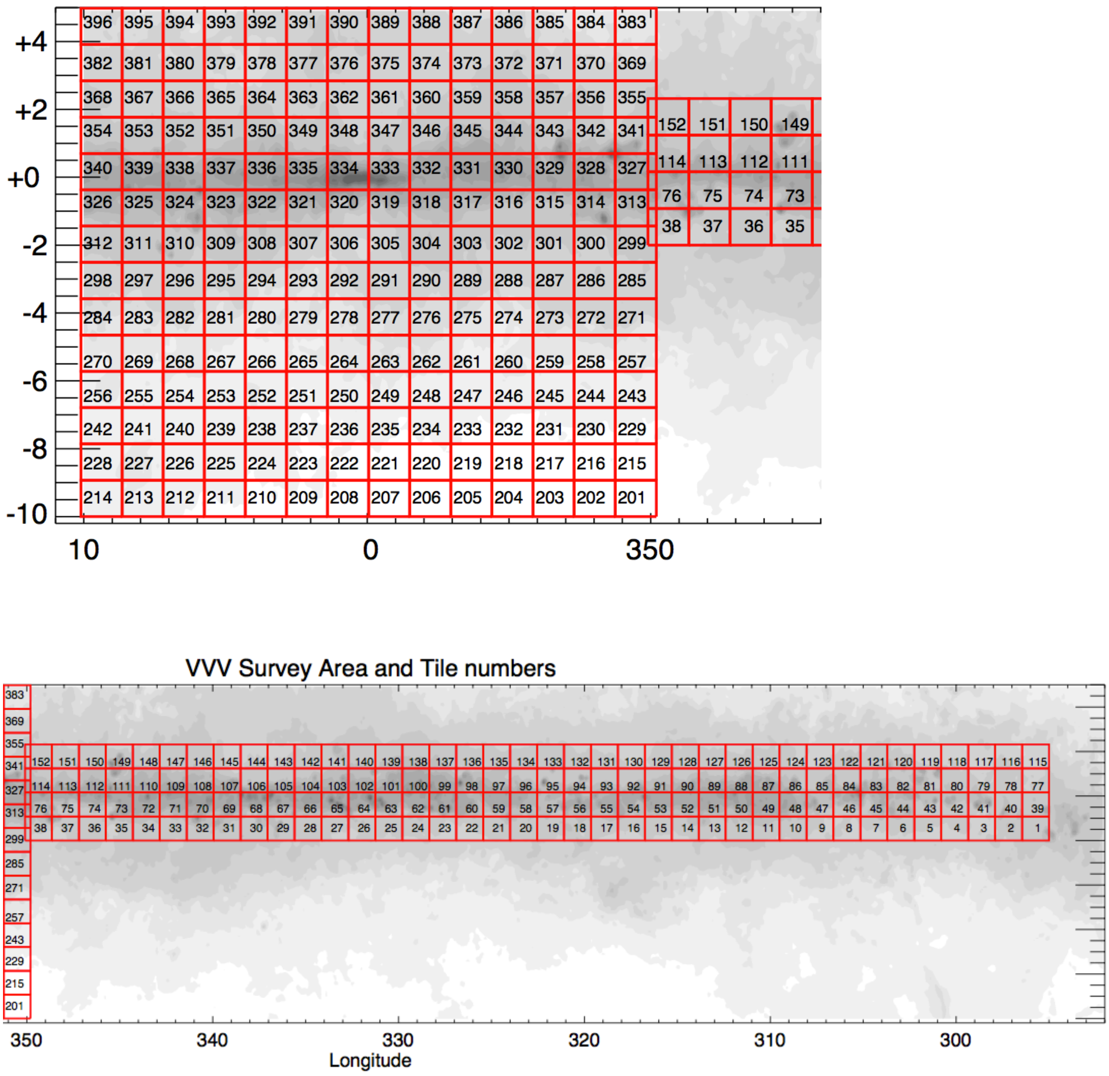

Figure 1. Maps showing the VVV tile numbers for the bulge (upper panel) and the disk (lower panel).

Release Content

TABLE 1: Bulge tiles coordinates

ID	RA	Dec	Longitude (°)	Latitude (°)
b201	18:04:24.0	-41:44:53.52	350.74816	-9.68974
b202	18:08:00.1	-40:27:29.88	352.22619	-9.68971

b203	18:11:29.5	-39:09:52.92	353.70409	-9.68973
b204	18:14:53.0	-37:52:03.36	355.18207	-9.68974
b205	18:18:11.1	-36:34:02.64	356.66012	-9.68976
b206	18:21:24.4	-35:15:52.20	358.13813	-9.68975
b207	18:24:33.1	-33:57:33.48	359.61607	-9.68977
b208	18:27:37.7	-32:39:07.20	1.09399	-9.68974
b209	18:30:38.6	-31:20:34.08	2.572	-9.68971
b210	18:33:36.2	-30:01:55.56	4.04998	-9.68973
b211	18:36:30.6	-28:43:12.36	5.52796	-9.68978
b212	18:39:22.3	-27:24:25.20	7.00593	-9.68975
b213	18:42:11.4	-26:05:34.80	8.48396	-9.68974
b214	18:44:58.3	-24:46:42.24	9.96193	-9.68974
b215	17:59:16.0	-41:13:55.92	350.74595	-8.59756
b216	18:02:56.0	-39:57:07.92	352.21956	-8.59753
b217	18:06:29.5	-38:40:04.08	353.69327	-8.59756
b218	18:09:56.9	-37:22:46.56	355.16684	-8.59757
b219	18:13:18.8	-36:05:16.08	356.64051	-8.5976
b220	18:16:35.6	-34:47:34.08	358.11423	-8.59759
b221	18:19:47.7	-33:29:42.36	359.58781	-8.59757
b222	18:22:55.6	-32:11:41.28	1.06151	-8.59755
b223	18:25:59.5	-30:53:32.28	2.53522	-8.59757
b224	18:29:00.0	-29:35:16.80	4.0088	-8.59759
b225	18:31:57.1	-28:16:54.84	5.4825	-8.59755
b226	18:34:51.4	-26:58:27.84	6.9562	-8.59757
b227	18:37:42.9	-25:39:56.88	8.42977	-8.59756
b228	18:40:32.1	-24:21:21.96	9.9035	-8.59757
b229	17:54:12.5	-40:42:07.56	350.74383	-7.50542
b230	17:57:56.5	-39:25:54.48	352.2138	-7.50537
b231	18:01:33.8	-38:09:24.48	353.68363	-7.50537
b232	18:05:04.9	-36:52:38.28	355.15359	-7.50541
b233	18:08:30.3	-35:35:38.04	356.62342	-7.50539
b234	18:11:50.5	-34:18:24.48	358.09337	-7.50535
b235	18:15:05.8	-33:00:59.76	359.56322	-7.50542
b236	18:18:16.8	-31:43:24.24	1.03312	-7.50538
b237	18:21:23.6	-30:25:39.36	2.50307	-7.50541
b238	18:24:26.8	-29:07:46.20	3.973	-7.5054
b239	18:27:26.6	-27:49:45.84	5.44287	-7.50536
b240	18:30:23.3	-26:31:39.36	6.91271	-7.5054
b241	18:33:17.1	-25:13:27.12	8.38261	-7.50541
b242	18:36:08.5	-23:55:10.20	9.85251	-7.50542
b243	17:49:13.8	-40:09:29.16	350.74206	-6.41324
b244	17:53:01.6	-38:53:51.72	352.20875	-6.41323
b245	17:56:42.5	-37:37:54.84	353.67546	-6.41323

b246	18:00:17.1	-36:21:40.32	355.14219	-6.41321
b247	18:03:45.8	-35:05:09.96	356.60888	-6.41323
b248	18:07:09.1	-33:48:25.20	358.0755	-6.41322
b249	18:10:27.5	-32:31:27.12	359.54218	-6.41323
b250	18:13:41.3	-31:14:17.16	1.00886	-6.41325
b251	18:16:51.0	-29:56:56.04	2.47562	-6.41319
b252	18:19:56.7	-28:39:25.92	3.94224	-6.41326
b253	18:22:59.0	-27:21:46.80	5.40892	-6.41319
b254	18:25:58.0	-26:04:00.12	6.87563	-6.41325
b255	18:28:54.1	-24:46:06.60	8.34231	-6.41319
b256	18:31:47.5	-23:28:07.32	9.80903	-6.41325
b257	17:44:20.1	-39:36:02.16	350.74076	-5.32104
b258	17:48:11.3	-38:20:59.64	352.20485	-5.32102
b259	17:51:55.6	-37:05:36.24	353.66885	-5.32101
b260	17:55:33.4	-35:49:53.40	355.13291	-5.32104
b261	17:59:05.2	-34:33:52.92	356.59692	-5.32103
b262	18:02:31.5	-33:17:36.24	358.06096	-5.32105
b263	18:05:52.8	-32:01:04.80	359.525	-5.32104
b264	18:09:09.3	-30:44:20.04	0.98899	-5.32099
b265	18:12:21.5	-29:27:23.40	2.45295	-5.32106
b266	18:15:29.8	-28:10:15.24	3.91703	-5.32105
b267	18:18:34.4	-26:52:57.36	5.38103	-5.32101
b268	18:21:35.6	-25:35:30.48	6.84507	-5.32101
b269	18:24:33.8	-24:17:55.68	8.30909	-5.321
b270	18:27:29.2	-23:00:14.04	9.77309	-5.32107
b271	17:39:31.1	-39:01:49.44	350.73953	-4.22883
b272	17:43:25.5	-37:47:22.20	352.20141	-4.22884
b273	17:47:12.9	-36:32:31.92	353.66332	-4.22886
b274	17:50:53.7	-35:17:20.76	355.12516	-4.2289
b275	17:54:28.4	-34:01:49.80	356.58709	-4.22886
b276	17:57:57.5	-32:46:01.20	358.04898	-4.22882
b277	18:01:21.5	-31:29:56.40	359.51088	-4.22881
b278	18:04:40.6	-30:13:36.84	0.97275	-4.22884
b279	18:07:55.3	-28:57:03.60	2.43463	-4.22884
b280	18:11:05.9	-27:40:17.76	3.89659	-4.22886
b281	18:14:12.7	-26:23:20.76	5.35849	-4.22883
b282	18:17:16.1	-25:06:13.68	6.82039	-4.22886
b283	18:20:16.2	-23:48:57.60	8.28222	-4.22888
b284	18:23:13.5	-22:31:32.88	9.74416	-4.22889
b285	17:34:46.9	-38:26:51.72	350.73871	-3.13666
b286	17:38:44.3	-37:12:59.40	352.19896	-3.1367
b287	17:42:34.5	-35:58:41.88	353.65931	-3.1367
b288	17:46:18.1	-34:44:01.68	355.11962	-3.13673

b289	17:49:55.5	-33:29:00.24	356.57994	-3.13668
b290	17:53:27.3	-32:13:39.72	358.04023	-3.13673
b291	17:56:53.7	-30:58:01.20	359.50054	-3.13672
b292	18:00:15.3	-29:42:06.12	0.96088	-3.13663
b293	18:03:32.3	-28:25:56.28	2.4212	-3.13666
b294	18:06:45.1	-27:09:32.76	3.8815	-3.13671
b295	18:09:54.0	-25:52:56.64	5.34179	-3.13672
b296	18:12:59.4	-24:36:09.00	6.80204	-3.13666
b297	18:16:01.4	-23:19:10.92	8.26235	-3.13668
b298	18:19:00.5	-22:02:03.12	9.72271	-3.13666
b299	17:30:07.3	-37:51:11.88	350.73789	-2.04453
b300	17:34:07.3	-36:37:53.76	352.19711	-2.04451
b301	17:38:00.2	-35:24:09.00	353.65635	-2.04453
b302	17:41:46.4	-34:09:59.40	355.11565	-2.04449
b303	17:45:26.4	-32:55:27.48	356.57487	-2.04453
b304	17:49:00.6	-31:40:34.32	358.03411	-2.04446
b305	17:52:29.4	-30:25:22.08	359.49334	-2.04452
b306	17:55:53.3	-29:09:51.84	0.95261	-2.04456
b307	17:59:12.4	-27:54:05.04	2.41186	-2.04451
b308	18:02:27.3	-26:38:03.12	3.87111	-2.04447
b309	18:05:38.2	-25:21:47.52	5.33034	-2.04451
b310	18:08:45.5	-24:05:18.96	6.78962	-2.04454
b311	18:11:49.3	-22:48:38.52	8.24891	-2.04449
b312	18:14:50.0	-21:31:47.64	9.70816	-2.04447
b313	17:25:32.2	-37:14:49.92	350.73753	-0.95236
b314	17:29:34.8	-36:02:05.64	352.19625	-0.9523
b315	17:33:30.2	-34:48:52.92	353.65504	-0.95232
b316	17:37:18.8	-33:35:14.28	355.11368	-0.95231
b317	17:41:01.1	-32:21:10.80	356.57248	-0.95229
b318	17:44:37.6	-31:06:45.00	358.03121	-0.9523
b319	17:48:08.6	-29:51:58.32	359.48996	-0.95233
b320	17:51:34.6	-28:36:52.56	0.94861	-0.95235
b321	17:54:55.8	-27:21:28.44	2.40742	-0.95234
b322	17:58:12.6	-26:05:48.12	3.86612	-0.95234
b323	18:01:25.4	-24:49:52.68	5.32477	-0.95232
b324	18:04:34.4	-23:33:42.84	6.78355	-0.95232
b325	18:07:40.0	-22:17:20.40	8.24226	-0.95238
b326	18:10:42.3	-21:00:45.72	9.70101	-0.95231
b327	17:21:01.7	-36:37:48.00	350.73744	0.13984
b328	17:25:06.5	-35:25:37.20	352.19621	0.13989
b329	17:29:04.2	-34:12:56.52	353.65492	0.13987
b330	17:32:55.0	-32:59:47.76	355.11368	0.13984
b331	17:36:39.5	-31:46:13.08	356.57236	0.13988

b332	17:40:18.1	-30:32:14.28	358.0311	0.13982
b333	17:43:51.2	-29:17:52.80	359.48985	0.13988
b334	17:47:19.1	-28:03:10.80	0.94855	0.13988
b335	17:50:42.3	-26:48:09.36	2.40731	0.13985
b336	17:54:01.0	-25:32:49.92	3.8661	0.13985
b337	17:57:15.5	-24:17:14.28	5.32478	0.13981
b338	18:00:26.2	-23:01:23.16	6.78348	0.13983
b339	18:03:33.3	-21:45:17.64	8.24226	0.13983
b340	18:06:37.2	-20:28:59.16	9.70099	0.13985
b341	17:16:35.5	-36:00:07.56	350.73765	1.23203
b342	17:20:42.4	-34:48:30.24	352.19686	1.23205
b343	17:24:42.1	-33:36:20.88	353.65613	1.23203
b344	17:28:35.0	-32:23:41.64	355.11542	1.23207
b345	17:32:21.6	-31:10:35.04	356.57468	1.23205
b346	17:36:02.2	-29:57:02.52	358.03399	1.23203
b347	17:39:37.2	-28:43:06.24	359.49322	1.23206
b348	17:43:07.0	-27:28:47.64	0.95251	1.23203
b349	17:46:31.9	-26:14:08.52	2.41172	1.23201
b350	17:49:52.3	-24:59:09.96	3.87096	1.23204
b351	17:53:08.5	-23:43:53.40	5.33027	1.23202
b352	17:56:20.8	-22:28:20.28	6.78955	1.23201
b353	17:59:29.4	-21:12:31.68	8.24885	1.23202
b354	18:02:34.6	-19:56:29.04	9.70808	1.23199
b355	17:12:13.6	-35:21:49.68	350.73827	2.32427
b356	17:16:22.5	-34:10:45.12	352.19857	2.32417
b357	17:20:24.1	-32:59:06.36	353.65894	2.32423
b358	17:24:18.9	-31:46:56.64	355.11924	2.32422
b359	17:28:07.3	-30:34:17.40	356.57962	2.3242
b360	17:31:49.7	-29:21:11.16	358.03989	2.32423
b361	17:35:26.5	-28:07:39.36	359.50024	2.32421
b362	17:38:58.0	-26:53:43.80	0.96059	2.32418
b363	17:42:24.6	-25:39:25.92	2.42098	2.3242
b364	17:45:46.6	-24:24:47.88	3.88124	2.32419
b365	17:49:04.4	-23:09:50.40	5.34158	2.32416
b366	17:52:18.1	-21:54:34.92	6.80192	2.32418
b367	17:55:28.1	-20:39:02.88	8.26224	2.32419
b368	17:58:34.7	-19:23:15.00	9.72265	2.32423
b369	17:07:55.9	-34:42:57.24	350.73892	3.41637
b370	17:12:06.5	-33:32:24.36	352.20083	3.41644
b371	17:16:09.9	-32:21:16.20	353.6628	3.41638
b372	17:20:06.4	-31:09:35.28	355.12466	3.41637
b373	17:23:56.5	-29:57:23.04	356.58663	3.41642
b374	17:27:40.6	-28:44:42.36	358.04853	3.4164

b375	17:31:19.0	-27:31:34.68	359.51046	3.41635
b376	17:34:52.2	-26:18:01.44	0.97243	3.41644
b377	17:38:20.3	-25:04:05.16	2.43434	3.41638
b378	17:41:43.8	-23:49:46.56	3.89631	3.41638
b379	17:45:03.0	-22:35:07.44	5.35828	3.41637
b380	17:48:18.1	-21:20:09.24	6.8202	3.4164
b381	17:51:29.4	-20:04:53.40	8.28204	3.4164
b382	17:54:37.2	-18:49:20.64	9.74399	3.41636
b383	17:03:42.2	-34:03:30.60	350.73979	4.50856
b384	17:07:54.4	-32:53:29.40	352.2038	4.50857
b385	17:11:59.4	-31:42:51.12	353.66783	4.50858
b386	17:15:57.5	-30:31:37.92	355.13195	4.5086
b387	17:19:49.2	-29:19:52.68	356.59597	4.50856
b388	17:23:34.8	-28:07:36.84	358.06004	4.50857
b389	17:27:14.8	-26:54:52.56	359.52411	4.50859
b390	17:30:45.4	-25:43:05.52	0.96034	4.50854
b391	17:34:15.1	-24:29:30.12	2.42444	4.50852
b392	17:37:40.1	-23:15:31.32	3.8885	4.50858
b393	17:41:00.7	-22:01:10.92	5.35253	4.50853
b394	17:44:17.1	-20:46:29.64	6.81666	4.50854
b395	17:47:29.7	-19:31:29.28	8.28074	4.50857
b396	17:50:38.7	-18:16:11.28	9.74476	4.50855

TABLE 2: Disk tile coordinates

ID	RA	Dec	Longitude (°)	Latitude (°)
d001	11:43:24.9	-63:31:38.64	295.4377	-1.64975
d002	11:56:12.6	-63:52:21.00	296.89672	-1.64979
d003	12:09:17.2	-64:08:46.68	298.35572	-1.64971
d004	12:22:35.2	-64:20:48.12	299.8147	-1.64971
d005	12:36:02.6	-64:28:18.84	301.27373	-1.64973
d006	12:49:35.2	-64:31:14.88	302.73271	-1.64977
d007	13:03:08.4	-64:29:34.44	304.1917	-1.64978
d008	13:16:37.6	-64:23:18.24	305.65072	-1.6497
d009	13:29:58.6	-64:12:30.24	307.10972	-1.64971
d010	13:43:07.3	-63:57:15.84	308.56873	-1.64973
d011	13:55:59.9	-63:37:42.60	310.02772	-1.64971
d012	14:08:33.2	-63:14:00.24	311.48673	-1.6497
d013	14:20:44.8	-62:46:19.92	312.94573	-1.64979
d014	14:32:32.5	-62:14:52.80	314.40472	-1.64974
d015	14:43:42.1	-61:40:33.96	315.83598	-1.64972
d016	14:54:38.8	-61:02:16.44	317.29497	-1.64975

d017	15:05:08.7	-60:20:51.00	318.75395	-1.64975
d018	15:15:11.9	-59:36:30.60	320.21293	-1.64975
d019	15:24:48.6	-58:49:27.84	321.67194	-1.64978
d020	15:33:59.4	-57:59:54.60	323.13095	-1.64976
d021	15:42:45.1	-57:08:02.40	324.58996	-1.64971
d022	15:51:06.6	-56:14:02.40	326.04898	-1.64975
d023	15:59:04.9	-55:18:04.32	327.50799	-1.64974
d024	16:06:41.2	-54:20:17.88	328.96694	-1.64974
d025	16:13:56.6	-53:20:51.36	330.42599	-1.64974
d026	16:20:52.3	-52:19:53.40	331.88495	-1.64978
d027	16:27:29.4	-51:17:30.84	333.34393	-1.64976
d028	16:33:49.0	-50:13:50.52	334.80299	-1.64976
d029	16:39:52.2	-49:08:58.92	336.26199	-1.64971
d030	16:45:40.1	-48:03:01.80	337.72099	-1.64973
d031	16:51:13.6	-46:56:04.20	339.17999	-1.64971
d032	16:56:33.7	-45:48:11.16	340.63896	-1.64975
d033	17:01:41.3	-44:39:26.64	342.09795	-1.64972
d034	17:06:37.1	-43:29:54.96	343.55695	-1.64975
d035	17:11:22.0	-42:19:39.72	345.01595	-1.64979
d036	17:15:56.8	-41:08:44.16	346.47495	-1.64979
d037	17:20:22.0	-39:57:11.16	347.934	-1.64973
d038	17:24:38.4	-38:45:04.32	349.39294	-1.64975
d039	11:45:52.5	-62:28:17.40	295.43747	-0.55759
d040	11:58:14.2	-62:48:15.12	296.89617	-0.55758
d041	12:10:50.9	-63:04:04.80	298.35479	-0.55753
d042	12:23:39.7	-63:15:39.60	299.8135	-0.55756
d043	12:36:36.7	-63:22:53.40	301.27213	-0.55754
d044	12:49:38.4	-63:25:42.96	302.73081	-0.55755
d045	13:02:40.6	-63:24:06.84	304.18948	-0.5576
d046	13:15:39.3	-63:18:05.40	305.64814	-0.55754
d047	13:28:30.7	-63:07:42.24	307.10682	-0.55756
d048	13:41:11.1	-62:53:02.04	308.56549	-0.55756
d049	13:53:37.2	-62:34:12.00	310.02413	-0.5576
d050	14:05:46.2	-62:11:20.04	311.48283	-0.55756
d051	14:17:35.5	-61:44:36.60	312.94152	-0.55757
d052	14:29:03.3	-61:14:12.48	314.40014	-0.55761
d053	14:40:08.1	-60:40:18.48	315.85883	-0.55752
d054	14:50:49.0	-60:03:07.56	317.3175	-0.55758
d055	15:01:05.4	-59:22:51.24	318.77616	-0.55761
d056	15:10:57.1	-58:39:41.40	320.23482	-0.55759
d057	15:20:24.3	-57:53:49.92	321.69349	-0.55755
d058	15:29:27.3	-57:05:28.32	323.15217	-0.55754
d059	15:38:06.7	-56:14:47.40	324.61087	-0.55755

d060	15:46:23.4	-55:21:57.60	326.0695	-0.55754
d061	15:54:18.1	-54:27:08.64	327.52817	-0.55761
d062	16:01:51.8	-53:30:29.16	328.98684	-0.55756
d063	16:09:05.6	-52:32:08.16	330.44549	-0.55755
d064	16:16:00.5	-51:32:13.20	331.90419	-0.55754
d065	16:22:37.4	-50:30:51.84	333.36286	-0.55756
d066	16:28:57.4	-49:28:10.56	334.82153	-0.55755
d067	16:35:01.4	-48:24:15.84	336.28015	-0.55756
d068	16:40:50.5	-47:19:13.08	337.73882	-0.55761
d069	16:46:25.6	-46:13:07.32	339.19753	-0.55758
d070	16:51:47.4	-45:06:03.96	340.65613	-0.55757
d071	16:56:56.9	-43:58:06.96	342.11483	-0.55761
d072	17:01:54.9	-42:49:20.28	343.57351	-0.55754
d073	17:06:42.0	-41:39:48.24	345.03215	-0.55756
d074	17:11:19.0	-40:29:33.72	346.49083	-0.55759
d075	17:15:46.6	-39:18:39.96	347.94953	-0.55759
d076	17:20:05.3	-38:07:09.84	349.40822	-0.55752
d077	11:48:10.1	-61:24:47.16	295.43749	0.53461
d078	12:00:07.6	-61:44:03.84	296.89636	0.53458
d079	12:12:18.6	-61:59:20.40	298.35521	0.53456
d080	12:24:40.4	-62:10:30.00	299.81408	0.53461
d081	12:37:09.6	-62:17:27.96	301.27295	0.53465
d082	12:49:42.8	-62:20:11.40	302.73182	0.53458
d083	13:02:16.6	-62:18:38.16	304.19066	0.53466
d084	13:14:47.2	-62:12:50.04	305.64955	0.53458
d085	13:27:11.3	-62:02:48.84	307.10837	0.5346
d086	13:39:25.6	-61:48:39.24	308.56725	0.53465
d087	13:51:27.1	-61:30:28.08	310.02613	0.53456
d088	14:03:13.2	-61:08:22.20	311.48497	0.53458
d089	14:14:41.5	-60:42:30.60	312.94386	0.53465
d090	14:25:50.4	-60:13:03.72	314.40272	0.53463
d091	14:36:38.4	-59:40:11.64	315.86159	0.53462
d092	14:47:04.4	-59:04:05.52	317.32043	0.53461
d093	14:57:07.9	-58:24:56.16	318.77932	0.53465
d094	15:06:48.6	-57:42:55.44	320.23818	0.53459
d095	15:16:06.6	-56:58:13.80	321.697	0.53459
d096	15:25:01.9	-56:11:02.04	323.15588	0.53461
d097	15:33:35.2	-55:21:30.60	324.61479	0.53459
d098	15:41:47.0	-54:29:49.20	326.07365	0.53465
d099	15:49:38.0	-53:36:07.56	327.5325	0.53463
d100	15:57:09.0	-52:40:34.32	328.99135	0.53458
d101	16:04:21.0	-51:43:17.40	330.45023	0.53459
d102	16:11:14.7	-50:44:24.72	331.90911	0.5346

d103	16:17:51.2	-49:44:03.48	333.36798	0.5346
d104	16:24:11.3	-48:42:20.16	334.82687	0.53461
d105	16:30:16.0	-47:39:21.24	336.28568	0.5346
d106	16:36:06.0	-46:35:12.12	337.7445	0.5346
d107	16:41:42.3	-45:29:57.84	339.20338	0.5346
d108	16:47:05.7	-44:23:43.44	340.66229	0.53457
d109	16:52:16.9	-43:16:33.24	342.12118	0.53461
d110	16:57:16.8	-42:08:31.56	343.58005	0.53462
d111	17:02:05.9	-40:59:42.36	345.03883	0.53459
d112	17:06:45.0	-39:50:08.52	346.49771	0.53457
d113	17:11:14.7	-38:39:53.28	347.95664	0.53461
d114	17:15:35.6	-37:29:00.24	349.41546	0.5346
d115	11:50:18.7	-60:21:09.00	295.43768	1.6268
d116	12:01:53.8	-60:39:47.52	296.89732	1.62677
d117	12:13:41.0	-60:54:32.76	298.35689	1.62684
d118	12:25:37.8	-61:05:19.68	299.81648	1.62674
d119	12:37:41.3	-61:12:02.52	301.27608	1.62684
d120	12:49:48.4	-61:14:39.48	302.73567	1.62683
d121	13:01:55.9	-61:13:09.12	304.19526	1.6268
d122	13:14:00.7	-61:07:32.16	305.65484	1.62675
d123	13:25:59.6	-60:57:50.40	307.11447	1.62681
d124	13:37:49.7	-60:44:08.88	308.57402	1.62675
d125	13:49:28.2	-60:26:32.28	310.03361	1.6268
d126	14:00:52.9	-60:05:08.16	311.49324	1.62678
d127	14:12:01.4	-59:40:04.44	312.9528	1.62677
d128	14:22:52.3	-59:11:29.76	314.4124	1.62684
d129	14:33:24.0	-58:39:34.56	315.87197	1.62678
d130	14:43:35.7	-58:04:28.20	317.33156	1.62679
d131	14:53:26.6	-57:26:21.48	318.79117	1.62676
d132	15:02:56.4	-56:45:24.48	320.25077	1.62679
d133	15:12:05.0	-56:01:48.00	321.71037	1.62674
d134	15:20:52.6	-55:15:41.76	323.16993	1.62676
d135	15:29:19.3	-54:27:15.48	324.62955	1.62682
d136	15:37:25.9	-53:36:39.24	326.08912	1.62676
d137	15:45:12.7	-52:44:01.32	327.54872	1.62676
d138	15:52:40.6	-51:49:30.36	329.00835	1.62678
d139	15:59:50.2	-50:53:14.64	330.4679	1.6268
d140	16:06:42.4	-49:55:21.36	331.92752	1.62681
d141	16:13:17.9	-48:55:57.72	333.38714	1.62678
d142	16:19:37.6	-47:55:10.20	334.8467	1.62678
d143	16:25:42.3	-46:53:04.92	336.30624	1.62678
d144	16:31:32.8	-45:49:46.92	337.7659	1.62684
d145	16:37:09.9	-44:45:22.32	339.22547	1.62682

d146	16:42:34.4	-43:39:55.44	340.68506	1.62681
d147	16:47:46.9	-42:33:30.96	342.14462	1.62677
d148	16:52:48.2	-41:26:12.48	343.60424	1.62683
d149	16:57:39.0	-40:18:04.32	345.06387	1.6268
d150	17:02:19.8	-39:09:10.08	346.52343	1.62677
d151	17:06:51.3	-37:59:32.64	347.98303	1.62675
d152	17:11:14.1	-36:49:15.24	349.4426	1.62674

VVV observations took place from 2010-2015. They comprised multi-epoch Ks observing blocks (OBs) and two epochs of contemporaneous multi-filter OBs, with JHKs OBs and ZY OBs taken separately in order to comply with ESO policies on maximum OB duration. All planned VVV observations from 2010-2015 have now been completed but the new VVVX extension to the VVV survey is continuing and it includes sparsely sampled data at the original VVV tile positions.

The files for this VVV Survey DR4.2 include only data that have passed the Quality Control (QC) procedures designed to remove individual bad observations.

Release Notes

Data Reduction and Calibration

All DR4 data are based on the CASU version v1.3 pipeline, which produces publication quality results provided that appropriate checks are made. The main changes to the pipeline since version 1.1 are as follows.

(i) The magnitude zero point error estimate for tiles is now calculated from the zero-point variation in the component pawprint images;

(ii) All tile catalogues have been re-grouted taking into account both detector level magnitude zero points variations and atmospheric seeing variations. ("Grouting" refers to the process of constructing calibrated tile images and catalogues from the 6 overlapping VIRCAM pawprint images).

(iii) A bug involving how the aperture 2 correction was calculated is now fixed and tile catalogues have now been re-grouted to include this. The change in the associated apermag2 results (source magnitudes in aperture 2) is typically at the level of ~0.05 mag.

(iv) Prior to re-grouting all the stacked pawprint photometric zero-points were recomputed using the latest version of the photometry software.

(v) Post re-grouting all the tile photometric zero-points have also been updated.

Full details of the 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 photometric transformations. This works well in the J, H and Ks bandpasses and improvements in the pipeline between v1.1 and v1.3 have fixed the calibration of a small number of tiles that previously appeared to have problems at the 0.1 mag level (by comparison with 2MASS and by using the tile overlap regions). Remaining fields with slightly poorer than average photometric calibration in J, H or Ks are solely due to poor and changing weather conditions, which will be apparent from the pawprint and tile zero points and the seeing given in the FITS catalogue headers.

The only changes to individual DR4 FITS images are in the headers. The zero points will in general be slightly different than in the previously releases owing to slight improvements in the calibration procedure as noted above. Also, the ESO Grades describing data quality for each OB have in some cases been updated. A very small change to the astrometric WCS coefficients was also implemented, affecting only data taken after 20101201. The effect on the astrometry is much less than 1 arcsecond. The PV2_3 and PV2_5 FITS header keywords for subsequent data changed from 42.0, -10000.0 to 44.0, -10300.0.

The tile catalogues have slightly changed photometry compared to previous releases, owing to the updated zero points and the new aperture corrections for aperture 2. 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). We plan to supply profile fitting photometry products in the near future.

The team has worked on the quality control using the v1.3 data, as detailed below.

The limiting magnitudes are similar to the ones for DR1 since we cover the same fields. Maps of limiting magnitudes are given in Saito et al. (2012). In addition, the calibration of the VVV Survey photometry was investigated as function of crowding in the bulge and disk fields, using the overlap regions between adjacent tiles and adjacent pawprint.

The VVV saturation limit ranges between Ks=10-12 mag, with multi-filter disk observations featuring a fainter saturation limit due to the slightly longer exposure time, e.g. DIT_{Ks}=10s in multicolor observations, as compared for DIT_{Ks}=4s in the variability study. DIT=4s was used for all Ks observations in the bulge. The saturation limit also varies between the 16 VIRCAM detectors. For brighter magnitudes the 2MASS photometry should be preferred. The photometric limit is typically Ks=17.5 mag, but in high density fields like the in the Galactic center region it can be Ks<16 mag (see photometric completeness in Saito et al.2012).

The photometric catalogues contain calibrated aperture photometry, and the limiting magnitudes correspond to the aperture photometry. For some specific scientific purposes it is better to obtain profile fitting (PSF) photometry and we plan to supply band-merged PSF photometry products in the near future.

Data Quality

The same words of caution as before apply as in previous 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 from v1.3 was performed with involvement of ESO and of most of the scientists from the VVV Survey Science Team. We checked image defects, telescope problems, seeing, zero points, magnitude limits, ellipticities, airmass, etc. Algorithmic quality control cuts to remove images with low zero points (after correcting for the seasonal trend), seeing that was significantly outside specification, or high average ellipticity were also applied.

Some additional quality control procedures were implemented for DR4 that identified a small number of tiles or pawprints where telescope guiding had been lost and fields with blurred or distorted image profiles. In addition we also identified some bad tiles where there was a large variation in the seeing or in the zero points between the 6 constituent pawprints, even though the values for the tile had passed the quality threshold. Furthermore, since we now have full confidence in the photometric calibration of the J, H and Ks data we decided to release some tile images and catalogues that had been removed from previous releases. In some cases this was because the improved calibration meant that the image now pass the seasonally adjusted threshold for the zero points. In other cases, some Ks images have variations in the background level that cause a poor cosmetic appearance without significantly affecting the time series photometry, which we consider to be the most important VVV science product. A good cosmetic appearance was required for all of the ZYJHKs master images from 2010-11 and 2015 in order to be part of this release.

There are a number of well known image defects intrinsic to VISTA, many of which are illustrated with pictures in the CASU web page located at:
casu.ast.cam.ac.uk/surveys-projects/vista/technical/known-issues

Known Issues

1) The Z and Y calibration is fairly good for fields located >2° off the Galactic equator but at present it remains unreliable for fields at latitudes $|b|<2°$. It had been hoped that ESO observations of standard fields in all filters in the 1st year of observation would provide data to calibrate the VVV Z and Y data but in the event there was insufficient data at similar times and airmasses to VVV.

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 PSF photometry products that 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 DR4.2 release, except for stars at or above the saturation limit.

Data Format

File Types

There are 6 types of file, all in FITS format. The main product is the 348 tile catalogues (filenames ending in ".fits"). There is also a meta-file containing the column description information reproduced below.

The other file types are 14 compressed ".fits.fz" image files (6 multi-extension VIRCAM pawprint images, 1 tile mage and the 7 associated weight maps) and 7 single-band source lists ".fits" files. These 14 images are provided because they were missing from DR4.1, which contains the rest of the images and single-band source lists that were used to create the DR4.2 two-epoch multi-filter catalogues.

Catalogue Columns

In the table below, the FITS format types are: A – ASCII string, I – signed 2 bit integer, J – signed 4 bit integer, K – signed 8 bit integer, D – double precision (64 bit) floating point variable, E – single precision (32 bit) floating point variable, B – unsigned byte.

All magnitudes are on the Vega system.

Column Name	Format	Description
IAUNAME	29A	IAU Name (not unique)
sourceID	K	Unique ID of this merged detection as assigned by merge algorithm
cuEventID	J	Unique ID of the VISTA Science Archive curation event giving rise to this record
frameSetID	K	Unique ID of the set of frames that this merged source comes from. These sets comprise multi-filter observations of the same field.
ra2000	D	Celestial Right Ascension
dec2000	D	Celestial Declination
l	D	Galactic longitude
b	D	Galactic latitude
lambda	D	SDSS system spherical co-ordinate 1
eta	D	SDSS system spherical co-ordinate 2
priOrSec	K	Seam code for a unique (=0) or duplicated (!=0) source (eg. flags overlap duplicates).
h_1mks_1Pnt	E	Point source colour H_1-Ks_1 (using aperMag3)
h_1mks_1PntErr	E	Error on point source colour H_1-Ks_1
h_2mks_2Pnt	E	Point source colour H_2-Ks_2 (using aperMag3)
h_2mks_2PntErr	E	Error on point source colour H_2-Ks_2
j_1mh_1Pnt	E	Point source colour J_1-H_1 (using aperMag3)
j_1mh_1PntErr	E	Error on point source colour J_1-H_1
j_2mh_2Pnt	E	Point source colour J_2-H_2 (using aperMag3)
j_2mh_2PntErr	E	Error on point source colour J_2-H_2

z_1my_1Pnt	E	Point source colour Z_1-Y_1 (using aperMag3)
z_1my_1PntErr	E	Error on point source colour Z_1-Y_1
z_2my_2Pnt	E	Point source colour Z_2-Y_2 (using aperMag3)
z_2my_2PntErr	E	Error on point source colour Z_2-Y_2
mergedClassStat	E	Merged N(0
mergedClass	I	Class flag from available measurements (1|0|-1|-2|-3|-9=galaxy|noise|stellar|probableStar|probableGalaxy|saturated)
pStar	E	Probability that the source is a star
pGalaxy	E	Probability that the source is a galaxy
pNoise	E	Probability that the source is noise
pSaturated	E	Probability that the source is saturated
z_1Mjd	D	Modified Julian Day in Z_1 band
z_1AperMag1	E	Point source Z_1 aperture corrected mag (1.0 arcsec aperture diameter)
z_1AperMag1Err	E	Error in point source Z_1 mag (1.0 arcsec aperture diameter)
z_1AperMag3	E	Default point source Z_1 aperture corrected mag (2.0 arcsec aperture diameter)
z_1AperMag3Err	E	Error in default point source Z_1 mag (2.0 arcsec aperture diameter)
z_1AperMag4	E	Point source Z_1 aperture corrected mag (2.8 arcsec aperture diameter)
z_1AperMag4Err	E	Error in point source Z_1 mag (2.8 arcsec aperture diameter)
z_1Gausig	E	RMS of axes of ellipse fit in Z_1
z_1Ell	E	1-b/a
z_1PA	E	ellipse fit celestial orientation in Z_1
z_1ErrBits	J	processing warning/error bitwise flags in Z_1
z_1AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Z_1
z_1Class	I	discrete image classification flag in Z_1
z_1ClassStat	E	S-Extractor classification statistic in Z_1
z_1ppErrBits	J	additional WFAU post-processing error bits in Z_1
z_1SeqNum	J	the running number of the Z_1 detection
z_1Xi	E	Offset of Z_1 detection from master position (+east/-west)
z_1Eta	E	Offset of Z_1 detection from master position (+north/-south)
z_2Mjd	D	Modified Julian Day in Z_2 band
z_2AperMag1	E	Point source Z_2 aperture corrected mag (1.0 arcsec aperture diameter)
z_2AperMag1Err	E	Error in point source Z_2 mag (1.0 arcsec aperture diameter)
z_2AperMag3	E	Default point source Z_2 aperture corrected mag (2.0 arcsec aperture diameter)
z_2AperMag3Err	E	Error in default point source Z_2 mag (2.0 arcsec aperture diameter)
z_2AperMag4	E	Point source Z_2 aperture corrected mag (2.8 arcsec aperture diameter)
z_2AperMag4Err	E	Error in point source Z_2 mag (2.8 arcsec aperture diameter)
z_2Gausig	E	RMS of axes of ellipse fit in Z_2
z_2Ell	E	1-b/a

z_2PA	E	ellipse fit celestial orientation in Z_2
z_2ErrBits	J	processing warning/error bitwise flags in Z_2
z_2AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Z_2
z_2Class	I	discrete image classification flag in Z_2
z_2ClassStat	E	S-Extractor classification statistic in Z_2
z_2ppErrBits	J	additional WFAU post-processing error bits in Z_2
z_2SeqNum	J	the running number of the Z_2 detection
z_2Xi	E	Offset of Z_2 detection from master position (+east/-west)
z_2Eta	E	Offset of Z_2 detection from master position (+north/-south)
y_1Mjd	D	Modified Julian Day in Y_1 band
y_1AperMag1	E	Point source Y_1 aperture corrected mag (1.0 arcsec aperture diameter)
y_1AperMag1Err	E	Error in point source Y_1 mag (1.0 arcsec aperture diameter)
y_1AperMag3	E	Default point source Y_1 aperture corrected mag (2.0 arcsec aperture diameter)
y_1AperMag3Err	E	Error in default point source Y_1 mag (2.0 arcsec aperture diameter)
y_1AperMag4	E	Point source Y_1 aperture corrected mag (2.8 arcsec aperture diameter)
y_1AperMag4Err	E	Error in point source Y_1 mag (2.8 arcsec aperture diameter)
y_1Gausig	E	RMS of axes of ellipse fit in Y_1
y_1Ell	E	1-b/a
y_1PA	E	ellipse fit celestial orientation in Y_1
y_1ErrBits	J	processing warning/error bitwise flags in Y_1
y_1AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Y_1
y_1Class	I	discrete image classification flag in Y_1
y_1ClassStat	E	S-Extractor classification statistic in Y_1
y_1ppErrBits	J	additional WFAU post-processing error bits in Y_1
y_1SeqNum	J	the running number of the Y_1 detection
y_1Xi	E	Offset of Y_1 detection from master position (+east/-west)
y_1Eta	E	Offset of Y_1 detection from master position (+north/-south)
y_2Mjd	D	Modified Julian Day in Y_2 band
y_2AperMag1	E	Point source Y_2 aperture corrected mag (1.0 arcsec aperture diameter)
y_2AperMag1Err	E	Error in point source Y_2 mag (1.0 arcsec aperture diameter)
y_2AperMag3	E	Default point source Y_2 aperture corrected mag (2.0 arcsec aperture diameter)
y_2AperMag3Err	E	Error in default point source Y_2 mag (2.0 arcsec aperture diameter)
y_2AperMag4	E	Point source Y_2 aperture corrected mag (2.8 arcsec aperture diameter)
y_2AperMag4Err	E	Error in point source Y_2 mag (2.8 arcsec aperture diameter)
y_2Gausig	E	RMS of axes of ellipse fit in Y_2
y_2Ell	E	1-b/a
y_2PA	E	ellipse fit celestial orientation in Y_2
y_2ErrBits	J	processing warning/error bitwise flags in Y_2

y_2AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Y_2
y_2Class	I	discrete image classification flag in Y_2
y_2ClassStat	E	S-Extractor classification statistic in Y_2
y_2ppErrBits	J	additional WFAU post-processing error bits in Y_2
y_2SeqNum	J	the running number of the Y_2 detection
y_2Xi	E	Offset of Y_2 detection from master position (+east/-west)
y_2Eta	E	Offset of Y_2 detection from master position (+north/-south)
j_1Mjd	D	Modified Julian Day in J_1 band
j_1AperMag1	E	Point source J_1 aperture corrected mag (1.0 arcsec aperture diameter)
j_1AperMag1Err	E	Error in point source J_1 mag (1.0 arcsec aperture diameter)
j_1AperMag3	E	Default point source J_1 aperture corrected mag (2.0 arcsec aperture diameter)
j_1AperMag3Err	E	Error in default point source J_1 mag (2.0 arcsec aperture diameter)
j_1AperMag4	E	Point source J_1 aperture corrected mag (2.8 arcsec aperture diameter)
j_1AperMag4Err	E	Error in point source J_1 mag (2.8 arcsec aperture diameter)
j_1Gausig	E	RMS of axes of ellipse fit in J_1
j_1Ell	E	1-b/a
j_1PA	E	ellipse fit celestial orientation in J_1
j_1ErrBits	J	processing warning/error bitwise flags in J_1
j_1AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) J_1
j_1Class	I	discrete image classification flag in J_1
j_1ClassStat	E	S-Extractor classification statistic in J_1
j_1ppErrBits	J	additional WFAU post-processing error bits in J_1
j_1SeqNum	J	the running number of the J_1 detection
j_1Xi	E	Offset of J_1 detection from master position (+east/-west)
j_1Eta	E	Offset of J_1 detection from master position (+north/-south)
j_2Mjd	D	Modified Julian Day in J_2 band
j_2AperMag1	E	Point source J_2 aperture corrected mag (1.0 arcsec aperture diameter)
j_2AperMag1Err	E	Error in point source J_2 mag (1.0 arcsec aperture diameter)
j_2AperMag3	E	Default point source J_2 aperture corrected mag (2.0 arcsec aperture diameter)
j_2AperMag3Err	E	Error in default point source J_2 mag (2.0 arcsec aperture diameter)
j_2AperMag4	E	Point source J_2 aperture corrected mag (2.8 arcsec aperture diameter)
j_2AperMag4Err	E	Error in point source J_2 mag (2.8 arcsec aperture diameter)
j_2Gausig	E	RMS of axes of ellipse fit in J_2
j_2Ell	E	1-b/a
j_2PA	E	ellipse fit celestial orientation in J_2
j_2ErrBits	J	processing warning/error bitwise flags in J_2
j_2AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) J_2
j_2Class	I	discrete image classification flag in J_2

j_2ClassStat	E	S-Extractor classification statistic in J_2
j_2ppErrBits	J	additional WFAU post-processing error bits in J_2
j_2SeqNum	J	the running number of the J_2 detection
j_2Xi	E	Offset of J_2 detection from master position (+east/-west)
j_2Eta	E	Offset of J_2 detection from master position (+north/-south)
h_1Mjd	D	Modified Julian Day in H_1 band
h_1AperMag1	E	Point source H_1 aperture corrected mag (1.0 arcsec aperture diameter)
h_1AperMag1Err	E	Error in point source H_1 mag (1.0 arcsec aperture diameter)
h_1AperMag3	E	Default point source H_1 aperture corrected mag (2.0 arcsec aperture diameter)
h_1AperMag3Err	E	Error in default point source H_1 mag (2.0 arcsec aperture diameter)
h_1AperMag4	E	Point source H_1 aperture corrected mag (2.8 arcsec aperture diameter)
h_1AperMag4Err	E	Error in point source H_1 mag (2.8 arcsec aperture diameter)
h_1Gausig	E	RMS of axes of ellipse fit in H_1
h_1Ell	E	1-b/a
h_1PA	E	ellipse fit celestial orientation in H_1
h_1ErrBits	J	processing warning/error bitwise flags in H_1
h_1AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) H_1
h_1Class	I	discrete image classification flag in H_1
h_1ClassStat	E	S-Extractor classification statistic in H_1
h_1ppErrBits	J	additional WFAU post-processing error bits in H_1
h_1SeqNum	J	the running number of the H_1 detection
h_1Xi	E	Offset of H_1 detection from master position (+east/-west)
h_1Eta	E	Offset of H_1 detection from master position (+north/-south)
h_2Mjd	D	Modified Julian Day in H_2 band
h_2AperMag1	E	Point source H_2 aperture corrected mag (1.0 arcsec aperture diameter)
h_2AperMag1Err	E	Error in point source H_2 mag (1.0 arcsec aperture diameter)
h_2AperMag3	E	Default point source H_2 aperture corrected mag (2.0 arcsec aperture diameter)
h_2AperMag3Err	E	Error in default point source H_2 mag (2.0 arcsec aperture diameter)
h_2AperMag4	E	Point source H_2 aperture corrected mag (2.8 arcsec aperture diameter)
h_2AperMag4Err	E	Error in point source H_2 mag (2.8 arcsec aperture diameter)
h_2Gausig	E	RMS of axes of ellipse fit in H_2
h_2Ell	E	1-b/a
h_2PA	E	ellipse fit celestial orientation in H_2
h_2ErrBits	J	processing warning/error bitwise flags in H_2
h_2AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) H_2
h_2Class	I	discrete image classification flag in H_2
h_2ClassStat	E	S-Extractor classification statistic in H_2
h_2ppErrBits	J	additional WFAU post-processing error bits in H_2

h_2SeqNum	J	the running number of the H_2 detection
h_2Xi	E	Offset of H_2 detection from master position (+east/-west)
h_2Eta	E	Offset of H_2 detection from master position (+north/-south)
ks_1Mjd	D	Modified Julian Day in Ks_1 band
ks_1AperMag1	E	Point source Ks_1 aperture corrected mag (1.0 arcsec aperture diameter)
ks_1AperMag1Err	E	Error in point source Ks_1 mag (1.0 arcsec aperture diameter)
ks_1AperMag3	E	Default point source Ks_1 aperture corrected mag (2.0 arcsec aperture diameter)
ks_1AperMag3Err	E	Error in default point source Ks_1 mag (2.0 arcsec aperture diameter)
ks_1AperMag4	E	Point source Ks_1 aperture corrected mag (2.8 arcsec aperture diameter)
ks_1AperMag4Err	E	Error in point source Ks_1 mag (2.8 arcsec aperture diameter)
ks_1Gausig	E	RMS of axes of ellipse fit in Ks_1
ks_1Ell	E	1-b/a
ks_1PA	E	ellipse fit celestial orientation in Ks_1
ks_1ErrBits	J	processing warning/error bitwise flags in Ks_1
ks_1AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Ks_1
ks_1Class	I	discrete image classification flag in Ks_1
ks_1ClassStat	E	S-Extractor classification statistic in Ks_1
ks_1ppErrBits	J	additional WFAU post-processing error bits in Ks_1
ks_1SeqNum	J	the running number of the Ks_1 detection
ks_1Xi	E	Offset of Ks_1 detection from master position (+east/-west)
ks_1Eta	E	Offset of Ks_1 detection from master position (+north/-south)
ks_2Mjd	D	Modified Julian Day in Ks_2 band
ks_2AperMag1	E	Point source Ks_2 aperture corrected mag (1.0 arcsec aperture diameter)
ks_2AperMag1Err	E	Error in point source Ks_2 mag (1.0 arcsec aperture diameter)
ks_2AperMag3	E	Default point source Ks_2 aperture corrected mag (2.0 arcsec aperture diameter)
ks_2AperMag3Err	E	Error in default point source Ks_2 mag (2.0 arcsec aperture diameter)
ks_2AperMag4	E	Point source Ks_2 aperture corrected mag (2.8 arcsec aperture diameter)
ks_2AperMag4Err	E	Error in point source Ks_2 mag (2.8 arcsec aperture diameter)
ks_2Gausig	E	RMS of axes of ellipse fit in Ks_2
ks_2Ell	E	1-b/a
ks_2PA	E	ellipse fit celestial orientation in Ks_2
ks_2ErrBits	J	processing warning/error bitwise flags in Ks_2
ks_2AverageConf	E	average confidence in 2 arcsec diameter default aperture (aper3) Ks_2
ks_2Class	I	discrete image classification flag in Ks_2
ks_2ClassStat	E	S-Extractor classification statistic in Ks_2
ks_2ppErrBits	J	additional WFAU post-processing error bits in Ks_2
ks_2SeqNum	J	the running number of the Ks_2 detection
ks_2Xi	E	Offset of Ks_2 detection from master position (+east/-west)

ks_2Eta	E	Offset of Ks_2 detection from master position (+north/-south)
VARFLAG	I	Classification of variability in this band
PRIMARY_SOURCE	B	Primary source 1

Acknowledgments

Please use the following statement in your articles when using these data: Based on data products from VVV Survey observations made with the VISTA telescope at the ESO Paranal Observatory under programme ID 179.B-2002.

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 Science Team Members listed at the VVV Survey webpage

http://vvvsurvey.org

- Photometric calibration papers

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