| | |
|---|---|
| **Data Collection** | VMC_MPHOT_Y |
| **Release Number** | 1 |
| **Data Provider** | Maria-Rosa Cioni |
| **Date** | 07.08.2012 |

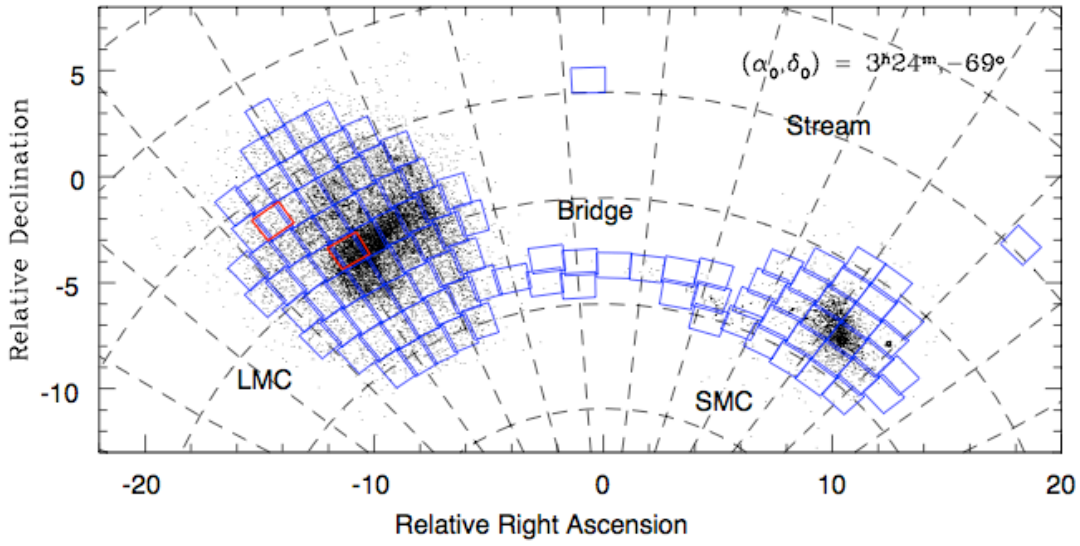
## Abstract

Observations were obtained with the VISTA telescope as part of the VISTA survey of the Magellanic Cloud system (VMC; ESO program 179.B-2003) in three filters: Y, J and Ks. The main goals of the VMC survey are the determination of the spatially resolved star formation history and the three-dimensional geometry of the Magellanic system. The sensitivity of the data is designed to reach sources below the oldest main-sequence turn off point of the stellar population and the multi-epochs to measure accurate Ks mean magnitudes for pulsating variable stars, e.g. RR Lyrae stars and Cepheids.

This catalogue data release refers to individual tile images for VMC tiles completed by end of September 2011. These are tiles LMC 6_6 (including the 30 Doradus star forming region) and LMC 8_8 (including the South Ecliptic Pole region). These images refer to at least three epochs in Y band. The total sky coverage of this release is ~3.5 deg$^2$ in the LMC.

## Overview of Observations

The figure below shows the Magellanic system as tiled by the VMC survey (blue) and tiles for which catalogues are released (red). Underlying small dots indicate the distribution of carbon stars, stellar clusters and associations.
Tile numbering begins from the bottom right corner, increasing from right to left and from bottom to right. The first LMC tile is 2_3, the first SMC tile is 2_2, the first Bridge tile is 1_2 and Stream tile 1_1 is right above the Bridge while 2_1 is to the right of the SMC.



# Release Content

This catalogue release covers two tiles in the Large Magellanic Cloud: LMC 6_6 and LMC 8_8.

LMC tiles were oriented with the Y axis more or less along the declination direction and cover about 1.771 deg$^2$ each where the central (1.475 x 1.017)=1.501 deg$^2$ corresponds to the nominal depth of the survey and the remaining area to half the exposure time in each band.

Tile centres, number of records, size in Mby and limiting magnitude corresponding to sources with photometric errors <0.1 mag are listed below.

| Tile | RA | Dec | Records | Mby | Y |
|---|---|---|---|---|---|
| LMC 6_6 | 05:37:40.008 | -69:22:18.120 | 3324876 | 269 | 20.0539 |
| LMC 8_8 | 05:59:23.136 | -66:20:28.680 | 1840622 | 149 | 20.5769 |

# Release Notes

The data for this release were prepared by the Cambridge Astronomy Survey Unit (CASU), the Wide Field Astronomy Unit (WFAU) and the VMC team.

The main processing steps are described in Hambly et al. (2008, MNRAS 384, 637) and Cross et al. (2009, MNRAS 399, 1730). Multi-epoch catalogues were extracted from individual tile images using the software suite provided by CASU (v1.1) and outgested from the VISTA Science Archive by WFAU using data in the VMCv20110909 release.

## Data Reduction and Calibration

The procedures to reduce and calibrate the data are described in detail at: http://casu.ast.cam.ac.uk/surveys-projects/vista/technical/data-processing.

In particular, catalogues were created from images that were filtered for nebulosity with size of the order of 30 arcsec (Irwin 2010, UKIRT Newsletter 26, 14).

The magnitudes were not corrected for reddening.

## Data Quality

The astrometric and photometric quality of the data is described in detail at *http://casu.ast.cam.ac.uk/surveys-projects/vista/technical*.

In addition, the quality error bit flags assigned during post processing are listed at *http://horus.roe.ac.uk/vsa/ppErrBits.html*. These flags refer to quality issues of varying severity such as it is a deblended source or it contains bad pixels in the default aperture. They also indicate if a source is located in the under-exposed area of a tile or in detector #16. They appear as ppErrBits in the catalogues and can be used to refine object samples.

## Known issues

These VISTA data may present the following issues, for which a full description is given in http://casu.ast.cam.ac.uk/surveys-projects/vista/technical/known-issues. A variable depth due to bad pixels in detectors #1, #4 and #16 as well as some bad rows. Point-like objects residuals of flatfielding, variable vignetting and spurious detections around bright stars. Some of these issues are recorded in the quality error bits flags assigned during post processing.

# Data Format

## Files Types

Multi-epoch source catalogues in Y, one per tile, are released:

vmc_er2_05h37-069d22_y_mPhot_558345748491.fits
vmc_er2_05h59-066d20_y_mPhot_558345748486.fits

where the name is constructed as project_release_ra/dec_band_typeofCat_framesetID.fits
and framesetID uniquely identifies the tile as follows:

558345748486 LMC 8_8
558345748491 LMC 6_6.

A MetaData file, vmc_er2_y_mPhotMetaData.fits, accompanies the release. Its name refers to project_release_band_typeofCat.fits.

## Catalogue Columns

Each epoch-merged and band-merged catalogue contains the following columns.

# Number; name; format; description
1; PHOT_ID; K; Unique identifier for epoch observation. Combination of source UID and detection UID
2; IAUNAME; 36A; Unique identifier in IAU naming convention
3; SOURCEID; K; UID of this merged detection
4; MJD; D; Modified Julian Day in Y band
5; YMAG; E; Default point/extended source Y aperture corrected mag (2.0 arcsec aperture diameter)
6; YERR; E; Error in default point/extended source Y mag (2.0 arcsec aperture diameter)
7; YPPERRBITS; J; additional WFAU post-processing error bits in Y
8; RA2000; D; Celestial Right Ascension
9; DEC2000; D; Celestial Declination

The format refers to the fits notation as follows:
A - string 32 characters; D - double floating point (8 bytes); E - real floating point (4 bytes); I - short integer (2 bytes); J - integer (4 bytes); K - long integer (8 bytes).

# Acknowledgements

Please reference Cioni et al. 2011, A&A, 527, A116 and use the following statement in your articles when using these data: Based on data products from observations made with ESO Telescopes at the La Silla Paranal Observatory under programme ID 179.B-2003.