RevMexAA (Serie de Conferencias), **40**, 267–267 (2011)

VVV POINTED SEARCH FOR NEW GALACTIC OPEN CLUSTERS

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We are reporting the discovery of 96 new infrared open clusters and stellar groups, found using in the disk area of the "VVV-Vista Variables in the Via Lactea" ESO Large Survey. Our search focused on the directions of known star formation regions, masers, radio and infrared sources.

VISTA Variables in the Via Lactea (VVV) is one of the six ESO Public Surveys operating on the new 4 meter Visible and Infrared Survey Telescope for Astronomy (VISTA). VVV is scanning the Milky Way (MW) bulge and an adjacent section of the disk, where star formation activity is high (Minniti et al. 2010; Saito et al. 2010). One of the principal goals of the VVV Survey is to find new star clusters of different ages.

For observational purposes, the VVV disk area is divided into 152 fields (tiles), each one covering 1:64 deg^2. We anticipated that our candidate clusters would be relatively faint and heavy reddened, given they had not been discovered in 2MASS, DENIS or GLIPMSE. We first retrieved the pipeline processed and calibrated Z, Y, J, H, K_S images from the Cambridge Astronomical Survey Unit (CASU VIRCAM pipeline v1.0; Irwin et al. 2004) and visually inspected the K_S-band tile images for stellar overdensities. Subsequently, we examined the composite J, H, K_S and Z, J, K_S color images of each candidate. Prior to constructing color-magnitude diagrams, we selected star cluster candidates if they: appeared compact, stood out well above the surrounding field and contained at least 10 candidate members with similar colors. As a result, we identified 96 new star cluster candidates. Typical examples are shown in Figure 1.

PSF photometry of 15×15 arcmin fields centred on the candidates was than performed on the VISTA Science Archive (VSA) reduced images. After the statistical field-star decontamination (Bonatto & Bica 2010), the color-magnitude and color-color diagrams were constructed and analyzed. For well populated cluster candidates we estimated the fundamental parameters (reddening, distance and age), by fitting the solar-metallicity Padova isochrones (Girardi et al. 2010) and the isochrones of Siess et al. (2000) for the pre-main sequence (PMS) stars. We estimate that more than 80% of the newly discovered clusters are younger than 5 Myr.

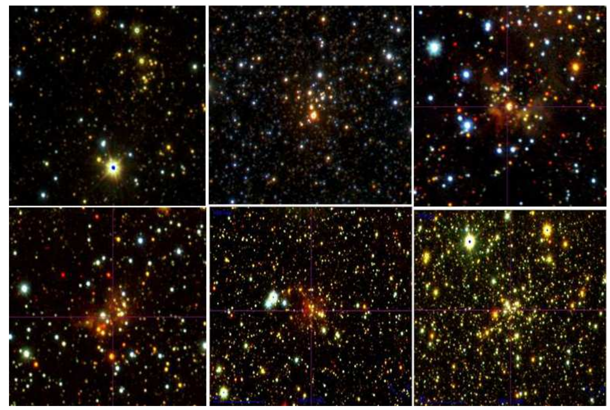

Fig. 1. The VVV J, H, K_S composite color images of typical VVV open cluster candidates. The field of view is 2.2×1.8 arcmin. North is up, East to the left.

JB is supported by FONDECYT No.1080086. JB, JC and SES are supported by MIDEPLAN ICM Nucleus P07-021-F. JC is supported by GEMINI-CONICYT FUND No.32090002. ANC received support from Comitee Mixto ESO-GOBIERNO DE CHILE and BASAL Center for Astrophysics and Associated Technologies PFB-06. The VVV Survey is supported by ESO, by BASAL Center for Astrophysics and Associated Technologies PFB-06, by FONDAP Center for Astrophysics 15010003, and by MIDEPLAN's Milky Way Millennium Nucleus P07-021-F.

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