A DENIS SURVEY OF STAR FORMING REGIONS

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1. Introduction

A complete census of embedded stellar population can be made by exploring in the infrared large areas of the sky in which giant molecular clouds extend. Very recently, thanks to the of large format IR array detectors, studies of young stellar population in GMCs, have been undertaken by different authors (*i.e.*, Lada *et al.* 1991) but all these observations were limited to relatively small regions of the whole GMCs, the DENIS project (Epchtein, this volume, p. 106) surveys the south hemisphere at I, J and K_s bands, including most of these clouds.

2. Orion A

The Orion molecular cloud complex is the best studied GMC of our Galaxy, given its short distance (D=450 pc; *e.g.*, Genzel & Stutzki 1989). During the proto-survey period, the DENIS instrument has observed this well-known cloud at J and K_s band.

2.1. OBSERVATIONS AND RESULTS

The observations of the region were made in february 1995 using the DENIS standard procedure (Epchtein *et al.* 1994). For the purpose of this study, 6 "DENIS strips" were used to cover the 3 square degrees around the Trapezium. The data reduction and the source extraction method is presented in more details in Copet *et al.* (in preparation).

We estimate the completeness limit of our sample at 15.6 and 13.8 at J and K_s band, respectively. The number of sources extracted above the completeness limit are 7032 at K_s and 7621 at J. The spatial distribution of the stars detected at the K_s band is presented in Figure 1. The J and K_s

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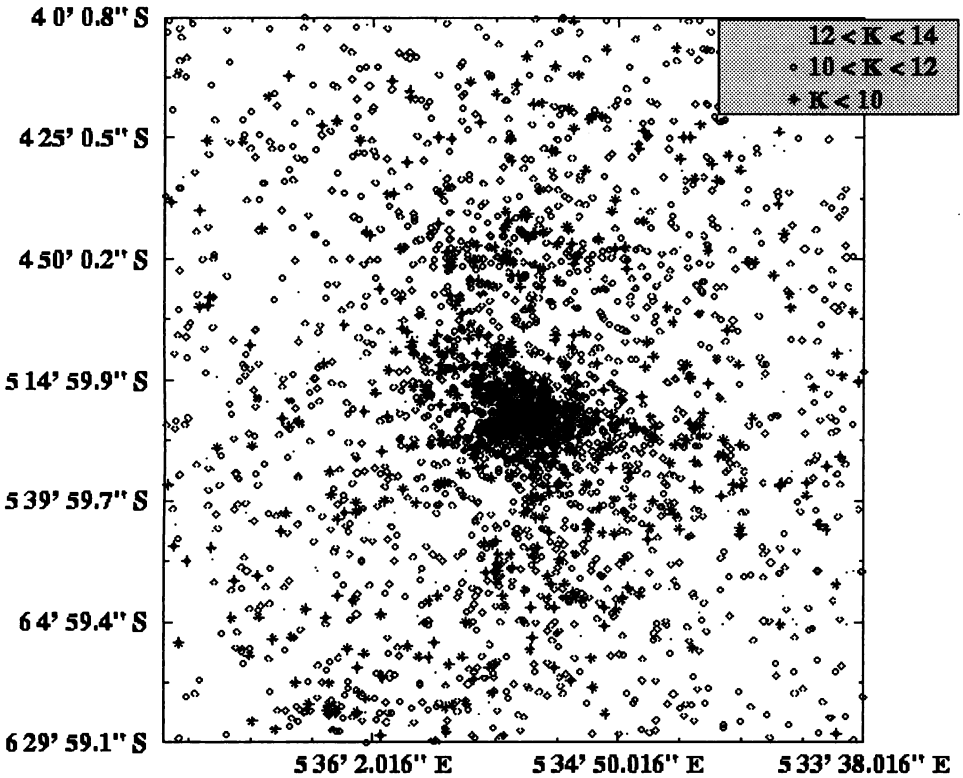

Figure 1. Spatial distribution of the sources detected at K_s band according 3 ranges of magnitude. The equinox of the coordinates is 2000.0

luminosity functions (not shown) present a clear excess of high luminosity stars in the vicinity of the Trapezium. The (J−K) color of the stars follows the CO density distribution, but some very red objects (J−K > 3) could be found far away the CO density peaks.

Using a molecular CS survey of this region (Tatematsu *et al.* 1993) and correlating our catalog with the CS peaks location, we have detected inside the CS cores 114 sources at J and 906 sources, in the K_s band. Probably as only 10 % of these sources are associated with the cores, then, usually rich clusters of embedded objects are not observed.

3. Chamaeleon

The Chamaeleon region has been mapped at several wavelengths: IR (Gauvin *et al.* 1992), X (Huenemoerder *et al.* 1994). The DENIS project has

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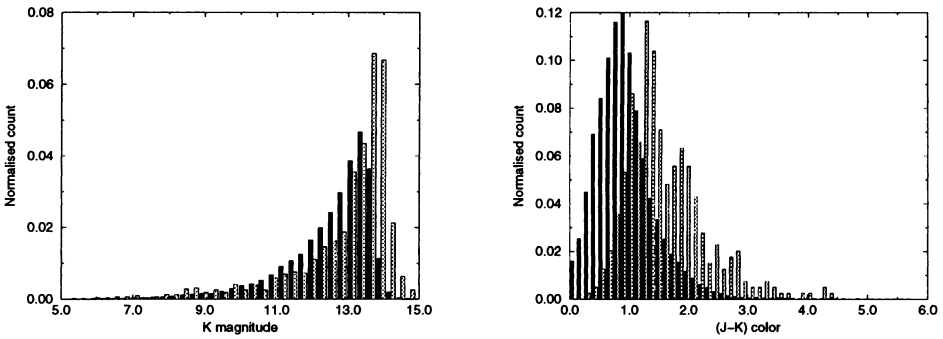

Figure 2. Histograms obtained with the DENIS data in the Chamaeleon region. The left side presents the K luminosity function in the Cha I region (grey bars) while the right side represents the distribution of the (J−K) color in the same area. The black bars are the distribution derived from a 30 degree long strip for comparison. The counts are normalised to unity.

already surveyed a large area on the Cha I and Cha II clouds in the J and K_s bands. We present in Figure 2 the luminosity function and the color histogram for the Cha I region. The number of K_s sources detected in this region is around 3000.
We note a very faint stellar population in the Cha I cloud (K>14) close to our detection limit and an excess of reddenning, but with only one color, we cannot disentangle between an intrinsic reddenning of the star or an extinction due to the cloud material.

4. Conclusion

The preliminary results on these two star-forming regions show that the nominal performances of the instrument are reached. The comparison with ISOCAM data (Kaas A.A., *private communication*; Nordh *et al.* 1996) shows a good correlation between the stellar population detected in the Near and Far infrared bands and provide an excellent base to study these kind of regions at higher sensitivity.

References

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