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IR IMAGES OF N159 IN THE LMC

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RESUMEN. Se obtuvieron imágenes en las bandas J, H, y K, del cercano infrarrojo de la región de gas ionizado N159 en la Nube Grande de Magallanes.
En un área de 10 minutos de arco cuadrado se detectaron alrededor de 50 fuentes infrarrojas. Esta región parece ser una zona de activa formación de estrellas asociada a un gran complejo molecular, y posiblemente coincida con una de las nubes de CO que conforman este complejo.

ABSTRACT. We obtained near infrared images in J, H, and K, filters of the HII region N159 in the LMC with the IR Imager on the 1.5m telescope of CTIO.
Some 50 sources are detected in an area of roughly 10 arc min squared. The region seems to be a site of active star formation associated to a large molecular complex and possibly coincides with one or the CO clouds which forms the molecular complex.

Key words: GALAXIES-MAGELLANIC CLOUDS — INFRARED PHOTOMETRY — INTERSTELLAR-H II REGIONS

In an attempt to investigate the associated young population to molecular clouds in the Large Magellanic Cloud (LMC), we have performed a near-infrared survey of the HII region N159 (Henize 1956). This region is a site of active star formation possibly associated with a large molecular cloud complex (Cohen et al 1988), which contains several CO clouds.

We observed two molecular clouds, Cloud 1 and Cloud 2, identified from high angular CO observations done in the N159 region (Johansson et al. 1989). Cloud 1, is the molecular cloud with the strongest CO emission in the LMC and lies 5 arcmin south of N159. Cloud 2 lies 1 arcmin east of N159 and is the nearest CO cloud to the optical HII position.

The observations were carried out during November 1988 on the 1.5m telescope at Cerro Tololo Interamerican Observatory with the 58x62 InSb infrared array. Images in the J, H, and K band were obtained in the following way: all on-object images obtained had nearby sky-images taken sequentially. The images were corrected for a small alinearity of the detector and then subtracted for sky and background emission. A mosaic of 8 images in the three bands was obtained for Cloud 1 centered at the CO peak position (ALFA= 5:40:20.4 DEC= -69:52:50 1950.0). For Cloud 2, a mosaic of two images centered at ALFA= 5:40:01 DEC= -69:47:30 (1950.0), in each band was obtained. All the images were processed using the IRAF software package at the Universidad de Chile, Astronomy Department Image Computing facilities.

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We have found about 17 IR sources in Cloud 1 and 15 IR sources in Cloud 2. These sources have been identified in the J, H, and K, images using the FIND algorith of DAOPHOT package (Stetson, 1987) and also by visual inspection of the images. Once the sources were identified for each cloud we obtained the photometry using the same software package. The IR photometry of these sources will be published elsewhere (Rubio and Roth 1990).

The preliminary results of this study indicate that Cloud 1 and Cloud 2 show very different IR properties. The photometry obtained shows that in Cloud 1 we find a number of reddened sources but without any indication of dust emission. On the other hand, Cloud 2 presents 5 of possibly 6 sources whose IR colors are typical of re-emission by dust. In this cloud IR extended emission is seen surrounding a compact infrared cluster containing 4 or 5 sources. In this region, Jones et al.(1986) detected a so called "protostar" which is most possibly associated to one of the sources member of this cluster. Star formation seems to be active in this cloud. Cloud 1, although is the strongest CO cloud, seems to be a quiescent cloud in terms of star formation. The IR sources in this region correspond almost certainly to evolved red supergiants.

Rubio et al (1990) found in the SMC the presence of what seems to be "active and quiescent CO clouds" in terms of star formation. The clouds discussed in this work display similar properties. Although further work is needed, we can think of two possibilities: either "quiescent clouds" are made up of a large number of clumpy knots which do not form stars yet or, alternatively, the extinction towards these centers is too high to allow the detection of the young clusters that could be embedded in them at near infrared wavelengths.

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