RevMexAA (Serie de Conferencias), **33**, 161–161 (2008)

A ^{12}CO (J=1→0) STUDY TOWARDS THE STAR FORMING REGIONS RCW 121 AND RCW 122

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Using NANTEN ^{12}CO (J=1→0) observations (HPBW = 2′.7), we found a molecular cloud associated with the star forming regions RCW 121 and RCW 122. Kinematical properties, large scale distribution, and physical parameters were determined. Both RCW 121 and RCW 122, have very strong IR counterparts. New radiocontinuum fluxes determinations indicate that RCW 121 and RCW 122 are thermal in nature.

RCW 121 and RCW 122 were first noticed in the catalogue of Hα-emission regions in the Southern Milky Way (Rodgers et al. 1960). They appear as relatively strong sources at several radiocontinuum frequencies (Beard, Maca Thomas, & Day 1969). A molecular study (CO(J=1→0)) was first made by Gillespie et al. (1979) over an area of 0.5 square degrees towards RCW 122. They found a peak of CO emission coincident with the radio continuum peak of RCW 122 as observed by Shaver & Goss (1970). The extended CO emission towards RCW 122 spands the range −16.5 to −9 kms^{-1} (LSR).

Using NANTEN ^{12}CO (J=1→0) observations (HPBW = 2′.7), we studied the molecular material over an area of 1.5 square degrees towards RCW 121 and RCW 122. We found a molecular cloud in the velocity range of −23 to −7 km sec^{-1} (LSR) associated with RCW 121 and RCW 122. This in turn may indicate a physical link between these two star forming regions. This velocity range is in very good agreement with previous molecular and radiorecombination line studies (McGee & Newton 1981; Caswell & Haynes 1987; Bronfman et al. 1996) carried out towards the radiocontinuum peaks of RCW 121 and RCW 122. Adopting a distance of 5 kpc (Radhakrishnan et al. 1972), the amount of molecular gas associated with RCW 121 and RCW 122 is $4{\times}10^4 M_\odot$ and $1{\times}10^5 M_\odot$ respectively.

Both RCW 121 and RCW 122 have very strong IR counterparts (IRIS and MSX). They have an excellent morphological correspondence with the distribution of the molecular gas (Figure 1).

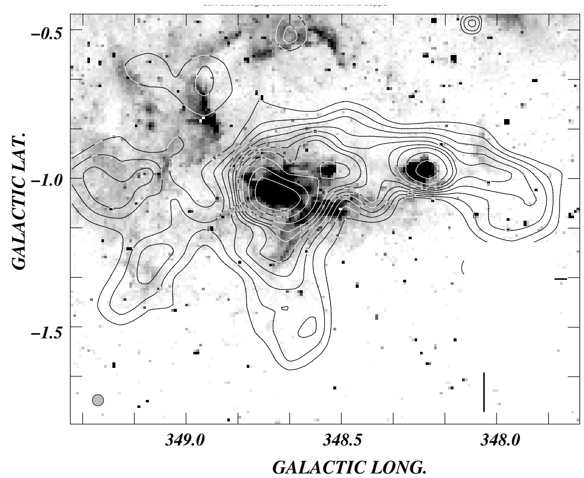

Fig. 1. Overlay of CO emission (contours) along the velocity range −23 to −7 km s^{-1} and MSX A (8.1μm) emission (grey scale). The beam size of the CO observations is shown by a shaded circle in the lower left corner.

New radiocontinuum flux determinations at 2.41, 5.0, 8.35 and 14.35 GHz allowed us to determine an spectral index of −0.12±0.01 and 0.01±0.02 for RCW 121 and RCW 122, respectively, which indicate the thermal nature of the emission.

Near infrared photometry obtained from the 2MASS catalogue reveals the presence of several infrared sources with excess infrared emission coincident with RCW 122.

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