**Abstract:** The properties of molecular clouds associated with 10 H II regions were studied using CO observations. We identified 142 dense clumps within our sample and measured and calculated physical properties of the clumps such as size, excitation temperature, line widths, density, and mass. We found that our sources are divided into two categories: those that show a power law size-line width relation ("type I") and those which do not show any relation ("type II"). Type I sources in our study have larger power law indices compared to previous studies. Type II sources also have larger line widths compared to type I. We also have examined the relation between other physical parameters such as density and excitation temperature and distance from the H II region. It seems that while the clumps within clouds have been warmed up by the radiation from the exciting star and H II region, the internal dynamics of the environment has not been much affected beyond the layers collected around expanding ionized gas. We conclude that massive star forming regions have larger line widths than lower mass star forming regions and these large line widths are present before the massive stars formed.

**Size-Line width relationship**

We investigated the size-line width relation for our sources using both $^{13}$CO (J=1-0) and $^{12}$CO(2-1) emission lines and calculated effective radius. Our sources are divided into two categories: those which show a power law relation and those which do not show any size-line width relation. We labeled the first group of six sources as type I and the other four sources with no relation as type II. Type II sources have larger line widths in general.

The power law indices derived for size-line width relation in type I sources are relatively larger than the previous studies, but they are not affected by the exciting star or the ionized gas. We may conclude that larger line widths and consequently larger indices are possibly the initial conditions of the massive star forming clouds.

**Temperature vs. normalized distance from H II region**

We expect clumps to be warmed by the radiation from the exciting star and to show a trend of decreasing temperature with distance from the H II region. The fact that we cannot see this relationship for all clouds might be due to internal heating sources within the clumps such as proto-stars (for example C4 and C8 in S330; noted in the top panel).

We check the effect of distance projection by numerically simulating randomly distributed clumps with heating from an external source. Bottom panel shows the simulated temperature variation from a heating source with similar physical conditions as our cloud samples with different luminosity decrease power law index, $\alpha$.

**Line Width vs. normalized distance from H II region**

Line width vs. normalized distance from H II region are shown for $\Delta V_{\text{int}}$ (top) and $\Delta V_{\text{vir}}$ (bottom). The line widths for the clumps within collected shells around H II regions are slightly larger, but no relation was found between $\Delta V_{\text{int}}$ and $\Delta V_{\text{vir}}$ and normalized distance from the H II region. The expansion of the ionized gas affects the internal dynamics of the collected mass but these effects do not go beyond the shells. The plots of $\Delta V$ versus normalized distance are very scattered for both type I and type II regions, even for those sources in which temperature increases by distance.

If the line profiles are not much affected by the H II region and the exciting star, then the observed large line widths are more probable to be a part of the initial characteristics of the cloud which already have formed at least one massive star.

**Column density and volume density vs. clump size**

We found no relation between the column density and size for our sources (top panels, type I right and type II left). We also investigated the relation between velocity integrated volume density and size. There is a weak relation for some individual sources such as S175A and S175B but, in total, the volume density decreases as size increases.

These results may be due to the fact that the smaller clumps are more evolved. The gas is more collapsed to the centre and therefore these clumps have smaller size with larger volume density. This also explains the lack of a relation between size and column density.

**M$\text{LTE}$ Line width relationship**

Local Thermodynamic Equilibrium (LTE) mass, $M_{\text{LTE}}$, vs. $\Delta V_{\text{vir}}$ for type I (top) and type II (bottom) sources. The dashed line is the least-squares fit with the slope of 4.2, the same as the $M_{\text{LTE}}$ vs. $\Delta V_{\text{vir}}$ plot (not shown here). Similar to $^{13}$CO(2-1), no relation is found between $M_{\text{LTE}}$ and $\Delta V_{\text{vir}}$ for type II sources.

$M_{\text{LTE}}$ is calculated only based on the observed $^{13}$CO(2-1) and $^{12}$CO(2-1) brightest temperatures and independent of internal dynamics. It may indicate that he clumps in type I regions are in Virial equilibrium and as the Virial mass, the LTE mass also increases with the line width.

**Equilibrium State of the Clumps**

For most of the clumps Virial masses is larger compared to velocity integrated (X factor) or LTE mass, indicating that most of our clumps are probably not gravitationally stable; although more massive clumps tend to be closer to Virial equilibrium. For most of the clumps, $M_{\text{vir}}$ is also higher than the $M_{\text{LTE}}$ but mostly below the line of the $M_{\text{vir}} = 10 M_{\odot}$, similar to $M_{\text{LTE}}$. $M_{\text{vir}}$ tends to be equal to $M_{\text{LTE}}$ for higher masses.

Similar to $M_{\text{LTE}}$, clumps have larger $M_{\text{vir}}$ for low mass clumps. At approximately $M = 100 M_{\odot}$, $M_{\text{LTE}} < M_{\text{vir}}$. We may conclude that the larger clouds are gravitationally bound but the fragmented smaller clumps within them are not in Virial equilibrium.

**CO(2-1) maps of molecular clouds associated with a sample of 10 H II regions.** The green curves show the visible boundary of the ionized gas.