

Z202a Tracing the evolution of GMCs in the LMC with CO (2-1) ALMA observations

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Giant Molecular Clouds (GMCs) are known to form massive stars together with a huge number of low-mass stars, regulating the evolution of a galaxy. The Large Magellanic Cloud (LMC) is the nearest neighbor to the Milky Way at 50 kpc. Its nearly face-on view allows us to unambiguously identify young objects associated with GMCs over a galaxy. This makes the LMC one of the most suitable targets to study the ISM and star formation in details over an entire galaxy, making it possible to gather information about GMCs at various evolutionary stages. Based on our previous ALMA observations of GMCs in different evolutionary stages in $^{13}\text{CO}(1-0)$, we have found that the GMCs are dominated by filamentary/clumpy structures. The evolution leads to more prominent filaments. The size-linewidth relation does not show significant difference for the evolutionary stages. As a follow-up project we observed three GMCs in different evolutionary stages with three times higher resolution ($\sim 1''$) in ^{12}CO and $^{13}\text{CO}(2-1)$. The typical rms is $\sim 0.4\text{ K}$ at a velocity resolution of 0.5 km/s . We resolved a more detailed spatial distribution of the CO gas and we have found that the typical width of the filaments is 0.4 pc . The ratio of $^{13}\text{CO}(2-1)/(1-0)$ is ~ 0.8 which is higher than that in the Orion molecular cloud (Nishimura et al. 2015). The high ratio indicates warm and / or dense emitting region.