Poster: Dense Molecular Cloud Core in the Galactic Center 50 km/s Molecular Cloud

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The Galactic Center (GC) 50 km/s Molecular Cloud (50MC) is a most remarkable molecular cloud in the Sagittarius A region and appears to include several compact HII regions. This cloud is a candidate for the massive star formation induced by cloud-cloud collision (CCC) from the difference of the core mass function (CMF) of the molecular cloud cores identified by the CS (J=1-0) emission line in the previous work. We observed the whole of the 50MC with a high angular resolution ($\sim$1.5″x1.5″) in ALMA cycle1 using the H13CO+ J=1-0 and C34S J=2-1 emission lines data. As a result, we confirmed the half-shell-like shock structure of the high R_T=T(SiO J=2-1)/T(H13CO+ J=1-0) from our data which is considered as a feature of CCC. Additionally, we identified 3293 and 3192 dense cores from the H13CO+ J=1-0 and C34S J=2-1 maps using the clumpfind algorithm, respectively. We found that almost all the dense cores in the 50MC are not bound by self-gravity, and are likely bound by the external pressure of the ambient turbulent gas with a density of $\sim 2.3\times10^4$cc and a velocity dispersion of $\sim$17km/s. The gravitationally bound H13CO+ and C34S cores with the virial parameter less than 3 is 7.0%(=231/3293) and 0.7%(=23/3192) of all the identified cores, respectively. Furthermore, the ratio of the bound H13CO+ and C34S cores to all the cores in the CCC region is 12.5%(=127/1015) and 2.8%(=22/772), while that in the non-CCC region 4.6%(=104/2266) and 0.04%(=1/2420), respectively. On the other hand, the slope of the CMF in the CCC region is not significantly different from that in the non-CCC region.It is concluded that the CCC efficiently formed massive bound cores even if the slope of the CMF is not changed so much by the CCC.

Molecular Clouds