Evolutionary Picture of **Giant Molecular Cloud Mass Functions** on Galactic Scales

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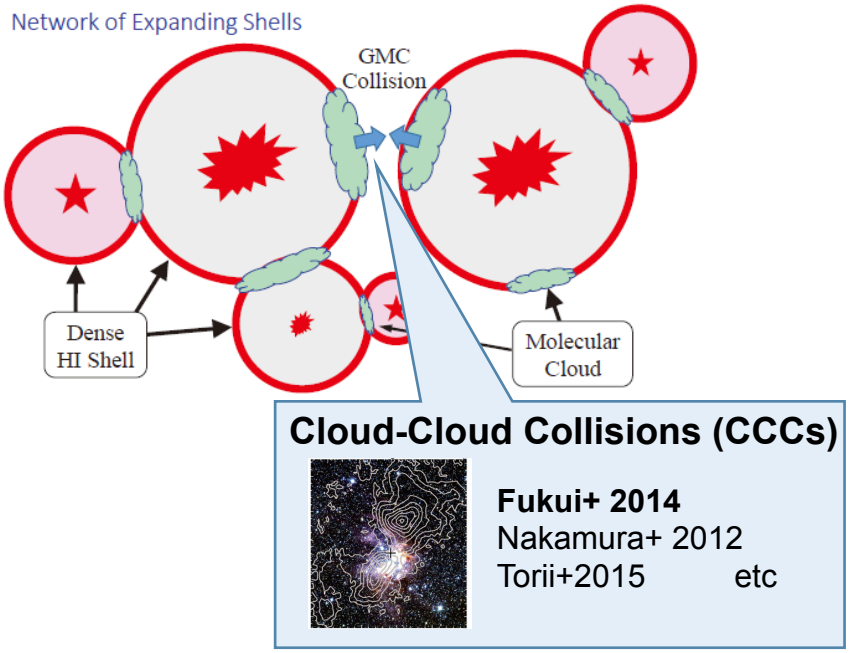
1) Inutsuka+ 2015

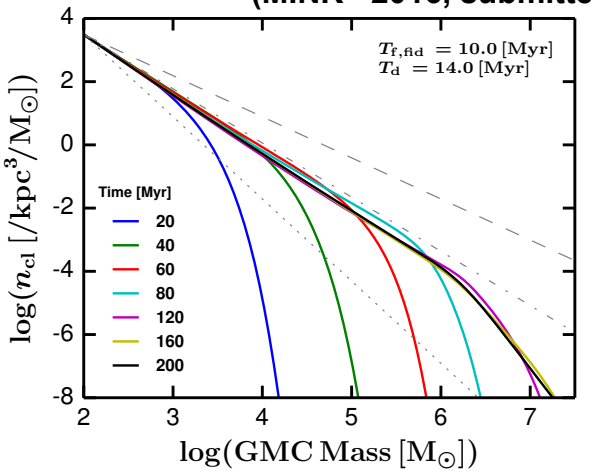


2) Formulate **coagulation equation** of GMC Mass Function

$$\frac{\partial n_{\rm cl}}{\partial t}+\frac{\partial}{\partial m}\left(n_{\rm cl}\frac{{\rm d}m}{{\rm d}t}\right)=-\frac{n_{\rm cl}}{T_{\rm d}}+\frac{1}{2}\int_0^\infty\int_0^\infty K(m_1,m_2)n_{{\rm cl},1}n_{{\rm cl},2}\times\delta(m-m_1-m_2){\rm d}m_1{\rm d}m_2-\int_0^\infty K(m,m_2)n_{\rm cl}n_{{\rm cl},2}{\rm d}m_2$$

3) Successfully **reproduce observed variation** of GMC mass functions.

(MINK+ 2016, submitted)



4) Observations may **put unique constraints on GMC formation/dispersal timescales** by observing the mass function slope.

Steady State Solution

$$n_{\rm cl}(m)=\frac{N_0}{M_\odot}\left(\frac{m}{M_\odot}\right)^{-1-\frac{T_{\rm f}}{T_{\rm d}}}$$

⇨ **The CCC effect is limited only in the massive end of GMC mass functions.**