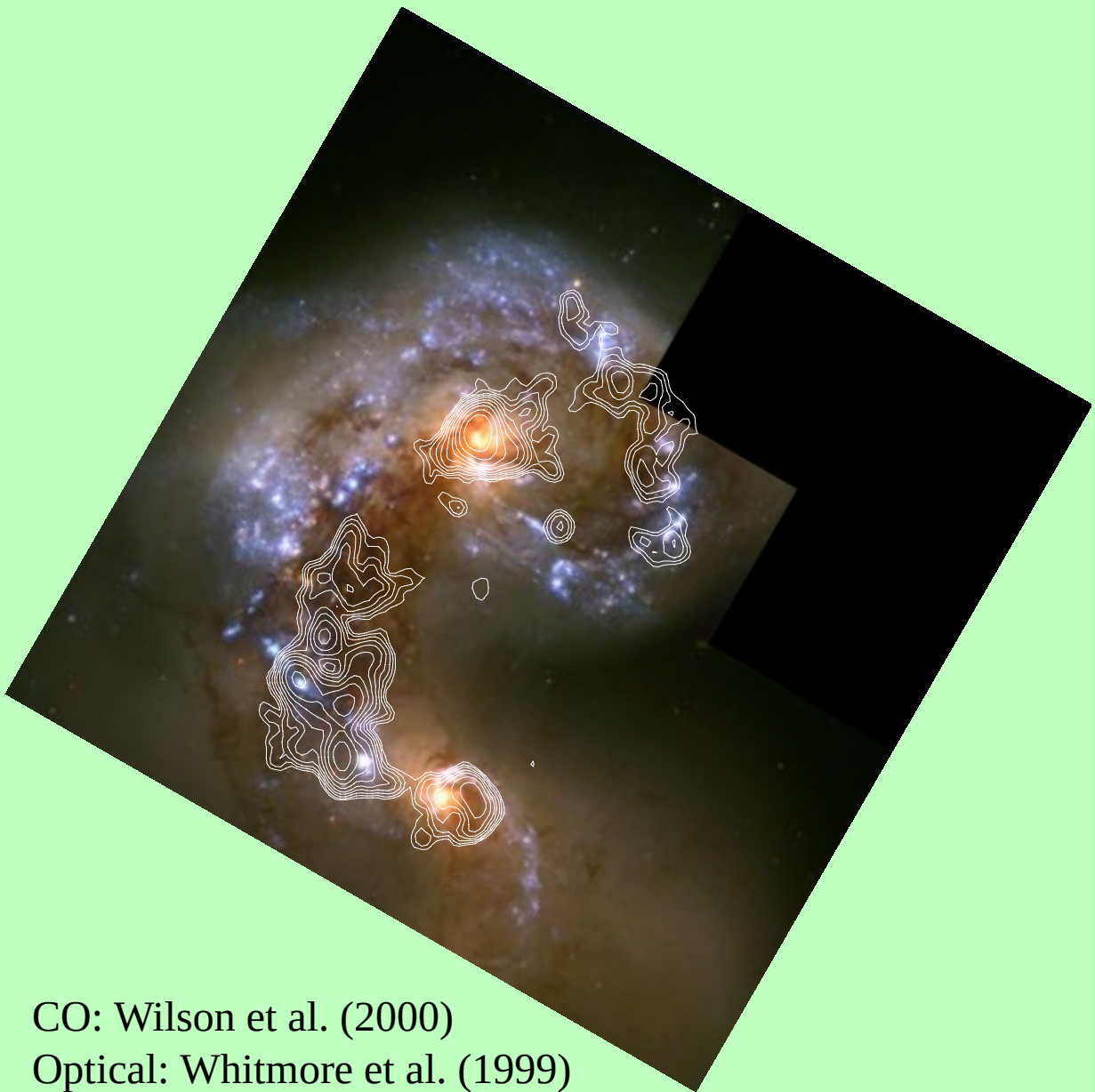


The Mass Function of Supergiant Molecular Complexes in the Antennae (NGC4038/39)

C. Wilson, N. Scoville, S. Madden, V. Charmandaris

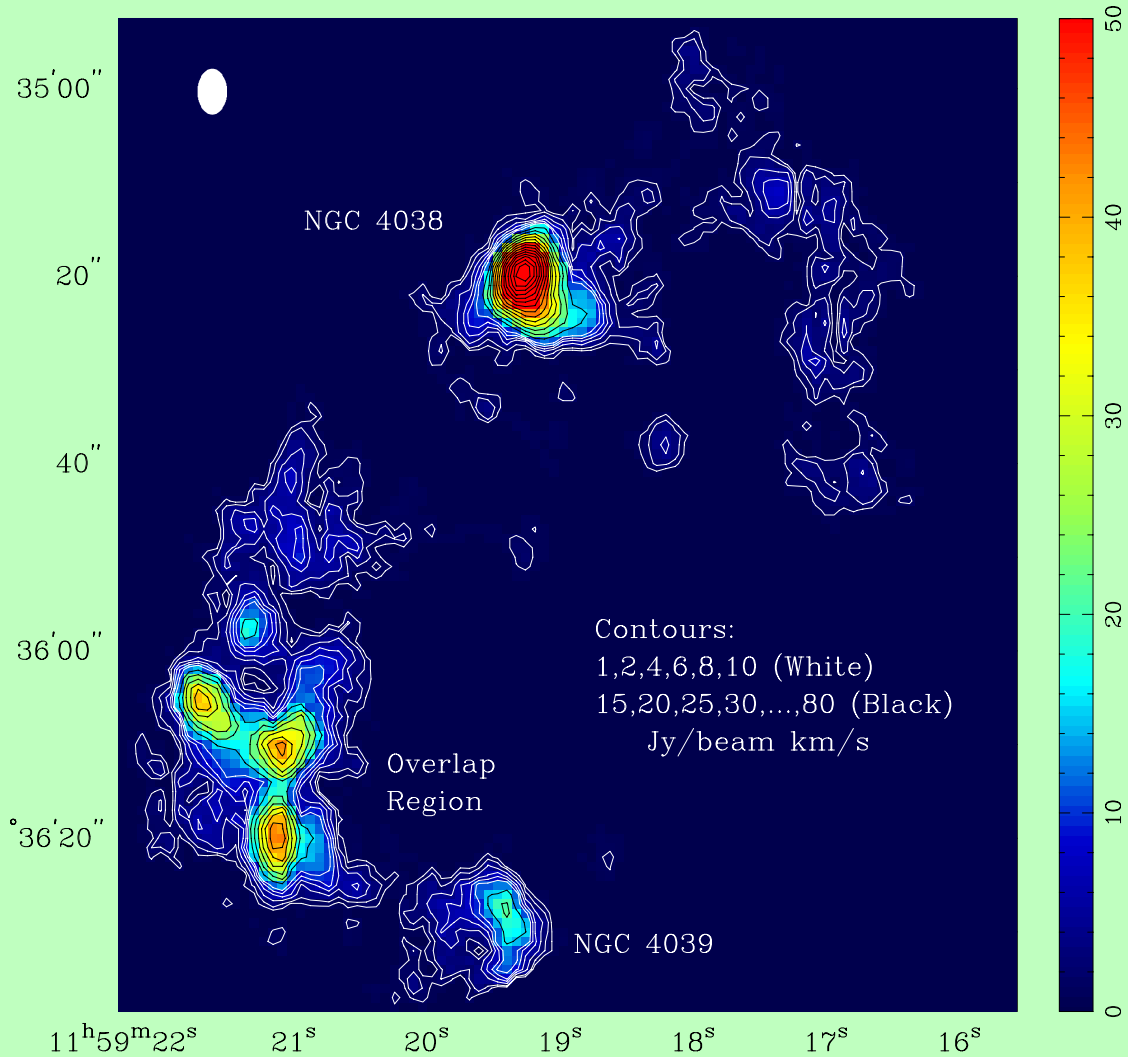


CO: Wilson et al. (2000)

Optical: Whitmore et al. (1999)

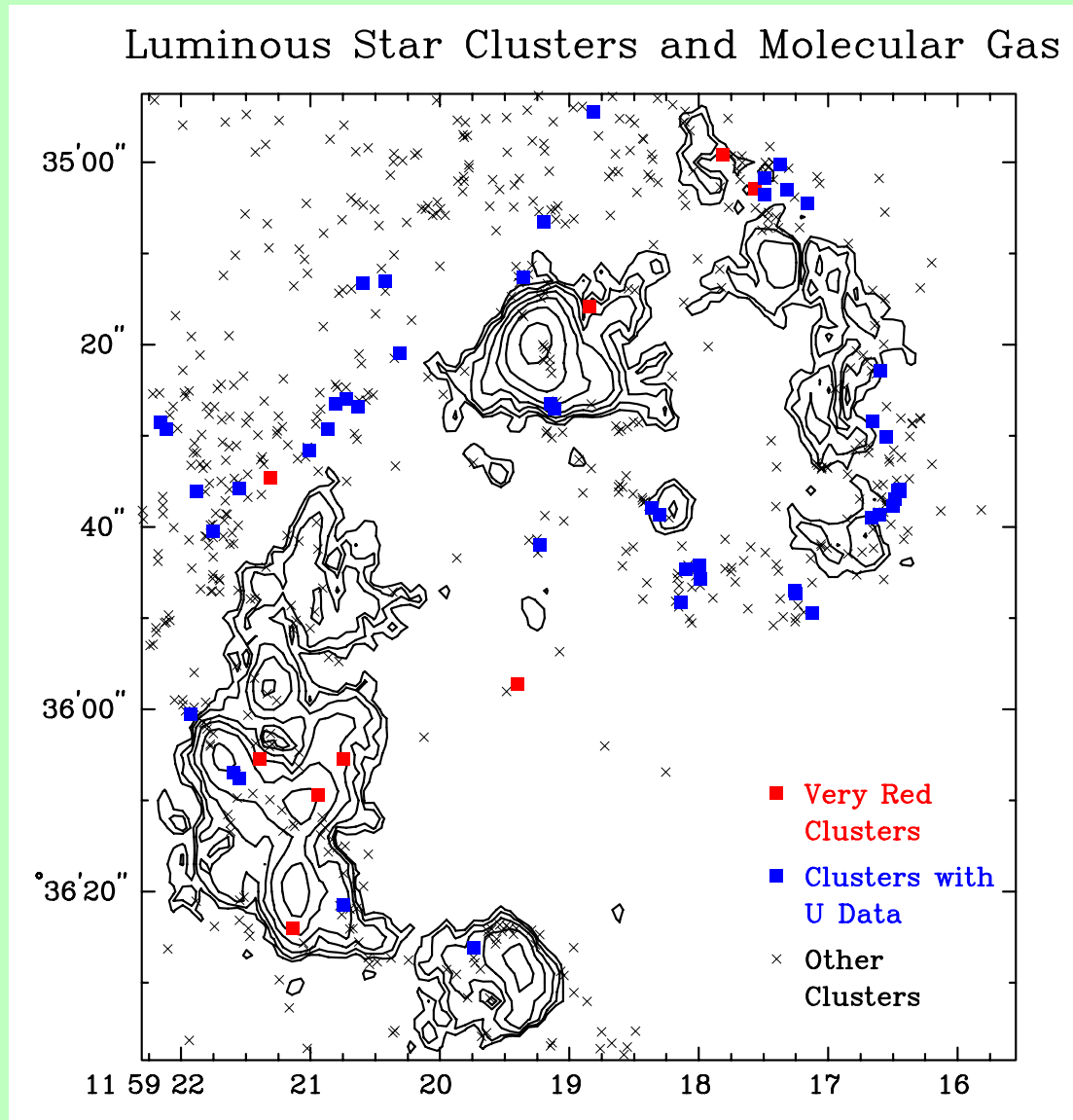
CO J=1-0 Emission from the Antennae

CO Integrated Intensity



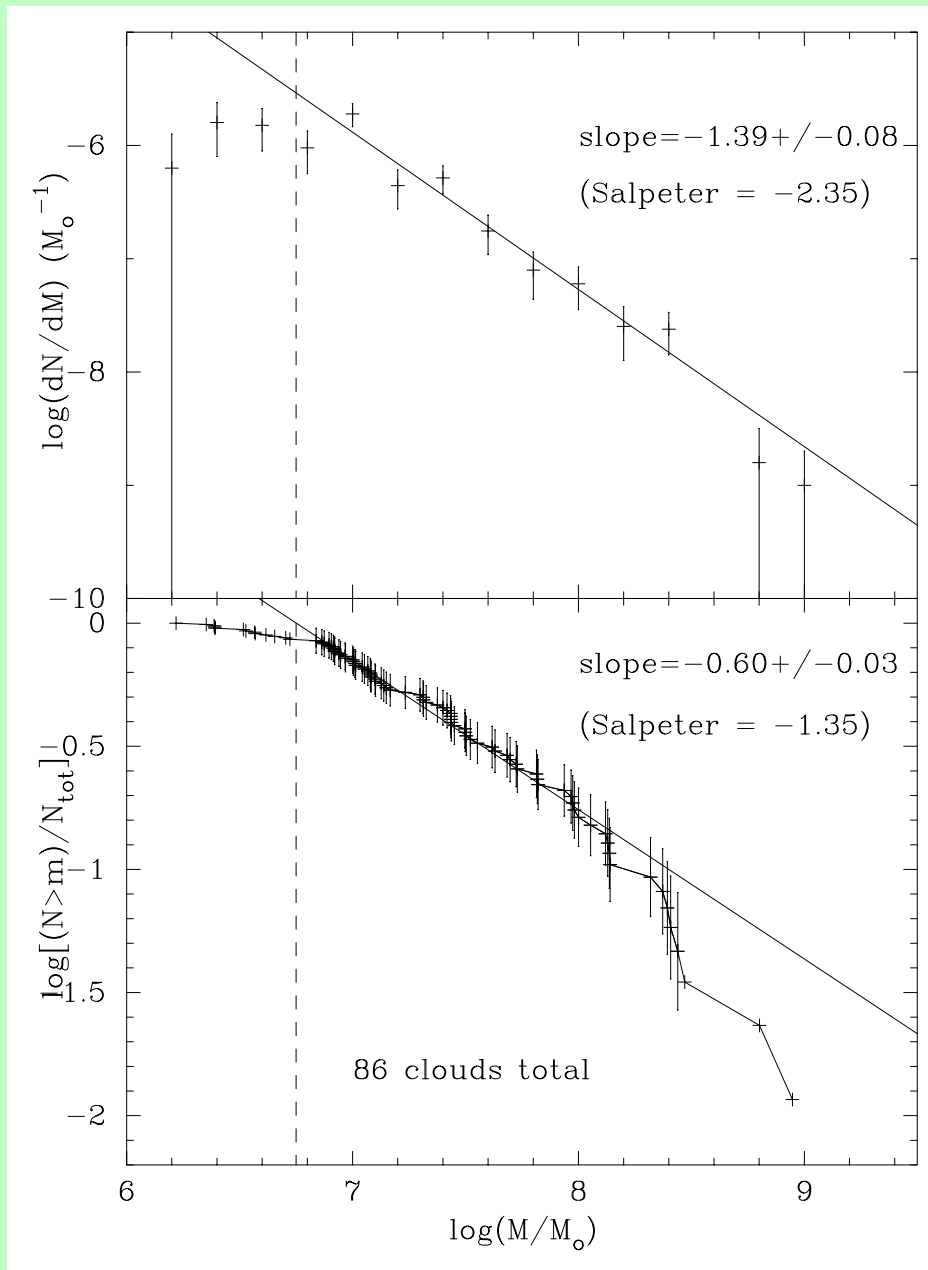
- 3x5'' (300x500 pc) resolution
- 0.055 Jy/beam (0.33 K) rms
- 5.2 km/s (2 MHz) resolution
- 79 kpc² area imaged (Wilson et al. 2000)

Comparing Molecular Gas and Star Clusters



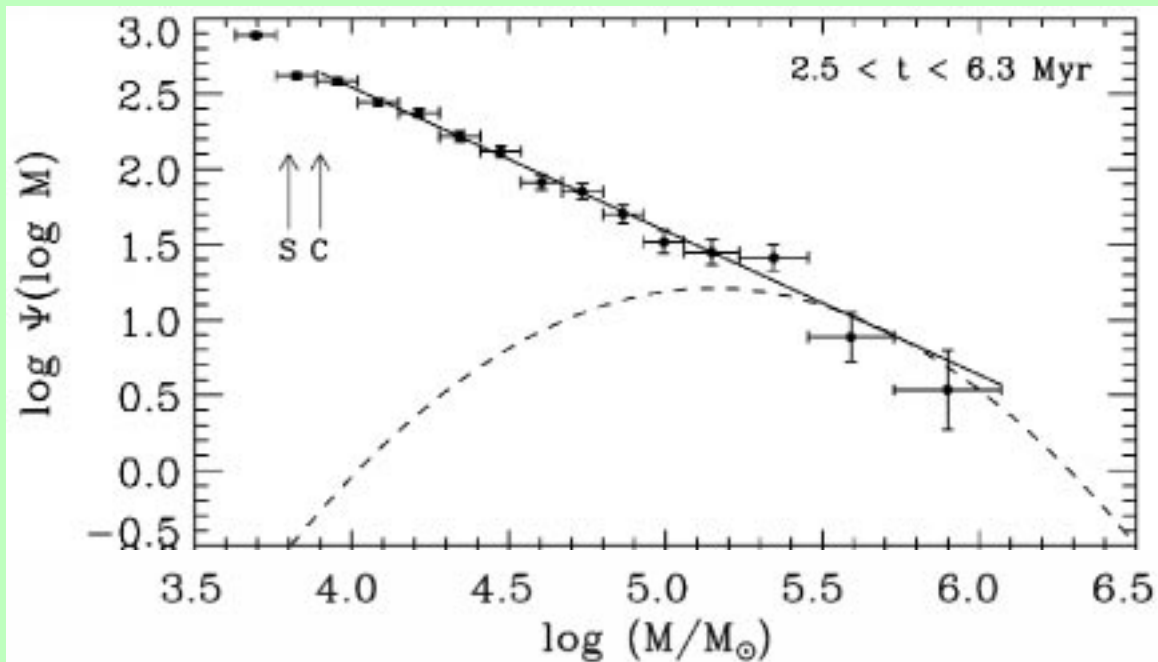
- Star cluster positions from Whitmore & Schweizer (1995)
- only clusters lying within the region mapped in CO are shown

The Mass Function of Supergiant Molecular Complexes

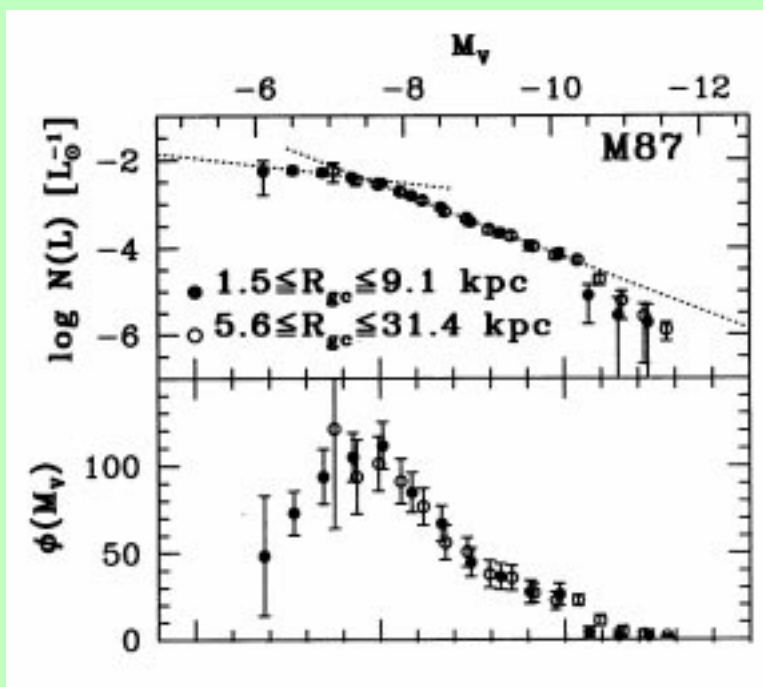


(Wilson et al. 2001)

Comparison with star cluster mass function



young star
clusters in the
Antennae
(Zhang & Fall
1999)



globular clusters in
M87 (McLaughlin
& Pudritz 1996)

Comparison with Cluster Formation Theories

- currently two main theories for how super star clusters form:
 1. *shock compression of pre-existing giant molecular clouds to form a single super star cluster (Schweizer et al. 1996, Jog & Solomon 1992)*
 2. *efficient star formation inside very massive cloud cores which may exist inside supergiant molecular clouds (Harris & Pudritz 1994, McLaughlin & Pudritz 1996)*

In the Antennae:

- supergiant molecular complexes extend up to $10^8 M_{\odot}$ and follow the same power-law mass function as GMCs
- these complexes are more massive and more numerous than those seen in other galaxies (M51, NGC 1068)
- complexes are not concentrated to the nuclei but found throughout the disk
- scaling from Orion, these massive complexes are likely to contain dense massive cores as massive as 10^5 - $10^6 M_{\odot}$

These results seem most consistent with the picture of massive star cluster formation occurring inside massive dense cores which themselves form inside supergiant molecular clouds (as in McLaughlin & Pudritz 1996)