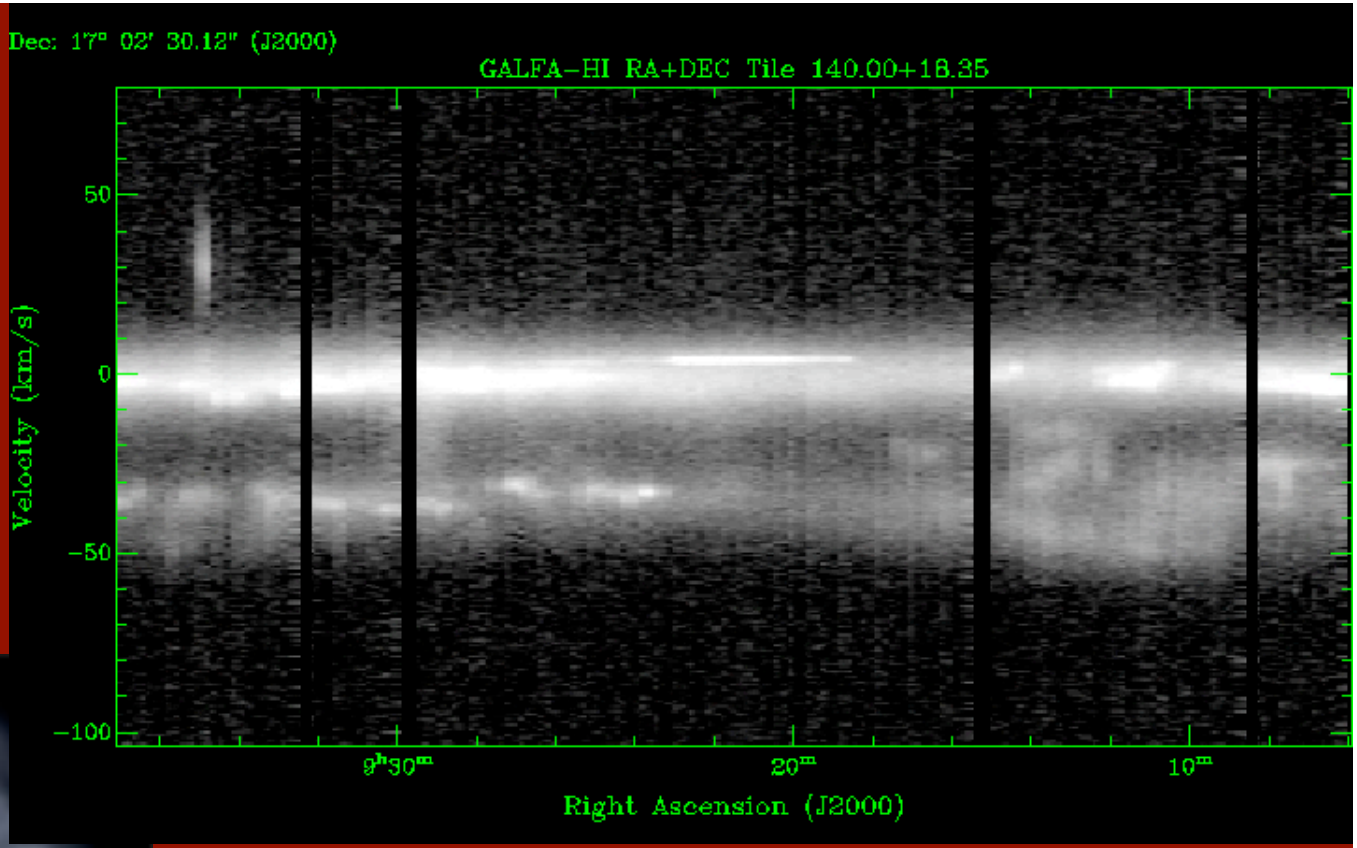
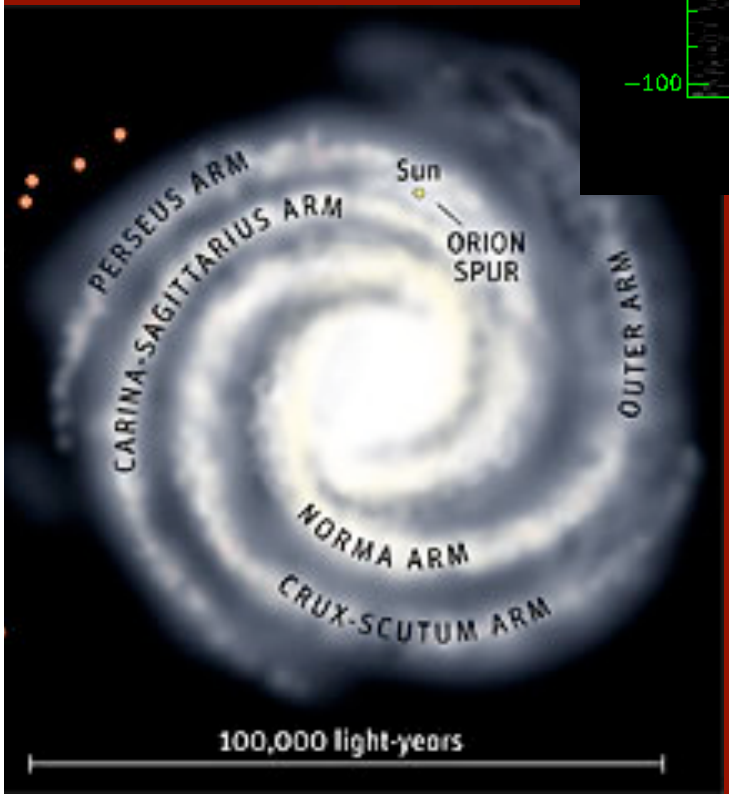
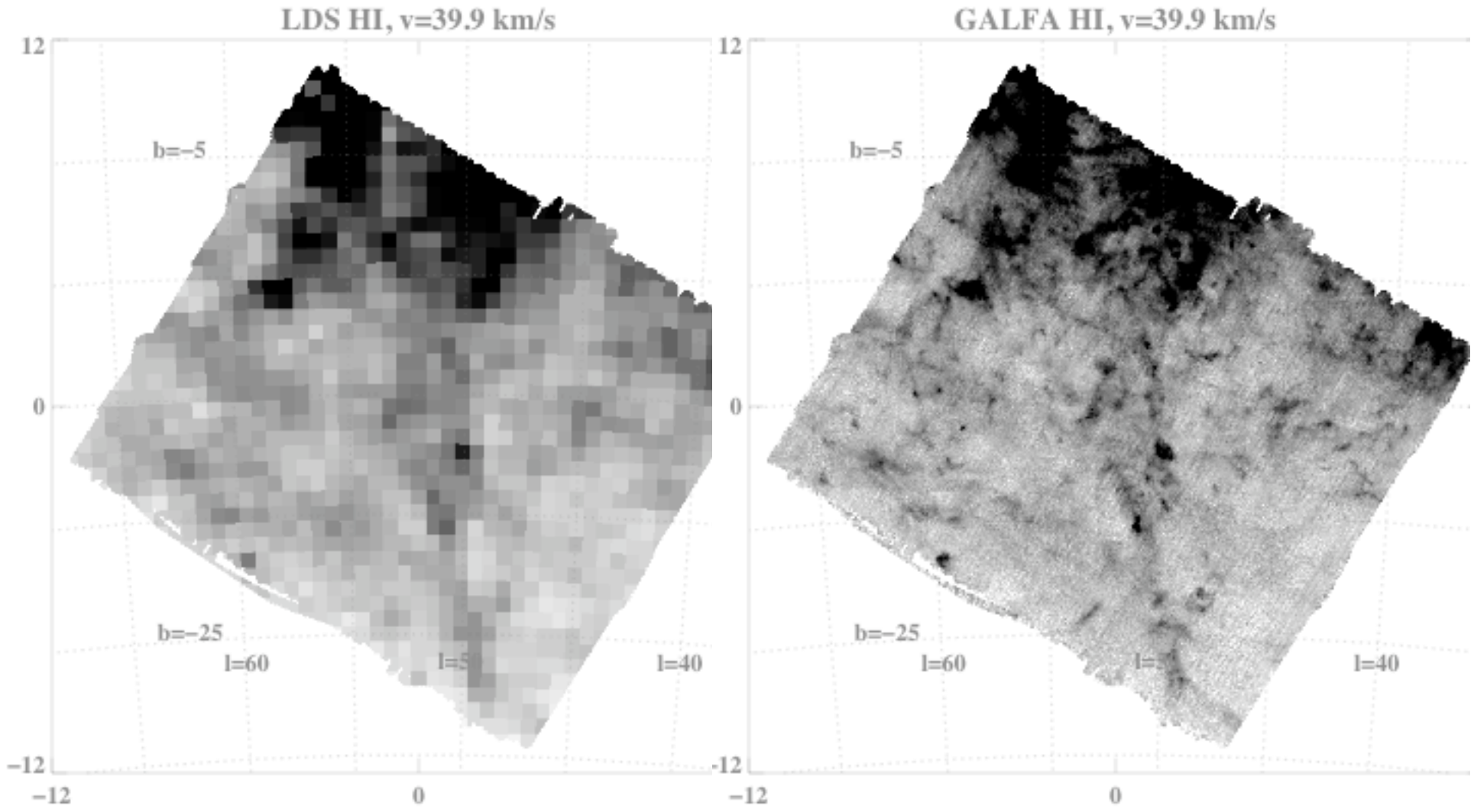




From ATNF press release on McClure-Griffiths et al. paper

TOGS/GALFA Data

(+/- 700 km/s at 0.2 km/s)



Collaborators: **Josh G. Peek** (Berkeley), **Jana Grcevich** (Michigan), **Jessica Werk** (Michigan), Erik Mets (Michigan), Jesper Sommer-Larsen (Neils Bohr Institute), Carl Heiles (Berkeley), Snezana Stanimirovic (Madison), Emma Ryan-Weber (Cambridge), Gerhardt Meurer (JHU), Fabian Heitsch (Michigan), Kevin Douglas (Berkeley), Eric Korpela (Berkeley), Steve Gibson (NAIC), Sally Oey (Michigan), Rob Kennicutt (Cambridge), Ken Freeman (RSAA)

Where does the Galaxy go when its hungry?

Choices:

- Use up its disk gas
- Accrete material from the halo

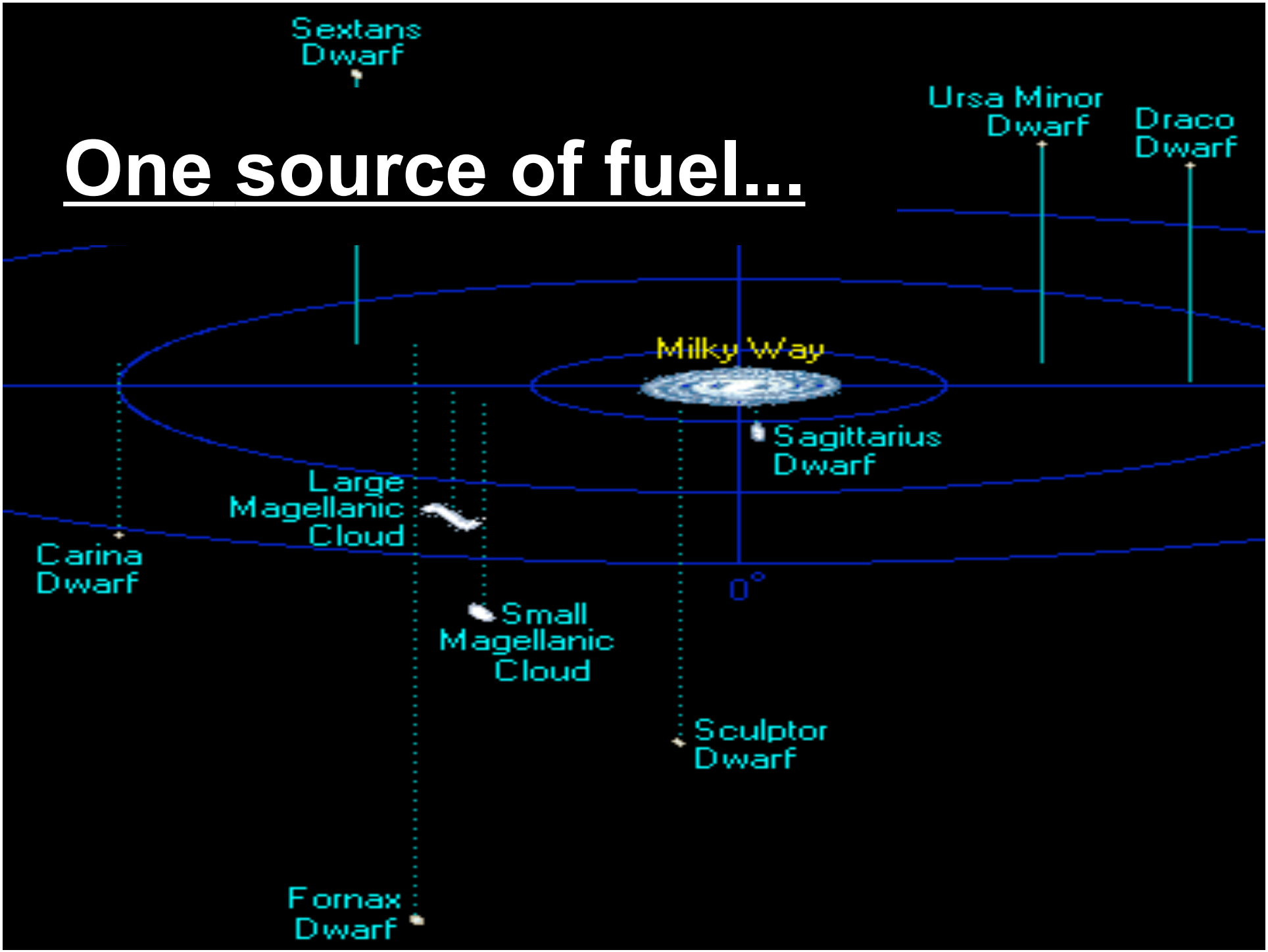
Where does the Galaxy go when its hungry?

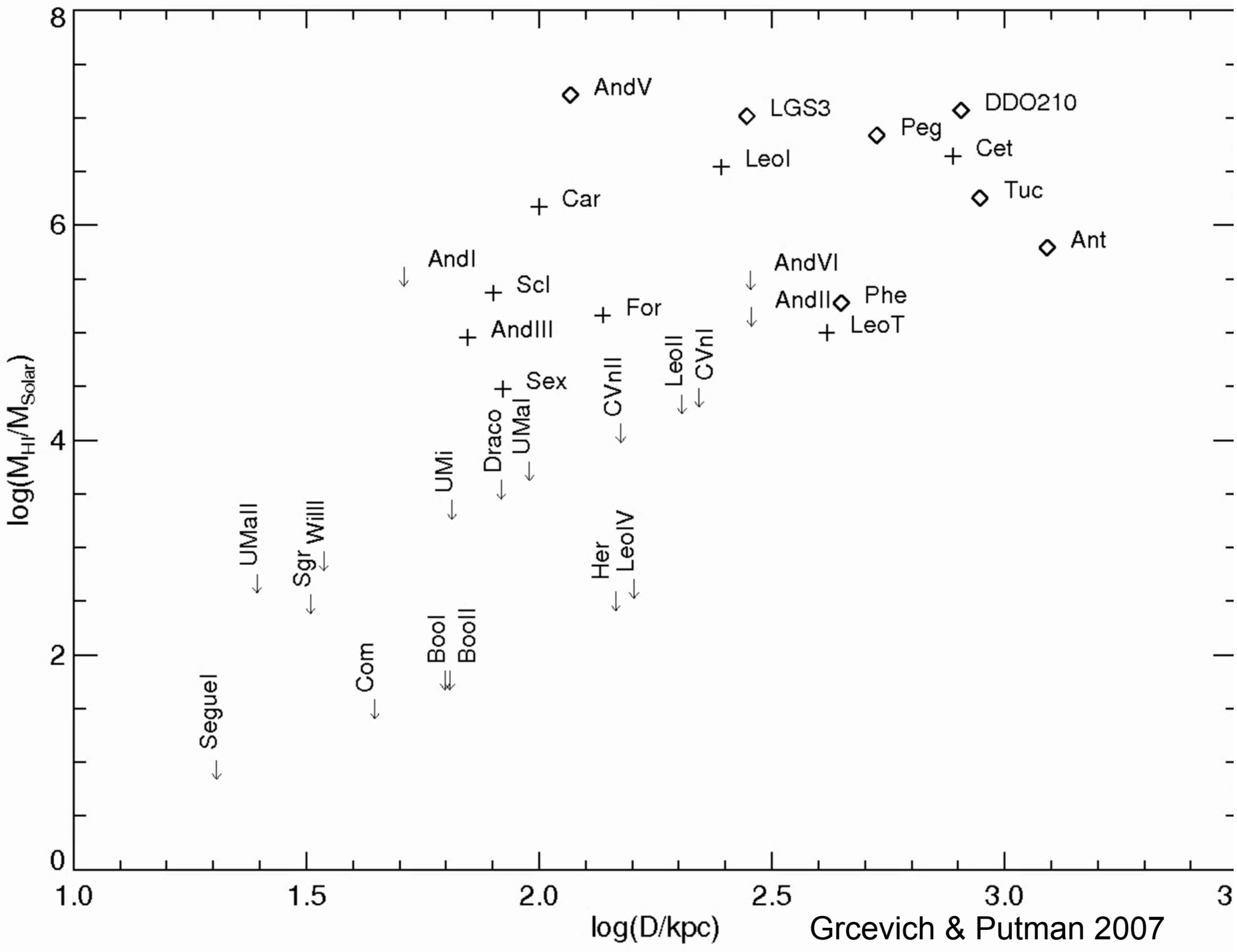
Choices

- Uses up its disk gas
- Accretes material from the halo

- Stellar evidence indicates the latter continues over ~ 7 Gyr (e.g. Chiappini, Matteucci, & Gratton 1997; Chiappini, Matteucci, & Romano 2001; Kotoneva et al. 2002)

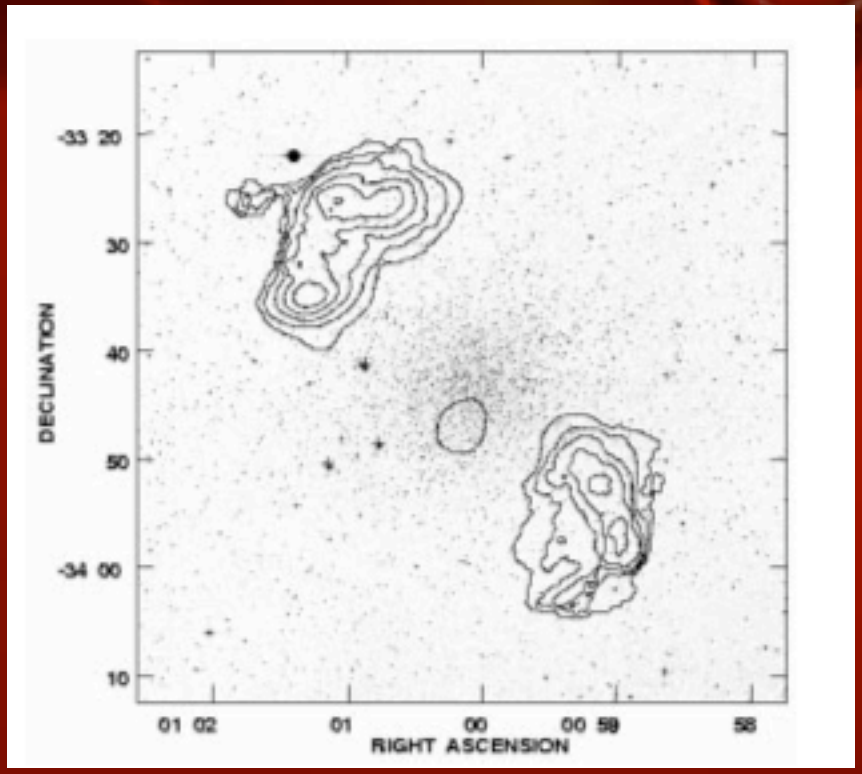
One source of fuel...

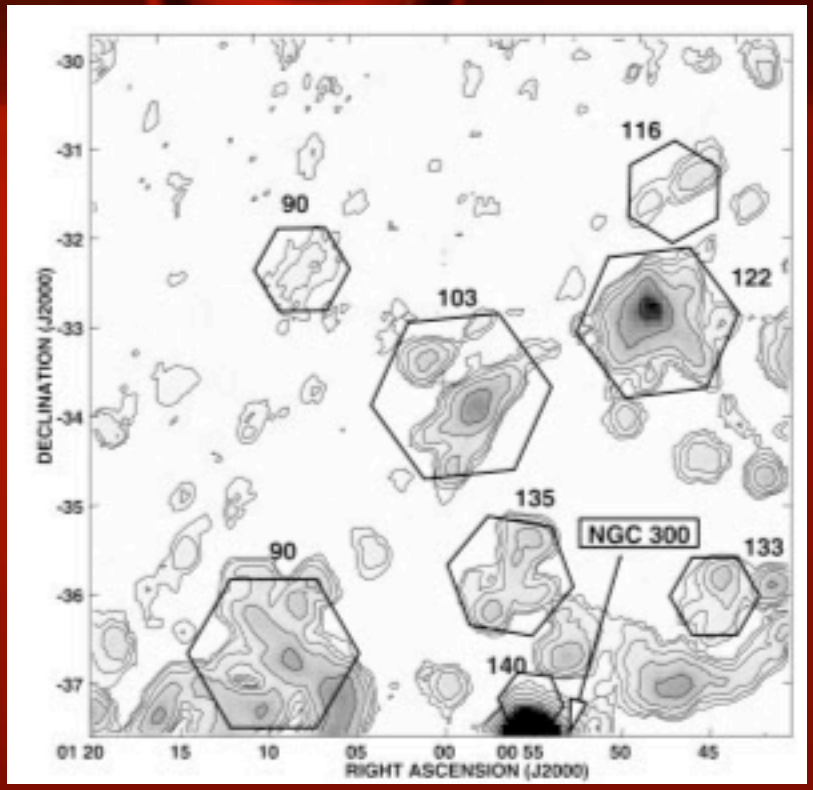




Grcevich & Putman 2007

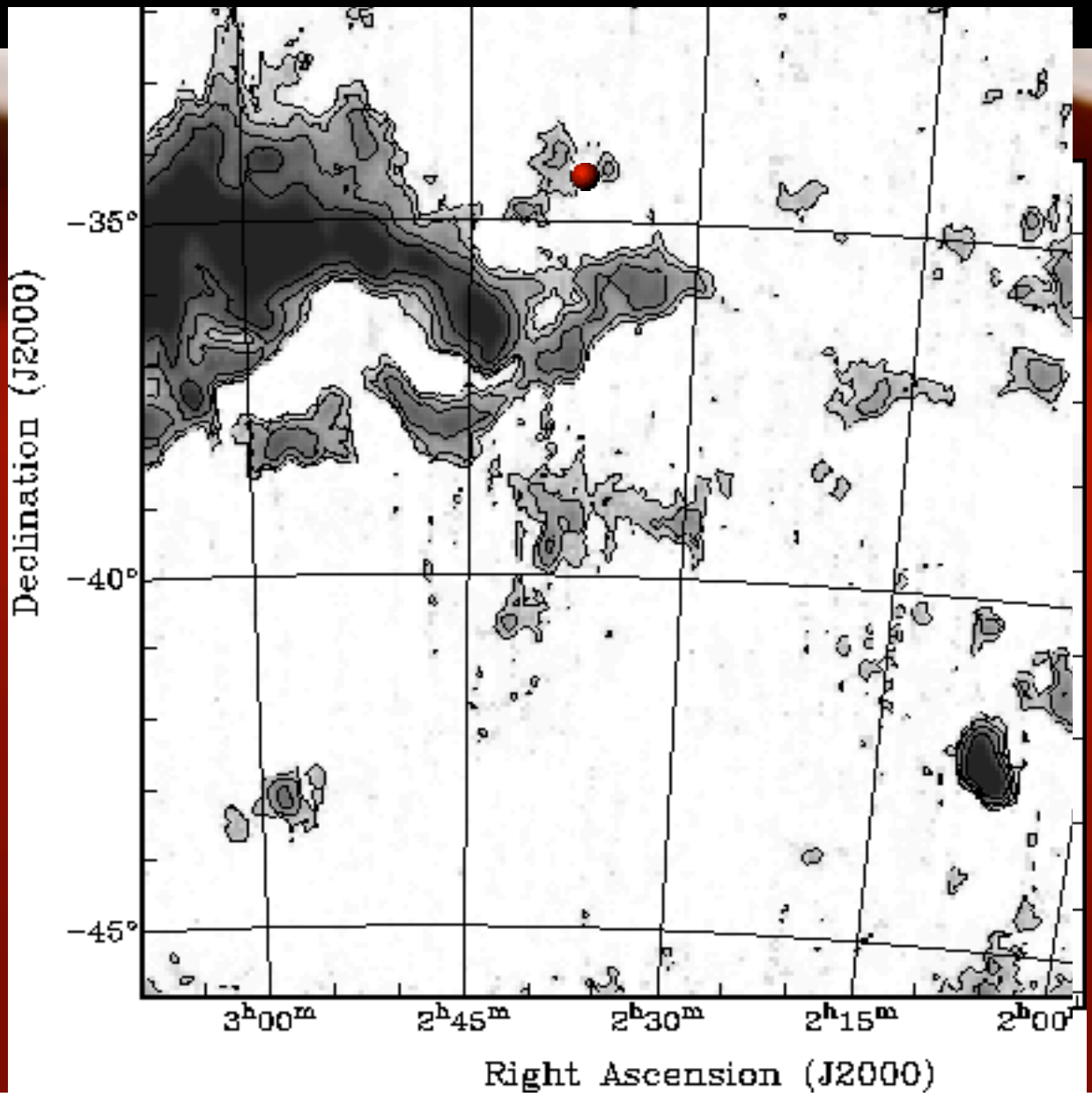
Sculptor



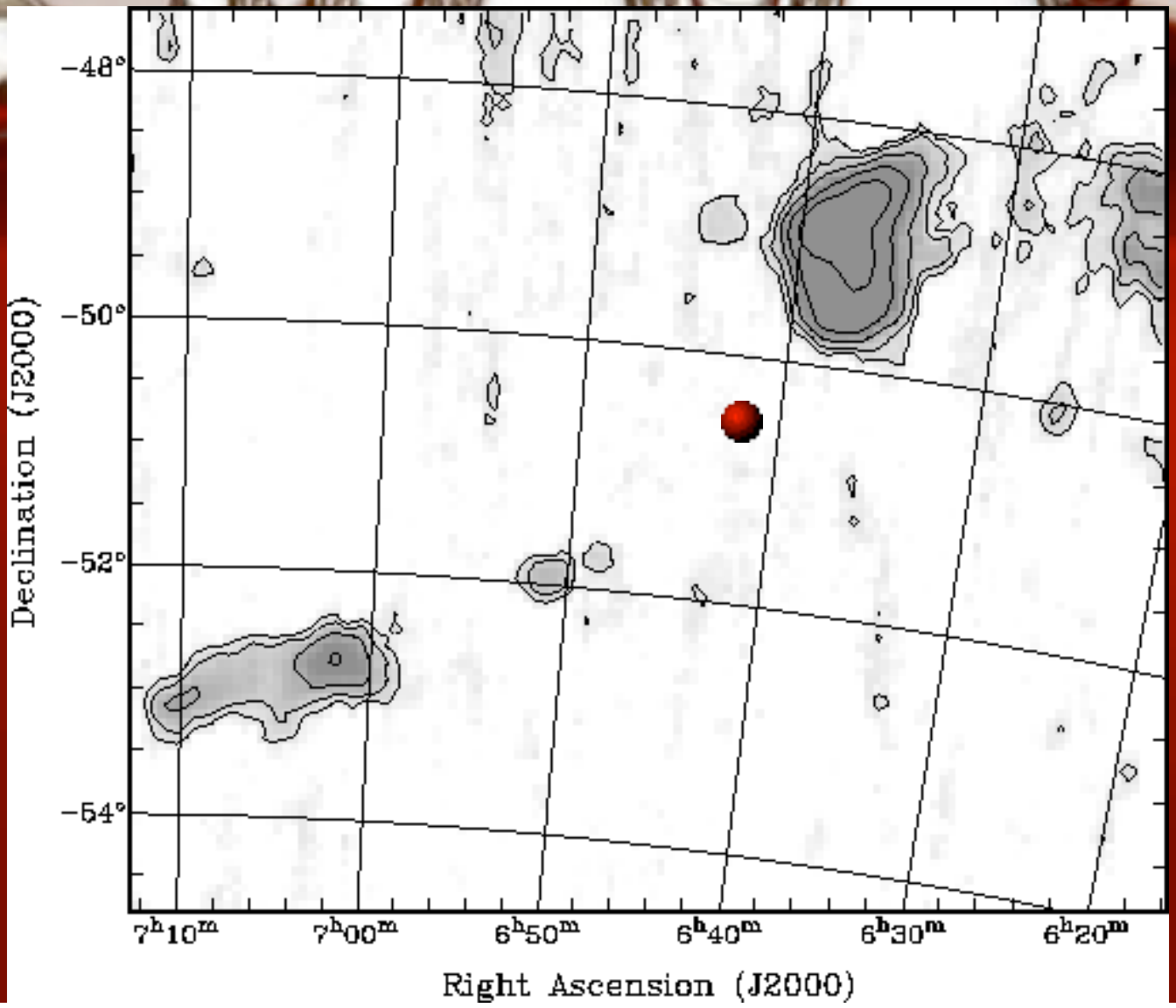


Carignan (1999)

Fornax at V ~ 53 km/s

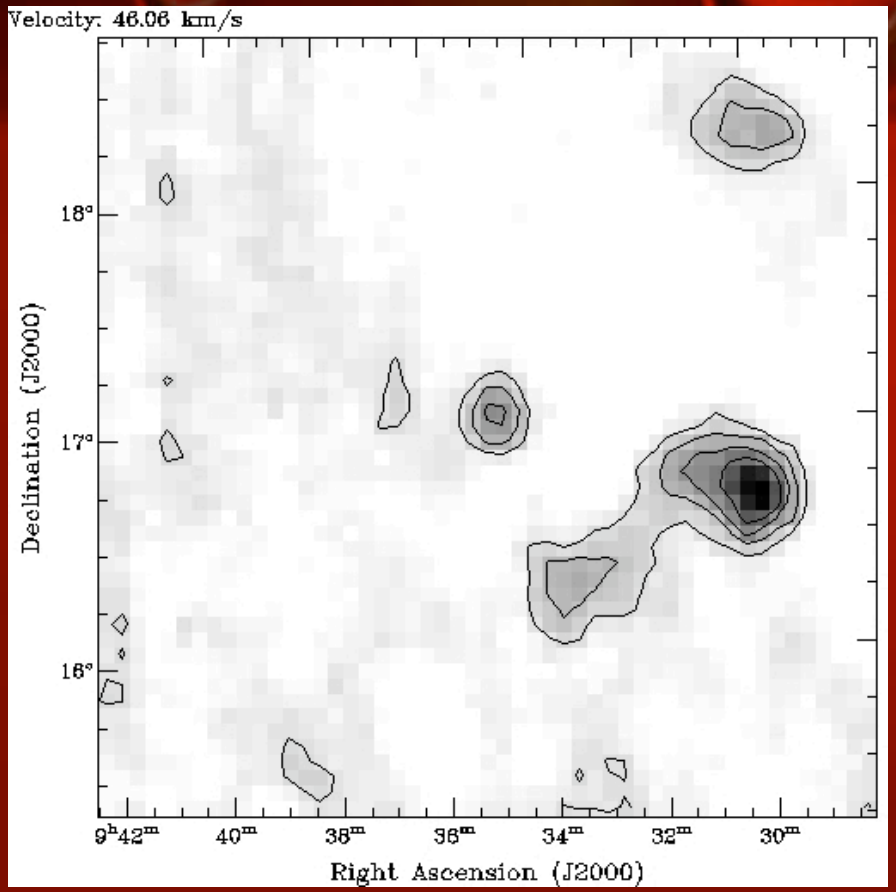


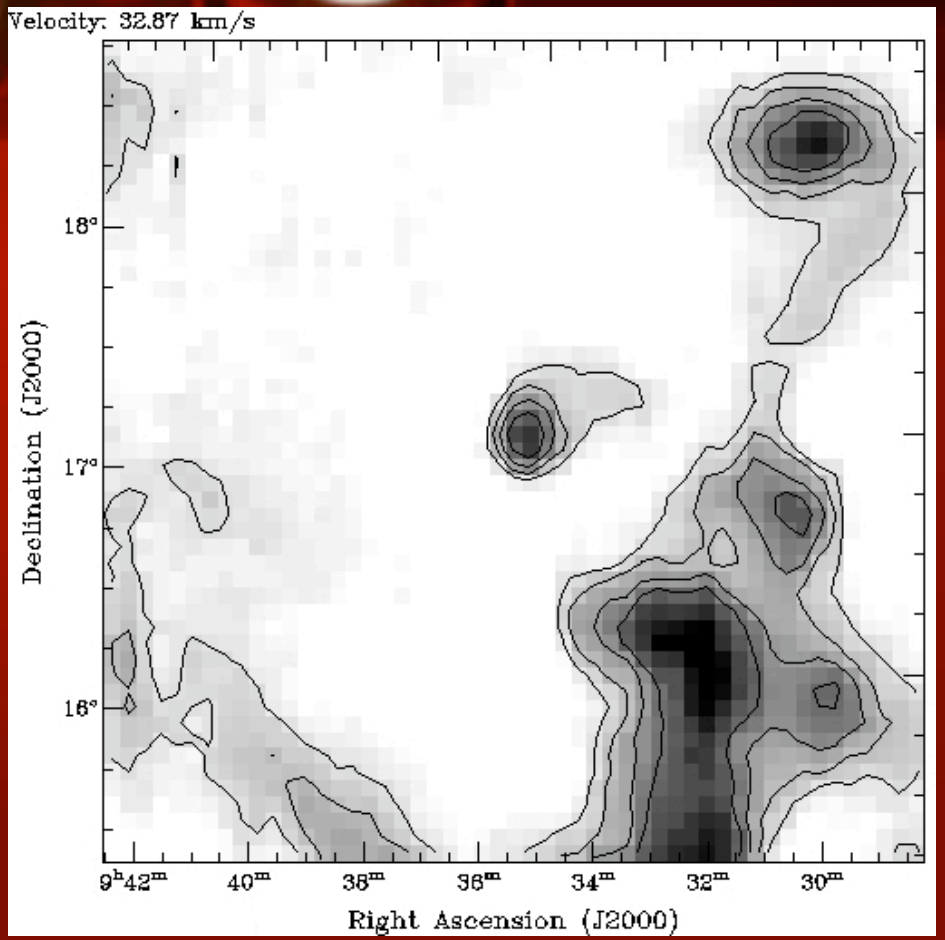
Carina at V ~ 224 km/s



Bouchard et al. (2005)

Leo T





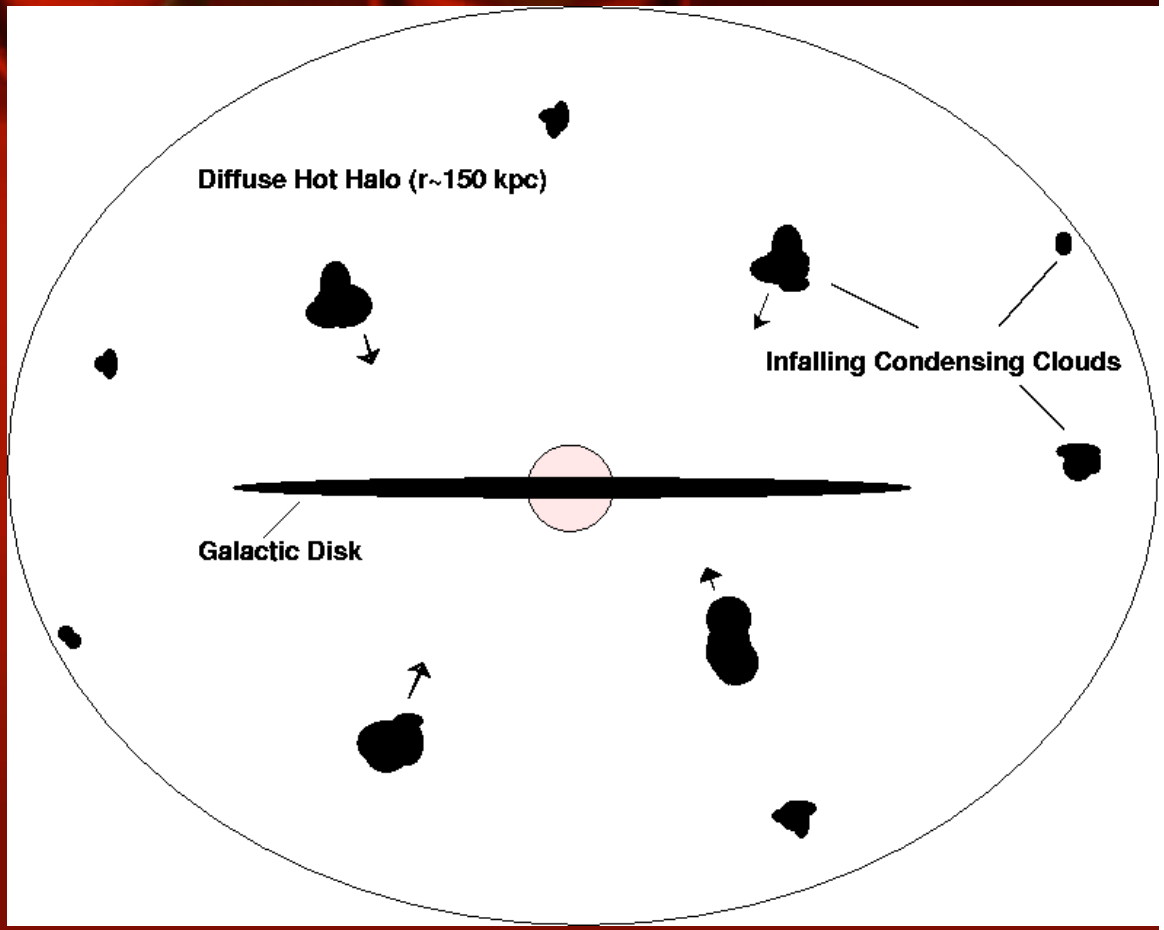
Grcevich & Putman 2007

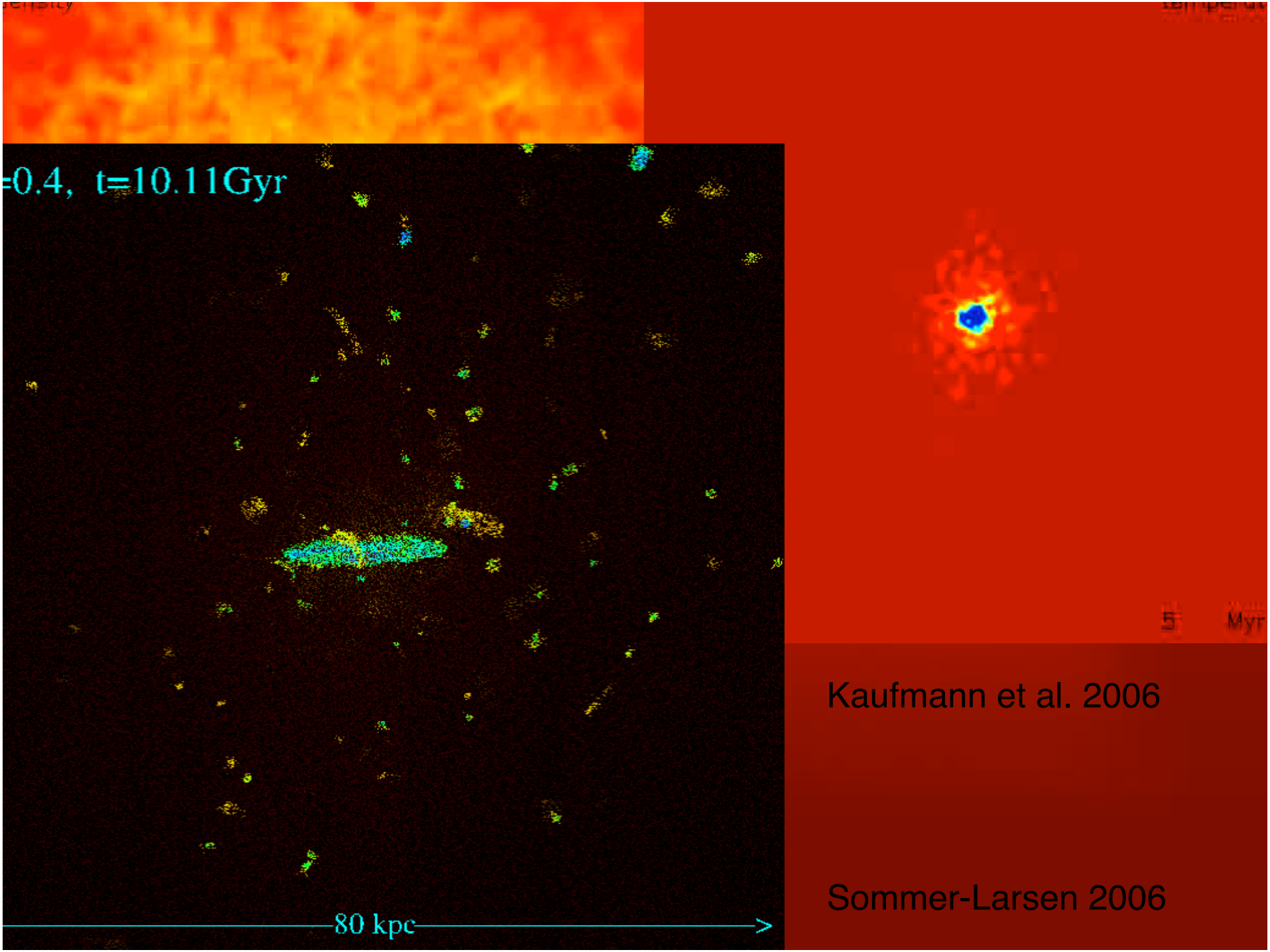
Dwarf Galaxies

- Even with very large gas fractions, they have only only brought in 5-50 million solar masses of star formation fuel
- Transition dwarfs at > 100 kpc?
- Where is the continuous fuel for billions of years?

Other feeding mechanisms….

- Thermal instabilities in the hot halo forming cool pressure supported halo clouds (e.g., Burkert & Lin 2000; Maller & Bullock 2004; Sommer-Larsen 2006)

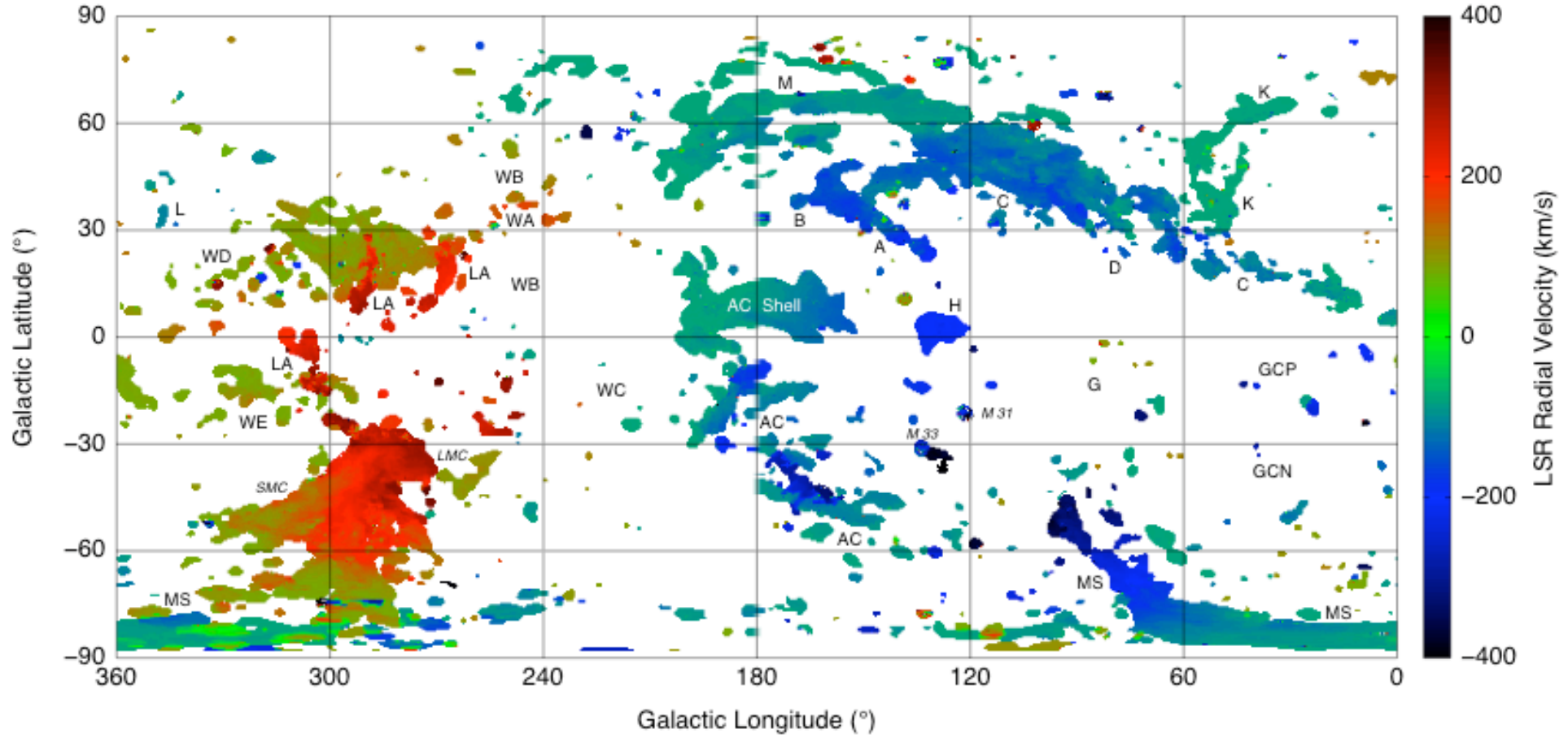




Kaufmann et al. 2006

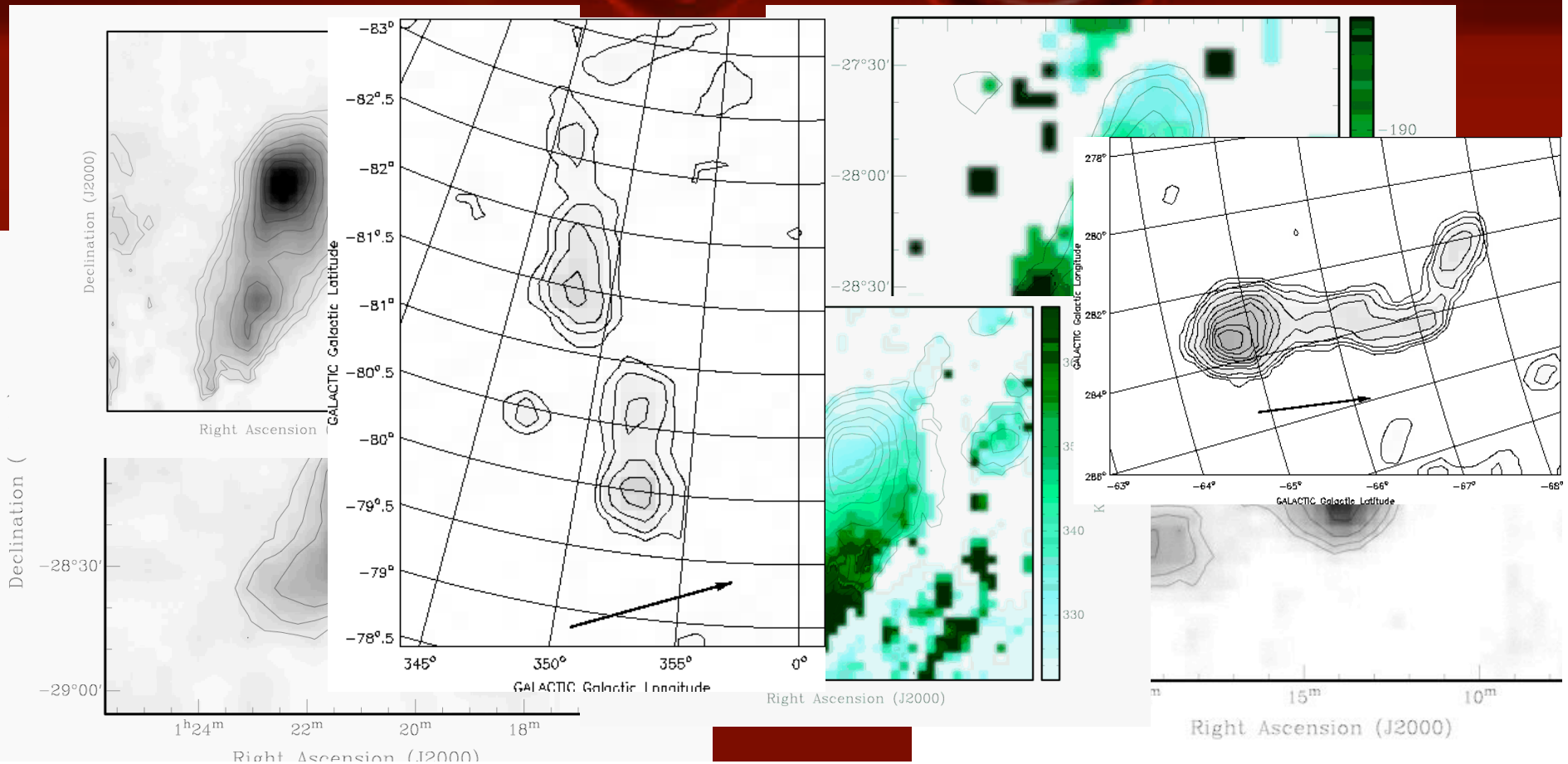
Sommer-Larsen 2006

Numerous clouds of unknown origin out there

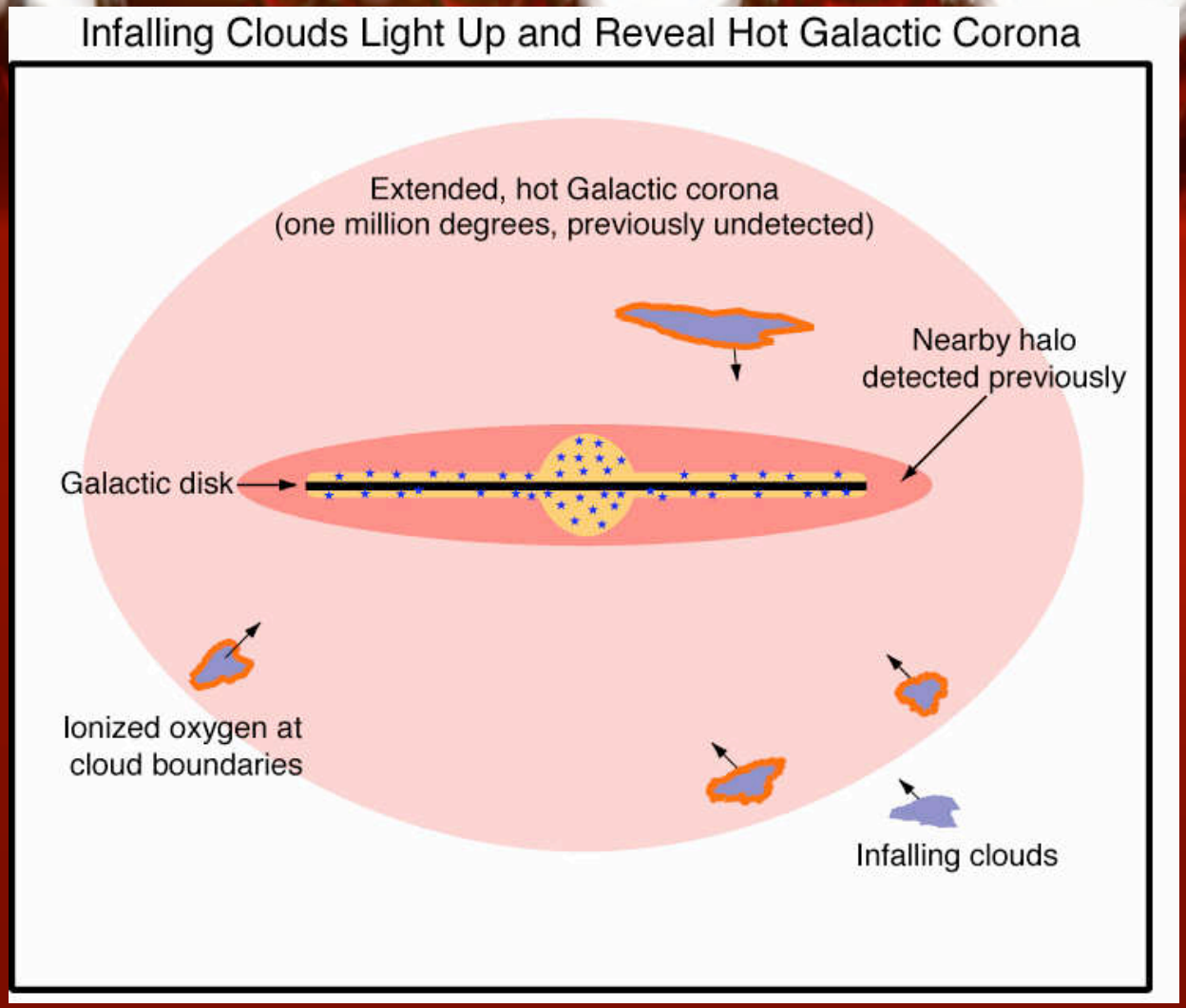


T. Westmeier (LAB data)

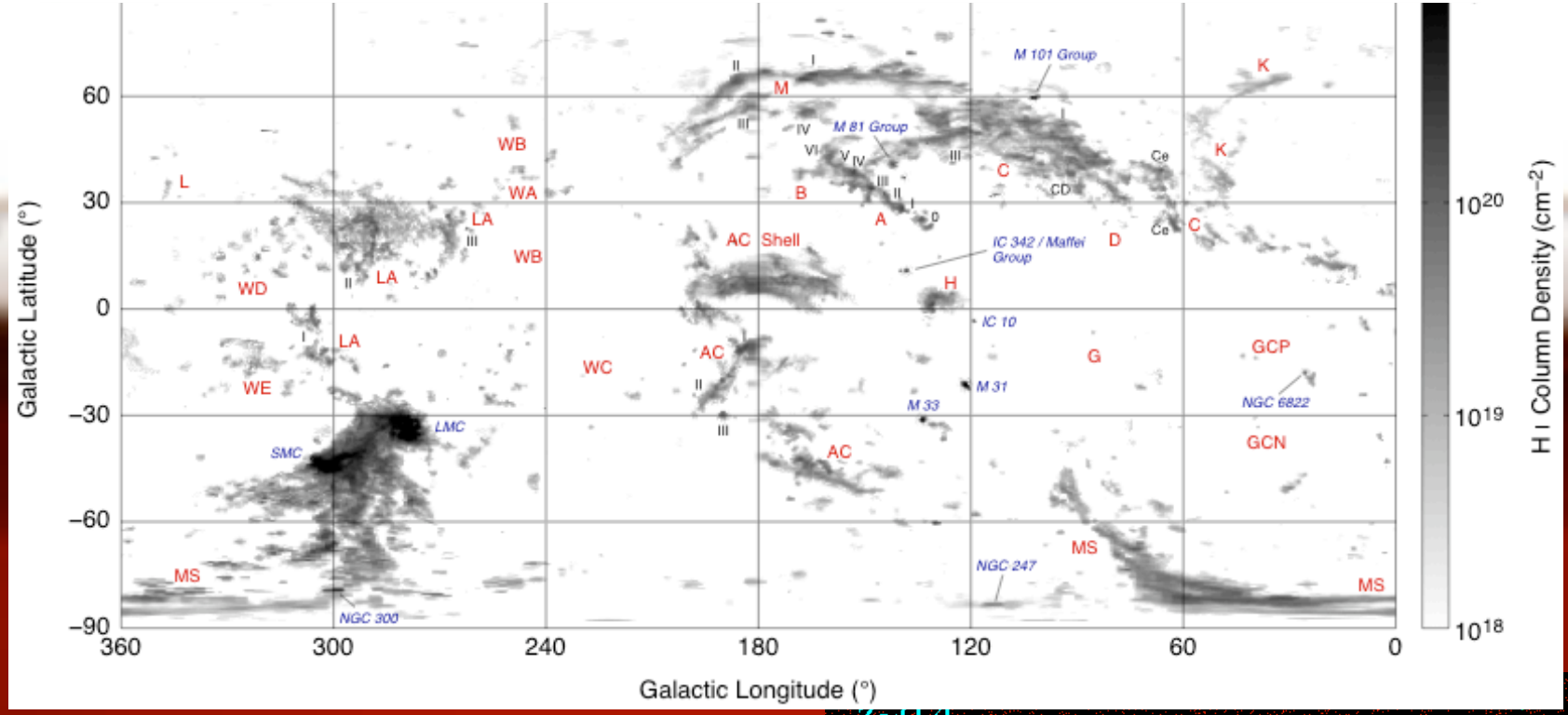
Evidence for the diffuse halo to at least the Magellanic Clouds (~55 kpc)

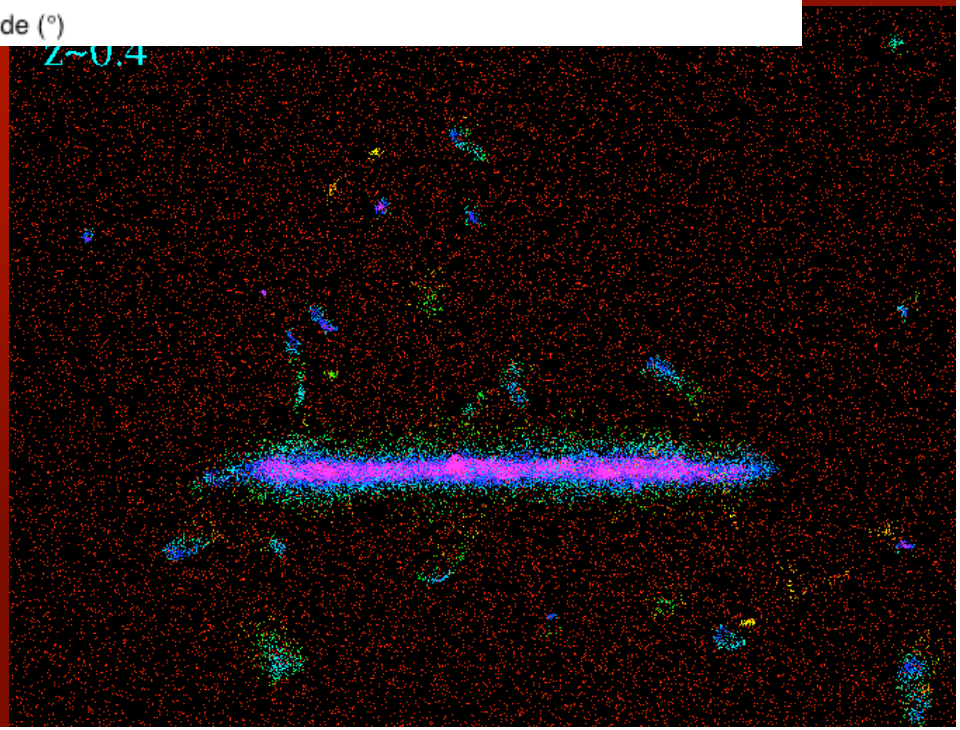


O VI and OVII results

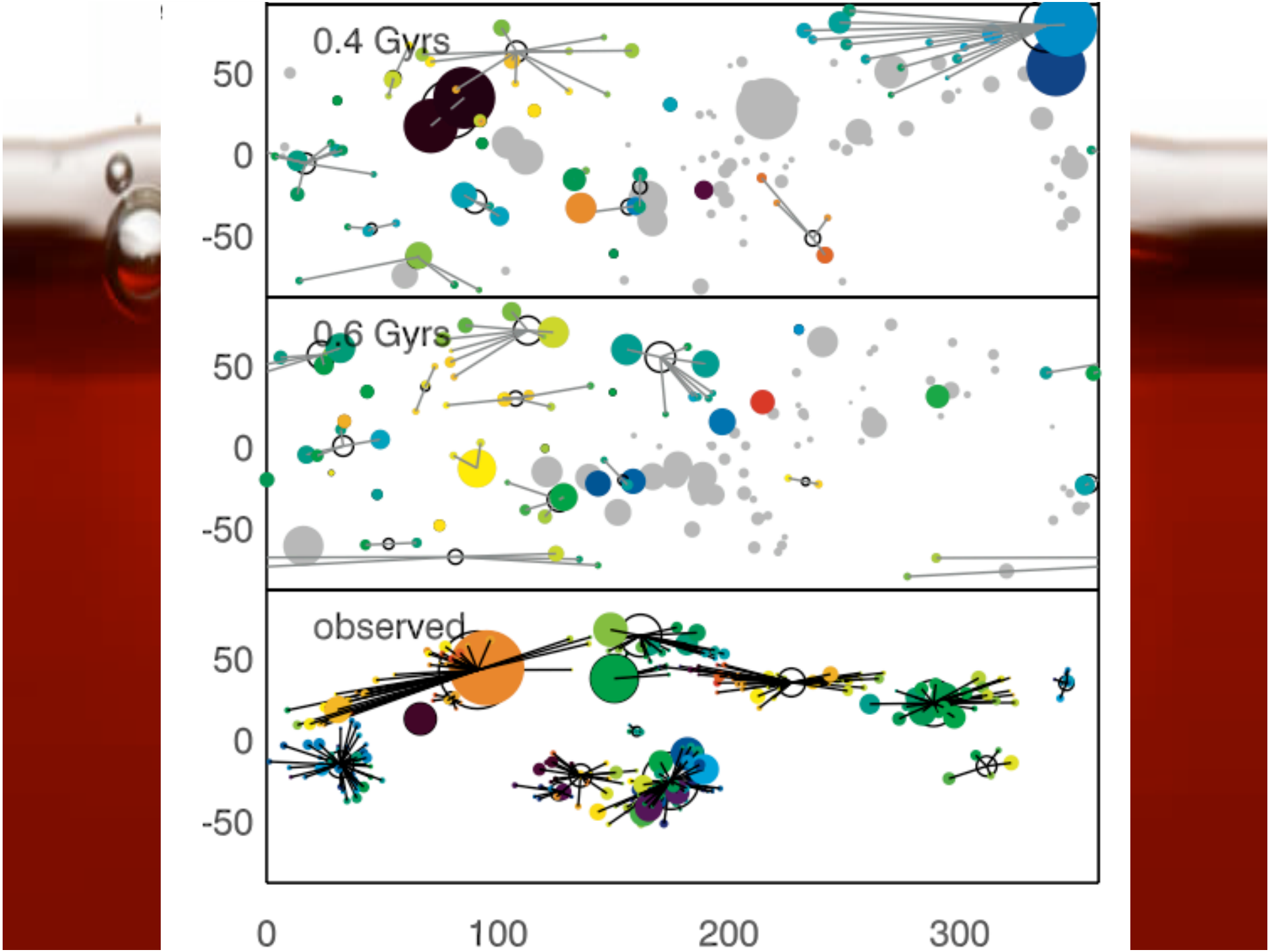


e.g., Sembach et al. 2003; Williams et al. 2006; Fang et al. 2007

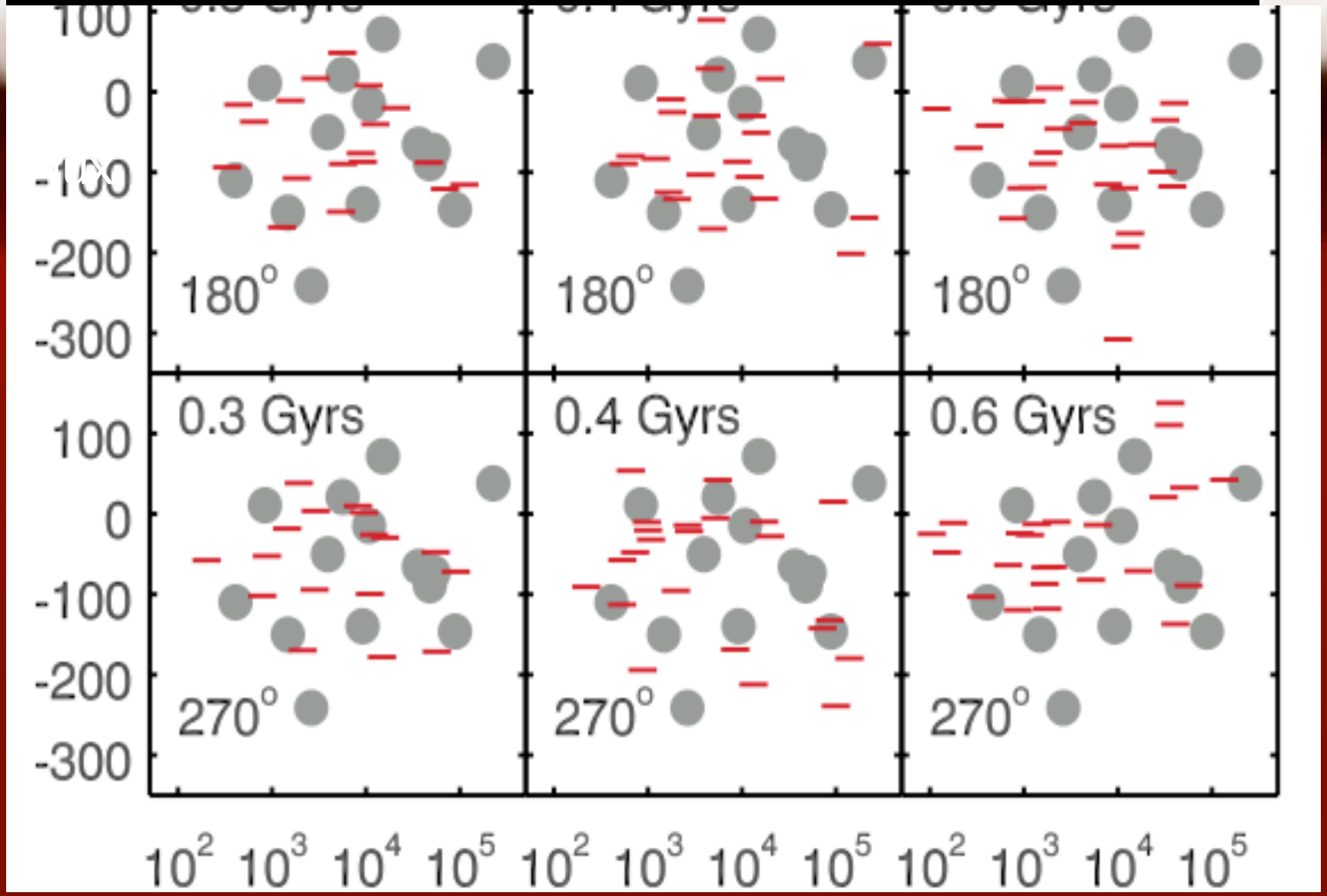




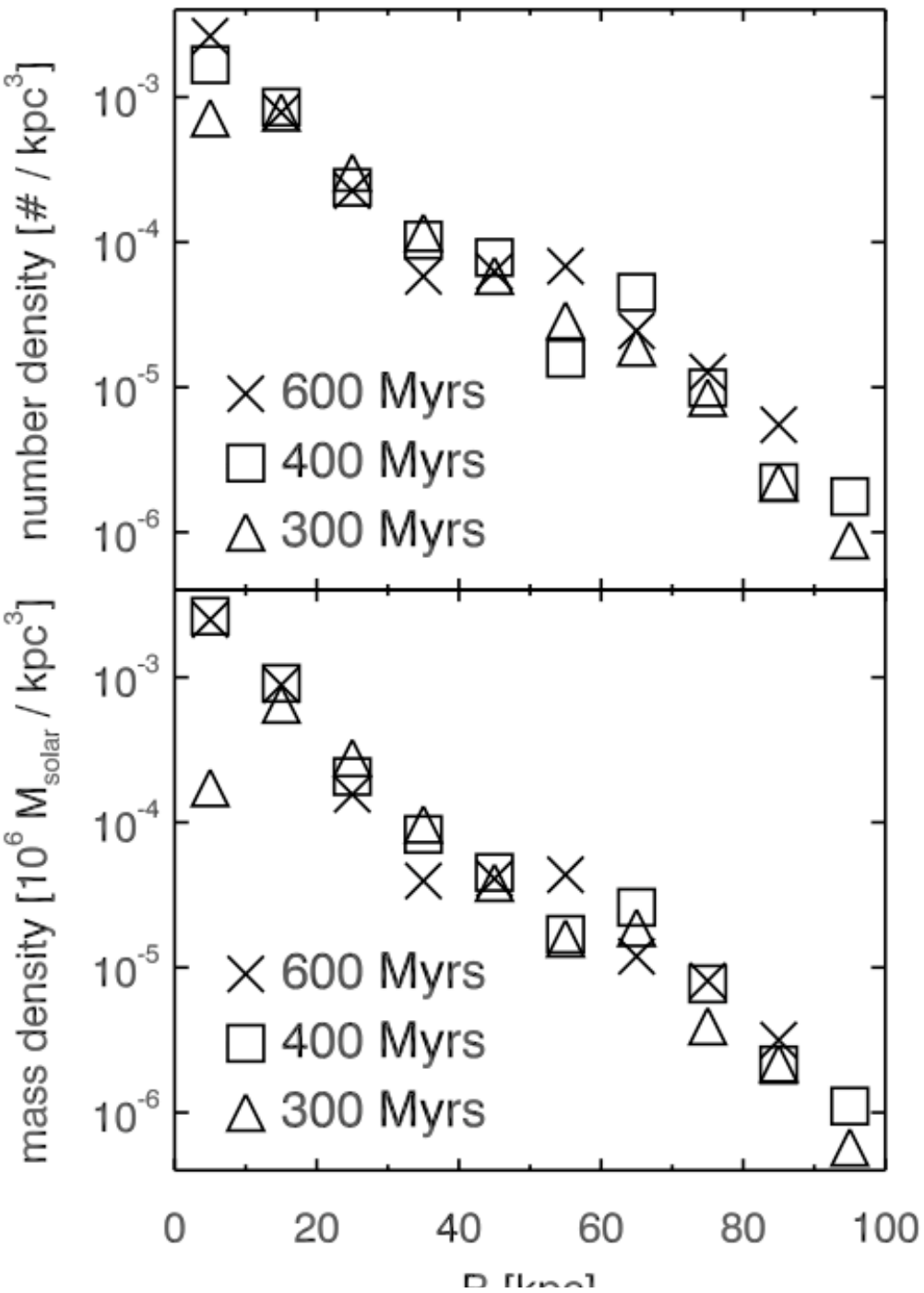
How do the observed and simulated clouds compare? (Peek, Putman & Sommer-Larsen 2007)


0.4 Gyrs
0.6 Gyrs
observed
50
0
-50
50
0
-50
50
0
-50
0
100
200
300

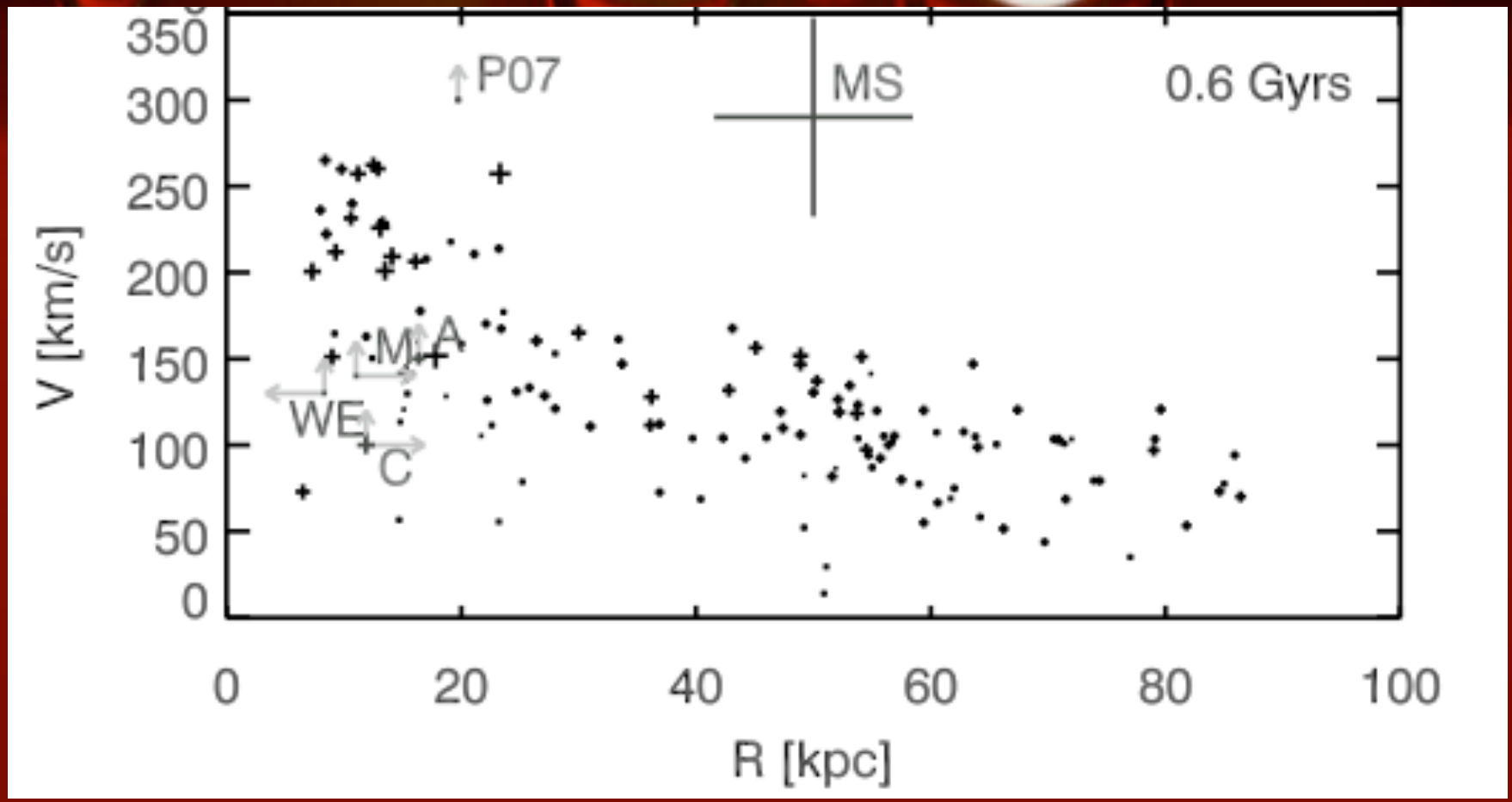
Flux and Velocity of Clouds



V
GSR

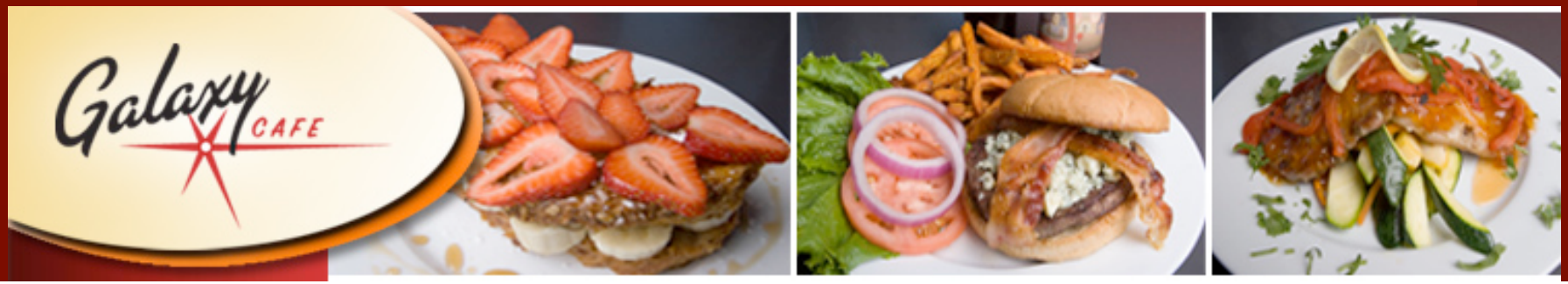

number density [# / kpc^3]
10^{-3}
10^{-4}
10^{-5}
10^{-6}
600 Myrs
400 Myrs
300 Myrs
mass density [10^6 M_{solar} / kpc^3]
10^{-3}
10^{-4}
10^{-5}
10^{-6}
600 Myrs
400 Myrs
300 Myrs
0
20
40
60
80
100

Radius vs. True Velocity



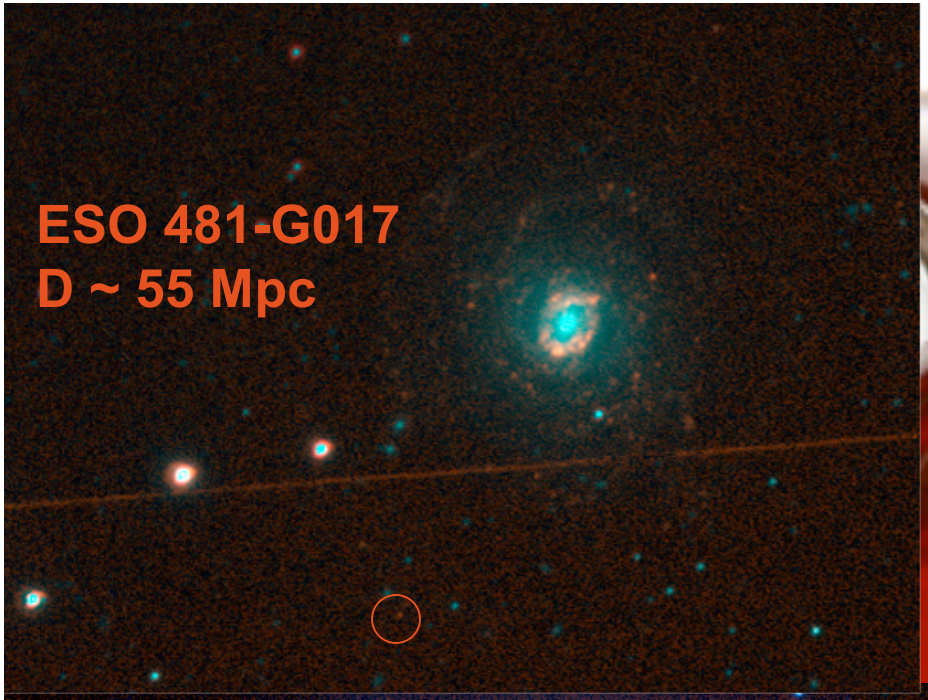
Galactic Fuel

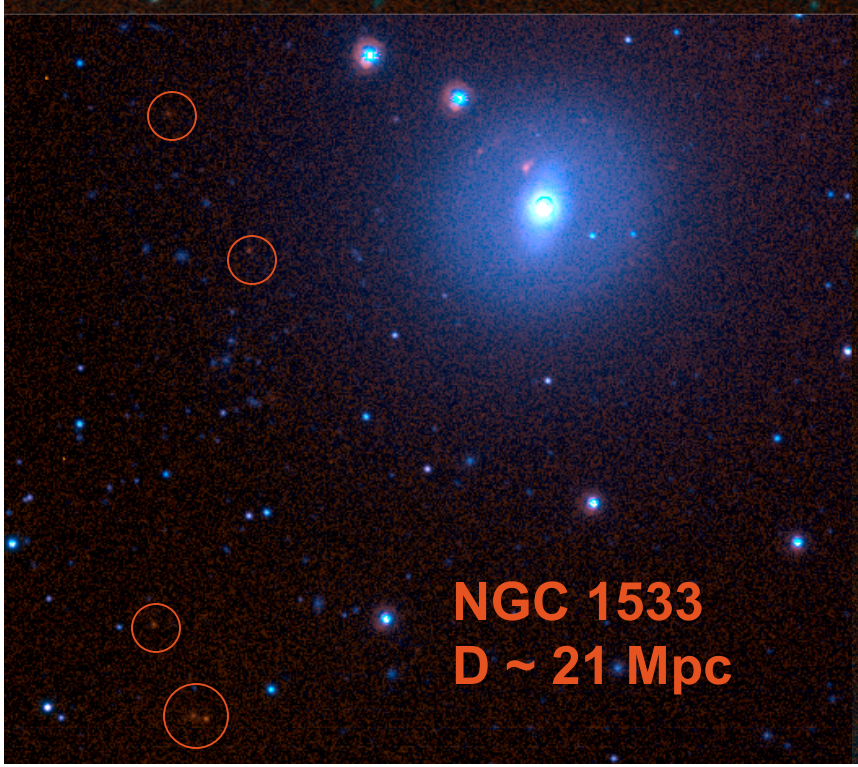
- Overall agreement between HVCs and the condensed halo clouds, but only ~ 0.2 M_o/yr today
- Possible discriminant between condensed clouds and satellite debris
- Dwarf galaxies could bring in a similar rate, but only for about 0.5 Gyr
- More fuel somewhere?

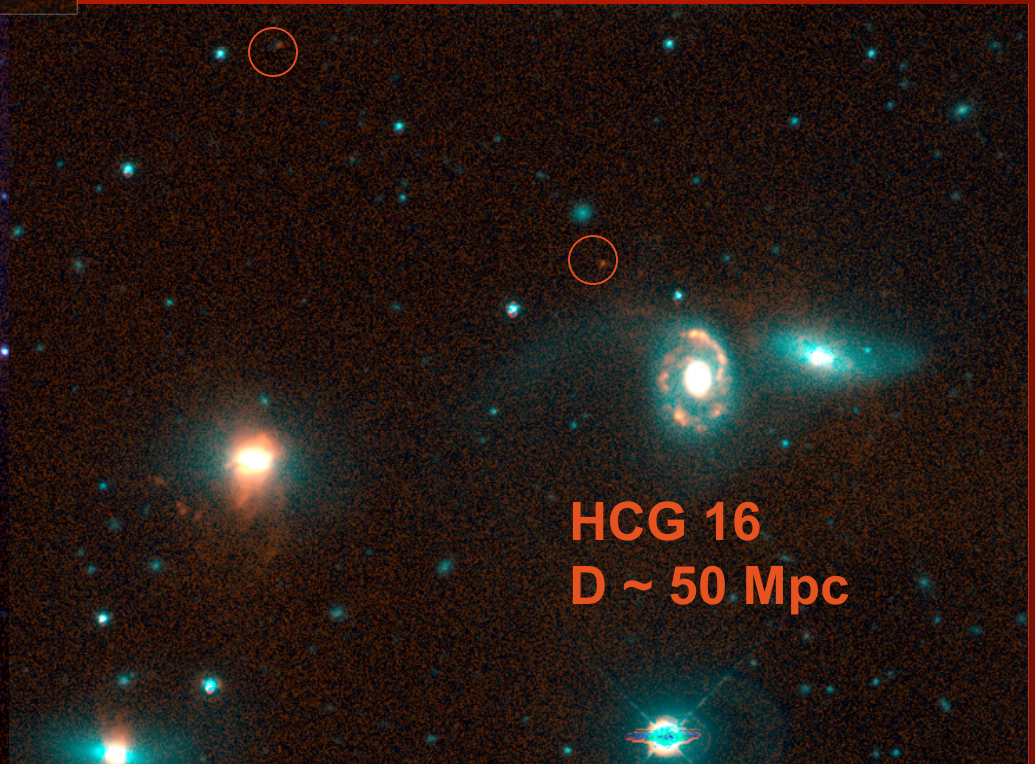


Intergalactic HII Regions

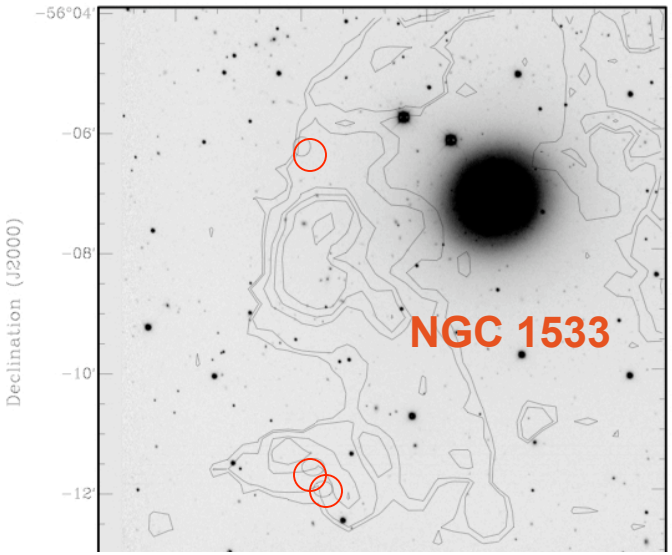
Werk et al. (2007)

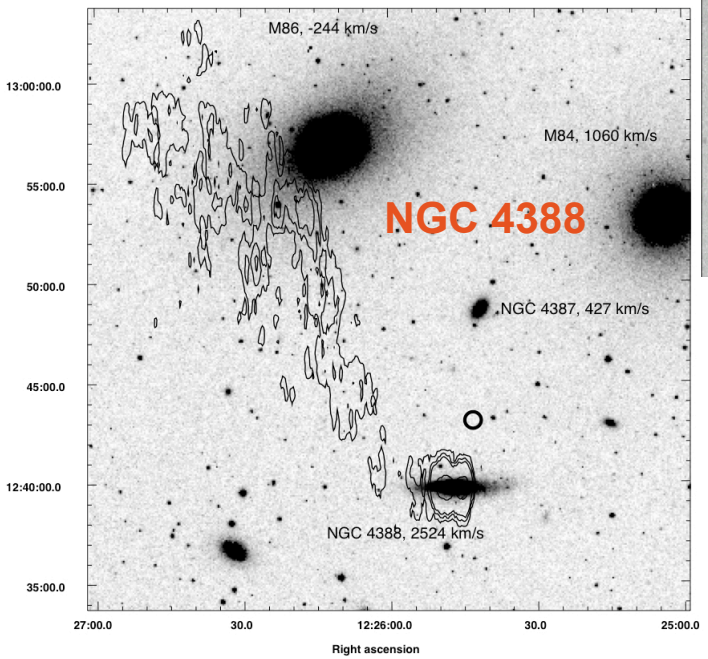


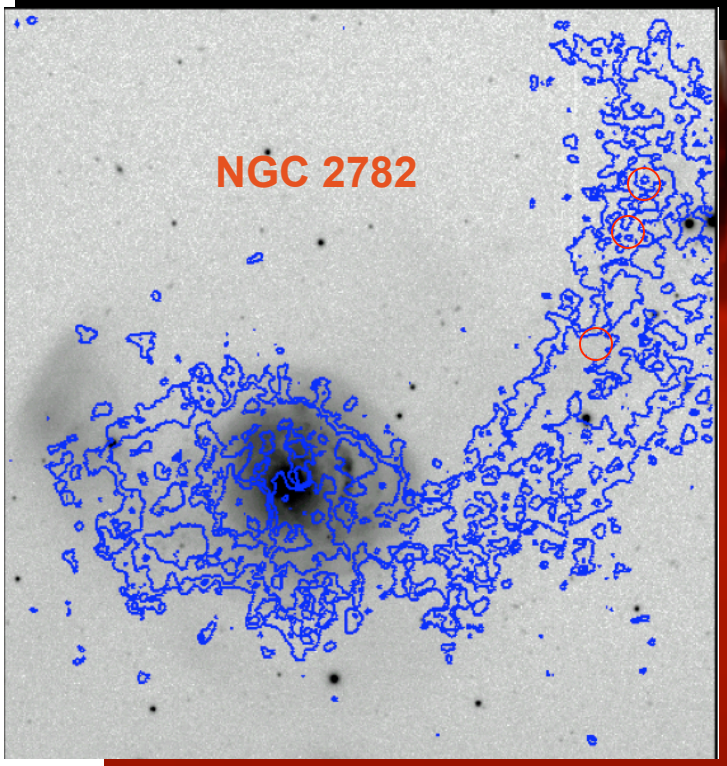




Intergalactic HII Regions







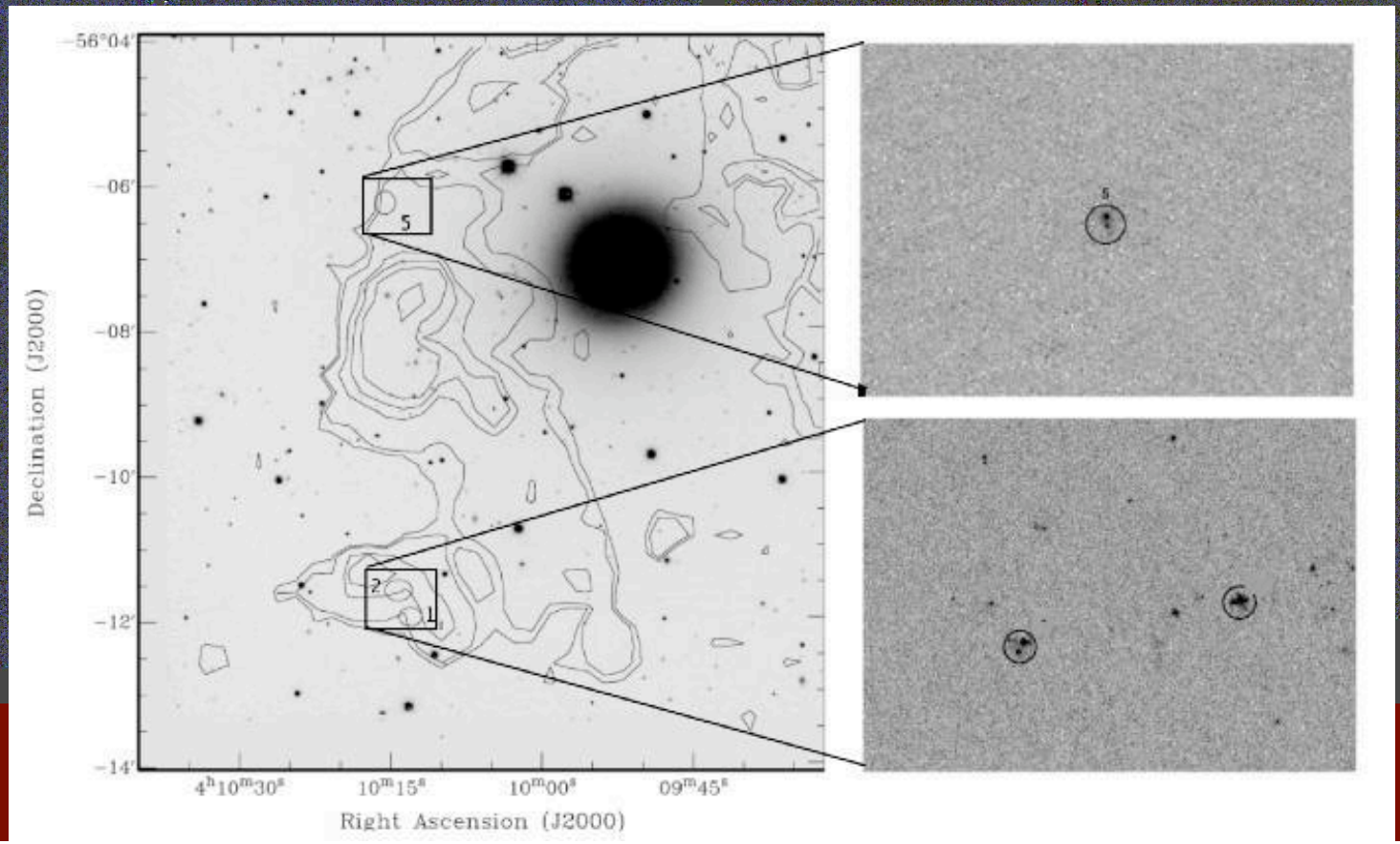
Ryan-Weber et al. 2004; Oosterloo & van Gorkom 2005 ; Smith et al.

- Often found in relatively low HI column density gas
- FWHM 45 - 70 pc (OB Association)
- $37 < \text{Log } L_{H\alpha} < 38$
- 20 - 60 kpc from nearest galaxy
- Ages: 3 - 10 Myrs
- 3 - 25 OV stars
- 600 - 7000 $M_{\odot}$
- No Obvious Older Population

Stellar Populations
(Werk et al. 2007)

3 bands: F250W, F555W, and F814W

NGC 1533's Intergalactic HII Regions



Comparison with Galactic Open Clusters

Galactic Open Clusters
(Lata et al. sample < 10 Myrs)

- **Masses 25 - 4 x 10^4 $M_\odot$**
- **-9.0 < Mv < -4.5**
- **0 <V-I < -0.27**

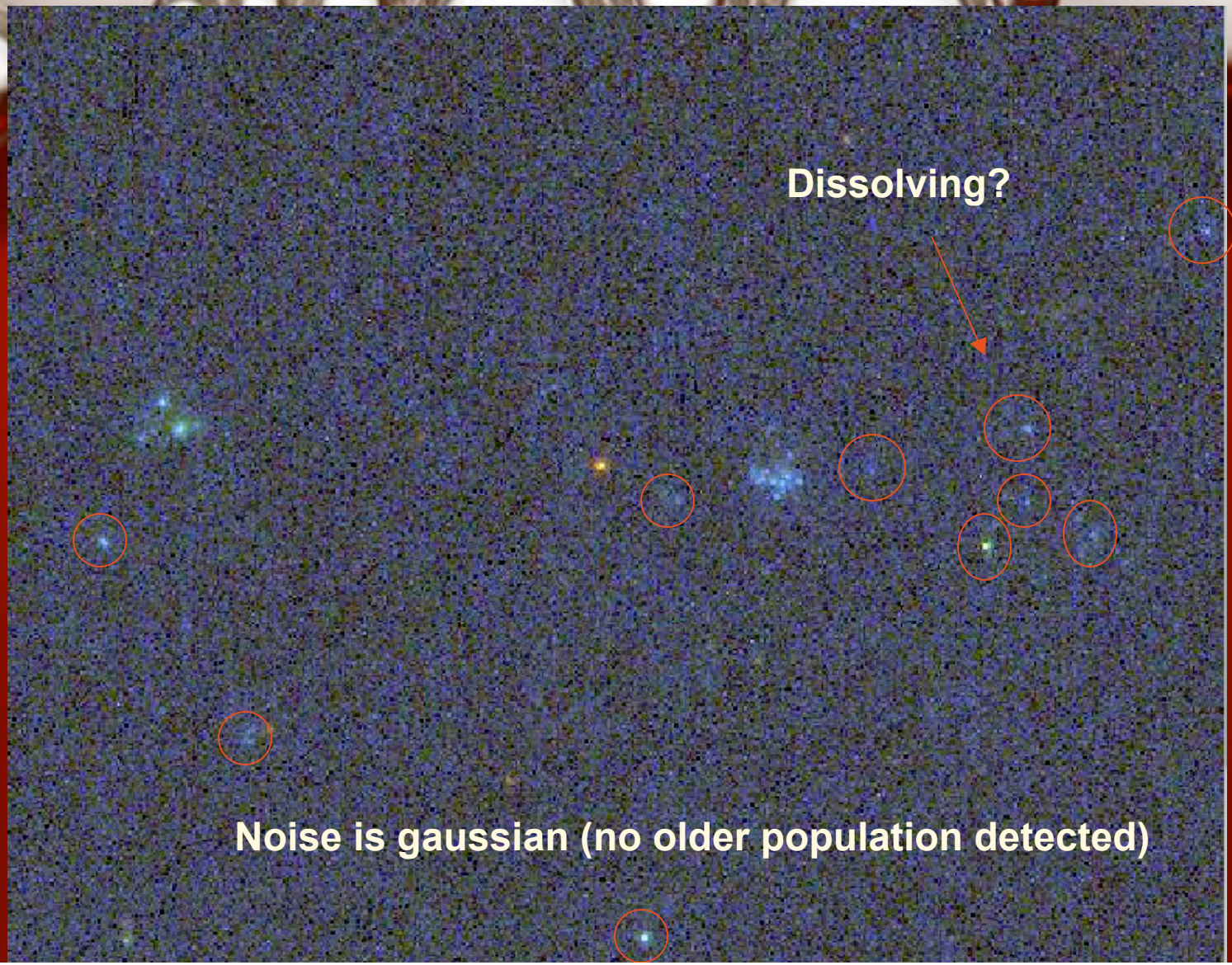
NGC 6611

HII Region components and field objects:

- **Masses < ~ 500 $M_\odot$**
- **-7.7 < Mv < -3.8**
- **0.4 < V-I < -0.90 (mean ~-0.1)**

F10

Evolution and Ultimate Fate



Intergalactic HII Regions

- Star formation without the influence of previous stellar feedback
- 600-7000 M_o clusters, 4-7 Myr old that are very similar to Galactic OB associations
  - Fundamental star formation properties on scales of 10's of parsecs despite environment differences
- Impact at higher redshift?