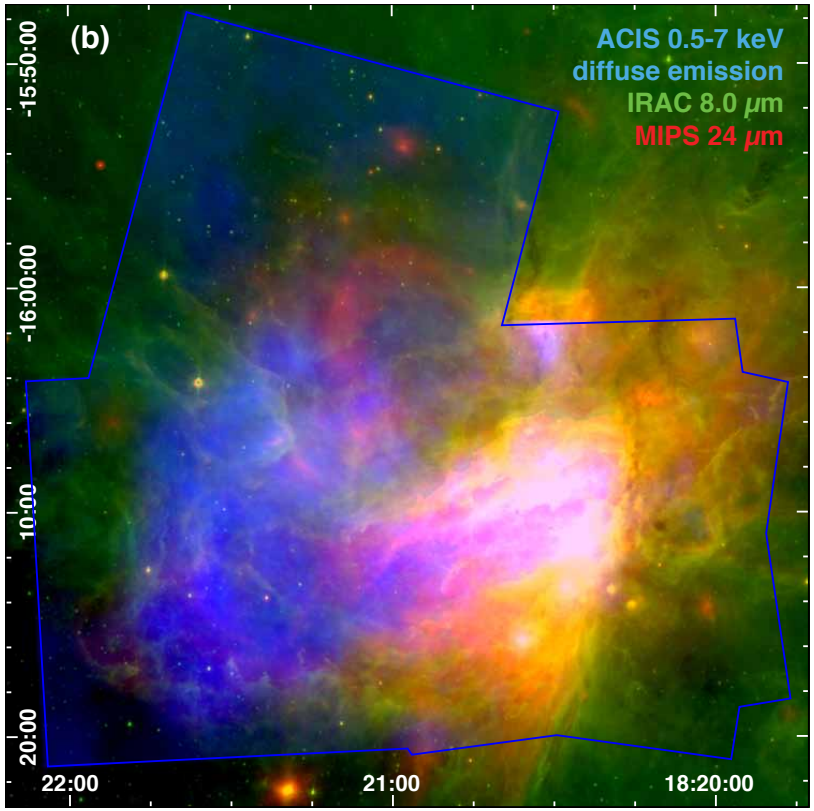
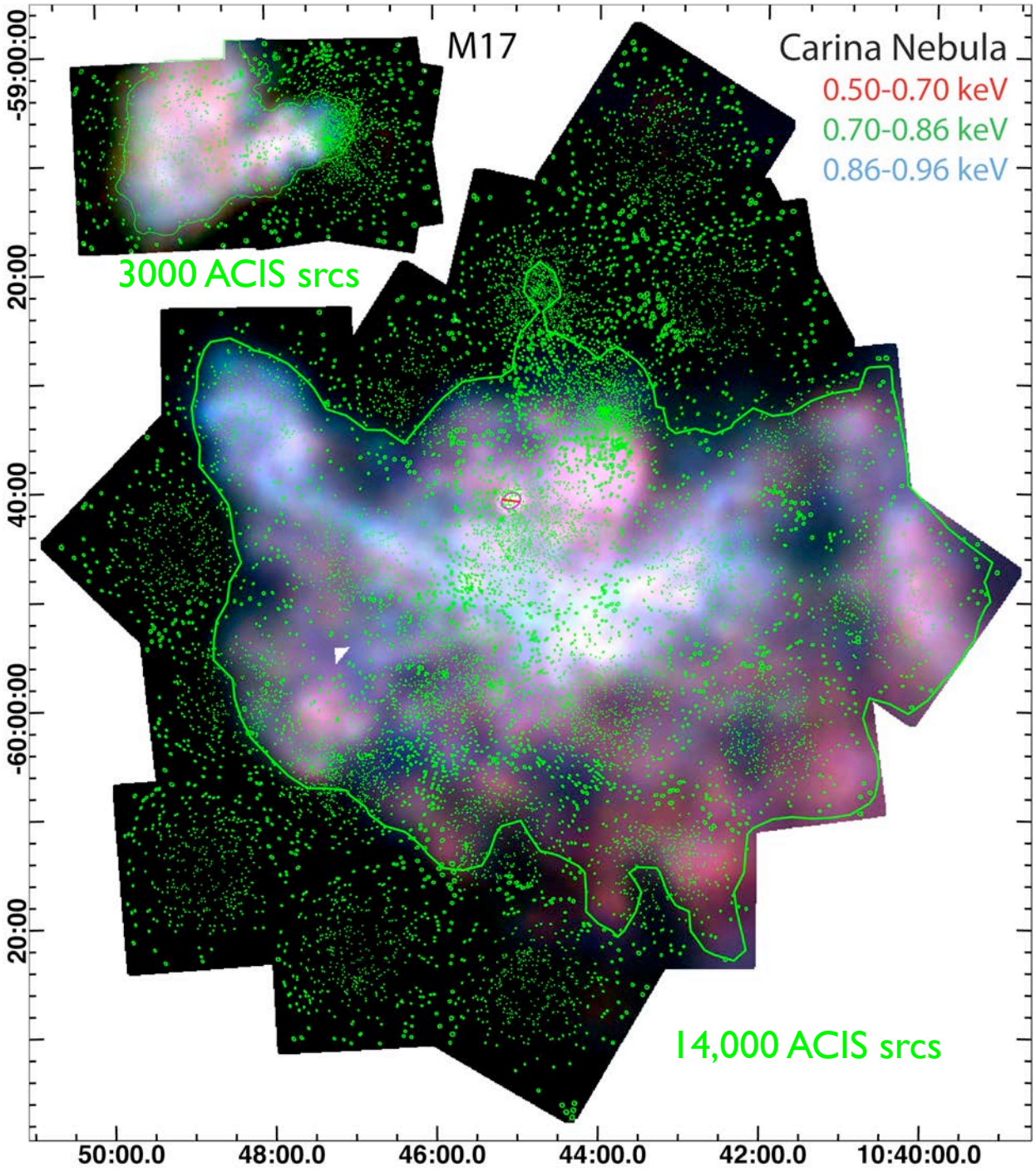
Birth of the Hot ISM

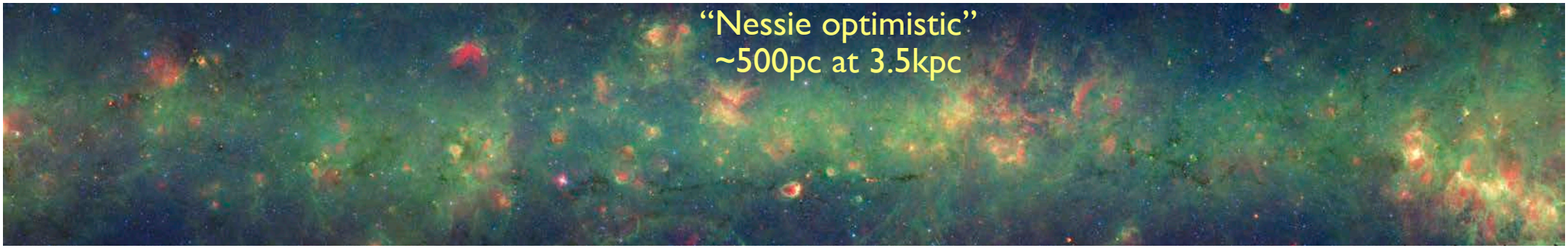


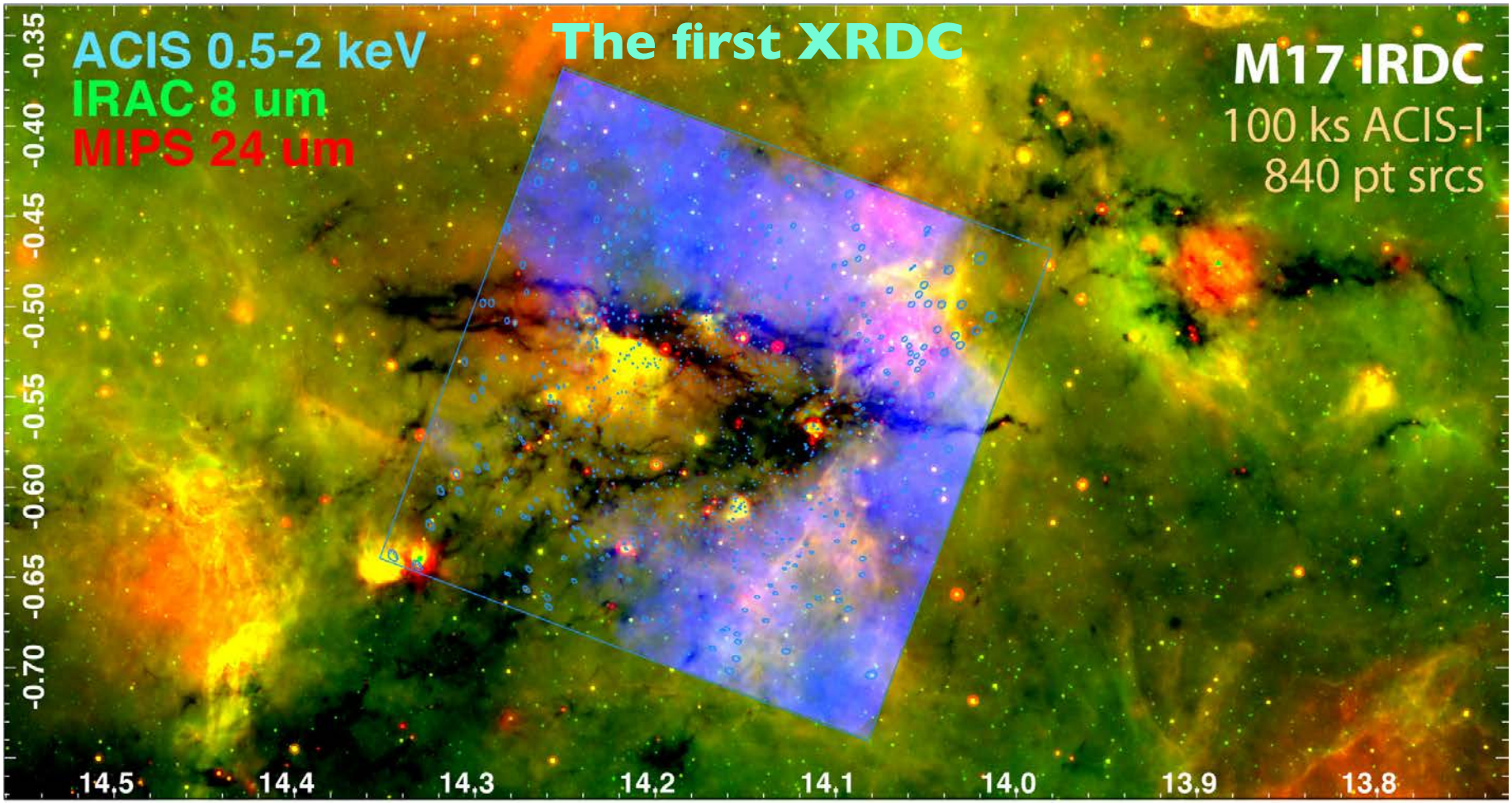
Chandra's spatial resolution lets us separate young stars from the faint diffuse X-rays surrounding them, tracing hot plasma generated by O star winds.
We see this emission in essentially all young clusters, as predicted 48 years ago. But most of the GLIMPSE bubbles remain unexplored...



X-raying the Bones of the Milky Way

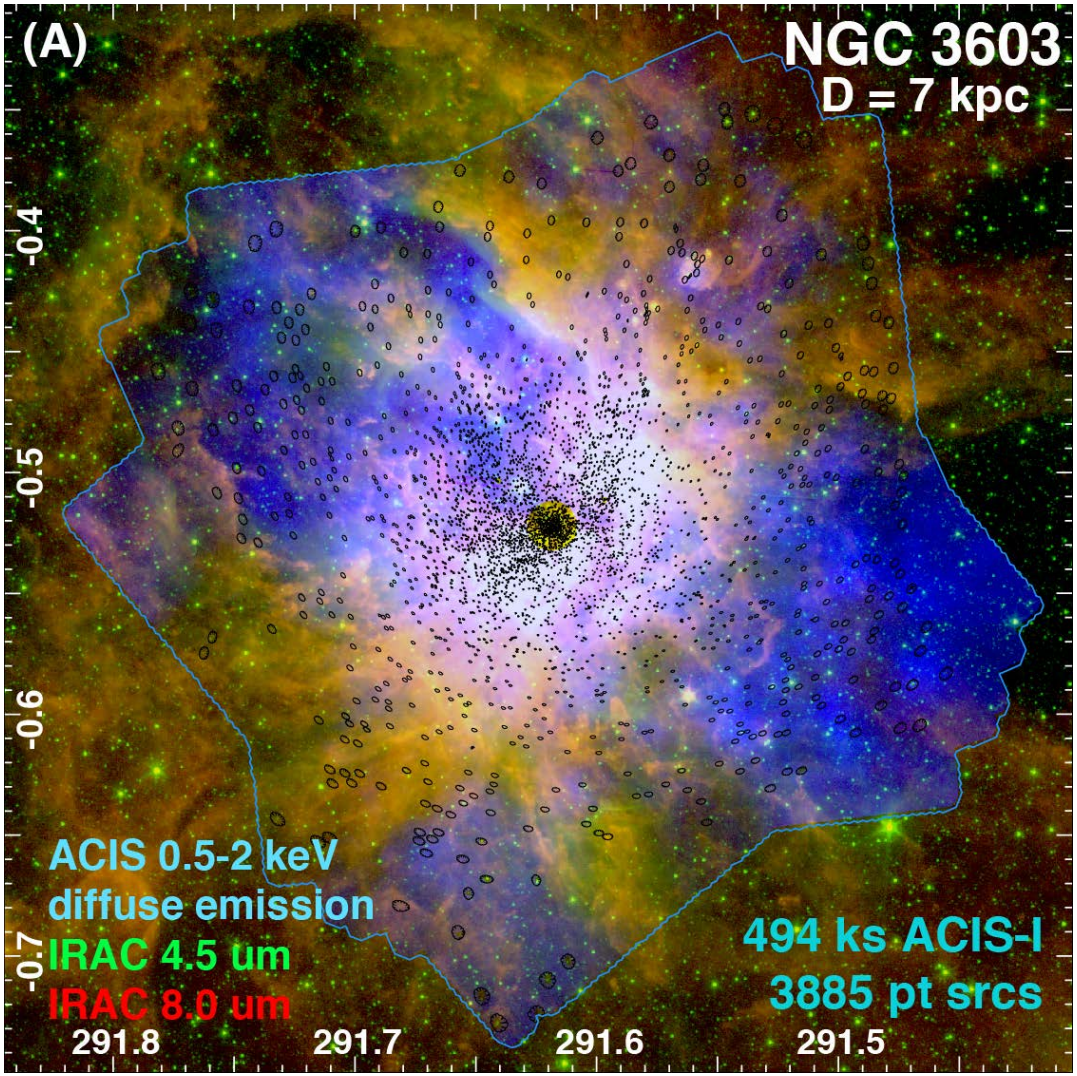
Goodman14: major Infrared Dark Cloud (IRDC) filaments form structures that extend for hundreds of parsecs and form the "spines" of the spiral arms.

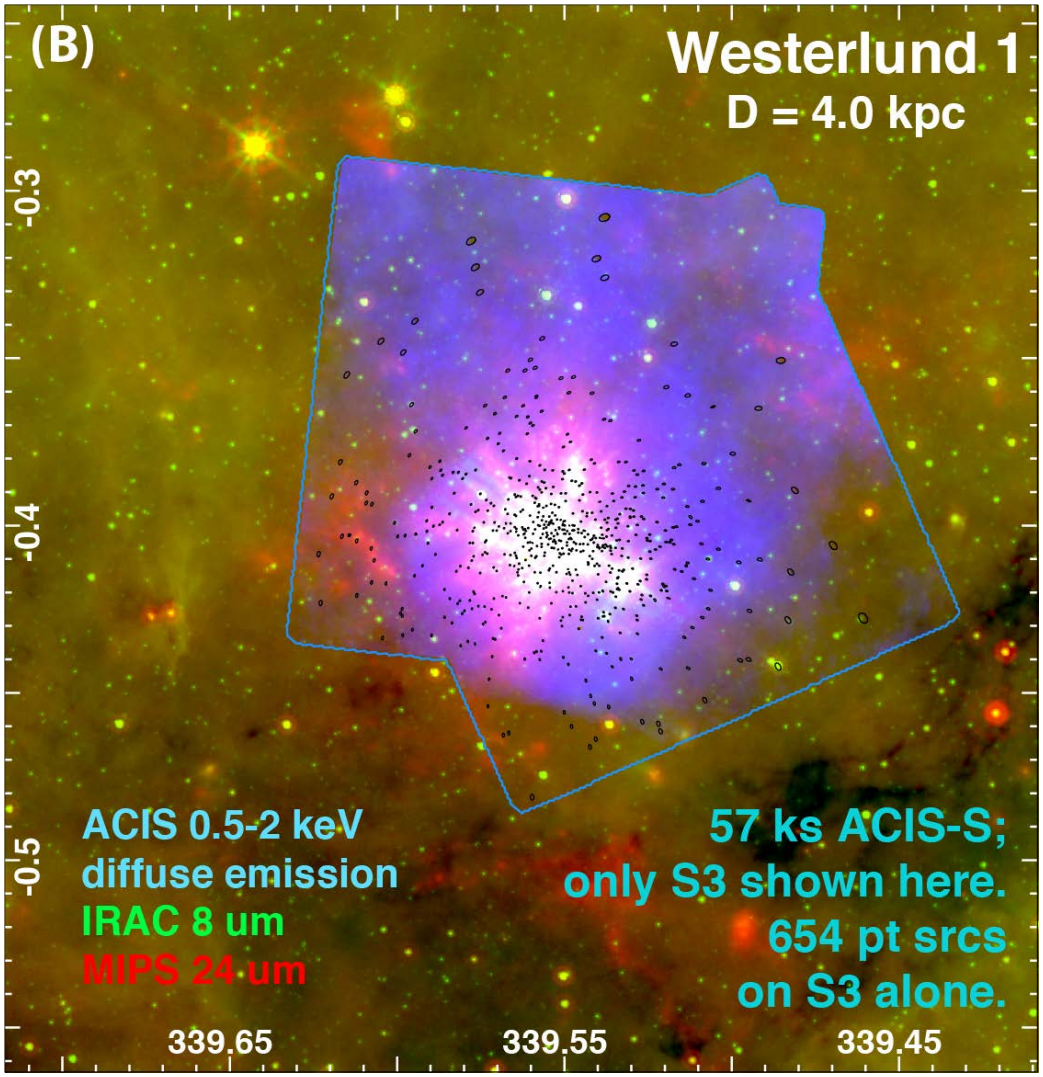




Povich16: Rapid Circumstellar Disk Evolution and a High Rate of Distributed Star Formation in the IRDC M17 SWex

Star Formation Powerhouses: Young Massive Clusters



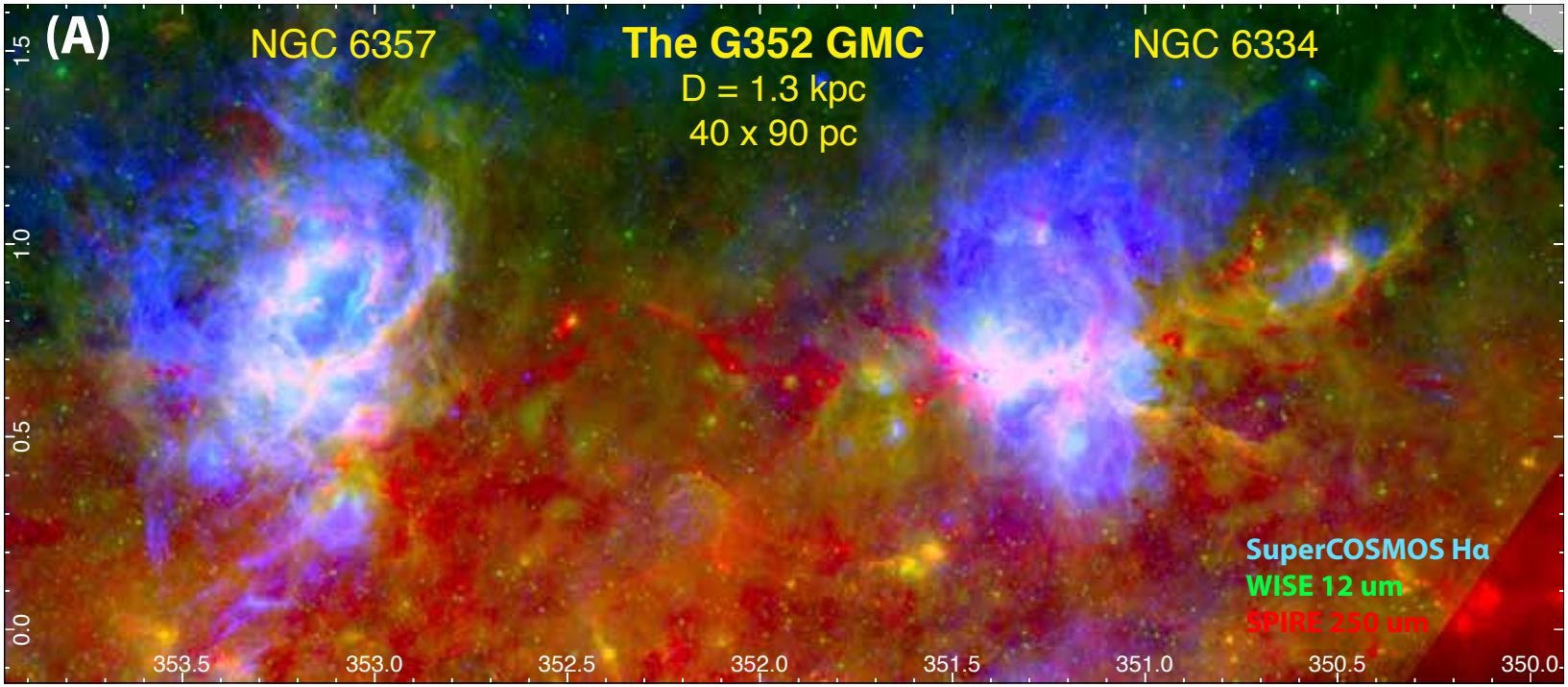


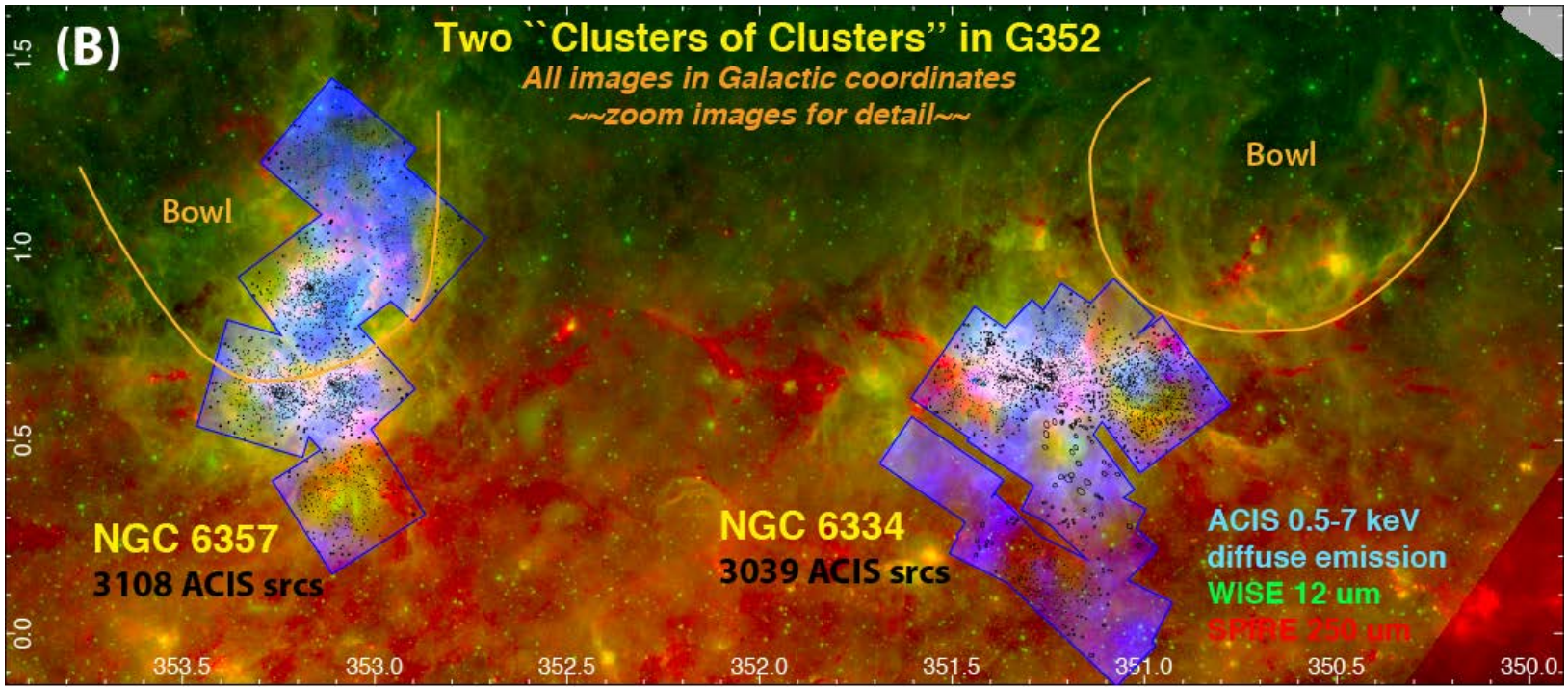
NGC 3603:
~2 Myr old,
13,000 Msolar;
diffuse X-rays from
wind shocks

YMCs shape galaxies, fuel the hot ISM, give birth to XRBs, SNRs, pulsars, gamma rays, etc. Here we see the rare beasts at the top of the IMF.

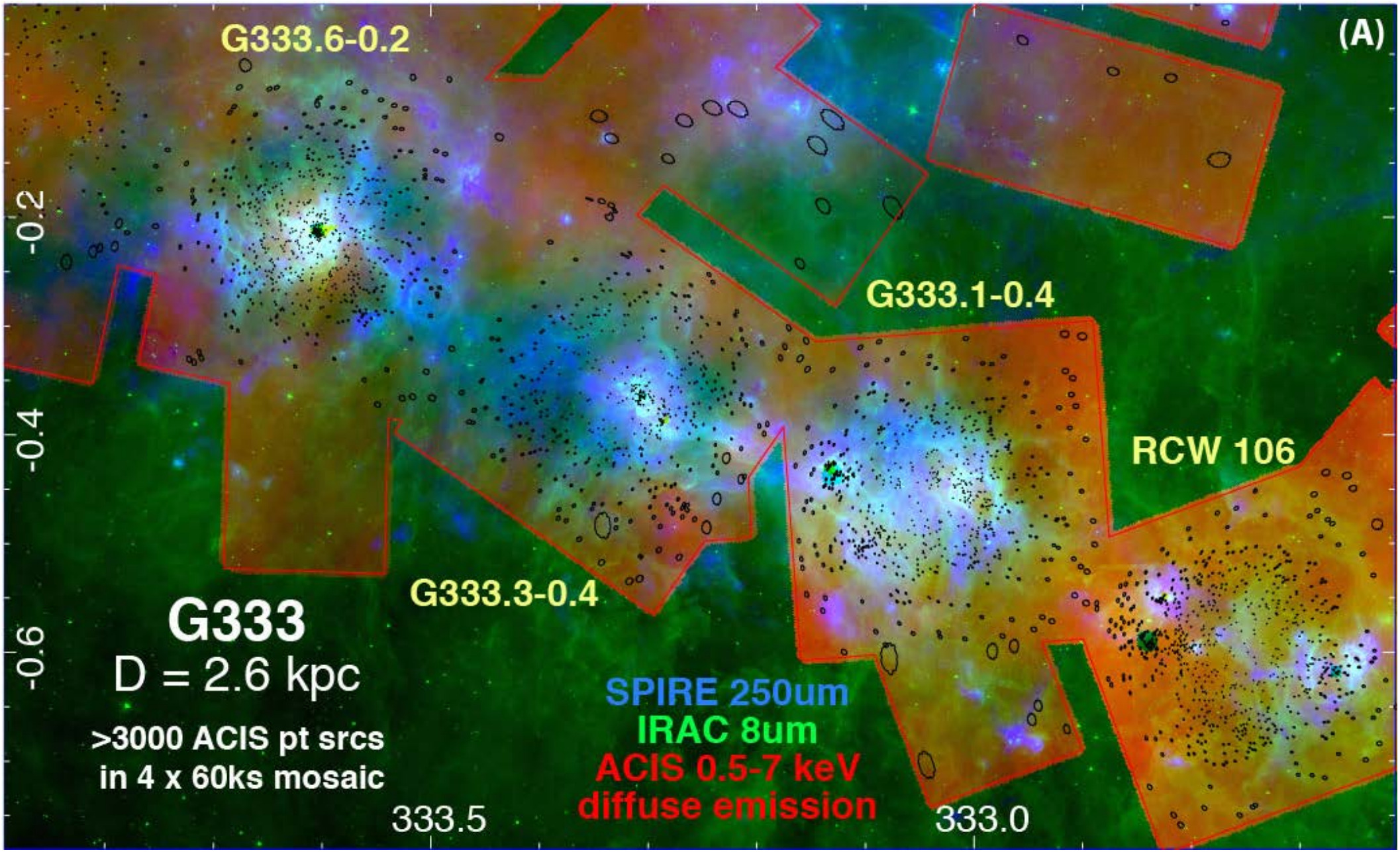
Wd1:
4 Myr old,
50,000 Msolar;
diffuse X-rays mainly
from cavity SNRs

For the big picture of Galactic star formation, survey whole giant molecular filaments





Chandra can piece together the structures (young clusters, SNRs) that make up major star-forming complexes.



We need comprehensive X-ray study of whole GMCs and major spiral arm filaments -- study the forest ecology, not just the butterflies and tigers.

The MCs: massive star feedback in an earlier cosmic time...