

The Multiple Star Formation History in NGC 346

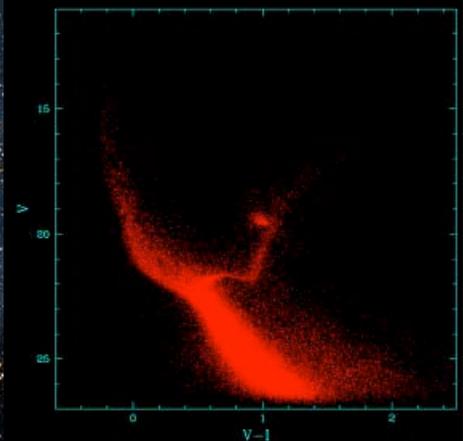
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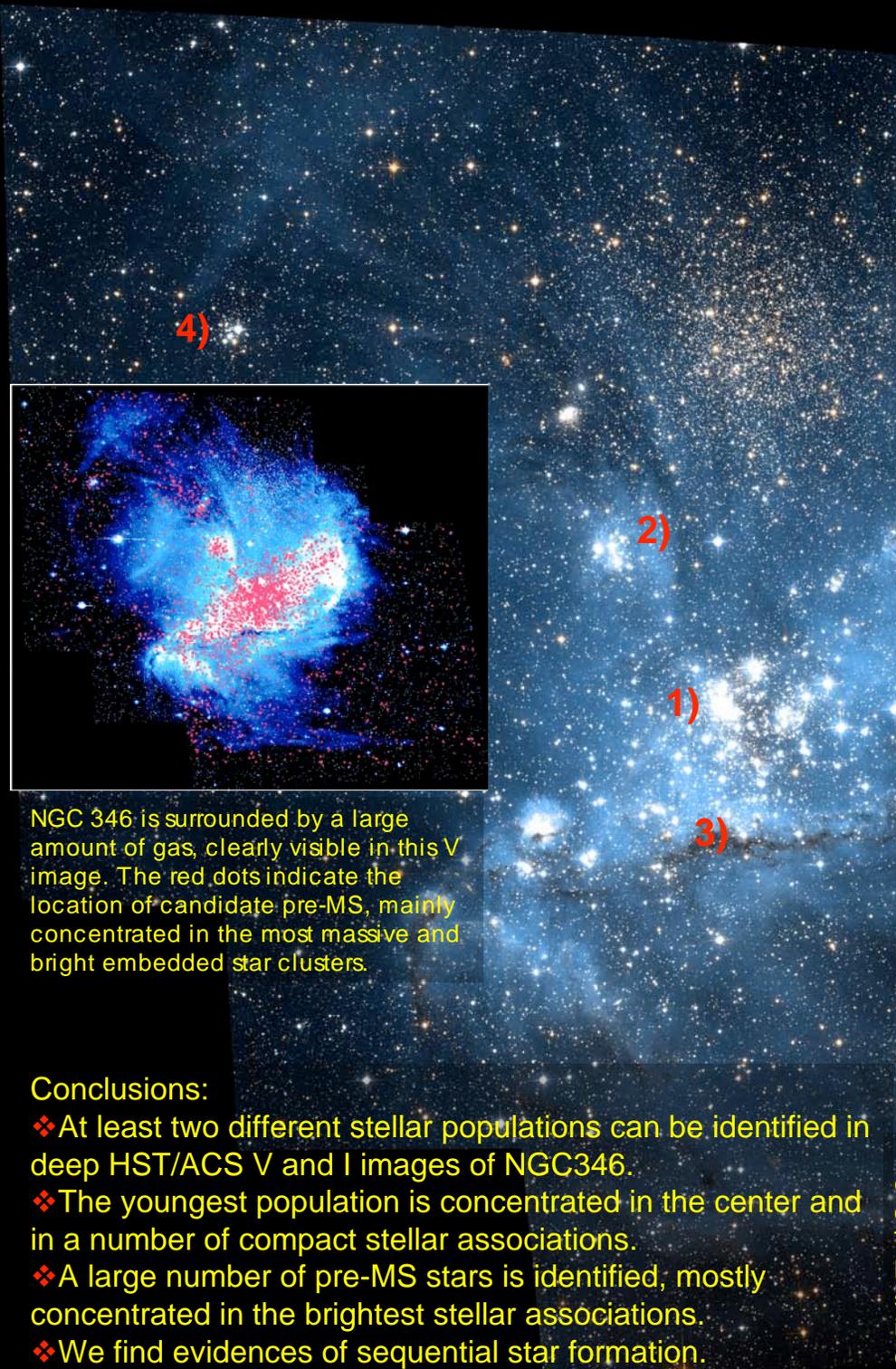
NGC 346 contains a significant fraction of the O stars known in the entire SMC. Ground-based narrow-band images show abundance of dust and compact embedded clusters, suggesting the presence of continuing star formation, triggered by the outflows from the ionizing cluster, as observed in 30 Doradus.

While the bright end of the stellar population ($V < 19.5$ mag) of NGC346 has been well investigated in the past 20 yrs, we have very little information on the faint end of the stellar luminosity function. The exquisite resolving power of deep HST/ACS allows us to investigate the cluster mass function down to $\sim 3M_{\odot}$ and to detect pre-MS stars down to $M \sim 0.5 M_{\odot}$.

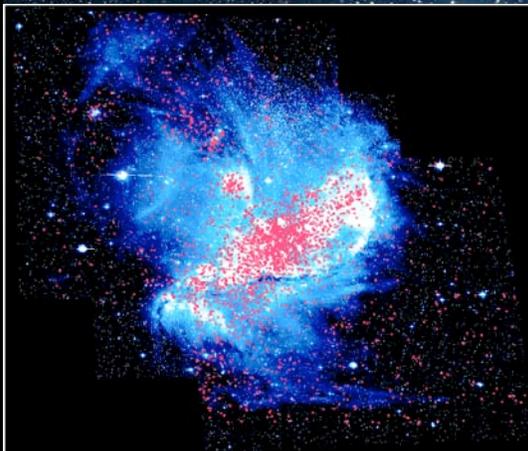
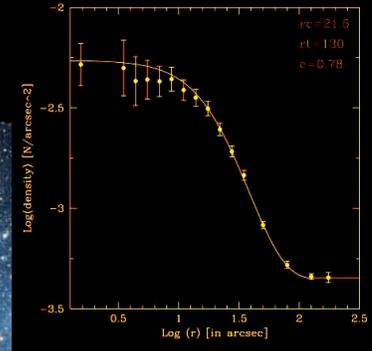
NGC346 ($\alpha=00:59:19$, $\delta=-72:10:48$) is an extremely young ($\sim 3-5$ Myr) compact cluster, which excites the largest ($\sim 420''$ in diameter) and brightest HII region, N66, in the Small Magellanic Cloud (SMC); its $H\alpha$ luminosity places it on the boundary between normal and giant extragalactic HII regions.

V, V-I Color-Magnitude Diagram (CMD) of the entire region. The stellar content of NGC346 is clearly indicated by the bright, blue young MS. A strong contamination is evident from the old SMC stellar population, with the MS-TO of the old stellar population indicating an average age of ~ 4 Gyr. A sequence parallel to the old MS is clearly visible at redder colors and fainter magnitudes.



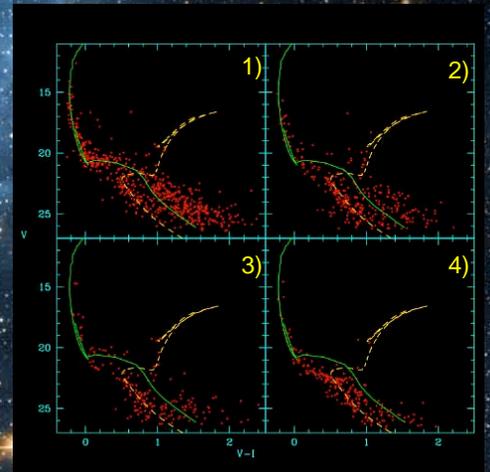


The core of an old (~4.5Gyr), relaxed globular cluster is clearly visible in the northern part of the region. This cluster extends over the entire region and contaminates its CMD.



NGC 346 is surrounded by a large amount of gas, clearly visible in this V image. The red dots indicate the location of candidate pre-MS, mainly concentrated in the most massive and bright embedded star clusters.

CMDs of four different stellar associations, indicated by the red numbers. Even in the innermost region it is possible to notice the contamination from the old cluster along the 4.5 Gyr.



Conclusions:

- ❖ At least two different stellar populations can be identified in deep HST/ACS V and I images of NGC346.
- ❖ The youngest population is concentrated in the center and in a number of compact stellar associations.
- ❖ A large number of pre-MS stars is identified, mostly concentrated in the brightest stellar associations.
- ❖ We find evidences of sequential star formation.

In the central region (Panel 1) the young MS ends at V~21.5. The sequence parallel to the old MS is likely constituted by pre-MS stars. These are stars in the mass range 0.3-3 Mo that have not reached yet the MS. Pre-MS stars are still visible in Panels 2 and 3. The association in Panel 4 is further away from the center and clearly older than the other.