

ENVIRONMENT OR STATISTIC? THE CASE OF M 83*

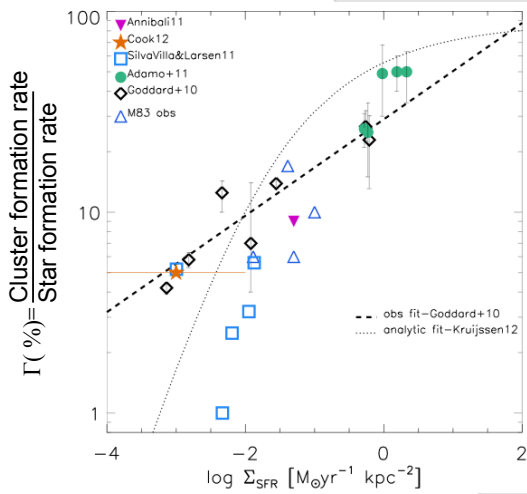
*by Silva-Villa, Adamo, & Bastian MNRAS submitted

Open question

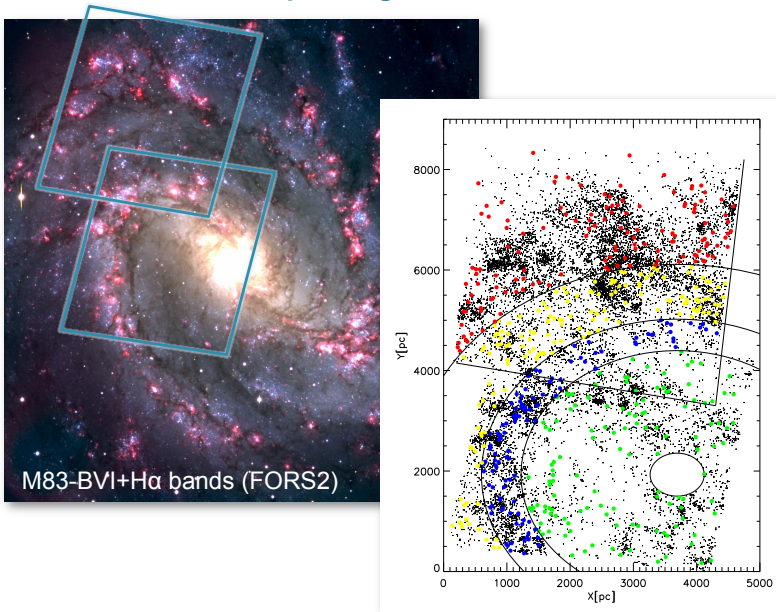
During the past years the accumulation of evidence showing the relation of the fraction of stars formed in clusters (Γ) and environment have challenged the accepted idea that most stars form in bound clusters (Fig. 1, Γ versus density of star formation rate Σ_{SFR}).

Why does it matter?

In order to quantify how accurate can star clusters be used to trace the star formation histories of galaxies at distances where single stars are beyond instrumental resolution, we need to quantify Γ and how this parameter is influenced by the local environment.



WFC3 pointing

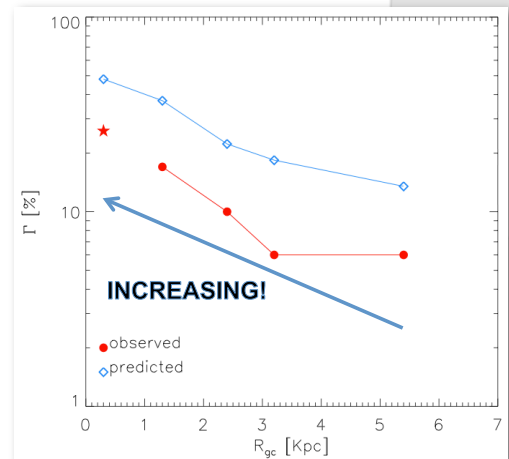


The result

Fig. 4 shows that the fraction of star formation happening in bound clusters decreases inside out. This trends, predicted by analytical models (Kruijssen 2012), agrees with the radial decrement of the gas surface density observed in M83.

The method

Using existing star cluster catalogues (Bastian et al 2012) and HST-WFC3 V and I images of the grand design, face-on spiral galaxy M83 (Fig.2), we present the observational estimates of Γ and how this relates with local environment. To avoid size-of-sample effects we bin the cluster data in annuli containing the same number of clusters (Fig. 3, colored dots). The underlying resolved stellar population (Fig. 3, black dots) has been used to derive the mean star formation rate in each the annulus.



HOW GALACTIC ENVIRONMENT INFLUENCES THE FRACTION OF STAR FORMATION HAPPENING IN BOUND CLUSTERS

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