

Erratum

The mass function of young star clusters in spiral galaxies

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ABSTRACT

An error was introduced in the equation used to calculate the number of clusters per age- and luminosity bin (Eq. (7)), affecting the predicted age distribution for a given cluster luminosity. Correction of this error leads to small adjustments in the relation between absolute magnitude and median age (Fig. 4) and in the model luminosity functions (Fig. 7). However, the changes are small enough that the results and conclusions of the paper remain unchanged.

Key words. Open clusters and associations: general – galaxies: star clusters – galaxies: spiral – errata, addenda

1. Erratum

An error was introduced when going from Eqs. (6) to (7) in the paper. While Eq. (6)

$$\frac{dN}{dL_V} = \frac{dN}{dM} \frac{dM}{dL_V}$$

is correct for current cluster mass M and V -band luminosity L_V , the current mass function is

$$\frac{dN}{dM} = \frac{dN}{dM_i} \frac{dM_i}{dM}$$

for initial mass M_i (see also Gieles 2009). The factor dM_i/dM follows by differentiation of Eq. (4) in the paper, but was neglected in Eq. (7) and the figures based on this equation. For brevity we define the ICMF, the initial cluster mass function (normalised to unit mass per unit time over a range of initial cluster masses $M_{lo} < M_i < M_{up}$), as

$$\psi(M_i) \equiv \frac{dN}{dM_i}$$

where, for example, $\psi(M_i)$ may be the Schechter function as

assumed throughout the paper. We may then write

$$\frac{d^2N}{dL_V d\tau} = \psi(M_i) \left(\frac{dM_i}{dM} \right) \Upsilon_V(\tau) \text{CFR}(\tau) f_{\text{surv}}(\tau)$$

for a star formation rate in clusters of CFR, mass-to-light ratio $\Upsilon_V(\tau) = dM/dL_V$ and infant mortality survival fraction f_{surv} . This relation replaces Eq. (7) in the paper.

In addition, the figures included in this *erratum* have been modified to use the Bruzual & Charlot (2003) tabulations of the mass fractions remaining after stellar evolution, rather than the parameterisation of $\mu_{\text{ev}}(t)$ from Lamers et al. (2005). Neither of these corrections change the conclusions of the paper, but lead to small adjustments in Figs. 4 and 7. The luminosity function slopes quoted in Sect. 4 of the paper remain the same within 0.01.

References

- Bruzual, G., & Charlot, S. 2003, MNRAS, 344, 1000
Gieles, M. 2009, MNRAS, 394, 2113
Lamers, H. J. G. L. M., Gieles, M., Bastian, N., et al. 2005, A&A, 441, 117

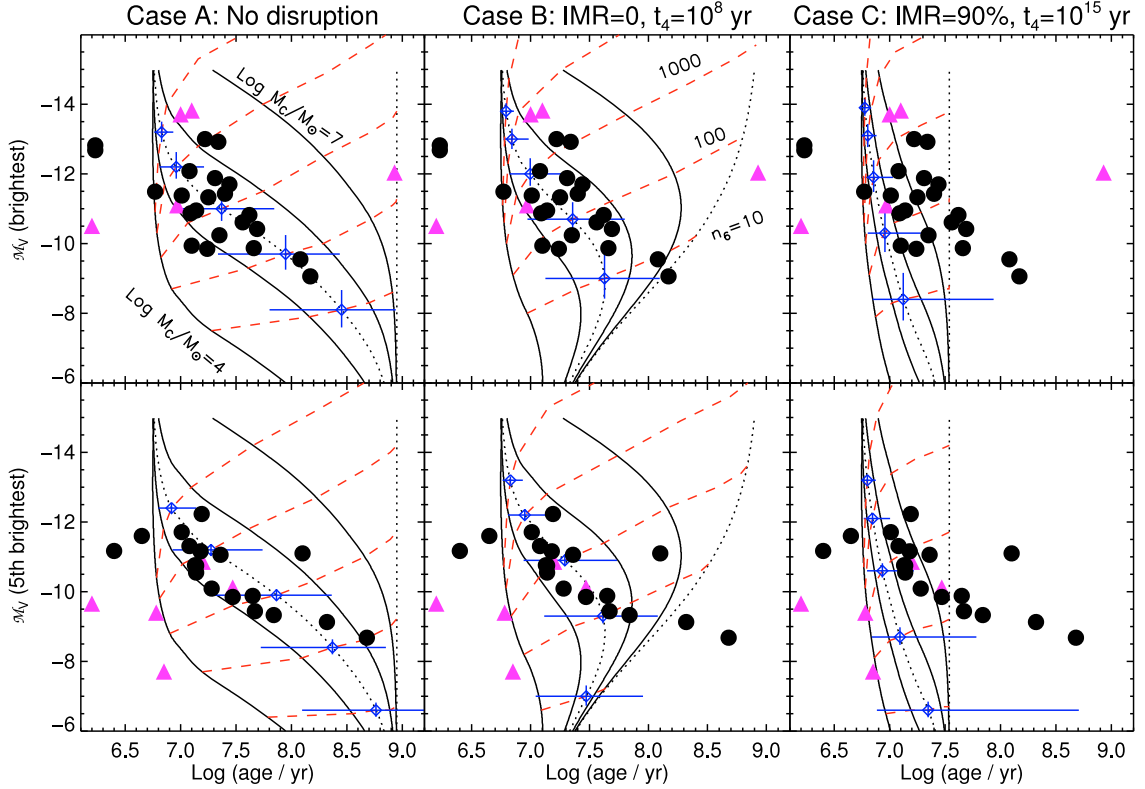


Fig. 4. The median absolute magnitude of the brightest (*top*) and 5th brightest (*bottom*) cluster versus median age. Results are shown for Schechter mass functions with $M_c = 10^4, 10^5, 10^6$ and $10^7 M_\odot$ and $\alpha = -2$ (solid curves), as well as for $M_c = 3 \times 10^5 M_\odot$ and $M_c = 10^{15} M_\odot$ (dotted curves). The (red) dashed lines are for constant total number of clusters ($n_6 = 10^1, 10^2, \dots, 10^5$) brighter than $M_V = -6$. The error bars mark the median absolute deviation of $\log(\text{age})$ and M_V for fixed M_c and n_6 . The triangles mark clusters in irregular galaxies while circles are for spirals (see Table 1).

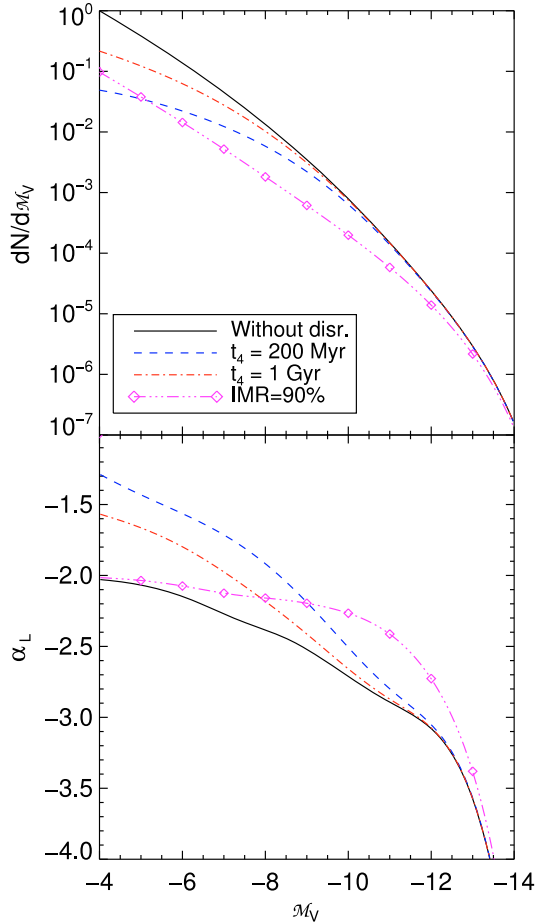


Fig. 7. *Top:* luminosity functions for a cluster sample with a Schechter mass function with $M_c = 2.1 \times 10^5 M_\odot$. *Bottom:* local logarithmic slope. In all cases, a constant cluster formation history has been assumed and various disruption scenarios are applied, as indicated in the legend.