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# Star formation history of Canis Major OB1 III: stellar group contents revealed by Gaia

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In this work, we found 15 physical stellar groups, 4 of which, the youngest, have similar characteristics and must be part of the CMa OB1 stellar association. The discovery of these groups endorses the hypothesis of multiple episodes of star formation and agrees with a monolithic scenario of star formation, with a common formation mechanism.

Our previous works, based on X-ray and infrared data (Gregorio-Hetem et al., 2009; Santos-Silva et al., 2021) we found that Canis Major OB1 (CMa OB1) is a Galactic stellar association having a very intriguing star-formation scenario, which probably had at least three star formation episodes (Fernandes et al., 2019).

To better understand the association stellar population and its star formation history, I recently conducted a study using HDBScan clustering code employing five-dimensional data (RA, DEC, pmRA, pmDEC and parallax) from the *Gaia*-DR2 catalogue to identify physical groups in the vicinity of CMa OB1 and to obtain their astrometric parameters. Additionally, we estimated the age of these groups using two different isochrone-fitting methods (Bonatto, 2019; Monteiro et al., 2020). With this, we confirm the existence of 15 star groups with distances between 570 and 1650 pc, of which 10 are previously known clusters and 5 are new open cluster candidates.

We identified that four younger groups (< 20 Myr), CMa05, CMa06, CMa07 and CMa08, are CMa OB1 contents (see Fig. 1). While CMa06 coincides with the star formation region very well studied by our group, CMa R1, CMa08, one of the new candidate clusters, may be the progenitor cluster of runaway stars that indicate the existence of different star formation episodes in the association. Since the youngest group, CMa06, is still immersed in the remaining material of the molecular cloud associated with the Sh 2-262 nebula, it continues to form stars, the other groups, CMa05, CMa07, and CMa08, seem to be in more evolved stages of evolution, with no recent star-forming activity.

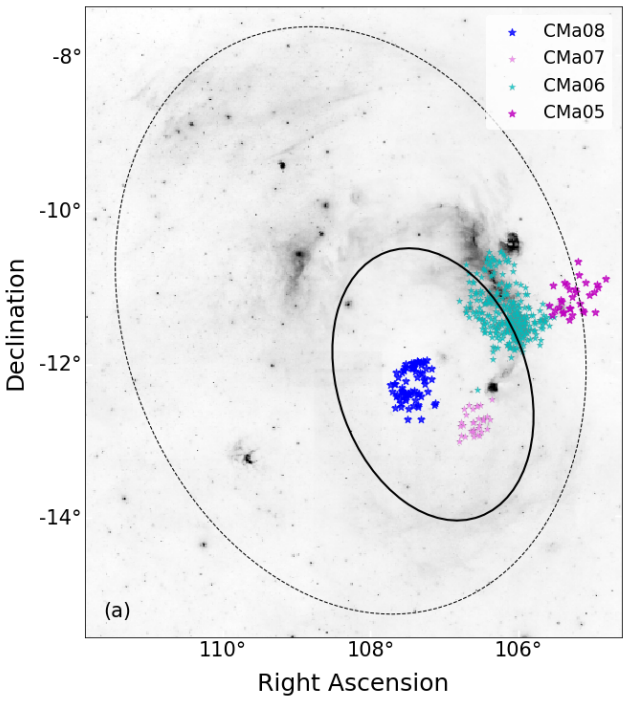


**Figure 1.** Fig.9 (a) from Santos-Silva et al. (2021). (a) Spatial distribution on Digital Sky Survey image (640 nm) with CMa OB1 groups: CMa05 (magenta), CMa06 (cyan), CMa07 (light pink), and CMa08 (blue).

The results of this work fit well in a monolithic scenario of star formation, with a common formation mechanism, and having suffered multiple episodes of star formation. This suggests that the hierarchical model alone, which

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explains the populations of other parts of the same association, is not sufficient to explain its whole formation history.

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