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Building the largest sample of open cluster masses with Gaia DR3 (poster pitch)

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Open clusters (OCs) play a fundamental role in understanding star formation, evolution, and the Milky Way's structure. The ESA space-based mission Gaia has significantly improved our knowledge of OCs and the Milky Way through precise astrometric and photometric data. The main objective of this research is to construct an extensive sample of estimated OC masses using Gaia DR3. We analyze 2880 OCs within 2 kpc, estimating masses using different methodologies depending the OC distance and on the number of member stars. Our analysis reveals that the mass function's break varies with cluster distance, suggesting an observational bias. The break of the function also shifts towards higher masses as the cluster ages. Older clusters exhibit a less steep high mass slope. Moreover, for clusters older than log t = 9.3, high-mass clusters become scarce, while low-mass clusters prevail. The spatial distribution of cluster masses in the Galactic disk indicates fewer high-mass OCs at bigger vertical distances abs(z) from the Galactic plane, with only low-mass OCs observed at the biggest z-values. Clusters in sparse regions exhibit higher mean tidal mass compared to those in spiral arms. Upon evaluating the completeness of our sample, we have identified a discrepancy in our cluster age function compared to the one derived using completeness-corrected Gaia DR2, highlighting the need for completeness corrections.

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