

A SYNOPTIC VIEW OF THE MAGELLANIC CLOUDS:  
VMC, GAIA AND BEYOND

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**A complete massive star census of  
R136/NGC2070, the core of  
30 Doradus**

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Massive stars are key to our understanding of galaxy evolution and the chemical enrichment of the universe, yet their formation, evolution and final fate is poorly understood. We have undertaken a complete census of NGC2070, the central, rich region of the 30 Doradus star-forming complex with VLT/MUSE, plus the young massive star cluster R136 at its core, with HST/STIS, each complementing the multi-epoch VFTS survey with VLT/FLAMES. Together these represent the largest complete sample of massive stars, with which to study their properties and evolution, including in excess of a dozen very massive stars over 100 solar masses. The initial mass function of massive stars in 30 Dor has been found to be top heavy. The ionising output is dominated by the most massive stars. Stars are He enriched at the highest masses, owing to a combination of mass loss which reveals hydrogen deficient lower layers and mass dependent core-overshooting which mixes the synthesized material from the core to upper stellar layers. We have developed a theoretical description, which can explain the empirical mass-loss dependence on the Eddington factor.