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Supergiant Stars as Abundance Probes

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Abstract. By compiling abundances from red and blue supergiants (SGs) within the Local Universe, I present the Mass-Metallicity relation (MZR) using stellar tracers, demonstrating the excellent internal consistency. Comparing this result with nebular tracers, those empirically calibrated to direct-method studies provide the most consistent results.

Keywords. stars: abundances, (stars:) supergiants, galaxies: abundances, galaxies: dwarf

Massive stars are important probes of chemical evolution in star-forming galaxies. These tracers represent the youngest stellar population and provide robust, independent abundance estimates, important to constrain models of galactic chemical evolution and to anchor the more uncertain nebular estimates at larger distances. Massive stars have been used to examine the metal-content and -distribution in many Local Universe galaxies out to distances of ∼20 Mpc.

Blue and Red SG stars are the brightest components in stellar populations in the optical and near-IR, respectively. Even though these stars are evolved products, they

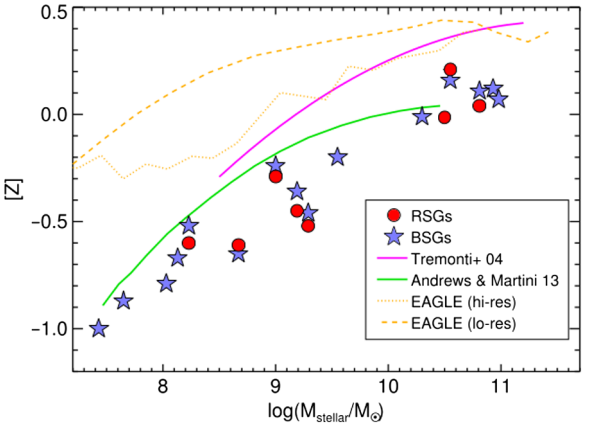

Figure 1. MZR estimated using stellar tracers from Davies *et al.* (2017), using both red and blue SG metallicities in Local Universe galaxies. The MZR from direct line measurements of H II regions shows the best agreement.

are still remarkably young objects (<50 Myr). Intermediate resolution multi-object spectroscopy combined with state-of-the-art stellar model atmospheres, are vital for realising the potential of these stars (e.g. Evans *et al.* 2011).

Recent results demonstrate the internal consistency between the stellar tracers in different systems (e.g. Gazak *et al.* 2015; Patrick *et al.* 2017). These results are compiled in Fig. 1 and shown against nebular tracers at larger distances. Using this comparison, we determine that nebular tracers empirically calibrated to direct-method studies provide the most consistent results.

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