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ABSTRACT
The Red Giant Branch Bump is a unique evolutionary feature whose observed properties are direct probes of star's inner structure. We generate synthetic RGB2 magnitudes using the Dartmouth Stellar Evolution Program (DSEP) code (Dotter et al.) and compare these to the 70 cluster, observational sample of Nataf et al. 2013. Our best fitting DSEP model yields reasonable agreement in the observed low [Fe/H] region: [Fe/H] = −1.0 to −2.3, and can be used to better estimate the mass of the convective envelope in the RGB bump. We show the mass of the convective envelope against luminosity for 13 Gyr, [α/Fe] = 0.4, and 15 Gyr, [α/Fe] = 0.4 models, and the effect of overshoot is about 6% in the maximum mass of the convective envelope on the RGB bump.

BACKGROUND
The Red Giant Branch Bump: A Sensitive Probe of Mixing in Lower Mass Stellar Models
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EVOLUTIONARY IMPACT OF OVERSHOOT CORRECTION
We show four stellar tracks (13 Gyr, [α/Fe] = 0.4, [Fe/H] = −1.0; 1 Gyr, [α/Fe] = 0.4; 10 Gyr, [α/Fe] = −1.0; 13 Gyr, [α/Fe] = 0.4) evolved with different overshoot values as indicated. The effect of increased overshoot is, in part, moving the maximum depth of penetration reached by the convective envelope to an earlier point in the star's evolution. More significantly, the effect corresponds to a temporal shift in the occurrence of the Red Giant Branch bump.

THE RGBB IN TERMS OF CONVECTIVE ENVELOPE MASS
The mass of the convective envelope is shown against luminosity for the same four overshoot values and baseline model parameters used in the central panel. Evolutionary time is traced along the luminosity curve from left to right, where the dot correspond to the RGB bump.

CHANGE IN MASS
We implement a \( \chi^2 \) minimization routine to assess the goodness of fit of our best model to N2013's data. We use a combination of LOF and best fit 13 Gyr model to quantify the trend. The mass of the convective envelope adjusted to zero the model's predictions with N2013's data. A sensitive probe of mixing in lower mass Stellar Models.

QUANTIFYING RESULTS
Identifying Outliers
A GC may be classified as an outlier in two ways:
(1) If it's contribution to the total reduced \( \chi^2 \) score, or \( \chi^2 \) score, is sufficiently large
(2) its \( \chi^2 \) score computed using the 4D Local Outlying Factor (LOF) algorithm is sufficiently large

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