A New Star-Forming Region in Scorpius-Centaurus

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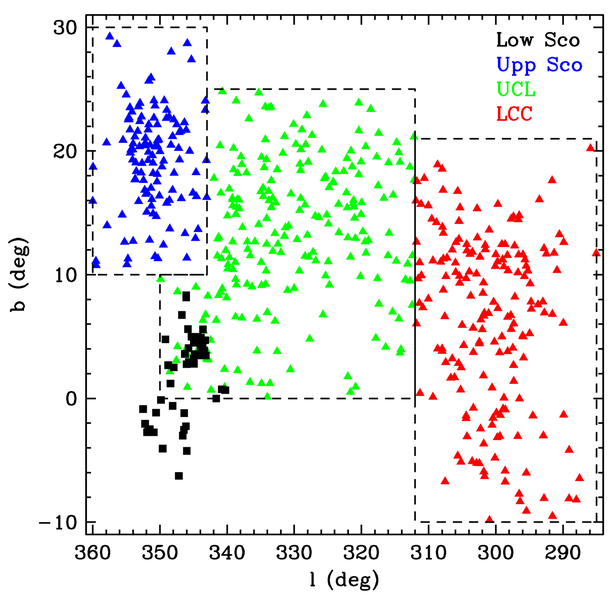
ABSTRACT

We present the results of a survey of ~70 stars in the nearby Scorpius-Centaurus OB association based mainly on high-resolution spectra from the Magellan Clay 6.5-m telescope. A subsample of these stars are lithium rich, have common velocities, and are clustered near the southeastern part of the Upper Centaurus-Lupus sub-region of Scorpius-Centaurus. Given their separation away from known members, clustering, and youth, we believe that many of these stars constitute a new sub-region of Scorpius-Centaurus, which we propose to call "Lower Scorpius". For this new group, we estimated stellar parameters including temperature, surface gravity, metallicity, radial velocity, and projected rotational velocity.

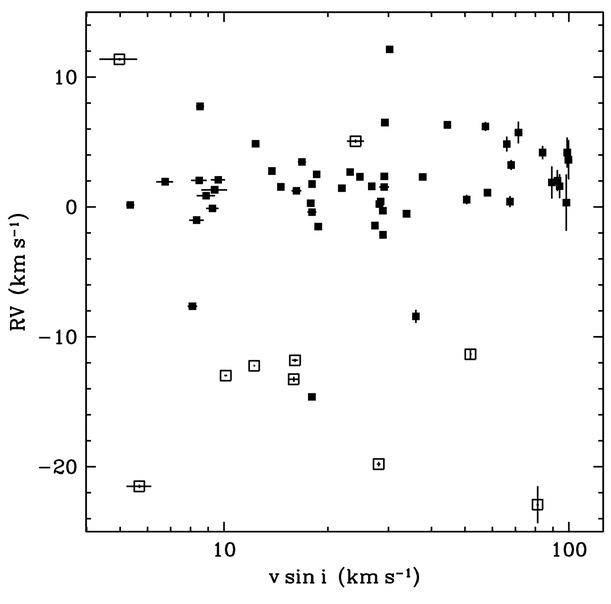
SCORPIUS-CENTAURUS

- Nearest site of recent massive star formation
- Known Subgroups
  - Upper Scorpius: ~12 Myr, ~145 pc
  - Upper Centaurus-Lupus: ~16 Myr, ~140 pc
  - Lower Centaurus-Crux: ~17 Myr, ~118 pc



Lower Scorpius sample relative to other Scorpius-Centaurus subgroups.

VELOCITIES

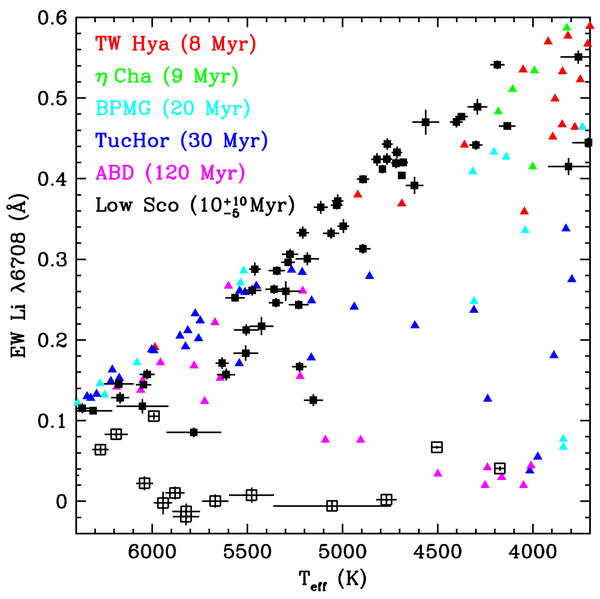


Group radial velocities consistent with other Sco-Cen subgroups.

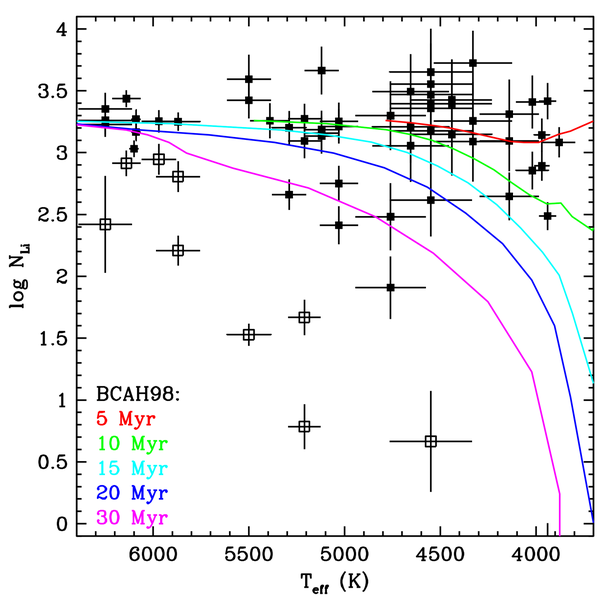
ANALYSIS

- Stellar parameters estimated using Spectroscopy Made Easy (SME) (Valenti & Piskunov 1996) including $T_{\rm eff}$, log g, [M/H]
- Adopted solar abundance pattern from Grevesse et al. (2010)

LITHIUM ABUNDANCE

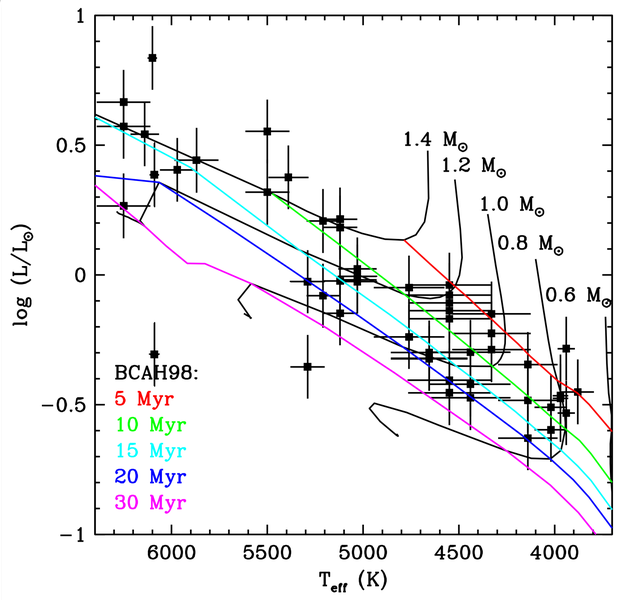


Li-6708 equivalent widths match those for PMS stars from Mentuch et al. (2008).



Most candidate members have estimated lithium abundances consistent with ages < ~20 Myr.

ISOCHRONES



Nearly all candidates have luminosities and temperatures consistent with Baraffe et al. (1998) isochrones between 5 and 20 Myr.

RESULTS

- Possible new star-forming subgroup of Scorpius-Centaurus
- Age < ~20 Myr based on lithium abundance and isochrone fits
- Velocities consistent with other Sco-Cen subgroups
- Lower Scorpius [M/H] = 0.09 ± 0.09

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