

VLT/FLAMES observations of Collinder 261

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Abstract. We report on results of VLT/FLAMES observations of the very old cluster Cr 261. We compare the results with those of other clusters older than the Hyades.

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1. Introduction

The study of open clusters has received a great boost with the advent of the multi-object spectrograph FLAMES at the VLT, due both to the larger telescope area and to the multiplexing capability. Open clusters are among the preferred targets for observations with FLAMES, since they are key tracers of stellar and Galactic evolution. In particular, they offer a unique opportunity for investigating Li depletion and non-standard mixing mechanisms in stars during their main-sequence evolution (see reviews by Deliyannis 2000, Jeffries 2000, Pallavicini *et al.* 2004).

2. The observations

We have observed with FLAMES the open clusters NGC2506 (age ~ 2 Gyr, Marconi *et al.* 1997), Melotte 66 (~ 4 Gyr, Kassis *et al.* 1997) and Cr 261 (~ 7 Gyr, Gozzoli *et al.* 1996; Friel *et al.* 2003; Prisinzano *et al.* 2005). The spectroscopic data, obtained with the GIRAFFE spectrograph, were reduced with the standard pipeline and are being analysed to derive radial velocities, Li abundances, and metallicities for turn-off (TO) and lower MS stars. Preliminary results on Li abundances in Cr 261 are presented here. Results for the other clusters will be reported elsewhere (Spanò *et al.* 2005).

3. Results for the old cluster Cr 261

Cr 261 is one of the oldest open clusters in the Galaxy, with an estimated age ranging from ~ 7 to ~ 9 Gyr (Janes *et al.* 1994; Phelps *et al.* 1994; Gozzoli *et al.* 1996; Prisinzano *et al.* 2005). The metallicity, derived from both low-resolution and high-resolution spectra, is slightly subsolar (Friel *et al.* 2002; Friel *et al.* 2003) and the reddening is highly uncertain, with quoted E(B-V) values ranging from 0.22 to 0.34 (Janes *et al.* 1994; Mazur *et al.* 1995; Gozzoli *et al.* 1996; Prisinzano *et al.* 2005; see however Bragaglia *et al.* 2005 for different results). Our radial velocity analysis has identified 138 likely cluster members, out of 220 observed stars, with a maximum of 9 possible spurious objects. Li abundances (Fig. 1) show a spread nearly as large as the one in M67 (Jones *et al.* 1999) except for the fact that the upper limits in Cr 261 are significantly higher than in the latter cluster. The derived maximum Li abundances for solar-type stars are comparable to those measured in the very old (~ 6 -8 Gyr) cluster NGC 188 (Randich *et al.* 2003) and in the

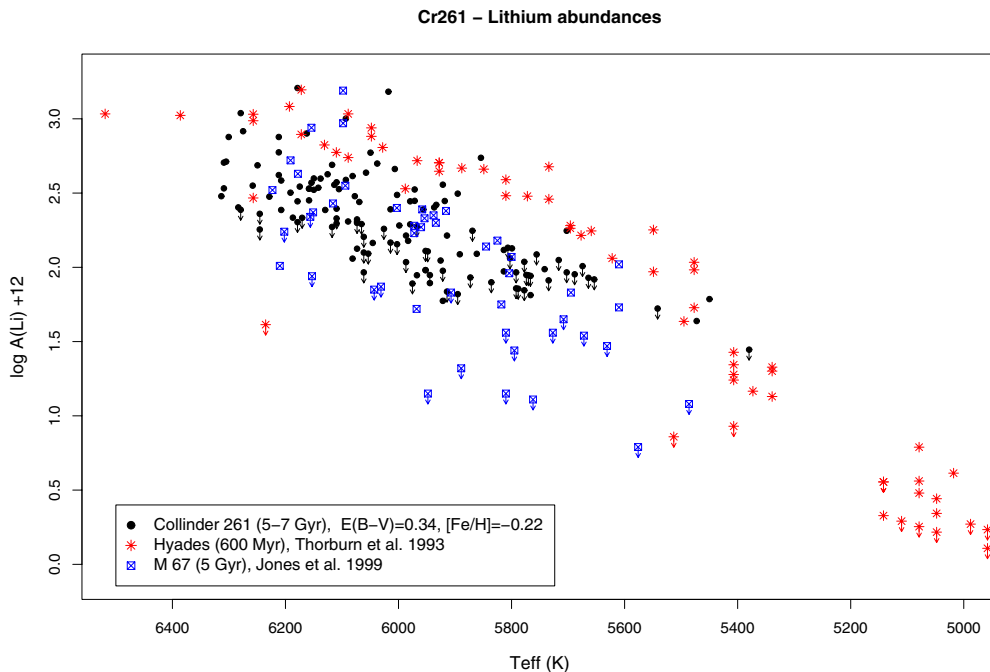


Figure 1. Li abundances vs. T_{eff} for MS stars in Cr 261.

upper envelope of the Li distribution of M 67, but are affected by a large systematic uncertainty due to the poorly determined reddening of the cluster. Comparison of the Li vs. Teff distribution of Cr 261 with those of the Hyades and M 67 suggests a high value of the reddening (~ 0.34) close to the highest value found in previous studies. A high-value of the reddening is also required to bring photometric and spectroscopic temperatures into agreement (cf. Friel *et al.* 2003).

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