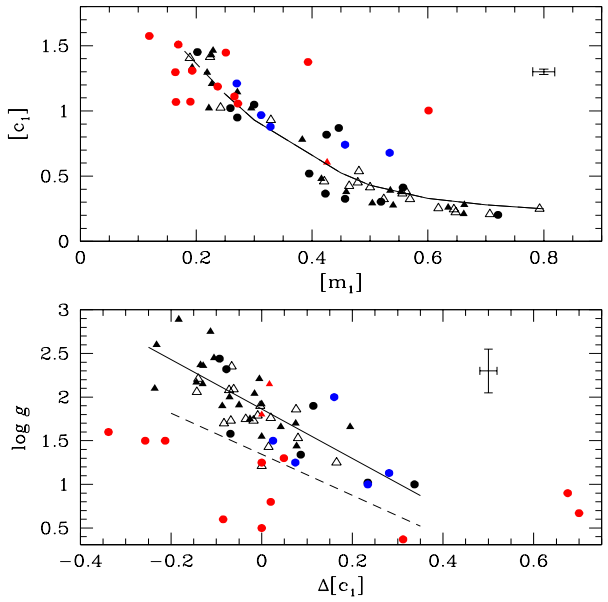

Fig. 6. Inclusion of post-AGB and RV Tau stars in the log g calibrations. The top panel shows the $[m_1]$-$[c_1]$ plane and the fiducial line definded by Gray (1991), relative to which the $\Delta[c_1]$ parameter is measured. The lower panel shows the distribution of the different groups of stars in the $\Delta[c_1]$- log g plane. Symbols are as in Figure 5. See text for discussion.

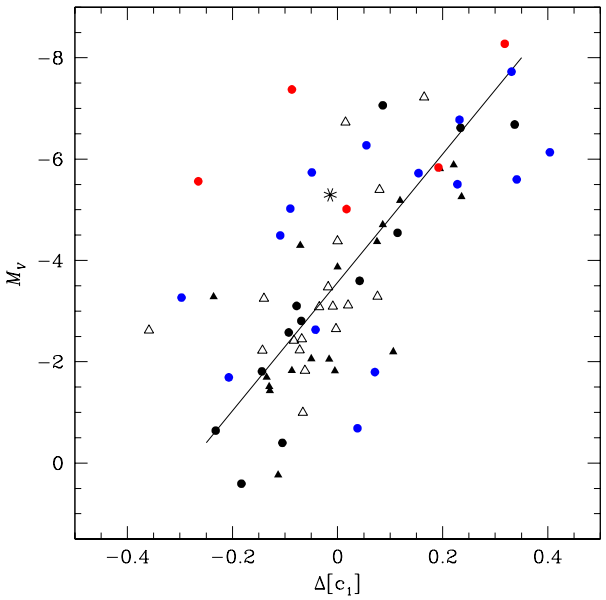

Fig. 7. Trend of M_V with $\Delta[c_1]$. The black symbols are as in Figure 1. The blue circles correspond to a sample of F-G supergiants and the red circles to a well documented post-AGB stars taken from Table 3 of Arellano Ferro et al. (2003), where values of M_V were calculated from the O I 7774 feature.

M_V and $\Delta[c_1]$. In Figure 7 the plot of $\Delta[c_1]$ vs M_V is shown. Although a trend is clearly seen, the scatter is large ($\sigma = 1.3$ mag). Inclusion of the color term, $(b-y)_0$ does not improve the relationship ($\sigma = 1.1$ mag).

We find of interest to consider a sample of F-G supergiants and 5 well documented post-AGB stars listed by Arellano Ferro et al. (2003) (their Table 3) for which values of M_V have been calculated from the O I 7774 calibration. $uvby-\beta$ photometry for all these stars is available in the *Simbad* data base and thus we can calculate their $\Delta[c_1]$ parameters. They are plotted in Figure 7 (blue and red symbols) along with the F-G supergiants of Table 1. We see that both groups of stars follow the same trend and display a similar scatter. One can conclude from this that while the distances in Lyubimkov et al. (2010) are consistent with the absolute magnitudes predicted from the strength of the O I 7774 feature in F-G supergiants, a reliable calibration of M_V in terms of a photometric index, for example $\Delta[c_1]$, is not foreseen.

7. CONCLUSIONS

New accurate values of $T_{\rm eff}$ and log g (Lyubimkov et al. 2010) lead to reliable functional relationships for the Strömgren reddening free indices $[c1]$ and $[m1]$, which allow to predict the effective temperature and gravity of F-G supergiants. The temperature calibrations are given in equations (1) and (2) which predict the effective temperature with an standard deviation of 152 K. If the reddening is available, alternative calibrations, given by equations (3) and (4) provide slightly smaller standard deviations (129 and 119 K respectively). These calibrations are valid for the more evolved post-AGB stars of similar temperature and gravity. Given the fact that RV Tau stars are variables of large amplitude, it is rewarding to see that the five RV Tau stars included follow the temperature trends very closely. Perhaps their mean temperature and photometric indices are not too different from the temperatures reported by Stasińska et al. (2006) and the mean photometric indices calculated here.

The stellar gravity can also be predicted from the $\Delta[c_1]$ index (Gray 1991) from the calibration given by equation (5), with an accuracy 0.28 dex. The color term was found to be insignificant. This equation is valid for F-G yellow supergiants and very likely for RV Tau stars. However, well known post-AGB stars of similar temperature and gravities (see Table 2) do not follow the calibration.