

ABUNDANCES OF LONG-PERIOD VARIABLES: INITIAL RESULTS

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ABSTRACT. The kinematics of the long-period variables (LPVs), both in the LMC (Hughes et al. 1991 AJ 101, 1304) and in the Galaxy (eg. Feast 1963 MNRAS 125, 367) shows that there exists an Age-Period relation for these objects. Low-resolution (FORS) spectra have been obtained for a sample of SMC, LMC and Galactic LPVs using the Anglo-Australian Telescope, with the ultimate aim of using the bandstrengths of the TiO bands, in combination with a temperature indicator derived from the continuum, to estimate their metallicities in a method similar to that used by Mould and Bessell (1982 ApJ 262, 142), but using the TiO bandhead at 8480 Å. Metallicity estimates of these variables are essential, both in (1) verifying the finding of Wood et al. (1991 *The Magellanic Clouds*, eds. R.Haynes and D.Milne, (Kluwer: Dordrecht), p259) who theorise that the scatter in the mean Period-Luminosity and Period-Color relations of the LPVs in the LMC (Feast et al. 1989 MNRAS 241, 375) could be produced by a scatter in abundance, and (2) in investigating whether there exists a correlation between abundance, kinematics and period (age) for the LPVs in the LMC, as appears to be the case in the Galaxy.

Unfortunately, while the expected trend in bandstrength versus metallicity (Figure 1) is seen for the objects observed in 47 Tucanae, the LMC and the SMC, those objects observed in the solar neighbourhood run counter to this trend, indicating a problem with the method, most probably related to the continuum (temperature) estimate for very late M stars.

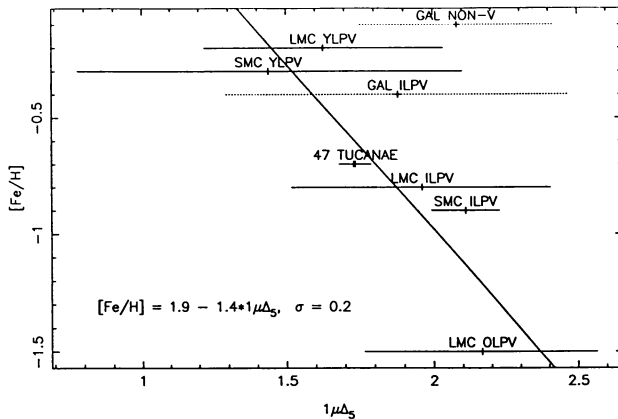


Figure 1. The distribution of observed continuum slopes (for a TiO bandstrength set at 0.5) against expected abundance $[Fe/H]$, for various groups of LPVs and non-variable M giants (NON-V) in the solar neighbourhood (GAL), 47 Tucanae, the LMC and the SMC. The LPVs were grouped into classes of short period (~ 10 Gy OLPVs), intermediate period (~ 3 Gy ILPVs) and long period (~ 1 Gy YLPVs). The error bars represent $\pm 1\sigma$ (rms). A least squares fit to the LMC, SMC and 47 Tucanae data only (solid bars), is shown by the formula and the straight line.