

C Appendix C

Spectral Atlas

The following PDF files show the spectra and profiles of the fitted spectral features for the data obtained from the New Technology Telescope (NTT) at La Silla, Chile and the Anglo Australian Telescope (AAT) in Australia. The spectra obtained from the NTT are discussed in Chapter 3; the spectra obtained from the AAT are discussed in Chapter 4

C.1 Local Bubble

These are the spectra obtained from the NTT. Each row of the PDF corresponds to the spectrum of one star, the name of which appears at the bottom right hand corner of the plot in the first column. Each plot corresponds to a wavelength range that spans the spectral feature of interest. The columns from left to right are: 1) the 5780 and 5797 Å DIBs, 2) the 5850 Å DIB, 3) the He line of the target star, 4) the Na lines of the ISM, 5), the 6196 and 6203 Å DIBs, 6) the 6270 Å DIB, 7) the 6283 Å DIB and 8) the 6614 Å DIB.

The fit of all bar the 5797 Å DIB is shown by a red line, the fit of the 5797 Å DIB is shown by a green line to distinguish it from the 5780 DIB. As discussed in Section 2.2.1 the overlying spectral feature around the 5780 line resulted in the best method of normalising that part of the spectrum involving a 2nd order polynomial. The 5780 and 5797 Å DIBs were fitted separately but displayed in the same plot, as a result the 5797 Å DIB sometimes looks to have a normalisation level higher than 1.0. If the two DIBs had not been plotted on the same graph they would have been normalised independently and the fits of both DIBs would have had continua closer to 1.0 as is normally the case. The reason for plotting both DIBs at the same time was because of the importance of these two DIBs, plotting them together gave a better overview of the relationship between them. Although not ideal, fitting theses two DIBs in this way gave the most accurate fits and therefore the most accurate measurements for both.

Many of the fits appear to be fitting noise, all of these plots were inspected by eye and only those data for which I could be certain there was a spectral feature fitted were used for the analysis and creation of the maps.

C.2 Small Magellanic Cloud (blue)

These are the spectra obtained from the ATT. Each row of the PDF corresponds to spectra of four stars (two plots for each star). The name of the star (in this case just a number) is given at the top left hand corner in the first plot for each star. The first plot in each pair shows the Ca II K line detected in both the Galactic sight-line and in the SMC itself, the second plot in each pair shows the Ca II H line again detected in both the Galactic sight-line and in the SMC itself. Only the Ca II K line was fitted with a profile (red line) as there was too much spectral contamination to accurately fit the Ca II H line. However, from the known wavelength separation of these two spectral lines it was possible to mark the expected peak position for the on the plot for the Ca II H line for both the Galactic sight-line and in the SMC.

All of these plots were inspected by eye and only those data for which I could be certain there was a spectral feature fitted were used for the analysis and creation of the maps.

C.3 Small Magellanic Cloud (red)

These are the spectra obtained from the ATT. Each row of the PDF corresponds to spectra of two stars (three plots for each star). The name of the star (in this case just a number) is given at the top left hand corner in the first plot for each star. The first plot in each pair shows the 5780 Å DIB detected in both the Galactic sight-line and in the SMC itself, the second plot in each pair shows the 5797 Å DIB detected in both the Galactic sight-line and in the SMC itself and the third plot in each pair shows the Na I D lines again detected in both the Galactic sight-line and in the SMC itself, both the D₂ and D₁ components of the Na I line in both Galactic sight-line and in SMC were sufficiently separated to be detected. There was also often a detection of the telluric Na I line which showed as an emission line connected to the Galactic component of the Galactic D lines, this was fitted in order to provide a more accurate fit for the Na I absorption lines. Both DIBs and Na lines were fitted (red lines).

Many of the fits appear to be fitting noise or the DIBs are so weak it is uncertain whether or not the fitting profile is actually detecting a DIB. All of these plots were inspected by eye and only those data for which I could be certain there was a spectral feature fitted were used for the analysis and creation of the maps.

C.4 Large Magellanic Cloud (blue)

These are the spectra obtained from the ATT. Each row of the PDF corresponds to spectra of four stars (two plots for each star). The name of the star (in this case just a number) is given at the top left hand corner in the first plot for each star. The first plot in each pair shows the Ca II K line detected in both the Galactic sight-line and in the LMC itself, the second plot in each pair shows the Ca II H line again detected in both the Galactic sight-line and in the LMC itself. Only the Ca II K line was fitted with a profile (red line) as there was too much spectral contamination to accurately fit the Ca II H line. However, from the known wavelength separation of these two spectral lines it was possible to mark the expected peak position for the on the plot for the Ca II H line for both the Galactic sight-line and in the LMC.

All of these plots were inspected by eye and only those data for which I could be certain there was a spectral feature fitted were used for the analysis and creation of the maps.

C.5 Large Magellanic Cloud (red)

These are the spectra obtained from the ATT. Each row of the PDF corresponds to spectra of two stars (three plots for each star). The name of the star (in this case just a number) is given at the top left hand corner in the first plot for each star. The first plot in each pair shows the 5780 Å DIB detected in both the Galactic sight-line and in the LMC itself, the second plot in each pair shows the 5797 Å DIB detected in both the Galactic sight-line and in the LMC itself and the third plot in each pair shows the Na I D lines again detected in both the Galactic sight-line and in the LMC itself. In the case of the LMC the Galactic D₁ line is often blended with the LMC D₂ line and D₁ components of the Na I, where they are sufficiently separated this is shown by the fitting profile. There was also often a detection of the telluric Na I line which showed as an emission line connected to the Galactic component of the Galactic D lines, this was fitted in order to provide a more accurate fit for the Na I absorption lines. Both DIBs and Na lines were fitted (red lines).

Many of the fits appear to be fitting noise or the DIBs are so weak it is uncertain whether or not the fitting profile is actually detecting a DIB. All of these plots were inspected by eye and only those data for which I could be certain there was a spectral feature fitted were used for the analysis and creation of the maps.



























































































































































































