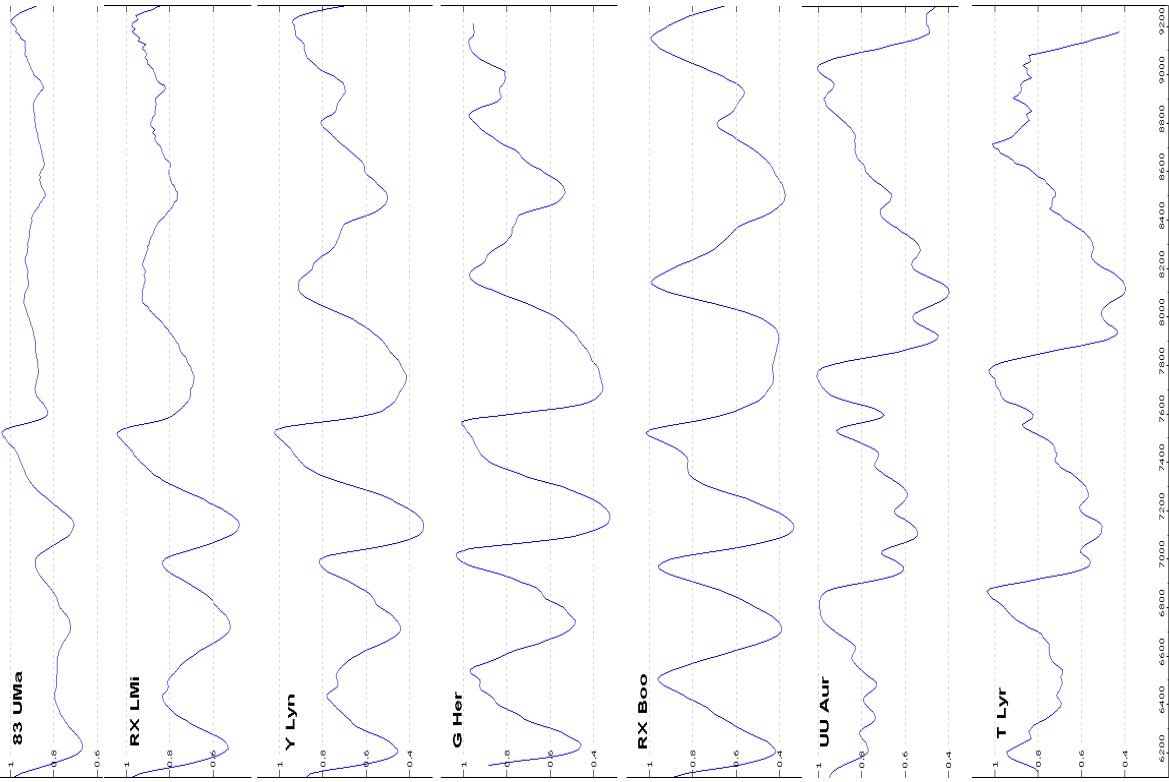


6100

9300 A



Red Star Spectral Classification using a Star Analyser

M2 III

M4 III

M5 s

M6- III

M8

C-N5- C2 6-

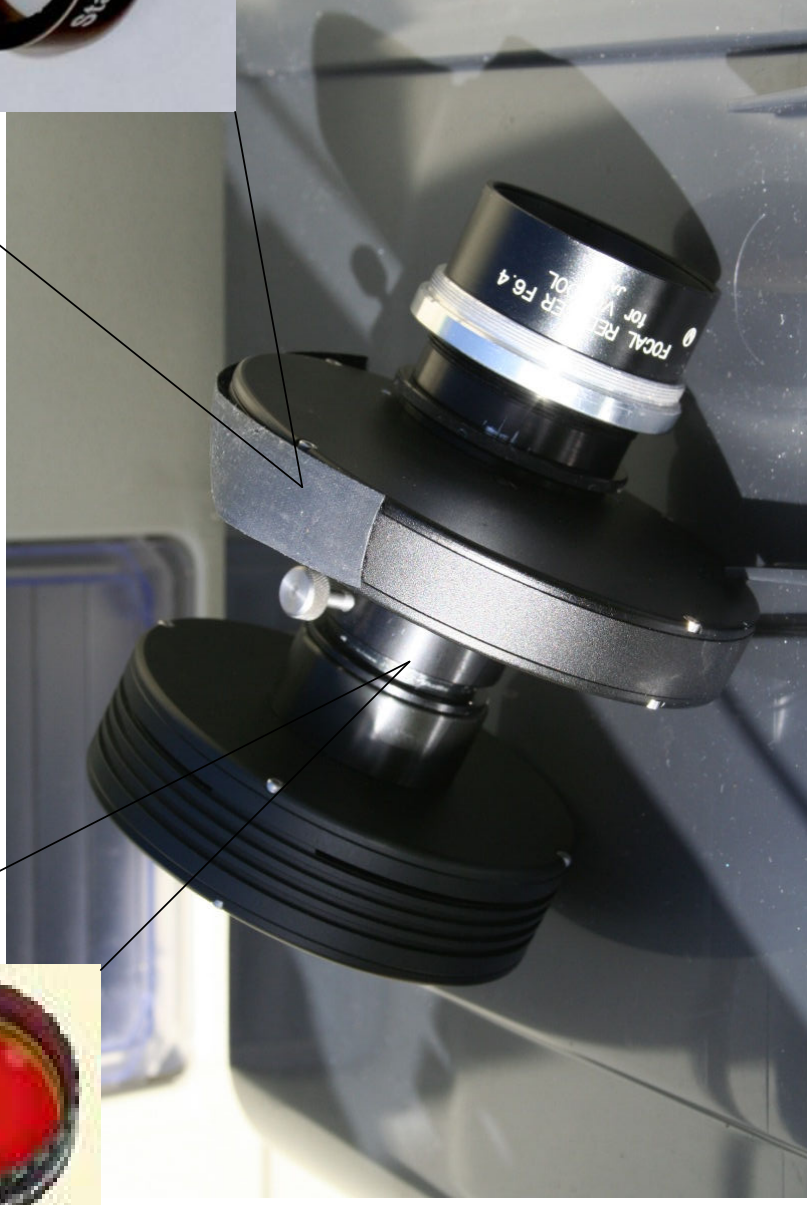
C6, 5J

R Leadbeater

(A Collaboration with
B Skiff
Lowell Observatory)

← Standard Stars

Low Resolution Spectrograph 6200-9200A R~100



Classification of red stars using a Star Analyser

Equipment

VC200L 200mm aperture Cassegrain (f6.4 with focal reducer)
Star Analyser 100 l/mm transmission grating plus Baader 610nm long pass filter
ATK 161C camera (Cooled Sony ICX424AL 640x480 7.4um pixels)

The Star Analyser was mounted in a filter wheel in the converging beam from the telescope giving a nominal 13 A/pixel dispersion. (R ~100 at Ha line)

Technique

Images, darks, were taken (flats were taken but discarded due to light leak problems)
Spectra were orientated parallel to CCD rows. Camera plus filter wheel was rotated to minimise interference from unwanted background stars and spectra.
Two sets of images were taken, one including the zero order to aid wavelength calibration (full spectrum including zero order is too long to fit on the CCD).
An A type star (Regulus) was included for wavelength calibration, instrument response and telluric line measurement.

Pre-Processing

Darks, flats correction (using ImageTOOLSca)
Alignment and stacking (using K3CCDTools)
Sky background subtraction (using IRIS)

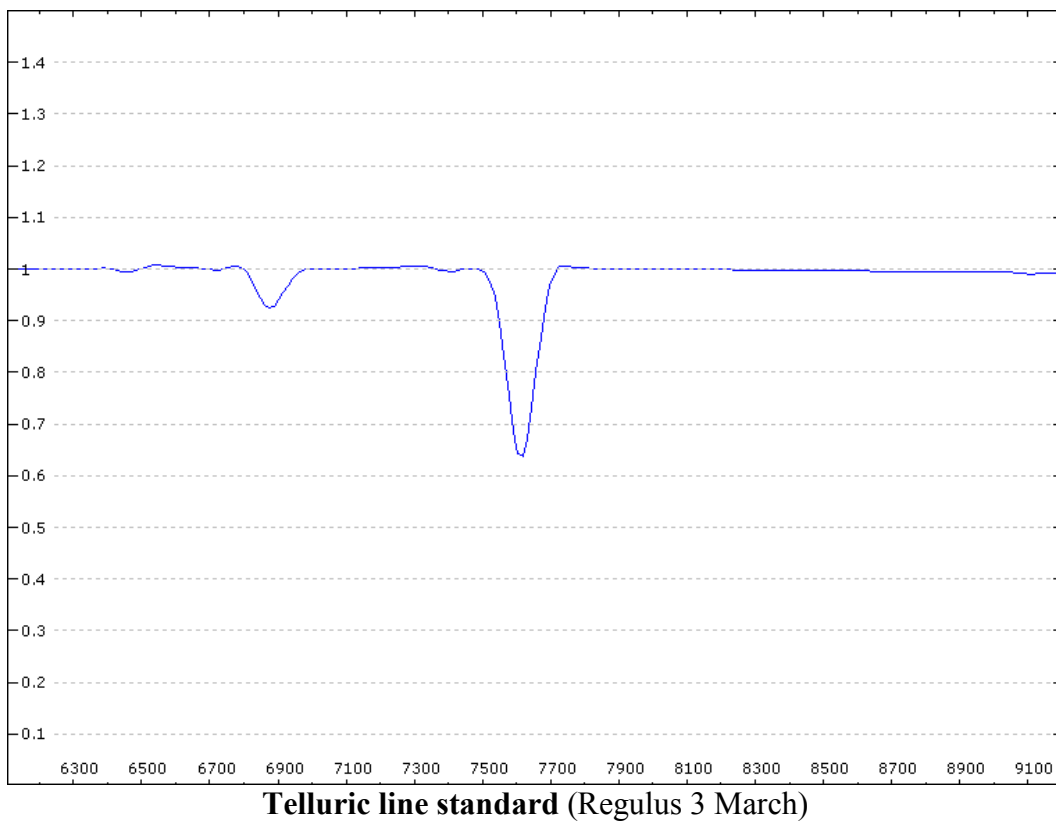
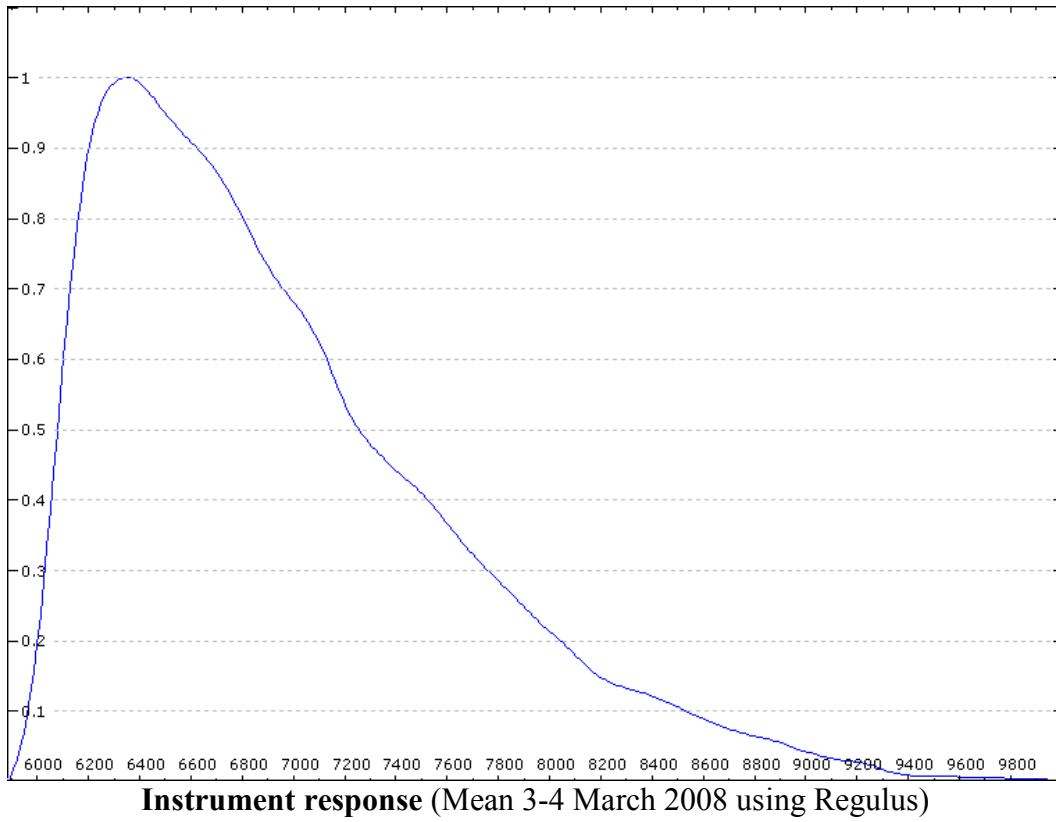
Wavelength Calibration (using Visual Spec)

Dispersion determined from A class star zero order and H alpha line (linear dispersion used)
Spectra calibrated using dispersion, zero order and a common point on the two spectra with and without zero order.
(Note target spectra taken on 3 March did not include zero order so were calibrated using dispersion and telluric line)

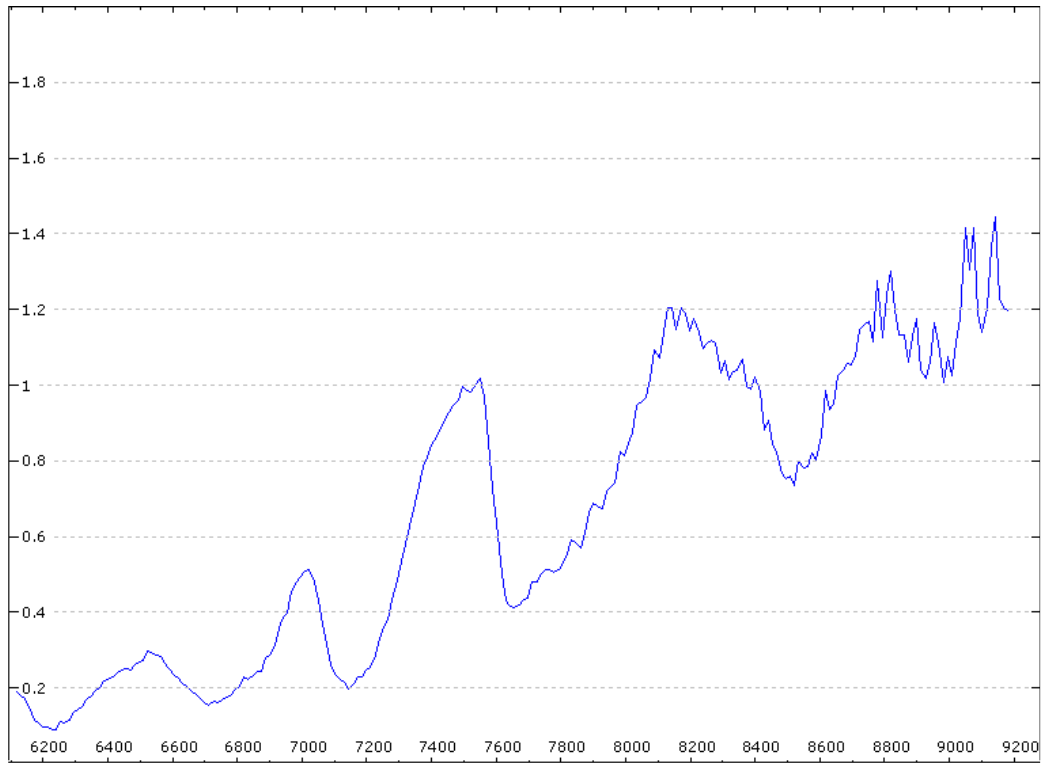
Flux calibration (using Visual Spec)

The instrument response was determined from the A type star and applied to the unknown spectra..
Plots were produced with the intensity scaled to 1 at the continuum around 7500A.
For stars where the continuum could realistically be estimated, a plots were also generated with the intensity normalised to a spline fit to the continuum..
A standard Telluric line spectrum was determined from the A type star (instrument response corrected measured spectrum /Telluric line free Pickles library spectrum).
Further plots were produced with the Telluric lines approximately subtracted. No correction was made for air mass difference between A star and measured star.

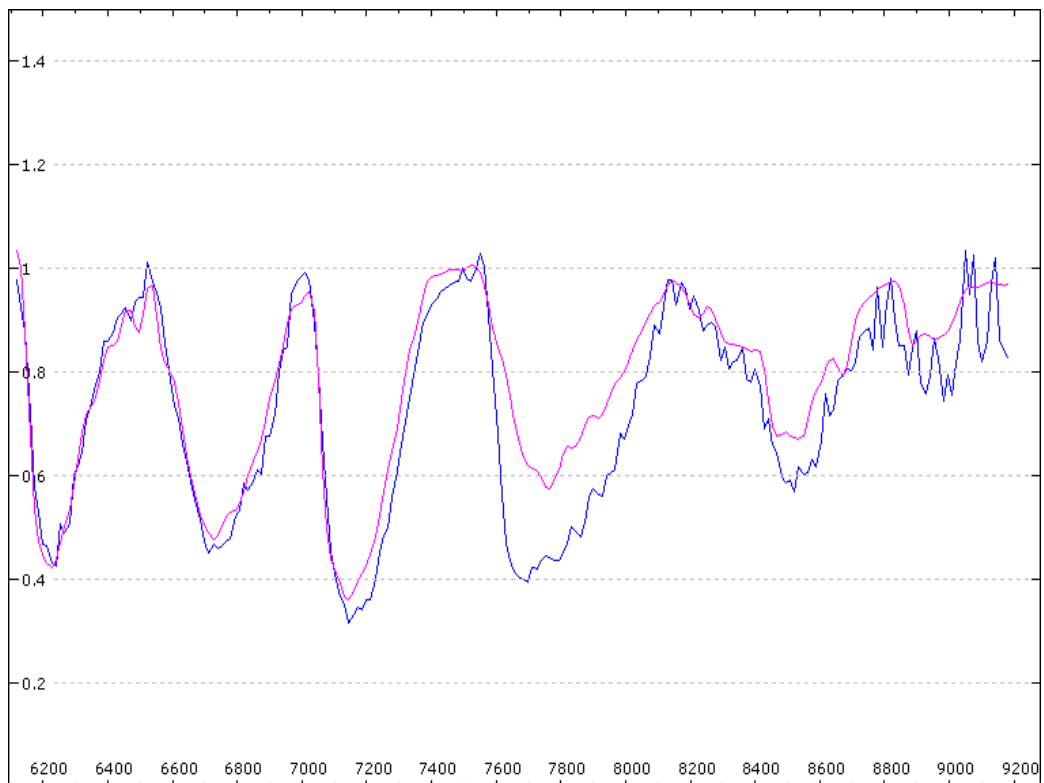
Flux calibration



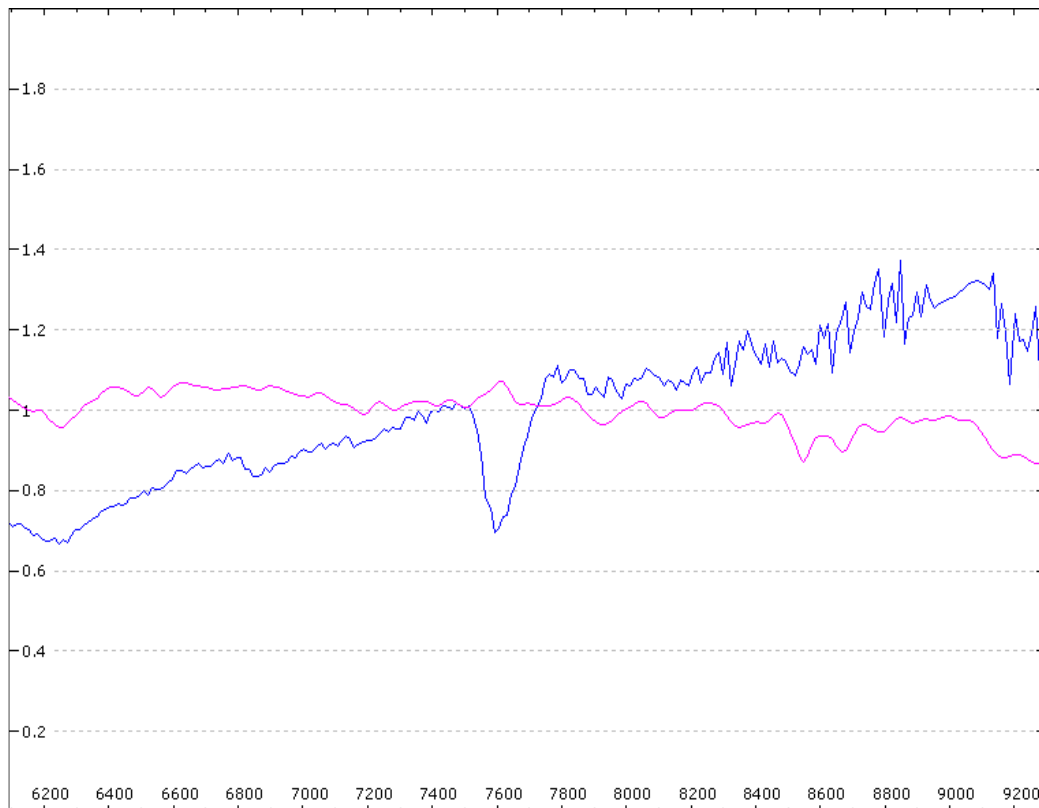
Targets (NSV 6696, BD+11 758, GSC4330-0851)



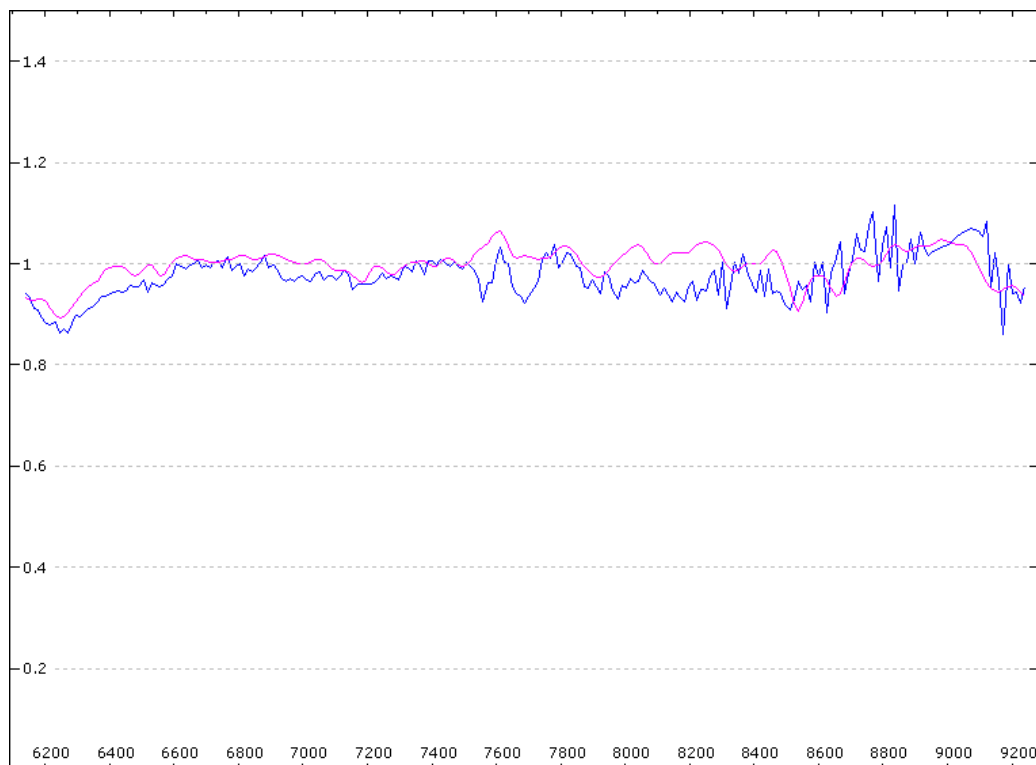
NSV 6696 3 March 08



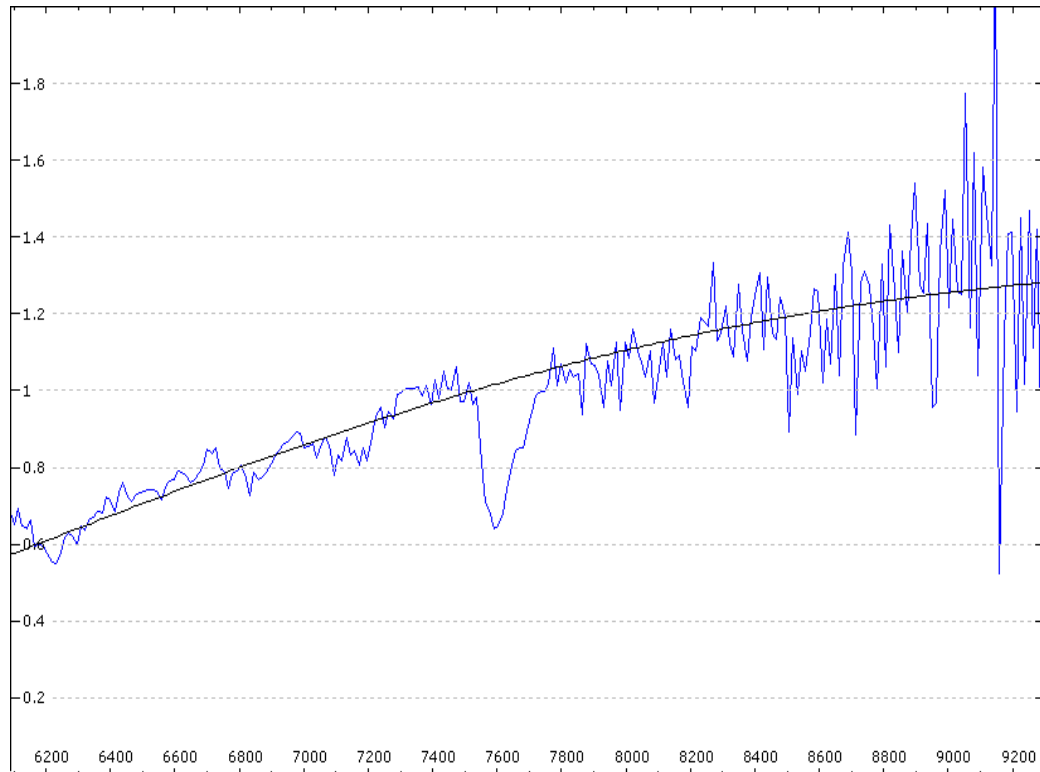
NSV 6696 3 March 08 (blue) normalised to continuum fit and telluric lines subtracted, compared with Pickles M5iii filtered to approximately match resolution (pink)



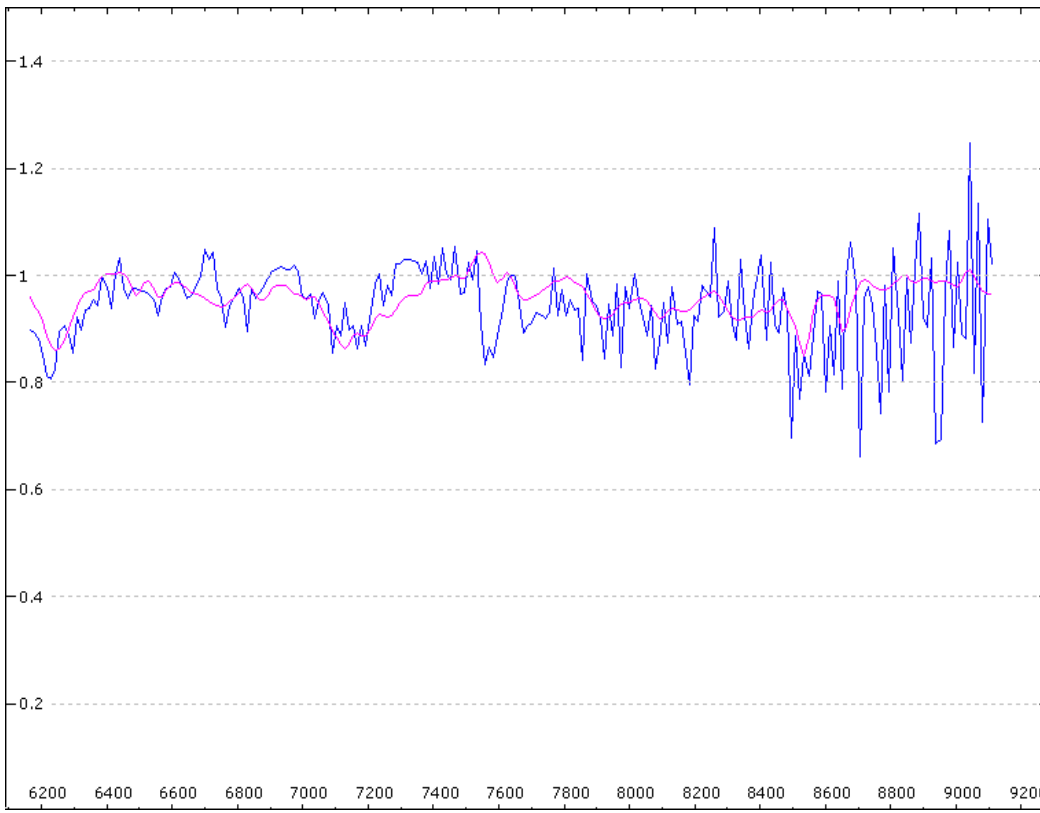
BD+11 758 4 March 08 (blue), compared with Pickles K4iii (pink) filtered to approximately match resolution



BD+11 758 4 March 08 (blue) normalised to continuum fit and telluric lines subtracted, compared with Pickles K4iii filtered to approximately match resolution (pink)



GSC 4330-0851 4 March 08 (blue) compared with Planck curve – 2800K (black)



GSC 4330-0851 4 March 08 (blue) normalised to continuum fit and telluric lines subtracted, compared with Pickles K5iii filtered to approx match resolution (pink)