A ONE ANGSTROM WAVELENGTH ERROR FOR SWP LOW DISPERSION SPECTRA IN THE LARGE APERTURE

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I. DISCUSSION

Exhibit A shows the wavelength error at Lyman-alpha in tabular and graphic format for point-source SWP spectra of two stars taken in the large aperture. The number of spectra N that were averaged for each of the first 11 years of IUE for each star is also listed in the table. Figure 1 is a plot of all 11 of these spectra for BD+75 325. Figures 2 and 3 are the average of all small aperture spectra of the two stars taken during the first 11 years. The large aperture spectra have a wavelength error of 1.08A, while the small aperture wavelength error is only about 0.07A. The low dispersion wavelength correction Thompson (IUE Newsl. No. 35) has been made in all cases and can be significant for spectra processed in years 6 through 9, with a range of .2A in mid-1984(year 6) to 2.7A at the end of year 9 in April of 1988.

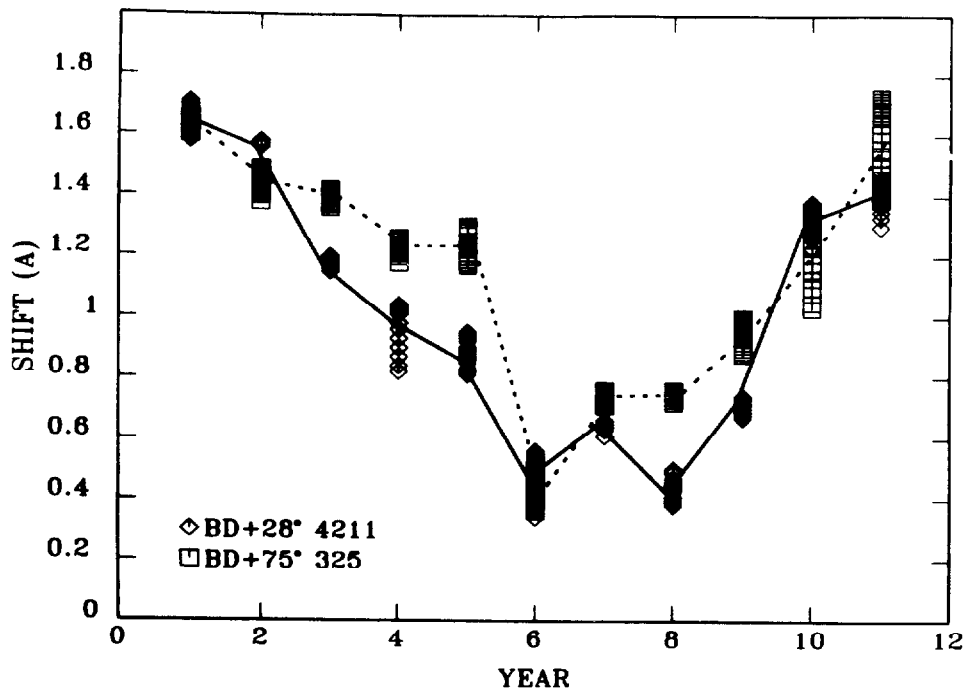
The evidence for some small variability in the error may indicate a sub-arcsec secular drift in the FES reference point, although the correction of the dispersion constants over time and the correction to this correction of Thompson for years 6-9 are also called into suspicion.

II. MAIN CONCLUSION

The error of about 1.1A in the large aperture wavelengths and negligible error in the small aperture indicates an error in the standard offset from the small to the large aperture dispersion constants (Turnrose, Bohlin, Holm, and Harvel 1979 IUE Newsl. No. 6). There may also be an analogous error in high dispersion.

LOW DISPERSION LARGE-ap
WAVELENGTH ERROR AT LYMAN-ALPHA

BD+28° 4211			BD+75° 325		
Year	N	Δλ	Year	N	Δλ
1	16	1.66	1	14	1.63
2	16	1.56	2	16	1.44
3	9	1.16	3	12	1.40
4	13	0.98	4	10	1.23
5	12	0.86	5	11	1.23
6	20	0.47	6	24	0.42
7	7	0.65	7	19	0.74
8	14	0.42	8	27	0.75
9	18	0.72	9	17	0.96
10	16	1.31	10	12	1.23
11	16	1.40	11	19	1.60



Mean Measured Wavelength: 1214.59
Mean Δλ (1215.67−1214.59): 1.08
RMS Scatter: 0.40
ERROR in the Mean: 0.085

Exhibit A

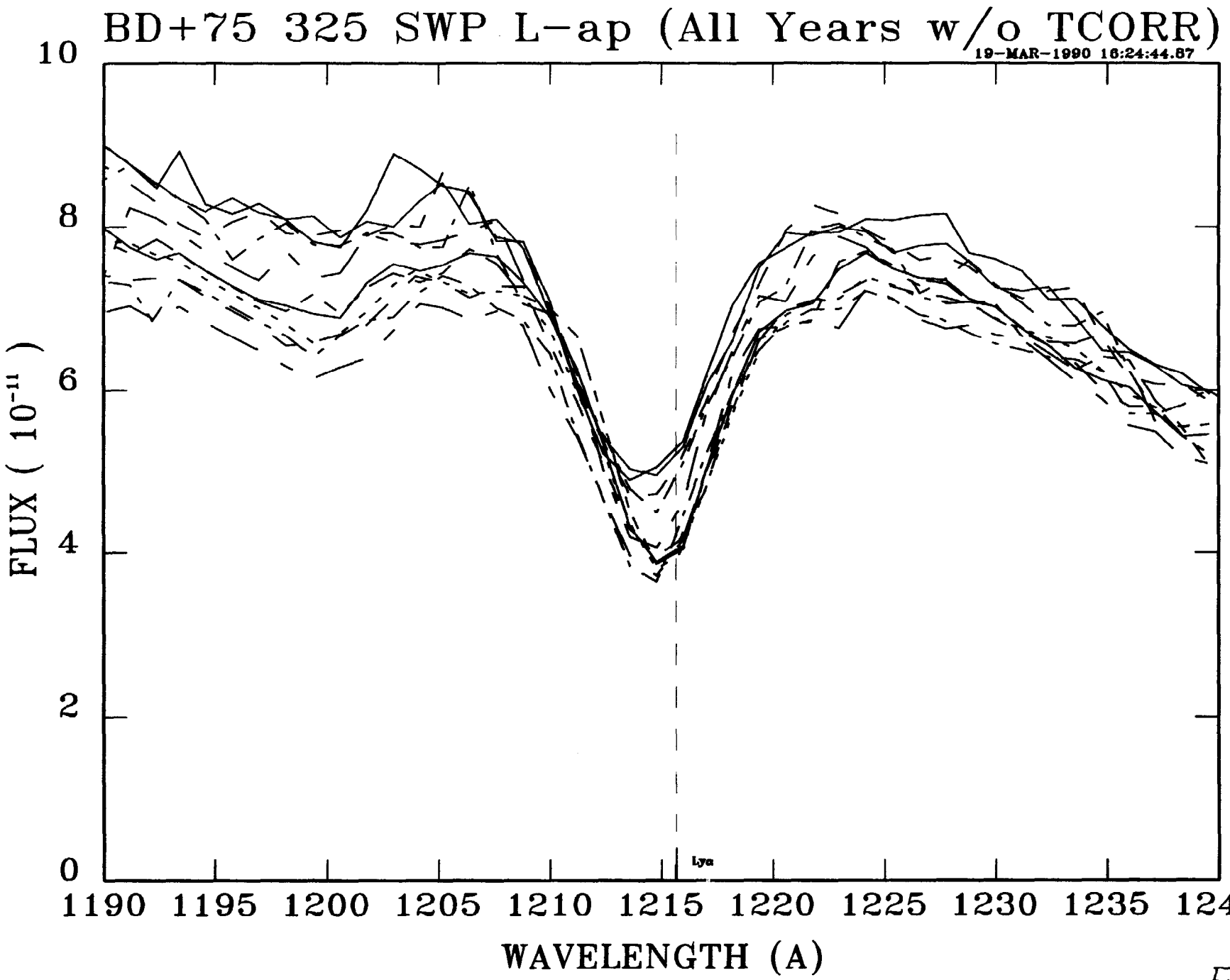

BD+75 325 SWP L-ap (All Years w/o TCORR)
19-MAR-1990 16:24:44.87
FLUX (10^-11)
WAVELENGTH (A)
Lya
0
2
4
6
8
10
1190
1195
1200
1205
1210
1215
1220
1225
1230
1235
1240

Fig. 1

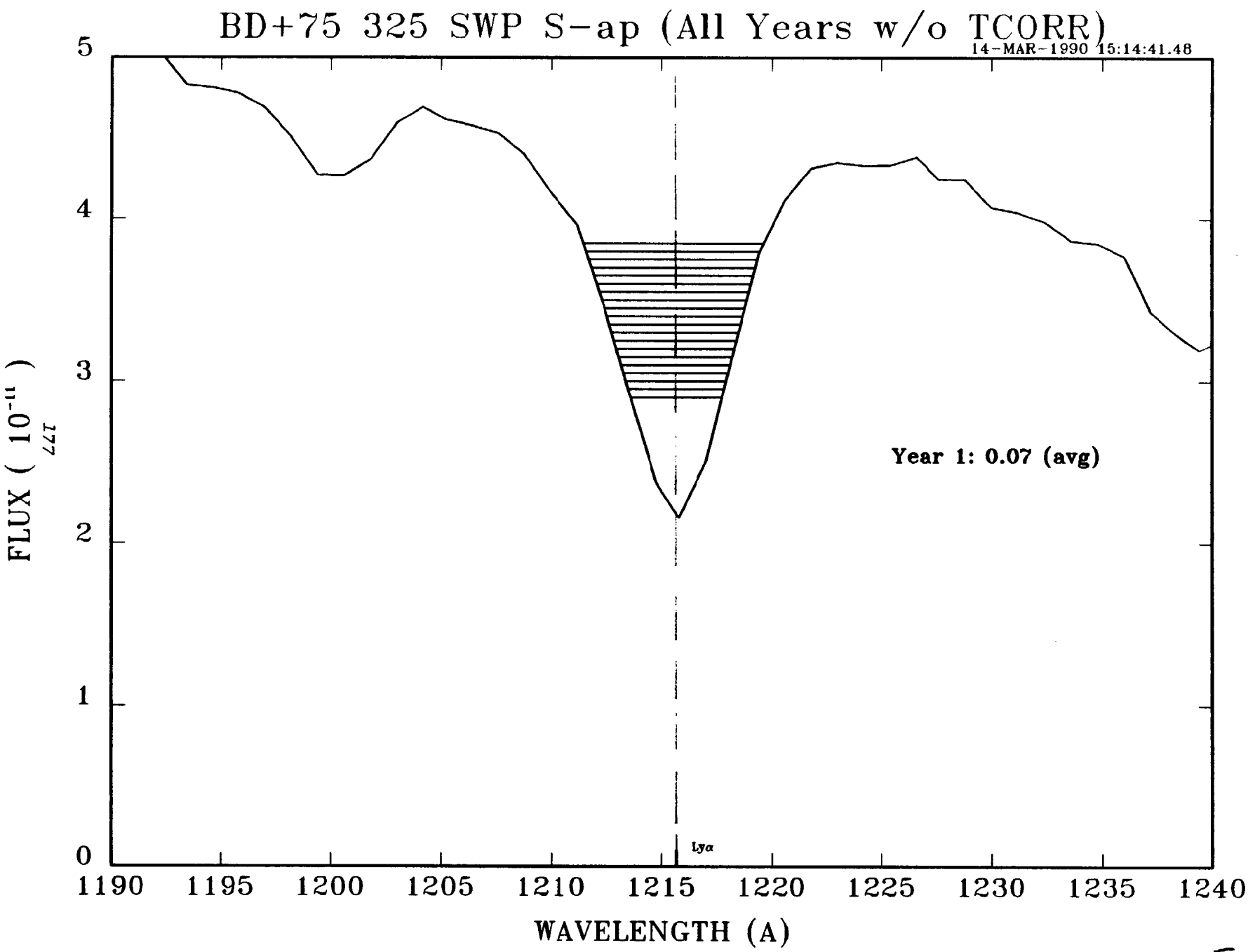

BD+75 325 SWP S-ap (All Years w/o TCORR)
14-MAR-1990 15:14:41.48
FLUX (10^-11 / 1AU)
WAVELENGTH (A)
Lyα
Year 1: 0.07 (avg)
0
1
2
3
4
5
1190
1195
1200
1205
1210
1215
1220
1225
1230
1235
1240

Fig. 2

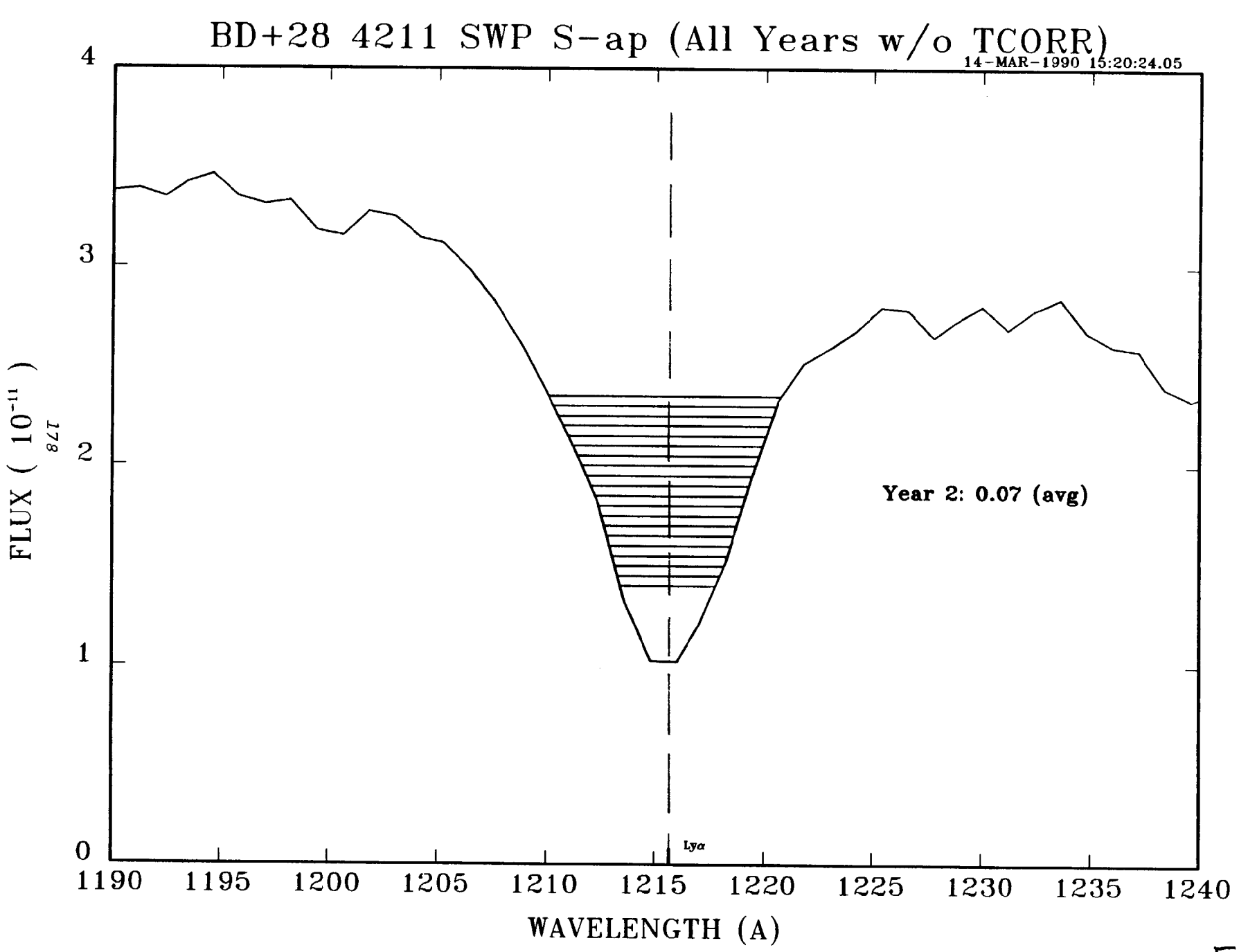

BD+28 4211 SWP S-ap (All Years w/o TCORR)
14-MAR-1990 15:20:24.05
FLUX (10^-11)
178
4
3
2
1
0
1190
1195
1200
1205
1210
1215
1220
1225
1230
1235
1240
WAVELENGTH (A)
Lyα
Year 2: 0.07 (avg)

Fig. 3