IUE Final Archive Calibration: SWP Low-dispersion Sensitivity Degradation Analysis of Large-Aperture Point Source and Trailed Data

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ABSTRACT. Low-dispersion sensitivity degradation correction ratios for the SWP camera have been derived for large-aperture point source images obtained using the *International Ultraviolet Explorer (IUE)*. A separate set of ratios has also been generated for use with trailed data. The images (733 point source and 231 trailed) have been reprocessed with Final Archive (NEWSIPS) software, providing a homogeneous database. Correction ratios have been created in 5 Å wavelength bins and are fit using a linear interpolation scheme in time, which will allow the user to safely extrapolate beyond the 1992 end point. The intent of this analysis is to furnish a degradation correction, which, when applied to the net flux along with the inverse sensitivity curve during the final archive process, will produce an absolutely calibrated and degradation corrected spectrum.

1. INTRODUCTION

The *International Ultraviolet Explorer (IUE)*, in operation since early 1978, has far outlived its expected lifetime of 5 years and continues to be a useful tool for the scientific community. The sensitivity of the SEC Vidicon camera is known to degrade with time, hence the need for a method to correct for this loss. Guest Observer programs that execute long-term monitoring of astronomical objects would benefit the most from such a correction scheme. The broad-band sensitivity analysis (Garhart 1991a) that monitors the degradation effects on the optical coatings of the camera caused by exposure to radiation is of insufficient resolution to provide a proper correction algorithm. The analysis described herein was motivated as a result of this concern.

2. ANALYSIS

2.1 Database

The degradation of the SWP camera with time has been analyzed for low-dispersion, large-aperture point source and trailed images. The database employed in the analysis contains the same images as used for quick-look sensitivity monitoring (Garhart 1991a) and consists of 733 point source and 231 trailed observations distributed amongst the five sensitivity monitoring standard stars as indicated in Table 1. The star BD+33° 2642 is not included in the trailed analysis, as the exposure time is too long to perform an accurate trail. In addition, several trailed exposure levels (*i.e.*, 40%, 100%, and 120%) for the standard HD 60753 were utilized, as indicated in Table 2. The photowrites for each image were carefully examined for defects such as data dropouts, cosmic ray hits, *etc.* and any corrupted spectra were discarded. All of the data were uniformly reprocessed using the final archive (NEWSIPS) processing software (Nichols-Bohlin 1990), the updated line library and wavelength calibration (Bushouse 1991), and the current SWP Intensity Transfer Function (ITF).

Table 1

Number of Spectra Used for Each Standard Star

Object	Pt. Source	Trailed
BD+28° 4211	179	28
HD 93521	111	20
HD 60753	162	145
BD+33° 2642	115	0
BD+75° 325	166	38
Total	733	231

Table 2

Trailed Exposure Levels Used for HD 60753

Expo. Level	No. Spectra
40%	20
100%	106
120%	19

2.2 Method

The analysis was done on the extracted net spectrum, before application of the absolute calibration (*i.e.*, in flux numbers), and the data sets for each standard star were treated separately. The spectra were corrected for camera head amplifier temperature (THDA) induced sensitivity variations (Garhart 1991b) using a correction coefficient of -0.47 %/°C and sections of the spectra affected by camera reseaux were interpolated across using adjacent good data points. Several absorption features (*e.g.*, geocoronal Ly α, Si IV, and C IV) were also interpolated across by applying the same technique used to correct for camera reseaux. Each individual spectrum was then normalized by dividing by an average of several spectra taken in a six month time period centered on 1985.0, which corresponds to the time of the SWP ITF. The plots in Figs. 1 and 2 illustrate the correction and normalization procedure.

The results shown in Figure 2 indicate that the effects from certain lines (*viz.*, N V, O I, and C II), which were not interpolated across, are removed upon normalizing the spectrum, whereas the other lines are not. The normalized data were then binned at 5 Å intervals using the standard Regional Data Analysis Facility (RDAF) procedure BINS (Figs. 3(a)–3(c) for point sources and Figs. 6(a)–6(c) for trails) and a set of degradation ratios was produced by performing a final binning of the data at six month intervals. The ratios derived from each standard star were compared and found to be in good agreement, so the last step of the process was repeated using all the data and a combined set of degradation ratios was derived. The number of spectra in each six month interval are listed in Table 3.

Table 3

Number of Spectra Used in Each Date Bin

Date	Pt. Source	Trailed	Date	Pt. Source	Trailed
1978.5	10	2	1985.5	26	7
1979.0	31	6	1986.0	21	7
1979.5	20	2	1986.5	22	8
1980.0	25	5	1987.0	23	5
1980.5	25	3	1987.5	28	5
1981.0	30	4	1988.0	21	7
1981.5	25	12	1988.5	37	12
1982.0	26	10	1989.0	31	1
1982.5	29	14	1989.5	20	5
1983.0	24	13	1990.0	34	11
1983.5	26	11	1990.5	47	7
1984.0	40	17	1991.0	18	14
1984.5	28	9	1991.5	21	11
1985.0	27	9	1992.0	18	14

3. SUMMARY

3.1 Linear Fit to Ratios

The SWP low-dispersion sensitivity degradation for the post-1979.5 epoch can be adequately represented by a linear relationship similar to the one used for post-1984.5 era LWP data (Teays and Garhart 1990). This method differs from the one implemented by Bohlin and Grillmair (1988), as they utilized a linear fit between each individual degradation ratio. The linear fits to the ratios were applied using the RDAF routine LINFIT, which is based on an algorithm developed by Bevington (1969). The 1978.5 to 1979.5 epoch degradation ratios, which exhibit a behavior unlike the post-1979.5 epoch, will be fit using a linear interpolation between each discrete point. The 1985.0 degradation ratio, which corresponds to the mean time of the SWP ITF, was calculated for each wavelength bin using the post-1979.5 linear fit and a zero-point correction was applied to the y-intercepts in order to force the aforementioned ratio to be one. This ensures that no degradation correction will be applied to data in this time period.

3.2 Degradation Trends

The individual point source and trailed degradation ratios, plotted as a function of date along with their linear fits, are illustrated in Figs. 4(a)–4(h) and Figs. 7(a)–7(h) respectively. The degradation ratios as a function of wavelength, fit with a seventh-order polynomial, are shown in Figs. 5(a)–5(h) for point sources and Figs. 8(a)–8(h) for trails. Excluding regions shortward of 1250 Å, the degradation increases towards the long wavelength end of the camera and is as high as 25% for trailed data and 20% for point sources (each tick mark represents five percent) over the entire time range (1978.5 to 1992.0) at 1950 Å. The degradation trends at wavelengths less than 1250Å are much more dramatic. When one examines the ratios for the 1150Å bin, the decrease in sensitivity is as high as 80% for trailed spectra and 75% for point sources (assuming one can believe the analysis at this extreme wavelength).

The slopes for the 1979.5 to 1992.0 time period were averaged together over broad-band wavelength ranges similar to the ones used in the standard quick-look sensitivity monitoring analysis (Garhart 1991a). The degradation rates, as computed by this method, closely approximate the quick-look rates of 0.8%/yr. for the extreme wavelength regions (1225–1375 Å and 1775–1925 Å) and 0.5%/yr. for the central wavelength region (1475–1625 Å). The y-intercepts and slopes for the linear fits to the ratios are listed in Table 4 for point sources and Table 5 for trailed data. At first, it may seem strange that the slopes seem to vary in a non-uniform manner from one bin to the next. However, this is reasonable when one looks at the fine-scale structure of the camera faceplate. The pixel-to-pixel variations are not smooth in nature, instead they are quite granular. The dramatic variations in sensitivity changes across adjacent wavelength bins have also been reported by Bohlin and Grillmair (1988). This effect is highlighted by the scatter of the data about the polynomial fit visible in the plots of the degradation ratios versus wavelength (Figs. 5(a)–5(h) and Figs. 8(a)–8(h)).

3.3 Application of Degradation Correction

The ratios will be applied to the net flux during the final archive process in the same fashion as the inverse sensitivity curve (*i.e.* using a nearest neighbor in wavelength) to provide absolutely calibrated and degradation corrected flux data. The flux correction is performed in the following manner:

1. Find the appropriate columns containing the slopes and y-intercepts which correspond to the epoch of the observation in question.
2. Calculate a correction ratio for each wavelength:

$$R_\lambda = Intercept + Slope * Date$$

where *Date* is the observation date in decimal years (*e.g.*, 1984.3).

3. Apply the correction ratio as follows:

$$Flux\ Corrected_\lambda = Flux_\lambda \ / \ R_\lambda$$

where λ is the closest 5 Å bin.

3.4 Degradation Correction Results

The plots shown in Figures 9–12 demonstrate the results of the flux correction process for point source data. A self-consistency test is illustrated in Figs. 9 and 10, since these images were used in the analysis to derive the degradation ratios, while Figs. 11 and 12 are an independent check. The correction of trailed data is seen in Figs. 13–14. Unfortunately, only the self-consistency check was done as no usable, independent trailed data could be found. The average error for each plot is determined by summing the percent differences at each wavelength and calculating the mean. For the uncorrected differences, the wavelength range of 1150 Å to 2000 Å is used in order to eliminate the ringing effect at the extreme edges.

4. DISCUSSION

The analysis was also done using 10 Å and 25 Å wavelength bins for comparison purposes. A marked improvement in degradation correction is seen when using 10 Å bins versus 25 Å bins, particularly in the short wavelength end of the camera, however, no improvement is seen between using 5 Å or 10 Å bins. The calibration group feels that using 5 Å bins would be advantageous over using 10 Å bins, as interpolation across wavelength would be unecessary. In fact, according to Bohlin and Grillmair (1988) the use of a nearest neighbor scheme is preferable, since the sensitivity changes with wavelength are not smooth. They performed a test, which compared the mean deviations produced from using a linear interpolation correction versus nearest neighbor and found the latter method provided significantly lower average errors. In house tests performed with NEWSIPS data using a seventh order polynomial fitted across wavelength showed no significant improvement in the average error. Tests were also performed in which a polynomial was fitted to the ratios in time (versus the linear fit used in this analysis) and again no decrease in the average error is seen.

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Table 4

Linear Fits to Point Source Degradation Ratios

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1150	89.944	-4.48083E-02	733.18	-0.36980	362.66	-0.18258
1155	90.915	-4.52970E-02	643.36	-0.32445	93.537	-4.66217E-02
1160	100.47	-5.01105E-02	510.06	-0.25709	22.560	-1.07526E-02
1165	76.668	-3.81201E-02	113.88	-5.69380E-02	-25.727	1.36076E-02
1170	73.196	-3.63710E-02	-19.683	1.05475E-02	-36.958	1.92766E-02
1175	75.205	-3.73826E-02	114.75	-5.73782E-02	-32.358	1.69556E-02
1180	68.346	-3.39273E-02	252.92	-0.12721	-70.908	3.64208E-02
1185	70.550	-3.50379E-02	189.04	-9.49338E-02	-89.615	4.58739E-02
1190	54.529	-2.69668E-02	168.73	-8.46886E-02	-55.259	2.84959E-02
1195	50.019	-2.46947E-02	252.31	-0.12693	-42.705	2.21473E-02
1200	41.467	-2.03864E-02	257.83	-0.12973	-115.51	5.89165E-02
1205	40.141	-1.97182E-02	152.59	-7.65558E-02	-89.023	4.55324E-02
1210	35.729	-1.74955E-02	195.98	-9.84867E-02	-83.821	4.28985E-02
1215	35.301	-1.72800E-02	48.577	-2.40014E-02	-65.754	3.37708E-02
1220	36.200	-1.77330E-02	84.785	-4.23107E-02	-177.34	9.01409E-02
1225	30.271	-1.47462E-02	137.48	-6.89386E-02	-123.35	6.28577E-02
1230	26.444	-1.28184E-02	80.318	-4.00507E-02	-48.708	2.51472E-02
1235	21.614	-1.03848E-02	-61.034	3.13470E-02	-218.84	0.11109
1240	25.698	-1.24421E-02	17.733	-8.43420E-03	-102.85	5.24984E-02
1245	25.893	-1.25405E-02	-127.54	6.49810E-02	-50.054	2.58264E-02
1250	16.050	-7.58210E-03	-86.375	4.41623E-02	-76.093	3.89669E-02
1255	20.165	-9.65505E-03	-146.98	7.47831E-02	-141.95	7.22400E-02
1260	14.564	-6.83341E-03	-84.623	4.32715E-02	-104.31	5.32180E-02
1265	10.135	-4.60215E-03	-16.738	8.97398E-03	-13.506	7.34066E-03
1270	15.294	-7.20122E-03	-8.5310	4.84461E-03	67.674	-3.36622E-02
1275	19.010	-9.07299E-03	-65.503	3.36203E-02	-69.738	3.57606E-02
1280	15.671	-7.39103E-03	-100.97	5.15387E-02	-53.919	2.77644E-02
1285	12.683	-5.88553E-03	-72.000	3.69171E-02	105.66	-5.28558E-02
1290	13.205	-6.14872E-03	31.735	-1.55079E-02	42.616	-2.10066E-02
1295	7.4188	-3.23363E-03	102.73	-5.13941E-02	-2.1259	1.58812E-03

Table 4
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1300	15.548	-7.32888E-03	32.840	-1.60752E-02	-49.808	2.56873E-02
1305	22.121	-1.06403E-02	129.23	-6.47710E-02	-56.285	2.89689E-02
1310	10.240	-4.65496E-03	-191.82	9.74493E-02	44.393	-2.19084E-02
1315	10.218	-4.64361E-03	-263.81	0.13383	30.063	-1.46690E-02
1320	20.935	-1.00426E-02	42.277	-2.08428E-02	-101.01	5.15610E-02
1325	24.221	-1.16981E-02	-156.87	7.98049E-02	-11.622	6.40882E-03
1330	15.769	-7.44049E-03	-175.54	8.92126E-02	-103.44	5.27800E-02
1335	8.1030	-3.57836E-03	4.7262	-1.85287E-03	158.23	-7.94175E-02
1340	17.812	-8.46964E-03	-20.042	1.06627E-02	52.504	-2.59953E-02
1345	16.435	-7.77575E-03	43.689	-2.15272E-02	174.73	-8.77425E-02
1350	13.586	-6.34061E-03	115.25	-5.77233E-02	-58.156	2.99020E-02
1355	10.910	-4.99227E-03	39.754	-1.95719E-02	-22.980	1.21278E-02
1360	19.389	-9.26382E-03	65.173	-3.23983E-02	24.173	-1.16806E-02
1365	18.544	-8.83851E-03	-6.3894	3.76198E-03	28.388	-1.38113E-02
1370	13.804	-6.45059E-03	-85.553	4.37524E-02	-10.323	5.73805E-03
1375	15.834	-7.47318E-03	-40.510	2.10155E-02	154.50	-7.75233E-02
1380	14.660	-6.88172E-03	-44.756	2.31471E-02	55.936	-2.77335E-02
1385	12.554	-5.82077E-03	-69.860	3.58229E-02	5.6325	-2.32409E-03
1390	15.674	-7.39238E-03	8.2272	-3.63666E-03	-40.280	2.08745E-02
1395	15.714	-7.41246E-03	-150.96	7.68144E-02	60.048	-2.98090E-02
1400	14.354	-6.72754E-03	-6.9503	4.04227E-03	49.946	-2.47078E-02
1405	18.820	-8.97716E-03	33.865	-1.65713E-02	83.167	-4.14838E-02
1410	16.958	-8.03910E-03	-49.731	2.56786E-02	170.31	-8.55070E-02
1415	9.1007	-4.08094E-03	114.47	-5.73183E-02	72.459	-3.60880E-02
1420	25.684	-1.24352E-02	137.48	-6.89279E-02	-0.52060	8.02723E-04
1425	15.512	-7.31068E-03	17.803	-8.45590E-03	115.76	-5.79563E-02
1430	16.392	-7.75415E-03	-66.691	3.42368E-02	84.920	-4.23730E-02
1435	24.216	-1.16958E-02	-75.037	3.84689E-02	116.37	-5.82511E-02
1440	15.860	-7.48610E-03	75.877	-3.78029E-02	93.848	-4.68841E-02
1445	18.072	-8.60064E-03	12.858	-5.95749E-03	83.468	-4.16372E-02

Table 4
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1450	13.651	-6.37318E-03	7.7130	-3.35577E-03	147.07	-7.37711E-02
1455	13.643	-6.36921E-03	-28.107	1.47392E-02	108.80	-5.44396E-02
1460	5.8616	-2.44919E-03	-208.35	0.10583	271.26	-0.13652
1465	14.185	-6.64251E-03	10.550	-4.78103E-03	204.24	-0.10265
1470	19.119	-9.12801E-03	-40.703	2.11197E-02	171.34	-8.60287E-02
1475	20.287	-9.71649E-03	-151.72	7.72258E-02	225.85	-0.11356
1480	18.479	-8.80567E-03	-116.24	5.92873E-02	147.19	-7.38272E-02
1485	13.550	-6.32220E-03	11.143	-5.07782E-03	233.56	-0.11747
1490	19.354	-9.24631E-03	-103.47	5.28294E-02	104.69	-5.23567E-02
1495	12.061	-5.57220E-03	19.746	-9.43613E-03	165.76	-8.32176E-02
1500	7.9272	-3.48977E-03	141.13	-7.07905E-02	78.456	-3.91196E-02
1505	7.3093	-3.17851E-03	241.53	-0.12154	-28.078	1.46982E-02
1510	12.545	-5.81591E-03	233.09	-0.11724	171.65	-8.61944E-02
1515	15.279	-7.19341E-03	36.811	-1.80390E-02	285.51	-0.14371
1520	14.827	-6.96569E-03	28.797	-1.40191E-02	61.139	-3.03616E-02
1525	14.355	-6.72791E-03	-119.64	6.09904E-02	108.42	-5.42484E-02
1530	8.3740	-3.71484E-03	176.85	-8.88366E-02	104.54	-5.22938E-02
1535	7.3752	-3.21166E-03	120.89	-6.05484E-02	198.45	-9.97401E-02
1540	6.8918	-2.96817E-03	6.3427	-2.67752E-03	110.26	-5.51888E-02
1545	6.6891	-2.86604E-03	4.2832	-1.64686E-03	33.838	-1.65812E-02
1550	10.952	-5.01368E-03	189.51	-9.52382E-02	37.531	-1.84405E-02
1555	9.7165	-4.39117E-03	146.61	-7.35497E-02	122.21	-6.12205E-02
1560	8.2402	-3.64746E-03	65.582	-3.26248E-02	-10.293	5.71514E-03
1565	1.1398	-7.04492E-05	37.492	-1.84242E-02	122.11	-6.11839E-02
1570	10.884	-4.97950E-03	153.55	-7.70552E-02	123.55	-6.18937E-02
1575	13.819	-6.45794E-03	182.33	-9.15948E-02	93.644	-4.67838E-02
1580	11.220	-5.14859E-03	196.17	-9.85949E-02	106.33	-5.31982E-02
1585	7.4076	-3.22802E-03	-13.881	7.53833E-03	78.989	-3.93895E-02
1590	12.677	-5.88276E-03	79.491	-3.96328E-02	101.61	-5.08073E-02
1595	6.7103	-2.87674E-03	104.37	-5.22111E-02	107.17	-5.36270E-02

Table 4
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1600	4.9536	-1.99176E-03	177.44	-8.91392E-02	95.961	-4.79669E-02
1605	8.6806	-3.86930E-03	-80.698	4.13035E-02	80.717	-4.02607E-02
1610	8.4782	-3.76734E-03	-59.821	3.07747E-02	243.53	-0.12251
1615	10.402	-4.73653E-03	39.516	-1.94545E-02	-42.616	2.20470E-02
1620	5.5105	-2.27229E-03	31.806	-1.55523E-02	64.574	-3.21099E-02
1625	6.0059	-2.52186E-03	304.19	-0.15319	32.686	-1.60000E-02
1630	15.916	-7.51417E-03	116.91	-5.85326E-02	140.08	-7.02370E-02
1635	8.6573	-3.85758E-03	78.991	-3.93920E-02	51.112	-2.53047E-02
1640	10.400	-4.73533E-03	173.50	-8.71503E-02	5.3350	-2.17681E-03
1645	9.1749	-4.11835E-03	306.17	-0.15418	110.36	-5.52336E-02
1650	13.546	-6.32025E-03	390.60	-0.19686	-58.127	2.98873E-02
1655	7.8514	-3.45157E-03	170.87	-8.58186E-02	55.692	-2.76198E-02
1660	4.9868	-2.00849E-03	52.015	-2.57394E-02	263.13	-0.13242
1665	14.871	-6.98775E-03	13.195	-6.14486E-03	-16.511	8.86565E-03
1670	7.4937	-3.27136E-03	-113.88	5.80634E-02	29.364	-1.43198E-02
1675	6.4157	-2.72829E-03	-7.2569	4.19662E-03	132.51	-6.64303E-02
1680	9.3712	-4.21722E-03	142.15	-7.12998E-02	108.76	-5.44266E-02
1685	12.876	-5.98306E-03	30.554	-1.49189E-02	-14.069	7.62904E-03
1690	9.6948	-4.38024E-03	18.661	-8.90888E-03	24.011	-1.16127E-02
1695	9.5605	-4.31259E-03	39.603	-1.94747E-02	156.49	-7.85400E-02
1700	10.736	-4.90459E-03	-10.064	5.61394E-03	76.573	-3.81643E-02
1705	14.191	-6.64525E-03	98.951	-4.94666E-02	78.781	-3.92749E-02
1710	14.047	-6.57288E-03	-47.967	2.47763E-02	115.74	-5.79475E-02
1715	12.425	-5.75567E-03	127.58	-6.39482E-02	-0.87793	9.64683E-04
1720	8.2830	-3.66902E-03	173.31	-8.70443E-02	133.94	-6.71477E-02
1725	21.577	-1.03663E-02	106.15	-5.30905E-02	100.66	-5.03186E-02
1730	18.991	-9.06373E-03	226.66	-0.11398	164.72	-8.26804E-02
1735	18.939	-9.03711E-03	141.55	-7.09834E-02	99.533	-4.97517E-02
1740	11.926	-5.50433E-03	221.83	-0.11155	141.88	-7.11557E-02
1745	15.323	-7.21563E-03	46.731	-2.30744E-02	107.15	-5.36034E-02

Table 4
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1750	12.342	-5.71382E-03	154.29	-7.74269E-02	118.63	-5.94064E-02
1755	18.018	-8.57312E-03	139.32	-6.98537E-02	111.08	-5.55838E-02
1760	18.616	-8.87450E-03	44.923	-2.21620E-02	61.512	-3.05447E-02
1765	14.745	-6.92459E-03	172.38	-8.65586E-02	149.63	-7.50674E-02
1770	13.008	-6.04941E-03	312.73	-0.15748	213.25	-0.10721
1775	14.854	-6.97951E-03	180.37	-9.06024E-02	131.03	-6.56705E-02
1780	15.782	-7.44675E-03	-80.344	4.11330E-02	70.242	-3.49587E-02
1785	10.300	-4.68534E-03	150.81	-7.56706E-02	143.28	-7.18618E-02
1790	13.864	-6.48057E-03	327.88	-0.16514	131.16	-6.57369E-02
1795	13.691	-6.39369E-03	436.97	-0.22027	101.84	-5.09246E-02
1800	14.309	-6.70495E-03	318.60	-0.16046	46.107	-2.27684E-02
1805	19.738	-9.43989E-03	294.63	-0.14834	76.207	-3.79668E-02
1810	17.037	-8.07927E-03	193.47	-9.72103E-02	166.22	-8.34417E-02
1815	19.280	-9.20903E-03	176.03	-8.83873E-02	241.48	-0.12146
1820	23.490	-1.13302E-02	164.56	-8.25811E-02	273.31	-0.13753
1825	26.357	-1.27741E-02	260.09	-0.13087	76.152	-3.79295E-02
1830	15.088	-7.09744E-03	70.880	-3.52696E-02	167.71	-8.41975E-02
1835	17.351	-8.23705E-03	223.34	-0.11231	145.54	-7.29963E-02
1840	18.285	-8.70782E-03	25.256	-1.22179E-02	116.34	-5.82439E-02
1845	11.605	-5.34267E-03	-27.780	1.45861E-02	224.75	-0.11302
1850	19.724	-9.43278E-03	106.42	-5.32256E-02	156.19	-7.83738E-02
1855	17.036	-8.07843E-03	63.027	-3.13013E-02	148.88	-7.46810E-02
1860	13.812	-6.45447E-03	261.76	-0.13172	181.68	-9.12599E-02
1865	21.547	-1.03513E-02	152.84	-7.66667E-02	227.17	-0.11423
1870	21.767	-1.04620E-02	106.18	-5.30996E-02	151.07	-7.57832E-02
1875	20.040	-9.59190E-03	87.524	-4.36785E-02	126.71	-6.34783E-02
1880	18.896	-9.01546E-03	70.013	-3.48326E-02	120.71	-6.04510E-02
1885	20.873	-1.00117E-02	-2.9464	2.03412E-03	96.387	-4.81595E-02
1890	18.216	-8.67284E-03	121.57	-6.08819E-02	166.04	-8.33521E-02
1895	19.357	-9.24767E-03	144.87	-7.26492E-02	203.02	-0.10203

Table 4
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1900	20.254	-9.69998E-03	269.43	-0.13560	92.036	-4.59623E-02
1905	15.595	-7.35279E-03	228.38	-0.11486	171.93	-8.63278E-02
1910	19.208	-9.17256E-03	6.9055	-2.93244E-03	205.87	-0.10347
1915	26.365	-1.27781E-02	115.16	-5.76309E-02	165.79	-8.32153E-02
1920	24.978	-1.20795E-02	70.913	-3.52666E-02	215.28	-0.10822
1925	20.895	-1.00229E-02	55.545	-2.75012E-02	260.28	-0.13096
1930	19.409	-9.27398E-03	-64.611	3.32120E-02	257.26	-0.12943
1935	23.442	-1.13058E-02	61.563	-3.05458E-02	200.00	-0.10050
1940	23.411	-1.12899E-02	180.63	-9.07161E-02	161.40	-8.09997E-02
1945	20.874	-1.00123E-02	161.04	-8.08144E-02	224.83	-0.11305
1950	25.033	-1.21075E-02	49.397	-2.44018E-02	158.07	-7.93131E-02
1955	21.891	-1.05244E-02	53.133	-2.63042E-02	78.032	-3.88857E-02
1960	20.554	-9.85107E-03	202.48	-0.10177	110.65	-5.53660E-02
1965	21.078	-1.01147E-02	126.94	-6.35872E-02	188.13	-9.45081E-02
1970	19.596	-9.36837E-03	-187.66	9.53703E-02	92.962	-4.64313E-02
1975	18.840	-8.98750E-03	-61.462	3.15954E-02	64.191	-3.18977E-02
1980	15.836	-7.47388E-03	180.43	-9.06504E-02	-29.633	1.54961E-02
1985	13.975	-6.53661E-03	269.43	-0.13561	69.757	-3.47163E-02
1990	27.461	-1.33304E-02	259.65	-0.13065	44.429	-2.19023E-02
1995	32.910	-1.60756E-02	94.573	-4.72500E-02	-90.239	4.61365E-02
2000	29.058	-1.41348E-02	84.471	-4.21499E-02	-84.186	4.30735E-02

Table 5

Linear Fits to Trailed Degradation Ratios

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1150	112.02	-5.59273E-02	1184.0	-0.59767	-281.96	0.14310
1155	90.034	-4.48533E-02	-312.55	0.15858	90.704	-4.51918E-02
1160	78.607	-3.90966E-02	676.63	-0.34130	-26.606	1.40546E-02
1165	66.015	-3.27531E-02	218.32	-0.10971	94.212	-4.69976E-02
1170	67.892	-3.36988E-02	433.34	-0.21837	15.132	-7.04548E-03
1175	59.571	-2.95069E-02	498.52	-0.25132	3.3332	-1.09670E-03
1180	49.001	-2.41820E-02	245.07	-0.12326	75.480	-3.75585E-02
1185	58.745	-2.90905E-02	654.30	-0.33004	-35.185	1.83607E-02
1190	44.123	-2.17242E-02	582.10	-0.29358	-64.630	3.32150E-02
1195	38.890	-1.90881E-02	513.06	-0.25870	-35.734	1.86101E-02
1200	31.358	-1.52938E-02	391.32	-0.19718	69.381	-3.45020E-02
1205	36.519	-1.78935E-02	362.90	-0.18283	-76.920	3.94131E-02
1210	31.184	-1.52062E-02	160.96	-8.07764E-02	92.018	-4.59380E-02
1215	29.475	-1.43451E-02	19.318	-9.20087E-03	121.34	-6.07517E-02
1220	27.189	-1.31937E-02	519.32	-0.26188	-98.926	5.05172E-02
1225	23.937	-1.15550E-02	380.89	-0.19193	-15.351	8.29240E-03
1230	27.103	-1.31502E-02	231.30	-0.11633	19.883	-9.50289E-03
1235	28.077	-1.36410E-02	265.26	-0.13351	-139.78	7.11567E-02
1240	19.896	-9.51936E-03	205.06	-0.10309	-38.914	2.01900E-02
1245	27.398	-1.32987E-02	557.62	-0.28125	-157.10	7.99052E-02
1250	17.060	-8.09069E-03	374.08	-0.18850	-41.948	2.17191E-02
1255	17.178	-8.15009E-03	95.974	-4.79670E-02	11.228	-5.14442E-03
1260	17.549	-8.33702E-03	-121.99	6.21740E-02	9.6301	-4.33655E-03
1265	13.303	-6.19798E-03	362.22	-0.18252	-43.647	2.25719E-02
1270	11.978	-5.53068E-03	346.40	-0.17451	94.056	-4.69944E-02
1275	14.479	-6.79028E-03	70.768	-3.52353E-02	-0.15786	6.03790E-04
1280	14.864	-6.98421E-03	-70.232	3.60248E-02	90.314	-4.51000E-02
1285	18.847	-8.99108E-03	-194.47	9.87977E-02	-8.2063	4.67578E-03
1290	12.489	-5.78808E-03	219.02	-0.11016	-49.281	2.54169E-02
1295	18.746	-8.93986E-03	380.34	-0.19166	-35.124	1.82740E-02

Table 5
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1300	12.262	-5.67370E-03	416.70	-0.21003	69.060	-3.43664E-02
1305	18.803	-8.96862E-03	439.13	-0.22137	-37.339	1.93929E-02
1310	16.163	-7.63896E-03	178.12	-8.94670E-02	72.103	-3.58987E-02
1315	22.591	-1.08772E-02	637.60	-0.32167	-160.15	8.14399E-02
1320	19.779	-9.46024E-03	195.04	-9.80211E-02	12.077	-5.56939E-03
1325	21.872	-1.05148E-02	259.74	-0.13072	-51.882	2.67441E-02
1330	30.675	-1.49496E-02	129.68	-6.50128E-02	-233.48	0.11850
1335	17.605	-8.36503E-03	84.619	-4.22214E-02	68.865	-3.42607E-02
1340	18.359	-8.74487E-03	241.36	-0.12144	-111.42	5.68182E-02
1345	21.926	-1.05422E-02	257.09	-0.12940	-190.94	9.69935E-02
1350	17.739	-8.43283E-03	356.61	-0.17967	-18.883	1.00678E-02
1355	14.111	-6.60500E-03	96.727	-4.83414E-02	93.496	-4.67084E-02
1360	17.288	-8.20559E-03	222.22	-0.11174	192.34	-9.66403E-02
1365	18.527	-8.82968E-03	168.95	-8.48407E-02	23.855	-1.15213E-02
1370	13.995	-6.54664E-03	189.52	-9.52317E-02	67.596	-3.36244E-02
1375	17.925	-8.52653E-03	282.80	-0.14236	118.73	-5.94486E-02
1380	19.862	-9.50250E-03	612.06	-0.30876	-100.92	5.15123E-02
1385	15.266	-7.18700E-03	241.42	-0.12145	106.21	-5.31311E-02
1390	16.874	-7.99714E-03	176.71	-8.87623E-02	24.717	-1.19589E-02
1395	16.289	-7.70240E-03	221.87	-0.11158	51.060	-2.52680E-02
1400	15.699	-7.40493E-03	302.96	-0.15255	108.99	-5.45326E-02
1405	19.000	-9.06777E-03	397.93	-0.20053	118.61	-5.93882E-02
1410	22.045	-1.06022E-02	501.93	-0.25309	16.762	-7.93338E-03
1415	16.097	-7.60578E-03	304.55	-0.15334	194.36	-9.76587E-02
1420	18.166	-8.64808E-03	385.86	-0.19444	95.701	-4.78167E-02
1425	16.096	-7.60479E-03	124.10	-6.21526E-02	219.86	-0.11054
1430	21.147	-1.01494E-02	443.90	-0.22376	118.44	-5.92981E-02
1435	15.913	-7.51289E-03	263.22	-0.13246	179.97	-9.03903E-02
1440	14.634	-6.86854E-03	146.19	-7.33308E-02	126.06	-6.31599E-02
1445	16.914	-8.01713E-03	403.91	-0.20356	98.021	-4.89909E-02

Table 5
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1450	13.790	-6.44356E-03	214.97	-0.10809	70.114	-3.48969E-02
1455	16.744	-7.93161E-03	315.07	-0.15867	53.351	-2.64245E-02
1460	10.231	-4.65061E-03	363.52	-0.18315	143.95	-7.22028E-02
1465	16.494	-7.80546E-03	114.86	-5.74915E-02	165.98	-8.33244E-02
1470	12.882	-5.98578E-03	300.60	-0.15136	105.48	-5.27654E-02
1475	12.074	-5.57873E-03	89.019	-4.44280E-02	261.30	-0.13148
1480	17.771	-8.44904E-03	332.95	-0.16770	93.813	-4.68635E-02
1485	15.609	-7.35972E-03	212.18	-0.10668	104.01	-5.20175E-02
1490	18.541	-8.83688E-03	358.48	-0.18061	36.801	-1.80612E-02
1495	15.979	-7.54591E-03	357.86	-0.18029	91.322	-4.56076E-02
1500	10.155	-4.61191E-03	53.437	-2.64748E-02	72.761	-3.62393E-02
1505	7.3593	-3.20368E-03	333.48	-0.16798	133.91	-6.71338E-02
1510	14.897	-7.00096E-03	210.00	-0.10557	159.24	-7.99182E-02
1515	14.252	-6.67613E-03	200.18	-0.10060	215.96	-0.10857
1520	17.708	-8.41691E-03	405.79	-0.20451	77.573	-3.86599E-02
1525	17.575	-8.35018E-03	230.44	-0.11590	86.559	-4.31991E-02
1530	10.977	-5.02596E-03	340.76	-0.17166	78.098	-3.89343E-02
1535	11.977	-5.52988E-03	400.73	-0.20196	66.894	-3.32727E-02
1540	10.394	-4.73269E-03	237.70	-0.11957	191.84	-9.63971E-02
1545	12.355	-5.72060E-03	324.12	-0.16325	105.27	-5.26590E-02
1550	12.806	-5.94746E-03	522.04	-0.26327	-25.413	1.33598E-02
1555	9.6468	-4.35606E-03	211.83	-0.10651	124.12	-6.21872E-02
1560	14.126	-6.61283E-03	327.81	-0.16513	-68.224	3.49890E-02
1565	14.026	-6.56241E-03	138.31	-6.93519E-02	91.441	-4.56704E-02
1570	12.951	-6.02085E-03	220.56	-0.11092	81.288	-4.05429E-02
1575	13.610	-6.35265E-03	446.26	-0.22498	-18.211	9.72279E-03
1580	12.763	-5.92609E-03	482.86	-0.24346	42.945	-2.11732E-02
1585	8.1301	-3.59200E-03	635.27	-0.32049	-23.069	1.21690E-02
1590	11.174	-5.12523E-03	249.92	-0.12576	92.181	-4.60485E-02
1595	7.7584	-3.40471E-03	141.80	-7.11116E-02	189.68	-9.53097E-02

Table 5
(Continued)

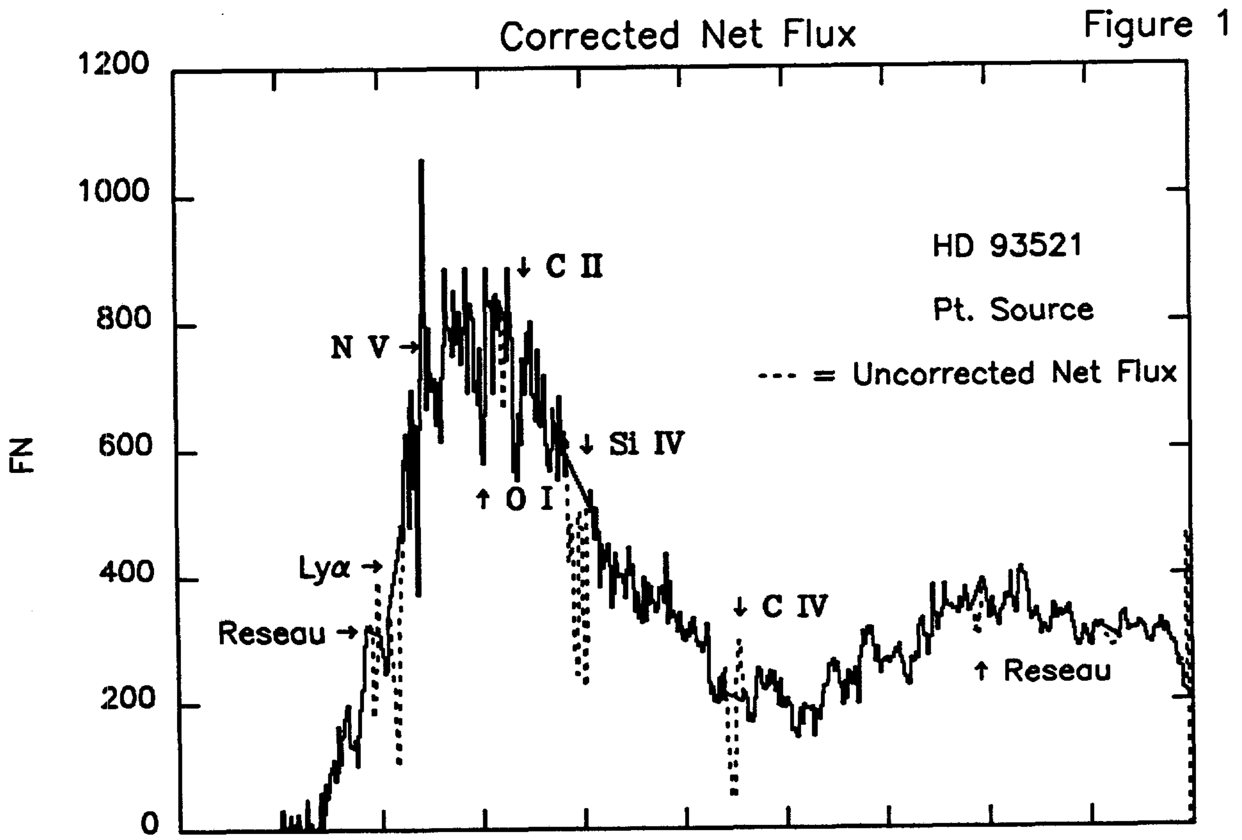
λ (Å)	**Intercept**	**Slope**	**Intercept**	**Slope**	**Intercept**	**Slope**
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1600	10.619	-4.84568E-03	152.70	-7.66246E-02	122.26	-6.12456E-02
1605	10.286	-4.67794E-03	128.57	-6.44242E-02	197.27	-9.91390E-02
1610	14.667	-6.88498E-03	161.54	-8.10860E-02	118.32	-5.92504E-02
1615	6.8964	-2.97048E-03	364.83	-0.18383	95.541	-4.77520E-02
1620	10.679	-4.87628E-03	441.55	-0.22260	23.164	-1.11832E-02
1625	9.4433	-4.25357E-03	421.06	-0.21223	174.49	-8.76299E-02
1630	14.493	-6.79726E-03	288.71	-0.14535	89.070	-4.44724E-02
1635	8.5391	-3.79805E-03	265.82	-0.13376	302.68	-0.15239
1640	9.4566	-4.26026E-03	333.93	-0.16821	58.065	-2.88159E-02
1645	9.8764	-4.47173E-03	341.19	-0.17188	89.089	-4.44883E-02
1650	11.238	-5.15788E-03	258.78	-0.13022	211.65	-0.10640
1655	14.122	-6.61062E-03	393.84	-0.19848	61.355	-3.04716E-02
1660	14.947	-7.02613E-03	312.54	-0.15739	113.66	-5.68939E-02
1665	11.081	-5.07866E-03	248.00	-0.12478	131.75	-6.60362E-02
1670	7.5473	-3.29838E-03	388.60	-0.19582	162.07	-8.13598E-02
1675	8.8685	-3.96396E-03	269.72	-0.13575	183.98	-9.24261E-02
1680	13.410	-6.25210E-03	326.03	-0.16420	133.79	-6.70648E-02
1685	14.514	-6.80806E-03	404.53	-0.20388	36.824	-1.80787E-02
1690	10.043	-4.55585E-03	307.79	-0.15499	184.02	-9.24429E-02
1695	14.336	-6.71855E-03	240.65	-0.12106	140.90	-7.06570E-02
1700	12.176	-5.63016E-03	248.46	-0.12500	158.28	-7.94402E-02
1705	11.916	-5.49918E-03	337.97	-0.17024	158.26	-7.94303E-02
1710	9.4292	-4.24646E-03	448.39	-0.22604	116.70	-5.84397E-02
1715	15.217	-7.16230E-03	234.44	-0.11792	191.78	-9.63596E-02
1720	13.090	-6.09052E-03	419.75	-0.21156	143.94	-7.21921E-02
1725	11.171	-5.12414E-03	416.07	-0.20971	141.65	-7.10366E-02
1730	15.161	-7.13384E-03	382.45	-0.19270	184.00	-9.24290E-02
1735	21.427	-1.02908E-02	388.88	-0.19595	108.87	-5.44663E-02
1740	17.582	-8.35360E-03	442.25	-0.22293	97.865	-4.89109E-02
1745	18.745	-8.93931E-03	357.19	-0.17995	129.99	-6.51375E-02

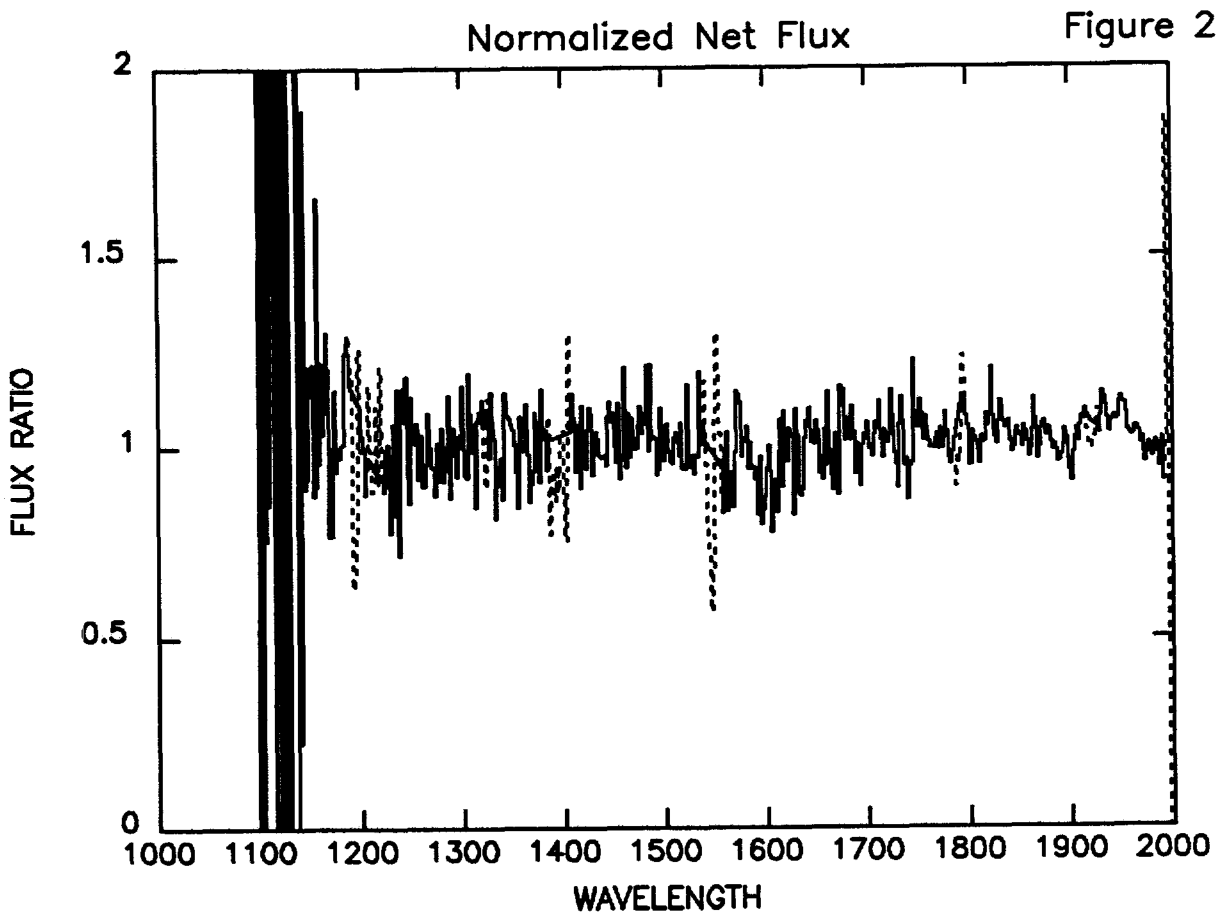
Table 5
(Continued)

λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1750	12.251	-5.66809E-03	248.73	-0.12514	178.86	-8.98328E-02
1755	16.662	-7.89029E-03	87.078	-4.34449E-02	226.02	-0.11366
1760	19.295	-9.21683E-03	251.12	-0.12635	123.45	-6.18357E-02
1765	15.412	-7.26067E-03	83.975	-4.18791E-02	224.73	-0.11300
1770	16.439	-7.77770E-03	658.85	-0.33237	157.13	-7.88514E-02
1775	20.066	-9.60482E-03	667.10	-0.33655	53.961	-2.67280E-02
1780	21.182	-1.01675E-02	446.34	-0.22499	99.648	-4.98064E-02
1785	19.470	-9.30470E-03	394.64	-0.19887	117.01	-5.85815E-02
1790	20.559	-9.85352E-03	465.29	-0.23457	109.18	-5.46252E-02
1795	16.943	-8.03163E-03	502.02	-0.25313	119.81	-5.99994E-02
1800	13.684	-6.38981E-03	410.67	-0.20696	241.45	-0.12145
1805	20.035	-9.58959E-03	430.67	-0.21707	160.12	-8.03563E-02
1810	17.536	-8.33056E-03	405.21	-0.20420	222.06	-0.11165
1815	18.243	-8.68647E-03	498.43	-0.25131	144.71	-7.25737E-02
1820	18.346	-8.73838E-03	181.33	-9.10557E-02	319.98	-0.16112
1825	20.116	-9.63030E-03	379.77	-0.19135	190.22	-9.55633E-02
1830	18.242	-8.68631E-03	360.94	-0.18183	206.24	-0.10366
1835	18.236	-8.68329E-03	412.92	-0.20810	165.66	-8.31594E-02
1840	16.278	-7.69676E-03	238.92	-0.12016	273.03	-0.13740
1845	15.938	-7.52549E-03	129.15	-6.46967E-02	281.88	-0.14187
1850	20.151	-9.64784E-03	102.38	-5.11679E-02	276.84	-0.13932
1855	17.148	-8.13513E-03	361.89	-0.18230	286.38	-0.14414
1860	18.805	-8.96956E-03	268.49	-0.13512	202.92	-0.10198
1865	17.362	-8.24270E-03	251.77	-0.12667	199.03	-0.10002
1870	18.225	-8.67763E-03	265.76	-0.13373	238.99	-0.12020
1875	14.457	-6.77949E-03	193.13	-9.70149E-02	382.36	-0.19264
1880	18.842	-8.98839E-03	219.84	-0.11052	299.84	-0.15094
1885	19.096	-9.11654E-03	287.53	-0.14472	286.03	-0.14397
1890	17.003	-8.06215E-03	409.66	-0.20644	284.52	-0.14320
1895	19.534	-9.33704E-03	372.84	-0.18784	228.67	-0.11499

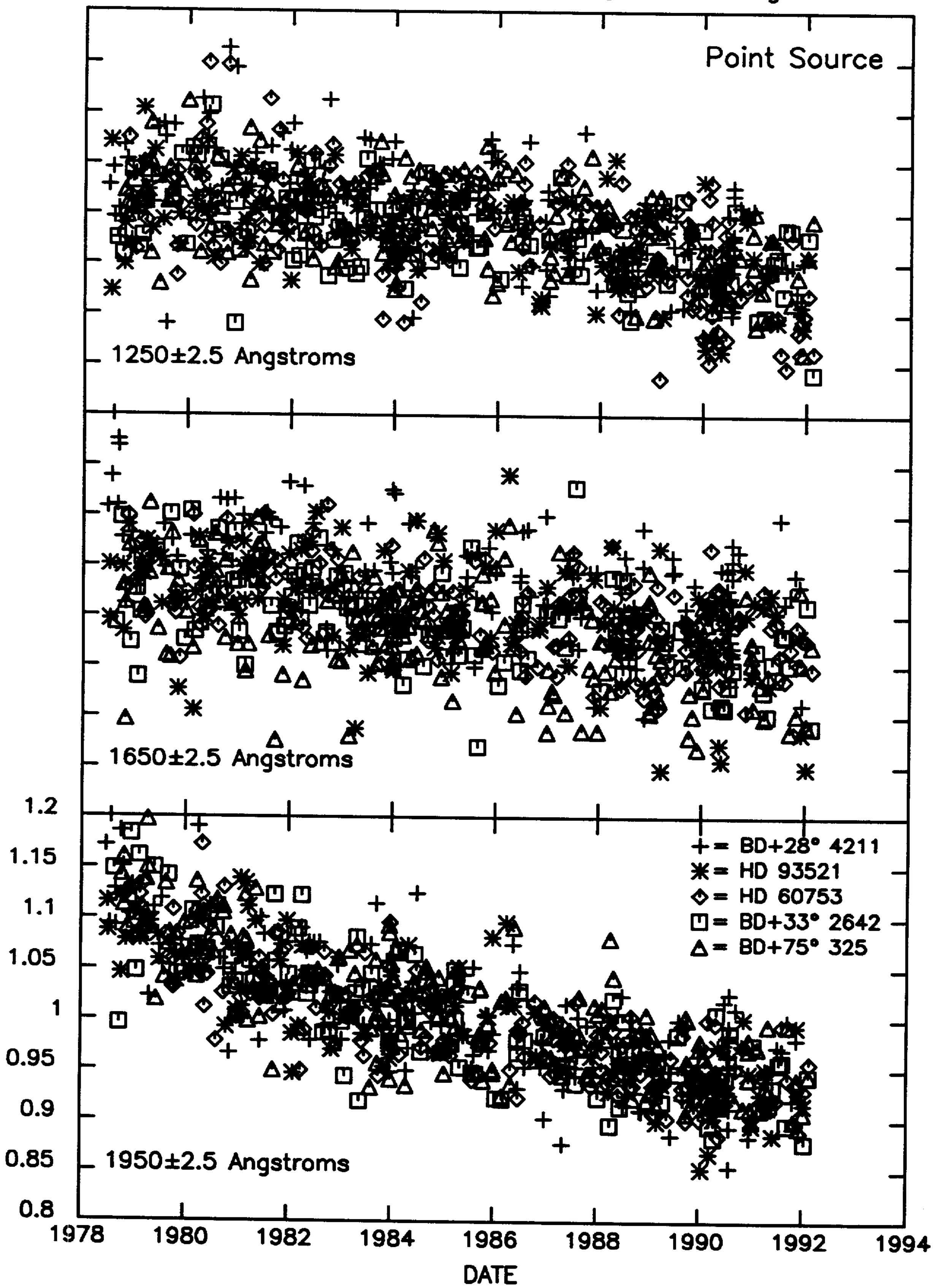
Table 5
(Continued)

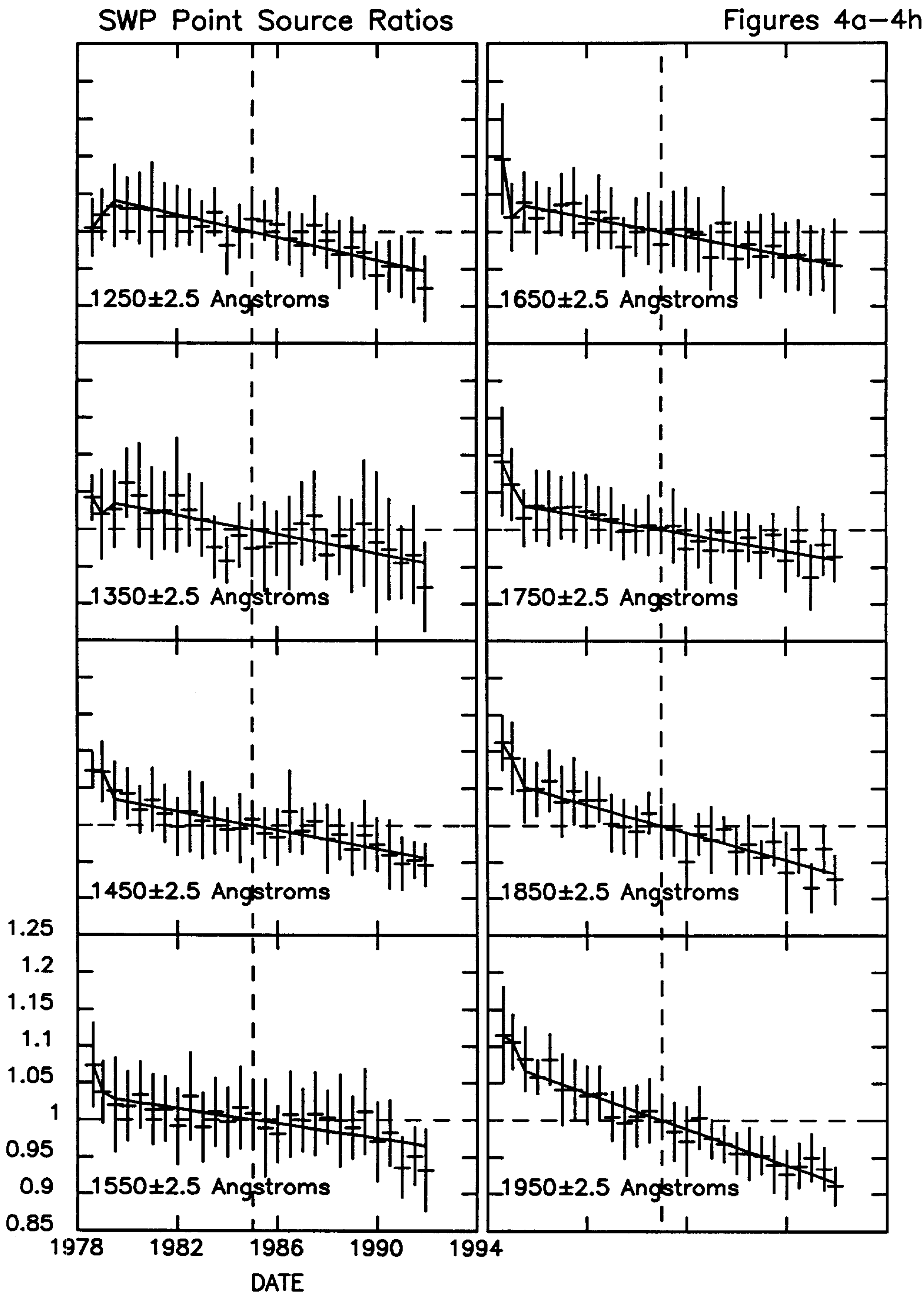
λ (Å)	Intercept	Slope	Intercept	Slope	Intercept	Slope
	1979.5 to present		1978.5 to 1979.0		1979.0 to 1979.5	
1900	20.617	-9.88276E-03	146.74	-7.35750E-02	322.59	-0.16244
1905	20.039	-9.59132E-03	244.57	-0.12301	285.56	-0.14373
1910	21.100	-1.01261E-02	334.11	-0.16827	198.23	-9.96059E-02
1915	22.786	-1.09753E-02	114.30	-5.71873E-02	276.43	-0.13911
1920	20.797	-9.97324E-03	103.16	-5.15579E-02	276.68	-0.13924
1925	17.928	-8.52772E-03	91.460	-4.56515E-02	273.60	-0.13769
1930	17.606	-8.36557E-03	1.5206	-2.03011E-04	289.37	-0.14565
1935	22.849	-1.10068E-02	97.665	-4.87859E-02	228.81	-0.11506
1940	20.711	-9.93015E-03	213.66	-0.10740	262.04	-0.13184
1945	21.347	-1.02505E-02	300.93	-0.15150	250.15	-0.12584
1950	24.678	-1.19283E-02	235.07	-0.11821	250.84	-0.12618
1955	23.047	-1.11070E-02	260.12	-0.13088	227.00	-0.11414
1960	21.493	-1.03237E-02	262.88	-0.13227	231.32	-0.11632
1965	17.807	-8.46713E-03	69.733	-3.46712E-02	284.90	-0.14340
1970	18.851	-8.99277E-03	324.97	-0.16367	110.65	-5.53661E-02
1975	19.992	-9.56776E-03	333.01	-0.16774	41.454	-2.04099E-02
1980	17.630	-8.37799E-03	90.157	-4.50166E-02	92.929	-4.64170E-02
1985	16.774	-7.94637E-03	107.43	-5.37358E-02	183.67	-9.22613E-02
1990	20.432	-9.78930E-03	262.85	-0.13227	128.61	-6.44397E-02
1995	20.975	-1.00628E-02	290.25	-0.14612	120.41	-6.02943E-02
2000	20.978	-1.00645E-02	290.25	-0.14612	120.40	-6.02901E-02


Corrected Net Flux
Figure 1
1200
1000
800
600
400
200
0
FN
HD 93521
Pt. Source
--- = Uncorrected Net Flux
C II
N V
Si IV
O I
Lyα
Reseau
C IV
Reseau

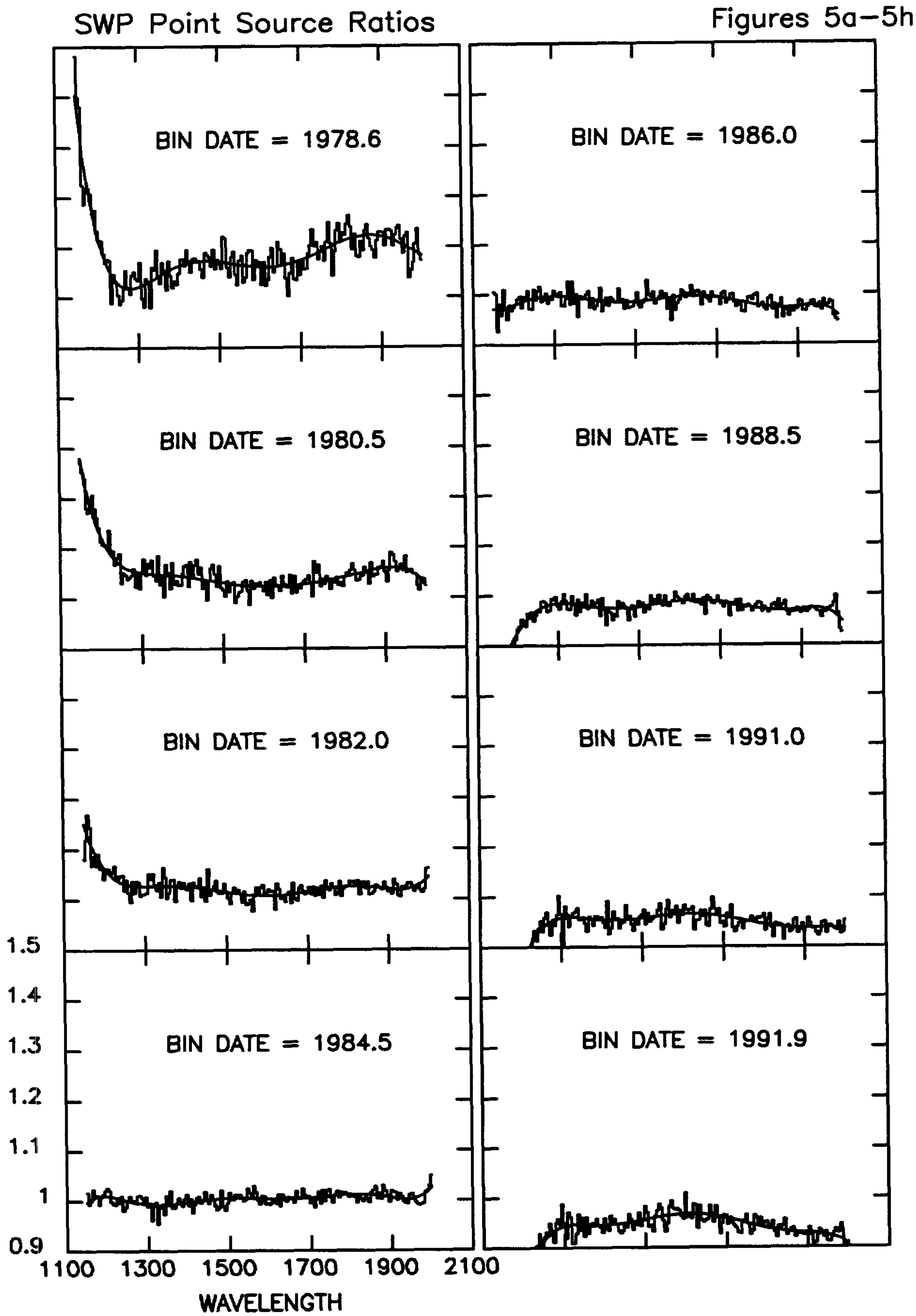

Normalized Net Flux
Figure 2
2
1.5
1
0.5
0
FLUX RATIO
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
WAVELENGTH

SWP Flux Ratios Figures 3a–3c

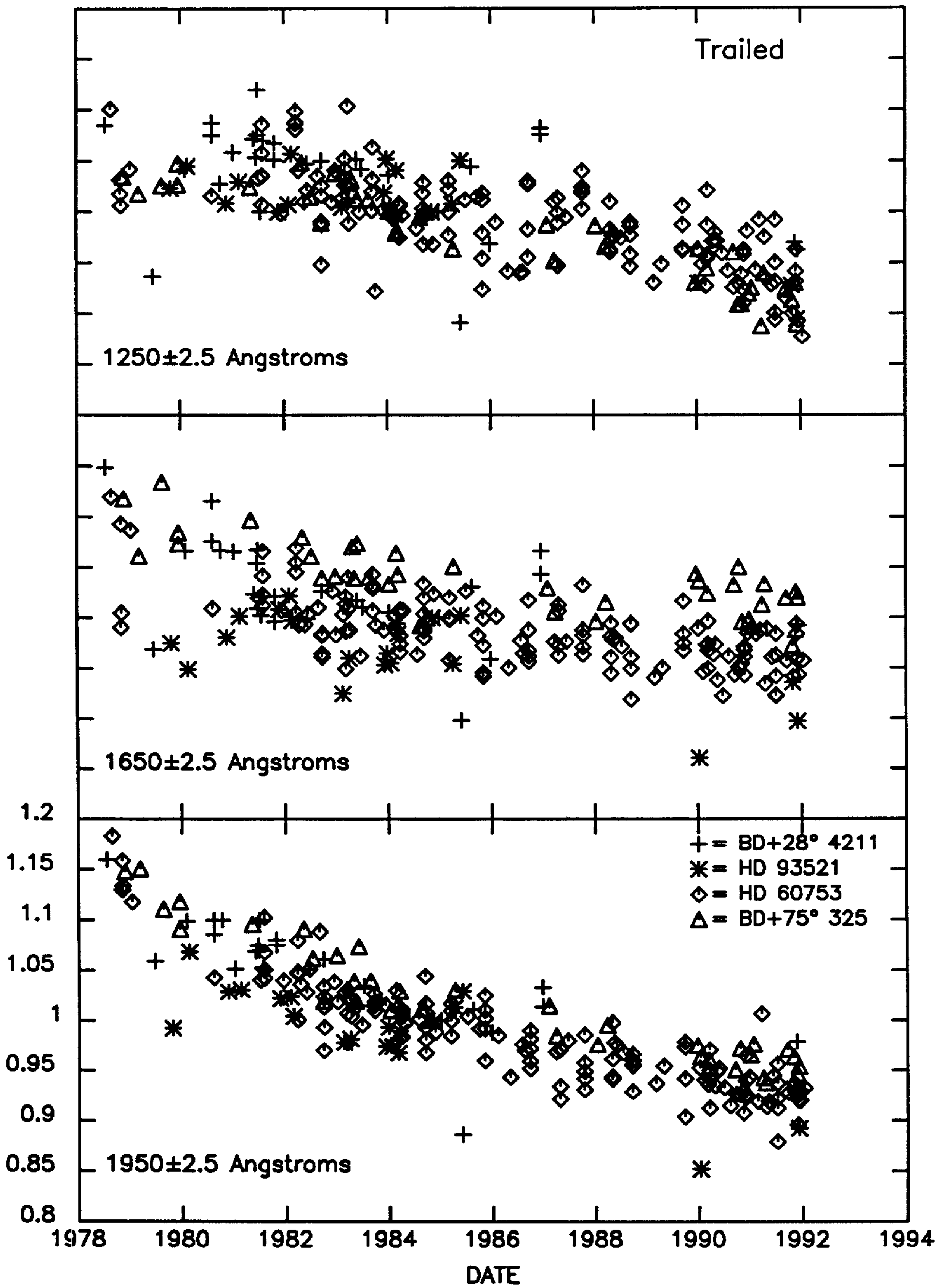




SWP Point Source Ratios
Figures 4a–4h
1250±2.5 Angstroms
1650±2.5 Angstroms
1350±2.5 Angstroms
1750±2.5 Angstroms
1450±2.5 Angstroms
1850±2.5 Angstroms
1550±2.5 Angstroms
1950±2.5 Angstroms
1.25
1.2
1.15
1.1
1.05
1
0.95
0.9
0.85
1978
1982
1986
1990
1994
DATE

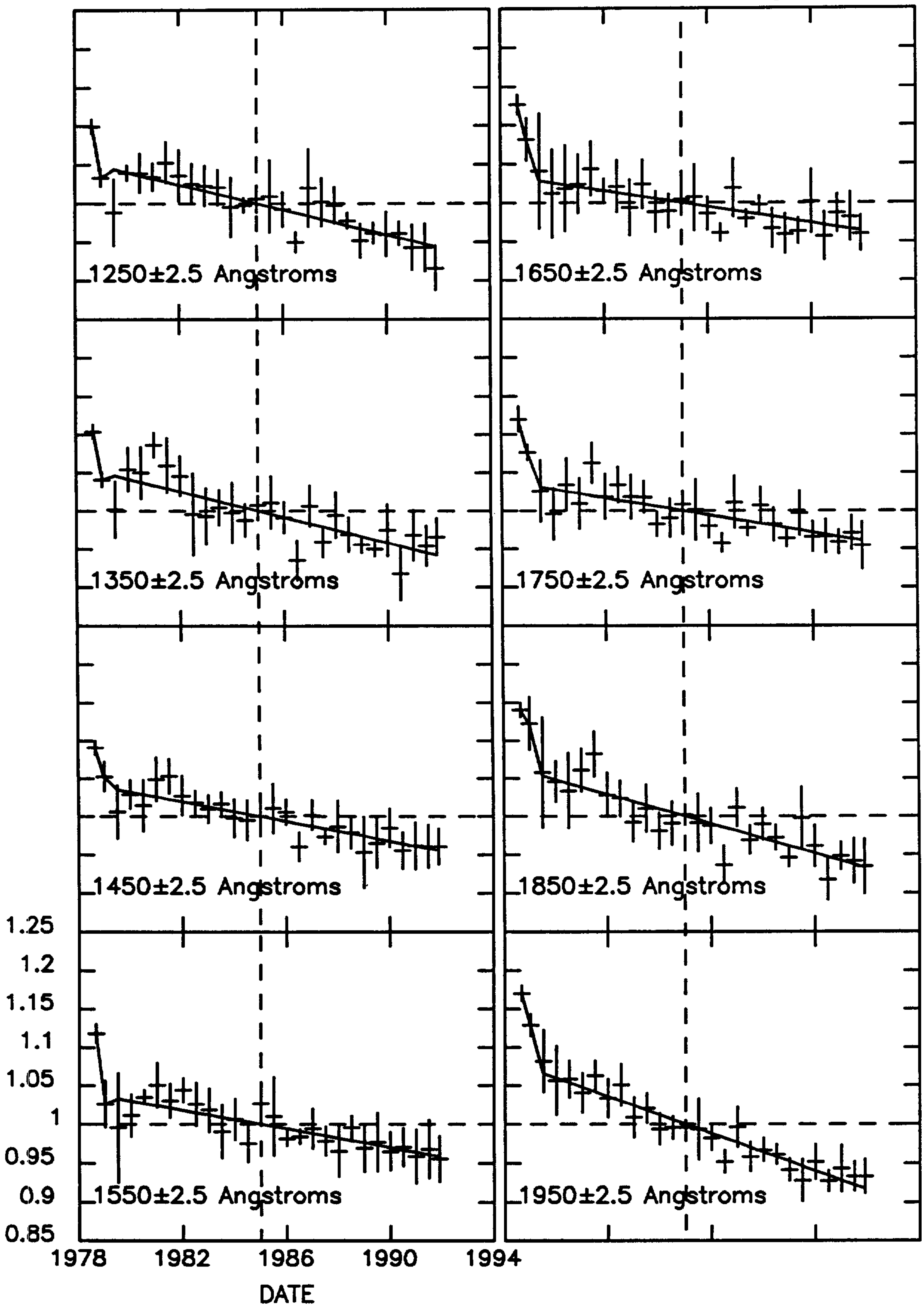

SWP Point Source Ratios
Figures 5a–5h
BIN DATE = 1978.6
BIN DATE = 1986.0
BIN DATE = 1980.5
BIN DATE = 1988.5
BIN DATE = 1982.0
BIN DATE = 1991.0
BIN DATE = 1984.5
BIN DATE = 1991.9
1.5
1.4
1.3
1.2
1.1
1
0.9
1100 1300 1500 1700 1900 2100
WAVELENGTH

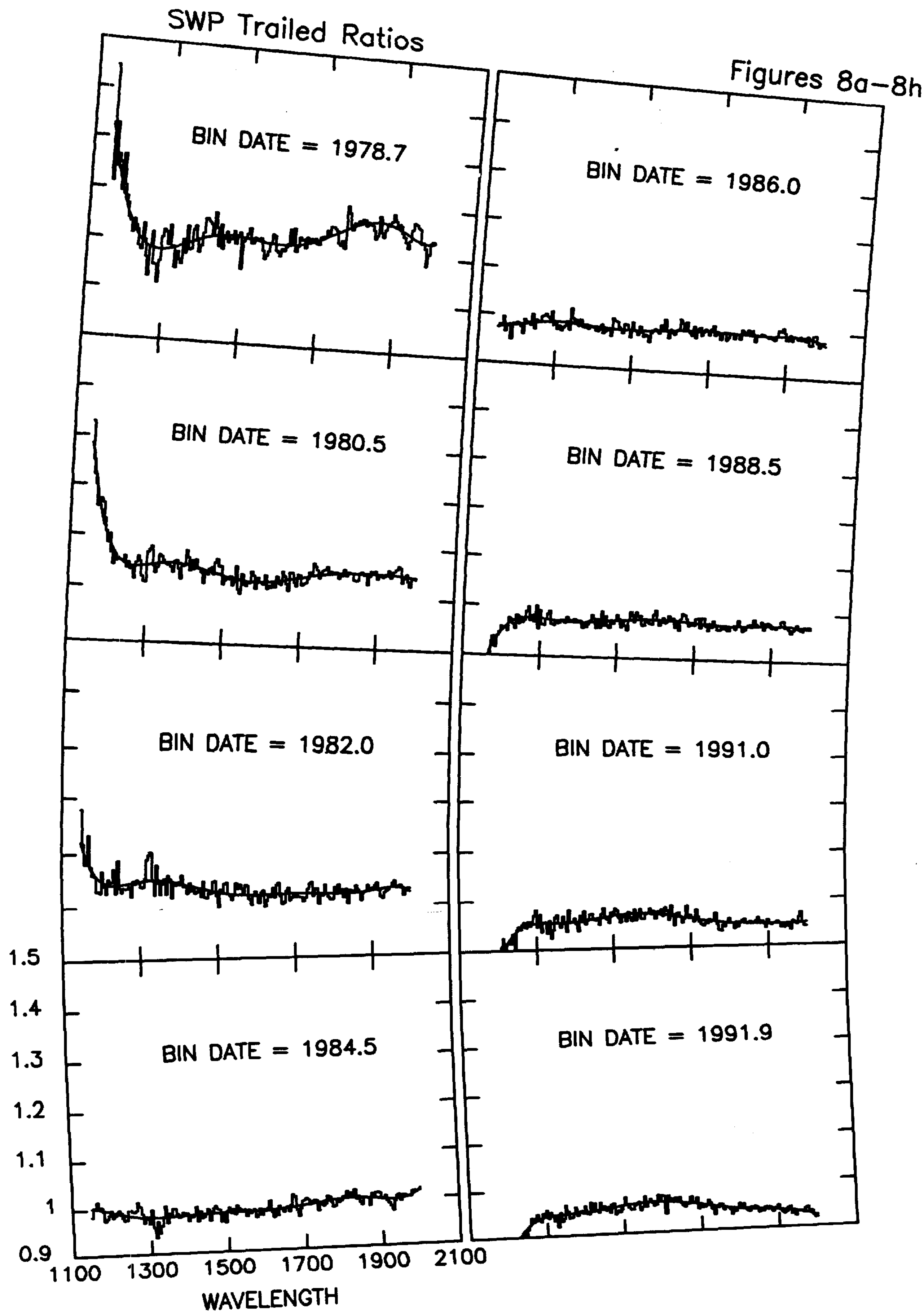
SWP Flux Ratios Figures 6a–6c



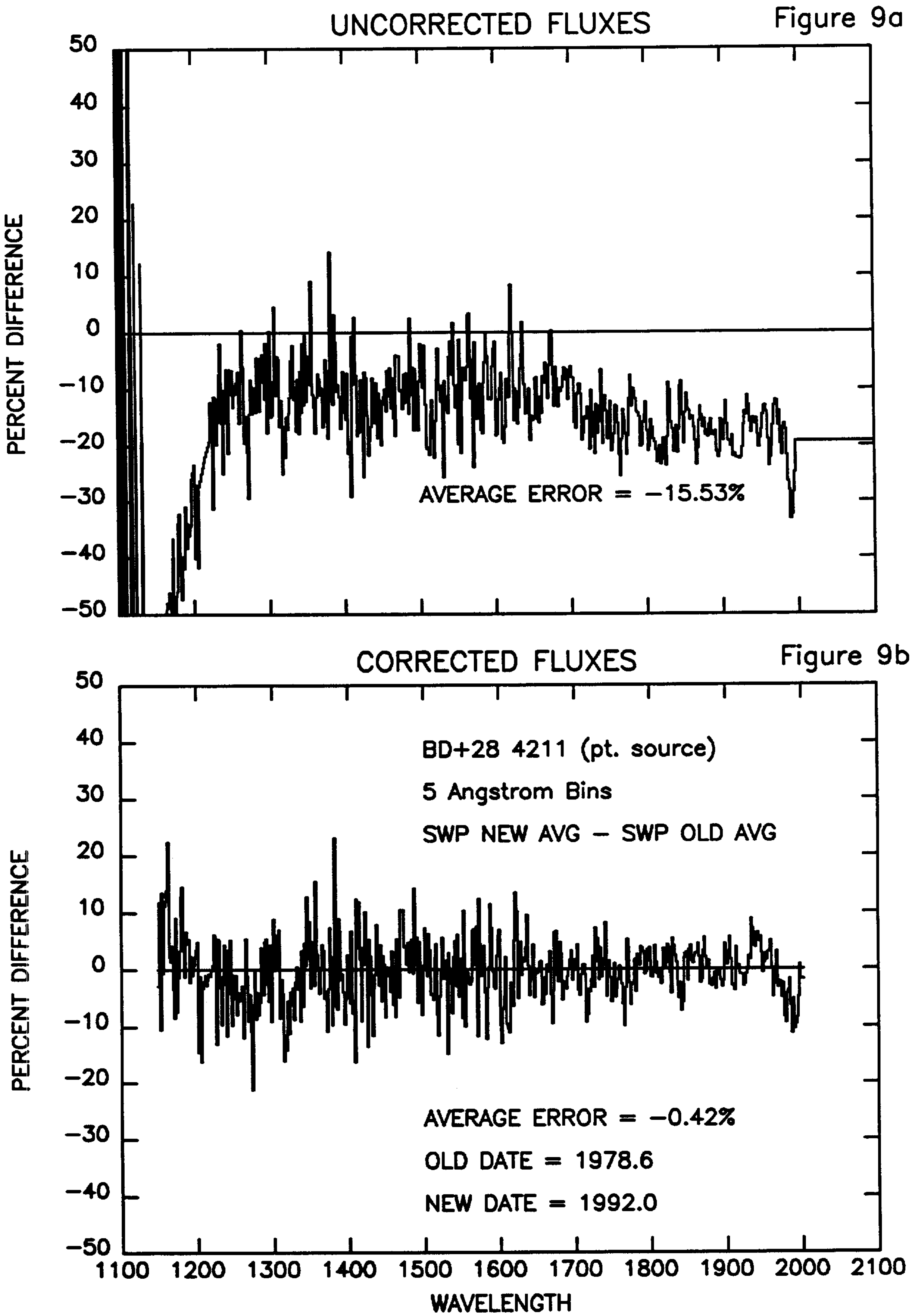
SWP Trailed Ratios

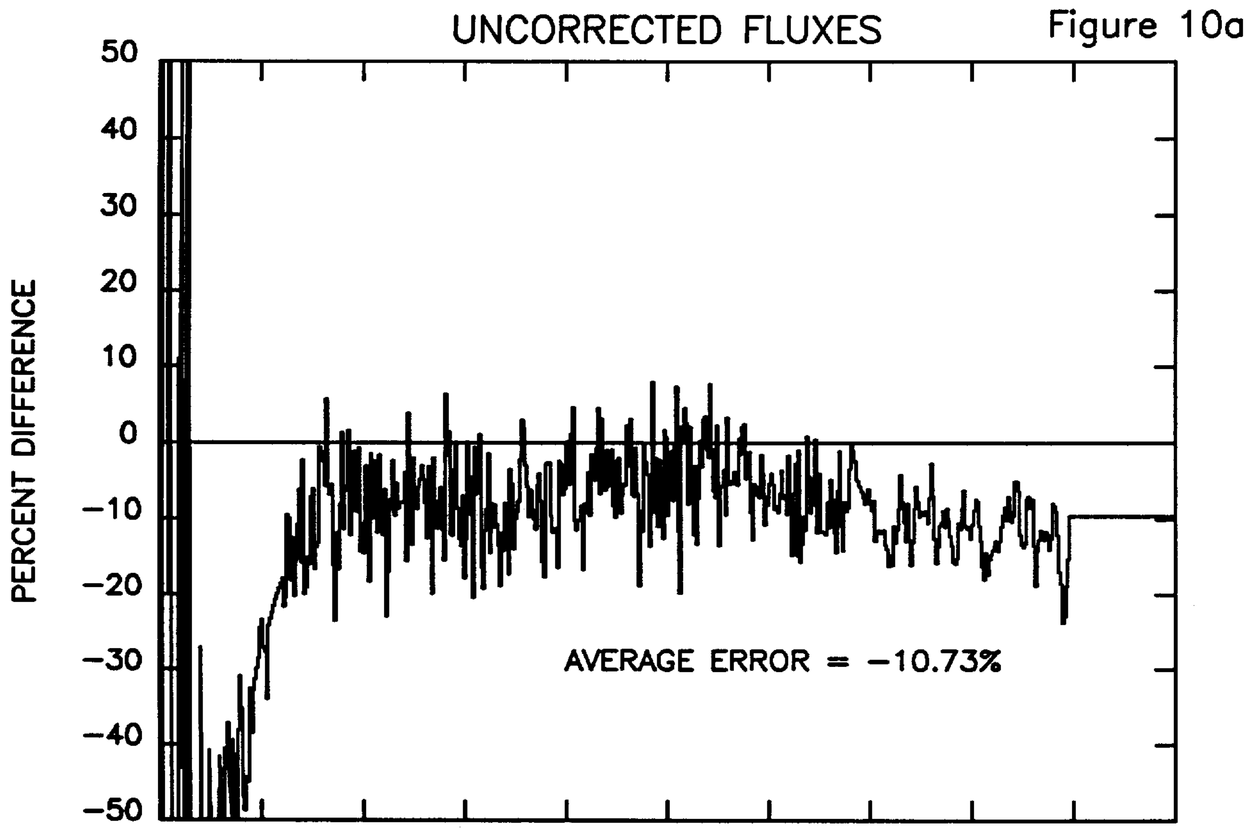
Figures 7a–7h

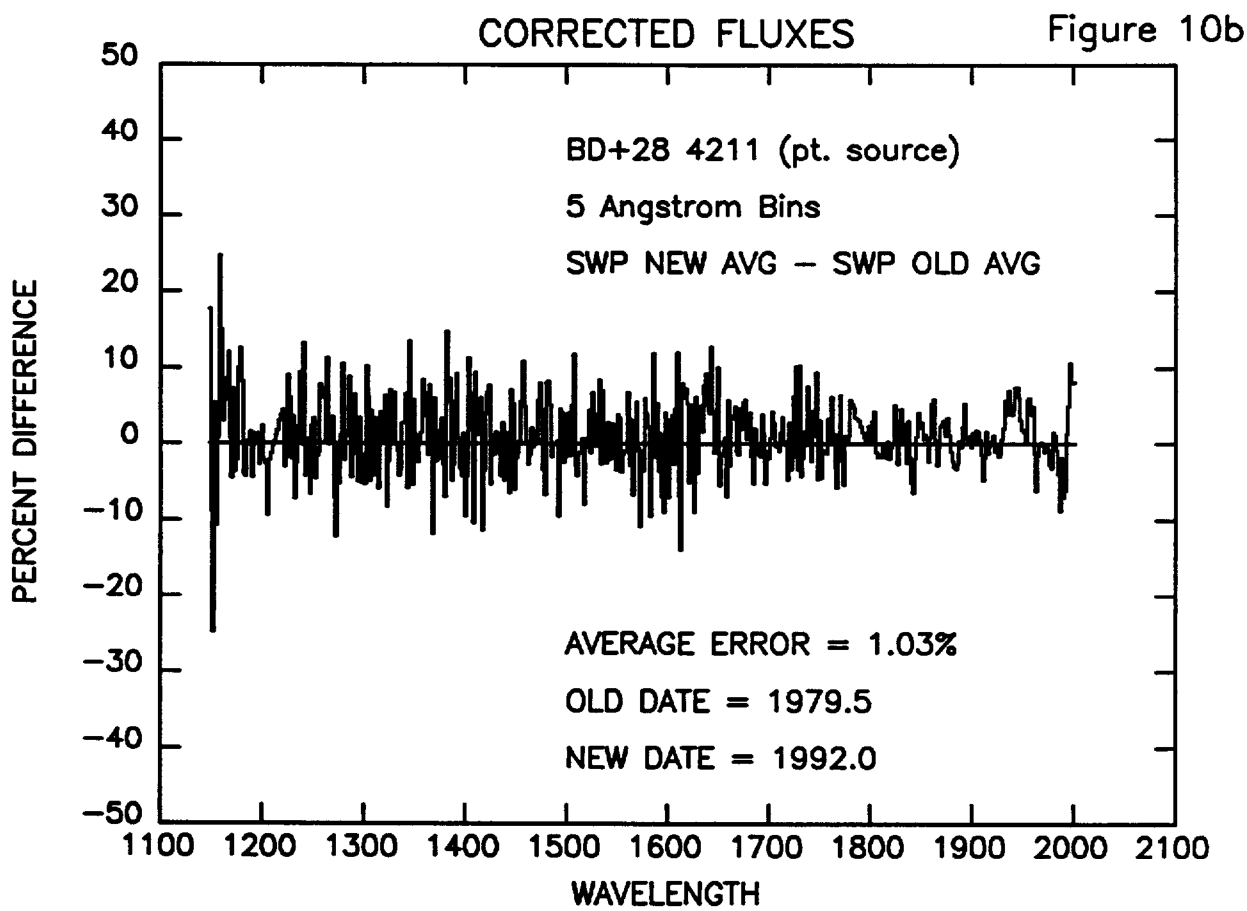


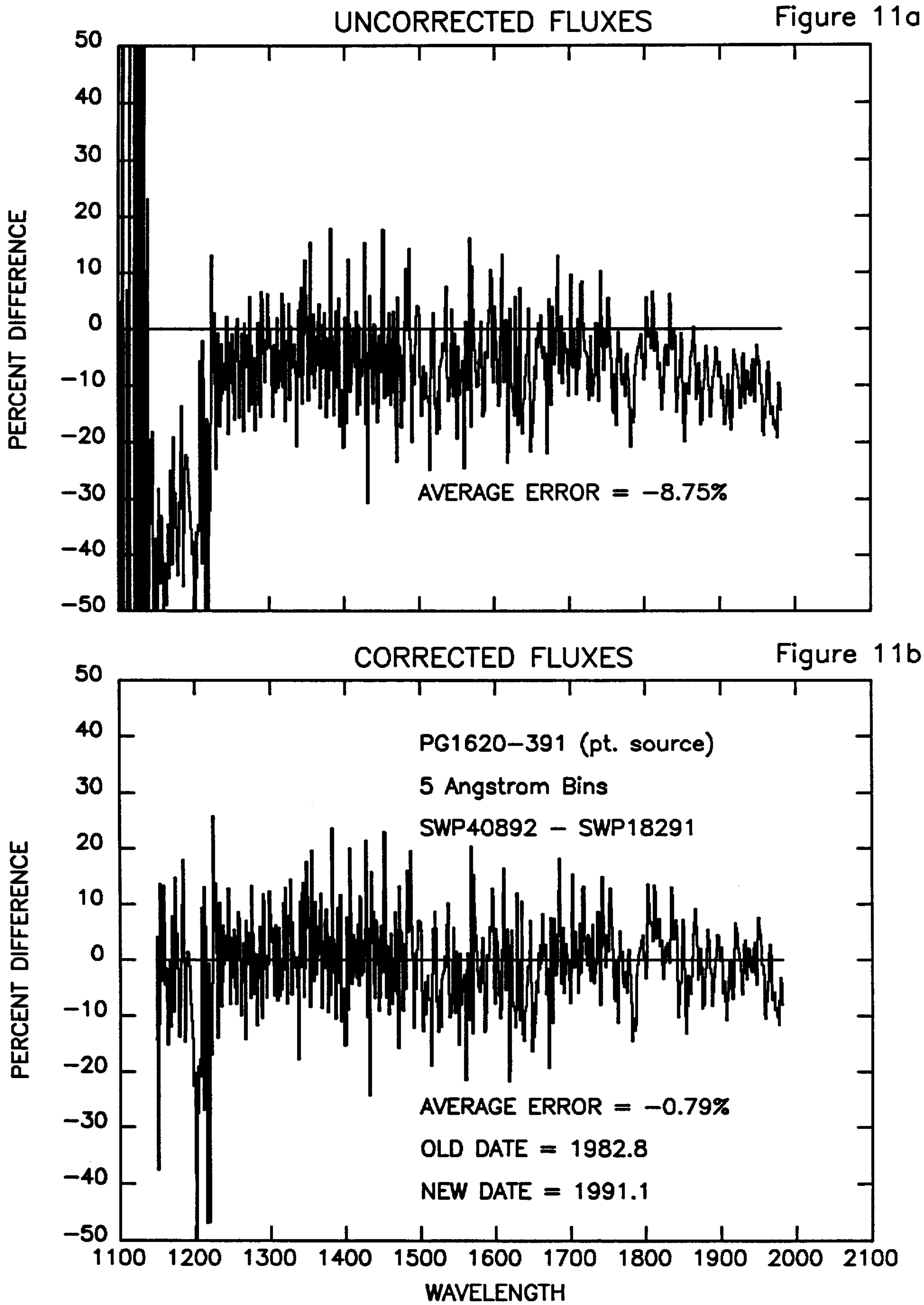


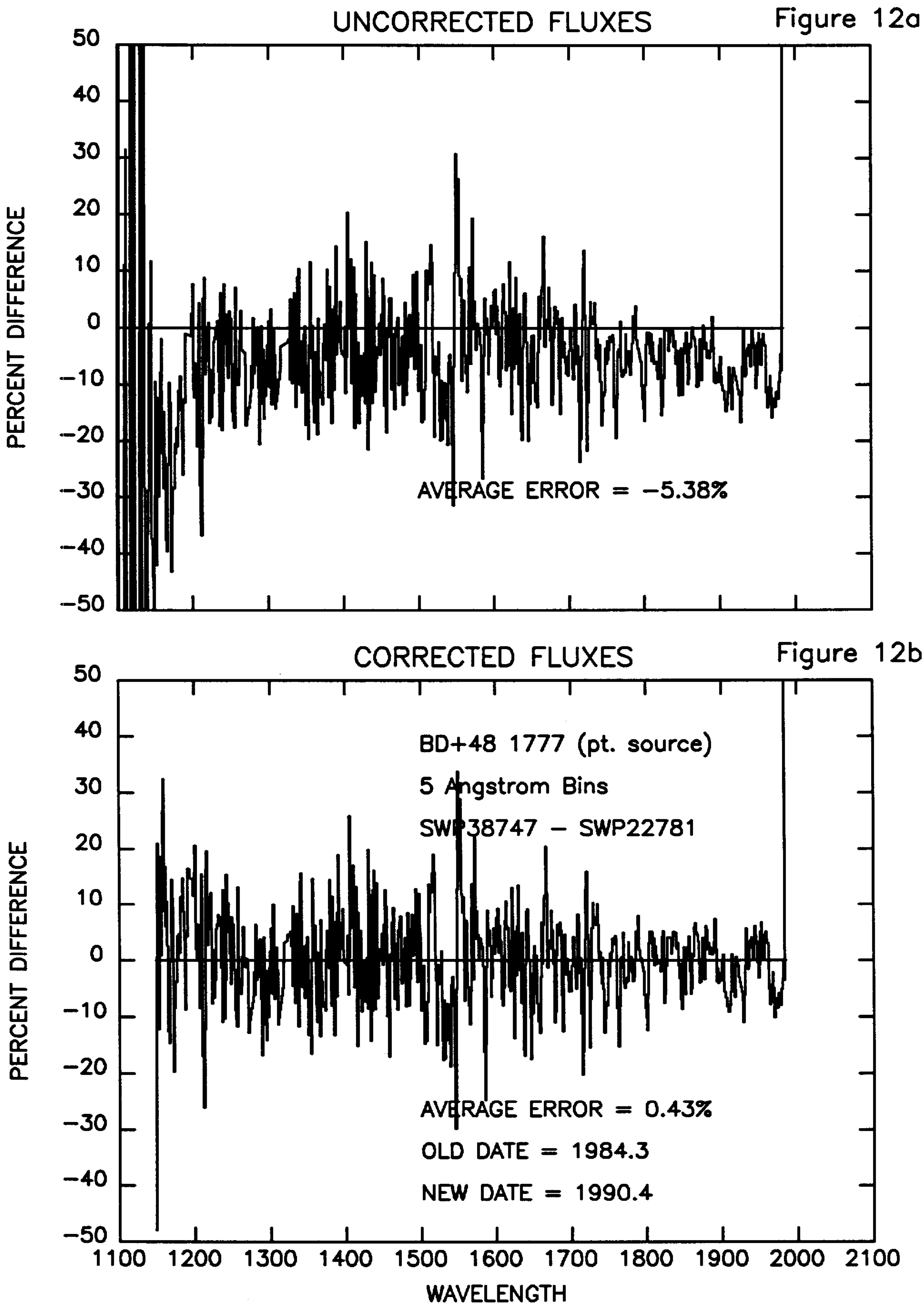
SWP Trailed Ratios
Figures 8a–8h
BIN DATE = 1978.7
BIN DATE = 1986.0
BIN DATE = 1980.5
BIN DATE = 1988.5
BIN DATE = 1982.0
BIN DATE = 1991.0
BIN DATE = 1984.5
BIN DATE = 1991.9
1.5
1.4
1.3
1.2
1.1
1
0.9
1100
1300
1500
1700
1900
2100
WAVELENGTH

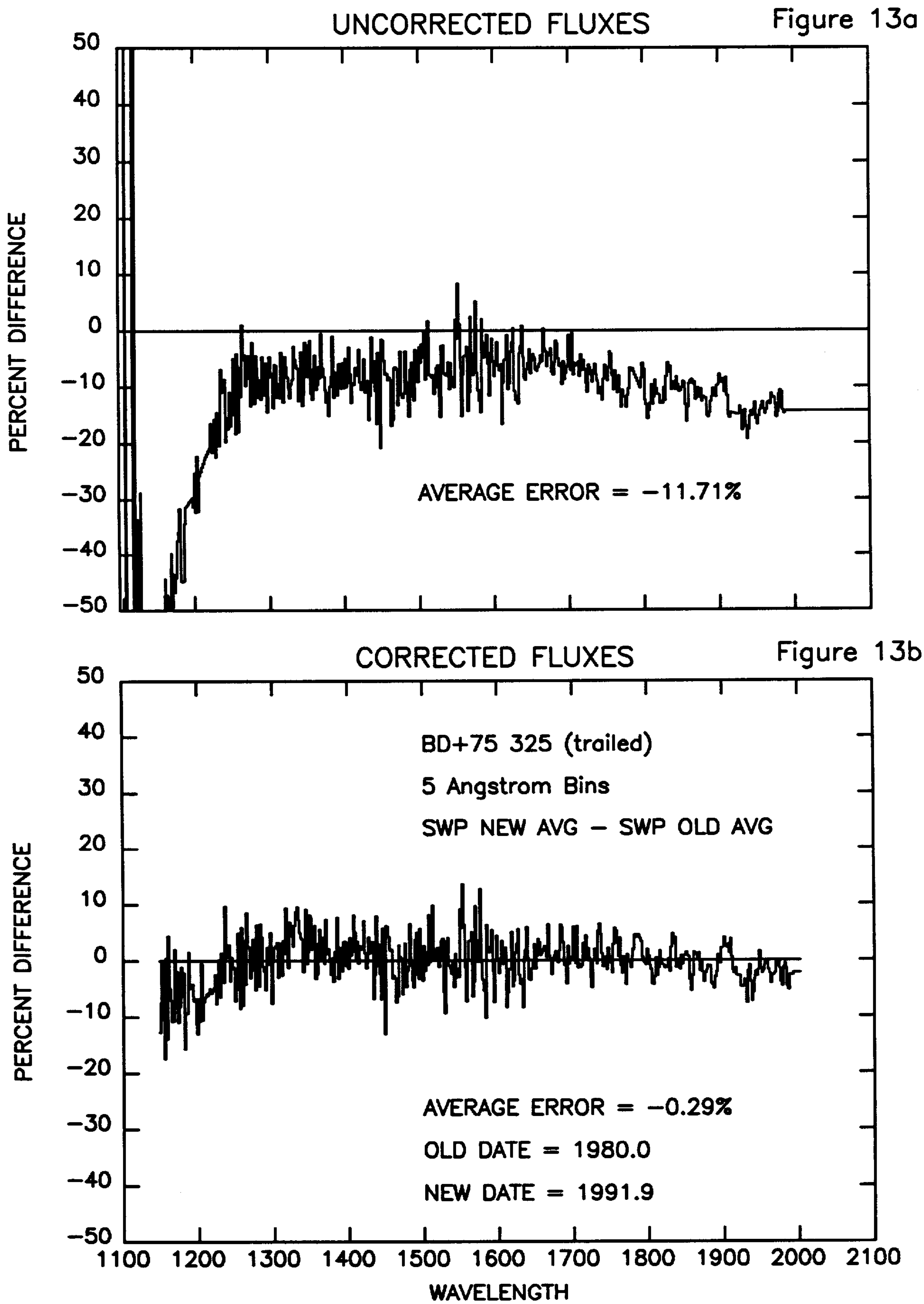

UNCORRECTED FLUXES
Figure 9a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −15.53%
CORRECTED FLUXES
Figure 9b
BD+28 4211 (pt. source)
5 Angstrom Bins
SWP NEW AVG − SWP OLD AVG
AVERAGE ERROR = −0.42%
OLD DATE = 1978.6
NEW DATE = 1992.0
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
WAVELENGTH

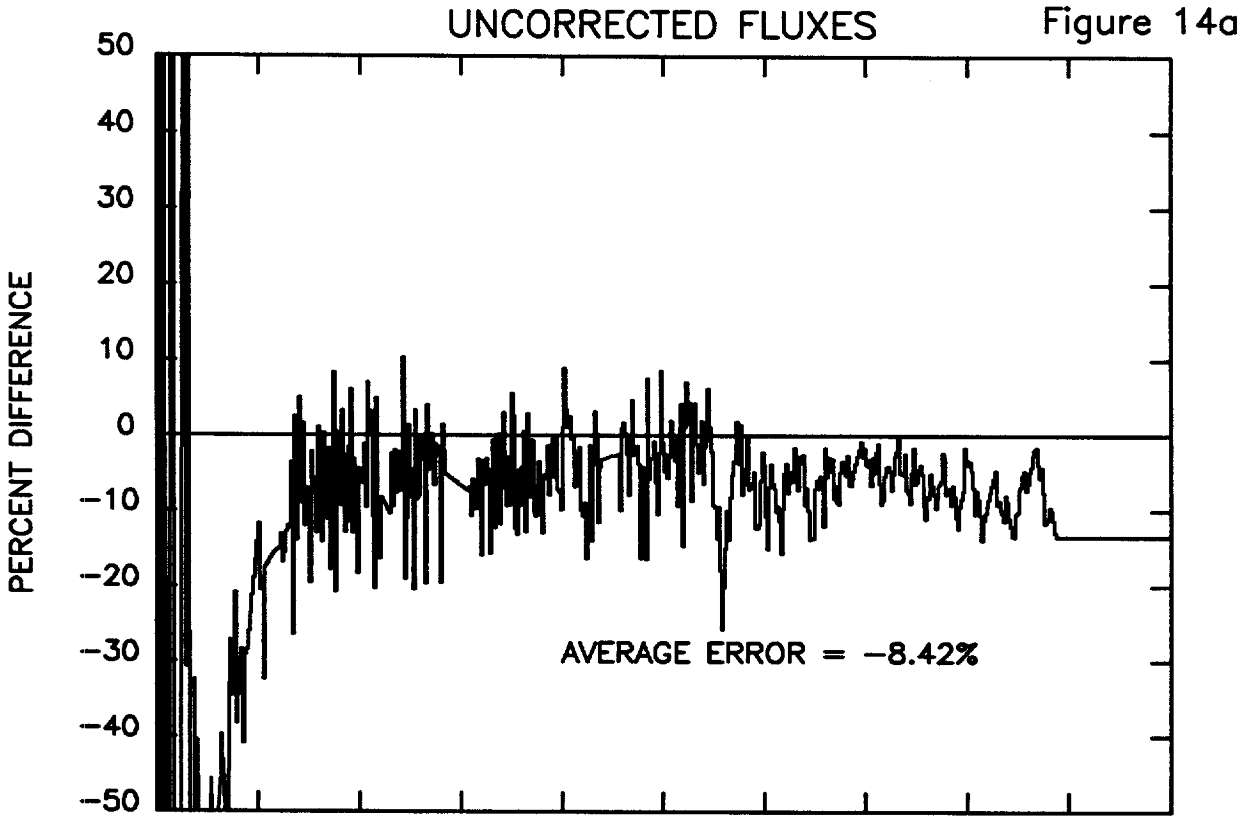

UNCORRECTED FLUXES
Figure 10a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −10.73%

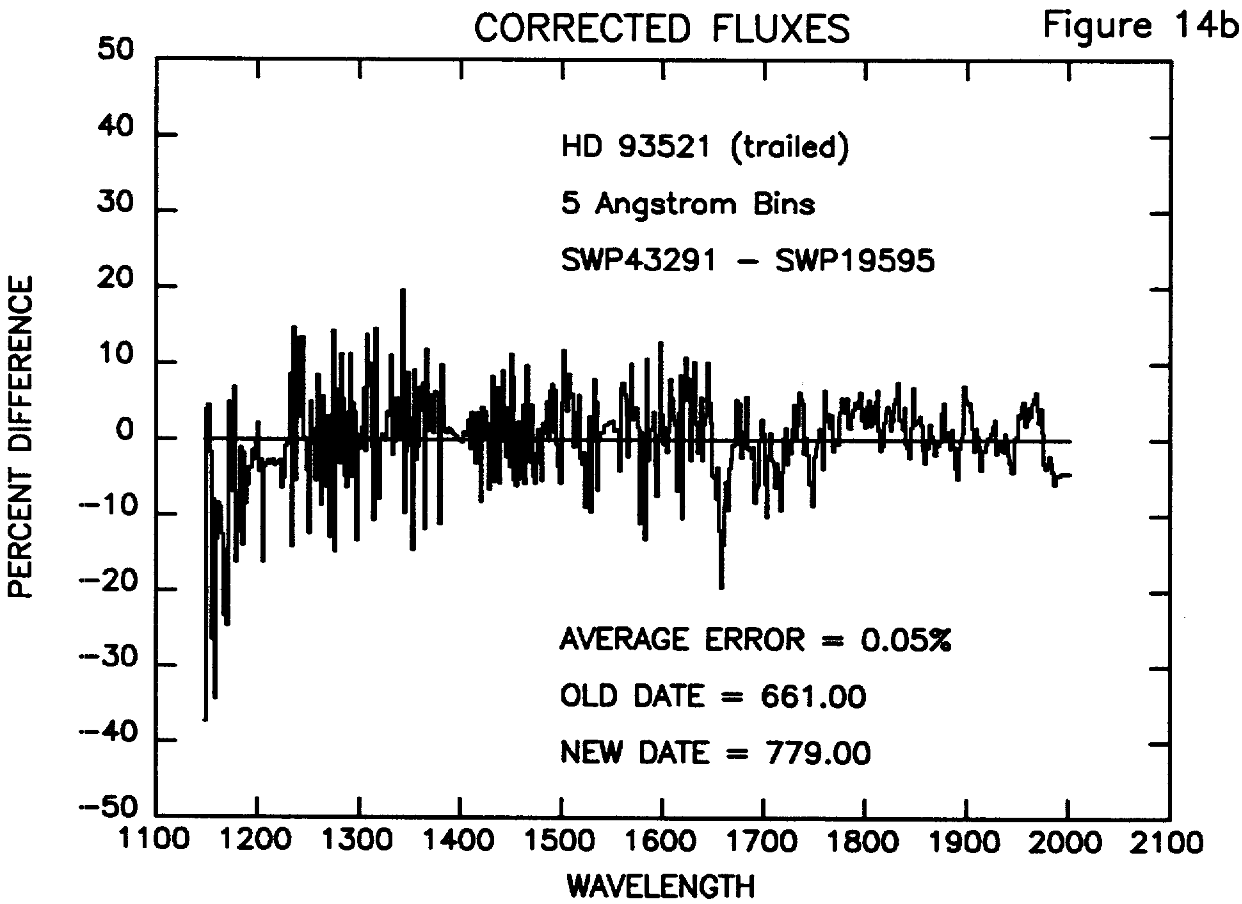

CORRECTED FLUXES
Figure 10b
PERCENT DIFFERENCE
BD+28 4211 (pt. source)
5 Angstrom Bins
SWP NEW AVG − SWP OLD AVG
AVERAGE ERROR = 1.03%
OLD DATE = 1979.5
NEW DATE = 1992.0
50
40
30
20
10
0
−10
−20
−30
−40
−50
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
WAVELENGTH


UNCORRECTED FLUXES
Figure 11a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −8.75%
CORRECTED FLUXES
Figure 11b
PG1620−391 (pt. source)
5 Angstrom Bins
SWP40892 − SWP18291
AVERAGE ERROR = −0.79%
OLD DATE = 1982.8
NEW DATE = 1991.1
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
WAVELENGTH


UNCORRECTED FLUXES
Figure 12a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −5.38%
CORRECTED FLUXES
Figure 12b
BD+48 1777 (pt. source)
5 Angstrom Bins
SWP38747 – SWP22781
AVERAGE ERROR = 0.43%
OLD DATE = 1984.3
NEW DATE = 1990.4
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
WAVELENGTH


UNCORRECTED FLUXES
Figure 13a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −11.71%
CORRECTED FLUXES
Figure 13b
BD+75 325 (trailed)
5 Angstrom Bins
SWP NEW AVG − SWP OLD AVG
AVERAGE ERROR = −0.29%
OLD DATE = 1980.0
NEW DATE = 1991.9
1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100
WAVELENGTH


UNCORRECTED FLUXES
Figure 14a
PERCENT DIFFERENCE
50
40
30
20
10
0
−10
−20
−30
−40
−50
AVERAGE ERROR = −8.42%


CORRECTED FLUXES
Figure 14b
PERCENT DIFFERENCE
HD 93521 (trailed)
5 Angstrom Bins
SWP43291 − SWP19595
AVERAGE ERROR = 0.05%
OLD DATE = 661.00
NEW DATE = 779.00
1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100
WAVELENGTH