Quick Look Sensitivity Monitoring

Checking for sensitivity variations of the IUE cameras by analysis of a subset of repeated observations of low dispersion standard stars (Holm and Schiffer 1980) has been continued. The data base for this check has been enlarged by including spectra acquired since the last report was generated.

The rate of change coefficients derived from linear regressions give sensitivity changes for the SWP that are +0.1%/year at 1550 Angstroms, and -0.3%/year at 1850 Angstroms, when only data taken after 1979.3 is used. At 1300 Angstroms there is no measurable change in sensitivity over the entire period. As reported earlier a rapid decrease in sensitivity was seen at 1550 and 1850 Angstroms during 1978. Linear regressions to the data taken before 1979.3 give decreases in sensitivity of 6.3%/year at 1550 Angstroms and 6.1% at 1850 Angstroms. These rates of change represent a total decrease in sensitivity of 7 to 8% since launch at these wavelengths. Linear regressions to the LWR spectra give a sensitivity decrease per year of 2.1% at 2400 Angstroms, of 1.0% at 2600 Angstroms and of 0.6% at 2900 Angstroms. These rates of decrease are larger than reported previously. Using only the data since 1980.5, the rates of decrease in sensitivity are much more pronounced: 4.5%/year at 2400 Angstroms and 4.2%/year at 2600 Angstroms.

Due to the wide range of camera temperatures experienced during normal operations recently, the temperature dependence of each camera has been determined. A subset of the sensitivity data was fit with a linear regression for both temperature and time effects. The SWP data was fit best with a 0.5%/degree decrease in sensitivity. The LWR data was fit best with a 1.1%/degree decrease. In both cases the variation was fitted to the head amplifier temperature (THDA). No effort has been made to fit to other camera temperatures.

Basically the techniques used are the same as described earlier. The new spectra were ratioed to reference spectra, smoothed, and binned. For the SWP the bins used were all 150Å wide. For the LWR the bins at 2400Å and at 2800Å were 300Å wide and the bin at 2600Å was 100Å wide. The smoothing was done with a median filter to eliminate the effects of wavelength misregistration and reseau marks. Some but not all of the older data was recomputed with this technique and the results were not significantly different. For this reason the earlier measurements were included in this analysis for all cases

not recomputed. The temperature coefficients for each camera and zero point shifts for each star were computed by a multiple linear regression to a subset of this data. The results were applied to all of the data and linear regressions done on each wavelength to determine the rate of change of sensitivity with time. The RMS error in the fits was about 2% for the SWP camera and 2.5% for the LWR when the times of rapid change were excluded. As earlier work had shown no major differences between the stars and none are suspected of UV variability no effort was made to fit each star independently as was done earlier.

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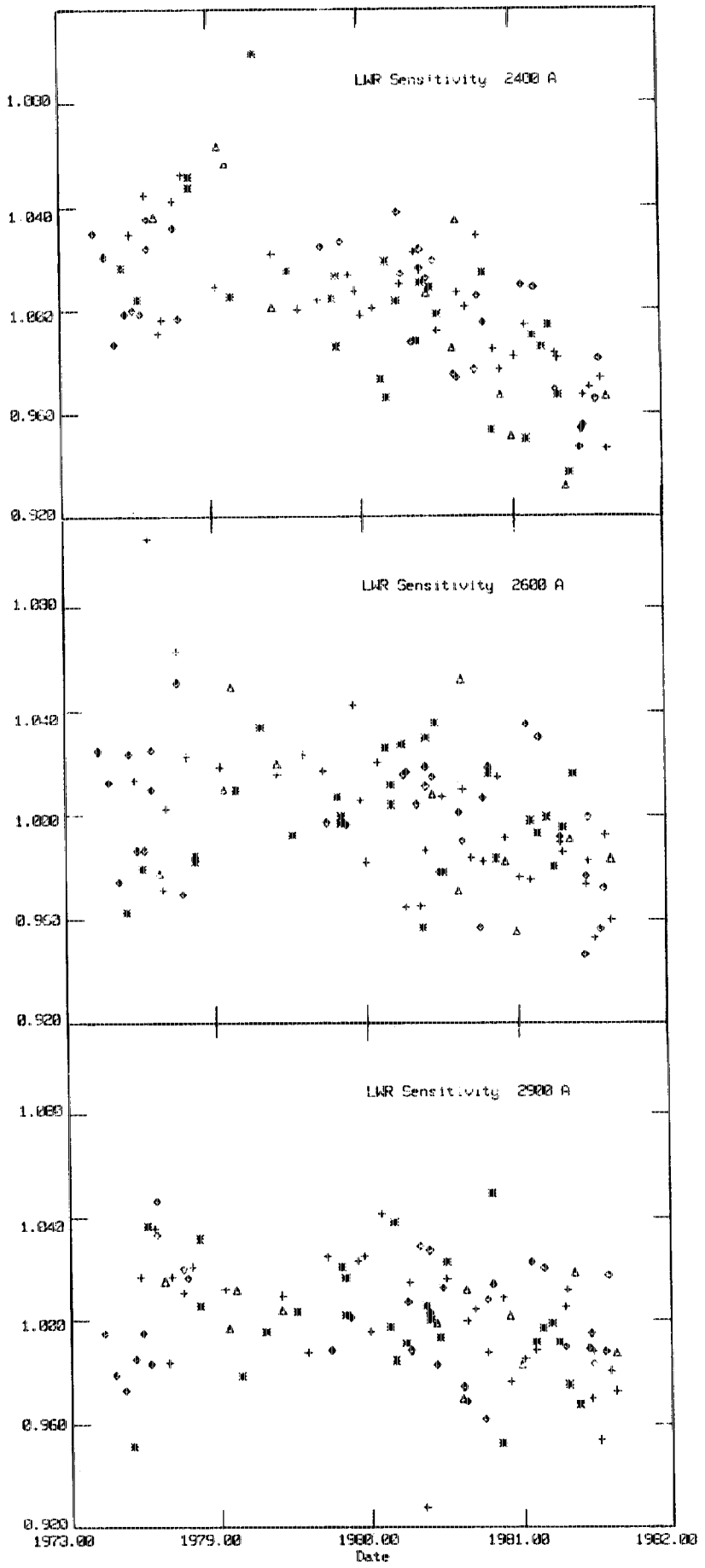
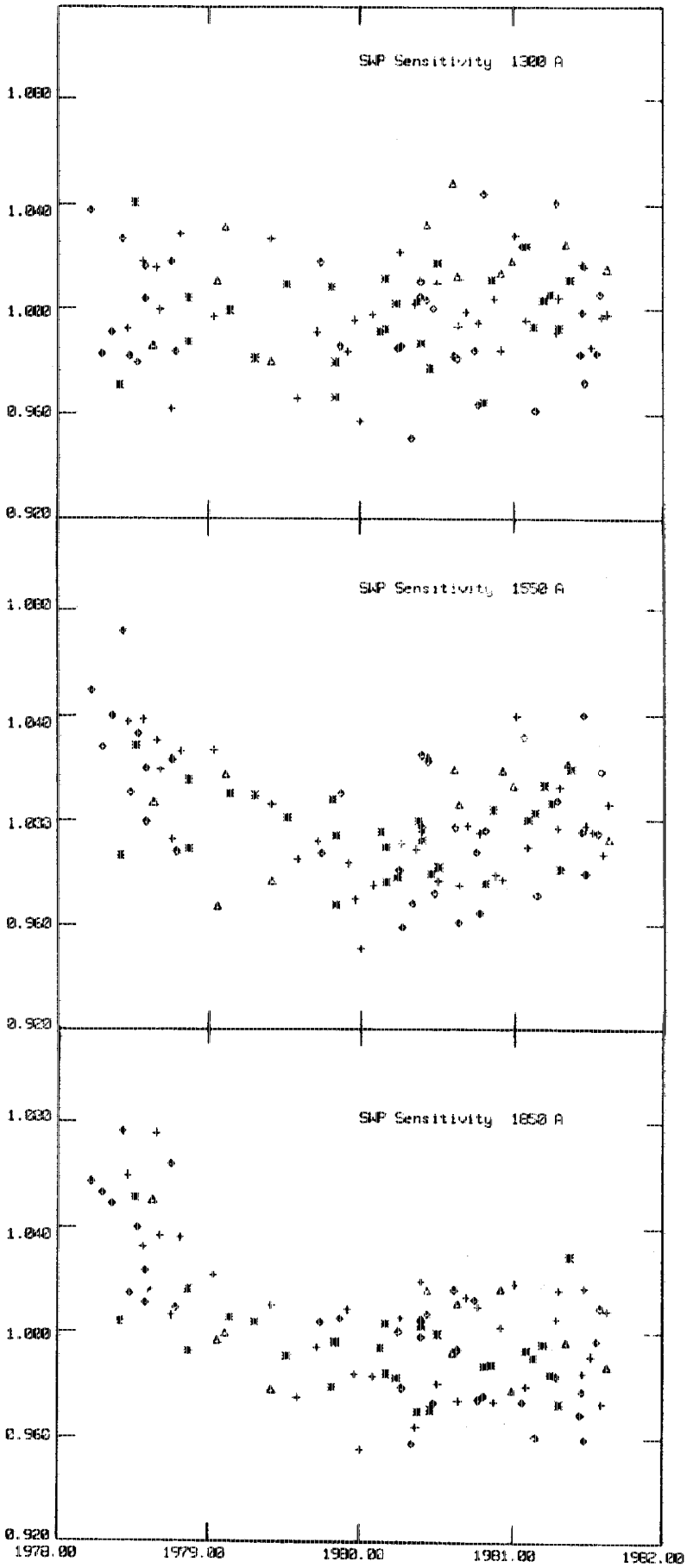
Holm, A.V., and Schiffer, F.H. 1980, NASA IUE Newsletter, No. 9, 8.



LWR Sensitivity Variations

- low-dispersion, point-source spectra
- broad band averages
- temperature corrected
- plus BD+28°4211
  asterisk HD 93521
  diamond HD 60753
  triangle BD+33°2642



SWP Sensitivity Variations

- low-dispersion, point-source spectra
- broad band averages
- temperature corrected
- plus BD+28°4211
  asterisk HD 93521
  diamond HD 60753
  triangle BD+33°2642