HIGH-PRECISION SOLAR RADIATION DATA FOR λλ3300-12500Å

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Very precise data on the solar radiation has been obtained by merging: (1) the absolute integrals of the disk-center intensity for 20Å-wide spectral bands, observed in the 1960's by Labs and Neckel (1962, 1963, 1967); (2) the ratios of the mean-to-central intensity following from observations of the center-to-limb variation of (a) all 20Å bands below 6600Å (Neckel and Labs 1984), and (b) the intensities at selected continuum wavelengths (Pierce and Slaughter 1977a,b); and (3) the high-resolution Fourier transform spectra (FTS) obtained by J. Brault at Kitt Peak for the center of the disk and for the irradiance.

The main result is (1) a compilation of 10, 20, and 50Å averages for both the intensity at the center of the disk and the disk-averaged radiation (irradiance) and (2) for both spectra the most reliable localization of the 'continuum'-level yet produced.

The internal accuracy of the data is defined by the 'scatter' in the FTS spectra, which is on the order of 0.1%. Local systematic deviations exceeding 0.5% are not to be expected. The absence of a significant neutral or wavelength-dependent systematic error in the absolute data has already been well established; now it is confirmed again.

A detailed paper has been published (Neckel and Labs 1984), as has a summary (Neckel 1984).

REFERENCES

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DISCUSSION

JASCHEK: Thank you for this very nice paper. For once we have a calibration which has errors smaller than 1%. That is marvelous.

HAYES: Do you plan any further work on the absolute calibration of the Sun?

NECKEL: We have new solar irradiance measurements which extend from 2000 Å to 3 microns which were made in December of last year in collaboration with some French and Belgian colleagues on the Spacelab I flight. It will take some time before we finally receive all the data. I should say that there is also another good set of solar irradiance data which agree very well with ours. Those are the data published exactly 60 years ago by Minnaert, who took his data from the famous observations by Abbot made in 1922 and 1923. There is really amazing agreement between our measurements and these old ones, which were, for many decades, the standard for solar radiation.

BESSELL: When will the KPNO FTS Atlas of Brault be available for use?

NECKEL: You can get it (on tape) from James Brault at Kitt Peak. We have published the polynomials which you can use to calibrate the data.