Abstract. Solar irradiation fluxes are determined between 150 and 210 nm from stigmatic spectra of the Sun obtained by means of a rocket-borne spectrograph. Absolute intensities at the disk center with a spectral resolution of 0.04 nm and a spatial resolution of 7 arc sec are presented. From center-to-limb intensity variations determined from the same spectra, mean full disk intensities of the quiet Sun can be deduced. In order to compare them with other measurements, the new solar fluxes have been averaged over a bandpass of 1 nm.

1. Introduction

The photodissociation of molecular oxygen by the ultraviolet solar irradiation flux ranging from 175 to 242 nm is the initial source of odd oxygen in the mesosphere and the stratosphere. This wavelength interval corresponds to the Schumann-Runge band system (204–175 nm) and to the Herzberg continuum (242–204 nm) of molecular oxygen. In this spectral region, solar fluxes are not sufficiently well known, especially between 180 and 200 nm. The first complete measurements reported by Detwiler et al. (1961) are generally considered as being too high by an important factor. The other flux values covering also this whole spectral region which were published by Widing et al. (1970) correspond to values measured at the center of the solar disk and cannot be used in aeronomy which requires total disk solar flux values. The most recent measurements have been obtained by means of rocket-borne spectrometers by Rottman (1974) between 116 and 185 nm and by Heroux and Swirbalus (1976) between 125 and 194 nm. In addition, Brueckner et al. (1976) have deduced average disk intensities from a quiet Sun spectrum between 175 and 210 nm. Other measurements have also been obtained by Simon (1974) by means of a balloon-borne spectrometer between 196 and 230 nm. Rocket measurements agree very well together below 180 nm leading to an equivalent blackbody solar temperature of the order of 4550 K in this spectral region. Simon's data lead to a brightness temperature of the Sun of the order of 4700 K at 196 nm. There is therefore an important increase in the solar flux between 180 and 196 nm which must be determined to calculate accurate photodissociation rate coefficients of minor stratospheric con-
stituents (Kockarts, 1976). Data published by Heroux and Swirbalus (1976) and by Brueckner et al. (1976) do not solve completely this problem, since systematic differences of roughly 40% can be seen between these observations. Furthermore, high spectral resolution fluxes are needed, to calculate, for example, the photodissociation rate coefficient of nitric oxide which has absorption bands with rotational structure in the Schuman–Runge region (Cieslik and Nicolet, 1973).

The purpose of this work is to determine the solar irradiation fluxes between 150 and 210 nm from stigmatic spectra of the Sun obtained by Samain et al. (1975), by computing the mean flux over the whole disk from the center-to-limb variations determined from the same spectra.

2. Observational Data and Calibration

The stigmatic spectra of the Sun between 120 and 210 nm were obtained during a rocket flight, April 17, 1973, by means of a double Wadsworth mounting spectrograph. This experiment leads to the determination of solar disk intensities with a spectral resolution of 0.04 nm and to center- to-limb distributions with spatial resolution of 7 arc sec. Absolute intensities at the center of the disk have

![Solar Disk Center Intensity](image)

**Fig. 1.** Absolute intensities for the solar disk center between 150 and 185 nm with a spectral resolution of 0.04 nm and a spatial resolution of 7 arc sec.