THE 44–60 Å FLUX DURING THE ASCENDING PERIOD OF THE SOLAR CYCLE No. 20 (1964–67)

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Abstract. An attempt is made to separate the ‘true’ 44–60 Å flux from the ‘nominal’ one measured by the Solrad 8 satellite during 1966.

The 44–60 Å flux recorded at Arcetri through the telemetry of the Solrad 6, 7, and 8 satellites is also examined in order to study its time variations in comparison with other indices of solar activity.

1. Introduction

The aim of this paper is to present solar flux variations in the 44–60 Å band during the ascent of the current solar cycle (no. 20).

This work is based on the data telemetered at Arcetri from the Solrad 6, 7, and 8 satellites, whose observations cover, with some interruptions, the period from 1964 to 1967.

As it is well known, the Solrad satellites are instrumented to monitor the solar radiation in the 1–20 Å and 44–60 Å bands and in the UV region between 1080 and 1350 Å. Detailed information about the equipment and the data-reduction methods are available elsewhere (KREPLIN, 1966).

The 44–60 Å flux is measured by means of an ionization-chamber photometer assuming, for convenience, that the energy spectral distribution is a grey-body distribution with \( T = 0.5 \times 10^6 \) K. The efficiency of the 44–60 Å photometer is shown in Figure 1 (KREPLIN, 1966). It appears from this figure that a region of high sensitivity is present below 20 Å. A second ionization-chamber photometer, whose efficiency curve is also shown in Figure 1, gives some information about the correction of the data derived from the first photometer.

This correction is only now possible, as the second photometer was first introduced in the Solrad 8 satellite.

2. Variations with the Solar Cycle

In Figure 2 are shown the time variations (from March 1964 to September 1967) of the flux derived, without any correction, in the 44–60 Å band. The values reported are monthly means. In the same figure the radio flux at 2800 MHz (Ottawa) is plotted for comparison. The general trend of the X-ray flux is clearly similar to the decimetric activity index, even though some details do not show a perfect agreement and the X-ray variations during the studied period are much more prominent than the radio intensity variations.

Fig. 1. Spectral efficiency of the 44–60 Å (solid line) and 1–20 Å (dotted line) ion chamber photometers.

Fig. 2. Monthly means of the 44–60 Å (Solrad 6, 7 and 8) and of the 2800 MHz (Ottawa) fluxes during the ascending phase of solar cycle no. 20.