



Analytical Study of solar activity sudden increases and Halloween storms of 2003

A. A. Hady

Astronomy Dept., Faculty of Science,

Cairo University, Egypt

aahady@cu.edu.eg

0.1 Abstract

During the decline phase of the last five solar cycles, a secondary peak was detected 2 – 3 years after the main peak. The main peak of cycle 23 was in 2001, but an explosion of activities has occurred during the period 19 October – 10 November, 2003 (so-called Halloween storms). Again these storms appeared one year later, during the period 3-October – 13 November, 2004. It is considered a second peak during the decline phase of cycle 23.

During this period the sunspot area increased from (1110 10E-6) Hemisphere on 19 October to (5690 10E-6) Hemisphere on 30 October, then decreased to (1110 10 E-6) Hemisphere on 4 November 2003. Also, the radio flux of 10.7 cm increased from 120 sfu on 19 October to 298 sfu on 26 October, and then decreased to 168 sfu on 4 November 2003. There were two eruptive solar proton flares which were released on 26 and 28 October 2003, where the last one was the most eruptive flare recorded since 1976 with importance X17/4B.

The aim of this study is to follow the morphological and magnetic changes of the active region before, during and after the high energetic flares were produced. Also, applying the cumulative summation curves method for the different index of the active region to predict the flare of high energy has been carried out. The results are promising and can be used for proton flares and Geomagnetic Storms prediction, few days before their occurrence. The reasons of release of these Eruptive Storms, on October

– November 2003, has been also discussed, and during the decline phase of the last 5 cycles.