

SOLAR CYCLE EFFECT ON THE VARIATION OF SOME IONOSPHERIC E - AND F - REGION PARAMETERS AT IBADAN

E. O. SOMOYE

Department of Physics, Lagos State University, Ojo, Lagos, Nigeria.

ABSTRACT

The effect of solar cycle on the variation of the virtual height (h') and critical frequency (f_o) of echoes of ionospheric E- and F2- region at Ibadan were investigated. While the median virtual heights of 1965 (low epoch of solar cycle) and 1970 (high epoch of solar cycle) were used for both regions, the median critical frequency of 1964 (low epoch) and 1971 (high epoch) were used. It was found that these parameters for both regions varied differently with solar cycle. The variations of h'_{F2} and f_{oF2} were however greater than those of h'_E and f_{oE} were found not to vary much with solar cycle, the rate of hourly change of h'_E being 7.5 km/h during 1965 and 7 km/hr during 1970. The rate of yearly change was 14 km/hr. Also the diurnal curves of f_{oE} during 1964 and 1971 were similar that the slight differences between them were not noticeable. These results indicate uniform changes in both parameters of the E region over a solar cycle. On the other hand, not much similarity is observed in the diurnal curves of f_{oF2} of 1964 and 1971. Also, the rate of diurnal change of h'_{F2} is 11 km/hr and 17 km/hr during 1965 and 1970 respectively. The rate of yearly change for h'_{F2} is 26 km/year. These results indicate non-uniform changes in both parameters of the F2 region over a solar cycle. This may be due to the complex nature of the F2 region. Harmonic analyses carried out show that the diurnal component is predominant over the semi-diurnal components of the parameters for both regions while the solar cycle components are predominant over the semi-cycle components of all the parameters.

Key words: Solar cycle, Variation, E- and F- region