

## **Solar Flare Associated Ionospheric Effects over Ahmedabad (23°N)**

HARI OM VATS, SOM SHARMA, H CHANDRA and H S S SINHA

*Physical Research Laboratory, Navrangpura, Ahmedabad-380 009, India*

Solar flares are transient phenomena taking place in the Sun. Solar flare pumps huge amount of energy ( $\sim 10^{27}$  ergs or even more), in the form of radiation and matter into the interplanetary medium in very short duration. This excess amount of energy triggers various geophysical processes in the ionosphere. The solar flares events of July 1996 and May 1997 and their ionospheric effects were observed by operating a KEL digital ionosonde over Ahmedabad (23 °N). The excessive EUV portion of the flare spectrum is mainly responsible for enhanced photo-ionization of the different ionospheric regions. The X-class flare occurred on 9 July 1996 ( $R_x \sim 8$ ). A significant coronal mass ejection (CME) on the solar west limb beginning on 8 July 1996 at about 09:53UT was measured. The soft x-ray flux (0.1-0.8 nm) had started to increase on the previous day from background level ( $\sim 10^{-8}$  Wm<sup>-2</sup>). The enhanced production of X ray gave rise to excess ionization in the D - region of the ionosphere. Due to increased ionization in the D region, a minimum frequency observed by ionosonde ( $f_{min}$ ), was enhanced by a factor about 4. During few of the strong solar flare events a complete blackout was observed. During the solar flare of 12 May 1997 (a two-ribbon flare), we have established an empirical formula for estimation of solar flare produced excess ionization in the D region of the ionosphere over Ahmedabad. Using the empirical formula D-regions electron density has been found to be about 1200 el cm<sup>-3</sup>. Ionospheric effects of few recent solar flares and detailed physics of flare-ionosphere coupling will be discussed and presented.