STUDIES OF THE LOW LATITUDE ELECTRODYNAMCIS DURING WORLD DAYS

B. G. Fejer
R. F. Woodman

We propose to use Jicamarca radar observations during the World Day periods together with data from the San Marco satellite for the study of equatorial electrodynamics. These incoherent scatter World Day experiments are usually conducted during two or three yearly campaigns of two to three days each, and about 10 campaigns of about a day. These periods are selected from the times when the IMP-8 satellite is in the solar wind and can therefore provide the interplanetary magnetic field parameters. In addition, dark moon conditions are also required for supporting airglow observations. These experiments are carried out with the four incoherent scatter radars in the American chain, and the EISCAT and Saint-Santin radars in Europe. Additional ground based observations are often provided by about 70 magnetometer stations mostly at high latitudes, airglow detectors at high, middle and low latitudes, and by ionosondes and polarimeters in the South American region. The IMF data are typically supplemented by measurements from other satellite probes such as the NOAA Tiros satellites used to estimate the energy input into the high latitude ionosphere, and from the DMSP F6, F7 and Hilat satellites used to give additional information on the particle precipitation and ionospheric convection patterns. These observations are used to study the electrodynamical coupling from high to middle and low latitudes and are also used for testing detailed numerical models of the Earth's magnetosphere and ionosphere.

The equatorial F-region vertical and east-west drifts will be measured at Jicamarca with a time resolution of 1 min and a height resolution of about 15 km from 200 to 700 km. These data together with similar observations from the other radars, particularly from Arecibo, would be used comparison with the satellite electric field and neutral wind data. These will provide an excellent data base for studying the penetration of magnetospheric electric fields into the low latitude ionosphere as well as the importance of disturbance dynamo electric fields at equatorial latitudes. Furthermore, longitudinal coverage of the satellite data will help considerably our understanding of the day to day variablity of the low latitude ionospheric plasma drifts during magnetically quiet times. We anticipate that this study would be made in collaboration with a number of scientists involved with the satellite data as well as researchers providing other ground based data.

These studies would be performed on the 1987 World Day periods which will chosen soon following the criteria mentioned above. We would propose intial joint observations for December 8-12, 1986, which is centered around a World Day period. Additional extended periods of observations are proposed for January, March and June 1987.