

전리층 변화현상 연구

표 유 선
전파과 공업연구소

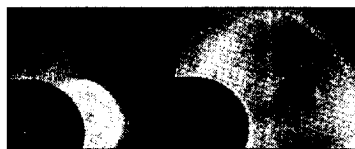
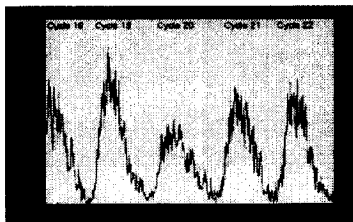
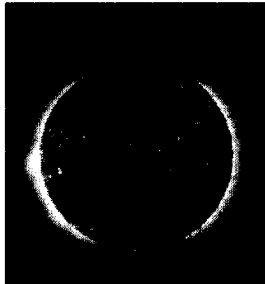
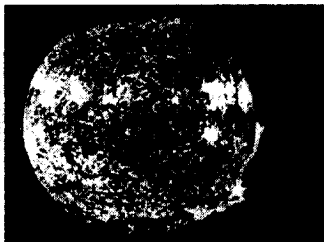
전리층 변화현상 연구

- PIM 코드활용을 중심으로 -

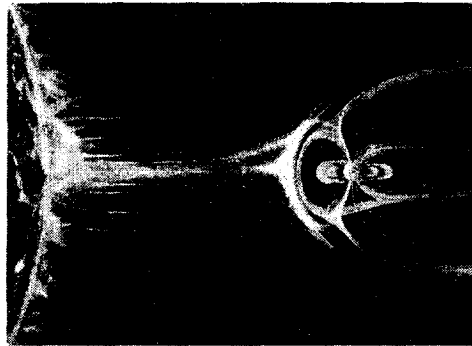


전파과
표유선

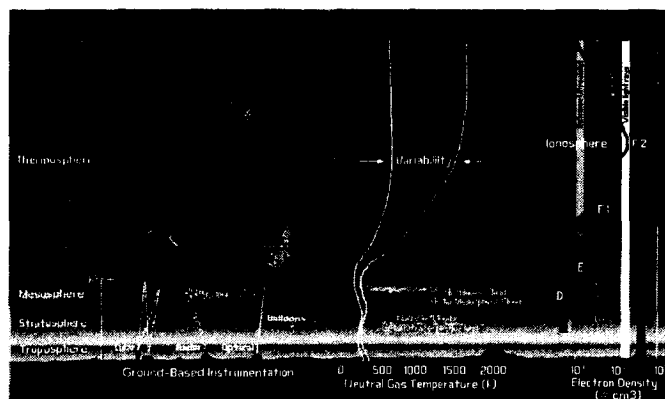
Active Sun



Solar-Terrestrial Environment

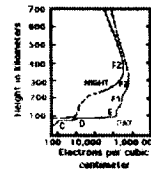


Ionosphere



Ionosphere

- *A part of the earth's atmosphere ionized by solar radiation and cosmic ray*
- *Strongly varied with solar activities*
- *D, E, F1, F2 layer*
- *Observation Instruments*
 - *satellites, sounding rockets*
 - *riometer, incoherent scatter radar*
 - *ballons, ionosonde*

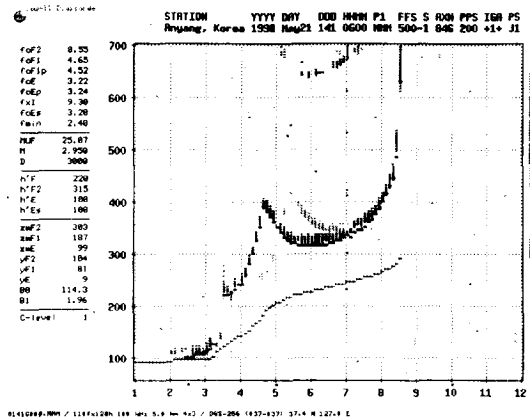


Ionosonde

- *DGS-256(Univ. of Mass, Lowell)*
- *Freq. sweep : 0.5 - 30MHz*
- *Peak pulse power : 10kW*
- *Band width : 20kHz*
- *Freq. step : 100kHz*
- *Maximum height : 2,680km*
- *Hight resolution : 10km*



Ionogram



IRI

- IRI(International Reference Ionosphere)
- : empirical model(50-2,000km)
- : NSSDC, COSPAR, URSI
- : Electron density, e^- & ion temperature,
- Ion composition(O^+ , H^+ , O_2^+ , NO^+ , He^+)
- : limited by the amount of data and the spatial and temporal distribution of that data

PIM

- PIM(Parameterized Ionospheric Model)
 - : a global model of theoretical ionospheric climatology(90-25,000km)
 - : Philips Laboratory(USAF), CPI etc.
 - : foF2, foE, TEC, Electron density, etc.
 - : limited by the accuracy and completeness of the physics and chemistry

PIM

- PIM :
 - 1) LOWLAT(The Low Latitude F-layer Model)
 - 2) MIDLAT(The Mid Latitude F-layer Model)
 - 3) ECSD(The Low and Mid Latitude E Layer Model)
 - 4) TDIM(The High Latitude Model)

PIM

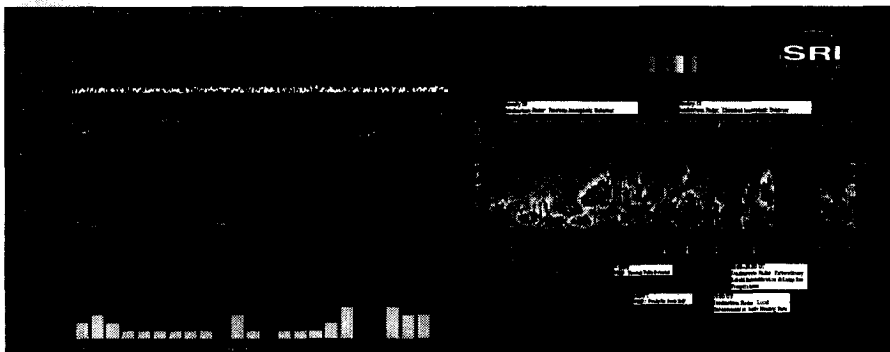
■ Input parameter (35)

: year, day, time(UT), the orientation of IMF B_y & $B_z(+,-)$, the solar radio flux at 10.7cm (2800MHz : $10^{22} \text{Wm}^{-2} \text{Hz}^{-1}$), sunspot number, the geomagnetic activity index(K_p), coordinate system, etc.

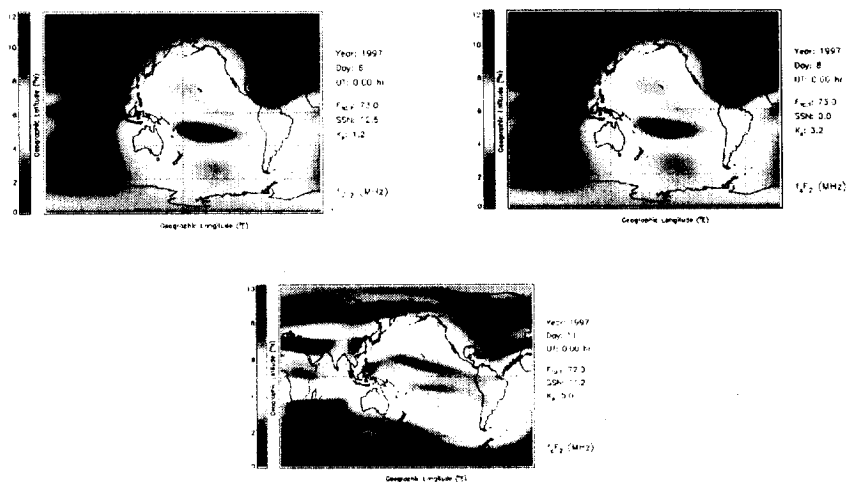
■ Output(11)

: foF2, foF1, foE, TEC, electron density, etc.

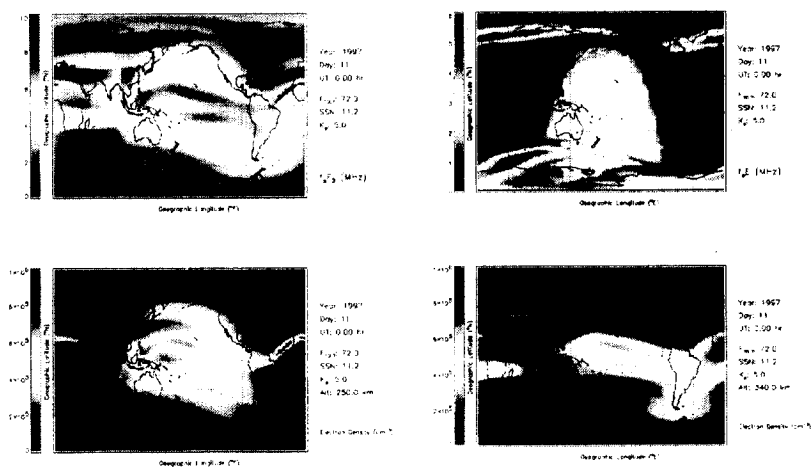
'97.1.11



'97.1.6, 8, 11 foF2 value



'97.1.11 foF2, foE, e^- Density



1. *Pharmaceutical Innovation and the Role of the State*
 2. *The Impact of Intellectual Property Rights on Drug Development*
 3. *The Role of Government in Regulating the Pharmaceutical Industry*
 4. *The Impact of Globalization on the Pharmaceutical Industry*
 5. *The Role of the Pharmaceutical Industry in Public Health*
 6. *The Impact of the Pharmaceutical Industry on the Environment*
 7. *The Role of the Pharmaceutical Industry in the Global Economy*
 8. *The Impact of the Pharmaceutical Industry on the Labor Market*
 9. *The Role of the Pharmaceutical Industry in the Social Welfare State*
 10. *The Impact of the Pharmaceutical Industry on the Health Care System*



Future Works

- Equatorial Anomaly(PREASA Campaign)
- Space Weather Forecast
- TEC Observation System
- APII Test-bed Experiment