profiles of the observed meteor decay times between 70 and 95 km by classifying strong and weak meteors according to their estimated electron line densities. The height profiles of monthly averaged decay times show a peak whose altitude varies with season in the range of 80~85 km: higher peak in southern spring and summer than in fall and winter. The higher peak during summer is consistent with colder temperatures that cause faster chemical reactions of electron removal, as effective recombination rates measured by rocket experiments. The height profiles of 15-min averaged decay times show a clear increasing trend with decreasing altitude from 95 km to the peak altitude, especially for weak meteors. This feature for weak meteors is well explained by ambipolar diffusion of meteor trails, allowing one to estimate atmospheric temperatures and pressures, as in previous studies. However, the strong meteors show not only significant scatters but also different slope of the increasing trend from 95 km to the peak altitude. Therefore, atmospheric temperature estimation from meteor decay times should be applied for weak meteors only. In this study, we present the simple model decay times to explain the height profiles of the observed decay times and discuss the additional removal processes of meteor trail electrons through the empirical recombination and by icy particles.

[Ⅰ-3-3] 중위도 고층대기/전리층 불균일 현상 연구를 위한 VHF 간섭 산란 레이더 설치 및 초기 관측 결과 소개

양태용[1], 곽영실[1], 황정아[1], 이재진[1], 최성환[1], 최호성[1,2], 조경석[1], 박영득[1], 김연한[1]

[1]한국천문연구원 태양우주환경연구그룹, [2]과학기술연합대학원

한국천문연구원은 우주환경예보센터(Korean Space Weather Prediction Center) 구축사업의 일환으로 고층대기/전리층의 불균일 현상을 관측할 수 있는 VHF 간섭 산란 레이더를 대한민국 공군과 협의를 통해 충남 계룡 (36.18°N, 127.14°E)에 설치하였다. 이 레이더는 2007년 '우주환경예보를 위한 중·저위도 고층대기 관측시스템 설계를 위한 기초연구'를 통해 선정되어 2009년 설치가 완료되었으며 12월 말부터 정상 관측을 수행하고 있다. 5 소자의 총 24기의 안테나가 12×2의 배열을 이루어 최대 출력 24kW, 단일 주파수 40.8MHz로 전리층 E층과 F층을 관측하여 중위도 고층대기의 불균일 현상을 관측하고 있다. 앞으로 천문연구원의 전천카메라, 자력계, 신틸레이션 모니터와 더불어 중위도 지역의 고층대기와 우주환경예보에 대해 지속적인 관찰 및 연구가 가능하다. 이 발표에서는 우리나라의 첫 고층대기/전리층 관측 VHF 레이더의 설치 과정과 현재까지 계룡 관측소에서 관측한 중위도 전리층의 레이더 초기 관측 자료를 소개하고자 한다.

[Ⅰ-3-4] Extreme Enhancements in GPS TEC on 8 and 10 November 2004

Jong-Kyun Chung[1], Gunhwa Jee[2], Eojin Kim[3], Yong Ha Kim[3], and Jungho Cho[1]

[1]*Space Geodesy Research Group, Korea Astronomy and Space Science Institute, Korea*

[2]*Polar Climate Research Center, Korea Polar Research Institute, Korea*

[3]*Detp. of Astronomy & Space Science, Chungnam National University, Korea*

It is a mistaken impression that the midlatitude ionosphere was a very stable region with well-known morphology and physical mechanism. However, the large disturbances of midlatitude ionospheric contents in response to global thermospheric changes during geomagnetic storms are reported in recent studies using global GPS TEC map and space-born thermospheric UV images, and its importance get higher with the increasing application areas of space navigation systems and radio communication which are mostly used in the midlatitudes. Positive and negative storm phases are used to describe increase and decrease of ionospheric electron density. Negative storms result generally from the enhanced loss rate of electron density according to the neutral composition changes which are initiated by Joule heating in high-latitudes during geomagnetic storms. In contrast, positive ionospheric storms have not been well understood because of rare measurements to explain the mechanisms. The large enhancements of ground-based GPS TEC in Korea were observed on 8 and 10 November 2004. The positive ionospheric storm was continued except for dawn on 8 November, and its maximum value is ~65 TECU of ~3 times compared with the monthly mean TEC values. The other positive phase on 10 November begin to occur in day sector and lasted for more than 6 hours. The O/N2 ratios from GUVI/TIMED satellite show ~1.2 in northern hemisphere and ~0.3 in southern hemisphere of the northeast Asian sector on 8 and 10 November. We suggest the asymmetric features of O/N2 ratios in the Northeast Asian sector may play an important role in the measured GPS TEC enhancements in Korea because global thermospheric wind circulation can globally change the chemical composition during geomagnetic storms.

[Ⅰ-3-5] Plasmaspheric contribution to the GPS TEC

Geonhwa Jee[1], Han-Byul Lee[1,2], Yong Ha Kim[2], Jong-Kyun Chung[3], Jungho Cho[3]

[1]*Korea Polar Research Institute, Korea*

[2]*Department of Space and Astronomy, Chungnam National University, Korea*

[3]*Space Geodesy Research Group, Korea Astronomy and Space Science Institute, Korea*

We performed a comprehensive comparison between GPS Global Ionosphere Map (GIM) and TOPEX/Jason (T-J) TEC data for the periods of 1998~2009 in order to assess the performance of GIM over the global ocean where the GPS ground stations are very sparse. Using the GIM model