[구SE-03] 40.8 MHz coherent scatter ionospheric radar observations of E- and F-region field aligned irregularities over Korea

Tae-Yong Yang, Young-Sil Kwak, Jae-Jin Lee, Seong-Hwan Choi, Junga Hwang, and Young-Deuk Park
Division of Space Science, Korea Astronomy and Space Science Institute, Daejeon, South Korea

The new coherent scatter ionospheric radar has been operating at Gyerong city (36.18°N, 127.14°E, dip lat 26.7°N), South Korea. This VHF radar is consisted of 24 Yagi antennas having 5 elements and observes the E- and F-region field-aligned irregularities (FAIs) in a single frequency of 40.8 MHz with a peak power of 24 kW. We present the first results of the E- and F-region FAIs over Korea by using the new VHF coherent scatter ionospheric radar. The morphological and echo characteristics are studied in terms of their echo strength, Doppler velocity and also by spectral width values. From the continuous observations from December 2009, we found ionospheric E- and F-region FAIs appeared frequently. The most interesting and striking observations for E region are occurrence of daytime E-region irregularities and strong Quasi-Periodic (QP) echoes at nighttime. And for F region, strong post-sunset and pre-sunrise FAIs appeared frequently. The VHF radar observations over Korea are discussed in the light of current understanding of mid-latitude E- and F-region FAIs.

[구SE-04] Kalman filter technique for defining solar regular geomagnetic variations

Daniel Martini[1], Mikko Orispää[2], Thomas Ulich[2], Markku Lehtinen[2], Kalevi Mursula[3], and Dong Hun Lee[1]
[1]*School of Space Research, Kyung Hee University, Yongin, South-Korea*
[2]*Sodankylä Geophysical Observatory, Sodankylä, Finland*
[3]*Dept. of Physics, University of Oulu, Finland*

Motivated by recent attempts to derive geomagnetic activity from hourly mean data in long term studies, we test the recursive Kalman filter method to obtain the regular solar variation curve of the geomagnetic field. Using a simple algorithm, we are able to assign a quiet day curve to every day separately, without the need for additional input parameter(s) to define the geomagnetically quiet days. We derive a digital counterpart AhK of the analog range index Ak at the subauroral Sodankylä station and compare it to the earlier digital estimate Ah and the local Ak index. We find that the new method outperforms the former estimate in every aspect studied and provides a robust, straightforward manner of estimating and verifying the manually scaled Ak index, based on readily available hourly values. The model is independent of sampling; thus, for shorter term studies where high sampling data are available, more accurate estimates can also be obtained when needed. Therefore, in contrast to other recent approaches, we do not provide a method to quantify irregular activity directly but derive the actual quiet day curves in the traditional manner. In future applications the same algorithm may be used to define a wide variety of geomagnetic indices (such as Ak, Dst, or AE).