



Dynamic and fine structure of main ionospheric trough-unique boundary layer, recent, new in situ measurements and GNSS diagnostics.

H. Rothkaehl (1), A. Krankowski (2), J. Blecki (1), M. Parrot (3), J-J Berthelier (4), J-P Lebreton (5)

(1) Space Research Centre PAS 00-716 Warsaw, Bartycka 18A, Poland(hrot@cbk.waw.pl),
(2) Institute of Geodesy, University of Warmia and Mazury in Olsztyn, Poland, 3)
LPCE/CNRS 3A, avenue de la Recherche Scientifique 45071 Orléans cedex 02 France, (4)
CETP/ Observatoire de Saint-Maur 4, avenue de Neptune94107 Saint-Maur-des-Fossés
CedexFrance, (5) RSSD/ESTEC/ESA Postbus 2992200 AG Noordwijk The Netherlands

The mid-latitude electron density trough observed in the topside ionosphere has been shown to be the near-Earth signature of the magnetospheric plasmopause and can provide useful information about the magnetosphere-ionosphere dynamics and morphology. The region of the main ionospheric trough is an unique region of the ionosphere, where different type of wave and instabilities can be generated and acts like a lens focusing a variety instabilities and disturbances from a different region of the Earth's environment. Thus for present the evolution of ionospheric trough in time and space domain we need some multipoint measurements and different type of measurements techniques. To develop a quantitative model of evolution ionospheric trough features during geomagnetic disturbances the analyse of particle and waves in situ measurements and TEC data was carried out. The high resolutions plasma particle diagnostics and wave diagnostics located on board of currently operated satellite DEMETER can give us precisely description of trough signatures and instabilities. On the other hand GPS permanent networks such as IGS and EPN provide regular monitoring of the ionosphere in a global scale. Recently, TEC maps have been produced with 5 min intervals and with spatial resolution of 150-200 km. The aim of this paper is to present some general behaviour of trough dynamics as well as the fine structures of ionospheric trough and discuss the different type of instability generated inside the trough from ULF frequency thru VLF up to HF frequency range. In order to better under-

stand the physical conditions and evolution of ionosphere trough region and describe the coupling between ionosphere and inner magnetosphere the global map of TEC parameters was constructed