

TOPSIDE PLASMA SCALE HEIGHT RETRIEVED FROM RADIO OCCULTATION MEASUREMENTS

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The plasma scale height is one of the important ionospheric characteristics due to its intrinsic connection to the ionospheric plasma temperature and composition and also, to the altitudinal profile of the electron density. Therefore, the knowledge of the plasma scale height is of crucial importance when addressing several open scientific and technological issues such as the upper ionosphere temperature balance and ion composition, the estimation and correction of propagation delays in Global Navigation Satellite Systems (GNSS), the nowcast and forecast of space-weather effects on telecommunications, etc. While the plasma scale height value in the bottomside ionosphere can be deduced directly and reliably enough by vertical incidence sounding, the plasma scale height in the topside ionosphere is quite difficult to obtain. The ionospheric radio occultation (IRO) technique employed by the Low-Earth-Orbiting (LEO) satellites can deliver the valuable information on the topside plasma scale height behaviour and can provide a rich database for consequent development of new empirical models of the plasma scale height and density. Reported here is a procedure for post-processing retrieval of the topside plasma scale height values from IRO measurements by the LEO satellite CHAMP (CHALLENGING Minisatellite Payload). Described also is the accumulated data base of such values. Further, presented are first results from the analysis of the topside plasma scale height's temporal and spatial variations. These preliminary results are compared with corresponding estimates from the International Reference Ionosphere (IRI) model calculations.