



Validation of the International Reference Ionosphere model using in situ measurements from GRACE K-Band ranging and CHAMP planar langmuir probe

C. K. Lee (1), S. C. Han (1), J. K. Chung (2), and D. Bilitza (3)

(1) Goddard Earth Science and Technology Center, University of Maryland Baltimore County, Baltimore, MD, 21228; also at Planetary Geodynamics Laboratory, Code 698, NASA Goddard Space Flight Center, Greenbelt, MD, 20771. United States (cklee92@gmail.com), (2) Space Geodesy Research Division, Korea Astronomy and Space Science Institute, Daejeon, South Korea, (3) Code 612.4, NASA Goddard Space Flight Center, Greenbelt, MD, 20771

The ionospheric delay derived by combination of dual frequency K-Band ranging measurements of GRACE infers the electron density integrated between the two satellites along the orbit with a baseline length of $\tilde{220}$ km at the altitude of $\tilde{450}$ km. Unlike GPS based measurements, GRACE KBR data have unique advantage with a short integration length (220 km) and extreme precision (a few micro meters) and consequently provide precise information on electron density at the orbiting altitude. We compare the GRACE measurements with the prediction from the International Reference Ionosphere (IRI) model that is a comprehensive assimilation model providing 3D tomographic information of the ionosphere including electron density. We validate the recent advances in the IRI models using in situ electron density measurements from Planar Langmuir Probe (PLP) onboard the CHAMP satellite. Finally, we discuss feasibility to assimilate those satellite data in the IRI models.