Geophysical Research Abstracts
Vol. 17, EGU2015-2781, 2015
EGU General Assembly 2015

The spatio-spectral localization approach to modeling VTEC by integrating ground GPS observations and satellite altimetry data

saeed farzaneh (1) and Mohammad Ali sharifi (2,3)

(1) Department of Surveying and Geomatics Engineering, College of Engineering, University of Tehran, Iran (farzaneh@ut.ac.ir), (2) Department of Surveying and Geomatics Engineering, College of Engineering, University of Tehran, (3) Research Institute of Geoinformation Technology (RIGT), College of Engineering, University of Tehran, Iran(Sharifi@ut.ac.ir)

The upper part of the Earth atmosphere is important for ground-based and satellite radio communication and navigation. It consists of free electrons and ions, mainly ionized by solar radiation. Free electrons, in the ionosphere, have a strong impact on the propagation of radio waves. When the signals pass through the ionosphere, both their group and phase velocity are disturbed. The effect is in first approximation proportional to TEC along the signal path and inversely proportional to the frequency squared. Several space geodetic techniques such as satellite altimetry, LEO satellite and Very Long Baseline Interferometry (VLBI) can be used for modeling the total electron content. In this study the combination of the data from ground GPS observation over west part of USA and from the altimetry mission Jason-2 is performed on the normal equation level in least-square producer and the least-squares variance component estimation is applied to consider the different accuracy levels of the observations. The integrated ionosphere model is expected to be more accurate and reliable than the results derived by the ground GPS observation over the oceans.

Keywords: Slepian function, LS-VCE, satellite altimetry, GPS, local ionospheric modeling