

Ionospheric Plasma Drift and Neutral Winds Modeling

Narayan P. Chapagain

Patan Multiple Campus, Patan Dhoka, Lalitpur
Tribhuvan University, Kathmandu, Nepal

e-mail: npchapagain@gmail.com

Abstract

This study reports the modeling results of the ambient ionospheric plasma drift zonal velocity and the neutral wind motions. In order to estimate the plasma drift velocity, we use theoretical formulations for ionospheric vertical electric field responsible for the development of the plasma drift velocity. We obtain the modelling results of the neutral wind motions using the Horizontal wind models (HWM093 and HWM07). The computed drift velocity is also compared with the experimental results of neutral winds motions measured by the Fabry Perot Interferometer. In addition, the equatorial plasma bubbles (EPBs) velocities as measured by OI airglow optical imaging system are also used to compare with the model results of ionospheric plasma drifts and neutral wind motions. Results show that trend of variations of model results of plasma drift velocity and local wind motions are similar, while the magnitude of EPBs drifts velocity most often shows quite different values. Furthermore, the model results for the plasma drift velocity and the neutral wind motions obtained from HWM93 illustrate good agreement with the experimental results of neutral winds and EPBs velocity as compared with the model results derived from HWM07.

Key words: plasma drift, neutral winds, HWM093, HWM07, equatorial plasma bubbles