

Global and Regional Ionosphere Mapping Based on GNSS Tracking Networks

*Ho-Fang Tsai¹, Yang-Yi Sun², Jann-Yenq Liu³, Min-Yang Chou¹

1. Department of Earth Sciences, National Cheng Kung University, Taiwan, 2. Department of Earth and Planetary Sciences, Kyushu University, Japan, 3. Institute of Space Science, National Central University, Taiwan

In the recent years, ionosphere weather becomes critical in high accuracy positioning, navigation and communication applications. An automated total electron content (TEC) processing system for real-time monitoring the ionospheric weather is needed in the modern communities. Based on our experience in construction of global TEC maps named Taiwan Ionosphere Group for Education and Research (TIGER) Global Ionosphere Map (TGIM) from ground- and space-based GPS networks, we also build up another data processing system, so-called regional ionosphere maps (RIM), using Kalman filter from the ground-based GNSS network in Taiwan area. The RIM system will generate hourly maps from GPS, GLONASS, Galileo and other satellite systems in real time with temporal resolution of 20 minutes, spatial resolution of $0.5^\circ \times 0.5^\circ$ in latitude and longitude. The results not only provide higher-resolution parameters of ionospheric weather for positioning and navigation, but also for scientific communities, for example, on the study of seismo-ionospheric phenomena.

Keywords: Total electron content, Regional ionosphere map, GNSS