

Current status and future plans of NICT ionospheric observations

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National Institute of Information and Communications Technology (NICT) has been observing ionosphere by ionosondes and GNSS receiver networks in Japan and in the Southeast Asia for monitoring ionospheric condition and researching ionospheric disturbances. Domestic ionosondes have been replaced with Vertical Incidence Pulsed Ionospheric Radar 2 (VIPIR2) ionosondes which can separate the O- and X-modes of ionospheric echoes which have improved the availability of automatic scaling of the ionogram. Now the O- and X-modes separated ionograms are available online. We have tried to detect arrival directions of ionospheric echo using the 8ch receiving antenna array of the VIPIR2.

In addition to ionosonde observations, we are providing high-resolution two-dimensional maps of absolute TEC, detrended TEC, rate of TEC change index (ROTI), and loss-of-lock on GPS signal over Japan using the dense GNSS network, GEONET, on realtime basis. To expand TEC observation area and spatial resolution, we have tried to use multi-GNSS data including GPS and QZSS for routine data collection and processing.

In Southeast Asia, we has developed the Southeast Asia low-latitude ionospheric network (SEALION) for the purpose of monitoring and researching severe ionospheric disturbances, such as plasma bubble. SEALION mainly consists of five FMCW ionosondes in four countries in Southeast Asia. We are now developing a new FMCW ionosonde system which is GNU Radio based software defined system. We have an on-going project to install a VHF radar at Chumphon and multi-GNSS receivers at equatorial SEALION stations to study plasma bubbles and their effects on precise GNSS positioning. In this presentation, we will introduce current status and future plans of ionospheric observation in NICT.

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