

Overview of Vertical Incidence Pulsed Ionospheric Radar 2 (VIPIR2) observation in Japan

*Michi Nishioka¹, Hideo MAENO¹, Hiroyuki YAMAKAWA¹, Takumi Kondo¹, Takuya Tsugawa¹, Mamoru Ishii¹

1. National Institute of Information and Communications Technology

National Institute of Information and Communications Technology (NICT) has been observing ionosphere by ionosondes for over 70 years in Japan. In 2017, we replaced the previous ionosondes with Vertical Incidence Pulsed Ionospheric Radar 2 (VIPIR2) ionosondes, which is mainly developed in NOAA. VIPIR2s are automatically operated at four stations at Wakkanai (Sarobetsu), Kokubunji, Yamagawa, Okinawa (Ogimi). In the presentation, we give an overview of our system and introduce some recent topics on our observation: 1. Estimation of arrival directions of received echo, and 2. Improvement of automatic scaling method. For estimation of arrival directions, two methods of Fourier imaging and Capon method are tried. These methods are confirmed by using data of oblique sounding. For the improvement of automatic scaling, we apply one of machine learning techniques and construct a model for scaling. The accuracy of some parameters is improved.

Keywords: VIPIR2, ionosonde, ionosphere, arrival angle, manual scaling, machine learning