

Advantage and Disadvantage of the Phased Array Weather Radar

*牛尾 知雄¹、妻鹿 友昭¹、菊池 博史²、吉川 栄一³

*Tomoo Ushio¹, Tomoaki Mega¹, Hiroshi Kikuchi², Eiichi Yoshikawa³

1. 首都大学東京、2. 電気通信大学、3. 宇宙航空研究開発機構

1. Tokyo Metropolitan University, 2. University of Electro-Communications, 3. JAXA

Recent progress of information and communication technologies has been enabling us to realize a rapid scanning radar system. In 2012, Toshiba Corporation and Osaka University succeeded in developing a new type of Phased Array Radar (PAR) system (Yoshikawa et al. 2013, Ushio et al. 2015, Mizutani et al. 2018) under a grant of National Institute of Communication and Information Technology (NICT), and installed in Suita Campus, Osaka University. This PAR system can scan the whole sky within 30 seconds up to 60 km in radius over 100 elevation angles with digital beam forming technique, and the initial observation results demonstrate the unique capability of the new PAR system. However, the observation is sometimes seriously contaminated by strong ground clutter through relatively high sidelobes at transmitting stage. In this study, a new clutter mitigation algorithm from adaptive beam forming technique on Minimum Mean Square Error (MMSE) formulation was investigated, and succeeded in suppressing not only the ground clutter but also ghost echo from strong precipitation echo nearby more than 20dB. And also the adaptive algorithm was applied to suppress the range sidelobe and showed the sidelobe level of -60dB. In this presentation, the advantages and disadvantages of the PAR will be discussed based on the observation results.