R005-51
Zoom meeting C ：11/2 PM2 (15:45-18:15)
17:30〜17:45

MF レーダー観測に基づく南極 MLT 領域風速場の水平構造の推定

#堤 雅基 [1)], 橋本 大志 [1)], 西村 耕司 [2)], 佐藤 亨 [3)], 高麗 正史 [4)], 佐藤 薫 [4)]
[(1] 極地研,[(2] 京大・生存圏,[(3] 京大・国際高等教育院,[(4] 東大・理

Estimation of horizontal wind structure in the Antarctic MLT region based on MF radar

#Masaki Tsutsumi[1)],Taishi Hashimoto[1)],Koji Nishimura[2)],Toru Sato[3)],Masashi Kohma[4)],Kaoru Sato[4)]
[(1]NIPR,[(2]RISH, Kyoto Univ.,[(3]ILAS, Kyoto Univ.,[(4]Graduate School of Science, Univ. of Tokyo

MF (Middle Frequency) radars have been used to measure wind velocity in mesosphere and lower thermosphere based on correlation analysis techniques [e.g., Reid, 2015]. The motion of atmosphere weakly ionized by solar insolation is measured in the technique. The ionized atmosphere is usually horizontally stratified, and radar echoes from such layered atmosphere are mostly obtained in the vertical direction. However, there also exist echoes coming back from large off-vertical angles. Meteor echoes are such type of echoes often detected at night (winter time in the polar region) mostly above 80 km. Because of the low radio frequency (2-3 MHz) the duration of MF radar meteor echoes is two orders longer than that of VHF meteor echoes. Thus, meteor echoes can sometimes dominate the MF radar echoes when the background atmospheric ionization is relatively low. These meteor echoes have been used to compensate the known problem of MF radar correlation technique above about 90 km [Tsutsumi and Aso, 2005].

We have recently scrutinized the MF radar meteor measurement technique and found that wind velocity can be estimated with a time resolution as good as 10 min under preferable ionospheric conditions. Such a resolution is remarkably high as meteor wind measurements. Horizontal structure of wind field can be further estimated within the horizontal region of 200 x200 km (see Figure). Estimation of momentum flux deposition may be possible using the method proposed by Hocking [2005].

The obtained results are to be verified by comparing with those observed by the co-locating PANSY radar [Sato et al, 2014].

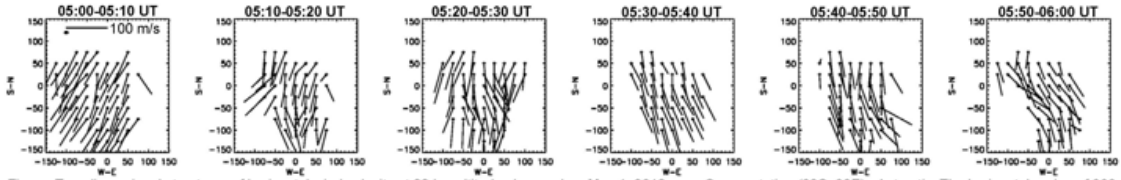

Figure: Two-dimensional structures of horizontal wind velocity at 88 km altitude observed on May 1, 2018, over Syowa station (69S, 39E), Antarctic. The horizontal region of 300 x 300 km is shown. Each wind vector is estimated using echoes detected within the corresponding sub-region with dimensions of 50 x 50 km.