

Development of a ship-borne lower troposphere radar

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We have developed a wind profiler for lower tropospheric observations over the sea (Ship-Borne Lower Troposphere Radar: SB-LTR), based on the L-band (1357.5 MHz) lower troposphere radar, which we previously developed. It is possible to vary the beam direction by electronically steering the zenith angle within 45 degrees, by using an active phased array antenna of 4 m x 4 m size. A peak output power of 2 kW is obtained by 24 active transmitting modules. The SB-LTR was installed to the

oceanographic research vessel MIRAI of JAMSTEC, Japan for test observations during March 2004 and December, 2004-January, 2005. A GPS navigational sensor and a three-axis angular sensor are deployed to provide necessary adjustments to wind profiles. During the observation, antenna beams were steered to vertical and four oblique directions with the zenith angle of 10 degrees. One cycle for five directions takes about 1 sec. Sub-pulse length is 1 micro sec, which corresponds to the range resolution of 150 m. Since 8-bit pulse compression coding with the IPP of 50 micro sec was used, average output power was about 854 W. Time series data after conducting pulse-decoding and 128 coherent integrations were stored. The data such as roll, pitch, direction and speed of the ship simultaneously obtained were also stored for off-line analysis. We will present the first observation results.