

昭和基地西オングル島における自然 VLF 波動の広帯域スペクトル観測機の開発

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Development of Natural VLF Spectrum Logger at West-ongul island of Syowa Station

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We have developed a new VLF wideband monitoring system for Syowa Station. This system is designed to monitor 25Hz to 50kHz of natural VLF waves at the West Ongul Island, where UAP monitoring site is located about 5km remote from Syowa Station in order to avoid noise of Syowa Station and has been continued to observe since 1976. Electric Power of this station has been supplied only by solar batteries until 2008. A new hybrid power supply system at West Ongul monitoring site has been deployed in 2009. New VLF wideband observation system is scheduled to be installed in summer, 2012.

The power resource is limited at the isolated observation site in Antarctica. We have deployed a hybrid power generationsystem in west Ongul island. This system has two electric power sources. One is the solar power generator and the other is the wind power generator. Still the power consumption of the observation system has to be minimized to about 20W including the VLF wideband sampling system and the wireless link between west Ongul island and east Ongul island where the Syowa Station is located. We have adopted a FPGA based A/D sampling system (CompactRIO(R) made by National Instruments Corp.) up to 50kHz for VLF monitoring at west ongul island and transferred the observation data with wireless LAN link, then recorded at Syowa Station in east ongul island. The FPGA system enables us a low power consumption and reconfigurable observation system. We have successfully obtained sample data by using this system during JARE49.

Figure 1 shows the logger system deployed at Observation hut in West ongul island . 10 spectrums of the frequency range from 25Hz to 10kHz can be obtained in 1 second and stored in the memory of the logger system. 600 spectrum data is save in one raw data file and transferred to the Syowa Station via WiFi network link.

Figure 2 illustrates the block diagram of the VLF-WB observation system. The raw data is stored in the data storage of a server operated in the Syowa Station. The QL data is processed every hour in the server and trasfered to the NIPR over the satellite communication link between Syowa Station and NIPR tachikawa campus.

Final specification of this new VLF-WB observation system deployed in JARE53 will be shown in this poster.



Figure 1. Front panel of VLF-WB Logger System

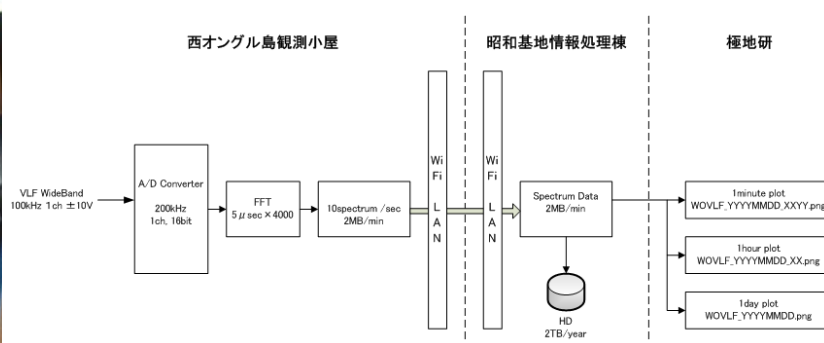


Figure 2. System block diagram of west ongul VLF-WB observation.