

## Current availability and utilization prospect of data obtained by AKEBONO for the research on lightning whistler

OIKE, Yuta<sup>1\*</sup> ; KASAHARA, Yoshiya<sup>1</sup> ; GOTO, Yoshitaka<sup>1</sup>

<sup>1</sup>Kanazawa University

The AKEBONO spacecraft (EXOS-D) was launched in 1989 to observe particles and plasma waves in the auroral region and the plasmasphere of the Earth. It covers the altitude region from 300 km to about 10,000 km with an orbital inclination of 75 degree, and has been operated for more than 25 years which exceed 2 cycles of solar activity or 1 cycle of solar magnetic polarity reversal. Therefore analyses of the data obtained by AKEBONO enable us to study how the magnetosphere varies comprehensively.

The WBA (Wide Band Analyzer) is one of subsystems of the VLF instruments onboard AKEBONO. It measures 1 component of electric or magnetic analogue waveform in the frequency band of 50 Hz - 15 kHz. Typical waves such as chorus, hiss and whistler were frequently observed by the WBA. Huge amounts of data obtained by the WBA for more than 25 years are originally recorded as analogue waveform format in the magnetic audio tapes. Data conversion from analogue to digital is now carried out and the converted data are stored in our computer storage as digital WAVE format. Total number of the data files of digital WAVE format is more than 6,000, the total file size exceeds 10 terabytes and the processable data amount corresponds to more than 5,000 hours observation.

An automatic detection system to detect lightning whistlers from spectrograms of the WBA was developed. The spectrum intensity is automatically calibrated inside the system referring to the status of automatic gain controller of the receiver before detecting lightning whistlers. The system can output observed time, frequency band and dispersion of each detected lightning whistler. Some statistics of the lightning whistlers such as spatial and local time dependence of the occurrence frequency were already performed and the comparison with lightning activities are now under study. Because the dispersion of lightning whistler strongly depends on the electron density profile along the propagation path of the wave so that global electron density profile can be estimated using trend of dispersions of lightning whistlers. It is also pointed out that the propagation behavior of lightning whistlers is important clue to understand the wave-particle interaction. Thus these data and statistics have potential to achieve more valuable knowledge of the plasma physics in the magnetosphere.

In this presentation, we introduce the current status of data availability of the WBA and the derived results so far. We also discuss prospect of the data utilization.

Keywords: AKEBONO (EXOS-D), VLF, wide band receiver, lightning whistler