

R003-P10

ポスター 3 : 11/26 PM2/PM3 (14:50-18:25)

ドローン電磁探査システムのプロトタイプ開発

#石須 慶一¹⁾, 北岡 紀広²⁾, 小川 康雄²⁾, 寺田 暁彦²⁾

(¹九州大学, ²東京科学大学)

Development of a UAV-based Electromagnetic Exploration System Prototype

#Keiichi Ishizu¹⁾, Norihiro Kitaoka²⁾, Yasuo Ogawa²⁾, Akihiko Terada²⁾

(¹Kyushu university, ²Institute of Science Tokyo)

Electromagnetic surveys in volcanic regions have traditionally faced the challenge of limited observation coverage due to the difficulty of accessing many areas on foot. As a solution, the semi-airborne electromagnetic (EM) method, which uses a ground-based transmitter and an airborne receiver, has garnered attention. However, conventional single-direction transmission has limitations in accurately estimating complex three-dimensional (3D) resistivity structures. Therefore, this research aimed to develop a prototype for a new semi-airborne EM survey system that utilizes two-directional transmitter dipoles (tensor-type transmission) to improve the estimation accuracy of 3D structures from multi-directional transmission data. This system applies an electromagnetic cross-talk technique, simultaneously transmitting signals at slightly different frequencies from the two transmitter dipoles. This enables a single receiver mounted on a drone to separate and measure the signals from both transmitters simultaneously without interference. A custom receiver coil was built using a flat cable to create an observation system that could be mounted on a drone. To verify the performance of the developed system, a field experiment was conducted at the former Ishizu mine site, south of Mt. Kusatsu-Shirane. The results confirmed that the drone in flight could simultaneously measure the signals from the two ground-based transmitters as intended, thus demonstrating the fundamental performance of this system. The ability to acquire two-directional transmission data in a single flight is a unique strength that significantly improves survey efficiency. Future work will focus on further verifying the effectiveness of this system and aiming for its application in active volcanic regions.