

Installation and Maintenance of Permanent Magnetotelluric Sites

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SUMMARY

Long-term magnetotelluric (MT) data acquisition has applications for remote reference processing, lithospheric research applications, and time-lapse monitoring of variations in the Earth's physical properties. Installing these permanent sites involves thorough scouting of the location, ensuring a continuous power supply, establishing a reliable internet connection, and using data loggers with features specifically designed for long-term recordings.

Selecting an appropriate site is crucial, as it must offer a stable internet connection and ample sunlight for charging batteries. After identifying a suitable location, setting up a large-capacity battery pool with a parallel connection is essential to power the receiver during periods without sunlight, particularly during the winter months when daylight is limited. Although the latest technology receivers have very low power consumption, battery levels may drop to a critical threshold after an extended period without sunlight. In such cases, when the sun returns and the batteries begin to charge again, the receivers need to boot up automatically and start recording. This feature is crucial for avoiding unnecessary trips to sites that are difficult to access.

Additionally, receivers need a way to stream data to a remote server. The internet connection can be established using either cellular or satellite networks. The receiver's internal memory should have ample capacity to store data files when the internet connection is interrupted. Furthermore, the ability to delete data files from the memory after successful transfer to the remote server is beneficial for maintaining long-term recordings. Web-based visualization tools, such as those for monitoring battery levels and signal strengths, are useful for checking the status of the permanent sites frequently.

In this study, we will present all these essential steps for the installation and maintenance of permanent MT sites. We will show applications from volcano monitoring projects as well as our permanent test site.

Keywords: Magnetotellurics, monitoring, long-period, volcanology, time-lapse
