

Participating in EarthScope:

Hosting a Transportable Magnetotelluric Station

EarthScope is installing transportable magnetotelluric (MT) stations to record electrical currents in the Earth. These data are used to image the Earth's interior and produce new insights into the composition and physiochemical state of the Earth. Planned for hundreds of sites across the country, EarthScope is seeking participation from local landowners and schools to accomplish this university-based research experiment.

MT Station Specifications

Transportable MT stations have a low profile — there is no noise or motion associated with the equipment. To reduce interference from surface vibrations and solar heating and to protect the equipment, the sensors and associated electronics are buried 3 feet below the ground. Power is supplied by batteries that are buried with the equipment. Two 14-gauge cables, each 300 feet in length, run north-south and east-west from the central equipment site, with the cables either buried 6 inches below the surface or inside a conduit lying on the ground. Data are recorded on site and are retrieved when the equipment is recovered. In areas with livestock, a fence can be erected for protection, although no equipment can be seen when installed.

Installation, Maintenance, and Removal

Installation of an EarthScope transportable MT station usually takes less than 1 day by 2 people. Installation requires the digging of 5 holes for the sensors, each about 3 feet deep and 1 foot in diameter. These holes are in a cruciform shape, about 300 feet apart. Another larger hole 4x4x2 feet is dug nearby for the case holding the electronics and batteries. Cables running from the central site may be buried 6 inches below the surface or run through conduit and left on the surface. Equipment installation is followed by testing and reconditioning landscaping. The buried equipment is heavily insulated and the equipment case is often completely covered with soil or rocks to keep the temperature stable.

The MT stations are temporary, remaining in place for 2 to 4 weeks and are then removed and reused at another site. The equipment operates continuously and requires no maintenance. A service trip may be necessary 1 to 2 weeks after installation, to ensure the equipment is operating normally. Disassembling the MT station takes a few hours. EarthScope removes all the equipment and fill in the holes.

EarthScope will:

- Respect the property and privacy of landowners throughout the experiment, notifying the landowner whenever access is required.
- Be responsible for the security and operation of the station.
- Assume liability if the equipment is damaged or stolen, remain responsible for any damage done to the landowner's property, and hold the landowner harmless for any loss or injury.
- Remove the equipment completely after the experiment and return the ground to its original contours.
- Provide the landowner with updates about the project.

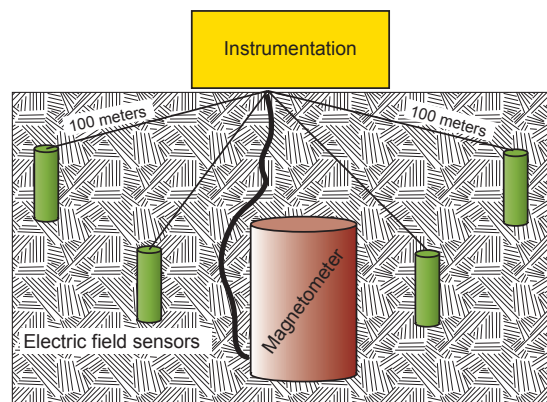


Diagram showing the spatial arrangement of key MT system components.



Preparing one of five shallow post holes for the sensors.



Magnetometer in the shallow post hole.



EarthScope technicians assembling and testing the electronics.