

Posthole Seismometer Installation, Performance, and Reliability in Challenging Environments

Geoffrey Bainbridge, Tim Parker, and Peter Devanney
Nanometrics Inc, Ottawa, Canada

A body of evidence now exists showing direct burial deployments compare favorably with and typically outperform traditional piers and shallow vaults based on PSDs, PDF plots and other routine metrics of station quality. Deployment in deeper holes offers superior performance. Posthole seismometers allow expanded coverage and densification of networks, as well as flexibility to reconfigure networks in temporary deployments for particular projects. But as this emerging technology gains acceptance, questions remain: How to apply it in all environments? What is best practice for site design, installation techniques, tools, accessories, and logistics? How is long term reliability in deployments below the water table and in various soil chemistries?

We present techniques for deployment in various environments: marsh, forest, glacier, permafrost, seasonal freeze/thaw environments, hard rocky soil, and different soil thickness ranging from deep basin sediments to exposed bedrock. Case study data is shown along with site diagrams and discussion of equipment and logistics. Statistics so far indicate reliability of buried posthole seismometers is similar to equivalent surface-version seismometers in vaults.