

# Recent Improvements in Very Broadband Seismometer Self-Noise Performance Embodied in the New Trillium 360 GSN Instruments

\*Alastair Fenwick<sup>1</sup>, Geoffrey Bainbridge<sup>1</sup>, Bruce Townsend<sup>1</sup>, Sarvesh Upadhyaya<sup>1</sup>

## 1. Nanometrics Inc

Nanometrics new Trillium 360 GSN seismometer embodies the culmination of many years of research and technology innovation as well as extensive collaboration with and input from the scientific community interested in very broadband seismometry. Several generations of seismometers with 240 or 360 second corner frequency have demonstrated successive improvements in self-noise at both very low and high frequencies. The most recent development has produced the lowest self-noise of any vault seismometer to date, and meets the performance requirements of a primary seismometer for the Global Seismic Network.

Posthole, Borehole and Vault form factors have been developed and are now being manufactured. Performance testing of several units of each model type has been carried out over the last year at a variety of facilities. The results of this recent performance testing is reviewed and interpreted, and compared with other co-located instrument types included the venerable STS-1.

The journey of seismometer development leading to the Trillium 360 GSN is reviewed, showing how successive innovations have led to incremental improvements that provide the foundation for this new performance benchmark. We also discuss potential for further performance and functional improvements, including potential for additional formfactors such as gimballed solutions for OBS deployment, and reduced size and power.

Keywords: GSN, Broadband, high frequency