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# DIRECT-PUSH SEISMIC TESTING FOR SHEAR AND COMPRESSION WAVE VELOCITIES

**D. MARCHETTI* AND B. R. COX****

* Studio Prof. Marchetti
Via Bracciano 38, 00189 Roma, Italy
diego@marchetti-dmt.it, https://orcid.org/0000-0002-2544-3575, www.marchetti-dmt.it

** Department of Civil and Environmental Engineering, Utah State University
brady.cox@usu.edu, https://engineering.usu.edu/cee/people/faculty/cox-brady

## ABSTRACT

Shear wave velocity Vs is a fundamental parameter for earthquake geotechnical engineering applications, including seismic site response analysis, liquefaction risk assessment and seismic design of shallow and deep foundations. The maximum shear modulus $G_0$, directly derived from Vs, plays a key role in the G-gamma degradation curve required for equivalent-linear seismic site response analyses and advanced deformation analyses commonly employed in FEM calculation software. Compression wave velocity Vp is also a fundamental parameter that can provide important indications on soil saturation and porosity, particularly relevant in partially drained geomaterials such as in some Tailings Dams.

Today, direct-push technology enables seismic testing in combination with other in-situ tests (CPT, DMT, SPT, etc) or independently with specific seismic-only probes (DPCH). Vs measurements via direct-push methods are of common practice onshore, nearshore or in shallow water depths (within 30-40 m), but very challenging in deeper offshore investigations.

This minisymposium aims to collect/share contributions and experience from researchers and practitioners on advanced applications of direct-push seismic testing, including technological developments in equipment, test procedures, data interpretation, soil characterization and applications to design using Vs and/or Vp. The topics of the session include (but are not limited to):

- Innovative technological developments
- Seismic testing configuration and procedures
- Wave sources and their deployment
- Comparisons of data interpretation methods (true-interval, pseudo-interval, ray tracing, slope-based)
- Vs predictions from other in situ tests (CPT, DMT, SPT, etc ) and comparisons with measured Vs
- Nearshore/offshore seismic testing
- Vs for liquefaction risk assessment
- Estimation of advanced material properties (e.g., degree of saturation, porosity, Ko)
- Methods for quantifying uncertainty
- Measurements of wave anisotropy