

## A STUDY OF NEAR-SURFACE SEISMIC METHODS ON TERRAIN SUSCEPTIBLE TO LANDSLIDES IN THE CITY OF CAMPOS DO JORDÃO, STATE OF SÃO PAULO, BRAZIL

*Brian Shams, University of São Paulo, Institute of Astronomy, Geophysics, and Atmospheric Sciences*

### Abstract

This study seeks to prove the usefulness of near-surface seismic methods as complementary data to conventional geotechnical and geological data in the characterization of areas of landslide risk. The setting is located in a low income housing neighborhood in the city of Campos do Jordão, state of São Paulo, Brazil. The area was devastated by numerous landslides between December 1999 to January 2000 after heavy rainfall in the area. Currently the area is being monitored by the National Center for Monitoring and Warning of Natural Disasters (CEMADEN), a service of the Brazilian government. The landslides in this area are known to be shallow. The survey line passes within a couple feet of the CEMADEN monitoring station which measures soil temperature, soil moisture, rainfall intensity, and rainfall accumulation (Mendes et. al 2015). Refraction and Multi-channel Analysis of Surface Waves (MASW) surveys were performed. In order to better identify the fundamental mode of the Rayleigh wave, separate surveys isolating the vertical and radial components of the Rayleigh wave were performed. By comparing the obtained Shear wave ( $V_s$ ) and Compressional wave ( $V_p$ ) profiles with the already known geotechnical data provided by CEMADEN and geological data from a previous study (Ahrendt 2005) of the site a better understanding of the geological interfaces that constitute the landslide prone area is obtained.

**Keywords:** MASW, surface wave, refraction, landslide, Brazil