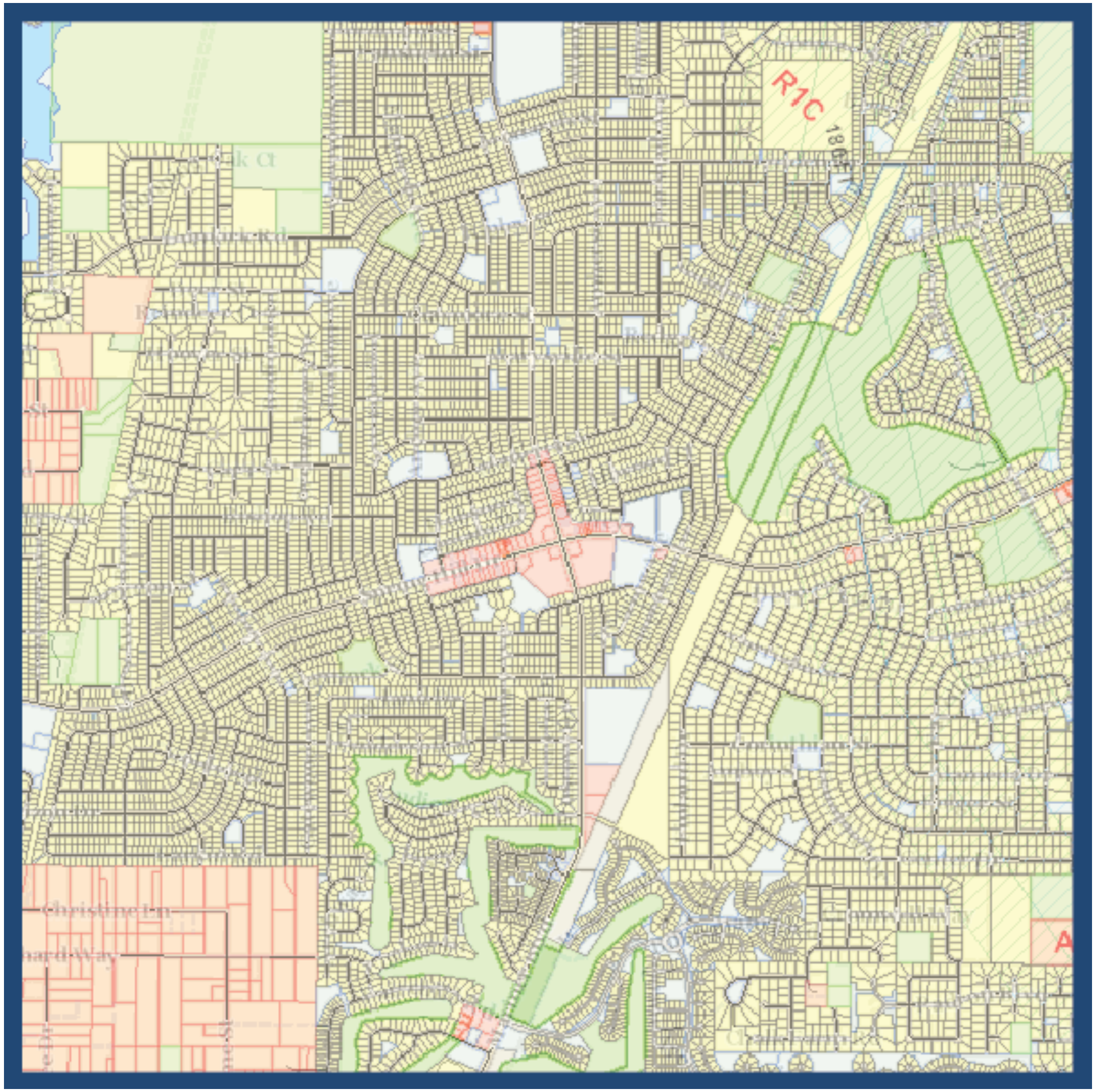
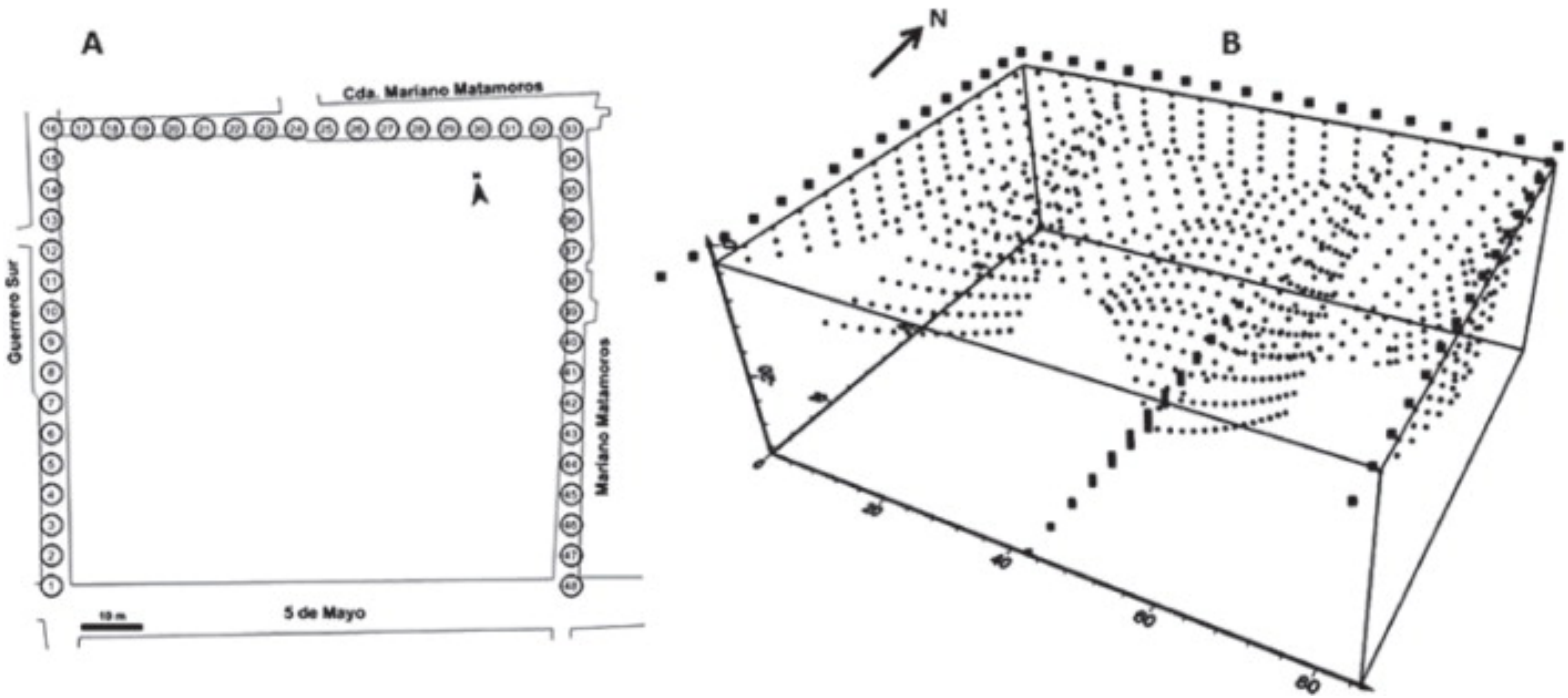
Urban Geophysics: tough!



Urban Geophysics: tough!

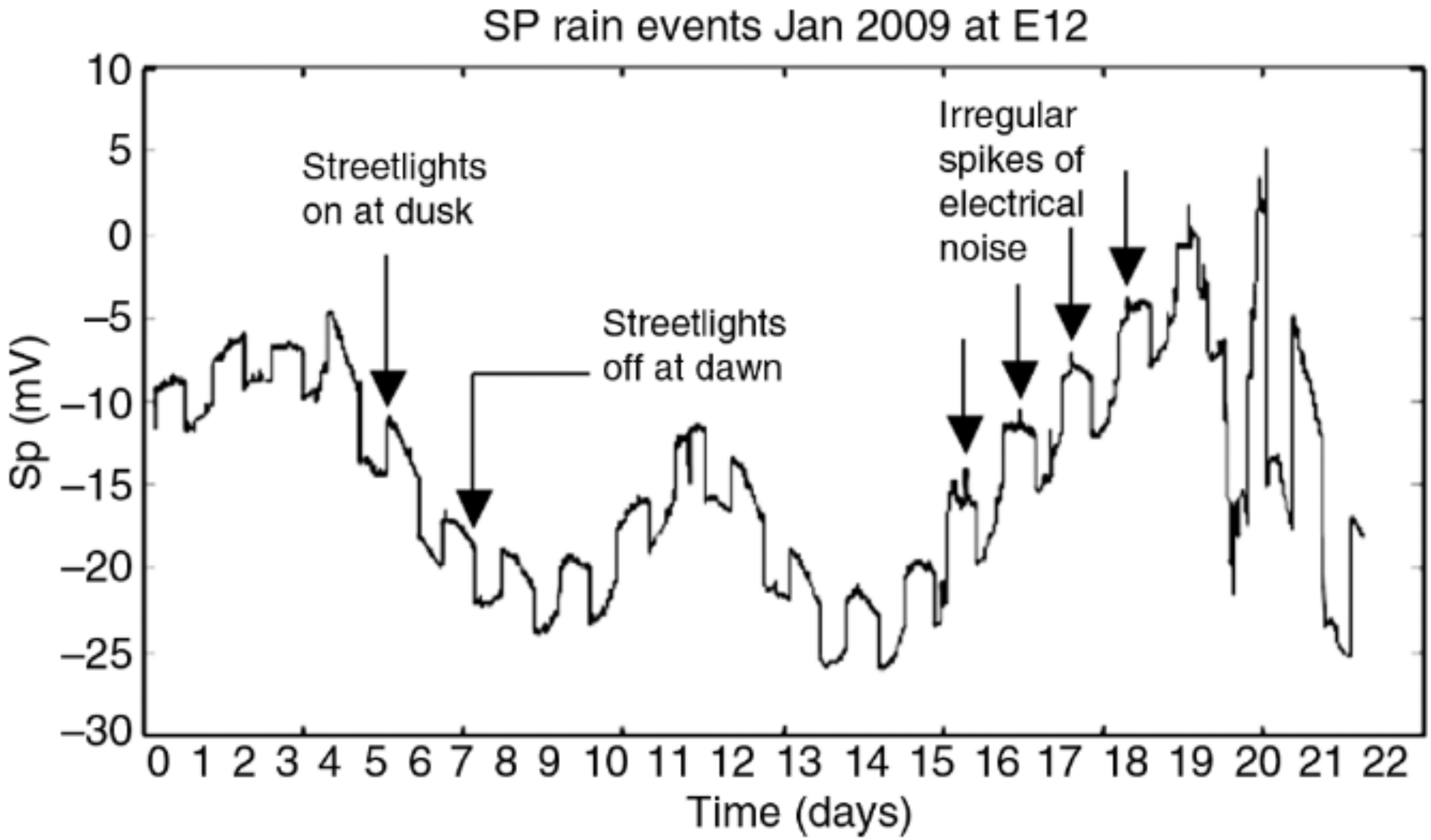
https://www.youtube.com/watch?v=SlrMw8OPGv8

Urban Geophysics: tough!

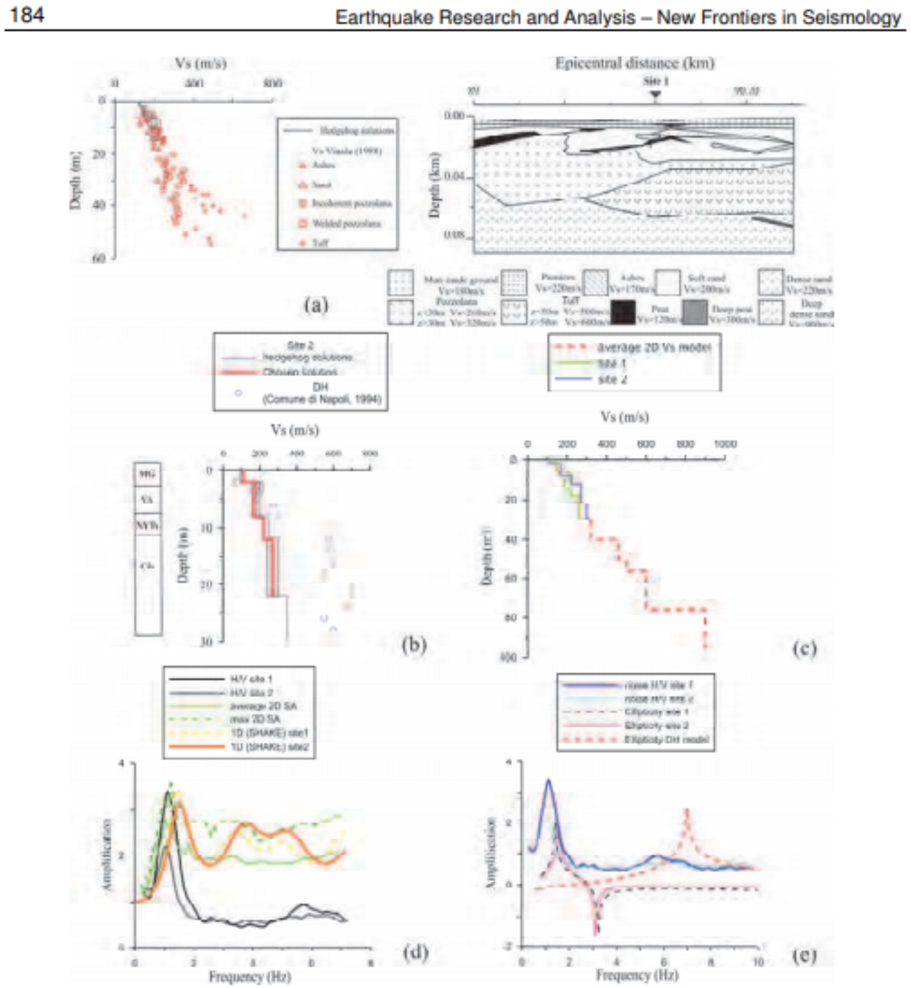


Rene Chavez, Mexico City

Urban Geophysics: tough!



Urban Geophysics: use that noise!



Nunziata et al., Naples, Italy

Urban Geophysics: use that noise!

AGU PUBLICATIONS

Geophysical Research Letters

RESEARCH LETTER

10.1002/2015GL063558

The seismic traffic footprint: Tracking trains, aircraft, and cars seismically

Nima Riahi[1] **and Peter Gerstoft**[1]

[1]Scripps Institution of Oceanography, University of California, San Diego, La Jolla, California, USA

Key Points:
- We study the spatiotemporal structure of seismic power in Long Beach (CA)
- Spatiotemporal filtering enhances signatures of moving traffic sources
- Velocity, acceleration, and counts of various events are measurable

Supporting Information:
- Text S1 and Figure S1

Correspondence to:
N. Riahi,
nriahi@ucsd.edu

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Abstract Although naturally occurring vibrations have proven useful to probe the subsurface, the vibrations caused by traffic have not been explored much. Such data, however, are less sensitive to weather and low visibility compared to some common out-of-road traffic sensing systems. We study traffic-generated seismic noise measured by an array of 5200 geophones that covered a 7 × 10 km area in Long Beach (California, USA) with a receiver spacing of 100 m. This allows us to look into urban vibrations below the resolution of a typical city block. The spatiotemporal structure of the anthropogenic seismic noise intensity reveals the Blue Line Metro train activity, departing and landing aircraft in Long Beach Airport and their acceleration, and gives clues about traffic movement along the I-405 highway at night. As low-cost, stand-alone seismic sensors are becoming more common, these findings indicate that seismic data may be useful for traffic monitoring.

1. Introduction

The ambient seismic wavefield has received much interest in the recent past both for its natural sources [*Gerstoft et al.*, 2006a; *Koper and de Foy*, 2008; *Kedar*, 2011; *Hillers et al.*, 2012] but also as a new probing signal for the solid Earth [*Sabra et al.*, 2005; *Gerstoft et al.*, 2006b; *Moschetti et al.*, 2007; *Riahi et al.*, 2013; *Weemstra et al.*, 2013] and to predict earthquake ground motion [*Denolle et al.*, 2014]. In comparison, anthropogenic seismic noise has received little attention so far [e.g., *Groos and Ritter*, 2009] or was only used indirectly for site amplification studies [*Bonnefoy-Claudet et al.*, 2006; *D'Amico et al.*, 2008] or subsurface imaging [*Nakata et al.*, 2011]. Seismic traffic noise, in particular, is an interesting observable: in contrast to traffic sensing systems based on video, infrared, acoustics, or radar, the vibrations caused by traffic are less affected by bad weather and limited visibility [*Wang et al.*, 2014].

Urban Geophysics: it's important!

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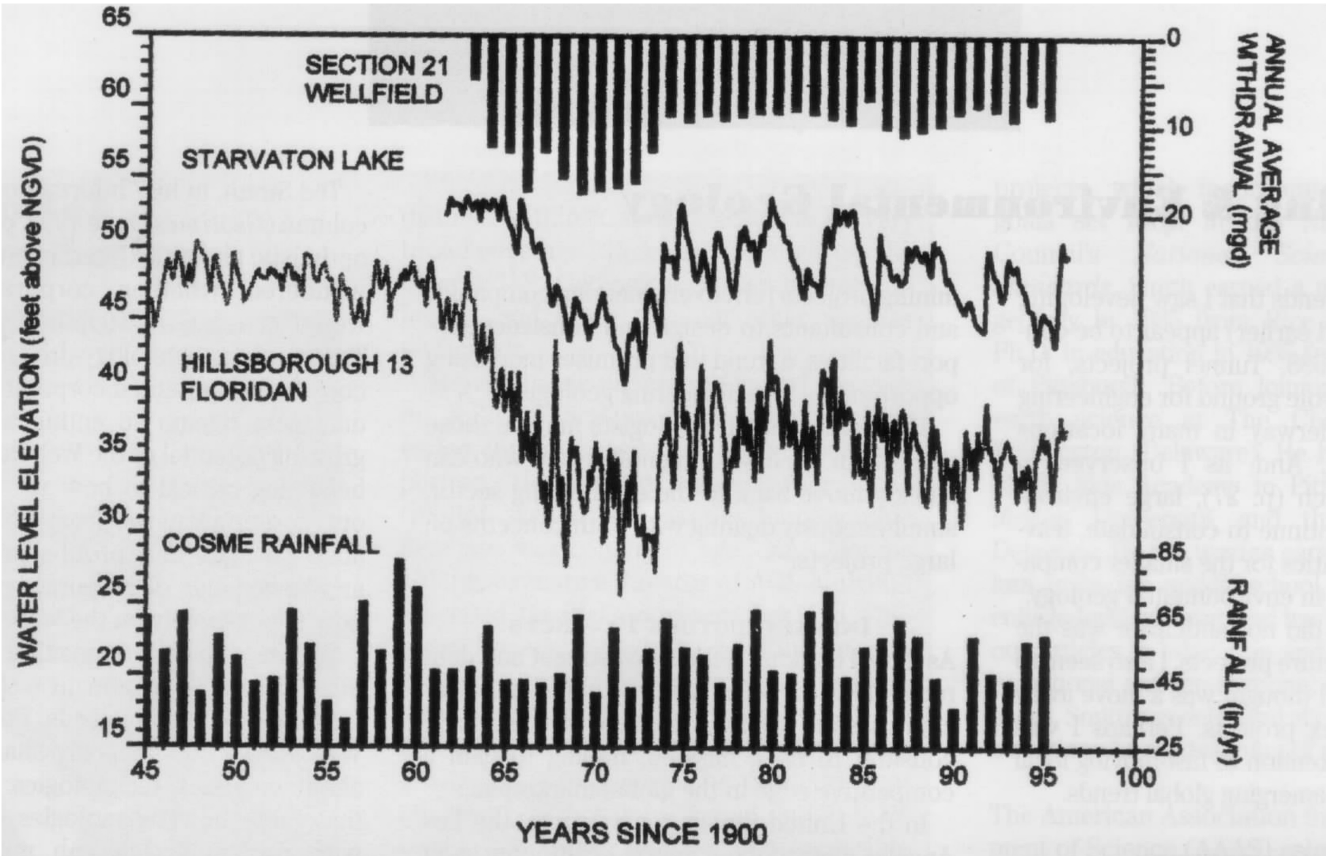
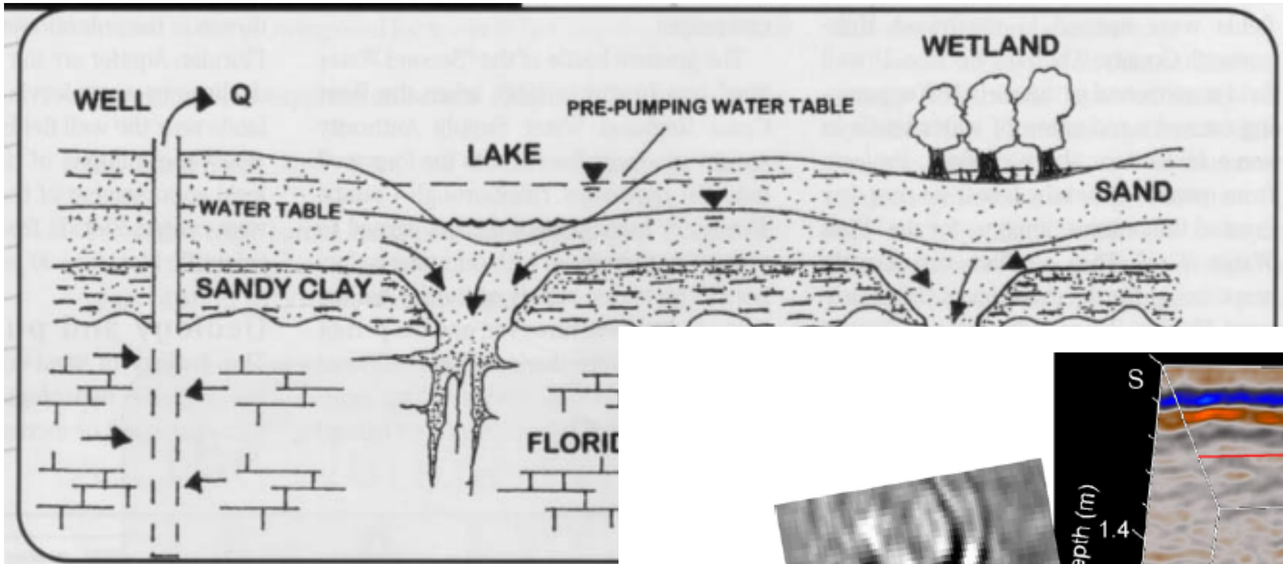
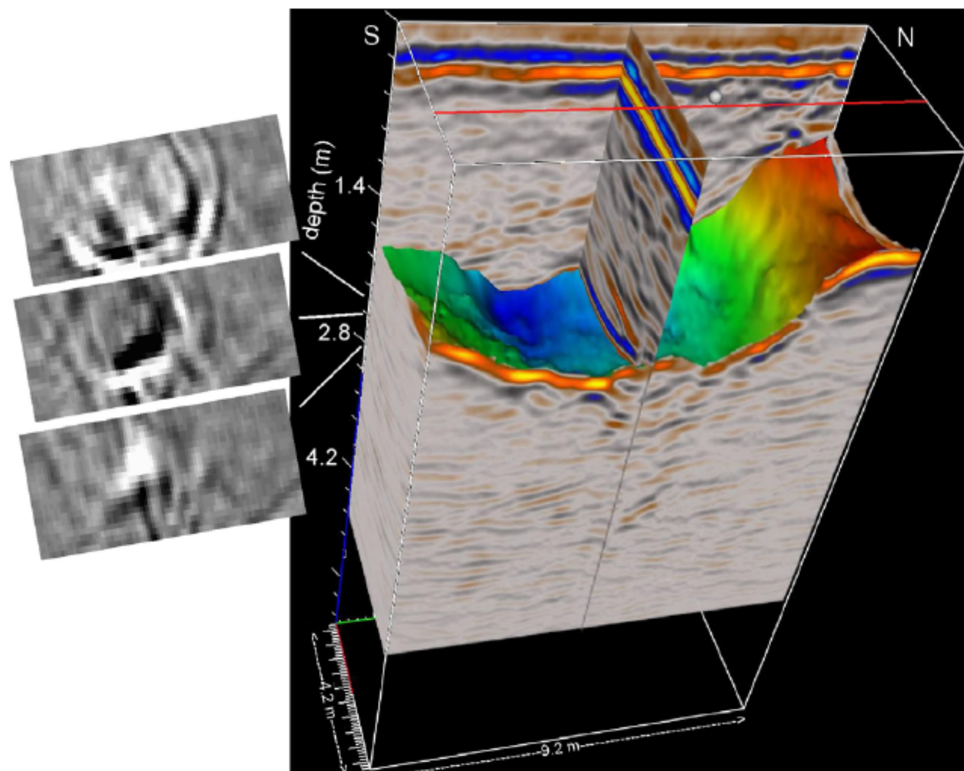


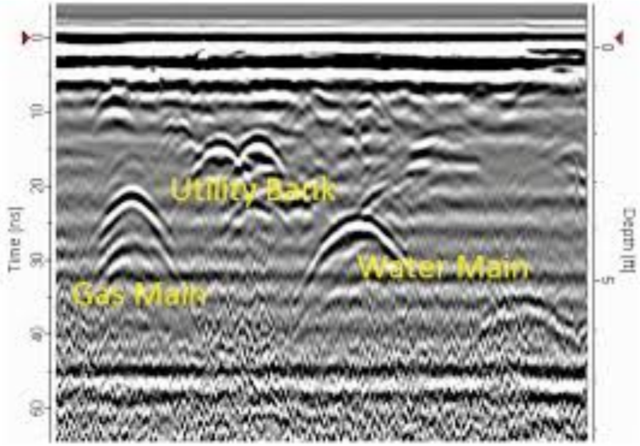
The Florida Water Wars

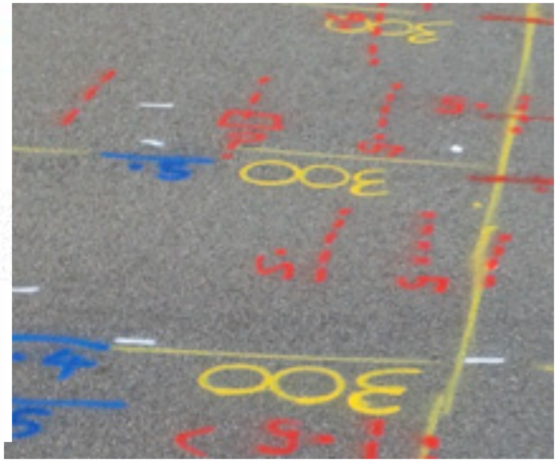
Urban Geophysics: it's important!



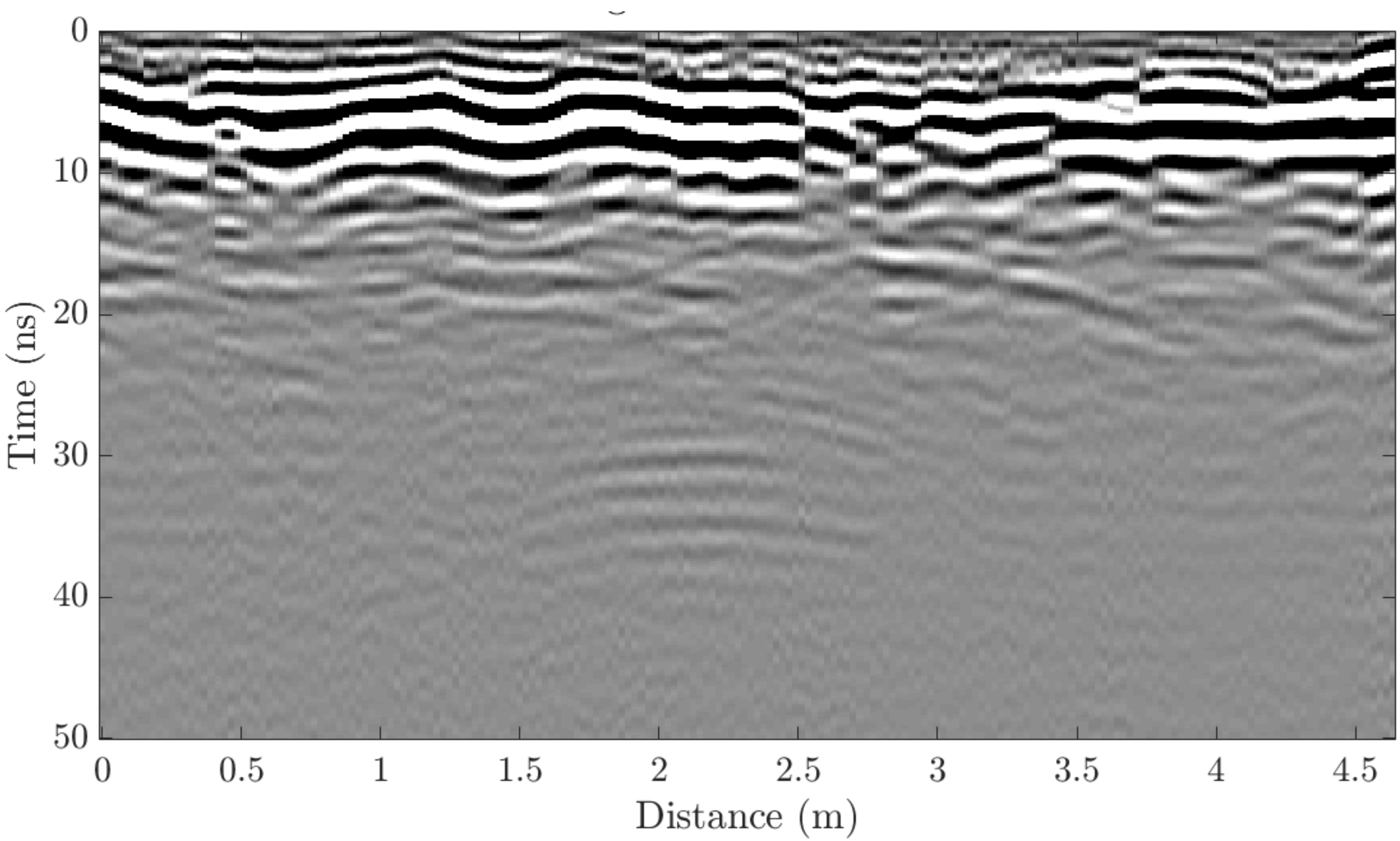


Urban Geophysics: it’s important!





Urban Geophysics: it’s important!

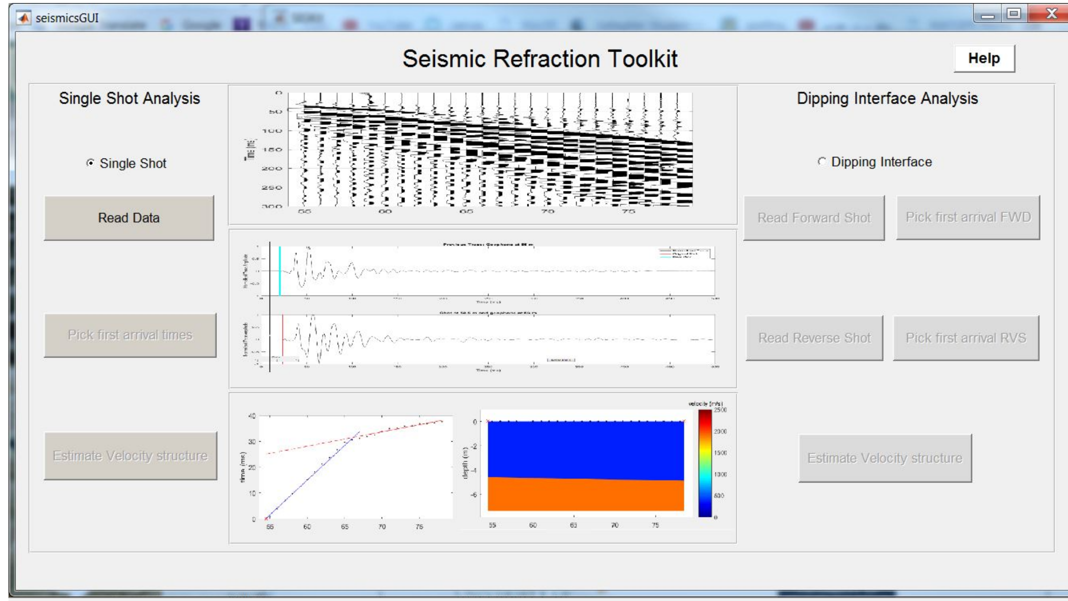


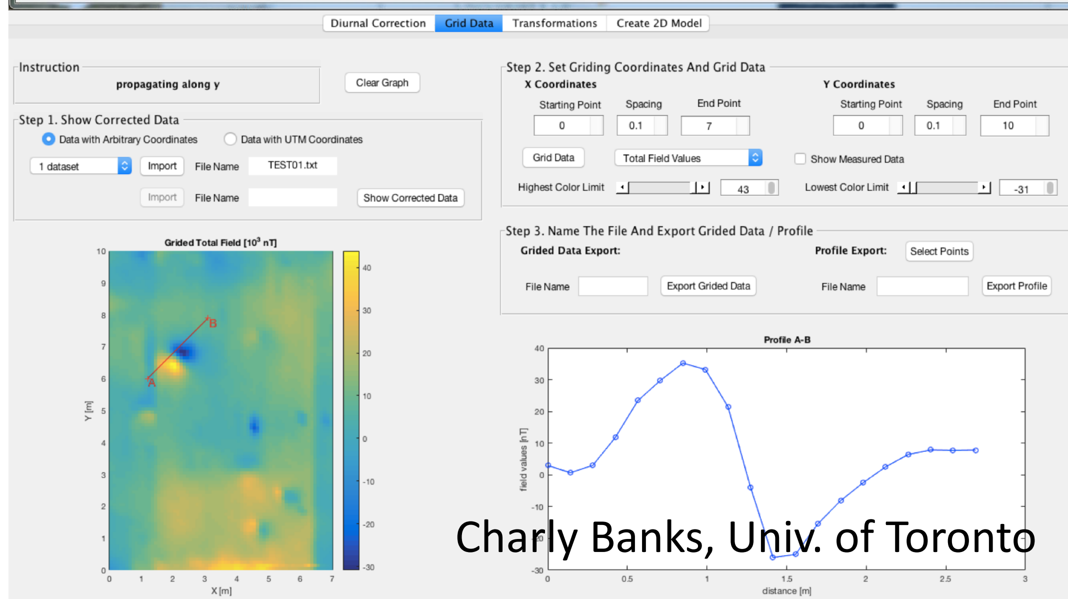
Limitations on research

Time → $$$

Equipment → aging/dead equipment replacement, ground truthing

Teaching Geophysics: challenges

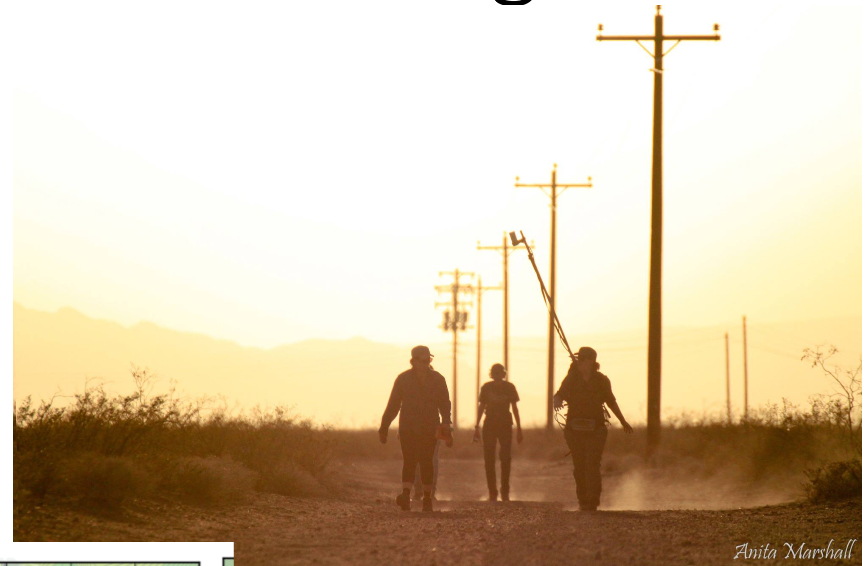




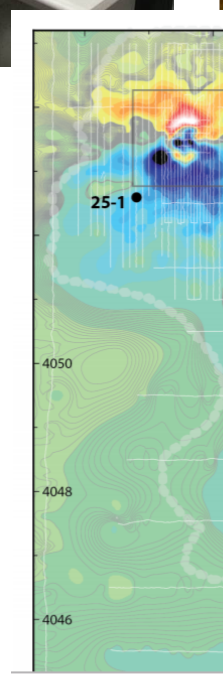
Software bottlenecks

Charly Banks, Univ. of Toronto

Teaching Geophysics: challenges



Comfort with social aspects of field work



STATISTICS IN VOLCANOLOGY
Volume 1
February 2, 2015

High-Resolution Ground-Based Magnetic Survey of a Buried Volcano: Anomaly B, Amargosa Desert, NV

George, O., McIlrath, J., Farrell, A., Gallant, E., Kinman, S., Marshall, A., McNiff, C., Njoroge, M., Wilson, J., Connor, C. B., Connor, L. J., Kruse, S.

University of South Florida, School of Geosciences, Tampa, Florida USA

Abstract

Aeromagnetic surveys over the Amargosa Desert, Nevada, have revealed the presence of several magnetic anomalies that have been interpreted to be caused by buried volcanoes; many of these anomalies have been

Teaching Geophysics: challenges

Prep & logistics time

Teaching Geophysics: challenges

Class size

Why teach urban & environmental geophysics?

Quantitative problem solving

“I didn’t think I could do physics”

Inquiry and data ownership

Full engagement in the scientific method