



# DAS Practical Fiber in cities.



24 February 2025



Istanbul



Bern. Smolinski et. al 2024

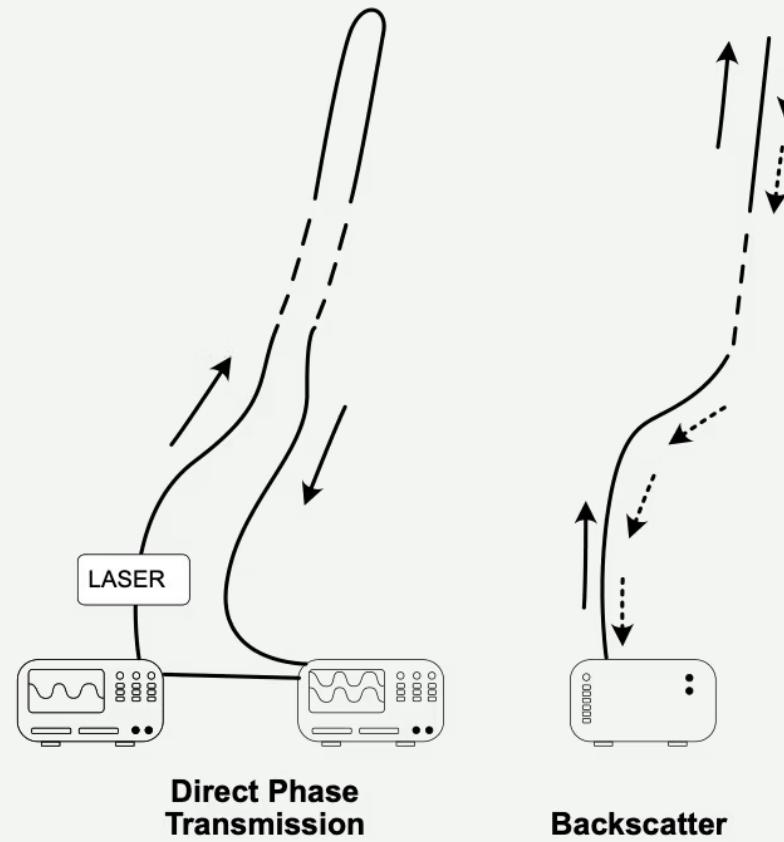


Credit: Jonas Igel

Athens

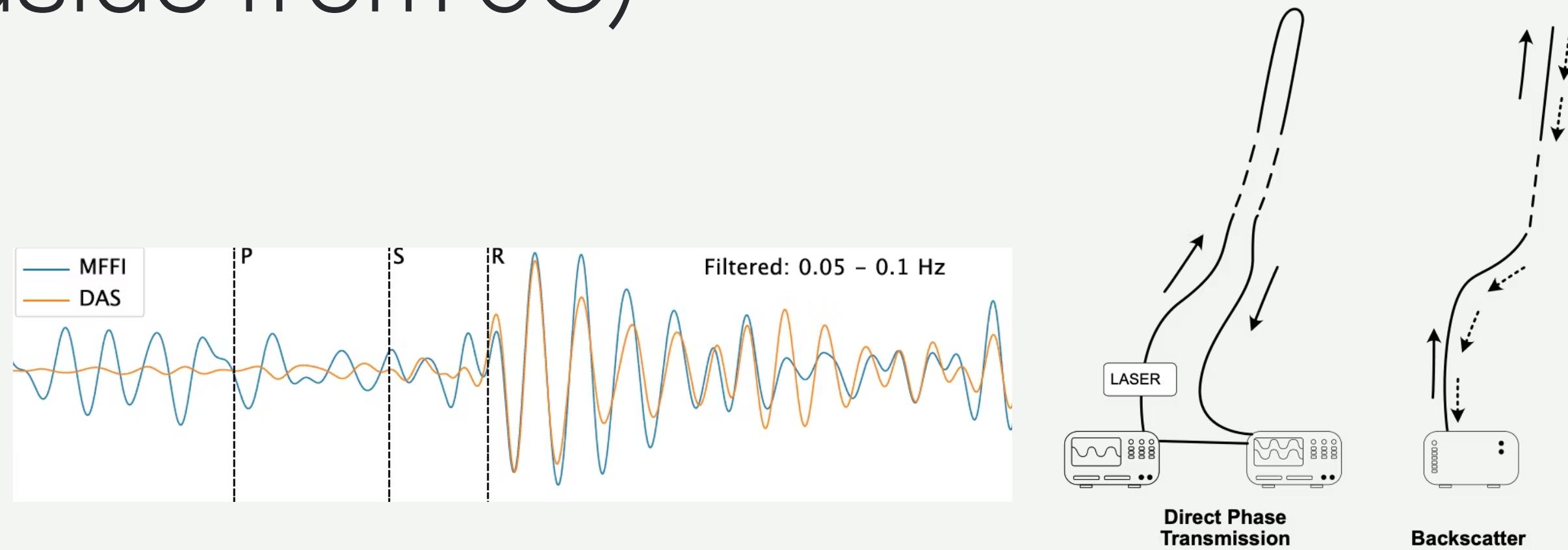
# First: A bonus comment.

DAS is not the only "emerging" fiber method.  
(also aside from 6C)



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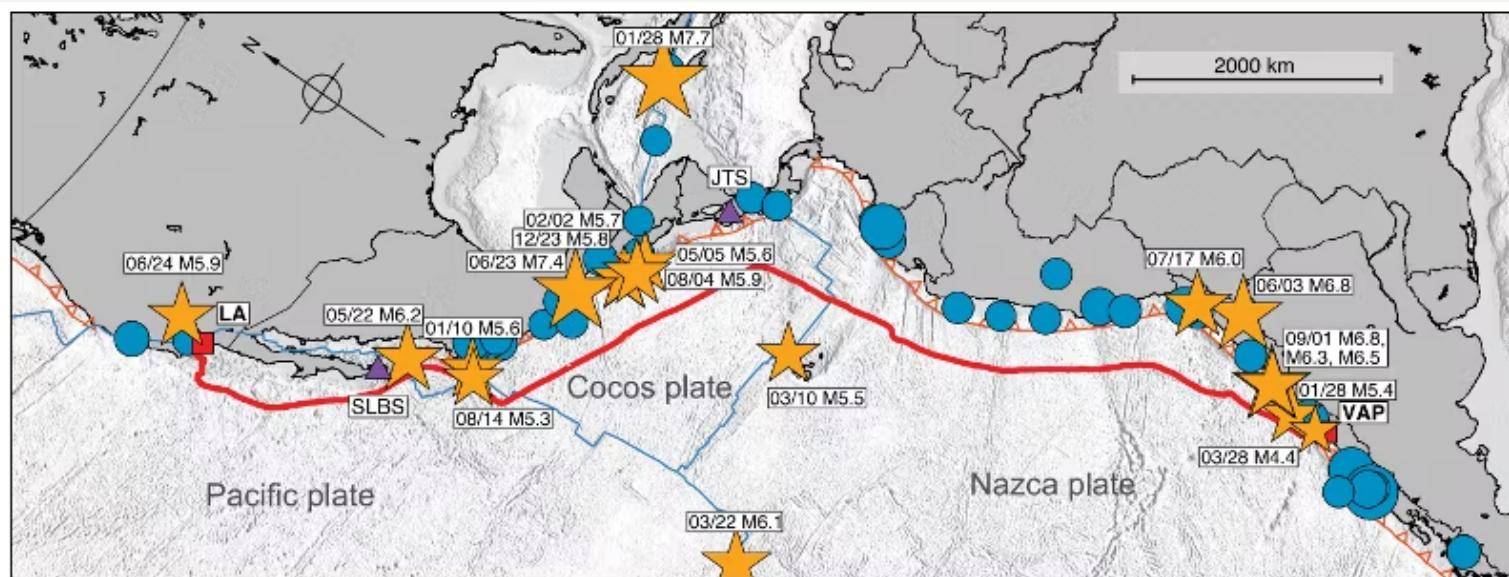


## REPORT

### GEOPHYSICS

# Optical polarization-based seismic and water wave sensing on transoceanic cables

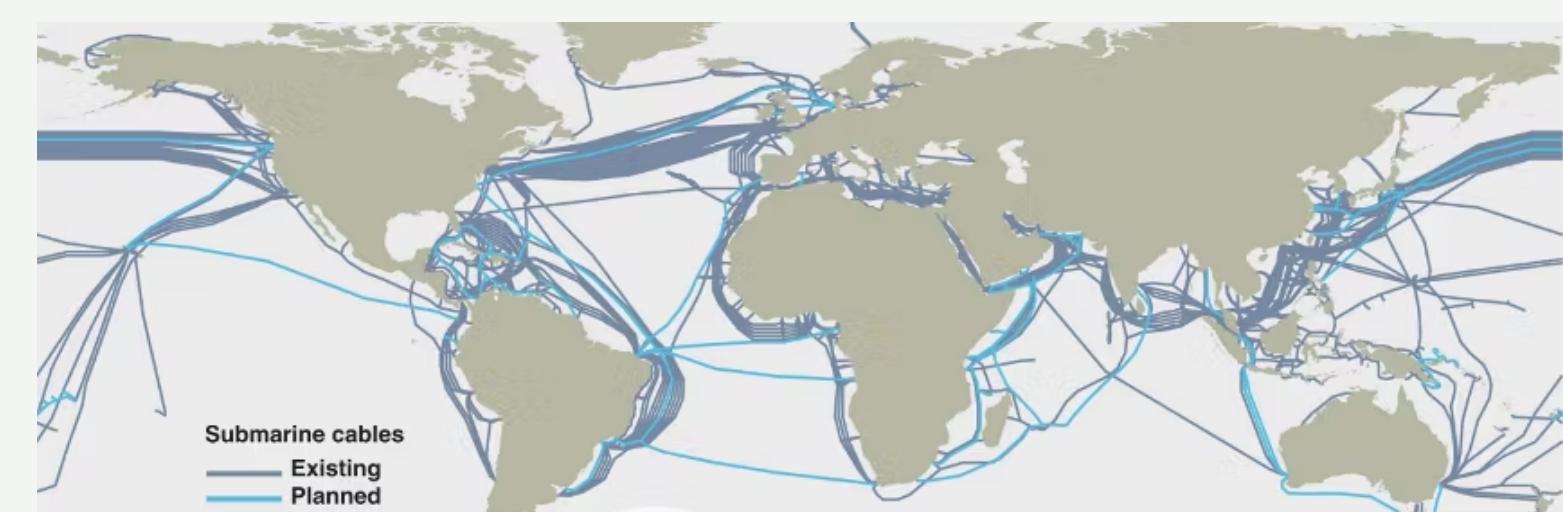
Zhongwen Zhan<sup>1\*</sup>, Mattia Cantono<sup>2</sup>, Valev Kamalov<sup>2</sup>, Antonio Mecozzi<sup>3</sup>, Rafael Müller<sup>2</sup>, Shuang Yin<sup>2</sup>, Jorge C. Castellanos<sup>1</sup>



## OPTICAL SEISMOLOGY

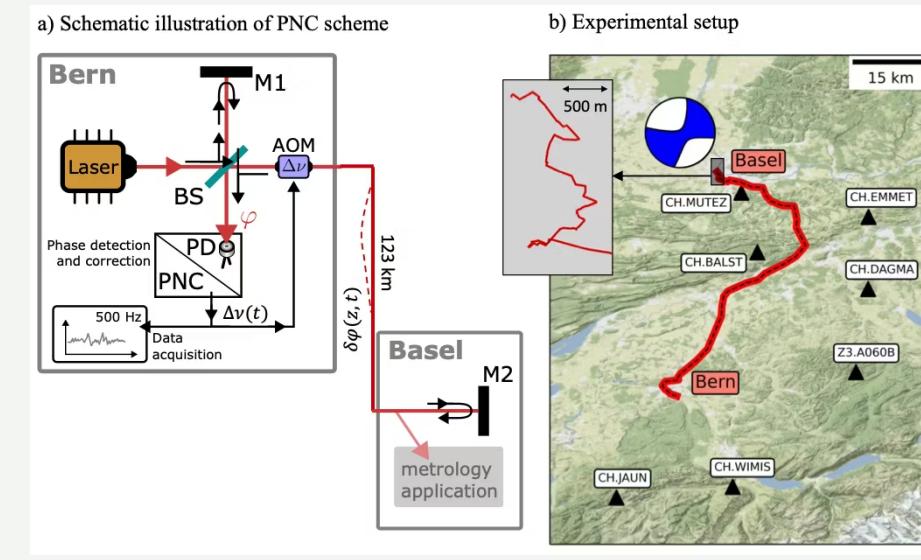
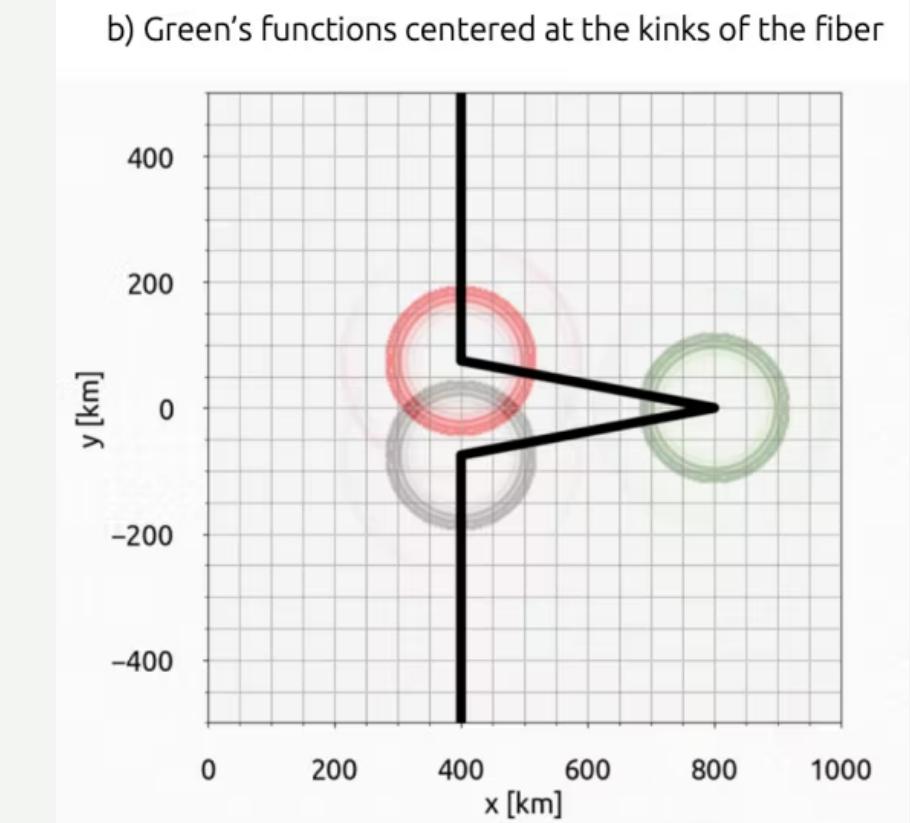
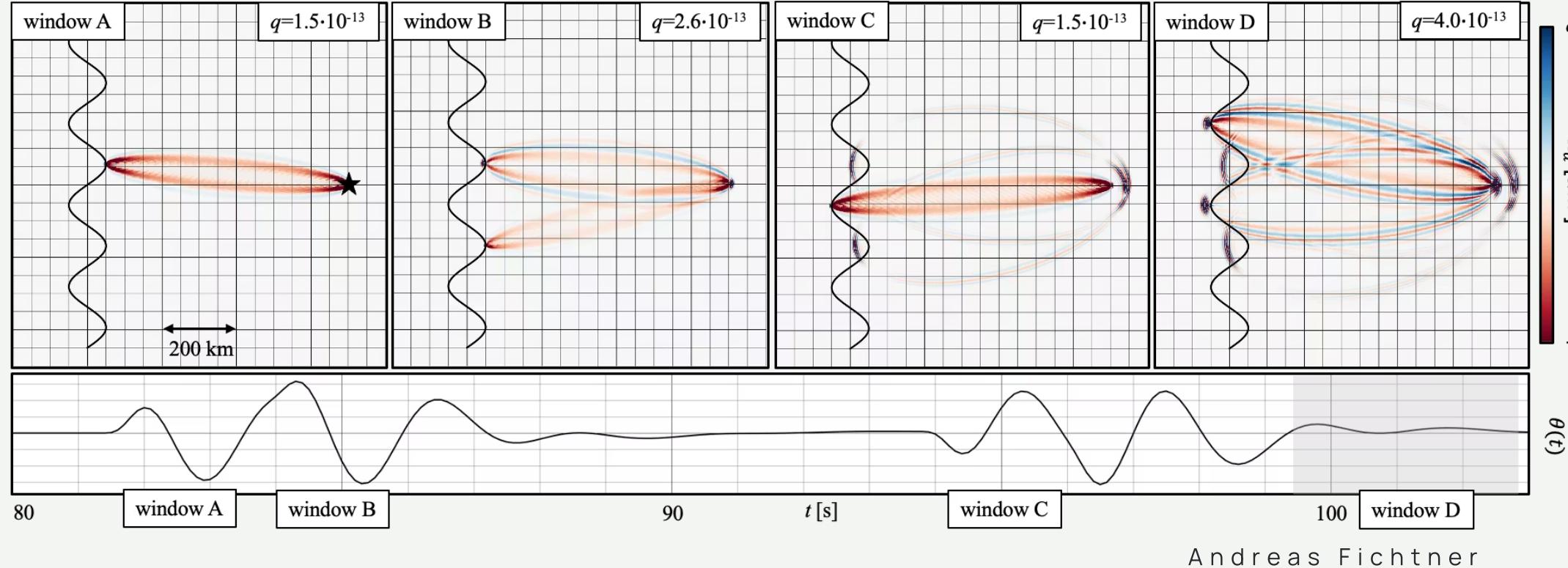
# Ultrastable laser interferometry for earthquake detection with terrestrial and submarine cables

Giuseppe Marra<sup>1\*</sup>, Cecilia Clivati<sup>2</sup>, Richard Luckett<sup>3</sup>, Anna Tampellini<sup>2,4</sup>, Jochen Kronjäger<sup>1</sup>, Louise Wright<sup>1</sup>, Alberto Mura<sup>2</sup>, Filippo Levi<sup>2</sup>, Stephen Robinson<sup>1</sup>, André Xuereb<sup>5</sup>, Brian Baptie<sup>3</sup>, Davide Calonico<sup>2</sup>



# Measurement: single Integrated Strain timeseries.

Useful? More than you might think.  
Space-time distribution is still very rich.



# Measurement: single **Integrated Strain** timeseries.

Compared to DAS:

-Less spatial information (or at least: requires reformulating methods)

+cheaper  
+fibers can be longer  
+fibers can be "live"

# OK. Back to DAS.

## Example 10 seconds, from Bern Switzerland

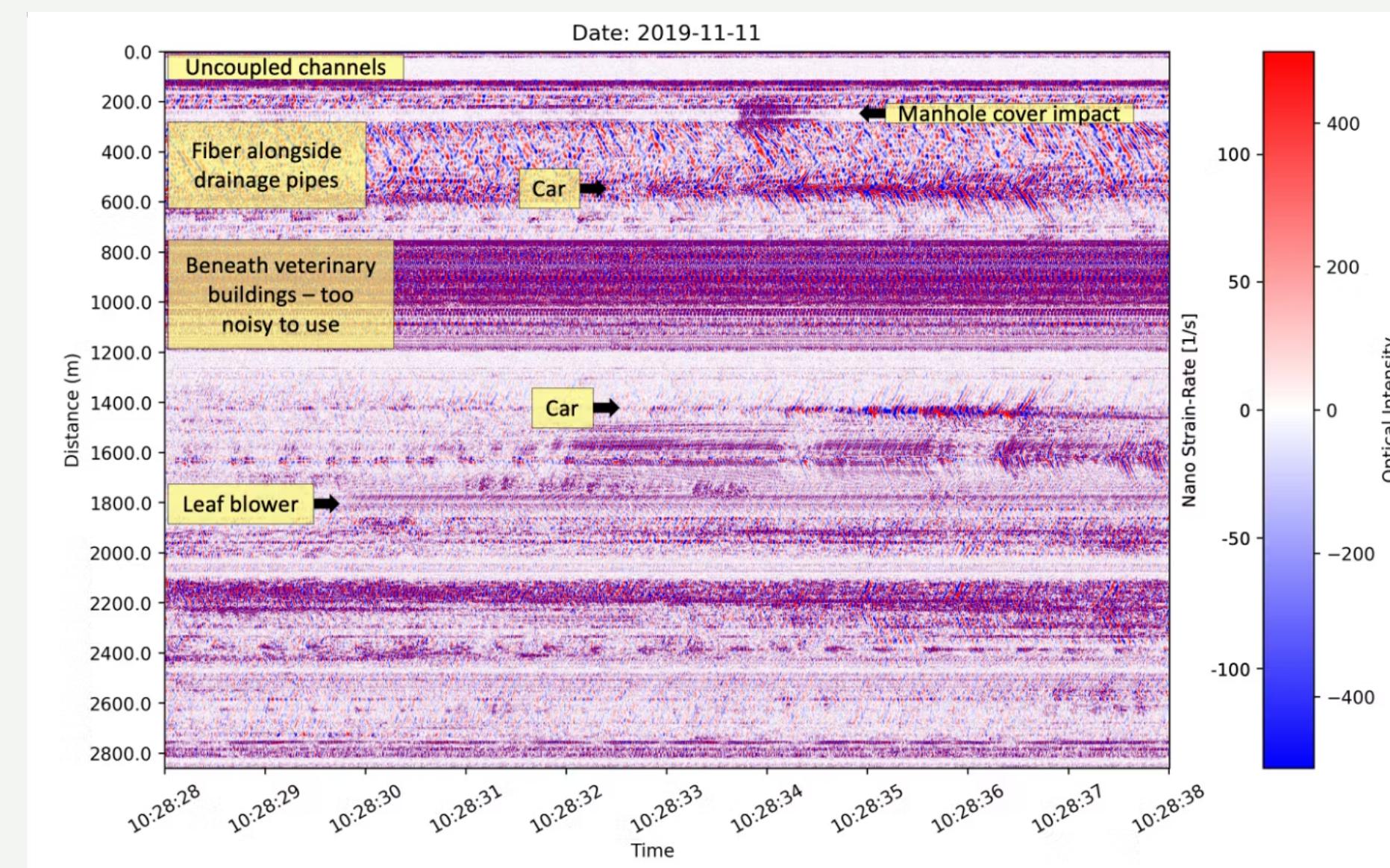
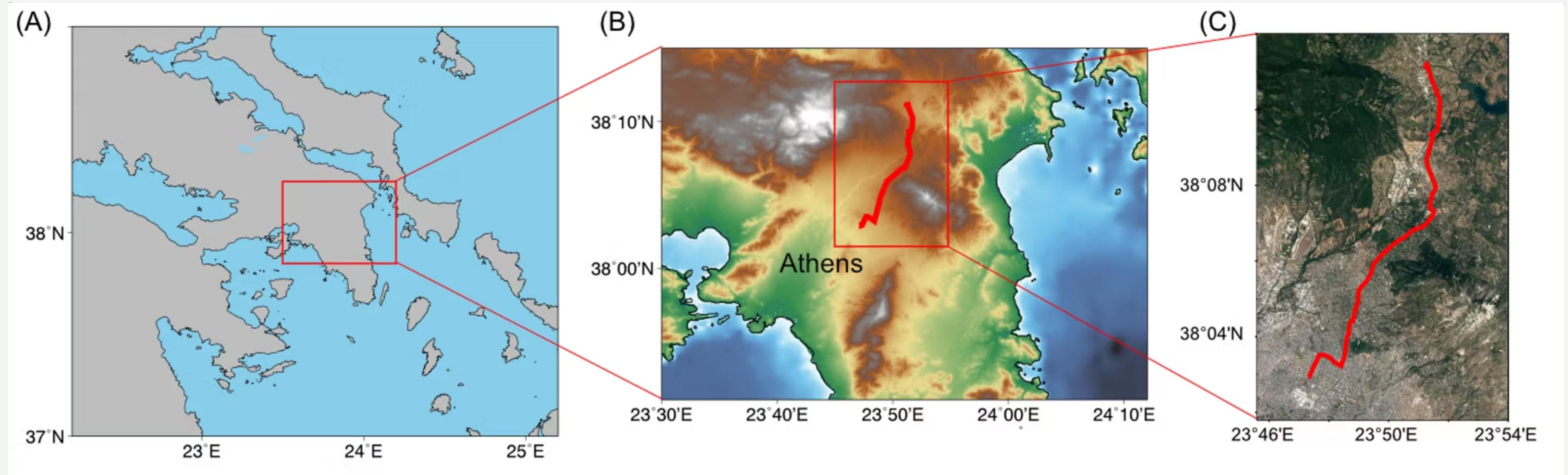


Figure from Krystyna Smolinski

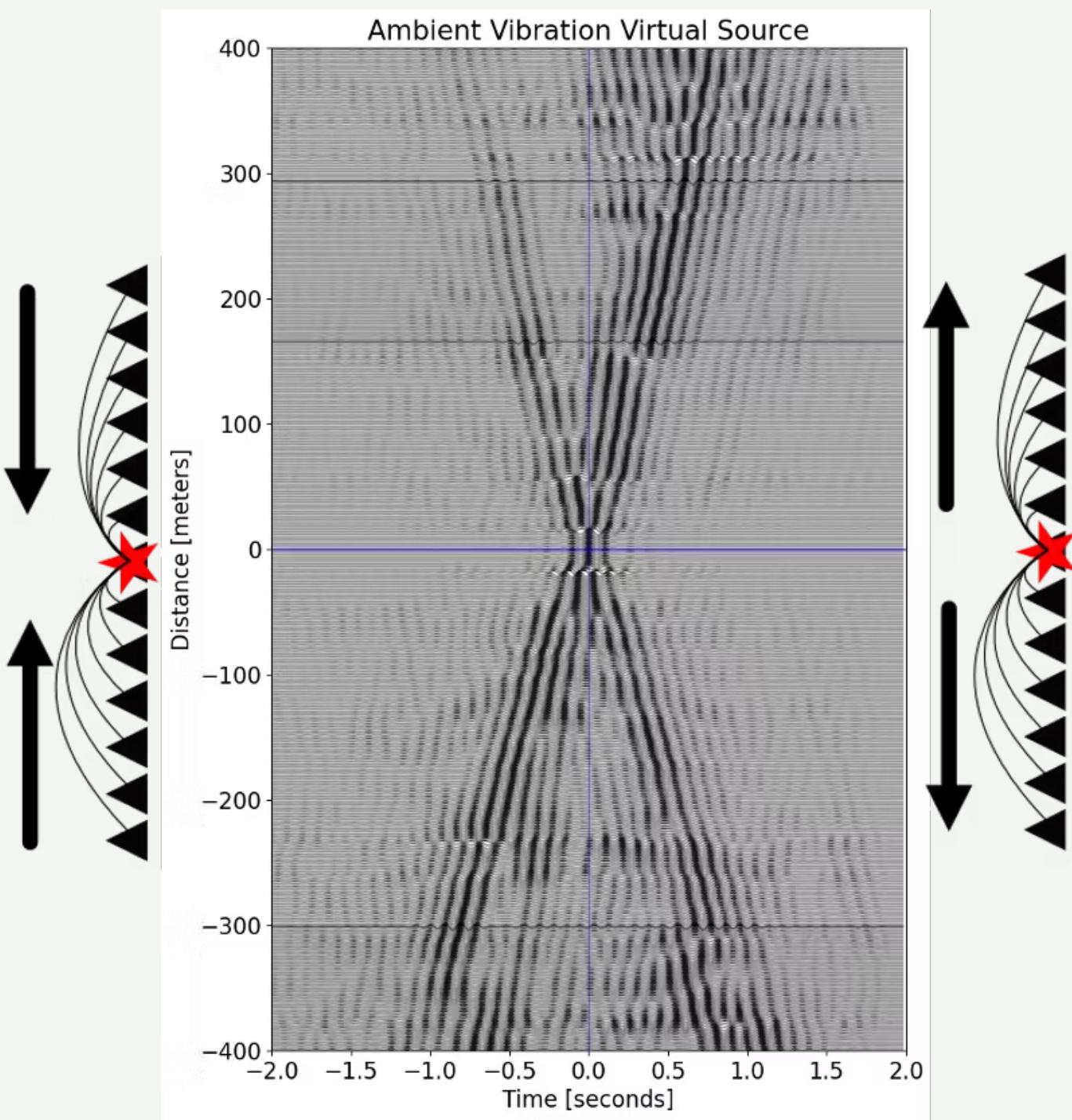
We'll use data from Athens, recorded in 2022.

We will focus on earthquake events.



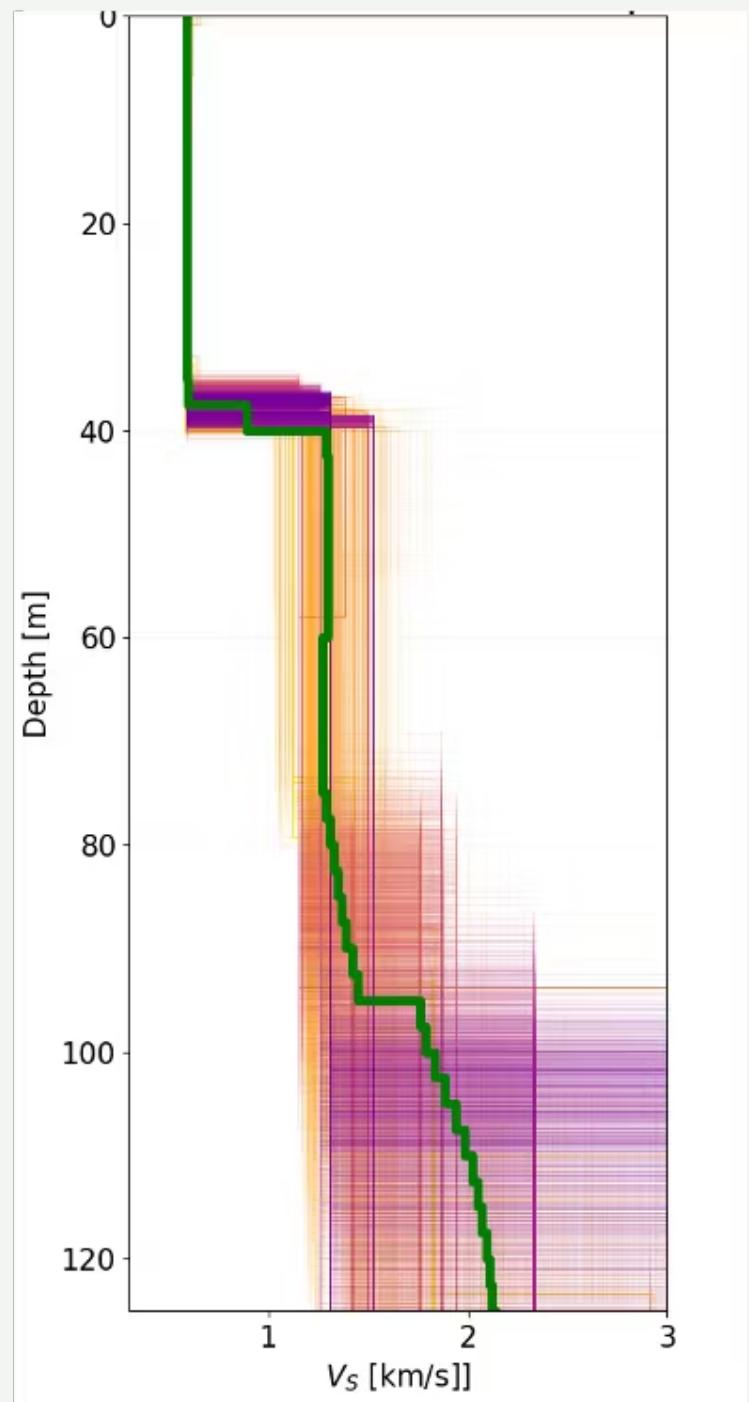
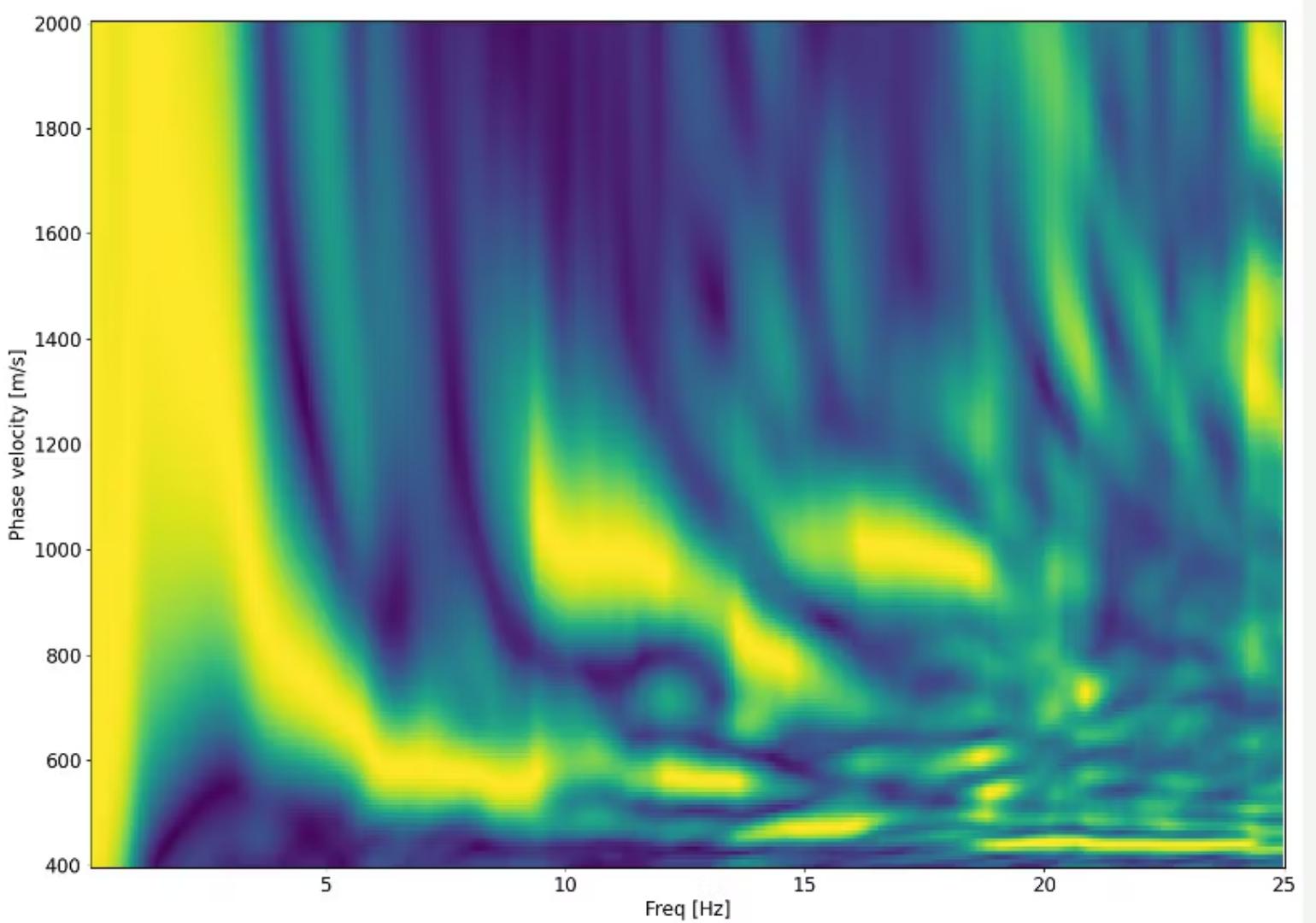
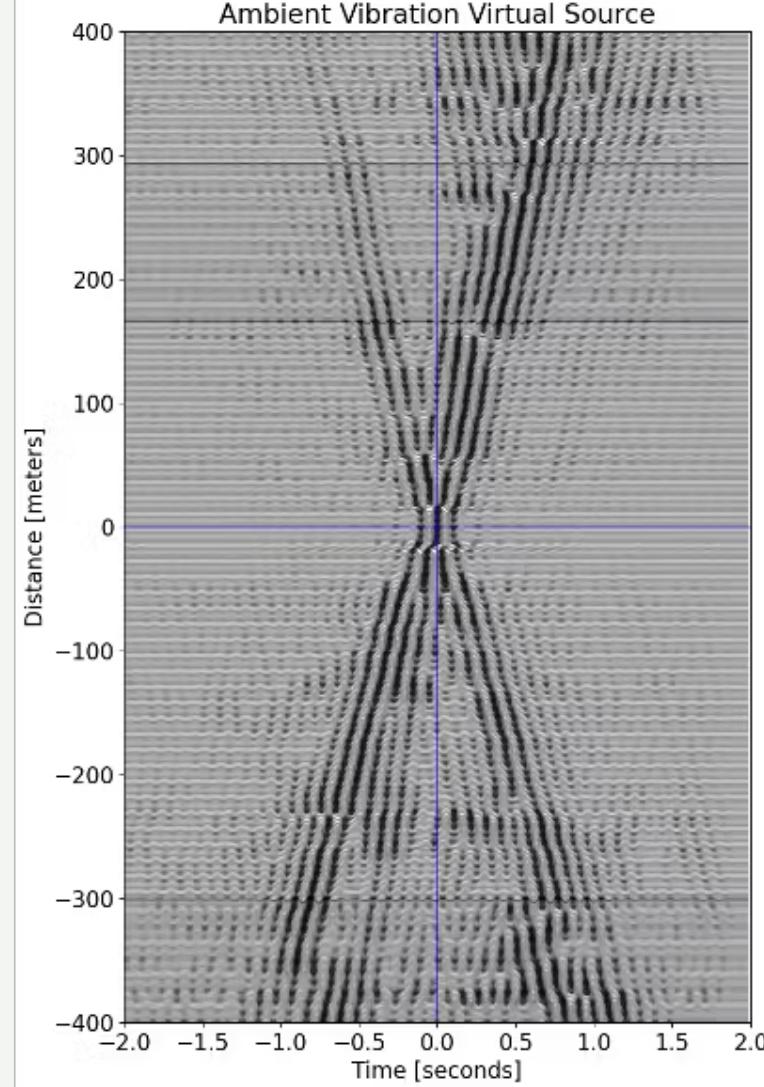
## Side note #2:

### Noise correlation is also possible

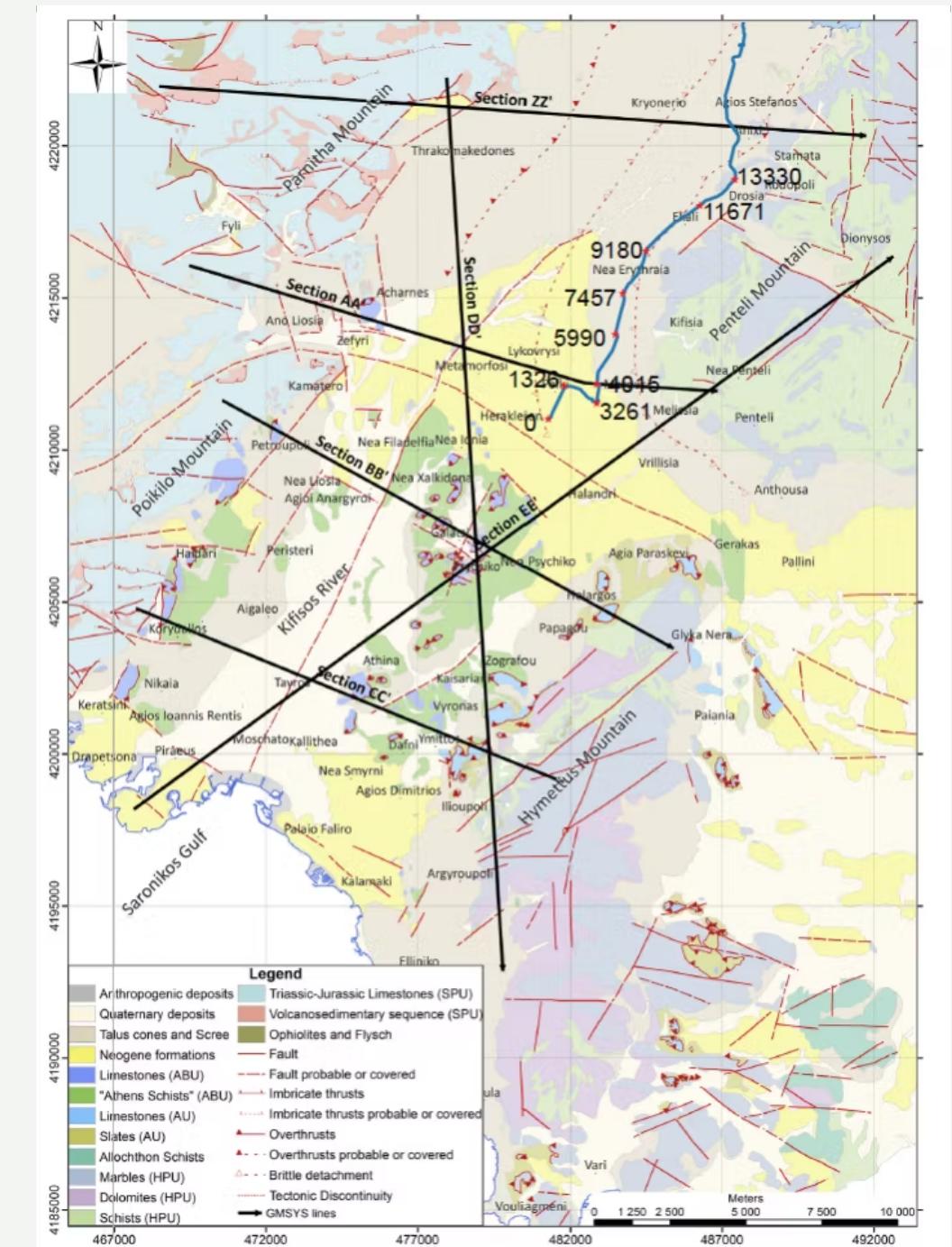
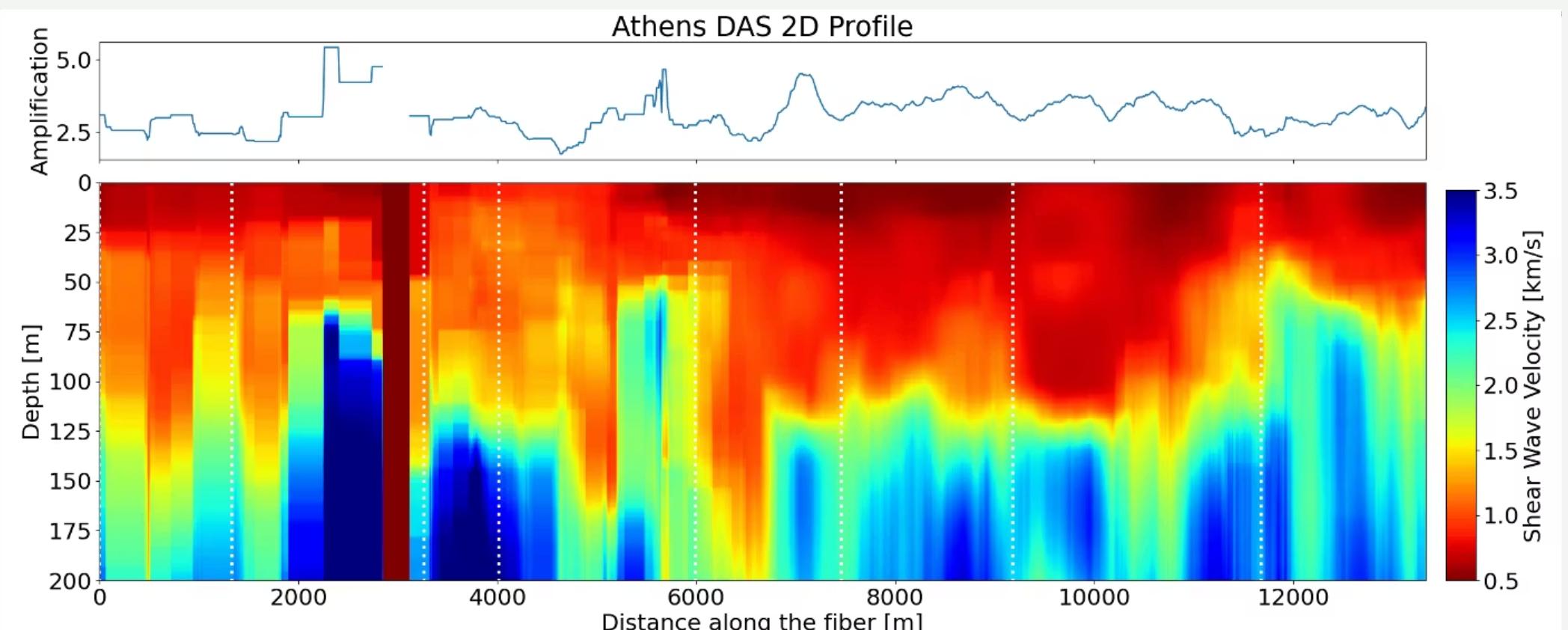


# Noise correlations → Dispersion Curve

→ 1D Profile



# Stitch together many such 1D models:



Advantage: 1 interrogator, ~2-3 days of setup = 14 km of 2D profile.

Disadvantage: 1-C, weeks of stacking, 40TB of data, lots of manual effort (dispersion picking). Quantity vs. quality.

Disadvantage: Getting access to the telecom fibers can be difficult. Need to figure out the business model.

# This afternoon's goals:

- Load data.
- Signal Processing.
- Find earthquakes.

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Software??

The image shows two screenshots of software documentation. The top screenshot is for 'Xdas: a Python Framework for Distributed Acoustic Sensing', featuring a logo with a microphone and waves, and text about managing, processing, and visualizing DAS data. The bottom screenshot is for 'DASCore (0.1.5)', showing a logo with the Colorado state flag colors, and information about it being a Python library for distributed fiber optic sensing, with links to code, documentation, and GitHub metrics.

Xdas: a Python Framework for Distributed Acoustic Sensing

Xdas is an python library for managing, processing and visualizing **Distributed Acoustic Sensing (DAS)** data.

DASCore (0.1.5) Introduction Tutorial Recipes Notes Contributing API

**DASCore**

A python library for distributed fiber optic sensing.

codecov 100% pypi v0.1.5 python\_versions 3.10 | 3.11 | 3.12 | 3.13 pypi 774/month conda 10.5281/zenodo.14580619 LGPLv3 Free Software

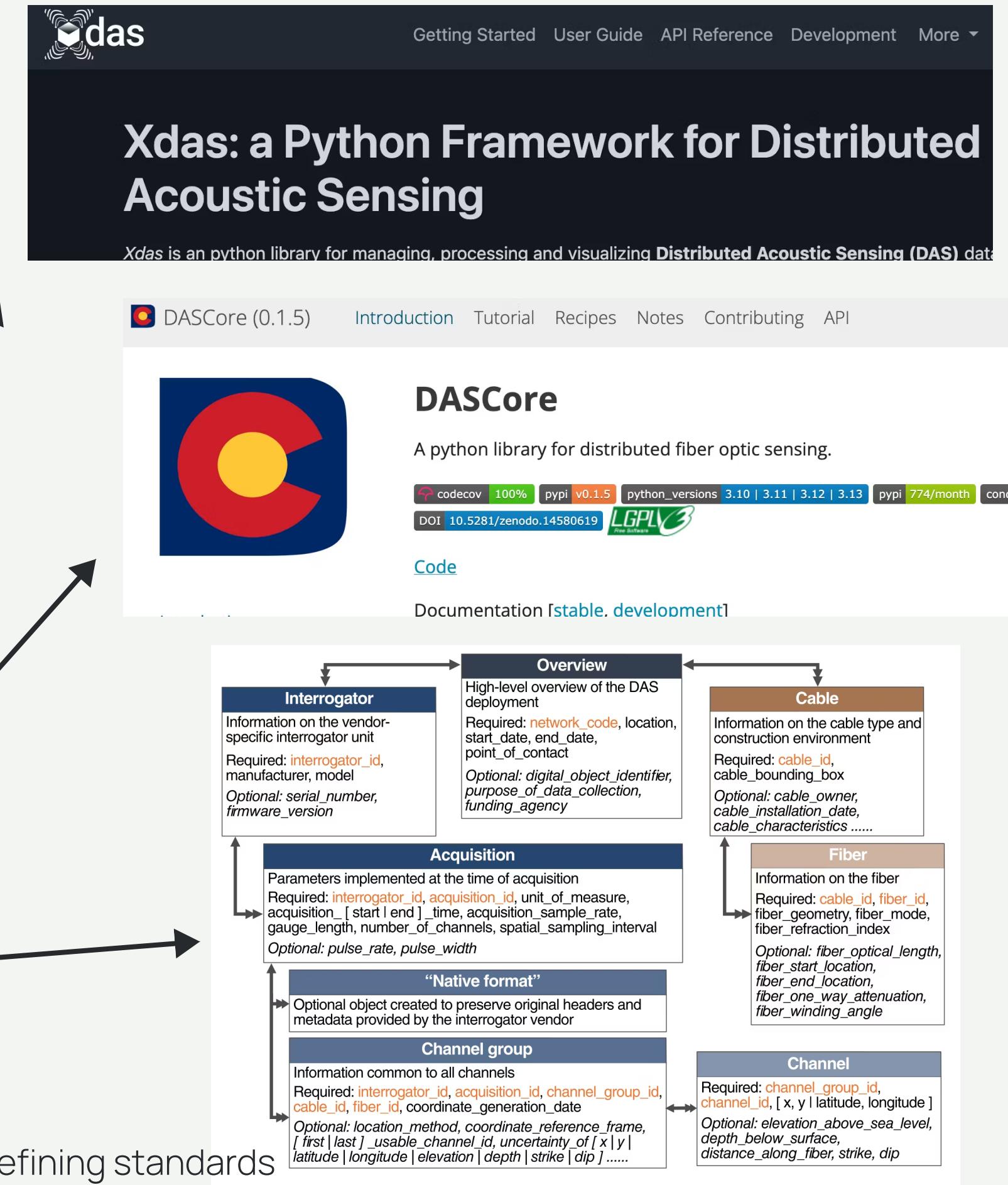
[Code](#)

Documentation [stable, development]

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Software??  
Standards??





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