**Jasper Ridge-Soil Sound Experiments**

Acoustic data Summary

**Research team:** Jane Willenbring (PI)**,** Peter Shearer (PI)**,** Sara Keen (postdoctoral researcher)**,** Travis Clow (PhD student)

**Project dates**: Jan – May 2021

**Research objectives**

The aim of this project was to explore the use of seismic and acoustic monitoring techniques to better understand soil bioturbation processes and to characterize soil properties. This work is motivated by recent research showing that seismic sensors can detect low amplitude signals that are generated by small disturbances in the nearby environment (e.g., bioturbation processes). This work suggests that seismic data sets may therefore be much richer than initially thought and that signals thought to be detectable only by acoustic sensors may in fact be present in seismic records. To determine the degree to which acoustic soundscapes correlate with seismic measurements, we simultaneously deployed acoustic and seismic sensors at several locations with distinct vegetation and soil types. We hope that analysis of these recordings will enable the identification of local, low amplitude disturbances within seismic datasets and will facilitate the comparison of seismic and acoustic soil soundscapes amongst study sites.

**Data collection**

We collected samples at four locations within Jasper Ridge Biological Preserve (Stanford University). At every sampling location, we placed two seismometers approximately 10 m apart (N = 8 seismometers). Each seismometer was surrounded by six Audiomoth acoustic recorders placed 1 m from the seismic sensor (N = 48 acoustic recorders). Acoustic recorders were buried at 6 cm depth and collected 30 min recordings at the beginning of every hour (16-bit wav files, 32 kHz sampling rate). A map with marked locations of our proposed sites can be found [here](https://www.google.com/maps/d/u/0/edit?mid=1IbpXdAje5GKMq4MCXZyx3nS91qvywOUJ&ll=37.42290685577431%2C-122.23357176184082&z=15).

**Sampling locations**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Location name** | **Site code** | **Vegetation** | **Mineralogy** | **Soil Order** | **Lat Long** |
| JR-L11-S1 | RW | Redwood forest | G | Alfisol | 37.4098, -122.227 |
| JR-L13-S1 | OW | Oak Woodland | D | Inceptisol | 37.4049, -122.228 |
| JR-L4-S1 | NG | Native grassland | M2 | Mollisol | 37.40559, -122.22672 |
| JR-L8-S1 | UC | Undifferentiated Chaparral | S2 | Alfisol | 37.40569, -122.228 |

**Acoustic data collection**

|  |  |  |  |
| --- | --- | --- | --- |
| **Site Code** | **Vegetation** | **Replicate** | **Acoustic recording dates** |
| RW | Redwood forest | 1 | Feb 5 – May 3, 2021 |
| RW | Redwood forest | 2 | Feb 5 – April 26, 2021 |
| OW | Oak Woodland | 1 | March 12 – May 3, 2021 |
| OW | Oak Woodland | 2 | March 12 – April 16, 2021 |
| NG | Native grassland | 1 | March 25 – April 25, 2021 |
| NG | Native grassland | 2 | March 25 – April 25, 2021 |
| UC | Undifferentiated Chaparral | 1 | Feb 5 – May 4, 2021 |
| UC | Undifferentiated Chaparral | 2 | Feb 9 – May 4, 2021 |

Upon finishing data collection, all acoustic recorders and seismometers were removed from the sampling locations and all acoustic data were copied to the Willenbring Group server space managed by Stanford University IT.