Analysis of Background Seismicity in Tompkins County for the Earth Source Heat Initiative

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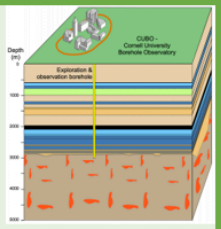
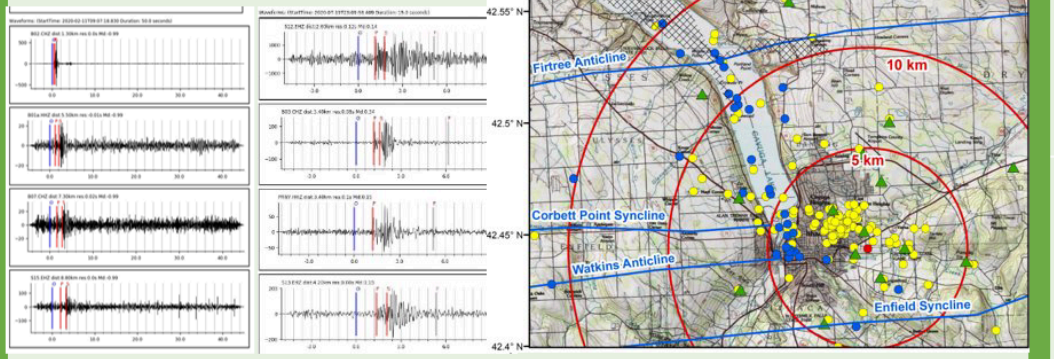
Motivation

- Understand background seismicity Thompkins County
  - Use as comparison after exploratory borehole drilled
  - Separate human-caused events
- Compare analyses of CorNET16 (2015-16)
- Understand the effectiveness of CorNET21 (2019-Present)
- Inform the Ithaca public of the project status and safety



Separating Anthropogenic and Natural Events

- Day/Night Separation
- Case studies:
  - Downtown Events
  - North Campus



Likely natural (left) and anthropogenic downtown (right) waveforms; Day (yellow) and night (blue) events, with distance to proposed borehole shown in red and known faults in blue.

Comparing CorNET16 Probable Anthropogenic Events

- Comparison of McLeod et al. 2020 and Weston Geophysical datasets
- Focusing on Cargill Salt Mine and Cayuga Crushed Stone around Portland Point
- Weston Geophysical findings validate those of Mcleod.

Corresponding events (left) around Portland Point. Mcleod in white, Weston in red. Triangles marking CorNET16 stations with proposed ESH site in red (right) (McLeod et al. 2020).

Next Steps

- Closer Investigations:
- North Campus Deep Dynamic Compaction / Events under Cayuga Lake
- Closer look at magnitudes and depths
- Continued operation of CorNET21 through 2022

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Borehole Image from Deep Geothermal Research at Cornell Website, Charts from Suhey et. al., 2021