Earthquake Early Warning Model using Signal Analysis and Data Classification

Week 3

The Data Incubator

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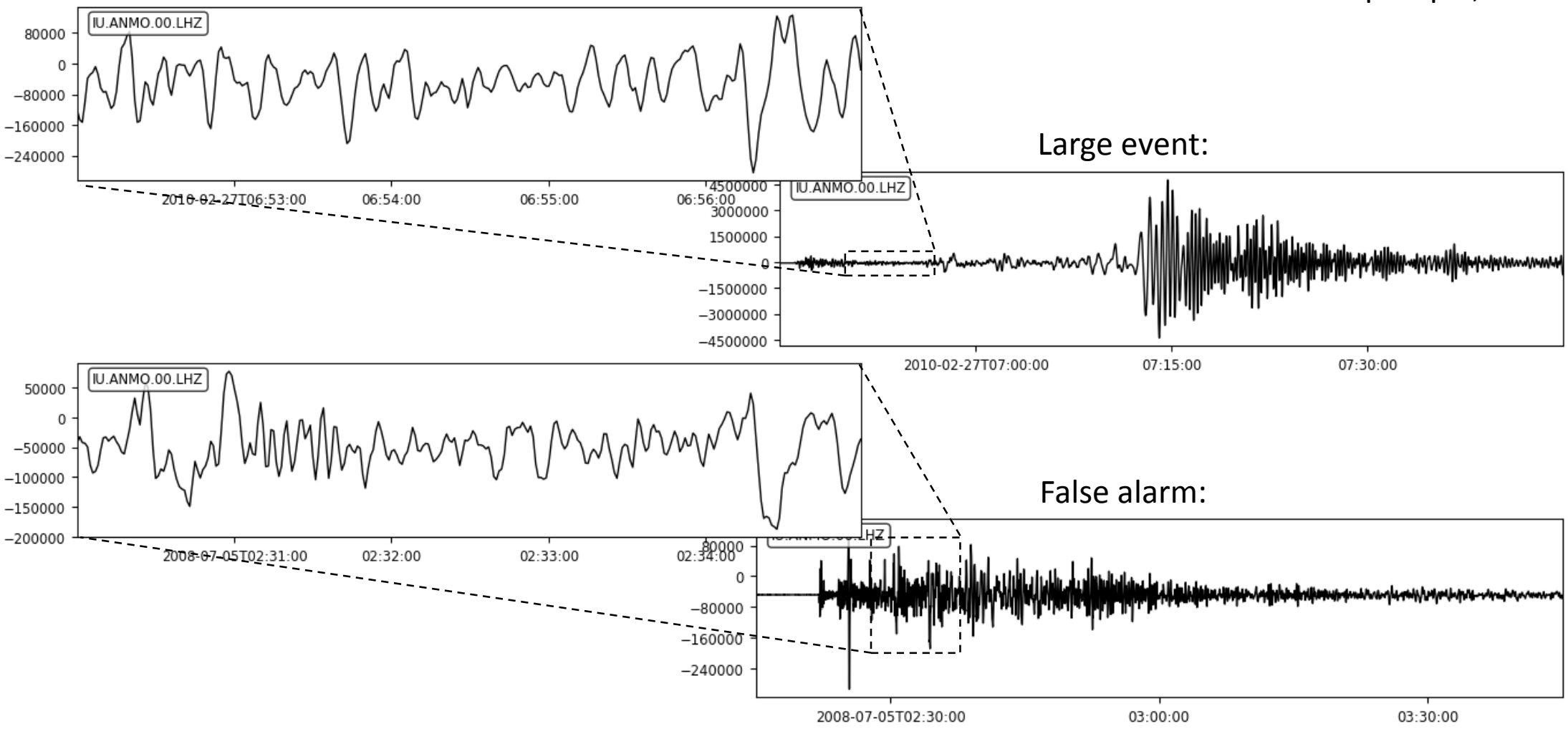
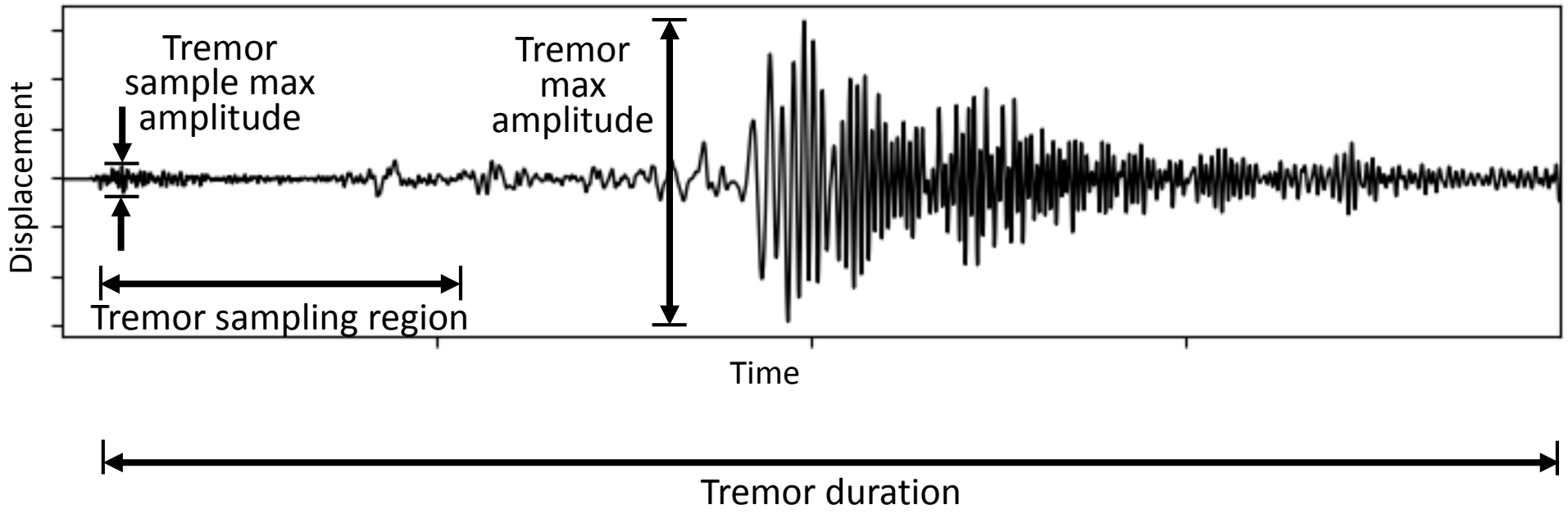
Seismic Waveforms

Data source: Global Seismic Network, Station IU ANMO
Albuquerque, New Mexico, USA

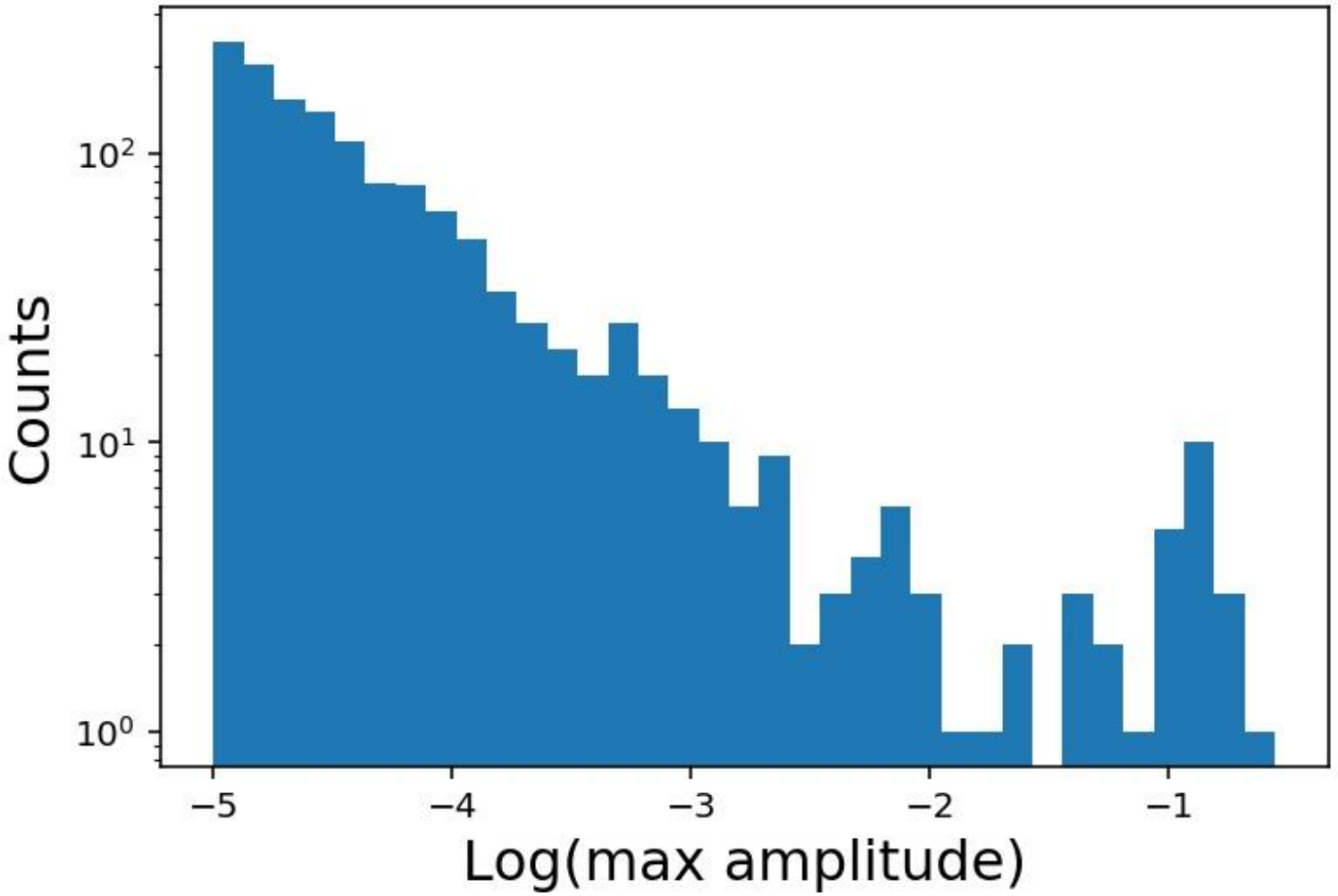


Earthquake Tremor Features



Power law behavior

- All available data from 2000-present from New Mexico seismogram
- Event tracking algorithm collected 1336 seismic events (~70 per year)
- FFT algorithm calculated spectral properties of collected waveforms

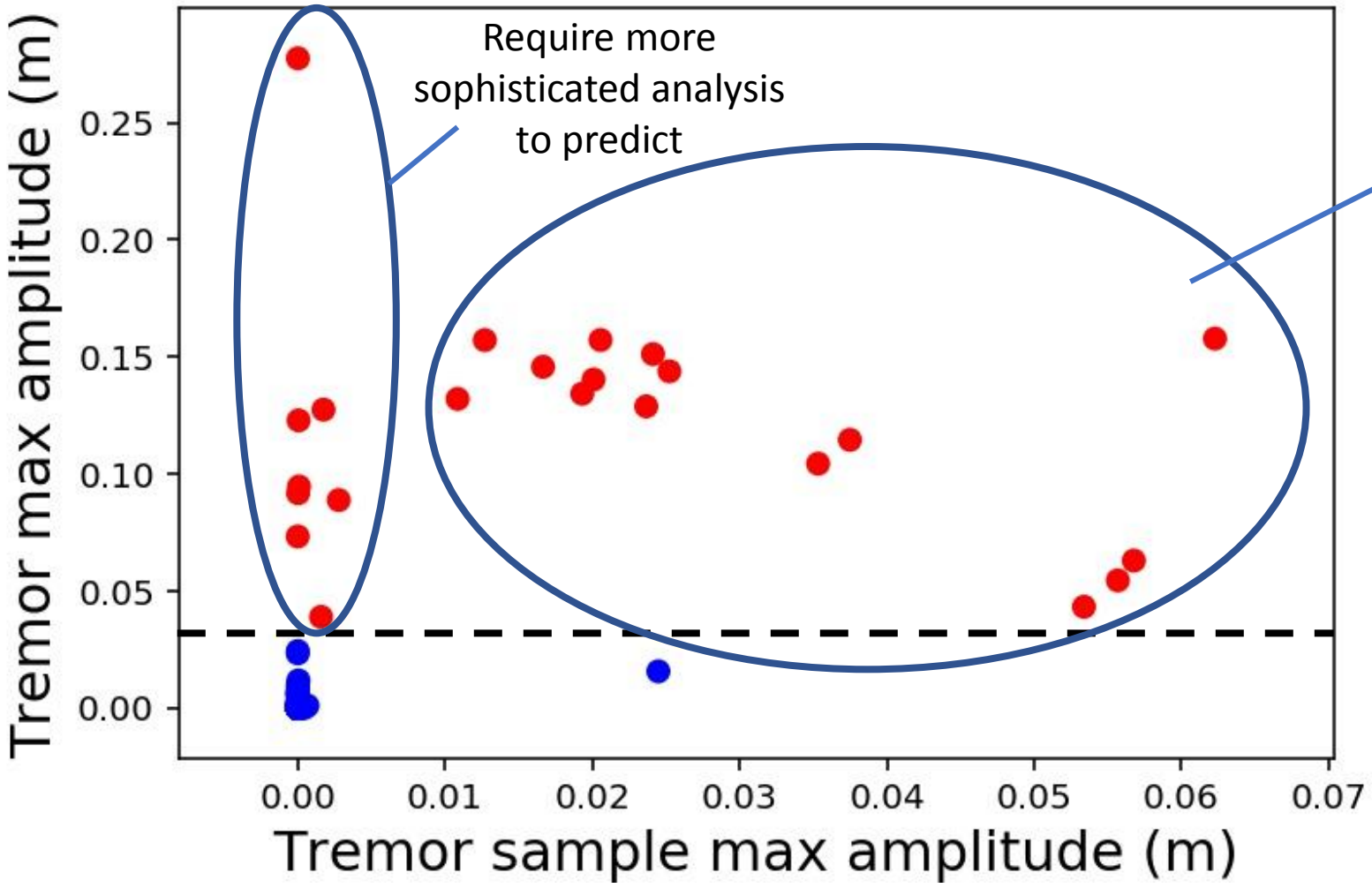


With only the first few minutes of a seismogram data:

- How big will the seismic event will get?
- How long the seismic event will last?

Project Goal: provide a few minutes of early warning before seismic events.

Does initial intensity predict future intensity?



Machine Learning Approach

- ML classification model that unions features from sampled tremor.
- Model input: Tremor sample features obtained from FFT:
  - Frequency centroid
  - Frequency range
  - RMS amplitude
- Model output: likelihood of seismic event developing into large event.