Svelvik CO_2 Seismic Monitoring – MW3 Zone Analysis

Objective:
To detect and interpret plume-related changes in:
- Waveform shape and amplitude
- Signal energy (envelope)
- First arrival time (velocity shift)

Key Findings (MW3 Region):
Amplitude Comparison:
Post-injection waveforms exhibited significant attenuation compared to baseline, indicating energy loss due to p

Envelope Analysis:
- Baseline traces showed strong, focused energy.
- Post-injection traces revealed dampened, flattened envelopes.
- Some traces nearly lost signal entirely → suggests saturation.

Arrival Time Shift:
- Mean delay (Post vs Baseline): 0.000093 s
- Indicates slight velocity drop due to CO_2 presence in pore space.

Interpretation:
These results confirm local plume effects in the MW3 region, characterized by energy scattering, partial saturat
The combination of envelope decay and arrival time shift strongly supports CO_2 plume migration into the monit

Tools Used:
- Python 3 with ObsPy
- SEG-2 seismic files (baseline, injection, post-injection)
- Custom waveform and envelope comparison scripts

Workflow:
Files → Inspect → Clean → Compare (Baseline vs Injection) → Interpret (MW3)

This project demonstrates the value of focused receiver analysis in shallow CO_2 injection scenarios and suppo