Mid Presentation

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Group 6, Topic 5

Introduction to Problem

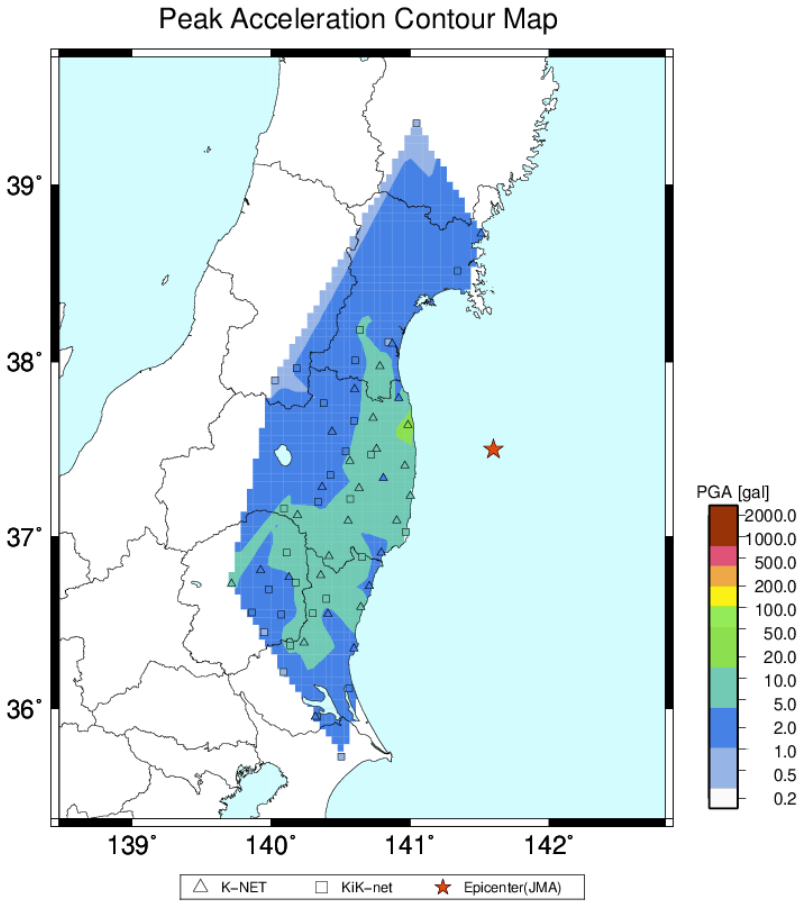
- Japan experiences frequent earthquakes due to its geographical location on the Pacific "Ring of Fire."
- The NIED (National Research Institute for Earth Science and Disaster Resilience) provides open access to strong-motion data through the K-NET and KiK-net networks.
- However, accessing, processing, and visualizing this data requires understanding specific file formats and handling large datasets.
- This project focuses on collecting, processing, and visualizing earthquake data from NIED to better understand seismic activity patterns across Japan.

Understanding the data

- Data comes from NIED, Japan, since 1996
- Hosted on NIED_FTP page, data grouped by:
  - All → combined *knet* and *kik*
  - Knet → Surface Station readings
  - Kik → Borehole Station readings

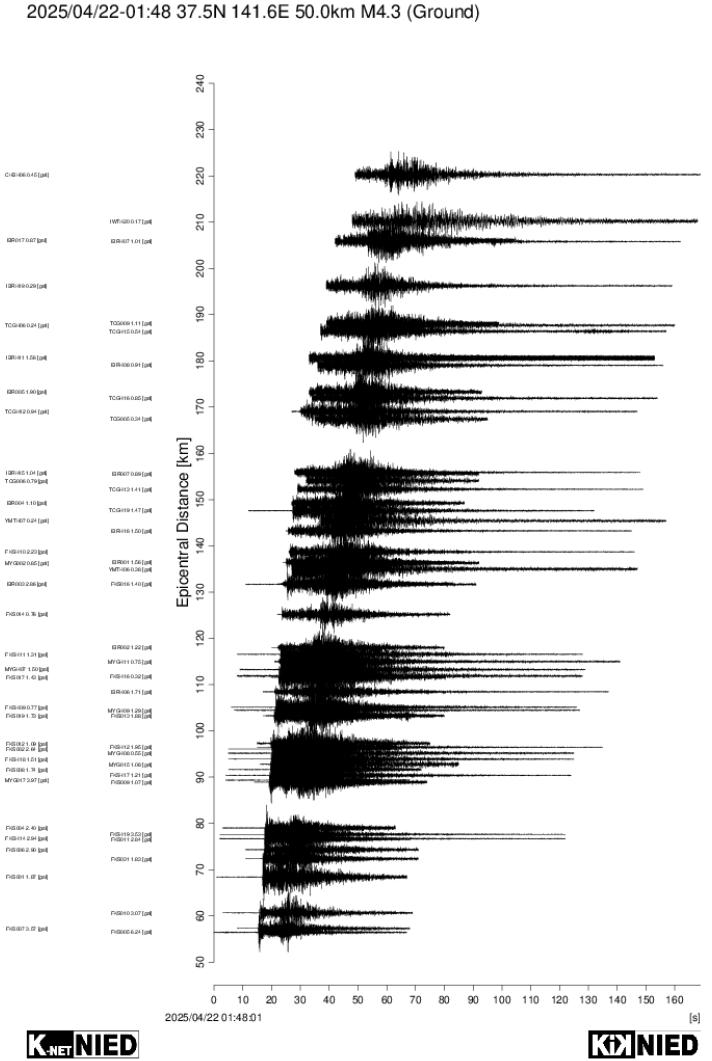
Example sources, from mixed knet-kik reading

$ tar -xvzf 20250422014800.all.img.tar.gz
./20250422014800.all_acmap.ps.gz
./20250422014800.all_aemp.ps.gz
./20250422014800.all_jmamap.ps.gz
./20250422014800.all_pmmap.ps.gz
./20250422014800.all_puwave3ch.ps.gz
./20250422014800.all_rsc0125map.ps.gz
./20250422014800.all_rsc0250map.ps.gz
./20250422014800.all_rsc0500map.ps.gz
./20250422014800.all_rsc1000map.ps.gz
./20250422014800.all_rsc2000map.ps.gz
./20250422014800.all_rsc4000map.ps.gz
./20250422014800.all_sicmap.ps.gz
./20250422014800.all_vcmap.ps.gz
./20250422014800.all_vemp.ps.gz



K-NET NIED KiK NIED

20250422014800.all_acmap.ps.gz



K-NET NIED KiK NIED

20250422014800.all_puwave3ch.ps.gz

What is K-Net

- Kyoshin Network
- Nation-wide strong-motion seismograph network.
- Over 1000 surface stations, uniformly distributed every 20km.
- Two main formats:
  - Binary format (based on win32)
  - ASCII format (plaintext)

What is KiK-Net

- Kiban Kyoshin Network
- Strong-motion seismograph network.
- Station consists of:
  - borehole with high sensitivity seismograph (Hi-net)
  - ground surface with regular seismograph
- Approximately 700 stations
- Readings from Borehole Stations

Research Questions

- “What is the structure of the earthquake data provided by the NIED platform?”
- “How frequently do earthquakes occur in different regions of Japan?”
- “What visualization techniques are most effective for representing spatial and temporal earthquake data?”

Objectives

- “Explore and understand the structure of the NIED earthquake dataset.”
- “Collect and process earthquake data.”
- “Develop visualizations to represent the spatial and temportal distribution of earthquakes in Japan.”

Success & Evaluation

- Successfully explored the structure and formats (binary and ASCII) of NIED earthquake data.
- Developed initial visualizations showing the spatial and temporal distribution of earthquakes across Japan.
- Answered research questions regarding data structure and earthquake occurrence patterns.

Project Plan

- Phase 1: Data access and preliminary exploration
- Phase 2: Data processing and automation
- Phase 3: Exploratory Data Analysis and Visualization
- Phase 4: Finalization