

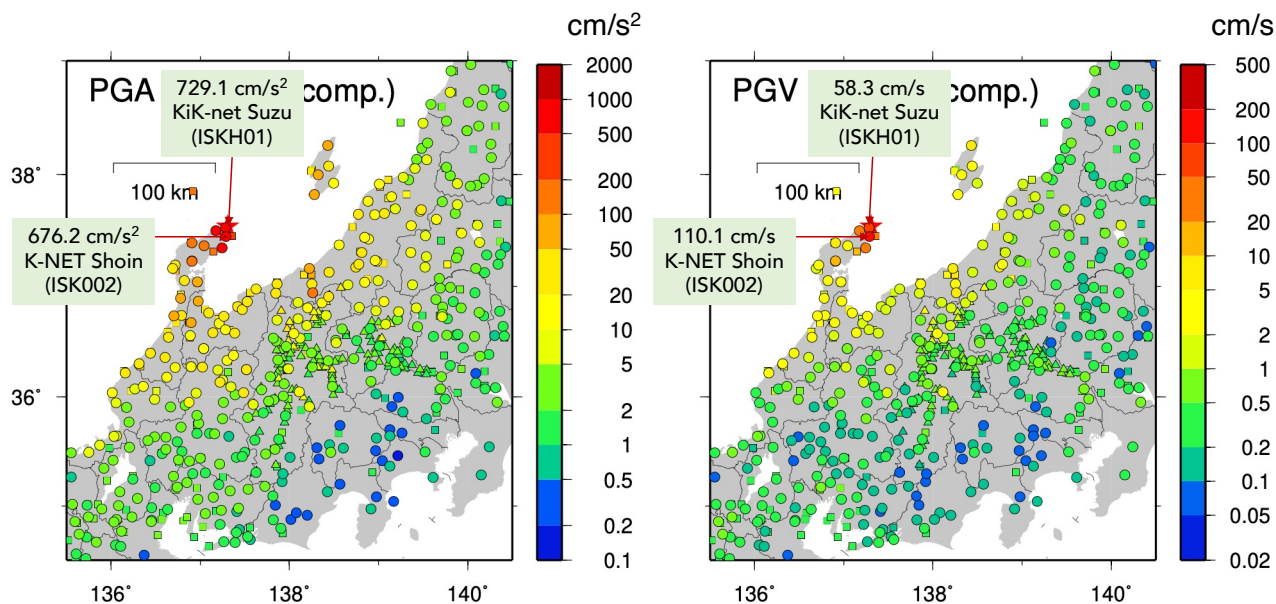
# Strong Ground Motions

Noto Peninsula, Ishikawa Prefecture earthquake on May 5, 2023

IISEE, Building Research Institute

May 18, 2023

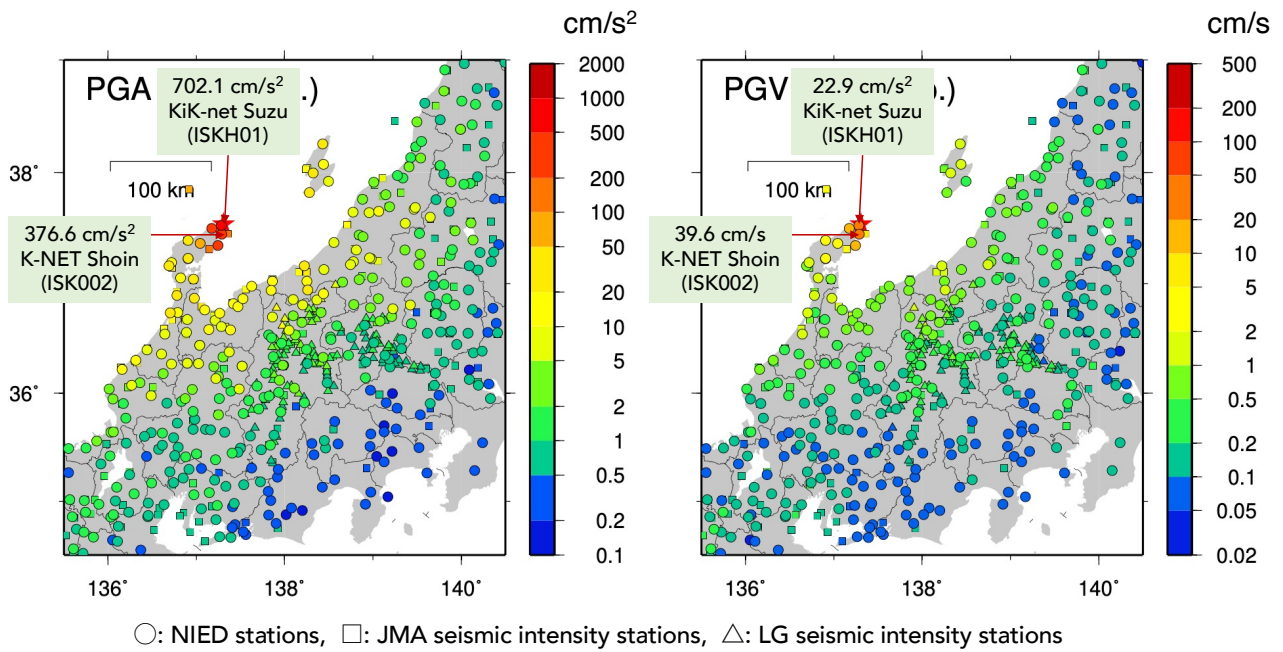
## Observed PGAs/PGVs (Horizontal comp.)



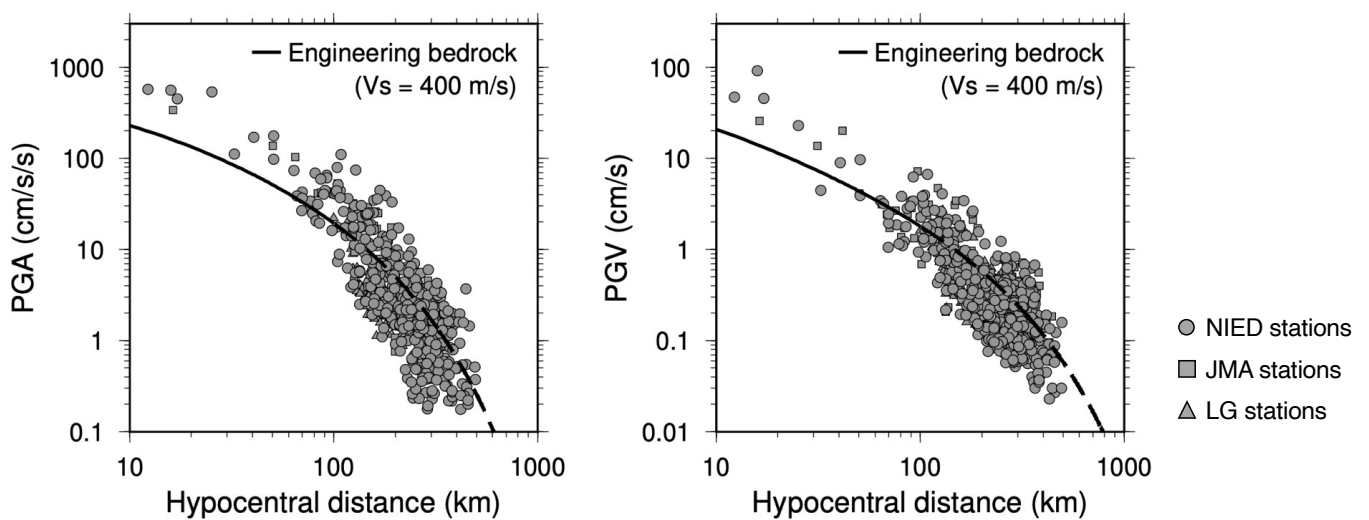
○: NIED stations, □: JMA seismic intensity stations, △: Local Government (LG) seismic intensity stations

※ PGA and PGV are the maximum values of vector summation in the horizontal components.

### Observed PGAs/PGVs (UD comp.)

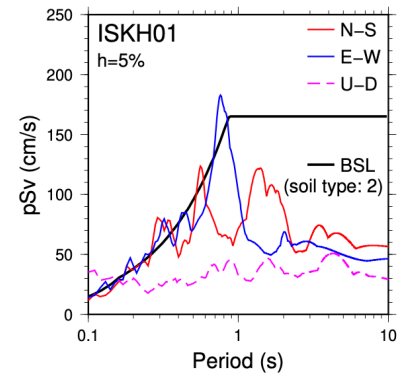
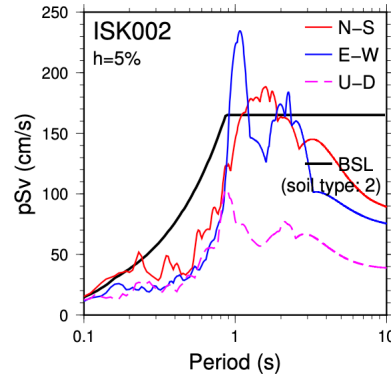
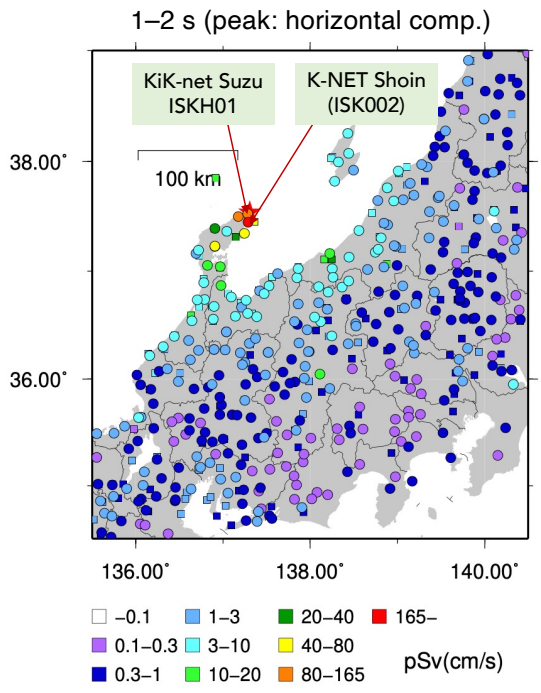


### Observed PGAs/PGVs vs GMPE (Si & Midorikawa, 1999)



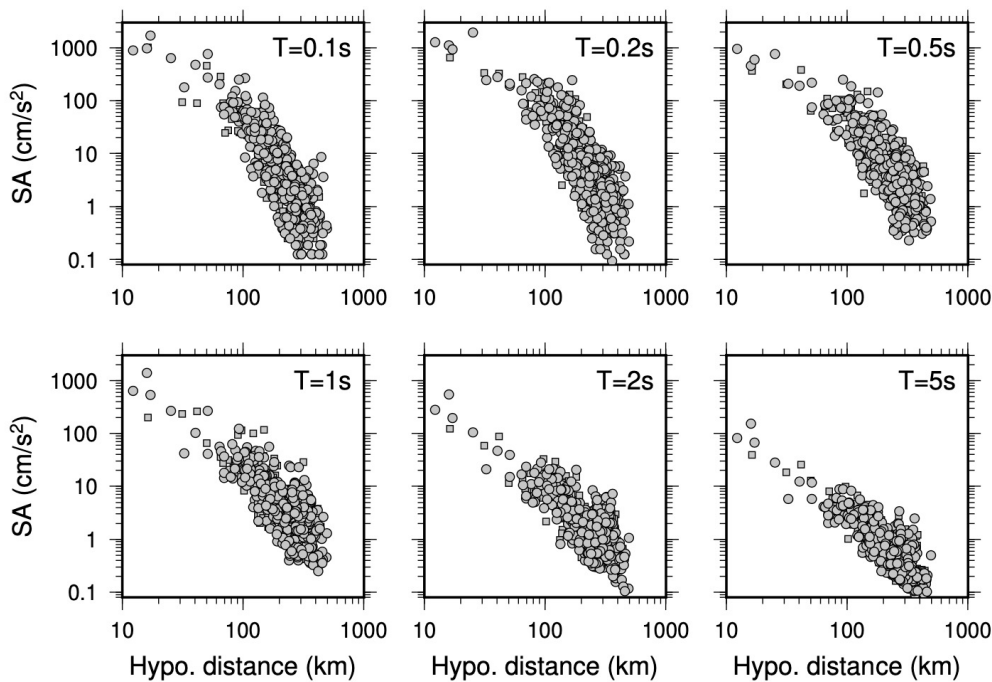
- ※ Horizontal axis is not the "shortest distance to the fault".
- ※ PGA/PGV values are the larger of the maximum values of NS and EW components.
- ※ Intraplate earthquake (depth=40 km) is assumed for the estimation.
- ※ Estimated values beyond 100 km (dashed line) are shown as reference values.

# Pseudo-velocity response (pSv: 1–2 s, h=5%)



Responses of pSv > 165 cm/s (T=1–2 s) was observed at K-NET station Shoin (ISK002).

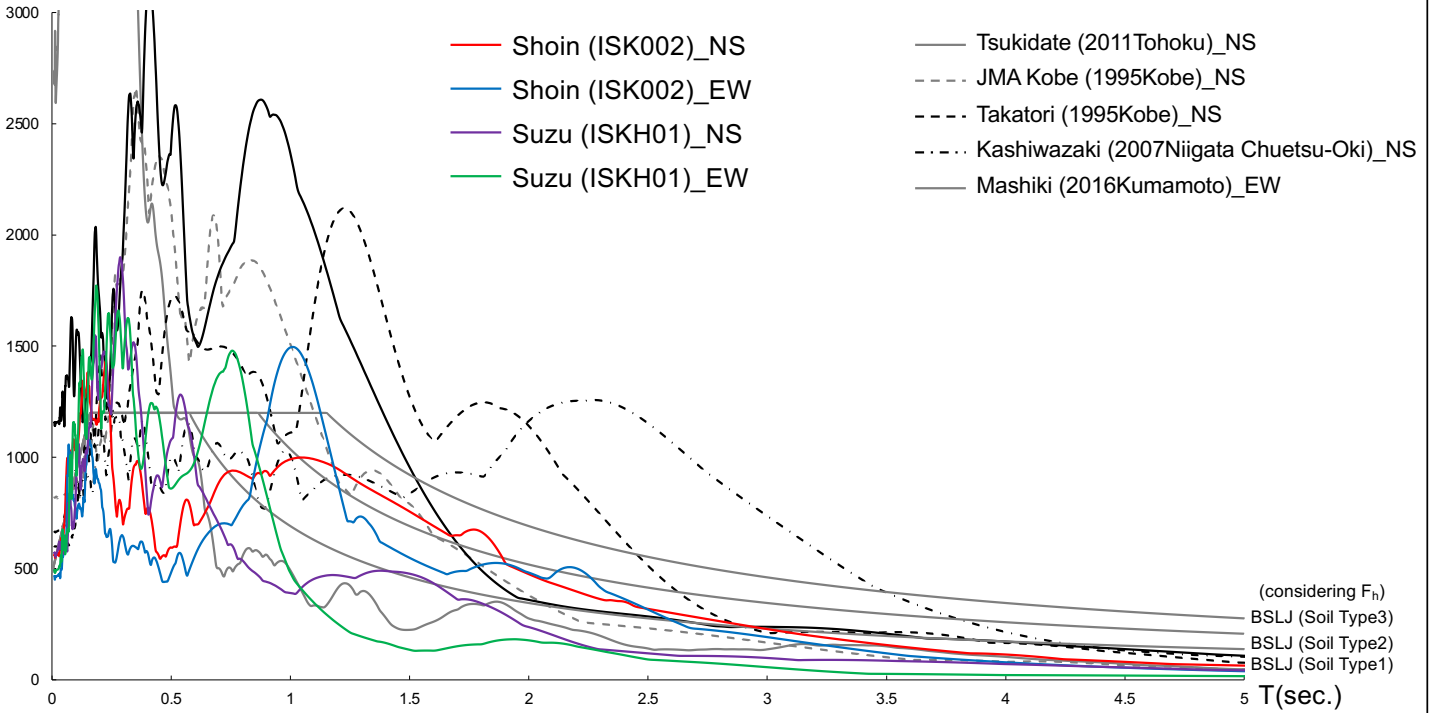
# Attenuation characteristics of response spectra (h=5%)



# Response acceleration spectrum $S_a$ and response periods

BRI Confidential

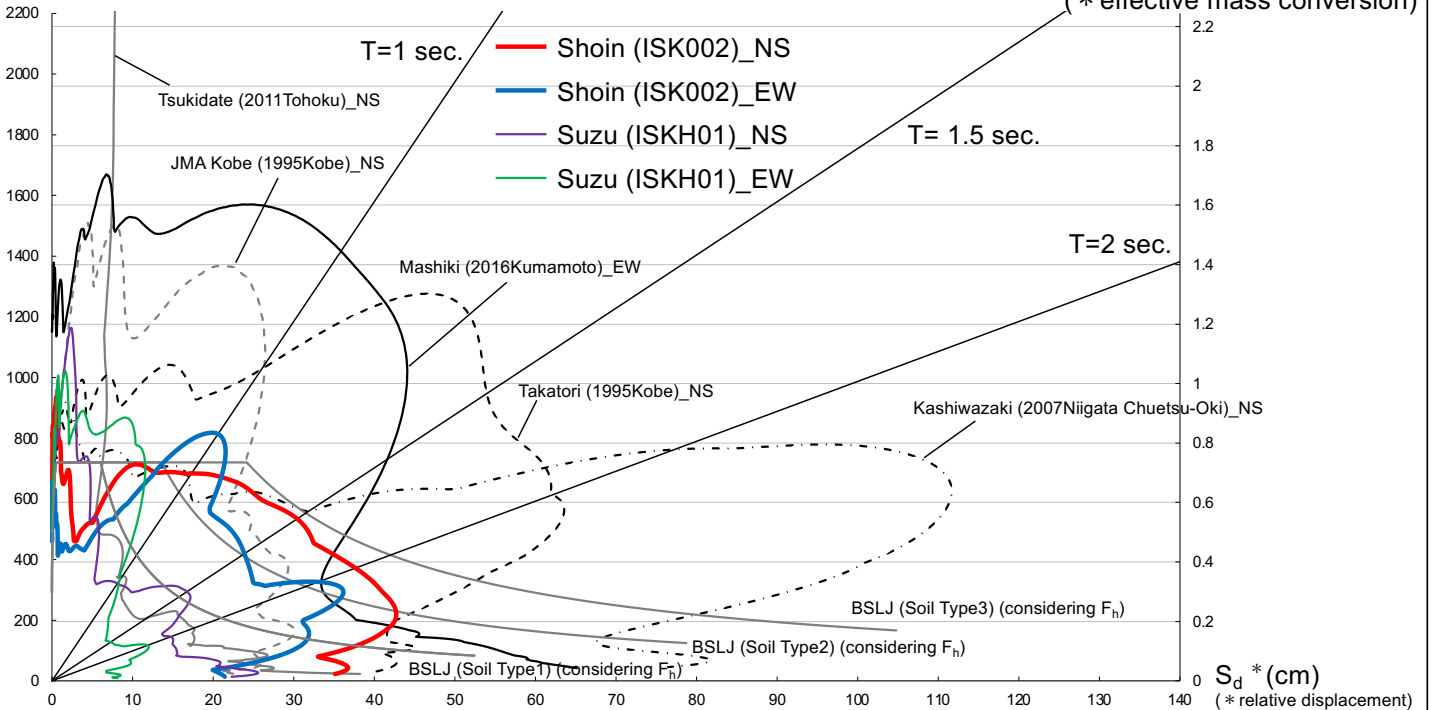
$S_a$  (cm/s<sup>2</sup>) Colored Line: NIED K-NET/KiK-net strong-motion (Equivalent damping factor=5%)



# Sa—Sd curve and response periods

BRI Confidential

$S_a$  (cm/s<sup>2</sup>) Colored Line: NIED K-NET/KiK-net strong-motion (Equivalent damping factor=15%)



## Summary

### –Noto Peninsula, Ishikawa Prefecture earthquake on May 5, 2023–

The largest PGA was recorded at KiK-net station Suzu (729.1 cm/s<sup>2</sup>), while the largest PGV was recorded at K-NET station Shoin (110.1 cm/s).

Response of pSv >165 cm/s (T=1–2 s) was observed at Shoin (ISK002).

Strong ground motions observed at Shoin (ISK002) and Suzu (ISKH01) have small amplitudes in the Sa-Sd compared to those observed during recent earthquakes in Japan.

From the Sa-Sd curve assuming a 15% equivalent damping ratio, the response displacement (Sd) of Shoin (ISK002) at the period of 1 to 2 seconds was 20 to 40 cm, which was larger than Suzu (ISKH01).

## Summary (cont.)

The response acceleration (Sa) of the North-South (NS) and the East-West (EW) components of Shoin (ISK002) showed large values at around the period of 1 s.

### **Acknowledgments:**

We used K-NET and KiK-net strong-motion data provided by the National Research Institute for Earth Science and Disaster Resilience; NIED), Japan  
<https://www.doi.org/10.17598/NIED.0004>

We used accelerograms from JMA seismic intensity meters and PGA/PGV information provided by local governments (SK-net).

We used strong motion data provided by RTRI.

We used hypocenter information determined by NIED Hi-net.  
Response spectra were calculated using the subroutine program developed by Osaki (1994).  
Figures were prepared using Generic Mapping Tools (GMT: Wessel and Smith, 1998).

Sa-T and Sa-Sd were calculated using the View Wave by Kashima, BRI.