

# Strong Ground Motions

Earthquake in Sanriku-oki on April 20, 2026 ( $M_w^*7.4$ ,  $M_j7.7$ )

IISEE, Building Research Institute

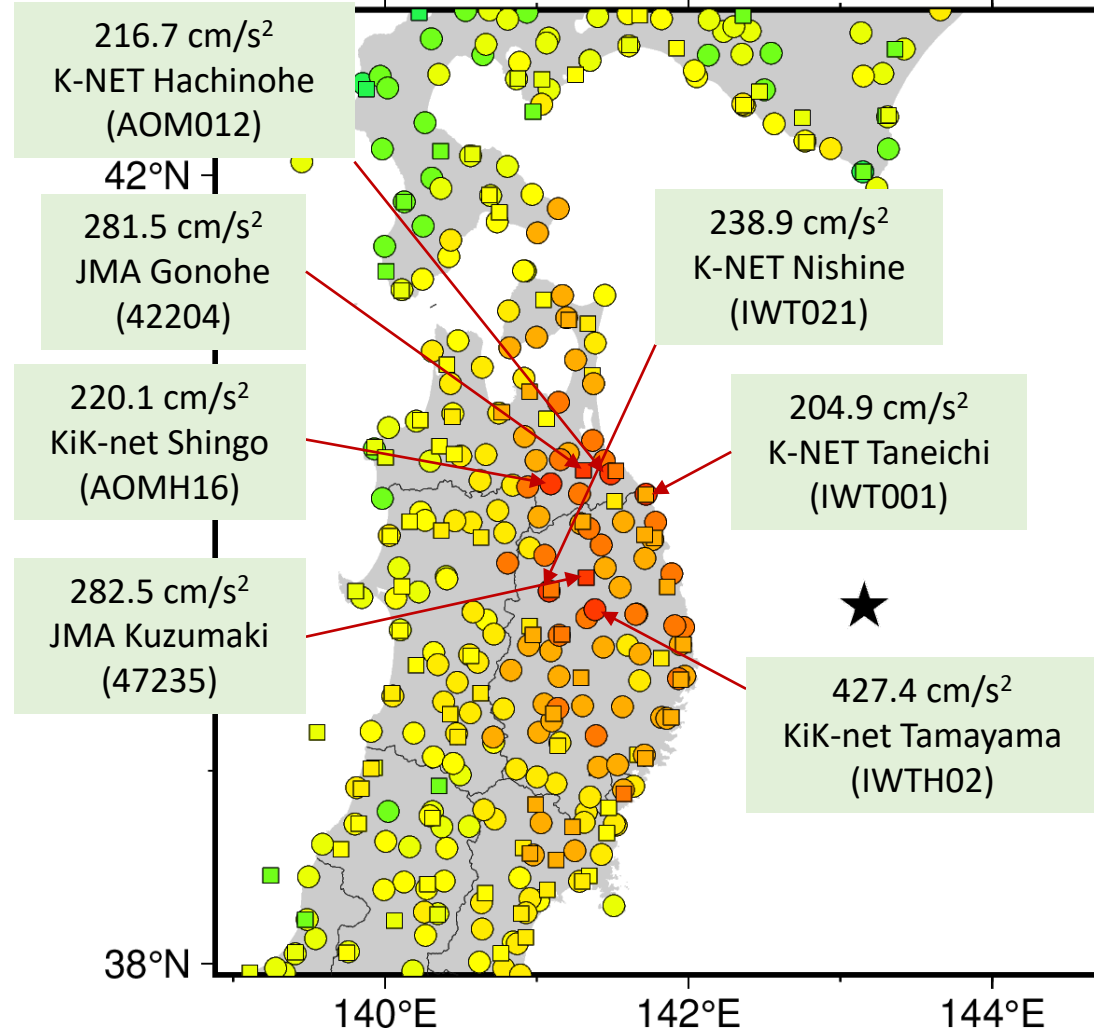
This report contains preliminary analysis results.

\*The moment magnitude ( $M_w$ ) was adopted from the estimate provided by NIED F-net.

# Observed PGAs/PGVs (Horizontal comp.)

## a) PGA

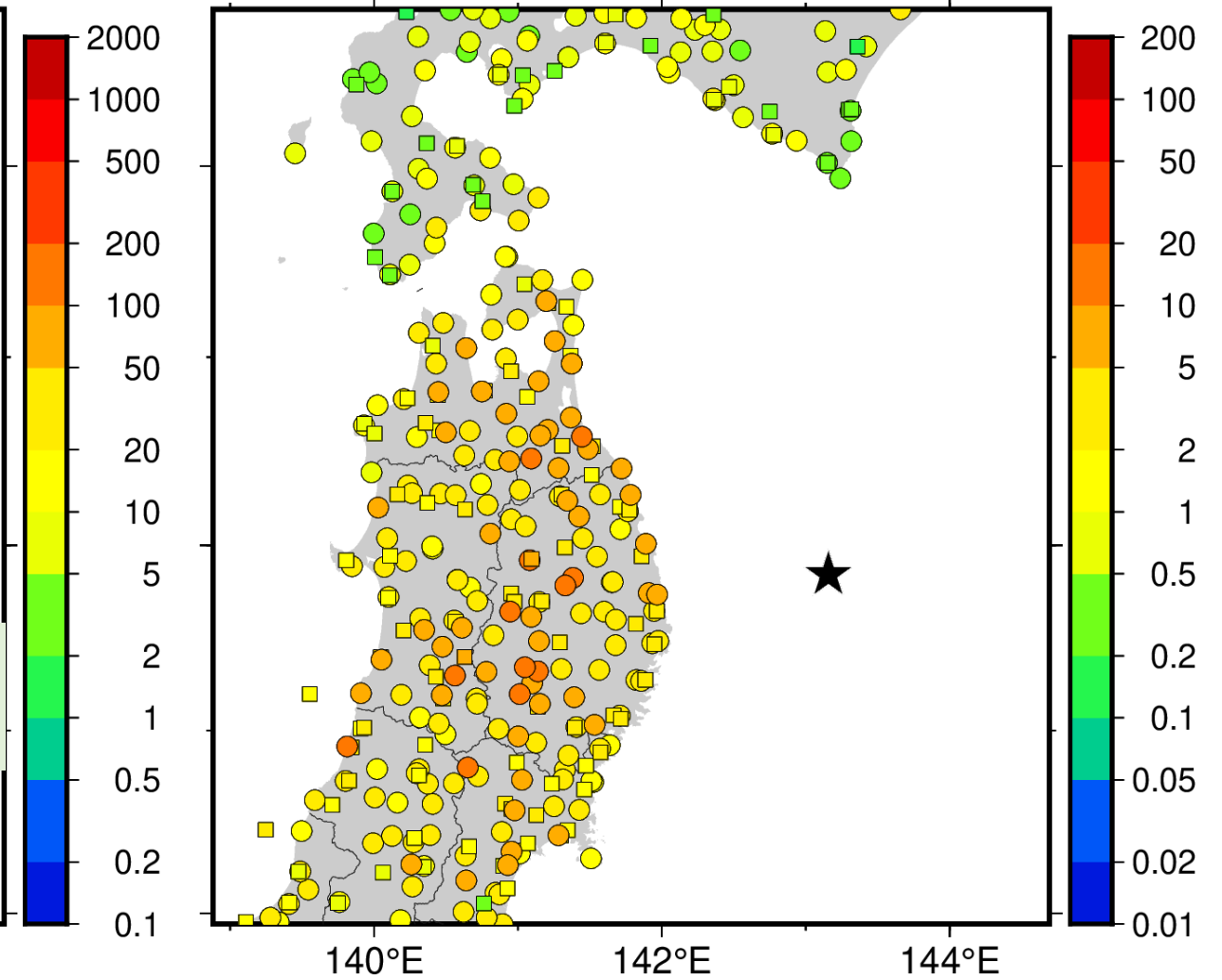
100 km

cm/s<sup>2</sup>

## b) PGV

100 km

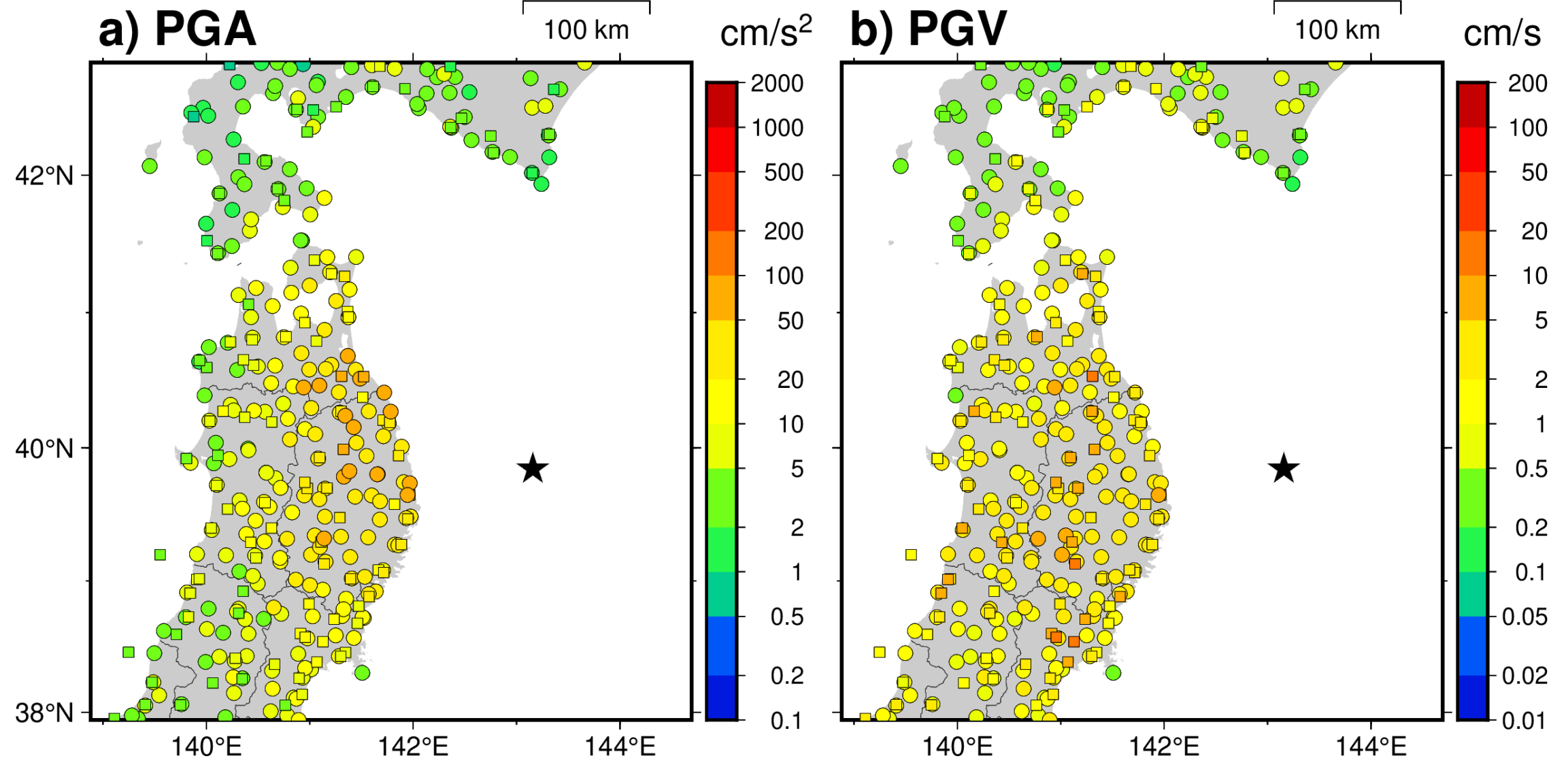
cm/s



○: NIED stations, □: JMA seismic intensity stations

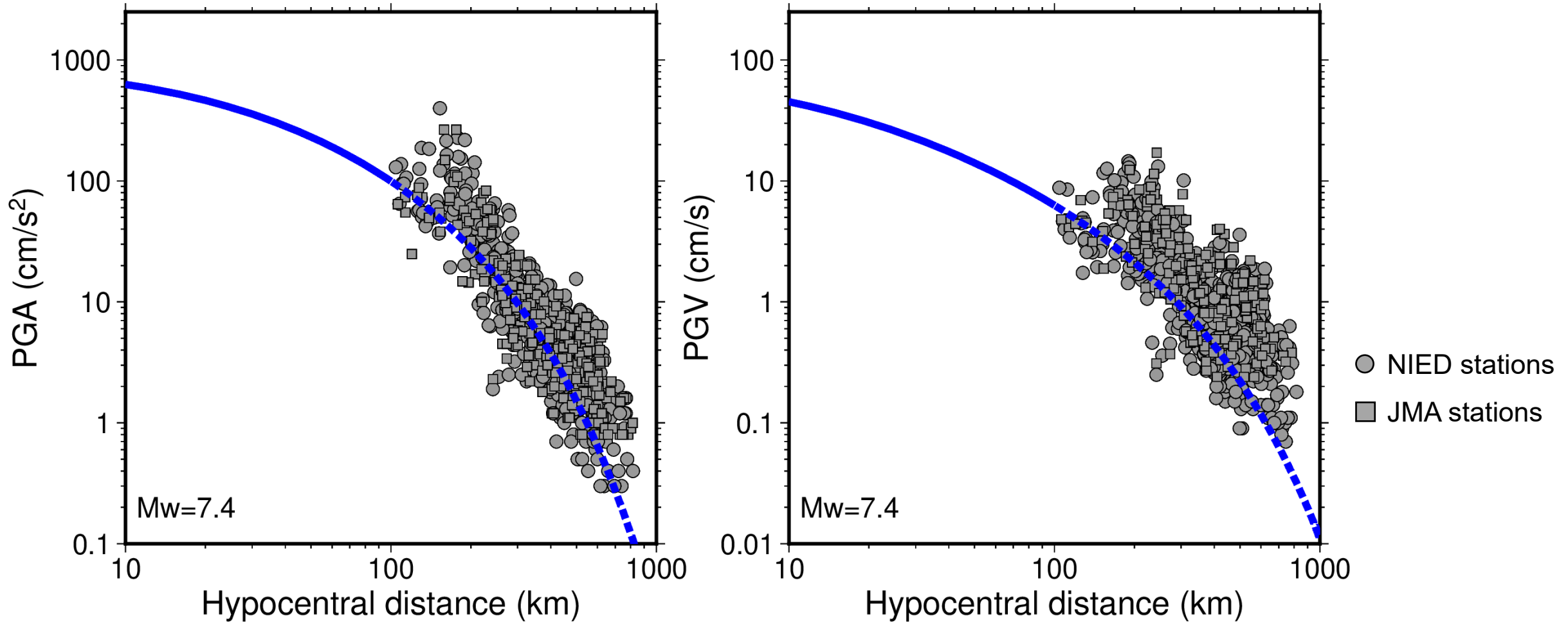
✱ PGA and PGV are the maximum values of vector summation in the horizontal components.

# Observed PGAs/PGVs (Vertical comp.)



○: NIED stations, □: JMA seismic intensity stations

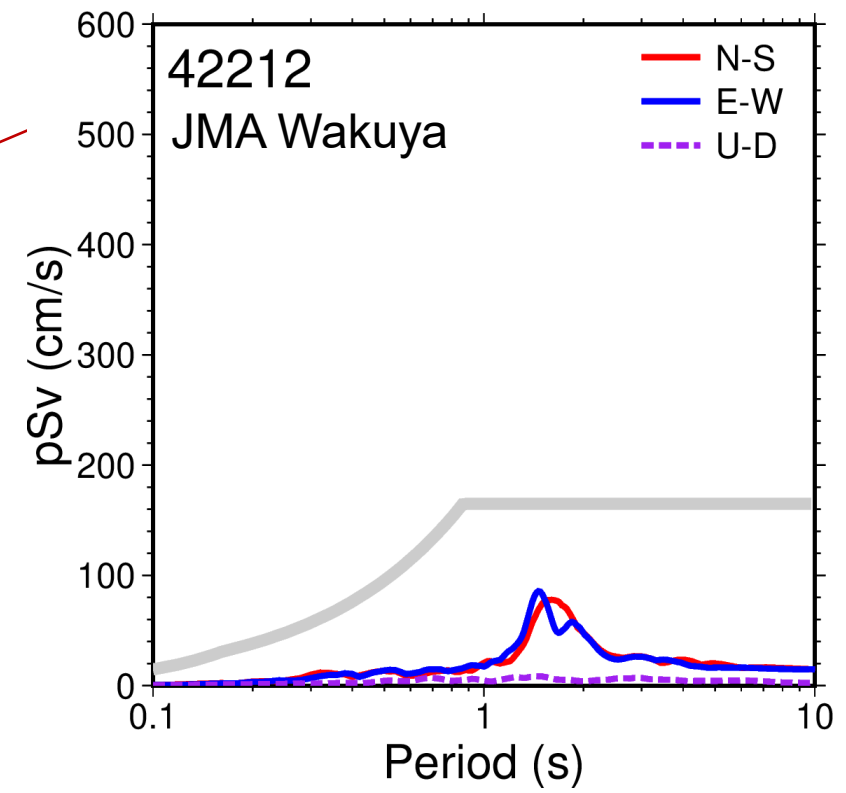
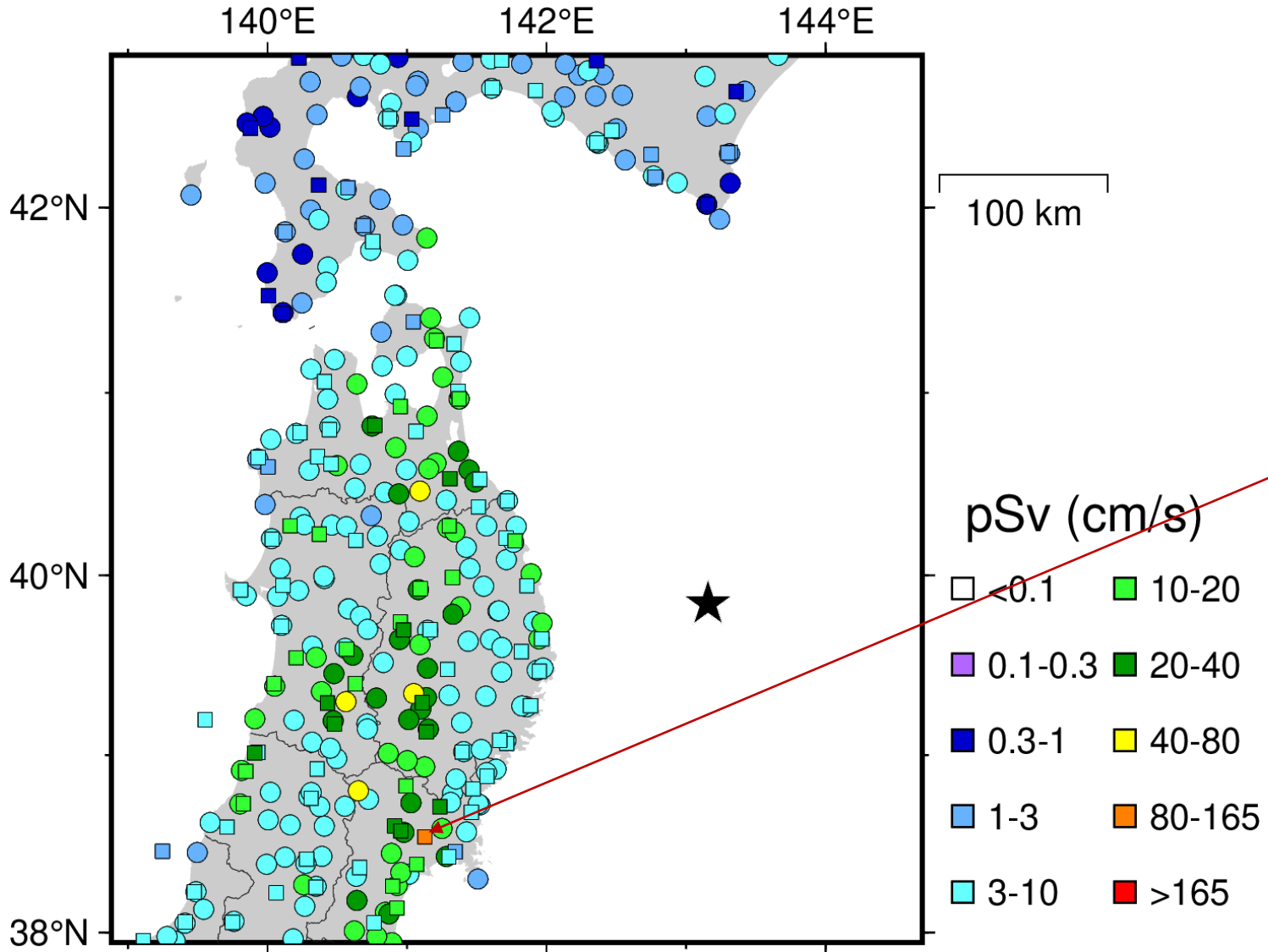
# Observed PGAs/PGVs vs GMPE (Si & Midorikawa, 1999)



- ⊠ 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.
- ⊠ Interplate earthquake (depth=19.4 km) is assumed for the estimation.
- ⊠ Estimated values beyond 100 km (dashed line) are shown as reference values.

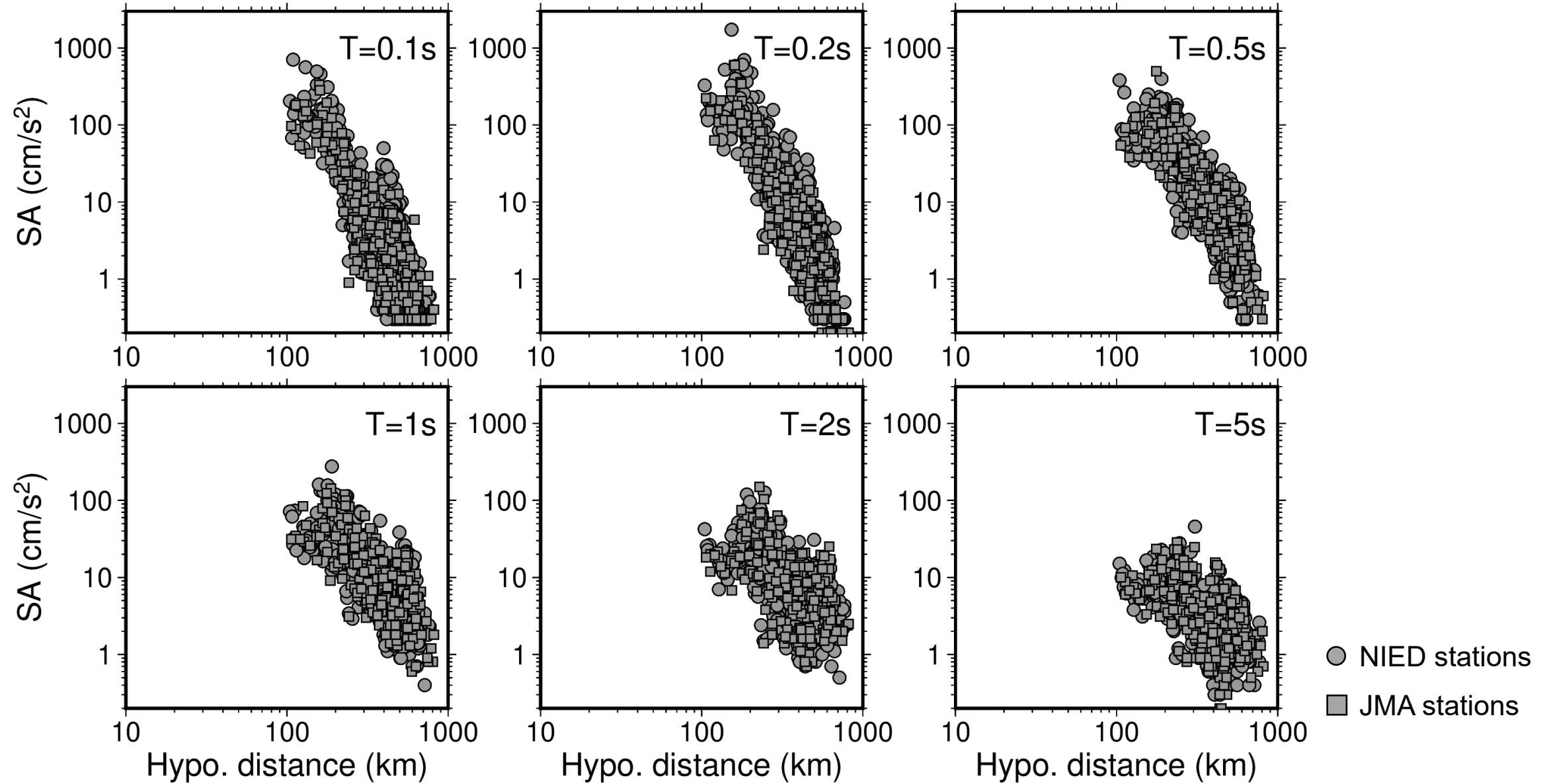
# Pseudo-velocity response

(pSv: maximum value for periods of 1–2 s, 5% damping)



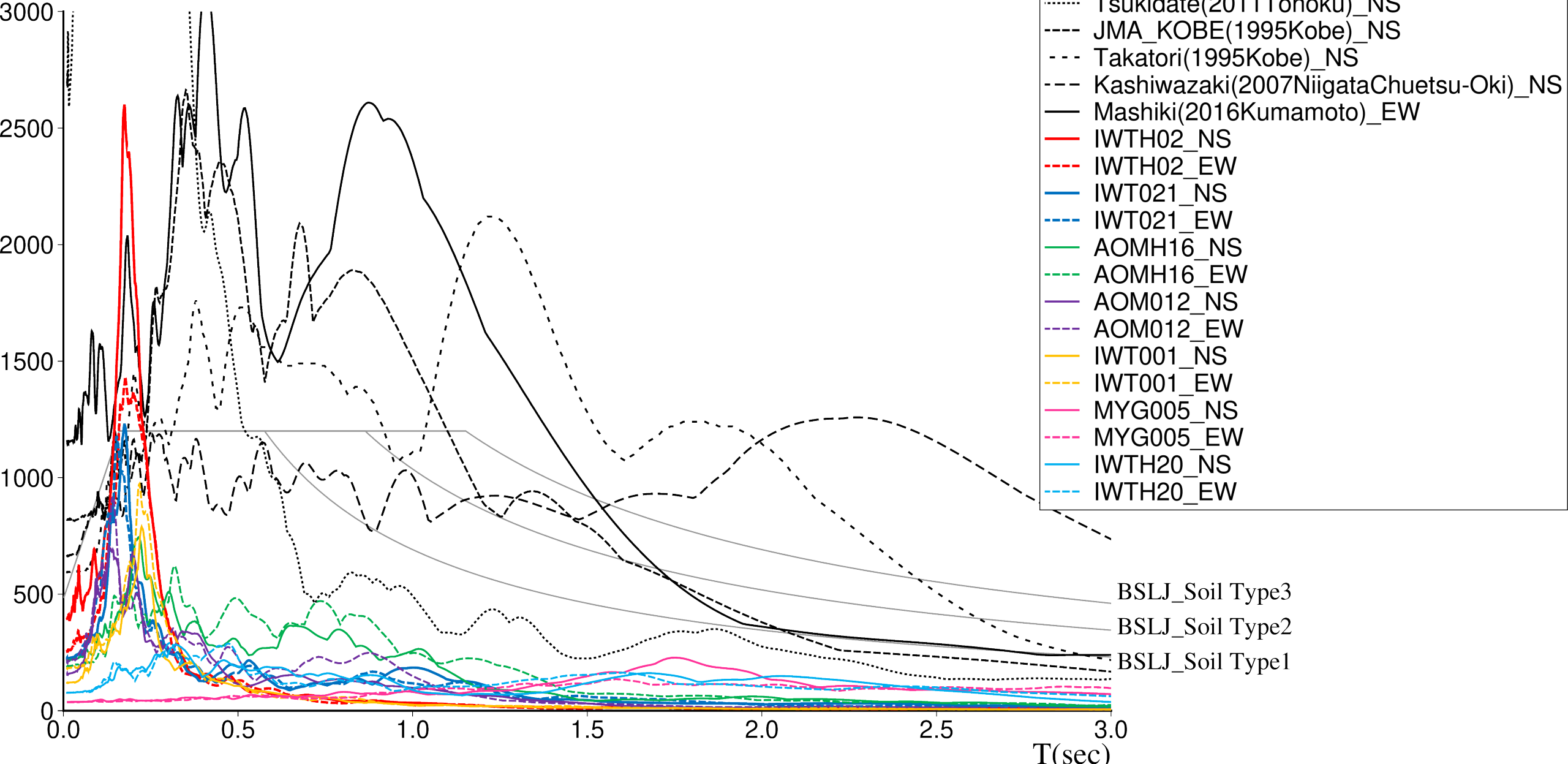
## Attenuation characteristics of response spectra (Sa)

5% damping

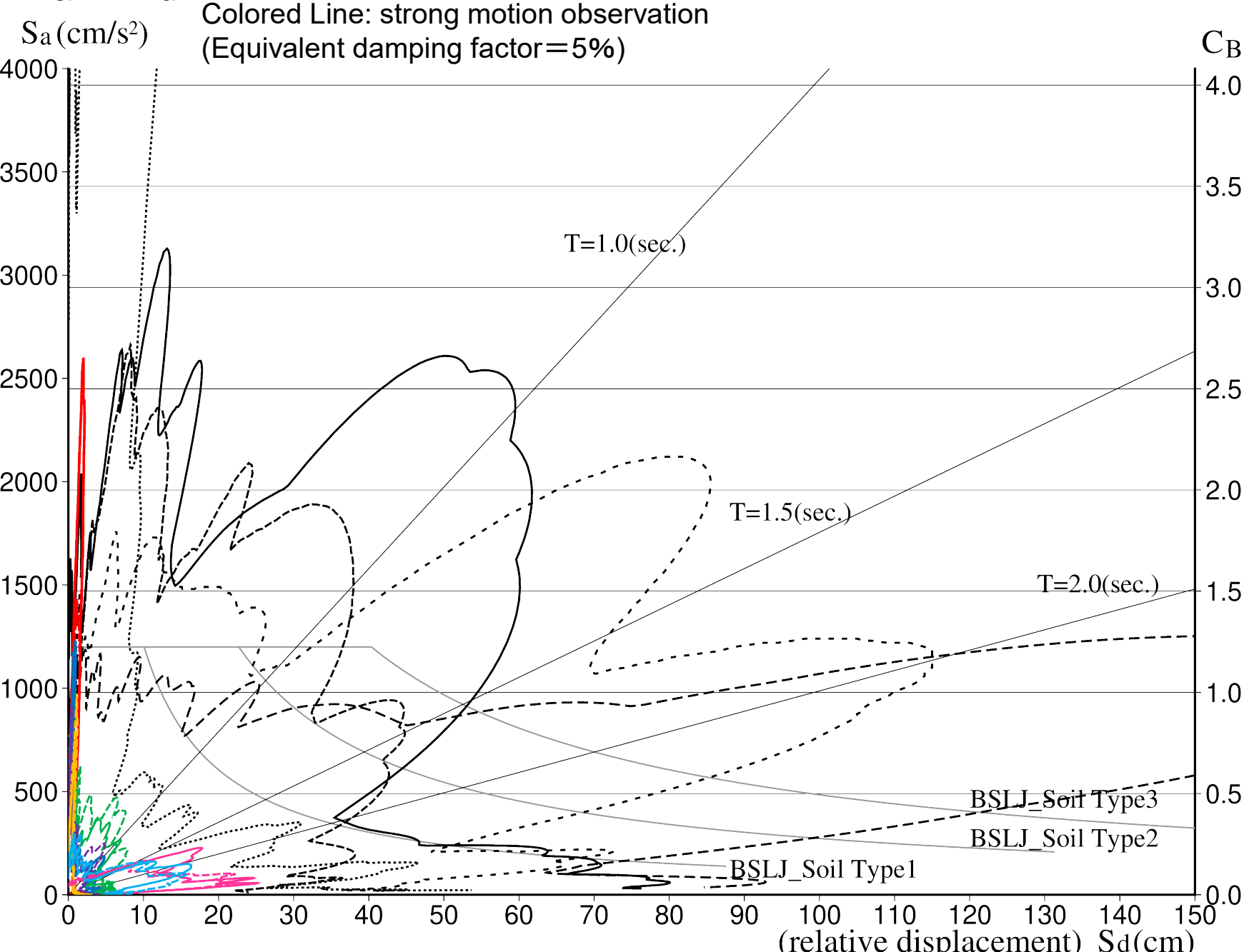


# Response acceleration spectrum $S_a$ and response periods

$S_a$  (cm/s<sup>2</sup>)    Colored Line: strong motion observation    (Equivalent damping factor=5%)



# $S_a - S_d$ curve and response periods



$C_B$  Base shear coefficient  $C_B$  \*  
(\* effective mass conversion)

- ..... Tsukidate(2011Tohoku)\_NS
- JMA\_KOBE(1995Kobe)\_NS
- Takatori(1995Kobe)\_NS
- Kashiwazaki(2007NiigataChuetsu-Oki)\_NS
- Mashiki(2016Kumamoto)\_EW
- IWTH02\_NS
- IWTH02\_EW
- IWT021\_NS
- IWT021\_EW
- AOMH16\_NS
- AOMH16\_EW
- AOM012\_NS
- AOM012\_EW
- IWT001\_NS
- IWT001\_EW
- MYG005\_NS
- MYG005\_EW
- IWTH20\_NS
- IWTH20\_EW

BSLJ\_Soil Type3  
BSLJ\_Soil Type2  
BSLJ\_Soil Type1

# Summary

- The maximum seismic intensity of 5+ for this earthquake was recorded at the seismic intensity station Hashikami, Aomori Pref (data not yet available). The calculated seismic intensity at KiK-net Tamakama (IWTH02) also indicated an intensity of 5+.
- Response values of  $pSv > 165$  cm/s ( $h = 5\%$ ,  $T=1-2$  s) were not observed.
- For periods of 0.5 seconds or longer, the response accelerations ( $S_a$ ) observed during this earthquake were smaller than BSLJ (Building Standard Law of Japan).
- From the  $S_a$ - $S_d$  curve, assuming a 5% equivalent damping ratio, the  $S_a$ - $S_d$  shapes of this earthquake were smaller than those of past major earthquakes in Japan.

## 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 strong-motion data from NIED (K-NET and KiK-net), JMA, and RTRI for past strong motion in Japan.

$S_a$ - $T$  and  $S_a$ - $S_d$  were calculated using the View Wave by Kashima, BRI.

Figures were prepared using Generic Mapping Tools (GMT: Wessel and Smith, 1998 and 2019).