Strong Ground Motions

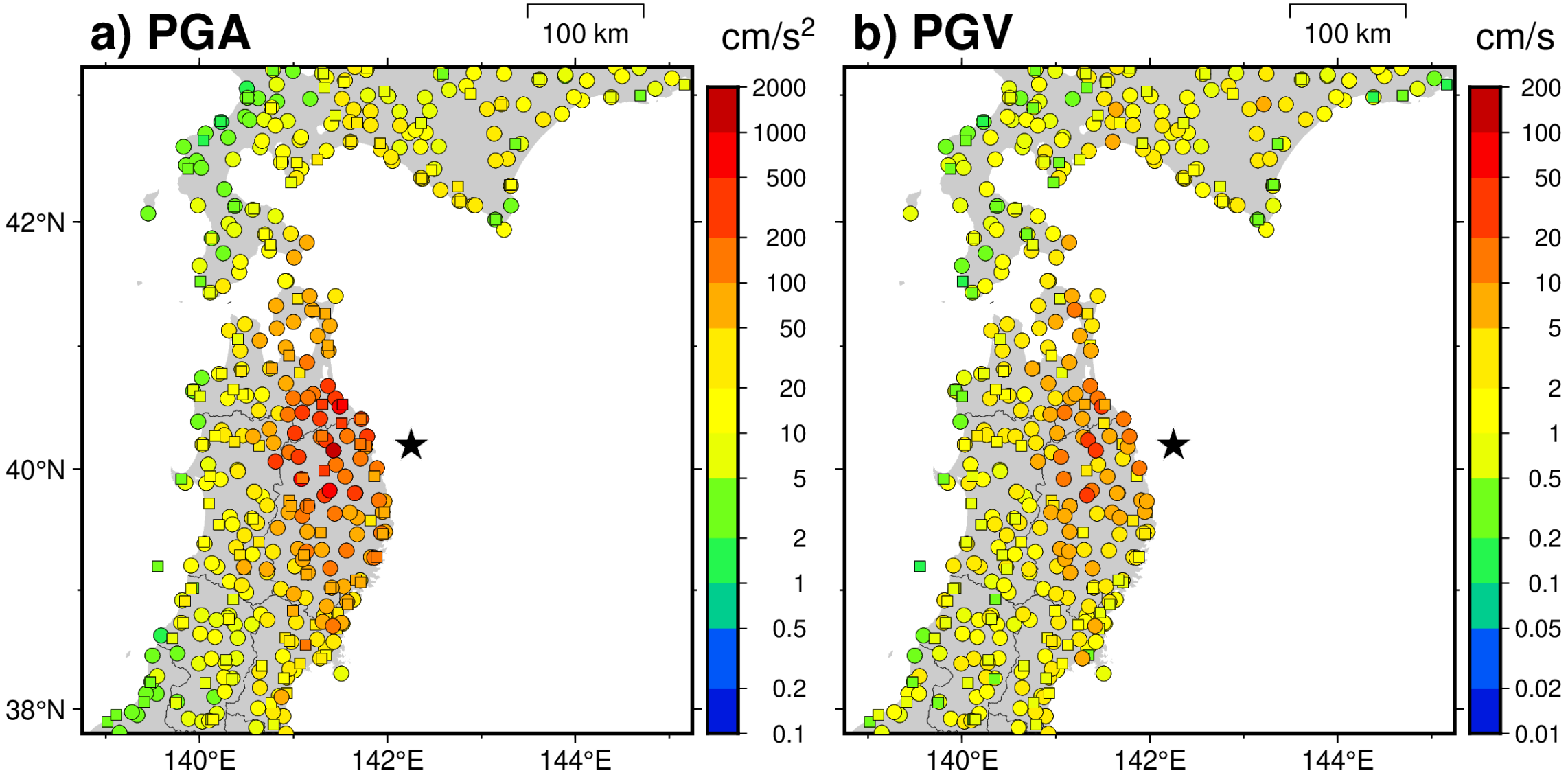
Earthquake in Iwate Pref. on June 25, 2026
(Mw6.9*, Mj6.9)

IISEE, Building Research Institute

This report contains preliminary analysis results.

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

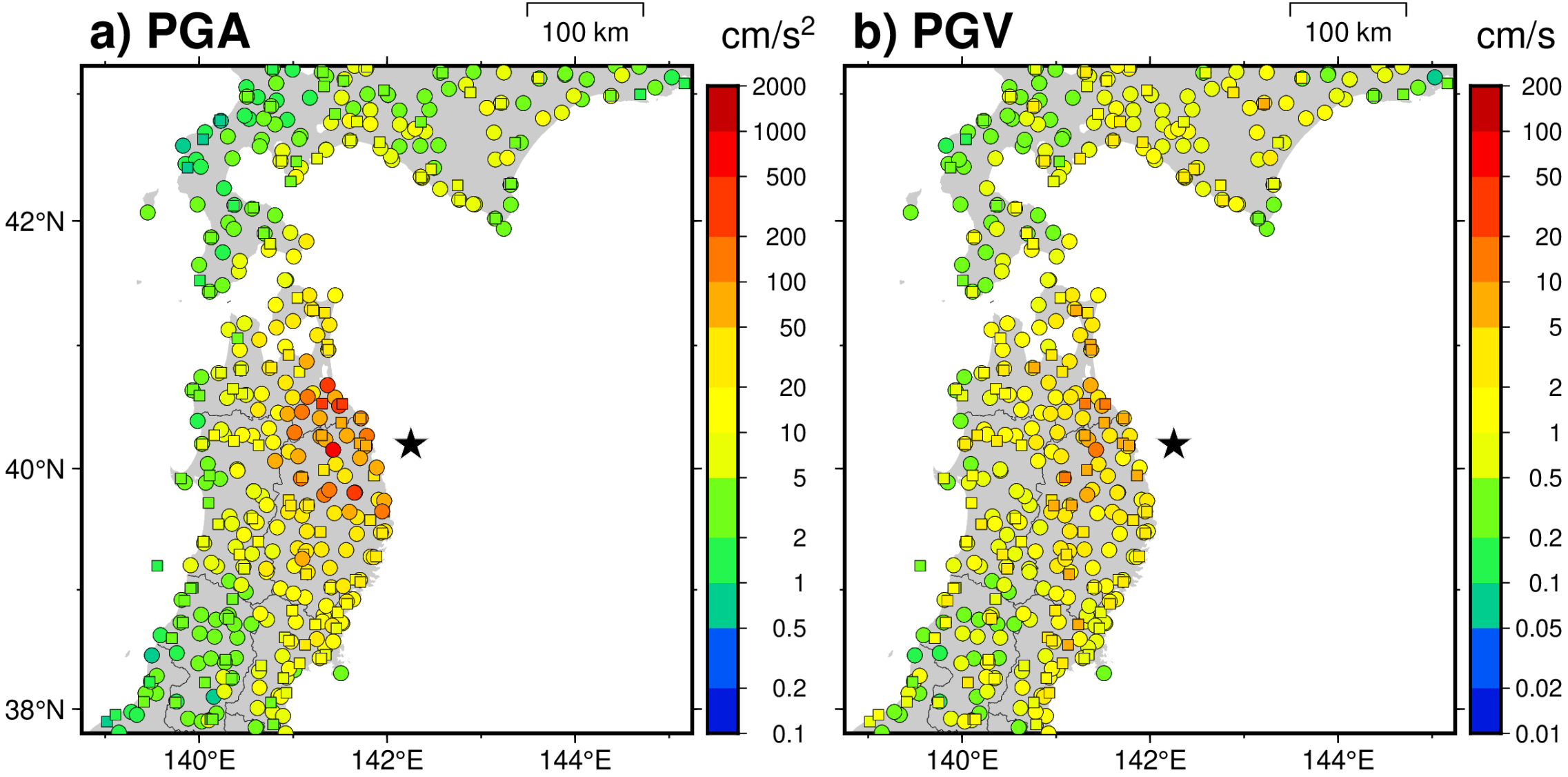
Observed PGAs/PGVs (Horizontal comp.)



○: NIED stations, □: JMA seismic intensity stations

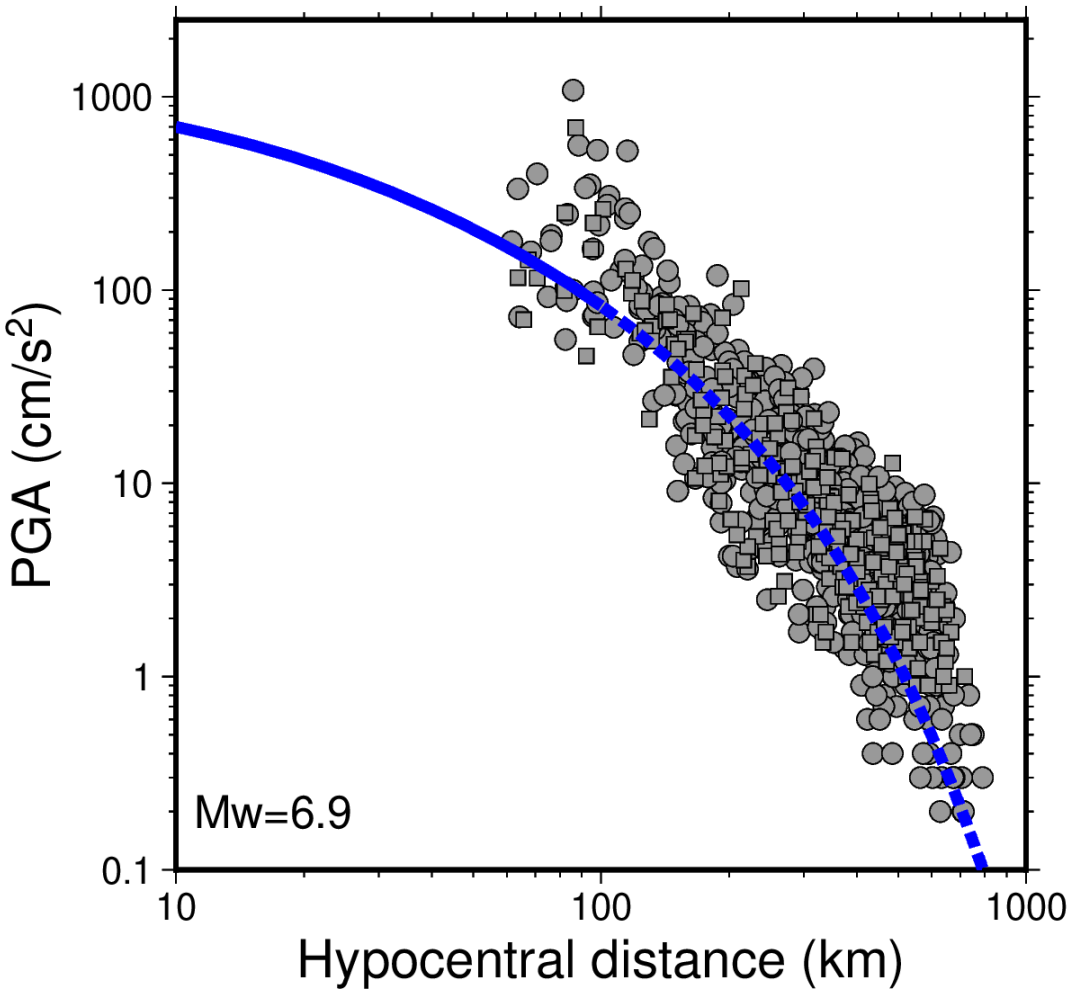
※ PGA and PGV are the maximum values of vector summation in the horizontal components.

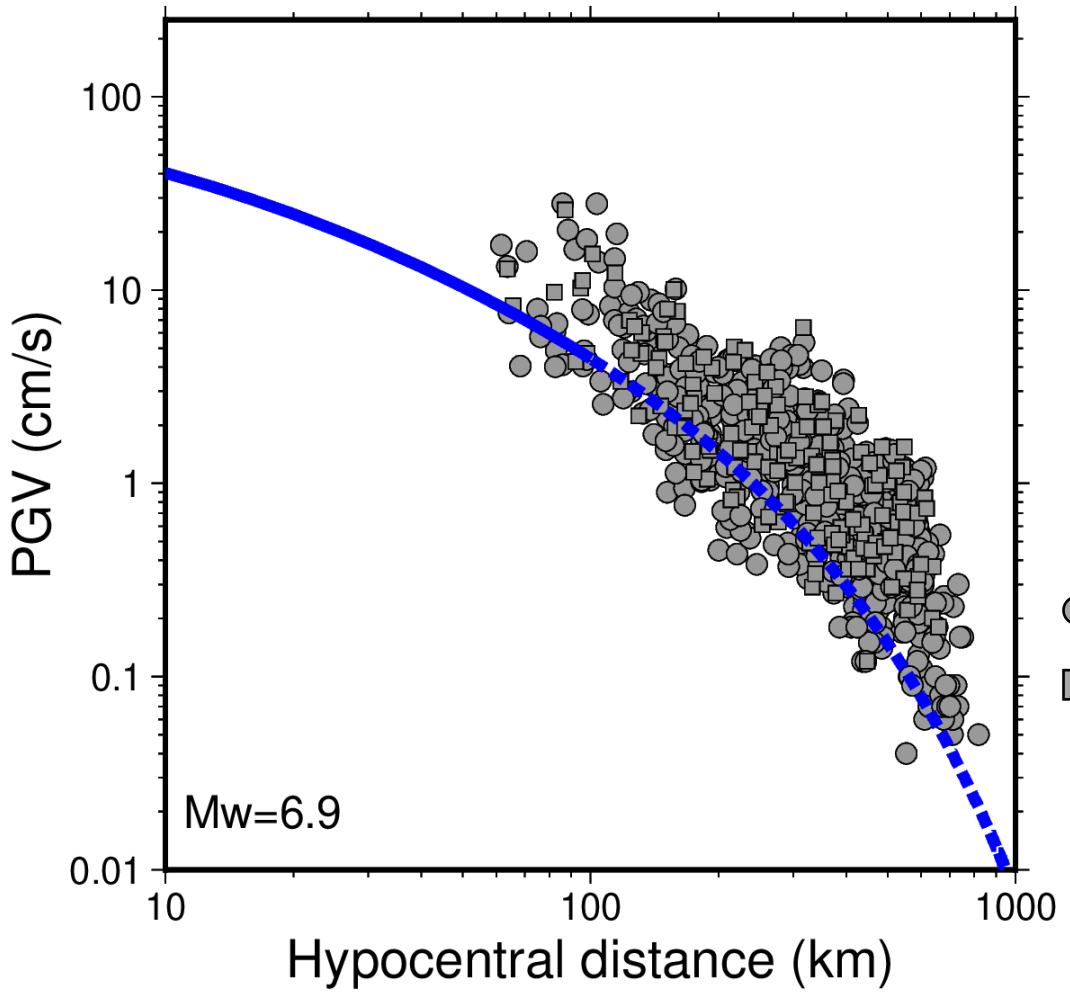
Observed PGAs/PGVs (Vertical comp.)



○: NIED stations, □: JMA seismic intensity stations

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



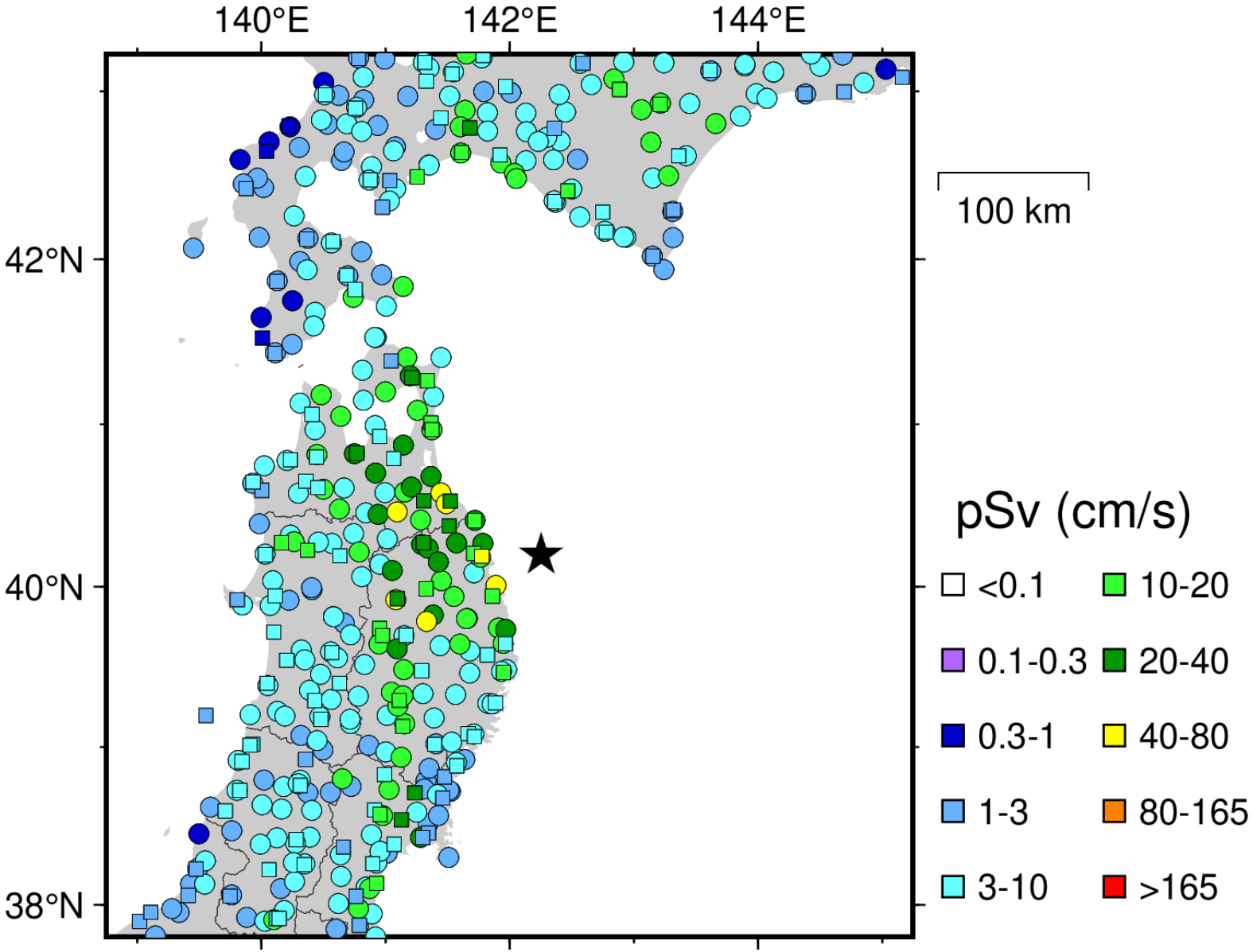


NIED stations
JMA stations

※ 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 (source depth=49 km) is assumed for the estimation.
※ Estimated values beyond 100 km (dashed line) are shown as reference values.

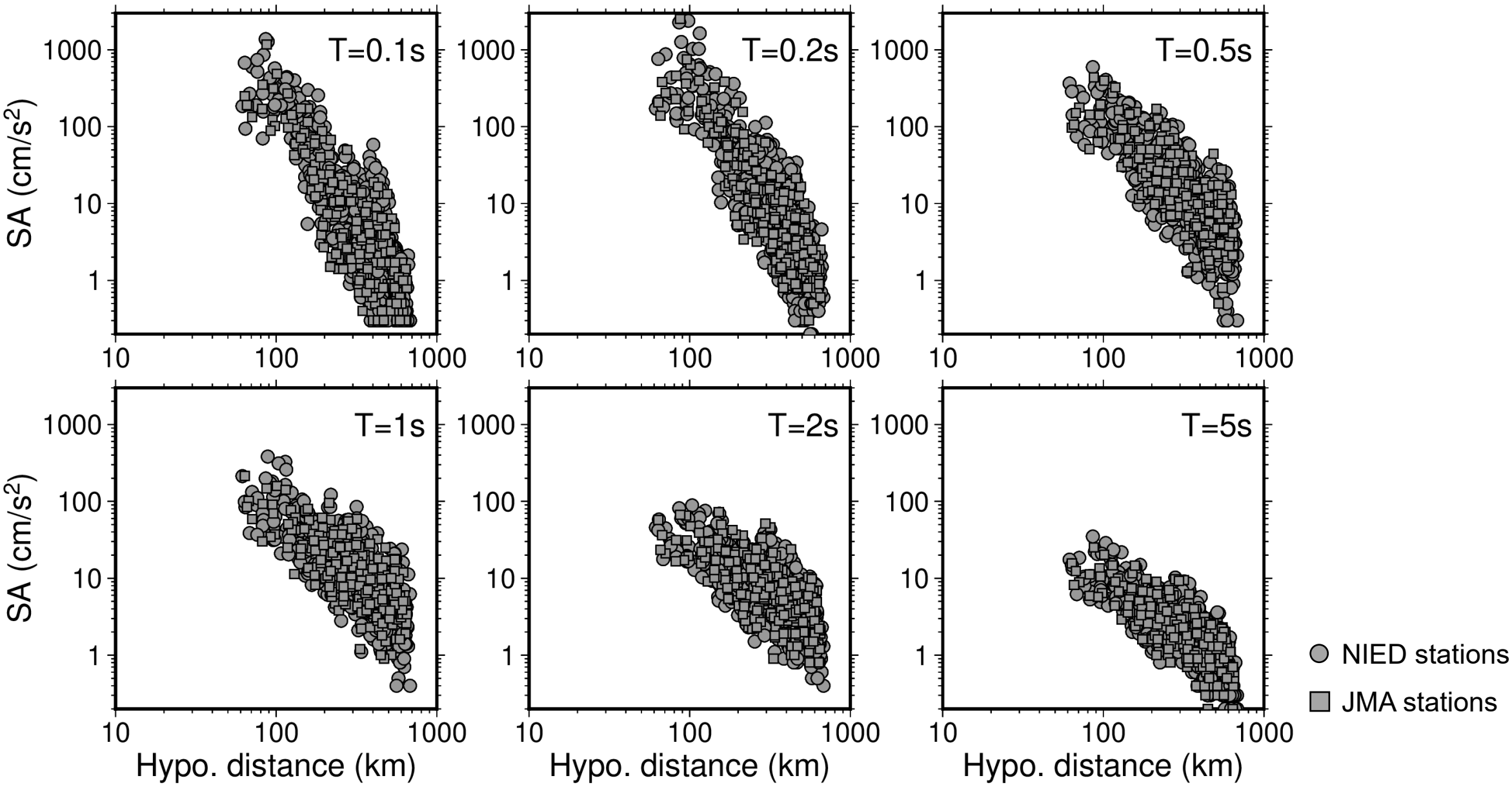
Pseudo-velocity response

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

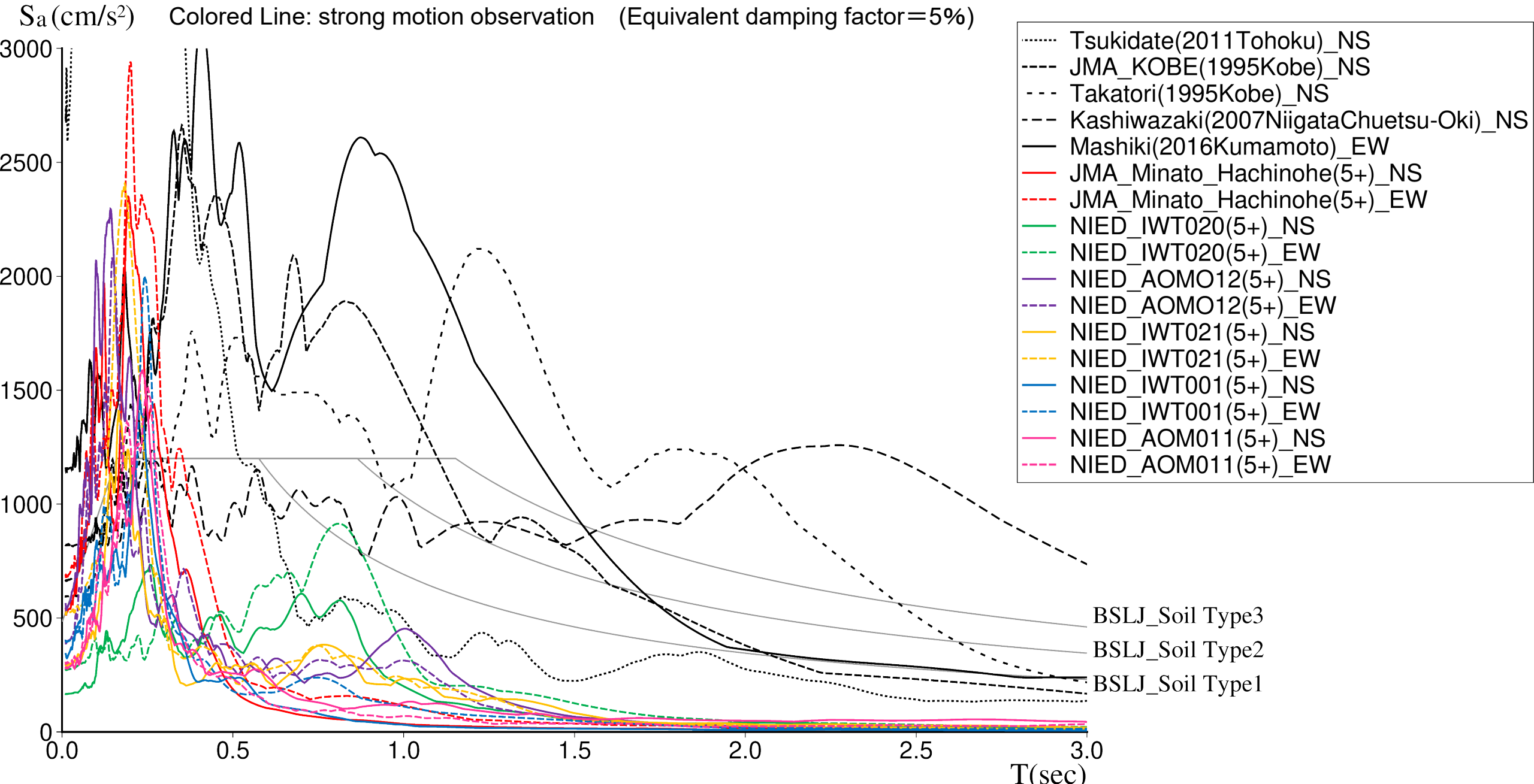


Attenuation characteristics of response spectra (Sa)

5% damping

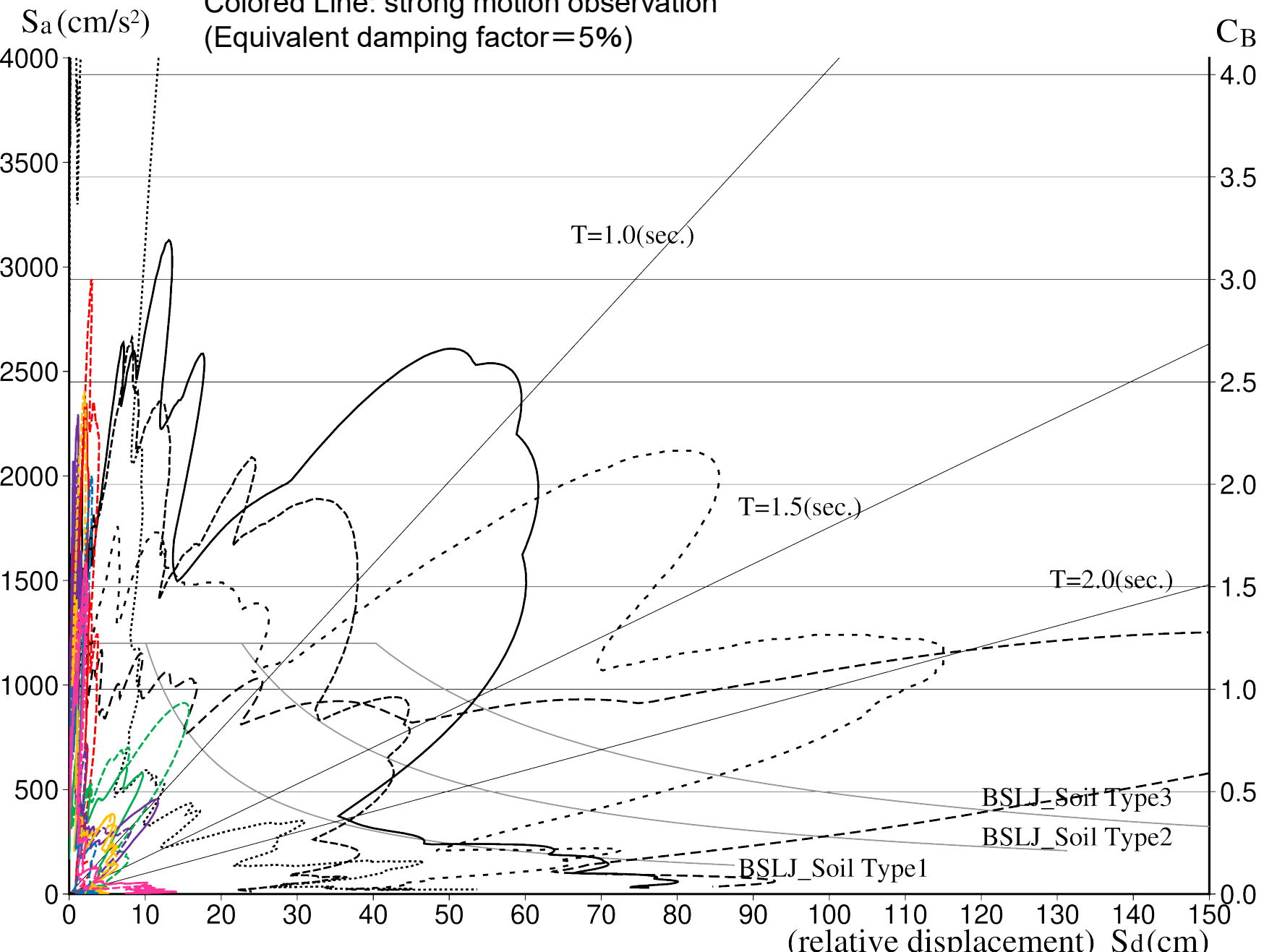


Response acceleration spectrum S_a and response periods



S_a - S_d curve and response periods

Colored Line: strong motion observation
(Equivalent damping factor＝5%)



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
- JMA_Minato_Hachinohe(5+)_NS
- JMA_Minato_Hachinohe(5+)_EW
- NIED_IWT020(5+)_NS
- NIED_IWT020(5+)_EW
- NIED_AOMO12(5+)_NS
- NIED_AOMO12(5+)_EW
- NIED_IWT021(5+)_NS
- NIED_IWT021(5+)_EW
- NIED_IWT001(5+)_NS
- NIED_IWT001(5+)_EW
- NIED_AOM011(5+)_NS
- NIED_AOM011(5+)_EW

Summary

- Strong ground motion with PGA > 100 cm/s² and PGV > 10 cm/s was observed over a wide area of eastern Aomori and Iwate Prefectures.
- Among the observation stations currently available from NIED and JMA, none recorded a pseudo-velocity response exceeding 165 cm/s in the 1–2 s period range.
- From the Sa-Sd curve assuming a 5% equivalent damping ratio, the Sa-Sd shapes of the East-West (EW) components of NIED_IWT020 were protruded with a period shorter than 1.0 seconds.
- From the response accelerations (Sa) and the Sa-Sd curve, assuming a 5% damping ratio, the Sa and Sa-Sd 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)
The moment magnitude (Mw) was obtained from the NIED F-net solution.
The hypocenter location is based on the automatically determined hypocenter from NIED Hi-net.
We used strong-motion data from NIED (K-NET and KiK-net), JMA, and RTRI for past strong motion in Japan.
Sa-T and Sa-Sd were calculated using the View Wave by Kashima, BRI.
Figures were prepared using Generic Mapping Tools (GMT: Wessel and Smith, 1998 and 2019).