National Seismic Hazard Maps for Japan (2020)

Map Edition

English version
Translated in January 2026
Earthquake Research Committee,
Headquarters for Earthquake Research Promotion

This document is an English translation
of the "*全国地震動予測地図２０２０年版*"
published in March 2021.

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About This Document

The Earthquake Research Committee of the Headquarters for Earthquake Research Promotion has updated and published seismic hazard maps since the release of the "National Seismic Hazard Maps for Japan" in 2005. These maps intend to serve as fundamental data for enhancing public awareness of disaster preparedness and supporting effective earthquake mitigation measures. Following the 2011 Tohoku Earthquake off the Pacific coast (March 11, 2011; magnitude 9.0), the Committee addressed several issues identified in the probabilistic seismic hazard maps, particularly focusing on evaluating large-scale, low-frequency earthquakes. The results were compiled and published in December 2014 as the "National Seismic Hazard Maps for Japan (2014) － Overview of National Seismic Hazards." Since then, the national seismic hazard maps have been updated to incorporate new findings from revised long-term assessments of active faults and subduction-zone earthquakes.
The "Long-Term Assessment of Seismic Activity along the Japan Trench" was published in February 2019, followed by the "Probabilistic Hazard Assessment of Tsunami due to Large Earthquakes along the Nankai Trough" in January 2020. Based on these new findings, the Committee updated the national seismic hazard maps and published them as the "National Seismic Hazard Maps for Japan (2020)." Furthermore, in August 2019, the Policy Committee of the Headquarters for Earthquake Research Promotion established a color scheme guideline for its materials. This guideline was influenced by both domestic and international trends in color standards and harmonization, as well as considerations for accommodating diverse types of color vision. Thus, the color scheme used in the seismic hazard maps was also adjusted accordingly.
The "National Seismic Hazard Maps for Japan (2020) / Map Edition" is the main component of the 2020 Edition. It includes probabilistic seismic hazard maps based on an assessment as on January 1, 2020. For first-time viewers of seismic hazard maps, we recommend starting with the general explanatory materials: "Let's Look at National Seismic Hazard Maps" and "Guide and Commentary." Additionally, the updated conditions for producing the "National Seismic Hazard Maps for Japan (2020)" are summarized in the "Outline of the National Seismic Hazard Maps for Japan (2020)."

Note that the "National Seismic Hazard Maps for Japan (2020)" are available on the seismic hazard map page of the Headquarters for Earthquake Research Promotion website (in Japanese):
https://www.jishin.go.jp/evaluation/seismic_hazard_map/shm_report/
Detailed data and related information are also published on the Japan Seismic Hazard Information Station website (J-SHIS, https://www.j-shis.bosai.go.jp/en/) which is operated by the National Research Institute for Earth Science and Disaster Resilience. These sources can be referenced as needed.

Notes

- The maps included in this publication were created with the approval of the Director-General of the Geospatial Information Authority of Japan (GSI), using Digital Map 25000 (Spatial Data Framework) and Base Map Information issued by the GSI (Approved for use under GSI Use Authorization No. 886, pursuant to the Survey Act: Authorization Code R 2JHs 886).
- The maps in this publication are based on the World Geodetic System.

- Administrative boundaries shown on the maps in this publication are as of January 1, 2019.
- Maps of Minami-Torishima Island and Oki-no-Tori Shima Island, which are part of Japanese territory, were not produced because the data required for mapping calculations were not available.

Note about the " average case " in the Table of Contents

Creating probabilistic seismic hazard maps requires the probability of earthquake occurrences. Generally, the probability of earthquake occurrences in the major active fault zones is calculated using the "mean recurrence interval" and the "time of the latest event." These values are often provided as ranges, and the resulting probability of earthquake occurrences varies depending on which values are used in the calculations. Long-term evaluations of subduction-zone earthquakes along the Sagami Trough and Kuril Trench yield a wide range of the probability of earthquake occurrences, similar to those for active faults. Therefore, the probabilistic seismic hazard maps account for both a "maximum case" and an "average case." In the "average case," the probability of earthquake occurrences for active faults was calculated using the median values of the "mean recurrence interval" and the "time of the latest event." For subduction-zone earthquakes, this probability was determined based on geological data. In the "maximum case," the highest long-term evaluated probability of earthquake occurrences was used for both active faults and subduction-zone earthquakes.

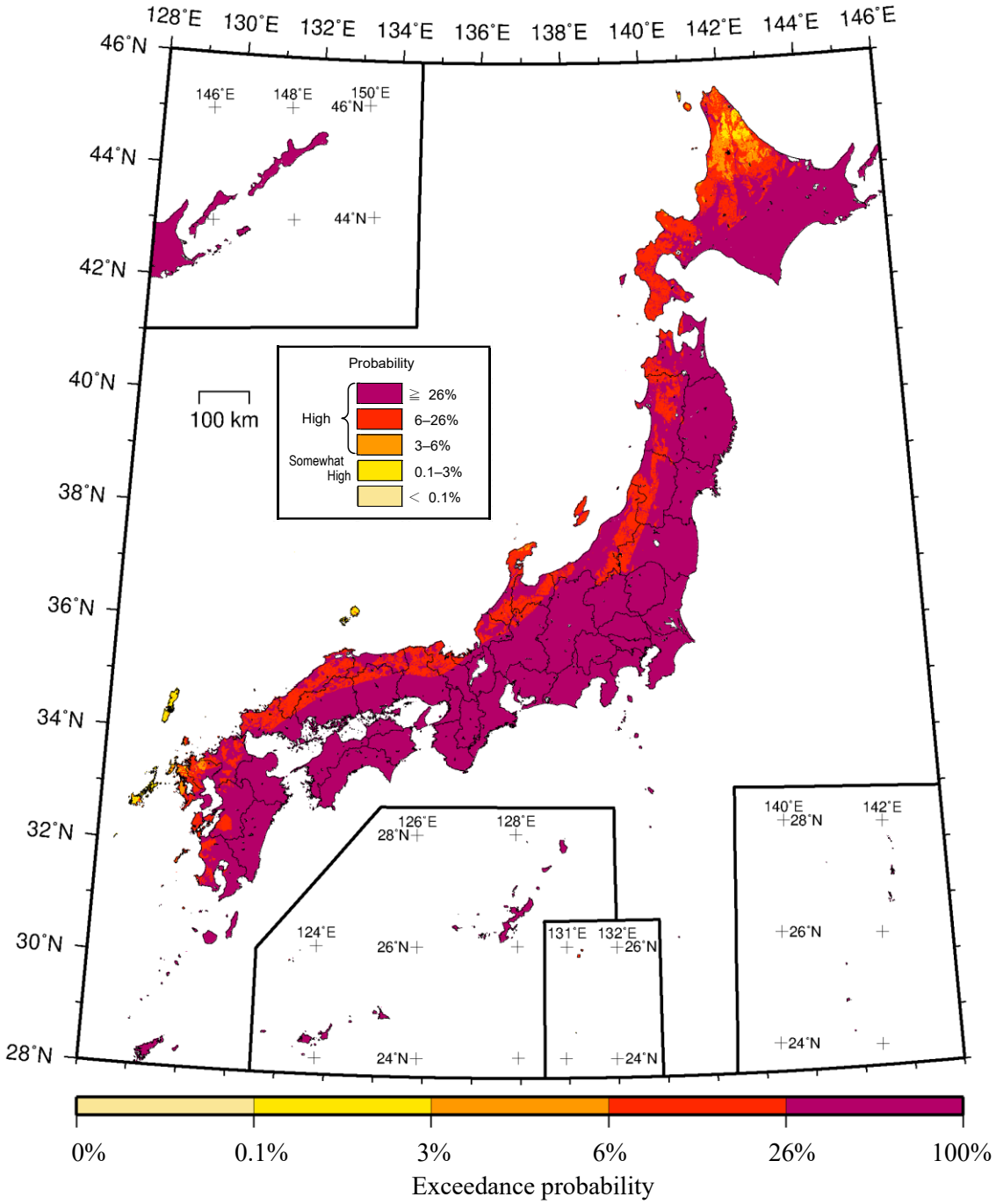
This Map Edition includes only the "average case," while the "maximum case" is provided by the Japan Seismic Hazard Information Station (J-SHIS).

National Seismic Hazard Maps for Japan (2020)
Map Edition

Probabilistic Seismic Hazard Maps

National Seismic Hazard Maps for Japan

tme-total-y30-s45 ,2020



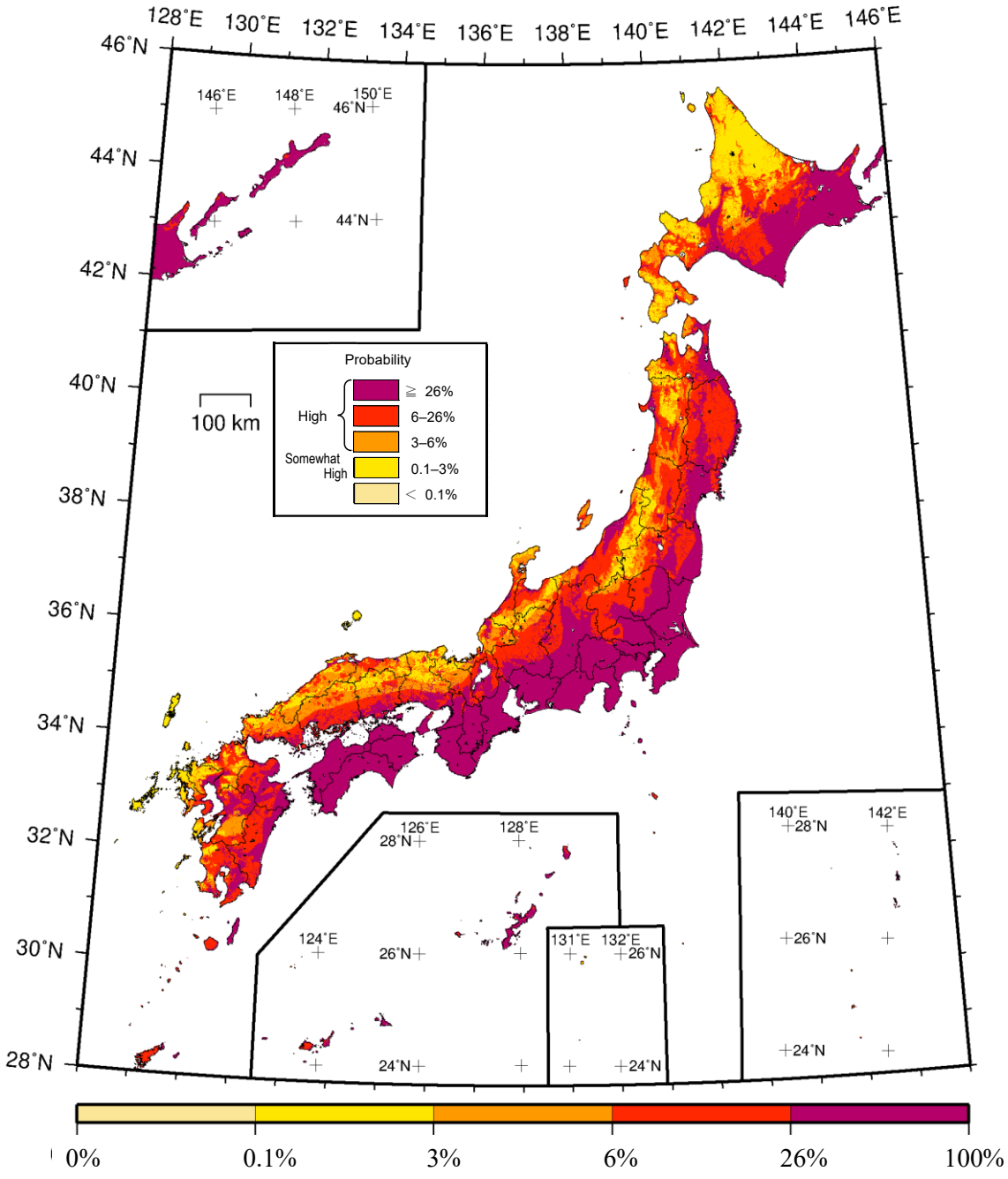
(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **5-Lower or higher**
(average case; **all earthquakes**)

* "The 30-year probability of ground shaking with a seismic intensity of ○○ is 0.1%, 3%, 6%, and 26%" broadly means that ground shaking exceeding a seismic intensity of ○○ occur once in approximately 30,000, 1,000, 500, and 100 years, respectively.

tme-total-y30-s50 ,2020

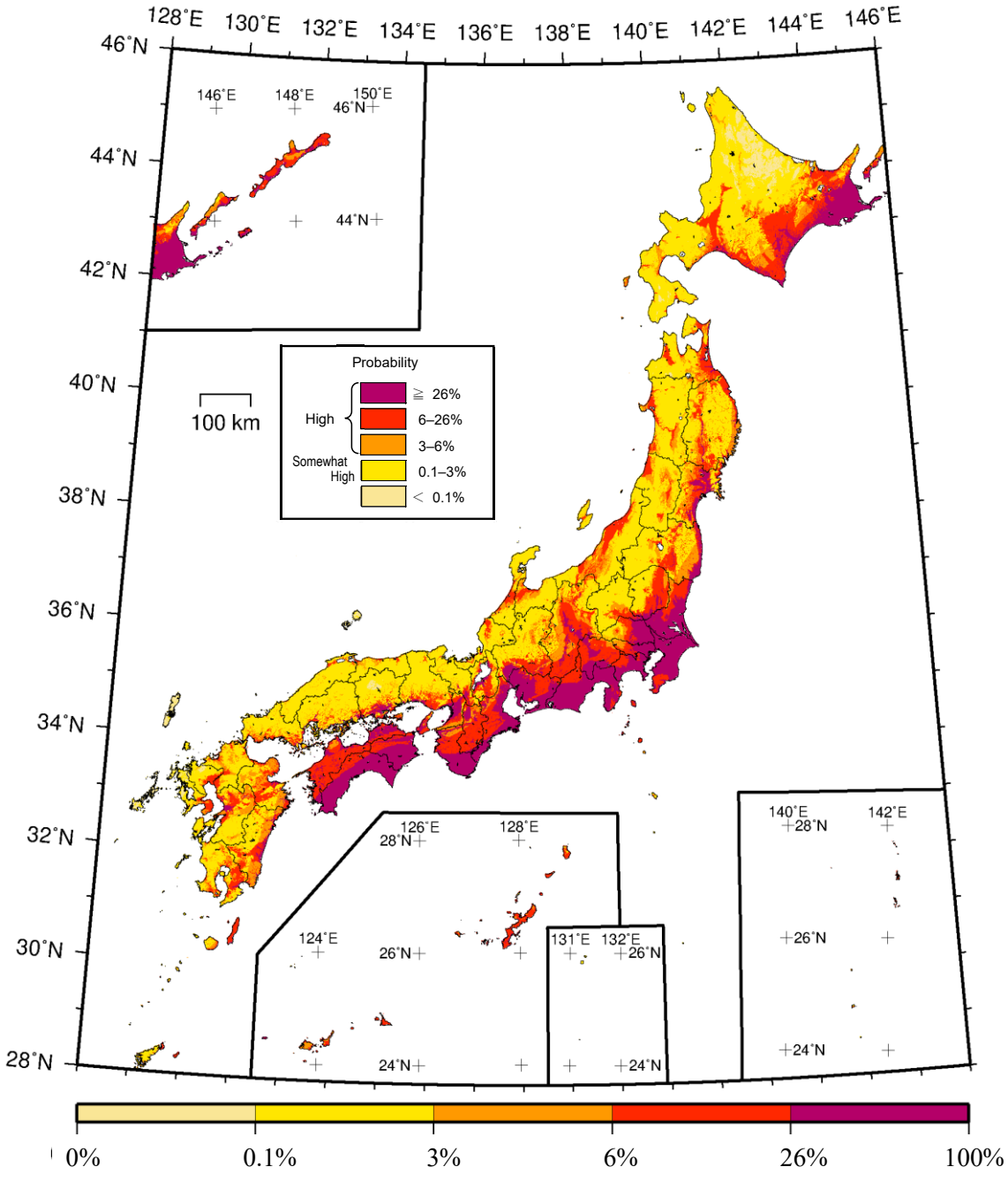


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **5-Upper or higher**
(average case; **all earthquakes**)

tme-total-y30-s55 ,2020

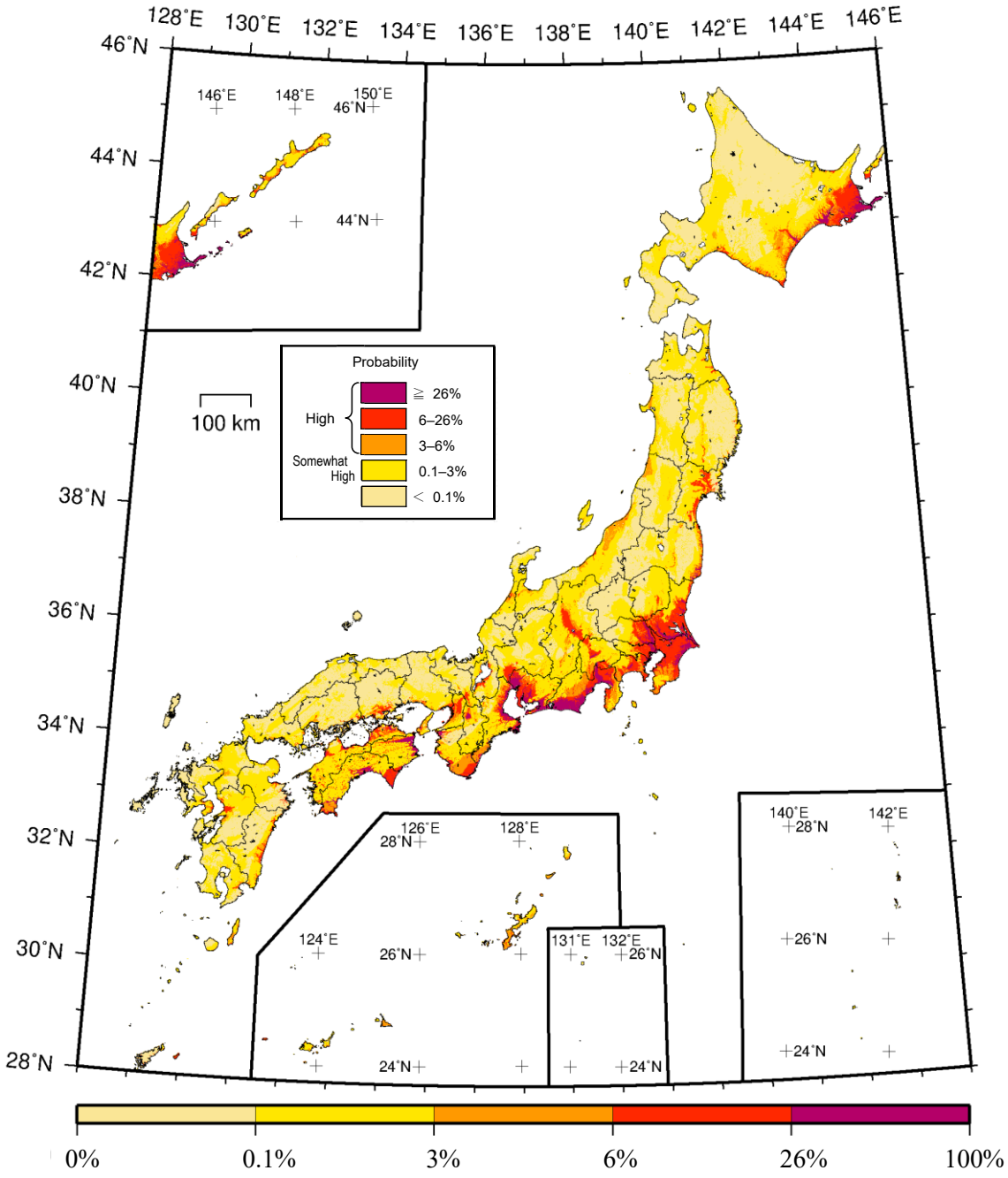


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **6-Lower or higher**
(average case; **all earthquakes**)

tme-total-y30-s60 ,2020

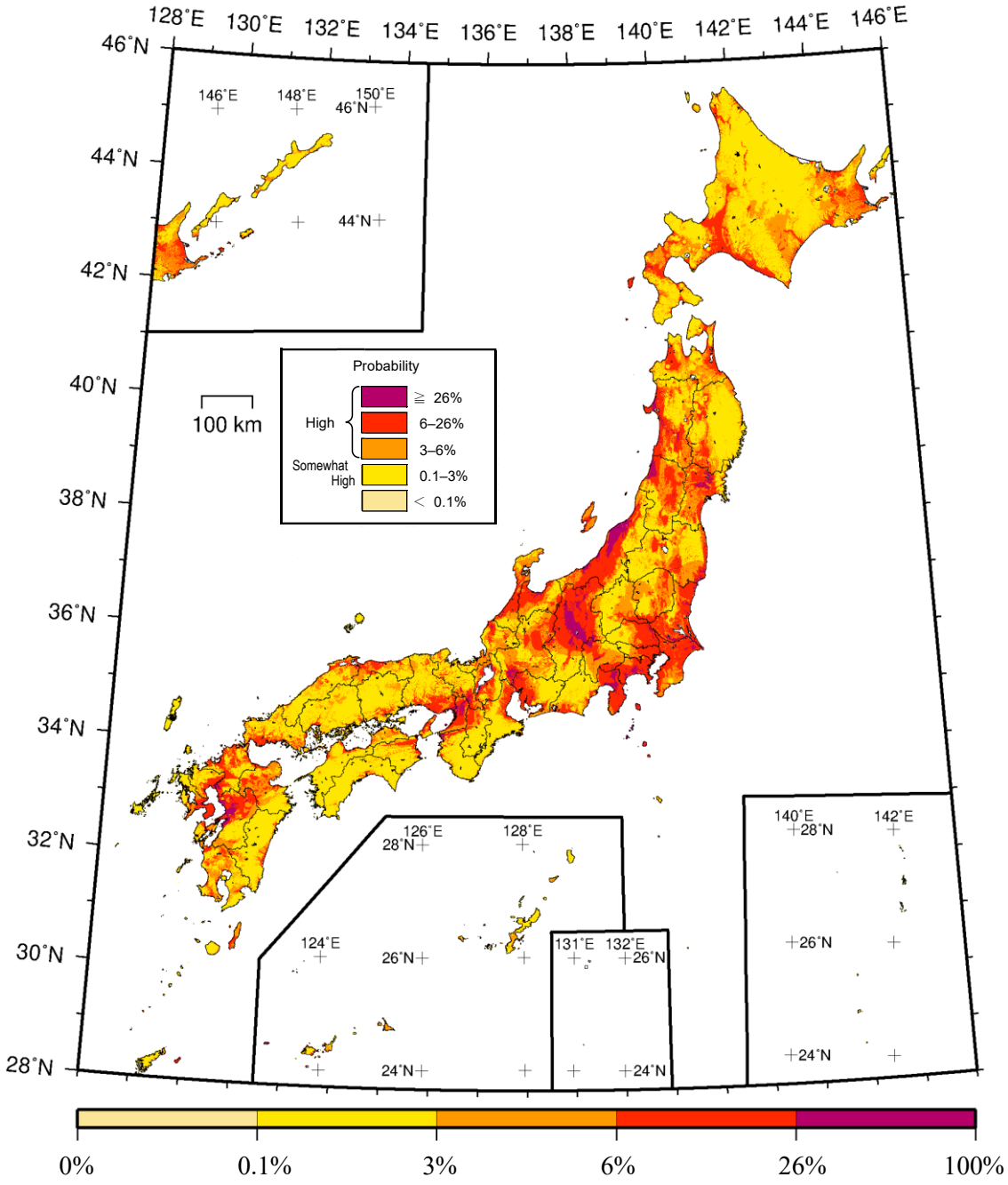


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **6-Upper or higher**
(average case; **all earthquakes**)

tme-cate3-y30-s50 ,2020



Exceedance probability

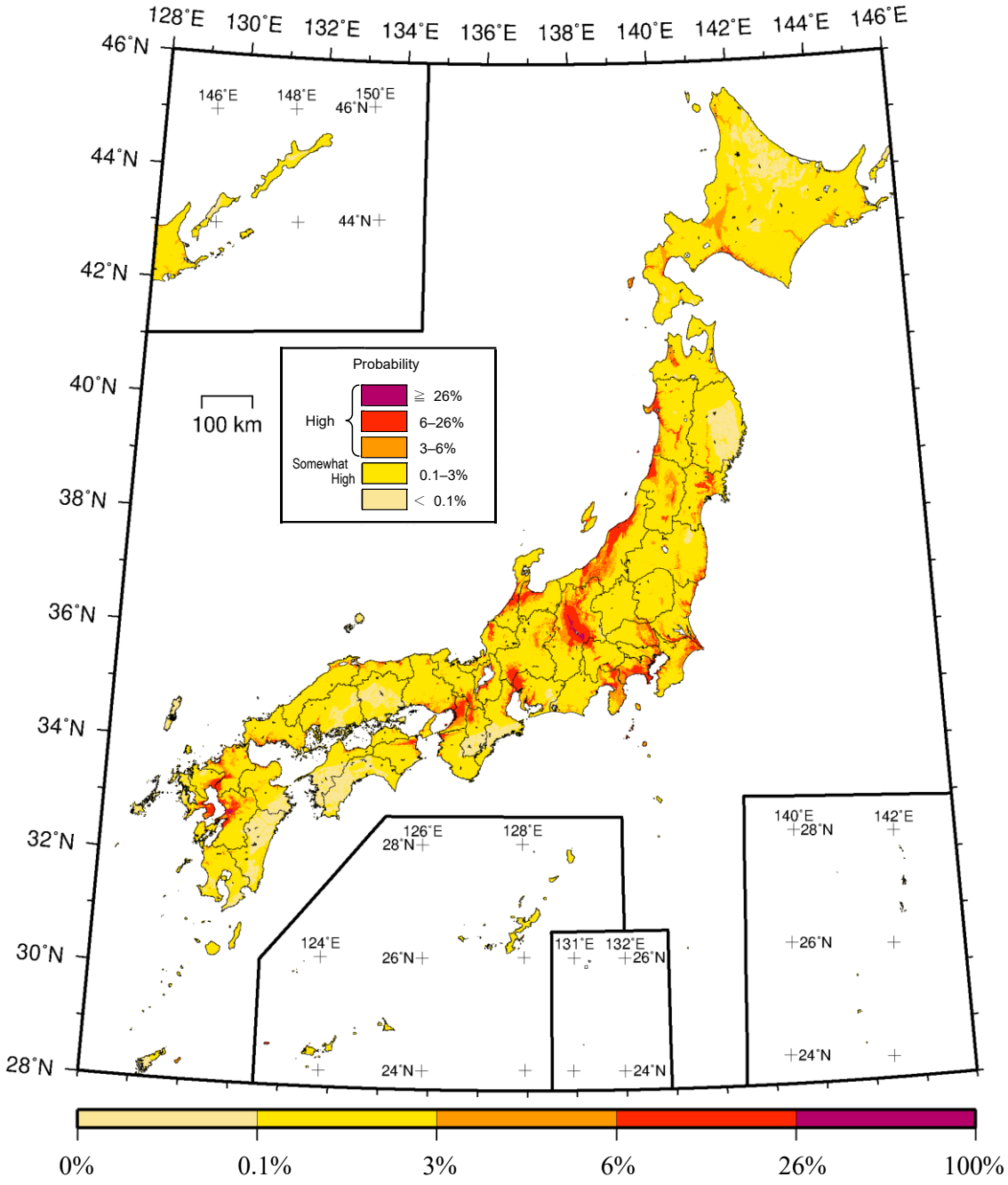
(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **5-Upper or higher**

(average case; **shallow crustal earthquakes**)

tme-cate3-y30-s55 ,2020

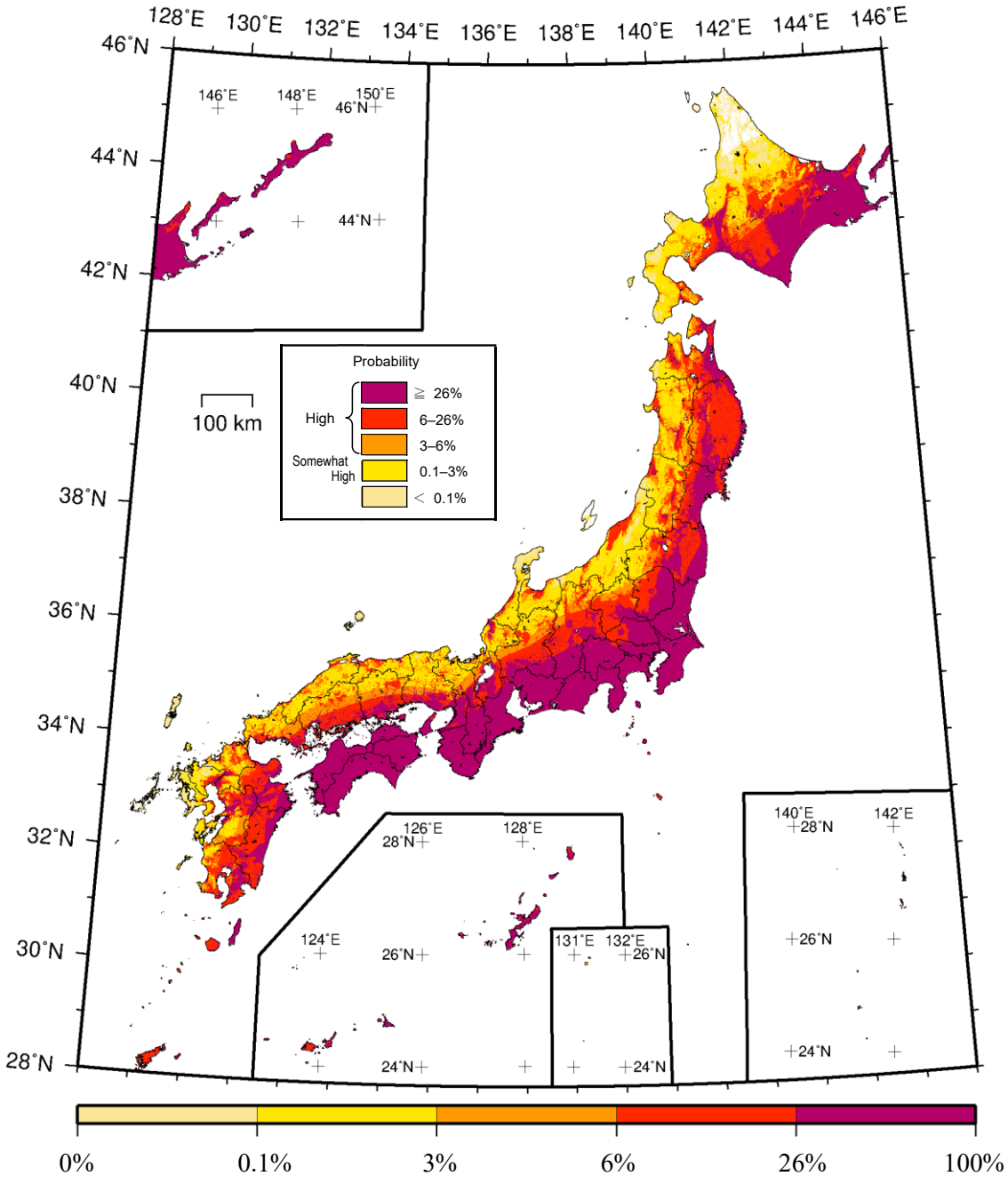


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **6-Lower or higher**
(average case; **shallow crustal earthquakes**)

tme-cat12-y30-s50 ,2020

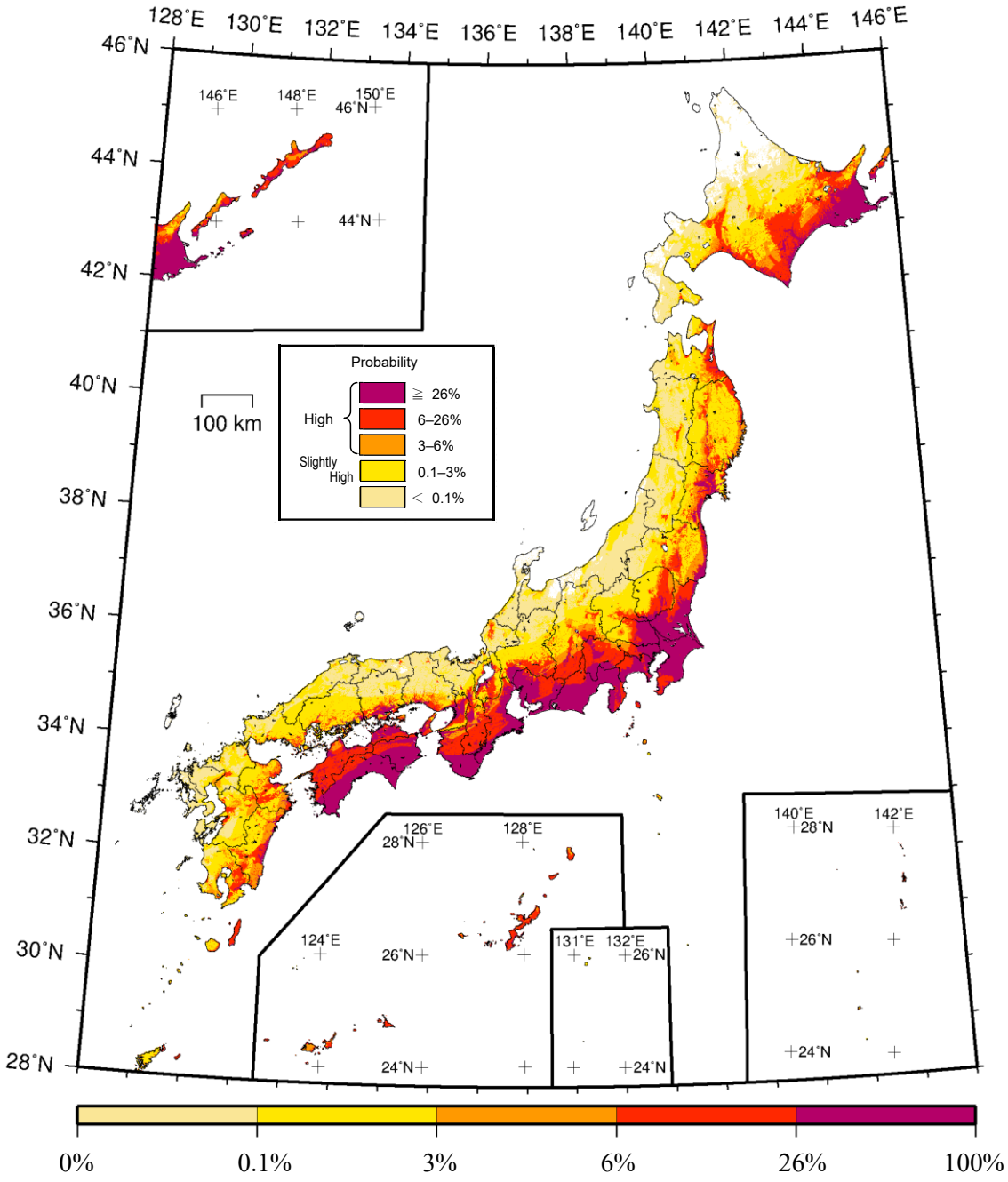


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

The 30-year probability of ground shaking with a seismic intensity of **5-Upper or higher**
(average case; **subduction-zone earthquakes**)

tme-cat12-y30-s55 ,2020

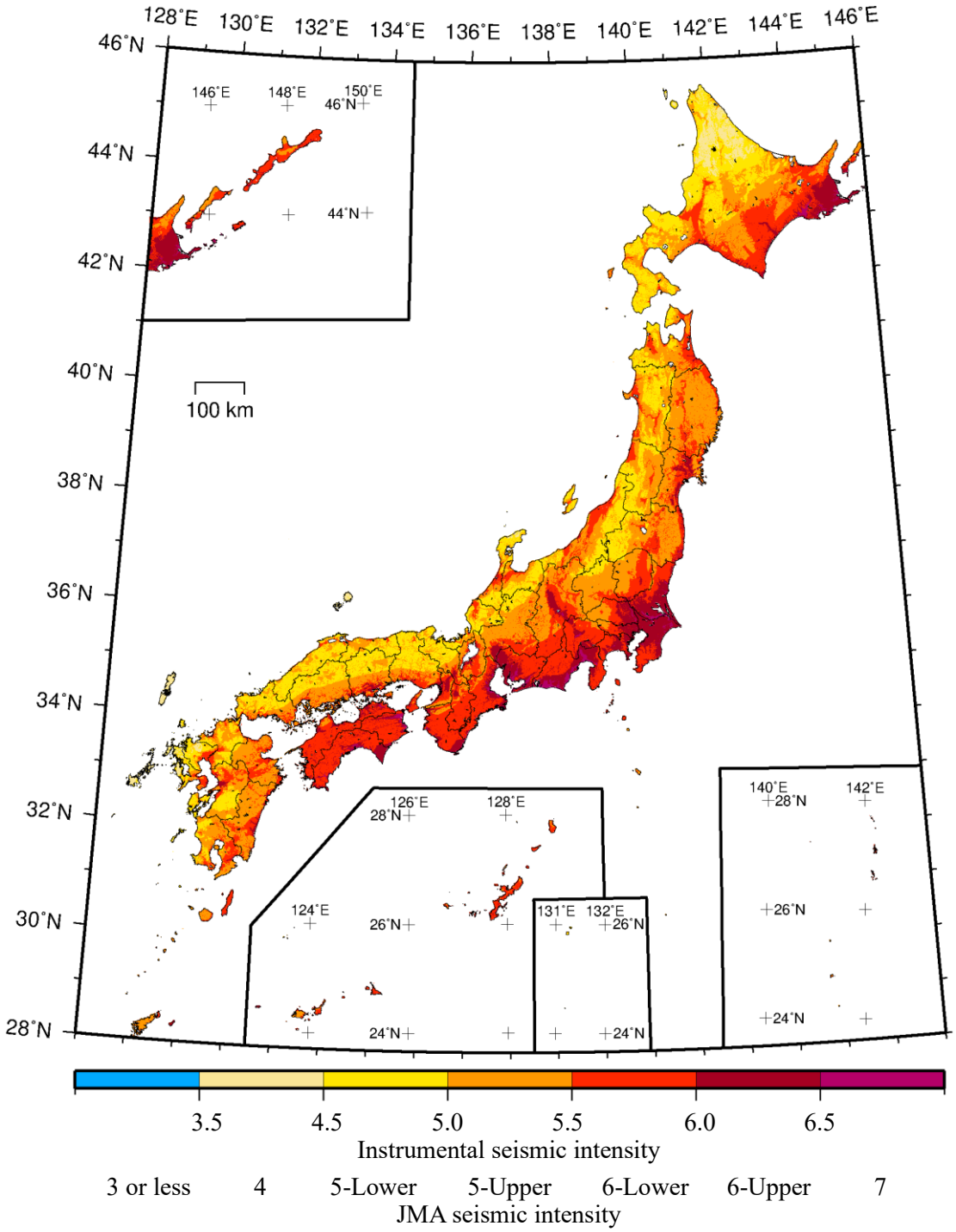


(Grid cell with zero probability based on the model calculation conditions is shown in white)

Probabilistic Seismic Hazard Maps: Probability distribution

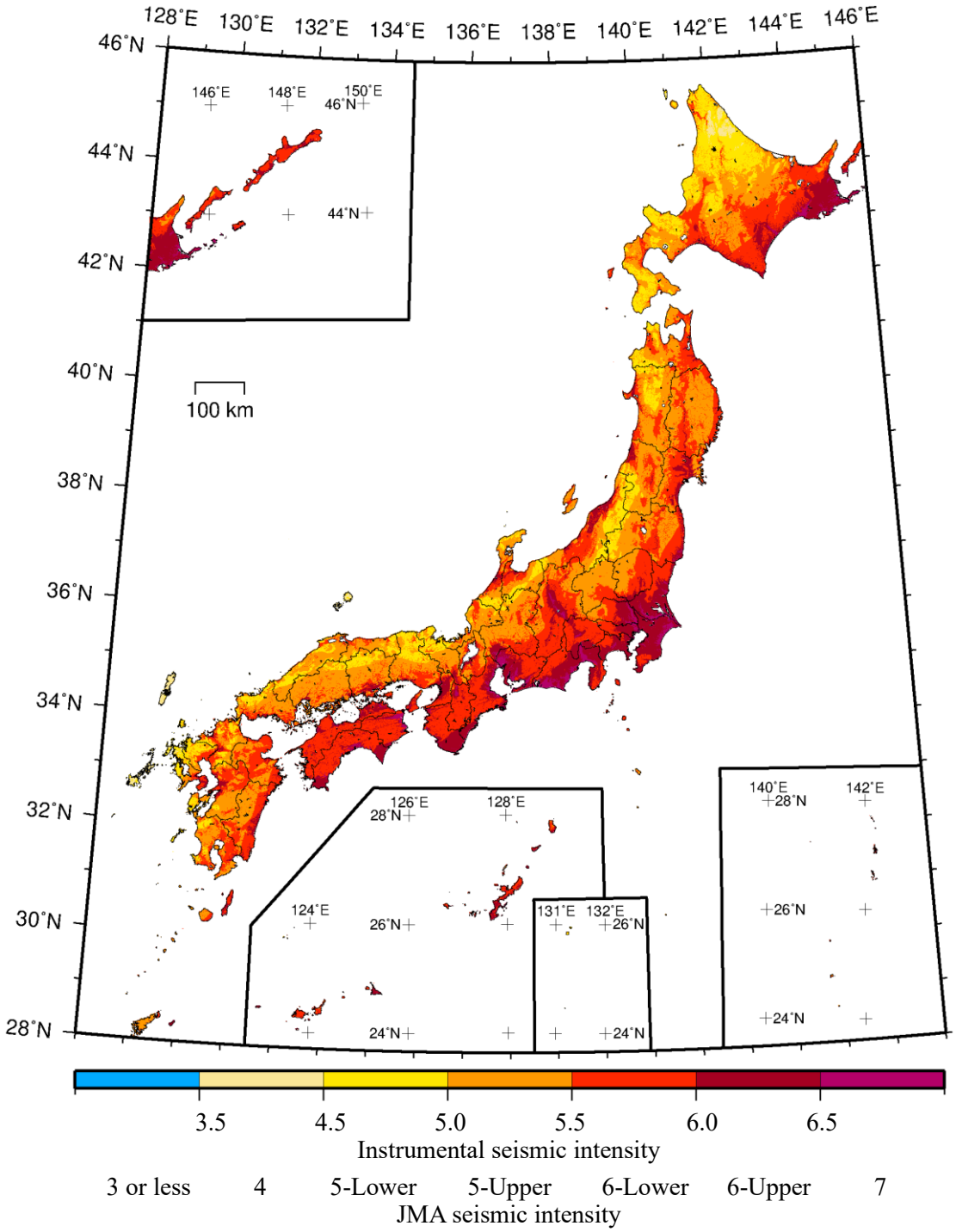
The 30-year probability of ground shaking with a seismic intensity of **6-Lower or higher**
(average case; **subduction-zone earthquakes**)

tme-total-y30-p06 ,2020



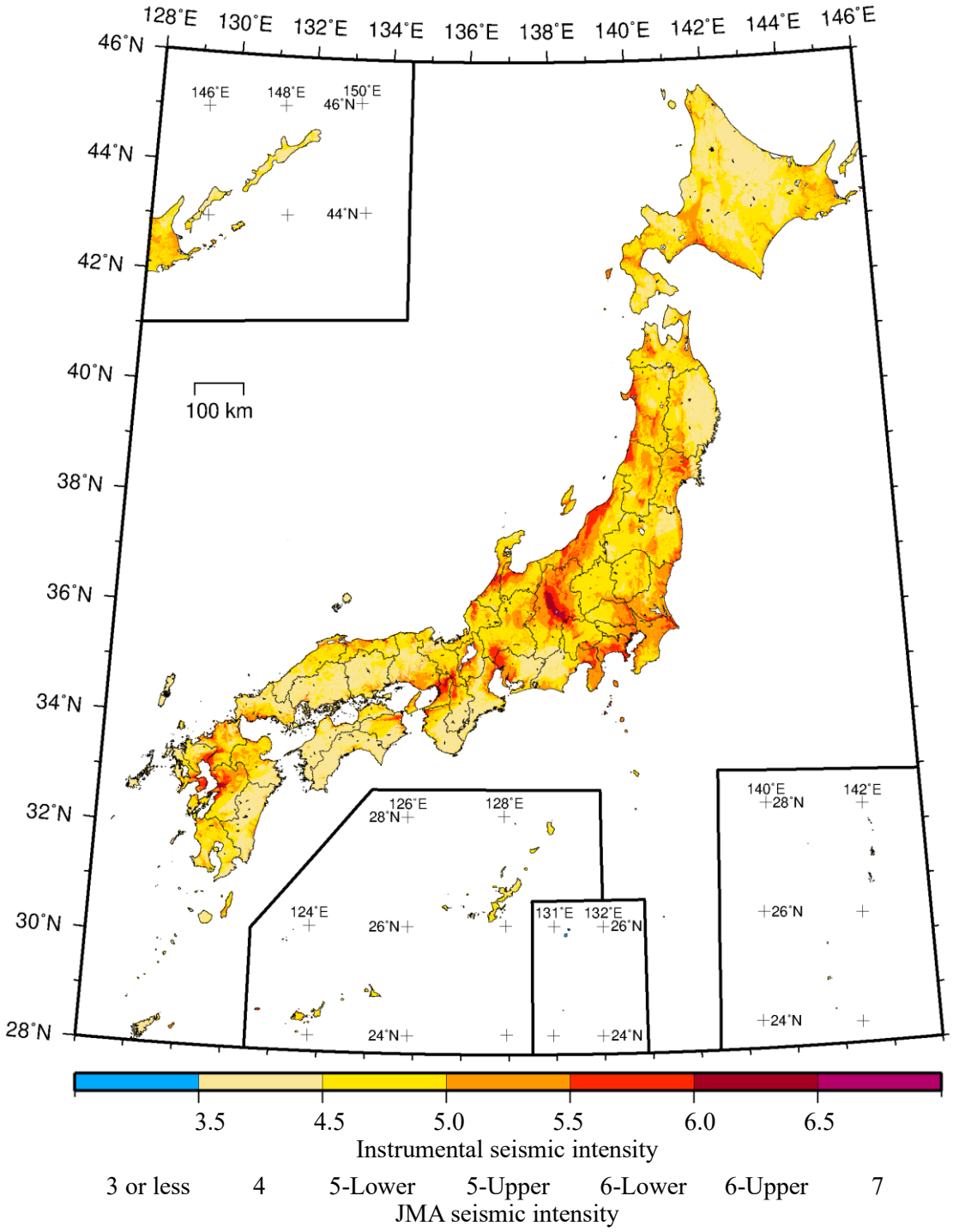
Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **6%**
(average case; **all earthquakes**)

* "Seismic intensity of ground shaking with the 30-year probability of 3% and 6%" roughly corresponds to the ground shaking with this intensity once in approximately 1000 and 500 years, respectively (more precisely, ground shaking exceeding this intensity).



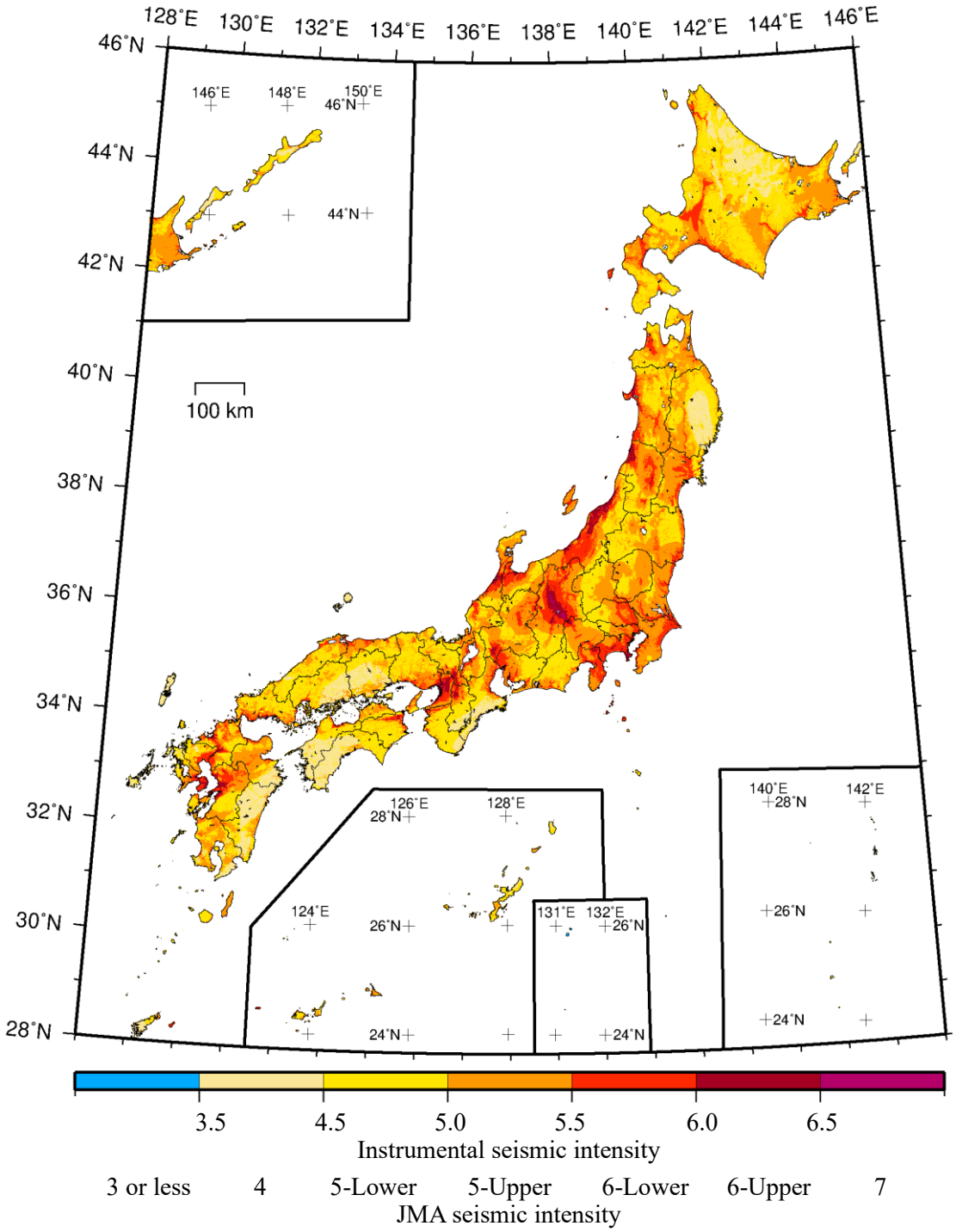
Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **3%**
(average case; **all earthquakes**)

tme-cate3-y30-p06 ,2020



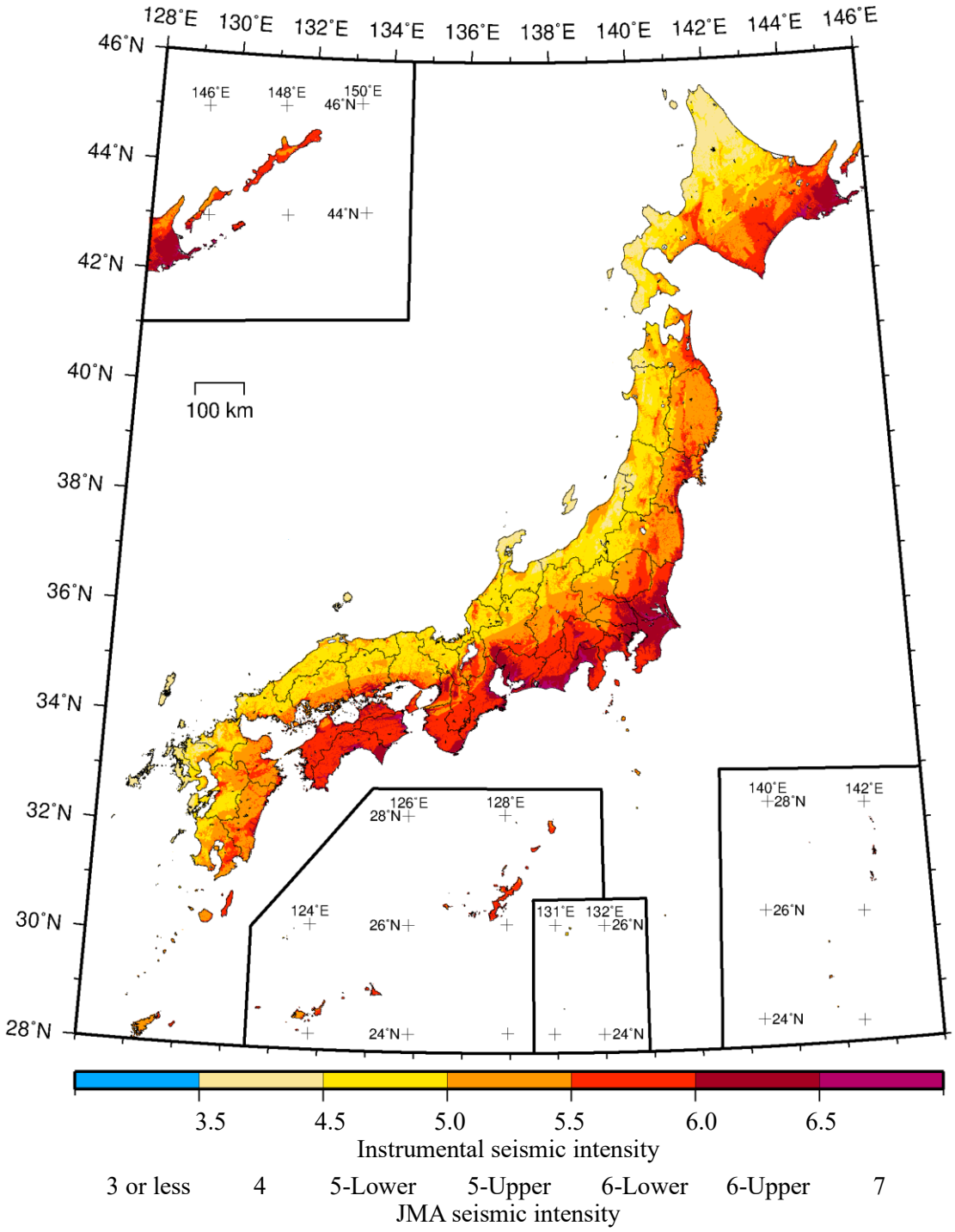
Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **6%**
(average case; **shallow crustal earthquakes**)

tme-cate3-y30-p03 ,2020

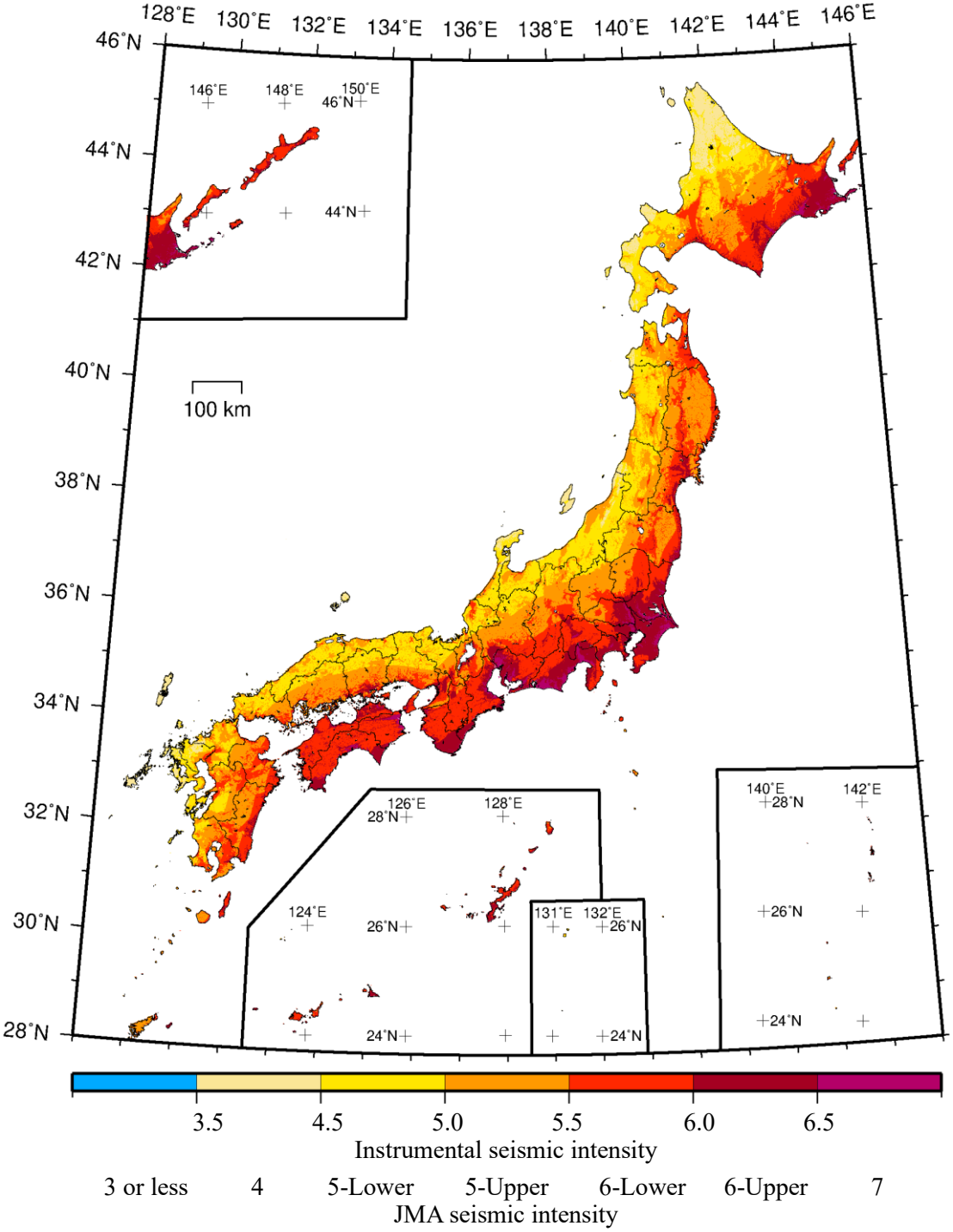


Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **3%**
(average case; **shallow crustal earthquakes**)

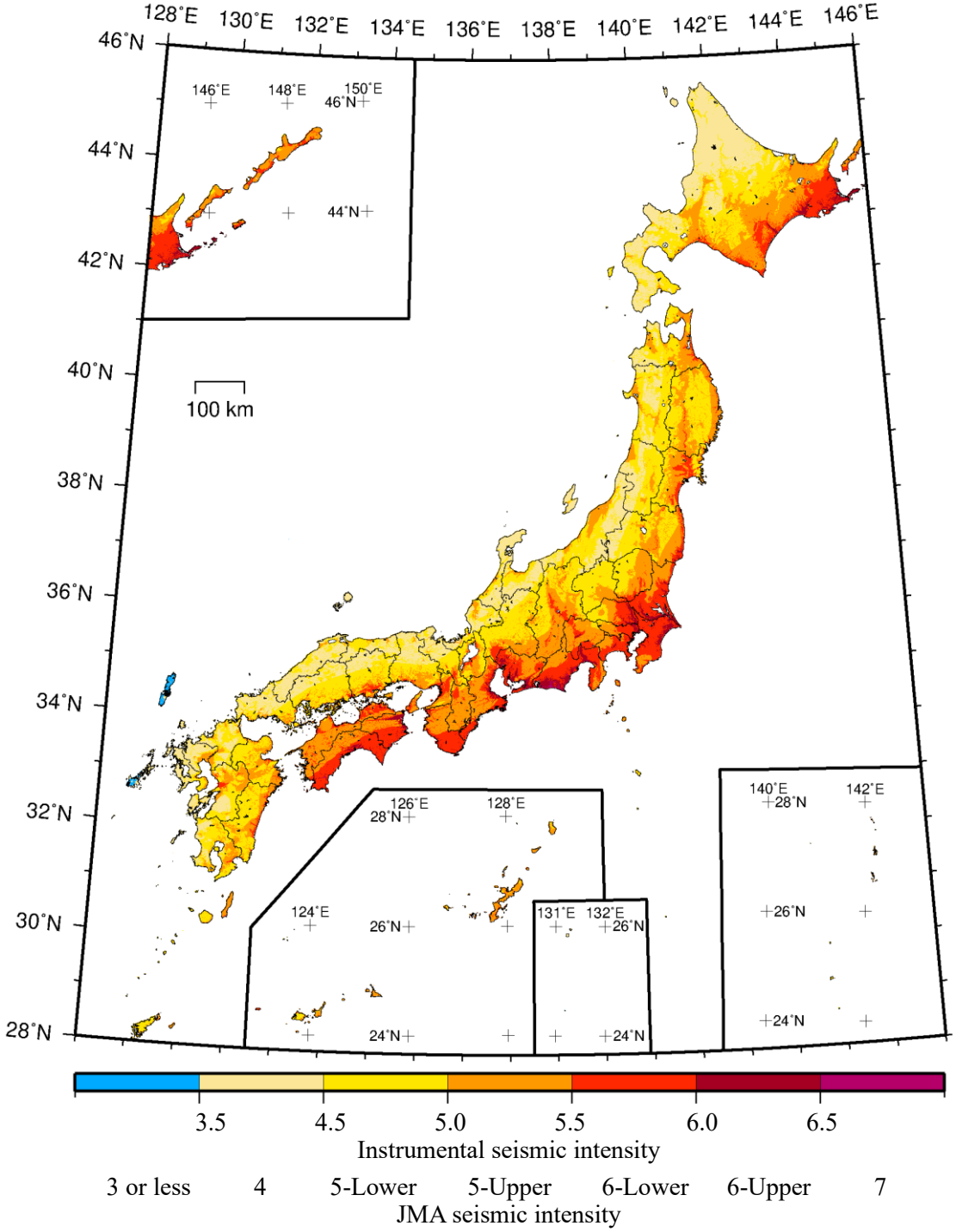
tme-cat12-y30-p06 ,2020



Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **6%**
(average case; **subduction-zone earthquakes**)

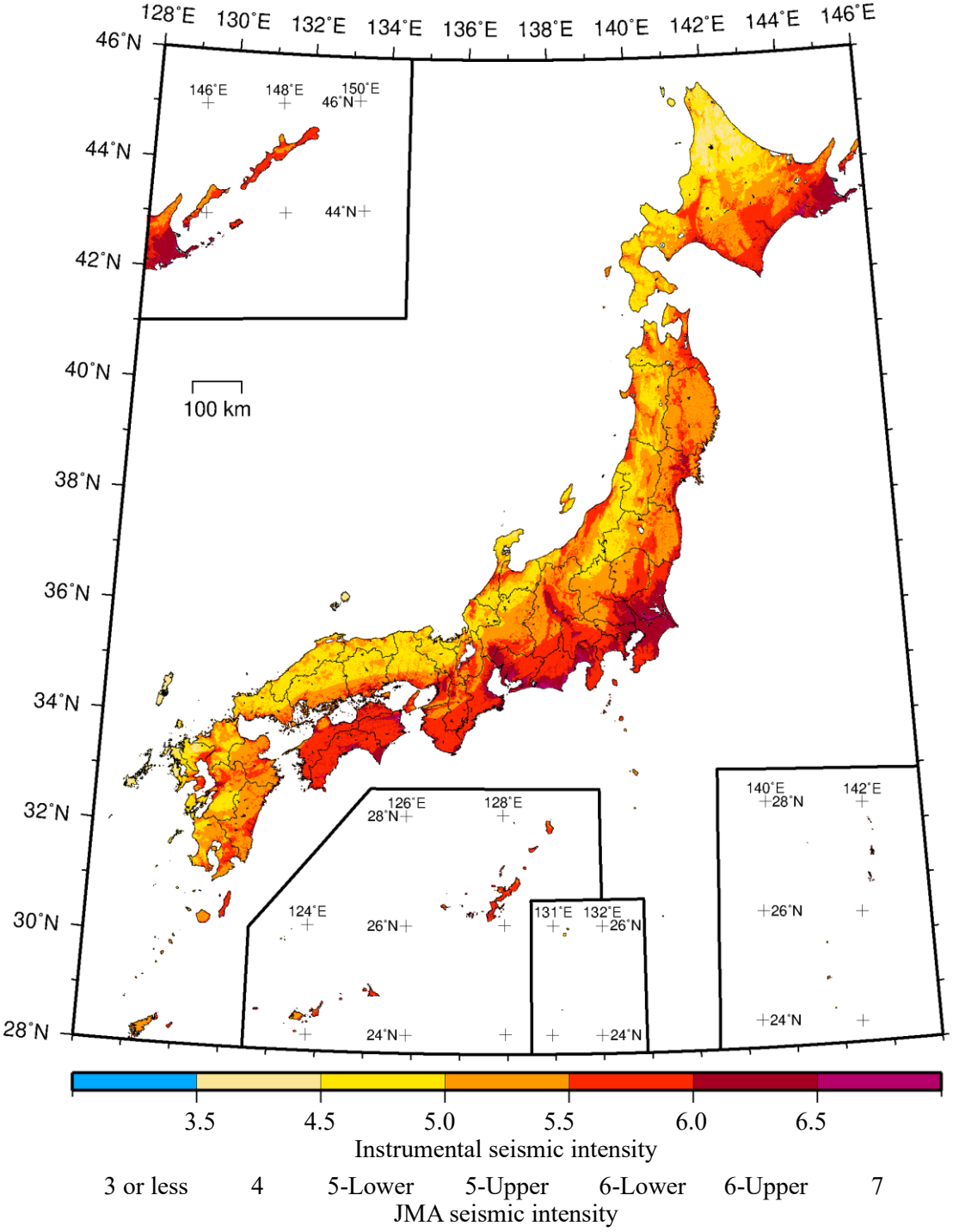


Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **30-year** probability of **3%**
(average case; **subduction-zone earthquakes**)

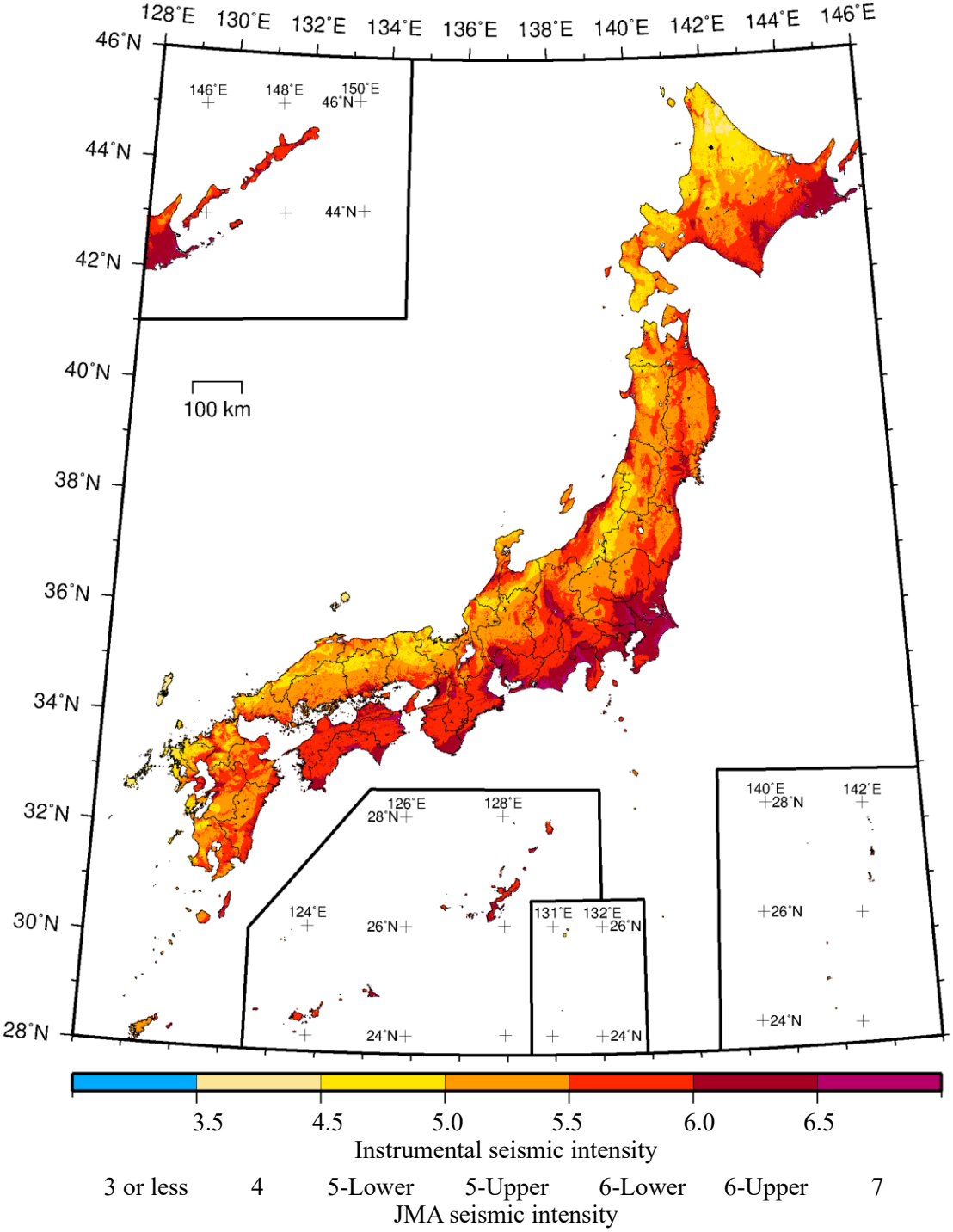


Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **50-year** probability of **39%**
(average case; **all earthquakes**)

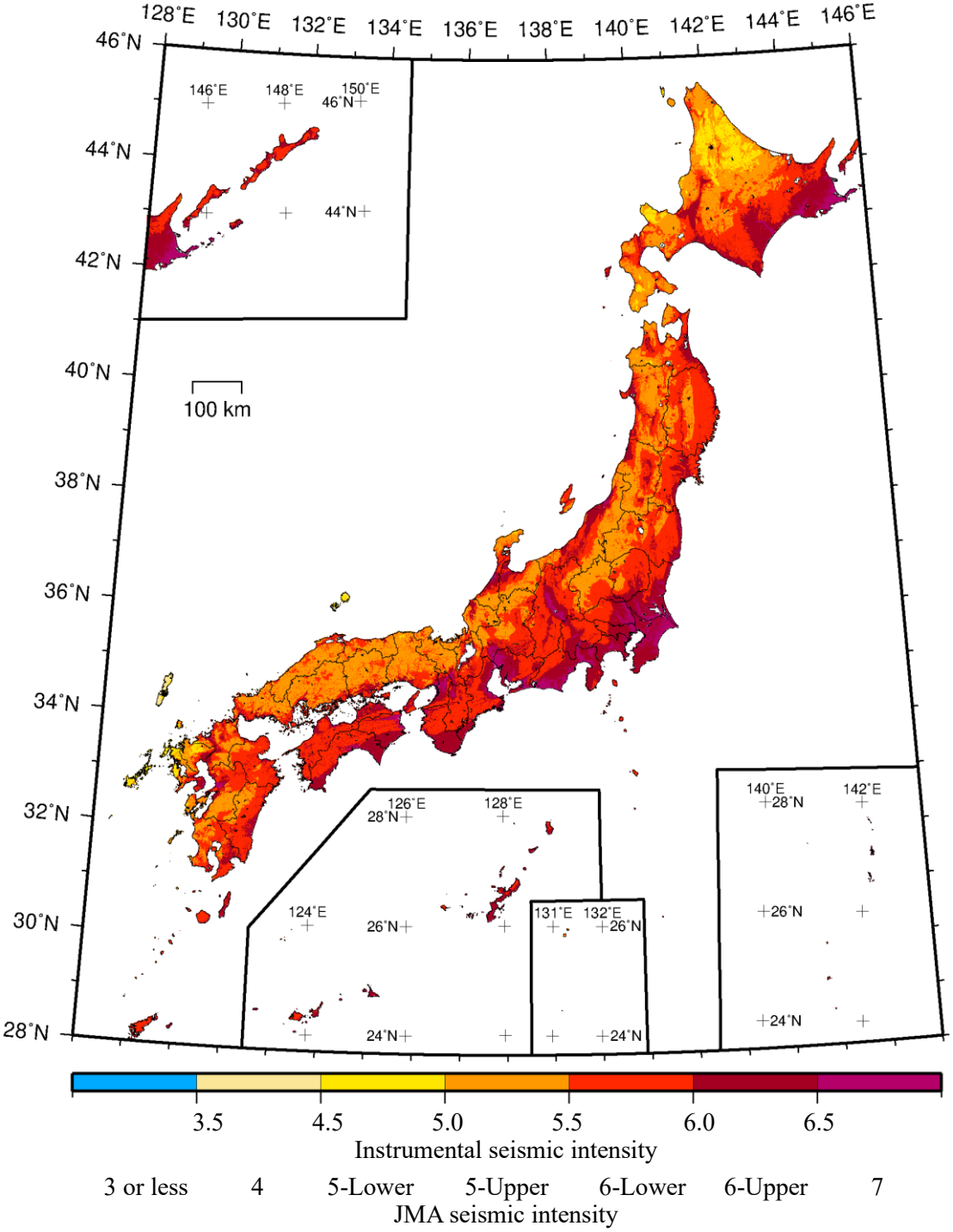
* "Seismic intensity of ground shaking with the 50-year probability of 2%, 5%, 10%, and 39%" roughly corresponds to the ground shaking with this intensity once in approximately 2,500, 1,000, 500, and 100 years, respectively (more precisely, ground shaking exceeding this intensity).



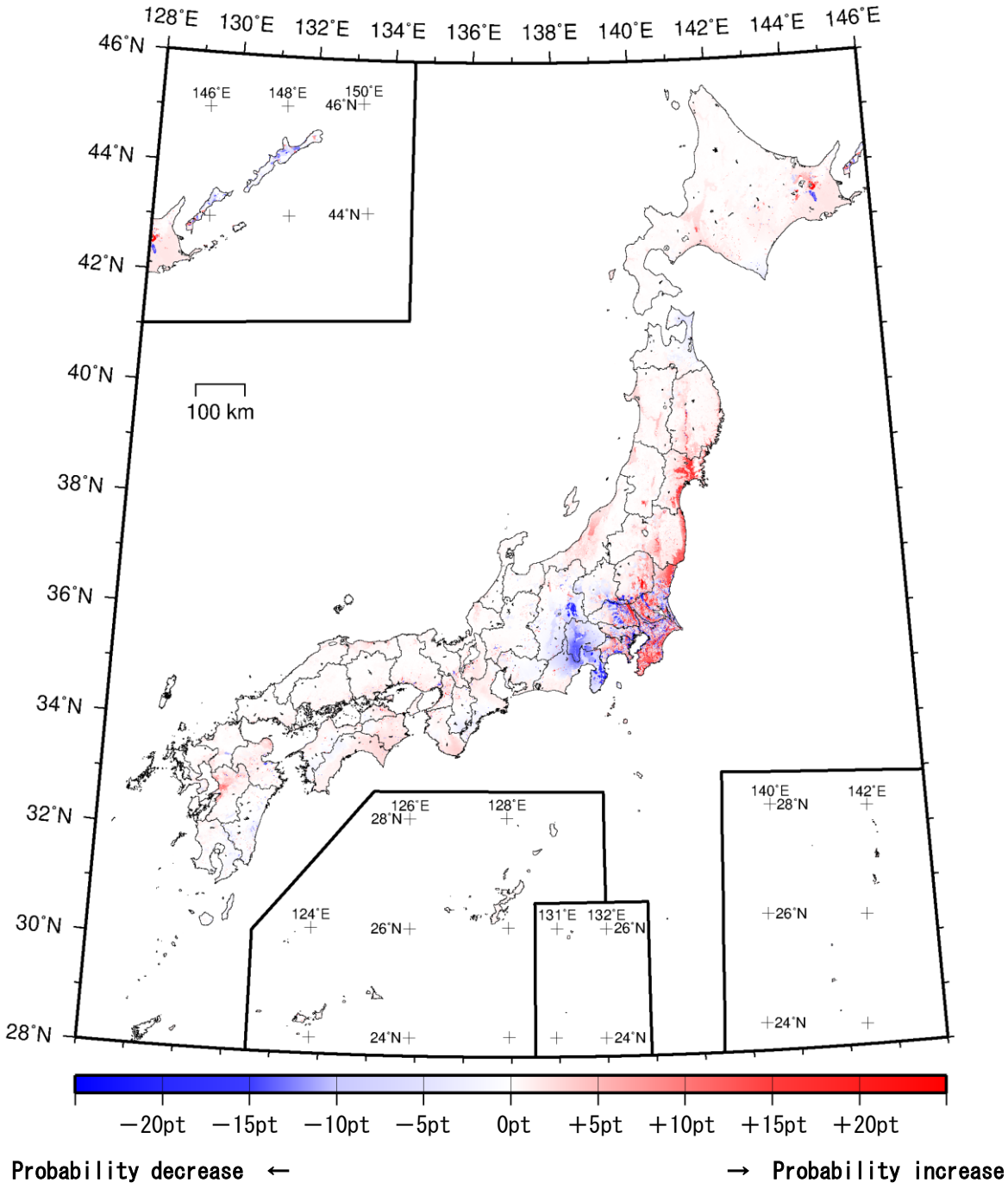
Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **50-year** probability of **10%**
(average case; **all earthquakes**)



Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **50-year** probability of **5%**
(average case; **all earthquakes**)



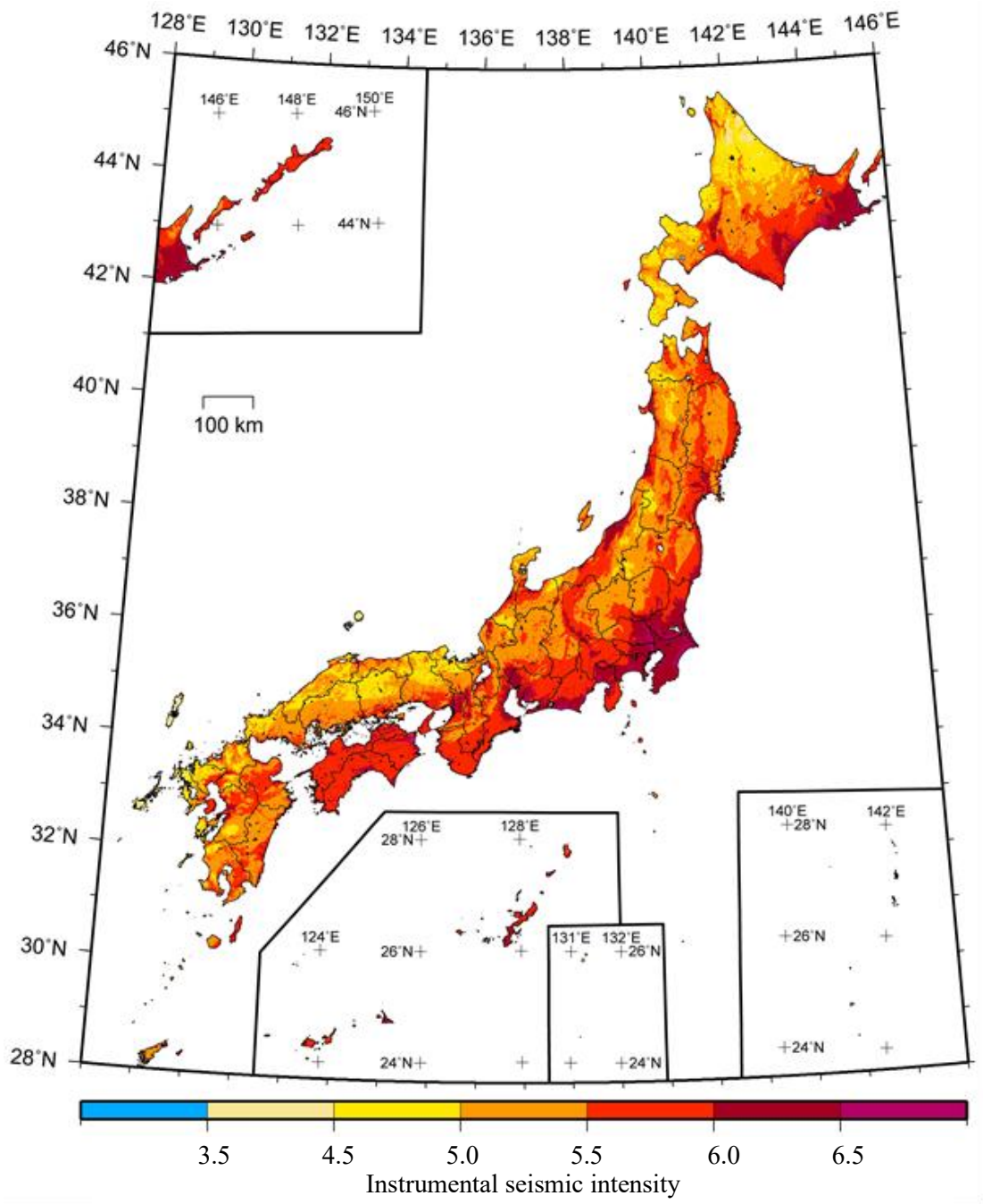
Probabilistic Seismic Hazard Maps: Seismic intensity distribution
Seismic intensity of ground shaking with the **50-year** probability of **2%**
(average case; **all earthquakes**)



Comparison with the old edition

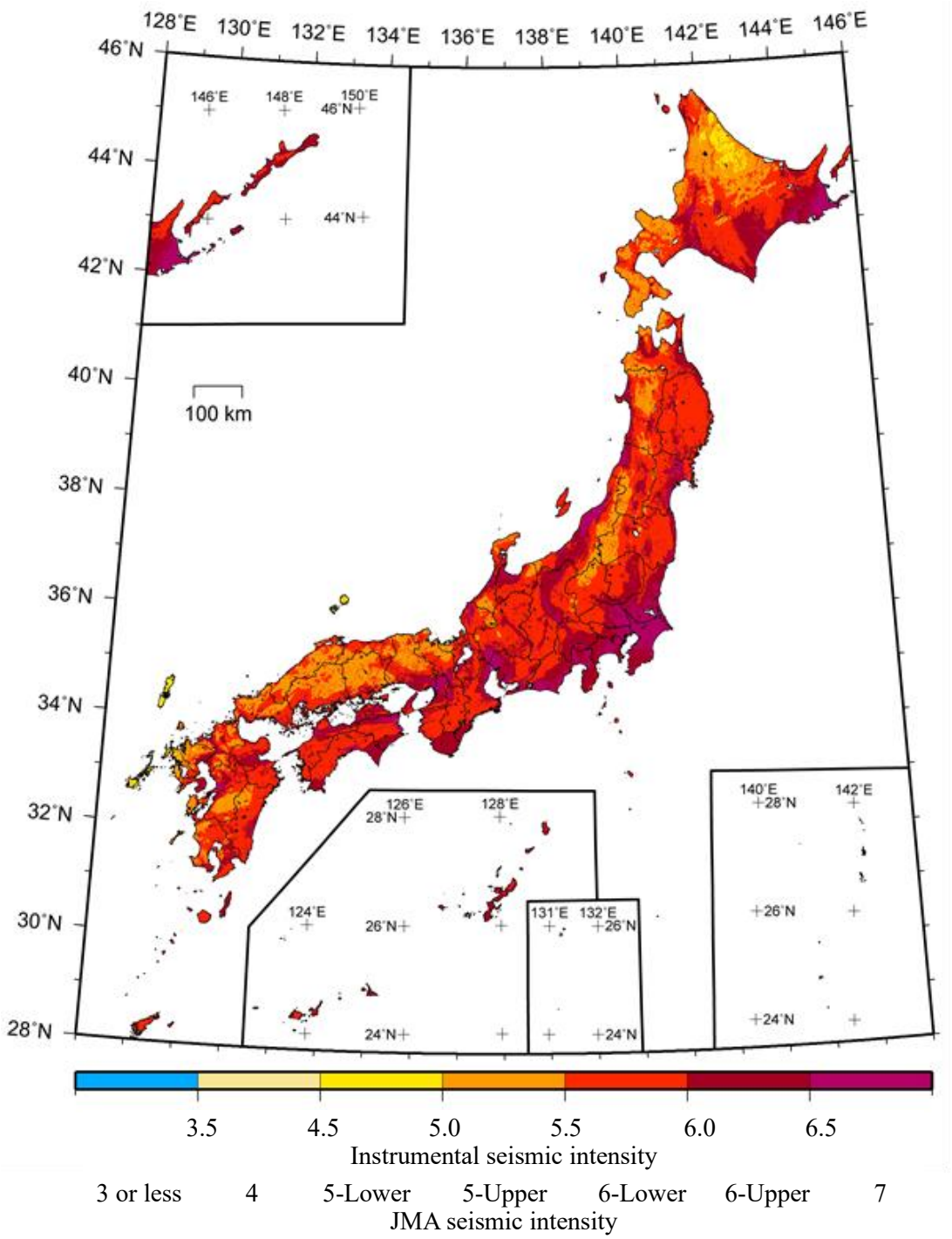
Differences in "**30-year probability** of ground shaking with a seismic intensity of **6-Lower or higher**"

(2020 Edition - 2018 Edition: average case; all earthquakes)



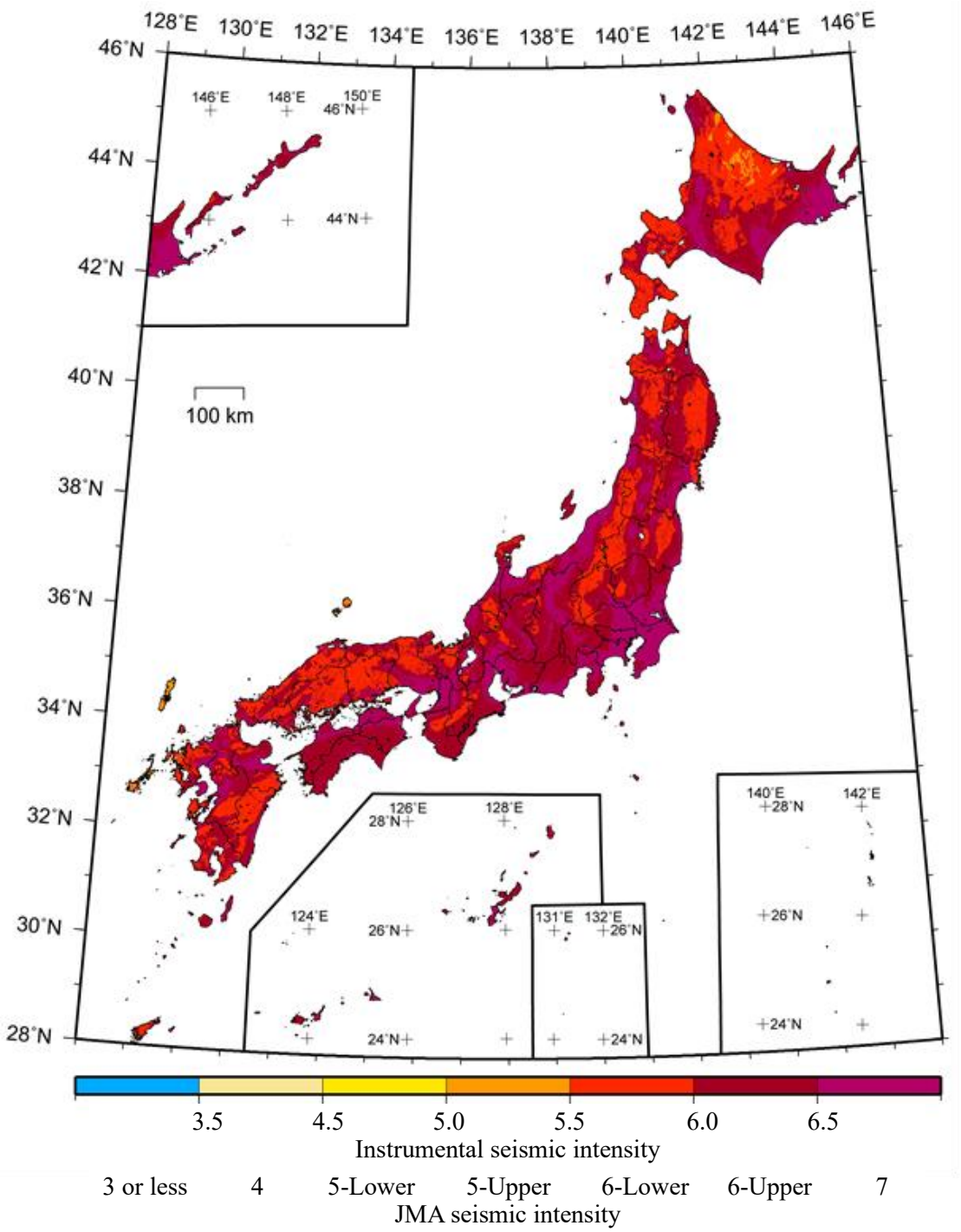
Probabilistic Seismic Hazard Maps: Long-term average seismic intensity distribution

Recurrence interval equivalent to **1,000 years**



Probabilistic Seismic Hazard Maps: Long-term average seismic intensity distribution

Recurrence interval equivalent to **5,000 years**



Probabilistic Seismic Hazard Maps: Long-term average seismic intensity distribution

Recurrence interval equivalent to **50,000 years**