Steering Committee Meeting of ICG/PTWS
20 September, 2024

Nankai Trough Earthquake Extra Information

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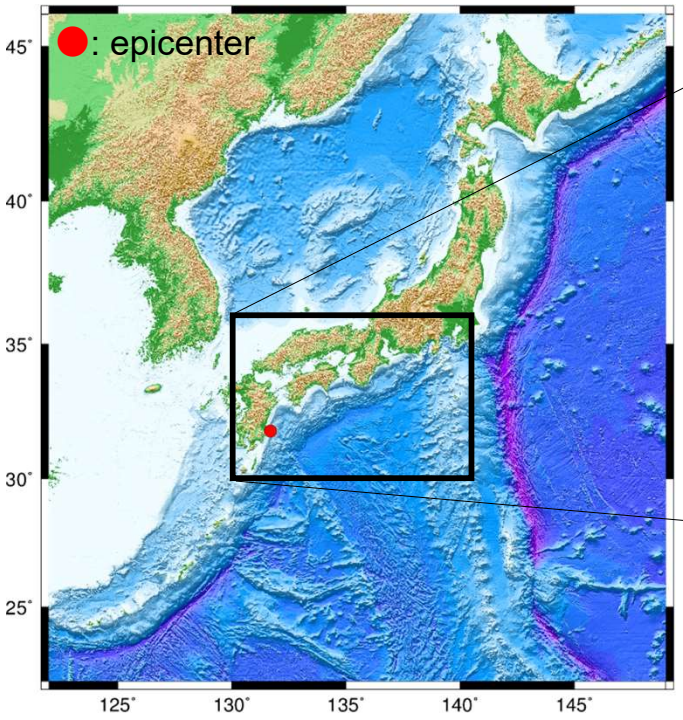
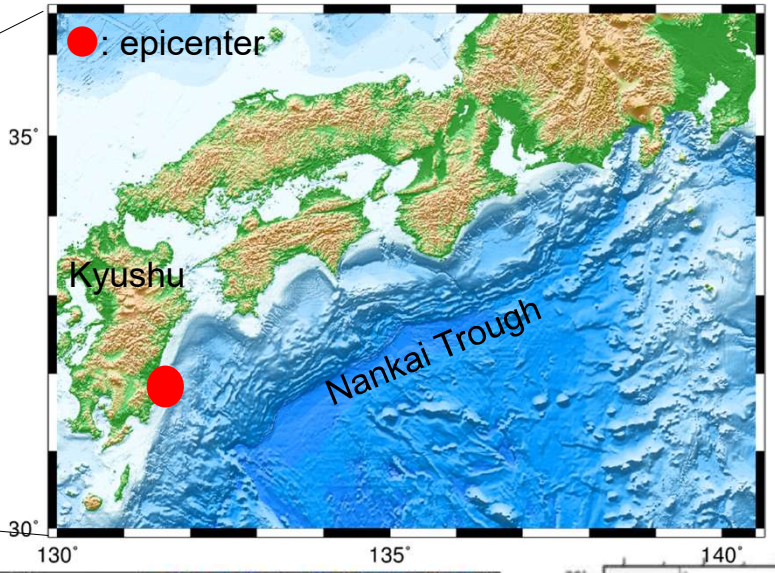
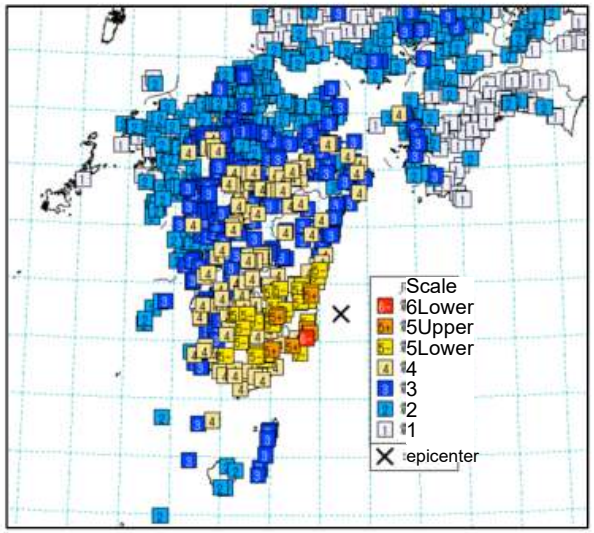
Earthquake in Hyuganada on August 8

- ✓ The earthquake occurred in the Hyuganada Sea off SE Kyushu around 4:42 p.m. on August 8 (JST) and had a JMA magnitude (Mjma) of 7.1.
- ✓ Seismic intensity was observed from 6lower to 1 on JMA seismic intensity scale around SW Japan.
- ✓ Tsunami waves were observed from Chiba to Kagoshima along the Pacific coast.
  ⇒ occurred **in the Nankai Trough** (caused by the subduction of the Philippine Sea Plate)

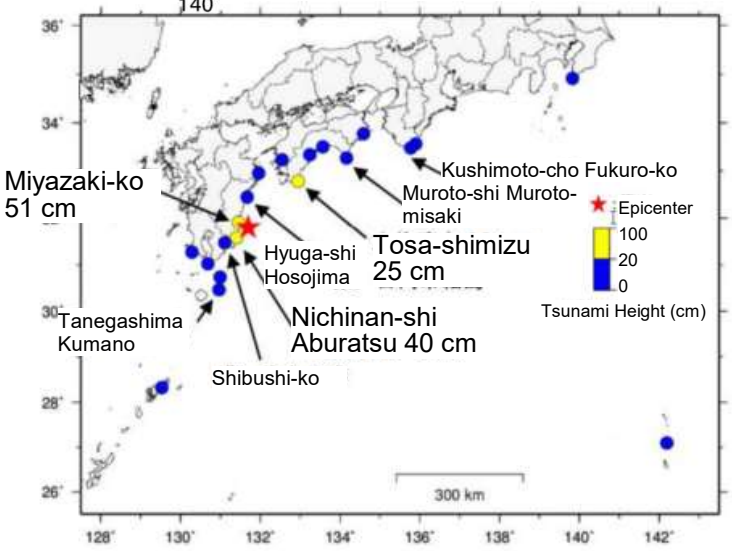




Distribution of JMA Seismic Intensity Scale



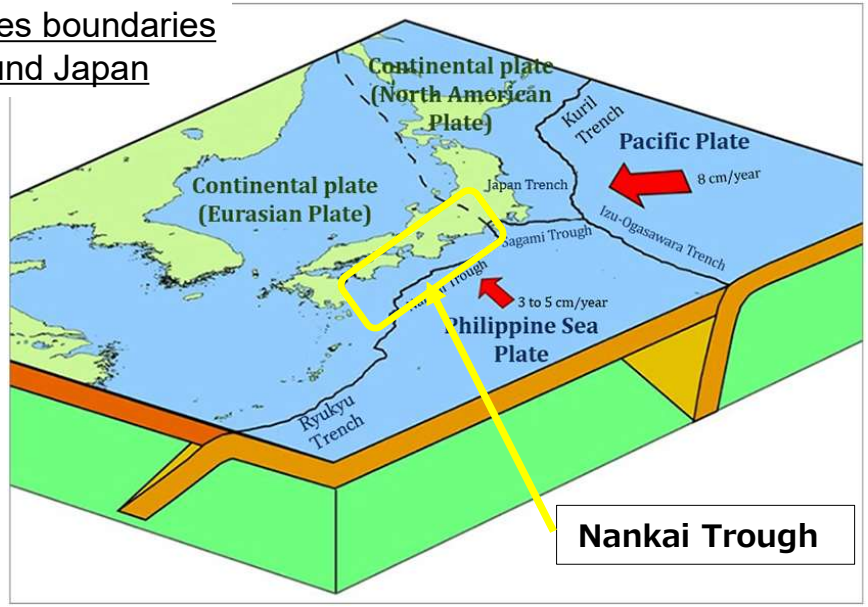
Tsunami Observation



Nankai Trough

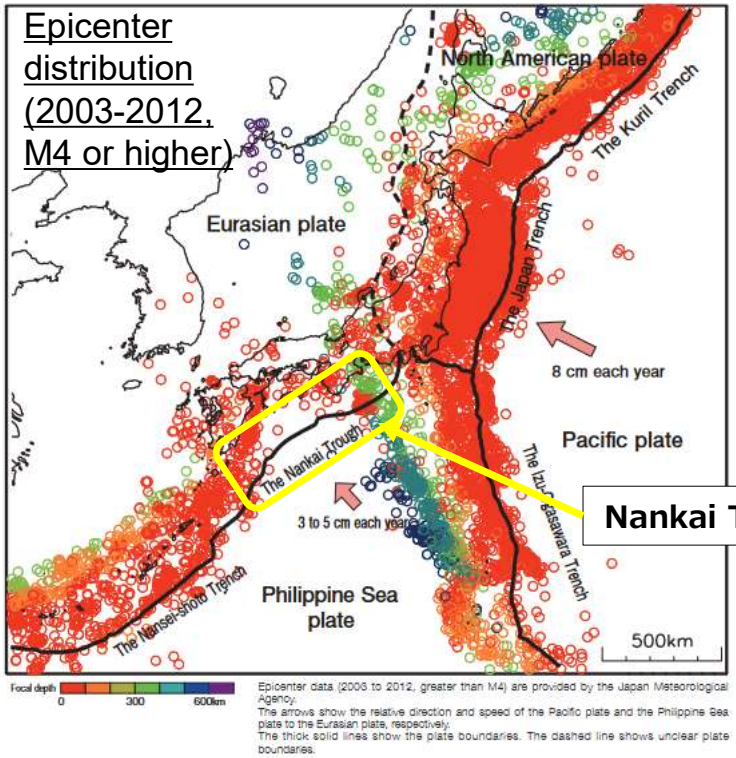
Japan Meteorological Agency

Plates boundaries around Japan



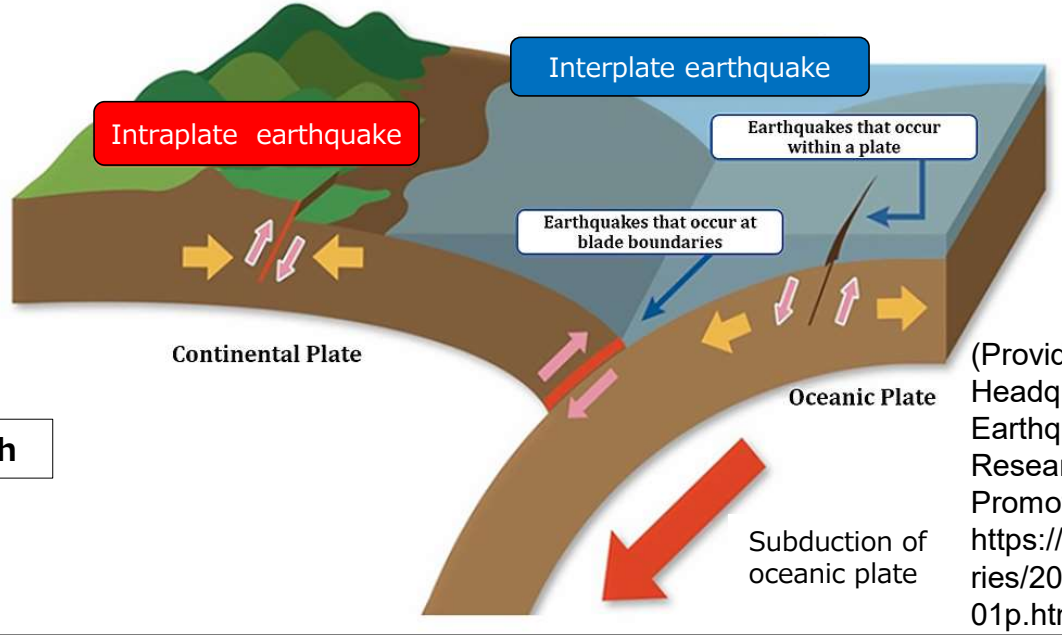
- ✓ Nankai Trough is located where the Philippine Sea plate subducts under the continental plate at the southwest of Japan.
- ✓ The Nankai Trough earthquake is an interplate earthquake type.

Epicenter distribution (2003-2012, M4 or higher)



Nankai Trough

Types of earthquakes that occur in and around Japan



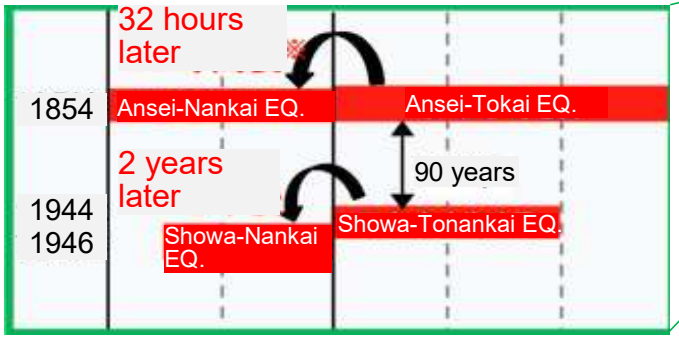
(Provided by the Headquarters for Earthquake Research Promotion; https://sj.jst.go.jp/stories/2021/s0810-01p.html)

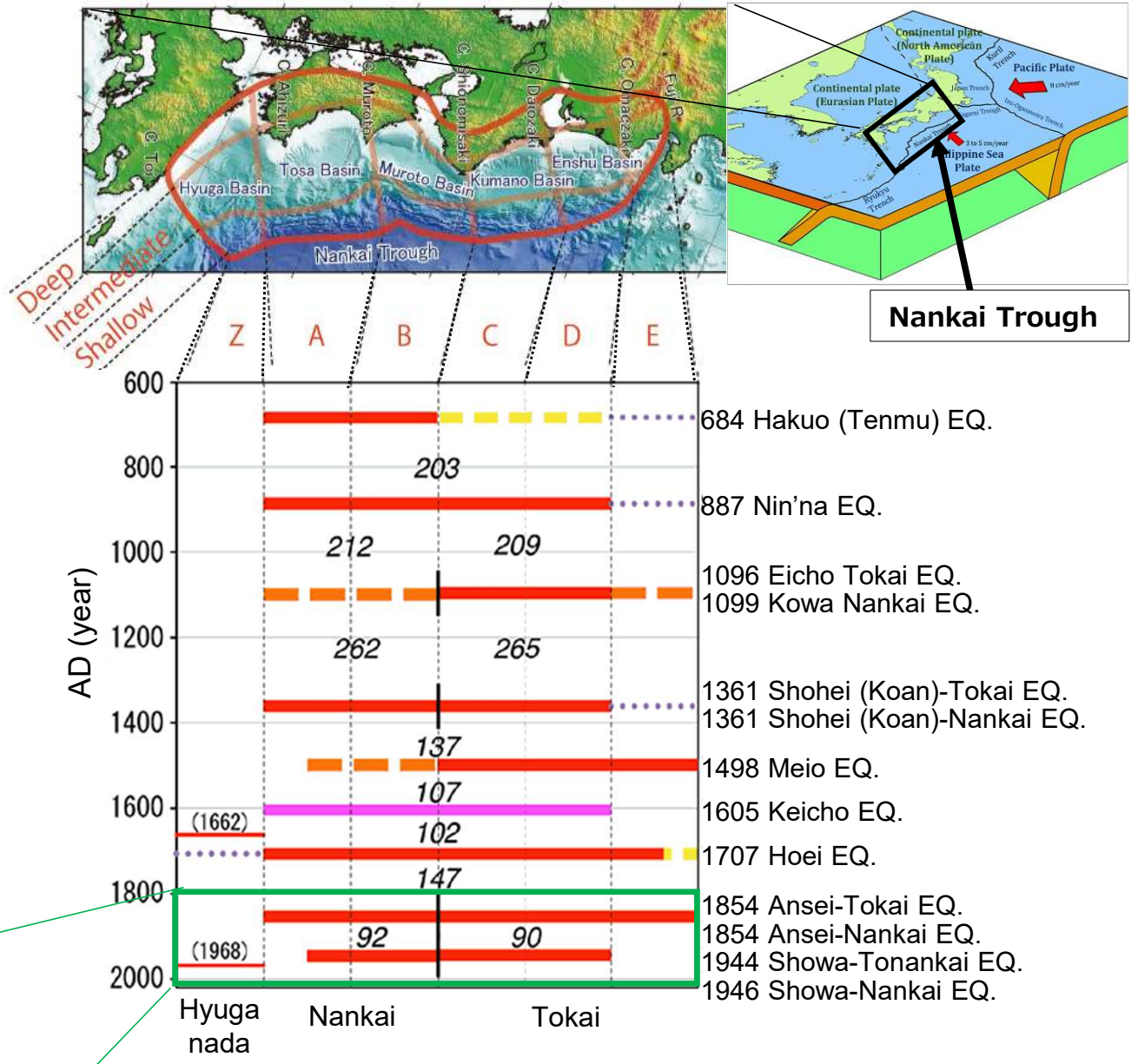
(Modified from “Understanding Earthquakes” by the Headquarters for Earthquake Research Promotion)

Historical Nankai Trough mega earthquake

気象庁 Japan Meteorological Agency

- Nankai Trough Earthquakes occur with a cycle of roughly 100-150 years in the region ranging from Suruga Bay to the Hyuganada sea with various repetition intervals and source areas.
- About 80 years have passed since the massive 1944 Showa Tonankai and 1946 Showa Nankai earthquakes, suggesting that another may be imminent.
- In some cases multiple earthquakes occur within a certain period, and in others most of the trough can rupture at once.





(Modified from Earthquake Research Committee, 2013)

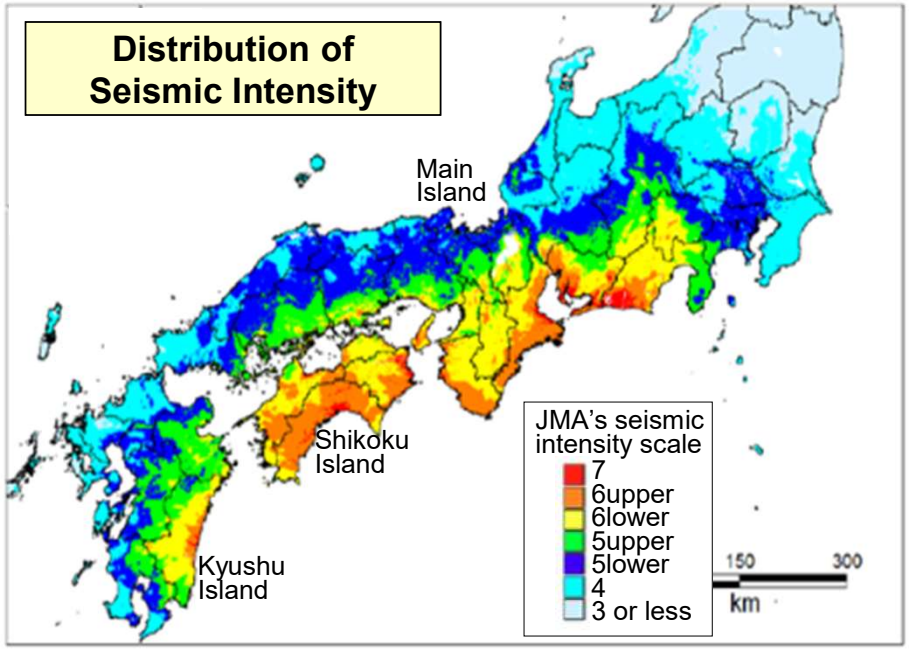
Anticipated Nankai Trough mega earthquake

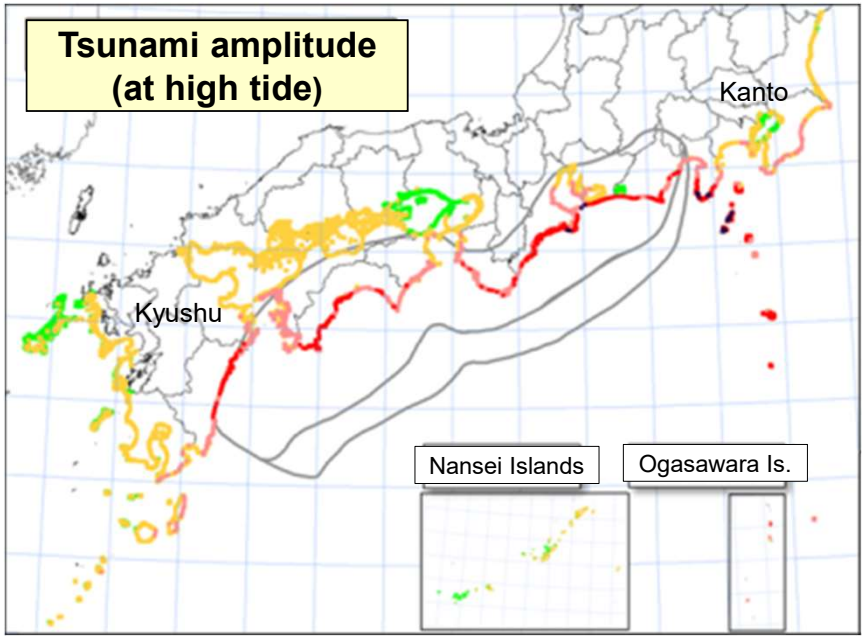
気象庁 Japan Meteorological Agency

- A Nankai Trough mega earthquake could generate severe damage over a wide area by strong shaking and the subsequent tsunami, especially the shaking of the highest level of 7 on JMA's seismic intensity scale in the Main Island, Shikoku Island and Kyusyu Island, and tsunamis exceeding 10 meters in the Pacific coast.

➢ The damages by the Nankai Trough mega earthquake could be greatly reduced by taking countermeasures in advance, such as preparedness and evacuation.

Estimation of seismic intensity, tsunami amplitude, and damage in the event of a maximum possible earthquake





Number of deaths and missing persons, buildings completely destroyed by fire

Maximum: approx. 323,000 persons (Winter/Night), approx. 2,386,000 buildings (Winter/Evening)

Economic damages

- Economic losses (direct) : approx. JPY 169.5 trillion
- Degradation of economic activity (indirect) : approx. JPY 44.7 trillion

(Modified from Cabinet Office of Japan, 2013)

“Nankai Trough Earthquake Extra Information”

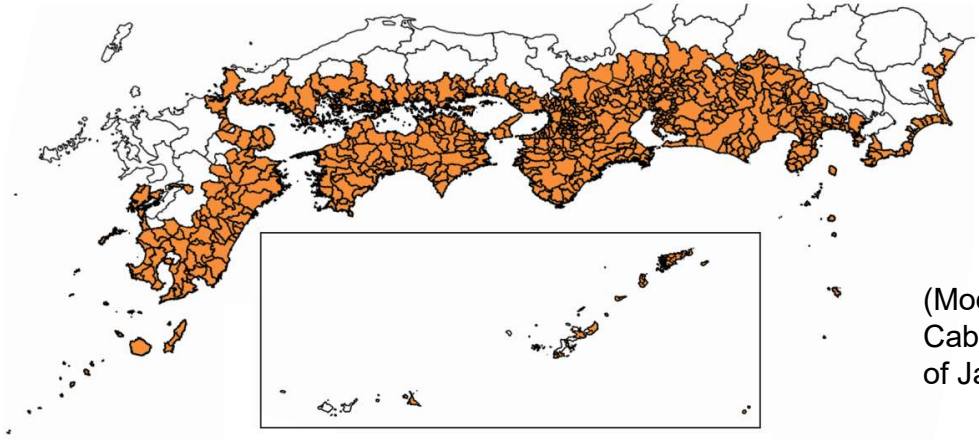
気象庁 Japan Meteorological Agency

- In the event of anomalies, JMA convenes the Nankai Trough Earthquake Assessment Committee for discussions on the expected potential for an earthquake and issues “Nankai Trough Earthquake Extra Information” or “Nankai Trough Earthquake-Related Commentary” depending on the conditions.

- **Nankai Trough Earthquake Extra Information**
  - ✓ The information is that the possibility of the occurrence of a mega earthquake is assessed to be relatively higher than usual in the possible epicenter area for Nankai Trough Earthquake.
  - ✓ If a mega earthquake occurs, strong shaking in the wide area and large tsunami along the coast area are expected.
  - ✓ People should take disaster prevention actions, such as reviewing their earthquake preparedness and preparing to evacuate immediately if an earthquake occurs.
  - ✓ It should be noted that the issuance of information indicating elevated potential for a Nankai Trough earthquake does not necessarily mean that one will actually strike.

Anticipated focal region

Measure promotion area for disaster prevention



(Modified from Cabinet Office of Japan, 2013)

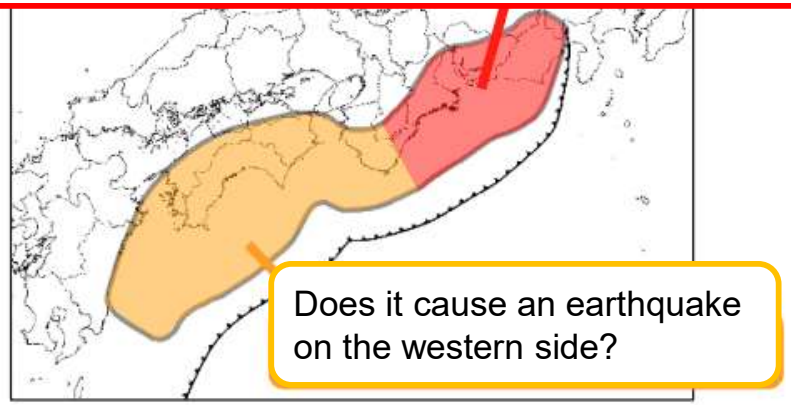
Anomalous phenomena in the Nankai Trough

気象庁 Japan Meteorological Agency

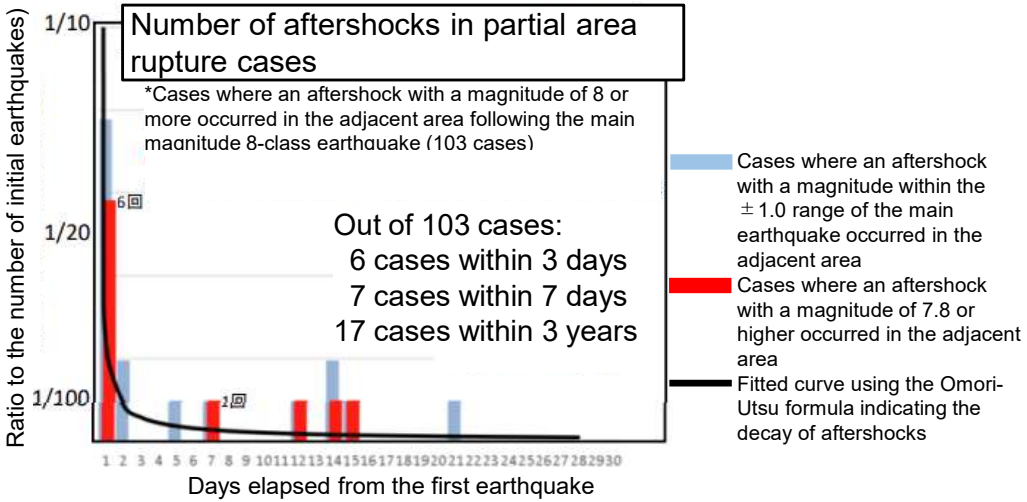
3 cases of anomalous phenomena are assumed, indicating an increased potential for a Nankai Trough earthquake. →"Nankai Trough Earthquake Extra Information"

1. Case of the occurrence of the large-scale earthquake with a moment magnitude (Mw) of 8.0 or higher, with serious damage)

A large-scale (M8 class) earthquake occurs on the eastern side of the Nankai Trough



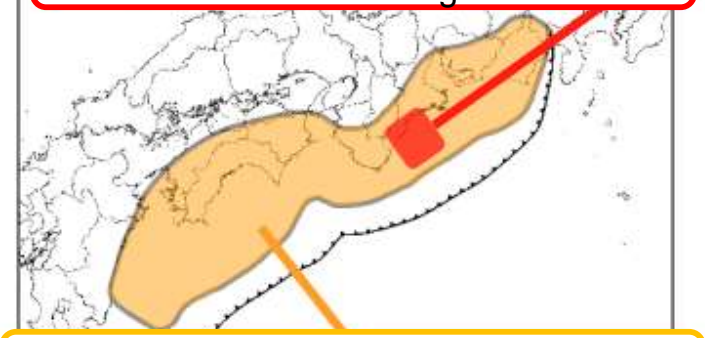
Does it cause an earthquake on the western side?



Normal probability: The probability of 70% to 80% in 30 years means that the probability of occurrence of an earthquake within 7 days is once in 1,000 times.

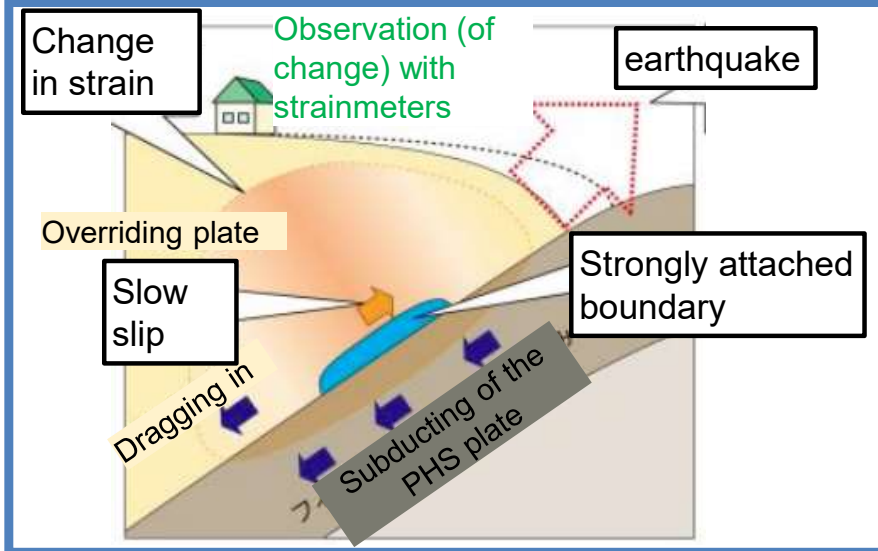
2. Case of the occurrence of the earthquake with a Mw of 7.0-8.0

Earthquake (M7 class) occurs along the Nankai Trough



Foreshock of the mega Nankai Trough Earthquake?

3. Unusual slow slip case



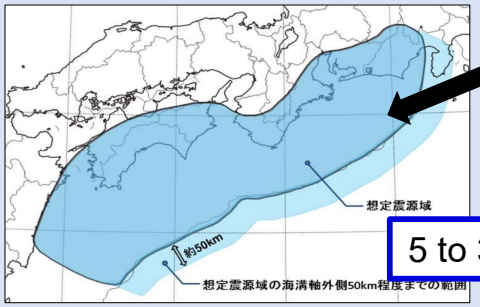
(Modified from Cabinet Office of Japan, 2013)

Procedure

気象庁 Japan Meteorological Agency

Nankai Trough Earthquake Extra Information

Disaster Prevention Measures



Observation of earthquake with a JMA magnitude (Mjma) of 6.8 or higher, or unusual slow slip

5 to 30 minutes later

Nankai Trough Earthquake Extra Information (Under Analysis)

Nankai Trough Earthquake Assessment Committee meeting

2 hours later~

Information to be announced

Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert)	Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)	Nankai Trough Earthquake Extra Information (Analysis Complete)

At least 1 week

Action of residents

Act in advance if it may not be possible to evacuate before a tsunami arrives	Remain prepared for an earthquake on a daily basis, etc.	Consider the potential for earthquakes in your daily routine



- If anomalous phenomena (Mjma6.8 or higher, or unusual slow slip) is observed in the Nankai Trough, "Nankai Trough Earthquake Extra Information (Under Analysis) " is issued.

- After the Assessment Committee meeting, "Nankai Trough Earthquake Extra Information" with keywords (Megathrust Earthquake Alert, Megathrust Earthquake Attention, and Analysis Complete) is issued.

- Disaster prevention according to keywords

(Modified from Earthquake Research Committee, 2013)

Disaster prevention Measures when “Nankai Trough Extra Information” is issued

気象庁 Japan Meteorological Agency

✓ The disaster prevention measures that people should take are linked to the keywords.

Keyword (About 2 hours later)	Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert)	Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)	Nankai Trough Earthquake Extra Information (Analysis Complete)
(Earliest) About 2 hours later	• Remain prepared for an earthquake on a daily basis • Act in advance if it may not be possible to evacuate before a tsunami arrives evacuation in advance for vulnerable people 	• Remain prepared for an earthquake on a daily basis carrying of emergency bag and helmet at all the time Keeping of a pair of comfortable shoes by your bed 	• Consider the potential for earthquakes in your daily routine commuting to school  walking  commuting to work 
1 week later (※)	• Remain prepared for an earthquake on a daily basis	• Consider the potential for earthquakes in your daily routine commuting to school and work 	
2 weeks later	• Consider the potential for earthquakes in your daily routine		

※ In the case of unusual slow slip observed, the period is approximately equal to the period of time during which the change was occurring.

What happened the day

August 8, 2024,

At 4:42 pm (JST) The earthquake occurred in Hyuganada Sea.

At 4:44 pm Tsunami Advisory (Hight < 1m) is issued. (Mjma6.9)

At 4:48 pm NWPTA #1 is issued.

JMA Magnitude (Mjma) updated from 6.9 to 7.1.

At 4:52 pm Area for Tsunami Advisory is expanded.

At 5:00 pm Nankai Trough Earthquake Extra Information (Under Analysis)

Nankai Trough Earthquake Assessment Committee meeting

At 5:45 pm NWPTA #2 is issued.

At 5:45 pm Press Conference (Tsunami Advisory and Tsunami Observation)

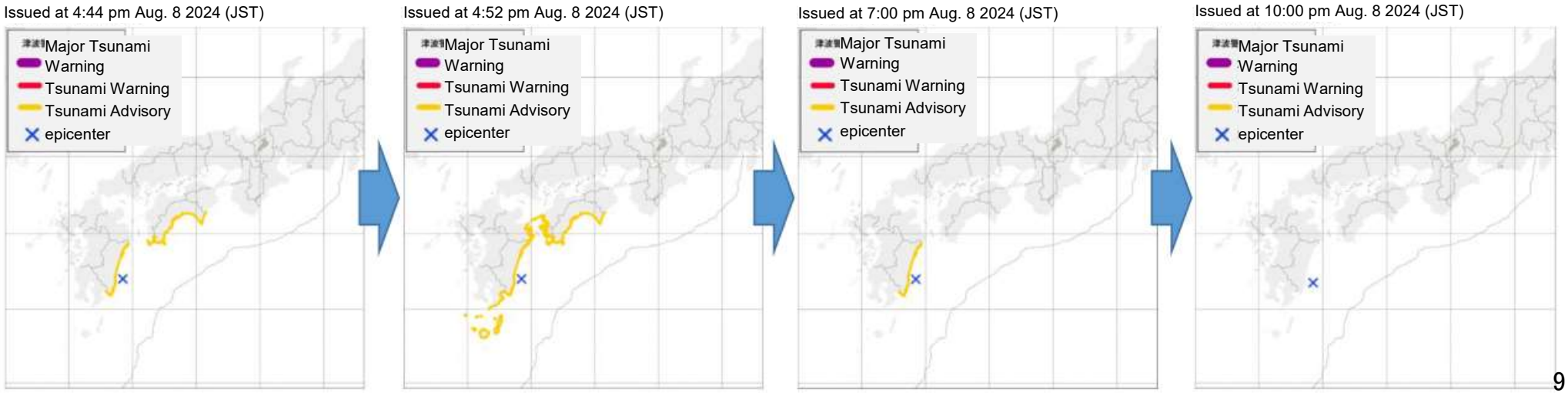
Moment Magnitude (Mw) was calculated 7.0.

At 7:15 pm Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)

At 7:45 pm Press Conference (Nankai Trough Earthquake Extra Information)

At 10:00 pm All Tsunami Advisories are canceled.

Tsunami information services according to SOP Operation about Nankai Trough Earthquake



What happened

気象庁 Japan Meteorological Agency

August 8, 2024,

At 4:42 pm (JST) The earthquake occurred.

At 5:00 pm "Nankai Trough Earthquake Extra Information (Under Analysis)"

Nankai Trough Earthquake Assessment Committee meeting

At 7:15 pm "Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)"

At 7:45 pm Press Conference

⇒The government called on the public to remain prepared for an earthquake.

August 9 - 15

"Nankai Trough Earthquake-Related Commentary" was issued daily to provide updated analysis results.

August 15

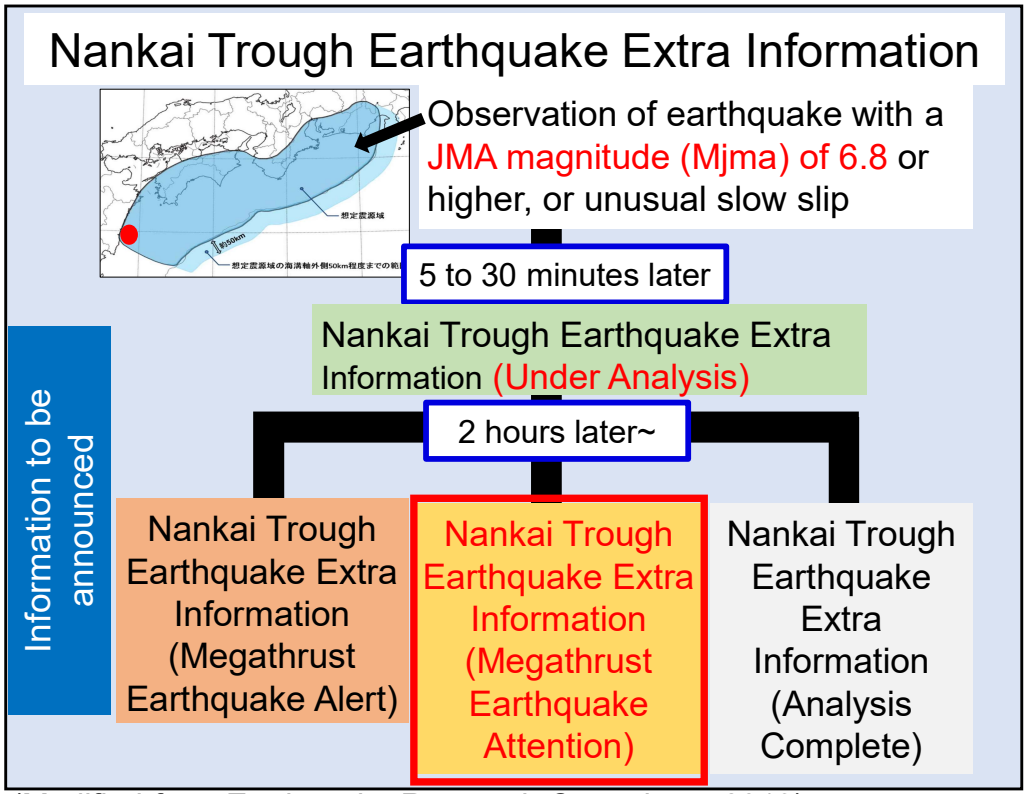
At 5:00 pm The government has ended its call for special attention.

“Nankai Trough Earthquake Extra Information” for the earthquake occurred in Hyuganada

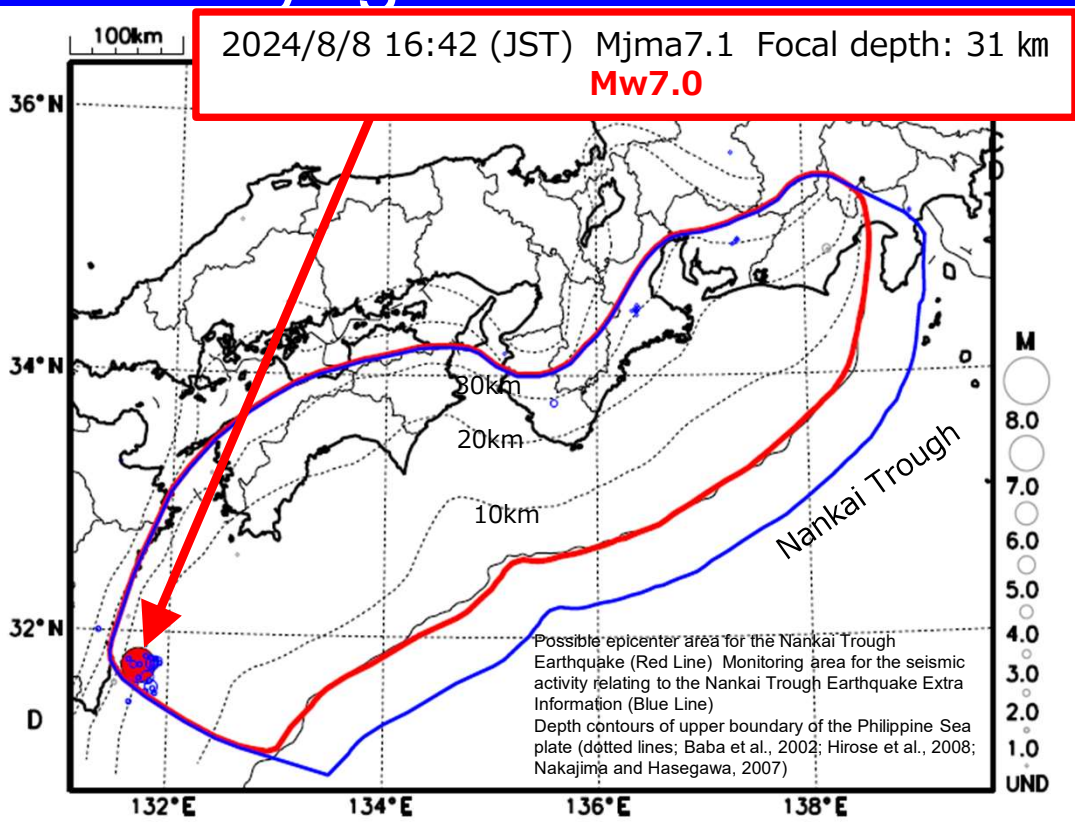
気象庁 Japan Meteorological Agency

✓ The earthquake occurred in the Hyuganada Sea corresponds to the “Case of the occurrence of the earthquake with a moment magnitude (Mw) of 7.0-8.0.

⇒ ”Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)”

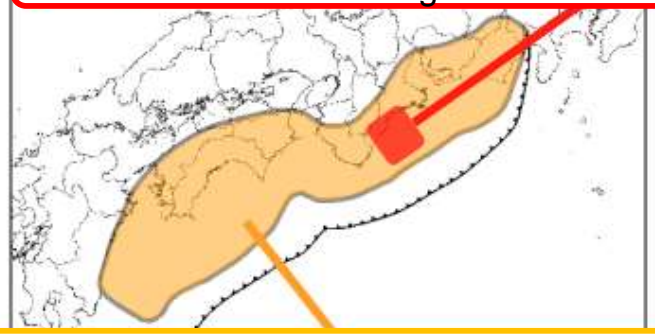


(Modified from Earthquake Research Committee, 2013)



2. Case of the occurrence of the earthquake with a Mw of 7.0-8.0

Earthquake (M7 class) occurs along the Nankai Trough



Foreshock of the mega Nankai Trough Earthquake?

What happened

August 8, 2024,

At 4:42 pm (JST) The earthquake occurred.

At 5:00 pm “Nankai Trough Earthquake Extra Information (Under Analysis)”
Nankai Trough Earthquake Assessment Committee meeting

At 7:15 pm “Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)”

At 7:45 pm Press Conference “Nankai Trough Earthquake Extra Information”
⇒The government called on the public to remain prepared for an earthquake.

August 9 - 15

“Nankai Trough Earthquake-Related Commentary” was issued daily to provide updated analysis results.

August 15

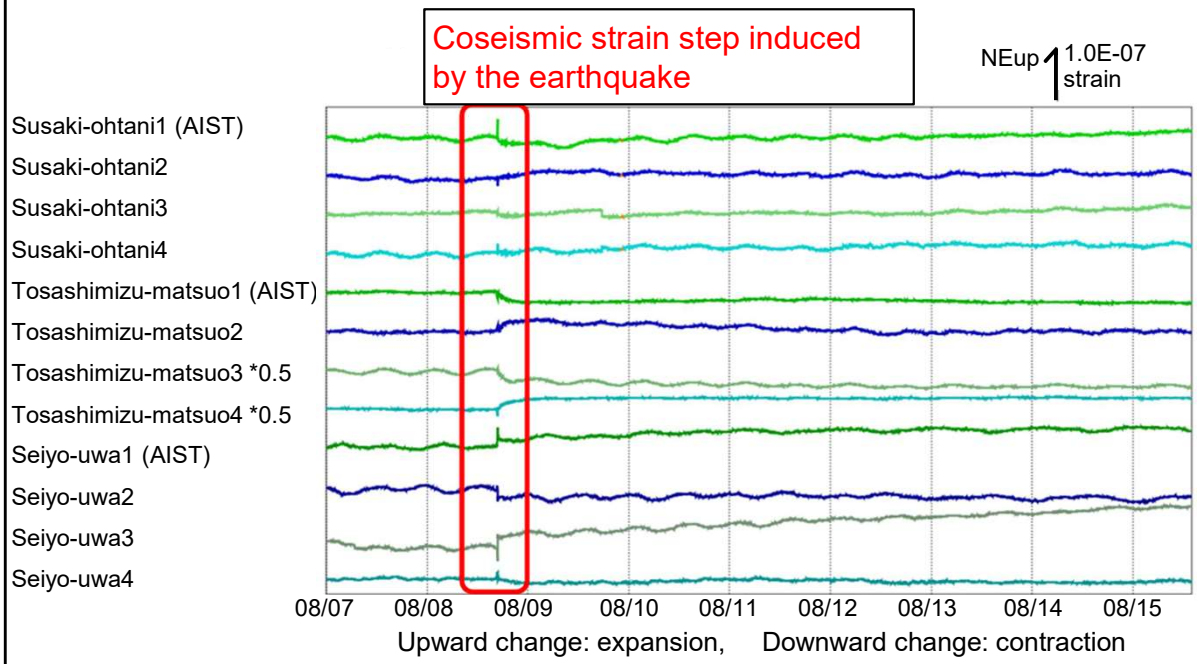
At 5:00 pm The government has ended its call for special attention.

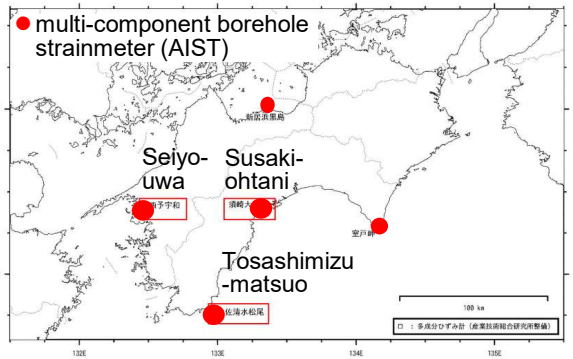
Nankai Trough Earthquake-Related Commentary

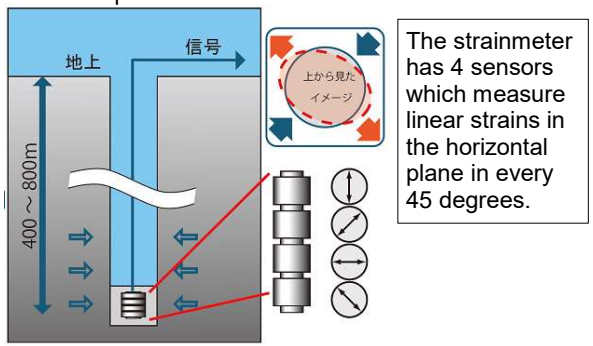
気象庁 Japan Meteorological Agency

✓ After the earthquake, significant changes were not observed in crustal volume strain and in seismicity along the Nankai Trough.
⇒The state of fixation of plate boundaries has not obviously changed.

Changes in crustal volume strain (corrected minutes values)

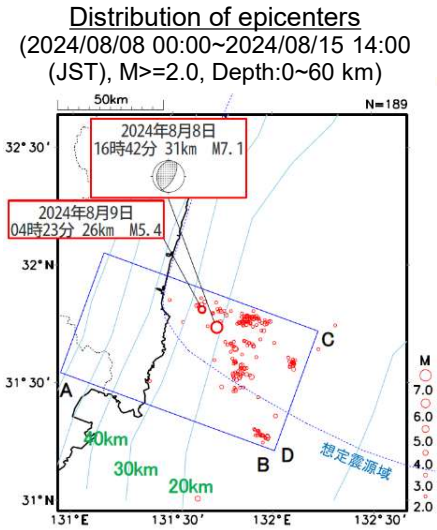


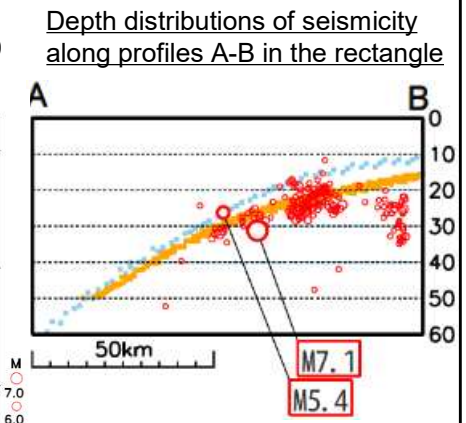


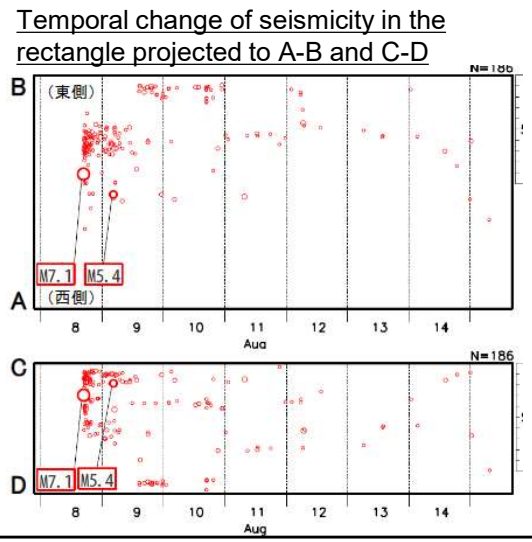


The strainmeter has 4 sensors which measure linear strains in the horizontal plane in every 45 degrees.

Seismicity







(https://www.jma.go.jp/jma/press/2408/15a/kaisetsu202408151800.pdf)

What happened

August 8, 2024,
At 4:42 pm (JST) The earthquake occurred.
At 5:00 pm “Nankai Trough Earthquake Extra Information (Under Analysis)”
Nankai Trough Earthquake Assessment Committee meeting
At 7:15 pm “Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)”
At 7:45 pm Press Conference
⇒The government called on the public to remain prepared for an earthquake.

August 9 - 15
“Nankai Trough Earthquake-Related Commentary” was issued daily to provide updated analysis results.

August 15
At 5:00 pm The government has ended its call for special attention.

End of the government's call for special attention

気象庁 Japan Meteorological Agency

At 5:00 p.m. on August 15th(JST) , the government's call for special attention following the announcement of “Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)” has ended.

However, the possibility of a mega earthquake has not disappeared, so the government has called on the people to continue their “earthquake preparedness daily".

Society Response

- Residents and local governments responded in different ways.
  Following the "Nankai Trough Earthquake Extra Information (Megathrust Earthquake Attention)":
  - Some trains were suspended or operated at reduced speeds.
  - Some beaches were closed.
  - Some people canceled trips.

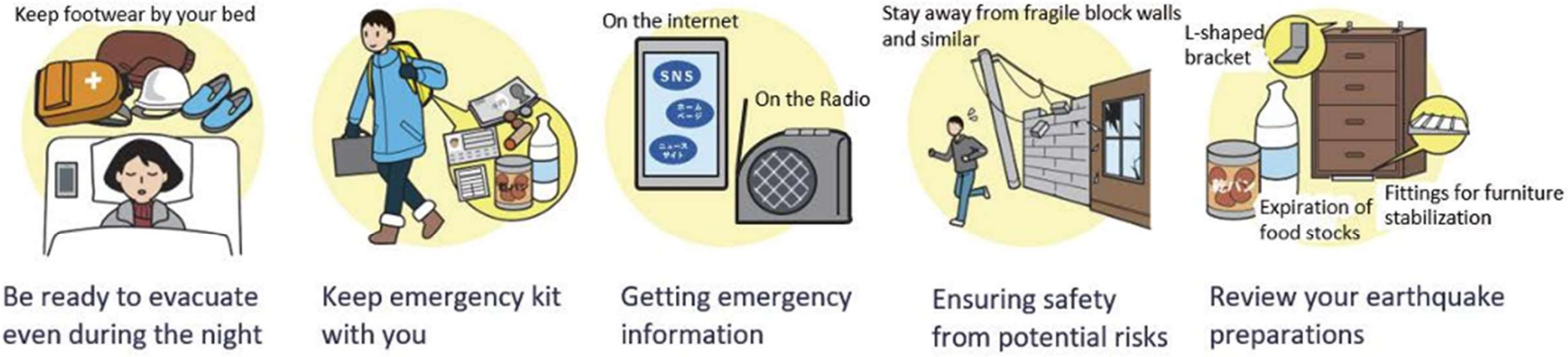
- Some report that the information has increased residents' awareness of disaster prevention.

- The government, along with academics, local governments and businesses, has launched a review of the case.

Daily Earthquake Preparedness

気象庁 Japan Meteorological Agency

✓ People should remain prepared for an earthquake on a daily basis.



Thank you for your kind attention.