## ◆Overview

| | |
|---|---|
| Origin Time | 2021-02-13 23:07 (JST)<br>2021-02-13 14:07 (UTC) |
| JMA Magnitude (M$_{JMA}$) | 7.3 |
| Moment Magnitude (Mw) | 7.1 (USGS, F-net) |
| Epicenter Region | East off Fukushima Pref. |
| Depth | 55 km |
| Focal Mechanism | Reverse fault with a compression axis in a WNW-ESE direction |
| Event Type | Intraslab earthquake in the Pacific plate |
| Maximum JMA Seismic Intensity | 6 upper (Miyagi Pref., Fukushima Pref.) |
| Long-Period Ground Motion (LPGM) Class | Class 4 in Fukushima Pref. (See the figure below) |
| Damage | 12 seriously injured, 141 slightly injured, and 162 houses partially damaged. [*1] |
| Remarks | A landslide covers a part of the Joban Expressway in Soma, Fukushima Prefecture, but no one was injured. [*1] |

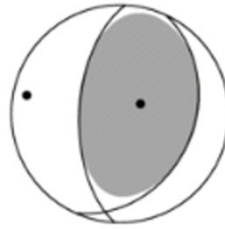https://www.jma.go.jp/jma/press/2102/14a/kaisetsu202102140110.pdf
*1 :https://www.fdma.go.jp/disaster/info/items/210213_fukushimakenokijisjin8.pdf

## ◆ LPGM JMA Seismic Intensity Map
**(See the next page for more information about the scale)**



class1
class2
class3
class4
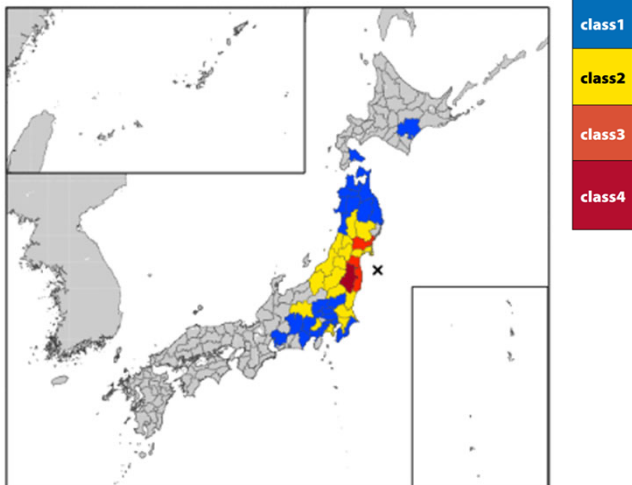
https://www.data.jma.go.jp/svd/eew/data/ltpgm_explain/data/past/20210213230800/index.html

## ◆Moment Tensor



Mw       = 7.1
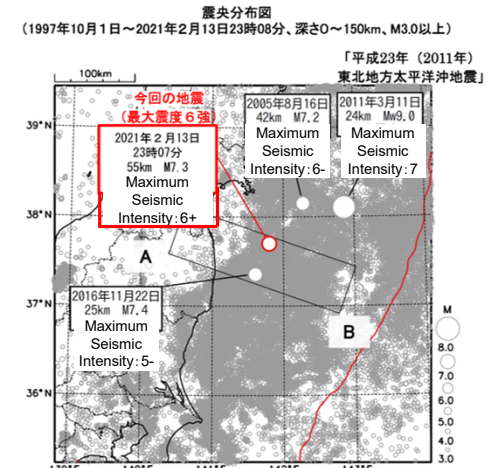Mo [Nm] = 4.95e+19
NP1: ( 24, 33,  108)
NP2: (183, 59,   79)

F-net :https://www.fnet.bosai.go.jp/event/tdmt.php?_id=20210213140700&LANG=en

## ◆JMA Seismic Intensity Map
**(See the next page for more information about the scale)**



| JMA | NIED | Intensity |
|---|---|---|
| 7 | 7 | 7 |
| 6⁺ | 6⁺ | 6 Upper |
| 6 | 6⁻ | 6 Lower |
| 5⁺ | 5⁺ | 5 Upper |
| 5 | 5⁻ | 5 Lower |
| 4 | 4 | 4 |
| 3 | 3 | 3 |
| 2 | 2 | 2 |
| 1 | 1 | 1 |

km
0        50
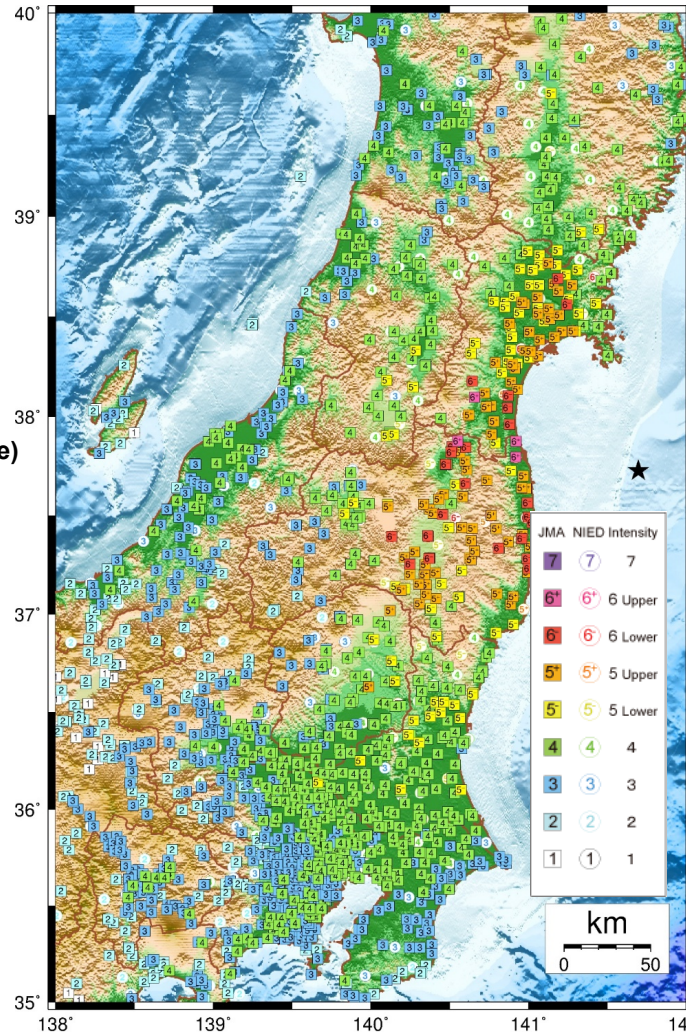
## ◆Epicenter and Hypocenter Distribution

### [Epicenter]

令和３年２月13日　福島県沖の地震
（発生場所の詳細）
震央分布図
（1997年10月１日～2021年２月13日23時08分、深さ0～150km、M3.0以上）



「平成23年（2011年）東北地方太平洋沖地震」

今回の地震（最大震度６強）
2021年２月13日 23時07分 55km M7.3 Maximum Seismic Intensity : 6+

2005年8月16日 42km M7.2 Maximum Seismic Intensity : 6-

2011年3月11日 24km Mw9.0 Maximum Seismic Intensity : 7

2016年11月22日 25km M7.4 Maximum Seismic Intensity : 5-

丸の大きさはマグニチュードの大きさを表す。
赤い線は海溝軸を示す。

### [Hypocenter]

上図の四角形領域内のA−B断面図



2016年11月22日 M7.4

2021年２月13日 M7.3

今回の地震

縦軸は深さを表し、丸の大きさはマグニチュードの大きさを表す。

https://www.jma.go.jp/jma/press/2102/14a/kaisetsu202102140110.pdf
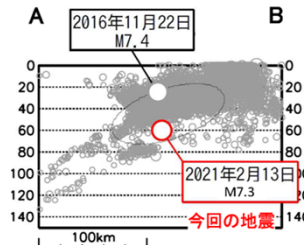
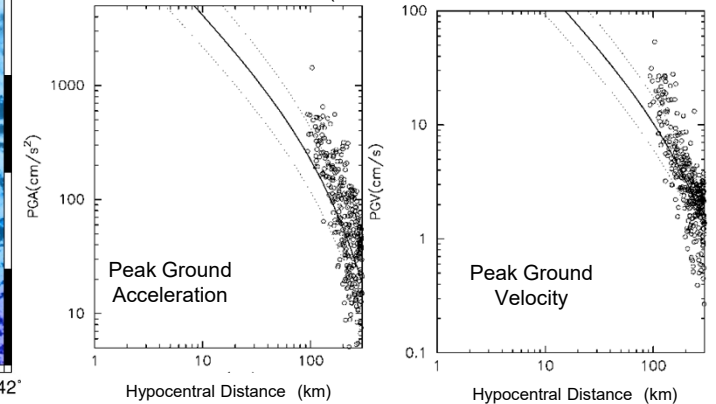## ◆ Attenuation Characteristics of Ground Motion

○ K-NET, KiK-net (Surface)
— Si and Midorikawa (1999) : Intraslab earthquake, Mw7.1 (F-net)



Peak Ground Acceleration

Peak Ground Velocity

## ● Summary of the JMA Seismic Intensity Scale

**0**
- Imperceptible to people.

**1**
- Felt slightly by some people keeping quiet in buildings.

**2**
- Felt by many people keeping quiet in buildings.

**3**
- Felt by most people in buildings.

**4**
- Most people are startled.
- Hanging objects such as lamps swing significantly.
- Unstable ornaments may fall.

**5 Lower**
- Many people are frightened and feel the need to hold onto something stable.
- Dishes in cupboards and items on bookshelves may fall.
- Unsecured furniture may move, and unstable furniture may topple over.

**5 Upper**
- Many people find it difficult to walk without holding onto something stable.
- Dishes in cupboards and items on bookshelves are more likely to fall.
- Unsecured furniture may topple over.
- Unreinforced concrete-block walls may collapse.

**6 Lower**
- It is difficult to remain standing.
- Many unsecured furniture moves and may topple over. Doors may be stuck.
- Wall tiles and windows may sustain damage and fall.
- In wooden houses with low earthquake resistance, tiles may fall and buildings may lean or collapse.

High earthquake resistance    Low earthquake resistance

**6 Upper**
- It is impossible to move without crawling. People may be thrown through the air.
- Most of unsecured furniture moves, and is more likely to topple over.
- Wooden houses with high earthquake resistance may lean in some cases.
- Large cracks may form, and large landslides and massif collapses may be seen.

High earthquake resistance    Low earthquake resistance

**7**
- Wooden houses with low earthquake resistance are even more likely to lean or collapse.
- Wooden houses with high earthquake resistance may lean in some cases.
- Reinforced-concrete buildings with low earthquake resistance are more likely to collapse.

High earthquake resistance    Low earthquake resistance

## JMA Intensity Scale for Long-Period Ground Motion

| Long-Period Ground Motion(LPGM) class | Human perception | Indoor situation |
|---|---|---|
| **class1** | • Felt by most people in buildings. Some people are startled. | • Hanging items such as lamps and blinds swing significantly. |
| **class2** | • Many people find it difficult to walk without holding onto something stable. | • Furniture on casters moves slightly.<br>• Items in cupboards and bookshelves may fall.<br>• Some of unsecured moves and may topple over. |
| **class3** | • It's difficult to remain standing. | • Furniture on casters moves significantly.<br>• Some of unsecured moves and may topple over.<br>• Partition walls may crack. |
| **class4** | • It's impossible to remain standing or move without crawling.<br>People are at the mercy of shaking. | • Furniture on casters moves significantly and may topple over.<br>• Unsecured furniture moves and may topple over.<br>• Partition walls are likely to crack. |

As Seismic Intensity data only partially express the strength of long-period shaking on higher floors, JMA is using a four-category intensity scale for LPGM to indicate the strength of shaking in high-rise buildings and the possibility of related damage.

The scale quantifies the effects of shaking in a high-rise building with a natural period of around 1.5 to 8 seconds (approx. 14 stories or more). There are four classes based on degrees of human perception and damage, such as toppling or shifting of furniture and fixtures. The conditions indicated are a rough guide, and actual damage may differ. Effects also vary with factors such as building/structural conditions and the duration of earthquake motion.

https://www.jma.go.jp/jma/kishou/books/jishintsunami/en/jishintsunami_en.pdf