

## Press Briefing

# Earthquakes and Volcanic Activity in Japan

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Time & Date: February 15 (Wed), 2017, 12:00-13:30

Place: Foreign Press Center Japan (6th floor, Nippon Press Center Bldg, 2-2-1 Uchisaiwaicho)

2017/2/15

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- 1. The 2016 Kumamoto Earthquake**
- 2. The Metropolitan Earthquake**
- 3. The 2011 Tohoku-oki earthquake and its effects**
- 4. The Nankai Trough Giant Earthquake and its disaster**
- 5. Summary**

# 1. The 2016 Kumamoto Earthquakes

- At 21:26 on April 14th, 2016, a magnitude (M) 6.5 earthquake occurred at a depth of 10 km in Kumamoto.
- At 1:25 on April 16<sup>th</sup>, 28 hours later, a M7.3 event occurred at a depth of about 10km there again.
- Both events brought a seismic intensity, Shindo in Japanese, of 7 in JMA scale, at Mashiki Town

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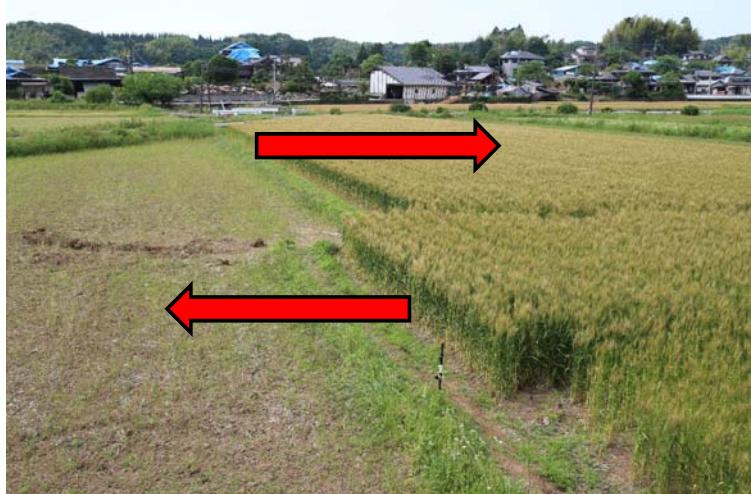
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# Surface faulting and known active faults

- Along the Futagawa fault zone, about 30 km long, a series of surface faults are found.
- The maximum faulting is 2.2 m right-lateral slip at Mashiki town, Dozon area.

## Right-lateral surface slip



2016, May 14th Naoshi Hirata @Mashiki town

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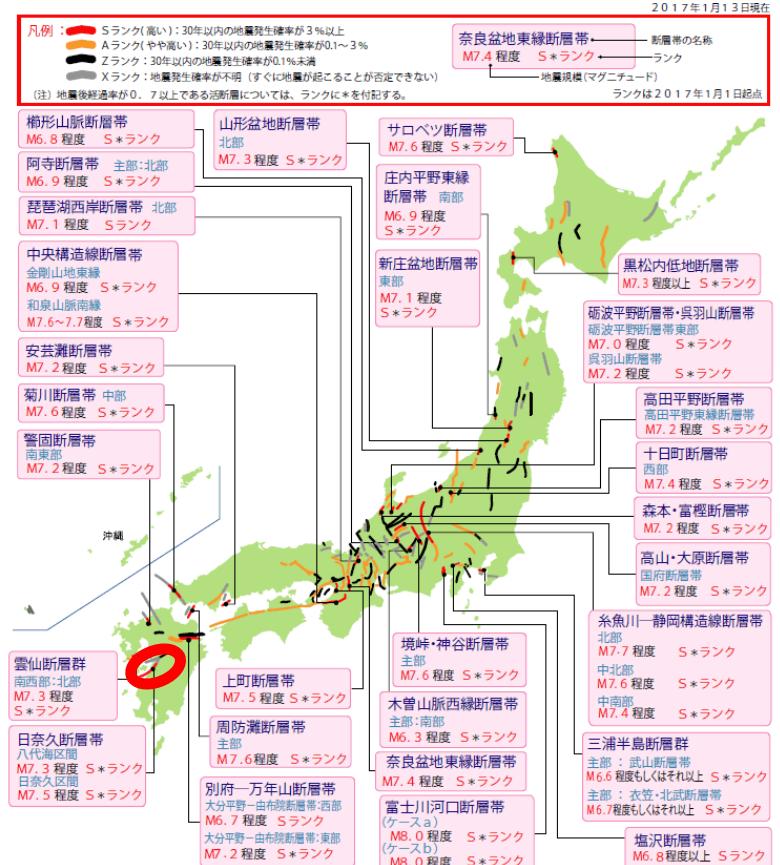
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# Major Active faults (97faults)

Head quarters for  
Earthquake Research  
Promotion (HERP)  
Earthquake Research  
Committee (ERC)

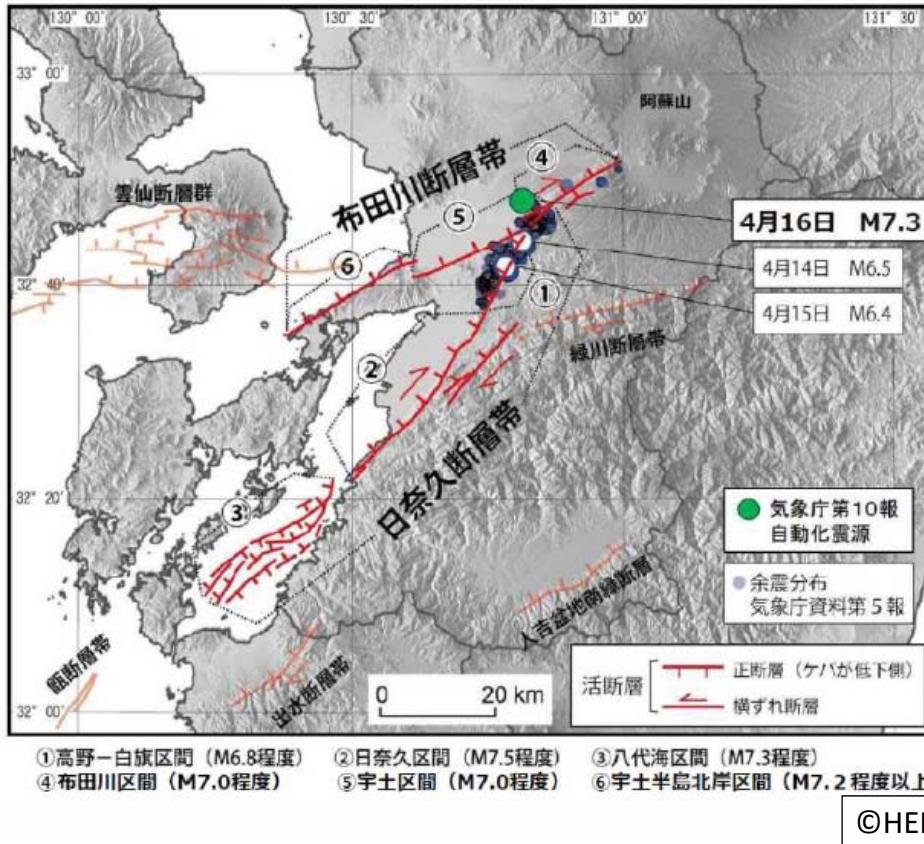
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## Long term evaluation of active faults

### ○ Hinagu fault zone 日奈久断層帶

2013, Feb. 1  
HERP, erC

- Takano-Shirahata Segment: M6.8
- 2 m Right lateral slip
- Occurrence probability can not evaluated because an average interval is not konw

### ○ Futagawa Fault zone 布田川断層帶

- Futagawa segment: M7.0
- 2 m Right lateral slip
- Occurrence probability : about 0%—0.9% in 30 yrs.
- Futagawa segment belong to a fairly high group

- Average Interval : 8100 – 26000 yrs
- Latest event: ac 6900~ac.2200 yr

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# Assessment of the Futagawa fault zone in February 2013 by ERC

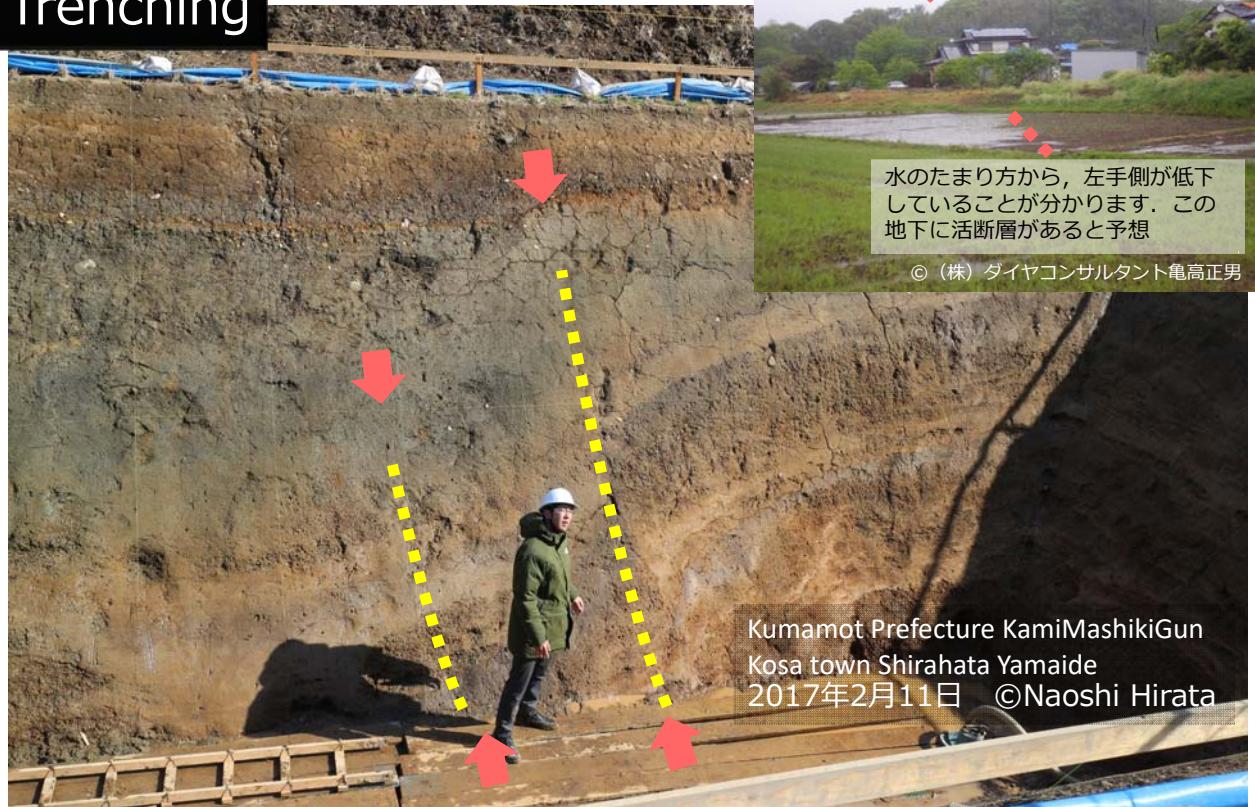
- Along the Futagawa segment of the Futagawa fault zone, an earthquake with M7.0 may occur with a 2 m right-lateral slip.
- A chance of occurrence of the event is approximately 0 to 0.9% in 30 years.
- The segment is classified to belong to “fairly high possibility” group among about 100 prominent active faults.

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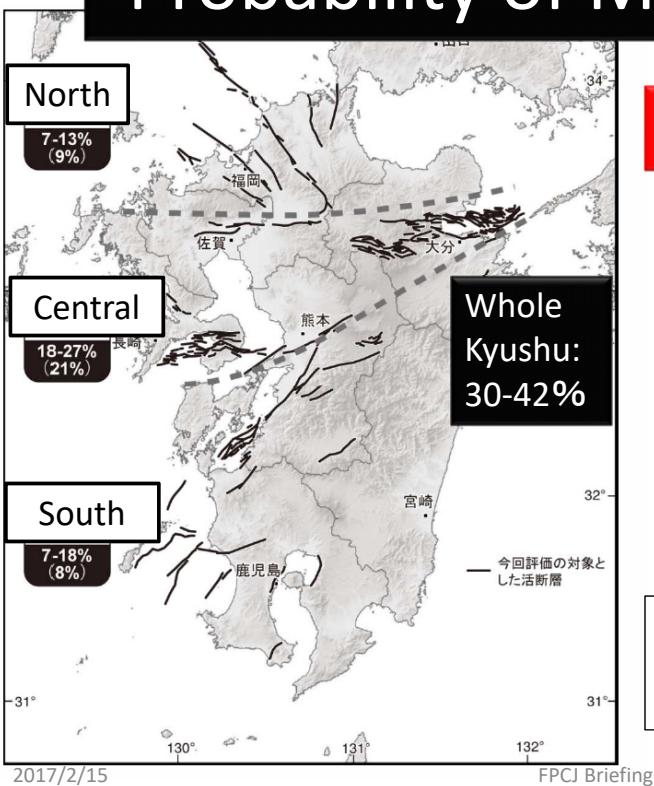
## Trenching



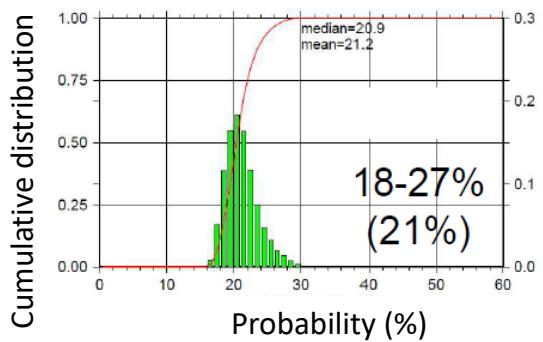
National Institute of Advanced Industrial Science and Technology (AIST) : Trenching Survey by the MEXT Project for the 2011 Kumamoto Earthquake

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# Probability of M6.8+ in 30 yrs



Central Kyushu: 18-20%



© Earthquake Reserch Committee,  
Headquarters for Earthquake Research  
Promotion (HERP)

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熊本市東区  
14%

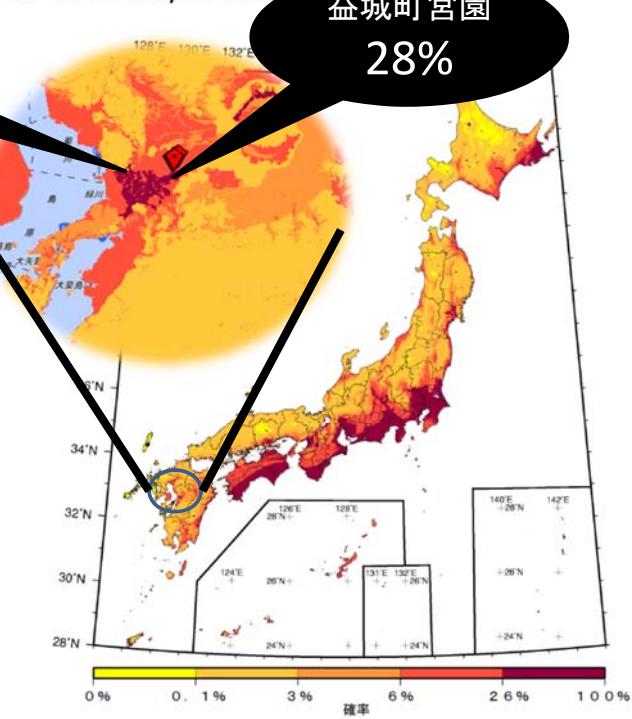
益城町宮園

28%

Probabilistic Seismic  
Hazard Assessment:  
A chance of Japanese  
Seismic Intensity 6- or  
larger in 30 years:  
as of Jan. 1 2016

- Injury by traffic accidents: 24%
- Suffering from fire: 1.9%

©HERP, ERC



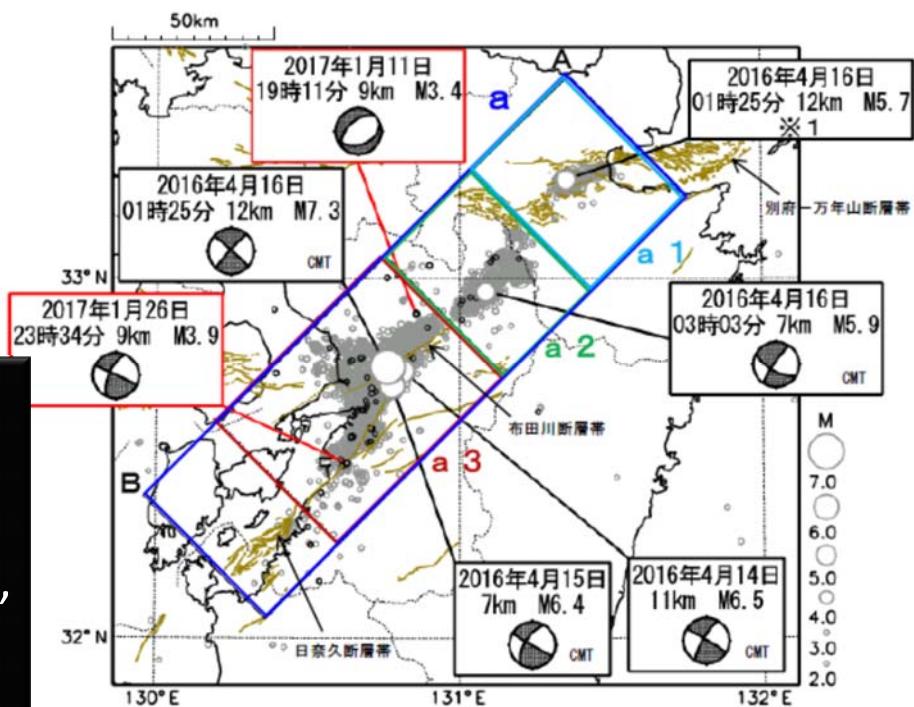
Probability of earthquake occurence  
+ Site amplification

(2016 April 14, ~2017 Jan, 31, Depth 0 ~20km、 $M \geq 2.0$ )

As of now, seismic activities are getting quite , but stil continuing

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## Epicentral Distribution 2017年1月の地震を濃く表示

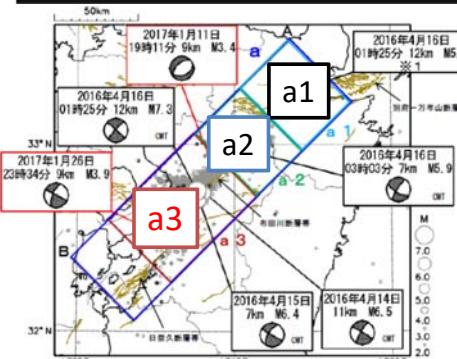


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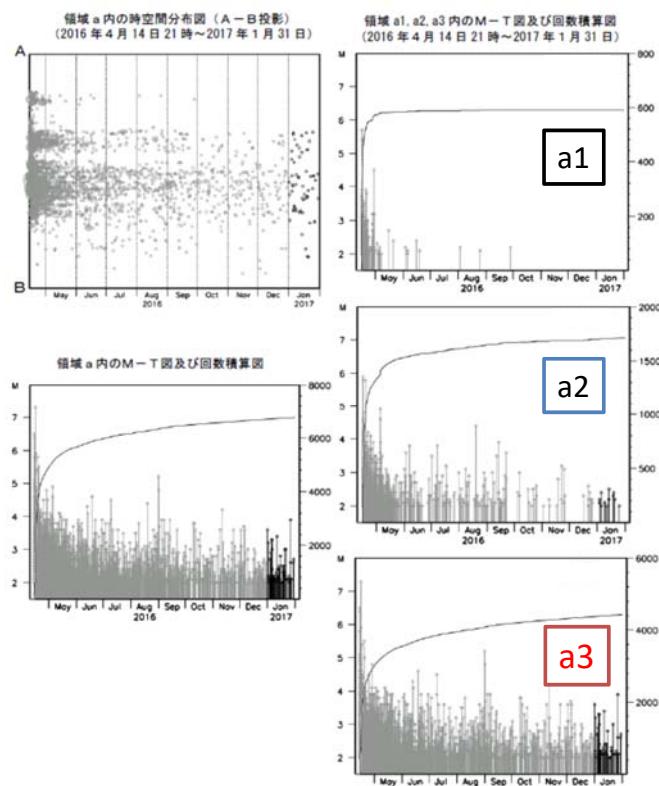
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## Temporal Change

As of now, seismic activities are getting quite , but stil continuing



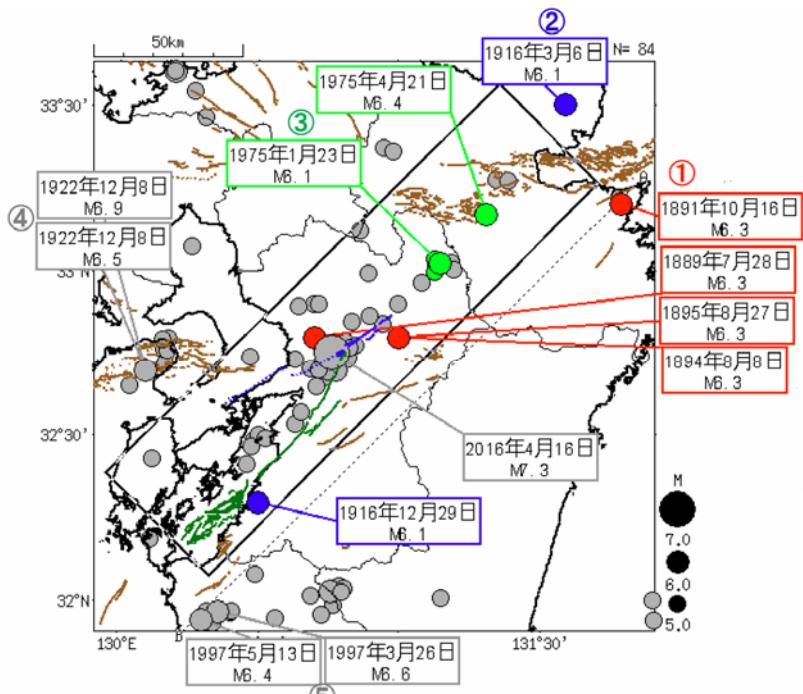
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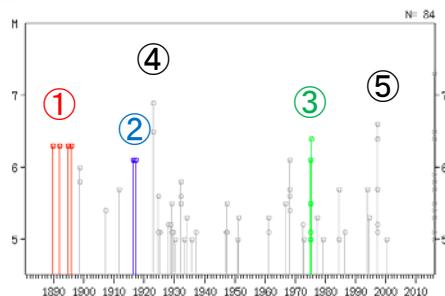
# Inland shallow earthquakes in Kushu (1889- )



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- ① 1889 Kumamoto earthquake was associated with 4 M6 class events in 6 yrs
- ② In 1916, M6 class events occurred in 10 month
- ③ In 1975, 2 M6 in 3 months



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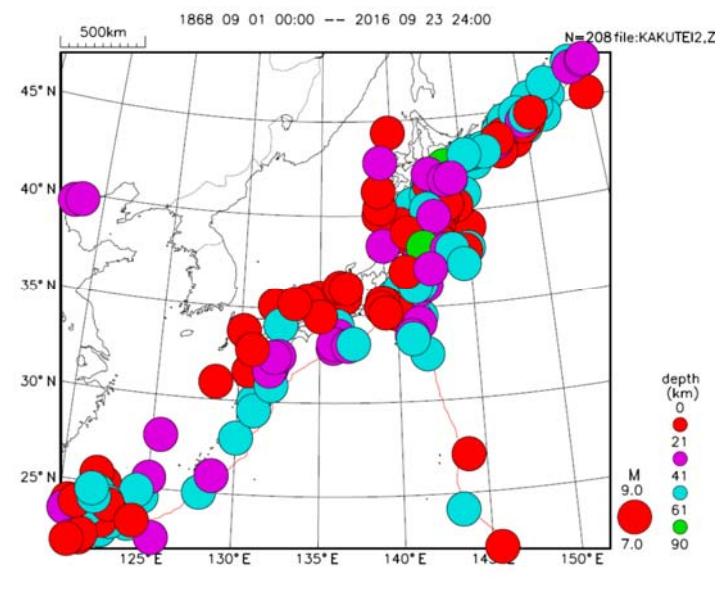
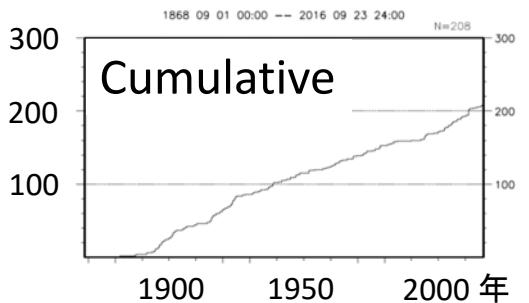
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# 208 M 7 events in 148 yrs (1868 -2016)

回数



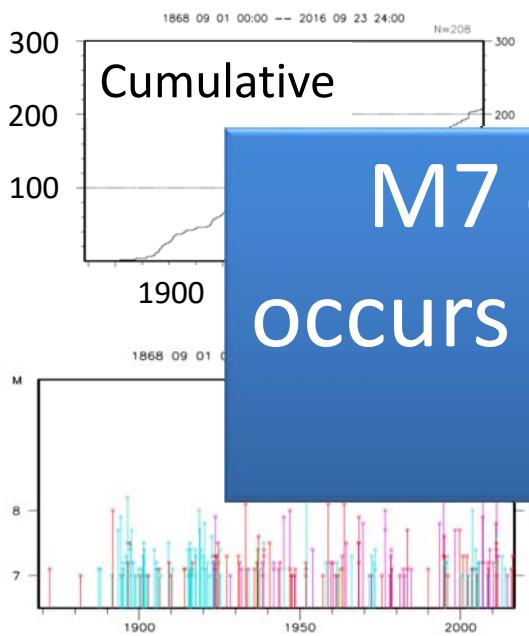
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# 208 M 7 events in 148 yrs (1868 -2016)

回数



M7 class event  
occurs once or twice  
every



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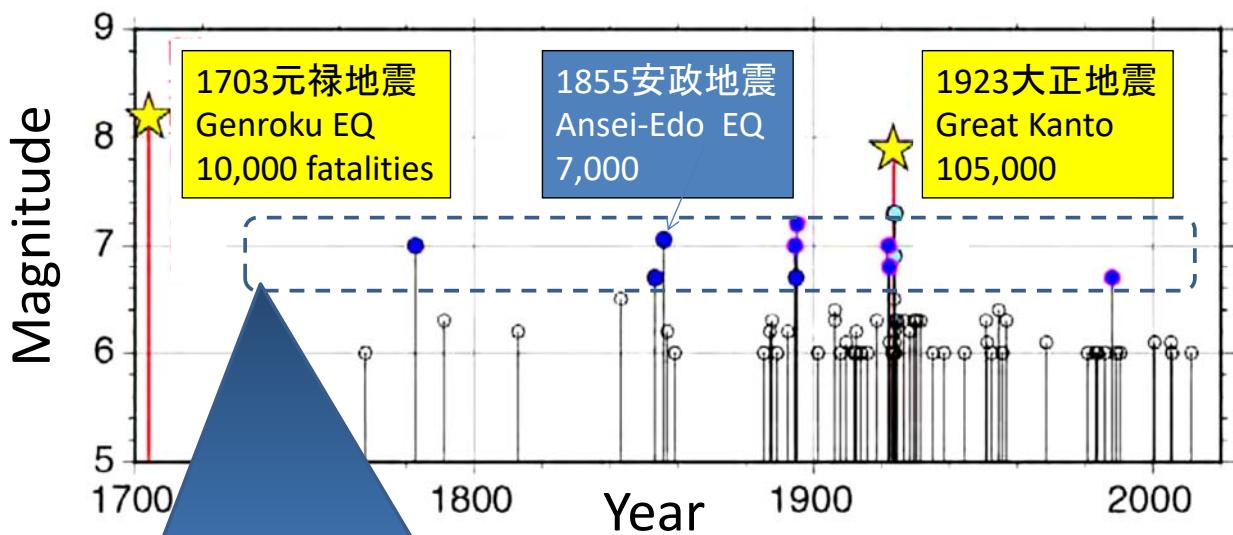
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# Sever Seismic Disaster in Kanto

HERP, ERC (2018)

## M8-class earthquakes along the Sagami Trough



## M7-class earthquakes caused by subduction of Philippine Sea Plate from the Sagami Trough

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### M7 class events associated with Philippine Sea plate subduction

- 太赤線で囲まれた範囲が評価対象領域を示す。
- 細赤線は最大クラスの地震の震源域を示す。
- 破線は本評価で用いたフィリピン海プレート上面の等深線を示す。

#### M6.7～7.3の地震

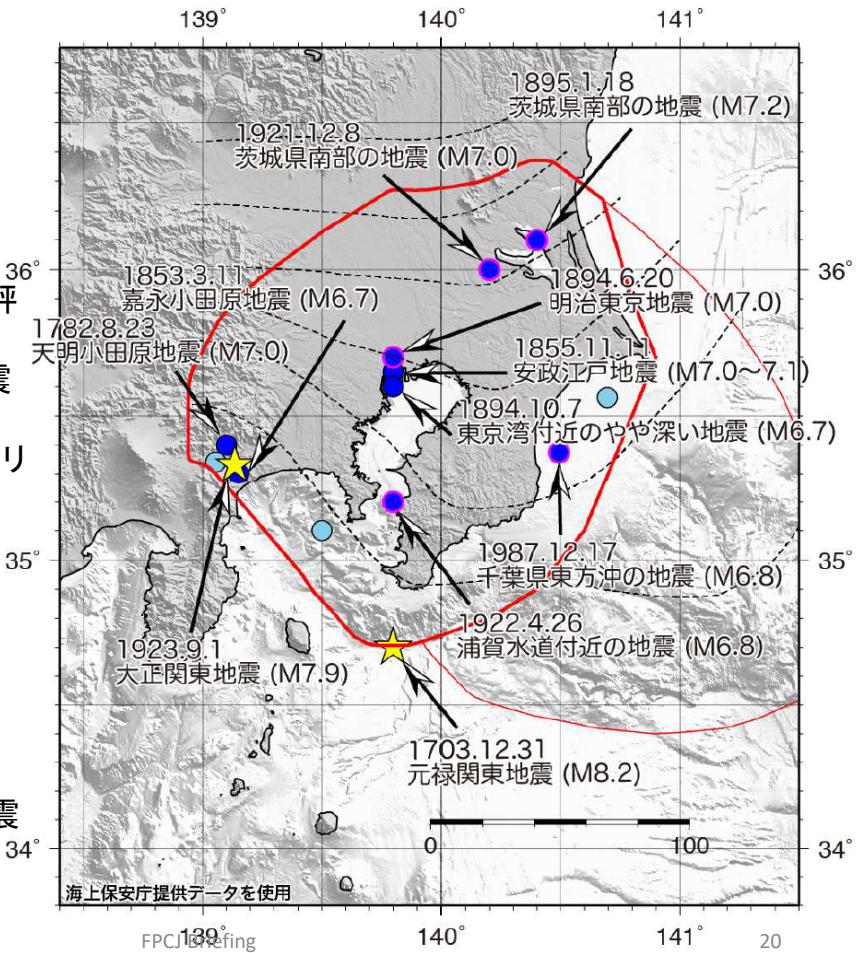
● : 本評価で対象とした地震  
(9地震)

(参考)

○ : 大正関東地震(1923)の余震

○ : 前回評価対象とした地震

★ : M8クラスのプレート境界地震



# Metropolitan Earthquake

An earthquake which may cause a  
gigantic earthquake disaster in Tokyo  
Metropolitan area

◆Hazard (External force to a society)

An “usually” large earthquake which is as large  
as the 2016 Kumamoto earthquake, which may  
occur anywhere in Japan

◆Exposure : Extraordinary large

◆Disaster risk : Large

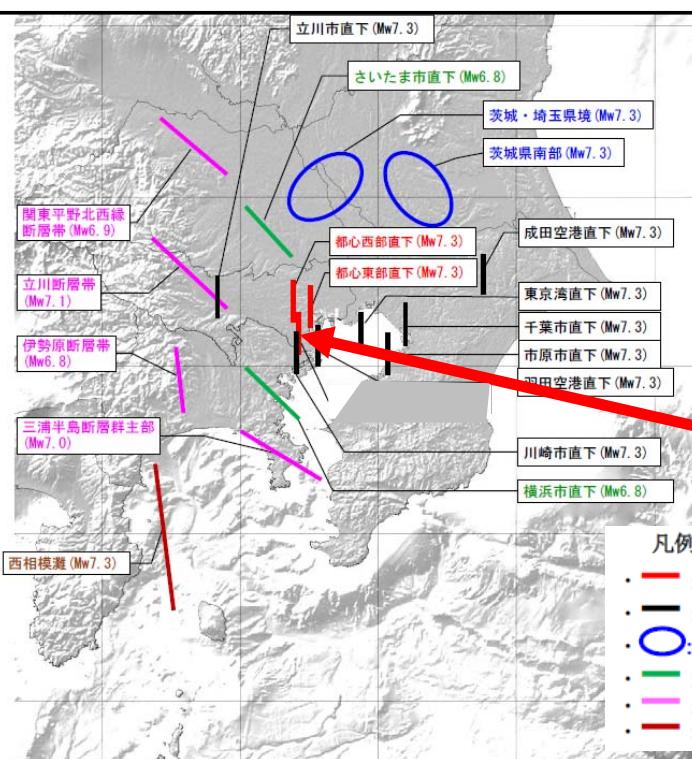
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## 首都直下地震の揺れと被害の予測

内閣府が検討対象とした「首都直下地震」の断層



可能性のある場所  
19の断層を「仮定」

仮定  
震源断層の想定

都心南部直下地震  
(Mw7.3)

凡例

- : 都区部のフィリピン海プレート内の地震
- : 都心部周辺のフィリピン海プレート内の地震
- : 北米プレートとフィリピン海プレートの境界地震
- : 地表断層が不明瞭な地殻内の地震
- : 活断層の地震 (地表断層が明瞭な地殻内の地震)
- : 西相模灘の地震

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防災

# Seismic Hazard/Risk Estimation



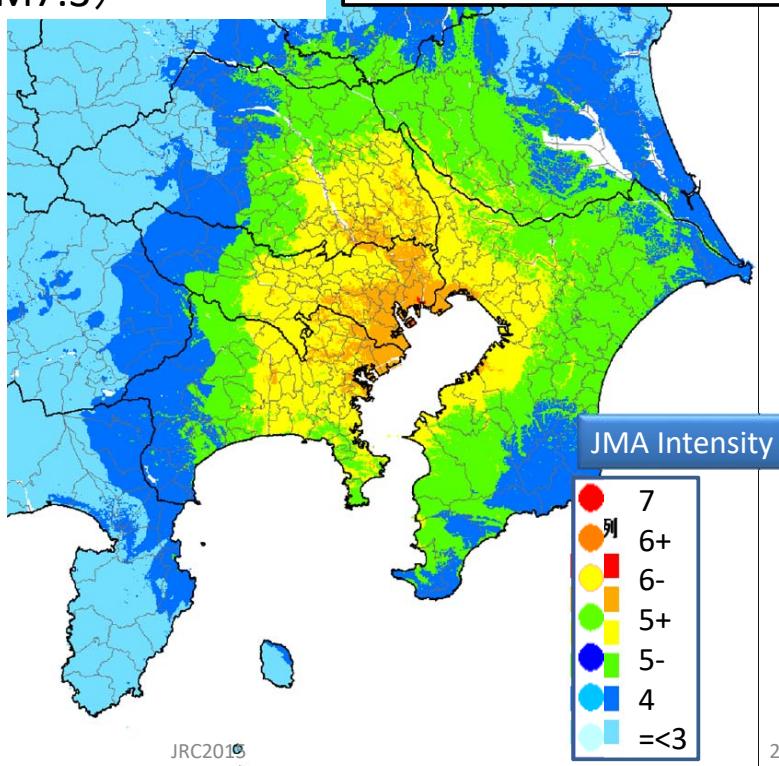
Assumed earthquake beneath southern CBD Tokyo (M7.3)

Central Disaster Prevention Council,  
Cabinet Office (2013)

**Area with 6- is 4,500 km<sup>2</sup>**  
**30% of Tokyo, Chiba, Kanagawa, Saitama Prefectures.**

**Estimated fatality:**  
**23,000**  
**Economic losses:**  
**JPY 95 trillions**

2015/4/17



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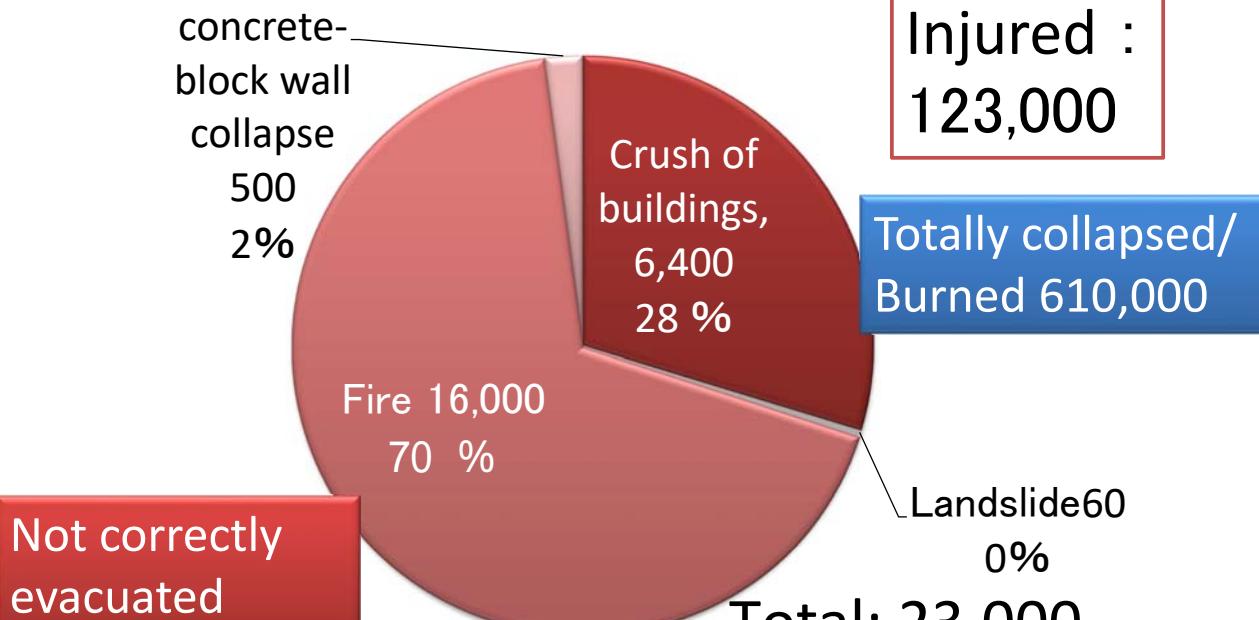


一般社団法人  
防災教育普及協会  
www.bousai-edu.jp

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## 3.2. Death toll by the southern central business district (CBD) earthquake (winter/evening)



2015/4/17

JRC2015

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