[IAG-IASPEI 2017] Kobe, JAPAN Aug.04.2017
J09 Geodesy and seismology general contributions

Geodetic and Seismological Risk of Operation of Nuclear Power Plants in Japan

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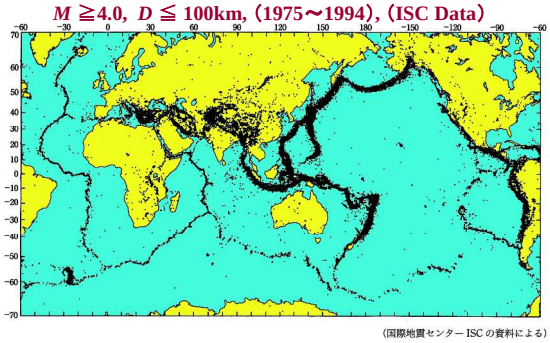
Earthquake distribution map of the world

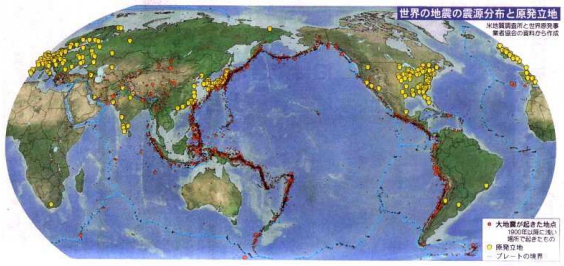
M ≧4.0, *D* ≦ 100km, (1975～1994), (ISC Data)



(国際地震センター ISC の資料による)

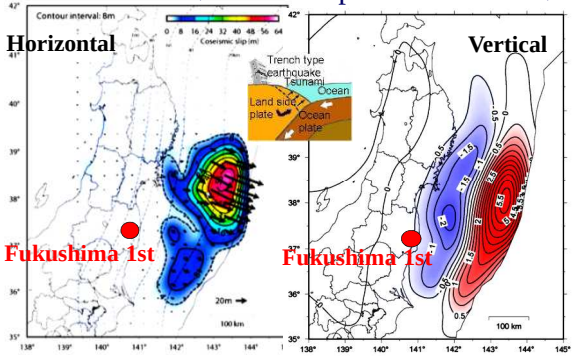
Japan area is about 0.25% of the whole world.
20% of M≧6 earthquakes are occurring in this area.

Distribution of Nuclear Power Plants in the World

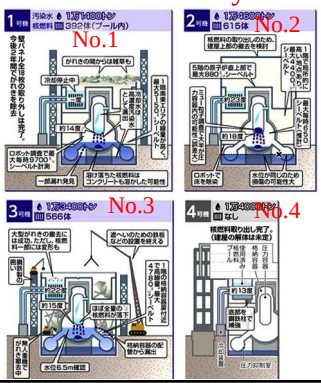


More than 50 nuclear plants were installed in Japan where is known as the tectonically active areas in the world. **"Akahata" Sunday-Ver., (May 22, 2011)**

2011 Tohoku Eq. (Mw9.0)
Source Model (GSI and Japan Coast Guard)



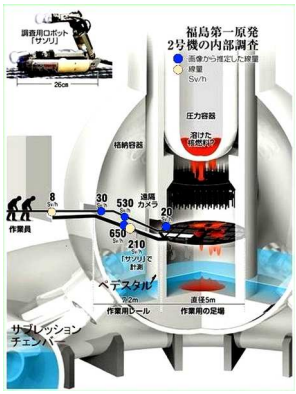
Present status of Fukushima 1st nuclear accident after 6 years (Reactors Nos.1～4)



Tokyo Shinbun Feb.11,'17

・The radiation released into the atmosphere in 2011 is about 1% of the total, while the remaining 99% is barely in the nuclear reactor and building's spent nuclear fuel pool.

No2 Reactor



Asahi Sinbun (Feb19, 17)

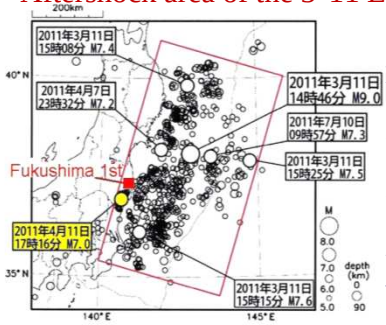
In the space inside the containment vessel, high radio-activity of 650 Sv/h is found!

650 Sv/hour
=5,690,000 Sv/year

Under control?

- When Prime Minister Abe invited the Tokyo Olympic Games, he declared that the Fukushima 1st Nuclear Power Plant was in an under control. **It is not true!**
- The Fukushima 1st nuclear plant is existing in the aftershock area of the 3/11 eq. of Mw9.0.
- In the past nuclear accidents in the world, there have been no cases that nuclear fuel debris was shaken with a strong motion of seismic intensity 6 or 7 after meltdown.

Aftershock area of the 3·11 Eq.（Mw 9, 0）



- **Aftershock of M 7.0 occurred on 11 Apr. at the epicentral distance of 61.7km.**
- **No damage to the equipment was reported.**

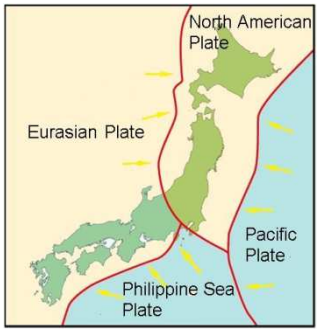
We are afraid that the nuclear plant is shocked again by the M7 class earthquake, epicentoral distance of which is within 10 km.

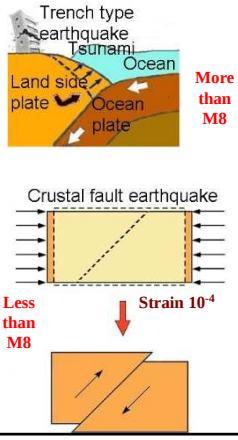
Major Eqs caused damage in and near Japan （1885～）

- On the Pacific side close to the plate boundary, trench type eqs exceeding M8 are occurring.
- The inland crustal fault eqs smaller than M8.0 are frequently occurring in and near Japan.

It cannot be known where the next M7 class earthquake will occur.

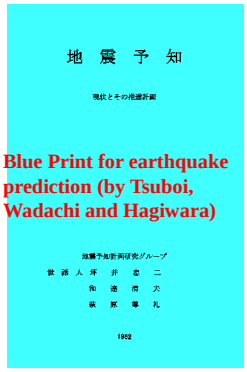
Types of earthquakes occurring in and near Japan





The national project of earthquake prediction in Japan

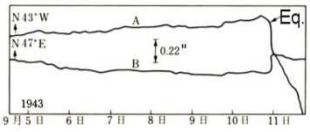
- 1962：Blue Print for earthquake prediction (by Tsuboi, Wadachi, Hagiwara)
- 1965：The national project of earthquake prediction started. Most prospective approach for short term predictions was considered to be continuous monitoring of crustal deformations based on data by Sassa and Nishimura (Kyoto Univ.)



Blue Print for earthquake prediction (by Tsuboi, Wadachi and Hagiwara)

Example of anomalous tilt change before Eq (M7,2)

Anomalous tilt change with the order of 0.1” was observed at the Ikuno mine located 60km away from the epicenter of the 1943 Tottori eq. of M7.2.



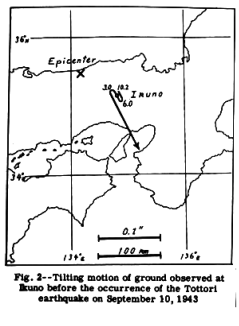
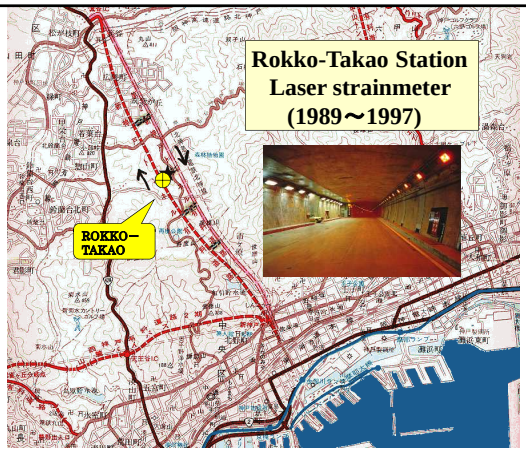
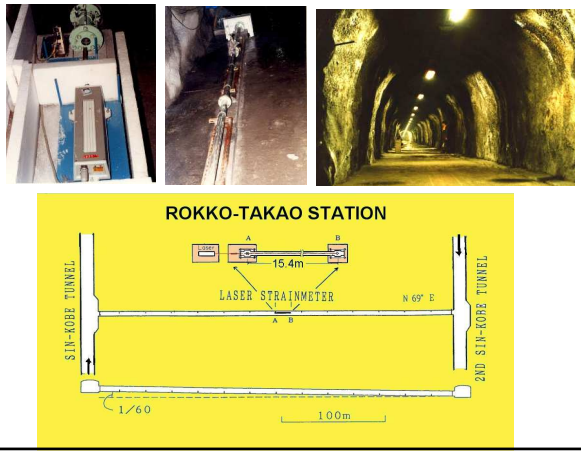
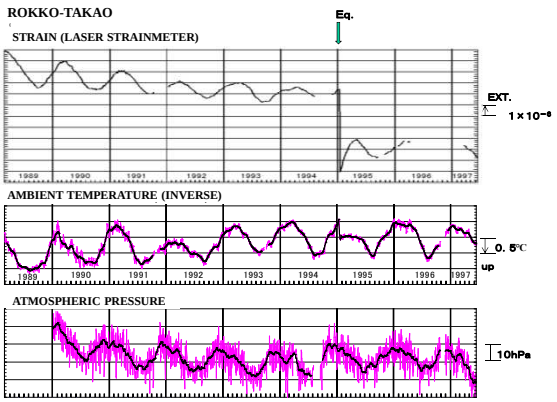


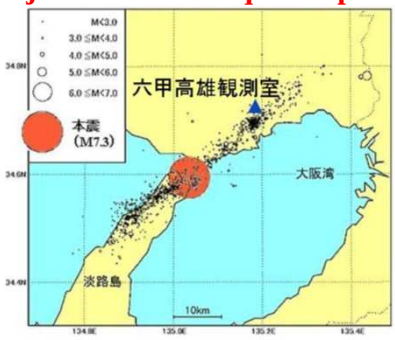
Fig. 2--Tilting motion of ground observed at Ikuno before the occurrence of the Tottori earthquake on September 10, 1943







We could not observe anomalous strain change by the laser strainmeter installed just above the Eq. fault plane.

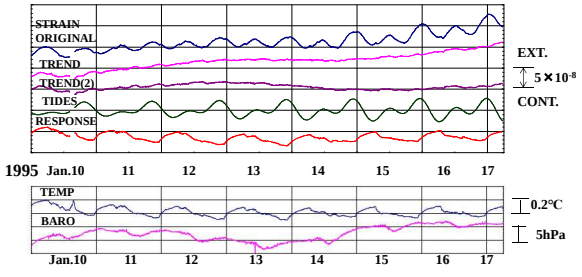


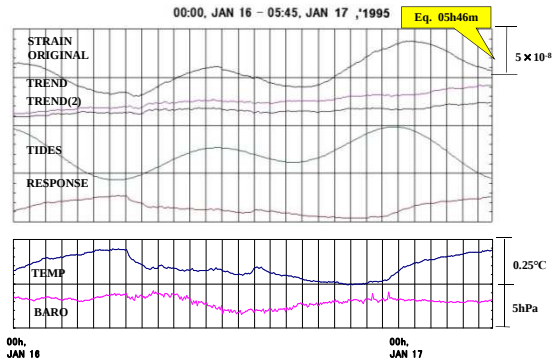
● :Mainshock of the Hyogo-ken Nanbu Earthquake (M7.3) and aftershock distribution within 24 hs.

▲:Rokko-Takao Station

We could not predict the Hyogo ken nanbu earthquake (M7.3) !

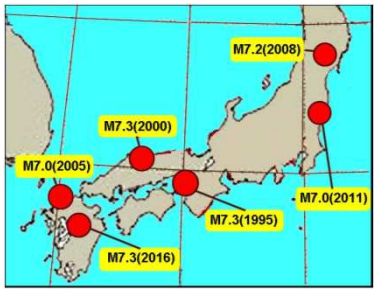
(1 week data before the occurrence of the earthquake)





Although observation was carried out just above the seismic fault region of M 7.3, no abnormal strain change was observed before the occurrence of earthquake.

Earthquake prediction in M7 class is impossible！



After the Hyogo ken Nanbu eq. of M7.3 (Jan. 17, 1995), following eqs ≧M7 were occurred in Japan

Western Tottori eq。 M7.3 (2000)

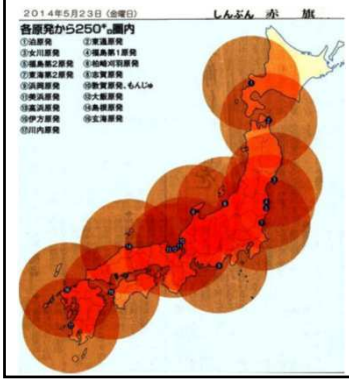
Fukuoka pref.west offshore eq. M7.0 (2005)

Iwate-Miyagi inland Eq .M7.2 (2008)

Fukushima pref. Hama-dori eq. M 7.0 (2011)

Kumamoto eq. M7.3 (2016)

Drawing a circle of 250 km from each nuclear plant…



All areas of Japan excluding the eastern part of Hokkaido and Okinawa fall within this range.

Most people living in Japan become the person concerned of the nuclear plant accident.