



# Post-Fukushima Assessment and Actions

**ENSREG**

**Brussels, June 11, 2013**

**Kenzo Oshima**

**NRA Commissioner**

# What happened ?

- **Earthquake and Tsunami**
- **SBO**
- **Cooling failure**
- **Core damage/Containment failure/  
Fuel meltdowns**
- **Hydrogen explosions**
- **Radioactive release**

**The worst “complex disaster”  
(Natural hazards + Human induced failures)**





by Tokyo Electric Power Co

by Tokyo Electric Power Co



by Tokyo Electric Power Co





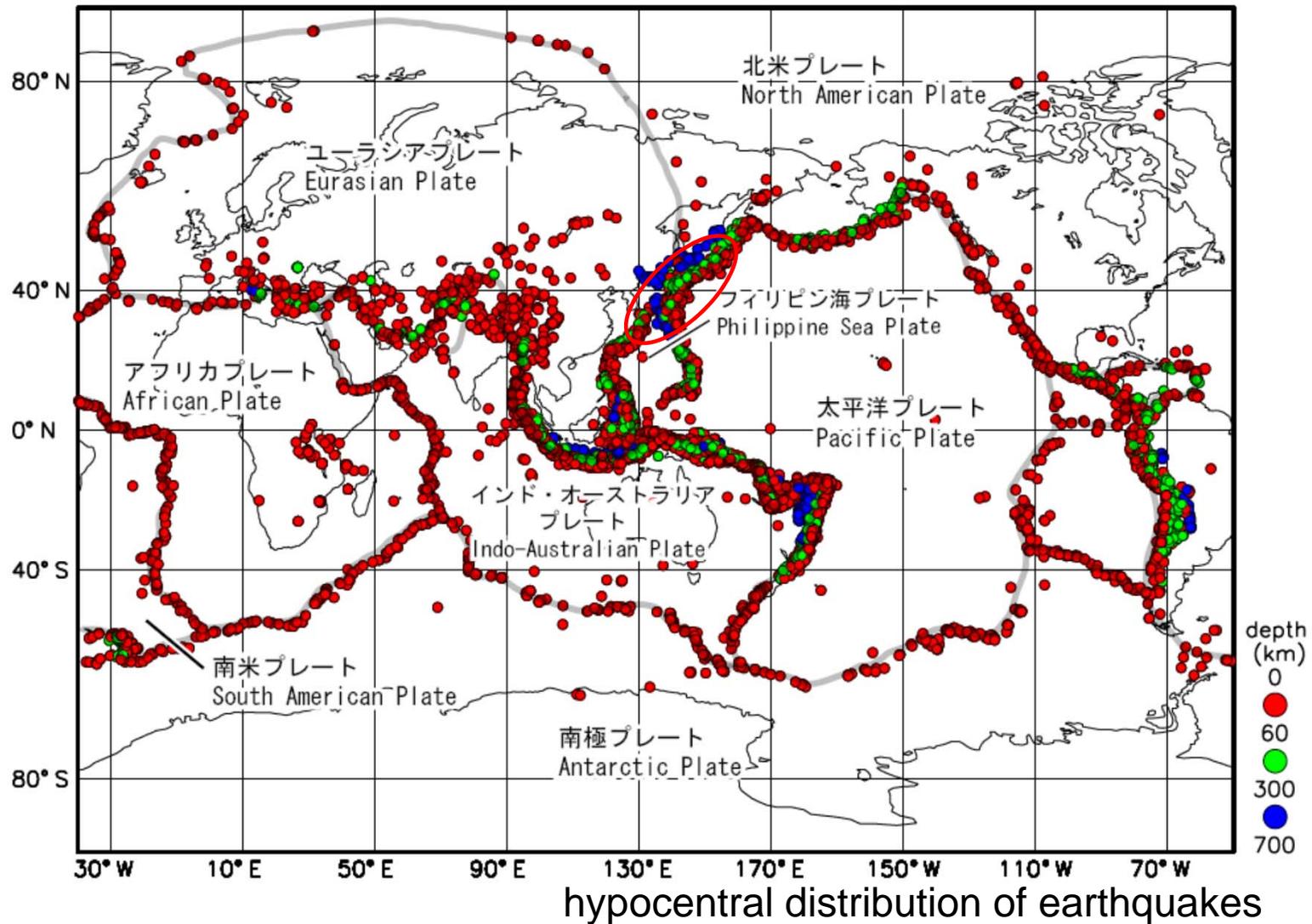
by Tokyo Electric Power Co



by AIR PHOTO SERVICE

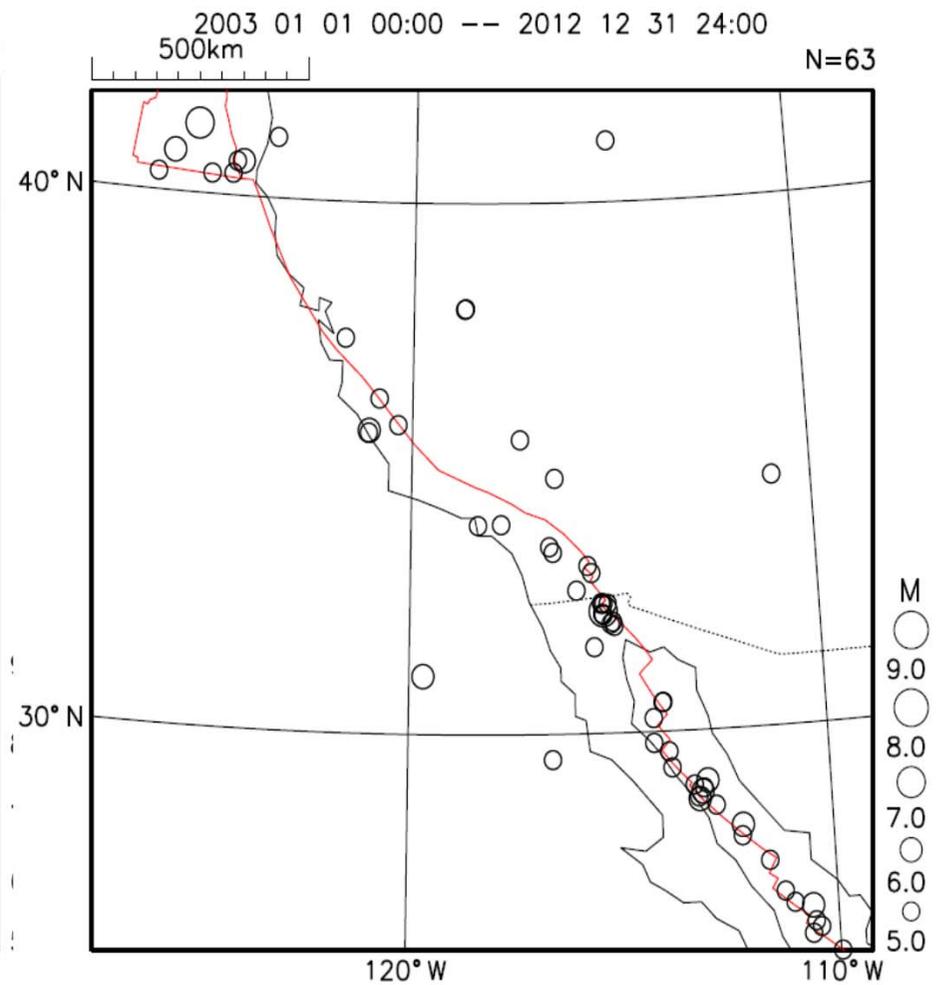
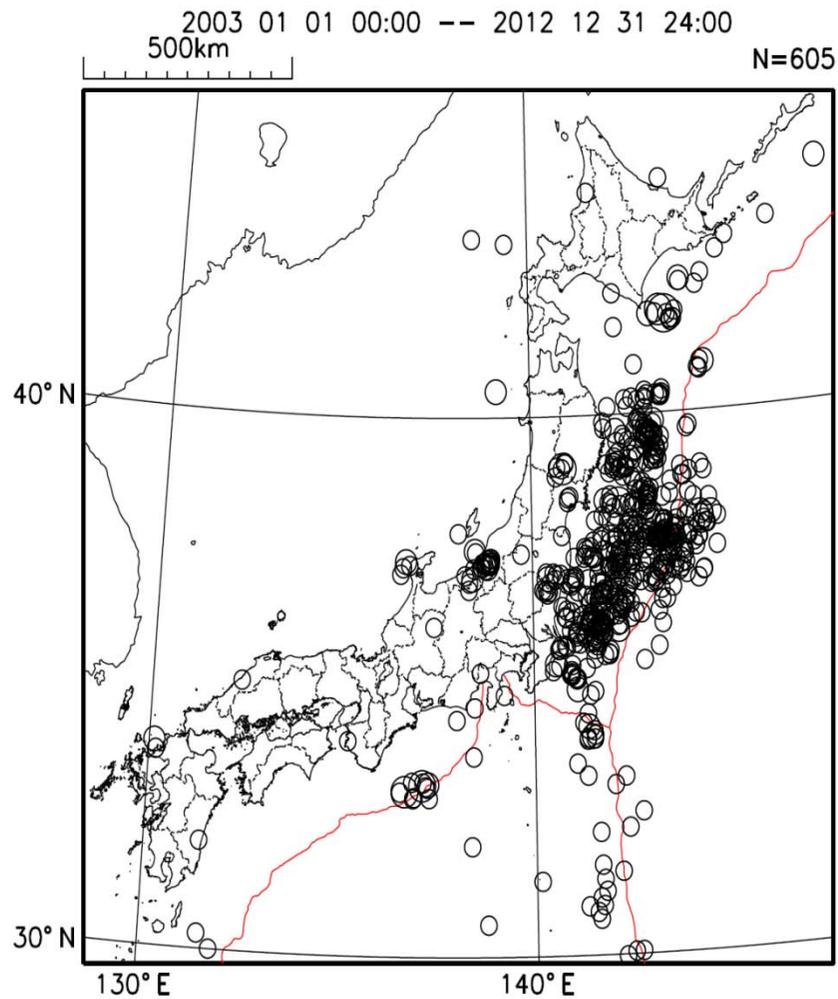
# **Japan, Natural disasters, and NPPs**

# 20% of World's earthquakes (above M6) occurs in or near Japan



\* Between 2000 and 2009, above magnitude 5  
made by Japan Meteorological Agency based on the data by US Geological Survey

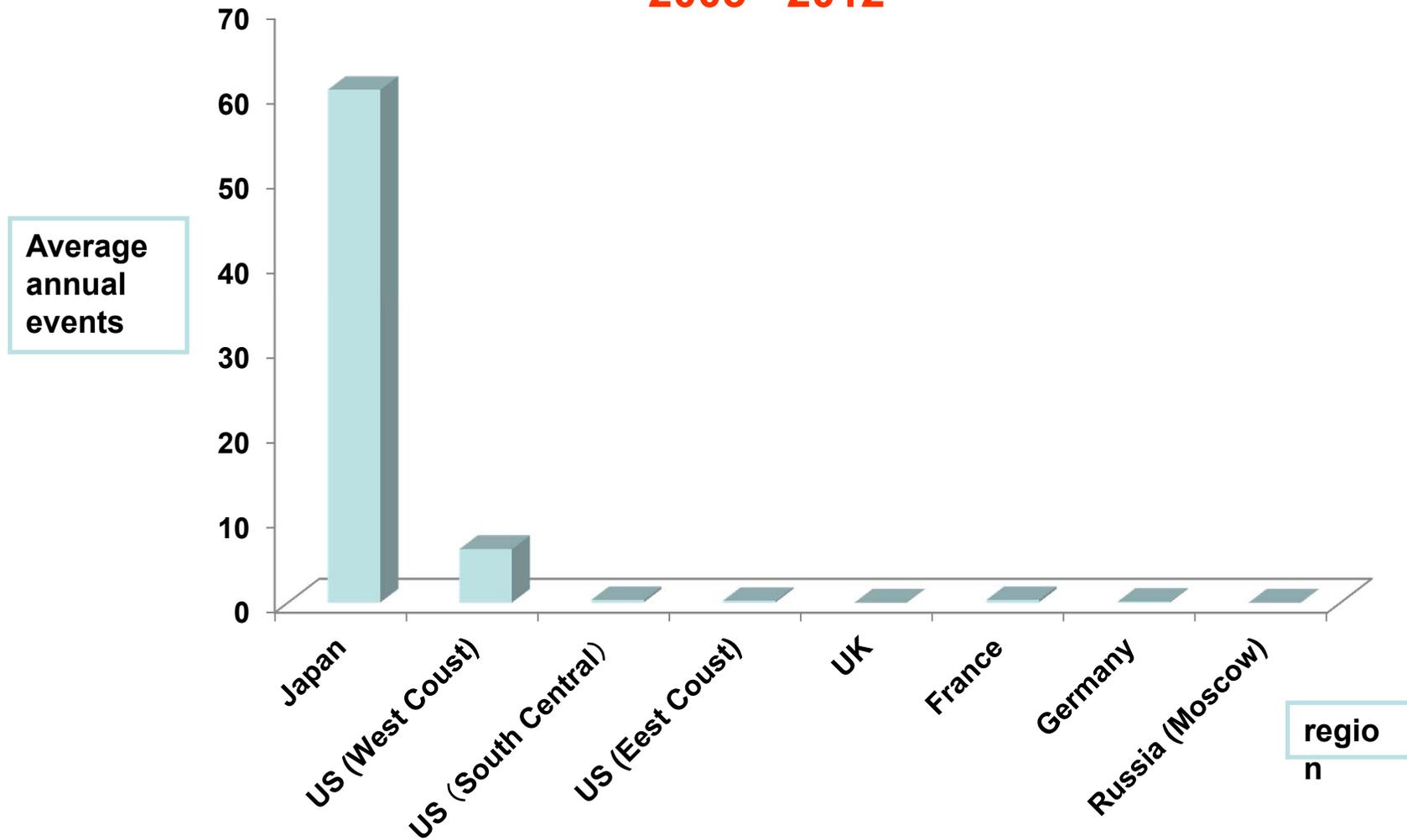
# Earthquakes (Japan and California, US)



by Japan Meteorological Agency

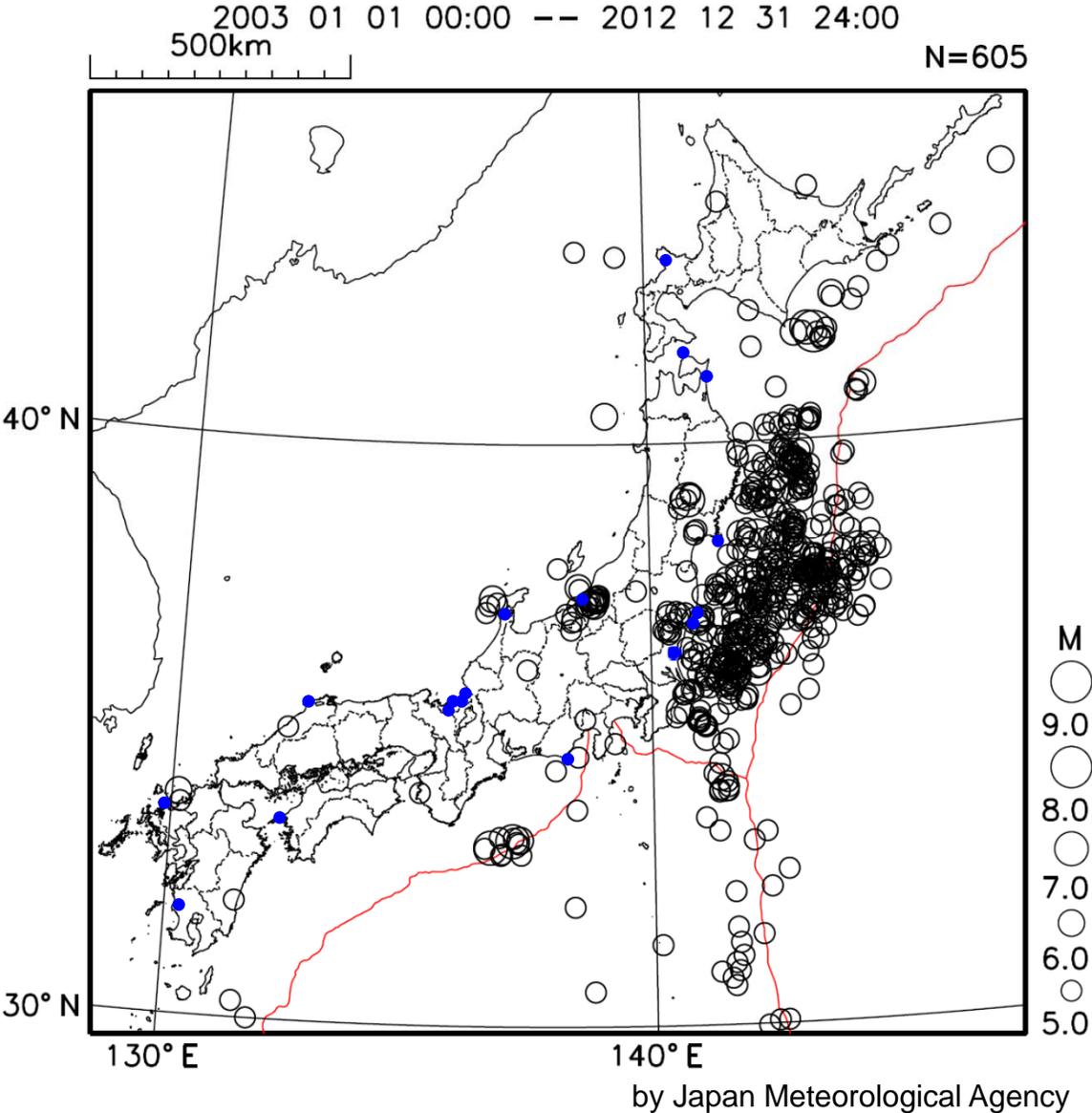
# Earthquakes

(M5 and above, shallower than 30 km)  
2003 - 2012

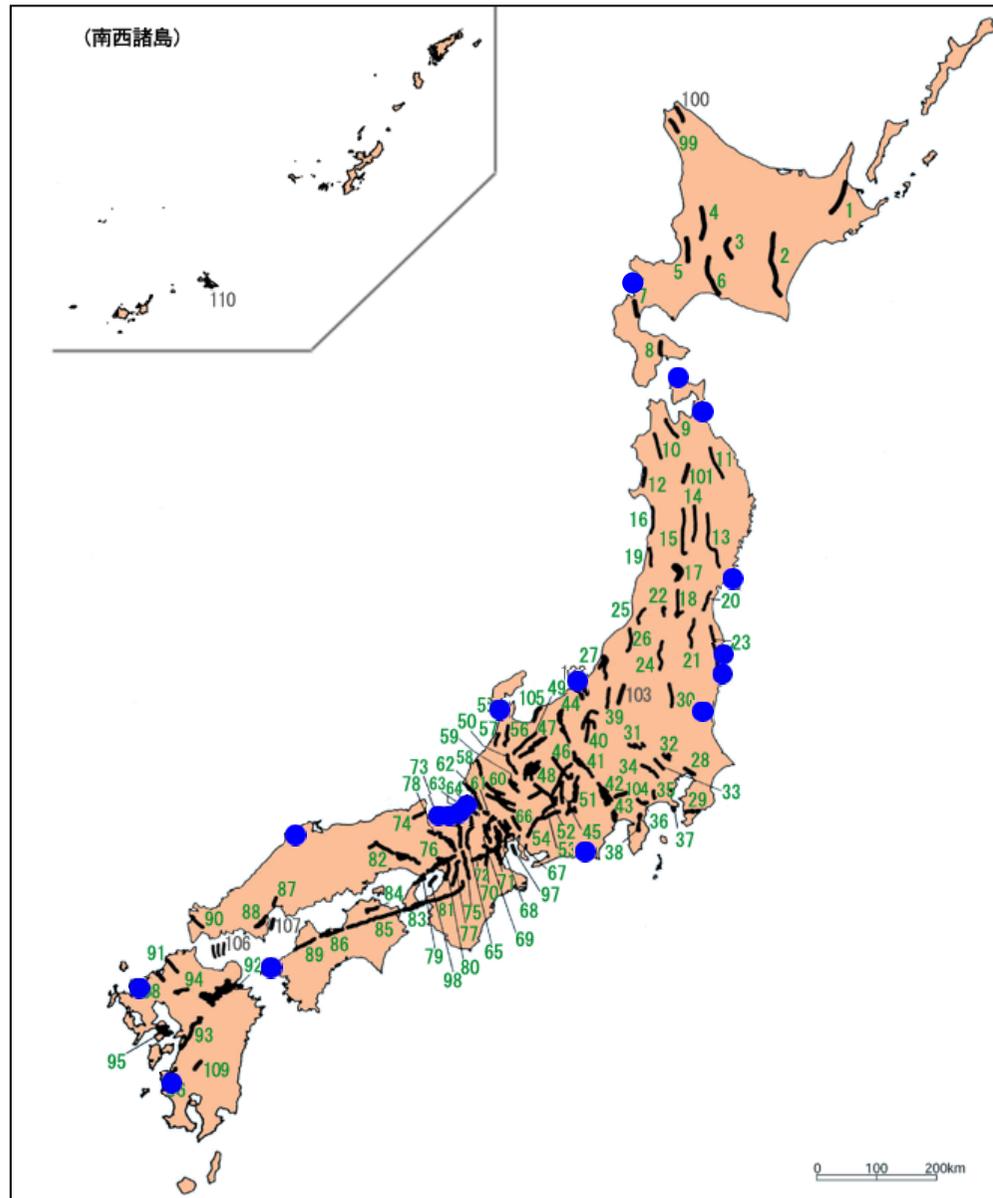


• Data by US Geological Survey

# Earthquakes and NPPs

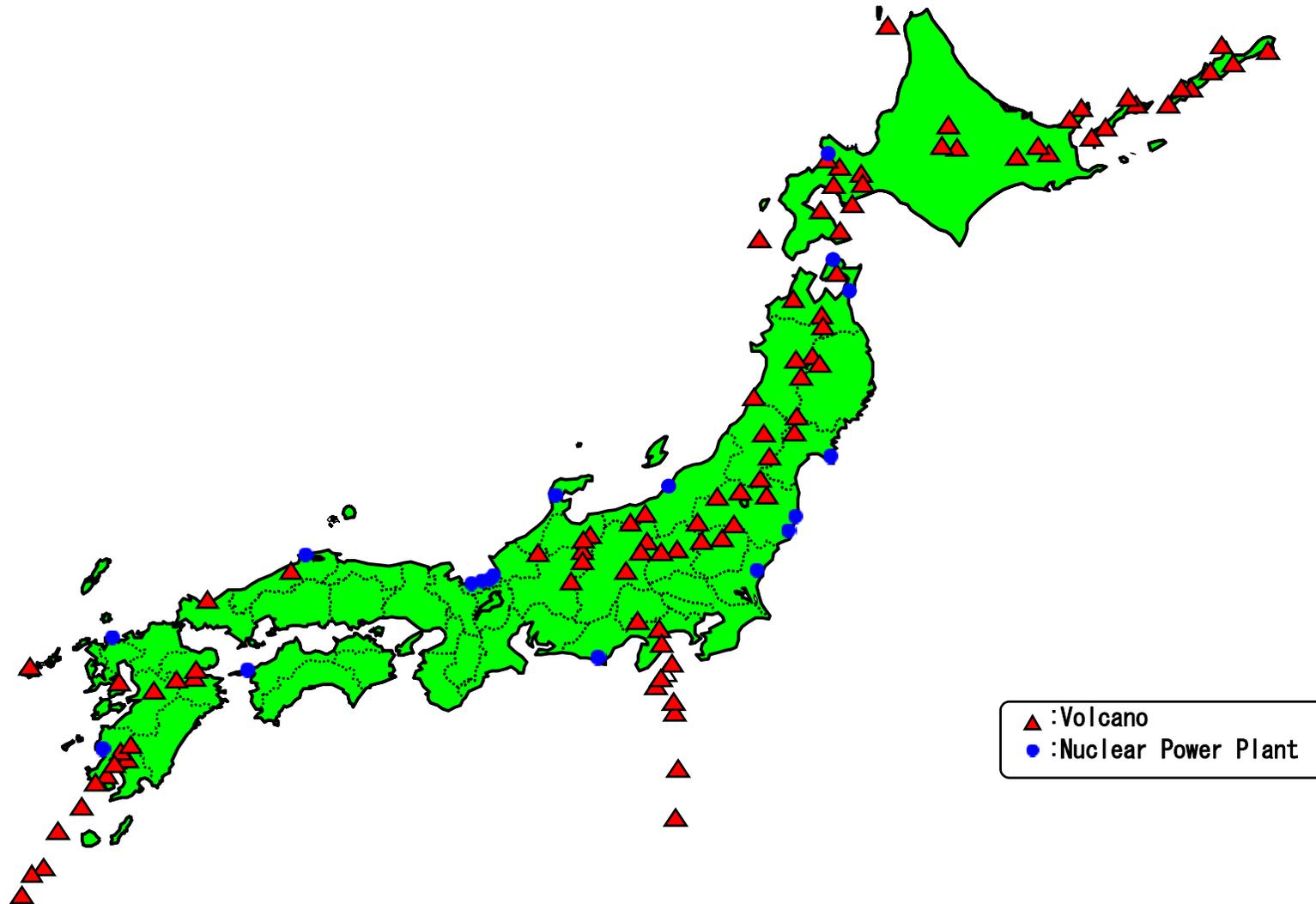


# Active faults and NPPs (approx. 2000 identified)

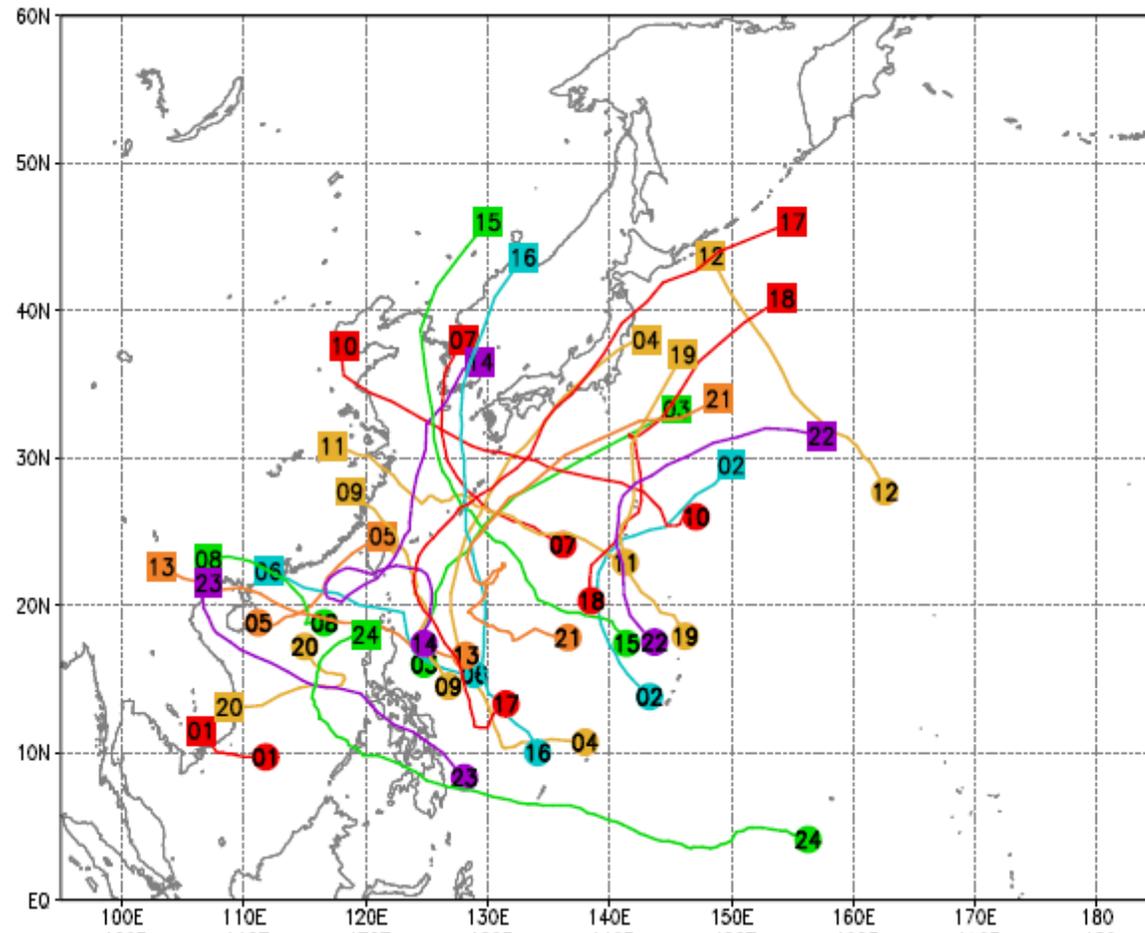


# Volcanos (active or dormant) and NPPs

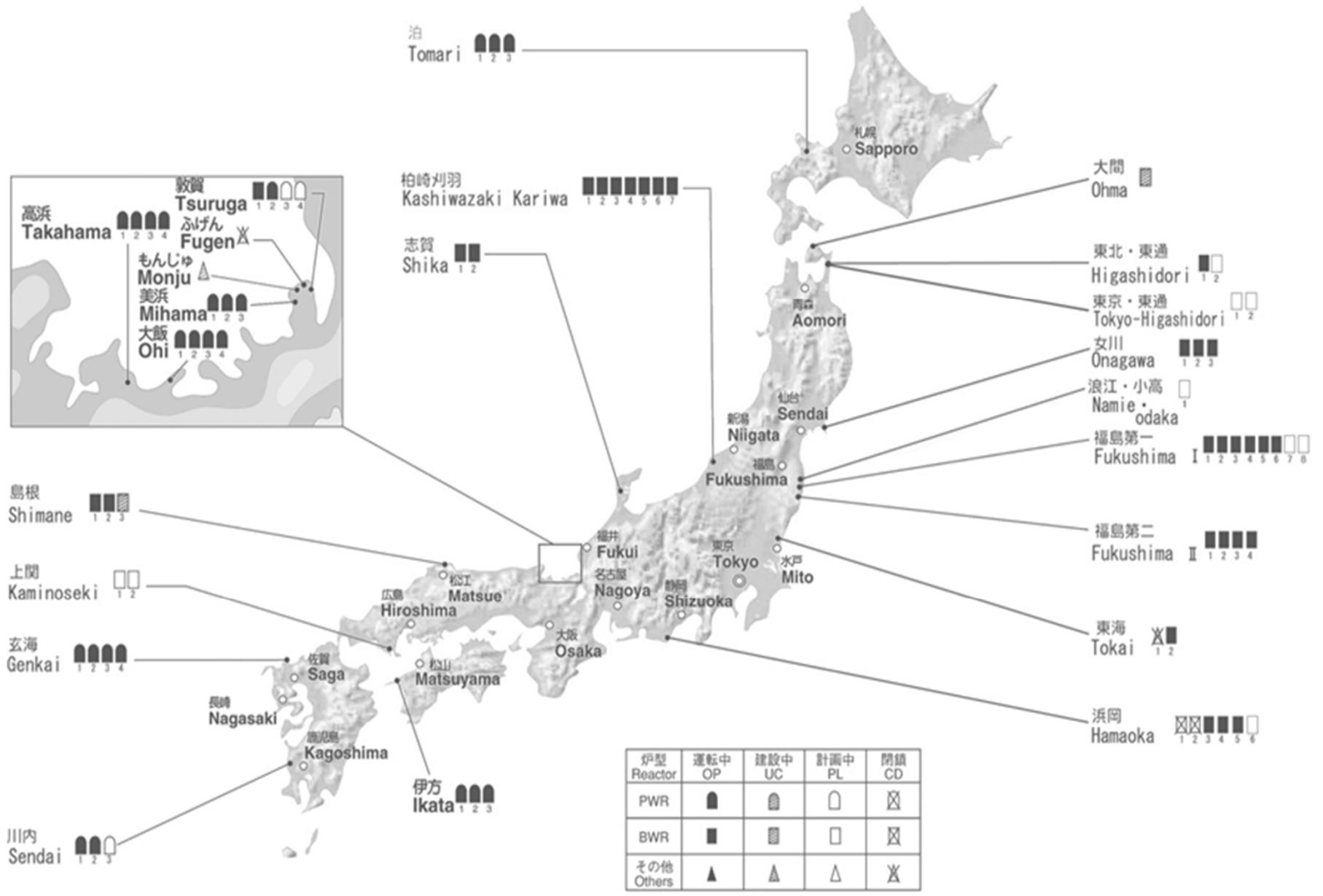
About 110 volcanos (world's 7% )



# Typhoon routes in 2012



Japan Meteorological  
Agency



# **Natural hazards and NPPs**

## **(some questions)**

- **Why so many NPPs in a disaster-prone land?**
- **Lessons:**
  - Was the accident preventable?**
  - Could it have been worse?**
  - Manmade disaster?**
    - **Safety culture**
    - **Structural, organizational, systemic problems**
- **How to regain public confidence?, etc.**

# Was the accident preventable?

## If...

- **“Safety first” policy enforced and risks squarely faced;**
- **Severe accident measures (DiD in place, esp. against natural hazards);**
- **International safety standards, past lessons, good practices followed;**
- **Delays in recommended reinforcements avoided.....**

**Could have been worse?  
(Some good luck)**

**At Fukushima Daiichi**

- “Seismic-Isolated Emergency Center”
- Cooling at spent-fuel pool at Unit 4

**Other NPPs in the vicinity:**

**Onagawa, Fukushima Daini, Tokai**

- Survival of a power line
- Site elevation
- Preparedness

# Organizational and Human Factors

## Structural·systemic

- Lack of regulatory independence
- Cozy, collusive relationship  
(“regulatory capture”)
- Weak SA response measures  
(in particular, against tsunami)
- Fragmented bureaucratic handling  
(crisis management )

## Policy·culture

- Flawed safety culture (“safety myth”)
- Inward-looking

## Human skills·capacity

- Deficiencies in professional expertise

# Recommendations for reform (Kurokawa Report)

- 1 A permanent parliamentary body on nuclear issues → **Done**
- 2 Crisis management system (clarify the role/responsibility of key stakeholders)  
→ **Being addressed**
- 3 Urgent measures for affected people and communities (health, decontamination, etc.)  
→ **Being addressed**
- 4 Governance reform at TEPCO;  
Mutual oversight system among power companies → **On the way**

# Recommendations (Cont'd)

**5 New regulatory organization**

→ **Done**

**6 Drastic reform of nuclear-related legislation** → **Pending**

**7 Addressing unresolved/unaddressed issues thru independent commissions, etc.** → **Partially addressed**

# **Nuclear Regulation Authority (NRA)**

**(Established in September 2012)**

## **Independence**

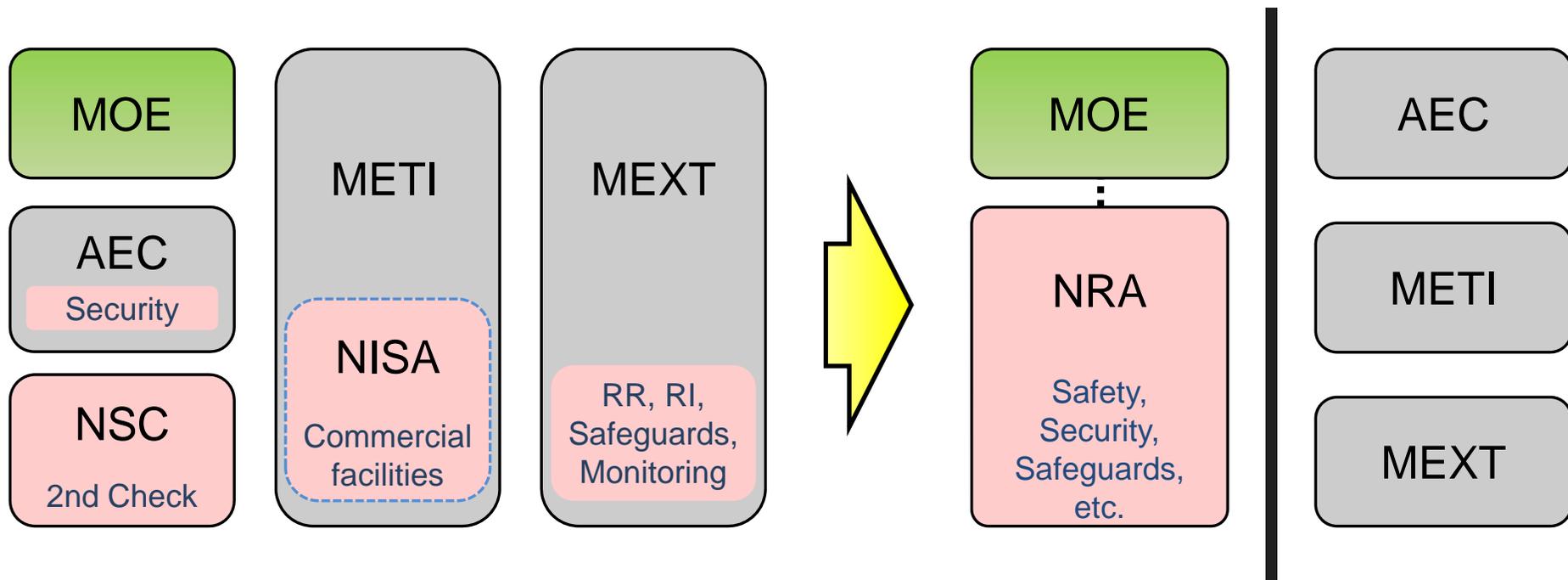
- **An Independent Commission (5 members, 500-member Secretariat, under the Min. of the Environment)**
- **Clear separation of Regulation from Promotion**

## **Integration**

- **“3 S” (safety, security, safeguards);  
Radiation monitoring; RI regulation**

## **Transparency**

# Integrated and Independent



- AEC : Atomic Energy Commission
- METI : Ministry of Economy, Trade and Industry
- MEXT : Ministry of Education, Culture, Sports, Science and Technology
- MOE : Ministry of the Environment
- NISA : Nuclear and Industrial Safety Agency (abolished)
- NSC : Nuclear Safety Commission (abolished)

# **NRA's Core Values and Principles**

## **(Mission statement)**

- **Learn and absorb lessons from Fukushima and never allow such accidents again;**
- **Restore public trust is of utmost importance;**
- **Foster a genuine safety culture; Highest priority on public safety;**
- **Independent decision-making based on scientific and technological information, free from any outside pressure or bias;**
- **Achieve genuinely effective regulations rather than formalities;**
- **Open and transparent organization: avoid self-isolation, self-righteousness;**
- **High ethical standards, sense of mission, rightful pride;**
- **Swift and effective response readiness to all emergencies.**

# **NRA: Current and future tasks**

- **TEPCO Fukushima Daiichi NPP**
  - **Decommissioning process/Roadmap**
- **Enhanced Safety Requirements**
  - **In progress**
- **Revisiting Fracture Zone surveys**
  - **In progress**
- **Safety Reassessment on 50 shutdown NPPs**
  - **Starting in July**
- **Guidelines for Emergency Plans**
  - **Revisions in progress**

# Enhanced Safety Requirements

1. Legal requirements (promulgated in June 2012)
  - **Mandatory severe accidents measures**
  - **Mandatory back-fitting**
  - **40-year operational limit (with possibility of maximum 20-year extension)**

# Enhanced Safety Requirements (Cont'd)

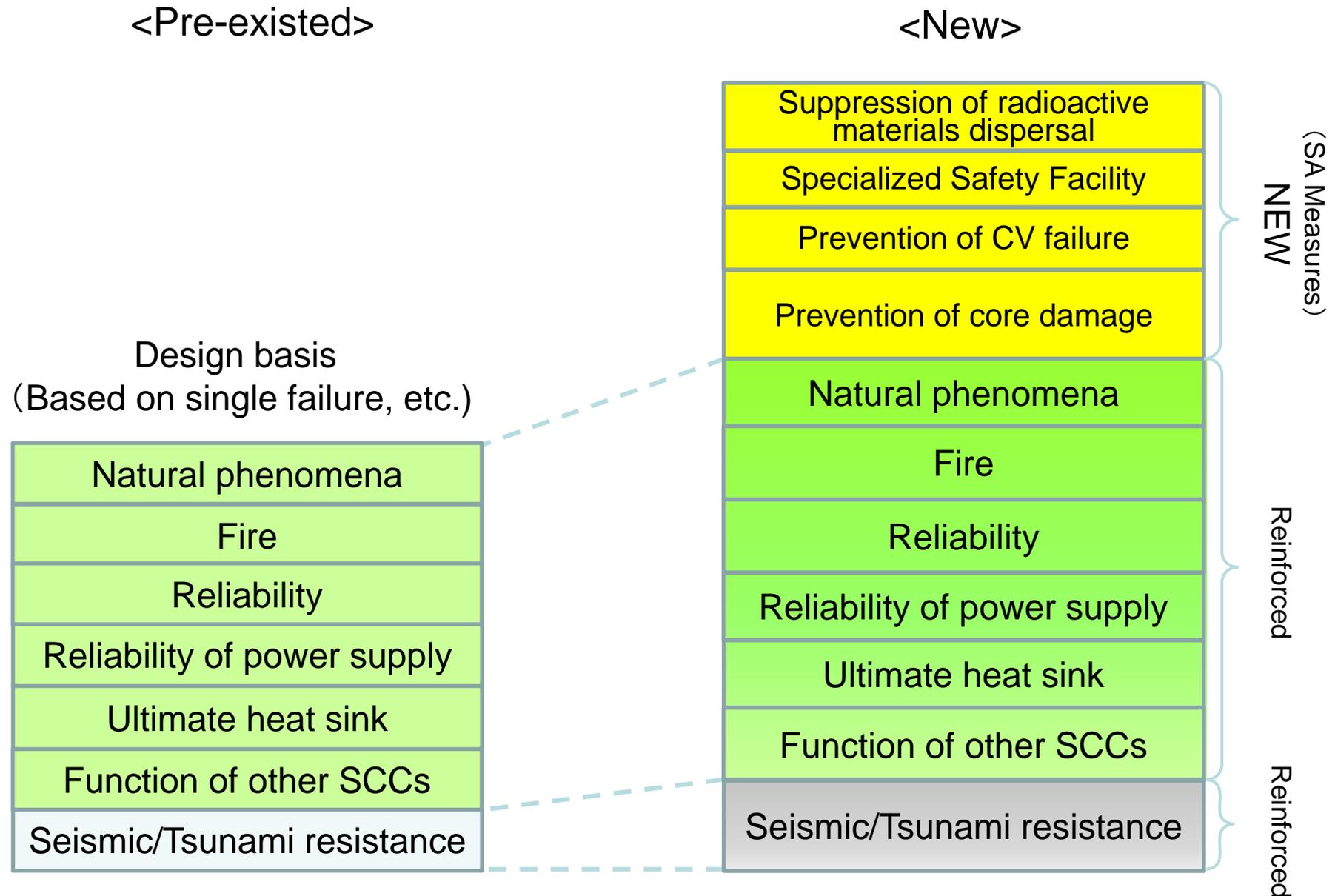
## 2. Severe accident measures (DiD Level 4)

- Prevention regarding core damage, containment failure...  
    e.g. Filtered venting system (BWR)
- Preventing hydrogen explosion
- Measures against external hazards (terrorism, plane crash...)
- Specialized safety facility

## 3. Strengthening Design Basis

- Enhanced measures against extreme natural hazards
- Stringent criteria for active faults
- Fire protection, tsunami inundation, etc.

# Structure of proposed requirements



# **NRA: International Dimension**

## **IAEA and others**

- **Fact Finding Mission (May 2011)**
- **Peer Review Mission on Decommissioning (April 2013)**
- **Comprehensive report (by end of 2014)**
- **IRRS, IPPAS (Missions as soon as ready)**
- **Nuclear Safeguards and Security**
- **OECD/NEA**
- **ENSREG and others**

## **Bilateral partners**

**Thank you for your attention !**