



# 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











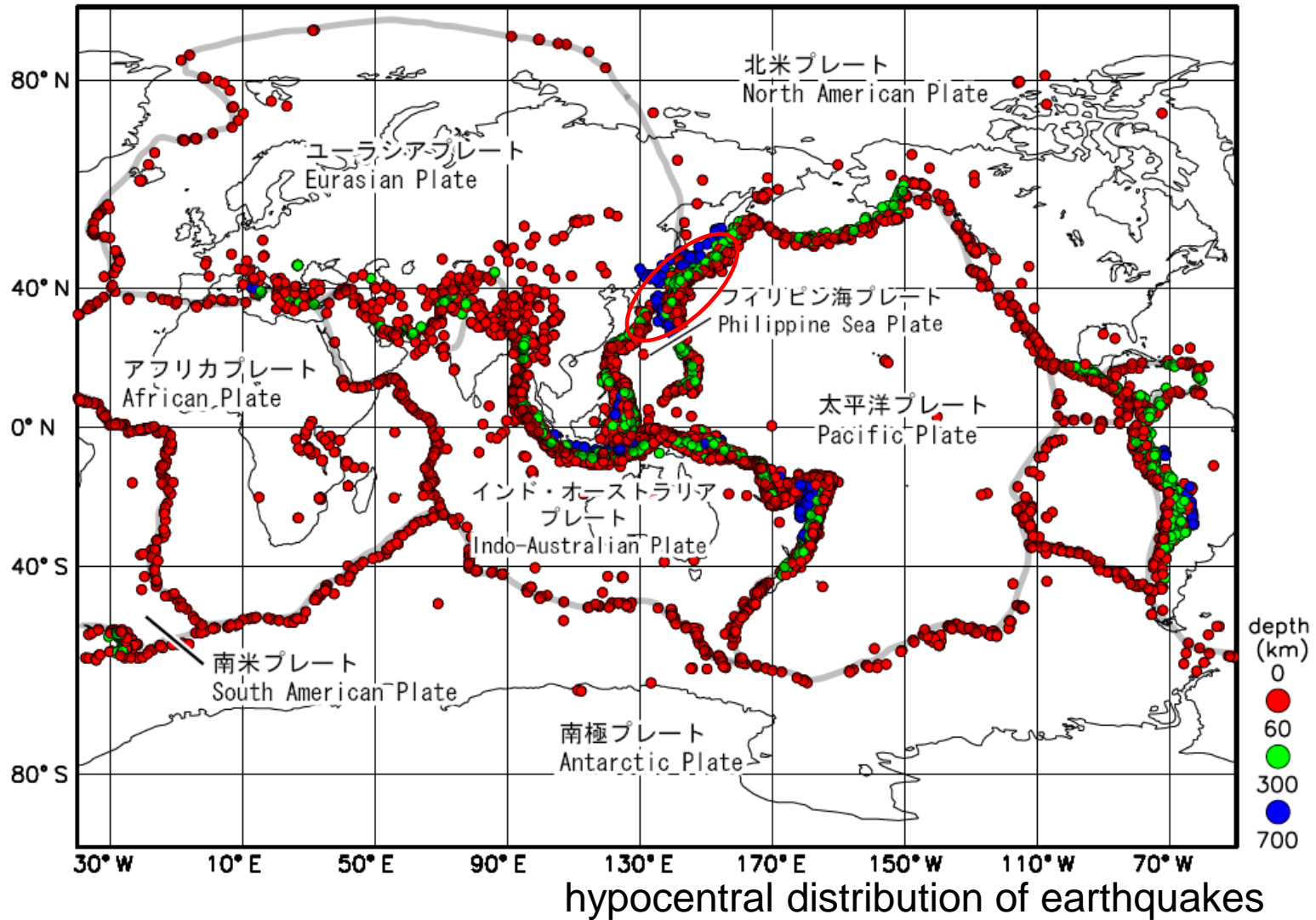


by AIR PHOTO SERVICE



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

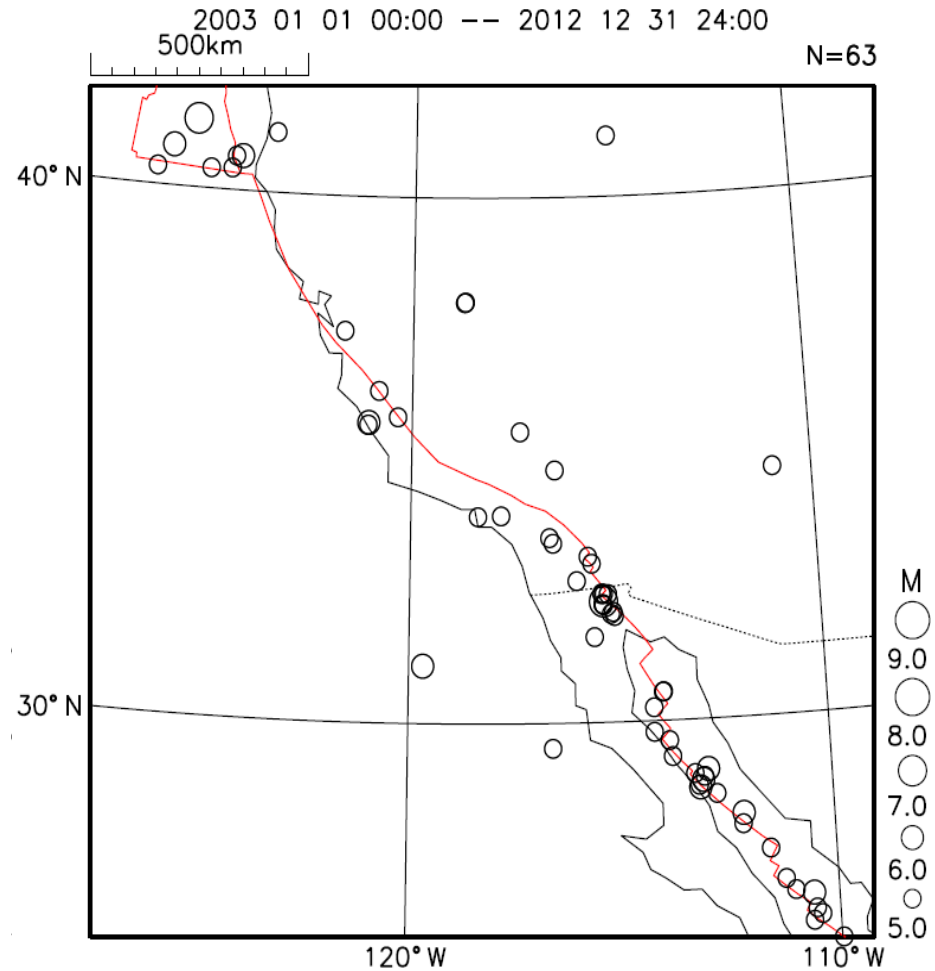
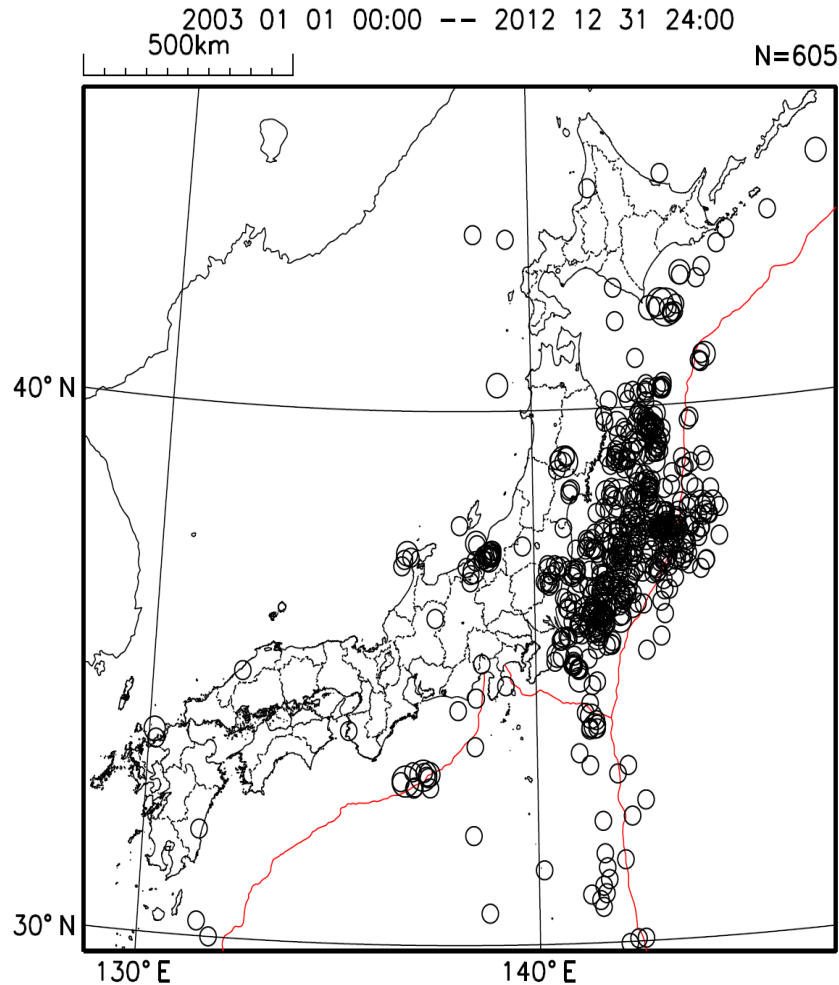
# 20% of World's earthquakes (above M6) occurs in or near Japan



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



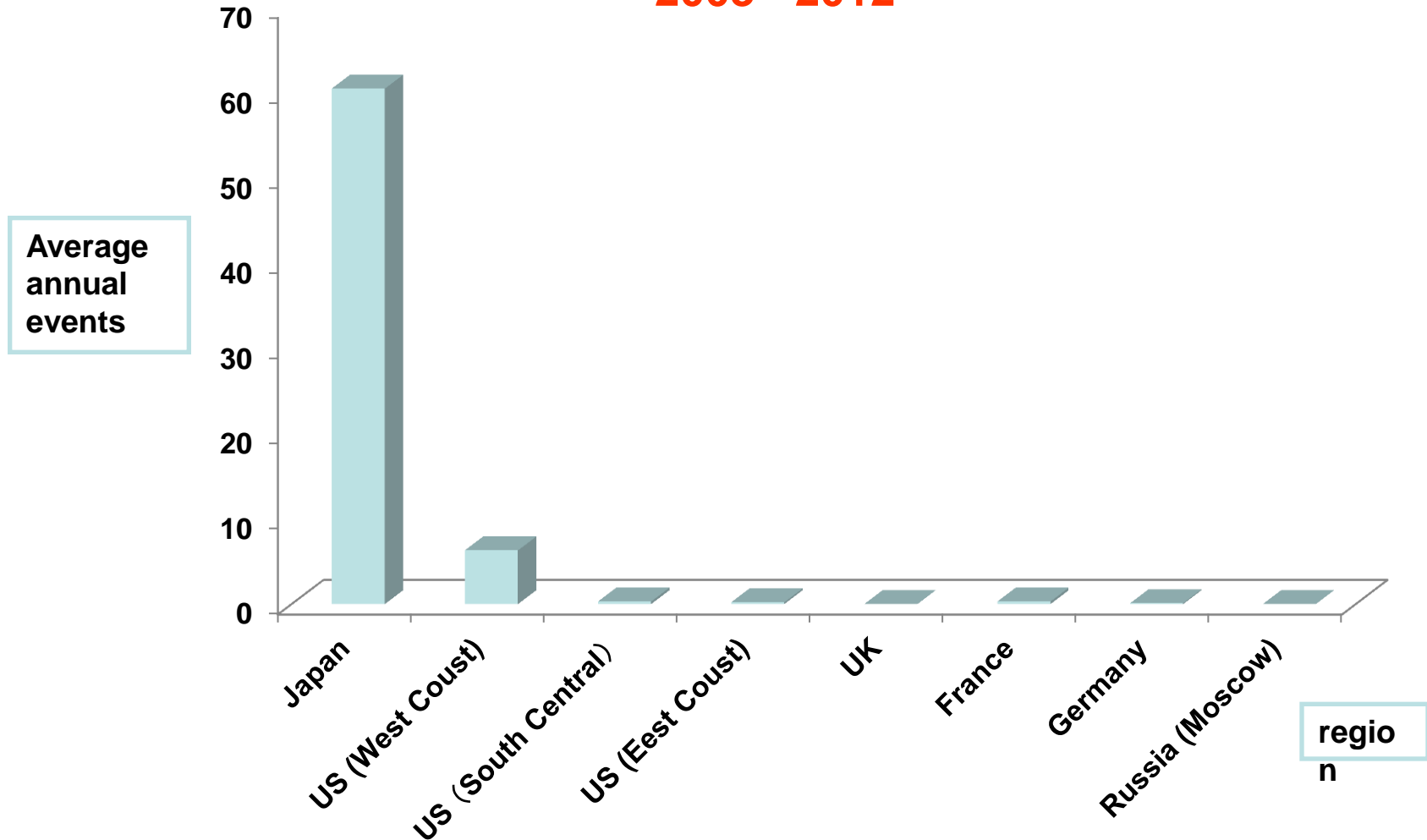
# Earthquakes (Japan and California, US)



by Japan Meteorological Agency

# Earthquakes

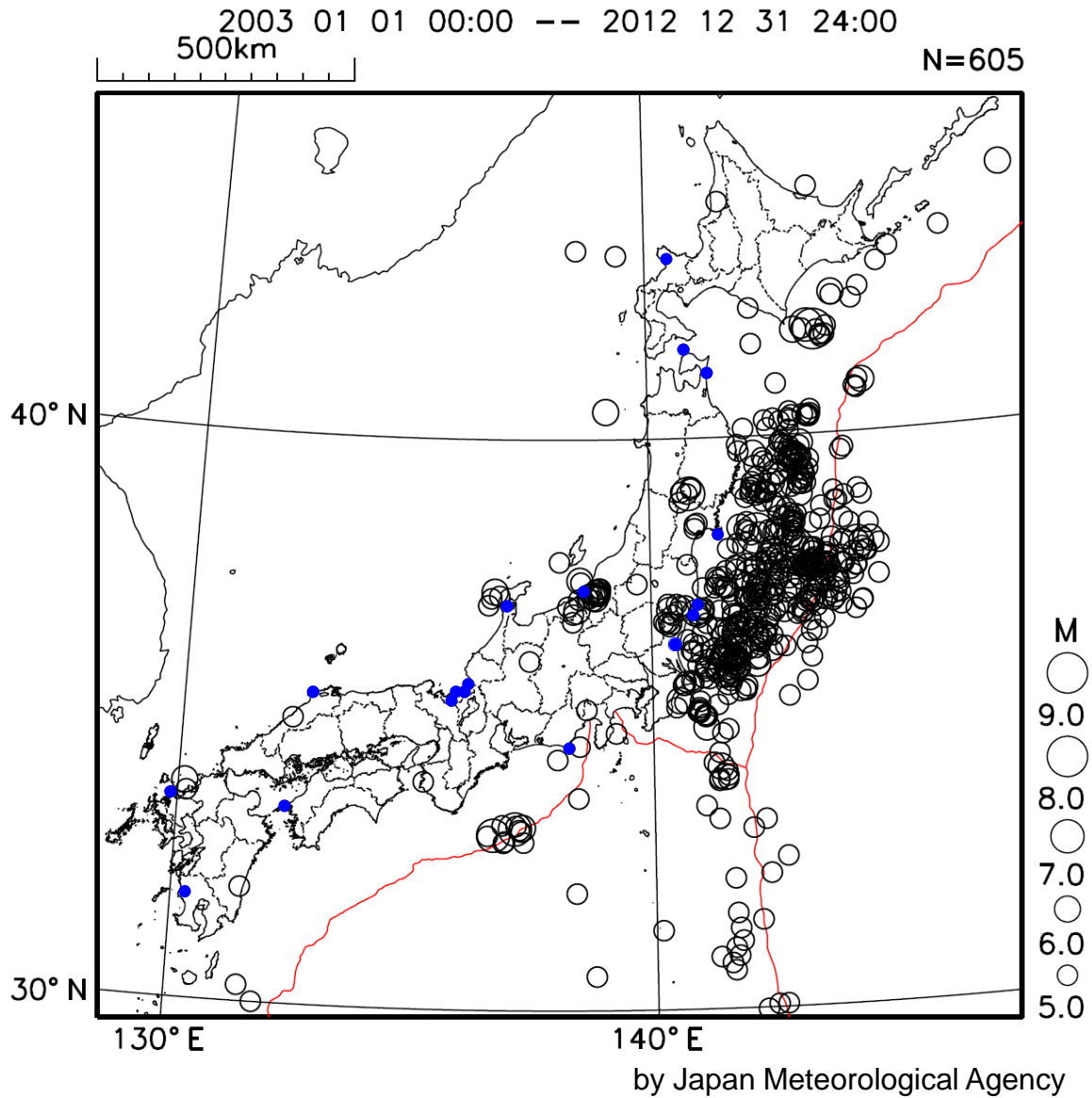
(M5 and above, shallower than 30 km)  
2003 - 2012



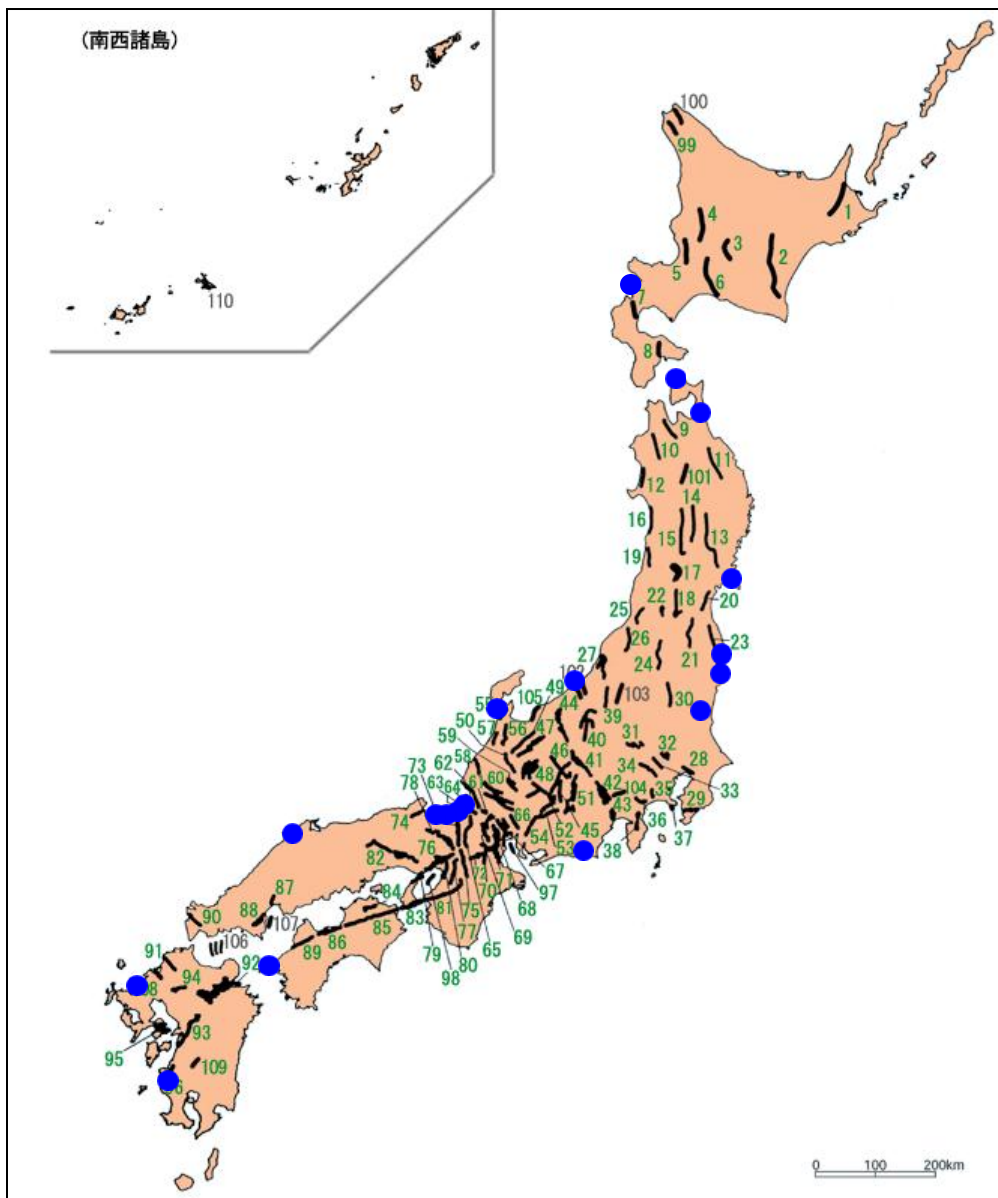
• Data by US Geological Survey



# Earthquakes and NPPs



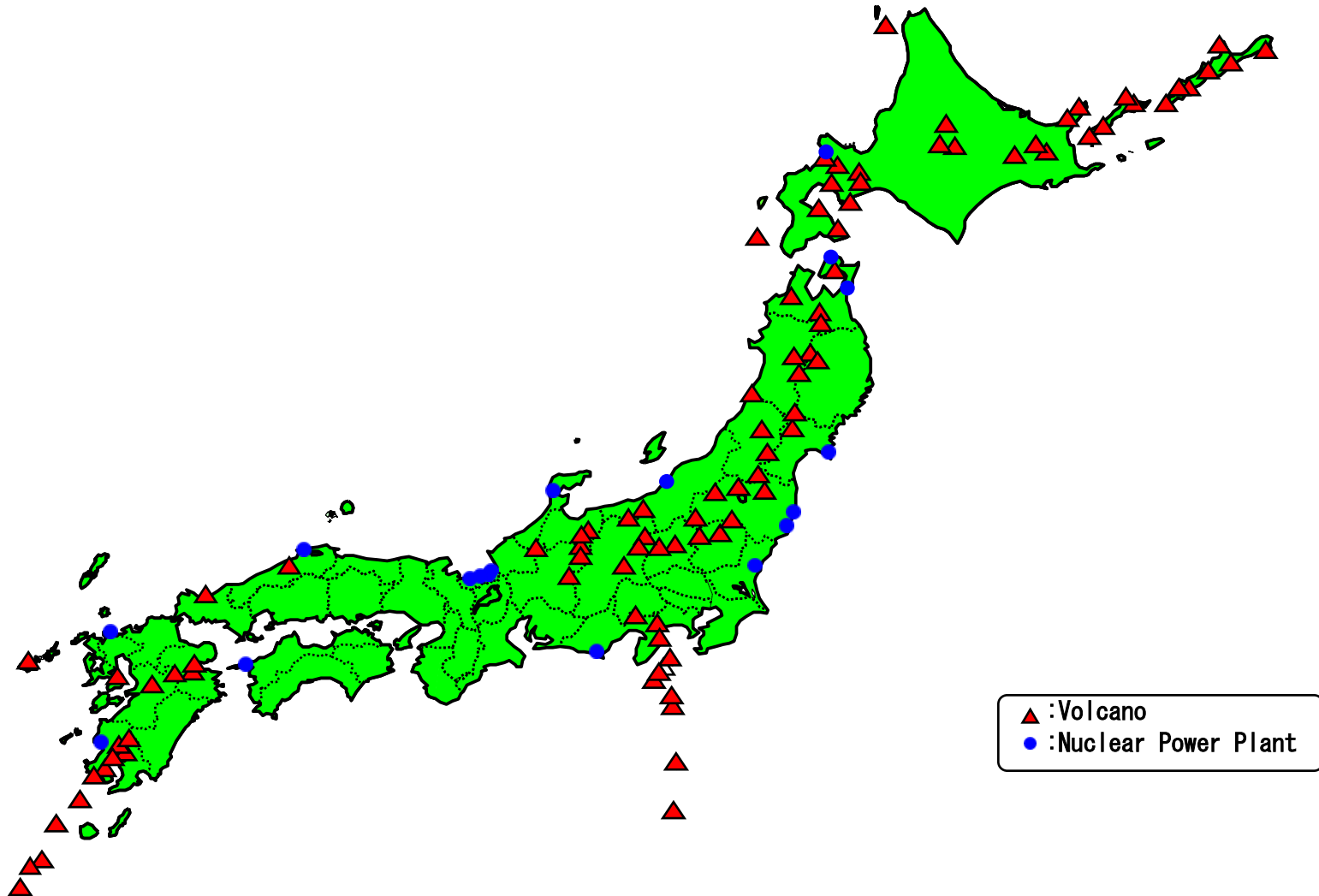
# Active faults and NPPs (approx. 2000 identified)



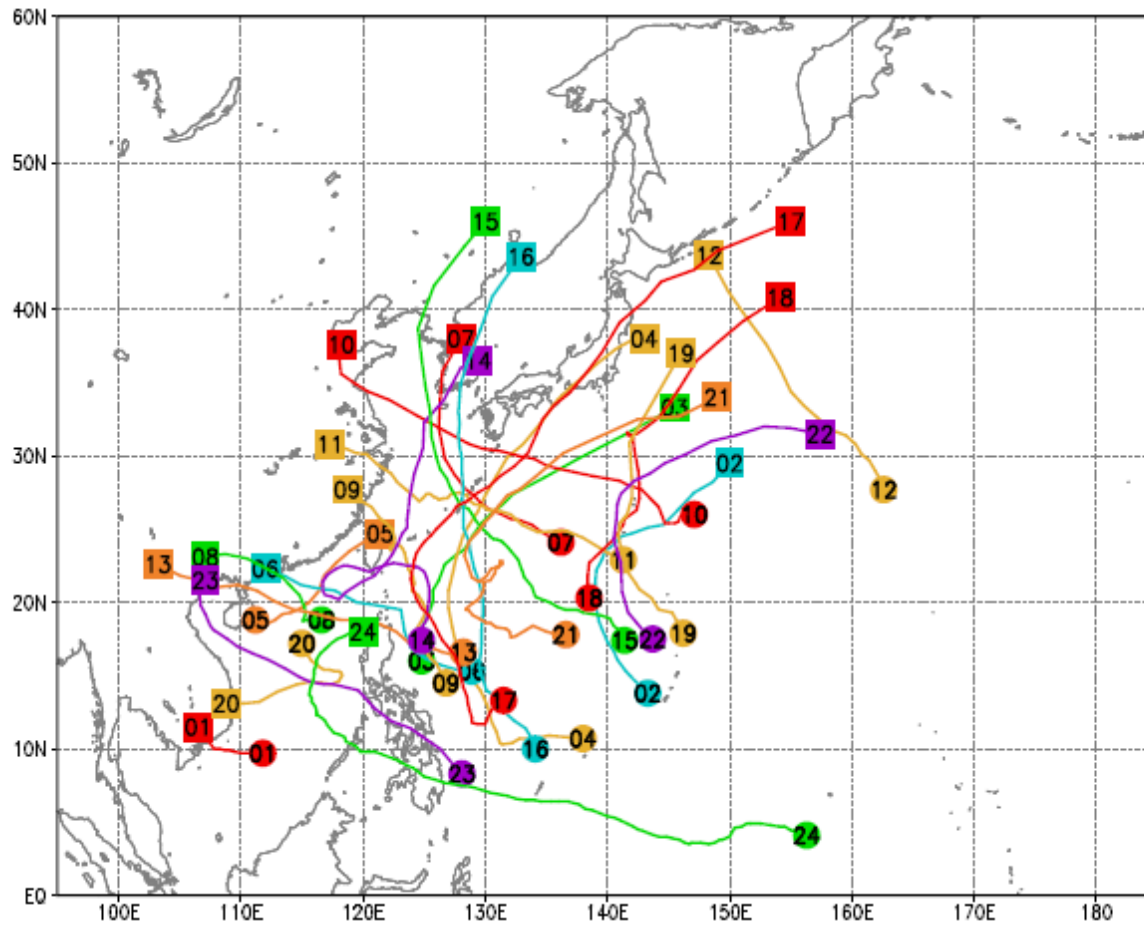


# Volcanos (active or dormant) and NPPs

About 110 volcanos (world's 7% )

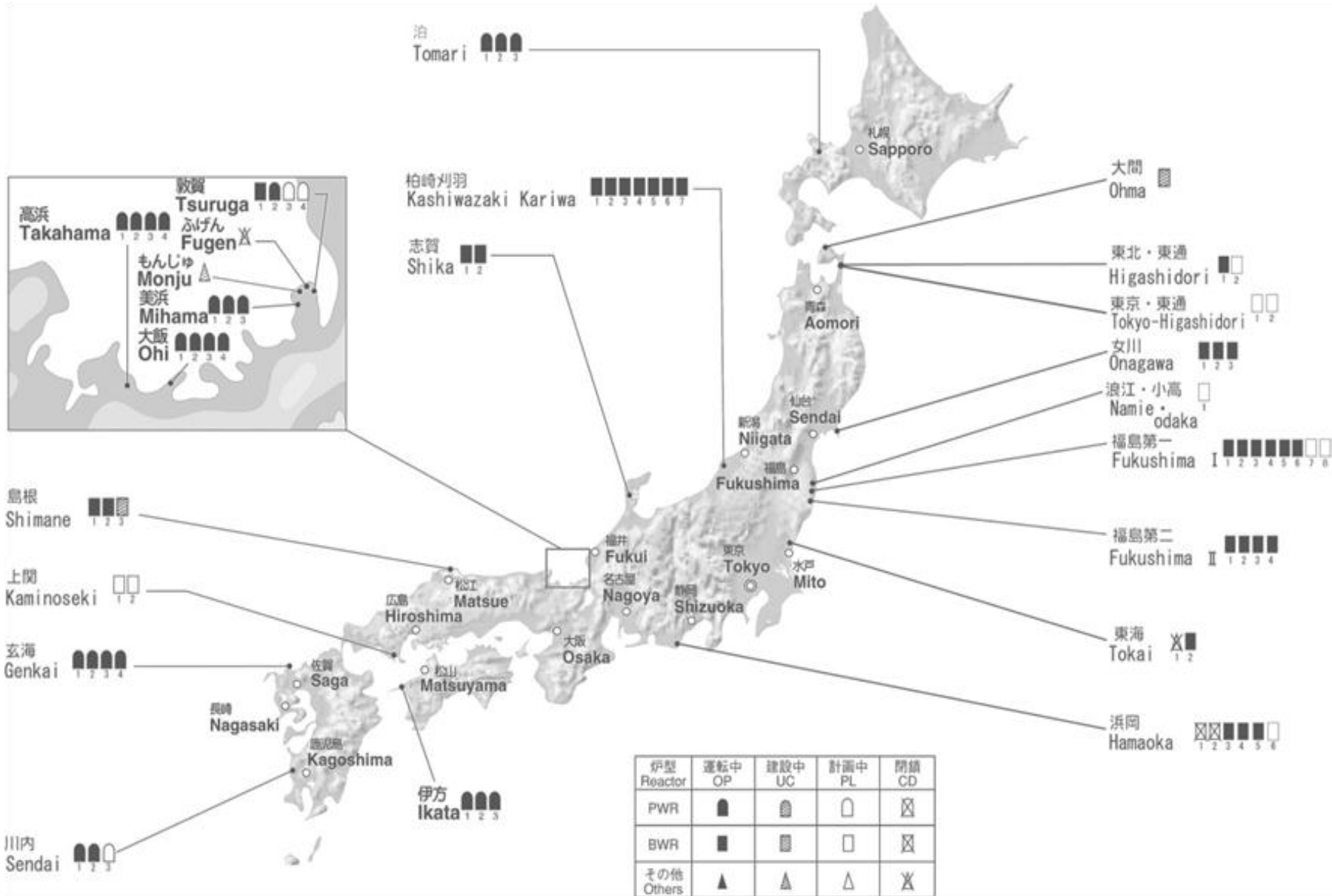


# Typhoon routes in 2012



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**

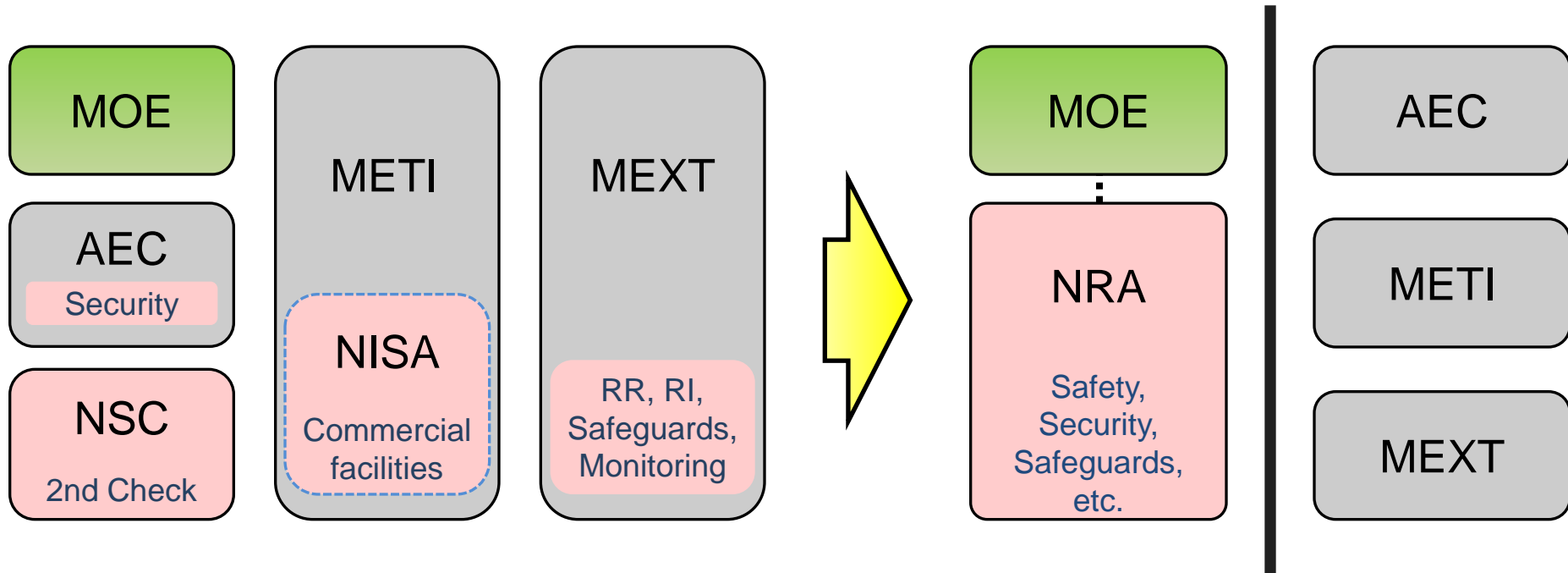
- **An Independent Commission (5 members, 500-member Secretariat, under the Min. of the Environment)**
- **Clear separation of Regulation from Promotion**

## **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

<Pre-existed>

<New>

Design basis  
(Based on single failure, etc.)

Natural phenomena
Fire
Reliability
Reliability of power supply
Ultimate heat sink
Function of other SCCs
Seismic/Tsunami resistance

Suppression of radioactive materials dispersal
Specialized Safety Facility
Prevention of CV failure
Prevention of core damage
Natural phenomena
Fire
Reliability
Reliability of power supply
Ultimate heat sink
Function of other SCCs
Seismic/Tsunami resistance

(SA Measures)  
NEW

Reinforced

Reinforced

# **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 !**