

# The Politics of Zoning: Making Risks (In)visible and Manageable in Disasters

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# How a zoning looks like...



Tomioka town©Tsujiuchi (Waseda University)

# Plan

- What is zoning/mapping in disasters?
- Case studies:
  - ▣ Evacuation zones for nuclear disaster risks (Fukushima)
  - ▣ Hazard mapping for volcanic risks (Lesser Antilles)
- Major Findings
  - ▣ « Red Zone »
  - ▣ Territorialization of risks and categorization of citizens
  - ▣ Role of counter/independent experts and citizen initiatives

\* Please note that this presentation/paper is based on the work still on progress. Please contact one of the authors for quoting or referencing.

# Projects

- Politics of the Earth Programme (Bruno Latour & Francois Gemenne, Sciences Po), interdisciplinary research project (Earth Sciences & Social Sciences)
- SHINRAI project (IRSN/Sciences Po/Tokyo Tech)
- RAVEX project (ANR/IPGP)
- Literature review + field interviews (nuclear case 120 persons+, volcanic case 60 persons+)

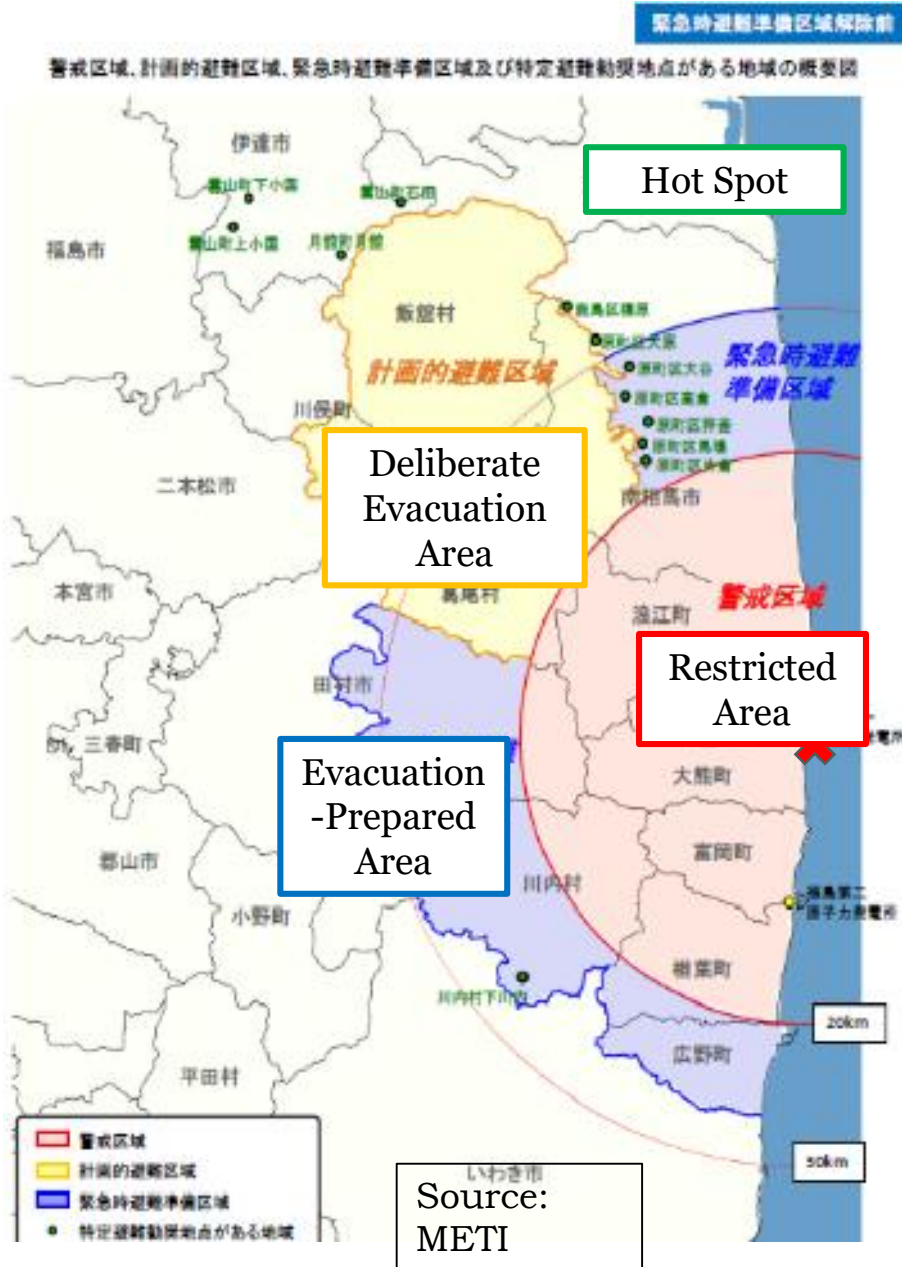
# What is zoning/mapping risks?

- A process of transformation: from threats into risks whereby matters that are scientifically uncertain or intangible would be made circumscribable both spatially and temporally
- An intertwined process of quantification and decision-making by scientific experts and the authorities
- A process of demarkation of risk zones from « safe » zones  
‘The threat is localized and encircled (on the map) so as to appear being under control’ (Topçu, 2015)

# Case 1: Fukushima Nuclear Zoning

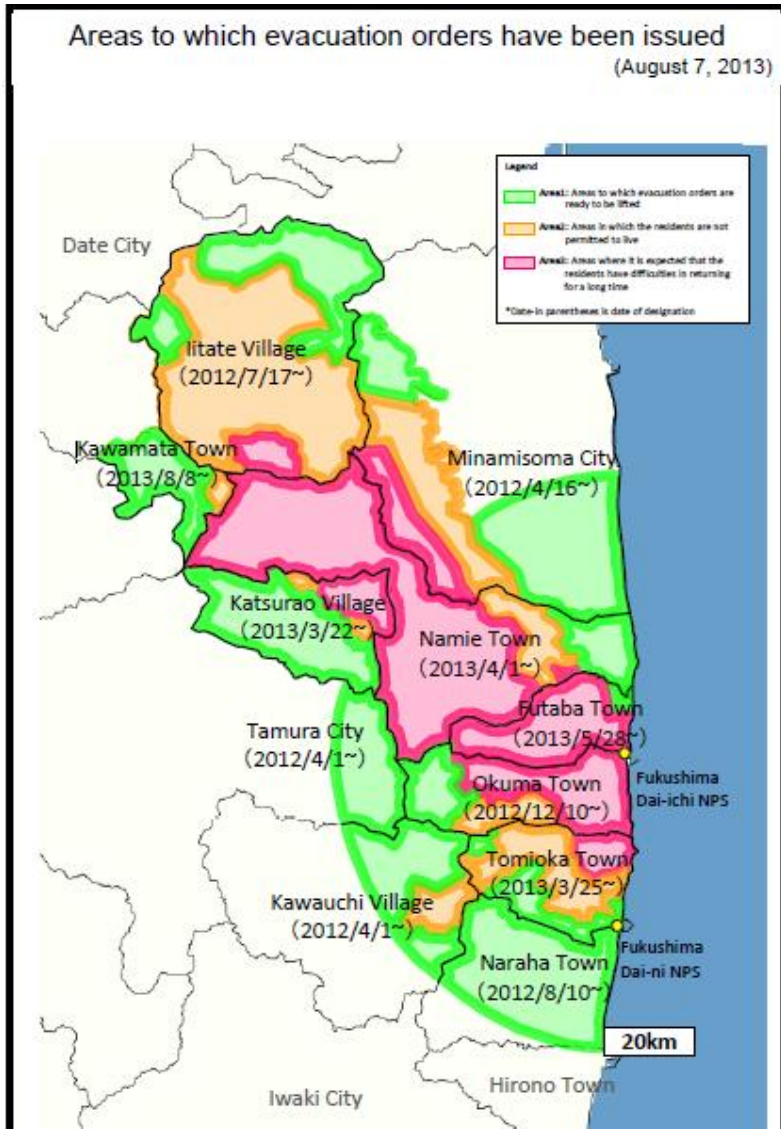
- Uncertainties in quantifying radiological risks
- Low-dose controversy
- Threshold of 20mSv/year (raised from 1mSv/y), based on which zoning policy was established.
- Official communication on radiological risk
- Controversy among experts, hence communities
- Consequences: seven categories of victims, 27 group-action lawsuits, “self-evacuees”, counter-experts, citizen initiatives

# Initial Evacuation Zones (2011)



Earthquake		
11/03	2km radius	Evacuation
	3km radius	Evacuation
12/03	10km radius	Evacuation
	20km radius	Evacuation
15/03	20-30km	Shelter indoors
22/04	20-30km	Shelter indoors or Evacuation by own means
	Areas with more than 20mSv per year	Evacuation within 1 month
16/06	Spots with more than 20mSv per year	Recommend for Evacuation

August 2013



April 2017



Source: METI



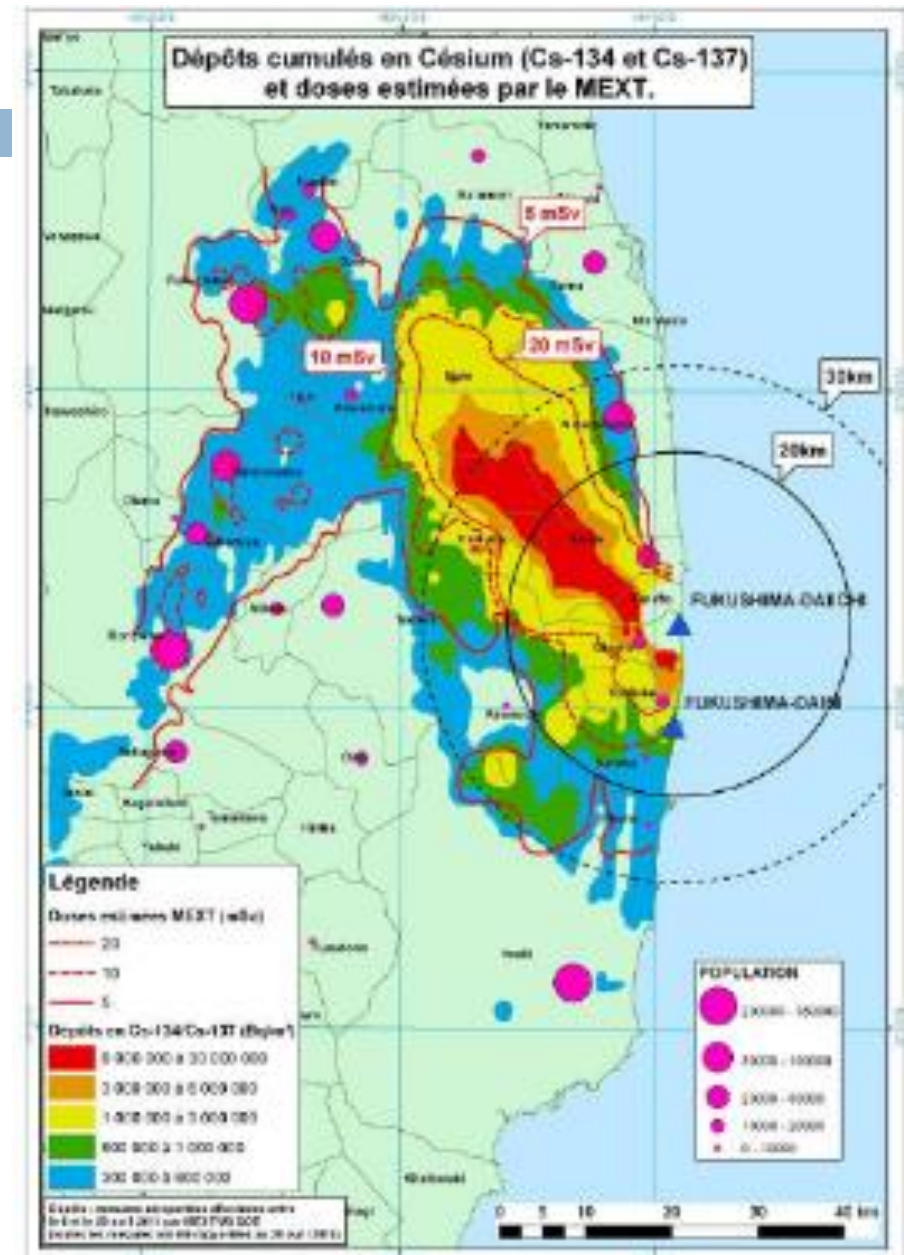


Alternative measurements : alternative zoning solutions, different consequences and costs ... ?

## Simulation for a choice of 10 mSv/year threshold

« l'IRSN proposerait de prendre en compte un seuil de contamination de 600 000 Bq/m<sup>2</sup> pour les césiums 137 et 134 (correspondant à une dose externe maximale de 10mSv pour la première année) »  
Si cela avait été appliqué, « 70 000 personnes » supplémentaires auraient été évacuées:

- Source: IRSN (2011)/Rapport DRPH/2011-10, 23 Mai 2011

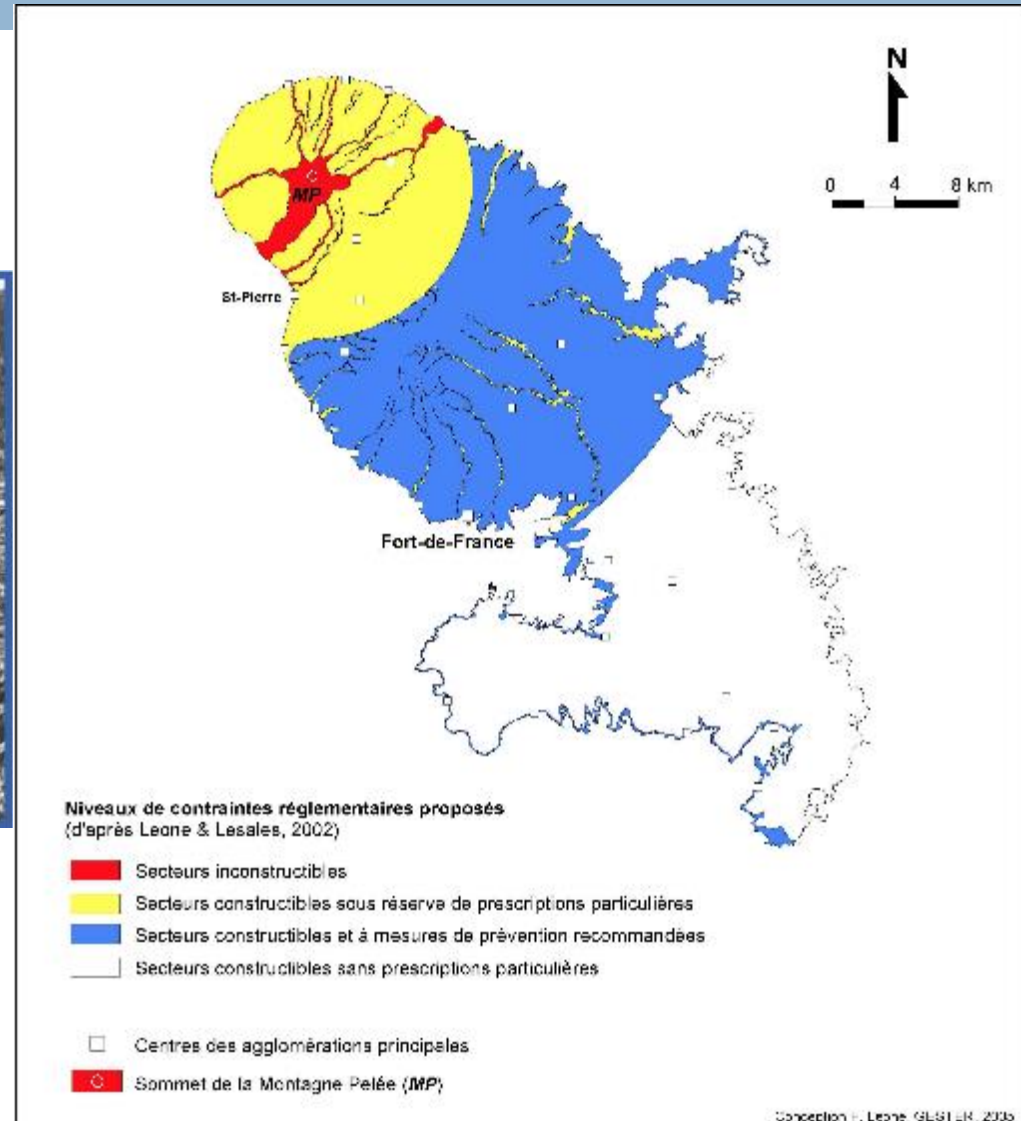


# Case 2: Volcanic hazard mapping

- Uncertainties in quantifying volcanic risks  
Choice of hazard maps (five), scientific uncertainties attached to a natural event, a model of calculation (ex. human survival rate based on a European), non-linear physics, probabilistic approach...etc.
- Definition of “red zone”
- Controversy among scientists (ex. Tazieff vs. Allègre in 1976), hence communities (ex. evacuation vs. staying)
- Antagonisms (the case of French Lesser Antilles):  
mainland authority vs. former French colonies, positive representation of volcanoes (symbolic, cultural, and mythical importance, fertile land..) vs. negative representation in disaster prevention (highly technical & authoritative exercise portraying it as a threat)

# Case 2: Volcanic hazard mapping

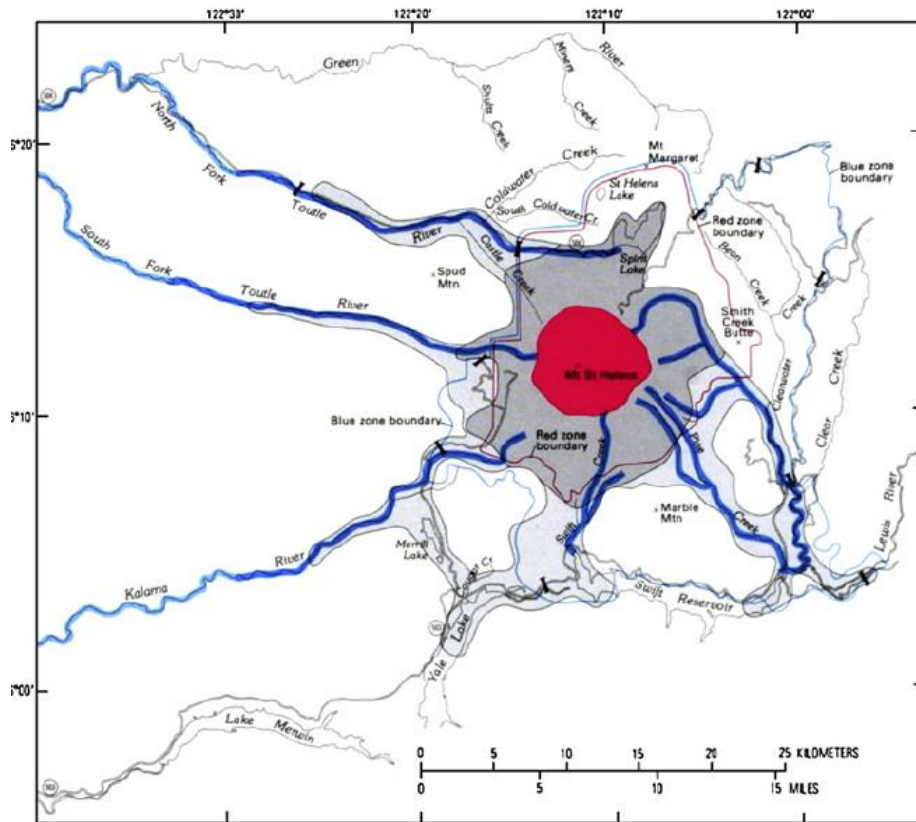
**St-Pierre en Martinique**  
**Eruption de la Montagne Pelée**  
**1902 (29 000 morts)**



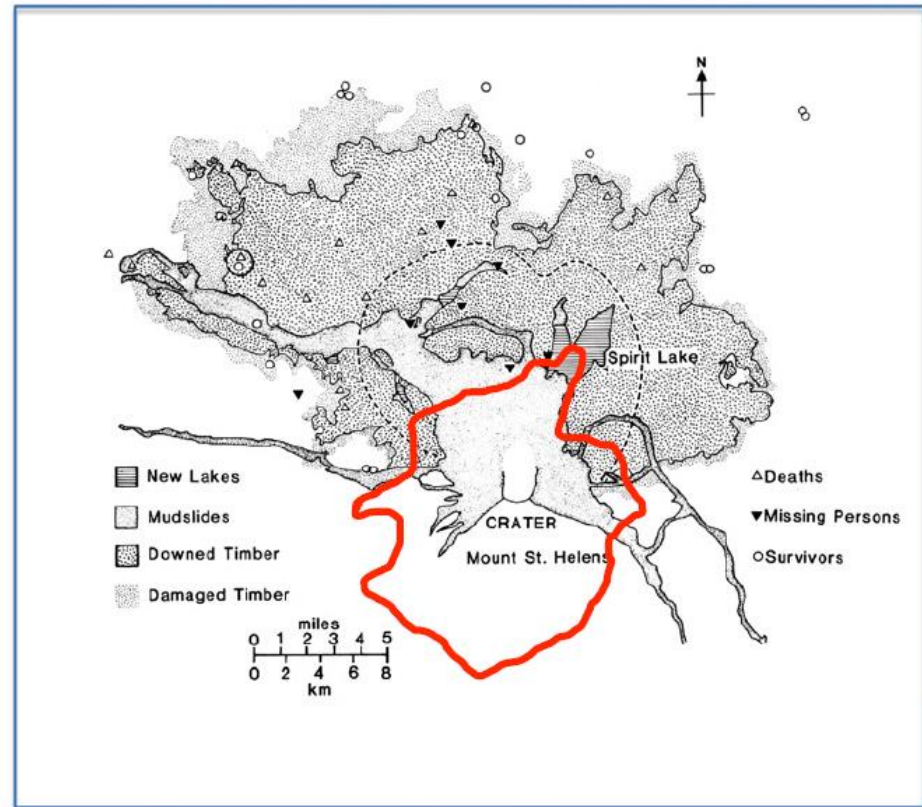
# Case 2: Volcanic hazard mapping

## Mount St Helens 1980: hazard –based zonation

Hazard map issued 1 April 1980



Actual destruction 18 May 1980



Source: Miller et al. (1981), Hazards assessments at Mount St Helens, 789-801

# Major Finding 1



**“Red Zone”**

# « Red Zone » in Volcanic (Natural) Disaster Prevention

- Volcanic hazard map in France: 4 zones including red zone (construction is prohibited)
  - ▣ Vesuvia resettlement initiative in Italy (2003): 20% of residents in Red Zone was offered 30,000 euros to resettle. Only 2,500 out of 120,000 accepted the offer.
- Flooding hazard map in France: 4 zones including red zone

# No « Red Zone » in Nuclear Disaster Prevention

- A historical account of nuclear zoning (Topçu, 2015)
  - United States Atomic Energy Commission (AEC) was initially considering to establish an *exclusion zone* around nuclear sites in 1950s (Eg. 30km radius for 1000MW/h)
  - Faced with the industry's resistance fearing public anxiety and rejection over nuclear energy, AEC came up with a new strategy (1956) : establishing evacuation zones in case of an accident, instead of establishing exclusion zones prior to an accident
- French Nuclear Safety Authority fails even today to impose 2km radius « zone at risk » around nuclear sites due to « local oppositions ».



Contrast with Vesuvia initiative

# Major Finding 2



**Territorialization of risks and  
categorization of citizens**



# Major Finding 2

- ❑ The zoning/mapping boundaries, once established, impose obligations (evacuation) as well as accord rights (compensation), thus becoming the most definitive and authoritative measure for the population
- ❑ They trace limits which include some people and exclude the others, determining the destiny of their post-disaster lives.

# Major Finding 2

- ❑ In the nuclear case, we coined it as **territorialisation of radiological risk** (Fassert, 2016) where the intrinsically elusive (uncontrollable) nature of radiological contamination (e.g. lasting, dispersed in leopard spots, and undetectable by human senses..ect) is ‘tamed’ through mapping, encircled and contained in a limited space, so as to appear being under control (Topcu, 2015)
- ❑ **Zoning thus creates categories of citizens and often reinforces inequality and injustice**, dividing victims into legitimate, less legitimate and illegitimate categories, and determining what type of damages deserves reparation the most and the least...etc.

# The case of Fukushima

- The evacuation zones have created seven categories of citizens:

Zones	Remark	Amount (equivalent in euros)
Red Zone More than 50mSv/year	Evacuation Zone (EZ)	500,000
Yellow Zone Between 20-50mSv/year		240,000
Green Zone Less than 20mSv/year		160,000
Hot Spot (8 houses) More than 20mSv/year	Three towns outside of EZ	87,000
Between 20-30km radius	Former EZ (until Sep 2011)	60,000
Outside of EZ (23 designated cities)	Both self-evacuees and residents	14,000

Family of four (two adults + two children)

# Major Finding 3



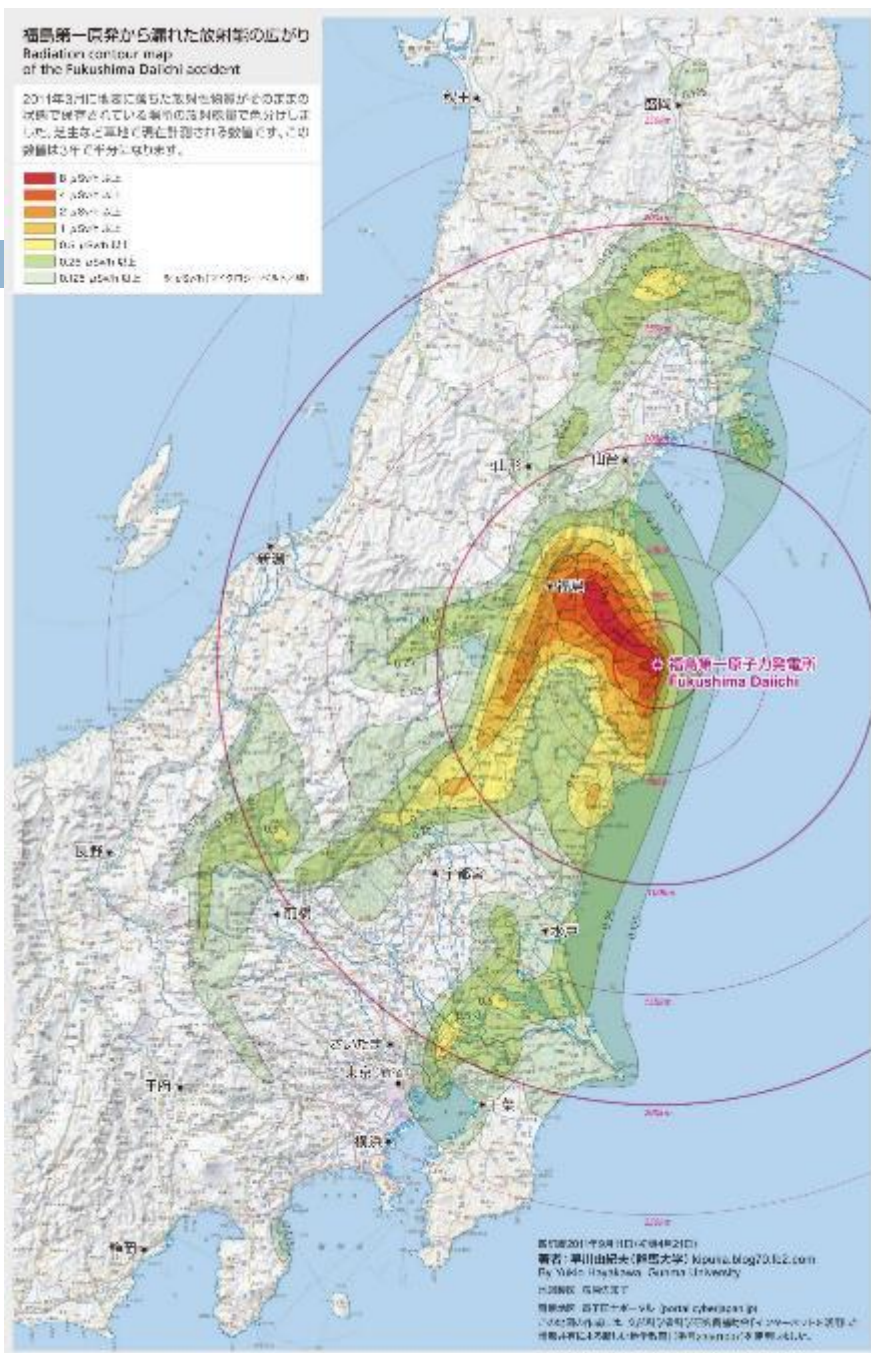
**Role of counter/independent experts  
and citizen initiatives**

# The case of Fukushima

- A number of independent scientists and NPOs have contested the zoning : 1) measuring ambient radiation dose by their own equipment (Eg. Watari), 2) the choice of 20mSv/year threshold (low-dose effect)
- A different view on low-dose effect leads to a different zoning (or challenges the very idea of zoning)

福島第一原発から漏れた放射線の広がり  
Radiation contour map  
of the Fukushima Daiichi accident

2011年3月に発生した福島第一原子力発電所の事故の状況で推定されている放射性降下物放射線量を色分けしました。足まとの単位と発生時刻での放射線量を、この図は1時間の平均放射線量を表しています。



Radiation Map by Prof  
Y. Hayakawa  
(Volcanologist), Gunma  
Univ, as of Sep 2011



## NPO « Save Children from Radiation in Fukushima »

Resident volunteers measure radiation dose on the school routes, parks, and around kindergarden/schools. When they were measuring at the parking of a supermarket, they are evicted by the manager as he thought that their presence made people scared....

# Alternative measurements : alternative zoning solutions ?



Prof Yamauchi (Radiation Physics), Kobe University

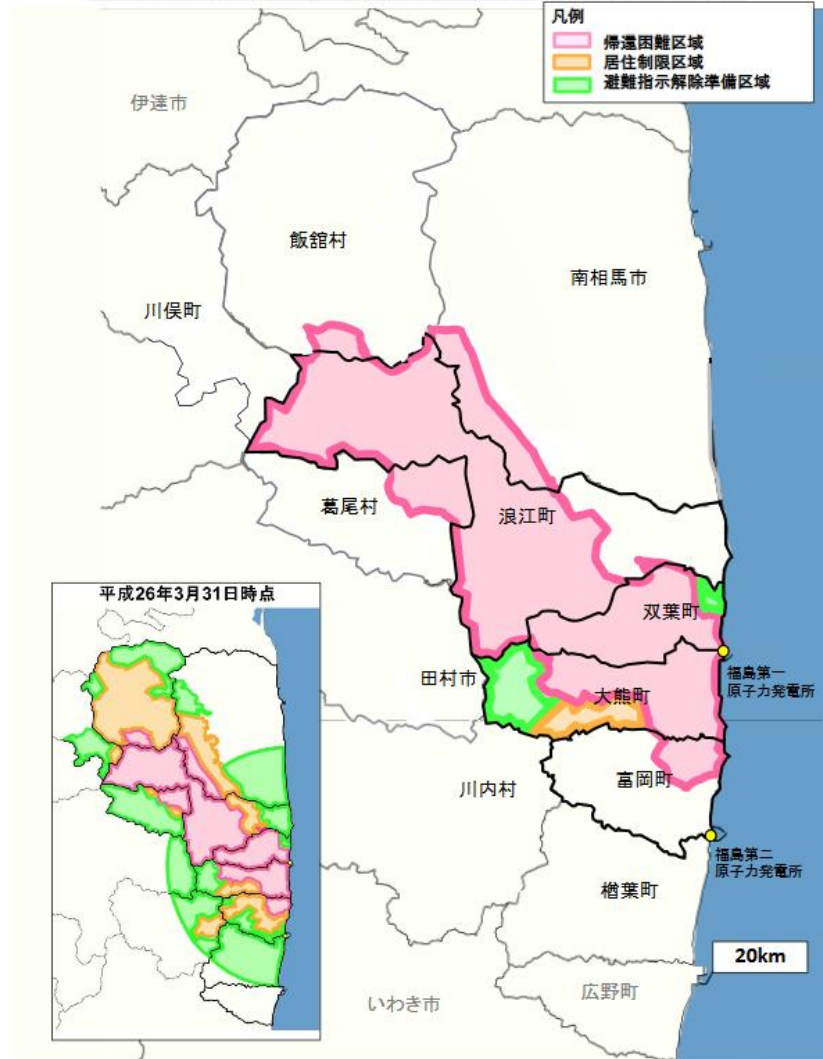
*“Fukushima city is the capital. It was symbolic, you could not evacuate the capital city without recognizing the significance of the consequences of a nuclear catastrophe”.*

He measured radiation dose in Fukushima city using his own equipment after a request made by the residents and exposed the existence of “hot spots”.



# Territorialisization of risk vs. « Endless Catastrophy » (Beck)

避難指示区域の概念図(平成29年4月1日時点)



# Concluding remarks

- Zoning is a highly political exercise of making choices and compromises between various national and economic interests. In addition, it incorporates a meta-aspect: the sense of control and mastery of the situation by the State authorities.
- From ‘technologies of hubris’ to that of ‘humility’, proposed by Jasanoff in 2003, is yet far from being implemented from the two cases of our study.