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

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How a zoning looks like...
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)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Zones</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/03</td>
<td>2km radius</td>
<td>Evacuation</td>
</tr>
<tr>
<td></td>
<td>3km radius</td>
<td>Evacuation</td>
</tr>
<tr>
<td>12/03</td>
<td>10km radius</td>
<td>Evacuation</td>
</tr>
<tr>
<td></td>
<td>20km radius</td>
<td>Evacuation</td>
</tr>
<tr>
<td>15/03</td>
<td>20-30km</td>
<td>Shelter indoors</td>
</tr>
<tr>
<td>22/04</td>
<td>20-30km</td>
<td>Shelter indoors or Evacuation by own means</td>
</tr>
<tr>
<td></td>
<td>Areas with more than 20mSv per year</td>
<td>Evacuation within 1 month</td>
</tr>
<tr>
<td>16/06</td>
<td>Spots with more than 20mSv per year</td>
<td>Recommend for Evacuation</td>
</tr>
</tbody>
</table>

**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/m² 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:

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)

© A. Lacroix
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”
Vocanic 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.
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:

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

Source: Yokemoto et al. (2015) and MEXT (2013) with some additional information from the author (R. Hasegawa)
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)
Radiation Map by Prof Y. Hayakawa (Volcanologist), Gunma Univ, as of Sep 2011
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?

"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."

Prof Yamauchi (Radiation Physics), Kobe University

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".
Territorialization of risk vs. «Endless Catastrophy» (Beck)
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.