

Session 2-1; Projected catastrophic disasters

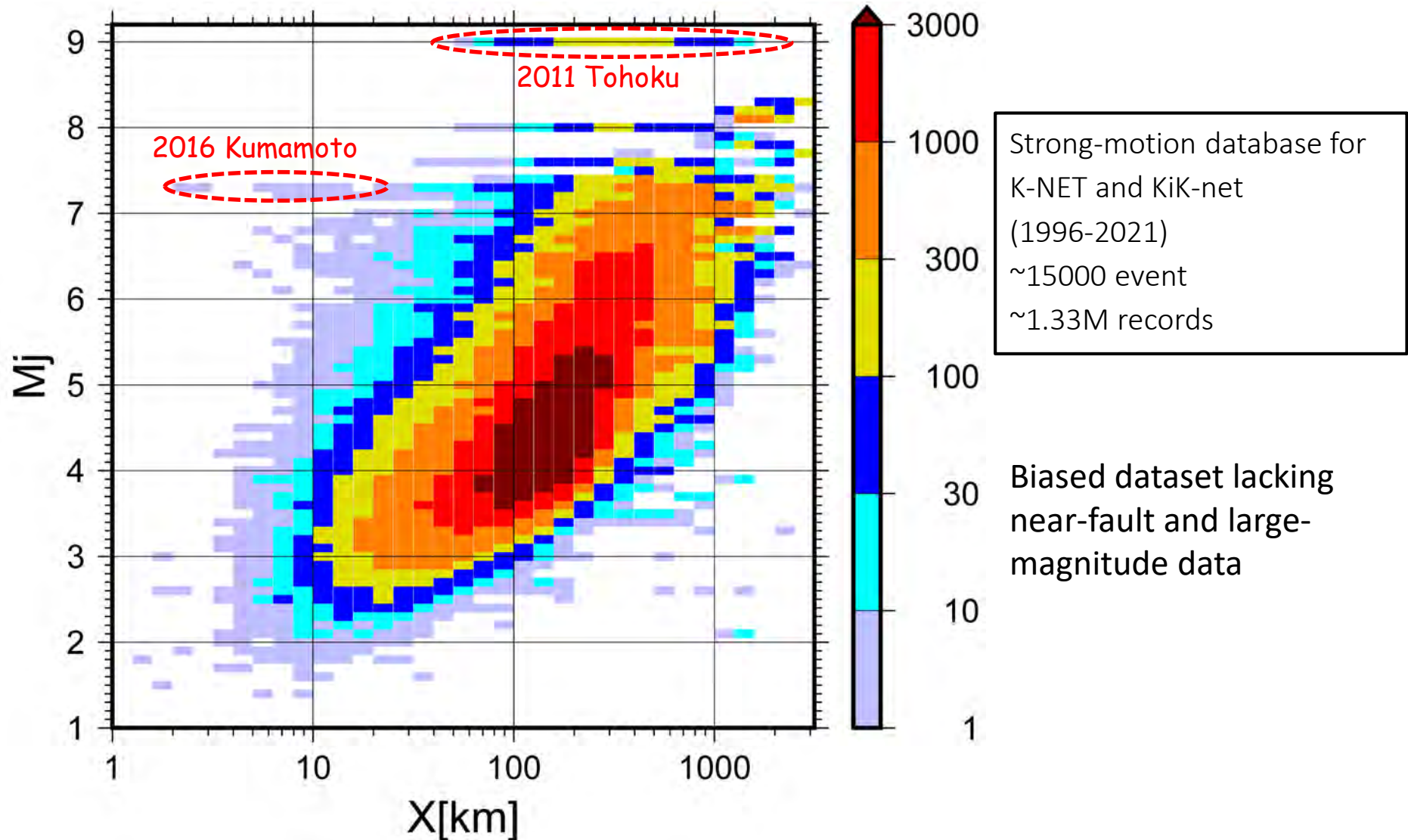
- Moderator ; Kenji Satake (ERI, U Tokyo)
- Speakers; Asako Iwaki (NIED)
Shunichi Koshimura (IRIDeS, Tohoku U)
Yukiko Hirabayashi (Shibaura Inst Tech)
Chris Allen (European Commission)
- BACKGROUND ; In the last century since 1923, science and technology have significantly advanced, and we can now model and forecast hazards such as earthquakes, tsunamis, and extreme weather events. We will discuss current status, limitations, and uncertainties of projection of catastrophic disasters.

- Main discussion on “projected hazard/disaster in the future”
 1. What are the scientific/technological developments in the last 100 years, and to what extent can we forecast future hazard/disaster
 2. What are the limitations and what is not yet possible ?
 3. How can we (scientists) communicate them (above) with the society ?
 4. What are the possible actions of the society, both public and private sectors?

[Discussion] Modeling the unknown

The biggest challenge in predicting ground motion (and other natural phenomena) that we have never experienced or recorded in the history, is the management of various uncertainties in prediction.

More effort is needed to reduce the uncertainties in the prediction model by constraining the conditions based on scientific knowledge.
Alternative is to make up the data by simulation.



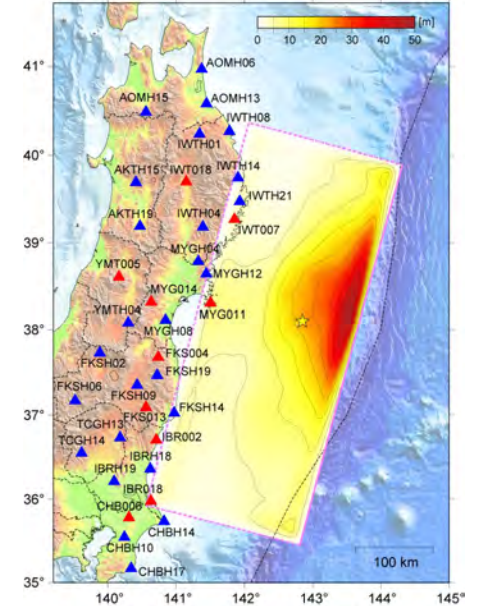
Revision of NSHMs after the 2011 M9.0 Tohoku earthquake

The 2011 Tohoku earthquake exhibited *unanticipated* natural phenomena, including the earthquake magnitude, ground motion and tsunami.

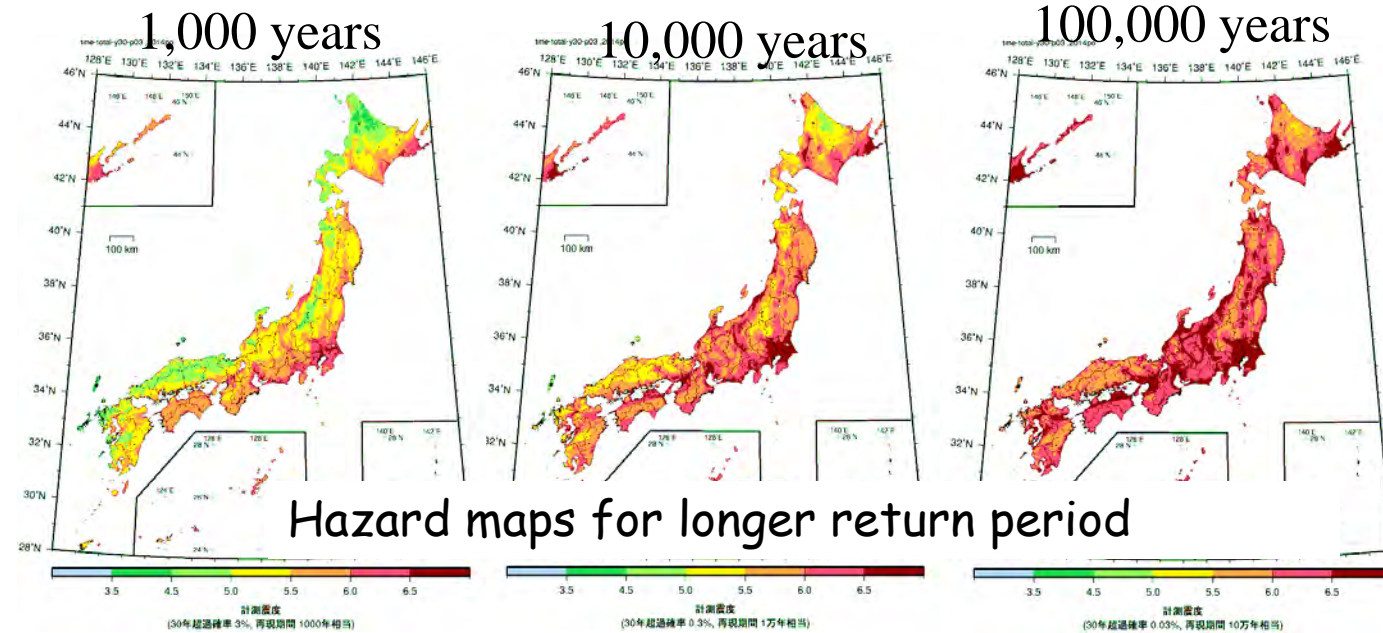
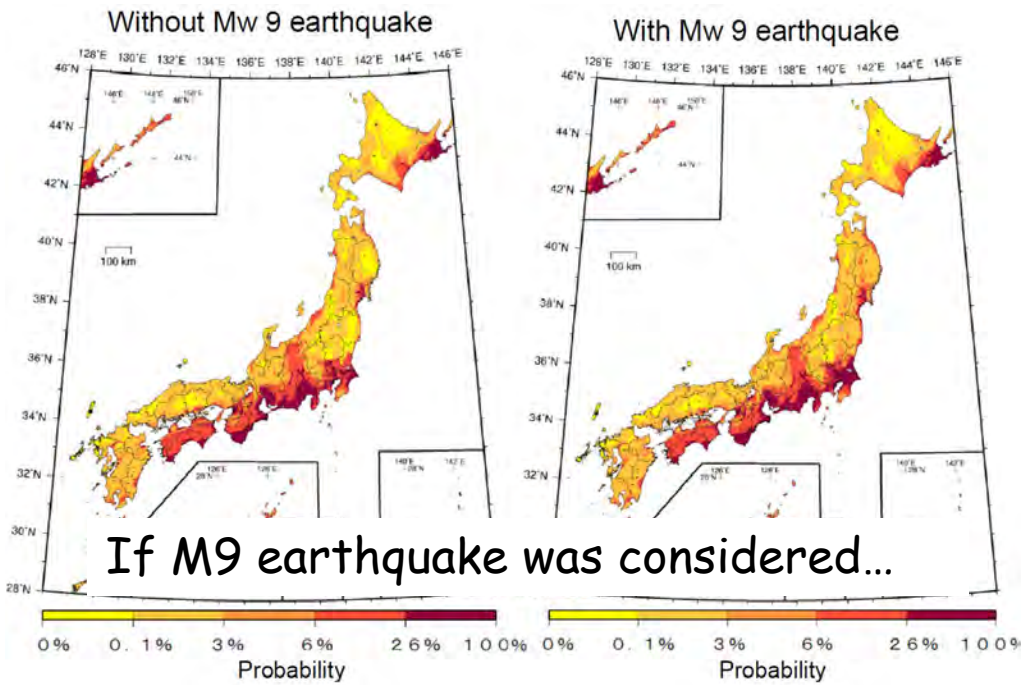
We learned how we had not known.

Revision based on the lessons from the 2011 M9.0 Tohoku earthquake:

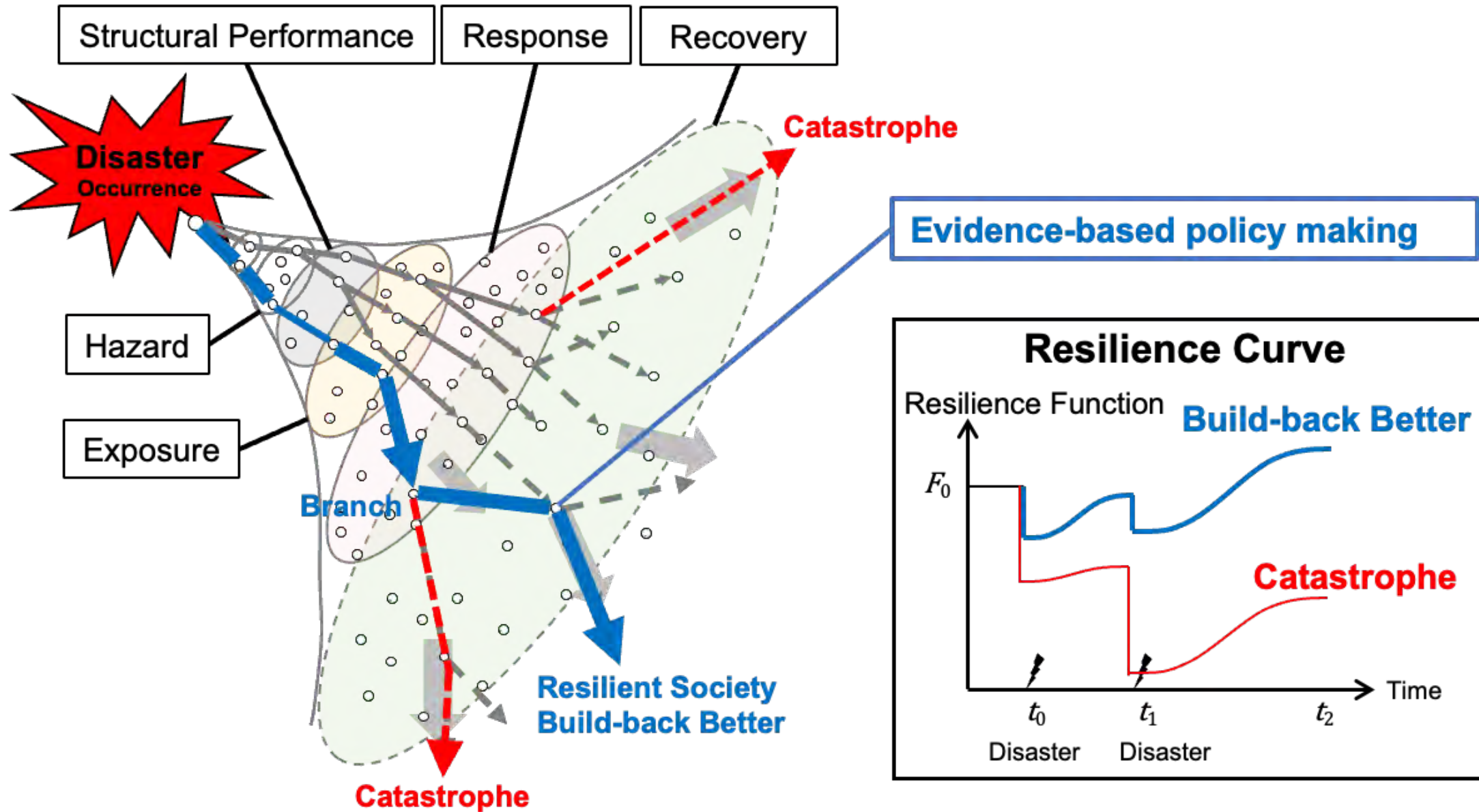
- Revision of seismic activity model and SHA with appropriate quantification of uncertainty, considering potential source area with low-frequent activity
- Revision of the ground-motion prediction model for large-scale fault
- Review of representation of hazard information



Suzuki et al. (2011)



Complex Disaster Process and Great Uncertainties



Panel discussion

- We need to respond to disasters never experienced before due to climate change.
温暖化が進むことでこれまで経験したことのない災害に対応していく必要がある
- Increased flooding in Japan and Asia was predicted more than 15 years ago. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) incorporated climate change into its river improvement plans only after the number of significant floods increased.
国土交通省が河川整備計画に気候変動を取り入れたのは、顕著な洪水が増えてから。
- To what extent can the government allocate budget for an uncertain future? Many measures are based on a 2°C rise, but is it necessary to assume a case beyond that?
不確実な将来に対して、国はどこまで予算配分できるのか。多くの対策は2°C上昇が基準だが、それを超える場合は想定しなくてよいのか。
- Current actions are important with regard to tipping. Can we take realistic actions to address low-probability events, including those in the far future, such as 300 years from now?
ティッピングが生じるかどうかは現在の行動が重要。しかし、生起確率が非常に小さく、影響が300年後に現れるような現象に対して、実感を持ってどうやって対策できるのか？

