Adaptation Measures for Extreme Floods in Japan, A Case Study **Using Huge Ensemble of High-Resolution Climate Model Simulation** Hokkaido University Tomohito J. Yamada







Large ensemble climate dataset

• Thousand years climate data under past and warmer(+2K and +4K) climate made by high resolution atmospheric models

Flood risk assessment

- Future changes in precipitation extremes(frequency, amount, spatiotemporal character and factor)
- Flood damage(inundation area, number of fatalities, number of flooded house, etc.)

Adaptation plan

- Far-sighted efficient flood control plan
- Committees held by national and regional governments.

Frequency of annual maximum rainfall over Tokachi river basin

0.40			
0.40			

Model result



Frequency of rainfall intensity



Relationship between temperature and precipitation



Rainfall intensity and temperature follow Clausius-Clapeyron relationship

Spatio-temporal rainfall characteristics





Heavy rainfall under warmer



d4PDF







Relationship between basin averaged rainfall and peak discharge



Further advanced flood risk assessment

1/5

Frequency of

~1/20

1/20~1/30 1/30~1/50

1/50~1/80

1/80~1/100

1/100~1/150

1/150~1/300

1/300~1/500

1/1000~

1/500~1/1000

inundation

Advanced risk assessment based on the huge high resolution ensemble data with risk based approach is going to be developed in order to help planning for highly effective adaptation strategy.

Adaptation

Committees



The seminar about Japan and Netherlands flood control in Hokkaido, Japan





- 2017 Projection of future flood risk in Hokkaido, Japan (Hokkaido development bureau and Hokkaido prefecture)
- Projection of future flood risk and 2018consideration of nationwide adaptation plan associate with climate change (MLIT)

Discussions are based on the large ensemble climate dataset and the risk assessment results.

This study was supported by SI-CAT (Social Implementation Program on Climate Change Adaptation Technology), the Ministry of Education, Culture, Sports, Science and Technology, Japan.