

Integrated Risk Governance Under Global Change

Peijun Shi

State Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University; Beijing, China

Academy of Disaster Reduction and Emergency Management, Ministry of Civil Affairs and Ministry of Education, P.R.China;

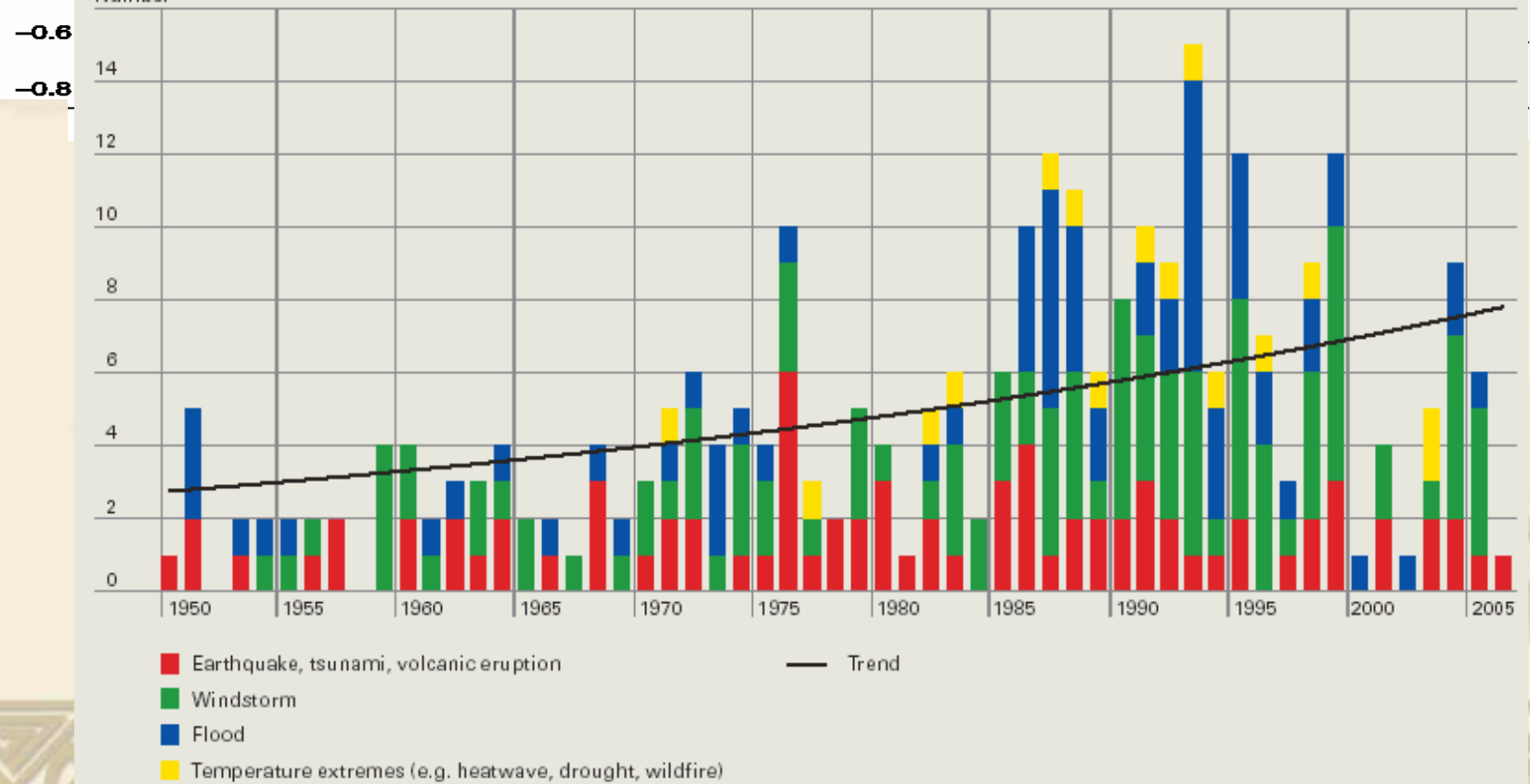
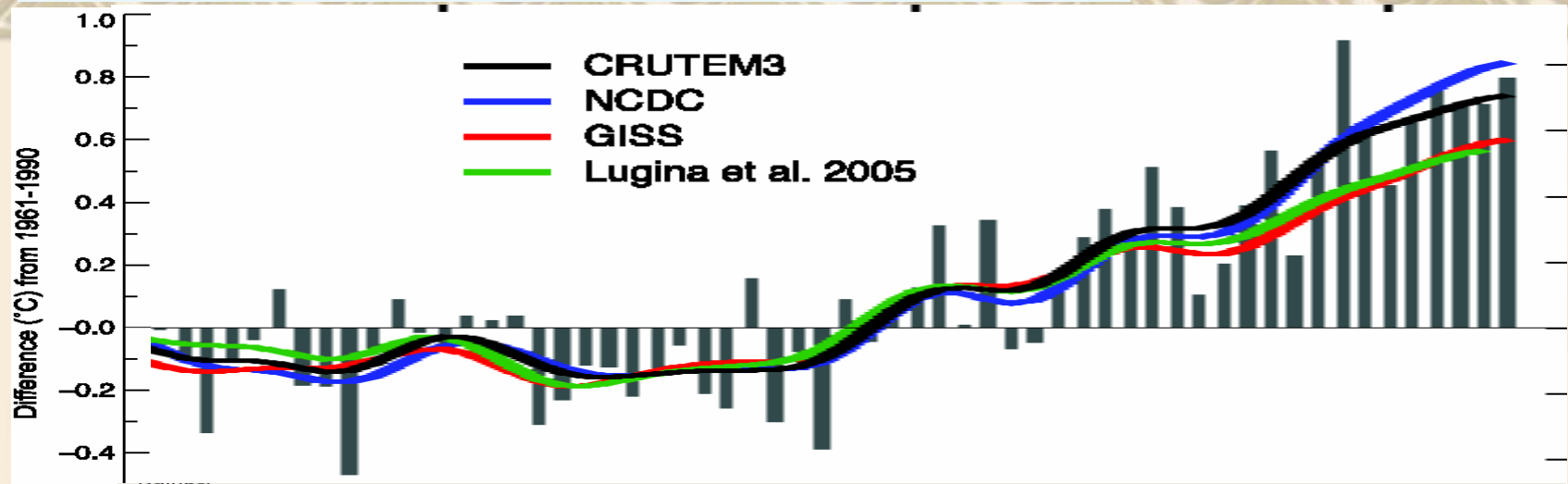
Contents

- ❖ Introduction
- ❖ Large-scale Disaster Risk(LSDR)
- ❖ Integrated LSDR Governance Under Global Change(IRG-Project)

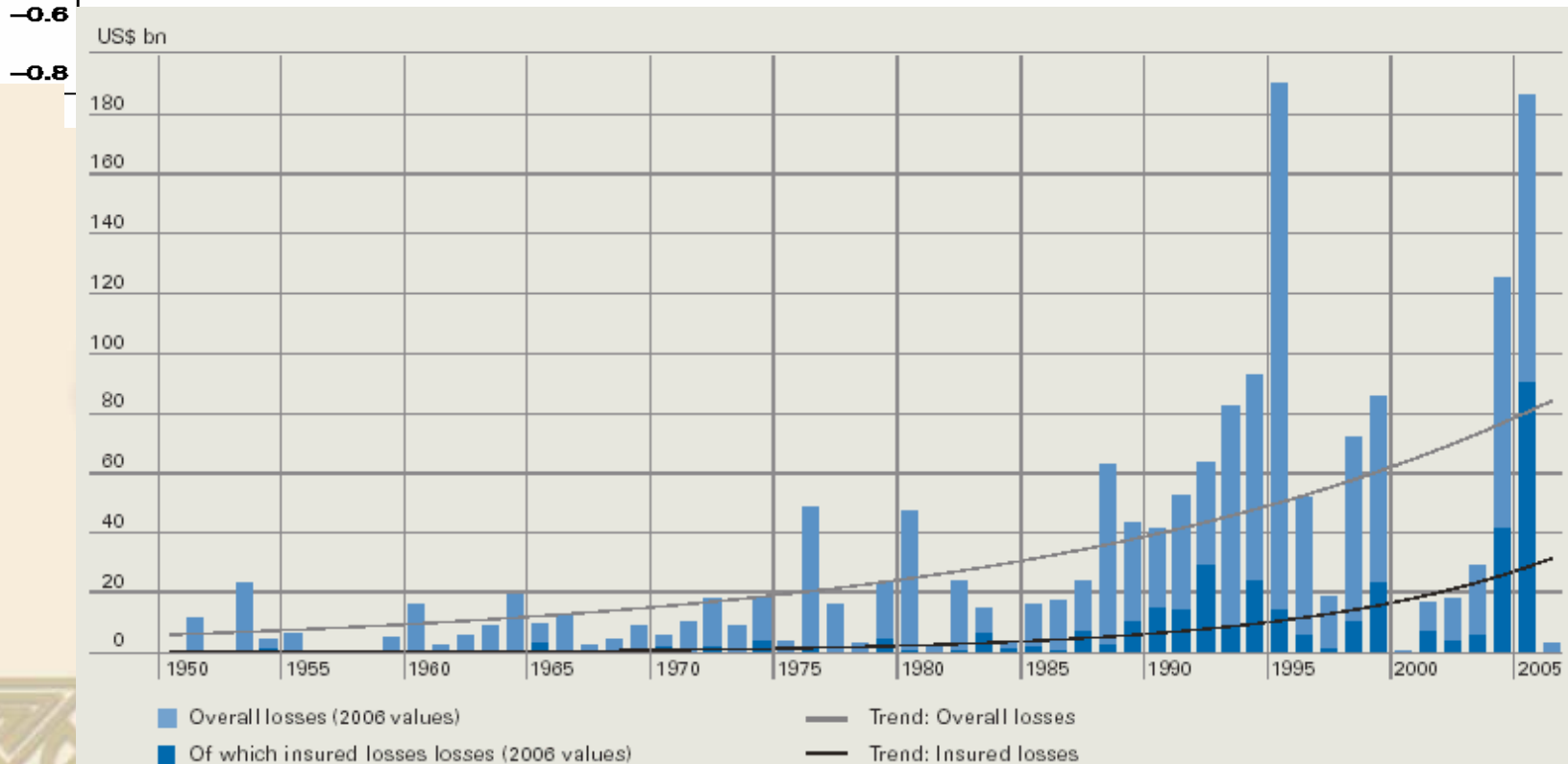
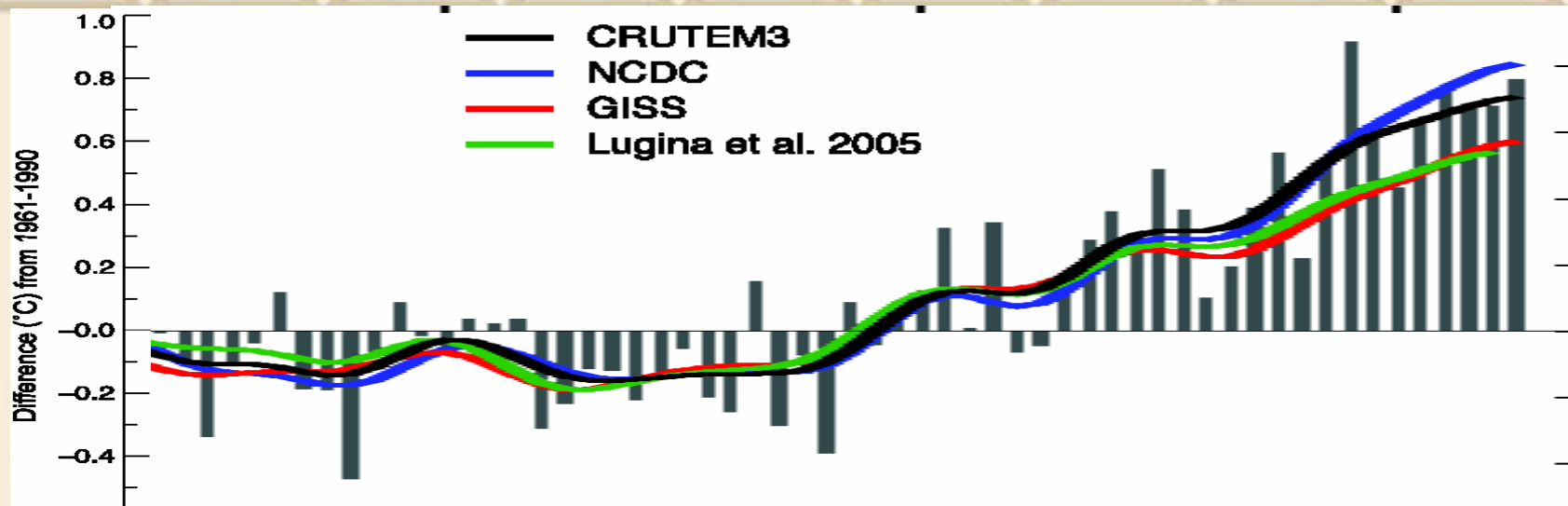


I Introduction

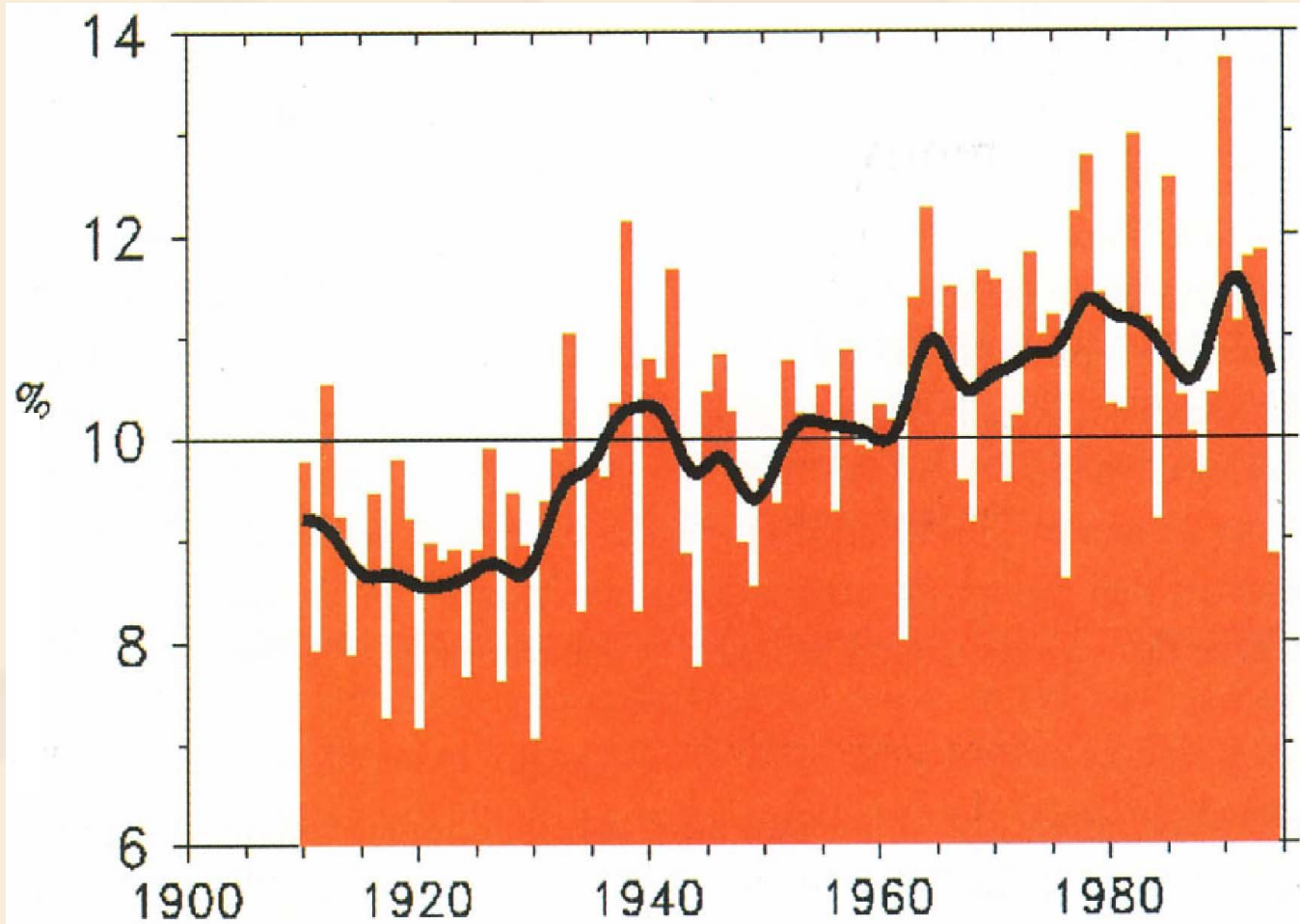
Surface Temperature Change and Main Disaster Numbers



Surface Temperature Change and Disaster Losses

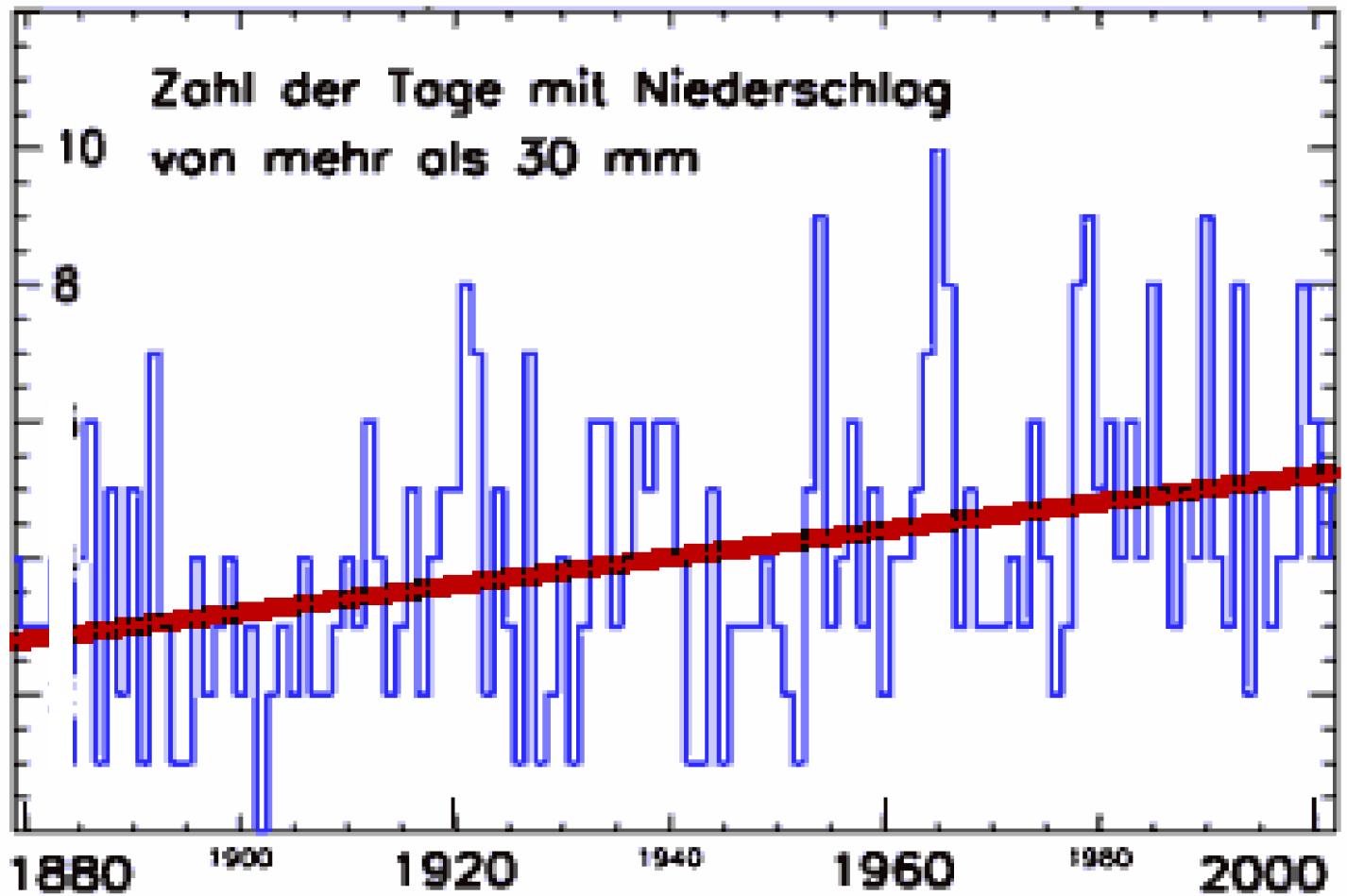


Increasing trend of high intensity rains in the USA



Source: <http://www.ncdc.noaa.gov/ol/climate/research/gcps/papers/amsbull/amsbull.html>

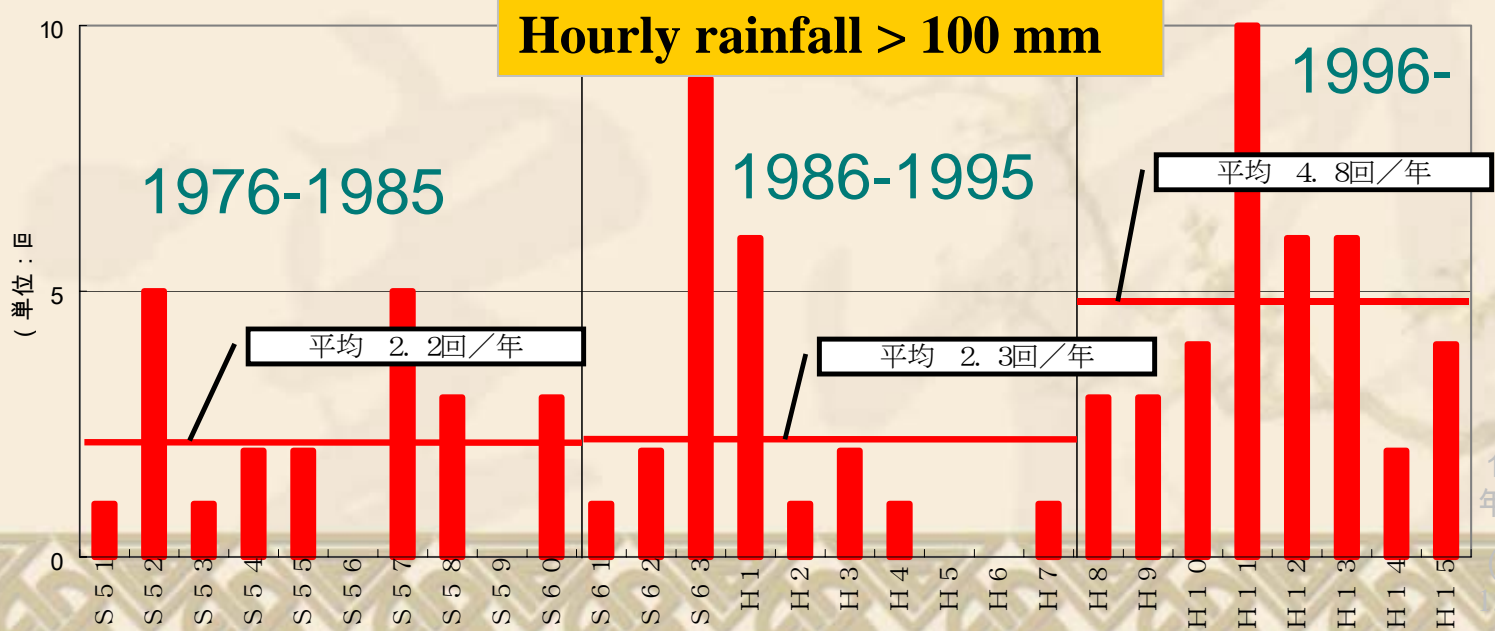
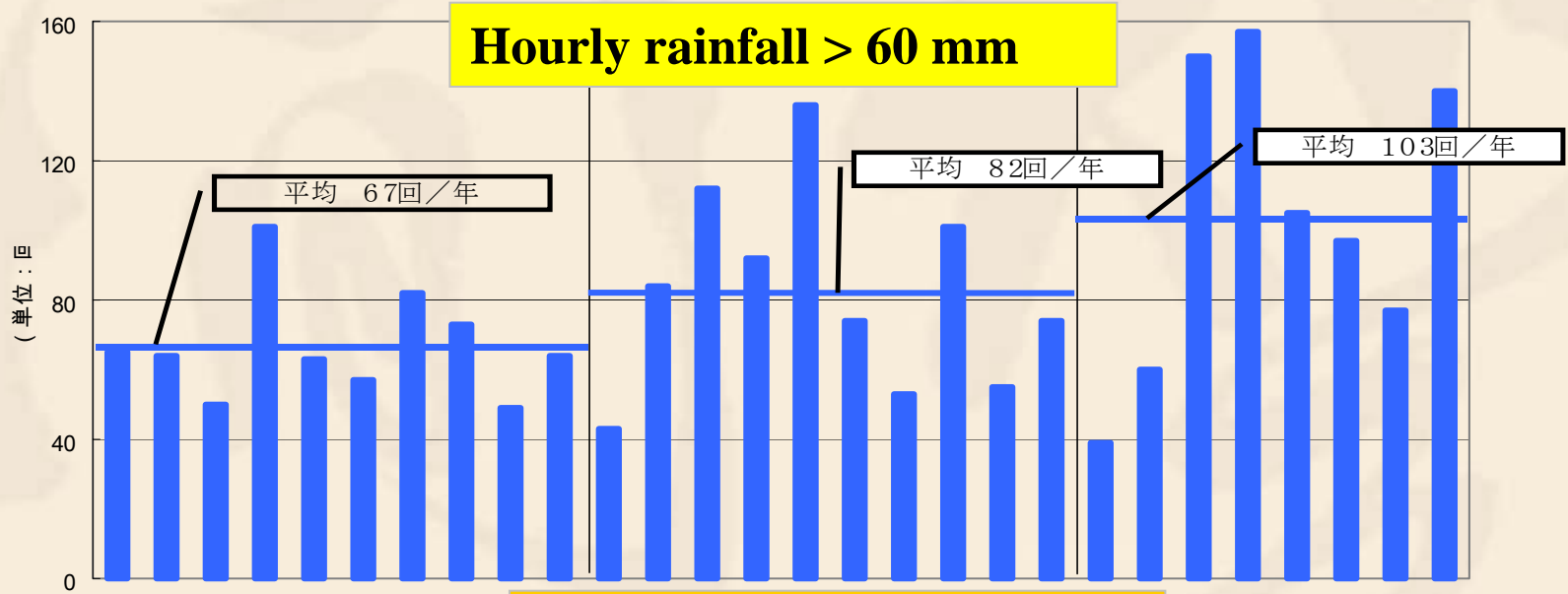
Rains more than 30 mm in Germany



Source:

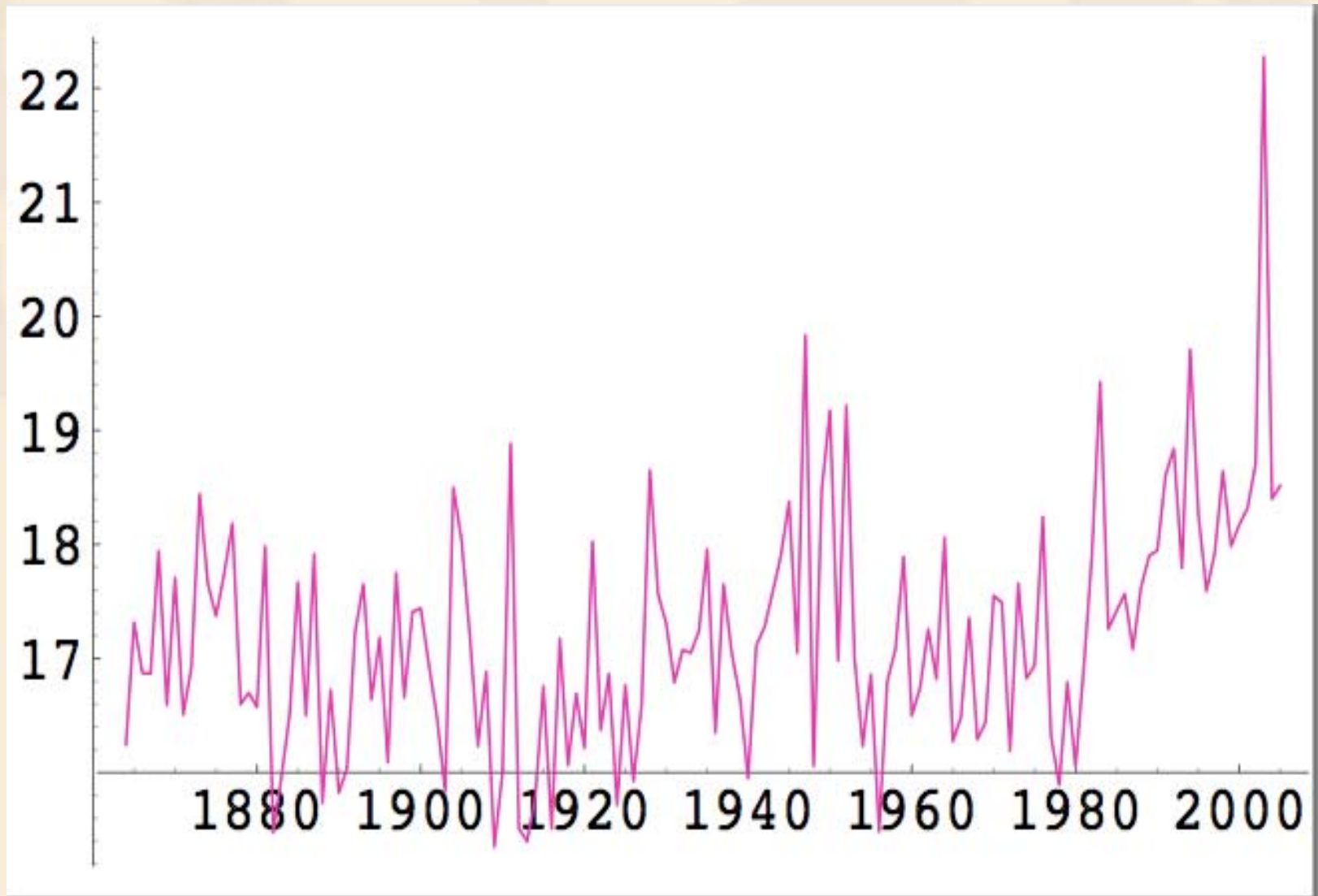
Wetterstation Hohenpeißenberg

Frequency: higher intensity rainfalls all over Japan

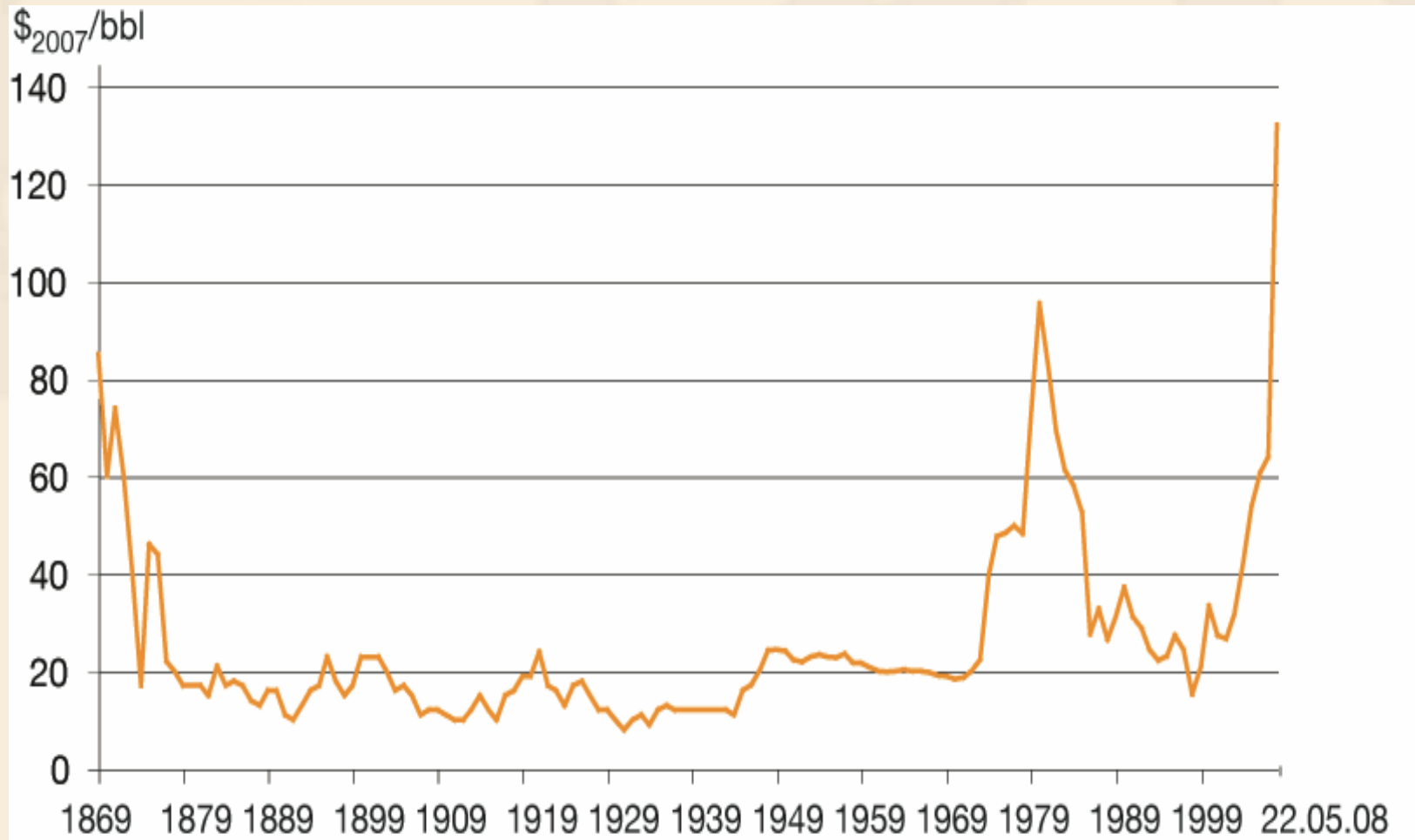


1時間降雨量における年間延べ件数
 (全国のアメダス地点300箇所より)

The 2003 Alpine Heatwave (Carlo C Jaeger)



Oil Prices 1870-Today (Carlo C Jaeger)





II Large-scale Disaster Risk

Flood Disaster Risk



**Flood in Yangtze River Basin of China
in Summer & Autumn, 1998**

Flood Risk



Drought Disaster Risk



Severe Drought in ChongQing, China, August, 2006

Freezing rain and snow disaster in China during the early 2008

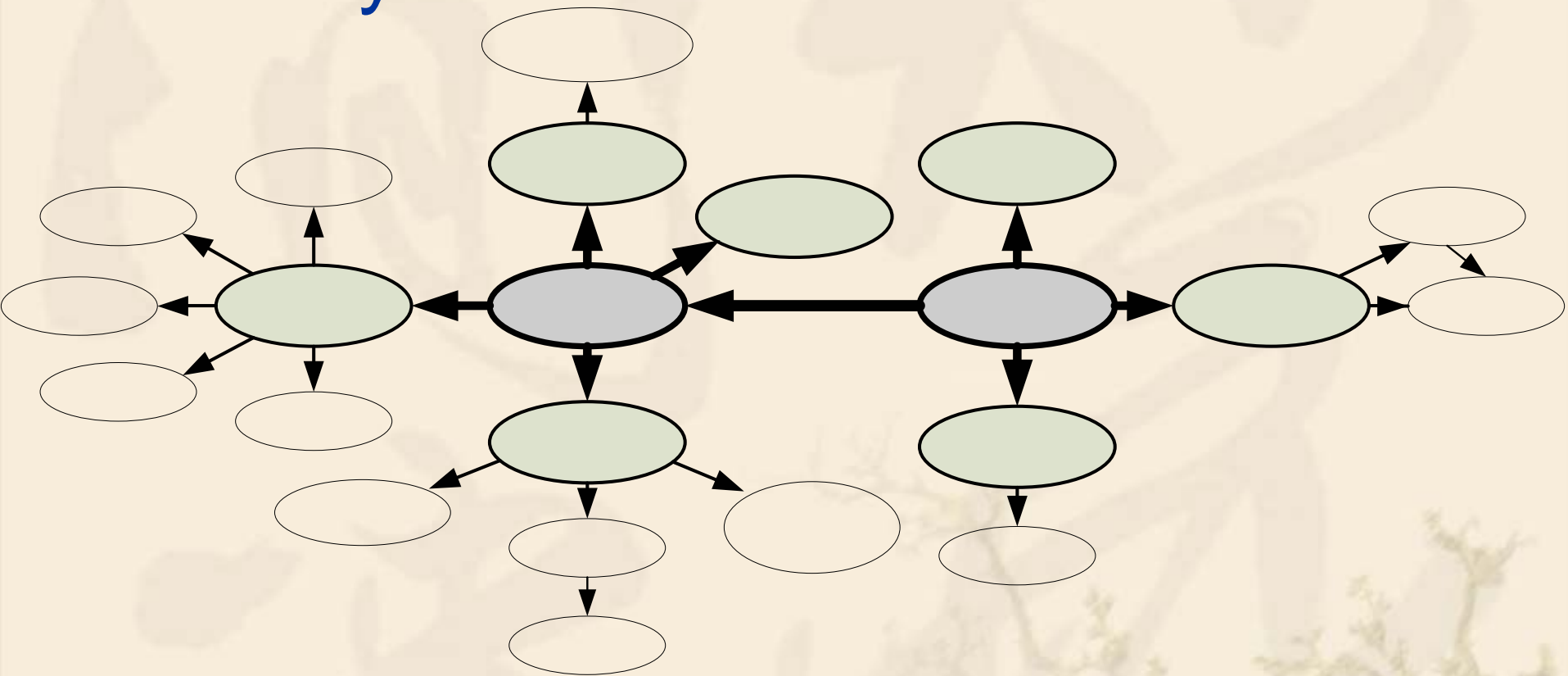


XINHUANET



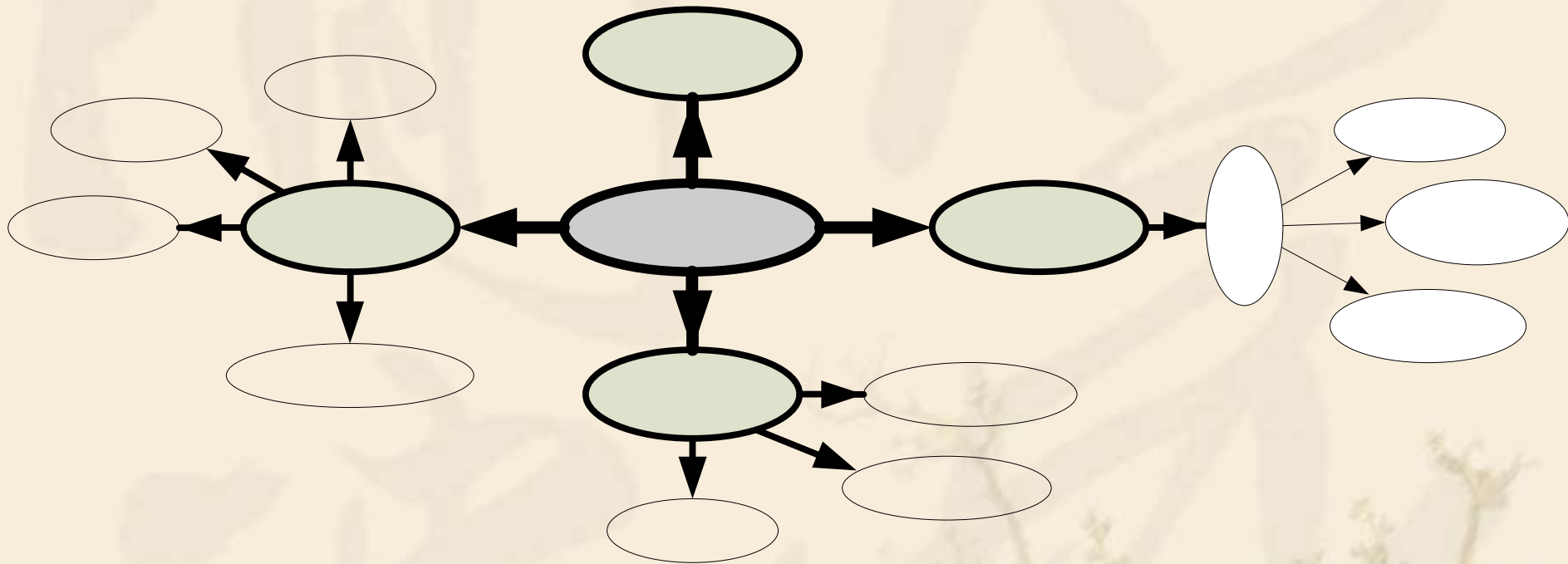
Transportation—Highway & Road

The System School - Disaster chains



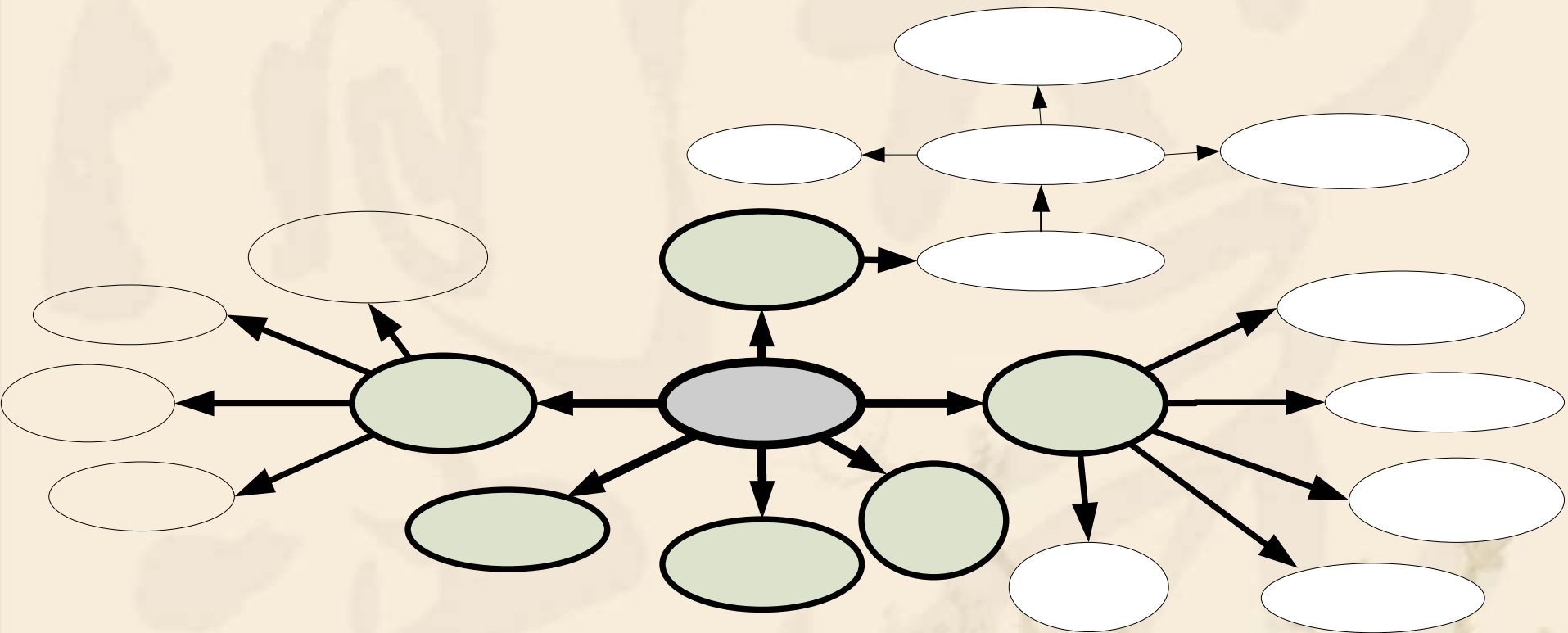
Typhoon-storm disaster chain

The System School - Disaster chains



Cold wave – wind disaster chain

The System School - Disaster chains



Drought disaster chain



II Integrated LSDR Governance Under Global Change



Disaster Reduction Implementation Science

(**N. Okada** et al. ,KU, Japan/Pagoda-Octopus-Vital System-Cycle System- CASiFiCA)

Integrated Risk Governance Science

(**O. Remm** et al. ,IRGC, Swizland/Risk Science-Risk Policy-Risk Communication)

Disaster Risk Reduction Science

(**S. Brinceno** et al. ,ISDR, UN./To build the resilience society living with risks)

Disaster Reduction and Sustainability Science

(**R. Kasperson and R. Kates** et al. ,IHDP/ESSP/Vulnerability-Resilience-Adaptation)

Understanding Integrated Disaster Risk Reduction Science

Why do we integrate ?

Contingency, Uncertainty, Complexity, Diversity,
Globality

What do we integrate ?

Multi-knowledge (Science, Technology, Management)

Multi-Scales (Macro, Medium, Micro)

Multi-Components (Governments, Communities, Institutes, Families)

Multi-Processes (Before, During, After)

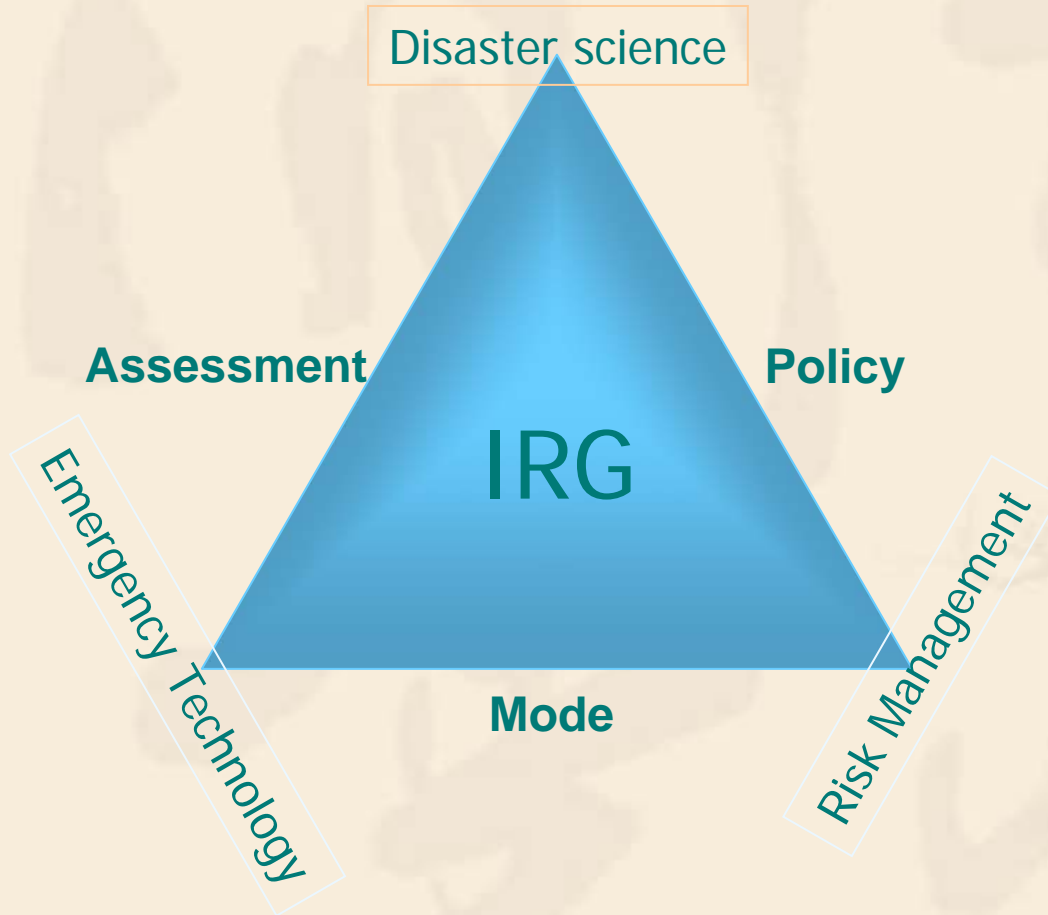
Multi-Actions (Engineering/ Structure/, Un-engineering/Non-structure)

System of System (Disciplinaries, Scales, Components, Processes,
Actions)

IRG –How to integrate?

- **Conferences, forums and workshops—“Brainstorming”**
 - IDRC
 - WCDR
 - IGRC
 - IIASA-DPRI
- **Information sharing network**
 - Global Platform for Disaster Risk Reduction (GP/DRR, UN/ISDR)
 - DRH-Asian (Japan)
 - Integrated Risk Governance Network (iRiskNet|IRG-China)
- **Integrated Risk Maps**
 - Hotspots of Global Disaster Risk (UNDP&WB)
 - The national first generation integrated risk map in China
- **Modeling and Simulation**
 - Alliance for Global Open Risk Analysis (Japan)
 - System for System (Old Dominion Univ., US)
 - Integrated Risk Governance Simulation and Dynamics (BNU, China)

Disaster Risk Science



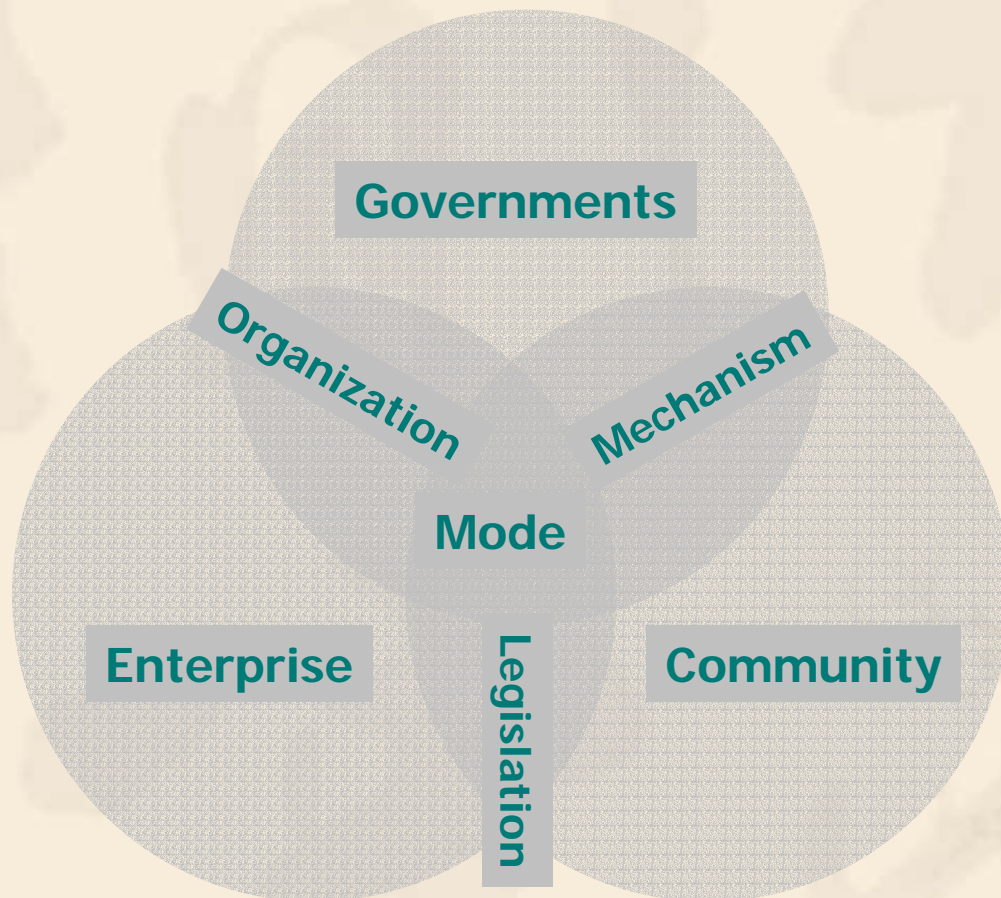
- **Disaster Science:**
 - Formation Mechanism of DS
 - Change Process of DS
 - Disaster Reduction Countermeasure

- **Emergency Technology:**
 - Contingency Plan
 - Contingency Action
 - Contingency Command

- **Risk Management:**
 - Risk Identification
 - Risk Classification
 - Risk Assessment
 - Modeling
 - Response
 - Adaptation

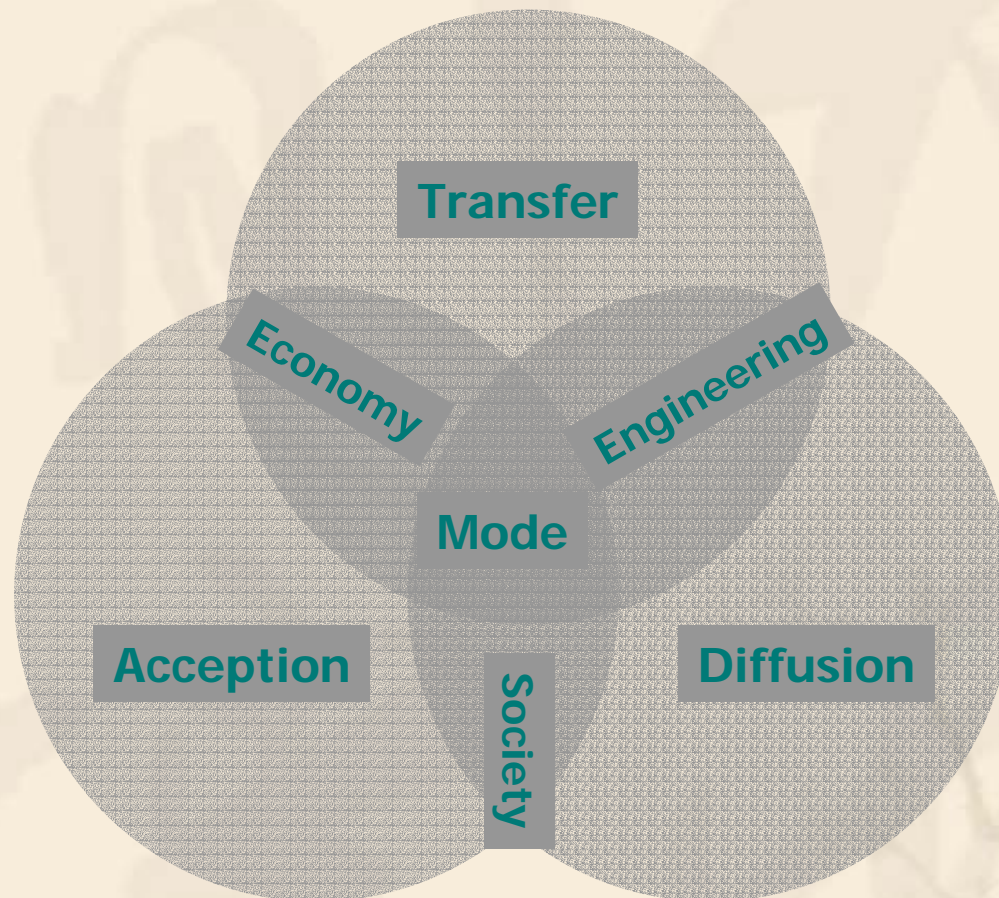
Disaster Risk Science

IRG - Integrated Disaster Risk Governance Mode



In view of research to practice, **integrate** the regional disaster risk management and sustainable development. **improve** global and regional society response strategy and policy to catastrophe risk, **provide** operational assessment tools.

IRG - Approach for Catastrophe Risk Transfer



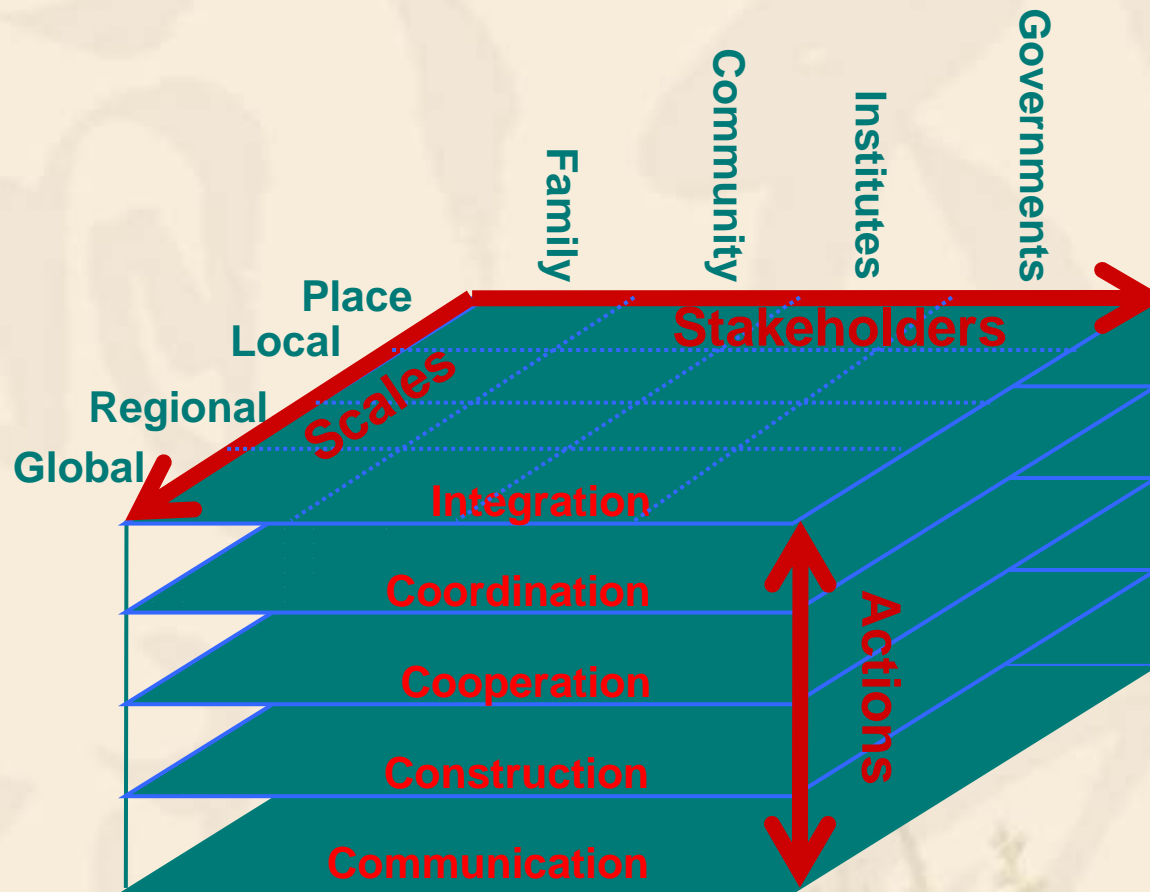
In view of the inter-disciplinary (natural sciences, social sciences and human sciences, technology and engineering, management), **go deep** in exploring approaches for transfer of catastrophe risks.

Approach for Catastrophe Risk Transfer

Integrated Disaster Reduction



Stakeholders Mode of Disaster Risk Reduction



Government: Development and Disaster Reduction (Governance)
Community: Safety Construction (Legislation)
Institute: Risk Transformation (Mechanism)
Family: Risk Awareness (Education)

IRG-Project Review

- ❖ History
- ❖ Chinese Proposal

Background

- ❖ Population increase dramatically, particularly in developing countries
- ❖ New technologies, e.g., nano technology, internet, gene engineering, etc.
- ❖ Impacts of human activities on natural systems, e.g., climate change
- ❖ Interconnections among energy, water and food
- ❖ Natural hazards in limited regions are now amplified easily and have global impacts.

Why IRG Program

- ❖ In the context of global climate change, frequencies and strengths of large-scale disasters increase as well as their impacts on global human society.
- ❖ To better deal with LSDR, basic scientific research, technological innovation, and institutional change are needed
- ❖ The LSDR events in China and other parts of the world occurred recently demonstrate the importance of international cooperation to share knowledge and experience

Three Fundamental Differences

- ❖ Natural characters of LSDR and social structures are different
- ❖ Differences in cultural, level of economic development and political systems
- ❖ Differences in policies, laws and institutions to deal with LSDR

Three Commons

- ❖ Needs for a safe and sustainable natural and social environment
- ❖ The role and responsibility of governments to develop relevant laws and policies
- ❖ Mechanism of disseminating risks caused by LSD is same in the context of globalization

Scientific Questions

- ❖ How to diagnose risks in different degrees, different stages and different regions
- ❖ How to assess complicated risks, especially risk chains (vs. multi-hazards)
- ❖ How to design LSDR maps to guide planning and development

Technical Issues

- ❖ Forecasting and early warning technology (observations, temporal and spacial resolutions, different datasets)
- ❖ Financial risk measuring
- ❖ Improving observational capabilities (remote sensing, etc.)
- ❖ Institutional design
- ❖ Damages assessment, sciences and technology

Social Aspects

- ❖ With differences in cultural, economic development, social systems, how to deal with LSDR
- ❖ The role of governments and other institutions (who should do what according to what kind of thresholds)
 - ⌘ Mechanisms
 - ⌘ Laws and policies (e.g., the role of insurance)

Some Forecasting Challenges (Carlo C Jaeger)

- **Energy prices:** „Forecasting crude oil prices right now is akin to forecasting the temperature on Mars a few eons from now.“ Tom Kloza, chief oil analyst, Oil Price Information Service.
- **Extreme Weather Events:** „Very few people could anticipate or prepare for that type of event.“ Iowa Gov. Chet Culver on the current Midwest flooding.

Learning in Emergencies (Carlo C Jaeger)

- ❖ **Emergencies have social entry and exit transitions.**
- ❖ **Learning depends critically on how these are handled.**
- ❖ Solecki and Michaels (1995) Looking Through the Postdisaster Policy Window. Environmental Management.
- ❖ Weick and Sutcliffe (2001) Managing the Unexpected. Wiley
- ❖ Nau (2001) De Finetti Was Right: Probability Does Not Exist. Theory and Decision.

IRG-Project: Activities so far(Carlo C Jaeger)

- ❖ **Spring 2007:** Answering a proposal by the Chinese National IHDP Committee, **IHDP forms a scientific planning committee** in view of a project on Integrated Risk Governance.
- ❖ **September 2007:** The SPC meets in Beijing and identifies **first research questions**.
- ❖ **February and March 2008:** The co-chairs of the SPC meet with the Chinese National IHDP Committee in Beijing and identify **first research activities on the Chinese Winter Storms 2008 and the Alpine Heat Wave 2003**.
- ❖ **June 2008:** Discussion meeting of SPC members in Santa Barbara in view of the **Science Plan**.
- ❖ **August 2008:** Writing Workshop at PIK in Potsdam

Mission Statement (Carlo C Jaeger)

The mission of IRG-Project is to improve the management of new risks that exceed current human coping capacity. We do so by focusing on the transitions in and out of the occurrence of those risks.

Focus Statement(Peijun Shi)

Science

Complexity
Uncertainty
Vulnerability
Vitality
Contingency

Technology

Feasibility
Viability
Urban Diagnosis
Sustainability
Case Study

Management

Governance
Open System
Mutual Acceptance
Cultural Calibration

Possible Case Studies (Carlo C Jaeger)

- ☞ Earthquakes in Japan(1995)
- ☞ Heat waves in Europe (2003)
- ☞ Hurricanes in USA (2005)
- ☞ Earthquakes in China (2008)
- ☞ Floods in India (2008)
- ☞ Ice storms in China (2008)
- ☞ Drought in Africa (2008)
- ☞ Food price rise (2008)
- ☞ Financial risks (2008)



Thank you for your attention !