Session II , III and IV Impacts Modeling

Chaired by Harasawa (NIES)

1. Brief Introduction of Impact Study :Harasawa
2. Impacts on South Asia : Prof. Lal
3. Progress of AIM/Impact Models
   - Takahashi
   - Profs Sun, Li You
   - Jung
   - Hijioka
   - Masutomi
4. Disscution

Brief Introduction of Impacts Study in Impacts Group

Hideo Harasawa

Projects / Subject	Central Env. Council (Int'l Strategy)	S-3 Low Carbon Society 2050 (MoE P)	S-4 Strategic Impacts Research (MoE P)	IPCC/GEO/ Avoiding Dangerous CC	Global Warming Initiative, NHK, PR	NIES next Research Plan
Stabilization and Impacts/Risk	2℃、475ppm, 50%GHG cut in 2050	←+ burden sharing	Impact Map, Function			New GW Research Prog.
Impacts Detection					Book	Integrated Impacts Monitoring
Extreme events Impacts			Extreme Events and Impacts (B-12)	Ch.10 Asia	Special TV Program (19 & 20 Feb.)	
Adaptation	Adaptation Strategy Plan		Impacts and Adaptation (B-52)	Ch.17 Adaptation		NIES next Research Plan
Scenario				Next IPCC Scenario,GEO 4		NIES, MoE, IR3S
Data : Climate Model, etc.				Impact Ref., Temp. and Impacts		

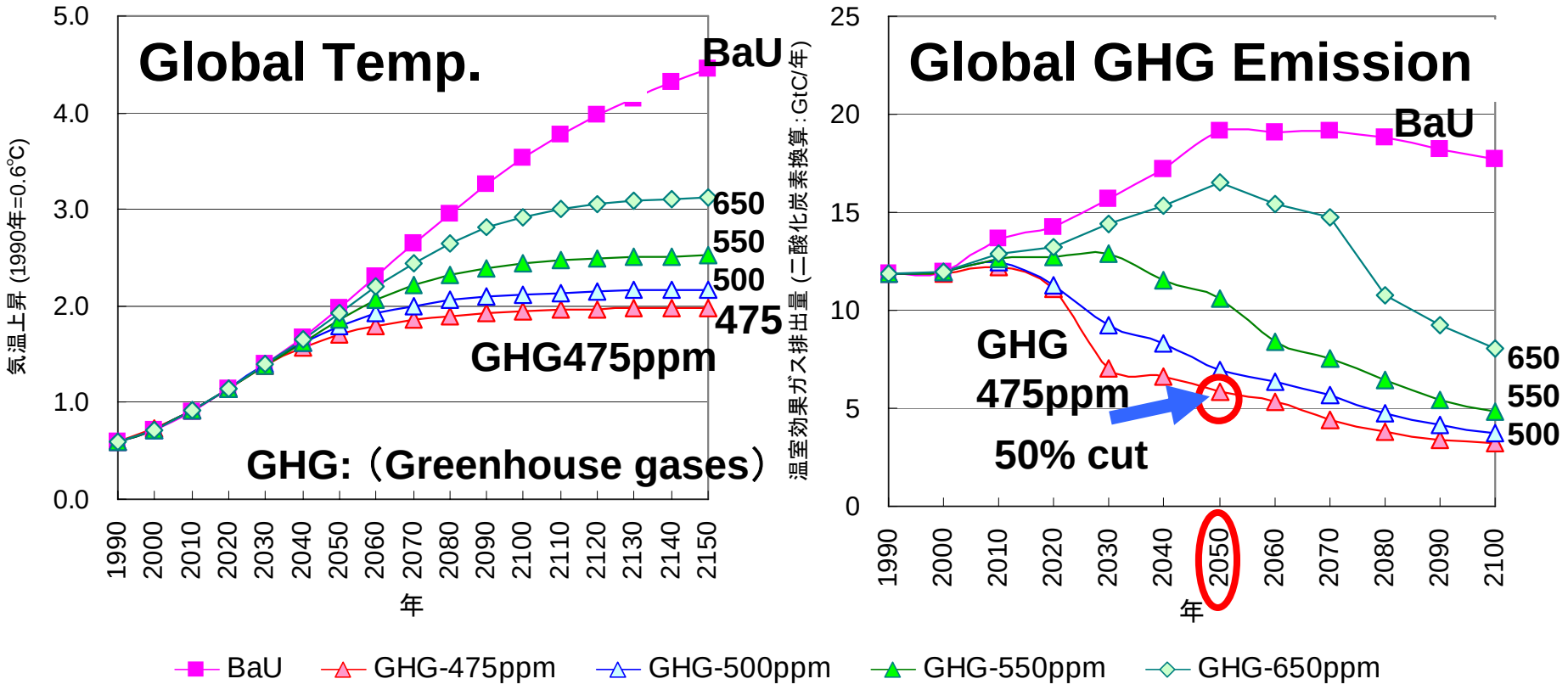
Impact/Policy

Agri. Impact

Heat Stress

Water Impact

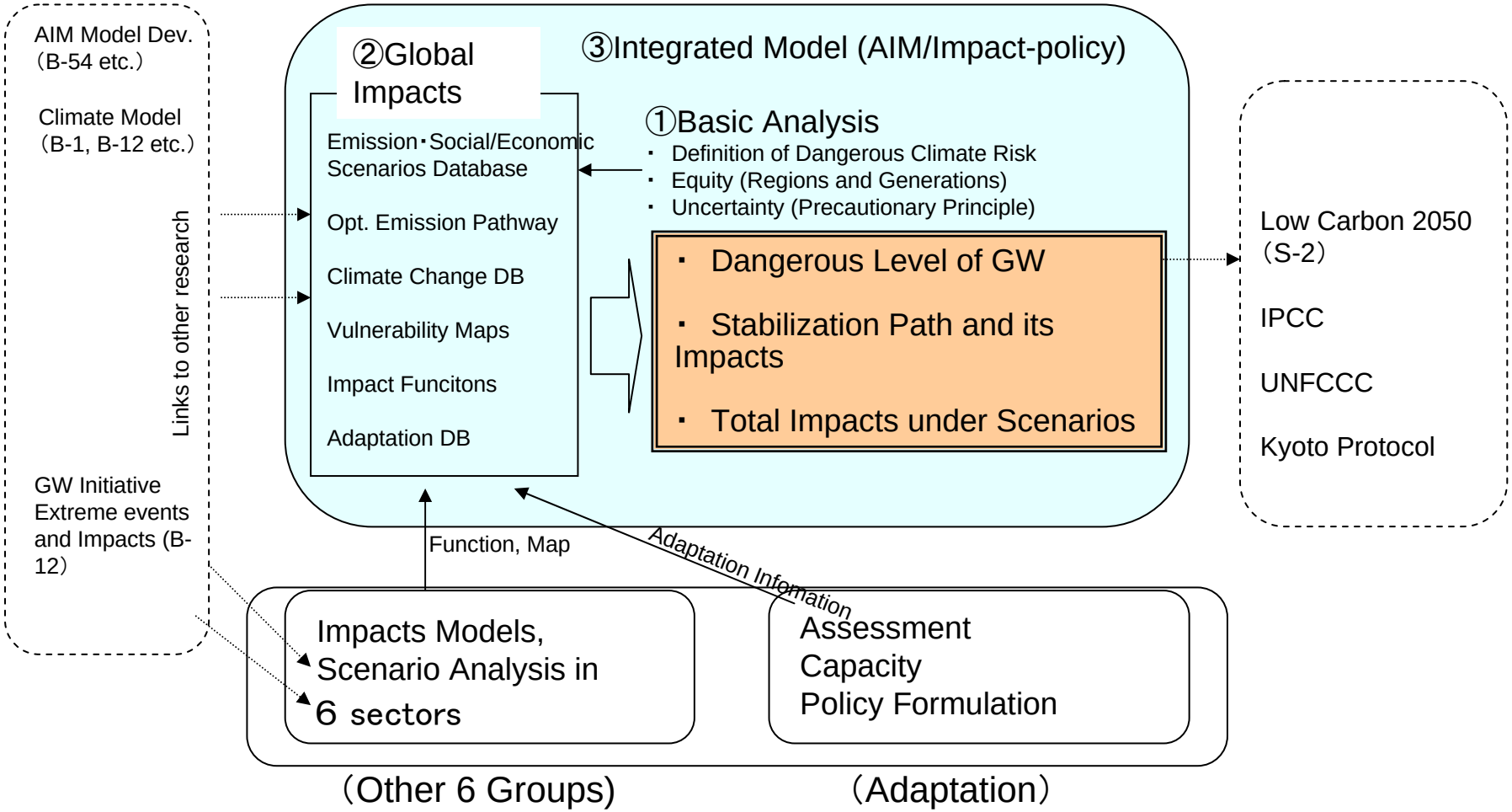
Longterm Stabilization Target: Temperature and GHG Emission



Greenhouse gases:
CO_2, CH4,
N2O, CFCs, etc.

- **2℃ stabilization: GHG <475ppm**
- **Global GHG emission in 2050 <50% of 1990**
- **60-80% cut in Japan (UK 60%, Germeny 80%, France75%**

S-4 Research on Dangerous Climate Risk and Emission Pathway



IPCC 3rd LA Meeting Merida (Mexico)

Chichen Itza

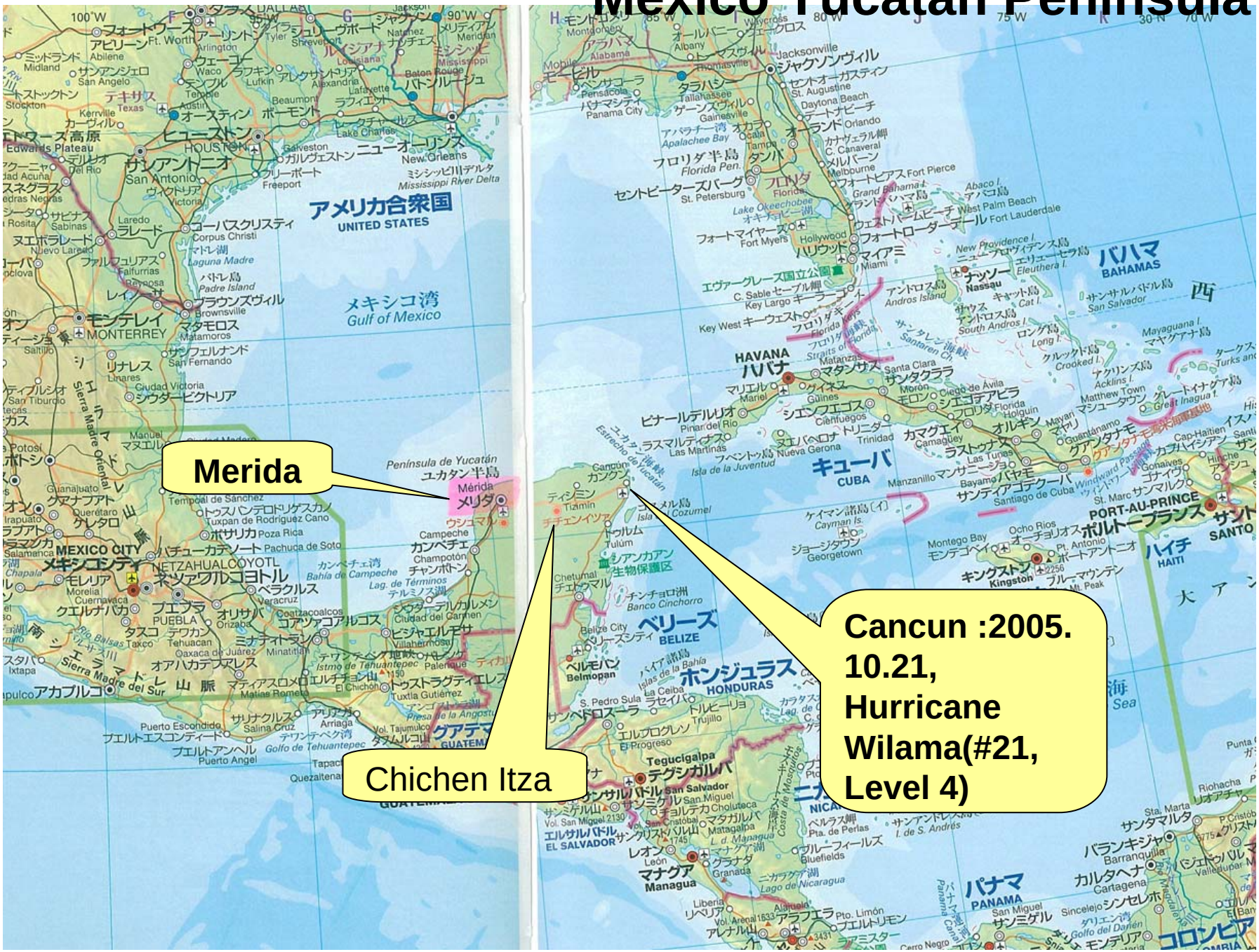
Opening

- 2006.1.16～19+20（CLA）
- TSU、CLA、LA、RE、Bureau、250persons
- Topics

  ★Response to Review Comments on FOD

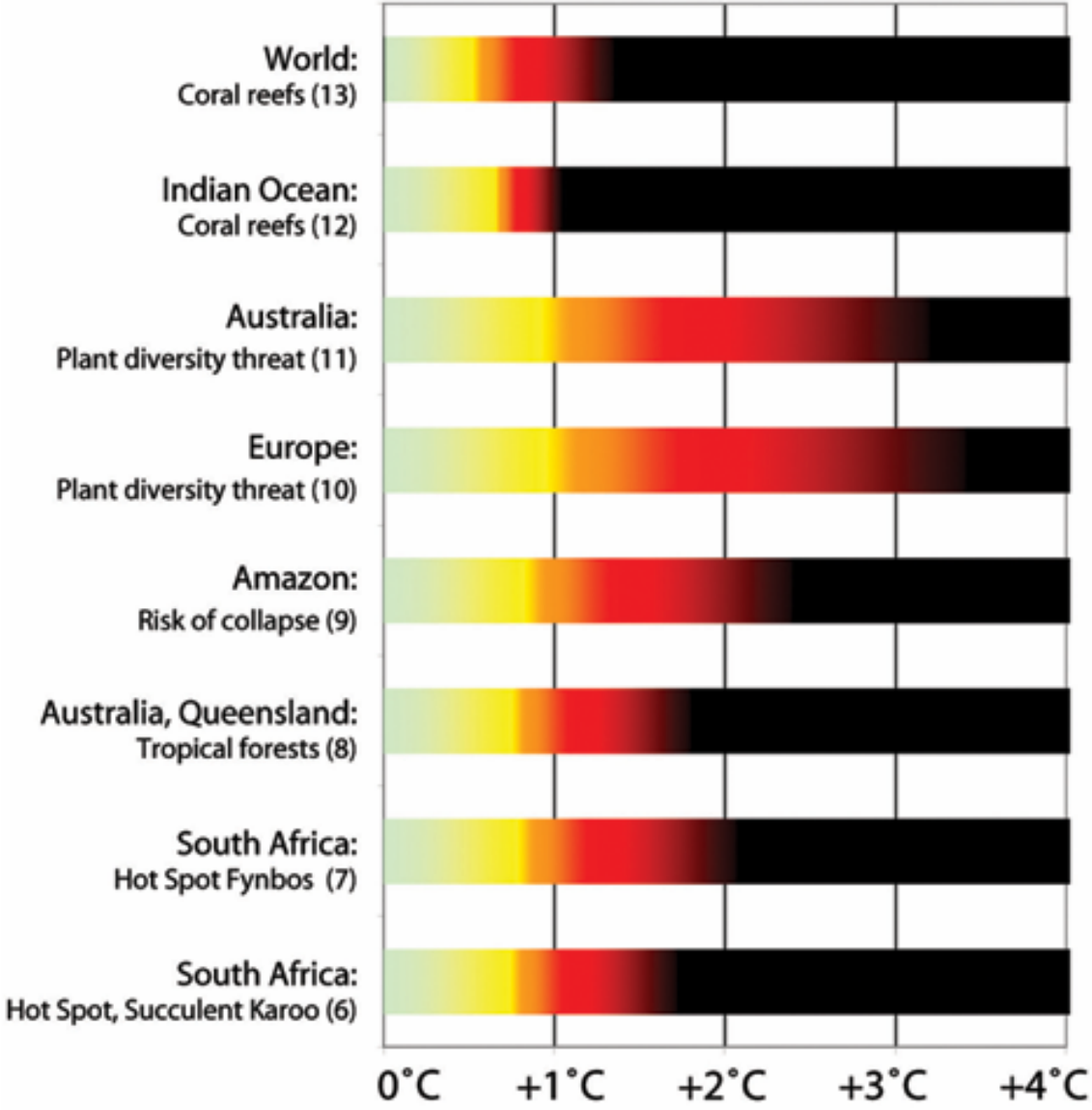
  ★Major Findings, SPM, TS
- Japanese Participants
  - T. Oki（Ch.3：Water ：LA）
  - S. Nisioka（Ch.10：Asia：RE)
  - H. Harasawa（Ch.10：Asia：CLA）
  - Y. Honda（Ch. 10：Asia：LA）
  - N. Mimura（Ch. 16：SI：CLA）
  - K. Takahasi（Ch. 17：Adaptation：LA）

Mexico Yucatan Peninsula



IPCC WG2 Discussion

- Emerging Impacts of Global Warming in the World (Detection of impacts)
- Compilation of Impacts Data and Knowledge for Stabilization and Major Vulnerability Issues
- Extreme Events and Global Warming (Europe Heatwave, Hurricane Katrina)
- Large Scale Extreme Events
- Acidification of Ocean
- Adaptation and Mitigation
- Global Warming and Sustainable Development



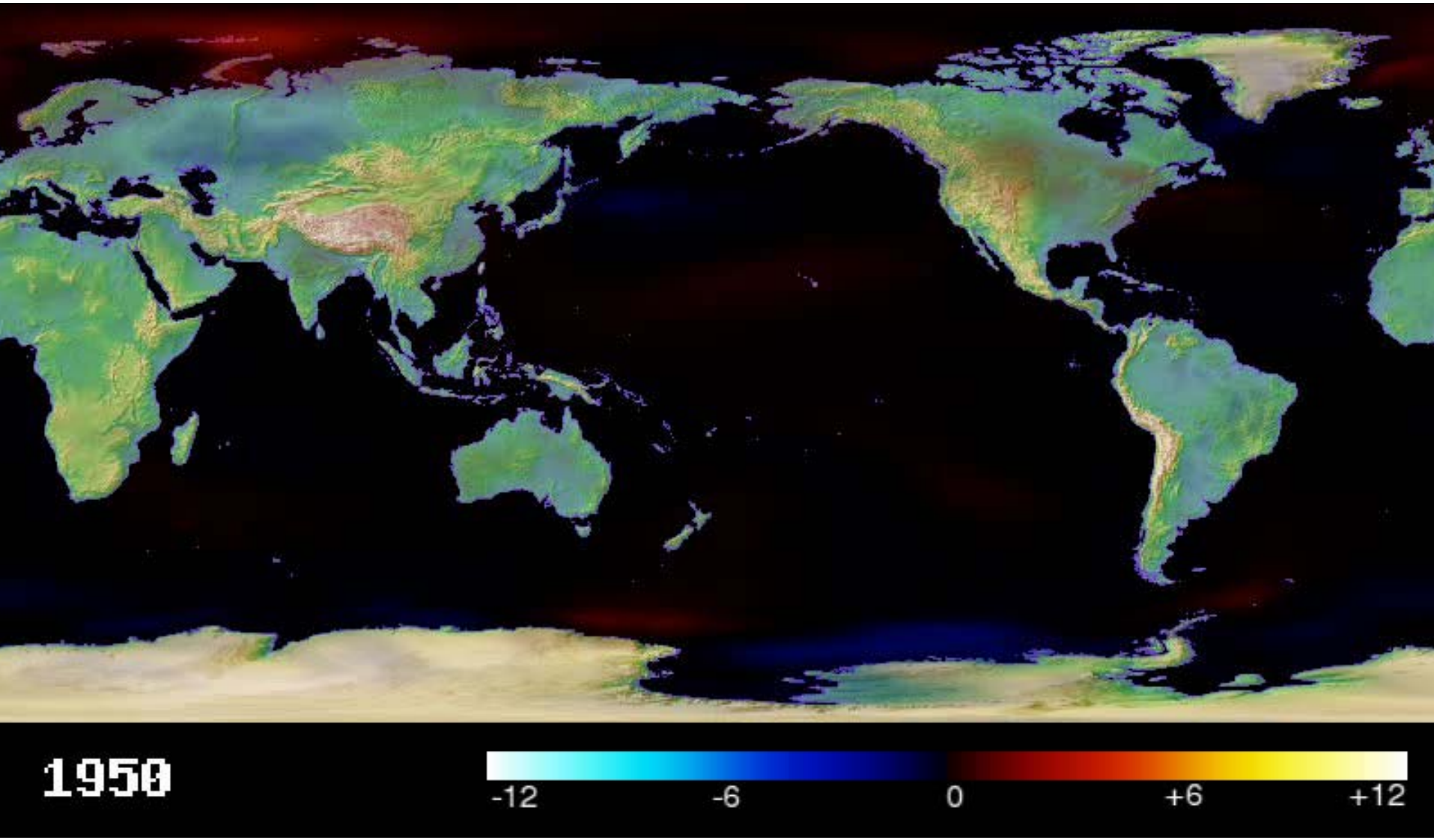
Ember diagram (example)

(Hare, B., 2006)

Temperature and Impacts Table

Change of 0.7° - 1.0° C (i.e., 0.1° – 0.4° C additional warming)	
Global	Increased ecosystem disturbance by pests and disease, especially in Boreal forests, Australia and California [84] (Gitay *et al.*, 2001; Hare, 2003)
Europe	Increased overwinter survival in resident and wintering birds and northward expansion in ranges of butterflies [81,82] (Millennium Ecosystem Assessment, 2005b).
Africa	Increase in drought in Sahel could lead to loss of local flora and fauna [83] {ECF, 2004, unknown}. Reduction in extent of Karoo, the richest floral area in the world and declines in range sizes for some animal species in South Africa [87] (Rutherford *et al.*, 1999).
Australia	Coral reefs at high risk [85] (Hoegh-Guldberg, 1999a). Reduction in extent of Queensland's World Heritage Rainforest with loss of habitat and range declines in the Golden Bowerbird [86,89] (Hilbert *et al.*, 2001; Hilbert *et al.*, 2003). Risk of extinction of vulnerable species in SW Australia Dryandra forest [88] (Pouliquen-Young and Newman, 1999).
Small Island States	Coral reefs at high risk in Caribbean and Indian Ocean [85] (Hoegh-Guldberg, 1999a).
Change of 1.0° – 1.5° C	
Global	82% of coral reefs bleached [90] (Hoegh-Guldberg, 1999a). 10% of global ecosystems are transformed losing between 2 and 47% of their extents; only 53% of the wooded tundra remains stable [91] (Leemans and Eickhout, 2003).
Australia	50% loss of highland rainforest with range losses of endemic species and some risk of extinction of Golden Bowerbird [92] (Hilbert *et al.*, 2001; Hilbert *et al.*, 2003; Williams *et al.*, 2003). Greater than 50% loss of Kakadu wetlands [94] (Hare, 2005).
Small Island States	Potential extinction of coral reefs in the Indian Ocean [93] (Sheppard, 2003).
Change of 1.0° – 2.0° C	
Global	Risks for many ecosystems [95] (Leemans and Eickhout, 2003).
Australia	Many eucalypts at risk from range shifts [96] (Hughes *et al.*, 1996). Significant loss of alpine zone [98] (Busby, 1988). Extinction risks for frogs and mammals in Queensland rainforest [100] (Williams *et al.*, 2003).
North America	Large impacts to salmonid fishes [97] {, impacts on ecosystems} (Keleher and Rahel, 1996).
Africa	Severe loss of extent of Karoo [99] (Rutherford *et al.*, 1999).
Antarctic	Threats to key mollusk species [101] (Peck *et al.*, 2004).
Arctic	Severe damage to Arctic ecosystems [103] (Hassol, 2004). 60% loss of lemmings with concomitant ecosystem impacts on predators [104] (Kerr and Packer, 1998).

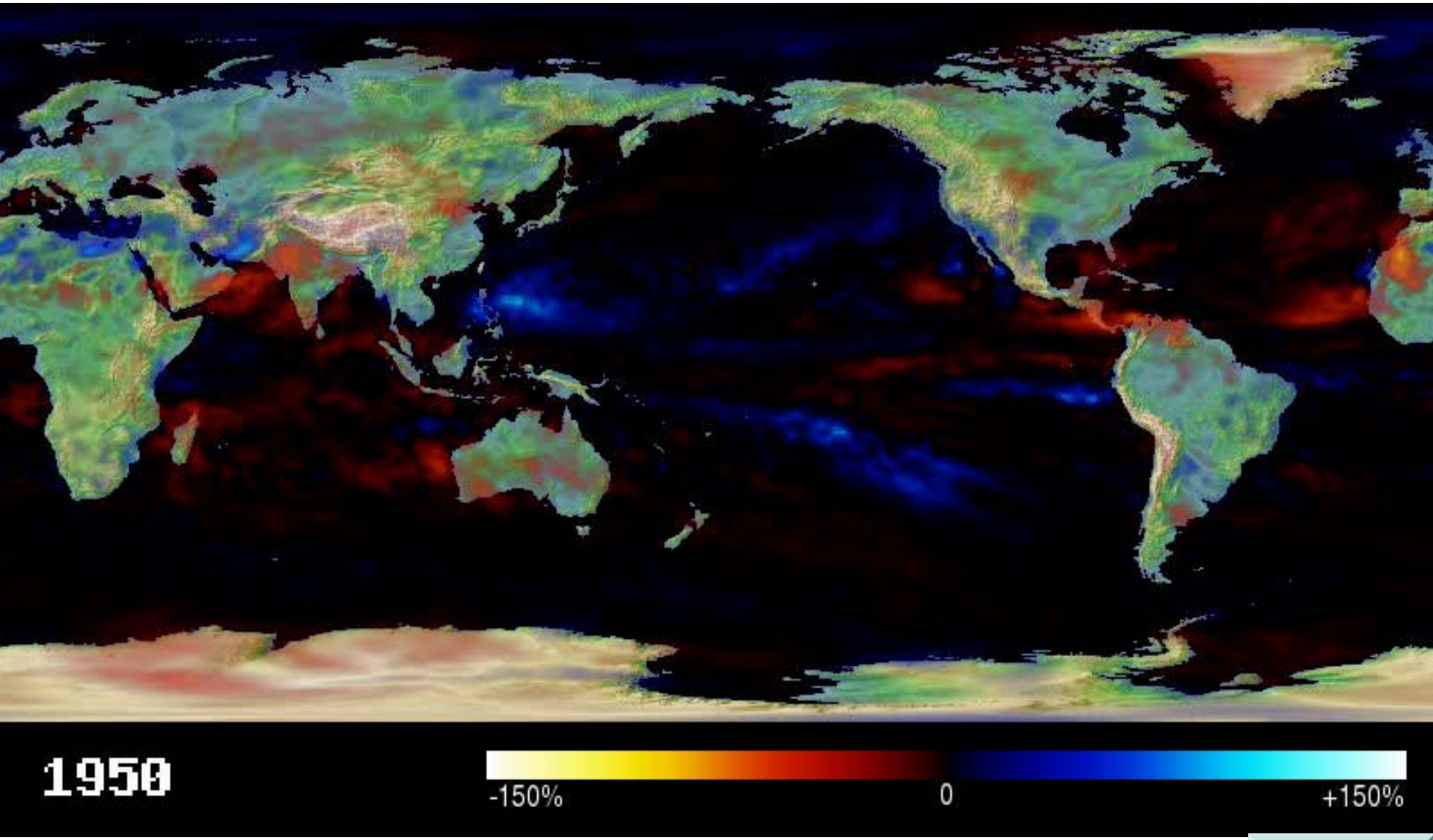
Future Temperature change（1950-2100）



Temperatire
Increase(℃)

Source: NIES/CCSR/JAMSTEC

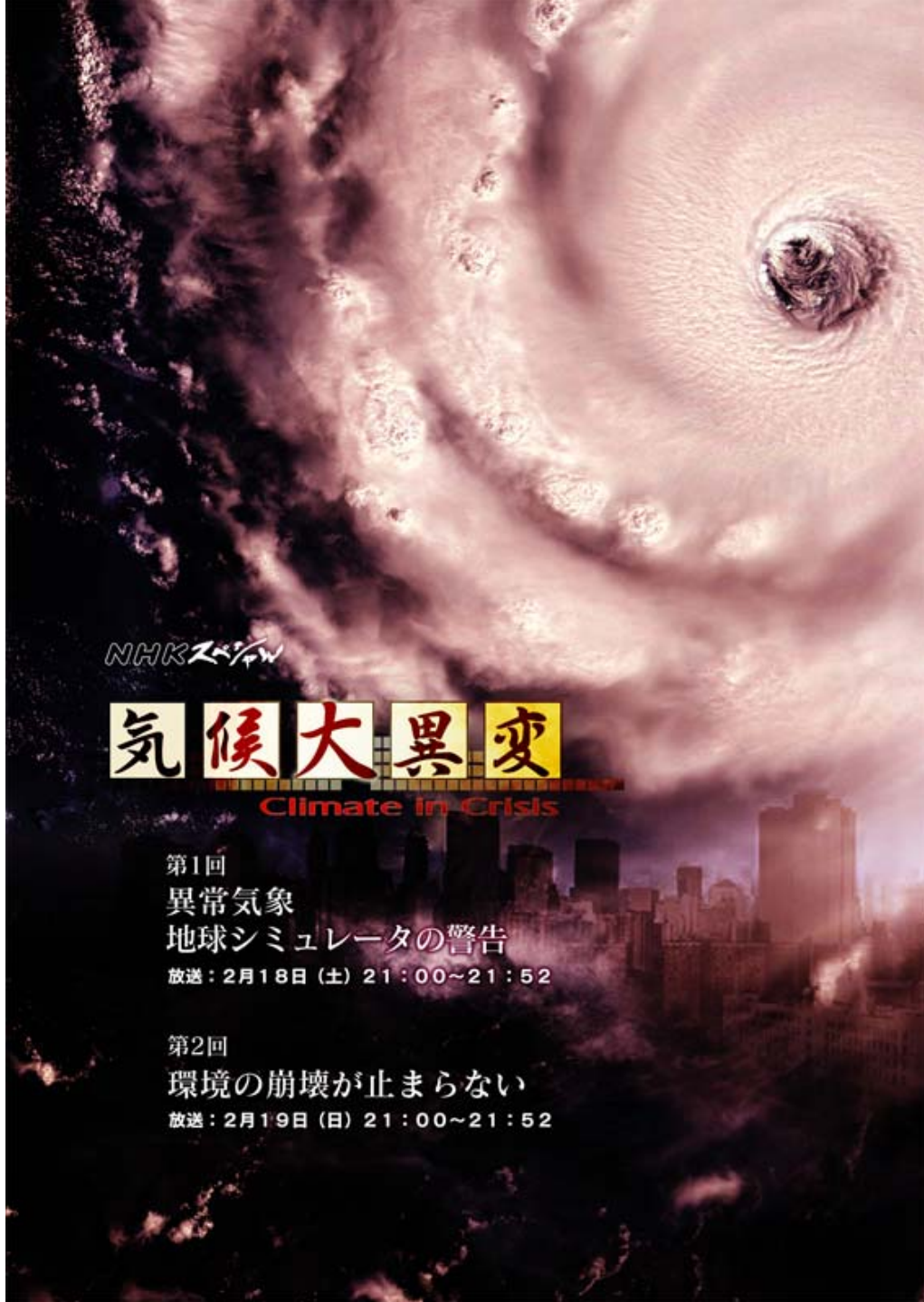
Future Precipitation change（1950-2100）



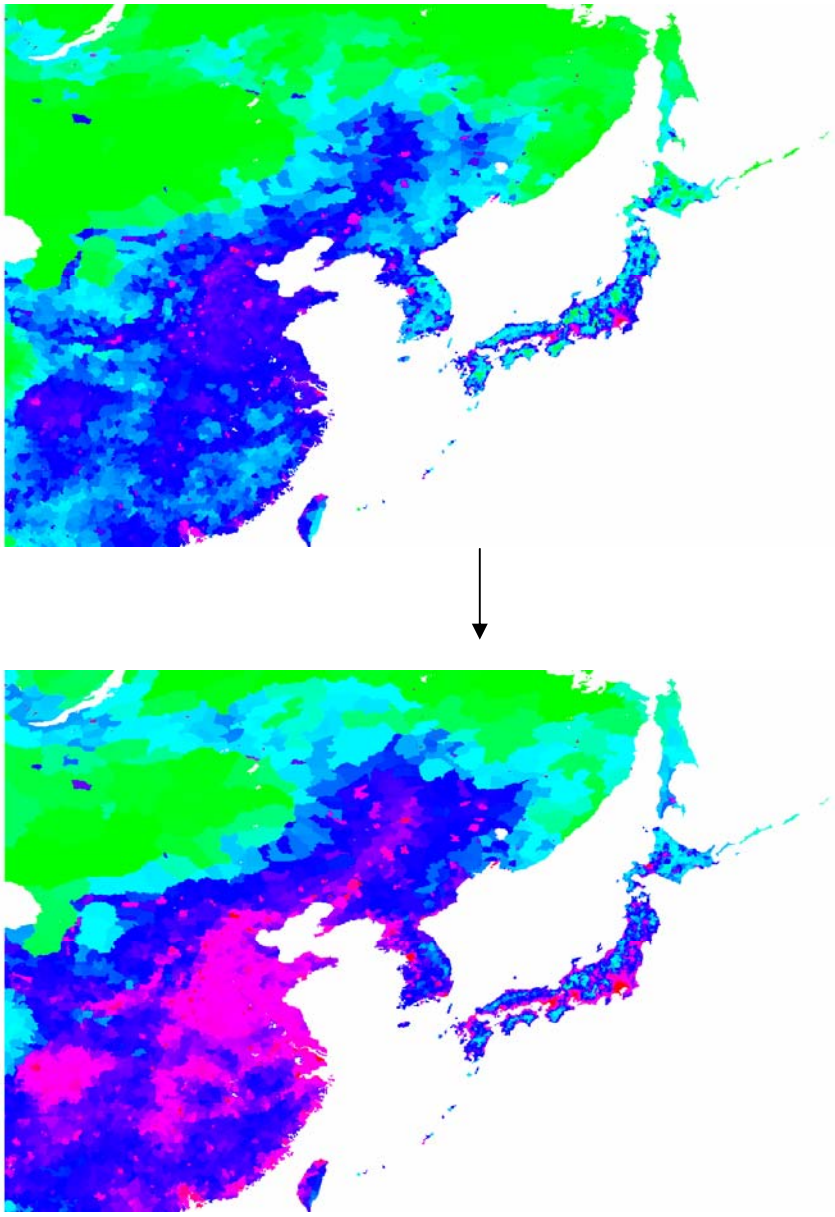
Precipitation
Change(%)

Source: NIES/CCSR/JAMSTEC

NHK Special TV Program “Climate in Crisis” 18(Sat) 21:00- 19(Sun) 21:00-



Impacts of Heat Wave; Excess death（1990’s vs. 2090’s）



1990’s

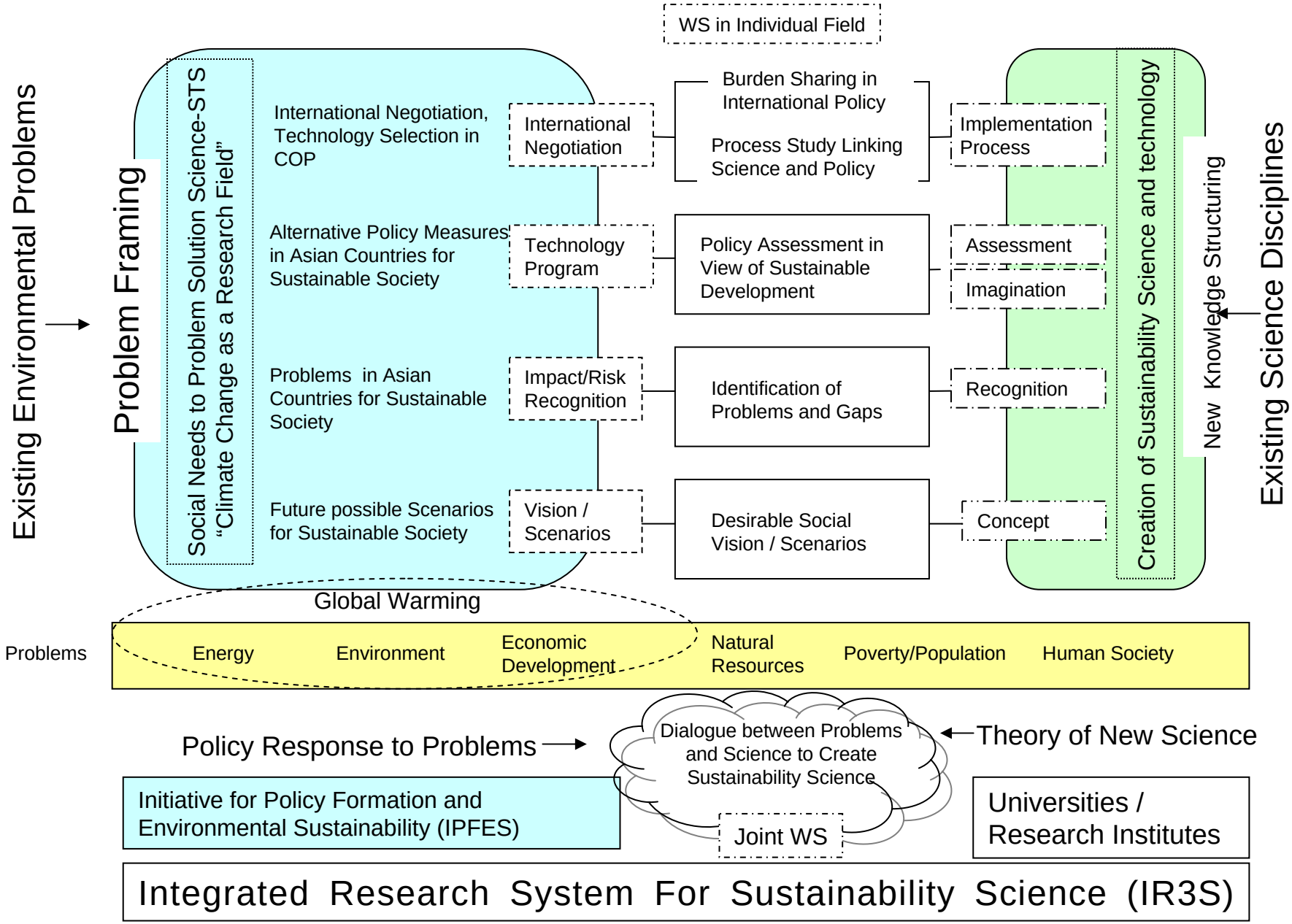
2090’s

10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^{0}

(Person/km^2)

By Takahashi and Prof. Honda

Figure 1. Mission and Role of Proposed Initiative by NIES in IR3S
～Dialogue between “Problem Framing and Creation of New Science”～



Future Development and Application of AIM/Impacts

- AIM/Impact – Global Model
  - Advanced Model: Water Resources, Health, Food
  - New Model: Land Use
- AIM/Impact [Country]
  - AIM/Impact–Korea, China, India
- AIM/Impact[Policy]
  - Stablization, Temp, Emission Pathway
  - Beyond Kyoto Strategy
- Adaptation
- Model Application:
  - Sustainable Society Vision and Scenario
  - Integration of Impacts model to Climate Model

Thank You

Activity in FY2005 and Future Direction of AIM/Impact