

Impact and adaptation studies and perspectives of AIM

**Y. Hijioka, H. Harasawa, K. Takahashi,
N. Hanasaki, H. Jung, Y. Masutomi**

National Institute for Environmental Studies

15th AIM International Workshop 2010 @ Ohyama Hall, NIES

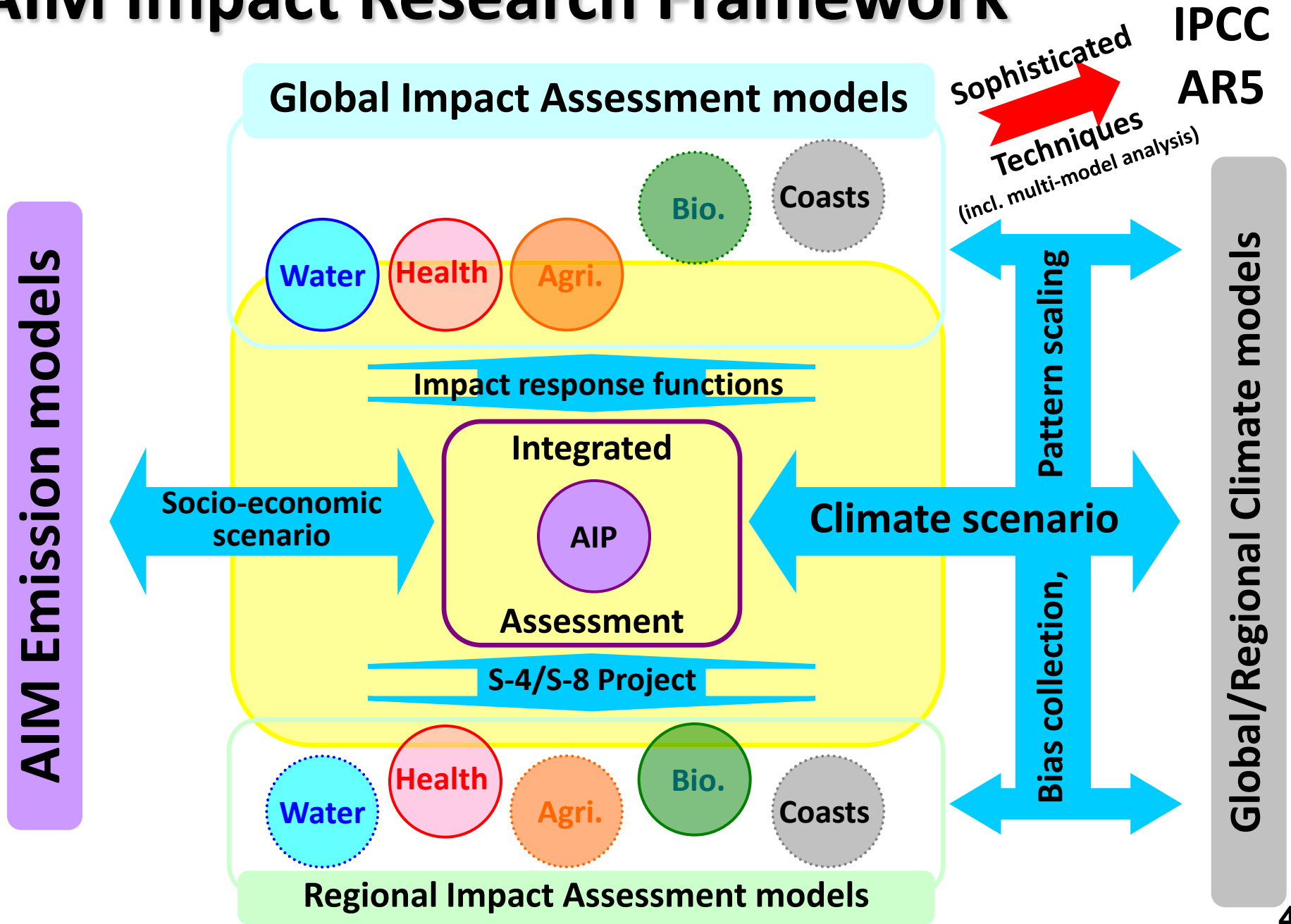
Member for impact research

- **Dr. Hideo Harasawa, Leader**
 - On loan for the cabin office, **Integrated assessment**
- **Dr. Kiyoshi Takahashi**
 - Secondment (University of East Anglia, 04.'09-03.'10), Global assessment (**Water, Health, Agri.**)
- **Dr. Naota Hanasaki**, Global assessment (**Water**)
- **Dr. Huicheul Jung**, Global assessment (**Biodiversity, Water, Health**)
- **Dr. Yuji Masutomi**
 - Center for Environmental Science in Saitama, Global assessment (**Agri.**)
- **Dr. Yasuaki Hijioka**, **Integrated assessment**

Japanese Impact researcher's Presentation Schedule

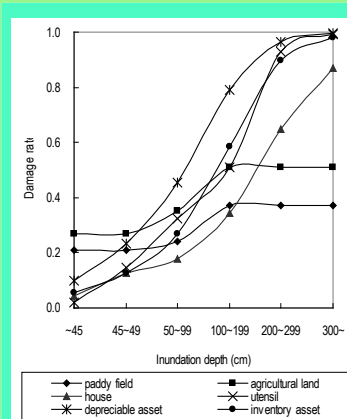
- **February 20 (Saturday) Day 1**
 - 9:30-11:00 Informal Meeting (Japanese AIM team)
 - ✓ 11:00-11:15 “**Linking** Impact and LCS Studies” **Y. Hijioka**
 - 13:20-15:20 Session I: Overall AIM Activities and Perspectives
 - ✓ 13:35-13:50 “Impact and adaptation studies and perspectives of AIM” **Y. Hijioka**
 - Session II, **Parallel Session-2: Impact Assessment 1**
 - 15:30 -18:00 Session II, Parallel Session-2: Impact Assessment 1
 - ✓ 15:30-15:55 “Introduction of **AIM/Impact[Policy]**” **Y. Hijioka**
 - ✓ 16:45-17:10 “Impact Assessment of Climate Change on **Rice** Production in Asia in Comprehensive Consideration of **Uncertainties** in Future Climate projections” **Y. Masutomi**
 - ✓ 17:10-17:35 “Assessing the **Risk of Heat-stressed Mortality** due to Global Warming Using **Multi-GCM** Approach” **H. Jung**
- **February 21 (Sunday) Day 2**
 - 09:00-10:55 Session III: Impact Assessment 2
 - ✓ 09:00-09:25 “Toward AR5: Activities of the **Global Water Resources Model H08**” **N. Hanasaki**

AIM Impact Research Framework

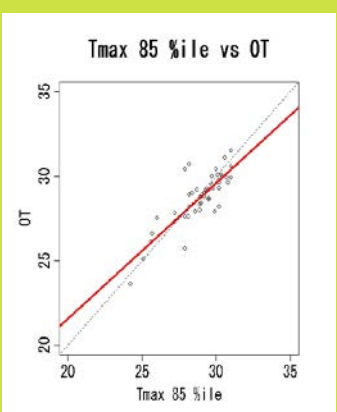


The Project for Comprehensive Projection of Climate Change Impacts (S-4)

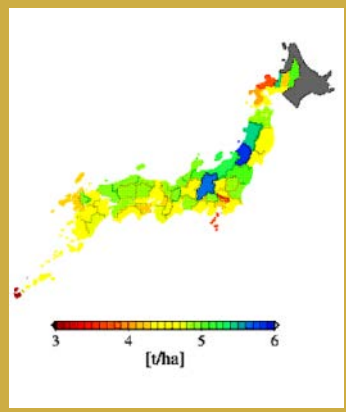
- Global Environment Research Fund **S-4** by **Ministry of the Environment**
- Targeted area: **Asian region** including **Japan**
- Targeted fields: **Water resources, forests, agriculture, coastal zones, human health**
- Research period:
 - Period I (**2005**-2007) + Period II (2008-**2009**)
- Project leader: **Nobuo MIMURA**, Ibaraki University
- Research budget: around **0.2** billion yen per year
- Number of sub-themes: **Seven**
 - Number of participating research institutions: **14** (2008)
 - Number of participating researchers: **42** (2007)



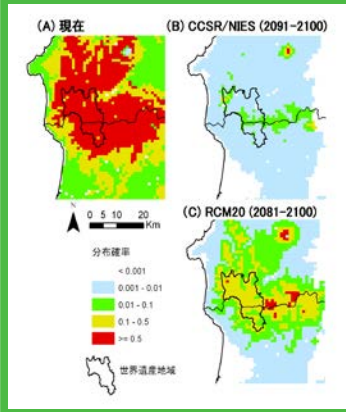
Water resource



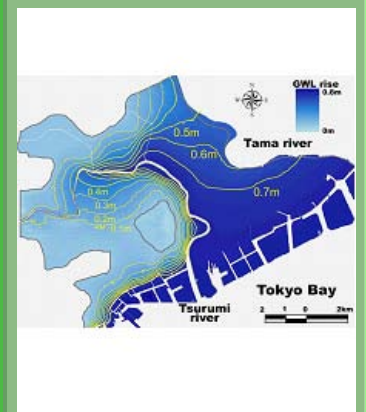
Human Health



Rice production



Forest

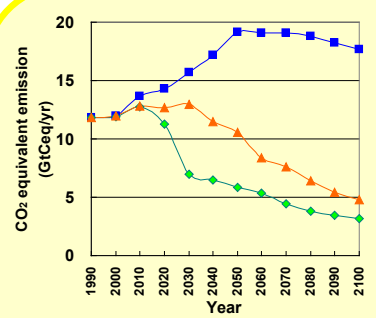


Coastal zones

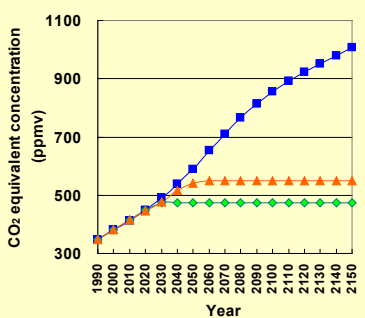
Climate change impact assessment by field

Economic assessment of climate change impacts

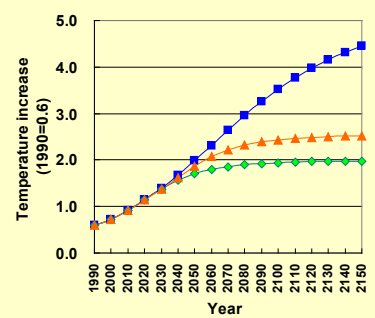
Impact response function



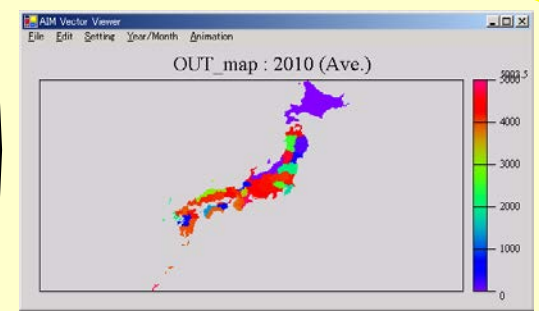
GHG emissions



Stabilization target of GHG concentrations



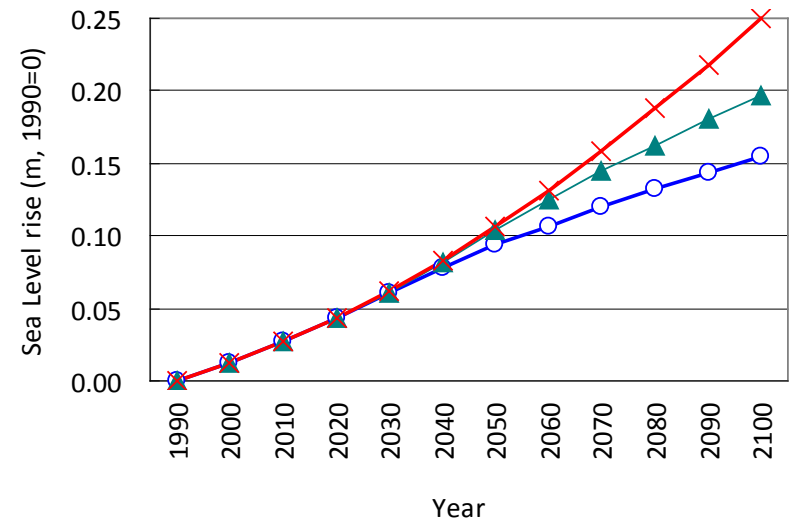
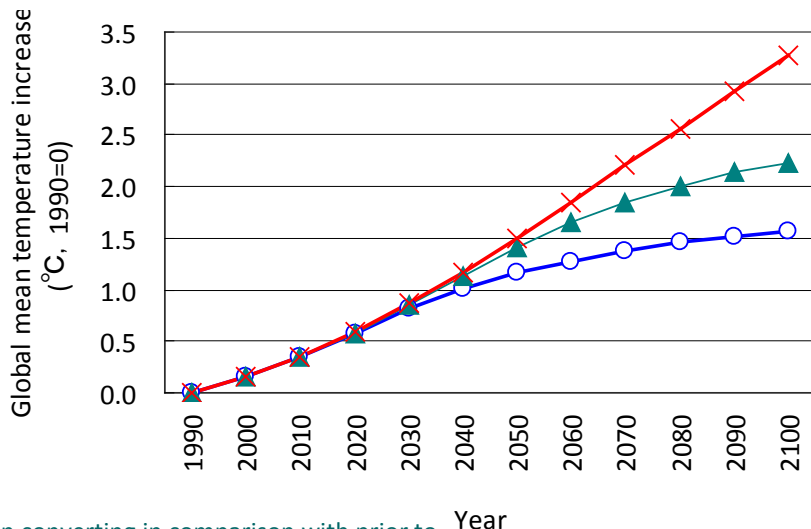
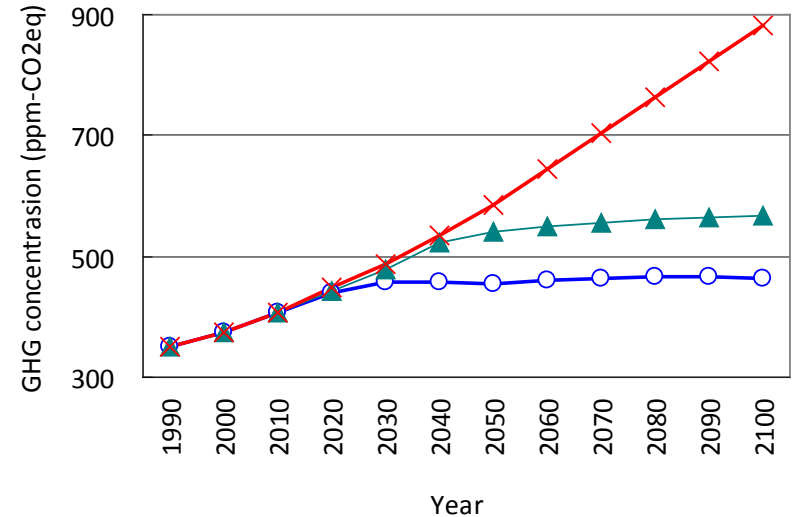
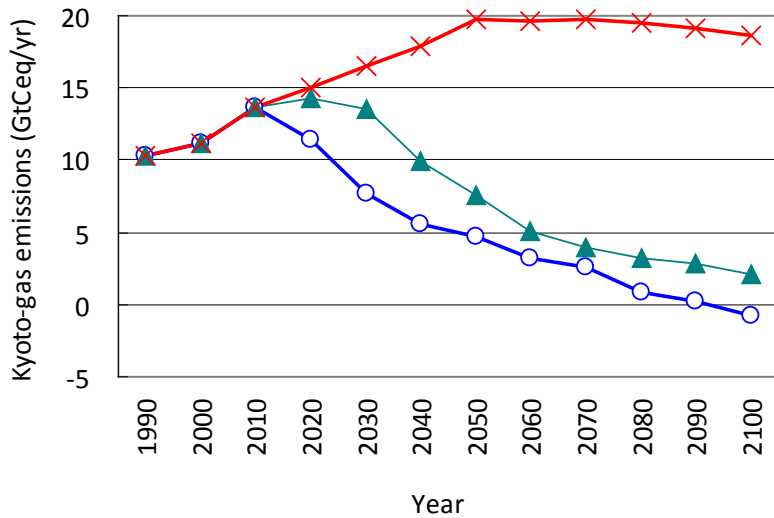
Temperature increase



Climate change impacts by field under the stabilization target

Integration of climate change impacts by field

Global GHG Emissions (Six Types of Greenhouse Gases Established under the Kyoto Protocol), GHG Concentration, Global Mean Temperature Increase, and Sea Level Rise by Scenario

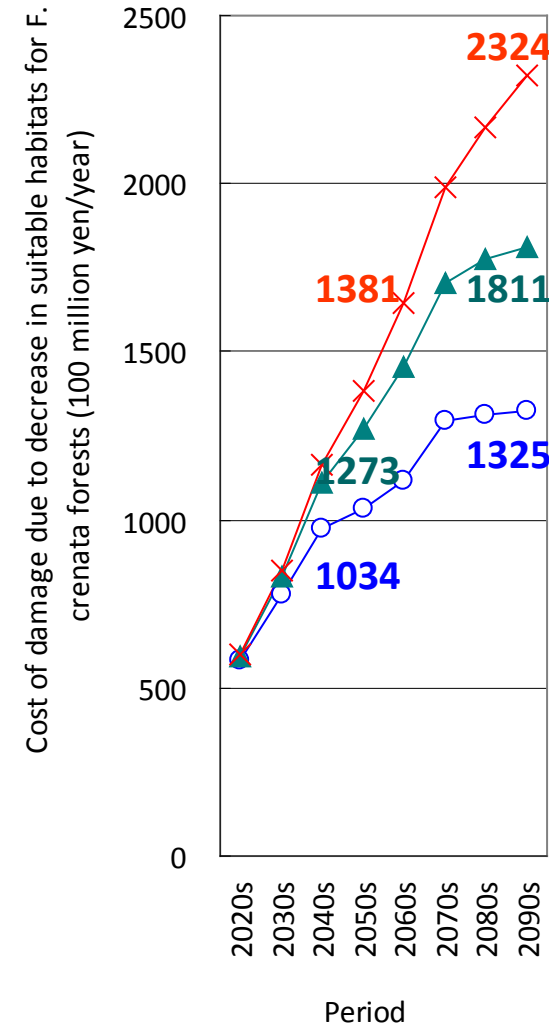
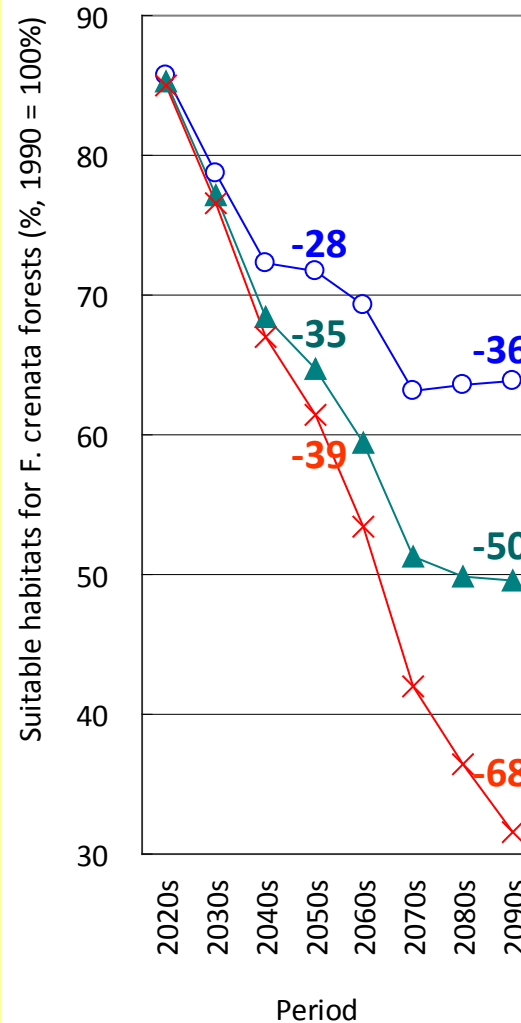


When converting in comparison with prior to the industrial revolution: +0.5° C

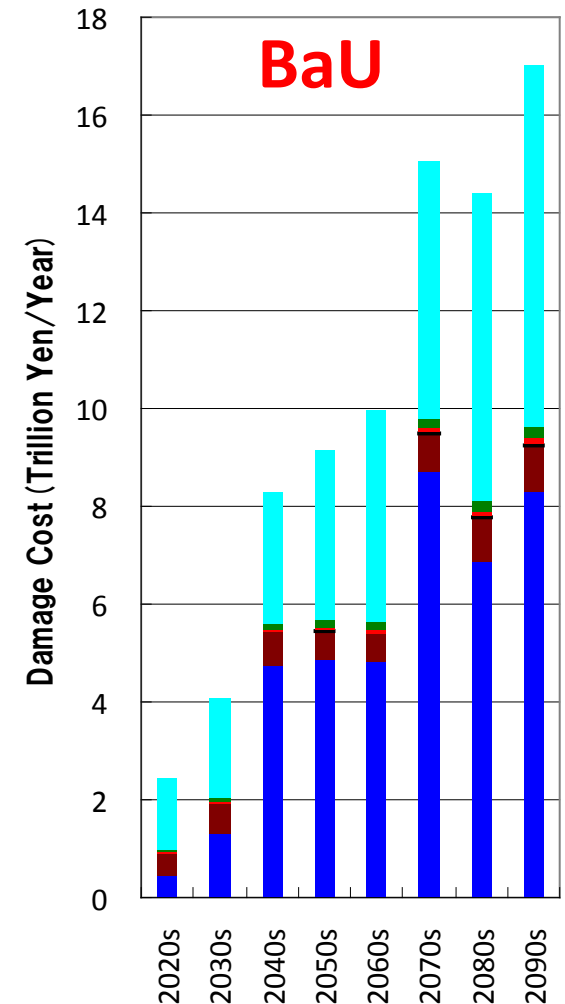
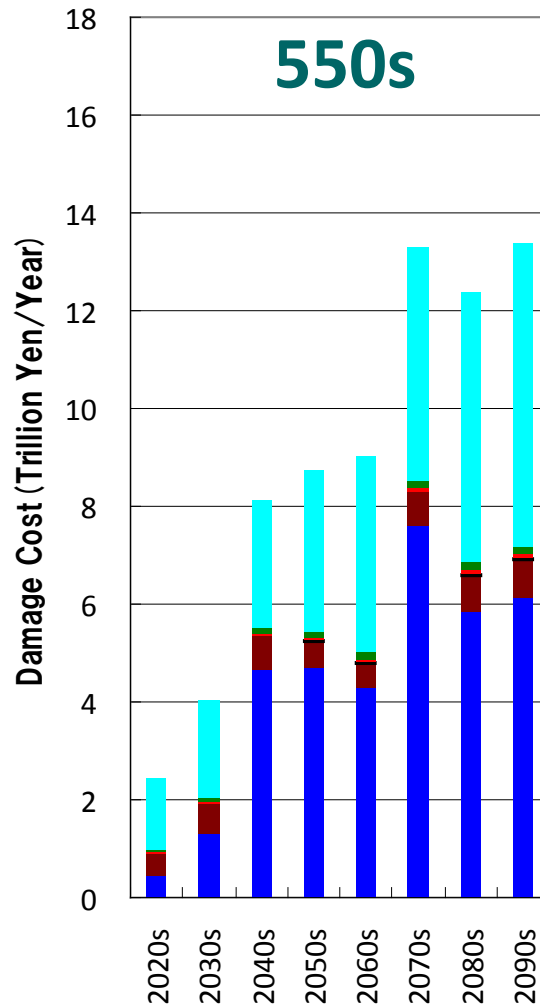
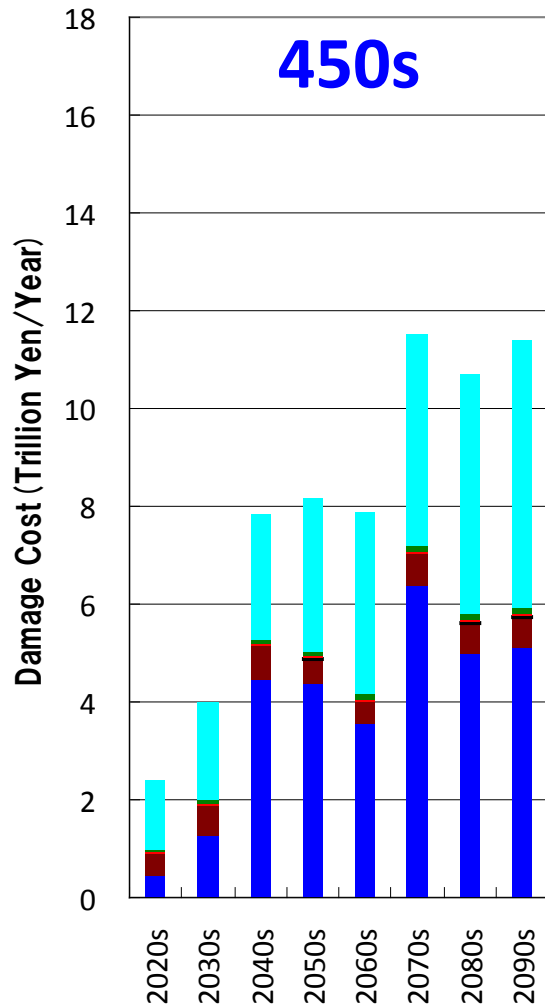
○ 450S ▲ 550S ✕ BaU

Impacts on Forests

- Climate variables
 - Changes in cumulative temperature (warmth index),
 - Changes in daily minimum temperature of the coldest month,
 - Changes in winter precipitation (December-March),
 - Changes in summer precipitation (May-September)
- Application of CVM (contingent valuation method).
- Smoothly migration
- No land use change
- Non-market value



Damage Costs by Scenarios



- Flood Area
- Slope Collapse
- Sandy Beach Loss
- Heat Stress Mortality Risk
- Loss of Suitable Habitats for F. crenata Forests
- Storm-Surge Flooding (Western Japan)

Outline of S-8 project

- Global Environment Research Fund **S-8** by Ministry of the Environment
- Targeted area : **Whole** and **regional** area in Japan and **Asia-Pacific region**
- Targeted fields: **Water resources, forests, agriculture, coastal zones, human health**
- Research period:
 - Period I (**2010**-2012) + Period II (20013-**2014**)
- Project leader: **Nobuo MIMURA**, Ibaraki University
- Research budget: around **0.35** billion yen per year
- Number of sub-themes: around **10**
 - Impact assessment in whole Japan: around 7
 - Impact assessment in Japanese regional area: around 2
 - Impact assessment in Asian developing countries: around 1

Objectives of S-8 project

- To assess climate change **impact assessment** focusing on **whole Japan** under different GHG concentration stabilization scenarios and adaptation strategies
 - Utilization of **new climate scenario** with high accuracy and resolution
 - Development of advanced model for assessment of climate change impacts and **adaptation strategy**
- To develop a planning method for **adaptation strategy** focusing on **Japanese local government** and **developing countries in Asia-Pacific region**
 - Development of **simplified tool** to assess the impacts of, and vulnerabilities and adaptation to, climate change
 - Consideration of **uncertainty** in the assessment

Collaboration with other research by GERF and external research fund

S-4

Scheme of S-8

【Theme 1】 IAV on whole Japan



Integrated modeling
Economic assessment

Simple assessment method

Simple assessment method

【Theme 2】 IAV on Japanese local government

feedback by local government

feedback by developing country

【Theme 3】 IAV on Asia-pacific region

Transmission of research results to domestic and international policymaking

Various IAV research and assessment on Asia-pacific region

Future plan

- **Reinforcement of global impact assessment model development**
 - Model improvement
 - Uncertainty analysis using multi-GCM results
 - Contribution to AIM research activities related to LCS studies
- **Collaboration with impact assessment researcher in Japan and Asia-Pacific**
 - Contribution to international model comparison
 - S-8 project and other GERF projects
 - Impact assessment in Tokyo