

The “Climate Change in Japan 2025” report and its use for Risk Assessment and Decision Making

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English Summary Content



Full contents (Japanese)

Abstract

- In March 2025, the Japan Meteorological Agency (JMA) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) published a national report, “Climate Change in Japan 2025”; the 2025 issue of the “Climate Change in Japan” series, with the aim of contributing to climate change action by providing basic information to the Japanese national and local governments, commercial companies and citizens.
- The reports in this series provide information on the status of greenhouse gases in the atmosphere and observed/projected changes in climate variables in and around Japan. In particular, the 2025 issue includes **the latest high-resolution climate projections** and **information on how the frequency and intensity of extreme heavy rainfall and high temperatures will change with the level of global warming**.
- The information on the reports is used for **various risk assessments and policies**, as well as for **infrastructure development and disaster prevention measures**.

Background

- Climate change progressing globally and regionally. → Paris Agreement
- Climate Change Adaptation Act and Plan in Japan → promoted **based on scientific findings**
- MEXT & JMA published “Climate Change in Japan 2020” summarizing a physical science basis to serve as essential information for climate change action by the public, commercial enterprises and local/national government bodies.
- In March 2025, MEXT & JMA published “Climate Change in Japan 2025”, **incorporating recent findings and outcomes**.

- ✓ Reflects the latest scientific knowledge and findings, such as the **IPCC Sixth Assessment Report**.
- ✓ New information on **how the frequency and intensity of extreme heavy rainfall and high temperatures will change** with the level of global warming
- ✓ **Updated projection models (Regional climate and ocean projection models)**

For optimal usability, specialists not only from the fields of physical science (meteorologists, climatologists and oceanographers) but also from climate impact assessment / science communication are involved in considering the outline, drafting and reviewing of the report.

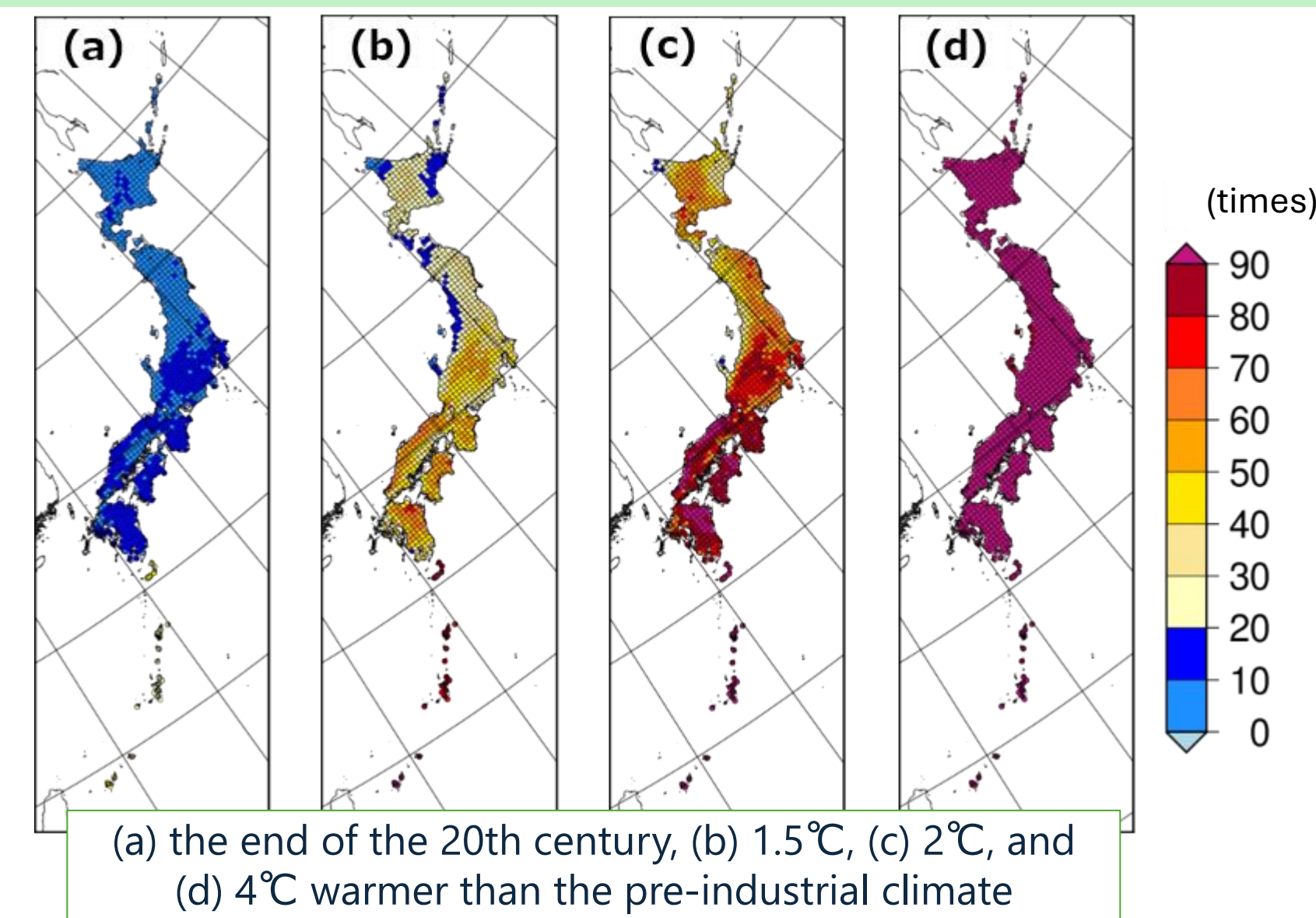
Surveys with local governments

- Requests from local government officials using “Climate Change in Japan 2020”
 - ✓ **High-resolution** climate projections **specific to their regions**
 - ✓ **Extreme heavy rainfall and high temperatures** in multiple criteria (once per 100yr, once per 50yr, once per 10yr etc.)
 - ✓ Projected **absolute values** (not changes relative to the end of 20th century)
 - ✓ **Plain language** that can be used to explain the basis for decision-making
 - ✓ **Diagrams and their source data** provision

- ✓ Specifications **accessible to local governments** (e.g., leaflets for each region)
- ✓ **High-resolution** projections

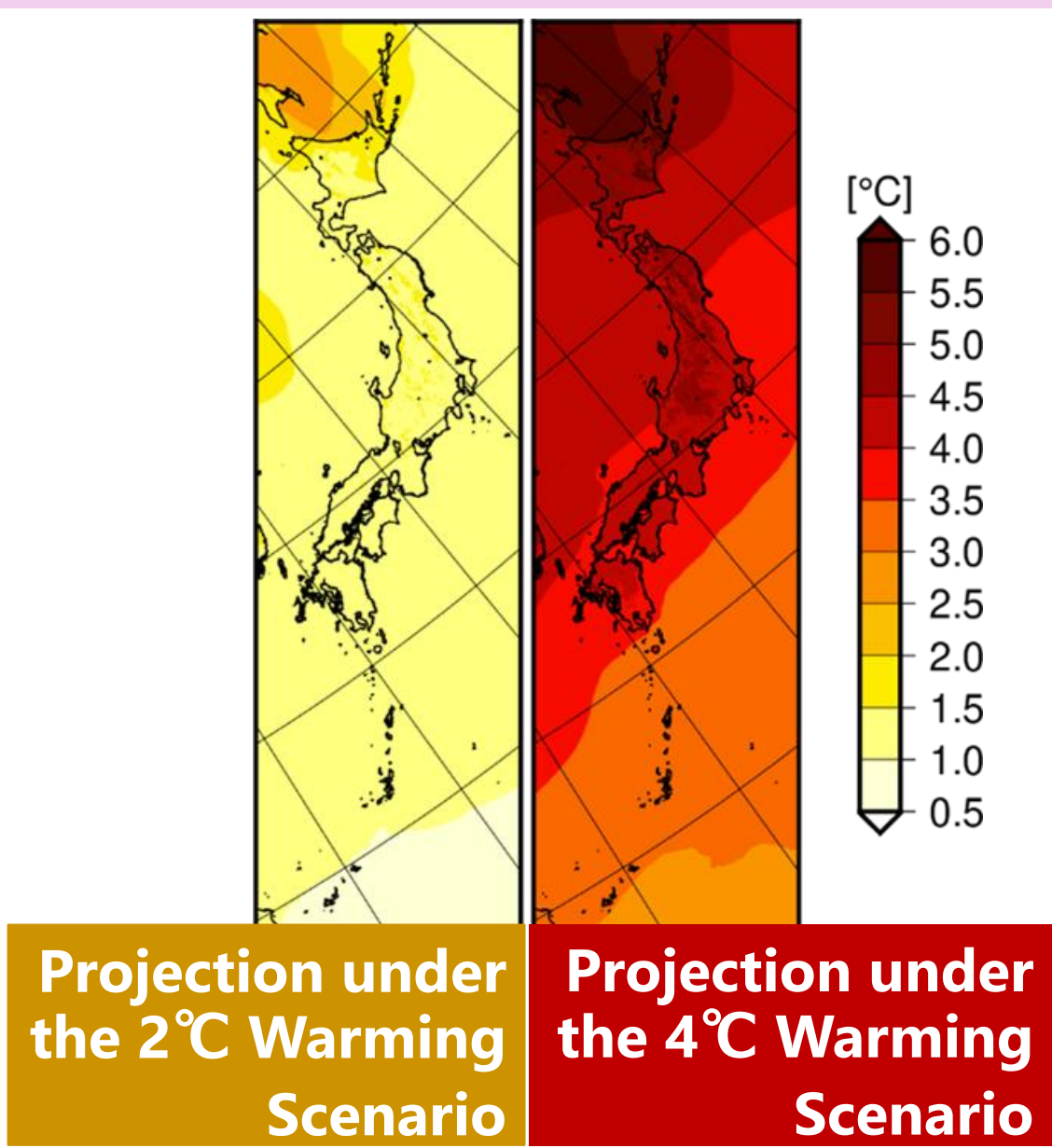


Changes in centennial extreme temperatures



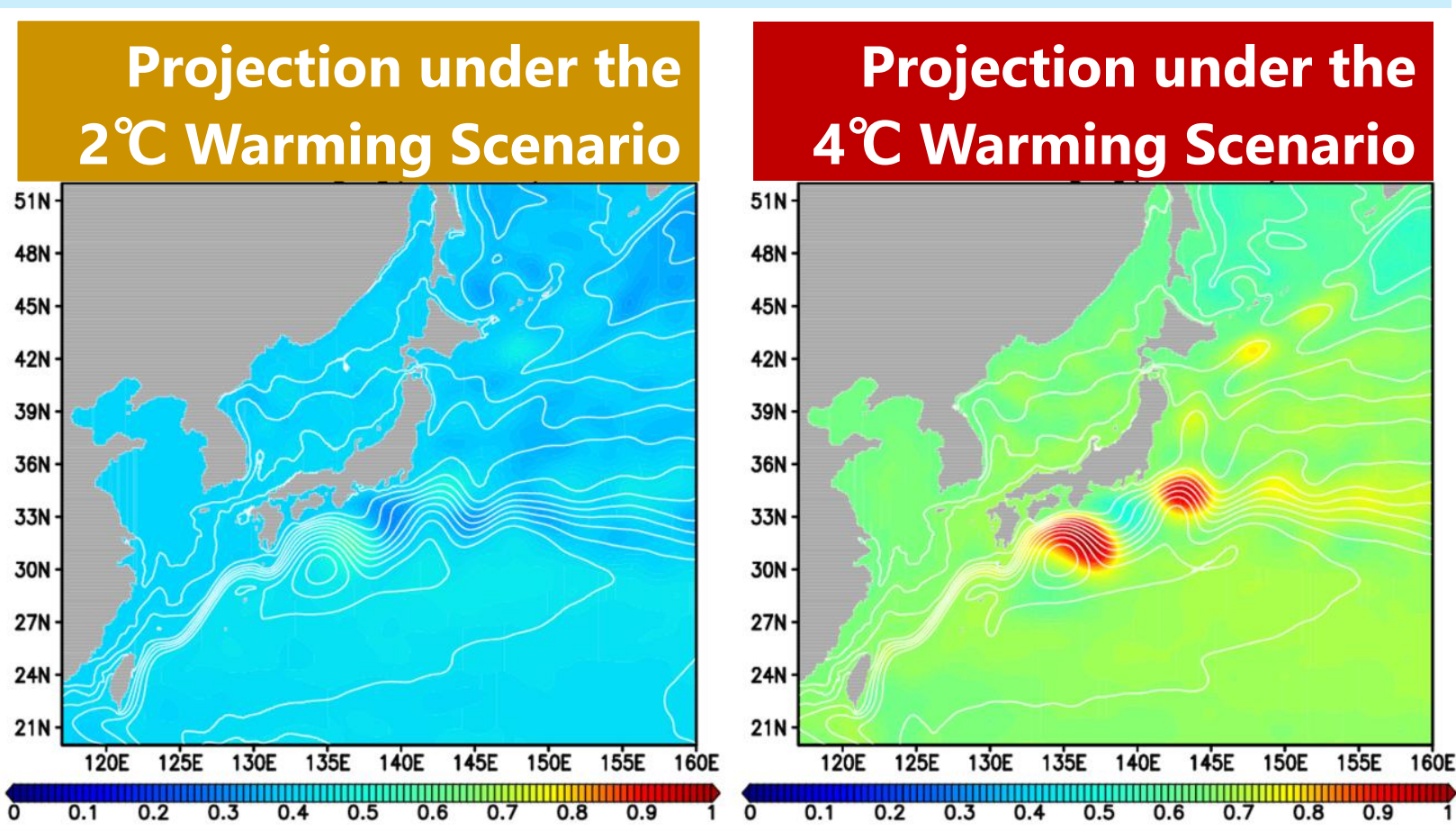
- Centennial extreme temperatures with pre-industrial conditions are projected to **occur approximately 99 times** with a 4°C rise.

Annual surface temperature



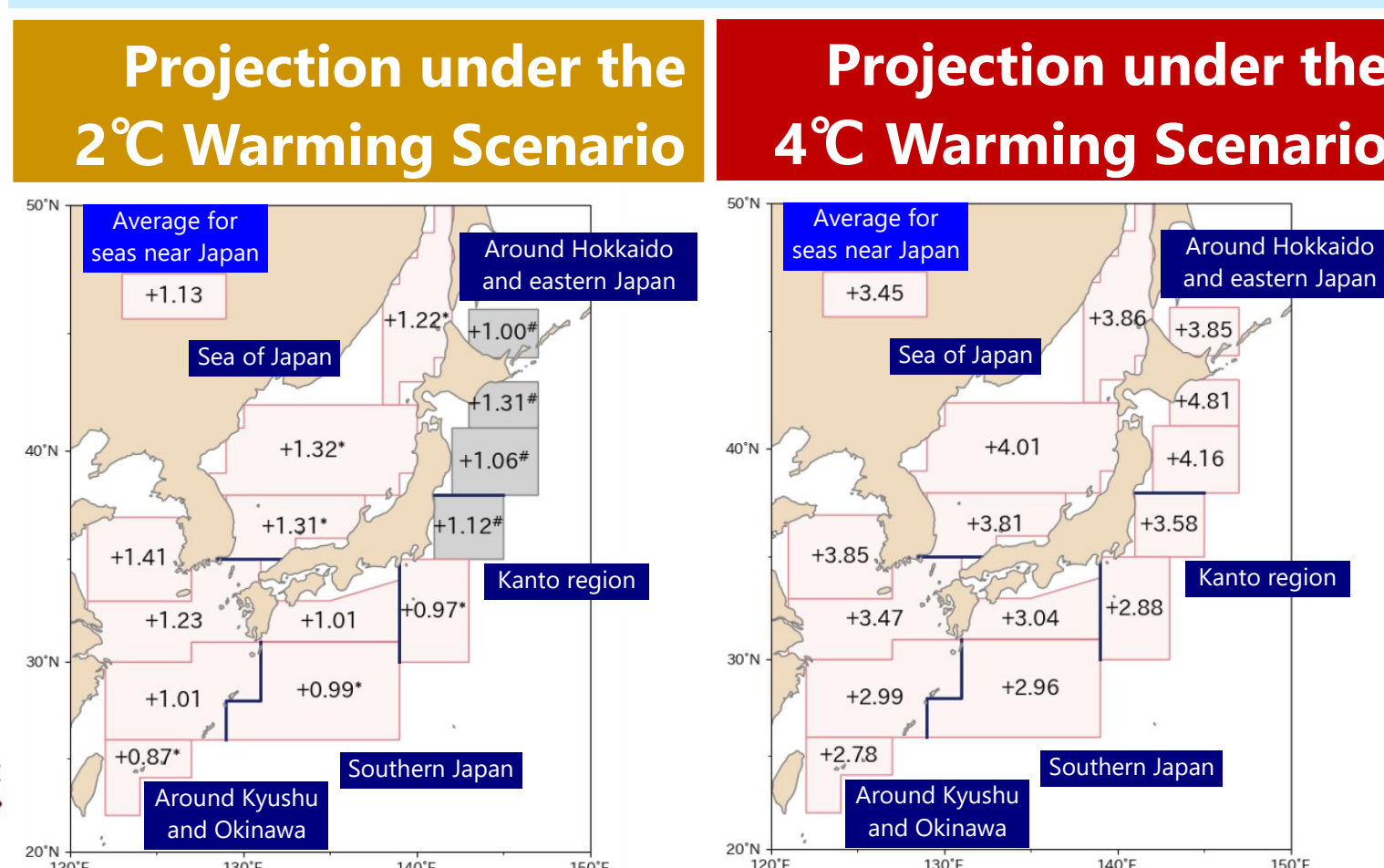
Changes in annual surface temperature at the end of the 21st century relative to the end of the 20th century

Sea level rise



Changes in sea level rise (m) near Japan at the end of the 21st century compared to the end of the 20th century
The contours show sea level distribution at the end of the 21st century.

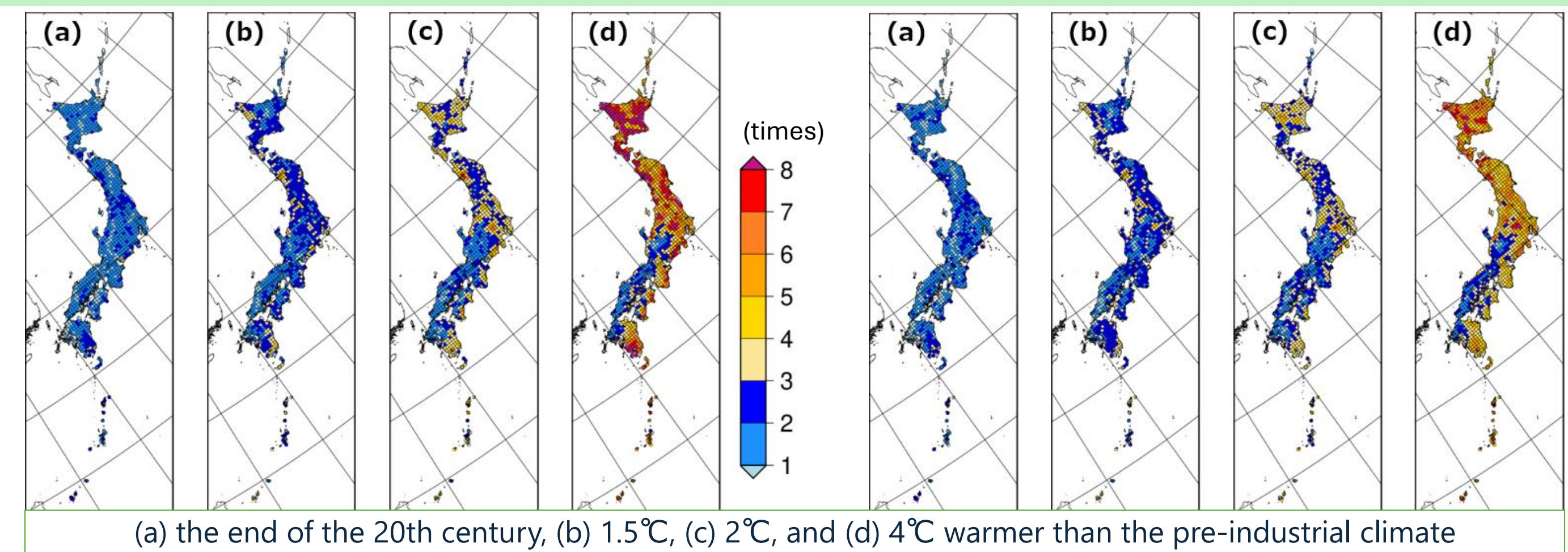
Sea surface temperature



Changes in area-averaged SSTs around Japan at the end of the 21st century compared to the end of the 20th century (**°C/century**)

Areas with no symbols: virtually certain trends,
*: extremely likely trends, #: no discernible trend

Changes in centennial extreme precipitation

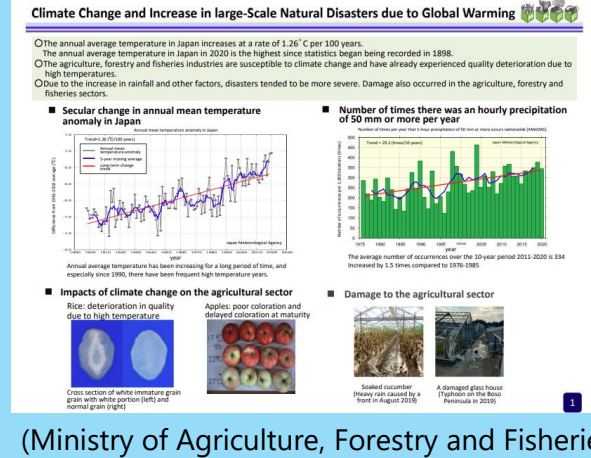


- Centennial extreme precipitation (daily) with pre-industrial conditions is projected to **occur approximately 5.3 times** in conditions with a 4°C rise.

- Centennial **daily precipitation amounts** with a 4°C rise are projected to increase by **approximately 32%** compared to that with pre-industrial conditions.

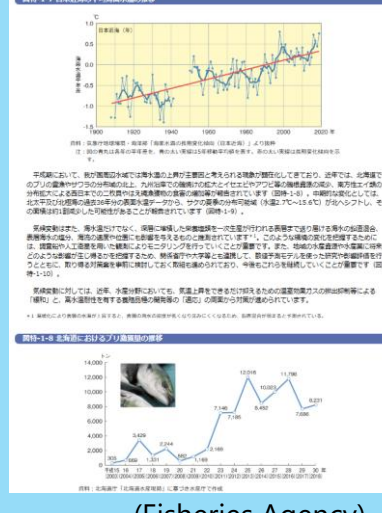
Projections of storm surges and extreme waves

Measures against heat strokes caused by extreme high temperatures



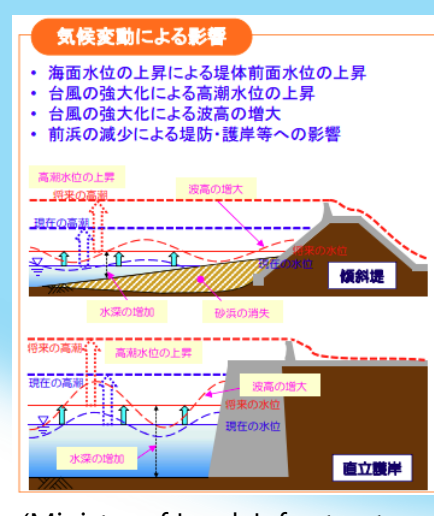
(Ministry of Agriculture, Forestry and Fisheries)

Measures for ocean ecosystem



(Fisheries Agency)

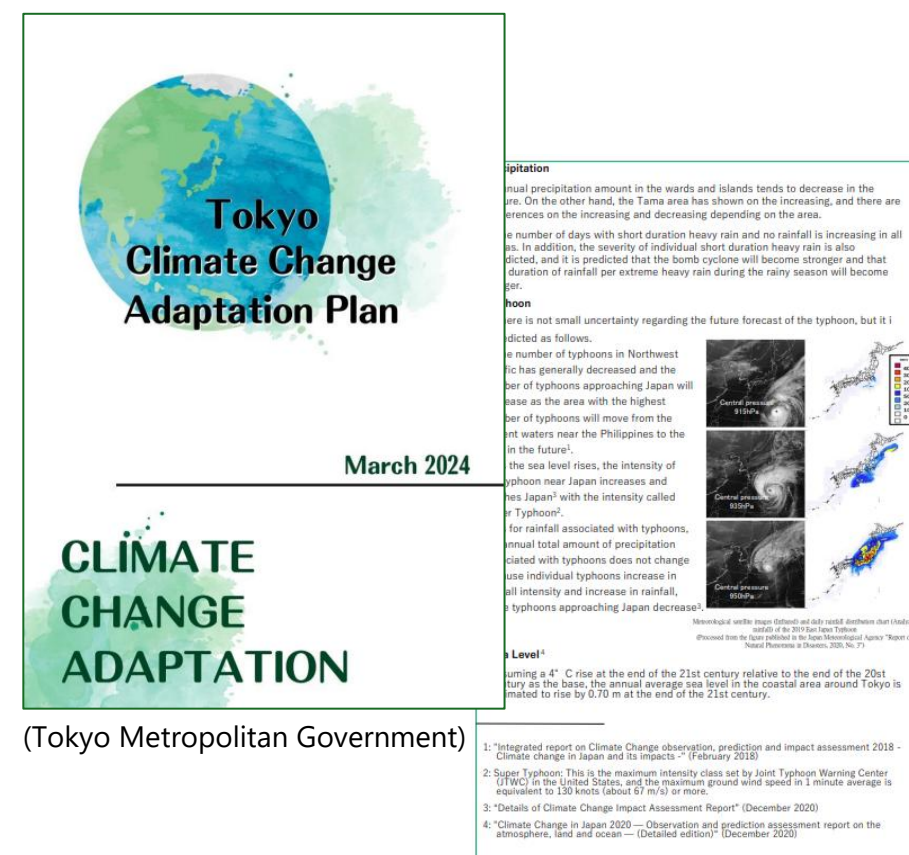
Infrastructure development and disaster prevention measures



(Ministry of Land, Infrastructure, Transport and Tourism)



(Ministry of the Environment)



Local Climate Change Adaptation Plan

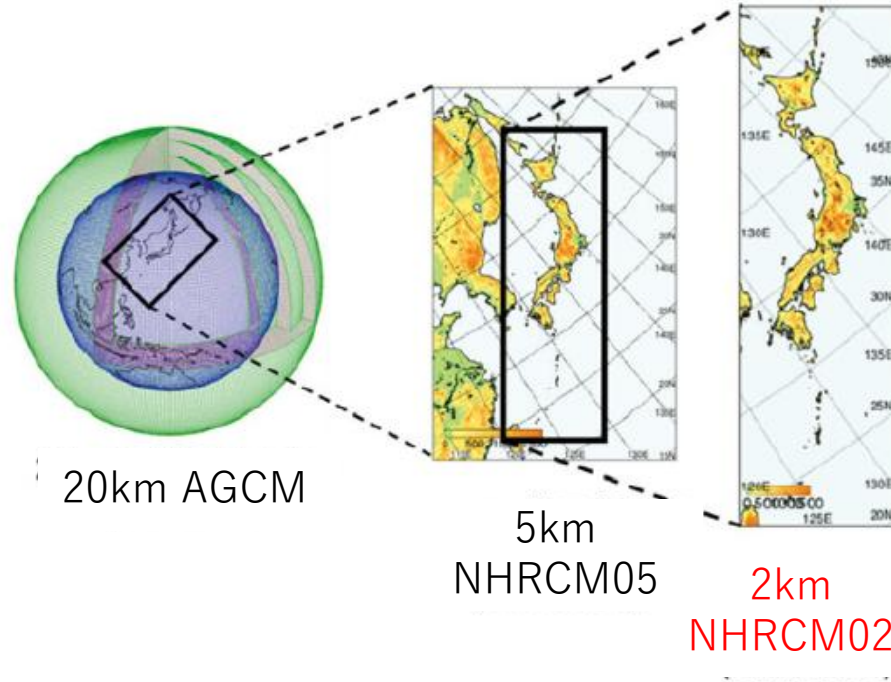
Next Assessment Report on Climate Change Impacts in Japan (to be updated in FY2025)

Projection models

Database for Policy Decision Making for Future Climate Change (d4PDF)

- ◆ An unprecedentedly large ensemble of climate simulations with a 60-km atmospheric general circulation model (AGCM) and dynamical downscaling with a 20-km regional climate model (RCM)
- ◆ The climate of
 - ✓ the latter half of the 20th century
 - ✓ 4°C, 2°C and 1.5°C warmer than the pre-industrial climate
 - ✓ the latter half of the 20th century without historical trends associated with the anthropogenic effect.

Non-Hydrostatic Regional Climate Model with a grid spacing of 2 km (NHRM02)

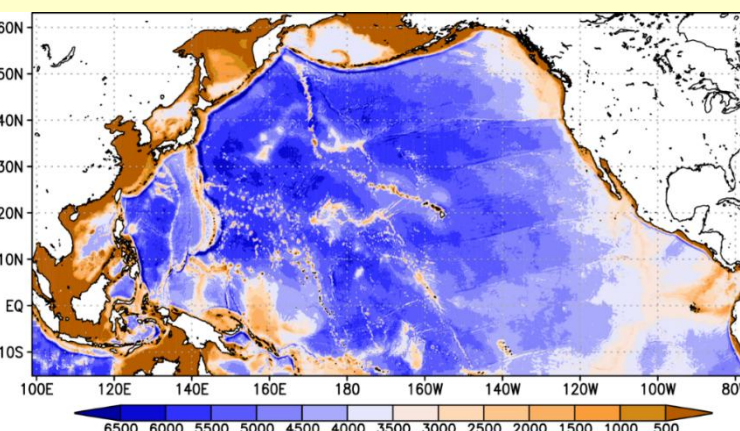


- ◆ Regional climate model increased the horizontal resolution **from 5 km to 2 km**
- ◆ Introduced a new urban model that can **include the effects of urbanization**

These projections above are based on the **2/4°C Warming Scenarios (RCP2.6 and RCP8.5, respectively)** used in the IPCC Fifth Assessment Report.

- The **2°C Warming Scenario**: potential climatic conditions **with achievement of the Paris Agreement's 2°C goal**.
- The **4°C Warming Scenario**: potential climatic conditions **with no future additional mitigation measures**.

Future Ocean Regional Projection dataset in the North Pacific (FORP-NP10)

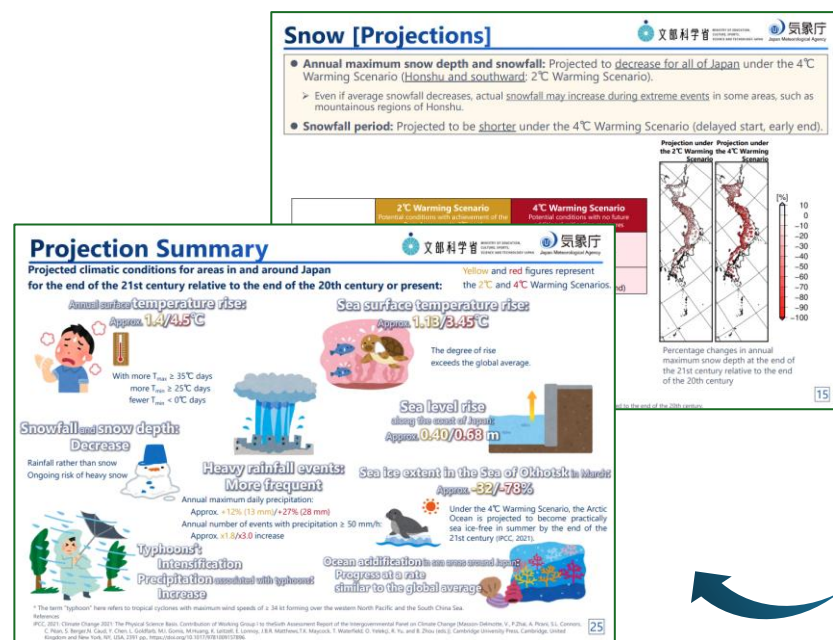


- ◆ An ensemble of historical and multi-scenario future projection simulations from 1960 to 2100 using a **high-resolution ocean downscaling model system**
- ◆ Ocean projection data **contains the ocean carbon cycle and marine ecosystems**

- **English Summary Content:** Simplified slides of the main publication intended for use as-is in study sessions, presentations and other work

- Related content (in Japanese) includes:

- **The main publication:** An overview of observed/projected climate change.
 - ✓ **HTML version can be translated using a web browser.**
- **Leaflets by prefecture:** Double-page leaflets providing overviews of observed/projected climate change **for individual regions**



English Summary Content

https://www.data.jma.go.jp/cpdinfo/ccj/2025/pdf/cc2025_gaiyo_en.pdf



- Full contents (Japanese)



<https://www.data.jma.go.jp/cpdinfo/ccj/index.html>