

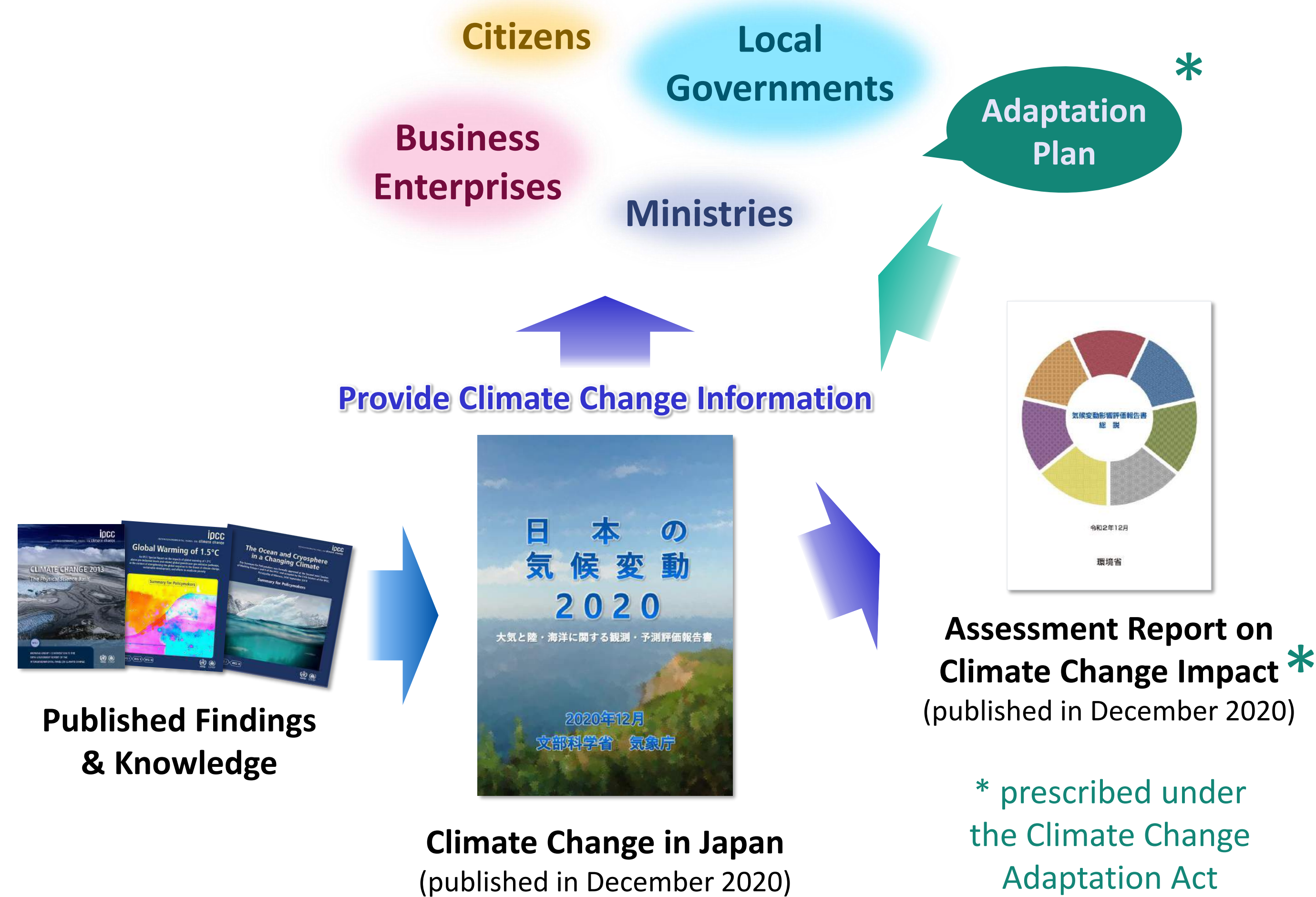
Climate Change Information for Risk Assessment and Decision Making

- ✓ MEXT and JMA published the *Climate Change in Japan* in December 2020 to share basic information and expertise on climate change and promote impact assessment and consideration of related mitigation/adaptation in Japan.
- ✓ Since its publication, efforts to deepen public understanding about this report have been made.
- ✓ The report has been used as intended, including as basic/background information to consider new technical standards of infrastructure to adapt to future climate change.
- ✓ MEXT and JMA continue their services to provide information on climate change effectively to support impact assessment and mitigation/adaptation in Japan.

Background

International interest in climate change has significantly increased since the Paris Agreement was adopted at COP21 in 2015. In the same context, Japan's Act on Promotion of Global Warming Countermeasures (1998), its Climate Change Adaptation Act (2018) and associated national plans stipulated requirements or recommendations for national and local governments, commercial enterprises and the public to promote and implement related mitigation and adaptation.

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Japan Meteorological Agency (JMA) published a report titled *Climate Change in Japan* in December 2020 to share basic information and expertise on climate change and promote impact assessment and consideration of related mitigation/adaptation in Japan.



The Report *Climate Change in Japan (2020)*

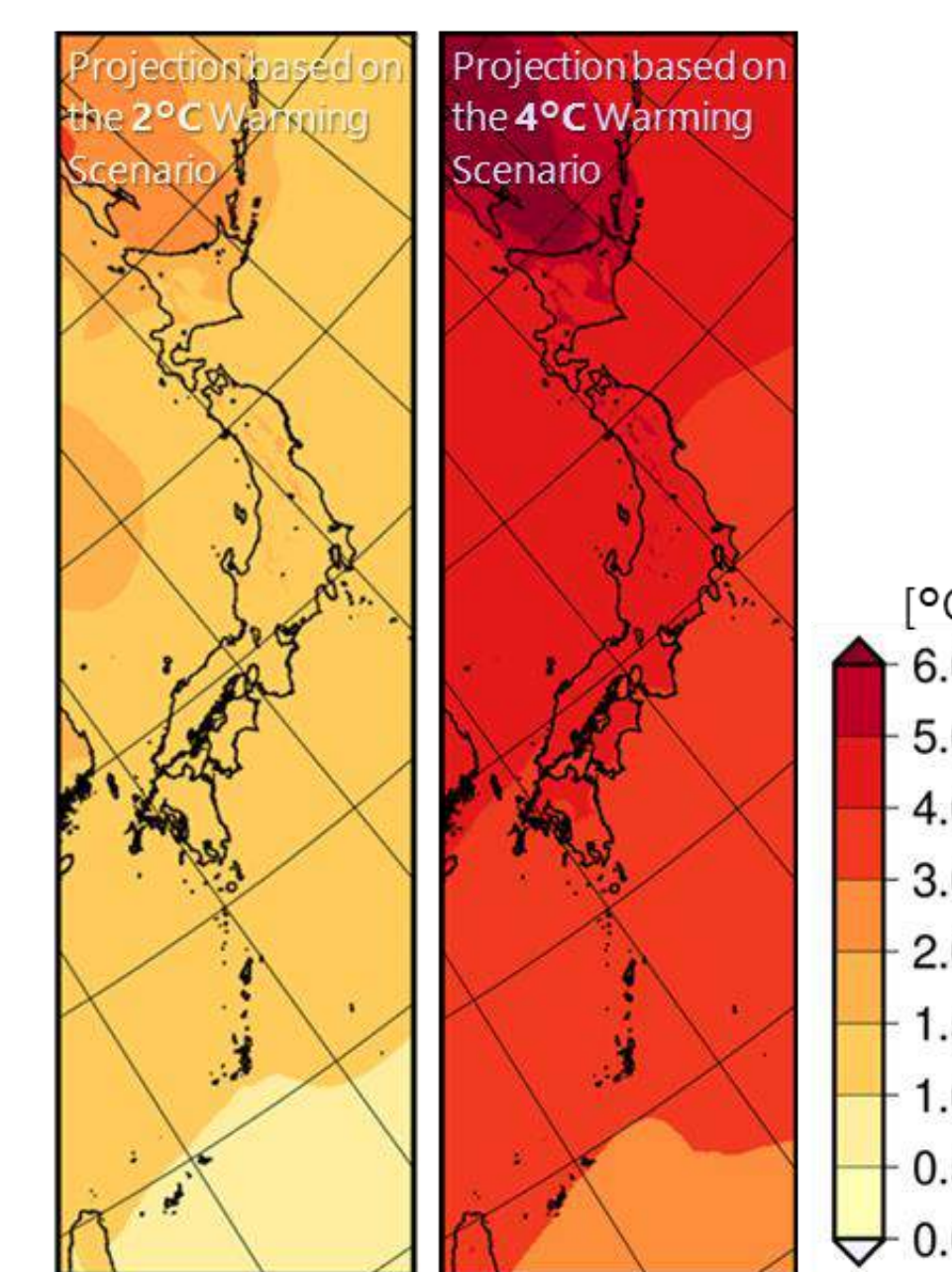
- The report outlines the status of atmospheric greenhouse gases (GHGs) and observed/projected changes in climate variables, including surface temperature, precipitation, snowfall, tropical cyclones, sea surface temperature, sea level and ocean acidification, in and around Japan.
- Climate projections are generally based on the RCP2.6 and 8.5 scenarios which are called "2°C and 4°C warming scenarios" in the report, and the projections based on these scenarios are described as the potential climatic conditions "with achievement of the Paris Agreement's 2°C target" and "with no additional mitigation measures beyond the current situation", respectively. This enables readers to compare two possible states of the future climate that may affect the areas of their responsibilities, business or life.
- Projections obtained from dynamic downscaling with a 5 km spatial resolution model are provided in the report. The complex topography and climatic characteristics of Japan are well considered in the projections. This helps readers to understand the potential climate change risk for them.
- 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.
- Ministries and governmental agencies have regular contact among the staffs who are concerned with climate change. The field offices of JMA also have regular contacts with the local governments within their responsible districts. The publication of the report was announced via such routes.
- MEXT and JMA held a media briefing when they published the report. For more effective and efficient announcement, they have written articles and held webinars for specialized fields such as education, meteorology, and oceanography those who may convey information and knowledge to the public.

Surface Temperature

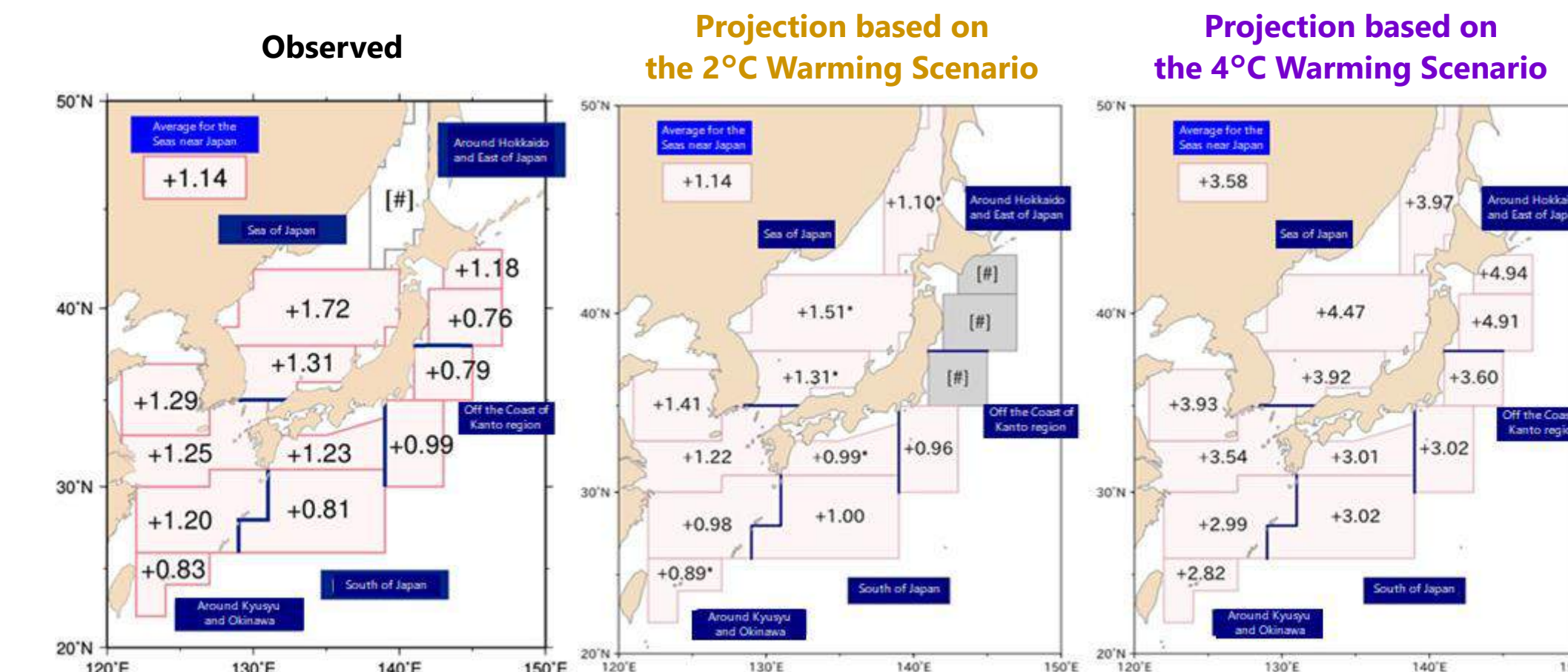
	Projection based on the 2°C Warming Scenario	Projection based on the 4°C Warming Scenario
Annual surface temperature over Japan	Increase about 1.4°C	Increase about 4.5°C
Annual global average surface temperature	Increase about 1.0°C	Increase about 3.7°C
T _{max} ≥ 35°C days per year	Increase about 2.8 days	Increase about 19.1 days
T _{min} ≥ 25°C days per year	Increase about 9.0 days	Increase about 40.6 days
T _{min} < 0°C days per year	Decrease about 16.7 days	Decrease about 46.8 days

T_{max}: the daily highest temperature
T_{min}: the daily lowest temperature

Changes in annual surface temperature for the end of the 21st century (2076 – 2095 average) relative to the end of the 20th century (1980 – 1999 average)



Sea Surface Temperature



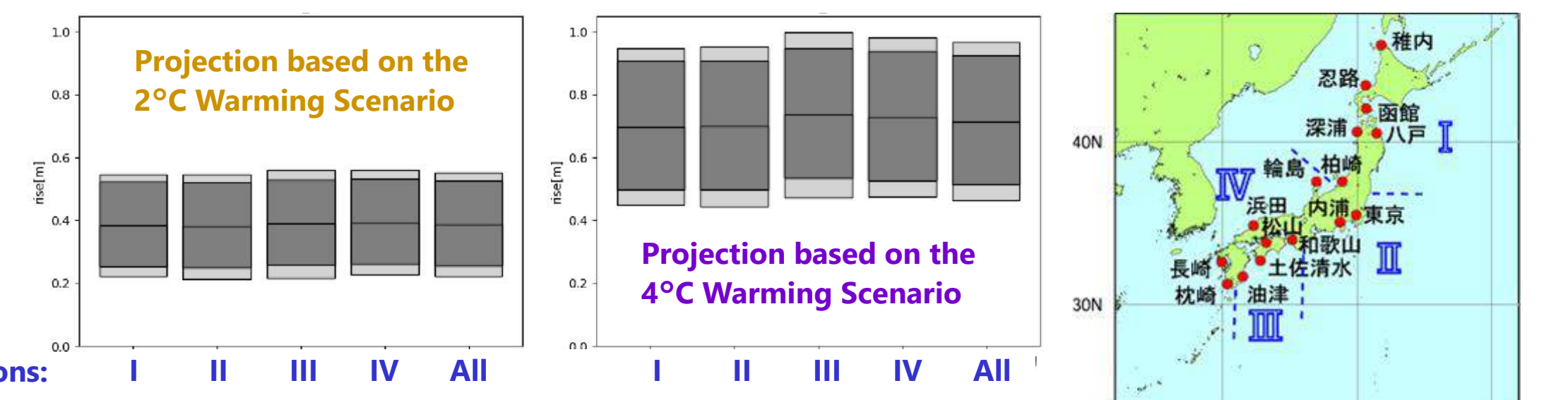
Changes in sea surface temperature during 1900 – 2019 (per 100 years) (left) and for the end of the 21st century (2081 – 2100 average) relative to the end of the 20th century (1986 – 2005 average) (middle and right). The symbols * and # denote statistically significant at 95% or more and no statistically significant tendency can be found, respectively.

Note: The projections are average over Japan for the end of the 21st century relative to the end of the 20th century or the present, unless otherwise stated. They are written in "about XX" form here by using the average though the report shows them with ranges of uncertainty.

	Projection based on the 2°C Warming Scenario	Projection based on the 4°C Warming Scenario
Averaged sea surface temperature near Japan	Increase about 1.14°C	Increase about 3.58°C
Averaged global sea surface temperature	Increase about 0.73°C	Increase about 2.58°C

Sea Level

	Projection based on the 2°C Warming Scenario	Projection based on the 4°C Warming Scenario
Averaged sea level at the sites along the Japanese coast	Increase about 0.39 m	Increase about 0.71 m
Global mean sea level	Increase about 0.39 m	Increase about 0.71 m



Changes in the sea level averaged over the sites along the Japanese coast for the end of the 21st century relative to the end of the 20th century

● Sites / I – IV: Regions

Summary of the Future Projections

Projected climate in and around Japan for the end of the 21st century, relative to the end of the 20th century or the present. Yellow and purple are the projections based on the 2°C and 4°C warming scenarios (RCP2.6 and 8.5), respectively.



Citation in Governmental Documents

- The information and expertise shared through the report have been used on various platforms, including presentations by other Ministries on climate change within their areas of responsibility and local-government plans for mitigation and adaptation.
- Of particular note is incorporation of the information in the *Assessment Report on Climate Change Impact*, which is prescribed under the *Climate Change Adaptation Act* and published every five years or so under the responsibility of the Ministry of the Environment as a comprehensive assessment of climate change effects in Japan to support formulation of national- and local-government plans for adaptation.

To Consider New Standards for Adapting to Potential Future Climate

- The Ports and Harbours Bureau of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) recently began considering new port/harbor infrastructure technical standards for adaptation to potential future climate conditions in consideration of usage for 50 years or more.
- Noting the *Climate Change in Japan (2020)* along with other proposals from experts, the Bureau established a technical advisory committee on this issue.
- Based on the report, JMA provided a briefing on observed and projected changes in sea levels, storm surges and high waves in and around Japan as well as their mechanisms at the first meeting of the committee, held in February 2021.
- The committee is now considering the use of projected changes in sea levels based on the RCP2.6 scenario as a general standard. They are also studying how to integrate the projections for tides, waves and wind into the new standard. They plan to conclude the discussion during FY2021 and to implement the new standards from FY2022.

