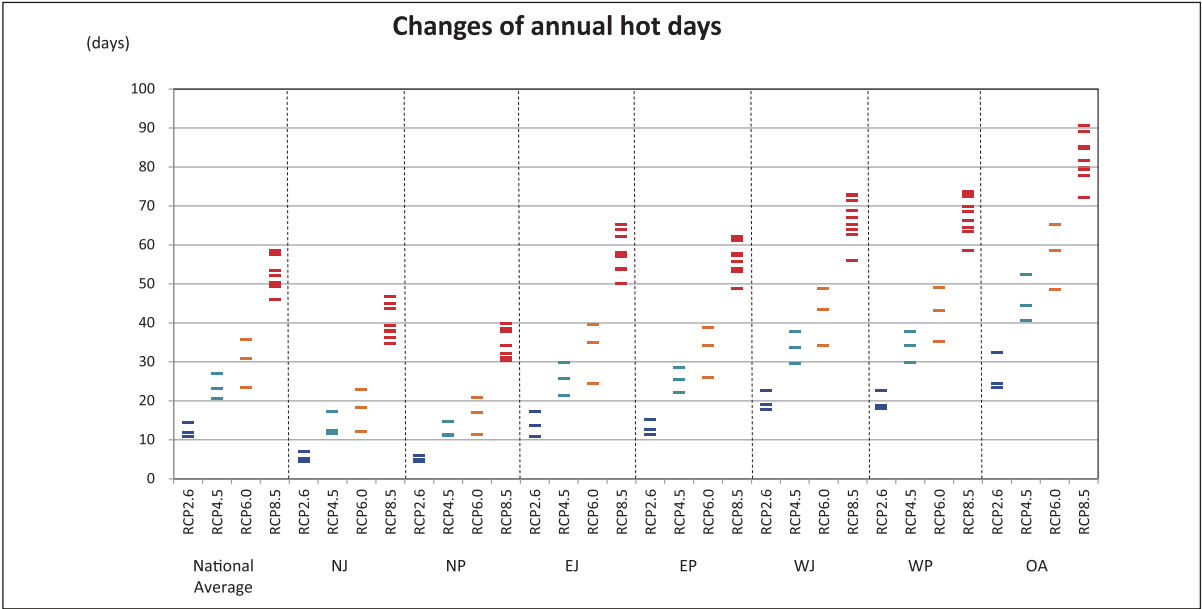


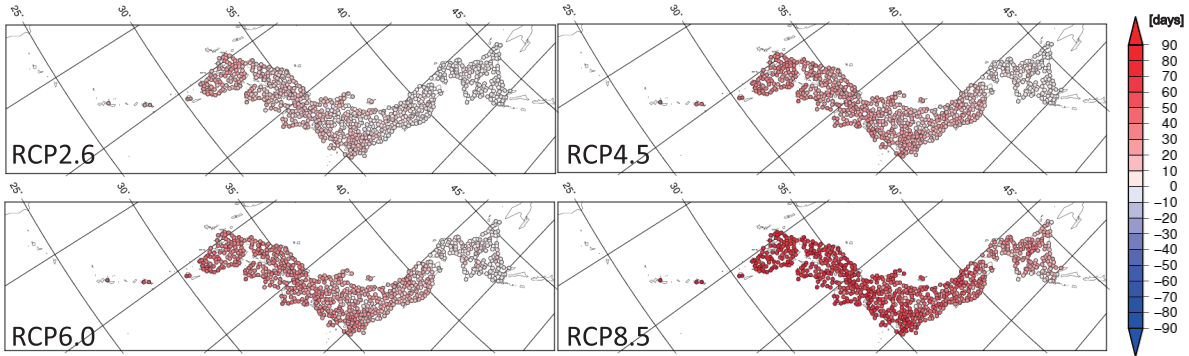
Projections of hot days⁷

- The number of annual hot days is projected to increase nationwide. (It will increase by about 10 days under the RCP2.6 scenario, and by about 50 days under the RCP8.5 scenario.) (national average)
- It is projected to increase in western Japan and the Okinawa/Amami, in particular. (In the Okinawa/Amami, it will increase by about 90 days under the RCP8.5 scenario.)



(days)	National	NJ	NP	EJ	EP	WJ	WP	OA
RCP2.6	12.4	5.5	5.0	13.9	13.1	19.9	19.8	26.8
RCP4.5	23.5	13.7	12.4	25.6	25.3	33.6	33.8	45.8
RCP6.0	30.0	17.7	16.4	33.0	33.0	42.1	42.4	57.5
RCP8.5	52.8	39.7	33.9	57.9	56.9	66.7	67.8	86.7
(Major city)	-	Sapporo	Kushiro	Niigata	Tokyo	Fukuoka	Osaka	Naha
Climatic normal	-	8.0	0.1	33.5	46.4	57.1	73.2	96.0

This graph indicates differences between the future climate projection (annual average for the period 2080-2100) and the present climate (annual average for the period 1984-2004) in each case. Average values of all cases under each scenario are shown in the table above. Annual average values for the period 1981-2010 of a major city in each region are also illustrated for reference.

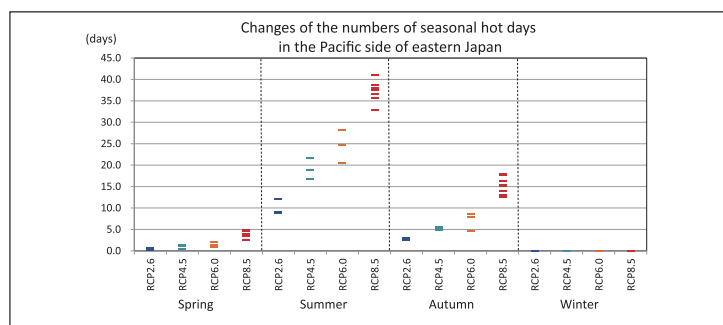


⁷----- "Hot day" means a day on which the daily maximum temperature goes above 30°C.

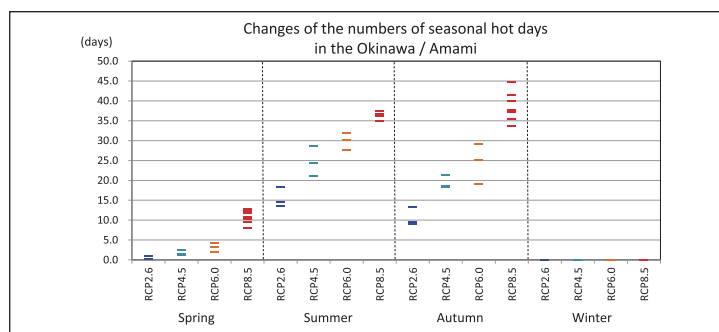
■ Seasonal changes in the number of hot days

The Charts/Tables below show seasonal changes in the number of hot days in the Pacific side of eastern Japan, and in the Okinawa/Amami.

From these Charts/Tables, we can see that while the number of hot days increases mostly in the summer (June-August) in the Pacific side of eastern Japan, such an increasing tendency extends into the autumn (September - November) in the Okinawa/Amami in addition to the summer. This means that the hot season we are now experiencing will continue into the autumn.



(days)	Spring(Mar-May)	Summer(Jun-Aug)	Autumn(Sep-Nov)	Winter(Dec-Feb)
RCP2.6	0.4	10.0	2.7	0.0
RCP4.5	1.0	19.0	5.3	0.0
RCP6.0	1.5	24.5	7.0	0.0
RCP8.5	3.8	37.7	15.3	0.0
Climatic normal (Tokyo)	0.3	38.9	7.2	0.0



(days)	Spring(Mar-May)	Summer(Jun-Aug)	Autumn(Sep-Nov)	Winter(Dec-Feb)
RCP2.6	0.7	15.5	10.6	0.0
RCP4.5	1.7	24.7	19.4	0.0
RCP6.0	3.1	29.9	24.4	0.0
RCP8.5	11.0	36.6	39.2	0.0
Climatic normal (Naha)	1.6	70.3	24.0	0.0

(Note) It is not possible for us to simply compare the regional average of changed values derived from the present climate based on model calculations, with the annual average value observed/recorded at a specific location. Furthermore, although we give here a representative major city in the region, the value indicated for that city is by no means a representative value of the climate of the entire region in question.

【Reference】 Number of hot days under the present climate conditions

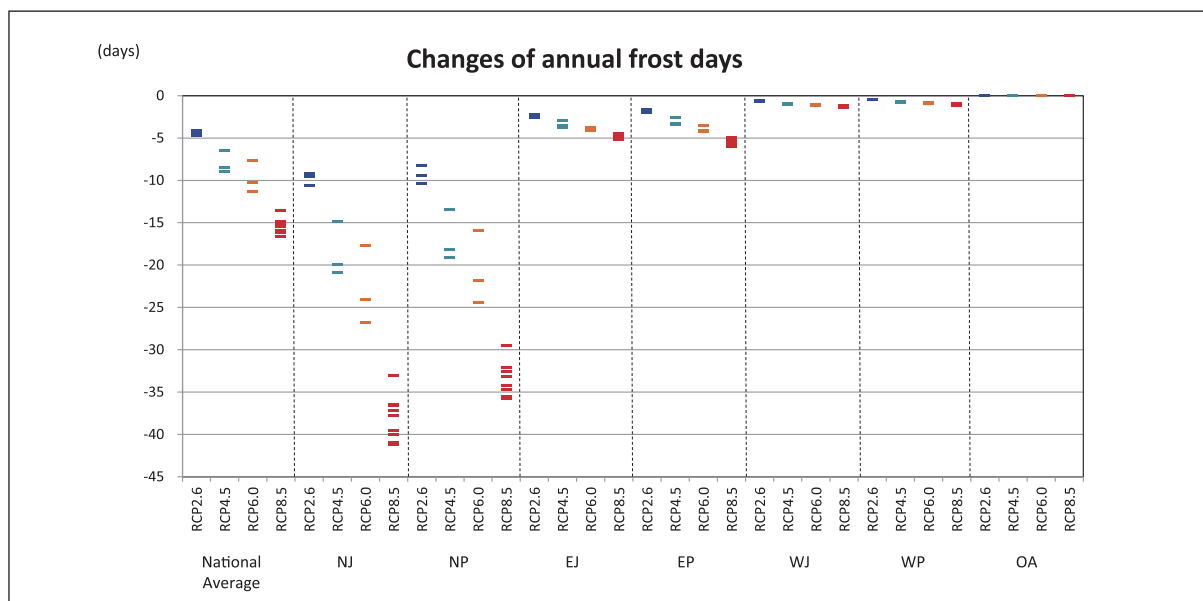
(days)	Annual	Spring	Summer	Autumn	Winter
National Average	22.6	0.1	20.3	2.2	0.0
NJ	7.5	0.0	7.1	0.4	0.0
NP	6.5	0.1	6.1	0.3	0.0
EJ	25.2	0.1	23.1	2.1	0.0
EP	26.2	0.2	23.4	2.6	0.0
WJ	36.5	0.2	32.6	3.7	0.0
WP	38.2	0.2	33.7	4.3	0.0
OA	66.1	0.2	52.7	13.2	0.0

The average values of YS, KF, and AS are indicated here.

(Note) The values in the Chart are regional average figures based on the results of a model calculation. Therefore, these values cannot be simply compared with the annual average figures (values actually observed at a specific location) of the reference cities stated above.

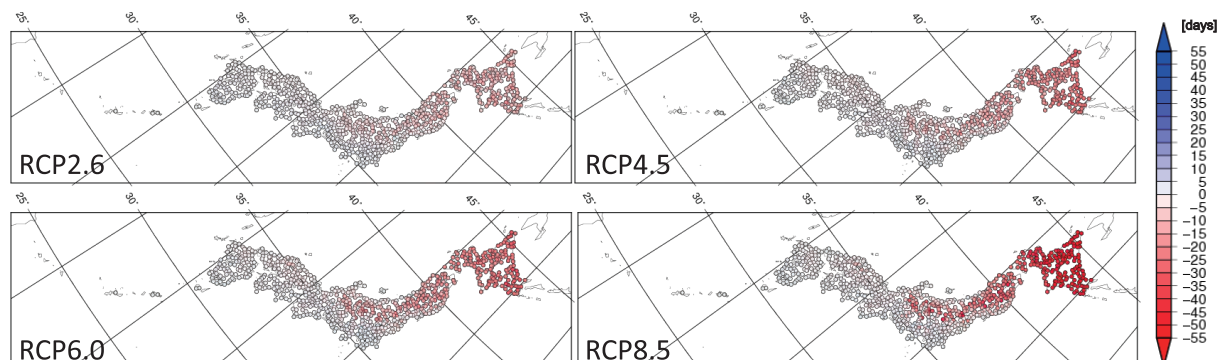
Projections of frost days⁸

- The number of annual frost days is projected to decrease nationwide. (It will decrease by about five days under the RCP2.6 scenario and by about 15 days under the RCP8.5 scenario.) (national average)
- The range of decrease will be larger in northern Japan, in particular. (It will decrease by about 40 days under RCP8.5 scenario in northern Japan.)



(days)	National	NJ	NP	EJ	EP	WJ	WP	OA
RCP2.6	-4.4	-9.8	-9.4	-2.4	-1.8	-0.7	-0.5	0.0
RCP4.5	-7.9	-18.5	-16.9	-3.4	-3.1	-1.0	-0.8	0.0
RCP6.0	-9.7	-22.9	-20.7	-4.0	-4.0	-1.1	-0.9	0.0
RCP8.5	-15.5	-38.1	-33.3	-4.9	-5.6	-1.3	-1.0	0.0
(Major city)	-	Sapporo	Kushiro	Niigata	Tokyo	Fukuoka	Osaka	Naha
Climatic normal	-	45.0	44.7	1.1	0.0	0.0	0.0	0.0

This graph indicates the difference between the future climate projection (annual average for the period 2080-2100) and the present climate (annual average for the period 1984-2004) in each case. Average values of all cases under each scenario are shown in the table above. The climatic normal (annual average values for the period 1981-2010) of a major city in each region are also illustrated for reference.



Distribution of changes in the number of frost days
(SST1/YS case alone is indicated for each scenario)

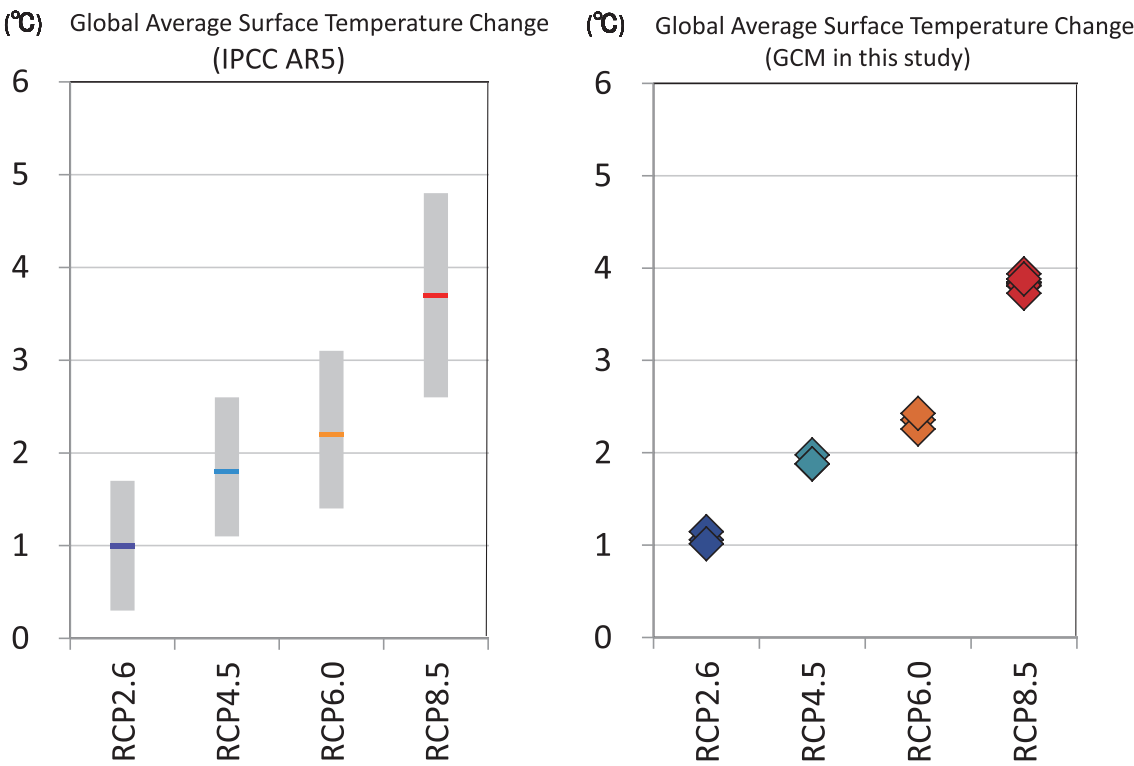
⁸----- "Frost day" means a day on which the daily maximum temperature does not go above 0°C.

■ What are the relationships between the IPCC projection and this result?

In the Fifth Assessment Report (AR5) of IPCC, climate-studying organizations worldwide individually performed climate-change projections using their own climate models. The results were collected and processed. By doing so, ranges of projections (ranges of uncertainties) were calculated, taking into account various professional opinions and differences in models. The figure to the left is a typical example of the results, in which average values of increases in the global average land temperature, along with ranges due to multiple models, are indicated.

We have also done projections for the entire world (projections using a global climate model), and we are similarly able to assess the increase in the global average land temperature. The figure to the right shows the results, with temperature increases for the nine cases under the RCP8.5 scenario and those for the three cases each under other scenarios are indicated by points. Looking at these two figures, we can see that the temperature increases in all cases in this projection are about the same as the average value in IPCC AR5.

As is clear from the fact that the ranges in the figure to the left are wider than those of the points in the figure to the right, this publication's projection does not cover the entire range of temperature increases in IPCC AR5. For that reason, it is necessary to note that the range of uncertainties shown by the results of this projection is only part of a wider range of potentially existing uncertainties.



Left: Change (increase) in the global average land temperature (annual average for the period 2080-2100) against the annual average of the temperature for the period 1986-2005 in IPCC AR5.

Right: Change (increase) in the global average land temperature (annual average for the period 2080-2100) against the annual average of the temperature for the period 1984-2004, calculated from the result of our study.

Source of numerical values for the figure to the left: "IPCC (2014): Climate Change 2013 – The Physical Science Basis – Summary for Policymakers"