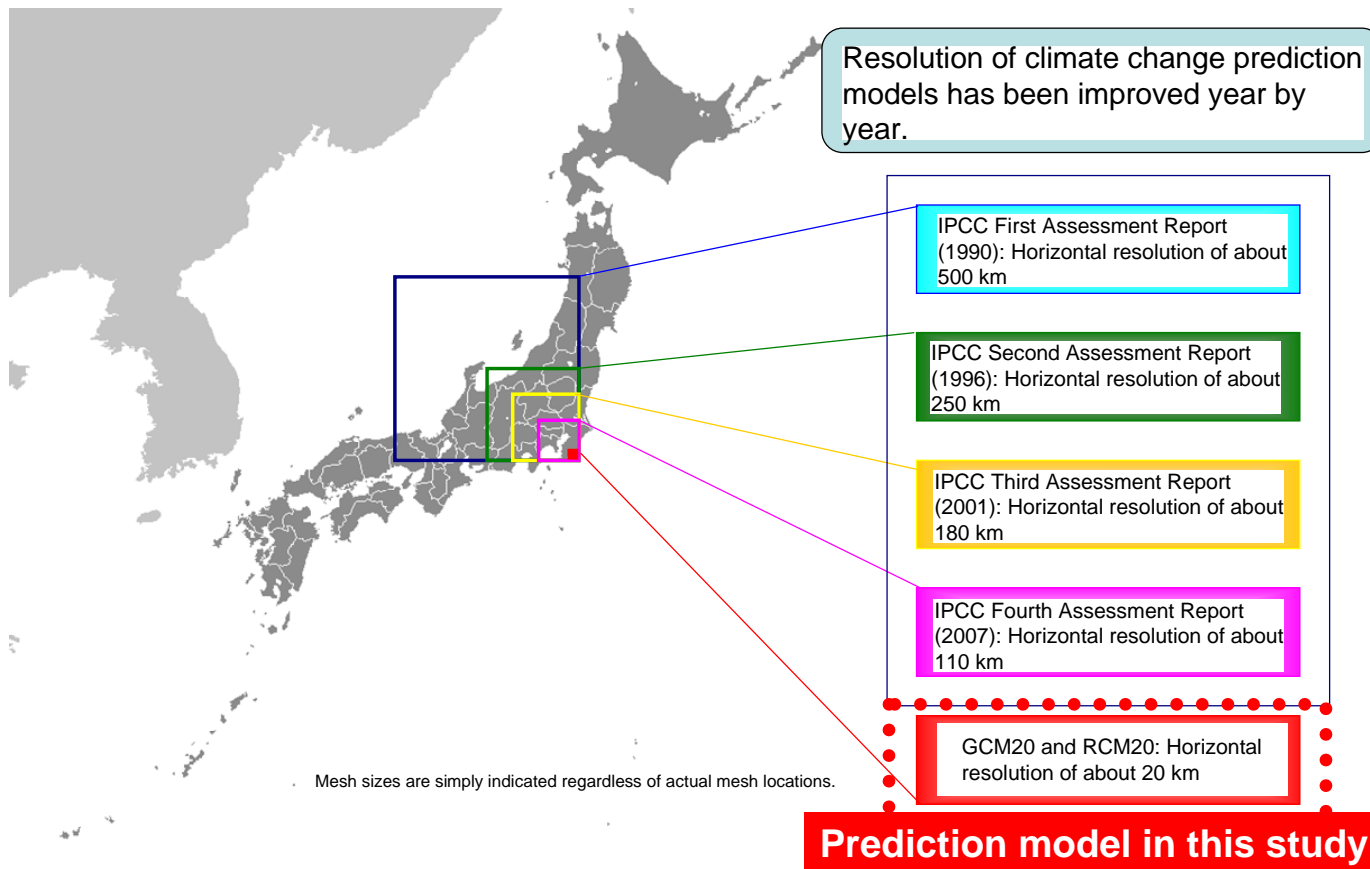


Resolution of climate change prediction models

3. Impacts of heavy rains



Estimation of increased rainfall in region

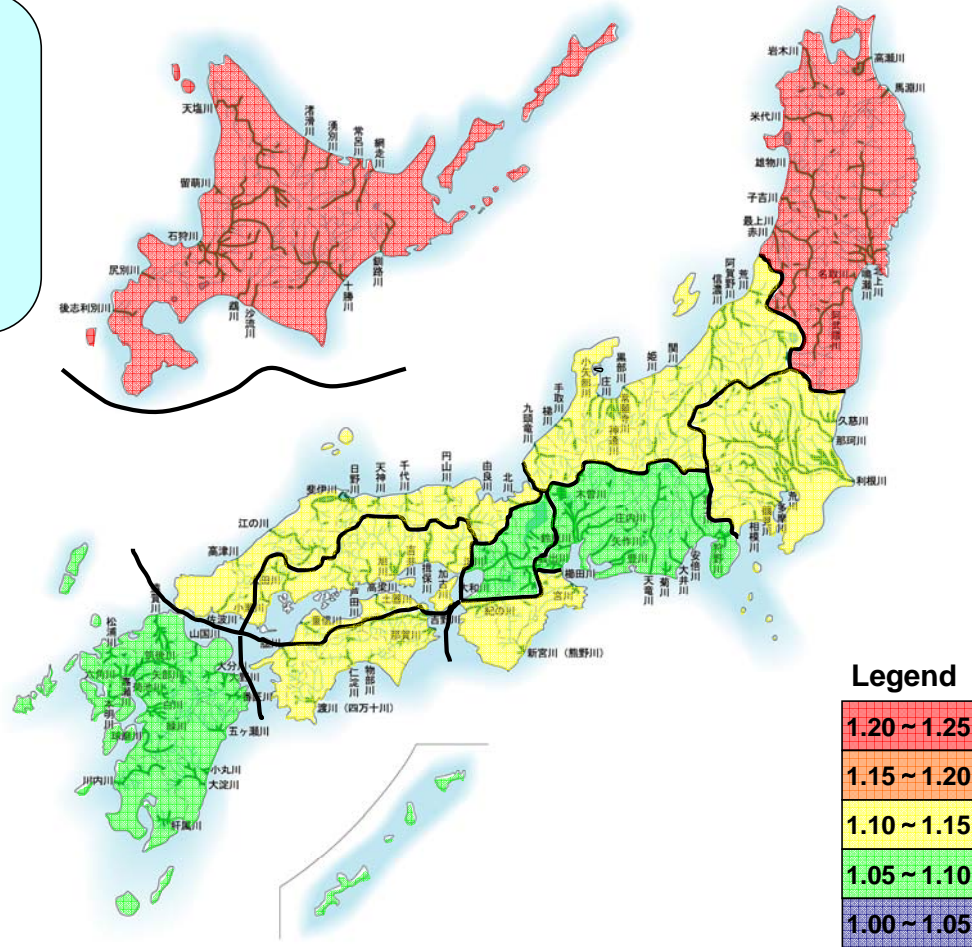
3. Impacts of heavy rains

Future rainfall amounts were projected as a median value in each region of

Average rainfall in 2080-2099 period
Average rainfall in 1979-1998 period

The above equation was obtained based on the maximum daily precipitation in the year at each survey point identified in GCM20 (A1B scenario).

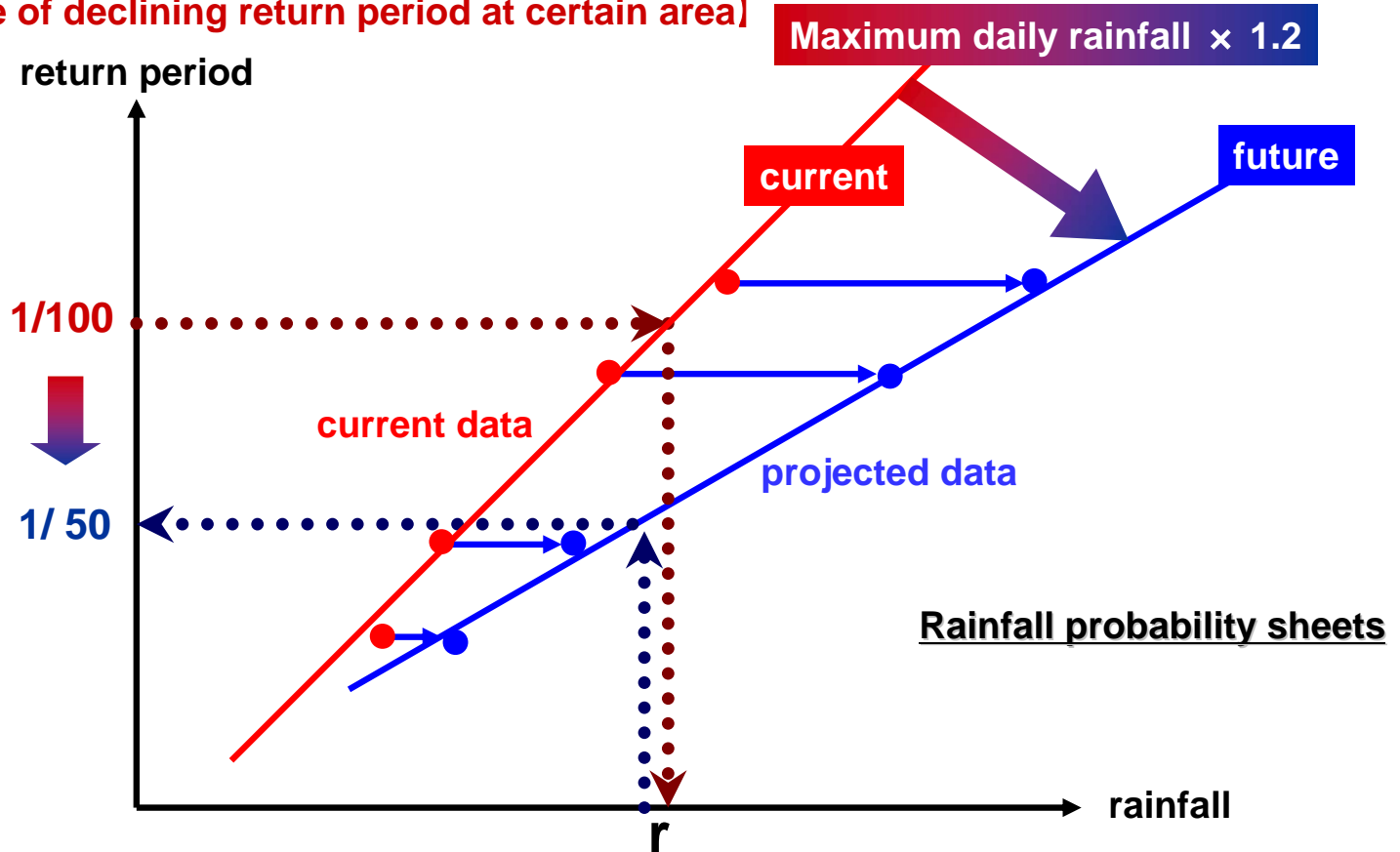
	Hokkaido	1.24
	Tohoku	1.22
	Kanto	1.11
	Hokuriku	1.14
	Chubu	1.06
	Kinki	1.07
	Southern Kii	1.13
	San-in	1.11
	Setouchi	1.10
	Southern Shikoku	1.11
	Kyushu	1.07



Declining return period by increasing rainfall

Return period of flood is declining by increasing rainfall in the future. Therefore declining future flood safety level is estimated.

[Image of declining return period at certain area]



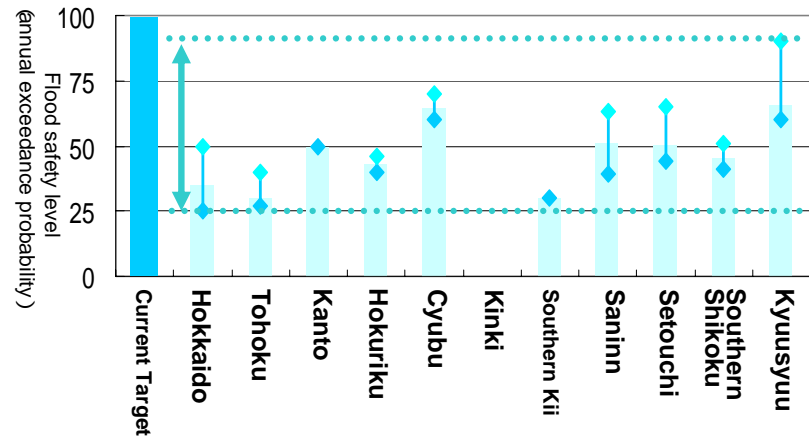
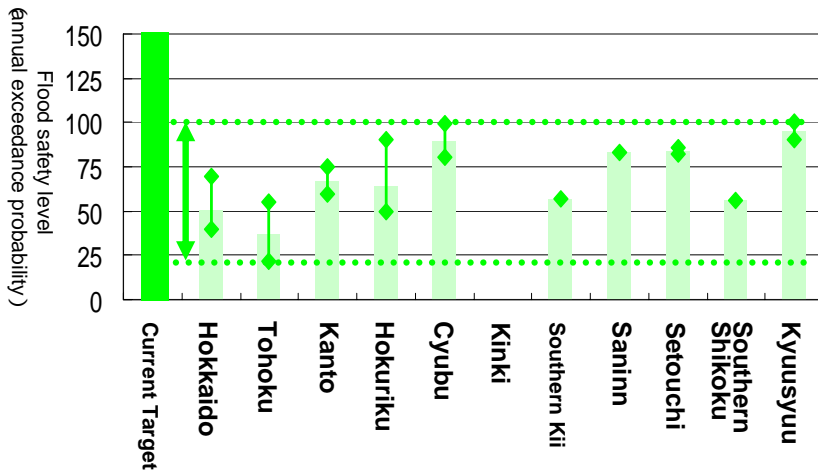
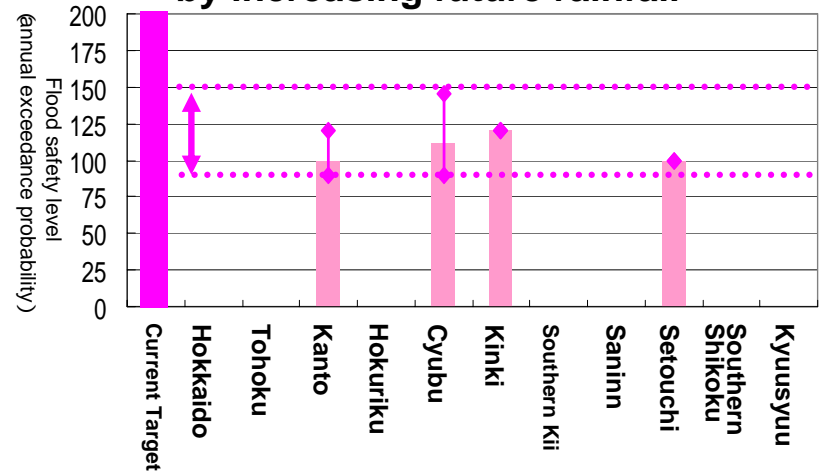
Declining the degree of safety level

3. Impacts of heavy rains

Impact for flood safety level by changing rainfall after 100 years

Region	1/200 (CurrentTarget)		1/150 (CurrentTarget)		1/100 (CurrentTarget)	
	Future flood safety level(annual exceedance probability)	Number of river system	Future flood safety level(annual exceedance probability)	Number of river system	Future flood safety level(annual exceedance probability)	Number of river system
Hokkaido	-	-	1/40 ~ 1/70	2	1/25 ~ 1/50	8
Tohoku	-	-	1/22 ~ 1/55	5	1/27 ~ 1/40	5
Kanto	1/90 ~ 1/120	3	1/60 ~ 1/75	2	1/50	1
Hokuriku	-	-	1/50 ~ 1/90	5	1/40 ~ 1/46	4
Cyubu	1/90 ~ 1/145	2	1/80 ~ 1/99	4	1/60 ~ 1/70	3
Kinki	1/120	1	-	-	-	-
Southern Kii	-	-	1/57	1	1/30	1
Saninn	-	-	1/83	1	1/39 ~ 1/63	5
Setouchi	1/100	1	1/82 ~ 1/86	3	1/44 ~ 1/65	3
Southern Shikoku	-	-	1/56	1	1/41 ~ 1/51	3
Kyusyu	-	-	1/90 ~ 1/100	4	1/60 ~ 1/90	14
All Japan	1/90 ~ 1/145	7	1/22 ~ 1/100	28	1/25 ~ 1/90	47

Declining the degree of safety against flood by increasing future rainfall



Circled number is number of calculated river system

Changes of peak runoff by future rainfall

3. Impacts of heavy rains

Estimations of future rainfall are about $\times 1.0 \sim \times 1.5$ compare to current rainfall. Peak runoff will be estimated about $\times 1.0 \sim \times 1.7$ compare to current rainfall in 9 major rivers.

Design Rainfall

$\times 1.0$ $\times 1.1$ $\times 1.2$ $\times 1.3$ $\times 1.5$

