



*Supplement of*

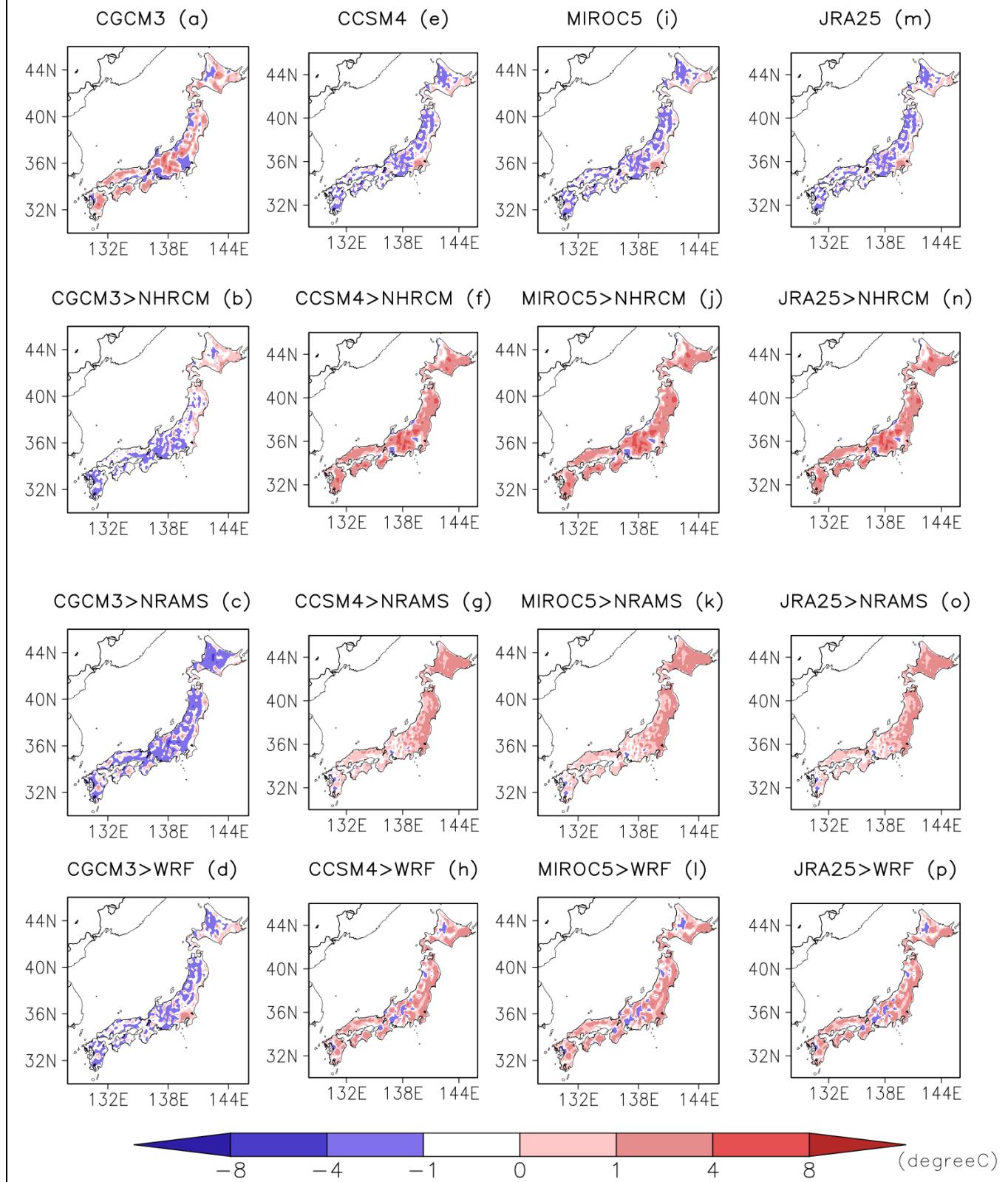
## **Investigation of Uncertainties in Multi-variable Bias Adjustment in Multi-model Ensemble**

**Saurabh Kelkar and Koji Dairaku**

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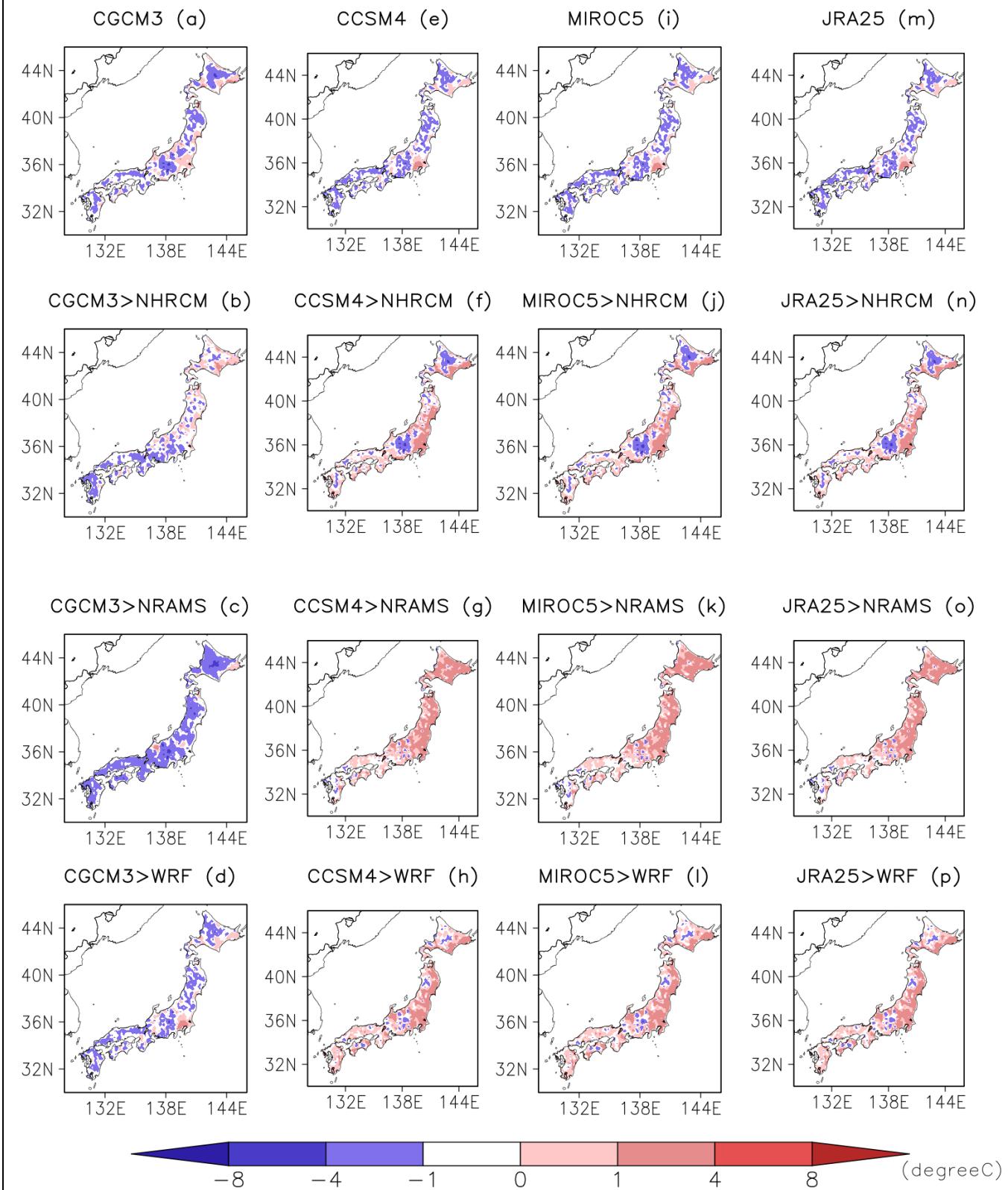
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## T2 for July without Bias Adjustment



**Figure S1: Bias in surface air temperature (T2) before the bias adjustment for GCMs, JRA25 (Top row), and corresponding RCMs.**

## T2 for July with Bias Adjustment

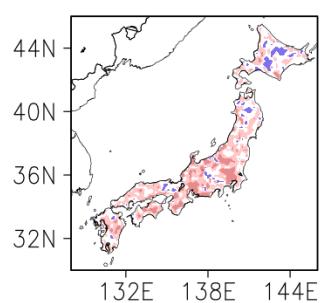


**Figure S2: Bias in surface air temperature (T2) after the bias adjustment for GCMs, JRA25 (Top row), and corresponding RCMs.**

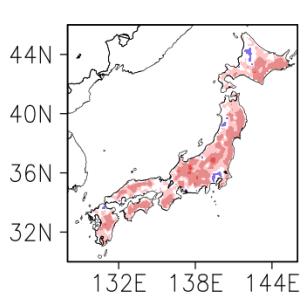
## Difference in T2 Bias for July

Difference =  $|T2 \text{ before adjustment}| - |T2 \text{ after adjustment}|$

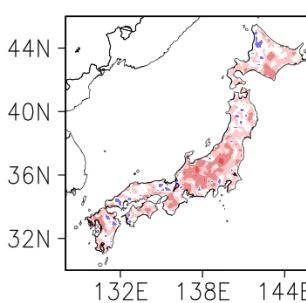
CGCM3 (a)



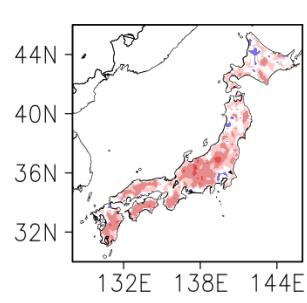
CCSM4 (e)



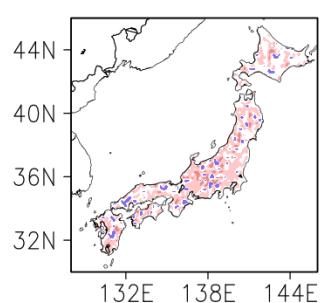
MIROC5 (i)



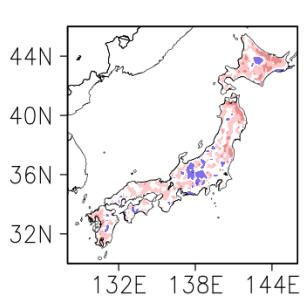
JRA25 (m)



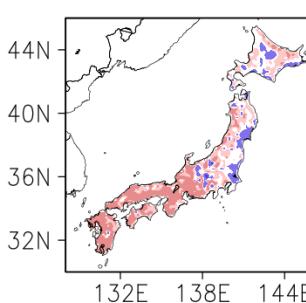
CGCM3>NHRCM (b)



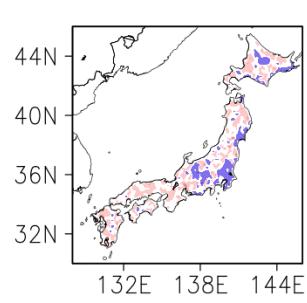
CCSM4>NHRCM (f)



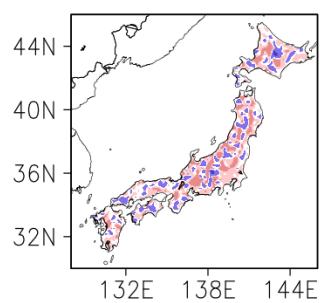
MIROC5>NHRCM (j)



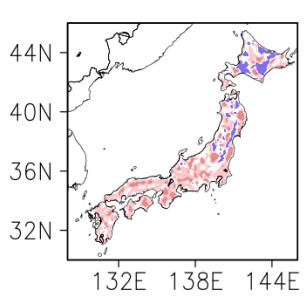
JRA25>NHRCM (n)



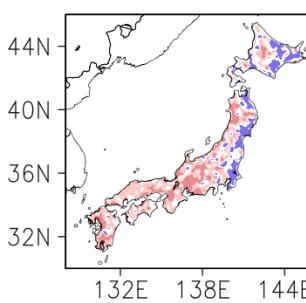
CGCM3>NRAMS (c)



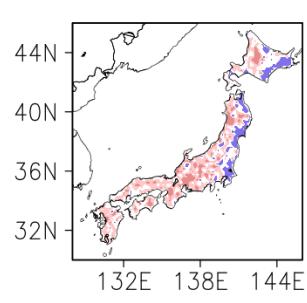
CCSM4>NRAMS (g)



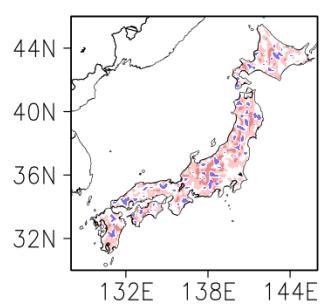
MIROC5>NRAMS (k)



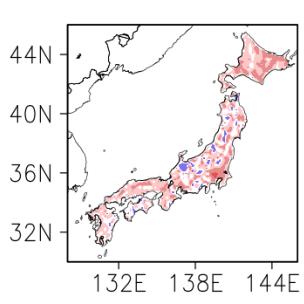
JRA25>NRAMS (o)



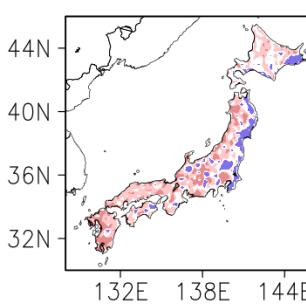
CGCM3>WRF (d)



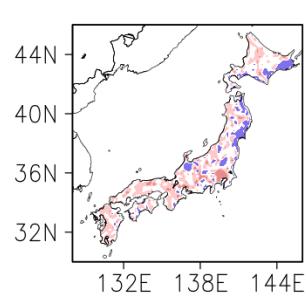
CCSM4>WRF (h)



MIROC5>WRF (i)

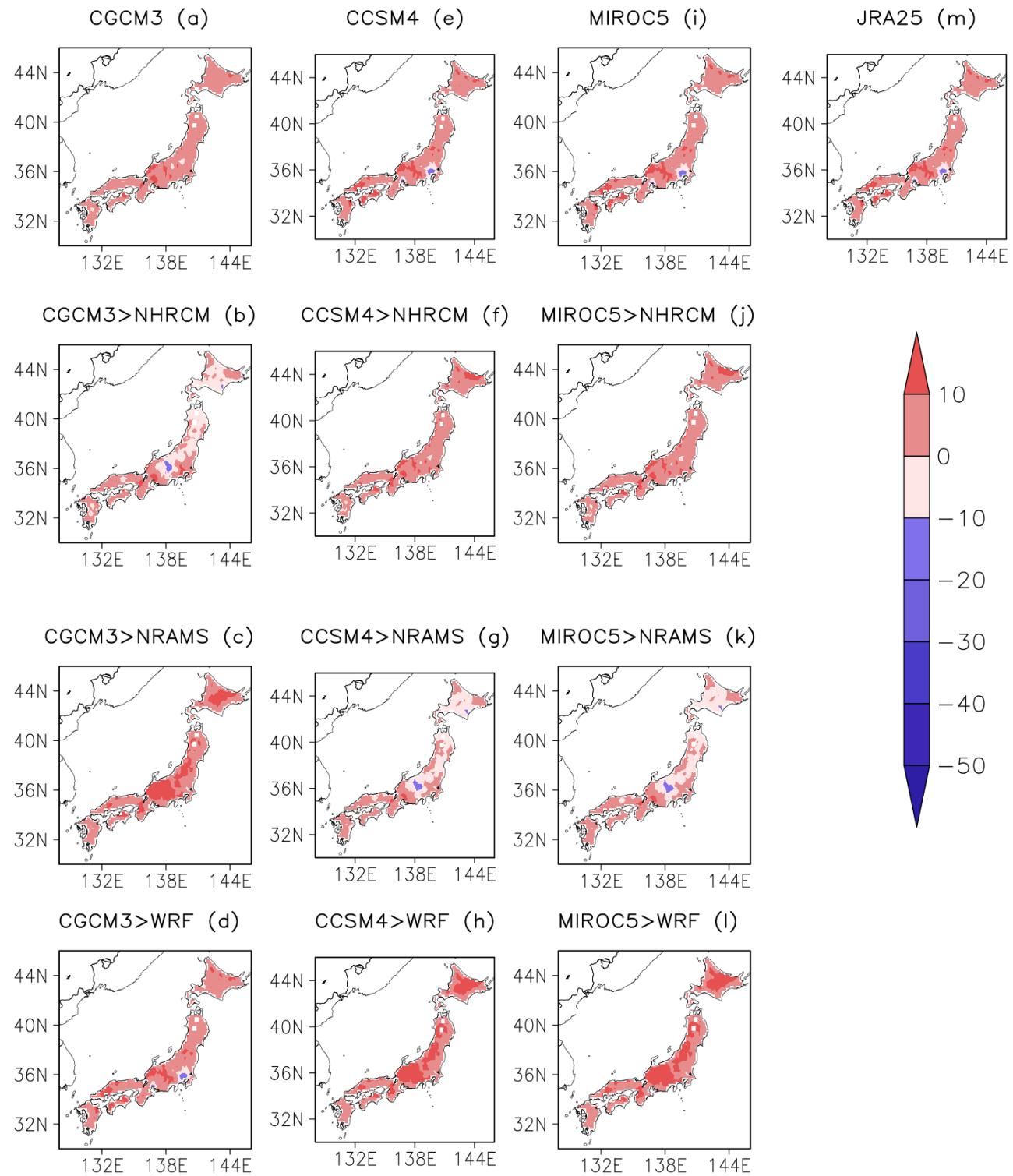


JRA25>WRF (p)



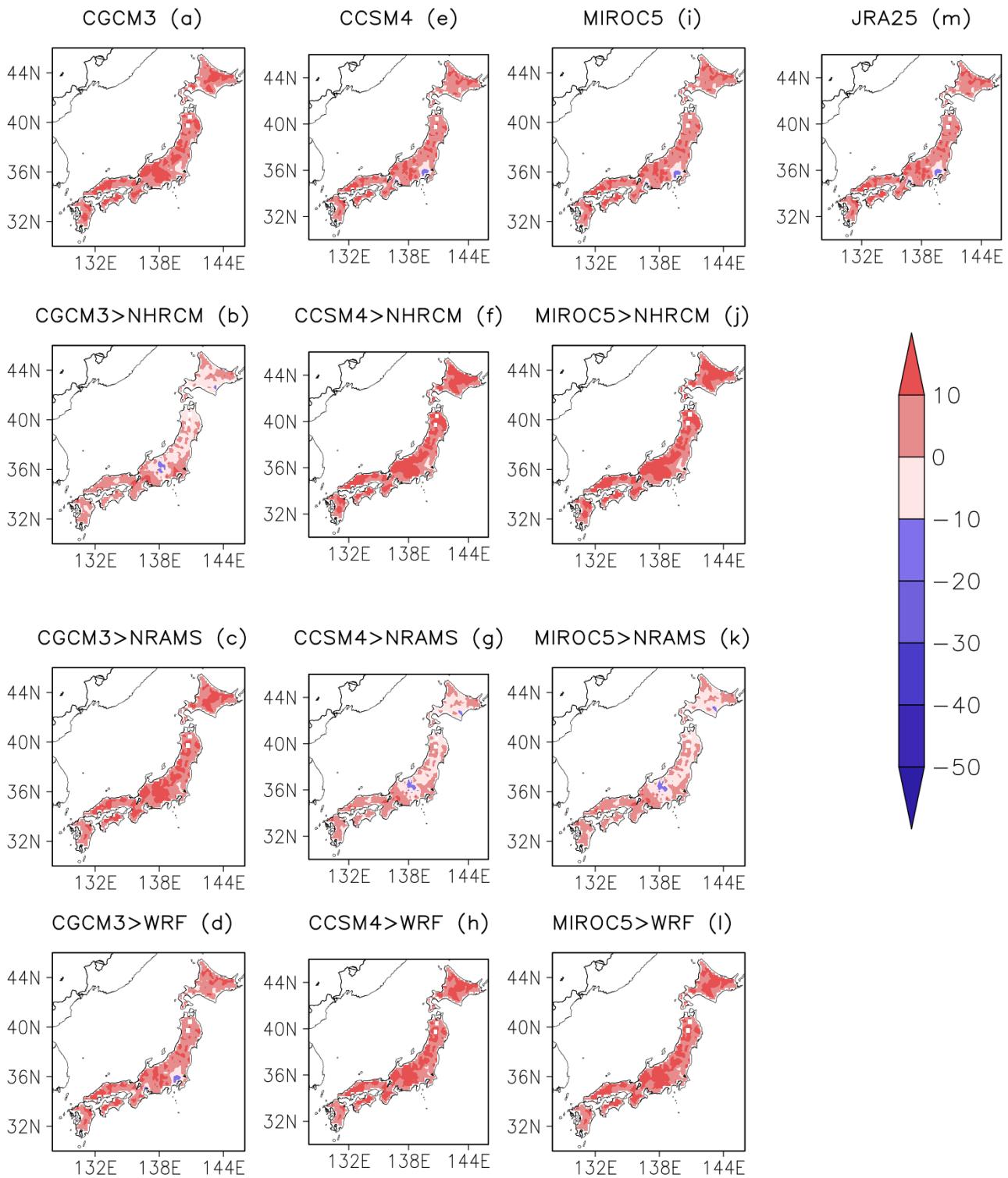
**Figure S3: Absolute difference between bias before and after the adjustment for surface air temperature (T2) GCMs, JRA25 (Top row), and corresponding RCMs.**

## Bias RH before Bias Adjustment for July



**Figure S4: Bias in relative humidity (RH) before the bias adjustment for GCMs, JRA25 (Top row), and corresponding RCMs.**

## Bias RH after Bias Adjustment for July

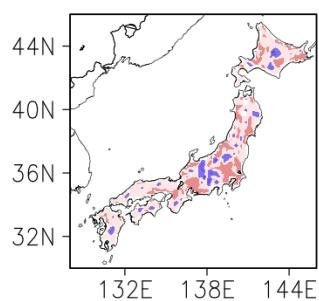


**Figure S5: Bias in relative humidity (RH) after the bias adjustment for GCMs, JRA25 (Top row), and corresponding RCMs.**

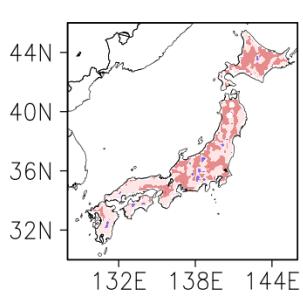
## Difference in RH Bias for July

Difference =  $|\text{RH before adjustment}| - |\text{RH after adjustment}|$

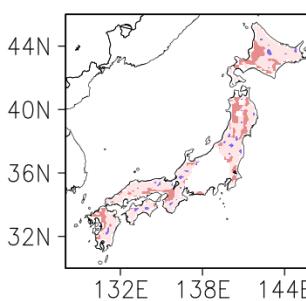
CGCM3 (a)



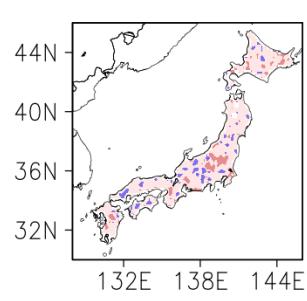
CCSM4 (e)



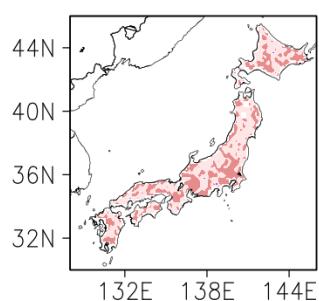
MIROC5 (i)



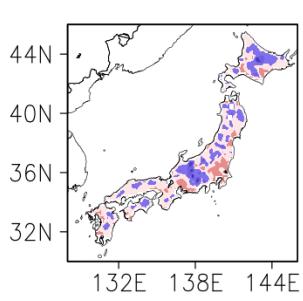
JRA25 (m)



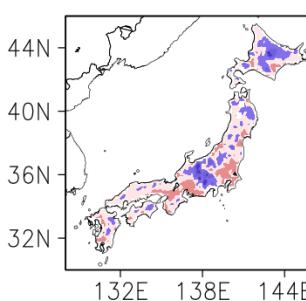
CGCM3>NHRCM (b)



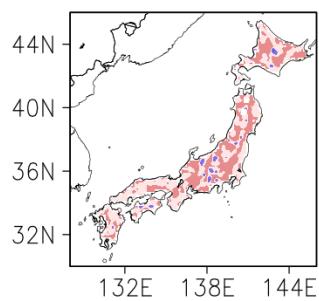
CCSM4>NHRCM (f)



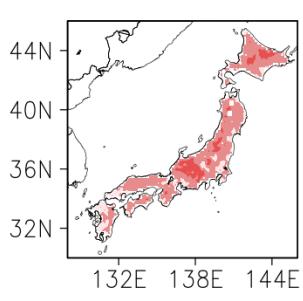
MIROC5>NHRCM (j)



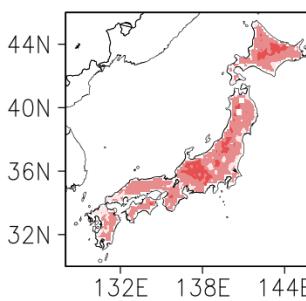
CGCM3>NRAMS (c)



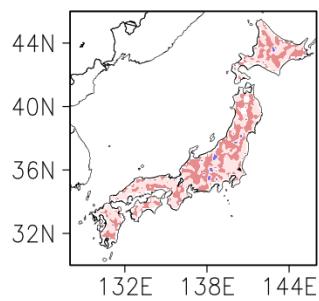
CCSM4>NRAMS (g)



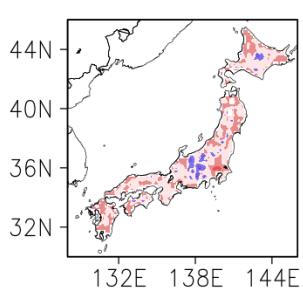
MIROC5>NRAMS (k)



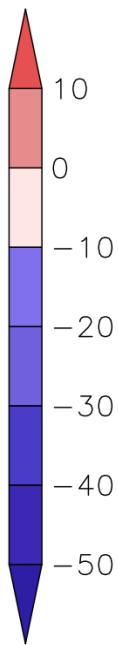
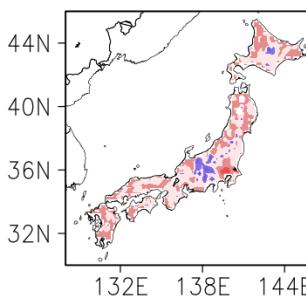
CGCM3>WRF (d)



CCSM4>WRF (h)



MIROC5>WRF (i)



**Figure S6: Absolute difference between bias before and after the adjustment for relative humidity (RH) GCMs, JRA25 (Top row), and corresponding RCMs.**