The effects of the topography on the reproducibility of the Non-Hydrostatic Regional Climate Model

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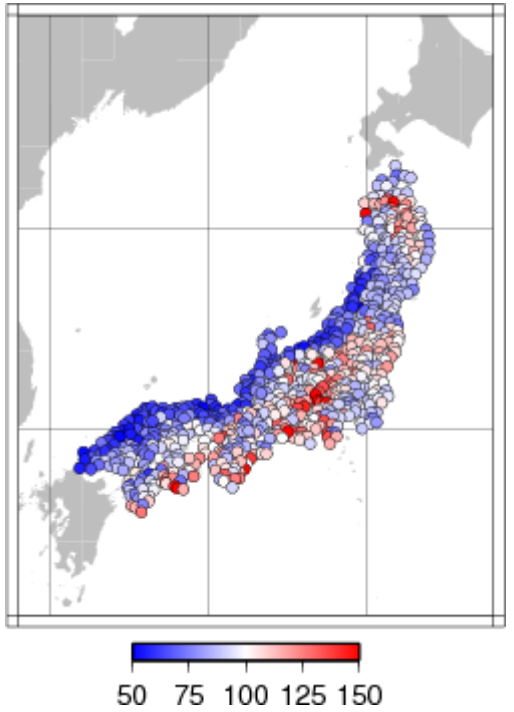
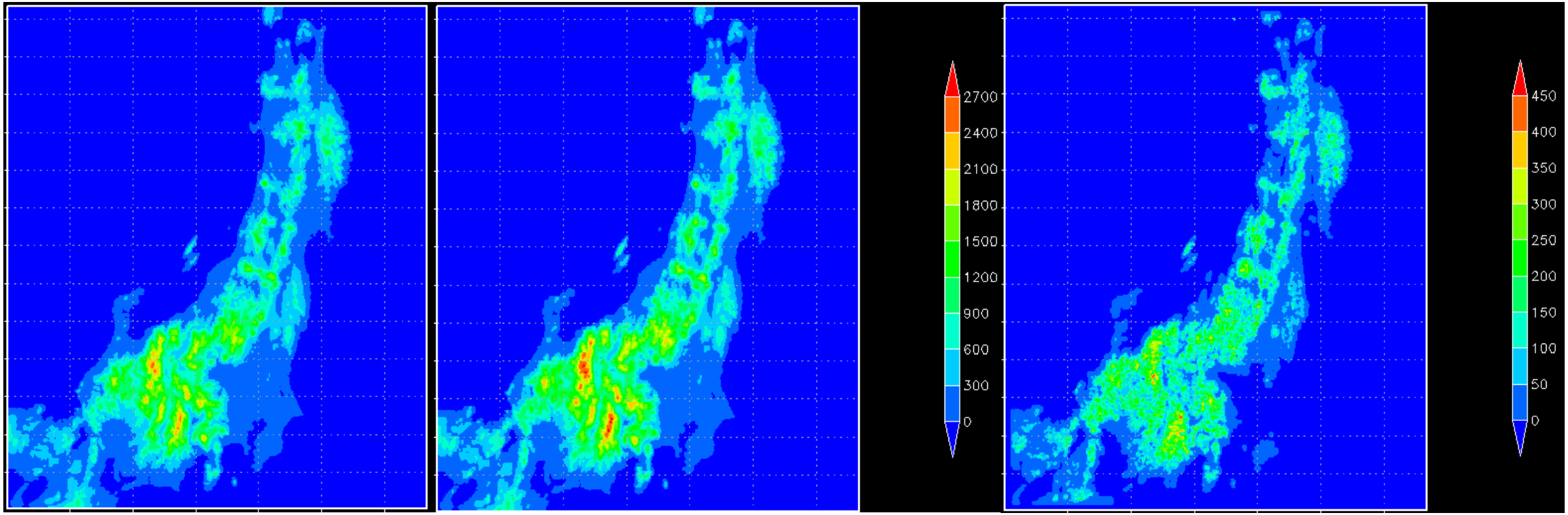
Introduction

- The NHRCM has good performance for reproducing the present climate.
- However, the precipitation in this model is underestimated in some areas around Japan.



annual precipitation
(model/observation)(%)

The difference of altitude between CTL and ENV

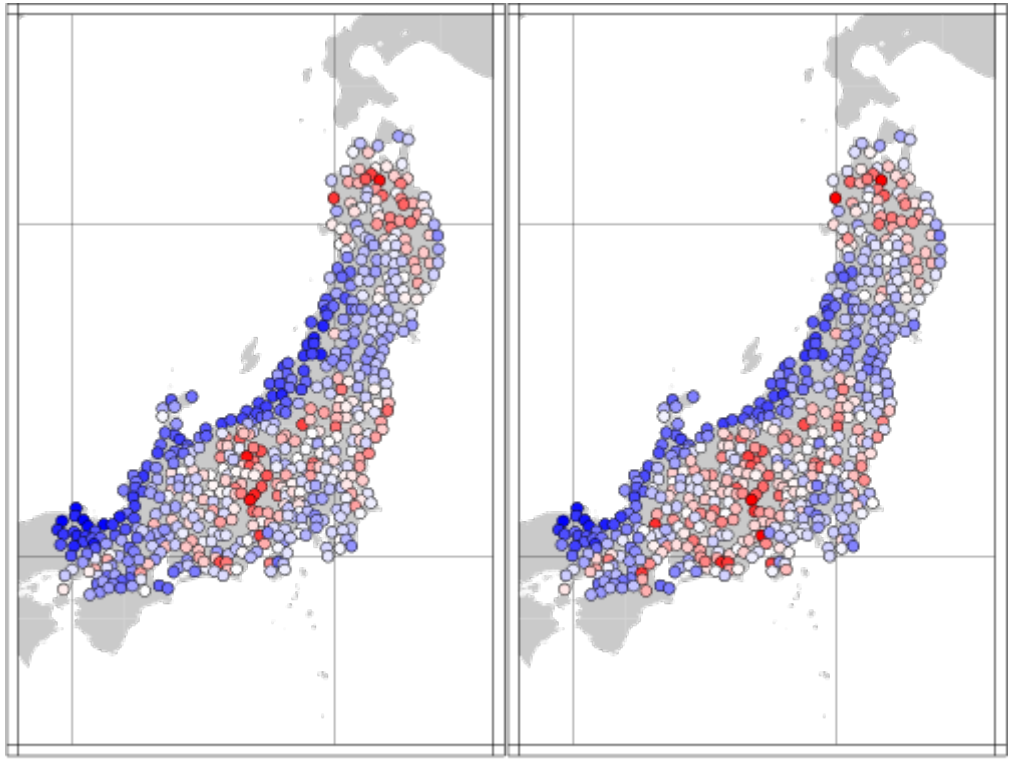


CTL topography data (m)

envelope mountain (ENV) topography data (m)

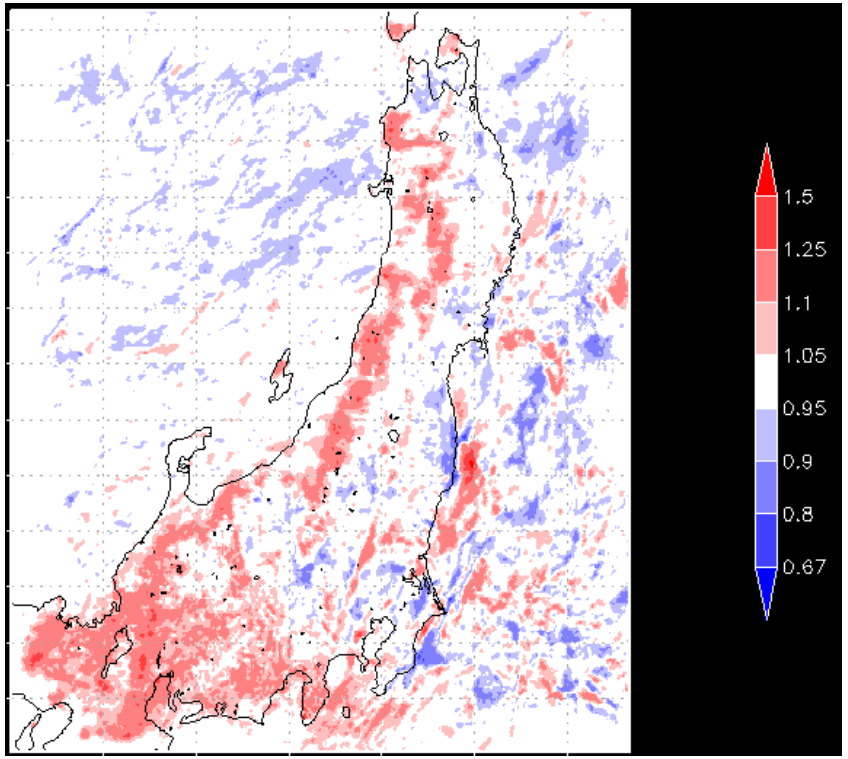
difference between CTL and ENV topography data (ENV – CTL , m)

Annual precipitation



CTL ENV

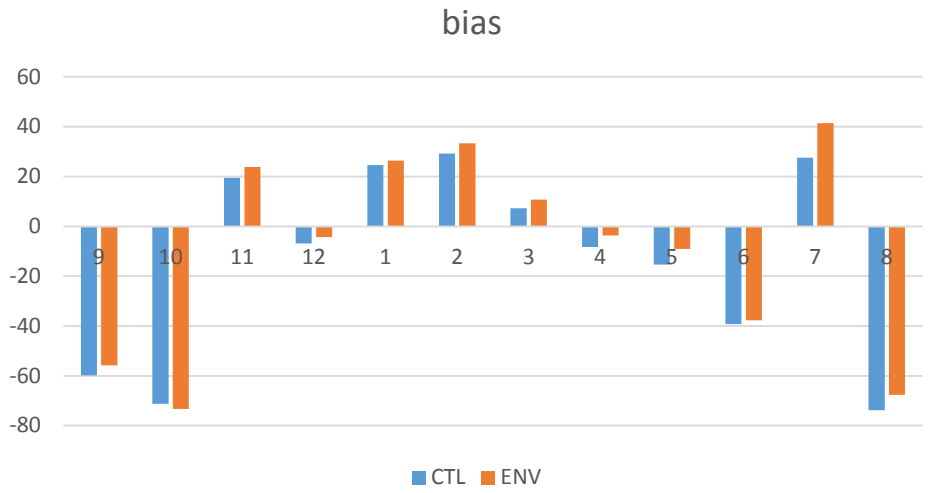
annual precipitation
(model/observation)(%)

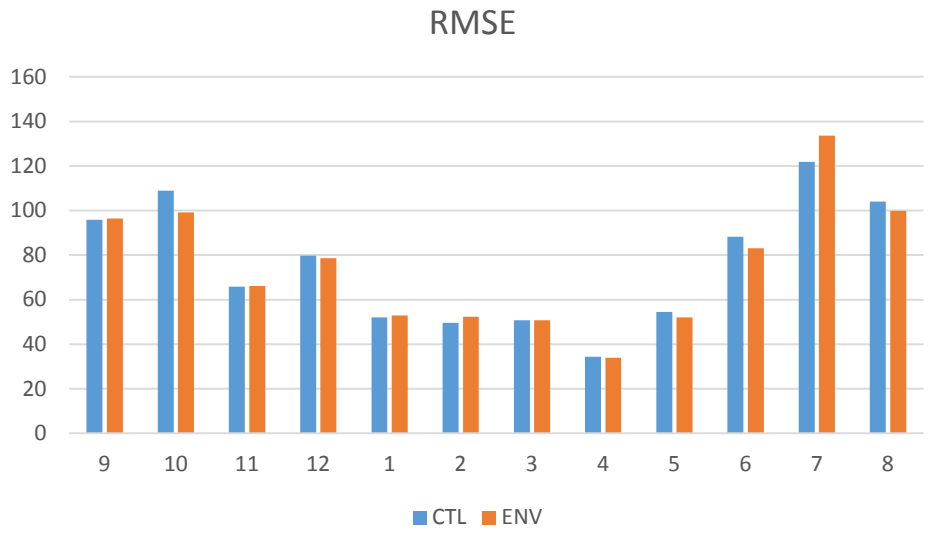


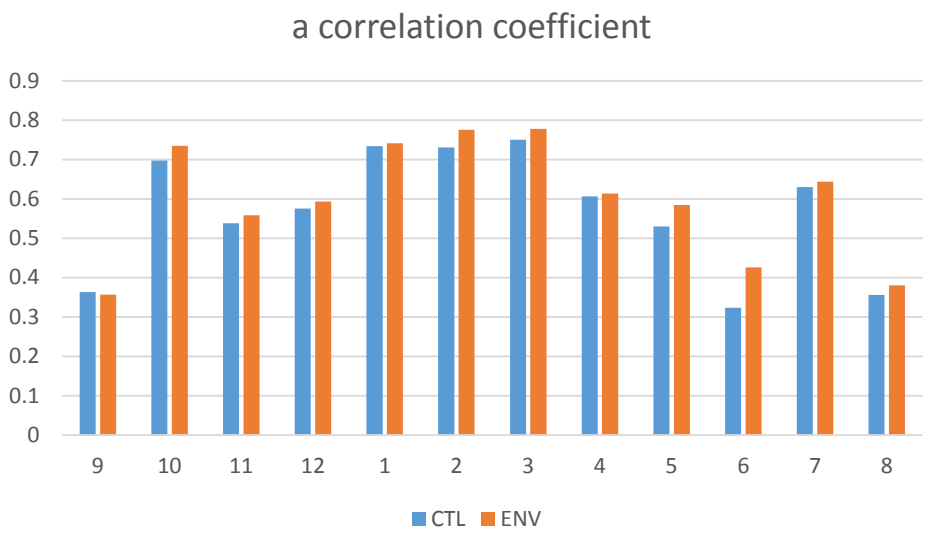
ENV/CTL

	bias	RMSE	a correlation coefficient
CTL	-170	403	0.710
ENV	-118	378	0.737

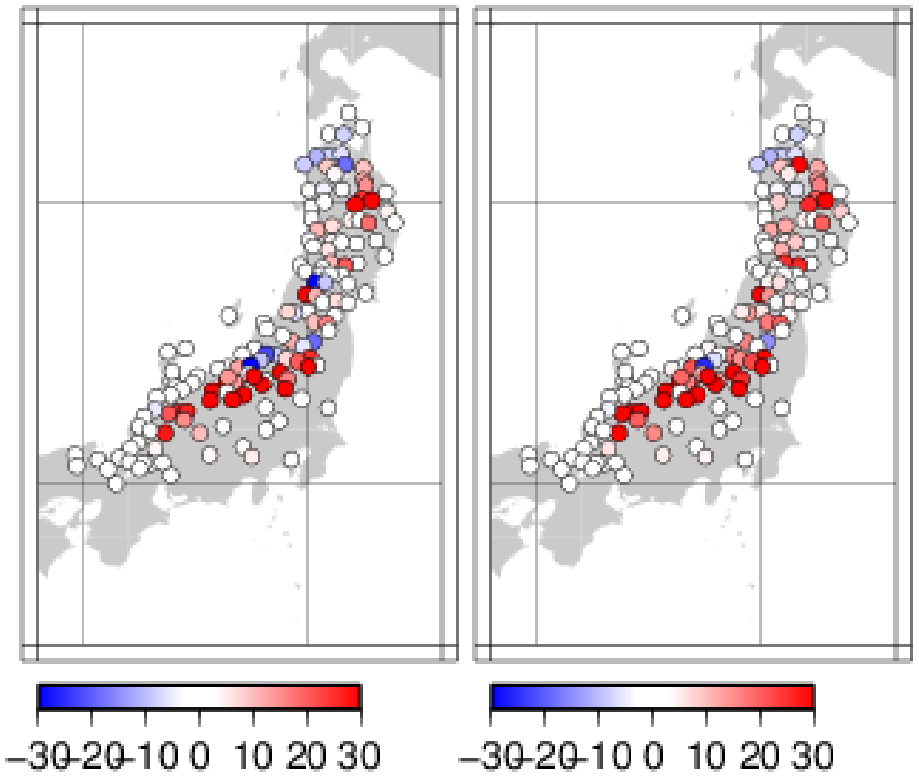
Monthly precipitation



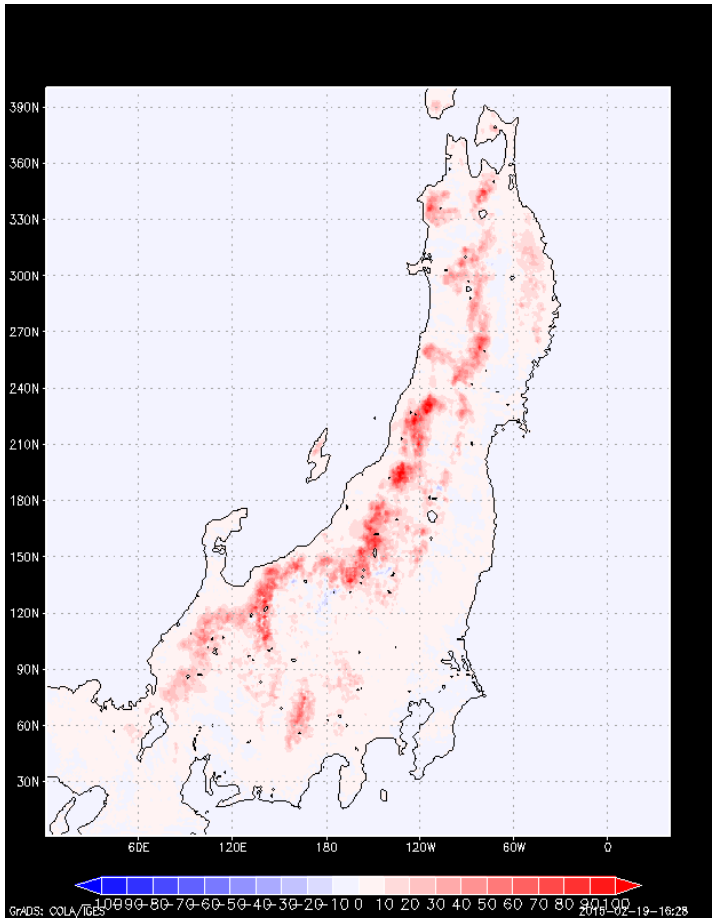




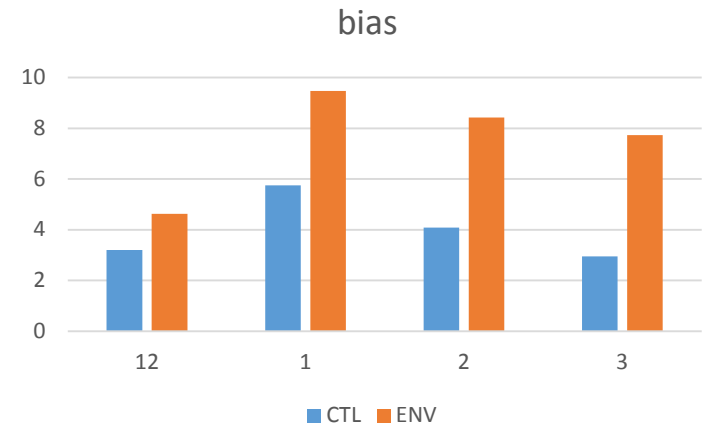
Snow depth

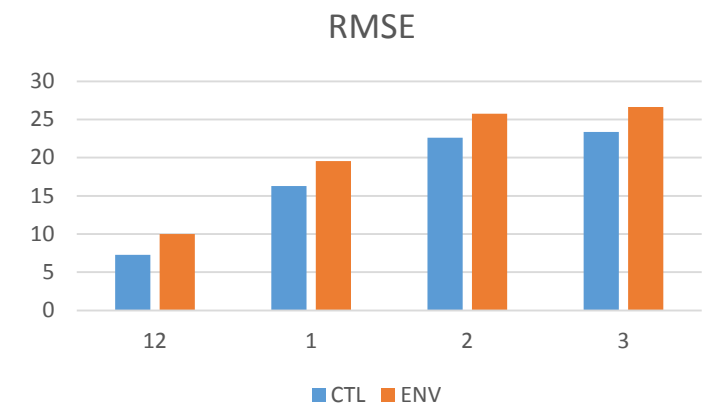


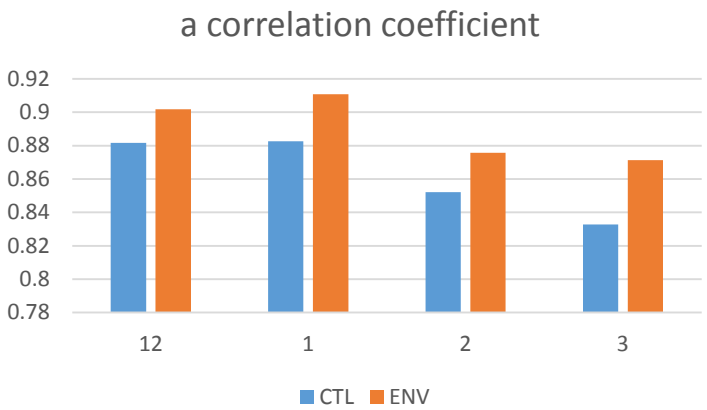
bias of snow depth
(left : CTL right : ENV , cm)



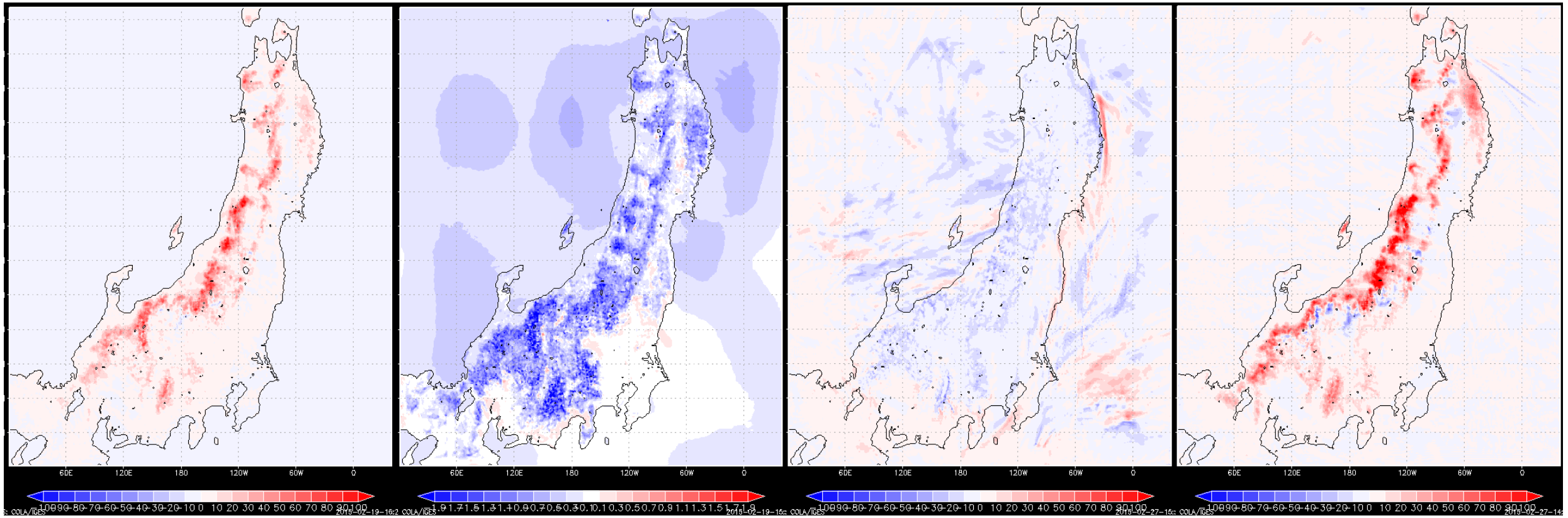
difference of snow depth in January
(ENV – CTL , cm)







Difference between ENV and CTL snow and temperature



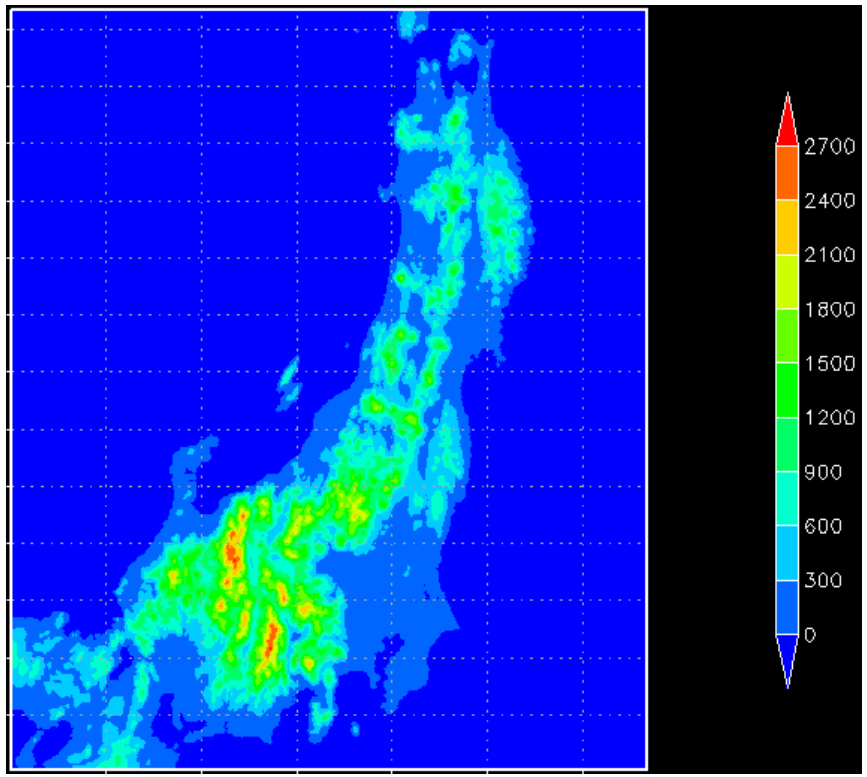
difference of snow depth
(ENV – CTL , cm)

difference of temperature
(without using altitude correction)
(ENV – CTL , ℃)

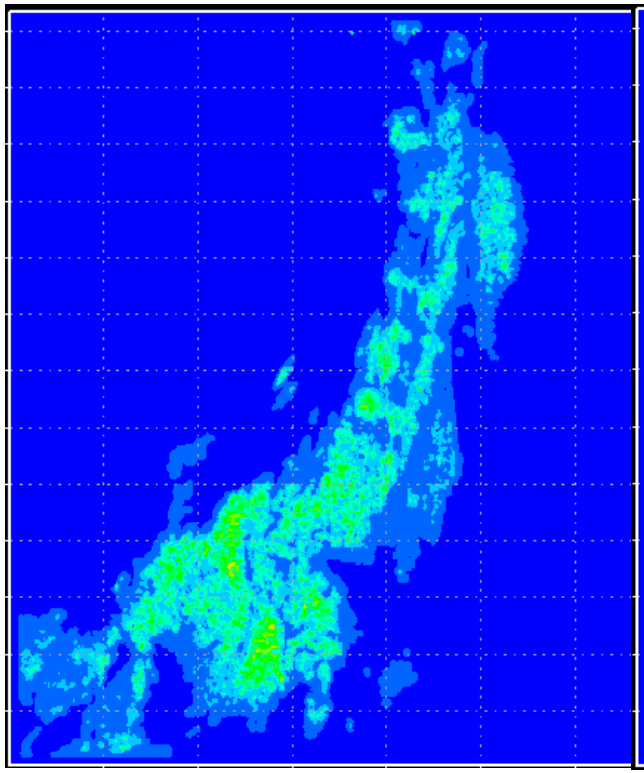
difference of amount of rain
(ENV – CTL , mm)

difference of amount of snow fall
(ENV – CTL , mm)

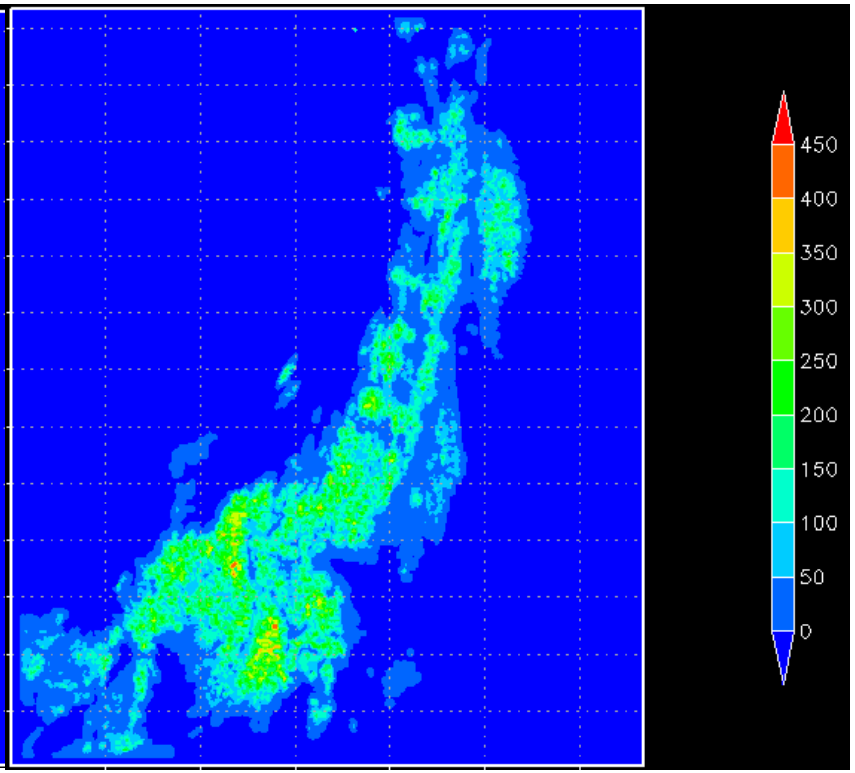
Use intermediate between CTL and ENV topography data



INT(intermediate between CTL and ENV) topography data (m)

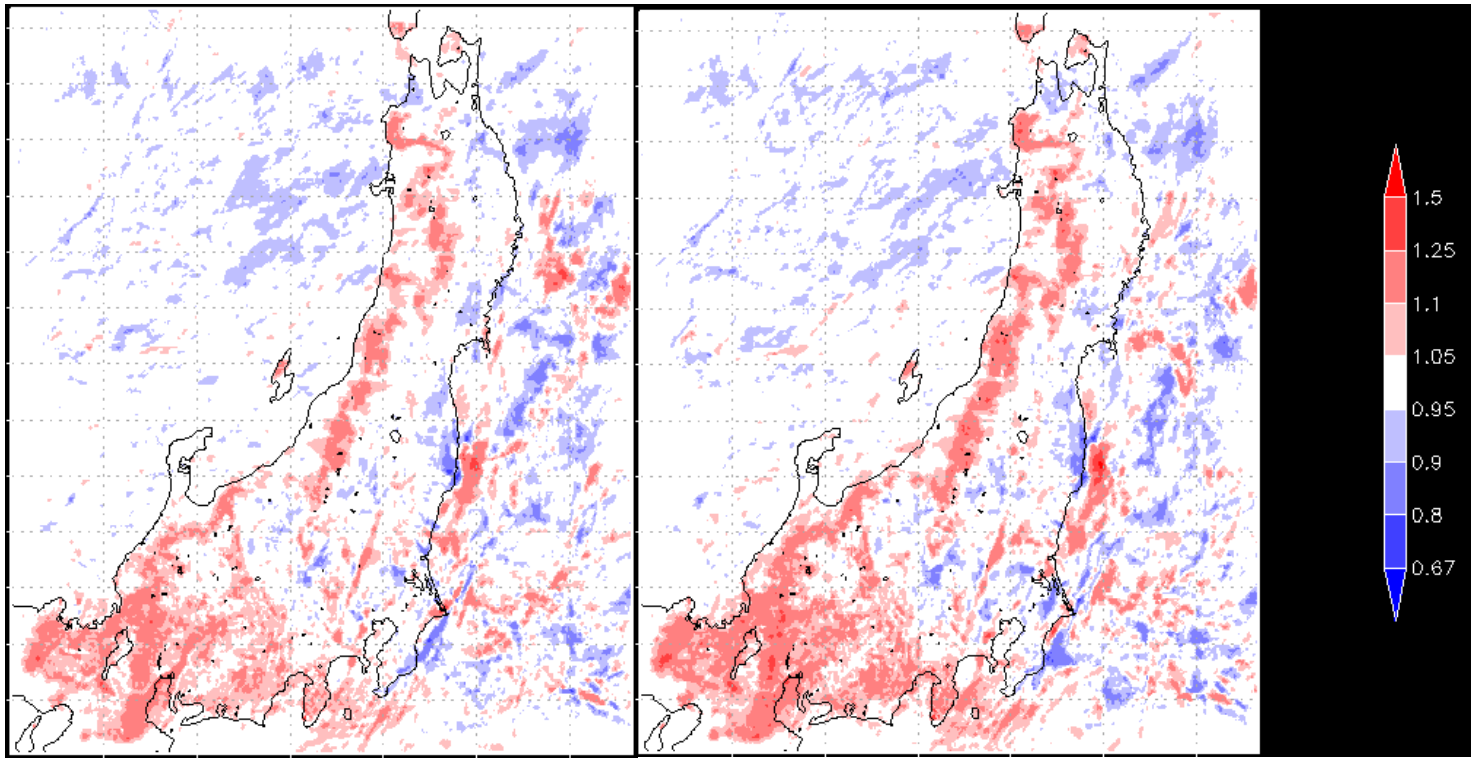


difference between CTL and INT topography data (m)



difference between CTL and ENV topography data (m)

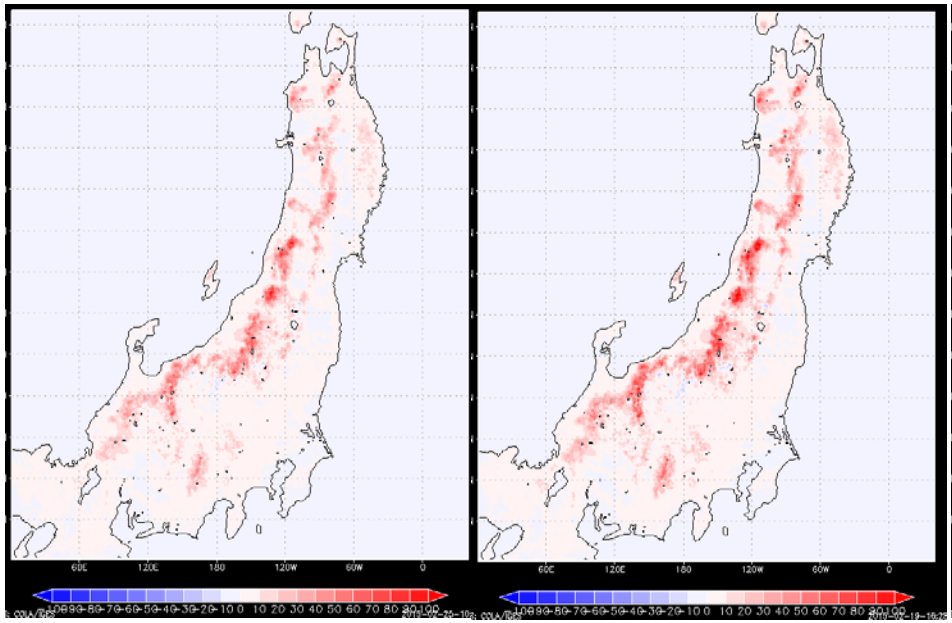
Annual precipitation



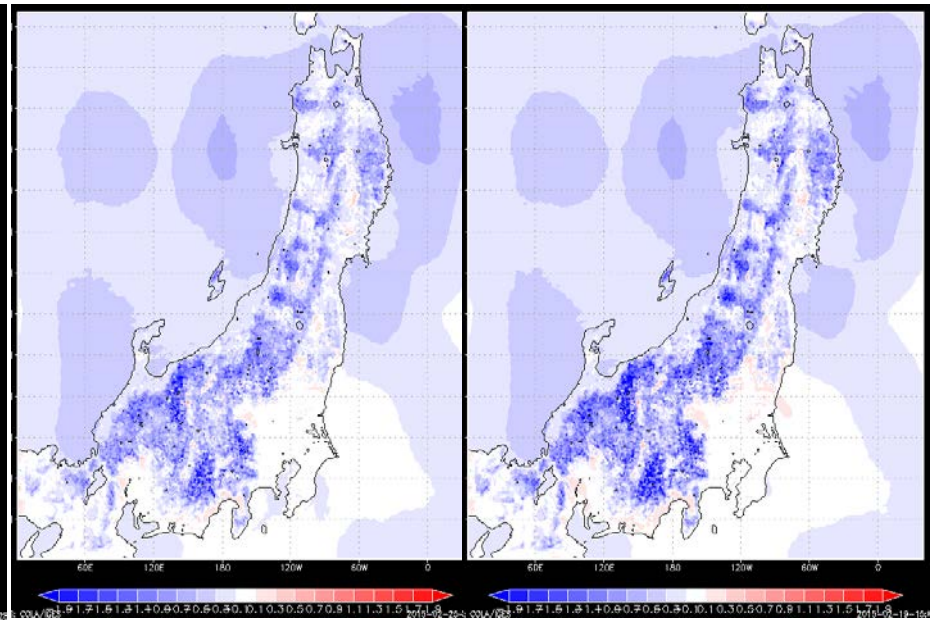
difference of annual precipitation
(left : INT / CTL right : ENV / CTL)

	bias	RMSE	a correlation coefficient
CTL	-170	403	0.710
ENV	-118	378	0.737
INT	-132	381	0.733

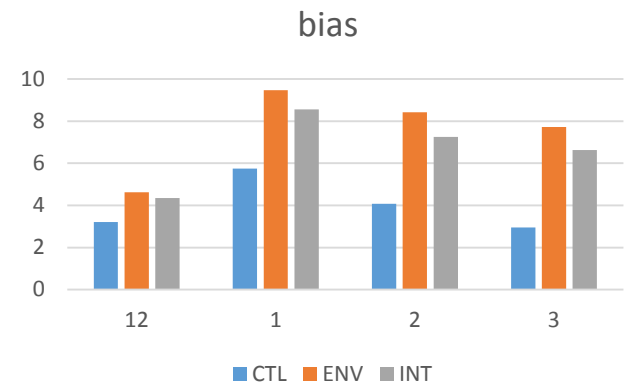
Snow depth

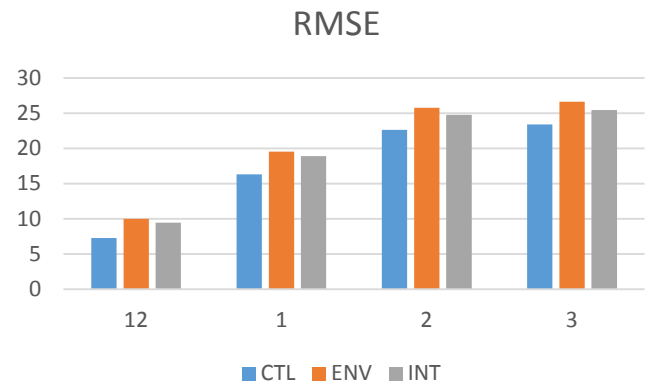


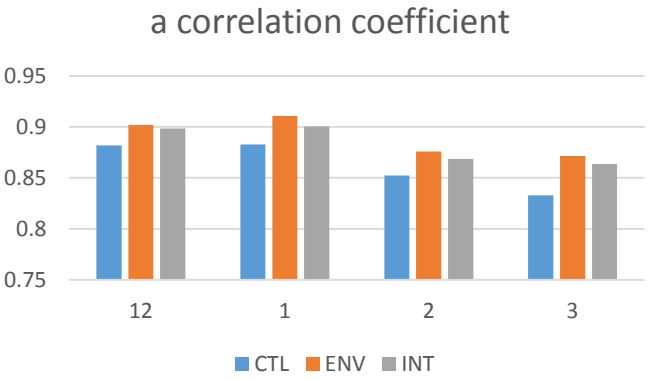
difference of snow depth in January
(left : INT – CTL right : ENV – CTL , cm)



difference of temperature in January
(without using altitude correction)
(left : INT – CTL right : ENV – CTL , ℃)







Summary

- ENV topography data
  - Altitude of the new topography data is higher than the old one.
  - Reproducibility of precipitation is improved by using ENV, while the snow depth has been overestimated as compared with the results of CTL.
- INT topography data
  - INT brings about good improvement for the reproducibility of precipitation, but the degree is somewhat smaller than in ENV.
  - The reproducibility of snow depth is overestimated in INT, however better than in ENV.

	precipitation	snow depth
CTL	3	1
ENV	1	3
INT	2	2

Thank you