


**AWCI Training Course on Improved Bias
Correction and Downscaling Techniques for
Climate Change Assessment including
Drought Indices**



**Part 1:
GCM Selection, Rainfall Bias Correction
and Downscaling**

Provided by the University of Tokyo
18 – 20 June 2013

Three steps

1. Selection of models (GCMs of the CMIP3), which perform acceptably well for the region of interest
2. Bias correction of historical simulation precipitation output and future projection precipitation output of selected models – using observed precipitation data
3. Downscaling and preparing rainfall input for hydrological model

Step 1: Model Selection

- ❑ Using an internet-based tool developed by UT – IIS
- ❑ Evaluating model performance during past simulation (1981 – 2000) against a reference dataset over a region of interest and/or regions closely climatologically/meteorologically related to the region of interest
- ❑ Evaluation is based on selected key meteorological elements

Evaluated elements during the course

- Model performance is evaluated for the following seven meteorological elements:
 - Precipitation (small scale)
 - Air Temperature (large scale)
 - Sea Surface Temperature (SST) (large scale)
 - Outgoing Longwave Radiation (OLR) (large scale)
 - Sea Level Pressure (SLP) (large scale)
 - Zonal Wind (large scale)
 - Meridional Wind (large scale)

Folder organization

□ **Model_selection**

- MODEL_SELECTION_tmp.xls
- MODEL_SELECTION_LONGLAT.xls
- TrainingCourse-20130618_GCM-Selection.ppt
- **Results** (prepared by UT team)
 - xxx_MODEL_SELECTION.xls
 - MODEL_SELECTION_RESULTS.xls

Summary Table: MODEL_SELECTION_LONGLAT.xls

Folder: Model_selection

	A	B	C	D	E
1	Country	Basin lon-lat (approx)	Small Scale (precipitation)	Large Scale (other elements)	Level: Tair, Wind (M
2	Bangladesh-A	23-26N, 90-95E	20-30N, 85-100E	0-45N, 70-160E	850hPa
3	Bhutan-S	26-30N, 89-91E	25-30N, 89-91E	0-45N, 70-160E	850hPa
4	Cambodia-P	12-14N, 102-104E	10-20N, 100-115E	0-20N, 80-160E	850hPa
5	India	N/A	15-25N, 70-85E	0-45N, 70-160E	850hPa
6	Indonesia-P	6-8S, 107-108E	15S-0N, 100-115E	20S-20N, 80-160E	850hPa
7	Japan-S	36-38N, 138-140E	35-45N, 135-145E	5-60N, 80-160E	850hPa
8	Malaysia-A	2-4N, 101-104E	0-15N, 100-110E	0-20N, 80-160E	850hPa
9	Mongolia-S	46-50N, 102-109E	40-55N, 100-115E	5-60N, 80-160E	850hPa
10	Myanmar-A	17-19N, 96-98E	15-25N, 95-100E	0-45N, 70-160E	850hPa
11	Nepal-S	27-30N, 82-86E	25-35N, 80-90E	0-45N, 70-160E	850hPa
12	Pakistan-A	35-38N, 74-76E	30-40N, 70-80E	0-45N, 70-160E	850hPa
13	Philippines-P	15-17N, 120-122E	10-20N, 115-130E	0-20N, 80-160E	850hPa
14	Sri Lanka-A	6-8N, 79-81E	0-10N, 75-85E	0-20N, 80-160E	850hPa
15	Thailand-P	16-21.5N, 96-101E	10-25N, 95-110E	0-45N, 70-160E	850hPa
16	Uzbekistan	40-43N, 69-72E	35-45N, 65-75E	0-60N, 50-120E	850hPa
17	Vietnam-P	15-17N, 107-108E	15-20N, 105-110E	0-20N, 80-160E	850hPa
18					
19	Asif-san	Patricia-san	Shrestha-san		

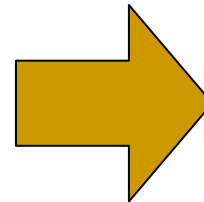
Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

RMSE	S_corr	RMSE	S_corr Index	RMSE Index	Total Index Precip	Grand Total	Models	descending
0	0.00	0.00	0	0	-1	-7	bccr_bcm2_0	0
0	0.00	0.00	0	0	-1	-7	cccma_cgcm3_1	0
0	0.00	0.00	0	0	-1	-7	cccma_cgcm3_1_t63	0
0	0.00	0.00	0	0	-1	-7	cnrm_cm3	0
0	0.00	0.00	0	0	-1	-7	csiro_mk3_0	0
0	0.00	0.00	0	0	-1	-7	csiro_mk3_5	0
0	0.00	0.00	0	0	-1	-7	gfdl_cm2_0	0
0	0.00	0.00	0	0	-1	-7	gfdl_cm2_1	0
0	0.00	0.00	0	0	-1	-7	giss_aom	0
0	0.00	0.00	0	0	-1	-7	giss_model_e_h	0
0	0.00	0.00	0	0	-1	-7	giss_model_e_r	0
0	0.00	0.00	0	0	-1	-7	iap_fgoals1_0_g	0
0	0.00	0.00	0	0	-1	-7	ingv_echam4	0
0	0.00	0.00	0	0	-1	-7	inmcm3_0	0
0	0.00	0.00	0	0	-1	-7	ipsl_cm4	0
0	0.00	0.00	0	0	-1	-7	miroc3_2_hires	0
0	0.00	0.00	0	0	-1	-7	miroc3_2_medres	0
0	0.00	0.00	0	0	-1	-4	miub_echo_g	0
0	0.00	0.00	0	0	-1	-7	mpi_echam5	0
0	0.00	0.00	0	0	-1	-7	mri_cgcm2_3_2a	0
0	0.00	0.00	0	0	-1	-7	ncar_ccsm3_0	0
0	0.00	0.00	0	0	-1	-7	ncar_pcm1	0
0	0.00	0.00	0	0	-1	-7	ukmo_hadcm3	0
0	0.00	0.00	0	0	-1	-7	ukmo_hadgem1	0
0.00	Total Average	0	0					

Scorr and RMSE averaging: 1. Analysis period
2. All models

Meteorological Element: Precipitation							
		June	July	August			
model	S_corr	RMSE	S_corr	RMSE	S_corr	RMSE	
1	bccr_bcm2_0	0.612577	2.96336	0.641915	3.14939	0.654535	3.04457
2	cccma_cgcm3_1	0.67609	2.80344	0.702107	2.9001	0.705961	2.95936
3	cccma_cgcm3_1_t63	0.668077	2.82739	0.699067	2.92443	0.679764	3.07007
4	cnrm_cm3	0.525991	3.40764	0.616057	3.33114	0.658663	3.10189
5	csiro_mk3_0	0.634887	3.01851	0.701048	2.99784	0.804089	2.35907
6	csiro_mk3_5	0.604204	3.39617	0.637255	3.36531	0.765534	2.62358
7	gfdl_cm2_0	0.699975	2.881	0.764176	2.69764	0.722448	2.97213
8	gfdl_cm2_1	0.745677	2.67032	0.77535	2.70179	0.763758	2.77364
9	giss_aom	0.508475	3.4729	0.606315	3.34358	0.68674	2.94604
10	giss_model_e_h	0.522648	4.00037	0.475727	4.49904	0.450178	4.32617
11	giss_model_e_r	0.479788	3.83325	0.595113	3.79972	0.627638	3.51206
12	iap_fgoals1_0_g	0.2221	3.99231	0.45438	3.68498	0.606514	3.1221
13	ingv_echam4	0.712693	2.73918	0.644567	3.17053	0.718778	2.78949
14	inmcm3_0	0.493076	3.41301	0.555526	3.56882	0.655465	3.0002
15	ipsl_cm4	0.468554	3.56933	0.516445	3.75673	0.626658	3.24568
16	miroc3_2_hires	0.759938	2.6016	0.573135	3.74899	0.566137	3.67448
17	miroc3_2_medres	0.778193	2.40629	0.591421	3.54172	0.53499	3.64249
18	miub_echo_g	0.501836	3.57485	0.621491	3.41304	0.7526	2.53125
19	mpi_echam5	0.700632	3.27375	0.667879	3.54028	0.726193	3.01962
20	mri_cgcm2_3_2a	0.624962	3.32155	0.592236	3.59373	0.64089	3.25602
21	ncar_ccsm3_0	0.586914	3.15148	0.607632	3.33779	0.621849	3.3873
22	ncar_pcm1	0.592746	3.73951	0.510997	4.16259	0.593308	3.61601
23	ukmo_hadcm3	0.602475	3.87233	0.656899	3.7304	0.69017	3.61585
24	ukmo_hadgem1	0.63235	3.66643	0.713683	3.61798	0.747354	3.45026



Analysis Period		
	S_corr	RMSE
	0.63634233	3.0525867
	0.69539267	2.8876333
	0.68230267	2.94063
	0.600237	3.2802233
	0.71334133	2.7918067
	0.66899767	3.1283533
	0.72886633	2.8502567
	0.761595	2.71525
	0.60051	3.2541733
	0.482851	4.2751933
	0.567513	3.71501
	0.42766467	3.5997967
	0.69201267	2.8997333
	0.56802233	3.3273433
	0.537219	3.5239133
	0.63307	3.34169
	0.634868	3.1968333
	0.625309	3.1730467
	0.69823467	3.2778833
	0.61936267	3.3904333
	0.605465	3.29219
	0.56568367	3.83937
	0.649848	3.7395267
	0.69779567	3.5782233
Total Averag	0.62885435	3.2946292

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

RMSE	S_corr	RMSE	S_corr Index	RMSE Index	Total Index Precip	Grand Total	Models	descending
0	0.00	0.00	0	0	-1	-7	bccr_bcm2_0	0
0	0.00	0.00	0	0	-1	-7	cccma_cgcm3_1	0
0	0.00	0.00	0	0	-1	-7	cccma_cgcm3_1_t63	0
0	0.00	0.00	0	0	-1	-7	cnrm_cm3	0
0	0.00	0.00	0	0	-1	-7	csiro_mk3_0	0
0	0.00	0.00	0	0	-1	-7	csiro_mk3_5	0
0	0.00	0.00	0	0	-1	-7	gfdl_cm2_0	0
0	0.00	0.00	0	0	-1	-7	gfdl_cm2_1	0
0	0.00	0.00	0	0	-1	-7	giss_aom	0
0	0.00	0.00	0	0	-1	-7	giss_model_e_h	0
0	0.00	0.00	0	0	-1	-7	giss_model_e_r	0
0	0.00	0.00	0	0	-1	-7	iap_fgoals1_0_g	0
0	0.00	0.00	0	0	-1	-7	ingv_echam4	0
0	0.00	0.00	0	0	-1	-7	inmcm3_0	0
0	0.00	0.00	0	0	-1	-7	ipsl_cm4	0
0	0.00	0.00	0	0	-1	-7	miroc3_2_hires	0
0	0.00	0.00	0	0	-1	-7	miroc3_2_medres	0
0	0.00	0.00	0	0	-1	-4	miub_echo_g	0
0	0.00	0.00	0	0	-1	-7	mpi_echam5	0
0	0.00	0.00	0	0	-1	-7	mri_cgcm2_3_2a	0
0	0.00	0.00	0	0	-1	-7	ncar_ccsm3_0	0
0	0.00	0.00	0	0	-1	-7	ncar_pcm1	0
0	0.00	0.00	0	0	-1	-7	ukmo_hadcm3	0
0	0.00	0.00	0	0	-1	-7	ukmo_hadgem1	0
0.00	Total Average	0	0					

Analysis Period	
S_corr	RMSE
0.63634233	3.0525867
0.69539267	2.8876333
0.68230267	2.94063
0.600237	3.2802233
0.71334133	2.7918067
0.66899767	3.1283533
0.72886633	2.8502567
0.761595	2.71525
0.60051	3.2541733
0.482851	4.2751933
0.567513	3.71501
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0.56802233	3.3273433
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0.63307	3.34169
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0.625309	3.1730467
0.69823467	3.2778833
0.61936267	3.3904333
0.605465	3.29219
0.56568367	3.83937
0.649848	3.7395267
0.69779567	3.5752233
Total Average	0.62885435 3.2946292

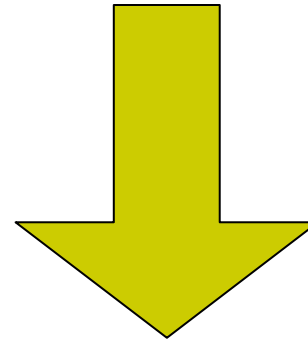
Scoring

$$\text{Scorr}_{\text{model}} \geq \text{Scorr}_{\text{total average}} \Rightarrow \text{Index}_{\text{Scorr}} = 1$$

$$\text{Scorr}_{\text{model}} < \text{Scorr}_{\text{total average}} \Rightarrow \text{Index}_{\text{Scorr}} = 0$$

$$\text{RMSE}_{\text{model}} \leq \text{RMSE}_{\text{total average}} \Rightarrow \text{Index}_{\text{RMSE}} = 1$$

$$\text{RMSE}_{\text{model}} > \text{RMSE}_{\text{total average}} \Rightarrow \text{Index}_{\text{RMSE}} = 0$$



$$\text{Index}_{\text{Scorr}} = 1 \text{ and } \text{Index}_{\text{RMSE}} = 1 \Rightarrow \text{Index}_{\text{total}} = 1$$

$$\text{Index}_{\text{Scorr}} = 1 \text{ and } \text{Index}_{\text{RMSE}} = 0 \Rightarrow \text{Index}_{\text{total}} = 0$$

$$\text{Index}_{\text{Scorr}} = 0 \text{ and } \text{Index}_{\text{RMSE}} = 1 \Rightarrow \text{Index}_{\text{total}} = 0$$

$$\text{Index}_{\text{Scorr}} = 0 \text{ and } \text{Index}_{\text{RMSE}} = 0 \Rightarrow \text{Index}_{\text{total}} = -1$$

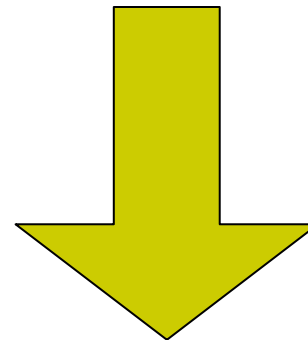
Scoring

$$\text{Scorr}_{\text{model}} \geq \text{Scorr}_{\text{total average}} \Rightarrow \text{Index}_{\text{Scorr}} = 1$$

$$\text{Scorr}_{\text{model}} < \text{Scorr}_{\text{total average}} \Rightarrow \text{Index}_{\text{Scorr}} = 0$$

$$\text{RMSE}_{\text{model}} \leq \text{RMSE}_{\text{total average}} \Rightarrow \text{Index}_{\text{RMSE}} = 1$$

$$\text{RMSE}_{\text{model}} > \text{RMSE}_{\text{total average}} \Rightarrow \text{Index}_{\text{RMSE}} = 0$$



$$\text{Index}_{\text{Scorr}} = 1 \text{ and } \text{Index}_{\text{RMSE}} = 1 \Rightarrow \text{Index}_{\text{total}} = 1$$

$$\text{Index}_{\text{Scorr}} = 1 \text{ and } \text{Index}_{\text{RMSE}} = 0 \Rightarrow \text{Index}_{\text{total}} = 0$$

$$\text{Index}_{\text{Scorr}} = 0 \text{ and } \text{Index}_{\text{RMSE}} = 1 \Rightarrow \text{Index}_{\text{total}} = 0$$

$$\text{Index}_{\text{Scorr}} = 0 \text{ and } \text{Index}_{\text{RMSE}} = 0 \Rightarrow \text{Index}_{\text{total}} = -1$$

	S_corr Index	RMSE Index	Total Index	Gr To
	1	1	1	
	1	1	1	
	1	1	1	
	0	1	0	
	1	1	1	
	1	1	1	
	1	1	1	
	1	1	1	
	0	1	0	
	0	0	-1	
	0	0	-1	
	0	0	-1	
	1	1	1	
	0	0	-1	
	0	0	-1	
	1	0	0	
	1	1	1	
	0	1	0	
	1	1	1	
	0	0	-1	
	0	1	0	
	0	0	-1	
	1	0	0	
	1	0	0	

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

MBER									
RMSE		S_corr	RMSE	S_corr Index	RMSE Index	Total Index Precip	Grand Total	Models	descending
0		0.00	0.00	0	0	-1	-7	bccr_bcm2_0	0
0		0.00	0.00	0	0	-1	-7	cccma_cgcm3_1	0
0		0.00	0.00	0	0	-1	-7	cccma_cgcm3_1_t63	0
0		0.00	0.00	0	0	-1	-7	cnrm_cm3	0
0		0.00	0.00	0	0	-1	-7	csiro_mk3_0	0
0		0.00	0.00	0	0	-1	-7	csiro_mk3_5	0
0		0.00	0.00	0	0	-1	-7	gfdl_cm2_0	0
0		0.00	0.00	0	0	-1	-7	gfdl_cm2_1	0
0		0.00	0.00	0	0	-1	-7	giss_aom	0
0		0.00	0.00	0	0	-1	-7	giss_model_e_h	0
0		0.00	0.00	0	0	-1	-7	giss_model_e_r	0
0		0.00	0.00	0	0	-1	-7	iap_fgoals1_0_g	0
0		0.00	0.00	0	0	-1	-7	ingv_echam4	0
0		0.00	0.00	0	0	-1	-7	inmcm3_0	0
0		0.00	0.00	0	0	-1	-7	ipsl_cm4	0
0		0.00	0.00	0	0	-1	-7	miroc3_2_hires	0
0		0.00	0.00	0	0	-1	-7	miroc3_2_medres	0
0		0.00	0.00	0	0	-1	-4	miub_echo_g	0
0		0.00	0.00	0	0	-1	-7	mpi_echam5	0
0		0.00	0.00	0	0	-1	-7	mri_cgcm2_3_2a	0
0		0.00	0.00	0	0	-1	-7	ncar_ccsm3_0	0
0		0.00	0.00	0	0	-1	-7	ncar_pcm1	0
0		0.00	0.00	0	0	-1	-7	ukmo_hadcm3	0
0		0.00	0.00	0	0	-1	-7	ukmo_hadgem1	0
0.00	Total Average	0	0						

MBER

<http://dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/index.html>



Login
Authentication for DIAS Systems

日本語

Enter your Email address and Password

Email Address:

ra@hydra.t.u-tokyo.ac.jp

Password:

[Redacted]

Warn me before logging me into other sites.

LOGIN clear

- Forgot your password ? [Please reset your password](#)
- [Please register](#) if you don't have a account.

Out and Exit your web browser when you are done accessing services that require

User name

Password

Login Button

Powered by [JA-SIG Central Authentication Service 3.3.5](#)

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Quantitative Evaluation of AOGCM *** Release 1.1 : Bug fixes and minor improvements (3/June/2013)

1. Intercomparison : Re-analysis/Observation Data vs. CMIP3 Model Output

- [1-D Plot \(time-series\)](#)
- [2-D Plot](#)
- [Vector Diagram](#)

- Cross-sectional View
 - [Longitude/Latitude-Time](#) , [Longitude/Latitude-Height](#)

- Vertical Profile
 - [1-D Plot](#) , [Vector Diagram](#)

2-D Plot option for evaluation

2. Comparison of Global Warming Projection between:

- [Climate Models](#)
- [Emission Scenarios](#)

- Periods of Analysis Time (Multimodel Ensemble Prediction)
 - [Daily Data](#) , [Monthly Data](#)

3. Tools for CMIP3

- Data Download
 - [Daily Data](#) , [Monthly Data](#)

- Model Evaluation
 - [Monthly Data](#) (Restricted Access)

4. Interannual Variations at a Glance

- [1-D Plot \(time-series\)](#)
- [2-D Plot](#)
- [Vector Diagram](#)

- Cross-sectional View
 - [Longitude/Latitude-Time](#) , [Longitude/Latitude-Height](#)

[Version 1.1.3 : 2013-06-03]

For questions, please contact [Akio Yamamoto](#).

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Reference Data

Meteorologic Element	Please select one of the following: <input type="text"/>	Level or Layer: <input type="text"/>
Analysis Area	Lon1(West): <input type="text" value="40"/>	Lat2(North): <input type="text" value="40"/> Lon2(East): <input type="text" value="140"/> Lat1(South): <input type="text" value="-10"/>
Time Range	From <input type="text" value="1981"/> To <input type="text" value="2000"/> ; For <input type="text" value="1"/> month(s) starting from <input type="text" value="January"/>	
Options	<input type="checkbox"/> Maskout the altitude above <input type="text"/> meters	
	Colorbar for diffs	<input type="radio"/> Max range <input type="radio"/> Manual: <input type="text"/> (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>
	<input checked="" type="checkbox"/> Display area	Lon1(West): <input type="text" value="-10"/> Lat2(North): <input type="text" value="60"/> Lat1(South): <input type="text" value="-25"/> Lon2(East): <input type="text" value="155"/>
	<input type="checkbox"/> Data download	

(per row)

Model Output: CMIP3

Meteorologic Element	Precipitation	Level or Layer: -----
Analysis Area	Please select one of the following: Precipitation Ground Temperature Outgoing Longwave Radiation (OLR) Sea Level Pressure Sea Surface Temperature	North: 40 South: -10 Lon2(East): 140
Time Range	Air Temperature Geopotential Height Specific Humidity Zonal Wind Meridional Wind	1 month(s) starting from January
Options	Horizontal Divergence Vorticity	<input type="checkbox"/> meters <input type="radio"/> Manual: (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>
	<input checked="" type="checkbox"/> Display area	Lon1(West): -10 Lat2(North): 60 Lat1(South): -25 Lon2(East): 155
	<input type="checkbox"/> Data download	

Reference Data

(3 per row)

Reference Data

Model Output

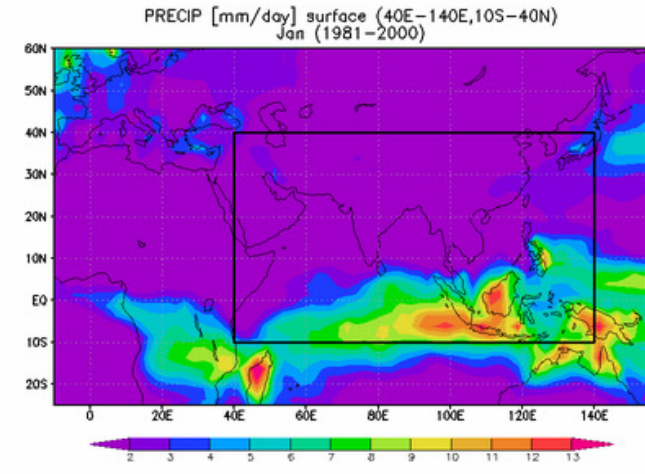


Meteorologic Element	Precipitation	Level or Layer: Ground/water surface
Analysis Area	Lon1(West): 40	Lat2(North): 40 Lat1(South): -10 Lon2(East): 140
Time Range	From 1981 To 2000 ; For 1 month(s) starting from January	
Options	<input type="checkbox"/> Maskout the altitude above meters	
	Colorbar for diffs	<input type="radio"/> Max range <input type="radio"/> Manual: (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>
	<input checked="" type="checkbox"/> Display area	Lon1(West): -10 Lat2(North): 60 Lat1(South): -25 Lon2(East): 155
	<input type="checkbox"/> Data download	

 (3 per row)

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Reference Data: GPCP



Model Output

List of reference datasets for individual meteorological elements

- ❑ Precipitation: **GPCP**
- ❑ Ground Temperature: **JRA25**
- ❑ Outgoing Longwave Radiation: **NOAA**
- ❑ Sea Level Pressure: **JRA25**
- ❑ Sea Surface Temperature: **HADLEY**
- ❑ Air Temperature: **JRA25**
- ❑ Geopotential Height: **JRA25**
- ❑ Specific Humidity: **JRA25**
- ❑ Zonal Wind: **JRA25**
- ❑ Meridional wind **JRA25**
- ❑ Horizontal divergence: **JRA25**
- ❑ Vorticity: **JRA25**

Evaluated elements during the course

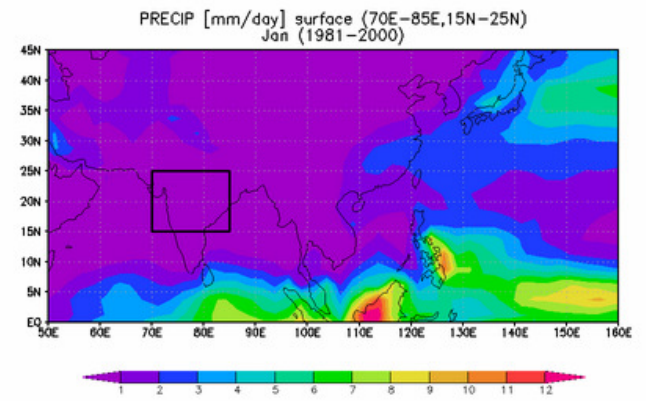
- Model performance is evaluated for the following seven meteorological elements:

- **Precipitation** (small scale)
- Air Temperature (large scale)
- Sea Surface Temperature (SST) (large scale)
- Outgoing Longwave Radiation (OLR) (large scale)
- Sea Level Pressure (SLP) (large scale)
- Zonal Wind (large scale)
- Meridional Wind (large scale)

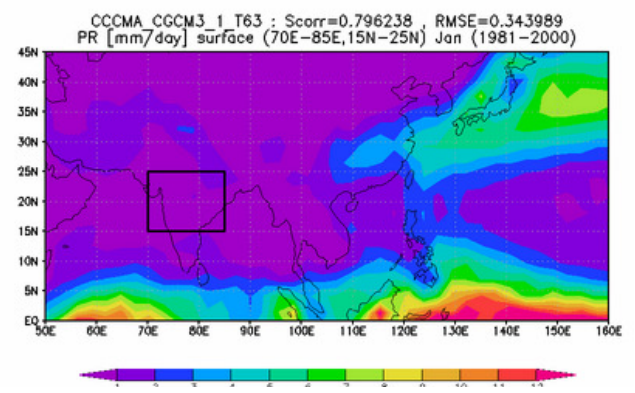
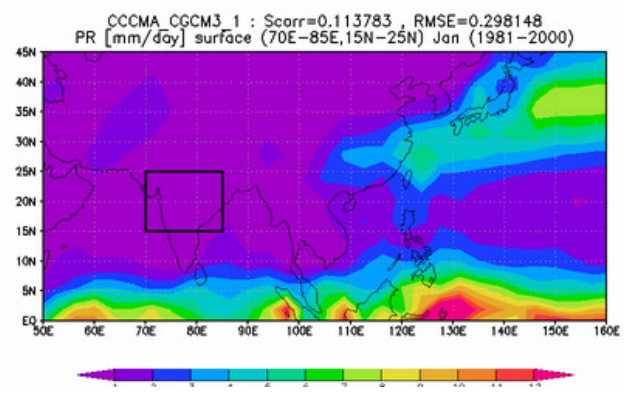
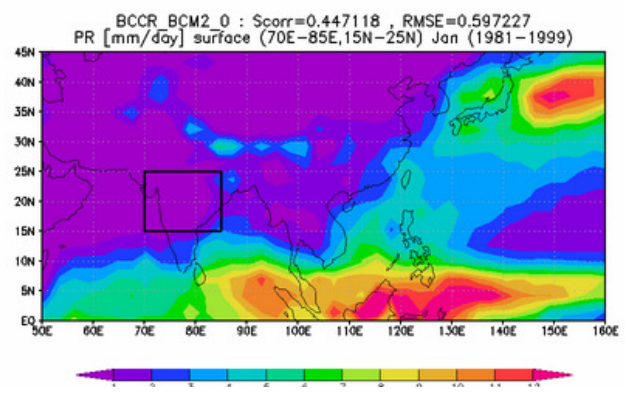
Meteorologic Element	Precipitation	Level or Layer:	Ground/water surface
Analysis Area	Lon1(West): 70	Lat2(North): 25	Lon2(East): 85
		Lat1(South): 15	
Time Range	From 1981 To 2000 ; For 1 month(s) starting from January		
Options	<input type="checkbox"/> Maskout the altitude above _____ meters		
	Colorbar for diffs	<input type="radio"/> Max range <input type="radio"/> Manual: _____ (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>	
	<input checked="" type="checkbox"/> Display area	Lon1(West): 50	Lat2(North): 45
		Lat1(South): 0	Lon2(East): 160
	<input type="checkbox"/> Data download		

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Reference Data: GPCP



CMIP3 Model Output: [Summary of Analysis](#)

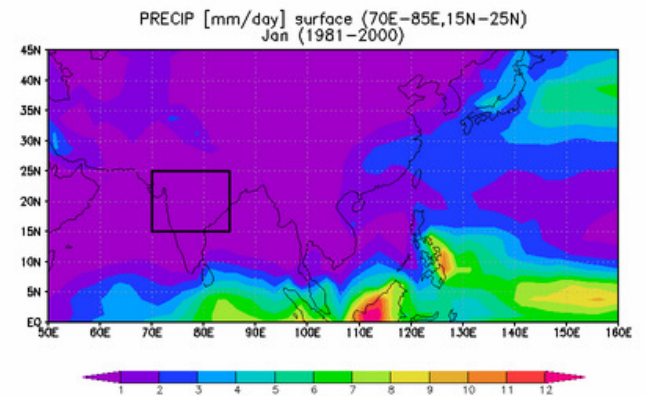


Meteorologic Element	Precipitation	Level or Layer:	Ground/water surface
Analysis Area	Lon1(West): 70	Lat2(North): 25	Lon2(East): 85
		Lat1(South): 15	
Time Range	From 1981	To 2000	; For 1 month(s) starting from January
Options	<input type="checkbox"/> Maskout the altitude above _____ meters		
	Colorbar for diffs	<input type="radio"/> Max range <input type="radio"/> Manual: _____ (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>	
	<input checked="" type="checkbox"/> Display area	Lon1(West): 50	Lat2(North): 45
		Lat1(South): 0	Lon2(East): 160
	<input type="checkbox"/> Data download		

View Reference Data View Model Output (3 per row) Clear All

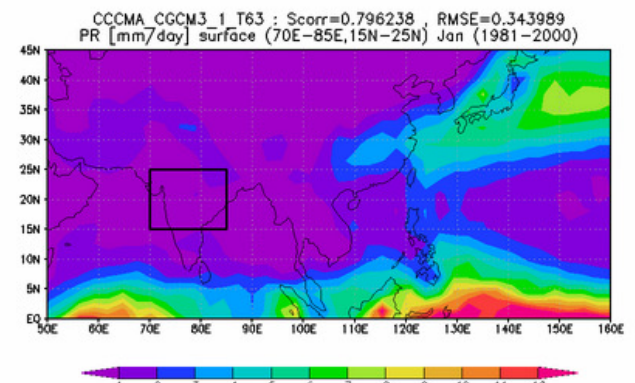
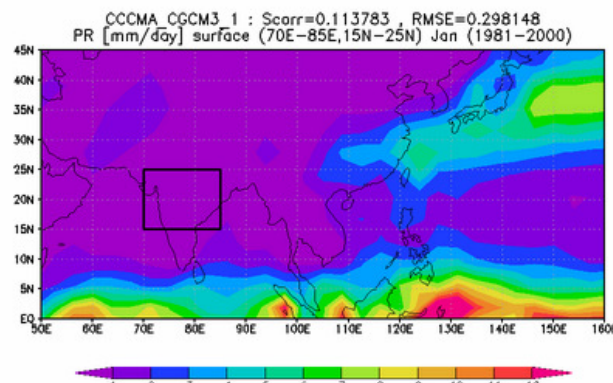
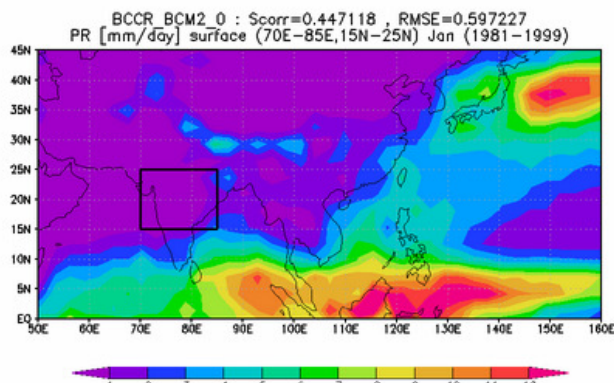
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Reference Data: GPCP



CMIP3 Model Output:

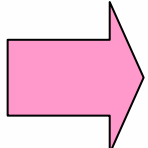
 [Summary of Analysis](#)



← → ↻ 🏠 dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/

Meteorologic Element	Precipitation	Level
Analysis Area	Lon1(West): 70	Lat2(North): 25 Lat1(South): 15
Time Range	From 1981 To 2000 ; For 1 mo	
	<input type="checkbox"/> Maskout the altitude above <input type="text"/> meters	
	<input type="radio"/> Max range <input type="radio"/> Mam	

Summary of Analysis Results Download: [CSV file](#)



Microsoft Excel - pr_Surface_Jan_1981-2000_A(40E-140E,10S-40N)_D

File Edit View Insert Format Tools Data Window

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	A	B	C	D
1	bccr_bcm2_0	0.803488	2.55526	
2	cccma_cgcm3_1	0.753476	2.63272	
3	cccma_cgcm3_1_t63	0.707119	2.86139	
4	cnrm_cm3	0.841968	2.69926	
5	csiro_mk3_0	0.815304	2.3014	
6	csiro_mk3_5	0.866608	2.38598	
7	gfdl_cm2_0	0.868471	2.37104	
8	gfdl_cm2_1	0.892548	2.50294	
9	giss_aom	0.731086	3.11295	
10	giss_model_e_h	0.703246	2.72236	
11	giss_model_e_r	0.756397	2.95968	
12	iap_fgoals1_0_g	0.771298	2.48557	
13	ingv_echam4	0.843576	2.09155	
14	inmcm3_0	0.849952	2.017	
15	ipsl_cm4	0.865569	2.24632	
16	miroc3_2_hires	0.780891	2.82709	
17	miroc3_2_medres	0.825645	2.19177	
18	miub_echo_g	0.888917	1.80879	
19	mpi_echam5	0.854794	2.29265	
20	mri_cgcm2_3_2a	0.82656	1.8486	
21	ncar_ccsm3_0	0.766107	3.03576	
22	ncar_pcm1	0.704558	3.83237	
23	ukmo_hadcm3	0.855597	3.48288	
24	ukmo_hadgem1	0.835898	3.62627	
25				
26				

Model	Scorr	RMSE
bccr_bcm2_0	0.406536	0.310795
cccma_cgcm3_1	0.584165	0.300434
cccma_cgcm3_1_t63	0.792754	0.194729
cnrm_cm3	0.551766	0.596403
csiro_mk3_0	0.839635	0.217573
csiro_mk3_5	0.760224	0.310917
gfdl_cm2_0	0.454962	0.432987
gfdl_cm2_1	0.322501	0.427368

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

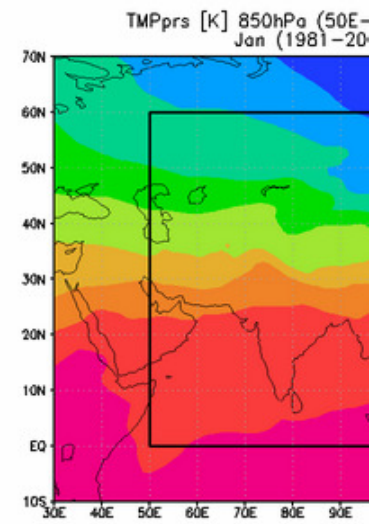
A		B		C		D		E		F		G		H		I		J		K		L		M	
1	PRECIPITATION	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE													
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE
3	bccr_bcm2_0	-0.29002	0.786082	0.19242	1.02936	0.437965	1.33928	0.431518	1.74103	0.202772	1.44577	0.572674	1.33456												
4	cccma_cgcm3_1	0.400823	0.492891	0.630698	0.564183	0.786877	0.513059	0.730973	1.17197	0.557778	0.757367	0.675063	0.432162												
5	cccma_cgcm3_1_t63	0.365936	0.651084	0.642465	0.607485	0.842501	0.588905	0.743821	1.24274	0.61369	0.817917	0.756587	0.26565												
6	cnrm_cm3	-0.236447	1.01647	0.20267	1.25576	0.525331	1.56511	0.506208	2.26833	0.1189	1.7382	0.290633	1.64034												
7	csiro_mk3_0	0.321041	0.765998	0.453155	0.861682	0.571262	0.900994	0.758385	1.14248	0.702417	1.00917	0.651595	1.00672												
8	csiro_mk3_5	0.122579	0.579696	0.326063	0.69769	0.478285	0.850036	0.652408	1.17574	0.446971	1.30376	0.543353	0.924261												
9	gfdl_cm2_0	0.573794	0.735883	0.680647	1.1	0.856602	1.02506	0.817799	1.58959	0.798985	1.49714	0.927566	0.899706												
10	gfdl_cm2_1	0.504462	0.557039	0.627569	0.767876	0.751162	0.900897	0.803752	1.39549	0.808624	0.655735	0.855987	0.32517												
11	giss_aom	-0.323095	1.57145	0.025642	1.80144	0.239204	2.01135	0.395022	2.44225	0.408479	1.57018	0.784903	0.382832												
12	giss_model_e_h	-0.358356	0.763146	0.048717	0.895584	0.395804	1.02634	0.506357	0.758237	0.437883	0.690756	0.401002	0.51397												
13	giss_model_e_r	-0.268326	0.694371	0.160624	0.810014	0.428666	0.912261	0.587141	0.816843	0.40252	0.653314	0.4231	0.504415												
14	iap_fgoals1_0_g	-0.217185	0.828366	0.028287	0.65055	0.412261	1.0669	0.488002	1.22438	0.408413	0.860522	0.722933	0.388412												
15	ingv_echam4	0.048337	0.61867	0.33862	0.750005	0.559835	0.948589	0.657862	0.730133	0.416667	0.79969	0.492677	0.514988												
16	inmcm3_0	0.143195	0.658289	0.375398	0.737838	0.454805	0.780172	0.606536	0.768597	0.59407	0.52842	0.849079	0.49859												
17	ipsl_cm4	0.745219	1.20641	0.776598	1.55449	0.835235	1.25948	0.761997	1.44656	0.724762	1.1108	0.896388	0.787567												
18	miroc3_2_hires	0.533584	0.562441	0.640415	0.821738	0.707841	1.33455	0.76997	1.85045	0.662958	1.58684	0.95086	0.993305												
19	miroc3_2_medres	0.639723	0.406069	0.591651	0.50044	0.619167	0.656872	0.725887	0.987367	0.726887	1.0637	0.903201	0.503323												
20	miub_echo_g	0.467126	0.307069	0.611378	0.485173	0.808534	0.56153	0.585619	0.82751	0.496942	0.464469	0.791989	0.475291												
21	mpi_echam5	0.465265	0.610365	0.471855	0.640128	0.593801	1.13001	0.64711	1.26864	0.619796	0.713587	0.663722	0.451726												
22	mri_cgcm2_3_2a	0.525577	0.408809	0.551878	0.527886	0.705016	0.709072	0.629856	1.17179	0.573159	1.10752	0.821807	1.24382												
23	ncar_ccsm3_0	0.213294	0.553638	0.46685	0.583664	0.573756	0.691207	0.624772	0.508375	0.602996	0.500712	0.849423	0.275137												
24	ncar_pcm1	0.195731	0.478076	0.117618	0.746211	0.270582	0.983574	0.439746	0.739255	0.462081	0.646813	0.784641	0.324636												
25	ukmo_hadcm3	0.438892	0.445191	0.530659	0.874199	0.664931	1.21068	0.736011	1.43746	0.747383	0.885089	0.847909	0.544184												
26	ukmo_hadgem1	0.709455	0.750357	0.706946	0.725302	0.750563	0.605864	0.694375	1.71931	0.652046	2.07776	0.668128	1.80773												
27																									
28		0.24	0.69	0.42	0.83	0.59	0.98	0.64	1.27	0.55	1.02	0.71	0.71												

Evaluated elements during the course

- Model performance is evaluated for the following seven meteorological elements:
 - Precipitation (small scale)
 - **Air Temperature** (**large scale**)
 - Sea Surface Temperature (SST) (large scale)
 - Outgoing Longwave Radiation (OLR) (large scale)
 - Sea Level Pressure (SLP) (large scale)
 - Zonal Wind (large scale)
 - Meridional Wind (large scale)

Meteorologic Element	Air Temperature	Level or Layer: 850hPa
Analysis Area	Lon1(West): 50 Lat2(North): 60 Lon2(East): 120 Lat1(South): 0	
Time Range	From 1981 To 2000 ; For 1 month(s) starting from January	
Options	<input type="checkbox"/> Maskout the altitude above 1500 meters	
	Colorbar for diffs <input type="radio"/> Max range <input type="radio"/> Manual: (absolute value of range) <input checked="" type="radio"/> Separate setting <input type="button" value="Recalculation"/>	
	<input checked="" type="checkbox"/> Display area Lon1(West): 30 Lat2(North): 70 Lon2(East): 140 Lat1(South): -10	
	<input type="checkbox"/> Data download	

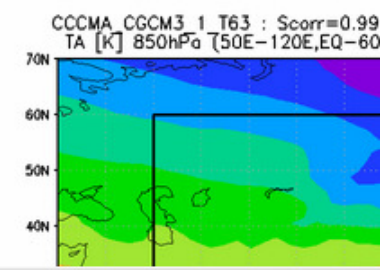
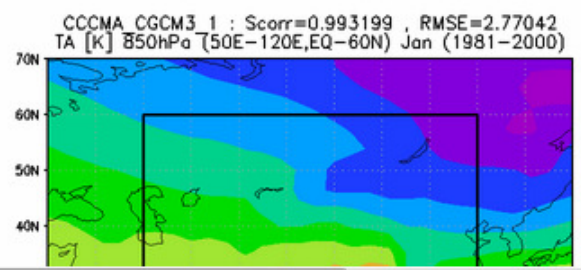
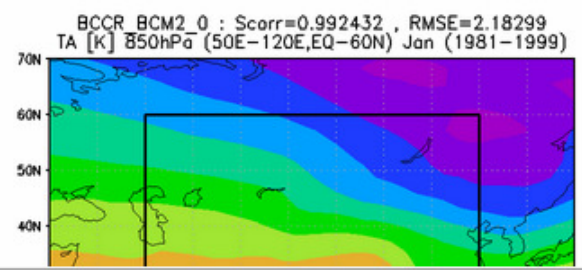
Reference Data: JRA25



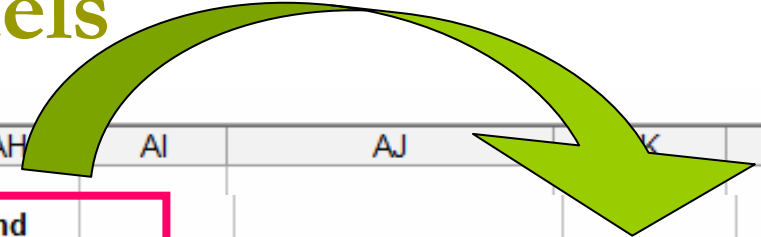
(3 per row)

CMIP3 Model Output:

[Summary of Analysis](#)



Final Sorting of Models



AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
	S_corr	RMSE	Total Index	Grand					

Model selected for this training course:

gfdl_cm2_1

66	0	1	0	4	mri_cgcm2_3_2a	0
44	1	1	1	1	ncar_ccsm3_0	0
48	0	1	0	-1	ncar_pcm1	0
69	1	1	1	2	ukmo_hadcm3	0
94	1	0	0	4	ukmo_hadgem1	0
16						

Thank you for your
attention



End of Part 1 & Step 1:
Model Selection