AWCI Training Workshop on Climate Change Impact Assessment

Part 1:
GCM Selection

Provided by the University of Tokyo

16 September 2014

Three steps forcings

…but why don't we use all models?

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 for past simulation (1981 – 2000) against a reference dataset over our area of interest and region(s) closely climatologically/meteorologically related to our area
- Evaluation is based on selected key meteorological elements

Evaluated elements during the course

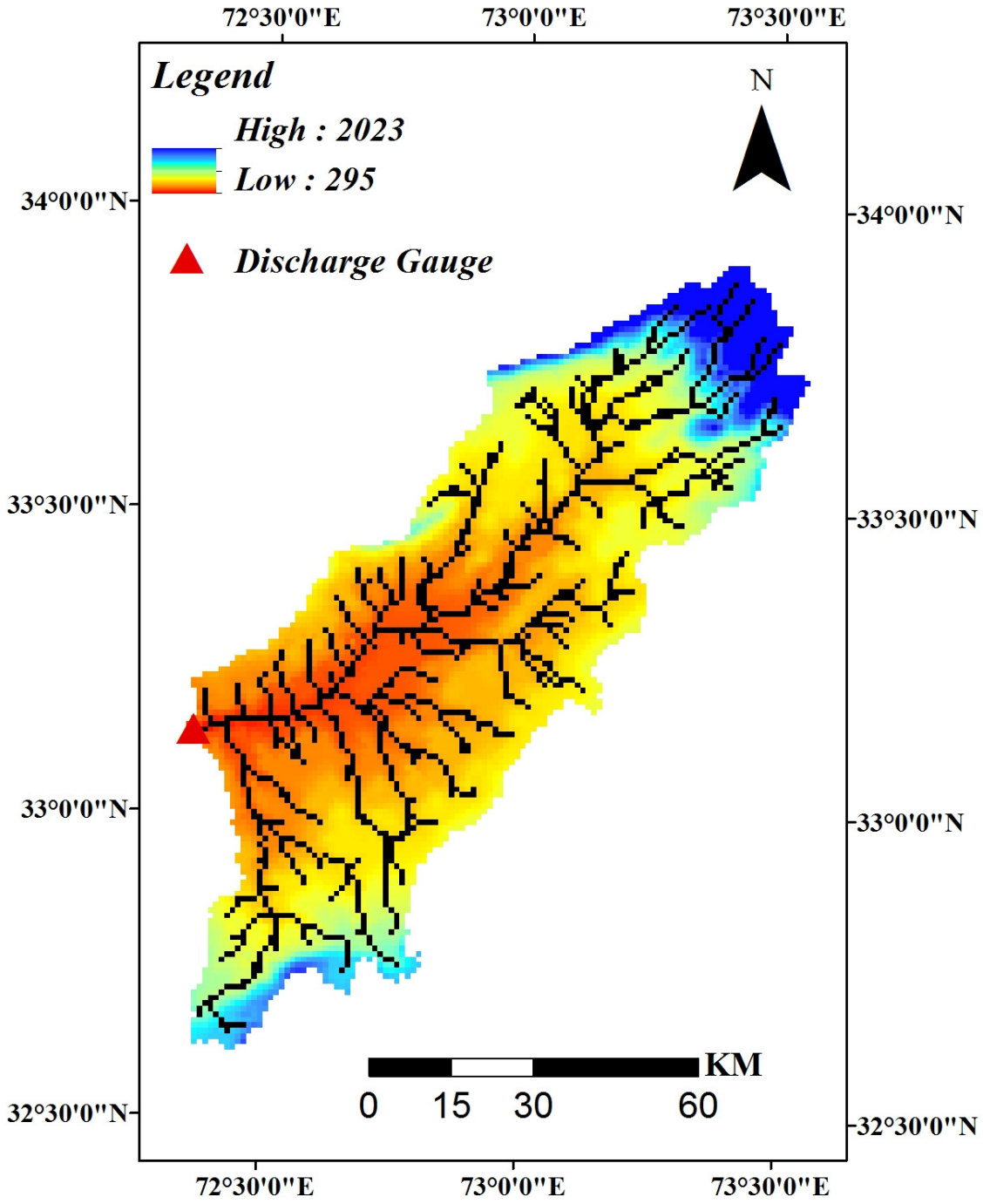
- Model performance is evaluated for the following seven meteorological elements:

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
  - TrainingWorkshop-20140916_GCM-Selection.ppt
  - **Results** (prepared by UT team)
    - PAKISTAN_MODEL_SELECTION.xls

Soan Basin in Pakistan



Summary Table: MODEL_SELECTION_LONGLAT.xls

Folder: Model_selection

	A	B	C	D	E
1	Coordinates of the investigated basin and of the inspection areas for model selection				
2					
3	**Country**	**Basin lon-lat (approx)**	**Small Scale (precipitation)**	**Large Scale (other elements)**	**Level: Tair, Wind (M**
4	Bangladesh	23-26N, 90-95E	20-30N, 85-100E	0-45N, 70-160E	850hPa
5	Bhutan	26-30N, 89-91E	25-30N, 89-91E	0-45N, 70-160E	850hPa
6	Cambodia	12-14N, 102-104E	10-20N, 100-115E	0-20N, 80-160E	850hPa
7	India	N/A	15-25N, 70-85E	0-45N, 70-160E	850hPa
8	Indonesia	6-8S, 107-108E	15S-0N, 100-115E	20S-20N, 80-160E	850hPa
9	Japan	36-38N, 138-140E	35-45N, 135-145E	5-60N, 80-160E	850hPa
10	Malaysia	2-4N, 101-104E	0-15N, 100-110E	0-20N, 80-160E	850hPa
11	Mongolia	46-50N, 102-109E	40-55N, 100-115E	5-60N, 80-160E	850hPa
12	Myanmar	17-19N, 96-98E	15-25N, 95-100E	0-45N, 70-160E	850hPa
13	Nepal	27-30N, 82-86E	25-35N, 80-90E	0-45N, 70-160E	850hPa
14	**Pakistan**	**32-34N, 72-74E**	**30-40N, 70-80E**	**0-45N, 70-160E**	**850hPa**
15	Philippines	15-17N, 120-122E	10-20N, 115-130E	0-20N, 80-160E	850hPa
16	Sri Lanka	6-8N, 79-81E	0-10N, 75-85E	0-20N, 80-160E	850hPa
17	Thailand	15-21.5N, 96-101E	10-25N, 95-110E	0-45N, 70-160E	850hPa
18	Uzbekistan	40-43N, 69-72E	35-45N, 65-75E	0-60N, 50-120E	850hPa
19	Vietnam	15-17N, 107-108E	15-20N, 105-110E	0-20N, 80-160E	850hPa
20					
21					

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
3	bccr_bcm2_0	0	0	0	0	0	0	0	0	0	0	0	
4	cccma_cgcm3_1	0	0	0	0	0	0	0	0	0	0	0	
5	cccma_cgcm3_1_t63	0	0	0	0	0	0	0	0	0	0	0	
6	cnrm_cm3	0	0	0	0	0	0	0	0	0	0	0	
7	csiro_mk3_0	0	0	0	0	0	0	0	0	0	0	0	
8	csiro_mk3_5	0	0	0	0	0	0	0	0	0	0	0	
9	gfdl_cm2_0	0	0	0	0	0	0	0	0	0	0	0	
10	gfdl_cm2_1	0	0	0	0	0	0	0	0	0	0	0	
11	giss_aom	0	0	0	0	0	0	0	0	0	0	0	
12	giss_model_e_h	0	0	0	0	0	0	0	0	0	0	0	
13	giss_model_e_r	0	0	0	0	0	0	0	0	0	0	0	
14	iap_fgoals1_0_g	0	0	0	0	0	0	0	0	0	0	0	
15	ingv_echam4	0	0	0	0	0	0	0	0	0	0	0	
16	inmcm3_0	0	0	0	0	0	0	0	0	0	0	0	
17	ipsl_cm4	0	0	0	0	0	0	0	0	0	0	0	
18	miroc3_2_hires	0	0	0	0	0	0	0	0	0	0	0	
19	miroc3_2_medres	0	0	0	0	0	0	0	0	0	0	0	
20	miub_echo_g	0	0	0	0	0	0	0	0	0	0	0	
21	mpi_echam5	0	0	0	0	0	0	0	0	0	0	0	
22	mri_cgcm2_3_2a	0	0	0	0	0	0	0	0	0	0	0	
23	ncar_ccsm3_0	0	0	0	0	0	0	0	0	0	0	0	
24	ncar_pcm1	0	0	0	0	0	0	0	0	0	0	0	
25	ukmo_hadcm3	0	0	0	0	0	0	0	0	0	0	0	
26	ukmo_hadgem1	0	0	0	0	0	0	0	0	0	0	0	
27													
28		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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

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	0.61257	2.9636	0.641915	3.14939	0.654535	3.04457
2	cccma_cgcm3_1	0.67809	2.80344	0.702107	2.9001	0.705361	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

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

	Analysis Period	
	S_corr	RMSE
	0.63634233	3.0525367
	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**

Scoring

$Scorr_{model} \geq Scorr_{total\ average} \Rightarrow Index_{Scorr} = \mathbf{1}$

$Scorr_{model} < Scorr_{total\ average} \Rightarrow Index_{Scorr} = \mathbf{0}$

$RMSE_{model} \leq RMSE_{total\ average} \Rightarrow Index_{RMSE} = \mathbf{1}$

$RMSE_{model} > RMSE_{total\ average} \Rightarrow Index_{RMSE} = \mathbf{0}$

$Index_{Scorr} = 1$ and $Index_{RMSE} = 1 \Rightarrow Index_{total} = \mathbf{1}$

$Index_{Scorr} = 1$ and $Index_{RMSE} = 0 \Rightarrow Index_{total} = \mathbf{0}$

$Index_{Scorr} = 0$ and $Index_{RMSE} = 1 \Rightarrow Index_{total} = \mathbf{0}$

$Index_{Scorr} = 0$ and $Index_{RMSE} = 0 \Rightarrow Index_{total} = \mathbf{-1}$

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		

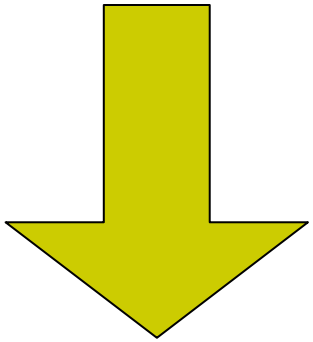
Scoring

$Scorr_{model} \geq Scorr_{total\ average} \Rightarrow Index_{Scorr} = \mathbf{1}$

$Scorr_{model} < Scorr_{total\ average} \Rightarrow Index_{Scorr} = \mathbf{0}$

$RMSE_{model} \leq RMSE_{total\ average} \Rightarrow Index_{RMSE} = \mathbf{1}$

$RMSE_{model} > RMSE_{total\ average} \Rightarrow Index_{RMSE} = \mathbf{0}$



$Index_{Scorr} = 1$ and $Index_{RMSE} = 1 \Rightarrow Index_{total} = \mathbf{1}$

$Index_{Scorr} = 1$ and $Index_{RMSE} = 0 \Rightarrow Index_{total} = \mathbf{0}$

$Index_{Scorr} = 0$ and $Index_{RMSE} = 1 \Rightarrow Index_{total} = \mathbf{0}$

$Index_{Scorr} = 0$ and $Index_{RMSE} = 0 \Rightarrow Index_{total} = \mathbf{-1}$

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

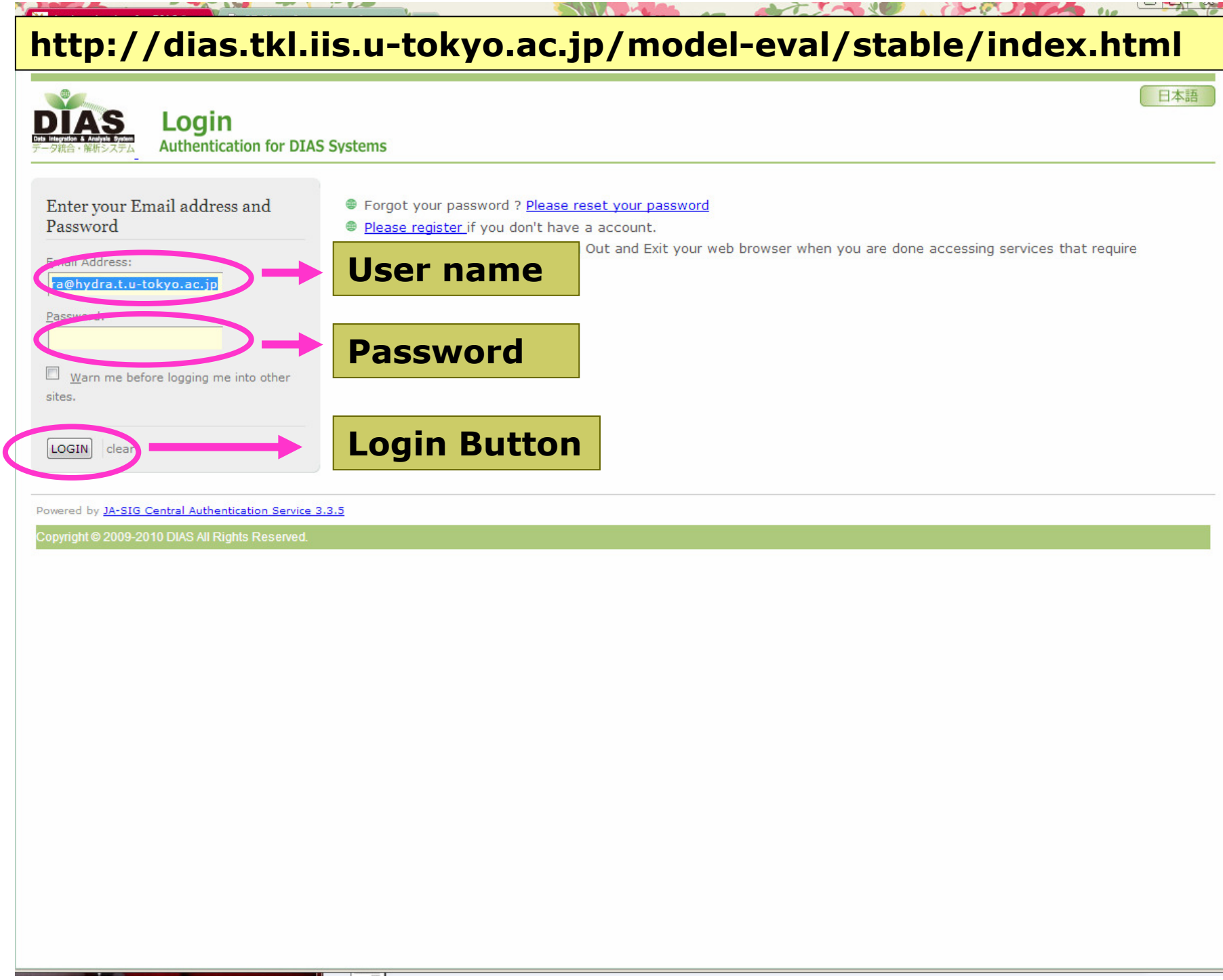
MBER

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

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	PRECIPITATION	JUNE		JULY		AUGUST		SEPTEMBER													
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index	Total Index Precip		Grand Total		Models	descending
3	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		bccr_bcm2_0	0
4	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		cccma_cgcm3_1	0
5	cccma_cgcm3_1_t6	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		cccma_cgcm3_1_t63	0
6	cnrm_cm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		cnrm_cm3	0
7	csiro_mk3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		csiro_mk3_0	0
8	csiro_mk3_5	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		csiro_mk3_5	0
9	gfdl_cm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		gfdl_cm2_0	0
10	gfdl_cm2_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		gfdl_cm2_1	0
11	giss_aom	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		giss_aom	0
12	giss_model_e_h	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		giss_model_e_h	0
13	giss_model_e_r	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		giss_model_e_r	0
14	iap_fgoals1_0_g	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		iap_fgoals1_0_g	0
15	ingv_echam4	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ingv_echam4	0
16	inmcm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		inmcm3_0	0
17	ipsl_cm4	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ipsl_cm4	0
18	miroc3_2_hires	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		miroc3_2_hires	0
19	miroc3_2_medres	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		miroc3_2_medres	0
20	miub_echo_g	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-4		miub_echo_g	0
21	mpi_echam5	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		mpi_echam5	0
22	mri_cgcm2_3_2a	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		mri_cgcm2_3_2a	0
23	ncar_ccsm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ncar_ccsm3_0	0
24	ncar_pcm1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ncar_pcm1	0
25	ukmo_hadcm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ukmo_hadcm3	0
26	ukmo_hadgem1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1		-7		ukmo_hadgem1	0
27																					
28		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Total	0	0									
29	AIR TEMPERATURE	JUNE		JULY		AUGUST		SEPTEMBER													
30	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index	Total Index T					
31	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
32	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
33	cccma_cgcm3_1_t6	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
34	cnrm_cm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
35	csiro_mk3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
36	csiro_mk3_5	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
37	gfdl_cm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
38	gfdl_cm2_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
39	giss_aom	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
40	giss_model_e_h	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
41	giss_model_e_r	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
42	iap_fgoals1_0_g	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
43	ingv_echam4	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
44	inmcm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
45	ipsl_cm4	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
46	miroc3_2_hires	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
47	miroc3_2_medres	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
48	mpi_echam5	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
49	mri_cgcm2_3_2a	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
50	ncar_ccsm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
51	ncar_pcm1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
52	ukmo_hadcm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
53	ukmo_hadgem1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
54																					
55		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Total	0	0									
56	SEA SURFACE TEMPERATURE	JUNE		JULY		AUGUST		SEPTEMBER													
57	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index	Total Index T					
58	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
59	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					
60	cccma_cgcm3_1_t6	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1					

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



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

Quantitative Evaluation of AOGCM

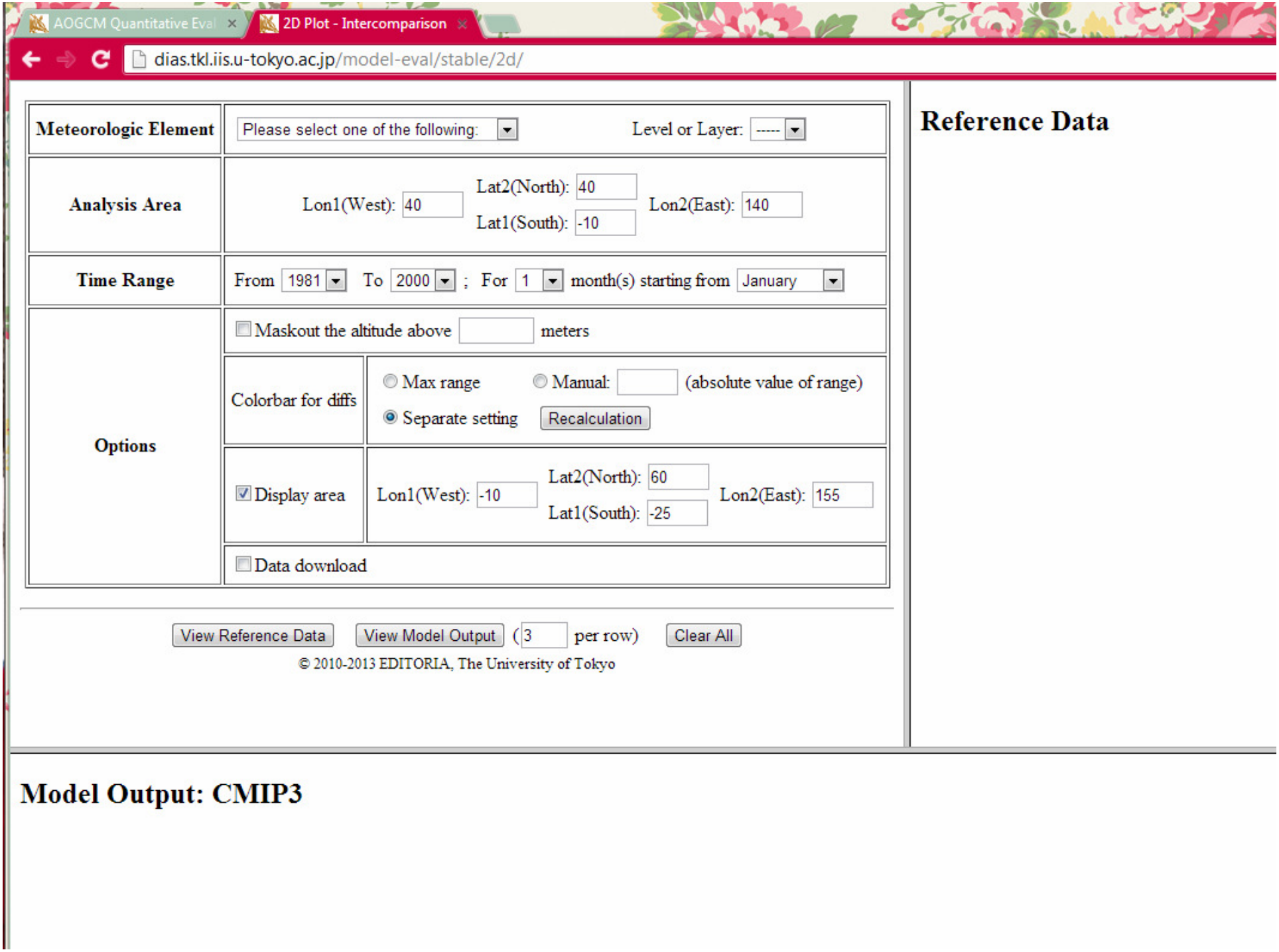
***** Release 1.1 : Bug fixes and minor improvements (3/June/2013)**

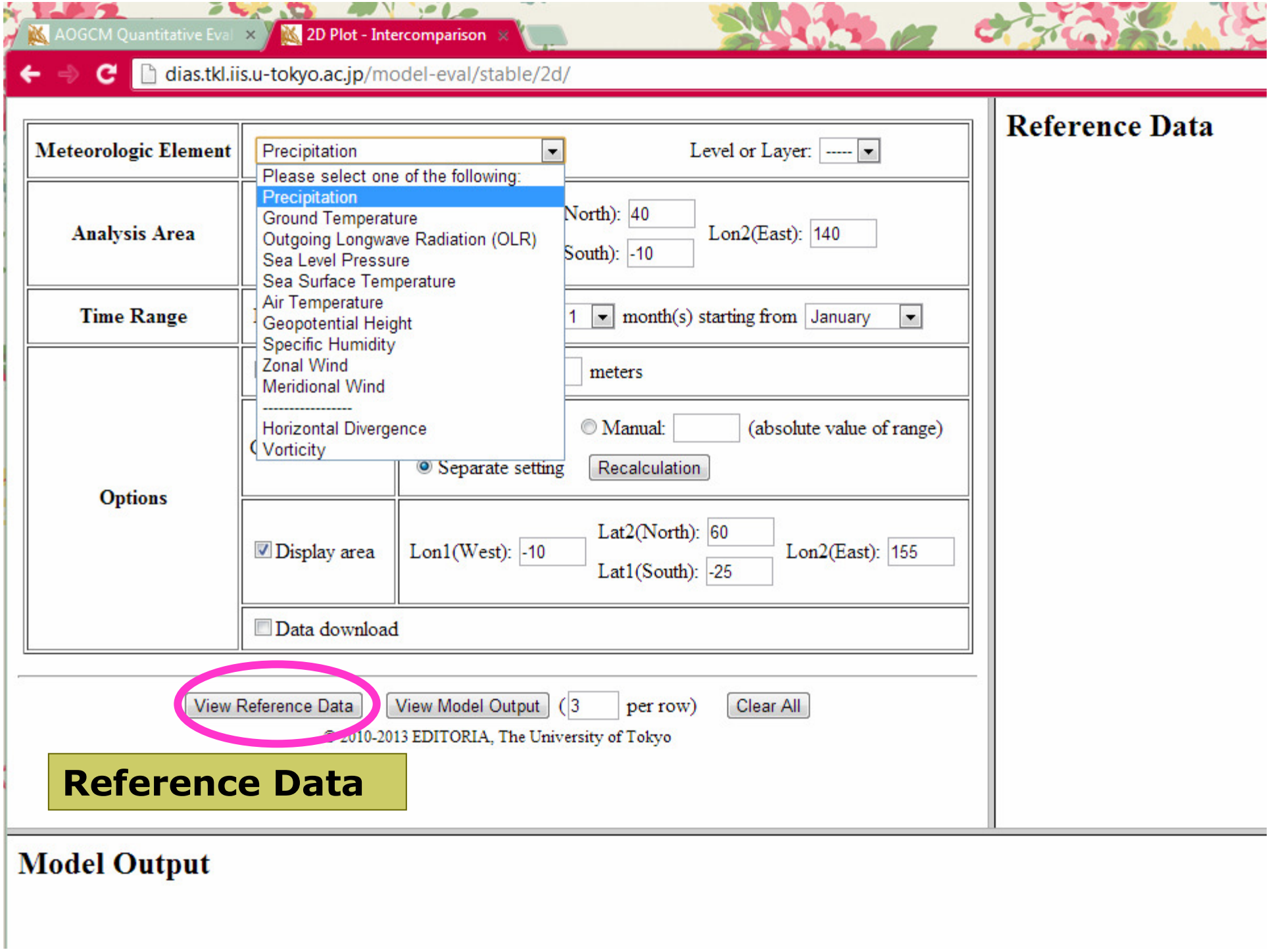
1. Intercomparison : Re-analysis/Observation Data vs. CMIP3 Model Output
   - 1-D Plot (time-series)
   - 2-D Plot
   - Vector Diagram
   - Cross-sectional View
     - Longitude/Latitude-Time , Longitude/Latitude-Height
   - Vertical Profile
     - 1-D Plot , Vector Diagram
2. Comparison of Global Warming 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

2-D Plot option for evaluation

[Version 1.1.3 : 2013-06-03]

For questions, please contact Akio Yamamoto.


AOGCM Quantitative Eval
2D Plot - Intercomparison
dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/
Meteorologic Element
Please select one of the following:
Level or Layer: ----
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
Maskout the altitude above meters
Colorbar for diffs
Max range
Manual: (absolute value of range)
Separate setting
Recalculation
Display area
Lon1(West): -10
Lat2(North): 60
Lat1(South): -25
Lon2(East): 155
Data download
View Reference Data
View Model Output
(3 per row)
Clear All
© 2010-2013 EDITORIA, The University of Tokyo
Reference Data
Model Output: CMIP3


AOGCM Quantitative Eval
2D Plot - Intercomparison
dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/
Meteorologic Element
Precipitation
Level or Layer: -----
Please select one of the following:
Precipitation
Ground Temperature
Outgoing Longwave Radiation (OLR)
Sea Level Pressure
Sea Surface Temperature
Air Temperature
Geopotential Height
Specific Humidity
Zonal Wind
Meridional Wind
Horizontal Divergence
Vorticity
Analysis Area
North): 40
South): -10
Lon2(East): 140
Time Range
1 month(s) starting from January
meters
Options
Manual: (absolute value of range)
Separate setting
Recalculation
Display area
Lon1(West): -10
Lat2(North): 60
Lat1(South): -25
Lon2(East): 155
Data download
View Reference Data
View Model Output
(3 per row)
Clear All
© 2010-2013 EDITORIA, The University of Tokyo
Reference Data
Reference Data
Model Output

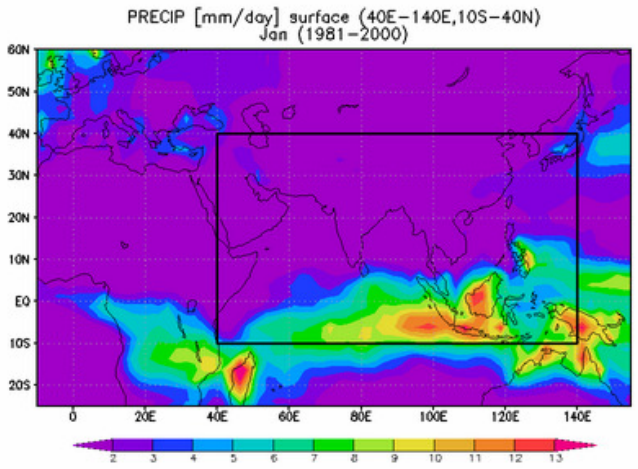
AOGCM Quantitative Eval | 2D Plot - Intercomparison

dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/

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	☐ Maskout the altitude above [ ] meters		
	Colorbar for diffs	○ Max range ○ Manual: [ ] (absolute value of range) ◉ Separate setting Recalculation	
	☑ Display area	Lon1(West): -10 / Lat2(North): 60 / Lat1(South): -25	Lon2(East): 155
	☐ Data download		

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

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

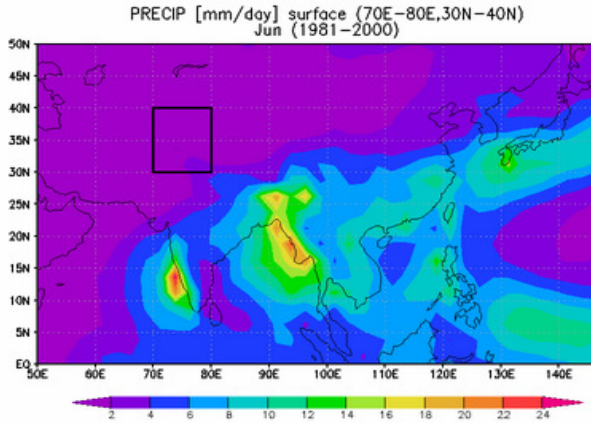
- Model performance is evaluated for the following seven meteorological elements:
  - **Precipitation** **(small scale)**
  - Air Temperature (large scale)
  - Sea Surface Temperature (SST) (large scale)
  - Outgoing Longwave Radiation (OLR) (large scale)
  - Sea Level Pressure (SLP) (large scale)
 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

dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/start.cgi

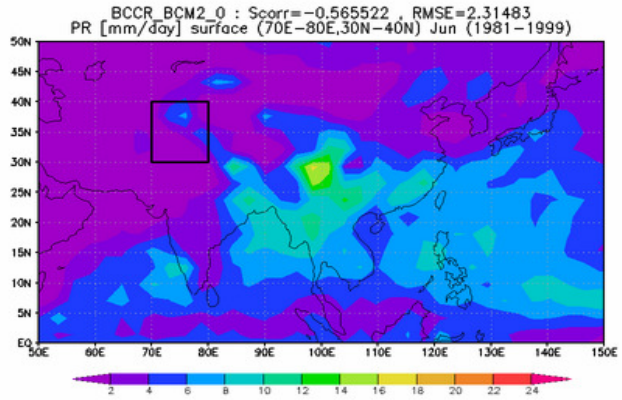
Meteorologic Element	Precipitation ▼ Level or Layer: Ground/water surface ▼
Analysis Area	Lon1(West): 70 Lat2(North): 40 Lon2(East): 80 Lat1(South): 30
Time Range	From 1981 ▼ To 2000 ▼ ; For 1 ▼ month(s) starting from June ▼
Options	☐ Maskout the altitude above meters
	Colorbar for diffs: ○ Max range ○ Manual: (absolute value of range) ◉ Separate setting Recalculation
	☑ Display area: Lon1(West): 50 Lat2(North): 50 Lon2(East): 150 Lat1(South): 0
	☐ Data download

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

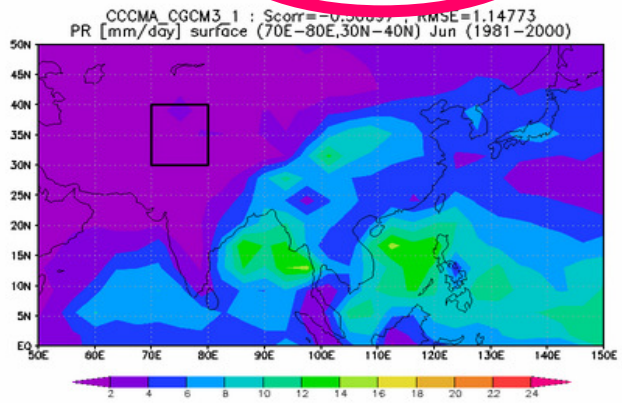
Reference Data: GPCP



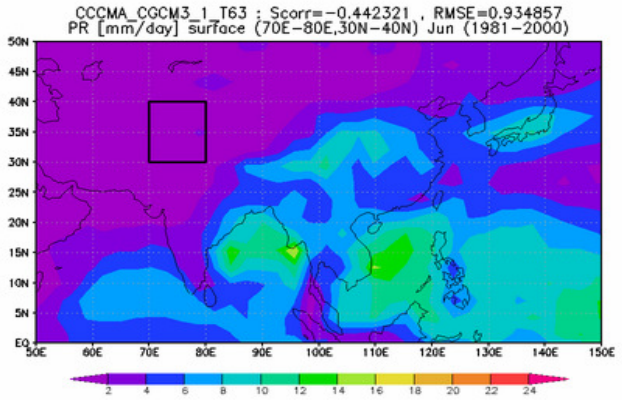
CMIP3 Model Output: Open as New Window/Tab | View All Difference Images | Summary of Analysis



Difference Image



Difference Image



Difference Image

Meteorologic Element	Precipitation ▾ Leve
Analysis Area	Lon1(West): 70 Lat2(North): 40 Lat1(South): 30
Time Range	From 1981 ▾ To 2000 ▾ ; For 1 ▾ mc
	☐ Maskout the altitude above meters
	Colorbar for diffs ◉ Separate setting ○ Max range ○ Manua Recalcu

Summary of Analysis Results Download : CSV file

Model	Sc
bccr_bcm2_0	-0.565522
cccma_cgcm3_1	-0.50697
cccma_cgcm3_1_t63	-0.442321
cnrm_cm3	-0.705786
csiro_mk3_0	-0.508989
csiro_mk3_5	-0.557294
gfdl_cm2_0	-0.432733
gfdl_cm2_1	0.567033
giss_aom	0.0349584
giss_model_e_h	-0.516578
giss_model_e_r	-0.68483
iap_fgoals1_0_g	0.643257

Microsoft Excel - pr_Surface_Jun_1981-2000_A(70E-80E,30N-40N

File Edit View Insert Format Tools Data Wind

J41 fx

	A	B	C	D
1	bccr_bcm2_0	-0.56552	2.31483	
2	cccma_cgcm3_1	-0.50697	1.14773	
3	cccma_cgcm3_1_t63	-0.44232	0.934857	
4	cnrm_cm3	-0.70579	2.79353	
5	csiro_mk3_0	-0.50899	1.97728	
6	csiro_mk3_5	-0.55729	2.17344	
7	gfdl_cm2_0	-0.43273	1.2487	
8	gfdl_cm2_1	0.567033	0.914761	
9	giss_aom	0.034958	1.5338	
10	giss_model_e_h	-0.51658	1.1809	
11	giss_model_e_r	-0.68483	1.43051	
12	iap_fgoals1_0_g	-0.64326	1.48927	
13	ingv_echam4	0.888009	0.839175	
14	inmcm3_0	-0.60041	1.32028	
15	ipsl_cm4	-0.57838	1.54122	
16	miroc3_2_hires	-0.22664	1.03662	
17	miroc3_2_medres	0.245911	0.967686	
18	miub_echo_g	-0.61756	1.11696	
19	mpi_echam5	0.457939	1.24188	
20	mri_cgcm2_3_2a	-0.59215	1.72875	
21	ncar_ccsm3_0	0.574402	1.66632	
22	ncar_pcm1	-0.50455	1.6352	
23	ukmo_hadcm3	-0.33944	1.09733	
24	ukmo_hadgem1	-0.20218	2.48862	
25				

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

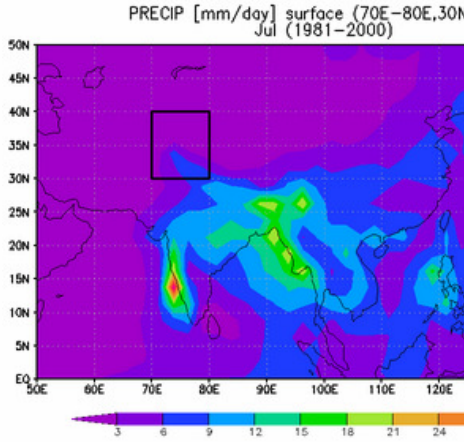
	A	B	C	D	E	F	G	H	I	J	K
1	PRECIPITATION	JUNE		JULY		AUGUST		SEPTEMBER			
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr
3	bccr_bcm2_0	-0.29002	0.786082	0	0	0	0	0	0		0.0
4	cccma_cgcm3_1	0.400823	0.492891	0	0	0	0	0	0		0.0
5	cccma_cgcm3_1_t6	0.365936	0.651084	0	0	0	0	0	0		0.0
6	cnrm_cm3	-0.236447	1.01647	0	0	0	0	0	0		0.0
7	csiro_mk3_0	0.321041	0.765998	0	0	0	0	0	0		0.0
8	csiro_mk3_5	0.122579	0.579696	0	0	0	0	0	0		0.0
9	gfdl_cm2_0	0.573794	0.735883	0	0	0	0	0	0		0.0
10	gfdl_cm2_1	0.504462	0.557039	0	0	0	0	0	0		0.0
11	giss_aom	-0.323095	1.57145	0	0	0	0	0	0		0.0
12	giss_model_e_h	-0.358356	0.763146	0	0	0	0	0	0		0.0
13	giss_model_e_r	-0.268326	0.694371	0	0	0	0	0	0		0.0
14	iap_fgoals1_0_g	-0.217185	0.828366	0	0	0	0	0	0		0.0
15	ingv_echam4	0.048337	0.61867	0	0	0	0	0	0		0.0
16	inmcm3_0	0.143195	0.658289	0	0	0	0	0	0		0.0
17	ipsl_cm4	0.745219	1.20641	0	0	0	0	0	0		0.0
18	miroc3_2_hires	0.533584	0.562441	0	0	0	0	0	0		0.0
19	miroc3_2_medres	0.639723	0.406069	0	0	0	0	0	0		0.0
20	miub_echo_g	0.467126	0.307069	0	0	0	0	0	0		0.0
21	mpi_echam5	0.465265	0.610365	0	0	0	0	0	0		0.0
22	mri_cgcm2_3_2a	0.525577	0.408809	0	0	0	0	0	0		0.0
23	ncar_ccsm3_0	0.213294	0.553638	0	0	0	0	0	0		0.0
24	ncar_pcm1	0.195731	0.478076	0	0	0	0	0	0		0.0
25	ukmo_hadcm3	0.438892	0.445191	0	0	0	0	0	0		0.0
26	ukmo_hadgem1	0.709455	0.750357	0	0	0	0	0	0		0.0
27											
28		**0.24**	**0.69**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**Total**	

dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/start.cgi

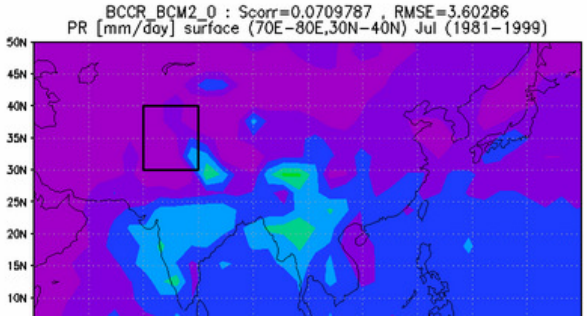
Meteorologic Element	Precipitation ▼ Level or Layer: Ground/water surface ▼
Analysis Area	Lon1(West): 70 Lat2(North): 40 Lat1(South): 30 Lon2(East): 80
Time Range	From 1981 ▼ To 2000 ▼ ; For 1 ▼ month(s) starting from July ▼
Options	☐ Maskout the altitude above meters
	Colorbar for diffs: ○ Max range ○ Manual: (absolute value of range) ◉ Separate setting Recalculation
	☑ Display area: Lon1(West): 50 Lat2(North): 50 Lat1(South): 0 Lon2(East): 150
	☐ Data download

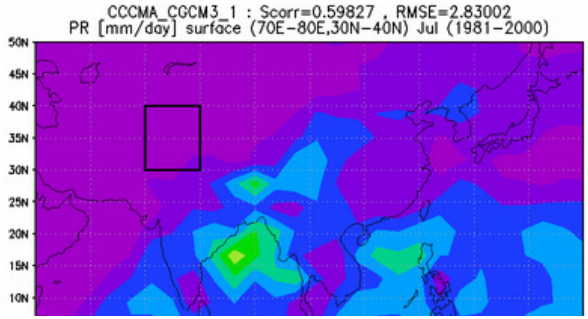
View Reference Data | View Model Output | (3 per row) | Clear All

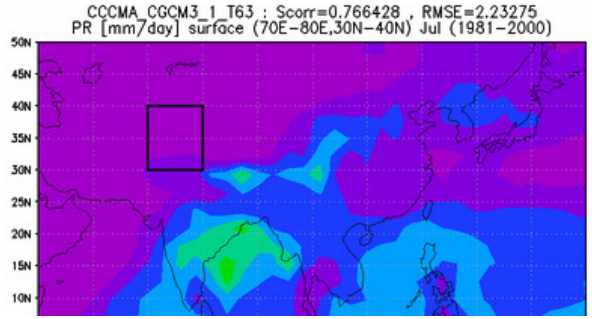
Reference Data: GPCP

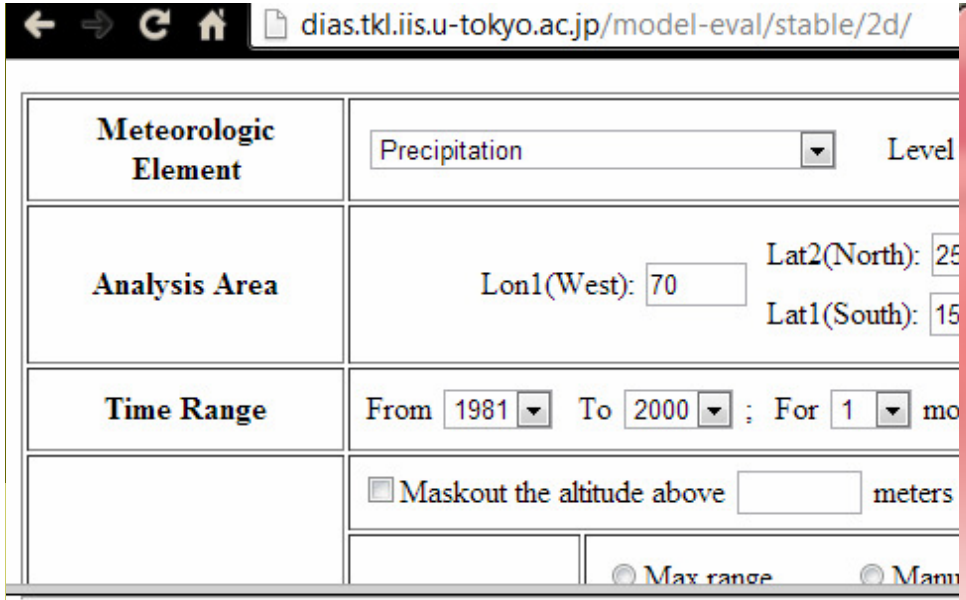


CMIP3 Model Output: Open as New Window/Tab | View All Difference Images | Summary of Analysis









Summary of Analysis Results Download : CSV file

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

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

File Edit View Insert Format Tools Data Window

Share This File WebEx

G16

	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				

Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

	A	B	C	D	E	F	G	H	I	J	K
1	PRECIPITATION	JUNE		JULY		AUGUST		SEPTEMBER			
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr
3	bccr_bcm2_0	-0.29002	0.786082	0.19242	1.02936	0.437965	1.33928	0.431518	1.74103		0.0
4	cccma_cgcm3_1	0.400823	0.492891	0.630698	0.564183	0.786877	0.513059	0.730973	1.17197		0.0
5	cccma_cgcm3_1_t6	0.365936	0.651084	0.642465	0.607485	0.842501	0.588905	0.743821	1.24274		0.0
6	cnrm_cm3	-0.236447	1.01647	0.20267	1.25576	0.525331	1.56511	0.506208	2.26833		0.0
7	csiro_mk3_0	0.321041	0.765998	0.453155	0.861682	0.571262	0.900994	0.758385	1.14248		0.0
8	csiro_mk3_5	0.122579	0.579696	0.326063	0.69769	0.478285	0.850036	0.652408	1.17574		0.0
9	gfdl_cm2_0	0.573794	0.735883	0.680647	1.1	0.856602	1.02506	0.817799	1.58959		0.0
10	gfdl_cm2_1	0.504462	0.557039	0.627569	0.767876	0.751162	0.900897	0.803752	1.39549		0.0
11	giss_aom	-0.323095	1.57145	0.025642	1.80144	0.239204	2.01135	0.395022	2.44225		0.0
12	giss_model_e_h	-0.358356	0.763146	0.048717	0.895584	0.395804	1.02634	0.506357	0.758237		0.0
13	giss_model_e_r	-0.268326	0.694371	0.160624	0.810014	0.428666	0.912261	0.587141	0.816843		0.0
14	iap_fgoals1_0_g	-0.217185	0.828366	0.028287	0.65055	0.412261	1.0669	0.488002	1.22438		0.0
15	ingv_echam4	0.048337	0.61867	0.33862	0.750005	0.559835	0.948589	0.657862	0.730133		0.0
16	inmcm3_0	0.143195	0.658289	0.375398	0.737838	0.454805	0.780172	0.606536	0.768597		0.0
17	ipsl_cm4	0.745219	1.20641	0.776598	1.55449	0.835235	1.25948	0.761997	1.44656		0.0
18	miroc3_2_hires	0.533584	0.562441	0.640415	0.821738	0.707841	1.33455	0.76997	1.85045		0.0
19	miroc3_2_medres	0.639723	0.406069	0.591651	0.50044	0.619167	0.656872	0.725887	0.987367		0.0
20	miub_echo_g	0.467126	0.307069	0.611378	0.485173	0.808534	0.56153	0.585619	0.82751		0.0
21	mpi_echam5	0.465265	0.610365	0.471855	0.640128	0.593801	1.13001	0.64711	1.26864		0.0
22	mri_cgcm2_3_2a	0.525577	0.408809	0.551878	0.527886	0.705016	0.709072	0.629856	1.17179		0.0
23	ncar_ccsm3_0	0.213294	0.553638	0.46685	0.583664	0.573756	0.691207	0.624772	0.508375		0.0
24	ncar_pcm1	0.195731	0.478076	0.117618	0.746211	0.270582	0.983574	0.439746	0.739255		0.0
25	ukmo_hadcm3	0.438892	0.445191	0.530659	0.874199	0.664931	1.21068	0.736011	1.43746		0.0
26	ukmo_hadgem1	0.709455	0.750357	0.706946	0.725302	0.750563	0.605864	0.694375	1.71931		0.0
27											
28		**0.24**	**0.69**	**0.42**	**0.83**	**0.59**	**0.98**	**0.64**	**1.27**	**Total**	

Evaluated precipitation element

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	PRECIPITATION	JUNE		JULY		AUGUST		SEPTEMBER								
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index	Total Index Precip
3	bccr_bcm2_0	-0.565521	2.31483	0.070981	3.60285	0.135485	3.21829	-0.250941	1.82518		-0.15	2.74		0	0	-1
4	cccma_cgcm3_1	-0.50697	1.14773	0.598269	2.83002	0.623889	2.83294	0.501428	1.39463		0.30	2.05		1	1	1
5	cccma_cgcm3_1_t63	-0.44232	0.934857	0.766428	2.23275	0.761763	1.92151	0.826907	0.910172		0.48	1.50		1	1	1
6	cnrm_cm3	-0.705786	2.79353	0.063735	3.07231	0.138115	2.83021	-0.103228	2.28274		-0.15	2.74		0	0	-1
7	csiro_mk3_0	-0.508989	1.97728	-0.067868	3.43464	0.762701	2.71819	0.394606	1.27021		0.15	2.35		0	0	-1
8	csiro_mk3_5	-0.557294	2.17344	-0.321504	3.53899	0.674054	2.47527	0.754079	0.91726		0.14	2.28		0	0	-1
9	gfdl_cm2_0	-0.432733	1.2487	0.897298	1.30777	0.918202	1.1118	0.844054	1.08856		0.56	1.19		1	1	1
10	gfdl_cm2_1	0.567033	0.914761	0.884658	1.46884	0.892711	1.37638	0.864287	1.68483		0.80	1.36		1	1	1
11	giss_aom	0.034958	1.5338	-0.105041	3.42766	0.389821	2.97318	0.523876	1.25613		0.21	2.30		1	0	0
12	giss_model_e_h	-0.516578	1.1809	-0.280138	3.42564	-0.200414	3.29612	-0.443009	1.72309		-0.36	2.41		0	0	-1
13	giss_model_e_r	-0.68483	1.43051	-0.470418	3.52376	-0.46916	3.47826	-0.497356	1.80308		-0.53	2.56		0	0	-1
14	iap_fgoals1_0_g	-0.643257	1.48927	-0.52545	3.71433	0.465822	3.34745	0.461911	1.39924		-0.06	2.49		0	0	-1
15	ingv_echam4	0.888008	0.839175	0.959546	0.985889	0.88997	1.42606	0.767263	0.885741		0.88	1.03		1	1	1
16	inmcm3_0	-0.600411	1.32028	-0.71452	3.82053	-0.556371	3.64231	-0.296125	1.75501		-0.54	2.63		0	0	-1
17	ipsl_cm4	-0.57838	1.54122	-0.687959	3.89379	-0.655444	3.79342	-0.601204	1.96708		-0.63	2.80		0	0	-1
18	miroc3_2_hires	-0.226644	1.03662	0.522146	2.66508	0.791378	2.13319	0.583473	1.11779		0.42	1.74		1	1	1
19	miroc3_2_medres	0.245912	0.967686	0.619597	2.28656	0.69139	2.05883	0.799455	0.826916		0.59	1.53		1	1	1
20	miub_echo_g	-0.617562	1.11696	-0.446835	3.6586	0.671619	2.93435	0.317971	1.49022		-0.02	2.30		0	0	-1
21	mpi_echam5	0.457939	1.24188	0.574354	2.52434	0.606468	2.53987	0.421737	1.29912		0.52	1.90		1	1	1
22	mri_cgcm2_3_2a	-0.592153	1.72875	-0.58526	3.81002	-0.085025	3.70343	-0.570495	1.97855		-0.46	2.81		0	0	-1
23	ncar_ccsm3_0	0.574401	1.66632	0.884975	1.31835	0.958854	0.815117	0.794347	2.25227		0.80	1.51		1	1	1
24	ncar_pcm1	-0.504549	1.6352	0.329176	2.97117	0.547023	3.1556	0.317388	1.50331		0.17	2.32		1	0	0
25	ukmo_hadcm3	-0.339443	1.09733	0.529214	2.9205	0.839476	2.07013	0.476632	1.50296		0.38	1.90		1	1	1
26	ukmo_hadgem1	-0.202184	2.48862	0.673237	2.12494	0.731494	1.97159	-0.035131	1.56629		0.29	2.04		1	1	1
27																
28		**-0.27**	**1.49**	**0.17**	**2.86**	**0.44**	**2.58**	**0.29**	**1.49**	**Total Average**	**0.157**	**2.103**				
29	AIR TEMPERATURE	JUNE		JULY		AUGUST		SEPTEMBER								
30	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index	Total Index T
31	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1
32	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1
33	cccma_cgcm3_1_t63	0	0	0	0	0	0	0	0		0.00	0.00		0	0	-1

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)

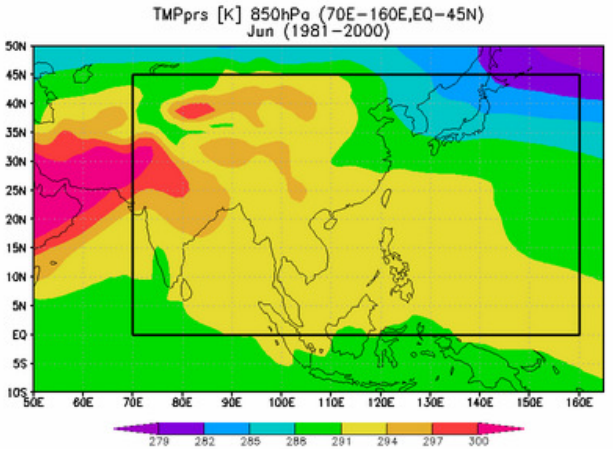
Google Translate | AOGCM Quantitative Eval | 2D Plot - Intercomparison

dias.tkl.iis.u-tokyo.ac.jp/model-eval/stable/2d/start.cgi

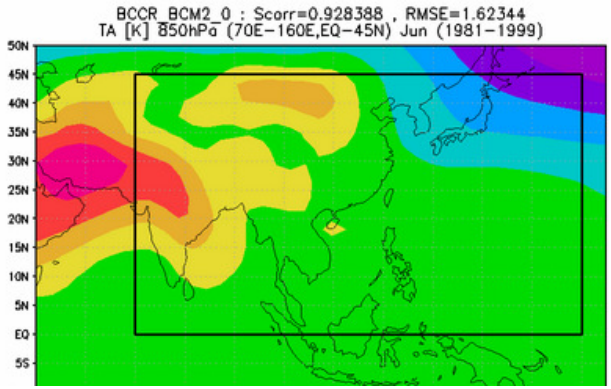
Meteorologic Element	Air Temperature ▼ Level or Layer: 850hPa ▼
Analysis Area	Lon1(West): 70 Lat2(North): 45 Lat1(South): 0 Lon2(East): 160
Time Range	From 1981 ▼ To 2000 ▼ ; For 1 ▼ month(s) starting from June ▼
Options	☐ Maskout the altitude above 1500 meters
	Colorbar for diffs: ○ Max range ○ Manual: (absolute value of range) ◉ Separate setting Recalculation
	☑ Display area: Lon1(West): 50 Lat2(North): 50 Lat1(South): -10 Lon2(East): 165
	☐ Data download

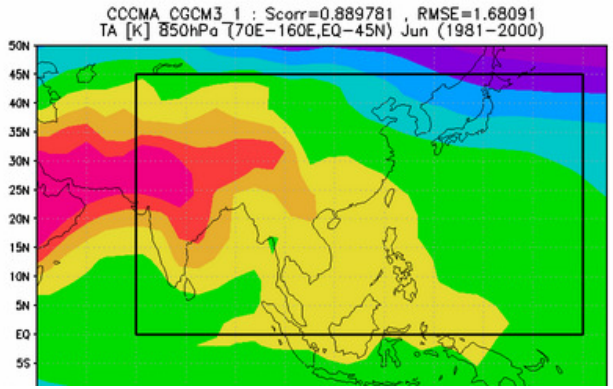
View Reference Data | View Model Output (3 per row) | Clear All

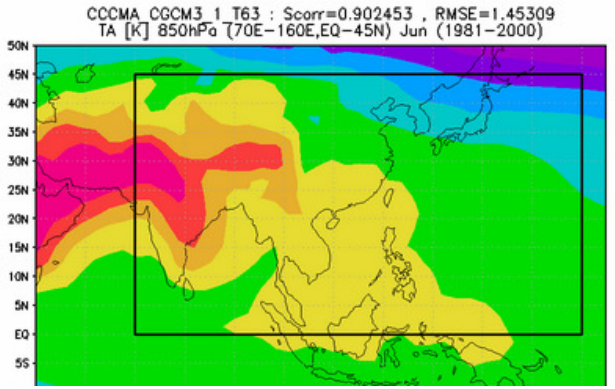
Reference Data: JRA25



CMIP3 Model Output: Open as New Window/Tab | View All Difference Images | Summary of Analysis





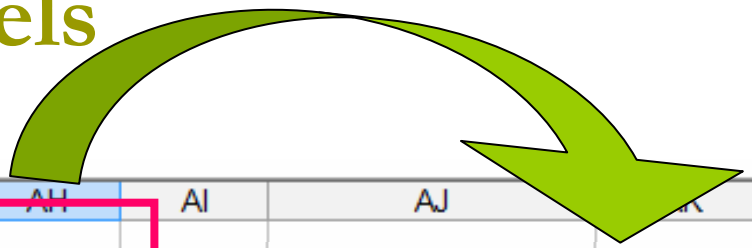


Evaluation Sheet: MODEL_SELECTION_tmp.xls

Folder: Model_selection

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	PRECIPITATION	JUNE		JULY		AUGUST		SEPTEMBER							
2	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index
3	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
4	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0
5	cccma_cgcm3_1_t6	0	0	0	0	0	0	0	0		0.00	0.00		0	0
6	cnrm_cm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0
7	csiro_mk3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
8	csiro_mk3_5	0	0	0	0	0	0	0	0		0.00	0.00		0	0
9	gfdl_cm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
10	gfdl_cm2_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0
11	giss_aom	0	0	0	0	0	0	0	0		0.00	0.00		0	0
12	giss_model_e_h	0	0	0	0	0	0	0	0		0.00	0.00		0	0
13	giss_model_e_r	0	0	0	0	0	0	0	0		0.00	0.00		0	0
14	iap_fgoals1_0_g	0	0	0	0	0	0	0	0		0.00	0.00		0	0
15	ingv_echam4	0	0	0	0	0	0	0	0		0.00	0.00		0	0
16	inmcm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
17	ipsl_cm4	0	0	0	0	0	0	0	0		0.00	0.00		0	0
18	miroc3_2_hires	0	0	0	0	0	0	0	0		0.00	0.00		0	0
19	miroc3_2_medres	0	0	0	0	0	0	0	0		0.00	0.00		0	0
20	miub_echo_g	0	0	0	0	0	0	0	0		0.00	0.00		0	0
21	mpi_echam5	0	0	0	0	0	0	0	0		0.00	0.00		0	0
22	mri_cgcm2_3_2a	0	0	0	0	0	0	0	0		0.00	0.00		0	0
23	ncar_ccsm3_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
24	ncar_pcm1	0	0	0	0	0	0	0	0		0.00	0.00		0	0
25	ukmo_hadcm3	0	0	0	0	0	0	0	0		0.00	0.00		0	0
26	ukmo_hadgem1	0	0	0	0	0	0	0	0		0.00	0.00		0	0
27															
28		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**Total**	**0**	**0**			
29	AIR TEMPERATURE	JUNE		JULY		AUGUST		SEPTEMBER							
30	Model	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE	Scorr	RMSE		S_corr	RMSE		S_corr Index	RMSE Index
31	bccr_bcm2_0	0	0	0	0	0	0	0	0		0.00	0.00		0	0
32	cccma_cgcm3_1	0	0	0	0	0	0	0	0		0.00	0.00		0	0
33	cccma_cgcm3_1_t6	0	0	0	0	0	0	0	0		0.00	0.00		0	0

Final Sorting of Models



AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
S_corr	RMSE		Index	Index	Index		Total		Models	descending	
0.03	1.95		0	0	-1		1		bccr_bcm2_0	0	
0.40	1.21		1	1	1		5		cccma_cgcm3_1	0	
0.57	0.97		1	1	1		6		cccma_cgcm3_1_t63	0	
-0.02	2.35		0	0	-1		-2		cnrm_cm3	0	
0.28	1.51		1	1	1		1		csiro_mk3_0	0	
0.30	1.54		1	1	1		1		csiro_mk3_5	0	
0.53	1.35		1	1	1		5		gfdl_cm2_0	0	
0.54	1.33		1	1	1		7		gfdl_cm2_1	0	
0.15	2.34		0	0	-1		3		giss_aom	0	
-0.11	1.51		0	1	0		-3		giss_model_e_h	0	
-0.12	1.75		0	0	-1		-6		giss_model_e_r	0	
-0.11	2.18		0	0	-1		-3		iap_fgoals1_0_g	0	
0.53	0.95		1	1	1		5		ingv_echam4	0	
-0.20	1.67		0	0	-1		-3		inmcm3_0	0	
0.02	2.04		0	0	-1		-3		ipsl_cm4	0	
0.54	1.48		1	1	1		3		miroc3_2_hires	0	
0.36	1.16		1	1	1		1		miroc3_2_medres	0	
0.12	1.36		0	1	0		1		miub_echo_g	0	
0.49	1.51		1	1	1		7		mpi_echam5	0	
0.04	1.79		0	0	-1		3		mri_cgcm2_3_2a	0	
0.30	1.33		1	1	1		2		ncar_ccsm3_0	0	
-0.02	1.56		0	1	0		-2		ncar_pcm1	0	
0.46	1.38		1	1	1		3		ukmo_hadcm3	0	
0.49	1.47		1	1	1		6		ukmo_hadgem1	0	
0.232	1.57										

Your task now

…is to complete the Model selection sheet:

- 4 months for each element
- 7 elements
- Sort out the models
- Select the suitable ones

Thank you for your attention

End of Part 1:
Model Selection