

CLIK hands-on (PART II):

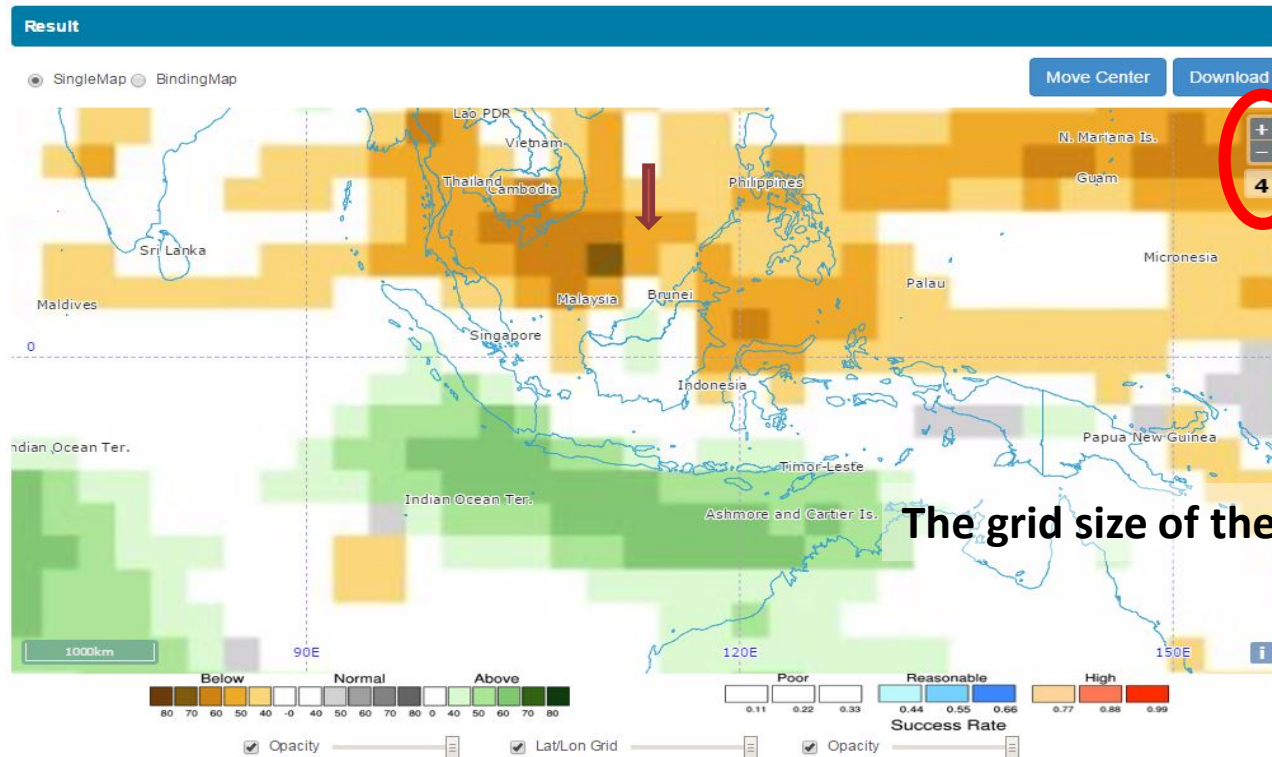
Data Processing for CLIK

(<http://clik.apcc21.org>)

Yoojin Kim
23 Aug 2016

Dynamical Forecast

- seasonal prediction graphic by dynamical MME forecast system (CLIK)



ZOOM IN!

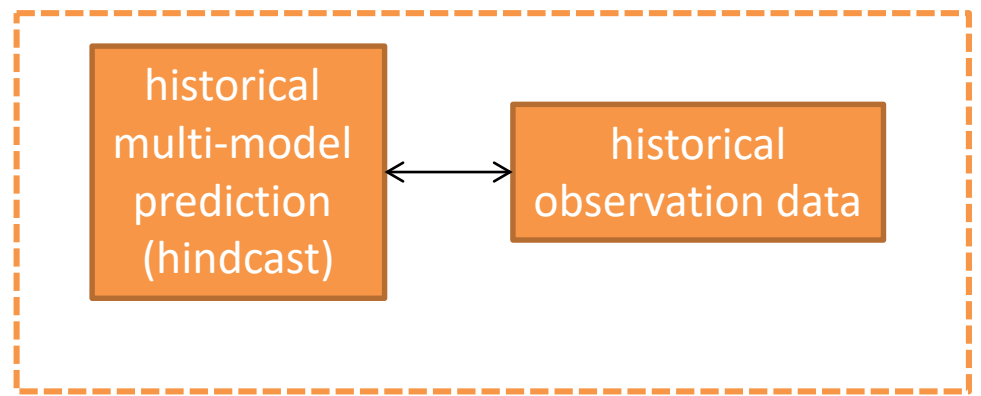
The grid size of the MME is 2.5° by 2.5°.

- A particular station (point) data

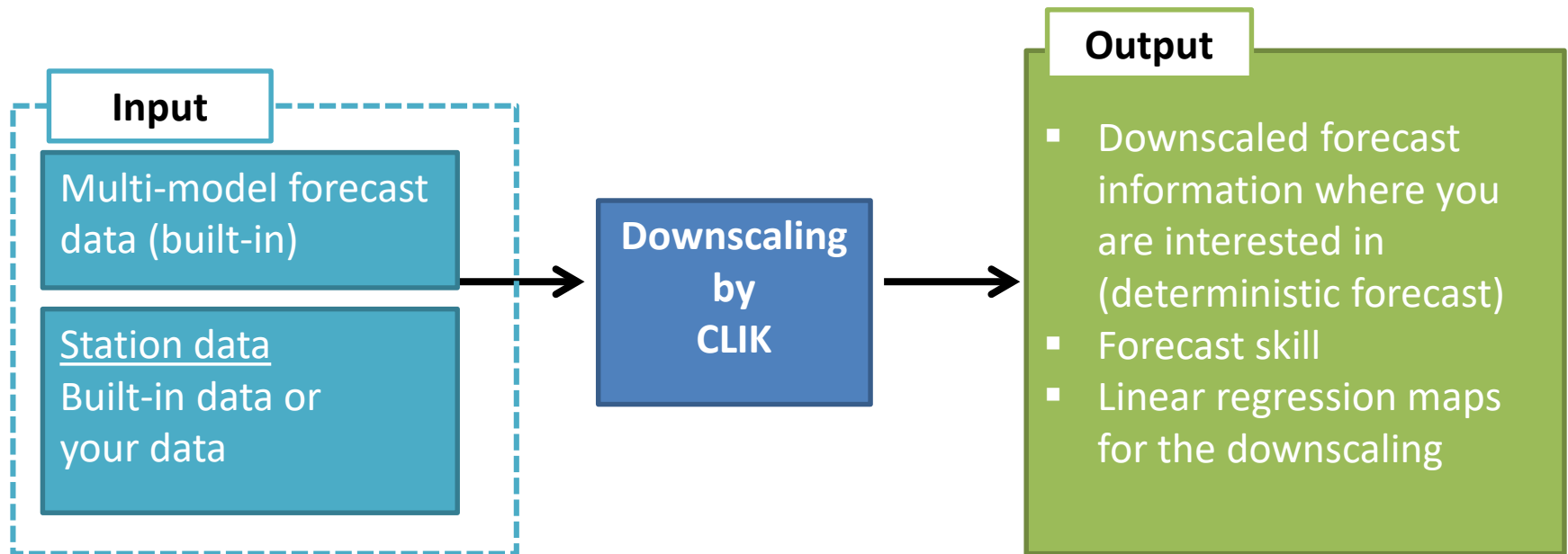
Post Processing, Downscaling

“Post-Processing of forecast data” CLIK provides “downscaling”

- There are many approaches in downscaling, all of them share similar process.
- The relationships between forecast and observation data



Downscaling by CLIK

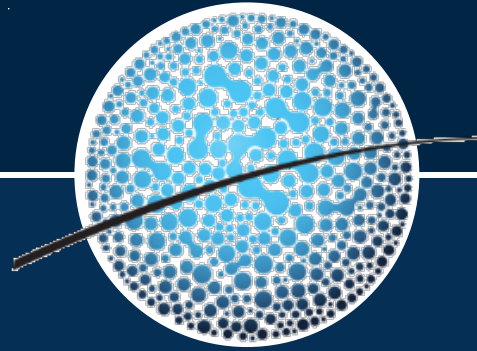


- **CLIK needs the information of the station for the downscale process.**
- **Data processing: Entering station data into the CLIK for customization**



Data Processing

- **In the part 2, Data processing:**
Making and uploading your station data into the CLIK system.
- **In the part 3, Downscaling**



Then, let's make the station data for the downscaling.

Entering station data into CLIK

A. Preparing Input data

1. Input two files: **metadata**, **observation** data
 - 1. metadata file contains information about station.
 - 2. observation data file is the station data itself.
 - You can input data only for one country at a time.
2. Only input monthly mean data (currently)
3. Use Notepad!
4. Format: delimited by comma, space, tab, or colon
5. File naming : `'*.txt'`
 - `'metadata.txt'` & `'korprcp.txt'`

Entering station data into CLIK

A. Preparing Input data

1. Metadata file

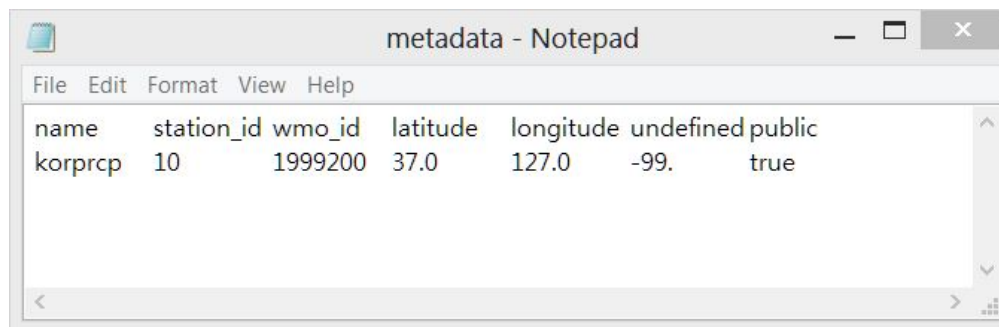
The first line of this file should contain the following headers:

Name, Station_id, WMO_id, Latitude, Longitude, Undefined, Public

Let's make a metadata file.

My example: Korean precipitation data

- Use Notepad.
- The filename is 'metadata.txt'.



```
File Edit Format View Help
name station_id wmo_id latitude longitude undefined public
korprcp 10 1999200 37.0 127.0 -99. true
```

Entering station data into CLIK

A. Preparing Input data

1. Metadata file

The first line of this file should contain the following headers:

Name, Station_id, WMO_id, Latitude, Longitude, Undefined, Public

- **Name:** name of the station
- **Station_id:** unique id for the station (integer, any number)
- **WMO_id:** WMO_id for station (integer, any number)
- **Latitude:** latitude for this station (float, for mapping)
- **Longitude:** longitude for this station (float, for mapping)
- **Undefined:** missing data (numeric)
- **Public:** true, if your data can be used by others
false, if your data can not be used by others

Entering station data into CLIK

A. Preparing Input data

2. Station data file

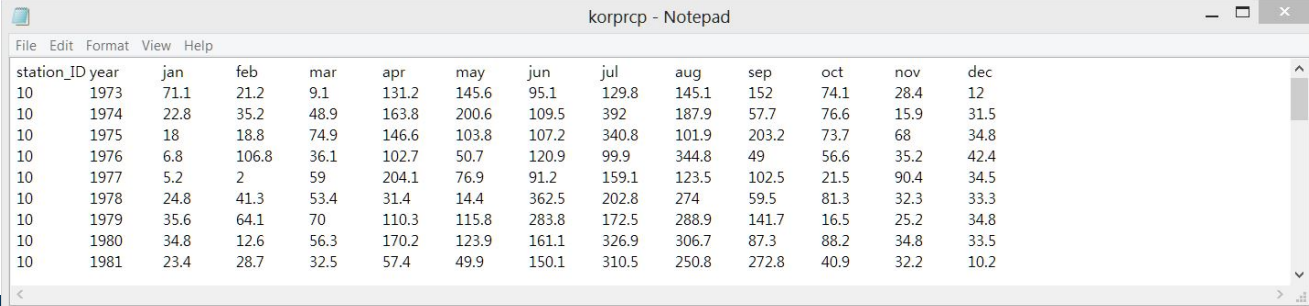
The first line of this file should contain the following headers:

Station_id, year, jan, feb, mar, apr, may, jun, jul, aug, sep, oct, nov, dec

Let's make a station data file.

My example:

- Use Notepad. Copy and past information from Exel to notepad in the specified format.
- The filename is 'korprcp.txt'.



The screenshot shows a Notepad window with the following data:

station_ID	year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
10	1973	71.1	21.2	9.1	131.2	145.6	95.1	129.8	145.1	152	74.1	28.4	12
10	1974	22.8	35.2	48.9	163.8	200.6	109.5	392	187.9	57.7	76.6	15.9	31.5
10	1975	18	18.8	74.9	146.6	103.8	107.2	340.8	101.9	203.2	73.7	68	34.8
10	1976	6.8	106.8	36.1	102.7	50.7	120.9	99.9	344.8	49	56.6	35.2	42.4
10	1977	5.2	2	59	204.1	76.9	91.2	159.1	123.5	102.5	21.5	90.4	34.5
10	1978	24.8	41.3	53.4	31.4	14.4	362.5	202.8	274	59.5	81.3	32.3	33.3
10	1979	35.6	64.1	70	110.3	115.8	283.8	172.5	288.9	141.7	16.5	25.2	34.8
10	1980	34.8	12.6	56.3	170.2	123.9	161.1	326.9	306.7	87.3	88.2	34.8	33.5
10	1981	23.4	28.7	32.5	57.4	49.9	150.1	310.5	250.8	272.8	40.9	32.2	10.2

Entering station data into CLIK

A. Preparing Input data

Let's do it with your station data

Data folder: original

C:/APCC_TP_SDM_Aug2016/0Dbase/OBS/

1. [Station]prcp.txt
2. Metadata.txt

Thanks to Ms. Hyojin Lee!

Entering station data into CLIK

B. Station data upload module

1. Click “Downscale”. This brings a page list of available data sets.
2. Click “Create” to create a new data set.
3. Fill up two fields in the new entry page.
 - Name: an identifying name of the dataset
 - Description: describe your dataset
 - Click “Create Dataset”
 - You’ll see the new data set in the list.
4. Choose the new data set and click “Edit” button.

The image shows two screenshots of the CLIK web interface. The left screenshot shows the 'Downscale' page with a table of datasets and a 'Create' button circled in red. The right screenshot shows the 'Create Dataset' page with a 'Create Dataset' button circled in red.

Left Screenshot: Downscale Page

Navigation: Prediction, **Downscale**, My Page

Select Dataset / Station

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
MCDW(Monthly Climatic Data for th...	The World	6463	1998 ~ 2014	1998 ~ 2014	PUBLIC
GHCN	GHCN	3707	1950 ~ 2009	N/A	PUBLIC
new		0	N/A	N/A	yoojin10
Aphrodite data interpolated to Mons...	Afghanistan, Bangladesh, Brunei Da...	4918	1961 ~ 2004	N/A	PUBLIC
Korea 60 Stations	Korea, Republic of	60	1973 ~ 2008	1973 ~ 2006	PUBLIC
koreamean	Korea, Republic of	1	1973 ~ 2014	N/A	yoojin10

Buttons: Create, Edit, Remove

Right Screenshot: Create Dataset Page

Navigation: Prediction, **Downscale**, My Page

Select Dataset / Station

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
Dili1	Timor-Leste	1	1982 ~ 2012	N/A	yoojin10
Aphrodite data interpolated to Mons...	Afghanistan, Bangladesh, Brunei D...	4918	1961 ~ 2004	N/A	PUBLIC
Korea 60 Stations	Korea, Republic of	60	1973 ~ 2008	1973 ~ 2006	PUBLIC
test		0	N/A	N/A	yoojin10
korean1	Indonesia	1	1973 ~ 2014	N/A	yoojin10
koreamean	Korea, Republic of	1	1973 ~ 2014	N/A	yoojin10

Buttons: Create, Edit, Remove

Entering station data into CLIK

B. Station data upload module

5. The new page allows you to add metadata and station data for one country at a time.
6. Check the 'Field Separator' and 'Country' for the metadata.
7. Upload the metadata file.
8. Check the 'Field Separator', 'Variable', 'Unit', and 'Country' for the station data.
9. Upload the station data file.
10. Click the Station line at the upper panel to see the specific information.
11. Click "Close".

The screenshot displays the CLIK web interface for entering station data. It features two main panels. The top panel, titled 'Stations in korean', contains a table with the following data:

Station ID	Country	NAME	WMO ID	Latitude	Longitude	Undefined
10	Korea, Republic of	korrcp	1999200	37	127	-99

A hand icon with the word 'CLICK' points to the first row of this table. Below the table are form fields for 'Field Separator' (radio buttons for Comma, Space, Tab, Colon), 'Country' (dropdown menu), and 'Station definition file (example)' (file selector and 'Upload' button). The bottom panel, titled 'Observed Data of station 10 in Korea, Republic of', contains a table with the following data:

Year	Variable	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1973	PREC	mm/month	71.1	21.2	9.1	131.2	145.6	95.1	129.8	145.1	152	74.1	28.4	12
1974	PREC	mm/month	22.8	35.2	48.9	163.8	200.6	109.5	392	187.9	57.7	76.6	15.9	31.5
1975	PREC	mm/month	18	18.8	74.9	146.6	103.8	107.2	340.8	101.9	203.2	73.7	68	34.8
1976	PREC	mm/month	6.8	106.8	36.1	102.7	50.7	120.9	99.9	344.8	49	56.6	35.2	42.4
1977	PREC	mm/month	5.2	2	59	204.1	76.9	91.2	159.1	123.5	102.5	21.5	90.4	34.5
1978	PREC	mm/month	24.8	41.3	53.4	31.4	14.4	362.5	202.8	274	59.5	81.3	32.3	33.3

Below the table are form fields for 'Field separator' (radio buttons for Comma, Space, Tab, Colon), 'Variable' (radio buttons for Precipitation, Temperature), 'Unit' (radio buttons for mm/month, mm/day, others), 'Country' (dropdown menu), and 'Observed data file (example)' (file selector and 'Upload' button). A 'Close' button is located at the bottom right of the interface.

Entering station data into CLIK

B. Station data upload module

11. After finish the data uploading, you can choose a new station data set in the data list.
12. Check the map and select the area for downscaling (shift + drag).
13. Click “ADD” below the map. And check the station data.

Select Dataset / Station

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
korean2	Korea, Republic of	1	1973 ~ 2014	N/A	yoojin10
GHCN	GHCN	3707	1950 ~ 2009	N/A	PUBLIC
Dili1	Timor-Leste	1	1982 ~ 2012	N/A	yoojin10
Aphrodite data interpolated to Mons	Afghanistan, Bangladesh, Brunei D	4918	1961 ~ 2004	N/A	PUBLIC
Korea 60 Stations	Korea, Republic of	60	1973 ~ 2008	1973 ~ 2006	PUBLIC
koreamean	Korea, Republic of	1	1973 ~ 2014	N/A	yoojin10

Create Edit Remove

5000km
How to use?

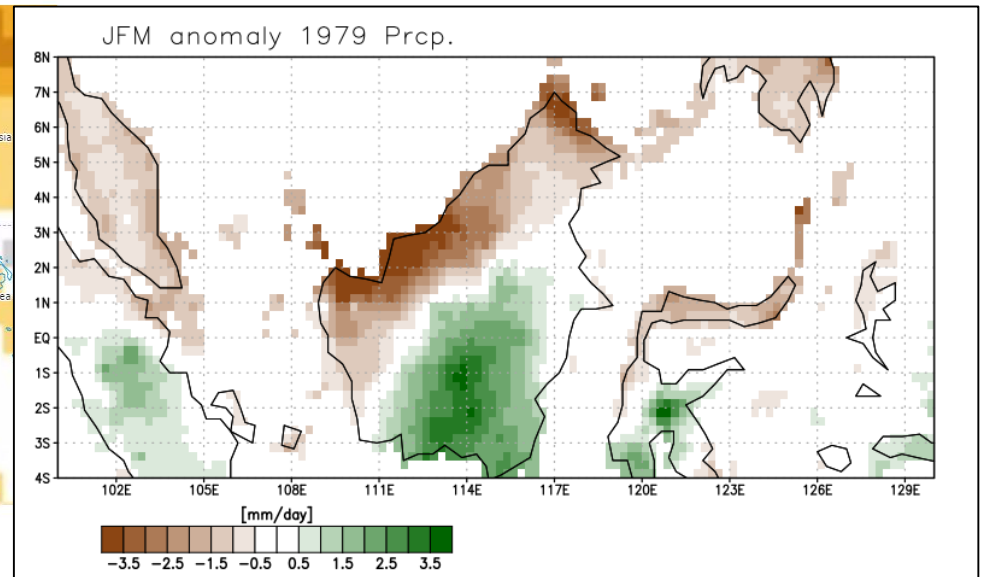
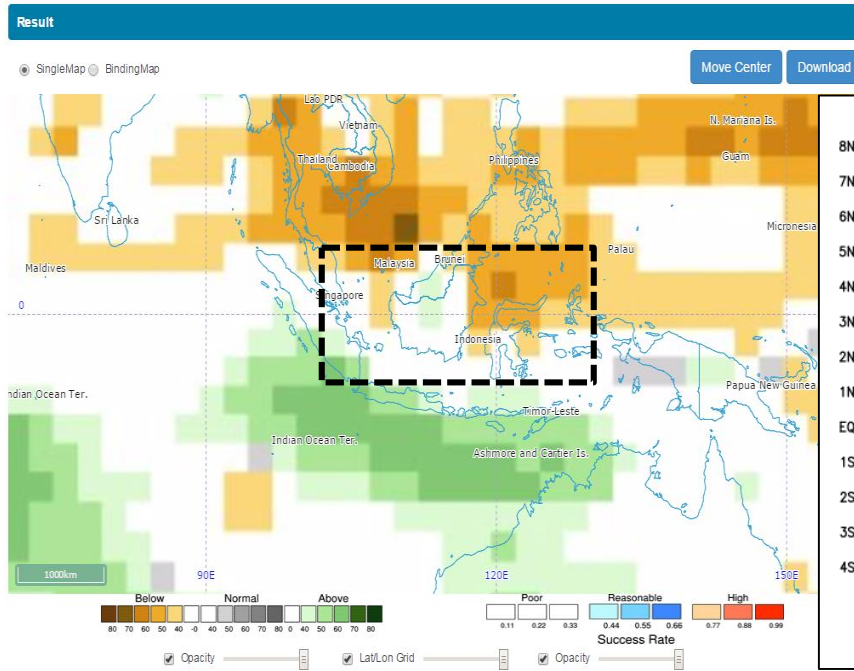
Add Remove



Thank you.

Post Processing

- **Real observation precipitation:**
APHRODITE gridded station precipitation (0.25 by 0.25)



Compare the grid size!

CLIK hands-on (PART III):
**Multi Model Downscaling Using
CLIK**
(<http://clik.apcc21.org>)

Yoojin Kim
23 Aug 2016



1. Downscaling using built-in station data

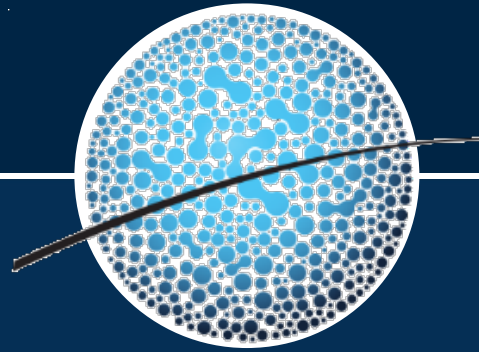
- APHRODITE* data
- Northern part of Sulawesi Island in Indonesia
- 3 stations
- JJA mean

2. Downscaling using your station data which was uploaded in the 'Data Processing Part'

*AHORODITE

Asian Precipitation – Highly-Resolved Observational Data integration Towards Evaluation of Water Resources

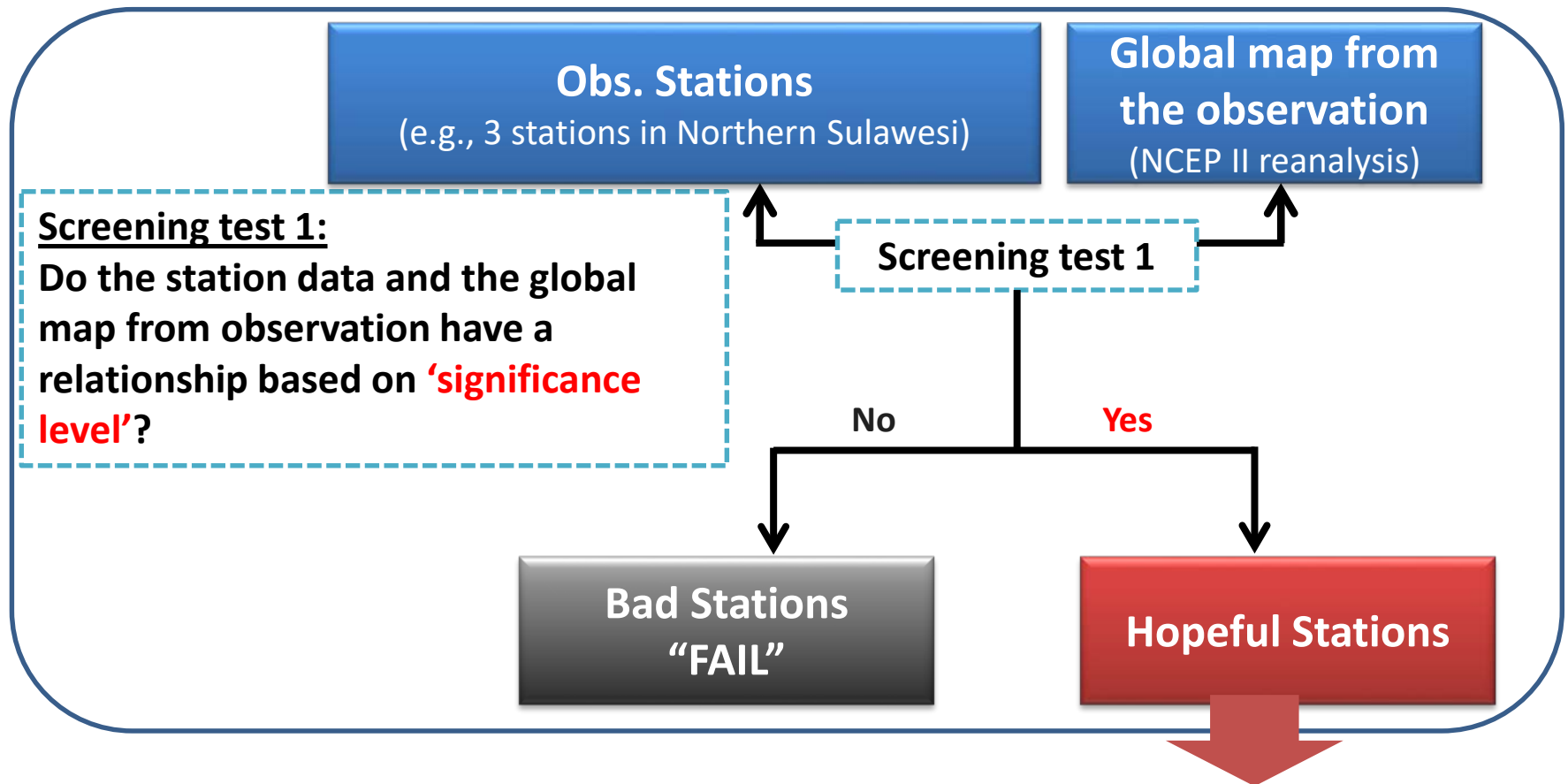
<https://climatedataguide.ucar.edu/climate-data/aphrodite-asian-precipitation-highly-resolved-observational-data-integration-towards.#sthash.42mDJsXJ.dpuf>



Downscaling procedure

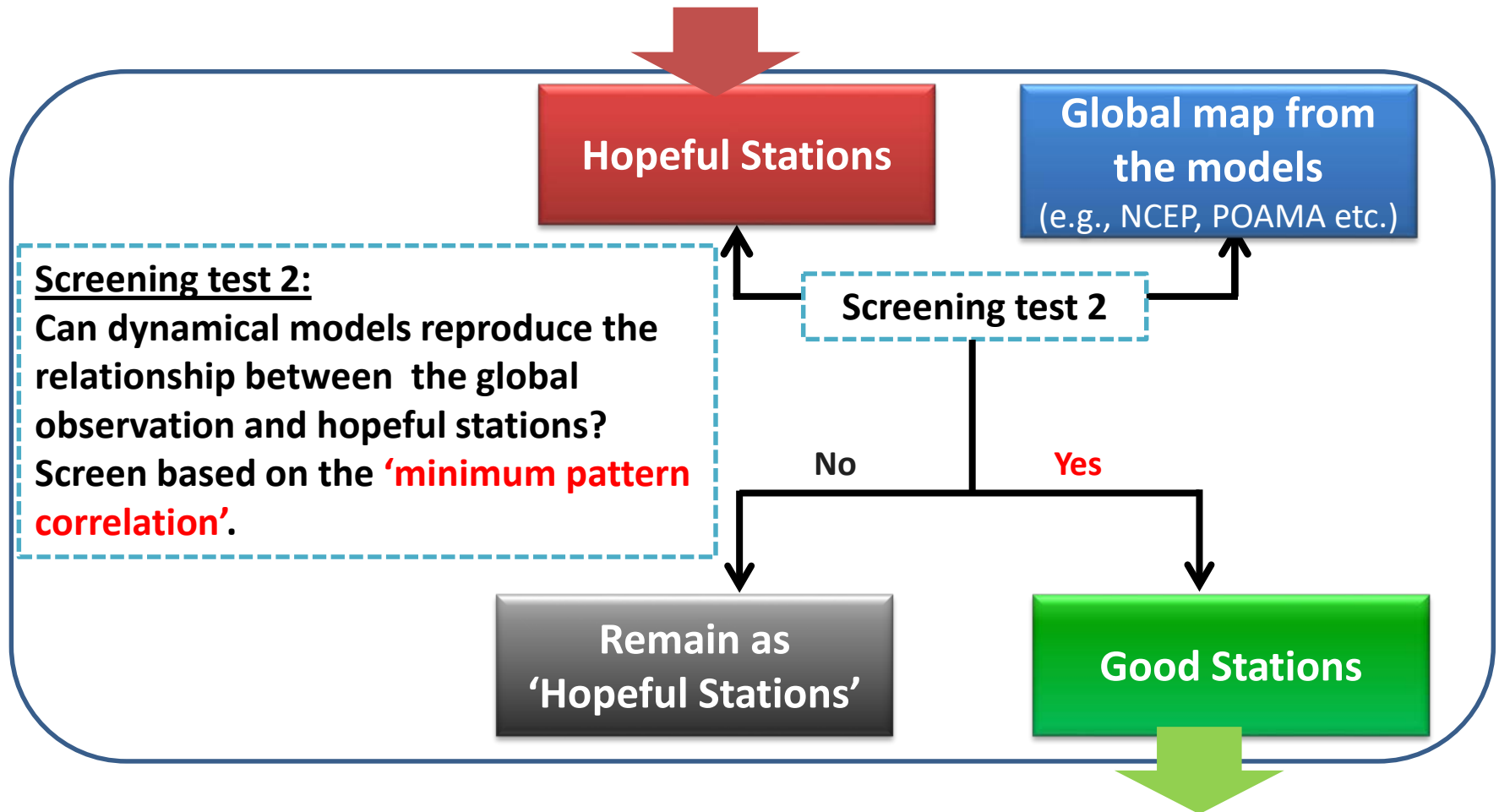
Downscaling procedure in CLIK

● Step 1. Screening process



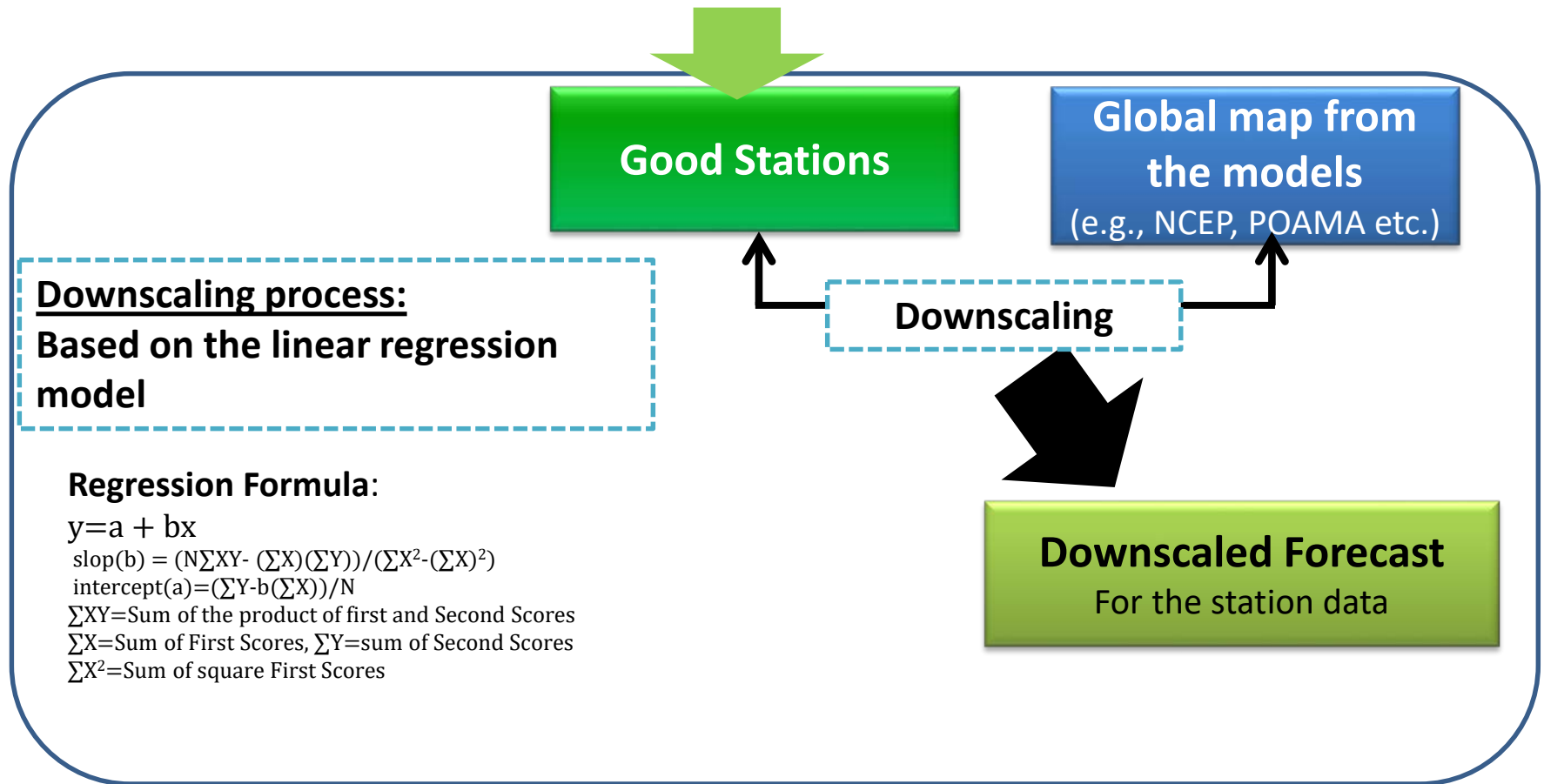
Downscaling procedure in CLIK

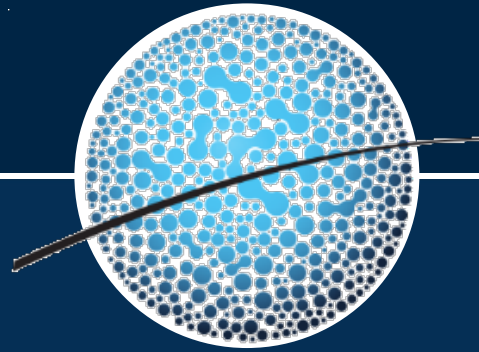
● Step 2. Screening process



Downscaling procedure in CLIK

● Step 3. Downscaling





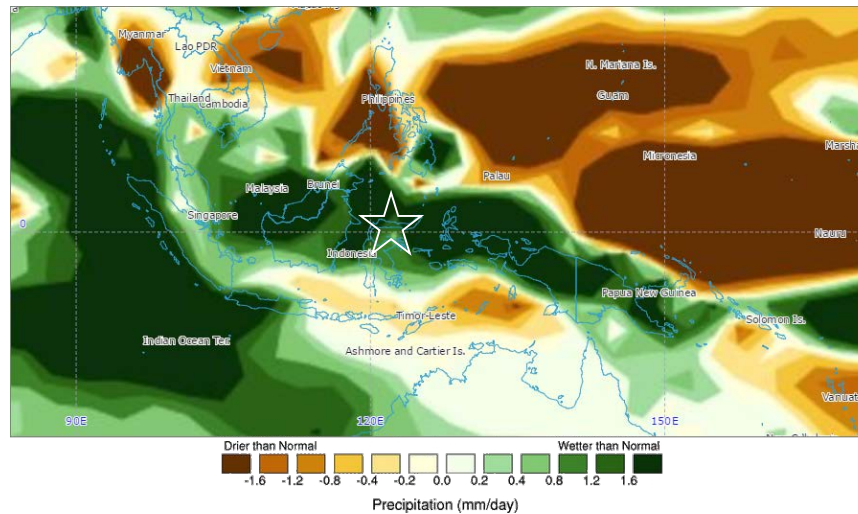
Let's do it!

1. Downscaling using built-in station data

Produce a downscaled forecast

Dynamical precipitation prediction for 2016 JJA by NCEP model

NCEP



Lead Month: 3, Year: 2016, Season: 6, Methods: SCM
Model: NCEP

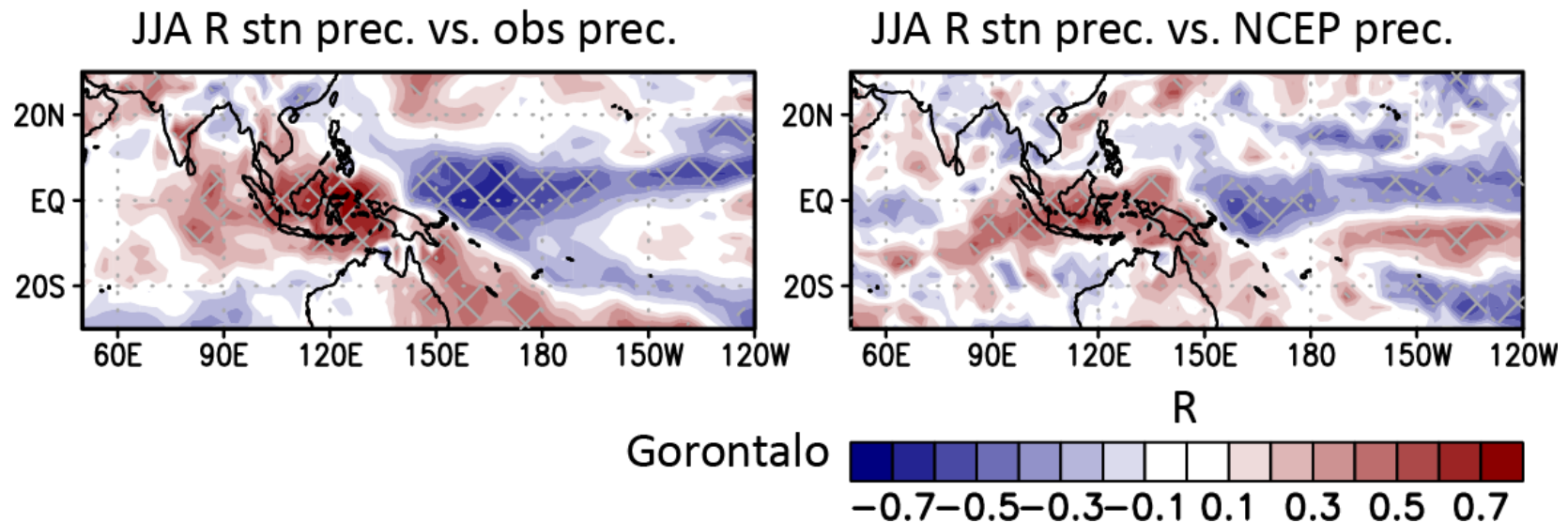
created by CLIJ(2016-05-29)

© APEC Climate Center

Northern part of Sulawesi

Produce a downscaled forecast

Relationship between Gorontalo (northern part of Sulawesi) station prcp. & ...



- The Station data have relationship with global observation precipitation.
- NCEP model can reproduce the relationship between observation and station.
- We hope a successful downscaling by CLIK system...

Produce a downscaled forecast

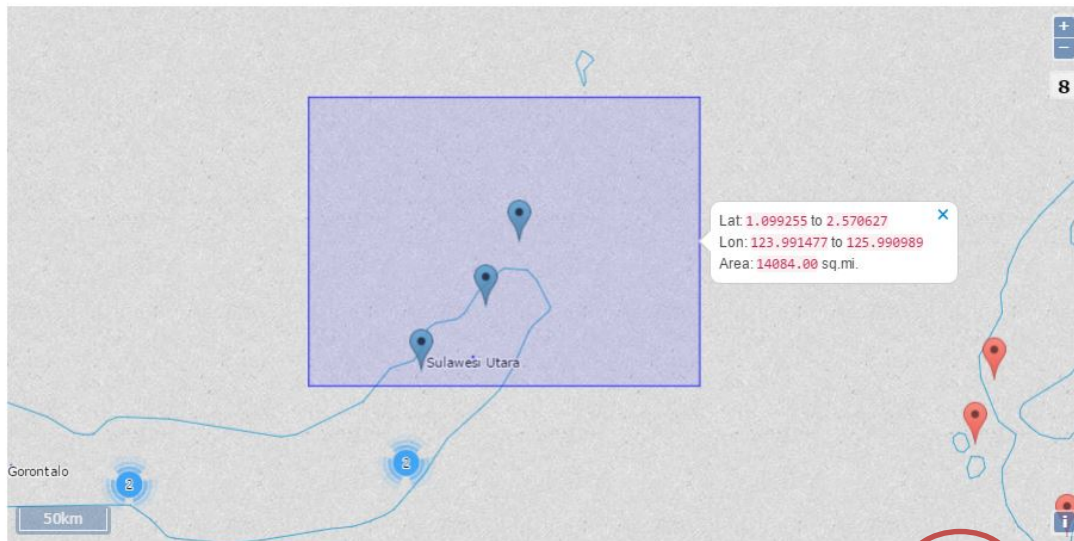
- A. Click 'Downscale' tab.
- B. Select the dataset (Aphrodite) in CLIK

The screenshot shows the CLIK (Climate Information Toolkit) interface. The top navigation bar includes 'Prediction', 'Downscale' (highlighted with a red circle), and 'My Page'. The 'Downscale' tab is active, displaying a table of datasets. The 'Aphrodite data interpolated to Mons...' dataset is highlighted with a red box. Below the table are 'Create', 'Edit', and 'Remove' buttons.

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
MCDW(Monthly Climatic Data for th...	The World	6463	1998 ~ 2014	1998 ~ 2014	PUBLIC
GHCN	GHCN	3707	1950 ~ 2009	N/A	PUBLIC
Aphrodite data interpolated to Mons...	Afghanistan, Bangladesh, Brunei Da...	4918	1961 ~ 2004	N/A	PUBLIC
Korea 60 Stations	Korea, Republic of	60	1973 ~ 2008	1973 ~ 2006	PUBLIC
koreamean	Korea, Republic of	1	1973 ~ 2014	N/A	yoojin10

Produce a downscaled forecast

C. Select stations on the map



1. On the map, you can choose stations where you are interested in. Press shift + left mouse button and drag to select stations.
2. Click 'Add'. Then you will see station's list and common data period.
3. Click 'Next'.

- 3 stations among Aphrodite dataset in Sulawesi island.
- Strongly recommend to choose lesser stations than 5.
- Too many stations would slow down the downscaling process seriously.

Station (3)	Station ID	Name	Precipitation	Temperature
<input type="checkbox"/>	97014000	Mapanget/manado_Indonesia	1961/1 ~ 2004/12	N/A
<input type="checkbox"/>	97014001	Amurang	1961/1 ~ 2004/12	N/A
<input type="checkbox"/>	97014002	Talisei	1961/1 ~ 2004/12	N/A

Common data period of selected stations	Month	1	2	3	4	5	6	7	8	9	10	11	12
Precipitation		1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004	1961 ~ 2004

NEXT

Produce a downscaled forecast

C. Select variables, models, training period, downscaling region

Set-up Downscaling

Prediction Season
Year: 2016 Season: JJA

Variable
 PREC T850 Z500
 SLP U850 V850
 U200 V200 SST

Models
 APCC BCC COLA
 CWB IRIF IRI_CA
 MGO NASA NCEP
 PNU POAMA

Predictand
 Precipitation Temperature

Training Period
Form: 1982 To: 2004

Method
 Linear Regression

Advanced Options
Significance Level: 5 %
Minimum Pattern Score: 0.3 %

Downscaling Region
Latitude: -10 ~ 10 Longitude: 50 ~ 160 Apply

Lat: -10.00000 to 10.0000
Lon: 50.00000 to 160.0000
Area: 10579947.29 sq.mi.

5000km

Previous Downscale

1. Select prediction season.
2. Select variable (predictor) for the downscaling.
3. Select models for the downscaling.
4. Select target variable (predictand) among precipitation and temperature.
5. Select training period.
6. Select method (currently we only provide linear regression).

- 2016 JJA
- PREC
- NCEP
- Precipitation
- From 1982-2004
- Linear Regression

Produce a downscaled forecast

C. Select variables, models, training period, downscaling region

Set-up Downscaling

Prediction Season
Year: 2016 Season: JJA

Variable
 PREC T850 Z500
 SLP U850 V850
 U200 V200 SST

Models
 APCC BCC COLA
 CWB IRIF IRI_CA
 MGO NASA NCEP
 PNU POAMA

Predictand
 Precipitation Temperature

Training Period
Form: 1982 To: 2004

Method
 Linear Regression

Advanced Options
Significance Level: 5 %
Minimum Pattern Score: 0.3 %

Downscaling Region
Latitude: -10 ~ 10 Longitude: 50 ~ 160 Apply

Lat: -10.000000 to 10.000000
Lon: 50.000000 to 160.000000
Area: 10579947.29 sq.mi.

5000km

Previous **Downscale**

7. Select advanced options for significance level and minimum pattern scores for screening.
 - The significance level is to find the relationship between station data and observation (NCEP reanalysis).
 - The pattern score is a screening value to find out the model pattern is similar to the observation or not.
8. Select the downscaling region: spatial range of the predictor's area. Or you can drag area in the map.
9. Click 'Downscale'.
 - Significance level: 5%
 - Minimum pattern score: 0.3
 - Region: 10S~10N, 50E-160E

Produce a downscaled forecast

D. Results

My Page

Jobs		System Status			
JOB ID	TYPE	STATE	RESULT DATA	CREATED	UPDATED
4236	Downscale	success	download	2016-08-22 21:14:57	2016-08-22 21:15:09
4235	Downscale	success	download	2016-08-22 21:08:37	2016-08-22 21:08:53
4234	Downscale	success	download	2016-08-22 20:04:45	2016-08-22 20:05:12
4233	Downscale	fail		2016-08-22 20:02:18	2016-08-22 20:02:18
4226	Downscale	fail		2016-08-22 13:00:04	2016-08-22 13:00:05
4175	Downscale	fail		2016-06-08 15:31:29	2016-06-08 15:31:29
4174	Downscale	fail		2016-06-08 15:24:34	2016-06-08 15:24:39
4173	Downscale	fail		2016-06-08 15:22:57	2016-06-08 15:23:00
4172	Downscale	fail		2016-06-08 15:21:13	2016-06-08 15:21:20
4171	Downscale	fail		2016-06-08 14:15:08	2016-06-08 14:15:13

Showing 1 to 10 of 81 entries

Previous 1 2 3 4 5 ... 9 Next

Details

JOB ID	4236	CREATE At	2016-08-22 21:14:57
DOWNSCALE ID	3540	UPDATE At	2016-08-22 21:15:09
PREDICTAND		PREDICTOR	
YEAR/SEASON	2016 / 6	Training Period	1982 / 2004
PREDICTAND	PREC	VARIABLE	PREC
DATASET	Aphrodite data interpolated to Monsoon Asia Region [ID:7602]	MODELS	NCEP
STATION	3 Stations	REGION	Lat -10~10/ Lon 50~130
SIGNIFICANCE LEVEL	5%		
MINIMUM PATTERN SCORE	0.3		

FEEDBACK

ViewResult Edit

1. You will see the 'state' of the process. After the process is done, you will see 'fail' or 'success'. Then you can see the results by clicking the job line.
2. Click 'ViewResults' button to see the results of downscaling.

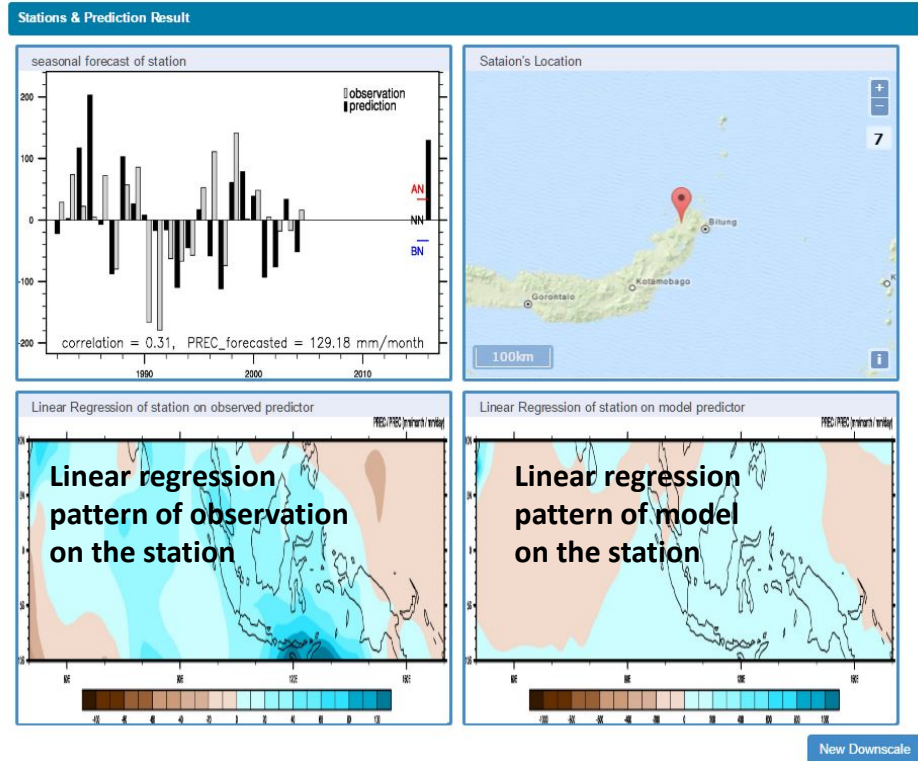
Produce a downscaled forecast

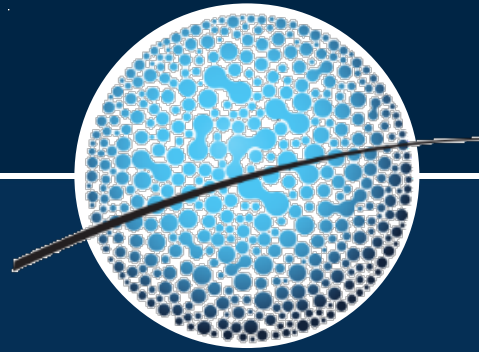
D. Results

Details					
PREDICTAND	2016 / 6		PREDICTOR	1982 / 2004	
YEAR/SEASON	2016 / 6		Training Period	1982 / 2004	
PREDICTAND	PREC		VARIABLE	PREC	
DATASET	Aphrodite data interpolated to Monsoon Asia Region		MODELS	☉ NCEP	
REGION	11 Stations		REGION	Lat: -10 ~ 10, Lon: 50 ~ 160	
SIGNIFICANCE LEVEL	5%				
MINIMUM PATTERN SCORE	0.3				
<input checked="" type="checkbox"/> List up hopeful & good result stations only					
Selected Stations					
Station ID	Result	Name	Data period for PREC	Data period for TEMP	Correlation
97014000	Good	Mapanget/manado_Indonesia	1961/1 ~ 2004/12		0.308431
97014001	Good	Amurang	1961/1 ~ 2004/12		0.308376
97014002	Good	Talisei	1961/1 ~ 2004/12		0.306781
97026001	Hopeful	Noancan	1961/1 ~ 2004/12		0.287869
97026002	Good	Modayak	1961/1 ~ 2004/12		0.295097
97028000	Hopeful	Tolitoi_Indonesia	1961/1 ~ 2004/12		0.416711



3. Select 'MODELS'.
4. Click the station ID where you are interested in. Then you can see the prediction results, forecast skill, station's location, linear regression pattern of observed predictor and model predictor.
5. Enjoy the downscaled forecast. You can download the graphic information also.





2. Downscaling using your station data



Produce a downscaled forecast

- **Same procedure with the built-in data, but with your station data which was uploaded in the previous part.**
- **If the downscaling fails,,,, be patient and try more!**
Find the large scale climate system that affects local climate.
 1. Try predictor in the tropical area.



Thank you.