CLIK hands-on (PART II):

Data Processing for CLIK

(http://clik.apcc21.org)

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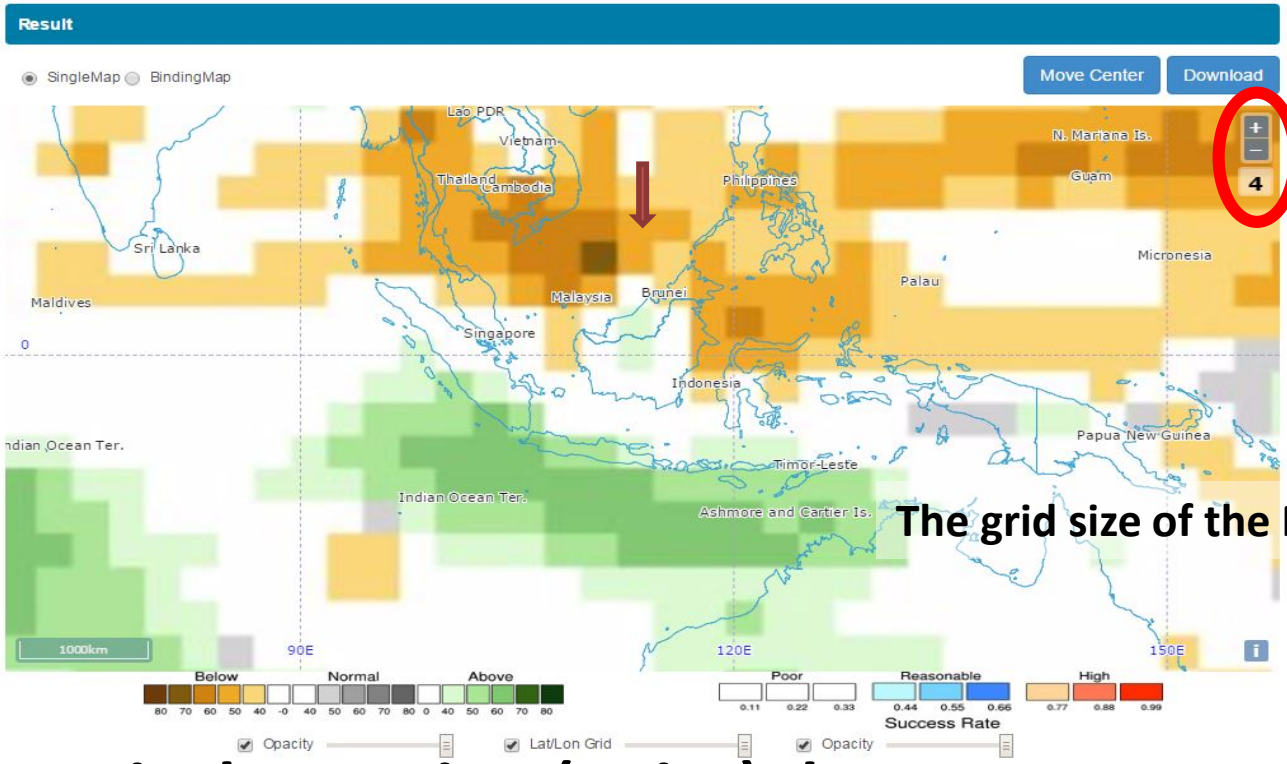
23 Aug 2016

APCC APEC CLIMATE CENTER

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°.

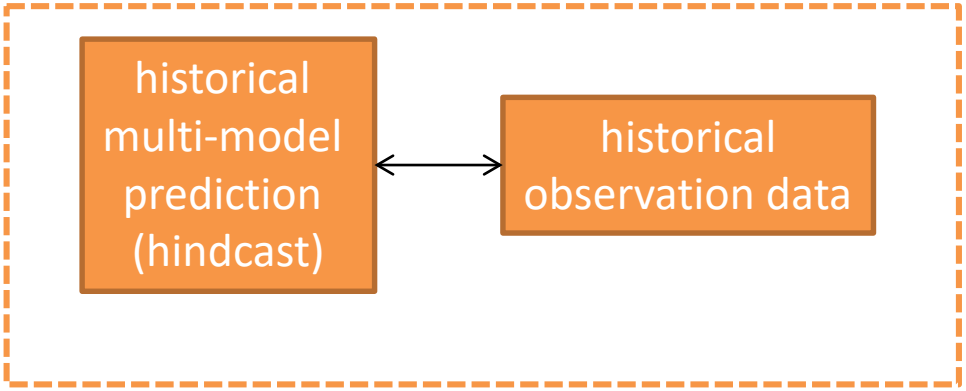
- A particular station (point) data

Post Processing, Downscaling

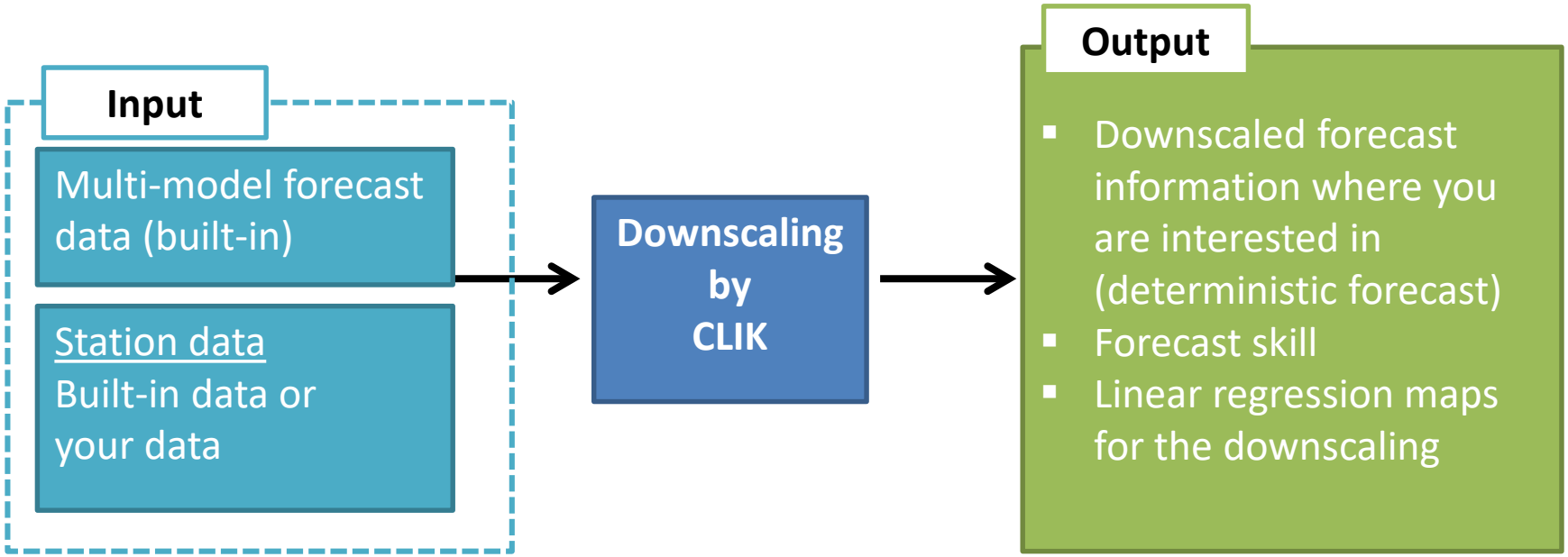
“Post-Processing of forecast data”

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



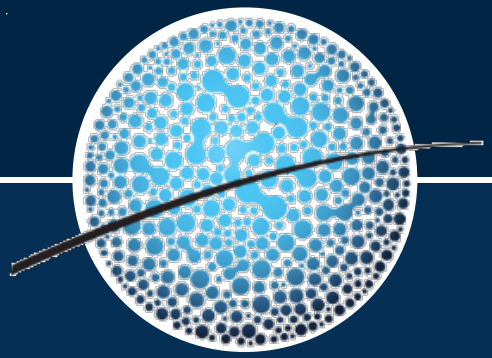
- **CLIK needs the information of the station for the downscale process.**
- **Data processing: Entering station data into the CLIK for customization**

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

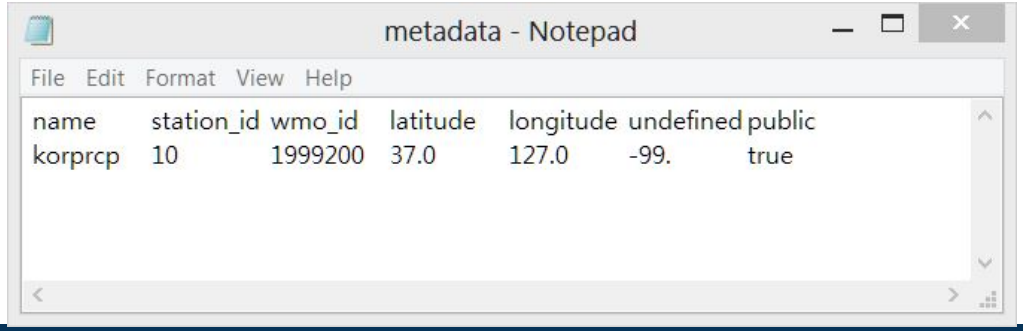
The first line of this file should contain the following headers:

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'.



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

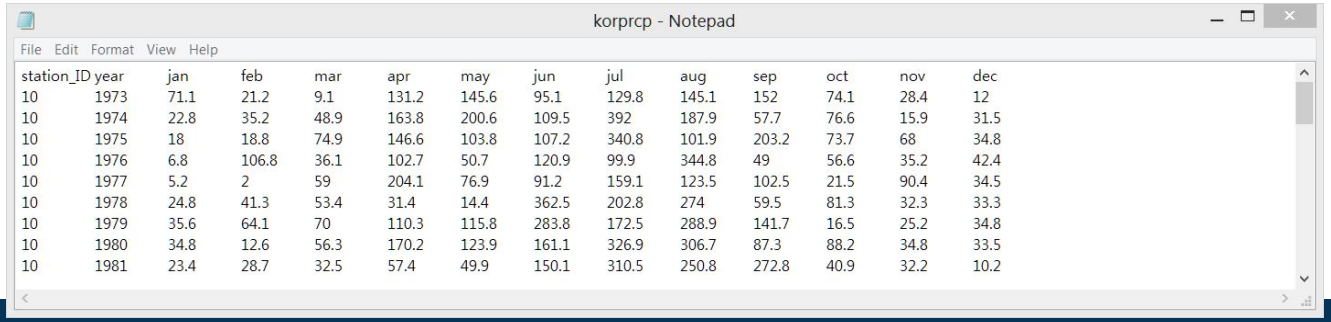
The first line of this file should contain the following headers:

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

<u>Let's make a station data file.</u>

My example:

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



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/

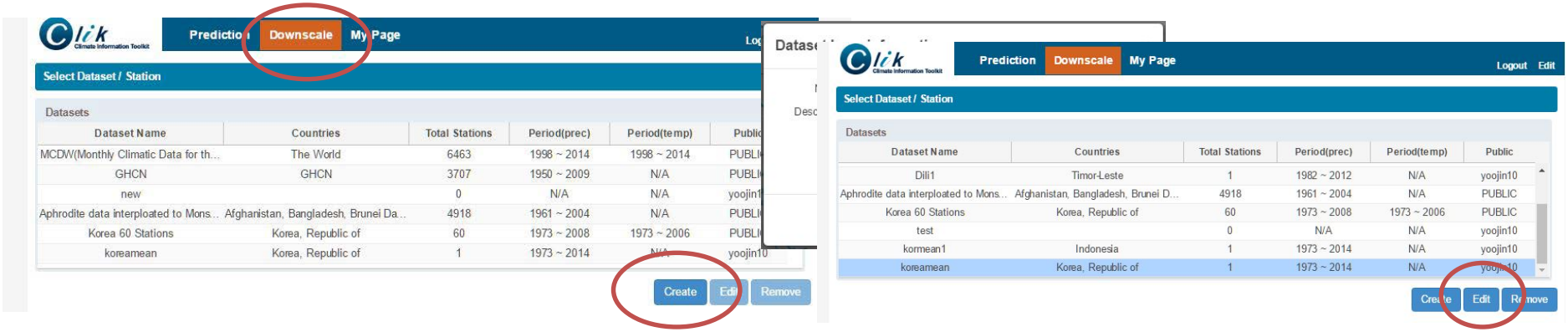
1. **[Station]prcp.txt**
2. **Metadata.txt**

Thanks to Ms. Hyojin Lee!

Entering station data into CLIK

B. Station data upload module

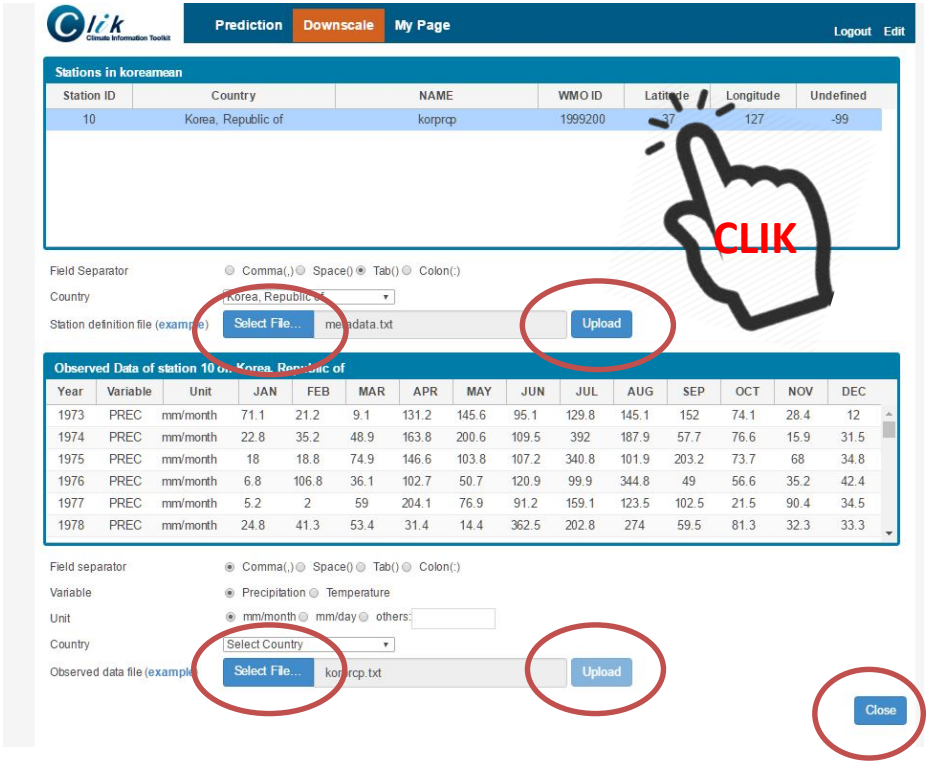
1. Click “Downscale”. This brings a page list of available data sets.
2. Click “Create” to create a new data set.
3. Fill up two fields in the new entry page.
   - Name: an identifying name of the dataset
   - Description: describe your dataset
   - Click “Create Dataset”
   - You’ll see the new data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



Entering station data into CLIK

B. Station data upload module

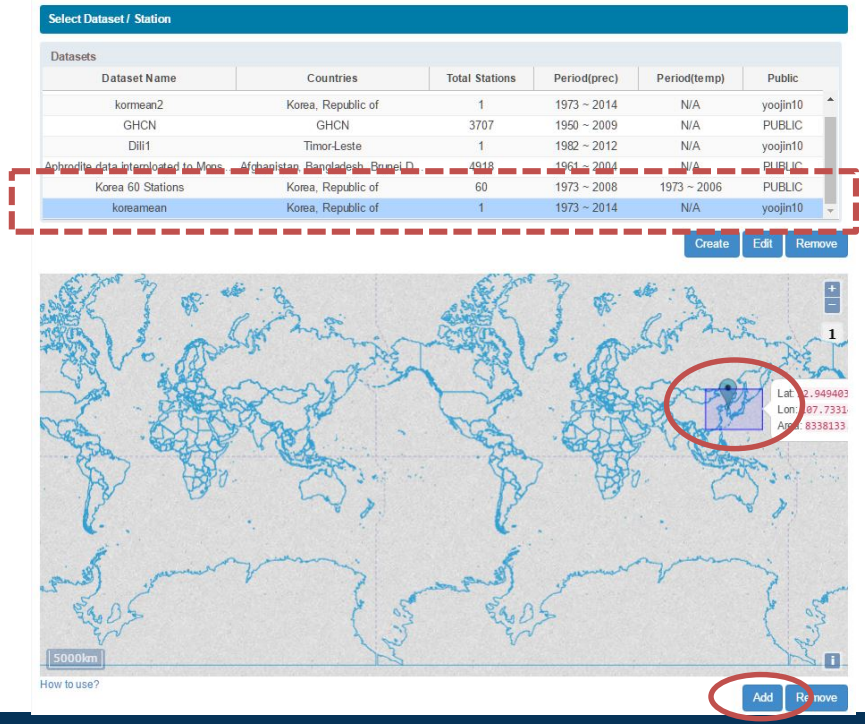
5. The new page allows you to add metadata and station data for one country at a time.
6. Check the ‘Field Separator’ and ‘Country’ for the metadata.
7. Upload the metadata file.
8. Check the ‘Field Separator’, ‘Variable’, ‘Unit’, and ‘Country’ for the station data.
9. Upload the station data file.
10.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



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.

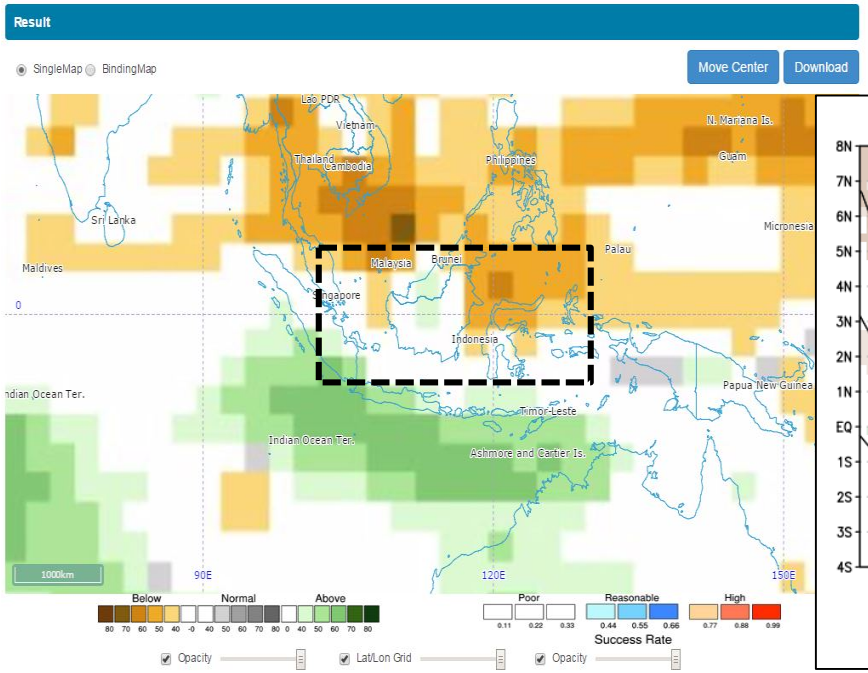


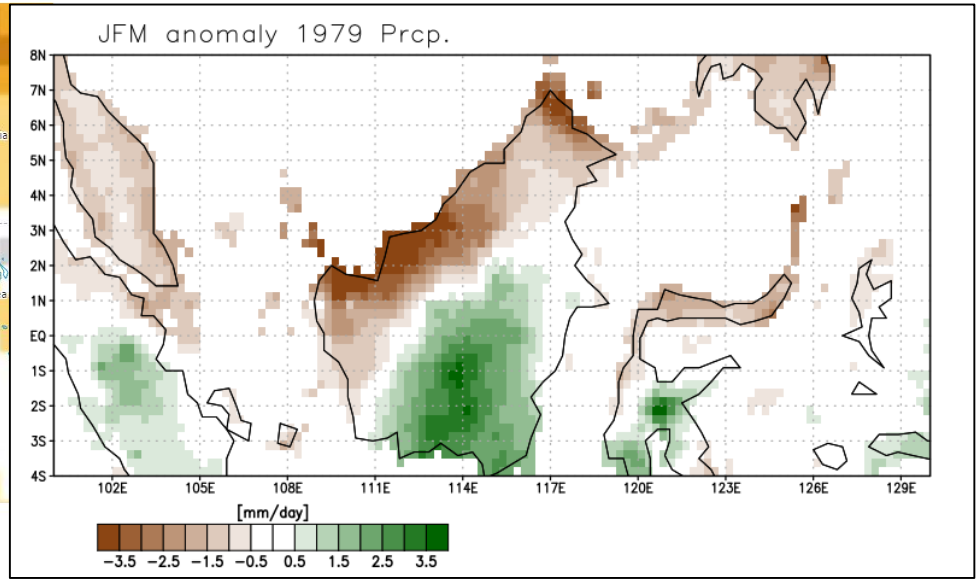

Thank you.

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)

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23 Aug 2016

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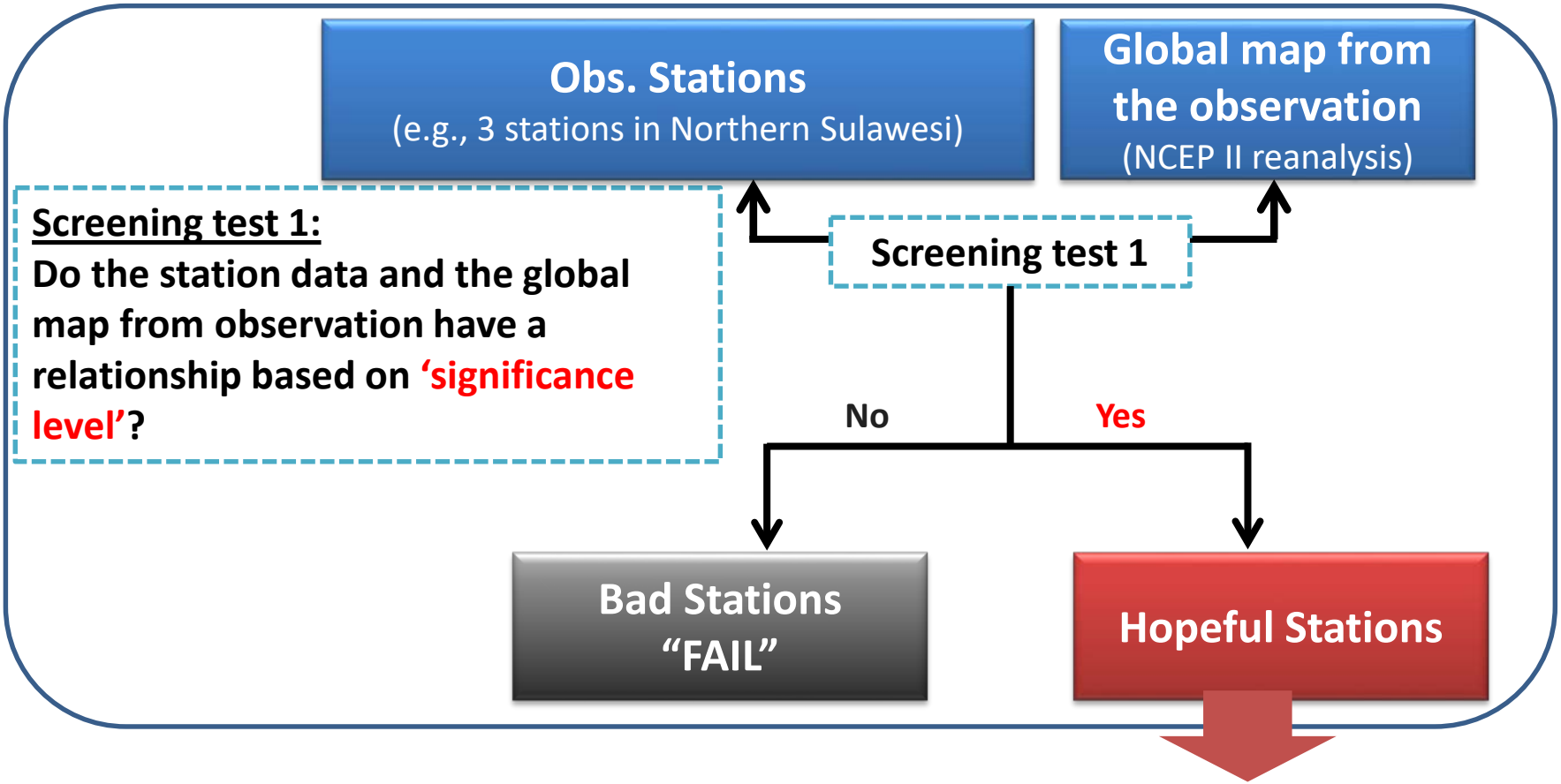
1. **Downscaling using built-in station data**
   - APHRODITE* data
   - Northern part of Sulawesi Island in Indonesia
   - 3 stations
   - JJA mean
2. **Downscaling using your station data which was uploaded in the ‘Data Processing Part’**

*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

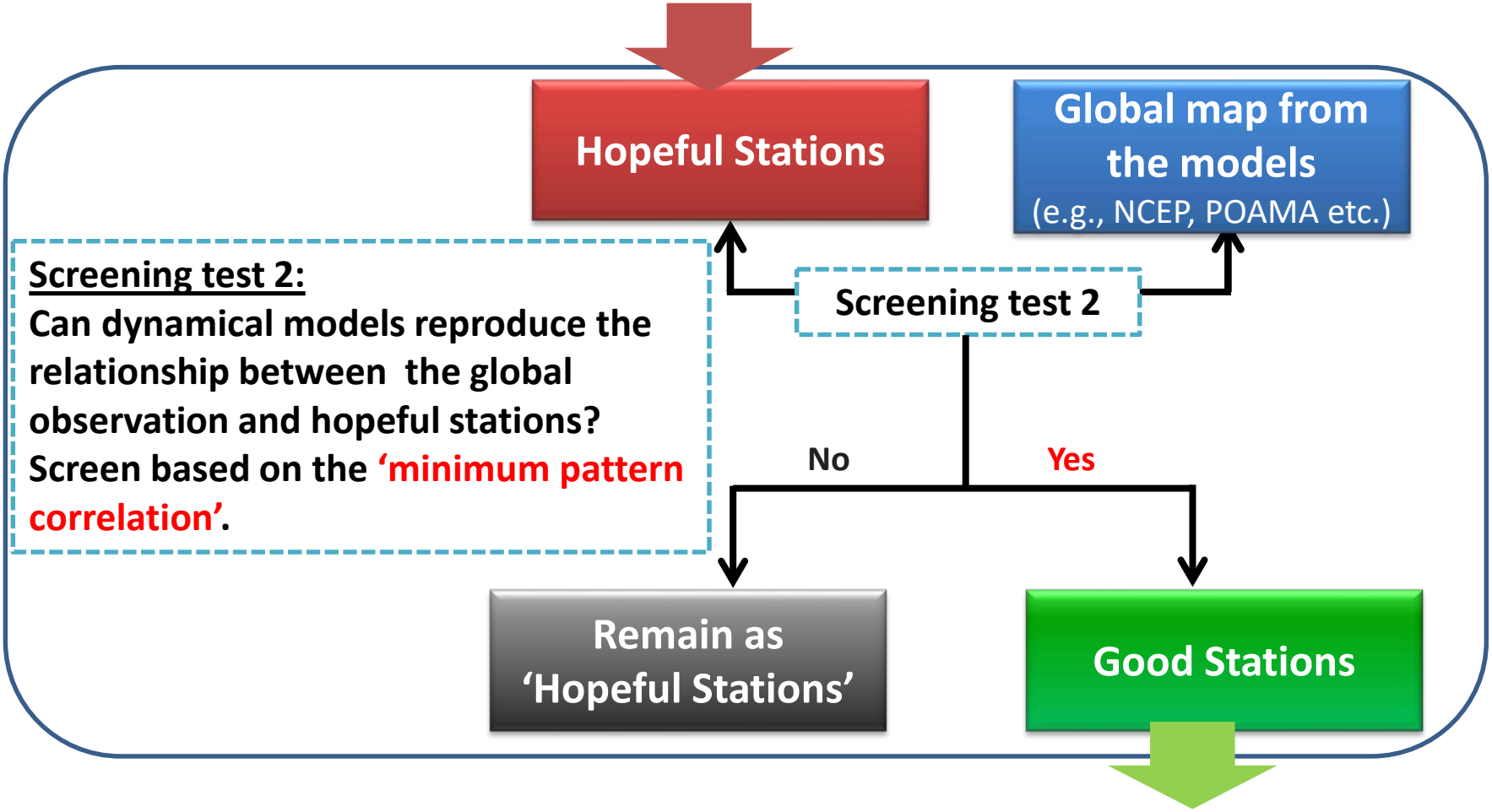
Downscaling procedure in CLIK

- **Step 1. Screening process**



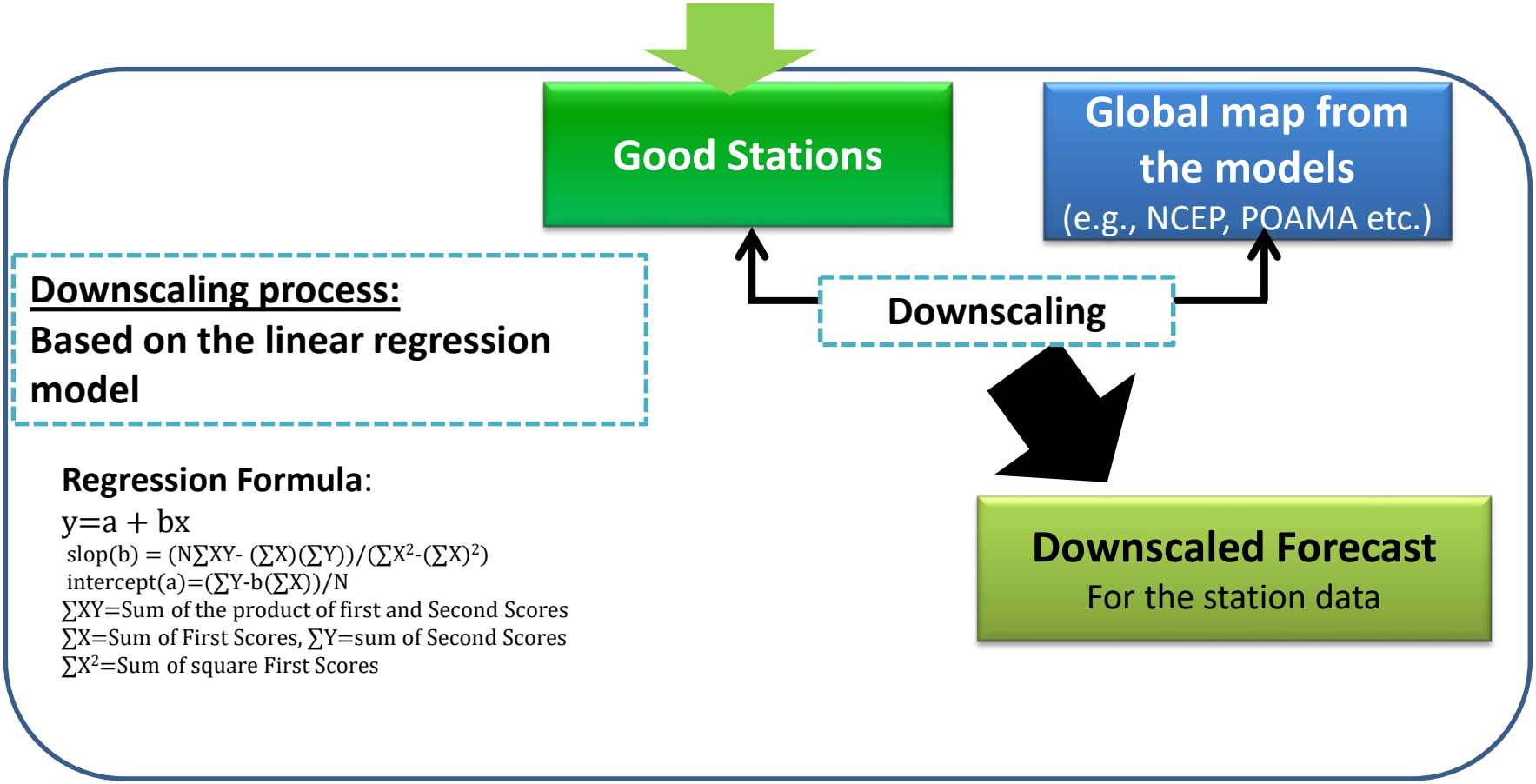
Downscaling procedure in CLIK

- **Step 2. Screening process**



Downscaling procedure in CLIK

- **Step 3. Downscaling**



Downscaling process:
Based on the linear regression model

Regression Formula:

$y=a+bx$

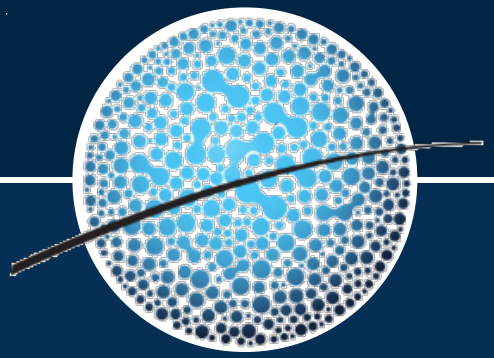
slop(b) = $(N\sum XY - (\sum X)(\sum Y))/(\sum X^2-(\sum X)^2)$

intercept(a)=$(\sum Y-b(\sum X))/N$

$\sum XY$=Sum of the product of first and Second Scores

$\sum X$=Sum of First Scores, $\sum Y$=sum of Second Scores

$\sum X^2$=Sum of square First Scores



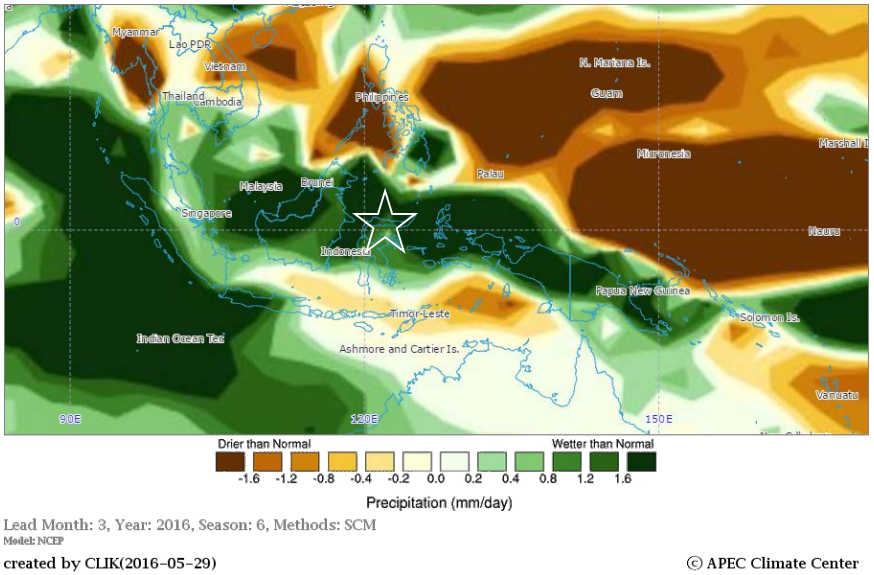
Let’s do it!

1. Downscaling using built-in station data

Produce a downscaled forecast

Dynamical precipitation prediction for 2016 JJA by NCEP model

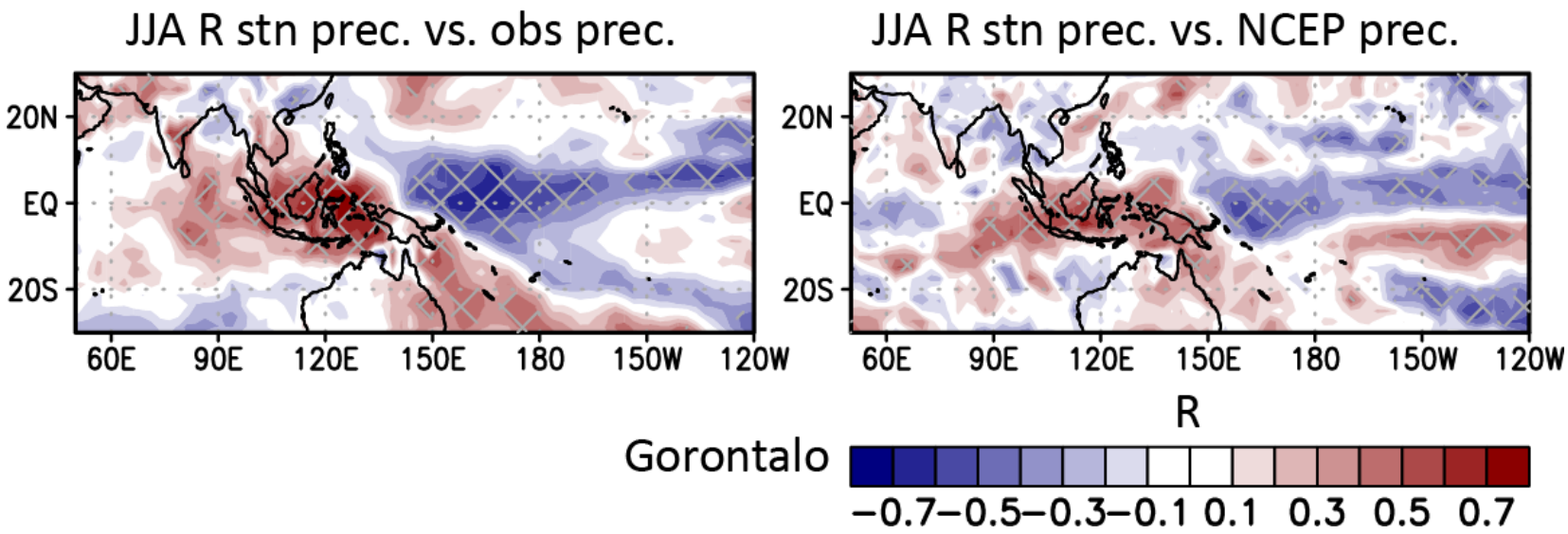
NCEP



Northern part of Sulawesi

Produce a downscaled forecast

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

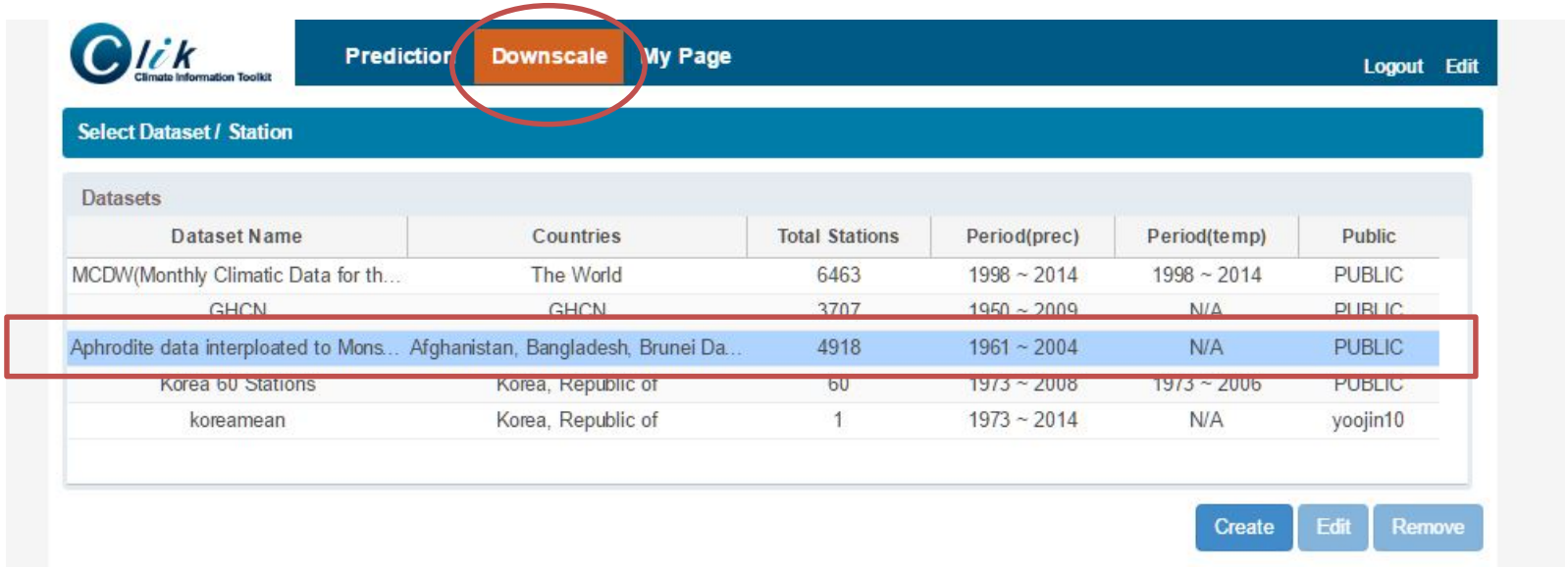


- **The Station data have relationship with global observation precipitation.**
- **NCEP model can reproduce the relationship between observation and station.**
- **We hope a successful downscaling by CLIK system...**

Produce a downscaled forecast

A. Click ‘Downscale’ tab.

B. Select the dataset (Aphrodite) in CLIK

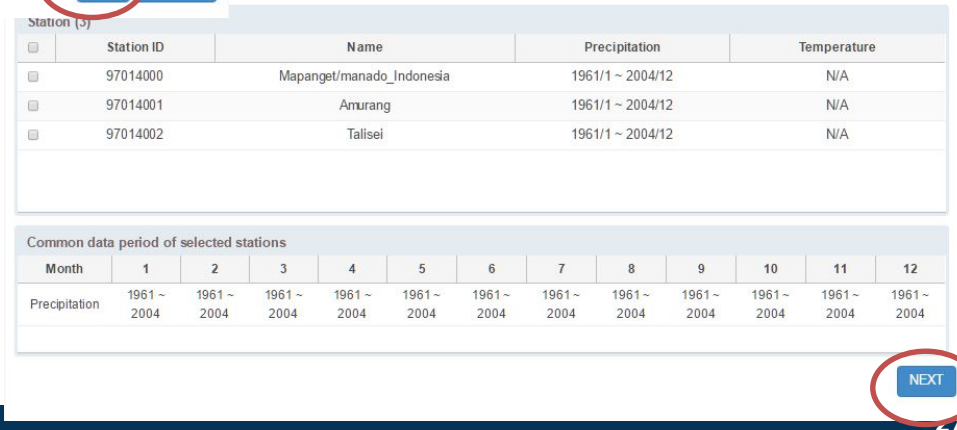


Produce a downscaled forecast

C. Select stations on the map

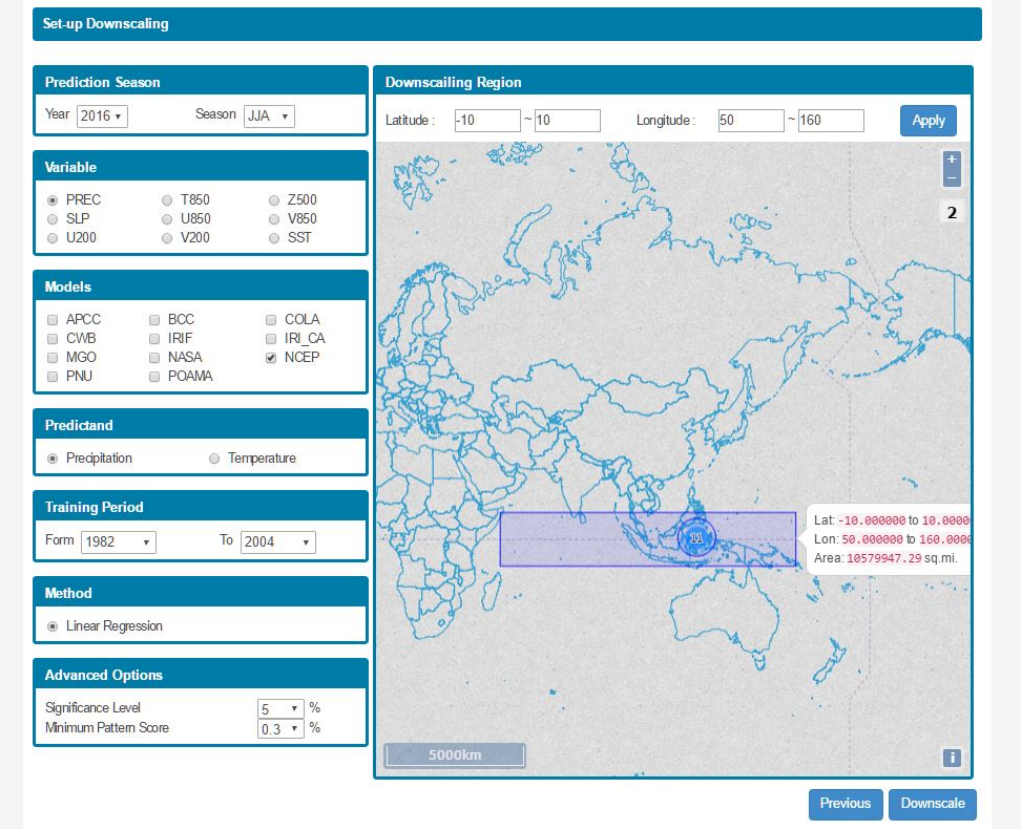
1. On the map, you can choose stations where you are interested in. Press shift + left mouse button and drag to select stations.
2. Click ‘Add’. Then you will see station’s list and common data period.
3. Click ‘Next’.

- 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.



Produce a downscaled forecast

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

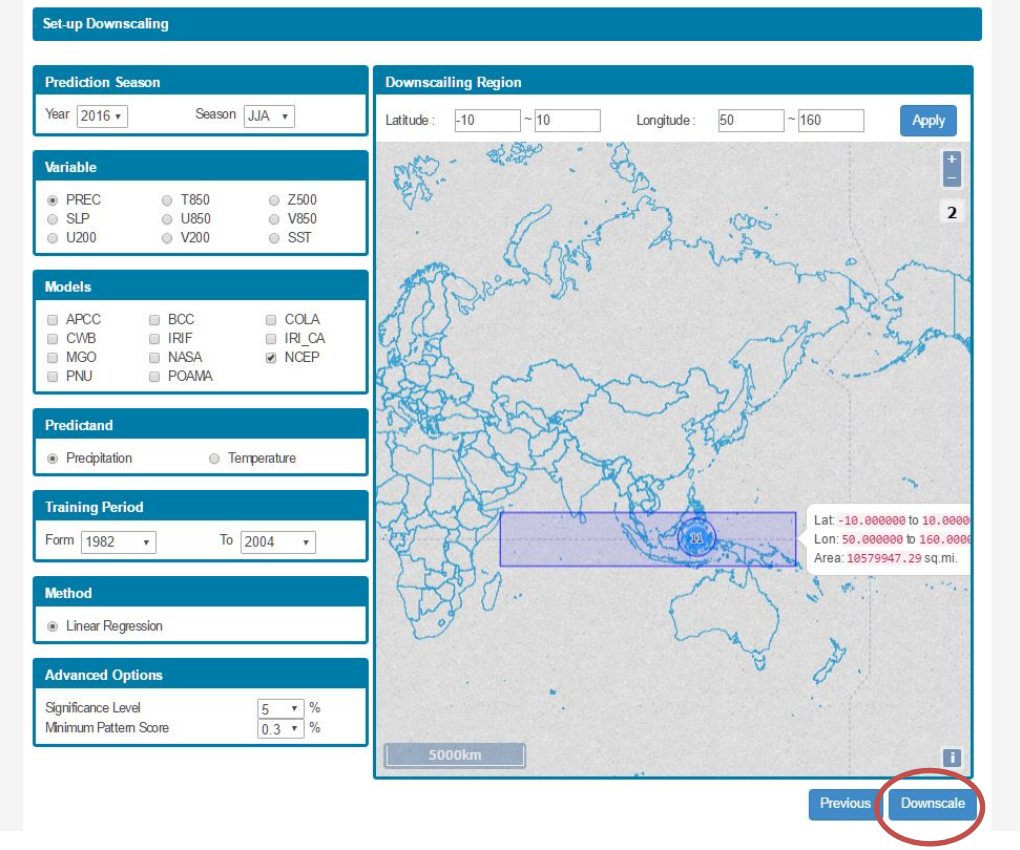


1. Select prediction season.
2. Select variable (predictor) for the downscaling.
3. Select models for the downscaling.
4. Select target variable (predictand) among precipitation and temperature.
5. Select training period.
6. Select method (currently we only provide linear regression).

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

Produce a downscaled forecast

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

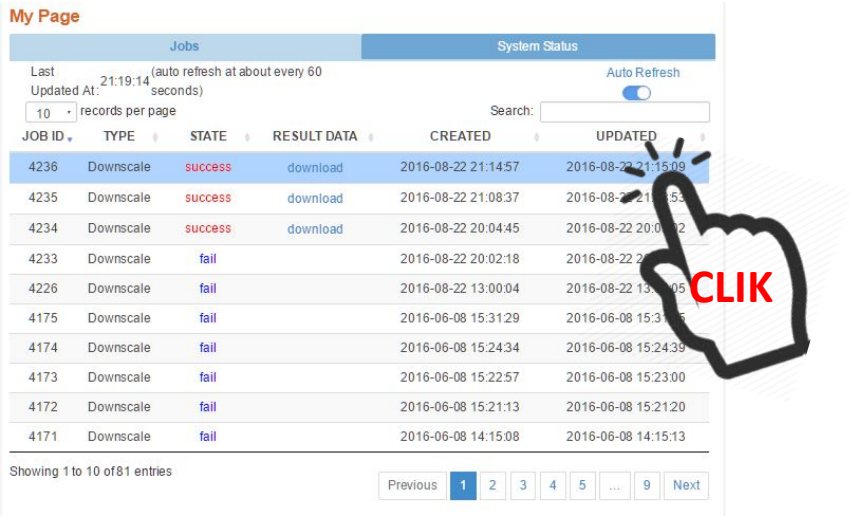


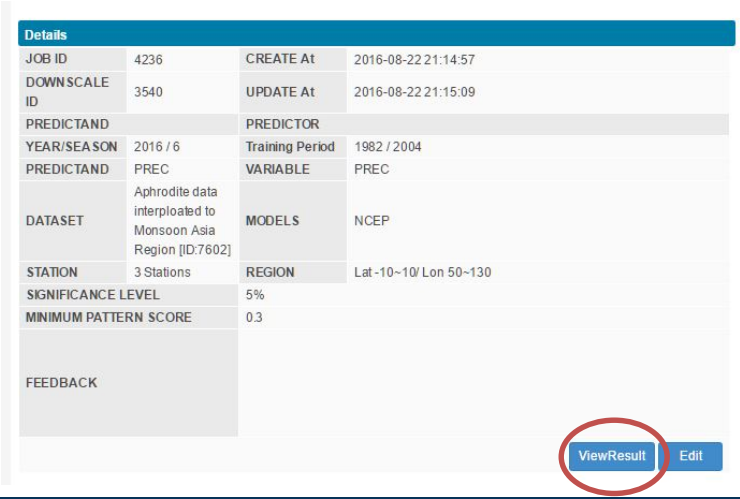
7. Select advanced options for significance level and minimum pattern scores for screening.
   - The significance level is to find the relationship between station data and observation (NCEP reanalysis).
   - The pattern score is a screening value to find out the model pattern is similar to the observation 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



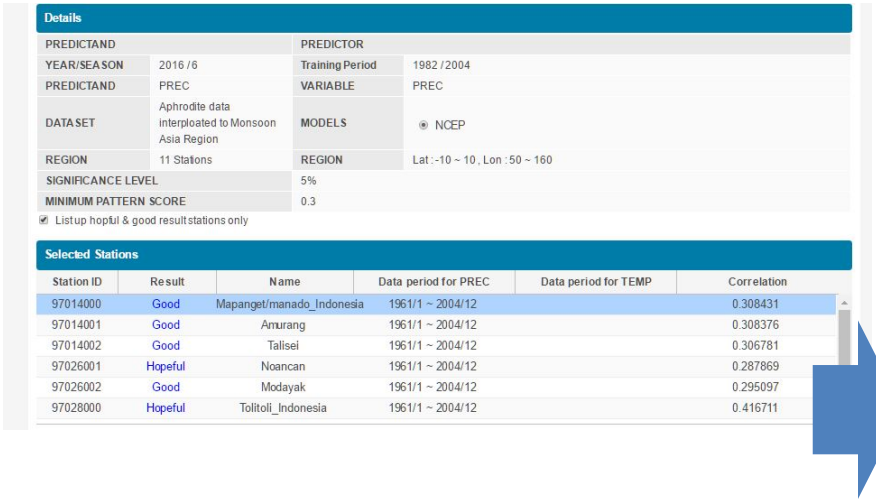


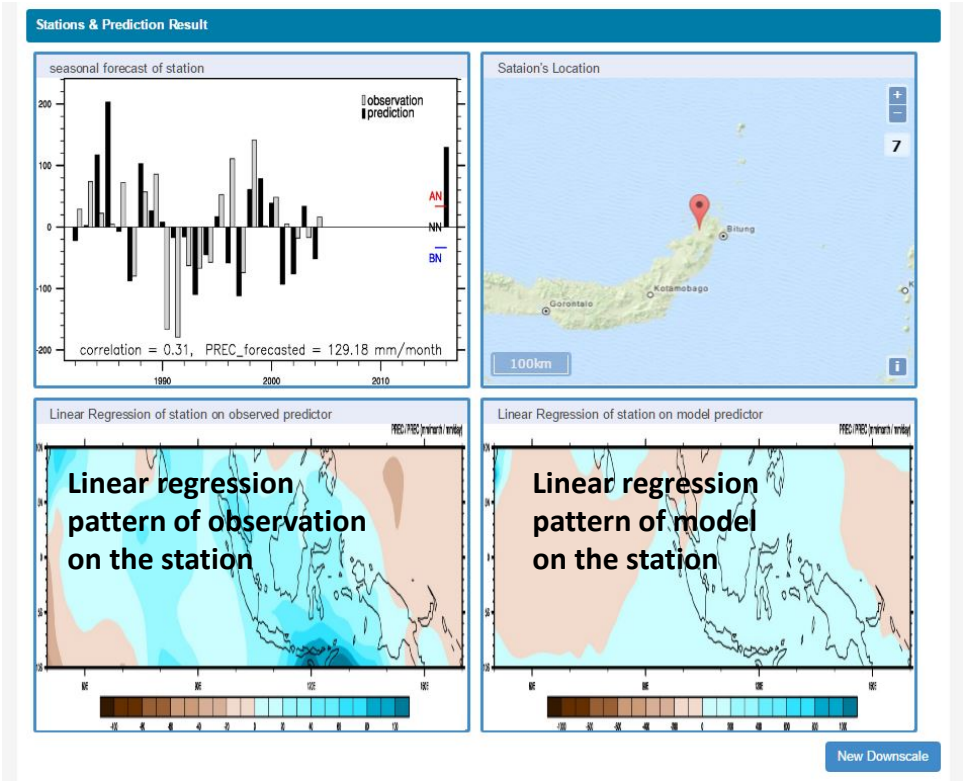
1. You will see the ‘state’ of the process. After the process is done, you will see ‘fail’ or ‘success’. Then you can see the results by clicking the job line.

2. Click ‘ViewResults’ button to see the results of downscaling.

Produce a downscaled forecast

D. Results





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.