

2024년 9월 26-27일
APCC 기후정보 생산 및 활용 사용자워크숍

[실습] 상세화 예측 실습

예측운영과 정다운



1. 왜 상세화 예측이 필요한가?
2. 자료 처리 실습
3. 상세화 예측 실습
4. 아웃룩 만들어 보기

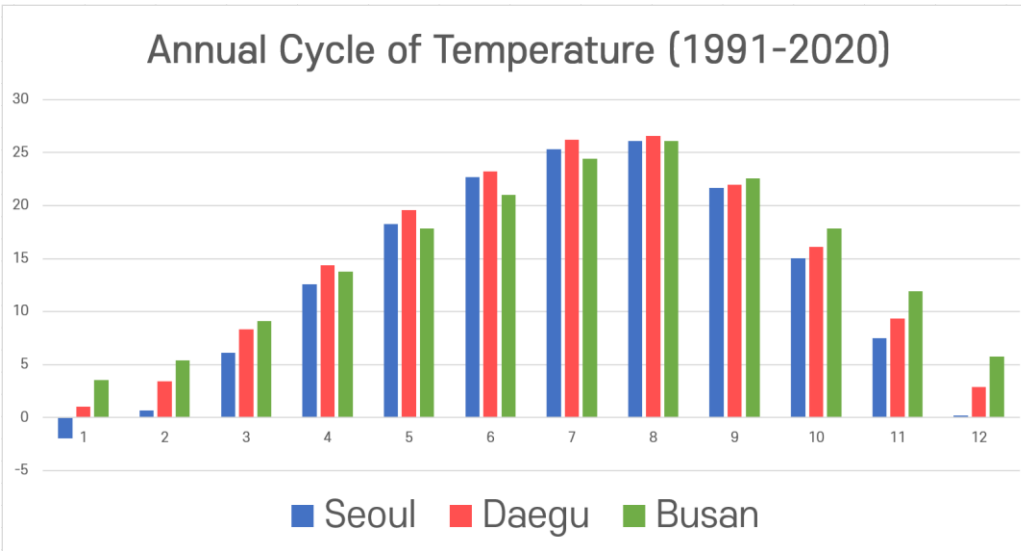


1. 왜 상세화 예측이 필요한가?
2. 자료 처리 실습
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4. 아웃룩 만들어 보기

Why downscaled forecast?

① 지역마다 기후 특성이 다르다.

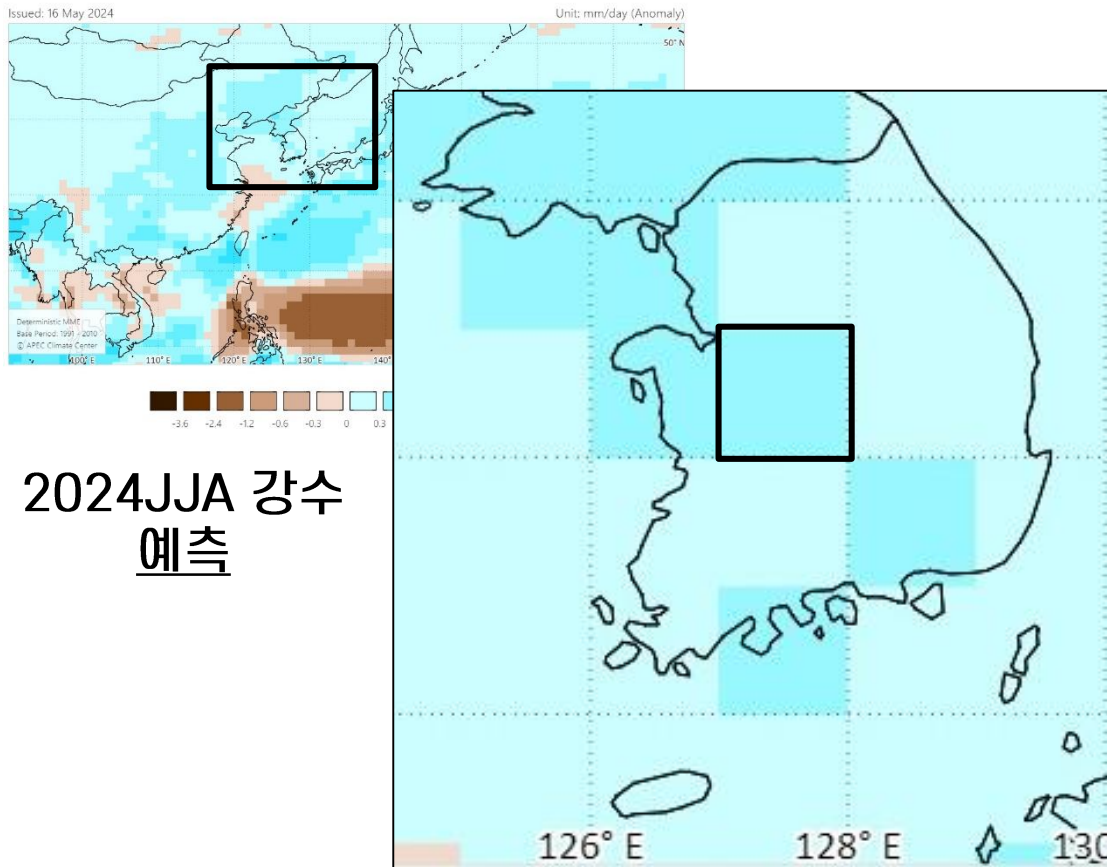
Annual Cycle of Temperature (1991-2020)



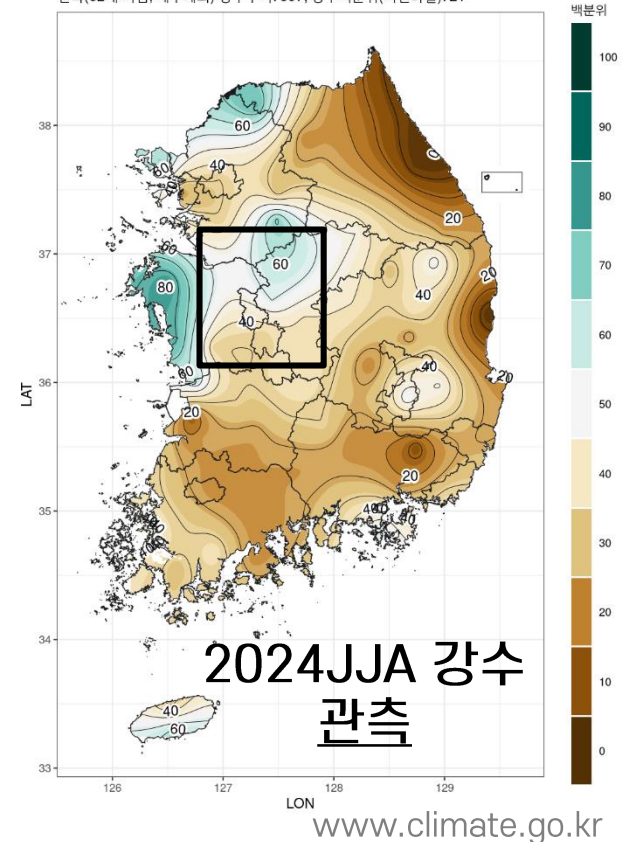
Why downscaled forecast?

② MME 예측의 해상도와 관측소 해상도의 차이가 크다.

Precipitation for June 2024-August 2024



[2024-06-01~2024-08-31] 남한(66개 지점) 강수 백분위 분포 전국(62개 지점, 제주제외) 강수누적: 597, 강수백분위(퍼센타일): 21





1. 왜 상세화 예측이 필요한가?
- 2. 자료 처리 실습**
3. 상세화 예측 실습
4. 아웃룩 만들어 보기



2024년 6월-8월(JJA)
서산의 강수량은?

Downscaling procedure in CLIK: Precipitation over Seosan for JJA 2024

지점자료

1973								2024
------	--	--	--	--	--	--	--	------

- Point

전지구 재분석 자료

1979							2024
------	--	--	--	--	--	--	------

- Grid (built-in)
- Reanalysis, CAMS OPI, and OISST

모델 과거예측자료

1980						2023
	1981				2018	
		1982		2010		

- Grid (built-in)
- Hindcast of dynamical models

Step 1. Prepare input data

기상자료개방포털 (data.kma.go.kr)

Metadata

META.csv

Station
information

Observation
data

PREC.csv
TEMP.csv

Station data
itself

Data Processing

Step 1. Prepare input data

기상자료개방포털 (data.kma.go.kr)

Metadata

META.csv

Observation
data

PREC.csv
TEMP.csv

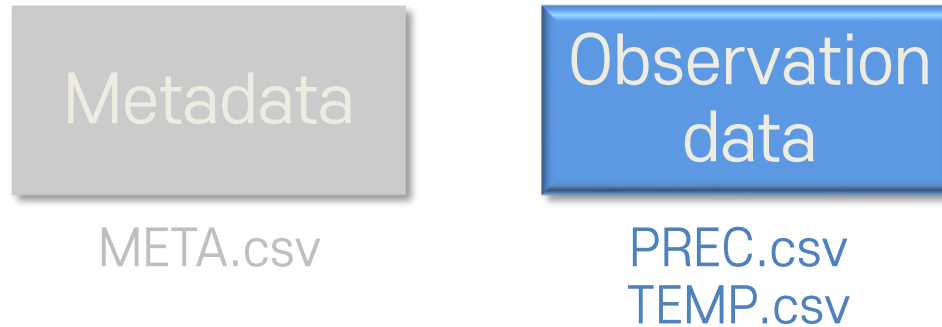
	1	2	3	4	5	
1	name,	station_id,	wmo_id,	latitude,	longitude,	undefined
2	Seoul,	108,	-999,	37.57142,	126.9658,	-999
3	Seosan,	129,	-999,	36.77658,	126.4939,	-999
4	Daegu,	143,	-999,	35.878,	128.653,	-999
5	Busan,	159,	-999,	35.10468,	129.03203,	-999

- **Name:** name of the station
- **Station_id:** unique id for the station (integer)
- **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)

Data Processing

Step 1. Prepare input data

기상자료개방포털 (data.kma.go.kr)



	1	2	3	4	5	6	7							
1	station id	year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
2	108	1973	16.9	3.7	13.7	133	82.5	107.9	191.3	188.4	88.1	26.5	24.7	11.4
3	108	1974	15.1	23.8	27.7	144.8	239.8	64.3	256.9	319	96.3	36.2	10.6	16.2
4	108	1975	17.4	6.4	64.2	103	83.7	50.5	384.5	96.2	181.3	21	36.3	22.9
5	108	1976	4	108.3	6.8	58.4	41.5	49.2	176.7	462.3	78.7	60.7	30.7	32.2
6	108	1977	2.2	0.2	36.5	228.8	63.7	46.4	405.4	101	96.2	15.7	96	55.4
7	108	1978	11.6	13.6	52.2	13	25.4	374.7	242.2	270.7	80.9	40	7.5	29.1
8	108	1979	19.6	32.6	60.3	138.6	116	354.4	204.3	237.8	46.8	3.5	30	35.5
9	108	1980	28	5	32.8	216.7	90.3	118.8	259.2	331.5	58.3	44.9	10.6	46.3
10	108	1981	21	12	55.4	55.4	80.8	109.1	463.8	192.9	129	34.1	46.7	16
11	108	1982	26	2.9	46	8.1	134.6	15.7	195.5	255.8	4.8	46.5	164.8	48.6
12	108	1983	11.1	11.7	67.5	113.4	69	27.4	398.6	132.2	253.4	82.2	28.7	9.9
13	108	1984	10.7	14.9	11.4	41.8	35.2	105.5	269.9	330.9	348.1	21.4	35.5	24.2
14	108	1985	31.2	25.9	57.8	69	177.4	85.4	185.2	438.9	171.7	177.8	82.4	41.9
15	108	1986	11.7	8.3	44.3	20.6	71.5	117.1	351.8	370.3	101	79.6	39.3	31.9
16	108	1987	43.4	36.2	34.2	55.3	126.6	130.3	651.2	521.8	61.1	21.9	66.8	2.6
17	108	1988	3.3	4.5	31.3	60.5	42.8	73.7	382.3	81.3	39.7	8.4	21.1	11.9
18	108	1989	14.6	32.7	116.7	14	41.1	177.1	343.5	329.4	101.2	69.9	154.5	12.4
19	108	1990	62.2	64.8	92.3	94.2	122.8	497.2	486.5	283.5	570.1	8	56	25.9

- One year per row.
- Data should be delimited by comma (,), space (), tab (), or colon (:).

Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API Documents Help Desk

Downscale

- Prediction
- Verification
- Downscale**
- Clipping
- Composite
- Masking
- AIMS

Select of

Show

Search:

	Countries	Total Stations	Period(prec)	Period(temp)	Public
Korea 101 Stations	Republic of Korea	101	1973 ~ 2019	1973 ~ 2019	PUBLIC
GHCN	GHCN	3697	1950 ~ 2009		PUBLIC
Asia Region (prec)	Asia	4918	1961 ~ 2004		PUBLIC
Iran stations	Islamic Republic of Iran	31	1951 ~ 2017	1951 ~ 2017	PUBLIC
Kurdistan stations	Islamic Republic of Iran	7	1960 ~ 2021	1960 ~ 2021	PUBLIC

Showing 1 to 5 of 5 entries

Previous 1 Next

Create Edit View Remove

Select station



2

Data Processing

Step 2. Upload data to CLIK

The screenshot displays the CLIK web interface. A 'New dataset' modal is open, with the following fields:

- Name: 4 Stations
- Description: 4 Stations

The 'Create' button is highlighted with a red circle and a hand cursor. The background shows a table of existing datasets:

Dataset Name	Period(temp)	Public
Korea 101 Stations	1973 ~ 2019	PUBLIC
GHCN	1950 ~ 2009	PUBLIC
Asia Region (prec)	1961 ~ 2004	PUBLIC
Iran stations	1951 ~ 2017	PUBLIC
Kurdistan stations	1960 ~ 2021	PUBLIC

At the bottom, there is a 'Select station' section with a map of the region.

Data Processing

Step 2. Upload data to CLIK

Dataset ▾ Processing ▾ My Jobs CLIK API Documents ▾ Help Desk

Downscale

Select observation dataset

Show entries

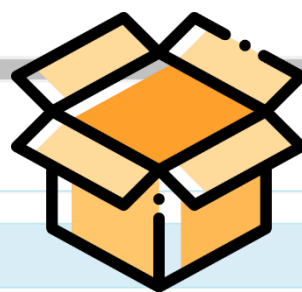
Search:

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
Korea 101 Stations	Republic of Korea	101	1973 ~ 2019	1973 ~ 2019	PUBLIC
GHCN	GHCN	3697	1950 ~ 2009		PUBLIC
Asia Region (prec)	Asia	4918	1961 ~ 2004		PUBLIC
Iran stations	Islamic Republic of Iran	31	1951 ~ 2017	1951 ~ 2017	PUBLIC
Kurdistan stations	Islamic Republic of Iran	7	1960 ~ 2021	1960 ~ 2021	PUBLIC

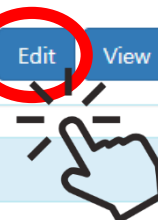
4 Stations

Showing 1 to 6 of 6 entries

Previous **1** Next



Create **Edit** View Remove



Select station



Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API Documents Help Desk

Metadata

1

Stations [Dataset : 4 Stations]

Show 10 entries

Search:

Station ID	Country	Name	WMO ID	Latitude	Longitude	Undefined
------------	---------	------	--------	----------	-----------	-----------

No data available in table

Showing 0 to 0 of 0 entries

Previous Next

Import Export Insert Modify Remove Remove All

Observation data

2

Data

Show 10 entries

Search:

Year	Variable	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
------	----------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

No data available in table

Showing 0 to 0 of 0 entries

Previous Next

Insert Modify Remove Remove All

Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API Documents Help Desk

Metadata

PUBLIC

1

Stations [Dataset : 4 Stations]

Show 10 entries

Search:

Station ID Country Name WMO ID Latitude Longitude Undefined

No data available in table

Showing 0 to 0 of 0 entries

Previous Next

	1	2	3	4	5
1	name,	station_id,	wmo_id,	latitude,	longitude,undefined
2	Seoul,	108,	-999,	37.57142,	126.9658,-999
3	Seosan,	129,	-999,	36.77658,	126.4939,-999
4	Daegu,	143,	-999,	35.878,	128.653,-999
5	Busan,	159,	-999,	35.10468,	129.03203,-999

Country

✓ Republic of Korea

Station information file(example)

✓ 파일 선택 META.csv
Browse file

META.csv

META.CSV



Data

Show 10 entries

Search:

Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API

Finished

확인

Metadata

PUBLIC

1

Stations [Dataset : 4 Stations]

Show 10 entries

Search:

Station ID	Country	Name	WMO ID	Latitude	Longitude	Undefined
------------	---------	------	--------	----------	-----------	-----------

No data available in table

Showing 0 to 0 of 0 entries

Previous Next

Import Export Insert Modify Remove Remove All

Country

Republic of Korea

Station information file(example)

파일 선택 선택된 파일 없음

Browse file

Upload

Data

Show 10 entries

Search:

Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API Documents Help Desk

Metadata

PUBLIC

1

Stations [Dataset : 4 Stations]

Show 10 entries

Search:

Station ID	Country	Name	WMO ID	Latitude	Longitude	Undefined
105	Republic of Korea	Gangneung	-999	37.7515	128.891	-999
108	Republic of Korea	Seoul	-999	37.5714	126.9658	-999
143	Republic of Korea	Daegu	-999	35.878	128.653	-999
159	Republic of Korea	Busan	-999	35.1047	129.032	-999

Showing 1 to 4 of 4 entries

Previous 1 Next

Observation data

2

Data

Show 10 entries

Search:

Year	Variable	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
------	----------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

No data available in table

Showing 0 to 0 of 0 entries

Previous Next

Data Processing

Step 2. Upload data to CLIK

Dataset Processing My Jobs CLIK API Documents Help Desk

Observation data

2

Show 10 entries

Year Variable Unit JAN FEB

Showing 0 to 0 of 0 entries

Import observed data

Export observed data

	1	2	3	4	5	6	7							
1	station_id	year	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
2	108	1973	56.9	3.7	13.7	133	82.5	107.9	191.3	188.4	88.1	26.5	24.7	11.4
3	108	1974	15.1	23.8	27.7	144.8	239.8	64.3	256.9	319.96	36.2	10.6	16.2	
4	108	1975	17.4	6.4	64.2	103	83.7	50.5	384.5	96.2	181.3	21	36.3	22.9
5	108	1976	4	108.3	6.8	58.4	41.5	49.2	176.7	462.3	78.7	60.7	30.7	32.2
6	108	1977	2.2	0.2	36.5	228.8	63.7	46.4	405.4	101	96.2	15.7	96	55.4
7	108	1978	11.6	13.6	52.2	13	25.4	374.7	242.2	270.7	80.9	40	7.5	29.1
8	108	1979	19.6	32.6	60.3	138.6	116	354.4	204.3	237.8	46.8	3.5	30	35.5
9	108	1980	28	5	32.8	216.7	90.3	118.8	259.2	331.5	58.3	44.9	10.6	46.3
10	108	1981	21	12	55.4	55.4	80.8	109.1	463.8	192.9	129	34.1	46.7	16
11	108	1982	26	2.9	46	8.1	134.6	15.7	195.5	255.8	4.8	46.5	164.8	48.6
12	108	1983	11.1	11.7	67.5	113.4	69	27.4	398.6	132.2	253.4	82.2	28.7	9.9
13	108	1984	10.7	14.9	11.4	41.8	35.2	105.5	269.9	330.9	348.1	21.4	35.5	24.2
14	108	1985	31.2	25.9	57.8	69	177.4	85.4	185.2	438.9	171.7	177.8	82.4	41.9
15	108	1986	11.7	8.3	44.3	20.6	71.5	117.1	351.8	370.3	101	79.6	39.3	31.9
16	108	1987	43.4	36.2	34.2	55.3	126.6	130.3	651.2	521.8	61.1	21.9	66.8	2.6
17	108	1988	3.3	4.5	31.3	60.5	42.8	73.7	382.3	81.3	39.7	8.4	21.1	11.9
18	108	1989	44.6	32.7	116.7	14	41.1	177.1	343.5	329.4	101.2	69.9	154.5	12.4
19	108	1990	62.2	64.8	92.3	94.2	122.8	497.2	486.5	283.5	570.1	0	56	25.9

Variable

Precipitation Temperature

Unit

mm/month mm/day others:

Observed data file(example)

파일 선택 PREC.csv

Browse file

PREC.csv

PREC.csv

Upload

Data Processing

Step 2. Upload data to CLIK

Metadata

Processing ▾ My Jobs CLIK API Documents ▾ Help Desk

1

Observation Dataset

PUBLIC

Stations [Dataset : 4 Stations]

Show 10 entries

Search:

Station ID	Country	Name	WMO ID	Latitude	Longitude	Undefined
105	Republic of Korea	Gangneung	-999	37.7515	128.891	-999
	Republic of Korea	Seoul	-999	37.5714	126.9658	-999
	Republic of Korea	Daegu	-999	35.878	128.653	-999
	Republic of Korea	Busan	-999	35.1047	129.032	-999

Observation data

2

Showing 1 to 4 of 4 entries

Previous 1 Next

Import Export Insert Modify Remove Remove All

Data [Station : 105]

Show 10 entries

Search:

Year	Variable	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1973	Precipitation	mm/month	159.7	2	23.4	62.2	114.2	170.8	79.9	59.5	133.8	116	81.6	1.4
1974	Precipitation	mm/month	15.7	51.7	57.2	126	126.5	47.1	264.4	212.4	170.1	96	15.8	37.4

Data Processing

Step 2. Upload data to CLIK

Observation data

2

Dataset Processing My Jobs CLIK API Documents Help Dark

Show 10 entries

Year	Variable	Unit	JAN	FEB
1981	Precipitation	mm/month	16.8	
1982	Precipitation	mm/month	27.7	

Showing 1 to 10 of 51 entries

	1	2	3	4	5	6
1	station_id	year	jan	feb	mar	apr
2	108	1973	0.4	0.6	4.5	12.4
3	108	1974	-2.4	-2.1	3.7	10.7
4	108	1975	-2.7	-0.8	4.4	13.3
5	108	1976	-3.8	2.8	4.8	11.3
6	108	1977	-6.7	-2.4	5.4	12.5
7	108	1978	-2.4	-2.5	4.2	11.5
8	108	1979	0.9	0.6	6	11.2
9	108	1980	-3.7	-3.1	5.2	10.1
10	108	1981	-7	-1.4	5.7	11.9
11	108	1982	-3.5	0.6	5.9	12.3
12	108	1983	-1.7	-1.7	6.4	13.6
13	108	1984	-5.9	-3.5	2.5	12.1
14	108	1985	-5.9	-0.3	4.3	11.6
15	108	1986	-5.4	-3.3	4.9	11.9
16	108	1987	-3	-0.1	4	10.8
17	108	1988	-2.1	-1.5	4.3	11.3
18	108	1989	0.8	2.4	6.1	14.3
19	108	1990	-3.2	2.7	7.2	11.3

Import observed data Export observed data

TEMP.csv

Variable Precipitation Temperature

Unit degC degK others:

Observed data file(example) 파일 선택 TEMP.csv
Browse file

Data Processing

Step 2. Upload data to CLIK

Dataset ▾ Processing ▾ My Jobs CLIK API Documents ▾ Help Desk

Downscale

Select observation dataset

Show entries

Search:

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
Korea 101 Stations	Republic of Korea	101	1973 ~ 2019	1973 ~ 2019	PUBLIC
GHCN	GHCN	3697	1950 ~ 2009		PUBLIC
Asia Region (prec)	Asia	4918	1961 ~ 2004		PUBLIC
Iran stations	Islamic Republic of Iran	31	1951 ~ 2017	1951 ~ 2017	PUBLIC
Kurdistan stations	Islamic Republic of Iran	7	1960 ~ 2021	1960 ~ 2021	PUBLIC
4 Stations	Republic of Korea	4	1973 ~ 2023	1973 ~ 2023	

Showing 1 to 6 of 6 entries

Previous **1** Next



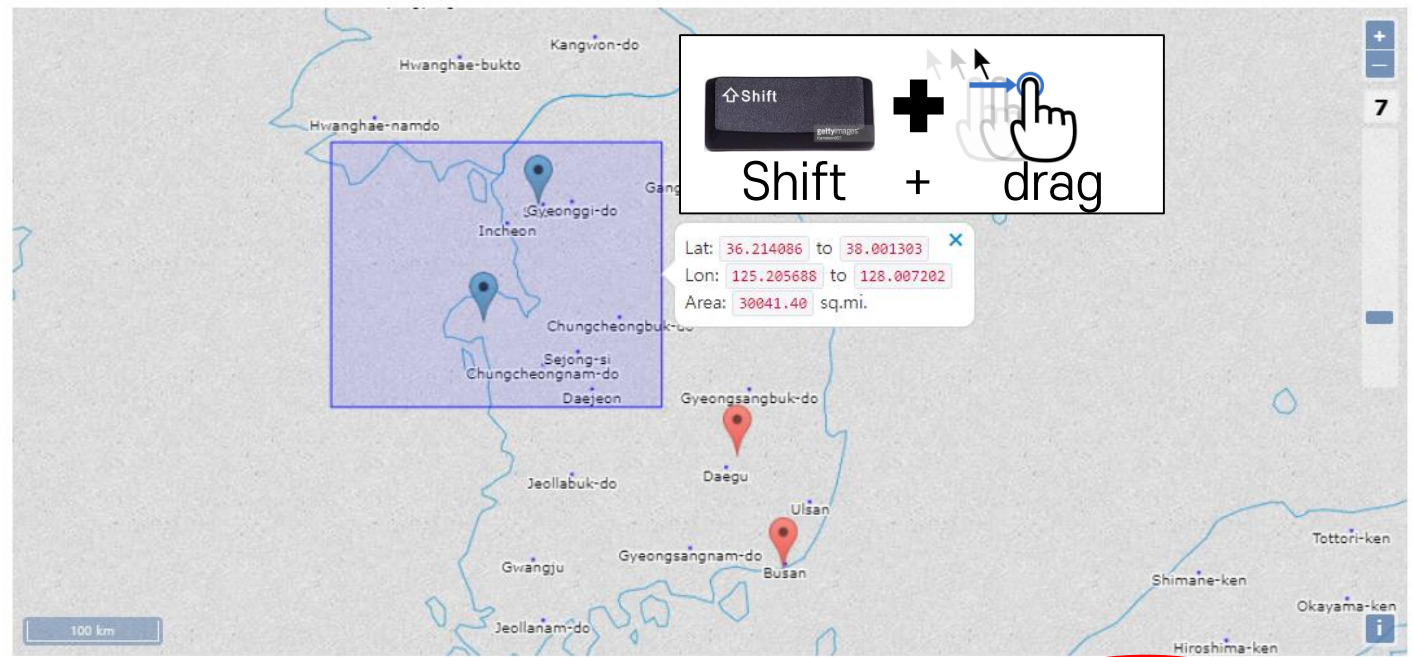
Create Edit View Remove



Data Processing

Step 2. Upload data to CLIK

Select station



How to use?

Show 10 entries

Station ID	Country	Name	Precipitation	Temperature
<input type="radio"/> 08	Republic of Korea	Seoul	1973~2024	1973~2024
<input checked="" type="radio"/> 129	Republic of Korea	Seosan	1973~2024	1973~2024

Showing 1 to 2 of 2 entries

Input Downscale Job

Previous 1 Next

Data Processing

Step 2. Upload data to CLIK

Station information

Dataset : 4 Station
Station ID : 129
Country : Republic of Korea
Station name : Seosan
Precipitation(1973~2024) , Temperature(1973~2024)

Predictand

Season

Year Season

Variable

Precipitation Temperature

Predictor

Variable

prec slp sst t850 u200 u850 v200 v850 z500

Models

Please select variable.

Training Period

From To

Advanced Options


Method Linear Regression

Significance Level %

Minimum Pattern Score

Domain

Latitude ~ Longitude ~



A world map with a blue outline of the continents. A blue rectangular box is drawn over the Korean peninsula, indicating the geographic domain for the data. The map includes a scale bar at the bottom left showing 2000 km and a zoom control on the right side.



1. 왜 상세화 예측이 필요한가?
2. 자료 처리 실습
- 3. 상세화 예측 실습**
4. 아웃룩 만들어 보기

Downscaling procedure in CLIK: Precipitation over Seosan for JJA 2024

지점자료

- Point

1973								2024
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전지구
재분석 자료

- Grid (built-in)
- Reanalysis, CAMS OPI, and OISST

1979								2024
------	--	--	--	--	--	--	--	------

모델
과거예측자료

- Grid (built-in)
- Hindcast of dynamical models

1980								2023
------	--	--	--	--	--	--	--	------

1981								2018
------	--	--	--	--	--	--	--	------

1982								2010
------	--	--	--	--	--	--	--	------

**CORRELATION
&
REGRESSION**



Correlation does not imply causation!

자동차 판매량

해외여행객수

남극 기압

북태평양 기압

코로나 확진자수

서산 강수량

CORRELATION



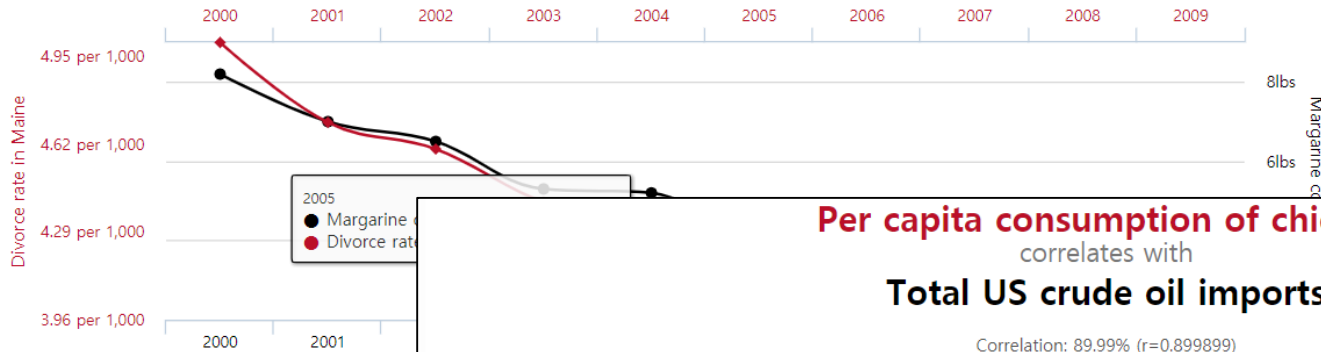
Correlation does not imply causation!

CORRELATION



Divorce rate in Maine
correlates with
Per capita consumption of margarine

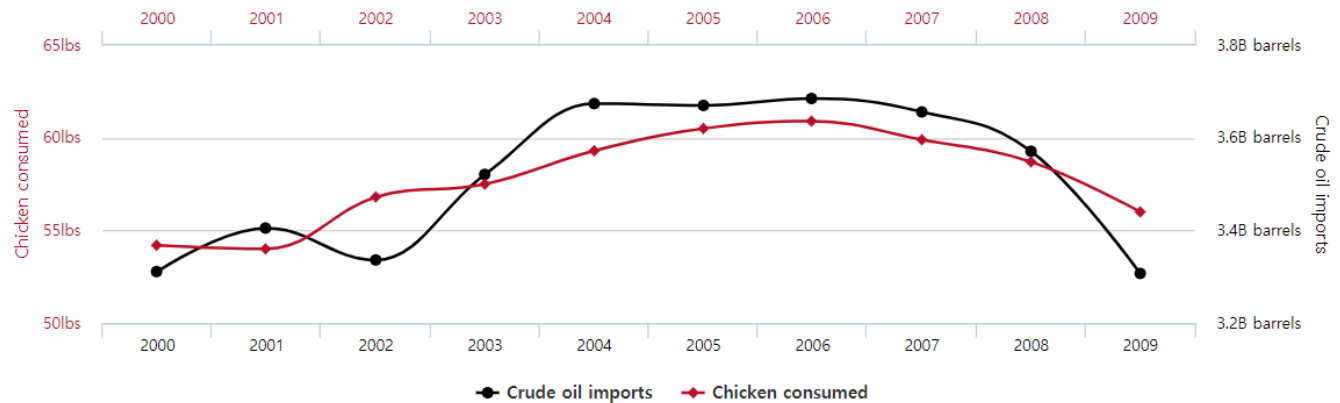
Correlation: 99.26% (r=0.992558)



Data sources: National Vital Statistics Reports and U.S.

Per capita consumption of chicken
correlates with
Total US crude oil imports

Correlation: 89.99% (r=0.899899)



Data sources: U.S. Department of Agriculture and Dept. of Energy

tylervigen.com

Correlation does not imply causation!

CORRELATION



자동차 판매량

해외여행객수

남극 기압

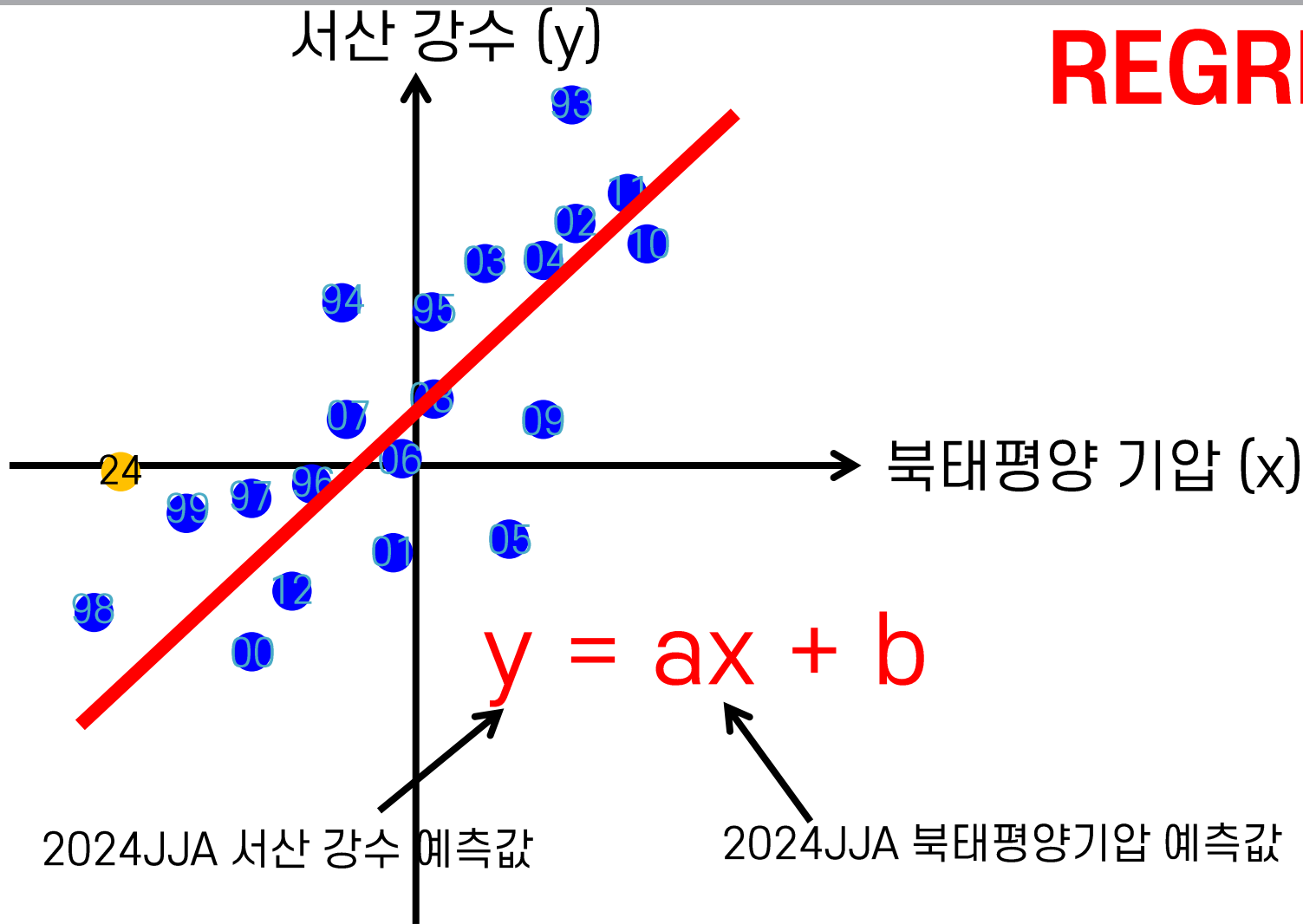
서산 강수량

북태평양 기압

코로나 확진자수

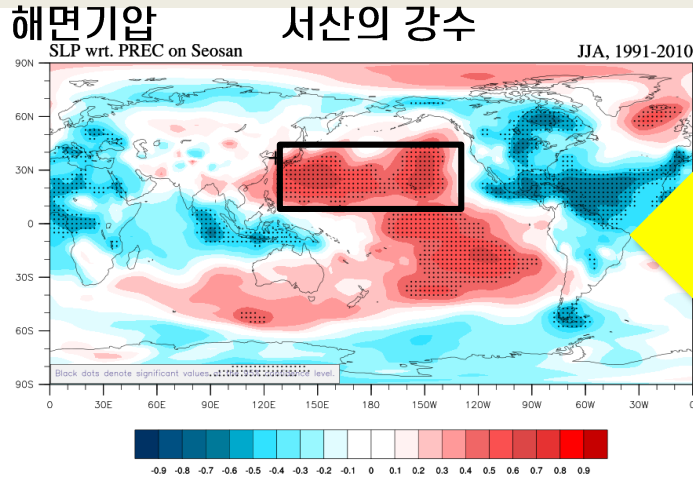
Correlation does not imply causation!

REGRESSION

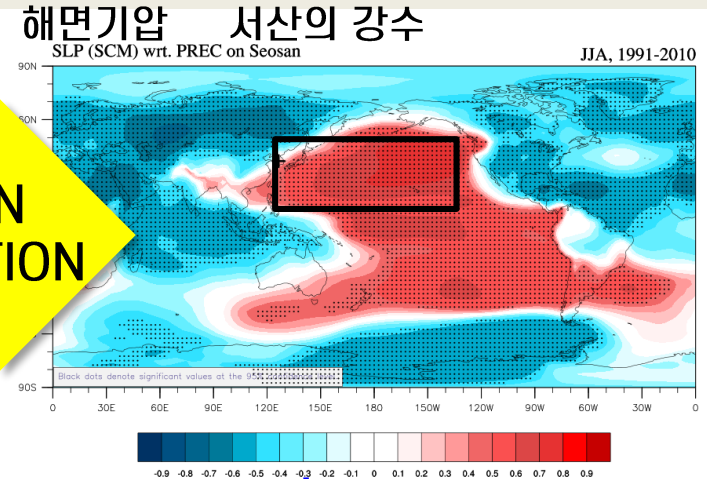


Downscaling procedure in CLIK: Precipitation over Seosan for JJA 2024

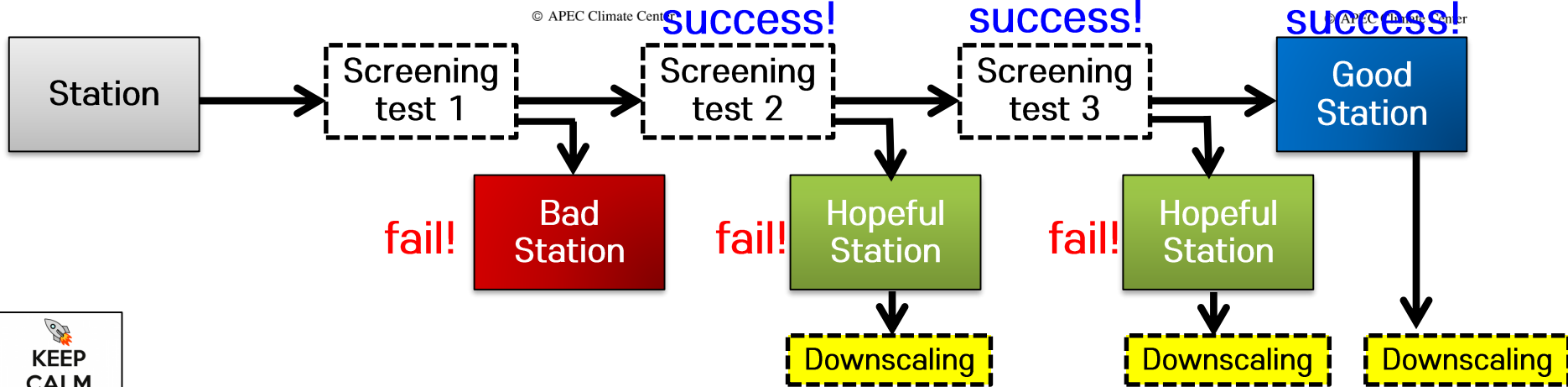
① 재분석자료와 지점자료의 상관관계



② 모델자료와 지점자료의 상관관계 계산



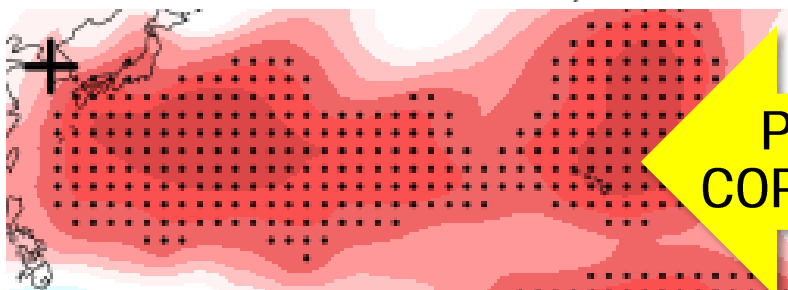
③
PATTERN
CORRELATION



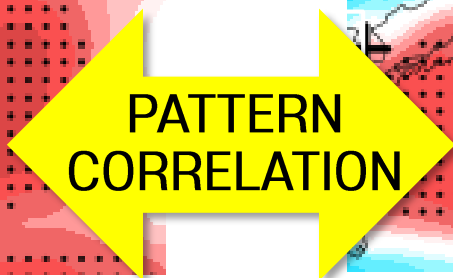
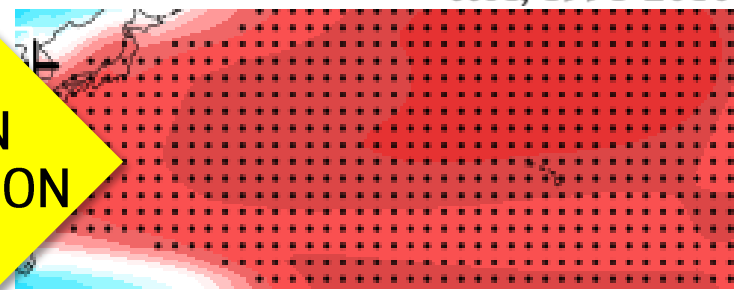
Downscaling procedure in CLIK: Precipitation over Seosan for JJA 2024

Relationship between 서산 강수 & 북태평양 기압

SLP wrt. PREC on Seosan JJA, 1991-2010



SLP (SCM) wrt. PREC on Seosan JJA, 1991-2010



from 관측자료

from 예측자료

- ① 과거 서산 강수가 과거 북태평양 기압과 상관관계가 있고,
- ② 과거 서산 강수가 모델이 예측했던 과거 북태평양 기압과 상관관계가 있으며,
- ③ 그 상관관계의 모습이 유사하다면,

Successful downscaling...?



2024년 6월-8월(JJA)
서산의 강수량은?

Produce a downscaled forecast: Precipitation over Seosan for JJA 2024

Station information

Dataset : 4 Station
 Station ID : 129
 Country : Republic of Korea
 Station name : Seosan
 Precipitation(1973~2024) , Temperature(1973~2024)

Predictand

Season: 2024년 6월, Precipitation
 Year: 2024 Season: 6
 Precipitation Temperature

Predictor

Variable: **slp (해면기압)**
 prec slp sst t850 u200 u850 v200 v850 z500

7개 모델

Models:
 APCC_SCOPS BOM_ACCESS-S2 CMCC_SPS3.5 CWA_TCWA1TV1.1
 ECCO_CANSIPsv2.1 HMC_SL-AV KMA_GLOSEA6GC3.2 METFR_SYS8
 MGO_MGOAM-2 NASA_GEOS-S2S-2.1 NCEP_CFSv2 PNU-RDA_GCGMv2.0
 UKMO_GLOSEA6

자동

Training Period:
 From: 1993 To: 2016 24 years

Advanced Options:
 Method: Linear Regression
 Significance Level: 5 %
 Minimum Pattern Score: 0.3

Domain

Latitude: 10~45 Longitude: 125~230

SLP wrt. PREC on Seosan JJA, 1991-2010 (1)

SLP (SCM) wrt. PREC on Seosan JJA, 1991-2010 (2)

Legend: lat: 10.000000 to 45.000000, lon: 125.000000 to 230.000000, sea: 0.65 sq.mi. (3)

Predictor

Advanced Options: Linear Regression, Sig. Level, Min. Pattern Score

Produce a downscaled forecast: Precipitation over Seosan for JJA 2024

Acknowledgement for APCC MME / Individual model

When you use the APCC MME and/or individual model data in any documents or publications, please acknowledge us by including the following text, *"The authors acknowledge the APCC MME Producing Centers for making their hindcast/forecast data available for analysis, the APEC Climate Center for collecting and archiving the data, as well as for producing APCC MME predictions."*

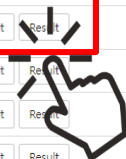
Acknowledgement for Clipped CMIP5

When you use other APCC data products in any documents or publications, please acknowledge us by including following text, *"The authors acknowledge the APEC Climate Center for providing the Clipped CMIP5"*. Note that you may have to insert citations or references for these datasets, following the original 'how to cite this datasets' directions posted on the original website for these datasets.

Auto Refresh

All Queued Running Failed Complete

Job type	Submission date	End date	Status
Downscaling	2023-07-05 16:10:58	2023-07-05 16:12:23	Download Edit Result
Downscaling	2023-07-05 16:00:56	2023-07-05 16:07:27	Download Edit Result
Downscaling	2023-07-05 16:00:35	2023-07-05 16:03:42	Download Edit Result
Downscaling	2023-07-05 15:57:22	2023-07-05 15:59:19	Download Edit Result
Downscaling	2023-07-04 16:49:30	2023-07-04 16:51:05	Download Edit Result
Downscaling	2023-07-04 15:16:29	2023-07-04 15:18:03	Download Edit Result
Downscaling	2023-07-04 15:14:17	2023-07-04 15:15:54	Download Edit Result
Downscaling	2023-07-04 14:26:40	2023-07-04 14:27:58	Failed Edit
Downscaling	2023-07-04 14:26:37	2023-07-04 14:27:35	Failed Edit
Downscaling	2023-07-04 14:23:31	2023-07-04 14:26:12	Failed Edit
Downscaling	2023-07-04 14:22:30	2023-07-04 14:24:34	Download Edit Result
Downscaling	2023-07-04 14:20:33	2023-07-04 14:24:09	Download Edit Result



Produce a downscaled forecast: Precipitation over Seosan for JJA 2024

Climate Information toolkit (CLIK) Home Dataset Processing My Jobs CLIK API Documents Help Desk Member

Details of Downscale: 66f12b12d5231f00063265b5

Predictand		Predictor	
Year-Season	2024-6	Training period	1993-2016
Variable	prec	Variable	slp
Dataset	4 Station	Models	<input checked="" type="radio"/> SCM <input type="radio"/> BOM_ACCESS-S2 <input type="radio"/> CMCC_SP3.5 <input type="radio"/> CWA_TCWAT1v1.1 <input type="radio"/> ECCS_CANSIPv2.1 <input type="radio"/> KMA_GLOSEA6GC3.2 <input type="radio"/> METFR_SYS8 <input type="radio"/> NASA_GEOS-S25-2.1 <input type="radio"/> PNU-RDA_CGCMv2.0 <input type="radio"/> UKMO_GLOSEA6
Region	129 Seosan	Region	Latitude: 10-45, Longitude: 125-230

Advanced Options

Significance level: 5%
Minimum pattern score: 0.3

129 Republic of Korea Seosan Good 0.391738

Downscaled forecast on the selected station

Correlation = 0.39 PREC_forecasted = 121.03 mm/month

Location

SLP / PREC (hPa / mm/month)

SLP / PREC (hPa / mm/month)

1. Job summary

2. Historical time series of downscaled prediction/observation data, correlation coefficient between them, deterministic forecast, and tercile category of the forecast

3. Location of station

4. Regressed predictor (SLP; observation) field onto the predictand (precipitation) over the selected domain

5. Regressed predictor (SLP; model) field onto the predictand (precipitation) over the selected domain

Produce a downscaled forecast: Precipitation over Seosan for JJA 2024

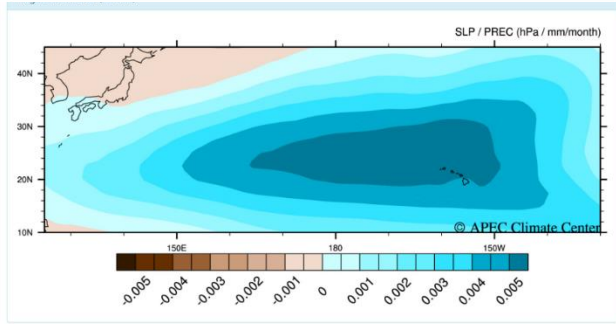
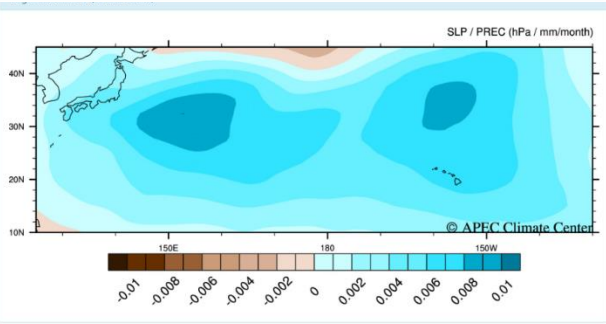
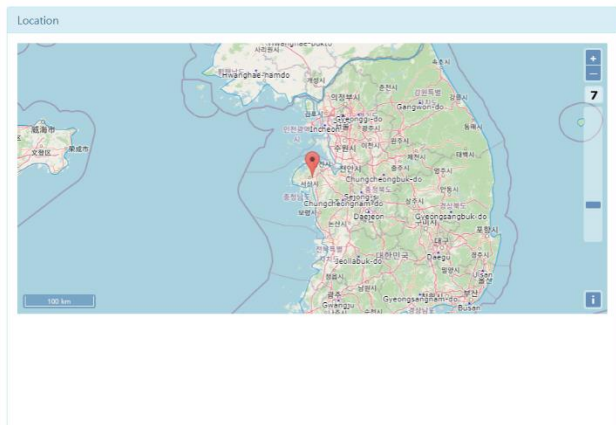
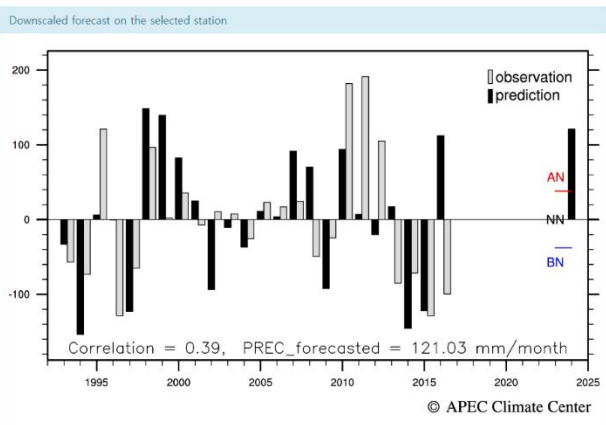
Details of Downscale: 66f12b12d5231f00063265b5

Predictand		Predictor	
Year-Season	2024-6	Training period	1993-2016
Variable	prec	Variable	slp
Dataset	4 Station	Models	<input checked="" type="radio"/> SCM <input type="radio"/> BOM_ACCESS-S2 <input type="radio"/> CMCC_SP3.5 <input type="radio"/> CWA_TCWAT1v1.1 <input type="radio"/> ECCS_CANSIPsv2.1 <input type="radio"/> KMA_GLOSEA6GC3.2 <input type="radio"/> METFR_SYS8 <input type="radio"/> NASA_GEOS-S25-2.1 <input type="radio"/> PNU-RDA_CGCMv2.0 <input type="radio"/> UKMO_GLOSEA6
Region	129 Seosan	Region	Latitude: 10-45, Longitude: 125-230

Advanced Options

Significance level	5%
Minimum pattern score	0.3

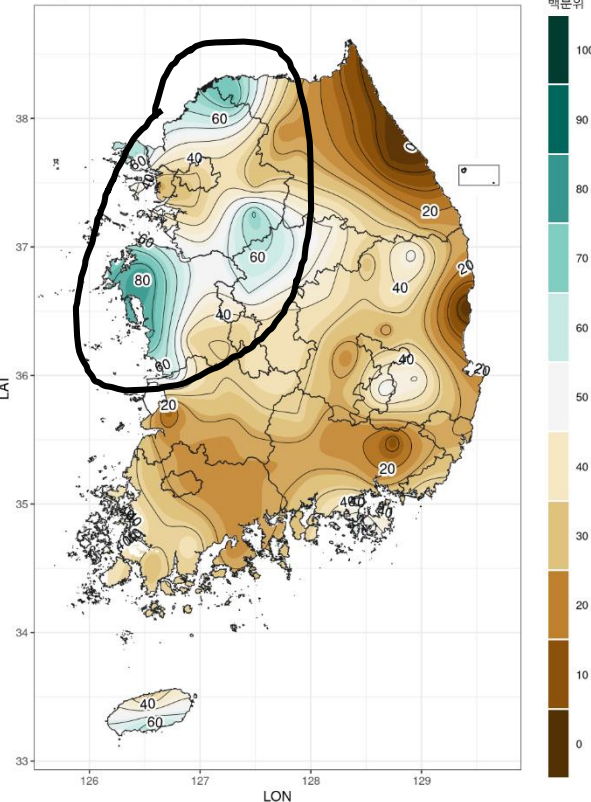
129 Republic of Korea Seosan Good 0.391738



- SCM
- Above-normal prec
- Good
- Cor. Coeff: 0.39

Produce a downscaled forecast: Precipitation over Seosan for JJA 2024

[2024-06-01~2024-08-31] 남한(66개 지점) 강수 백분위 분포
전국(62개 지점, 제주제외) 강수누적: 597, 강수백분위(퍼센타일): 21



붙임 2 | 2024년 여름철 주요 기압계



【그림 1】 2024년 6월하순~7월중순

- 이번 장마철 강수는 좁은 영역에서 강하게 내리는 특징을 보였는데, 1시간 최다강수량이 100 mm 를 넘는 사례가 9개 지점에서 관측되었다.

※ 2024년 장마철 1시간최다강수량 100 mm 이상 발생 사례

날짜	지점명	1시간최다 강수량	날짜	지점명	1시간최다 강수량
7.10.	여청도(전북 군산시)	146.0 mm	7.16.	의신(전남 진도군)	103.5 mm
	군산(전북 군산시)	131.7 mm	7.17.	신곡(경기 의정부시)	103.5 mm
	함라(전북 익산시)	125.5 mm		파주(경기 파주시)	101.0 mm
	서천(충남 서천군)	111.5 mm	7.24.	사하(부산 사하구)	112.5 mm
	양화(충남 부여군)	106.0 mm			

- 북태평양고기압 가장자리를 따라 유입된 수증기와 우리나라 북쪽에서 유입된 상층의 찬 공기가 정체전선상에서 충돌하면서 비구름이 강하게 발달하여 좁은 지역에 강하게 내리는 비가 자주 발생했다.

Produce a downscaled forecast: Precipitation over Busan for 2024 OND

Downscale

Select observation dataset

Korea 101 Stations or 4 Stations

Show 10 entries

Dataset Name	Countries	Total Stations	Period(prec)	Period(temp)	Public
Korea 101 Stations	Republic of Korea	101	1973 ~ 2019	1973 ~ 2019	PUBLIC
GHCN	World	3697	1950 ~ 2009		PUBLIC
Asia Region (prec)	Asia	4918	1961 ~ 2004		PUBLIC
Iran stations	Islamic Republic of Iran	31	1951 ~ 2017	1951 ~ 2017	PUBLIC
Kurdistan stations	Islamic Republic of Iran	7	1960 ~ 2021	1960 ~ 2021	PUBLIC

Showing 1 to 5 of 5 entries

Previous 1 Next

Create Edit View Remove

2

Shift + drag

Lat: 34.921056 to 35.408290
Lon: 128.483734 to 129.326935
Area: 2404.52 sq.mi.

4
159 Busan

How to use?

3 Add Selected Remove All

Show 10 entries

Station ID	Country	Name	Precipitation	Temperature
<input type="radio"/> 55	Republic of Korea	Changwon	1985~2019	1985~2019
<input checked="" type="radio"/> 159	Republic of Korea	Busan	1973~2019	1973~2019
<input type="radio"/> 253	Republic of Korea	Gimhaesi	2008~2019	2008~2019
<input type="radio"/> 255	Republic of Korea	Bukchangwon	2009~2019	2009~2019
<input type="radio"/> 257	Republic of Korea	Yangsansi	2009~2019	2009~2019

Showing 1 to 5 of 5 entries

5 Input Downscale Job

Produce a downscaled forecast: Precipitation over Busan for 2024 OND

Station information

Dataset : 4 Station
 Station ID : 159
 Country : Republic of Korea
 Station name : Busan
 Precipitation(1973~2024) , Temperature(1973~2024)



Predictor

Variable: **sst (해수면온도)**

prec slp sst t850 u200 u850 v200 v850 z500

Models

APCC_SCOPS BOM_ACCESS-S2 CMCC_SPS3.5 CWA_TCWA1TV1.1
 ECCC_CANSIPV3 KMA_GLOSEA6GC3.2 METFR_SYS8 MGO_MGOAM2.4
 NASA_GEOS-S2S-2.1 NCEP_CFSv2 PNU-RDA_CGCMv2.0 UKMO_GLOSEA6

Training Period

From 1993 To 2016 24 years

Advanced Options

Method: Linear Regression

Significance Level: 5 %

Minimum Pattern Score: 0.3

**BOM CMCC CWA ECCC
KMA METFR NASA
PNU=RDA UKMO**

Predictand

Season: Year 2024 Season 10

Variable: Precipitation Temperature

Domain

Latitude: -15 ~ 0 Longitude: 260 ~ 280

Apply

5000 km

Check pattern

Download

Predictand: 2023 OND / Precipitation
Predictor: sst / 9개 모델 / 열대 동태평양 (-15~0, 260~280)



1. 왜 상세화 예측이 필요한가?
2. 자료 처리 실습
3. 상세화 예측 실습
4. 아웃룩 만들어 보기

Exercise

Make your own seasonal climate outlook!

Station information

Station ID : 143
 Country : Republic of Korea
 Station name : Daegu
 Precipitation(1973~2019) , Temperature(1973~2018)

Any city which you are interested in

Predictand

Season: **2024ND or whatever**
 Year: 2022 Season: 11
 Variable: Precipitation Temperature

Predictor

Variable: prec slp sst t850 u200 u850 v200 v850 z500

Models: Please select variable.

Training Period: From To

Advanced Options: Method: Linear Regression
 Significance Level: 5 %
 Minimum Pattern Score: 0.3

Domain

Latitude ~ Longitude

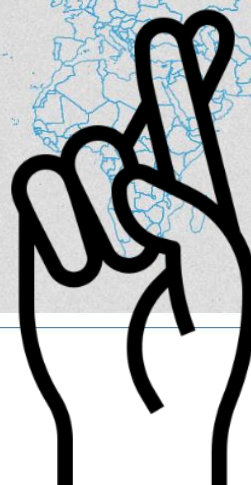
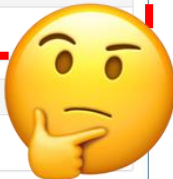
Apply

Check pattern

2

2000 km

Downscale





කාලගුණ විද්‍යා දෙපාර්තමේන්තුව
வளிமண்டலவியல் திணைக்களம்
DEPARTMENT OF METEOROLOGY
 இலங்கை இலங்கை SRI LANKA

Consensus Seasonal Weather Outlook
July, August and September(JAS)
Seasonal Rainfall and Temperature for Sri Lanka

This forecast was prepared using

- The prevailing global climate conditions.
- Forecasts from different climate models from around the world.
- Statistical downscaling of GCM output using CPT

Issued by Centre for Climate Change Studies (CCCS)

And
 Research Division

(b.4) Probabilistic Forecast for JAS season 2019 using Climate Information Toolkit

A climate information toolkit which has developed by APCC is used for following forecast. For the tool kit APCC has used Collection of Dynamic ensemble seasonal prediction data from National Meteorological and Hydrological Services and research institutes. This includes 14 operations and the models developed by institutes from 10 countries.

Areal rainfall data used as input data to "CLIK" toolkit and Downscaled to districts .SST selected as predictor for all the models. (APCC, MSC, NASA, NCEP, PNU, POAMA).

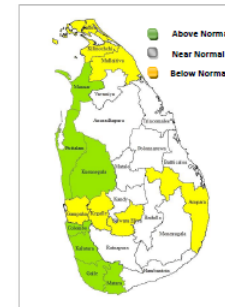


Fig 13: CLIK Multi model Ensemble Probabilistic Forecast for JAS season 2019

According to the CLIK tool there is a higher chance of receiving above normal rainfall in Mammal, Puttalam, Kurunegala, Colombo, Kalutara, Galle and Matara districts (Fig.13). And there is a higher chance of receiving below normal rainfall in Jaffna, Kilinochchi, Mullativu, Ampara, Gampaha, Kegalle and Nuwaraeliya districts. There is no signal in other districts and it indicates equal chances of receiving below normal, near normal and above normal rainfall for these districts.



Take-home message

1. 상세화 예측의 필요성
2. 기후예측을 위한 다양한 모델: 역학모델/통계모델
3. 예측인자 선정시 역학관계를 고려하라



Thank you!