



2023년 APEC기후센터 기후정보 생산 및 활동 사용자 워크숍

# [실습] 사용자 맞춤형 계절예측 및 검증실습

예측운영과

김상철 연구원

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## Prediction – Overview

### APCC 계절예측

- APEC 회원국 기상청 및 연구 기관으로 부터 수집된 전 지구 예측 모델의 300개 이상의 앙상블 자료를 종합
- 다중 모델 앙상블(Multi-Model Ensemble, MME) 기법 적용
- 3개월, 6개월 예측자료 제공
- Forecast(기후예측), Hindcast(과거 기후 재현)
- Monthly mean/Seasonal mean 구분 제공

### 단정 예측(Deterministic MME)

- 개별 모델의 앙상블 예측 값을 각 모델에 동일한 가중치를 부여하여 종합하는 방식
- 예측 값은 편차(기후 값 혹은 평년 값과의 차이)로 제공됨
- 기후 값, 평년 값: 평년 기간 동안의 평균값
- Simple Composite Method (SCM)

### 확률 예측(Probabilistic MME)

- 개별 모델의 예측 확률을 각 모델별로 가중치를 부여하여 통합하는 방식
- 확률 값 범주: 평년보다 높을 확률, 평년과 비슷할 확률, 평년보다 낮을 확률
- Gaussian fitting method (GAUS)

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**Prediction**

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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

ALL  
 APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCO\_CANSIPSv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  
 NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

Predict

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**APCC Seasonal Forecasts**

The APCC seasonal forecast is based on multi-model ensemble (MME) prediction system and disseminated to APEC member economics around 15th of every month. Currently, 15 operational centers and research institutes from 11 countries around the world participate in the APCC MME operational prediction system by routinely providing their predictions in the form of ensembles of global forecast fields. The APCC's real-time operational forecasts are issued in both deterministic (based on ensemble mean) and probabilistic (based on full set of ensemble members) forms.

**Deterministic MME Forecast**

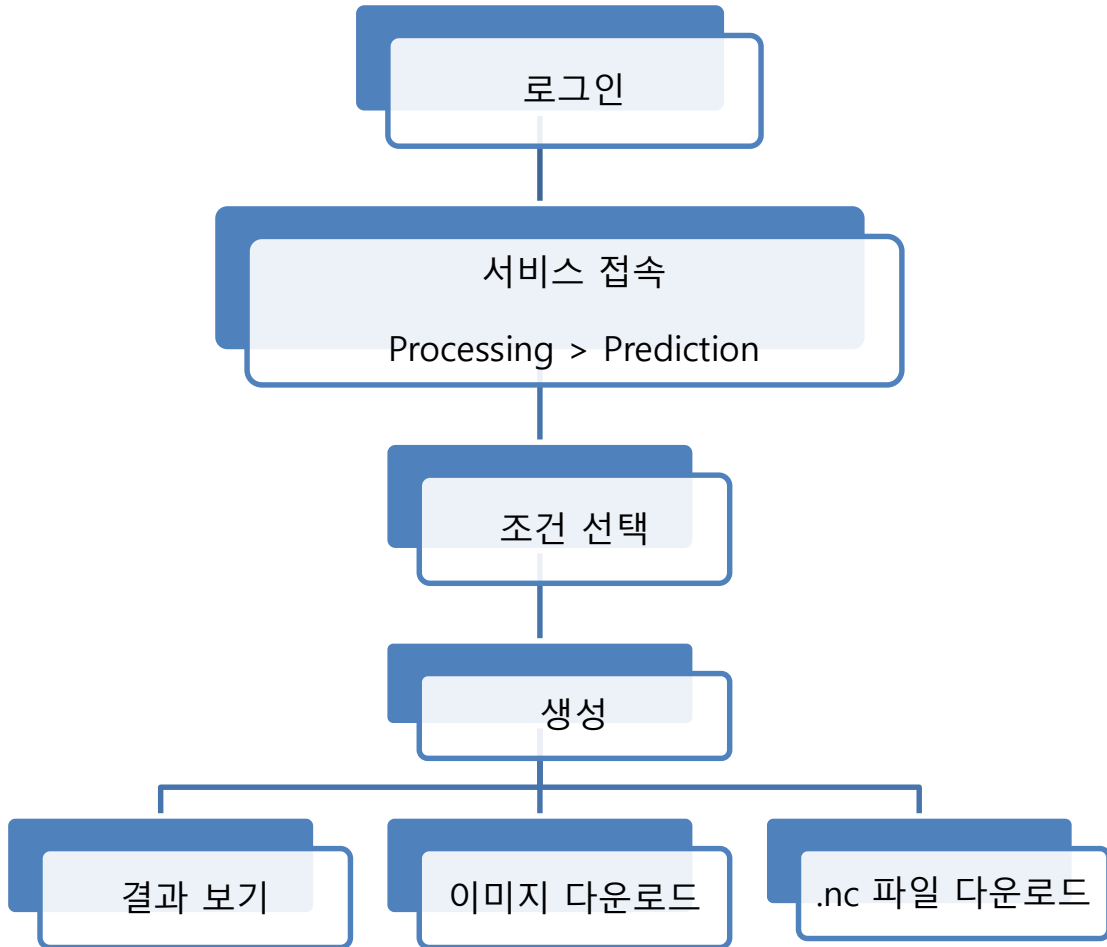
The deterministic forecast is based on a simply average of bias-corrected ensemble means from each model with equal weight to create a multi-model forecast. The ensemble mean anomaly forecasts for each individual model is calculated by their own climatology from the hindcasts.

**Probabilistic MME Forecast**

The probabilistic forecast is based on an uncalibrated MME with model weights being proportional to the square root of ensemble size, and a Gaussian fitting method for the estimation of the tercile-based categorical probabilities, that is, the probability of below-normal (BN), near-normal (NN), and above-normal (AN) categories with respect to climatology.

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| Prediction 시작하기 - 1 (Prediction 페이지 접속)



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**Prediction**

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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

- ALL
- APCC\_SCOPS
- BOM\_ACCESS-S2
- CMCC\_SPS3.5
- ECCC\_CANSIPsv2.1
- KMA\_GLOSEA6GC3.2
- METFR\_SYS8
- NASA\_GEOS-S2S-2.1
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- PNU-RDA\_CGCMv2.0
- UKMO\_GLOSEA6

**Predict**

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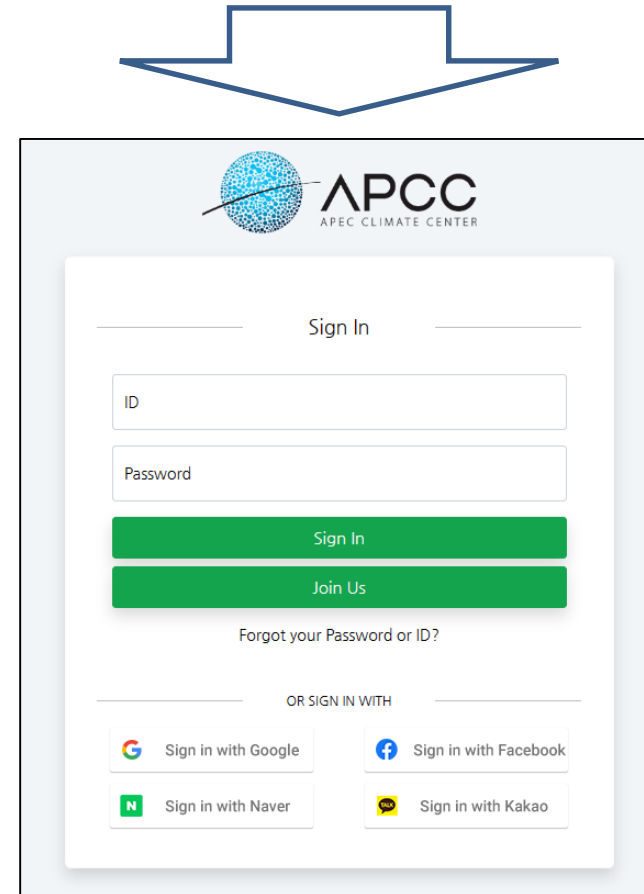
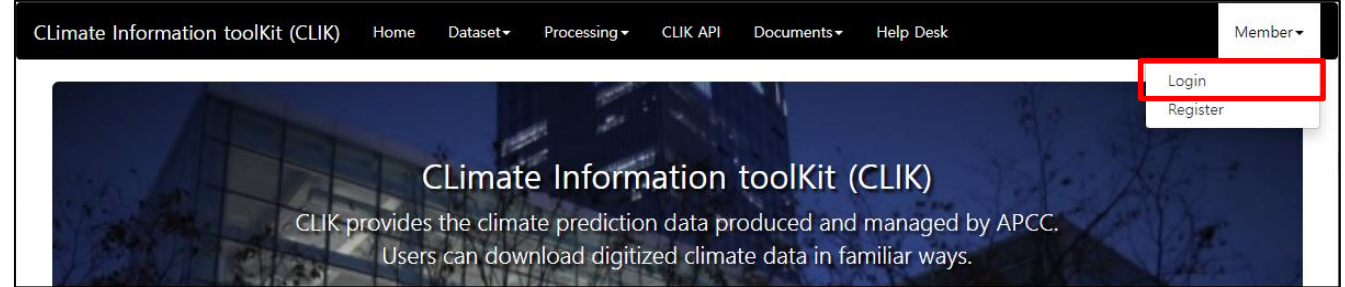
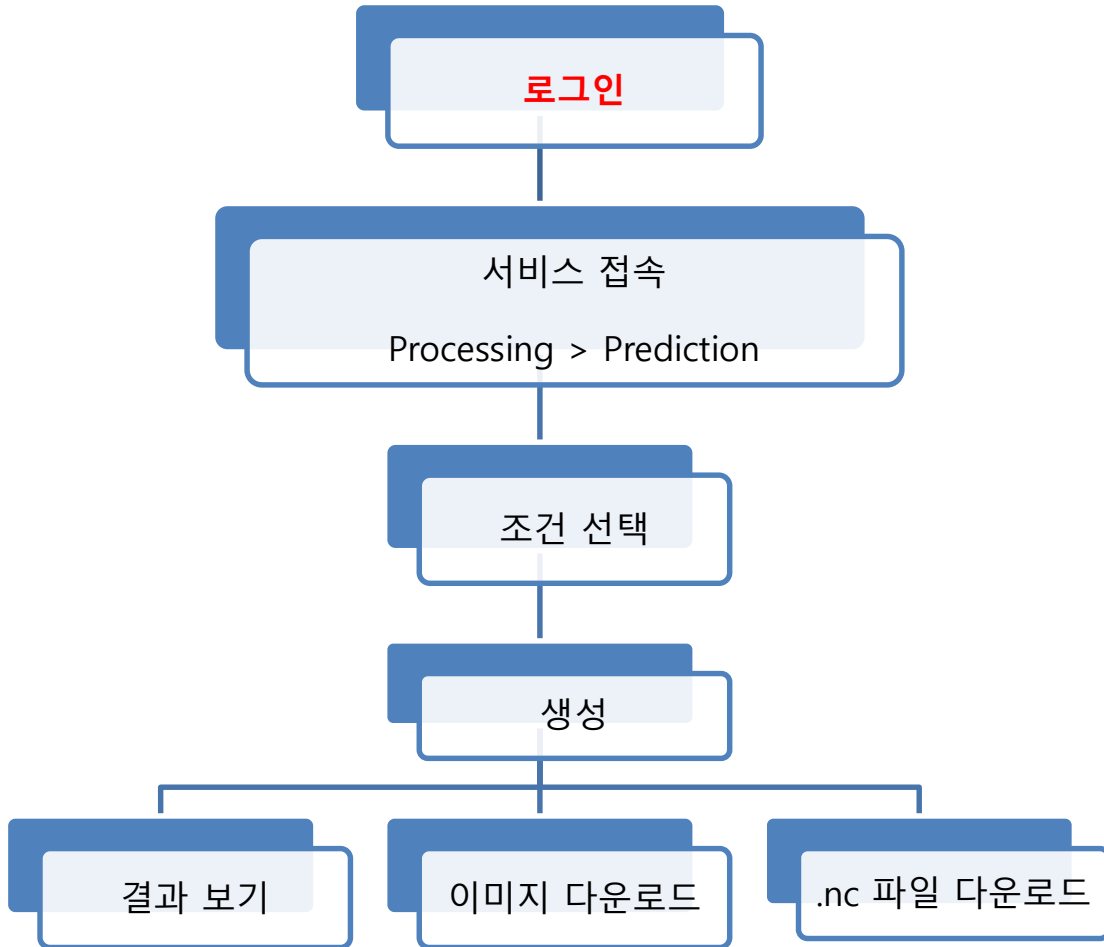
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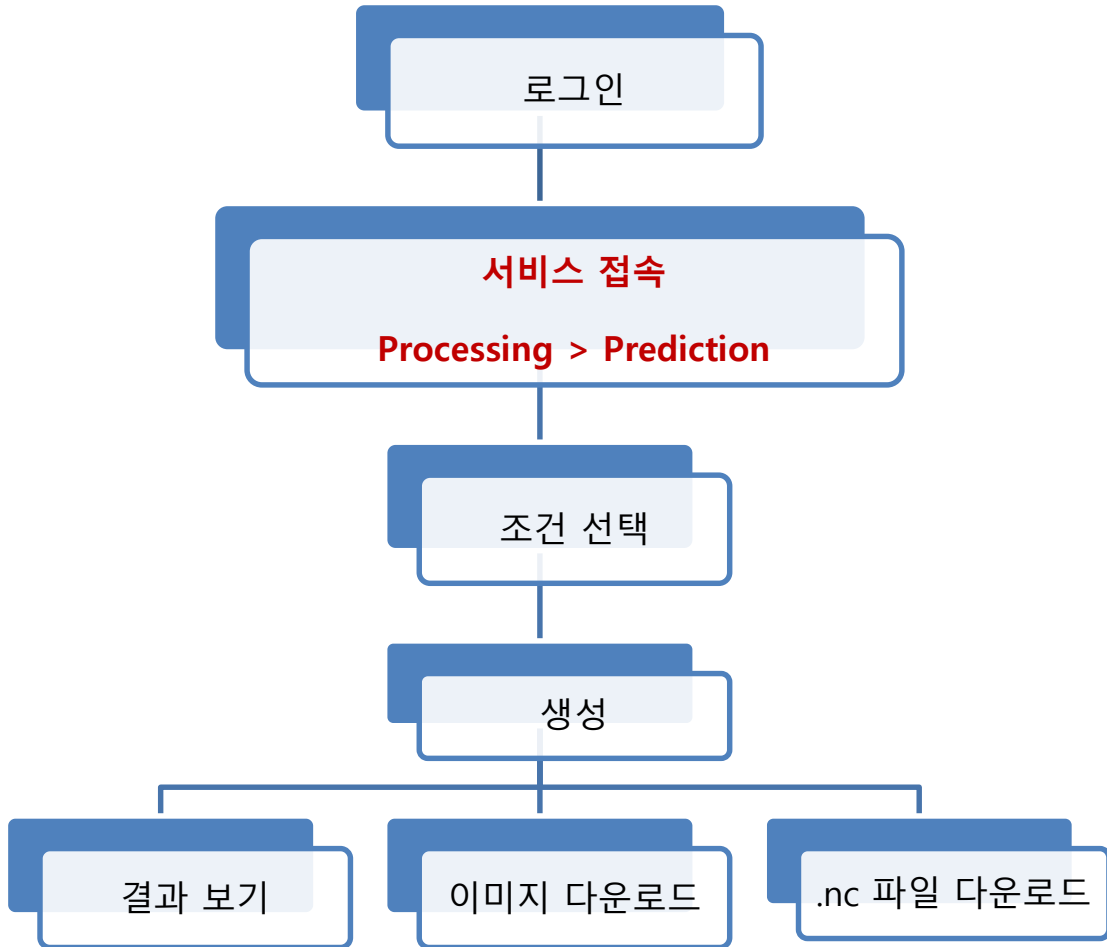
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## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

### | Prediction 시작하기 - 2 (로그인)



| Prediction 시작하기 - 3 (Prediction 페이지 접속)



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Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

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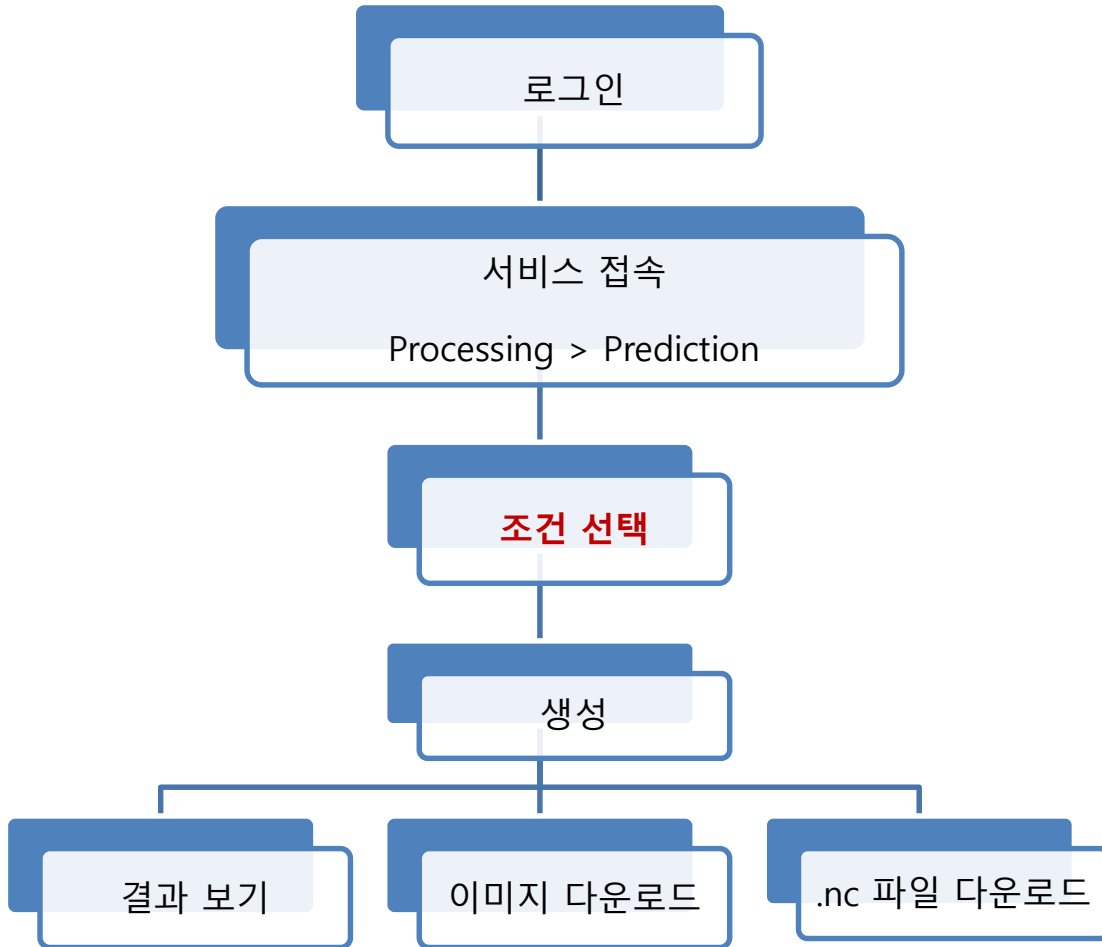
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| Prediction 시작하기 - 4 (조건 선택-모델리스트)



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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

**원하는 기간 선택**      **Method 선택**

Models: **원하는 모델을 선택**

ALL  
 APCC\_SCOPS    BOM\_ACCESS-S2    CMCC\_SPS3.5    ECCC\_CANSIPsv2.1    KMA\_GLOSEA6GC3.2    METFR\_SYS8    NASA\_GEOS-S2S-2.1  
 NCEP\_CFSv2    PNU-RDA\_CGCMv2.0    UKMO\_GLOSEA6

Predict

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**Deterministic MME Forecast**

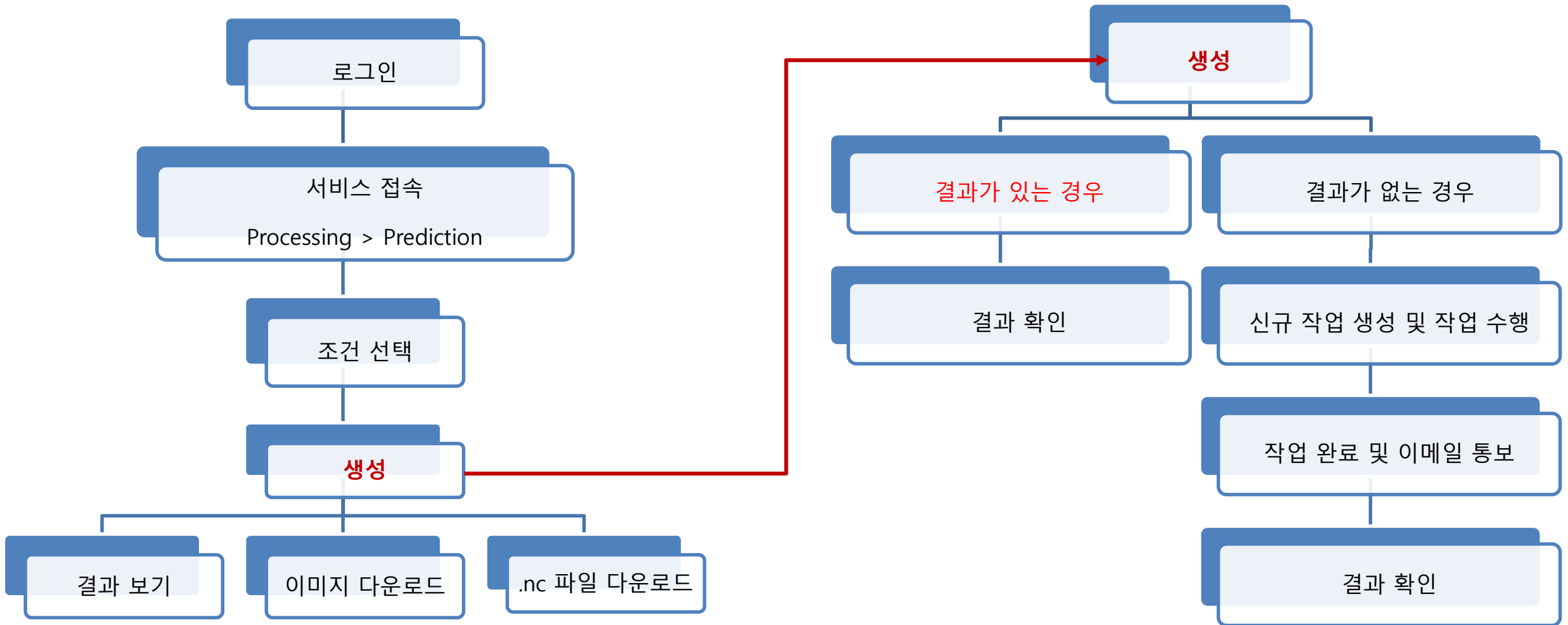
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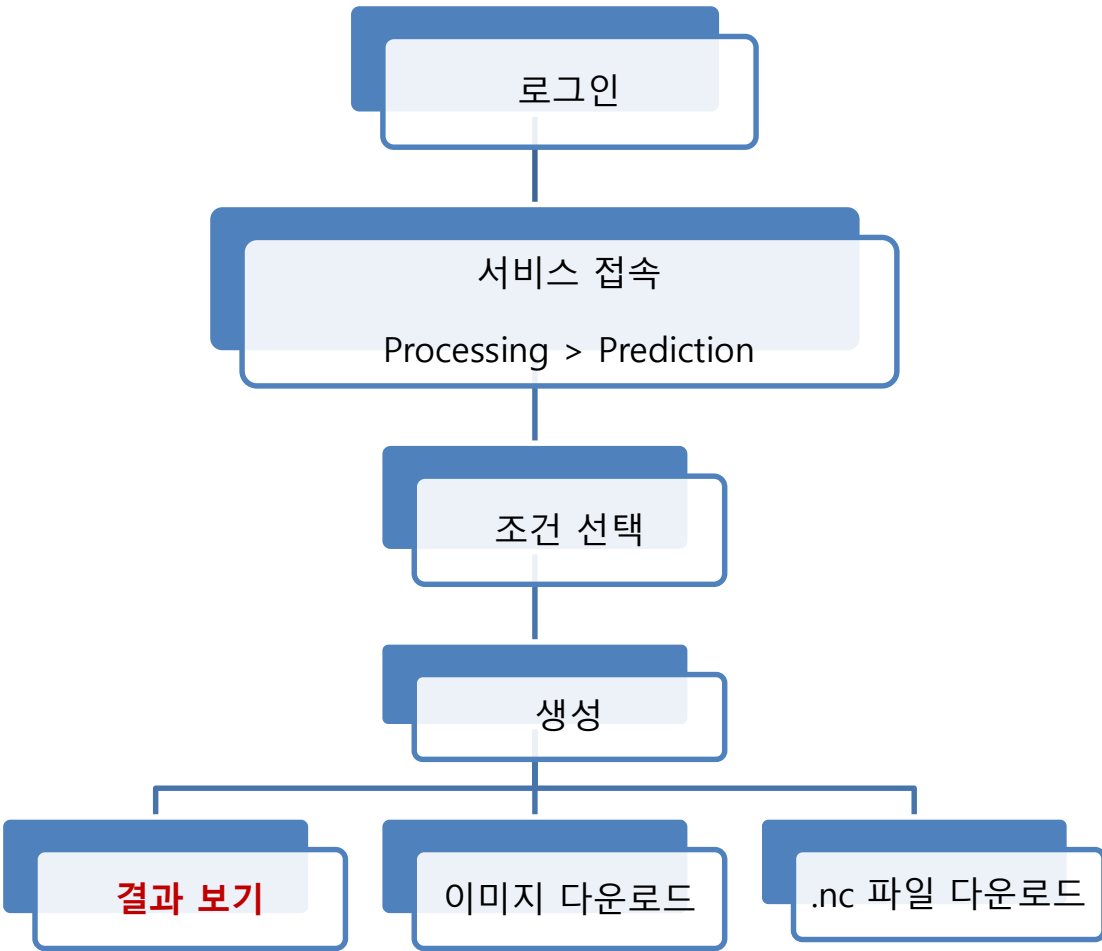
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| Prediction 시작하기 - 5 [생성 과정]



# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 6 (동일한 결과가 있는 경우)



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**Prediction**

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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCS\_CANSIPsv2.1  KMA\_GLOSEA6G3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1

NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict** Download (.png) Download (.nc)

**사용자간 작업 결과 공유**

**PREC (Precipitation)**

Precipitation for July-September 2023

**SLP (Sea Level Pressure)**

Sea Level Pressure for July-September 2023

**SST (Sea Surface Temperature)**

Sea Surface temperature for July-September 2023

**T2M (Temperature at 2m)**

Temperature at 2m for July-September 2023

**T850 (Temperature at 850hPa)**

Temperature at 850hPa for July-September 2023

**Z500 (Geopotential Height at 500hPa)**

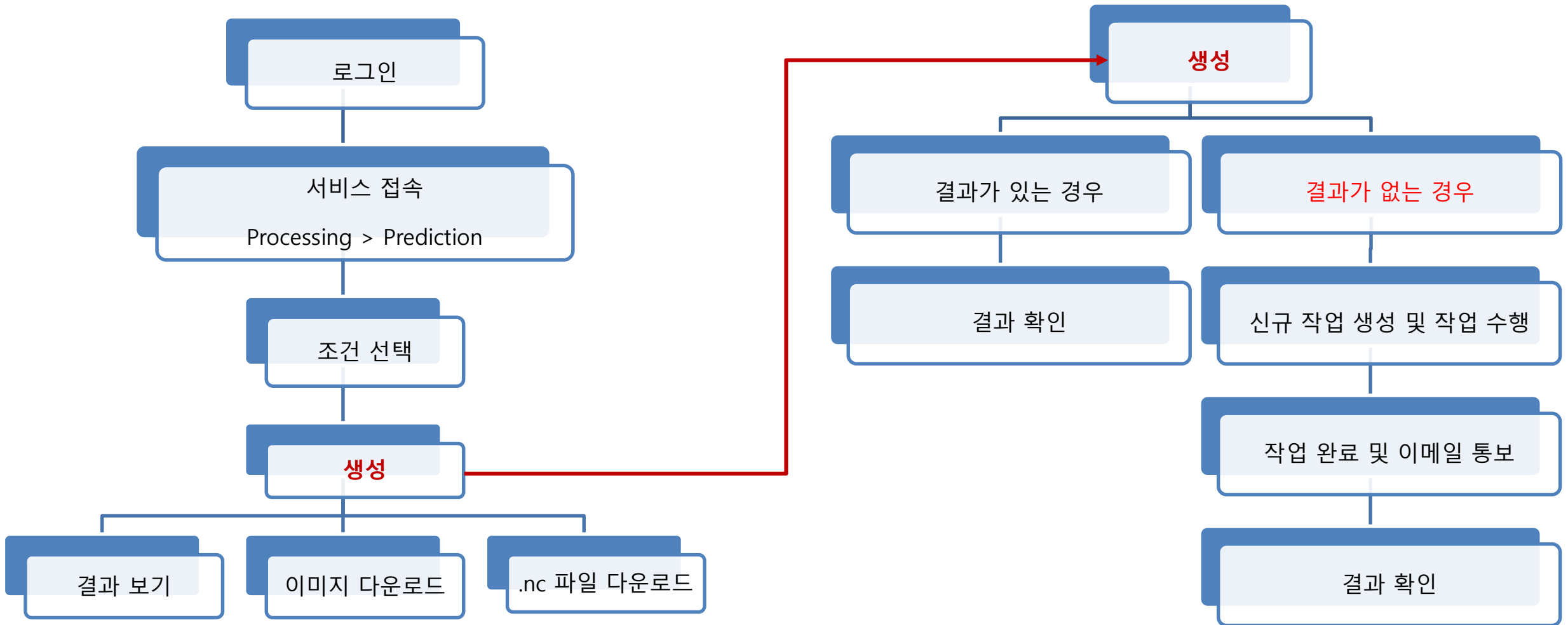
Geopotential height at 500hPa for July-September 2023

**UV200 (Wind at 200hPa)**

**UV850 (Wind at 850hPa)**

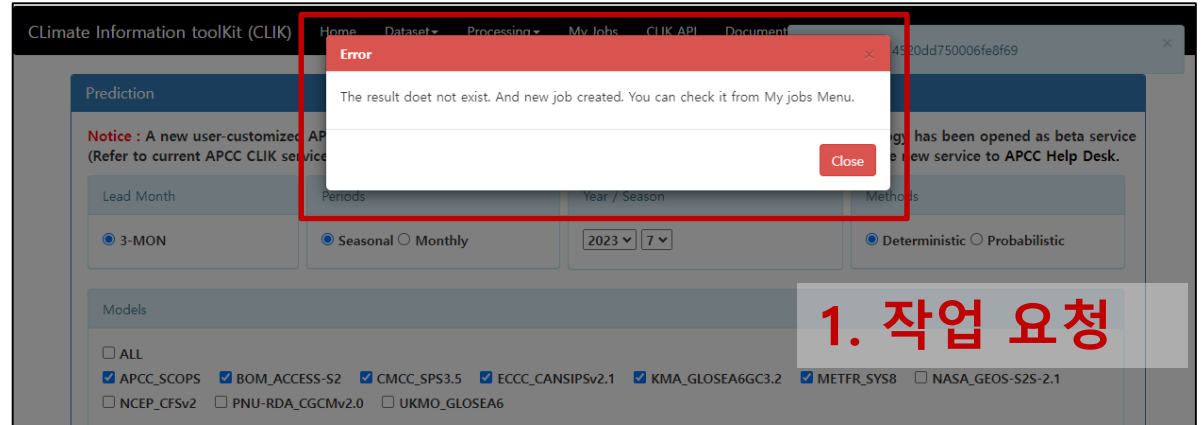
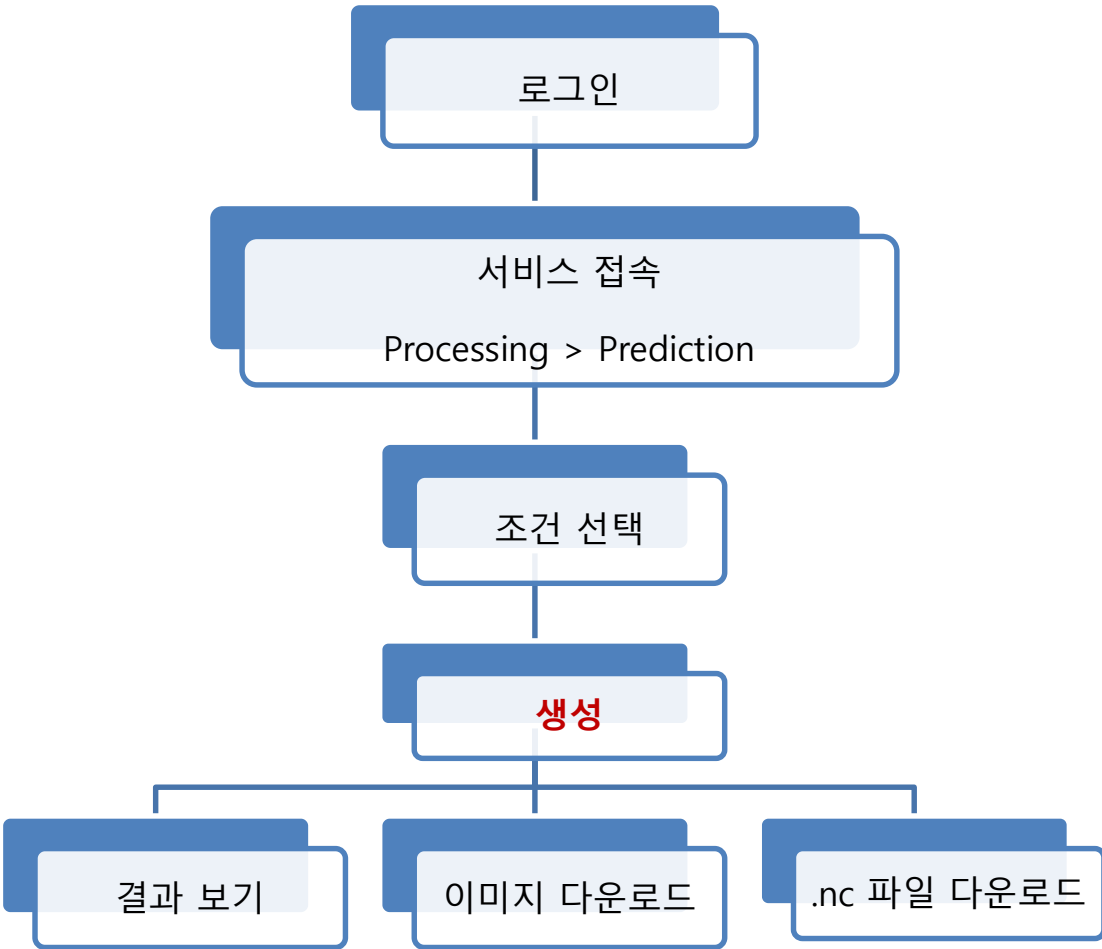
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| Prediction 시작하기 - 7 (생성 과정)



## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

### | Prediction 시작하기 - 8 (동일한 결과가 없는 경우)



**2 생성 작업 확인**

Job type	Submission date	End date	Status
Prediction	2023-07-06 16:56:40		Running
Prediction	2023-06-30 10:36:42	2023-06-30 10:39:29	Download View
Verification	2023-06-29 14:14:20	2023-06-29 14:26:46	Download View
Prediction	2023-06-29 14:14:06	2023-06-29 14:20:00	Download View

제목 : Notification of job status (APCC) ☆  
 보낸사람 : APCC <support@apcc21.org>  
 받는사람 : '김상철' <scslow@apcc21.org>

Your job (64a673b820dd750006fe8f65) was completed. Please check the [My Jobs] of the homepage, and [download](#) results.

If you have any question, please use [APCC Help desk](#).

APCC Homepage: <https://www.apcc21.org>  
 CLIKs Homepage: <https://cliks.apcc21.org>

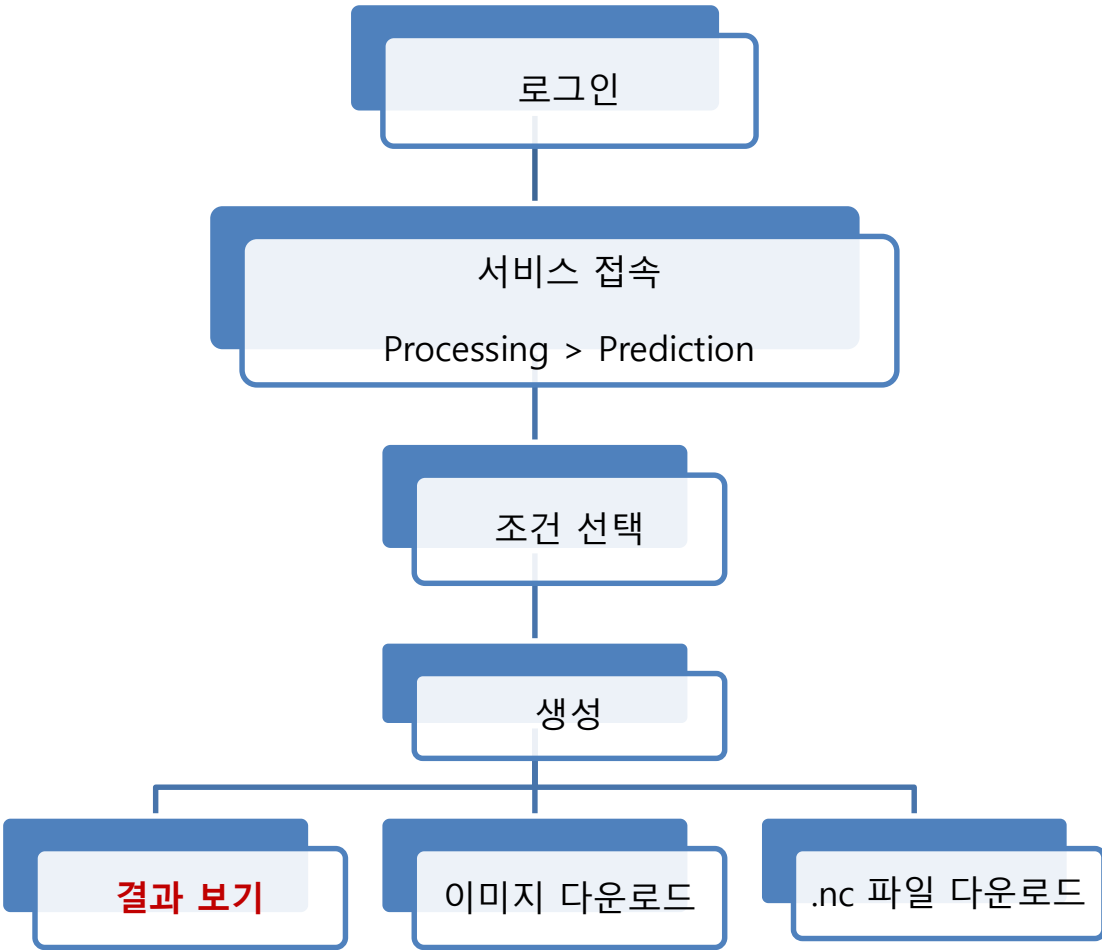
### 3 생성 작업 완료 메일

**4. 다운로드 / 결과확인**

Job type	Submission date	End date	Status
Prediction	2023-07-06 16:56:40	2023-07-06 17:01:31	Download View
Prediction	2023-06-30 10:36:42	2023-06-30 10:39:29	Download View
Verification	2023-06-29 14:14:20	2023-06-29 14:26:46	Download View
Prediction	2023-06-29 14:14:06	2023-06-29 14:20:00	Download View

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 9 (동일한 결과가 없는 경우)



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**Prediction**

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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCS\_CANSIPsv2.1  KMA\_GLOSEA6G3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1

NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict**

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**PREC (Precipitation)**

Precipitation for July-September 2023

SLP (Sea Level Pressure)

Sea Level Pressure for July-September 2023

SST (Sea Surface Temperature)

Sea Surface temperature for July-September 2023

T2M (Temperature at 2m)

Temperature at 2m for July-September 2023

T850 (Temperature at 850hPa)

Temperature at 850hPa for July-September 2023

Z500 (Geopotential Height at 500hPa)

Geopotential height at 500hPa for July-September 2023

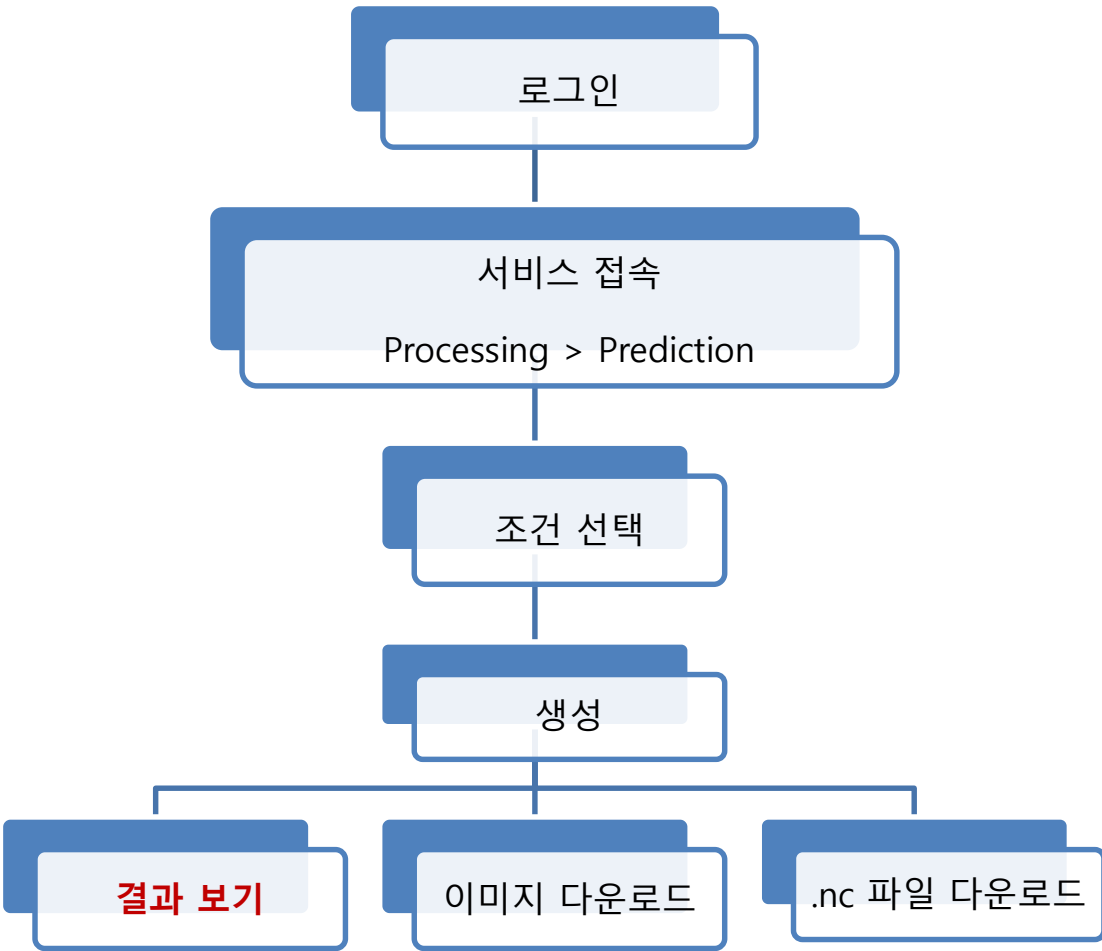
UV200 (Wind at 200hPa)

UV850 (Wind at 850hPa)

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# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 10 (결과 이미지 클릭)



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**Prediction**

Notice : A new user-customized APCC seasonal prediction (Refer to current APCC CLIK service : <https://clik.apcc21.org>)

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Models:

ALL  APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEP

**Predict**

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**PREC (Precipitation)**

PRECIPITATION (mm/day)

SLP (Sea Level Pressure)

SLP (hPa)

SLT (Sea Surface Temperature)

SLT (Celsius)

T2M (Temperature at 2m)

T2M (Celsius)

T850 (Temperature at 850hPa)

T850 (Celsius)

Z500 (Geopotential Height at 500hPa)

Z500 (gpm)

UV200 (Wind at 200hPa)

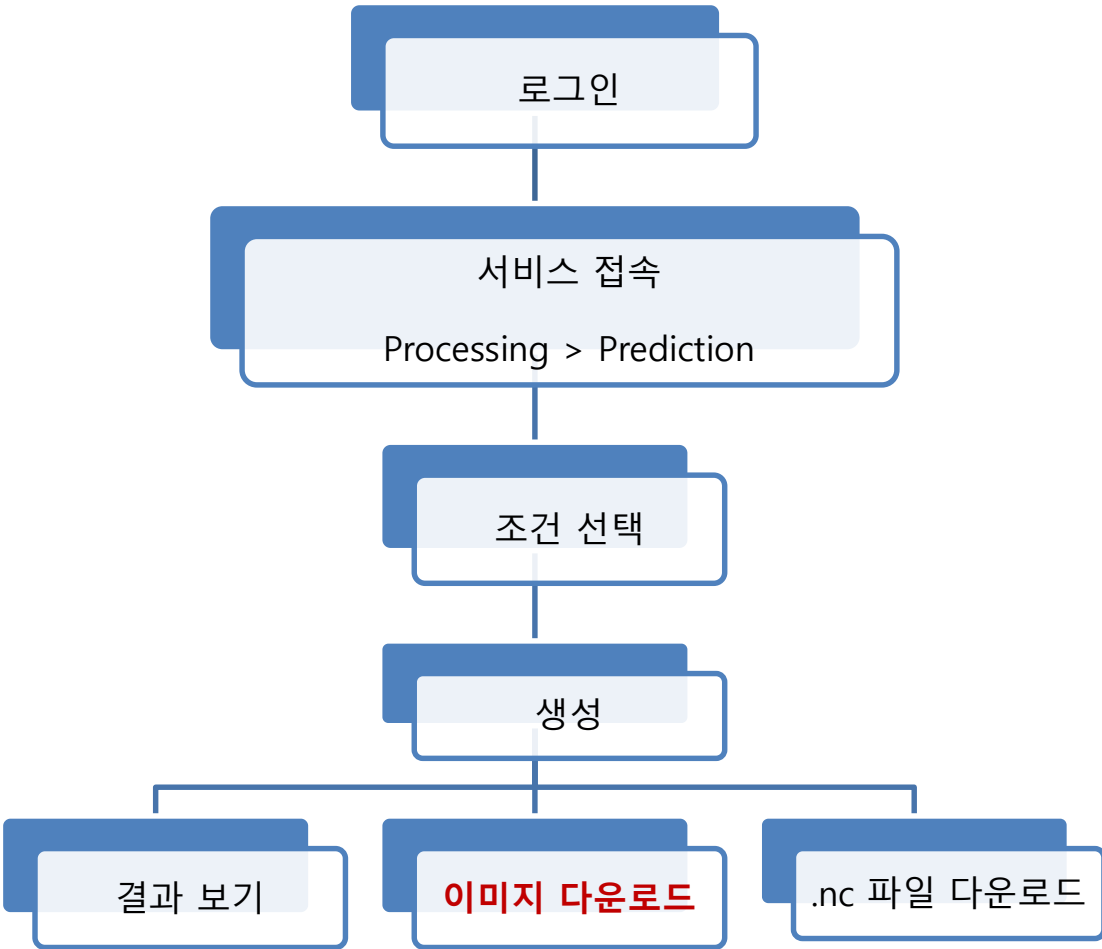
UV850 (Wind at 850hPa)

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원본 사이즈

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 11 (이미지 다운로드)



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**Prediction**

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Lead Month:  3-MON

Periods:  Seasonal  Monthly

Models:  ALL  APCC\_SCOPS  BOM\_ACCESS  NCEP\_CFSv2  PNIU  UKMO\_GLO

**이름**

- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_prec.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_slp.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_sst.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_t2m.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_t850.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_u200.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_u850.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_uv200.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_uv850.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_v200.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_v850.png
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_SEASONAL\_z500.png

**Download (.png)** **Download (.nc)**

**PREC (Precipitation)** **SLP**

Precipitation for July-September 2023 **Unit: mm/day**

Sea Level Pressure for July-September 2023 **Unit: hPa**

Sea Surface temperature for July-September 2023 **Unit: deg K**

**T2M (Temperature at 2m)** **T850 (Temperature at 850hPa)** **Z500 (Geopotential Height at 500hPa)**

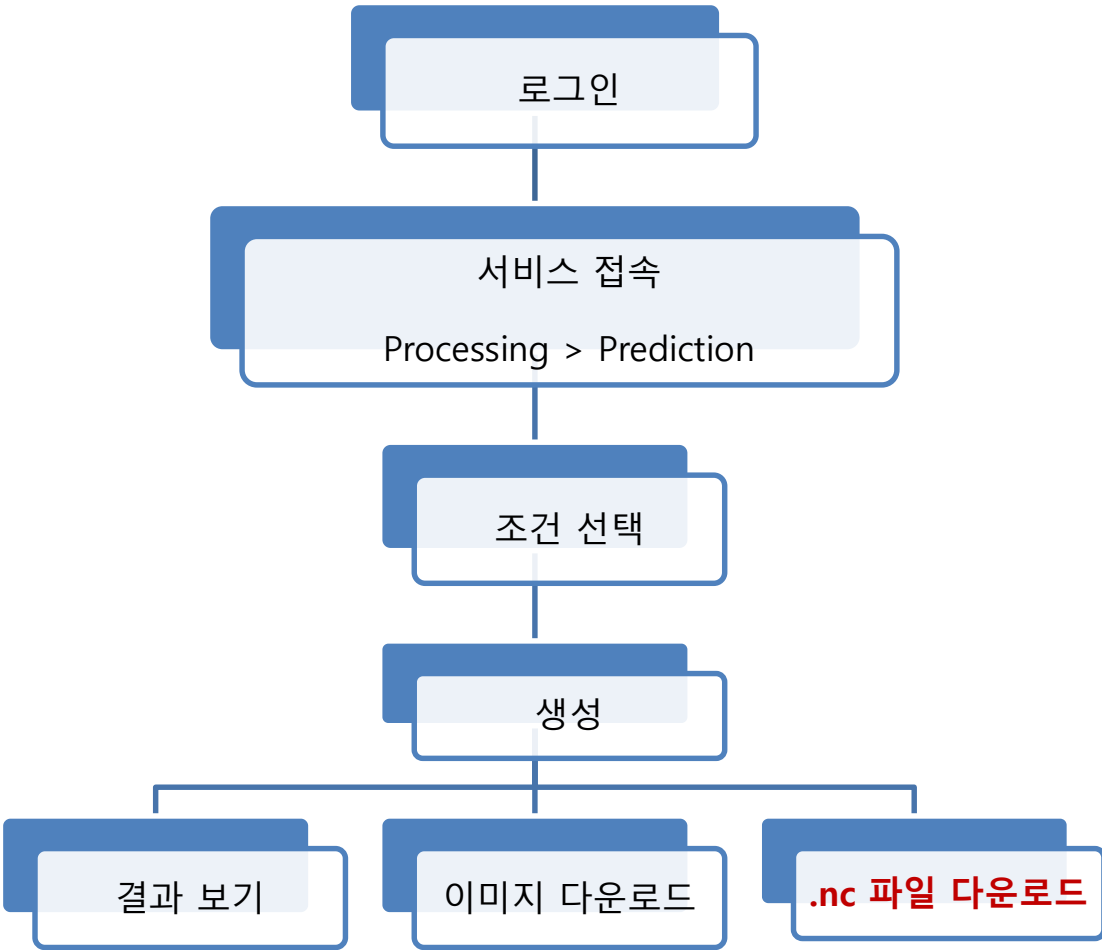
Temperature at 2m for July-September 2023 **Unit: deg K**

Temperature at 850hPa for July-September 2023 **Unit: deg K**

Geopotential height at 500hPa for July-September 2023 **Unit: m**

**UV200 (Wind at 200hPa)** **UV850 (Wind at 850hPa)**

Prediction 시작하기 - 12 (.nc 파일 다운로드)



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**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Models:  ALL  APCC\_SCOPS  BCCR\_CESS-S2  CMCC\_SPS3.5  NCEP\_CFSv2  CNRM-CM6.3  FGOALS-G2.3  GISS-EM2.3.5  INM-CM4.0  IPSL-CM6A1R  MIROC6  MRI-CGCM3.2.3a  NCAR-CCSM3  CNRM-CM6.3  FGOALS-G2.3  GISS-EM2.3.5  INM-CM4.0  IPSL-CM6A1R  MIROC6  MRI-CGCM3.2.3a  NCAR-CCSM3

이름

- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_prec.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_slp.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_sst.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_t2m.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_t850.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_u200.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_u850.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_v200.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_v850.nc
- 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_SEASONAL\_z500.nc

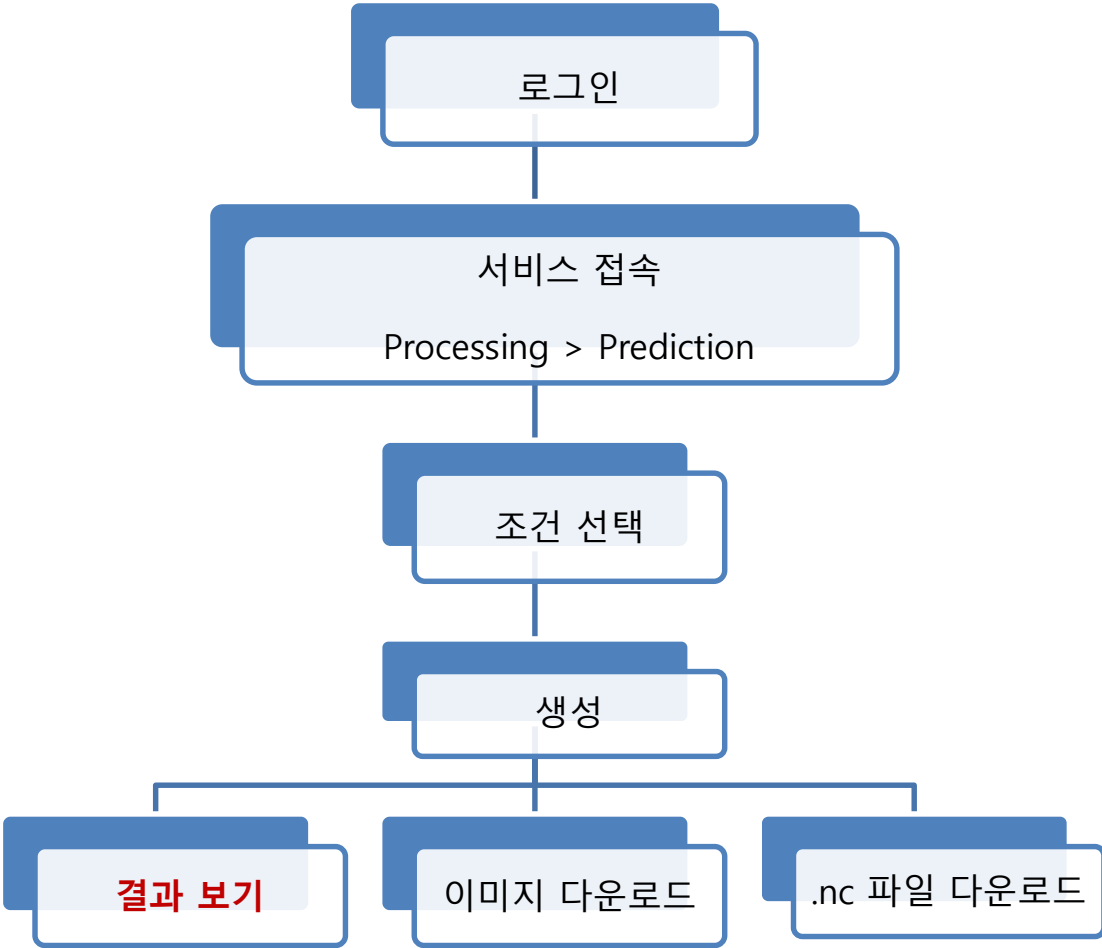
PREC (Precipitation) SLP (Sea Level Pressure) SST (Sea Surface Temperature)

T2M (Temperature at 2m) T850 (Temperature at 850hPa) Z500 (Geopotential Height at 500hPa)

UV200 (Wind at 200hPa) UV850 (Wind at 850hPa)

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 13 (Periods - Monthly)



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

**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month: 3-MON

Periods:  Seasonal  **Monthly**

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCS\_CANSIPSv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1

NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict**

Download (.png) Download (.nc)

First Month Second Month Third Month

**PREC (Precipitation)**

Precipitation for JUL 2023

SLP (Sea Level Pressure)

Sea Level Pressure for JUL 2023

SST (Sea Surface Temperature)

Sea Surface temperature for JUL 2023

T2M (Temperature at 2m)

Temperature at 2m for JUL 2023

T850 (Temperature at 850hPa)

Temperature at 850hPa for JUL 2023

Z500 (Geopotential Height at 500hPa)

Geopotential height at 500hPa for JUL 2023

APCC  
APEC CLIMATE CENTER

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 – 14 (Monthly 상세)

**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your an

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023

Models:

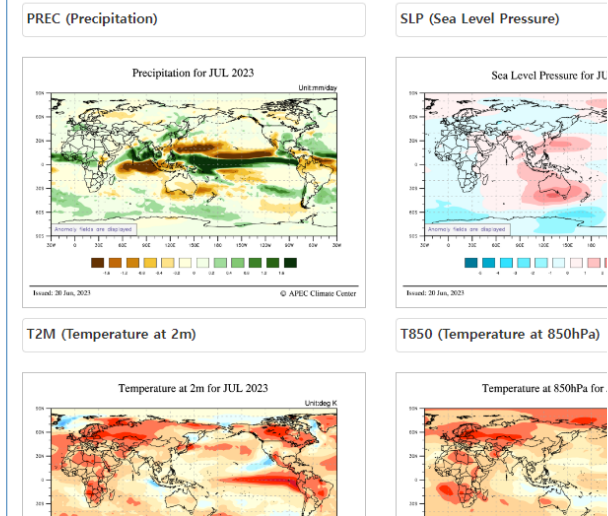
ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCC\_CANSIPsv2.1  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict**

Download (.png) Download (.nc)

First Month Second Month Third Month



**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification (Refer to current APCC CLIK service : <https://clik.apcc21.org>).

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Models:

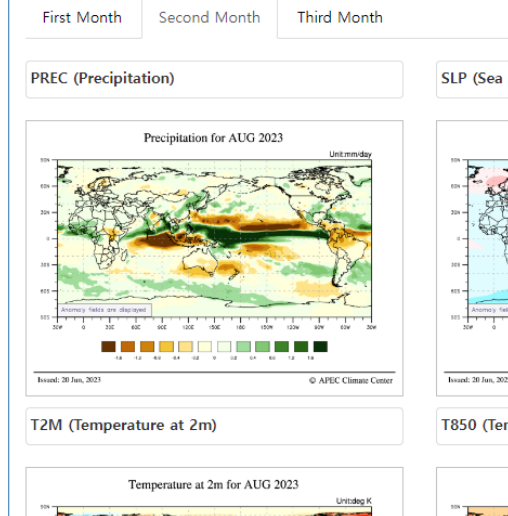
ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCC\_CANSIPsv2.1  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict**

Download (.png) Download (.nc)

First Month Second Month Third Month



**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Year / Season: 2023 7

Methods:  Deterministic  Probabilistic

Models:

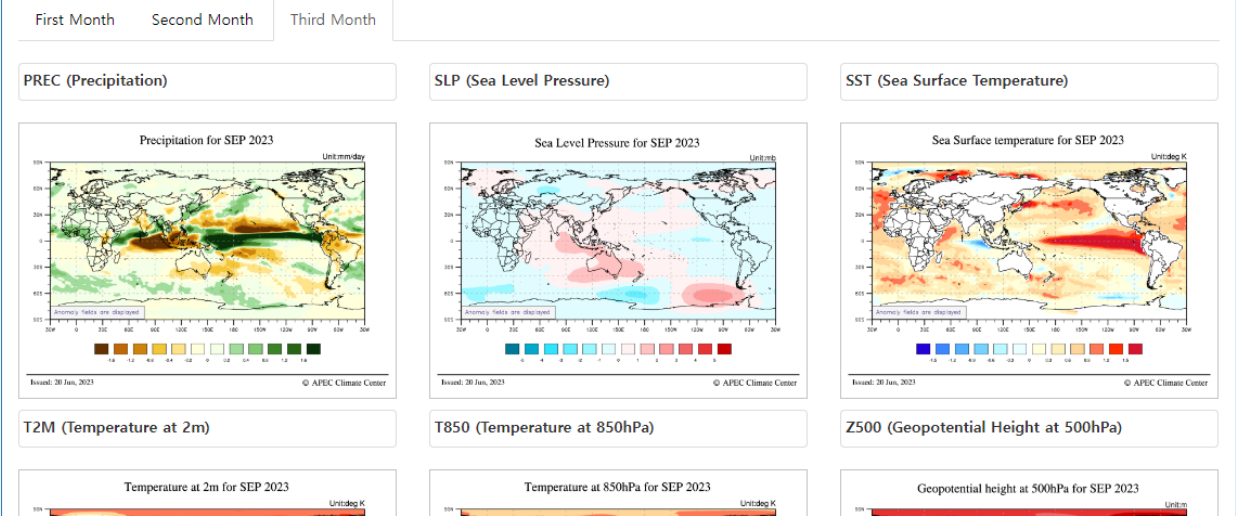
ALL

APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCC\_CANSIPsv2.1  KMA\_GLOSEA6G3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Predict**

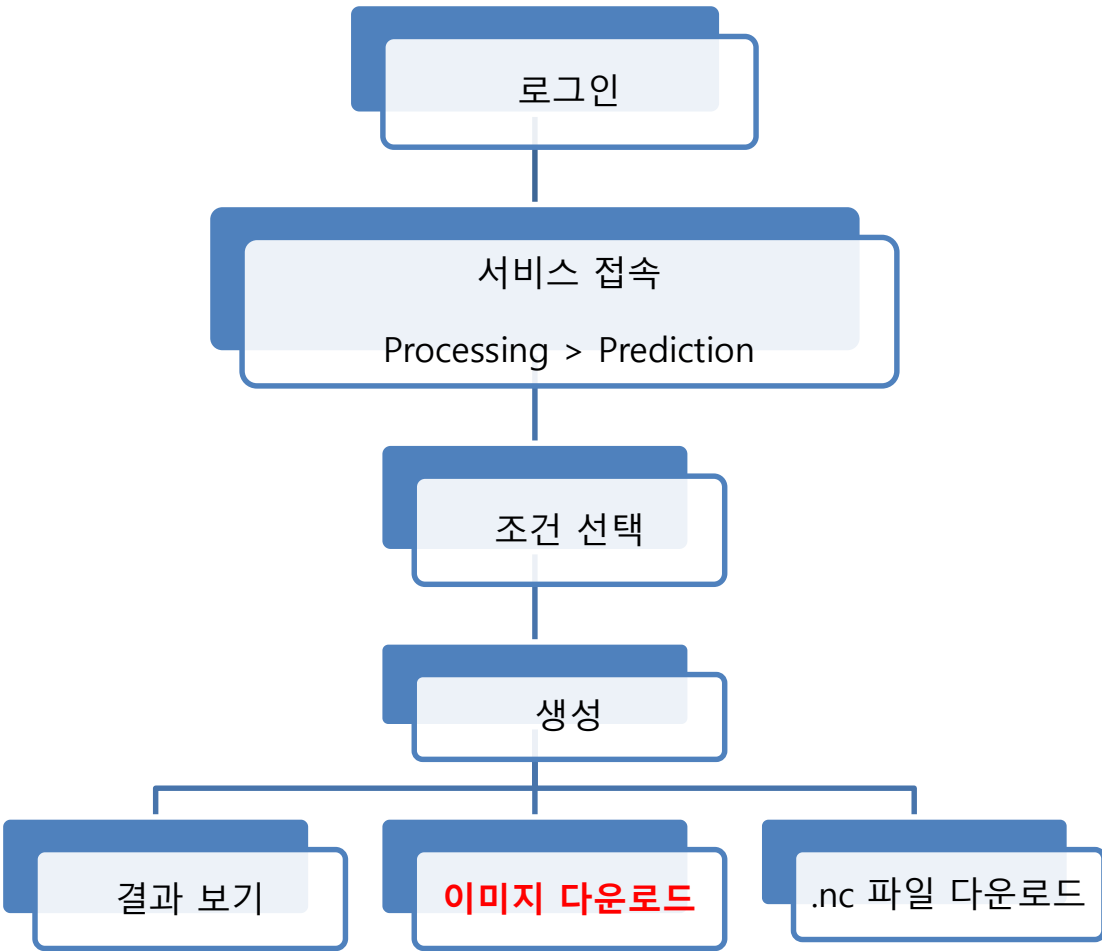
Download (.png) Download (.nc)

First Month Second Month Third Month



# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 15 (Monthly 이미지 다운로드)



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

**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month:  3-MON

Periods:  Seasonal  Monthly

Models:  ALL  APCC\_SCOPS  BOM\_ACCESS-SC  NCEP\_CFSv2  PNU-PR  UKMO-GLOSEA6

**Download (.png)** **Download (.nc)**

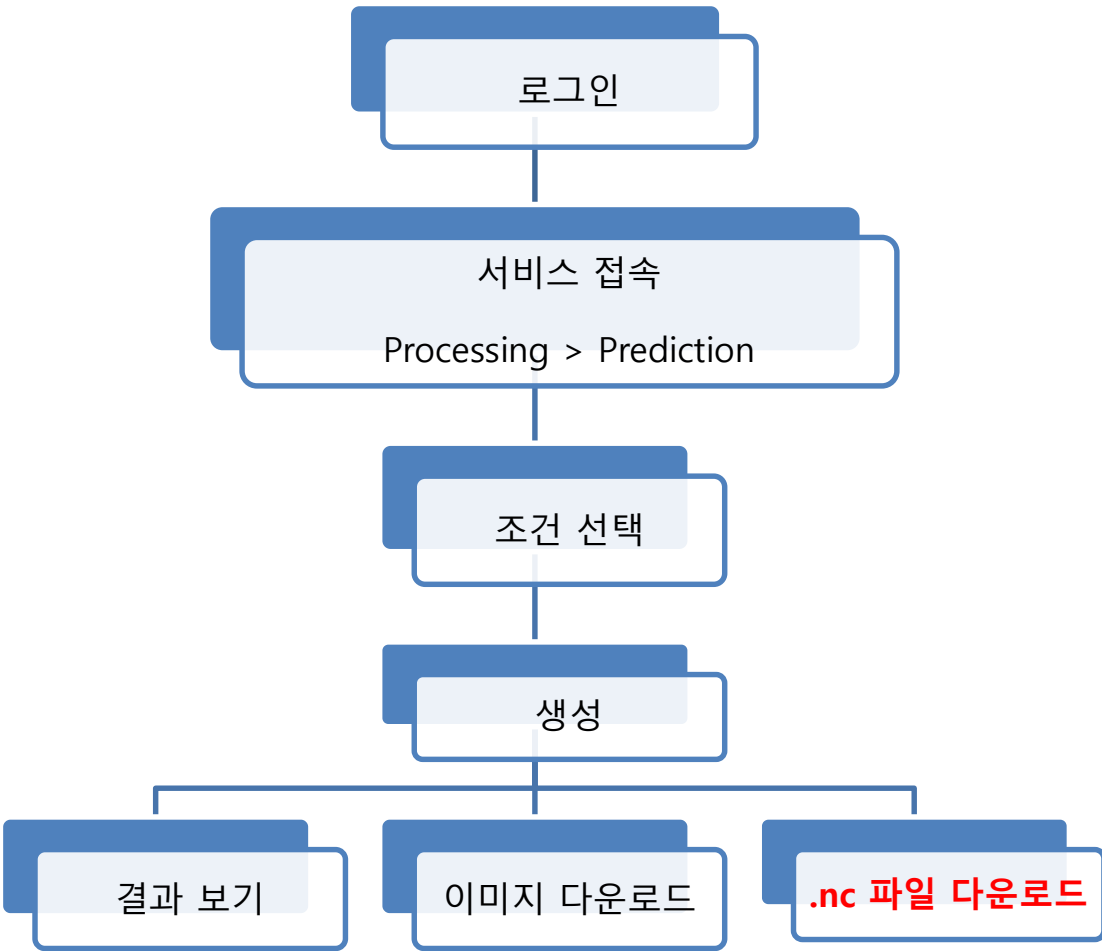
PREC (Precipitation) SLP (Sea Level Pressure) JUL 2023

T2M (Temperature at 2m) T850 (Temperature at 850hPa) Geopotential height at 500hPa for JUL 2023

3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_prec\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_prec\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_prec\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_slp\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_slp\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_slp\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_sst\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_sst\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_sst\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t2m\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t2m\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t2m\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t850\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t850\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_t850\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u200\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u200\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u200\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u850\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u850\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_u850\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv200\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv200\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv200\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv850\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv850\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_uv850\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v200\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v200\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v200\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v850\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v850\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_v850\_9.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_z500\_7.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_z500\_8.png  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_FIG\_MONTHLY\_z500\_9.png

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Prediction 서비스

## | Prediction 시작하기 - 16 (Monthly nc 파일 다운로드)



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

**Prediction**

**Notice :** A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month: 3-MON | Periods: Seasonal Monthly | Year / Season: 2023 7 | Methods: Deterministic Probabilistic

Models:

- ALL
- APCC\_SCOPS
- BOM\_ACCESS-1
- CMCC\_SPS3.5
- ECC\_CCA
- NCEP\_CFSv2
- PNU-RDA
- GCMV2.0
- UKMO
- 6

Download (.png) **Download (.nc)**

3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_prec.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_slp.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_sst.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_t2m.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_t850.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_u200.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_u850.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_v200.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_v850.nc  
 3-MON\_FORECAST\_SCM\_MME\_OUT\_DATA\_MONTHLY\_z500.nc

PREC (Precipitation) SLP (Sea Level Pressure) SST (Sea Surface Temperature)

T2M (Temperature at 2m) T850 (Temperature at 850hPa) Z500 (Geopotential Height at 500hPa)

*.nc 파일 다운로드*



# 실습

## Prediction 실습 시나리오 1 (사용법 익히기)

- 2023년 7월의 전체 모델을 대상으로 Prediction 결과를 확인하세요.
- 원본 이미지 결과 확인, 파일 다운로드 (이미지, NC파일)
- 결과 공유 확인

## Prediction 실습 시나리오 2

- 2023년 7월의 모델 중 원하는 모델을 선택하여 Prediction을 생성하고 결과를 확인하세요  
(이미 생성되어 있는 결과가 아닌 새로 생성되는 조합을 찾아보세요)  
(My Jobs 페이지 / 작업 완료 후 메일 확인)

### Verification – Overview

#### APCC 기후예측 검증

- 다중 모델 앙상블(Multi-Model Ensemble, MME) 기법에 기반
- 결정론적(Deterministic) 및 확률론적(Probability) 계절예측정보
- 3개월, 6개월 전망 제공
- 다양한 검증 기법을 통하여 예측정보의 계절적 특성 및 예측성에 대한 검증 정보도 제시

#### 성공률 (Success Rate, SR)

- 시도 횟수 중 성공의 비율 또는 백분율
  - ~ 0.33 : Poor skill region
  - 0.33 ~ 0.66 : Reasonable skill region
  - 0.66 ~ : High skill region

#### 이상상관계수 (Anomaly Correlation Coefficient, ACC)

- 특정 시간에 대한 기후평년값 대비 예측 편차값(Anomaly)이 관측과 공간적으로 얼마나 유사한지 평가하는 척도
- 기후평년값은 장기간 일별, 순별, 월별, 년별로 평균한 값을 의미하며, 세계 기상기구(WMO)에서는 30년 기간을 권고
- ACC는 최하 -1.0부터 최대 +1.0의 값의 범위로 +1.0에 가까울수록 관측과 공간분포의 유사성이 크다고 할 수 있음

#### HSS (Heidke Skill Score)

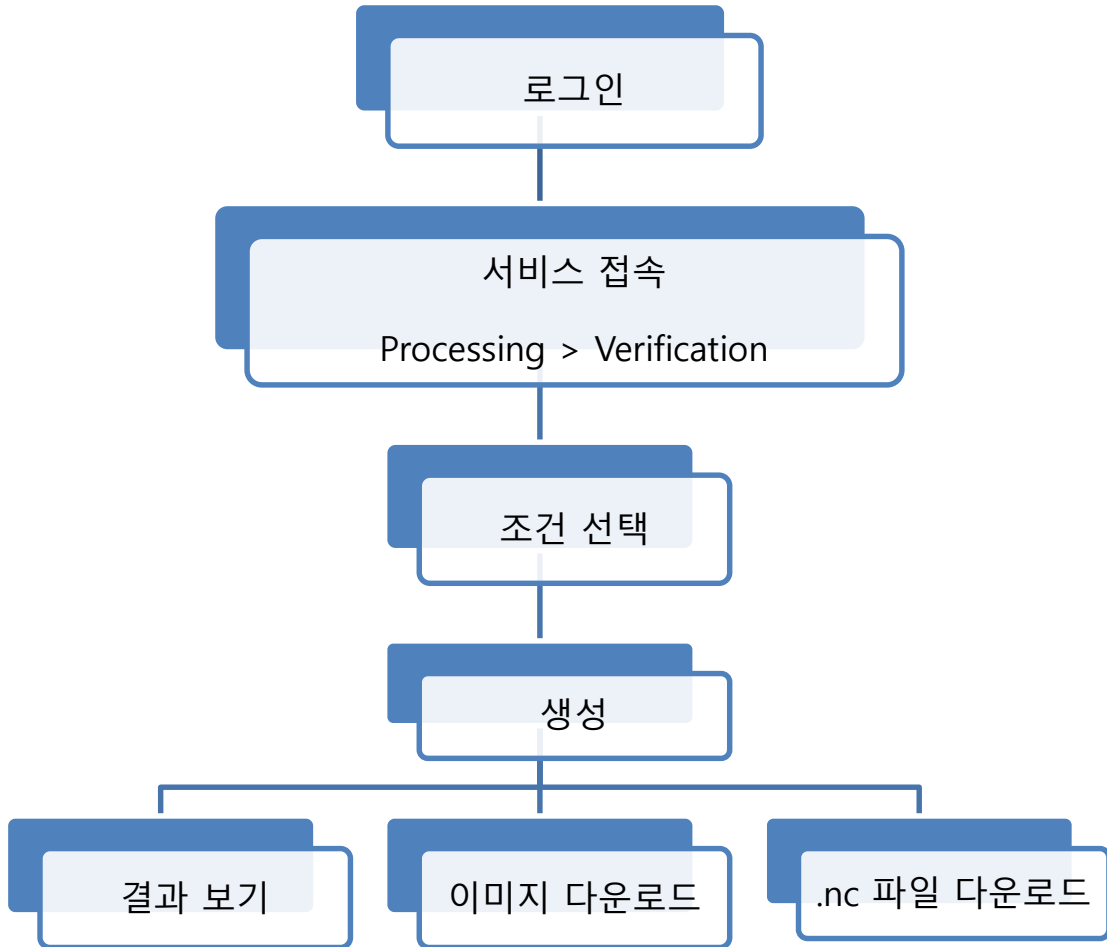
- 확률론적 계절예측의 카테고리에 대하여 정확히 예측된 값과 적중된 값(횟수)을 구분하여 평가하는 척도
- HSS는 100에 가까울수록 완벽한 예측을 나타내고, -50에 가까울수록 오적중 예측임을 의미

#### ROC (Relative Operating Characteristics) Curve

- ROC는 확률론적 계절예측의 카테고리에 대하여 관측 대비 적중률 (Hit Rate, HR)과 오적중률(False-Alarm Rate, FAR)을 비교 평가하는 척도
- ROC는 0과 1의 값의 범위를 가지며 곡선의 완만한 정도가 45° (ROC가 0.5 이하)와 가까울수록 예측력이 없다고 평가할 수 있으며, 곡선의 굴곡이 클수록 (ROC가 1에 가까울수록) 예측력이 높다가 평가할 수 있음

## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

### | Verification 시작하기 - 1 (Verification 페이지 접속)



Climate Information toolKit (CLIK) Home Dataset Processing CLIK API Documents Help Desk Member

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**Verification**

Notice : A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month

 3-MON

Year / Month

2023
7

Skills

 Success Rate
  ACC
  HSS
  ROC Curve

Variable

 prec
  slp
  sst
  t2m
  t850
  z500

Models

 ALL
  APCC\_SCOPS
  BOM\_ACCESS-S2
  CMCC\_SPS3.5
  ECCS\_CANSIPsv2.1
  KMA\_GLOSEA6GC3.2
  METFR\_SYS8
  NASA\_GEOS-S2S-2.1
  NCEP\_CFSv2
  PNU-RDA\_CGCMv2.0
  UKMO\_GLOSEA6

Verify

Download (.png) Download (.nc) Please login.

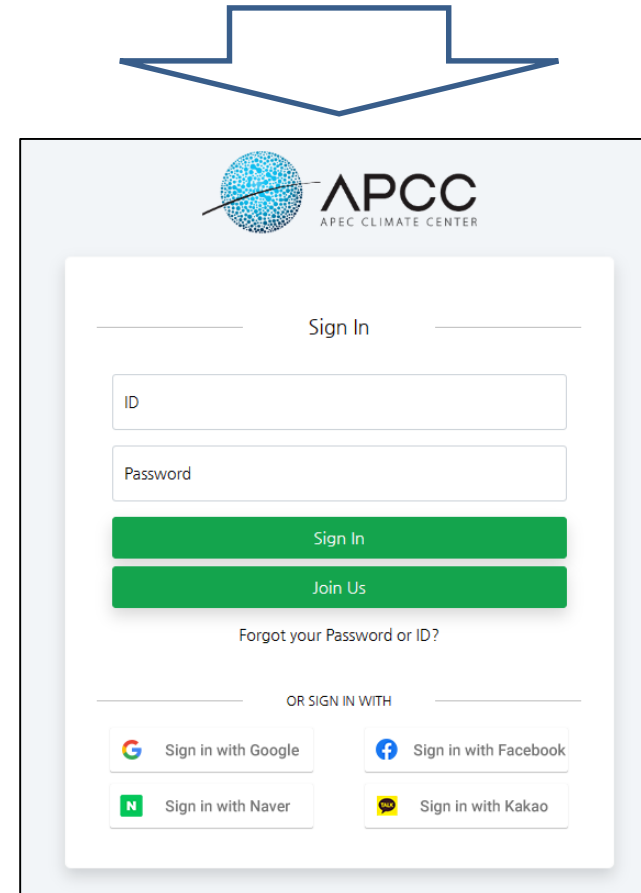
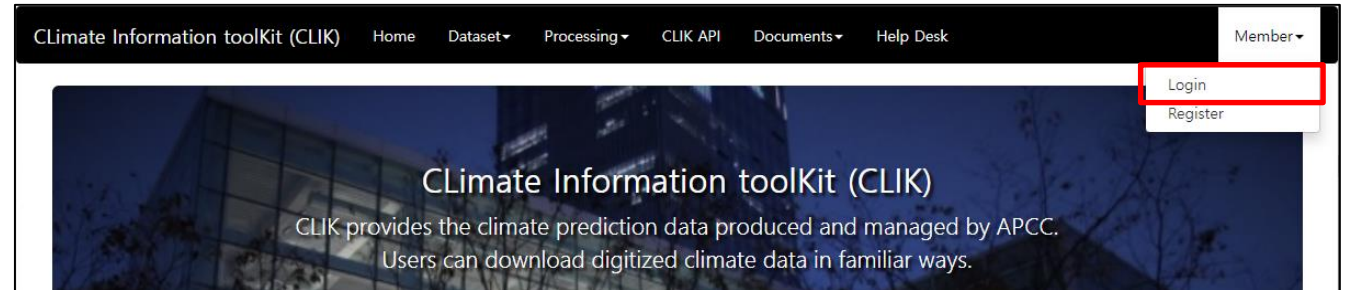
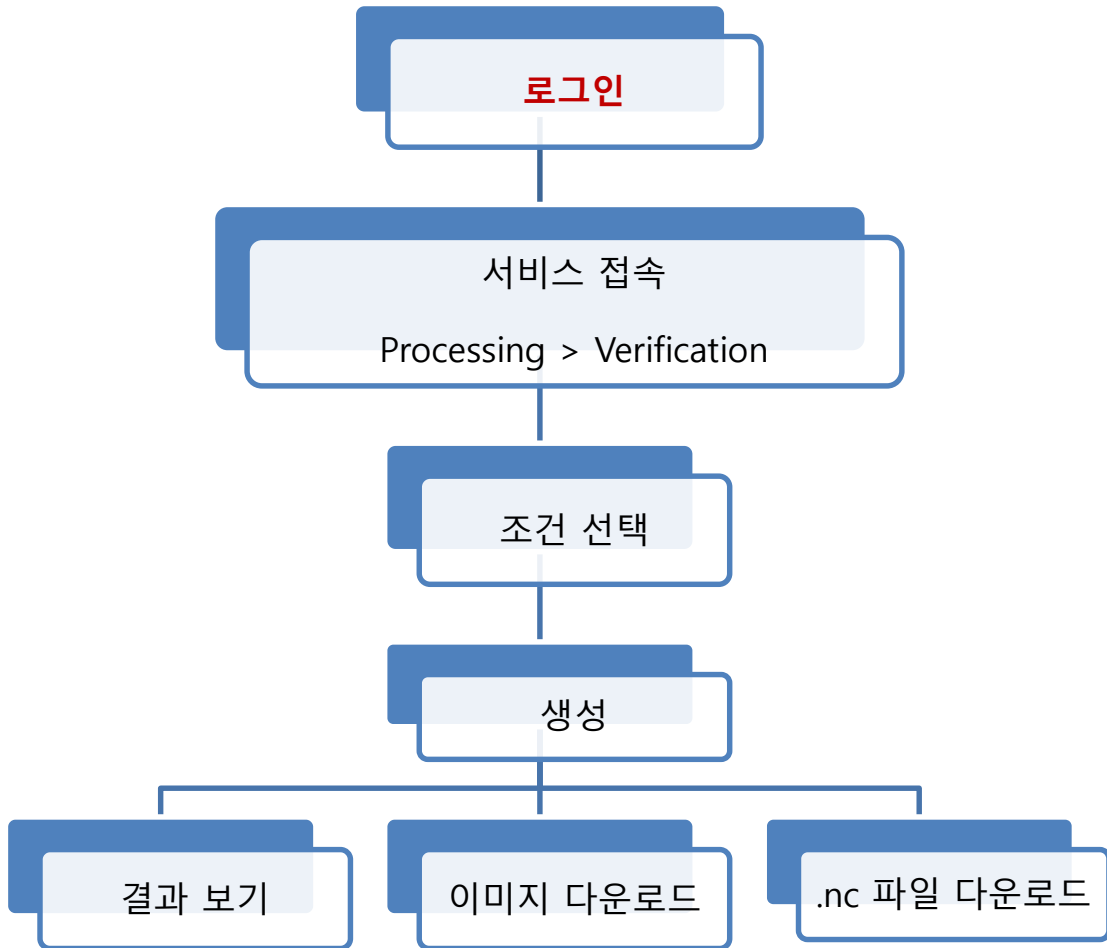
**Success Rate(SR)**  
 SR is the fraction or percentage of success among a number of attempts. CLIK provides a simple success rate as the DMME verification score.

- ~ 0.33 : Poor skill region
- 0.33 ~ 0.66 : Reasonable skill region
- 0.66 ~ : High skill region

**Anomaly Correlation Coefficient(ACC)**  
 ACC is one of the most widely used measures in the verification of spatial fields and is the correlation between anomalies of forecasts and those of verifying values with the reference values, such as climatological values.

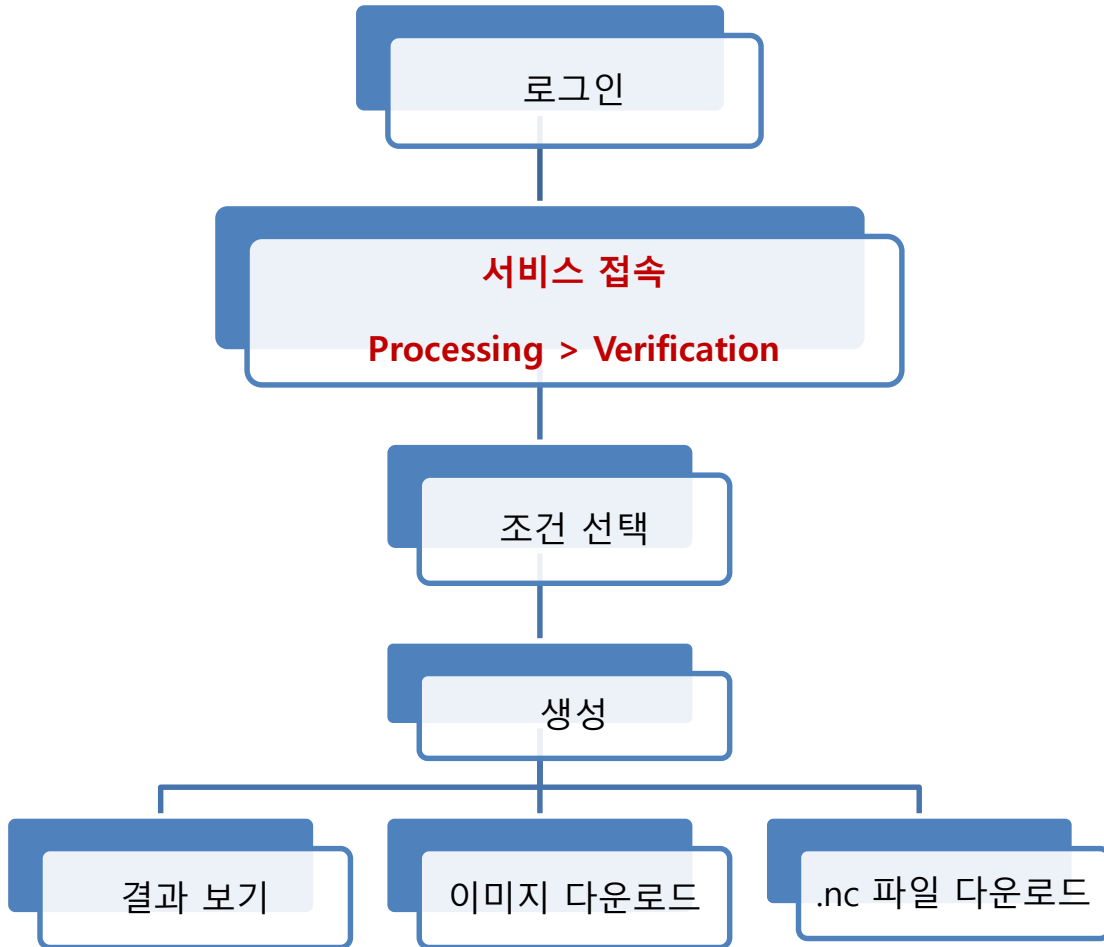
**Heidke Skill Score(HSS)**  
 HSS is commonly used skill score for the verification of categorical probabilistic forecast. Measuring the fractional improvement of the forecast over random forecast.

## | Verification 시작하기 - 2 (로그인)



## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

### | Verification 시작하기 – 3 (Verification 페이지 접속)



The screenshot shows the 'Verification' page in the Climate Information toolKit (CLIK). The page includes a navigation bar with 'Home', 'Dataset', 'Processing', 'My Jobs', 'CLIK API', 'Documents', 'Help Desk', and 'Member'. A notice at the top states: "Notice : A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk."

The main form contains the following sections:

- Lead Month:** 3-MON (selected)
- Year / Month:** 2023 / 7
- Skills:** Success Rate (selected), ACC, HSS, ROC Curve
- Variable:** prec, slp, sst, t2m, t850, z500
- Models:** ALL, APCC\_SCOPS, BOM\_ACCESS-S2, CMCC\_SPS3.5, ECCCS\_CANSIPsv2.1, KMA\_GLOSEA6GC3.2, METFR\_SYS8, NASA\_GEOS-S2S-2.1, NCEP\_CFSv2, PNU-RDA\_CGCMv2.0, UKMO\_GLOSEA6

Buttons for 'Verify', 'Download (.png)', and 'Download (.nc)' are visible. A red box highlights the 'Verify' and 'Download (.nc)' buttons.

**Success Rate(SR)**  
SR is the fraction or percentage of success among a number of attempts. CLIK provides a simple success rate as the DMME verification score.

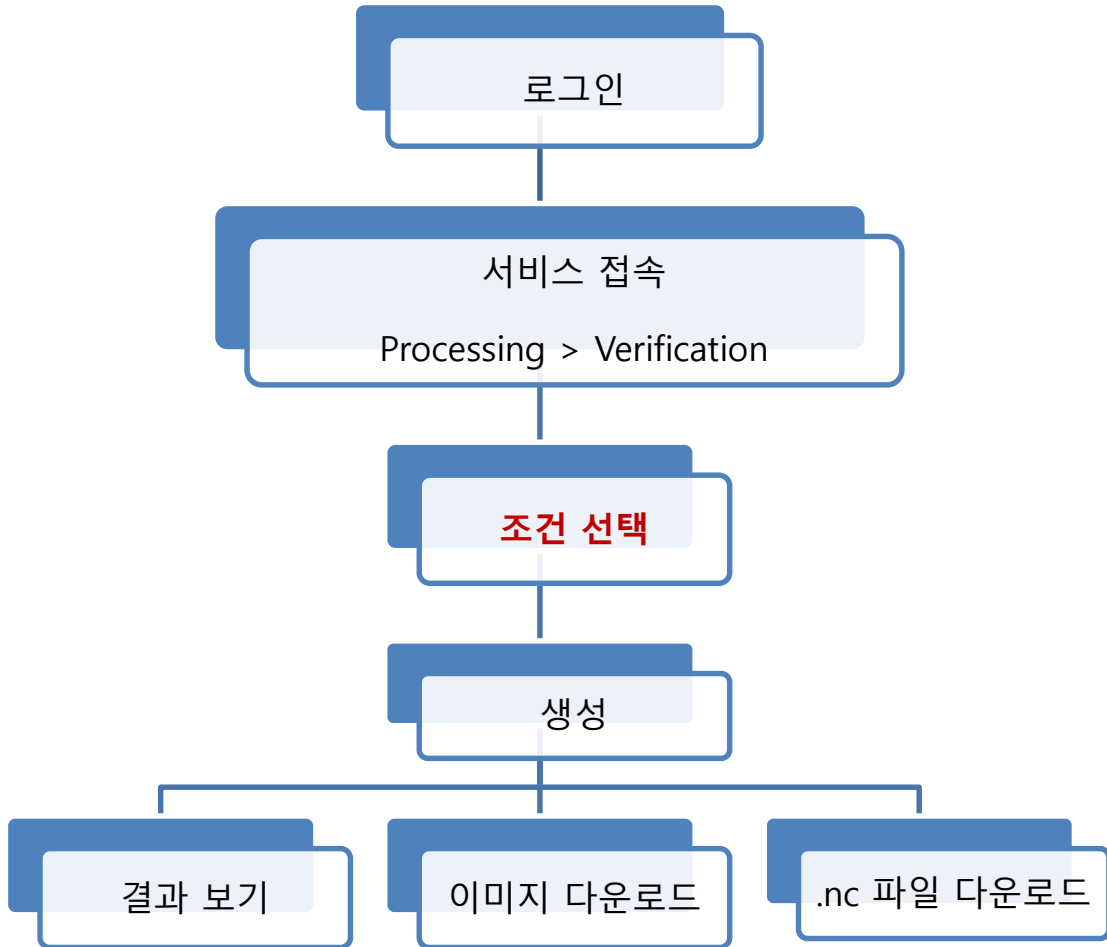
- ~ 0.33 : Poor skill region
- 0.33 ~ 0.66 : Reasonable skill region
- 0.66 ~ : High skill region

**Anomaly Correlation Coefficient(ACC)**  
ACC is one of the most widely used measures in the verification of spatial fields and is the correlation between anomalies of forecasts and those of verifying values with the reference values, such as climatological values.

**Heidke Skill Score(HSS)**  
HSS is commonly used skill score for the verification of categorical probabilistic forecast. Measuring the fractional improvement of the forecast over random forecast.

**Relative Operating Characteristics(ROC) Curve**  
The ROC curve indicates the degree of correct probabilistic discrimination in a set of forecasts. Discrimination is the ability to distinguish one

| Verification 시작하기 - 4 (조건 선택)



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

Verification

**Notice** : A new user-customized APCC seasonal prediction (MME) and verification services based on platform technology has been opened as beta service (Refer to current APCC CLIK service : <https://clik.apcc21.org>). Please leave your any questions and feedbacks about the new service to APCC Help Desk.

Lead Month:  3-MON

Year / Month: 2023 / 7

Skills:  Success Rate  ACC  HSS  ROC Curve

Variable:  원하는 변수를 선택

prec  slp  sst  t2m  t850  z500

Models:  원하는 모델을 선택

ALL  
 APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCCS\_CANSIPsv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  
 NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

Verify

Download (.png) Download (.nc)

**Success Rate(SR)**  
 SR is the fraction or percentage of success among a number of attempts. CLIK provides a simple success rate as the DMME verification score.

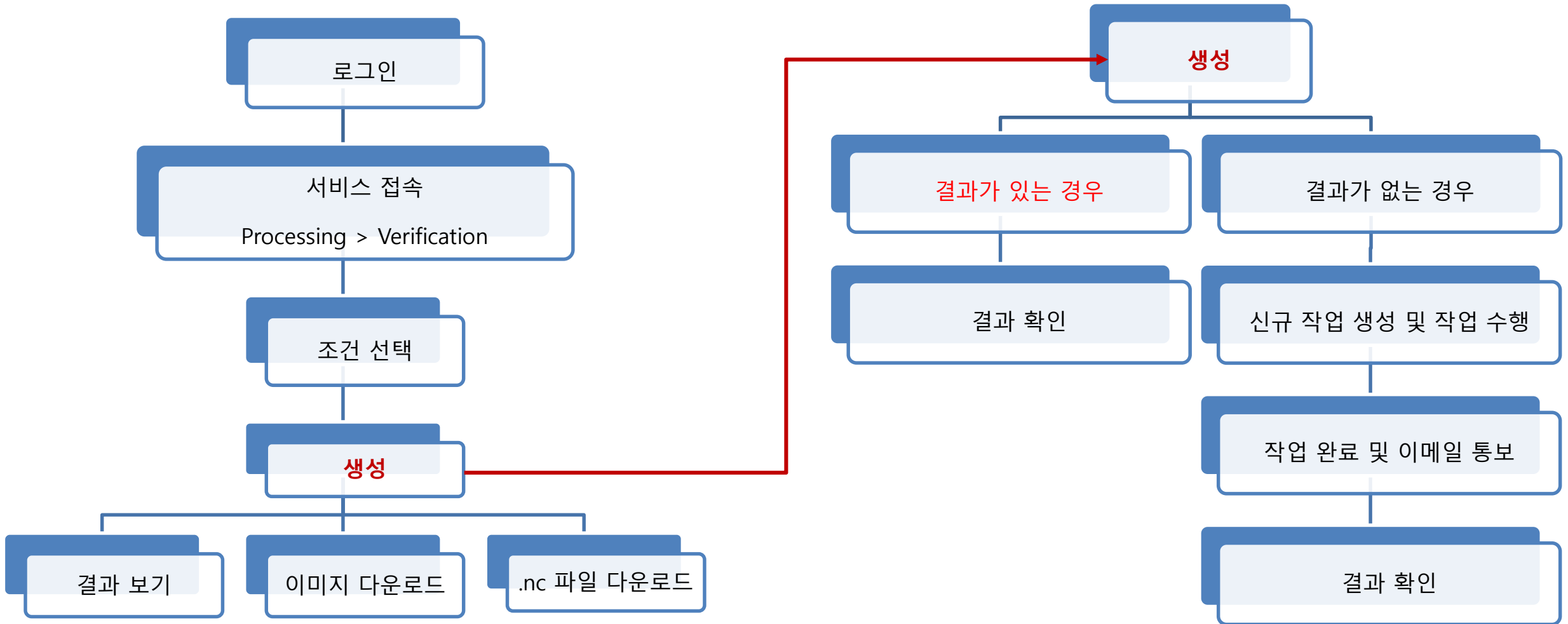
- ~ 0.33 : Poor skill region
- 0.33 ~ 0.66 : Reasonable skill region
- 0.66 ~ : High skill region

**Anomaly Correlation Coefficient(ACC)**  
 ACC is one of the most widely used measures in the verification of spatial fields and is the correlation between anomalies of forecasts and those of verifying values with the reference values, such as climatological values.

**Heidke Skill Score(HSS)**  
 HSS is commonly used skill score for the verification of categorical probabilistic forecast. Measuring the fractional improvement of the forecast over random forecast.

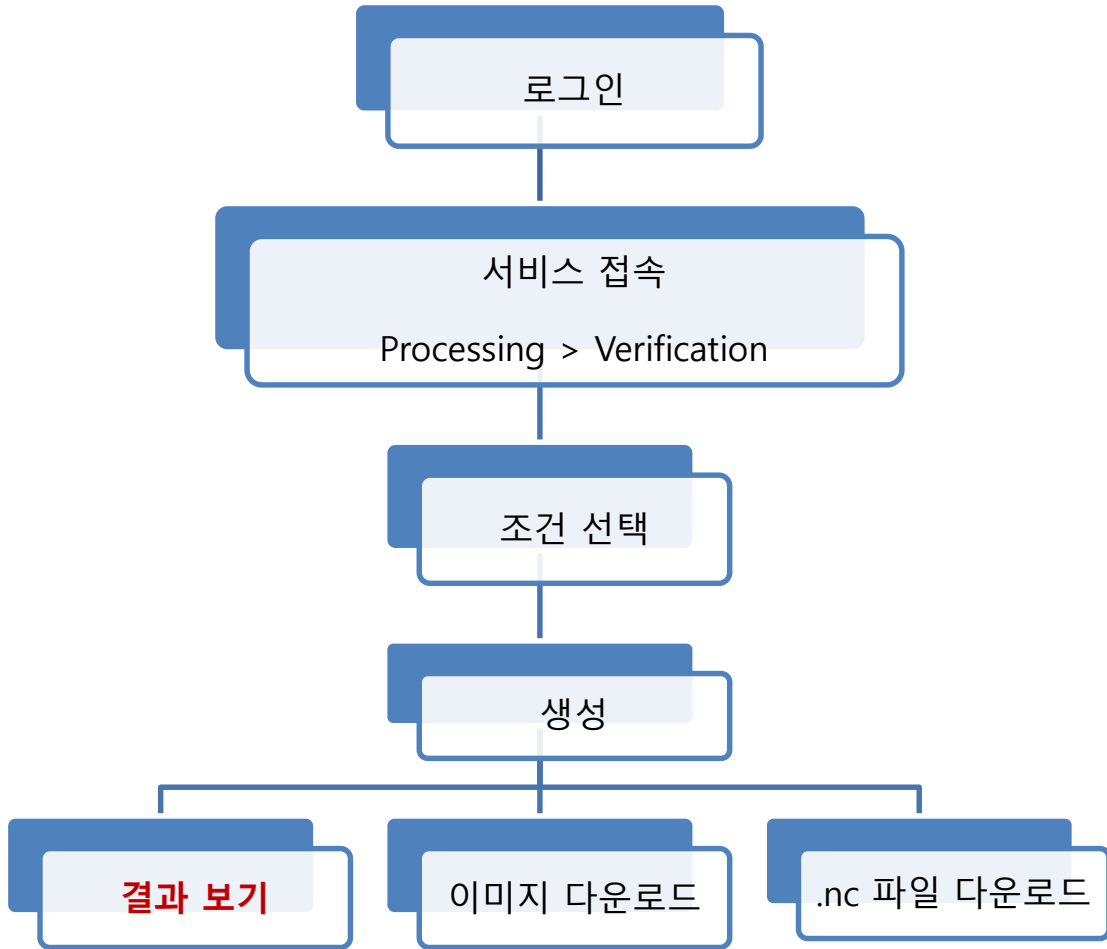
**Relative Operating Characteristics(ROC) Curve**  
 The ROC curve indicates the degree of correct probabilistic discrimination in a set of forecasts. Discrimination is the ability to distinguish one

| Verification 시작하기 - 5 (생성 과정)



## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

### | Verification 시작하기 - 6 (동일한 결과가 있는 경우)



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**Verification**

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Lead Month:  3-MON Year / Month: 2023 / 7 Skills:  Success Rate  ACC  HSS  ROC Curve

Variable:  prec  slp  sst  t2m  t850  z500

Models:  ALL  APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCC\_CANSIPSv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**사용자간 작업 결과 공유**

**Verify** Download (.png) Download (.nc)

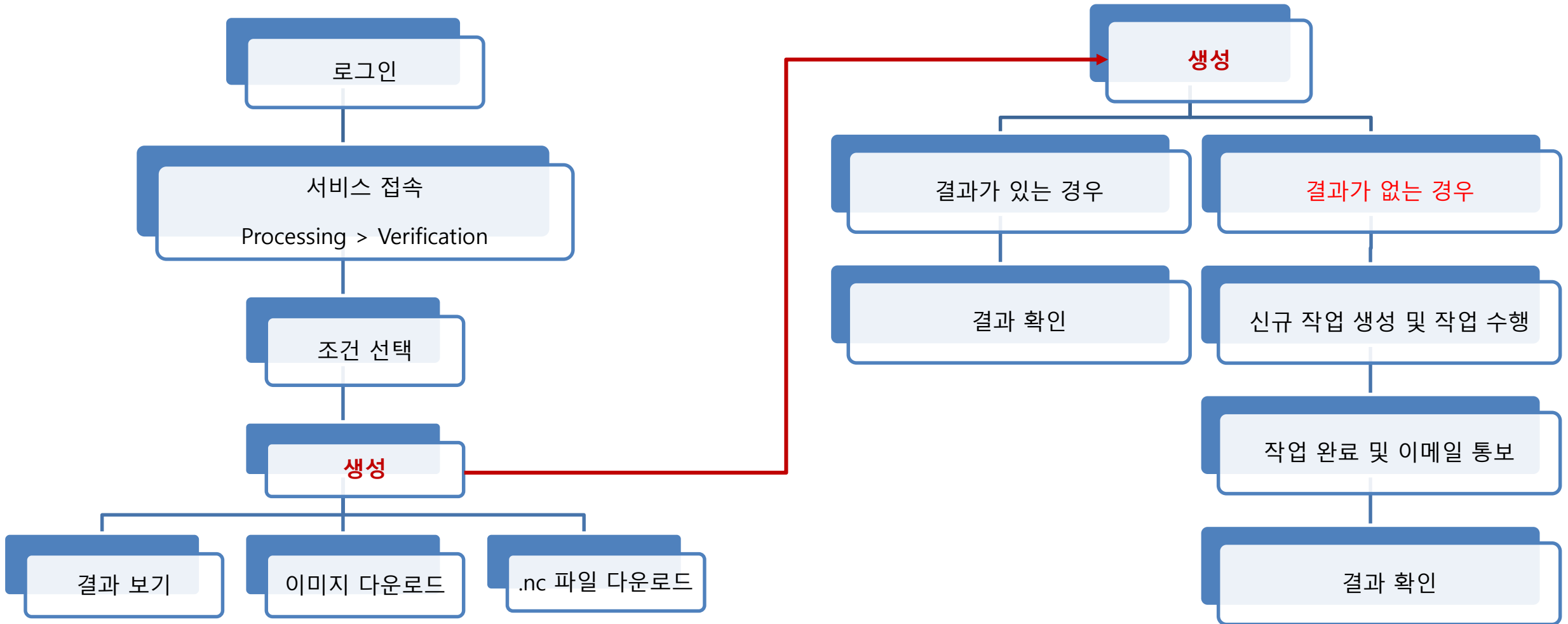
PREC (Precipitation)

**Anomaly Correlation Coeff. : PREC, JAS (1991-2013)**

Model	ACC
APCC_SCOPS	0.40
BOM_ACCESS-S2	0.45
CMCC_SPS3.5	0.42
ECCC_CANSIPSv2.1	0.20
KMA_GLOSEA6GC3.2	0.55
METFR_SYS8	0.50

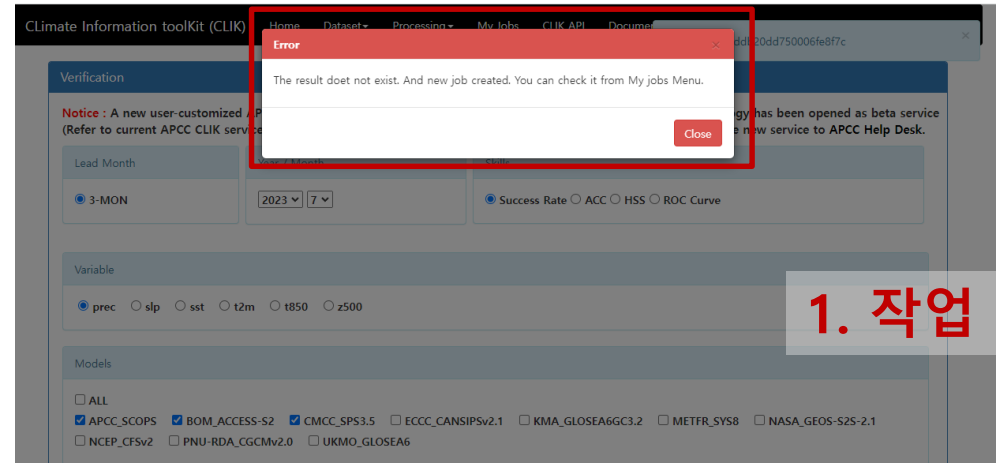
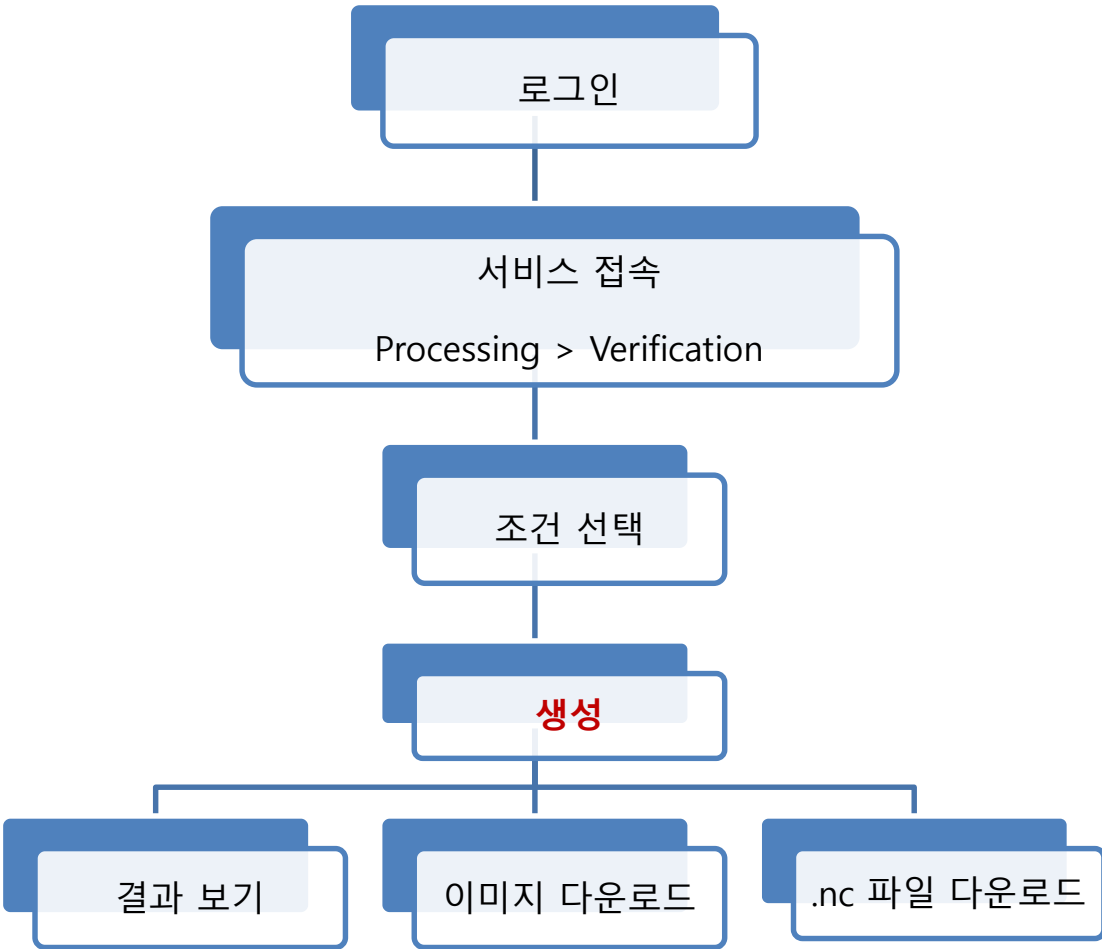
APCC APEC CLIMATE CENTER

| Verification 시작하기 - 7 (생성 과정)



## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

### | Verification 시작하기 - 8 (동일한 결과가 없는 경우)



1. 작업 요청

2 생성 작업 확인

Job type	Submission date	End date	Status
Verification	2023-07-07 10:43:55		Running
Prediction	2023-07-06 19:02:59	2023-07-06 19:10:38	<a href="#">Download</a> <a href="#">View</a>
Prediction	2023-07-06 19:02:45	2023-07-06 19:08:52	<a href="#">Download</a> <a href="#">View</a>

4. 다운로드 / 결과확인

제목 : Notification of job status (APCC) ☆

보낸사람 : APCC <support@apcc21.org>  
받는사람 : '김상철' <scslow@apcc21.org>

Your job (635616cfd8075e0006691062) was completed. Please check the [\[My Jobs\]](#) of the homepage, and [download](#) results.

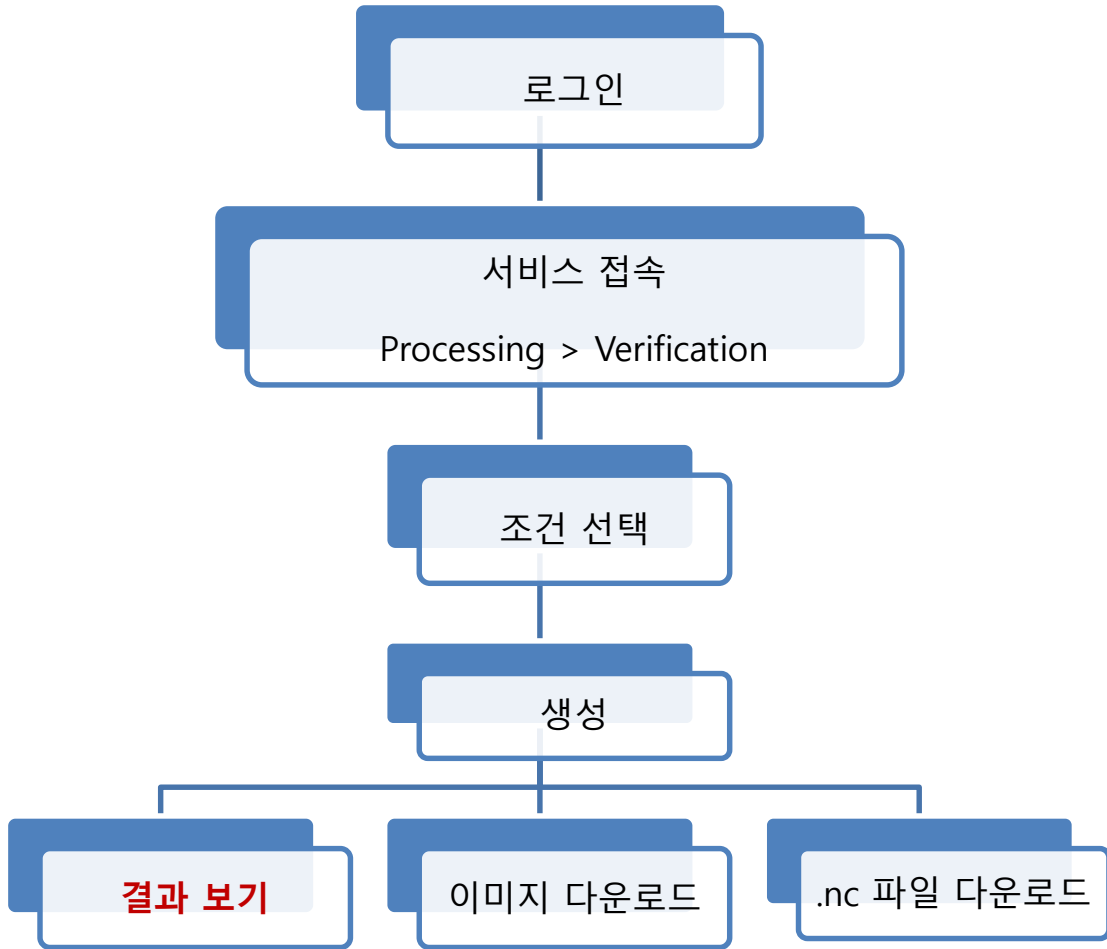
If you have any question, please use [APCC Help desk](#).

APCC Homepage: <https://www.apcc21.org>  
CLIKs Homepage: <https://cliks.apcc21.org>

Job type	Submission date	End date	Status
Verification	2023-07-07 11:06:37	2023-07-07 11:10:42	<a href="#">Download</a> <a href="#">View</a>
Prediction	2023-07-07 10:52:59	2023-07-07 10:58:10	<a href="#">Download</a> <a href="#">View</a>
Verification	2023-07-07 10:43:55	2023-07-07 11:05:49	<a href="#">Download</a> <a href="#">View</a>

3 생성 작업 완료 메일

| Verification 시작하기 - 9 (동일한 결과가 없는 경우)



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**Verification**

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Lead Month: 3-MON Year / Month: 2023 / 7 Skills:  Success Rate  ACC  HSS  ROC Curve

Variable:  prec  slp  sst  t2m  t850  z500

Models:  ALL  APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECC\_CANSIPSv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  NCEP\_CFSv2  PNU-RDA\_CGCMv2.0  UKMO\_GLOSEA6

**Verify** Download (.png) Download (.nc)

PREC (Precipitation)

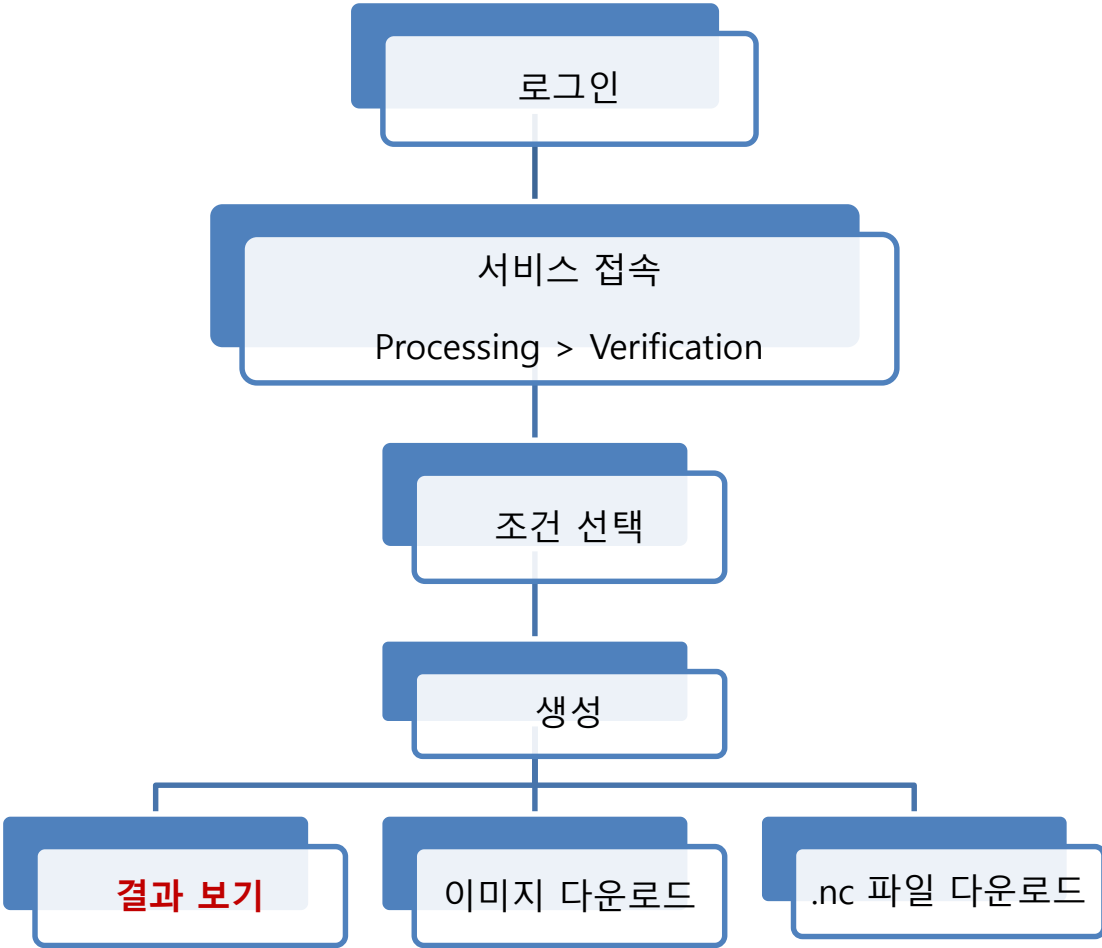
**Anomaly Correlation Coeff. : PREC, JAS (1991-2013)**

Model	ACC
APCC_SCOPS	0.40
BOM_ACCESS-S2	0.45
CMCC_SPS3.5	0.42
ECC_CANSIPSv2.1	0.20
KMA_GLOSEA6GC3.2	0.55
METFR_SYS8	0.50

APCC APEC CLIMATE CENTER

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

## | Verification 시작하기 - 9 (결과 이미지 클릭)



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**Verification**

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Lead Month: 3-MON Year / Month: 2023 / 7

Variable:  prec  slp  sst  t2m  t850  z500

Models:  ALL  APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_SPS3.5  ECCM...  NCEP\_CFSv2  PNU-RDA\_GCMv2.0  UKMO\_GLOSEA6

Verify Download (.png) Download (.nc)

**일본 사이트** (Red arrow pointing to the download buttons)

**Anomaly Correlation Coeff. : PREC, JAS (1991-2013)**

Region	ACC
Globe	0.40
N.Euraptropics	0.18
S.Euraptropics	0.18
Tropics	0.45
E.Asia	0.18
S.Asia	0.42
N.America	0.30
S.America	0.18
Australasia	0.55
Aus. S.Pacific	0.50
N.Eurasia	0.05
M.East	0.18

PREC (Precipitation)

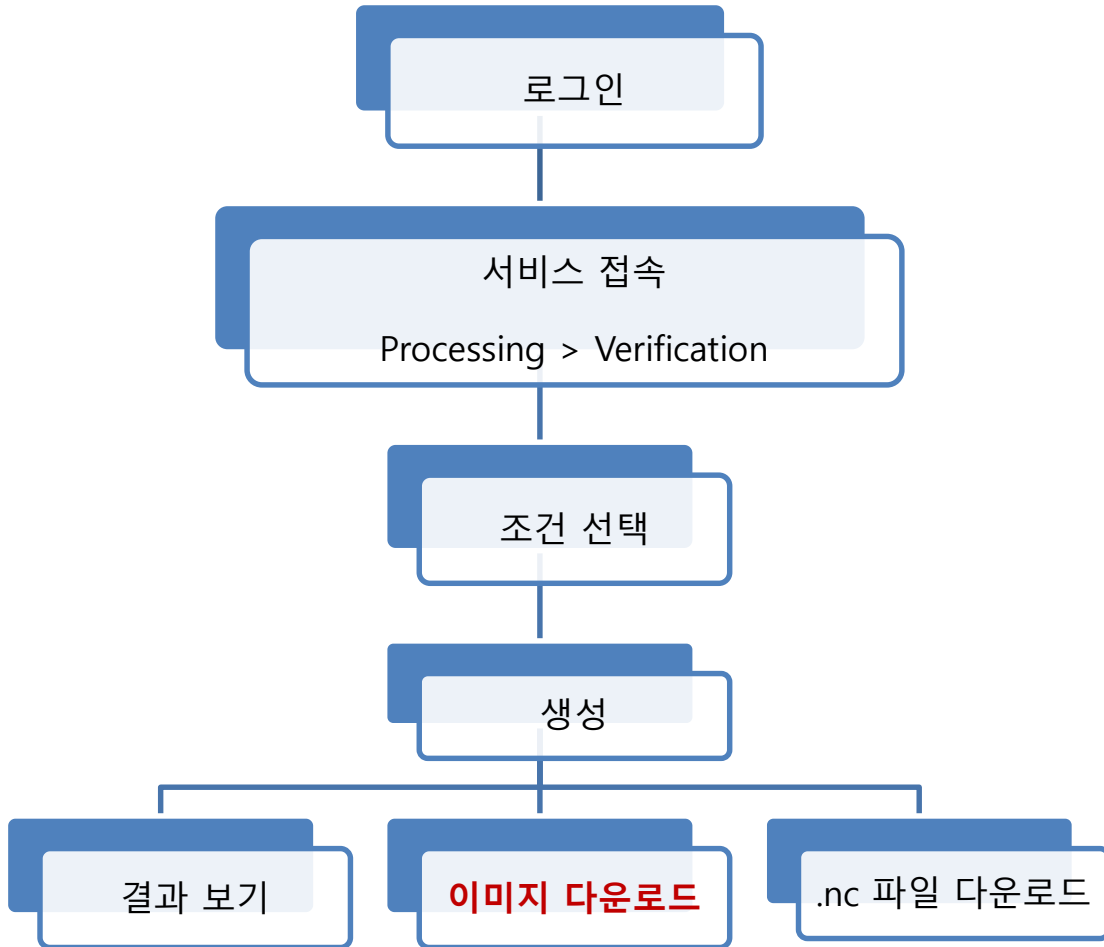
**Anomaly Correlation Coeff. : PREC, JAS (1991-2013)**

Region	ACC
Globe	0.40
N.Euraptropics	0.18
S.Euraptropics	0.18
Tropics	0.45
E.Asia	0.18
S.Asia	0.42
N.America	0.30
S.America	0.18
Australasia	0.55
Aus. S.Pacific	0.50
N.Eurasia	0.05
M.East	0.18

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## 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

### | Verification 시작하기 - 10 (이미지 다운로드)



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#### Verification

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Lead Month:  3-MON Year / Month: 2023 / 7 Skills:  Success Rate  ACC  HSS  ROC Curve

Variable:  prec  slp  sst  t2m  t850 이름

Models:  3-MON\_HINDCAST\_SCM\_CVS\_FIG\_ACC\_SEASONAL\_prec.ACC\_seasonal.landsea.png

ALL  APCC\_SCOPS  BOM  SPS2  CMCC\_SPS3.5  ECC\_CANSIPSv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  NCEP\_CFSv2  IAP\_FGOALS2.0  UKMO\_GLOSEA6

Verify

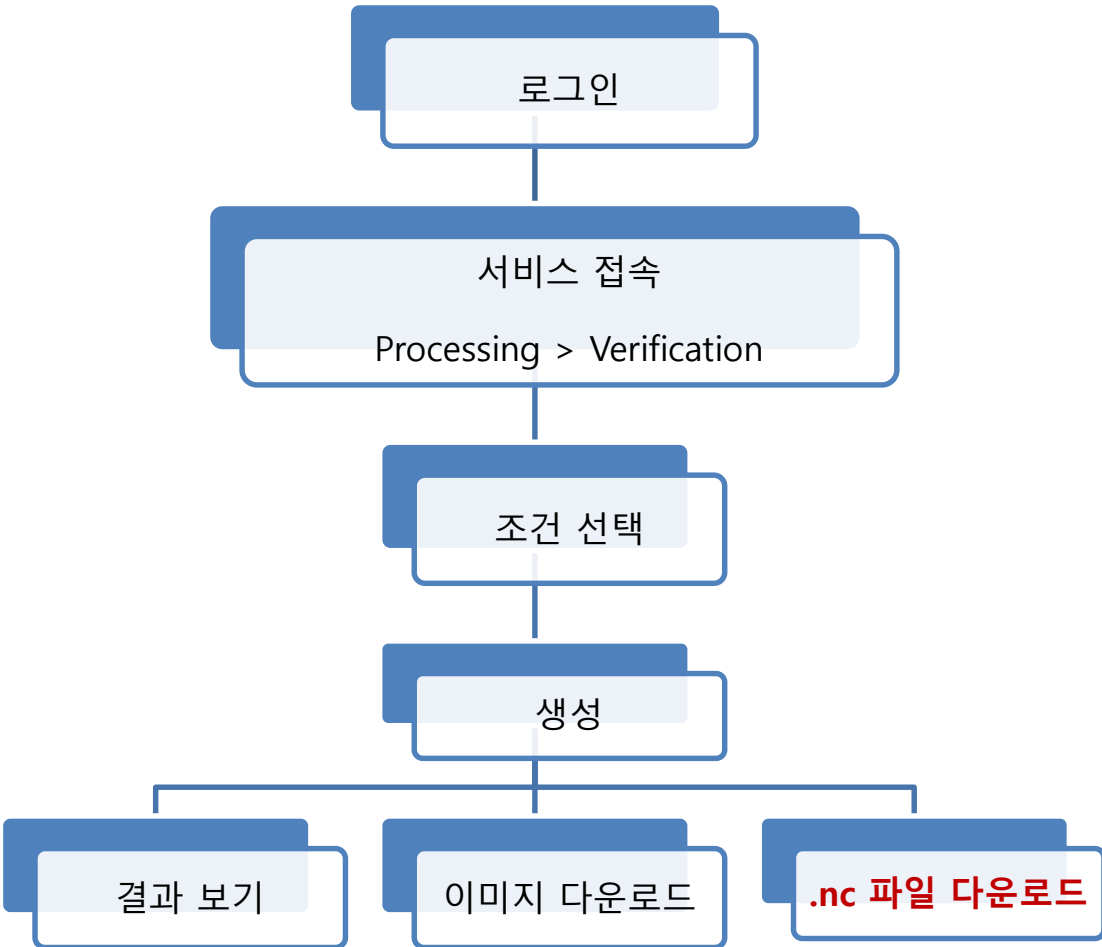
PREC (Precipitation)

#### Anomaly Correlation Coeff. : PREC, JAS (1991-2013)

The bar chart displays the Anomaly Correlation Coefficient (ACC) for precipitation (PREC) during the July-August-September (JAS) season from 1991 to 2013. The y-axis represents the ACC, ranging from 0.0 to 1.0. The x-axis represents different models or configurations. The chart shows six bars with the following approximate values: 0.4, 0.45, 0.42, 0.2, 0.55, and 0.5.

# 4. [실습] 사용자 맞춤형 계절예측 및 검증 실습 | Verification 서비스

## | Verification 시작하기 - 11 (.nc 파일 다운로드)



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**Verification**

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Lead Month:  3-MON Year / Month: 2023 / 7 Skills:  Success Rate  ACC  HSS  ROC Curve

Variable:  prec  slp  sst  t2m  t850  z500

Models: 이름 3-MON\_HINDCAST\_SCM\_CVS\_DATA\_ACC\_SEASONAL\_prec.ACC\_seasonal.landsea.nc

ALL  APCC\_SCOPS  BOM\_ACCESS-S2  CMCC\_S2  ECCS\_CANSIPsv2.1  KMA\_GLOSEA6GC3.2  METFR\_SYS8  NASA\_GEOS-S2S-2.1  NCEP\_CFSv2  PNU-RDA\_GCM2.3.2  GLOSEA6

Verify Download (.png) **Download (.nc)**

**.nc 파일 다운로드**

PREC (Precipitation)

Anomaly Correlation Coeff. : PREC, JAS (1991-2013)

Model	ACC
APCC_SCOPS	0.40
BOM_ACCESS-S2	0.45
CMCC_S2	0.42
ECCS_CANSIPsv2.1	0.25
KMA_GLOSEA6GC3.2	0.55
METFR_SYS8	0.50

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# 실습

## Verification 실습 시나리오 1 (사용법 익히기)

- 2023년 7월의 전체 모델을 대상으로 ACC 기법으로 Precipitation 변수의 결과를 확인하세요
- 파일 다운로드 (이미지, NC파일)

## Verification 실습 시나리오 2

- 2023년 7월의 원하는 모델을 선택하여 Verification의 조건을 선택하여 결과를 확인하세요  
(이미 생성되어 있는 결과가 아닌 새로 생성되는 조합을 찾아보세요)  
(My Jobs 페이지 / 작업 완료 후 메일 확인)



***Thank You !!***