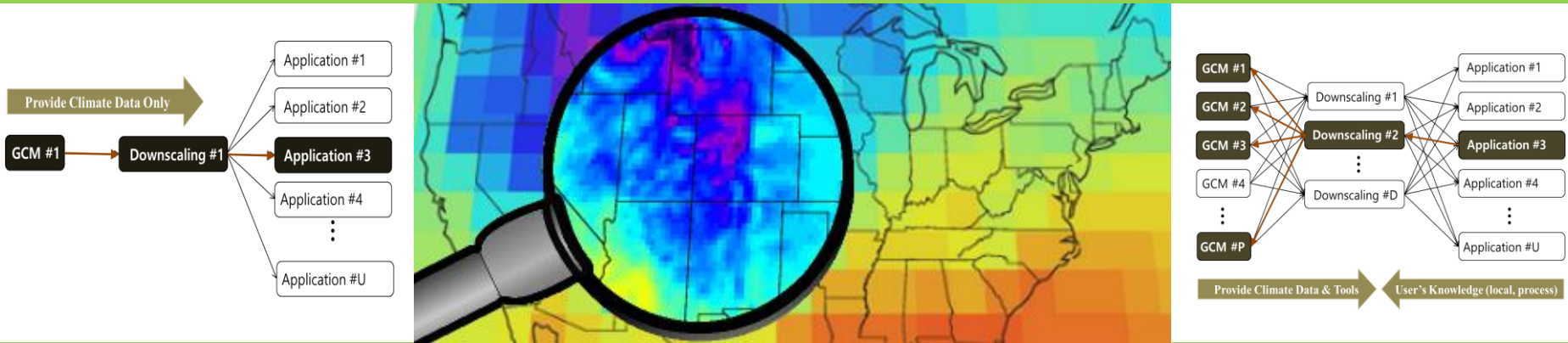


SDMIP: Statistical Downscaling Method Intercomparison Project



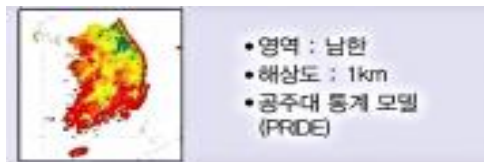
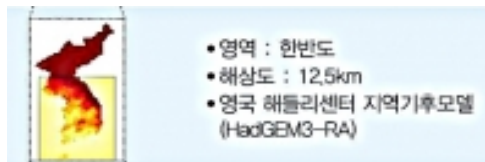
Jaepil Cho

2017/08/21

Provider-centered vs. User-centered

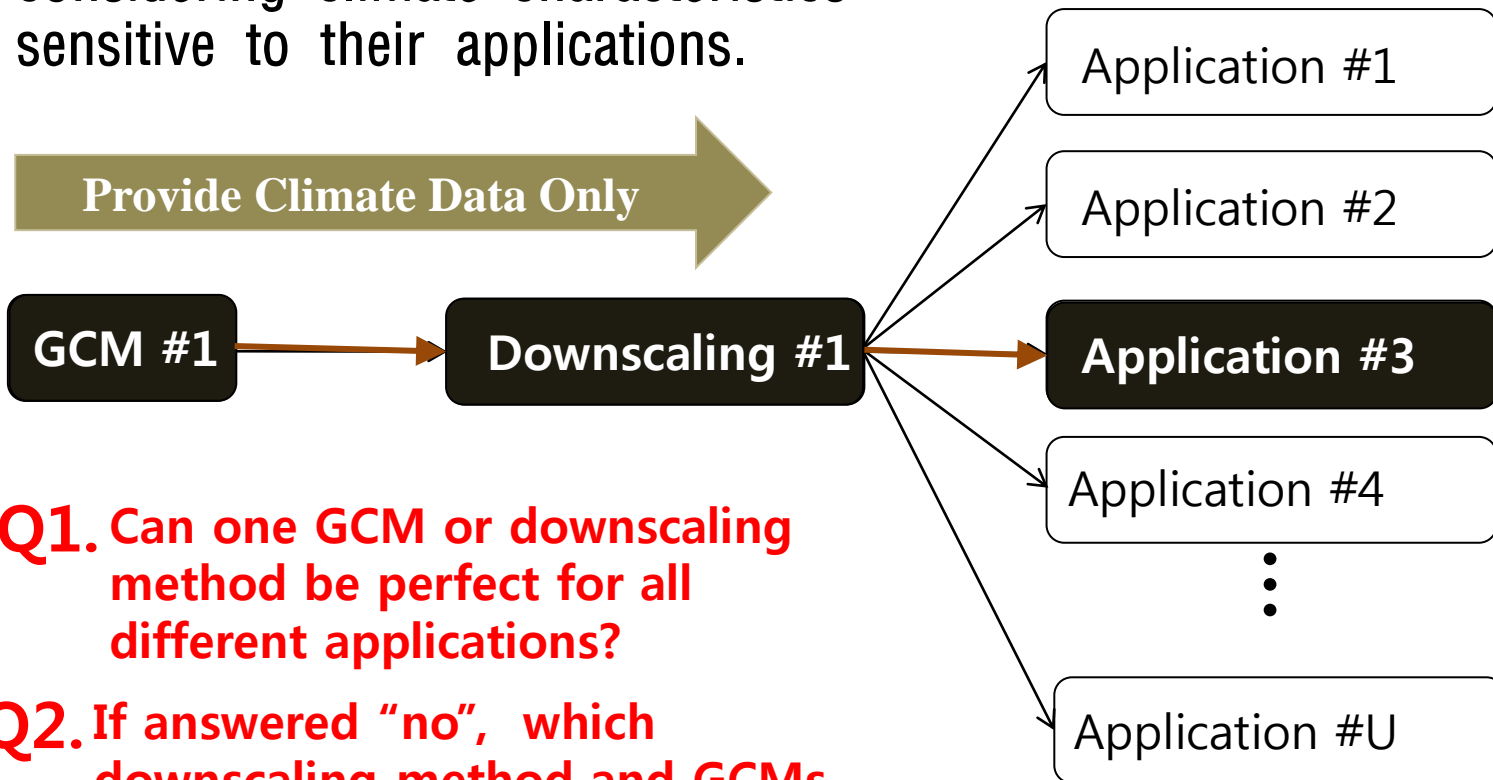


Standard Climate Change Scenario ???



Provider-centered Climate Data Service

- ❖ Provider gives climate data and users use it without considering climate characteristics sensitive to their applications.

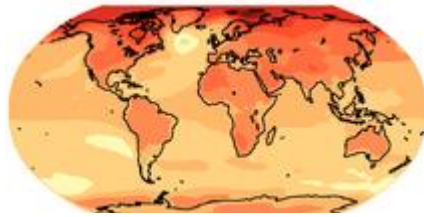


Q1. Can one GCM or downscaling method be perfect for all different applications?

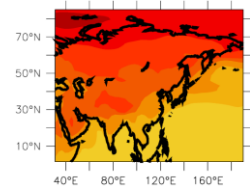
Q2. If answered "no", which downscaling method and GCMs are appropriate for a specific application?

Q3. Is there any user-centered climate service?

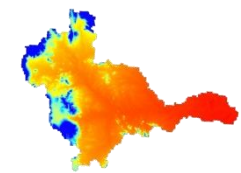
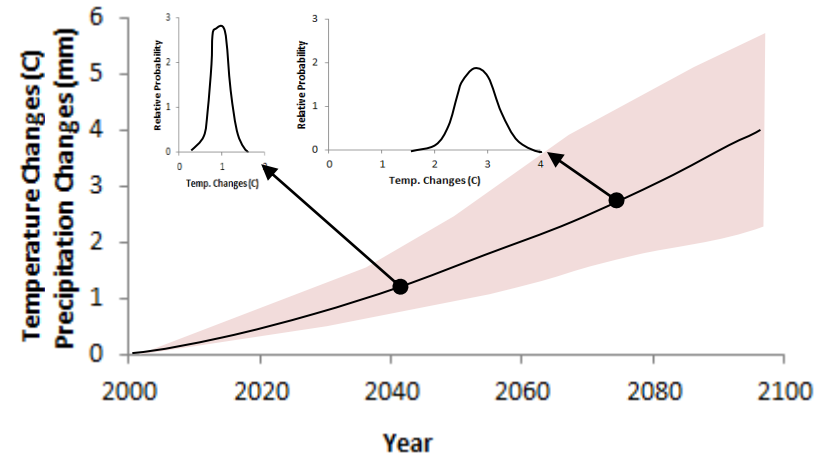
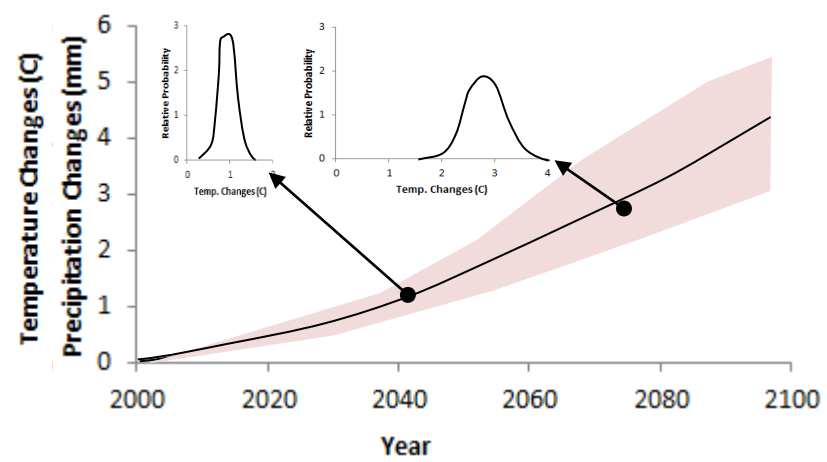
Uncertainty in Climate Change Research



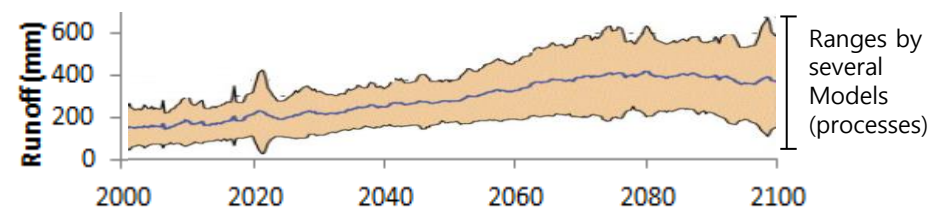
Global Climate Change



Regional Downscaling



Watershed-scale Hydrology Modeling



Uncertainty =
f (RCP Scenarios, GCMs, targeting period
Locations, Variables, Process

How reliable are projections of future climate change scenarios?

Scenarios	Inflow	% Change
Historical	988.5	
RCP8.5: GFDL-ESM2G	1198.0	21.2
RCP8.5: inmcm4	953.7	-3.5

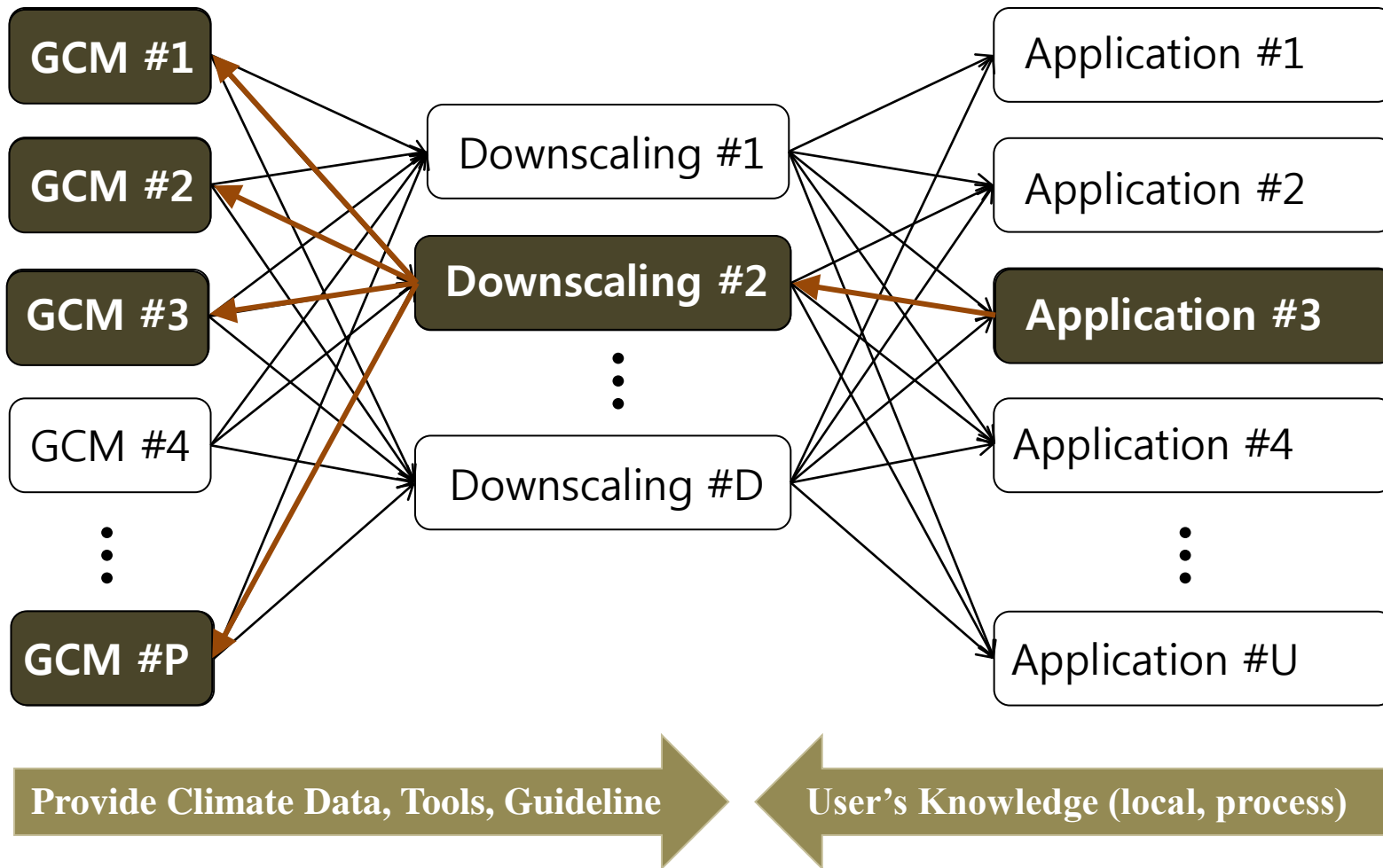
- How decisions can be utilized when opposite signals are projected in the same watershed?
- Even though MME-based projection shows same projection, what kind of additional information should be provided for decision-making?

**Uncertainty
of future projections**

Scenarios	Inflow (mm)	% change
Historical	988.5	
RCP8.5	1078.1	9.1

Even though we have same future projection ..

APCC's User-centered Downscaling Platform





Climate Service: Guideline (procedure) for use of downscaled climate change scenario data

Evaluation Procedures

User-selected
Variable, RCPs
Future periods

GCMs

Down-
scaling

Climate
Change
Indices

1. Data download
2. Evaluate observed data
3. Downscaling using different methods
4. Raw GCM analysis for excluding worst GCMs
5. Evaluating reproducibility of climate change indices (Historical period)
6. Comparison of future changes in climate indices before and after downscaling
7. Evaluating spatial reproducibility
8. Calculating weight factor for GCMs and Uncertainty ranges covered by increasing number of GCMs
9. Impact Assessment Modeling

All GCMs

All DS methods

User-selected GCMs

All Indices (27)

User-selected DS method

User-selected Indices

User's
decision

User's
decision
(Obs. data)

User's
decision
(GCMs)

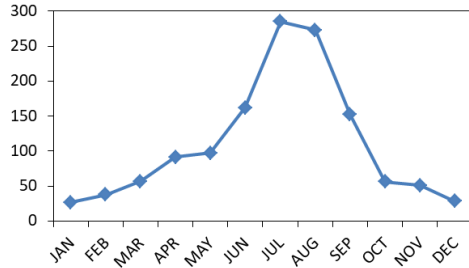
User's
decision
(Downscaling)



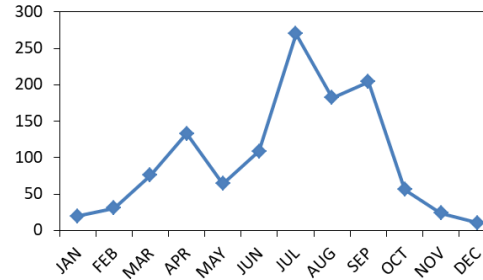
4. Raw GCM analysis for excluding worst GCMs

❖ Temporal evaluation

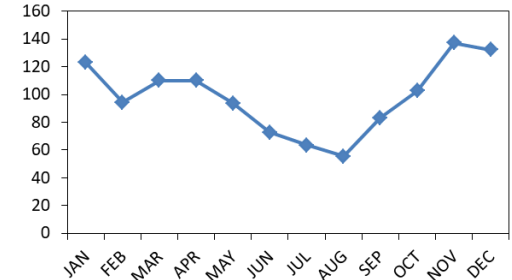
30 year monthly average(Obs)



GCM1

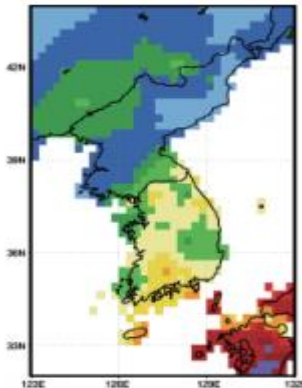


GCM2

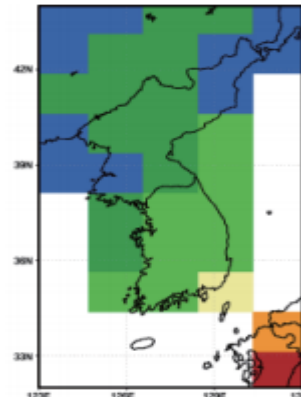


❖ Spatial evaluation

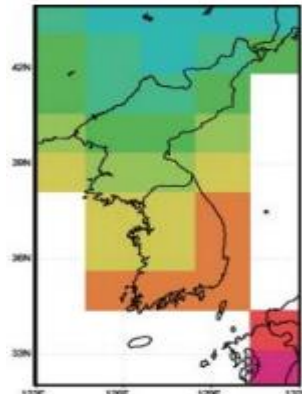
Observed



GCM1



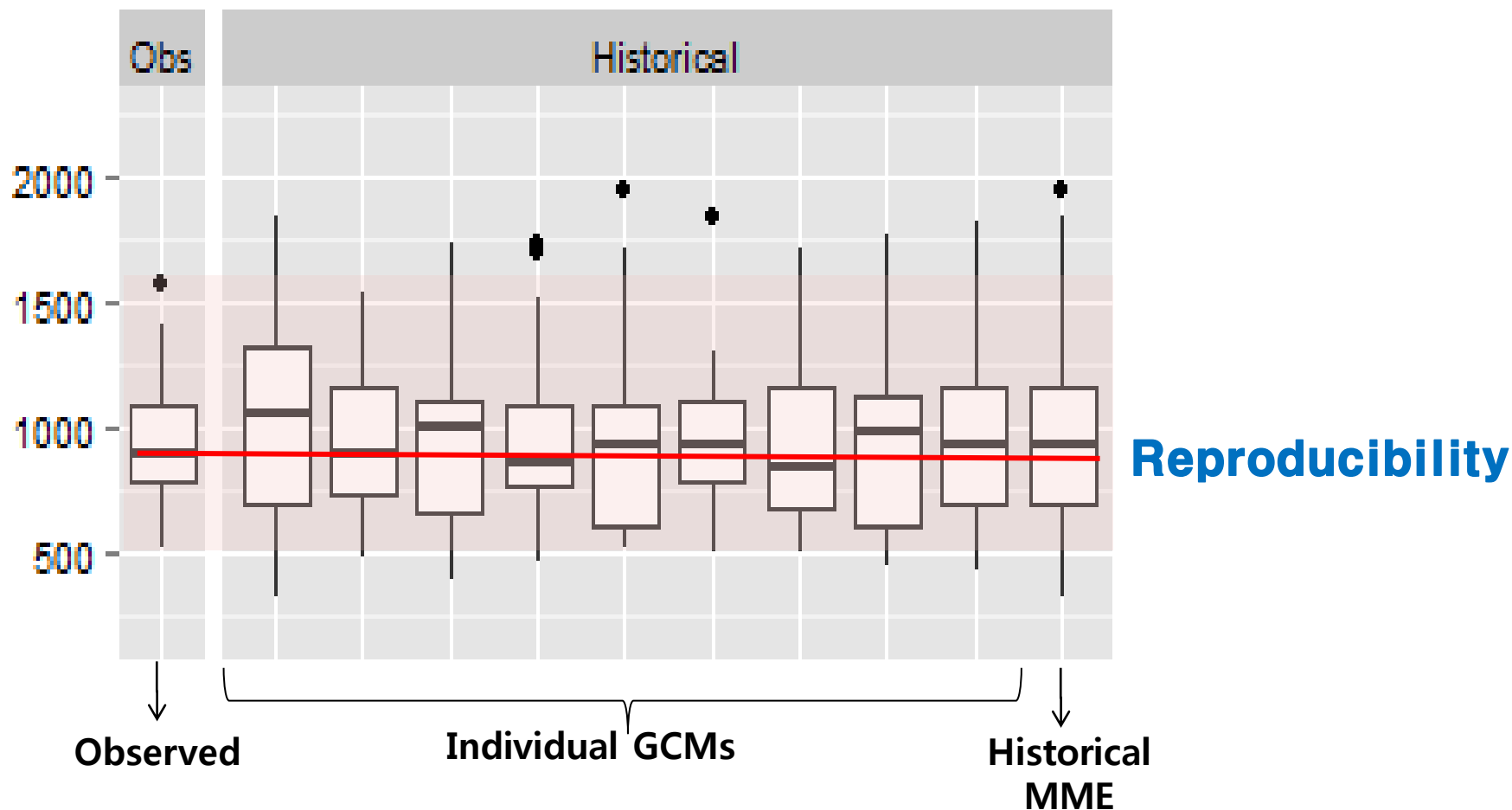
GCM2



공간
재현성
평가

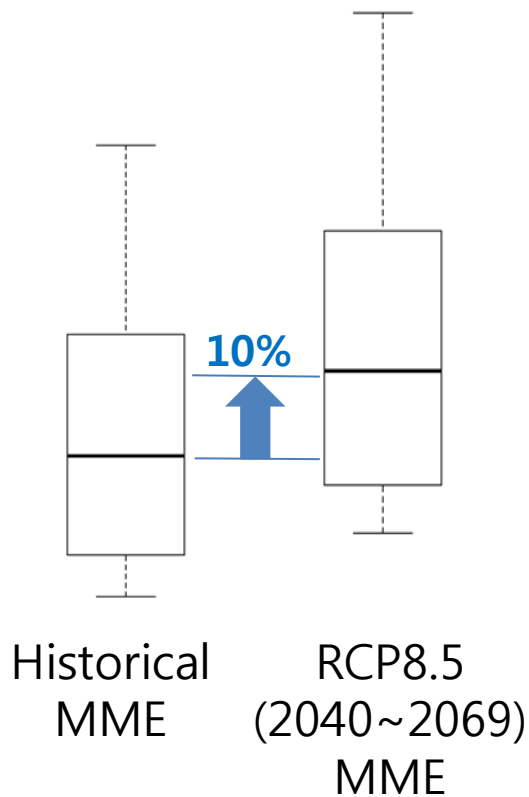
5. Evaluating reproducibility of climate change indices (Historical period)

- Annual total precipitation amount (mm)



6. Comparison of future changes in climate indices before and after downscaling

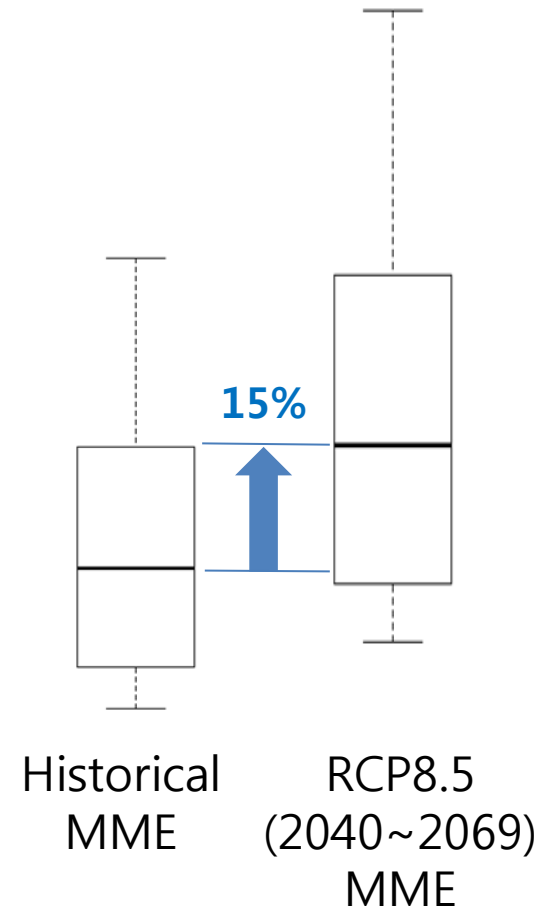
Raw GCM



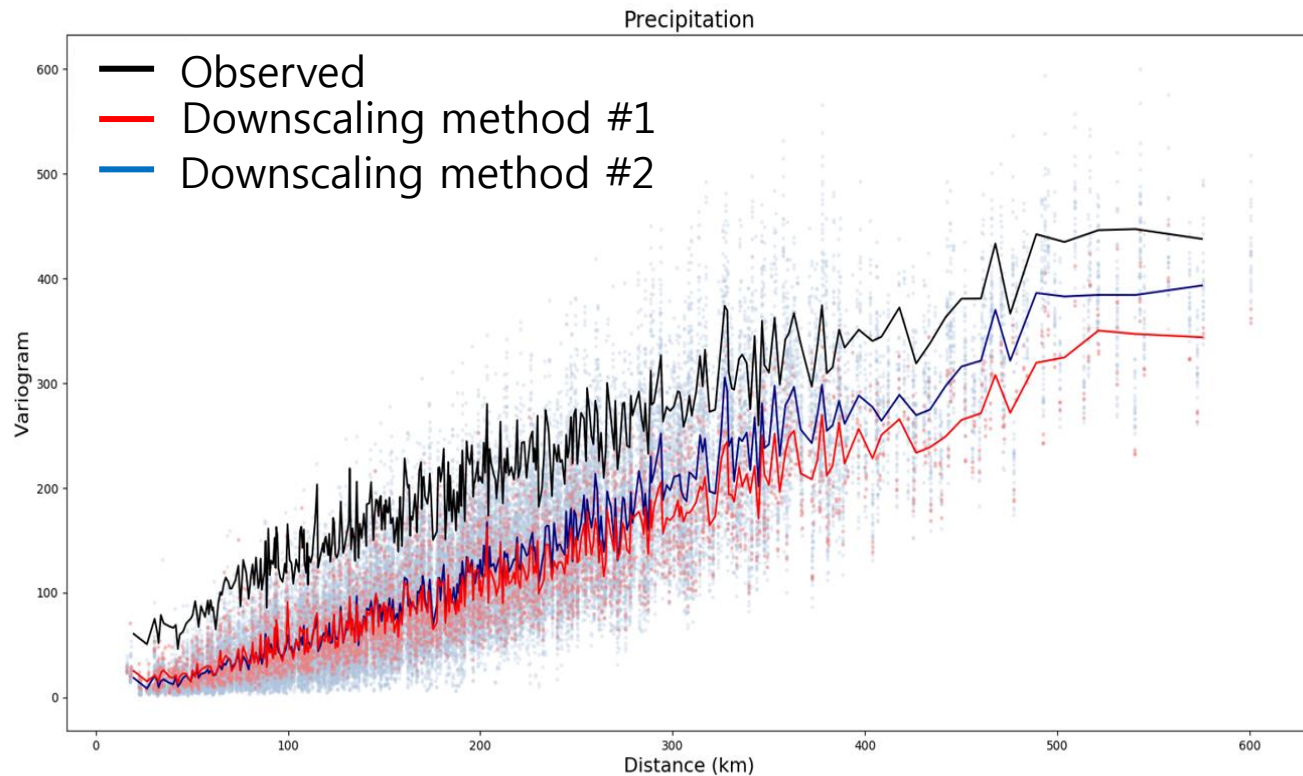
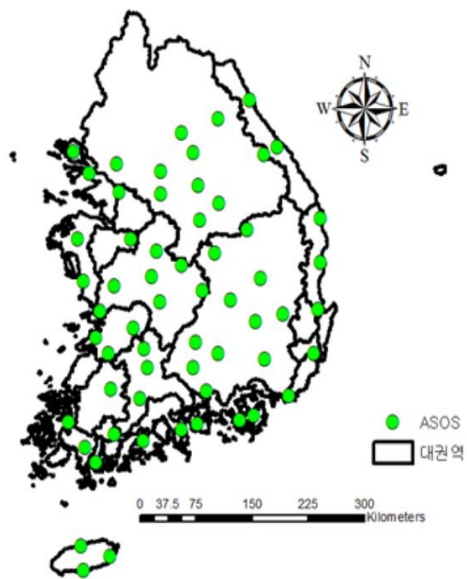
Downscaling Method #1



Downscaling Method #2

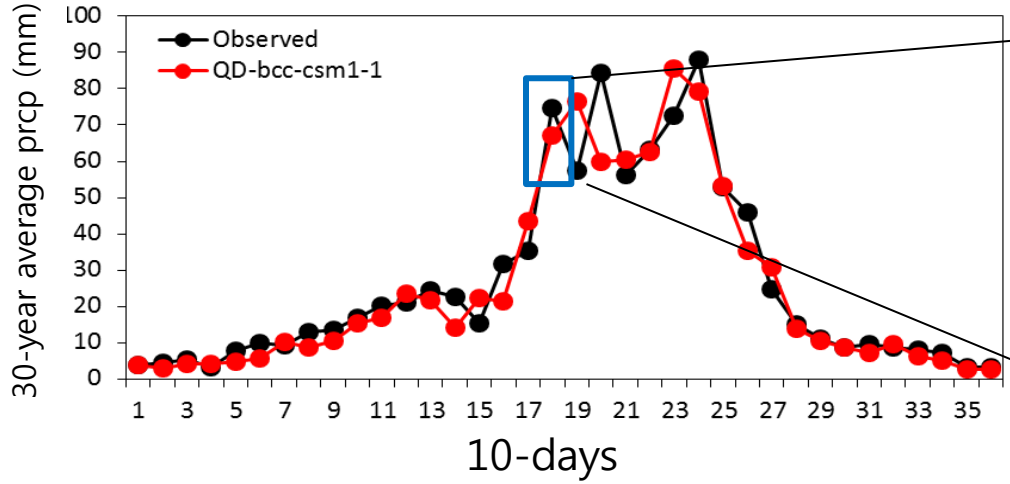


7. Evaluating spatial reproducibility

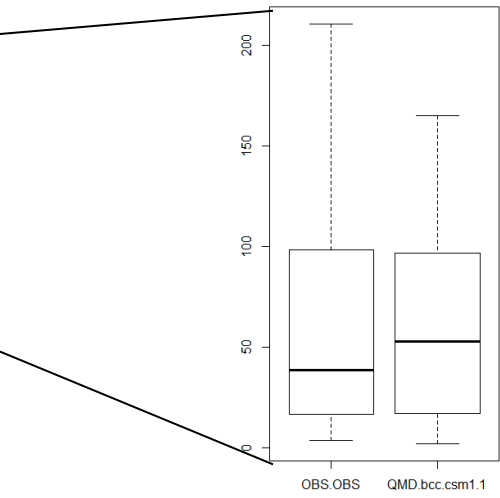


8. Calculating weight factor for GCMs

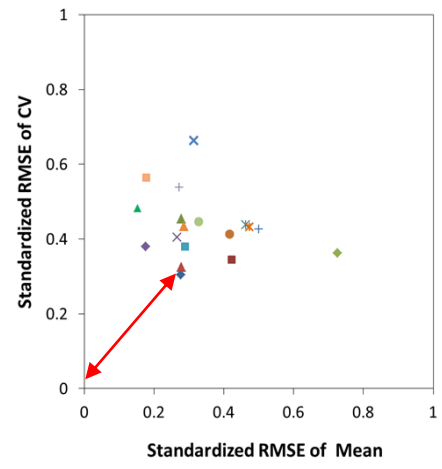
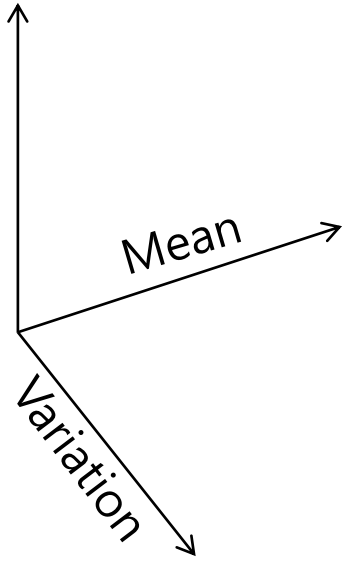
1. Mean difference (default)



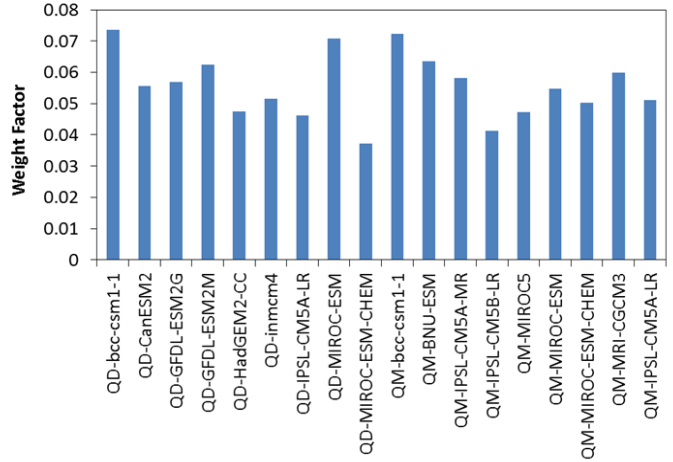
2. Variation difference (default)



3. User-selected climate index

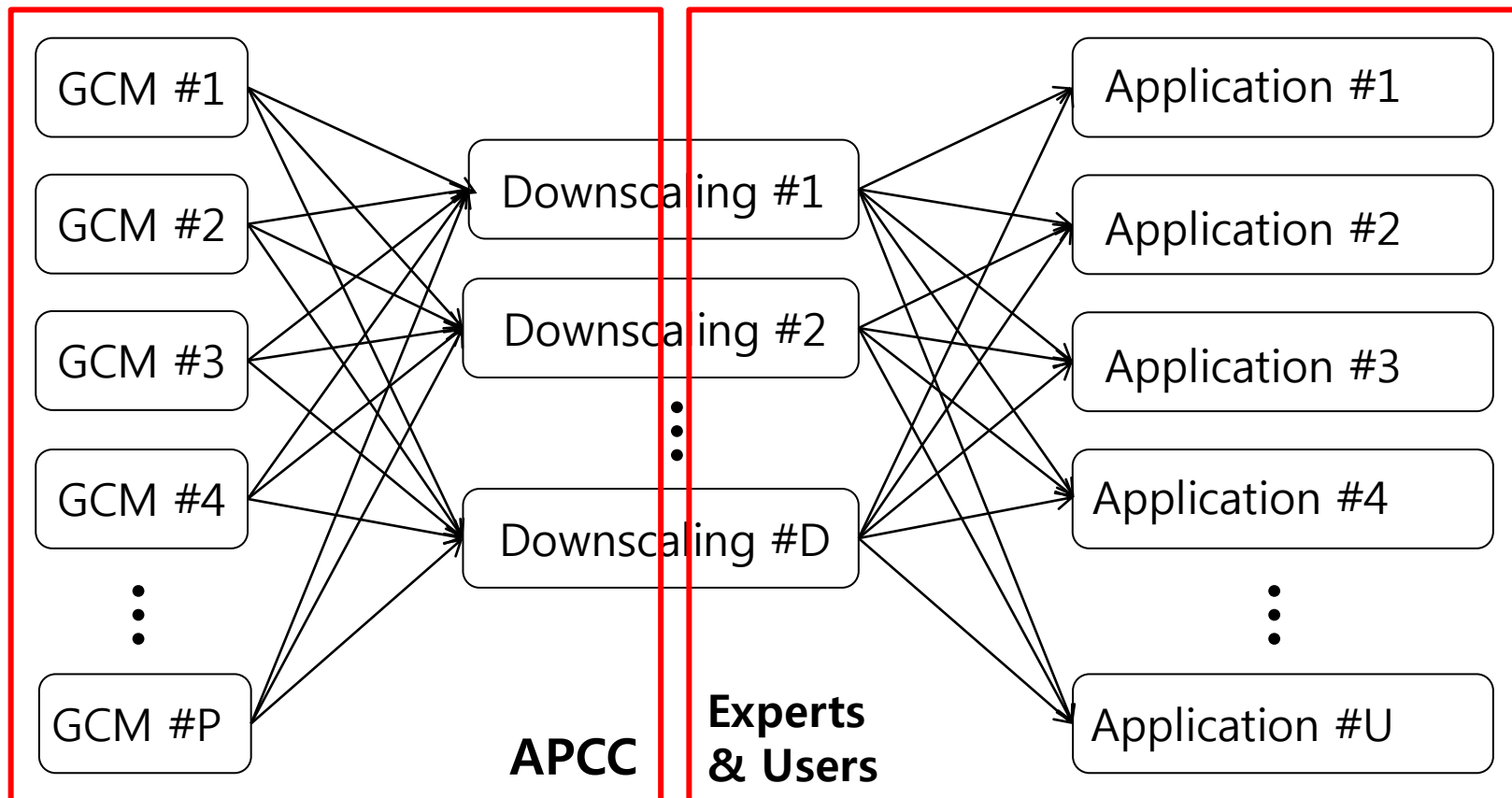


- ◆ QD-bcc-csm1-1
- QD-CanESM2
- ▲ QD-GFDL-ESM2G
- × QD-GFDL-ESM2M
- × QD-HadGEM2-CC
- QD-inmcm4
- + QD-IPSL-CM5A-LR
- ▲ QD-MIROC-ESM
- ◆ QD-MIROC-ESM-CHEM
- ◆ QM-bcc-csm1-1
- QM-BNU-ESM
- ▲ QM-IPSL-CM5A-MR
- × QM-IPSL-CM5B-LR
- × QM-MIROC5
- QM-MIROC-ESM
- + QM-MIROC-ESM-CHEM
- ▲ QM-MRI-CGCM3
- QM-IPSL-CM5A-LR



Participants for user-centered downscaling platform

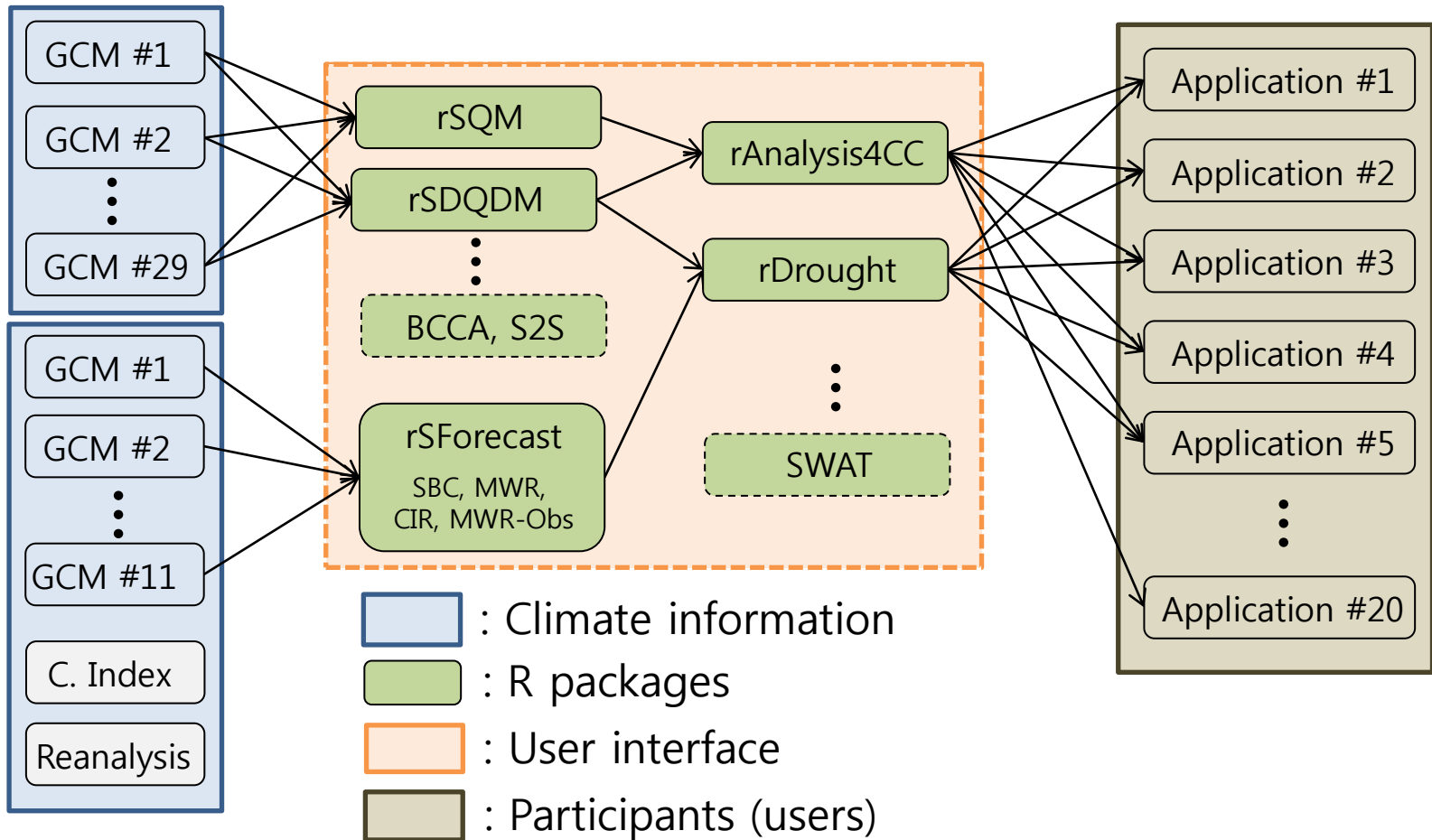
- ❖ APCC collects appropriate climate data and provide tools for data analysis
- ❖ Downscaling experts and users are involved based on their knowledge



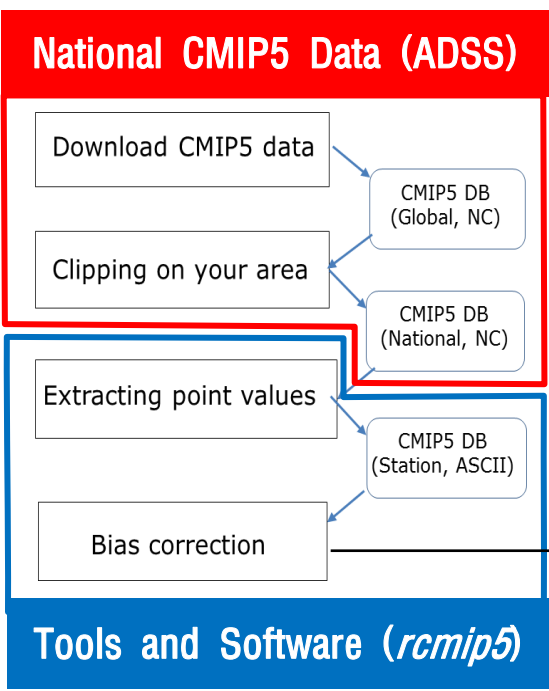
Provide Climate Data, Tools, Guideline

User's Knowledge (local, process)

Components of the training program



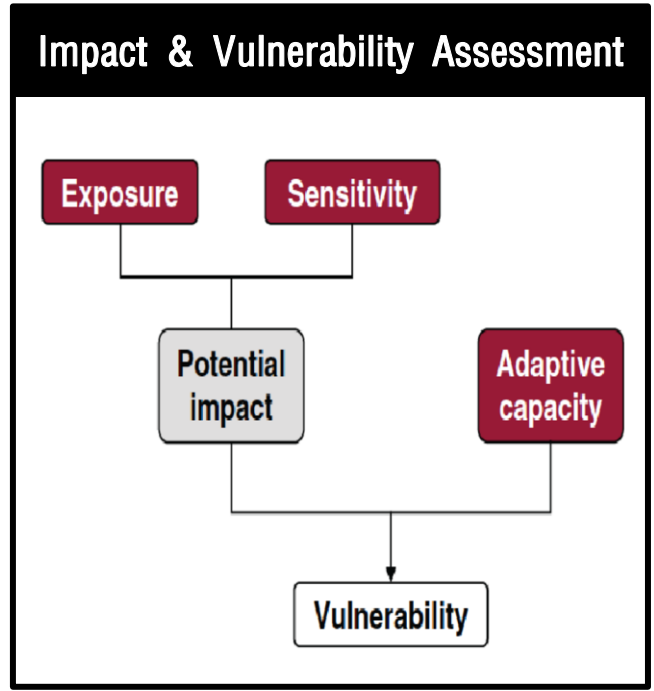
Overall Climate Change Adaptation Procedure



- User input (Observed weather station data)
- Downscaling experts



-  & Developed Countries



Site-specific local knowledge

Acknowledgement



organizing
the training
program

Mr. Daein Kang



preparing
climate
change
scenario data

Ms. Eunjeong Lee



preparing
seasonal
forecast
data

Mr. Sangmyeong Oh



developing
real-time
climate
indices service

Mr. Soonjo Yoon



developing
AIMS user
interface

Mr. Junhyuk Lee



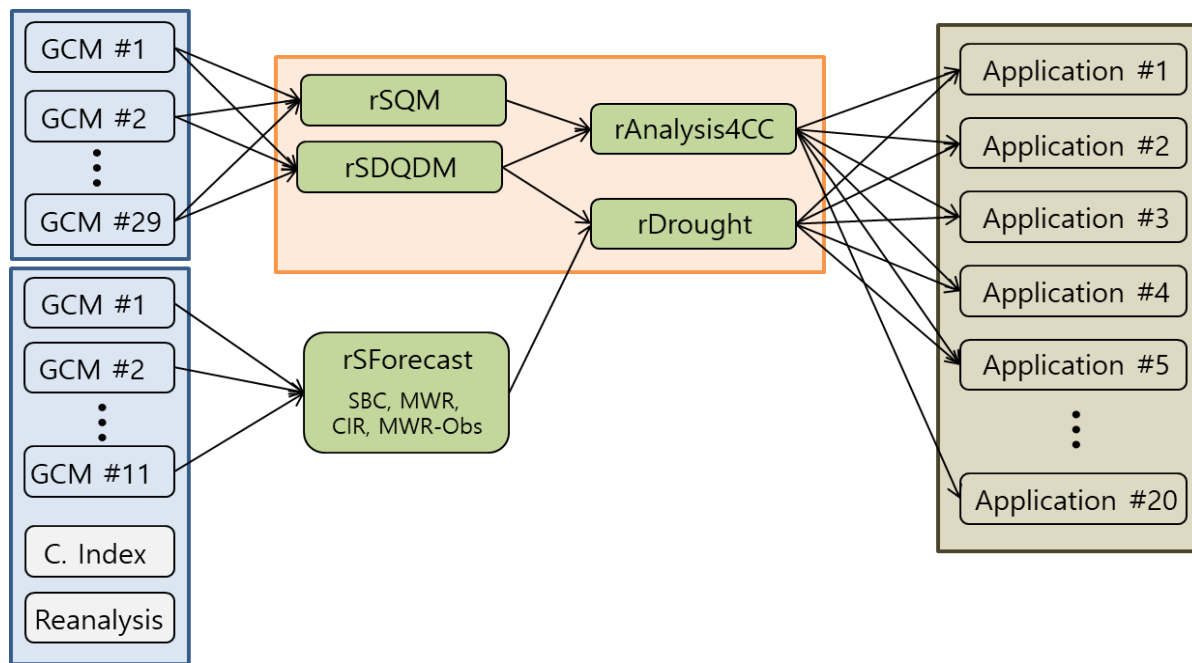
developing
platform idea,
rAnalysis,
rDrought, rSQM,
rSForecast

Dr. Jaepil Cho



publishing
R packages
to CRAN
developing
rAnalysis

Dr. Wonil Cho



developing
rSDQDM

Dr. HyungIl Eum



developing
rAnalysis

Mr. Imgook Jung



consulting
C.Change
evaluation
procedures

Dr. Sewoon Hwang



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Thank You!