

A User-Based Climate Change Service Project: Taiwan Climate Change Projection and Information Platform Project (TCCIP)



WRA

ΝCTI



Outline



Why TCCIP was launched ?

What has TCCIP done for Users?

3.) TCCIP Phase II (2013-2015)



Why TCCIP was launched

-The role of TCCIP











Too much or too little of water In Taiwan ?



- In recent years, heavy rainfall caused by Typhoon, Mei-yu and Monsoon bring severe damages and casualties. It is a problem of "too much of water."
- On the other hand, drought problem threatens livelihoods of people, agricultural activities and industry productions, because of uneven distribution of rainfall. It is a problem of "too little of water."
- Now, we are facing a new big challenge, worsened disaster risk and exposure maybe caused by climate change.
- The extreme cases are not only scenarios, but our obligation to figure out the possible solutions.

Typhoon with extreme rainfall



The increase of extreme events is evident in recent 10 years.



More and More Extreme Events in Taiwan ?







Typhoon Fanapi (2010)

2010.10.21 Suao station hourly rainfall 200.0 100.0 100 mm/hr 50.0 0.0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24



Typhoon Megi (2010)



- From the cases I mention, there are some possible linkages between extreme rainfall cases and climate change. But we need more concrete study to identify the causing factors and ways for reduce future impact.
- Therefore, we hope to build up scenario based and scientific methods to provide the projections of future trends to governmental agencies or other users as reference for decision making.



A scientific project of climate change research in Taiwan.

- Downscale global CC projection data(AR4) to Taiwan area.
- Local CC and it's impact research(EX: flood and drought).
- Taiwan CC information application and data services.
- Phase 1: 2010~2012.
- Funded by NSC, Taiwan (~ 3 million USDS).
- Interdisciplinary cooperated : 2 research institutes, 2 governmental departments, 3 universities are included.

Structure of TCCIP Project





The Role of TCCIP in Taiwan







What has TCCIP done for Users?





Working groups of TCCIP





Governmental Agencies, Researchers, and General users

What we have done



The first time to gather more than 1400 stations for long term rainfall record and to make it homogeneous and Gridded in Taiwan

For Climate research

High Resolution (5Km x 5Km) projection data based on Statistical downscaling in Taiwan

Projection data of extreme event based on Dynamic downscaling in Taiwan

Module creation for connection between Meteorology and Hydrology study on Climate Change

Observation

TCCIP

Data scattered in different institutes

Sources/Distributions of Rainfall observations

2000

400

station 800



Red dots: CWB Auto-gauge Green dots: Irrigation Associations Golden dots: CWB+CAF+CAA Blue dots: Water Resources Agency

(b) 1960~2009 station numbe

Before TCCIP

- Data scattered in different institutes
- Only Station data is available, no gridded data.

High-resolution gridded data is derived

After TCCIP

Data from different institutes is integrated, and quality controlled.(more than 1400 stations) High-resolution(1Km X 1Km, 5 Km X 5Km) gridded data for more local impact application is derived.



High resolution Grid format data archive

Datasets now available (Jan 1960 - Dec 2009)

1km & 5km monthly mean Precip. 1km & 5km monthly mean Tavg 1km & 5km monthly mean Tmax 1km & 5km monthly mean Tmin

Datasets to be available (Jan 1960 - Dec 2009)

1km & 5km Daily Precip. 1km & 5km Daily Tavg 1km & 5km Daily Tmax 1km & 5km Daily Tmin





Dynamical Downscaling ECHAM5-WRF & MRI-WRF





Downscaling using WRF model Driven by 20 km MRI/JMA AGCM dom1: Δx=5km 380x400 grids 36 vertical layers 20-layer buffer zone

Application of TCCIP





- Without dynamic downscaling projection data and well-developed modules, impact of future extreme typhoon event is difficult to be assessed.
- After TCCIP
 - An innovative module was created to connect RCM and flood simulation (SOBEK model) under climate change in Taiwan
 - With dynamic downscaling data, the flood characteristics of future extreme typhoon event were studied.

The loss assessment of future extreme typhoon event

Before TCCIP

 Without dynamic downscaling projection data and well-done modules, the assessment of future flood loss is quite tough.

After TCCIP

- Taiwan typhoon Loss Assessment System (TLAS)
- An innovative module was created to connect meteorology, flood simulation and TLAS under climate change in Taiwan.
- With dynamic downscaling data, the flood loss of future extreme typhoon event were examined.

Modules creation for connection among meteorology, flood simulation, and TLAS





Application and Data service

Workshop of Data Service and Communication





Workshop for Application of Science report 2011 and Projection data

1. Communicate with people from government agencies

3

2. More than 200 people to take part in

Data Service and Communication





TAIWAN CLIMATE CHANGE SCIENCE REPORT 2011

Before TCCIP

- Application of climate projection is still under construction.
- Data for climate change study distributed in many places.

After TCCIP

- Science report 2011 tailoring for Taiwan is published by NSC to give the guidance for application concerning climate change.
- Multiple tunnels for communication— 1.Workshop on Data application and communication is held by TCCIP for governmental agencies.

2.Information platform

• Data for climate change can be provided systematically.



TCCIP Phase II (2013-2015)







Taiwan Climate Change and Information Platform Project (TCCIP)

TCCIP

Research & Development

Central Weather Bureau (CWB)

Water Resources Agency, Taiwan Agricultural Research Institute, Public health agencies...

NCDR

National Science Council (NSC)

- Organize and implement
- Integrate research strengths
- Nurturing the potential

Research Center for Environmental Changes (RCEC), Academia Sinica

> Universities (NTU, NTNU, NCKU....)

International Cooperation -

IPCC CMIP data

SOUSEI program, Japan High-resolution (20km) Climate Simulation

High-Resolution AGCM (GFDL HiRAM, NCAR CAM5)

CORDEX-EA data



TCCIP Project Structure





TCCIP Phase II (2013-2015)





• Conducting "Climate Change in Taiwan: Scientific Report 2015".

TCCIP is not only a platform but also a Brand.







Thanks for your attention!







