Implementation Plan for the Korean Demonstration Project (KDP)

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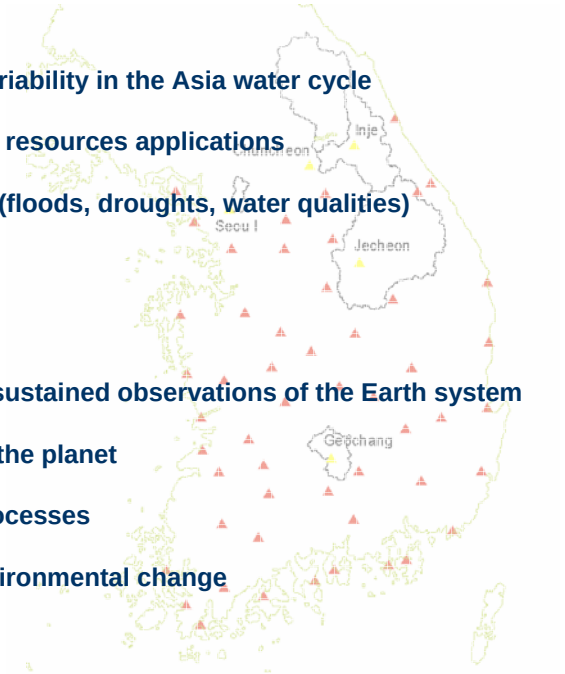
The Goal of GEOSS/AWCI

- ✓ To better understanding the mechanism of variability in the Asia water cycle
- ✓ To improve its predictability for various water resources applications
- ✓ To help for mitigating water-related disasters (floods, droughts, water qualities)



The Goal of GEOSS

- ✓ To achieve comprehensive, coordinated and sustained observations of the Earth system
  - Improve monitoring of the changing state of the planet
  - Increase understanding of complex Earth processes
  - Enhance the prediction of the impacts of environmental change

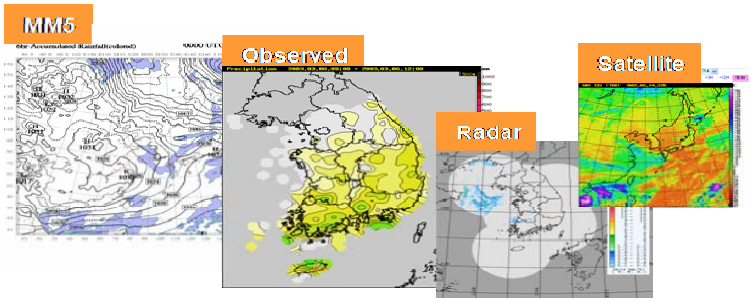
Three Targeted Issues and their Backgrounds for KDP

Use of Satellite and Numerical Data for Flood Management

*** Objectives**

- To utilize satellite data for flood and drought management
- To develop a short- and long-term weather forecast system for the application of water resources management

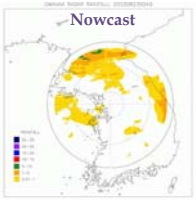
*** Method**



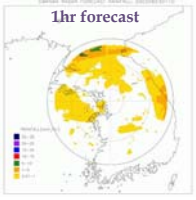
*** Major Outcomes and Future Works**

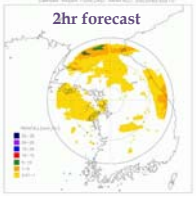
- Development of downscaling techniques for connecting global-meso-hydro scale model
- Development of satellite-based flood management scheme
- Design and implementation of weather forecasts for w.r. applications

Development of Radar Rainfall & Flood Forecasting System



0.5hr forecast





*** Objectives**

- To develop a radar rainfall and flood forecasting system for both urban and rural watersheds

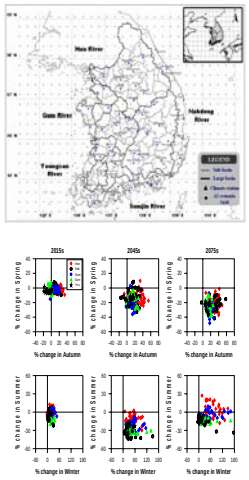
*** Method**

- Consists of four processes: Meteorological Forecasting Process, Hydrologic Observation Process, Hydrologic Modeling Process, and Urban Flood Forecasting & Warning Process

*** Major outcomes and Future Works**

- To forecast real-time radar-driven rainfalls coupled with satellite data
- To provide algorithms for real-time flood forecast

Climatic Change Impact & Vulnerability Assessments on Water Resources



* Objectives

- To evaluate the climate change impact assessment on the whole Korean sub-basins

* Method

GCM (ECHO-G) Simulations

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Downscaling (MM5) Scheme

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Hydrologic Model (PRMS) Simulations

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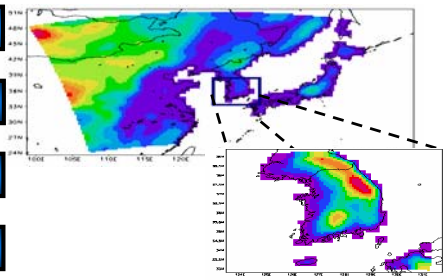
Impact Assessment on WR



* Major Outcomes & Future Works

- Relative changes of annual mean P, T, ET and Q during the future periods relative to the reference period
- Understanding and reducing the uncertainties of climate change and their hydrologic applications

❑ Nominated River Basin: Choong-Ju Dam Basin

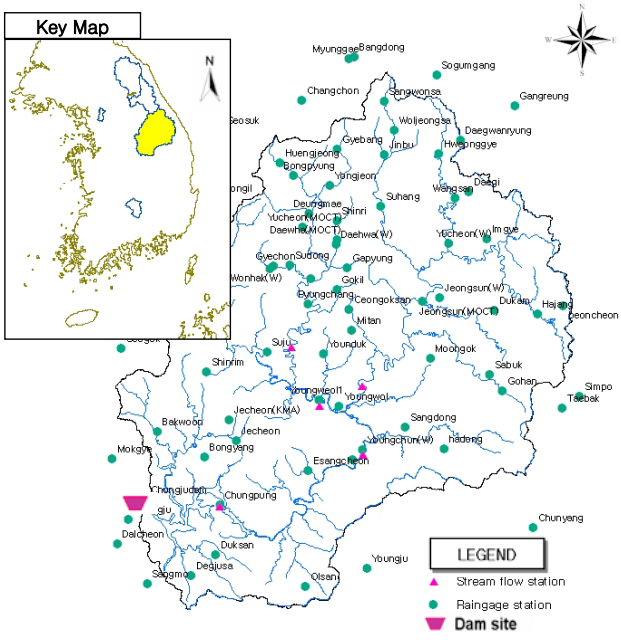


Fig. Study area of Choong-Ju dam site

River Basin Information

Location	App. 128ºE, 37ºN
Basin Areas	6662 km²
Catchment Lengths	321.9 km
Elevation	70-1570 EL.m
Land Use	Mountain
Annual MAP	1149 mm

Observation Systems and Data

Raingauge St.	46 (weather radar data)
Stage St.	5
Met. St.	3

Observation System

SURFACE	
Air Temperature	3
Humidity	3
Wind	3
Pressure	3
Precipitation	46
Snow Depth	3
Skin Temperature	3
Upward Shortwave Radiation	
Downward Longwave Radiation	
Net Radiation	3
Sensible Heat Flux	
Latent Heat Flux	
Ground Heat Flux	
CO2 Flux	

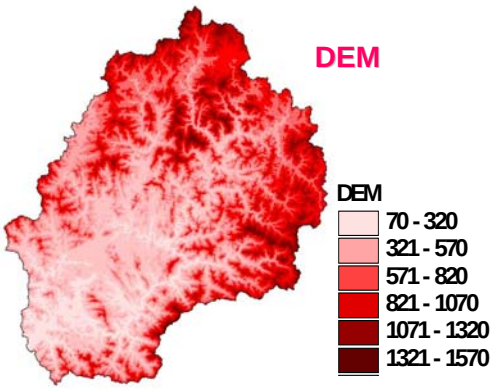
HYDROLOGICAL	
Streamflow	5
Reservoir (Water level, Outflow)	1
Groundwater Table	
Evaporation	3
Soil Temperature	3
Soil Moisture	

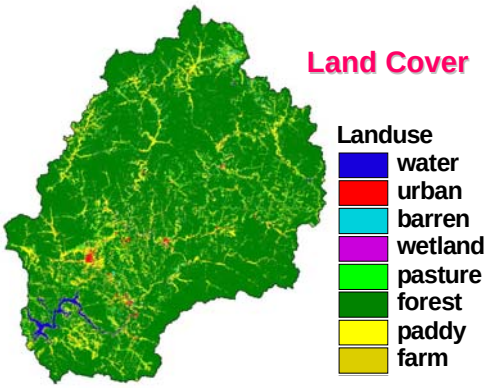
ATMOSPHERE	
Planetary Boundary Layer Tower	
Pilot Baloon	
Radiosonde	
Radar	available

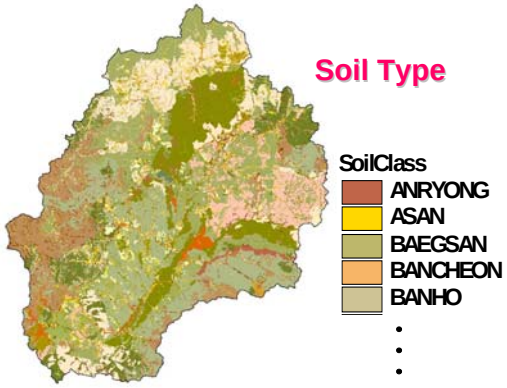
WATER QUALITY	
Groundwater Quality Indicators	8
Surface water Quality Indicators	26

※ Remarks - Korea have 12 upper air measurement stations and 2 CO2 flux stations
- 3 radiosonde stations (Sokcho, Pohang, Gosan)

GIS and Other data







Hydrologic Models

Hydraulic Design

- Rational formula
- Unit hydrograph
- Synthetic unit hydrograph
- TANK model

Flood Analysis

- HEC-1, HEC-2
- SSARR, SWM, SWMM, USGS, DAMBRK
- Storage function model, Clark
- PRMS, SLURP, SWAT, TOPMODEL

Urban Runoff Design / Analysis

- ILLUDAS
- RRL
- SWMM
- Rational formula

Flood Event Analysis

- Storage function model
- HEC-1
- Sacramento model

Thank you for your attention