International Cooperation for Capacity Building in Asia
- Needs and Proposals -

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Deg-Hyo Bae(dhbae@sejong.ac.kr)

Professor, Dept. of Civil & Env. Engrg., Sejong University, Korea

Needs-Interaction technology between atmospheric sciences and hydrology

- Numerical weather predictions at KMA/MOST
  - GDAPS for 110x110 and 220x220 km
  - RDAPS for 30x30km (5-km res. Test)
  - GTS network for global observations of on-site and RS data
  - Short-term(48 hrs), weekly(48hr-7days), long-term (monthly, seasonal, bi-annual) weather forecast information are provided.

- Real-time flood forecasts at FCCs/MOCT
  - Operate event-oriented FF model
  - Collect real-time prec. and stage data by telemeters

- Uncertainties of flood forecasts
  - inaccurate information of weather forecasts and runoff simulations
  - non-existance of interaction technology between these two fields

- **Evaluation of these interaction**
  - Weather forecasts system
  - Flow simulations system
  - met. and hydro. observation systems

- **Regional requirement under existing infrastructure**
  - Development of technology for weather forecast improvement
  - Distributed-type hydrologic modeling with RS data
  - Interaction technology between these two fields

- Need 1- Real-time flood forecasting technology by using short-term weather forecast
- Need 2 – Development of flash flood guidance system
- Need 3 – Wise use of satellite data and weather forecast information for water resource management

Porposals - data collection and technology development on demonstration basin for capacity building

- Demonstration basin – data collection

Characteristics of Choong-Ju basin

Location	App. 128ºE, 37ºN
Basin Areas	6662 km^2
Catchment Lengths	321.9 km
Elevation	0-1561
Land Use	Mountain
Annual MAP	1149mm

Available data

Raingauge St.	73
Stage St.	6
Evaporation	Pan data

GIS – DEM, Landuse, Soil map

- Technology development – Interactions between atmosphere and hydrology

  - Understanding numerical weather forecasts according to forecast lead time (for both KMA and AWCI outputs)

  - Use of satellite data for enhancement of water resources management and also for flood management

  - Application of various runoff models (conceptual, distributed models)

  - Developing interaction technologies between these two fields for both flood forecasting and water resources management

- Numerical weather forecast training workshop - KMA

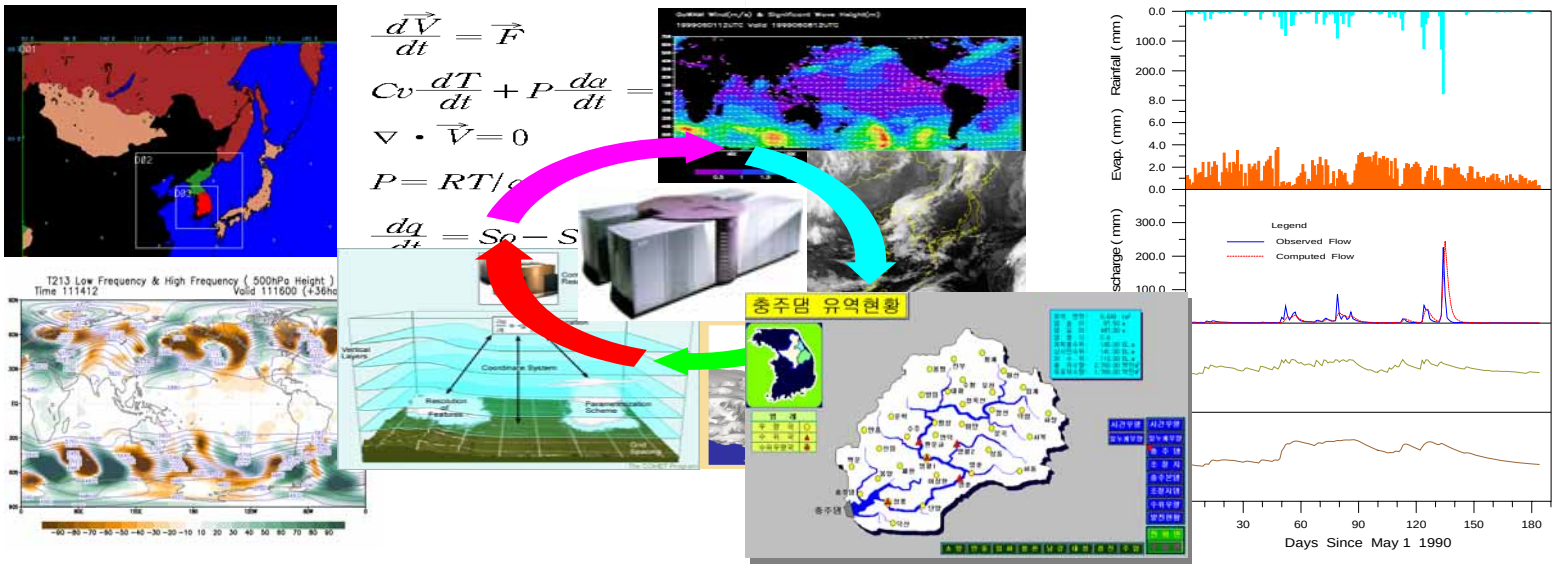
Water Resources Application of Short- and Long-Term Weather Forecast System (Project Leader: D.H. Bae)

Research Goal

The objective of this study is to develop a short- and long-term weather forecast system for the application of water resources planning and the integrated basin-wide water resources management

Study Summary

- The weather forecast system for water resources applications is required for the coupling of global-, meso- and hydro-scale model under the spatial scale and short-, mid- and long-term forecast model under the temporal scale. This study is especially focused on the development of the downscaling techniques for the connection of global-meso-hydroscale meteorological model, the techniques for the operational short- and long-term weather forecasts, and the techniques for the connection of weather forecasts and water resources applications.
- The downscaling techniques deal with the analysis of currently available GCMs and the development of dynamic, statistical and geostatistic downscaling techniques. For the development of operational weather forecast system for water resources application, it develops a technique for providing the short- and long-term forecast data over various river basin scales, and constructs a forecast performance test system through the comparison between numerical weather forecast and observed met data. The development of techniques for coupling weather forecasts and water resources applications covers the design and implementation of weather forecast I/O system required for runoff, routing, and dam operation.



Final Outcomes

- ❑ Downscaling technique for creating weather information necessary for water resources management
- ❑ Technology for producing and supplying long- and short-term weather forecast data on a real-time basis for the water resources management
- ❑ Application technology for long- and short-term weather forecast in conjunction with water resources management
- ❑ Analysis results of uncertainties in the conjunctive operation of weather forecast and hydrologic model

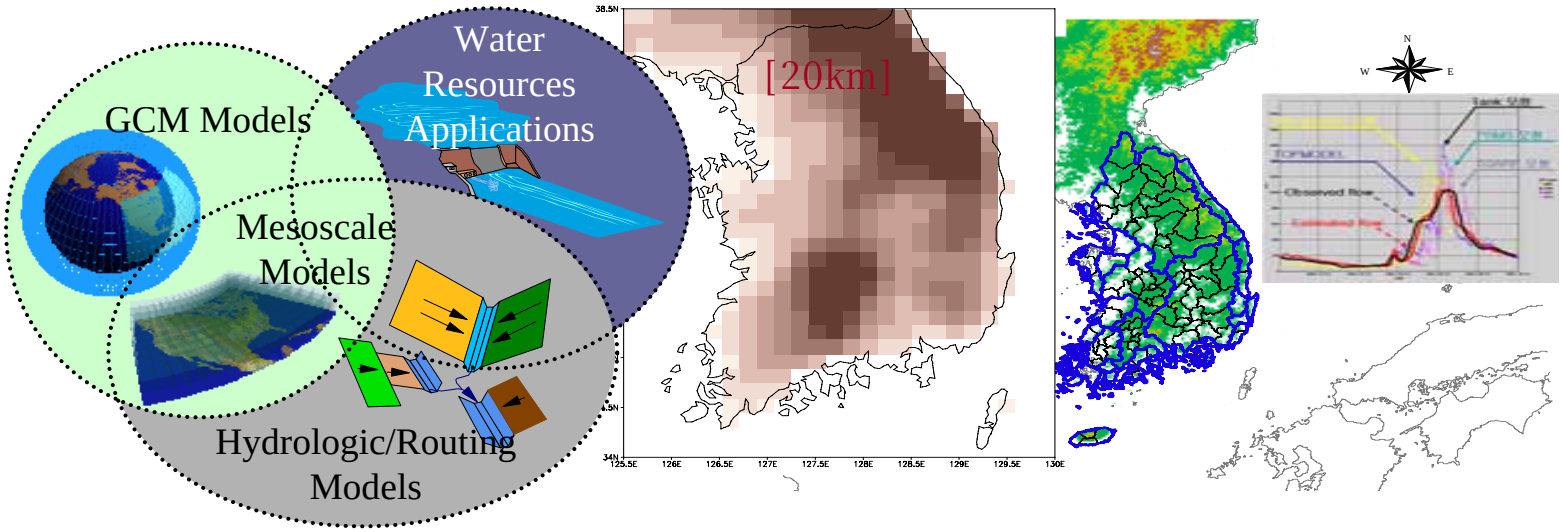
Technology for Climate Change Impact Assessments on Water Resources (Project Leader: D.H. Bae)

Research Objectives

- ❑ Development of the system for climate change impact assessments on water resources
- ❑ Development of high-resolution (10-20km grid-scale) climate change scenarios over the Korean Peninsula
- ❑ Examination of the variation of water availability on appoximately 1,000km^2 sub-basins based on the climate change scenarios

Major Research Contents

- ❑ Evaluation of uncertainties within the climate change scenarios, and generation of the high-resolution climate change scenarios over the east Asia/Korean peninsula domains
- ❑ Statistical evaluation of the climate change impacts on water resources using various observation data
- ❑ Development of long-term runoff ensembles including snowmelt, and analysis of river flow variation based on the climate change scenarios
- ❑ Analysis of the climate change impacts on eastern Asia continental water resources using the continental scale runoff model
- ❑ Establishment of international cooperation for the climate change impact study on water resources



Expected Results & Impacts

- In the field of climate, development of GCM/Hybrid downscaling/weather generator system and generation of highly reliable climate change scenarios.
- In the field of water resources, establishment of prototype procedures for climate change impact assessment on water resources in Korea
- Consideration of climate change impact assessment on water resources to the national long-term water resources plan