



Hydro-meteorologic Data and Their Use in Korea

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Contents

□ Korean Watershed and Data Observation

- Description of Korean watershed
- Meteorological data observation
- Hydrologic data observation

□ 21st Century Frontier R&D Program

- Frontier project outlines
- Two sub-topics in the program



Description of Korean Watershed

Legend

- Watershed Boundary
- Flood Control Center
- Raingage Station

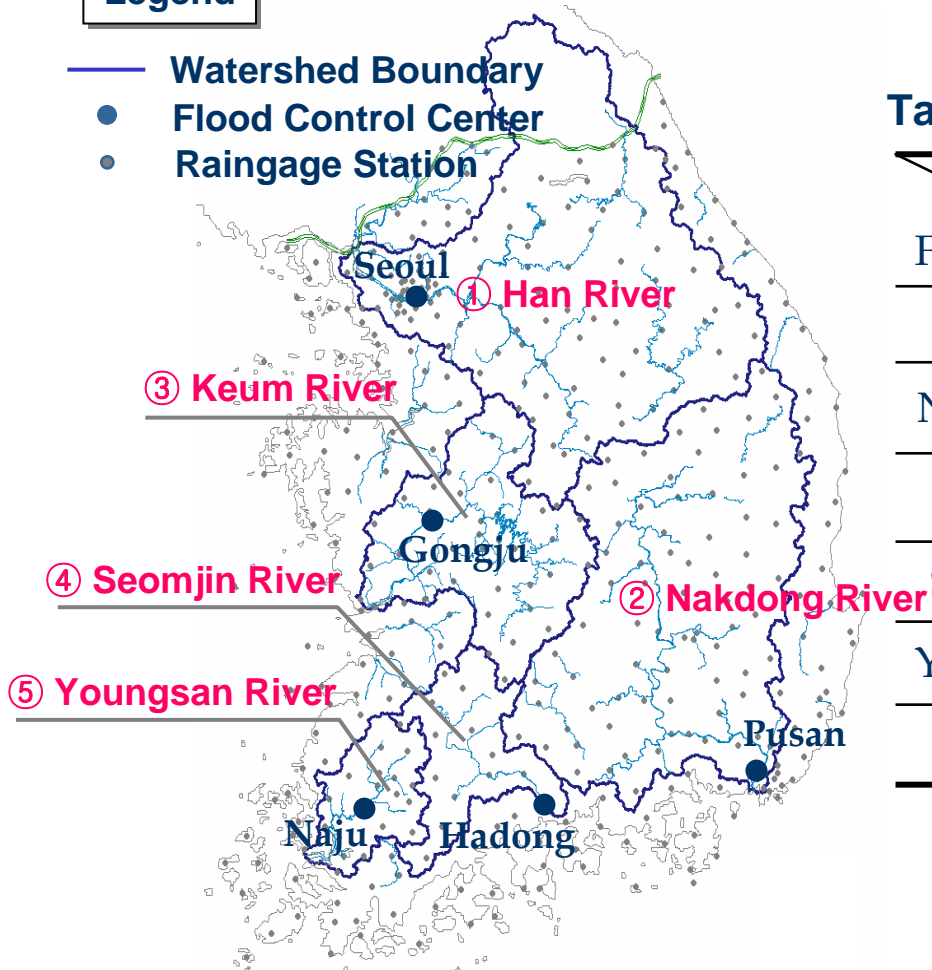


Table. Characteristics of the major watershed

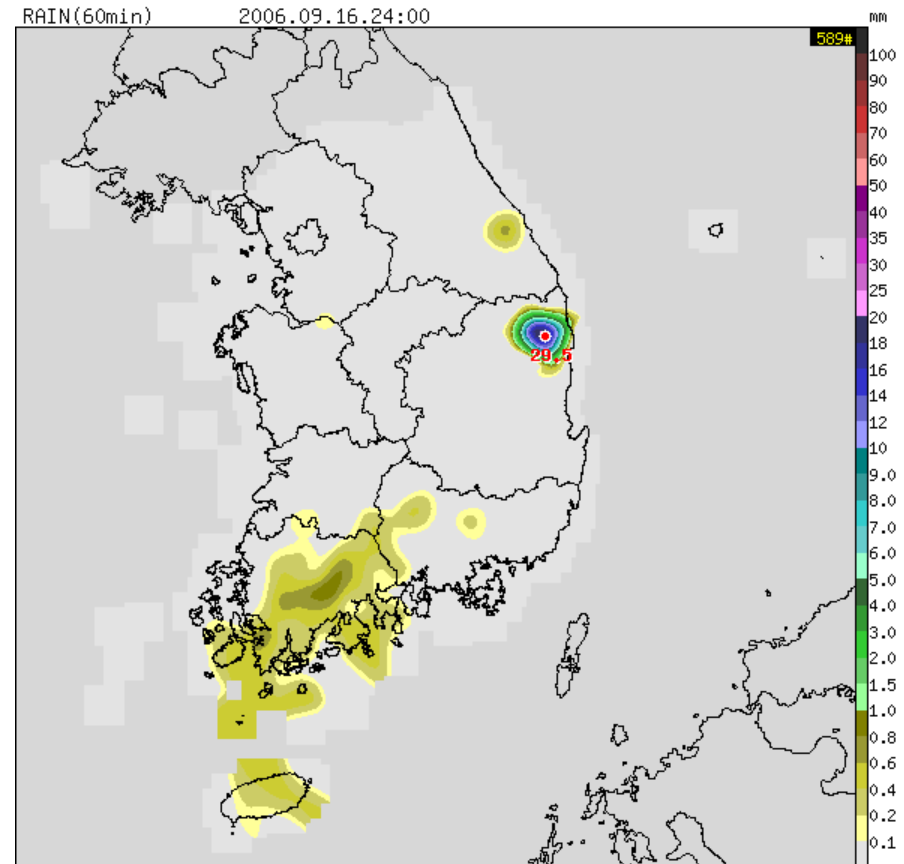
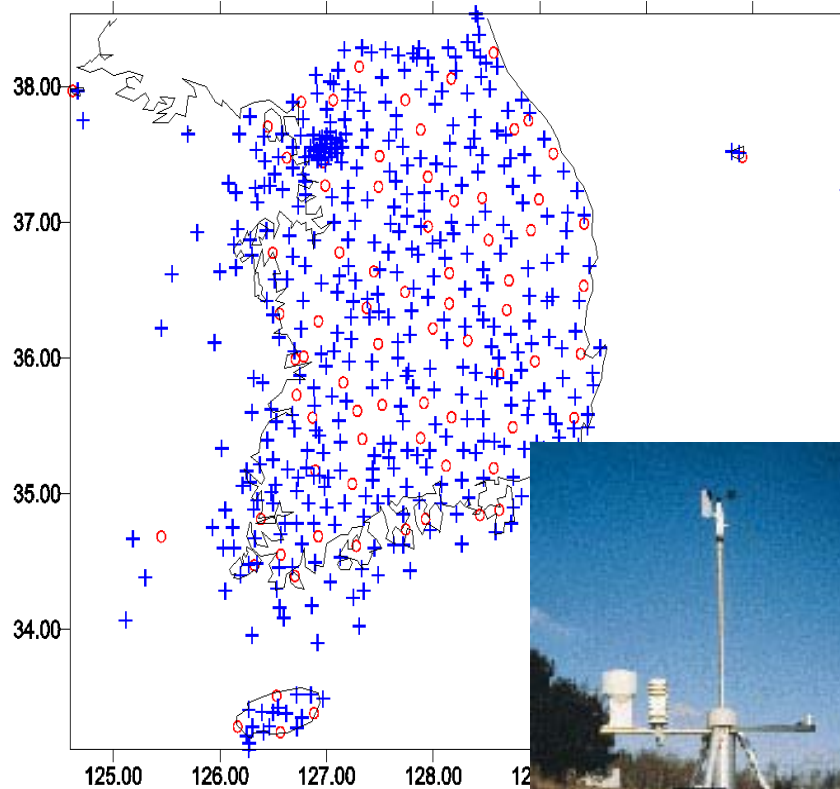
Item FCC	Area (km ²)	%	Raingage No.	Stage No.
Han R.	26,018	26.1	158	67
Nakdong R.	23,817	23.9	162	83
Keum R.	9,810	9.9	81	29
Seomjin R.	4,897	4.9	23	24
Youngsan R.	3,371	3.4	14	25
Total	63,016	68.2	438	228

Fig. Distribution of the major watershed and FCC in Korea

Meteorologic Data Observation

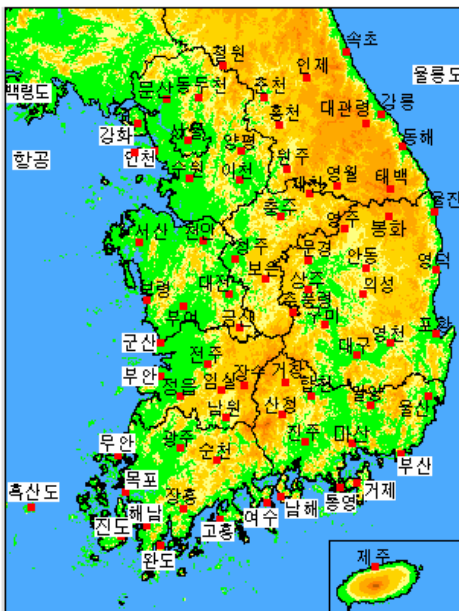
Automatic Weather Station (AWS) - Spatial

✓ Total number (2005): ground=539ea, sky=12ea



Automatic Weather Station (AWS) - Time series

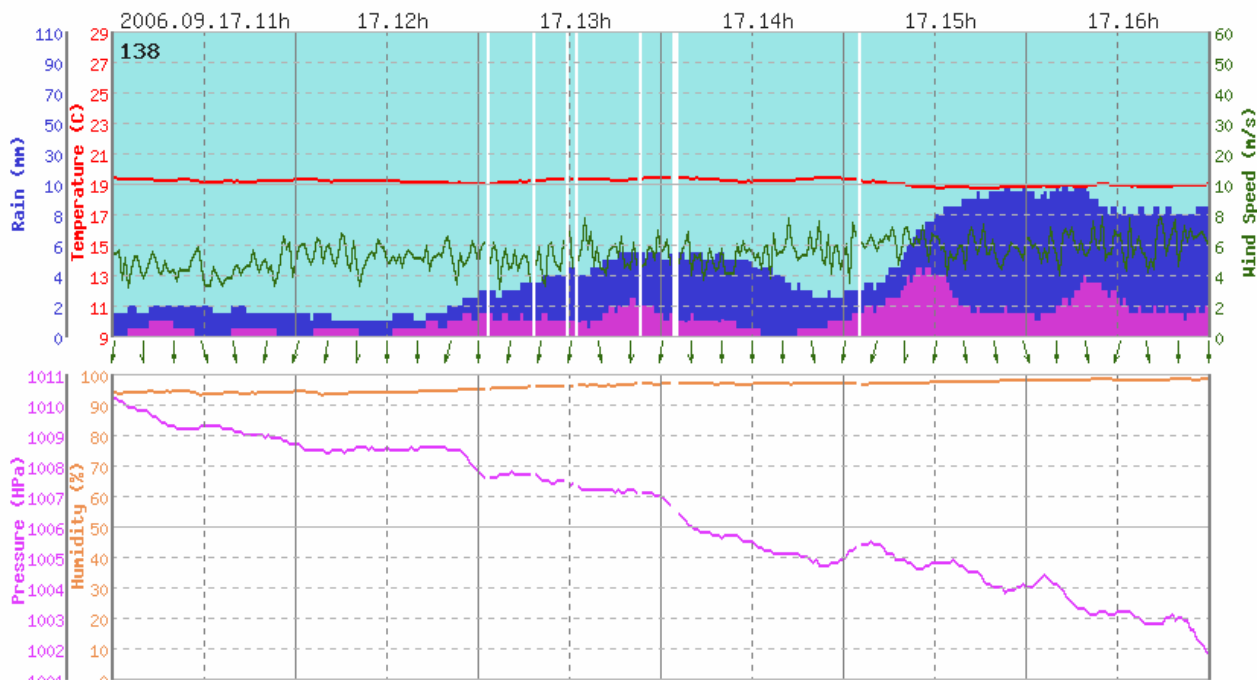
AWS 시계열 | 분석/매분 | 년월일시분 200609171700 | 확인 | - 1H + now HOME > AWS >



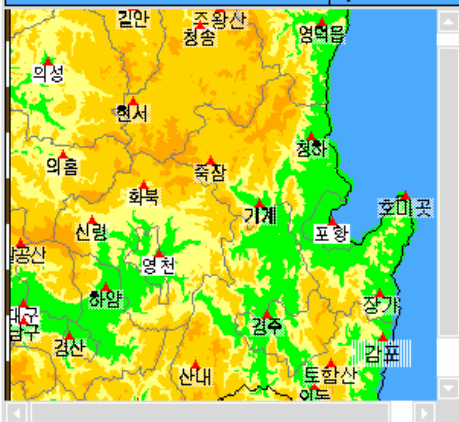
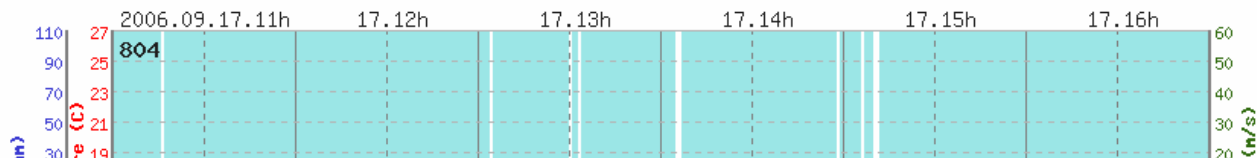
[매분분석자료] 포함 138 / 2006.09.17.17:00

{ 설명 } 하늘색 : 강우감지기 / 파란색 : 60분이동누적 / 분홍색 : 15분이동누적강수량

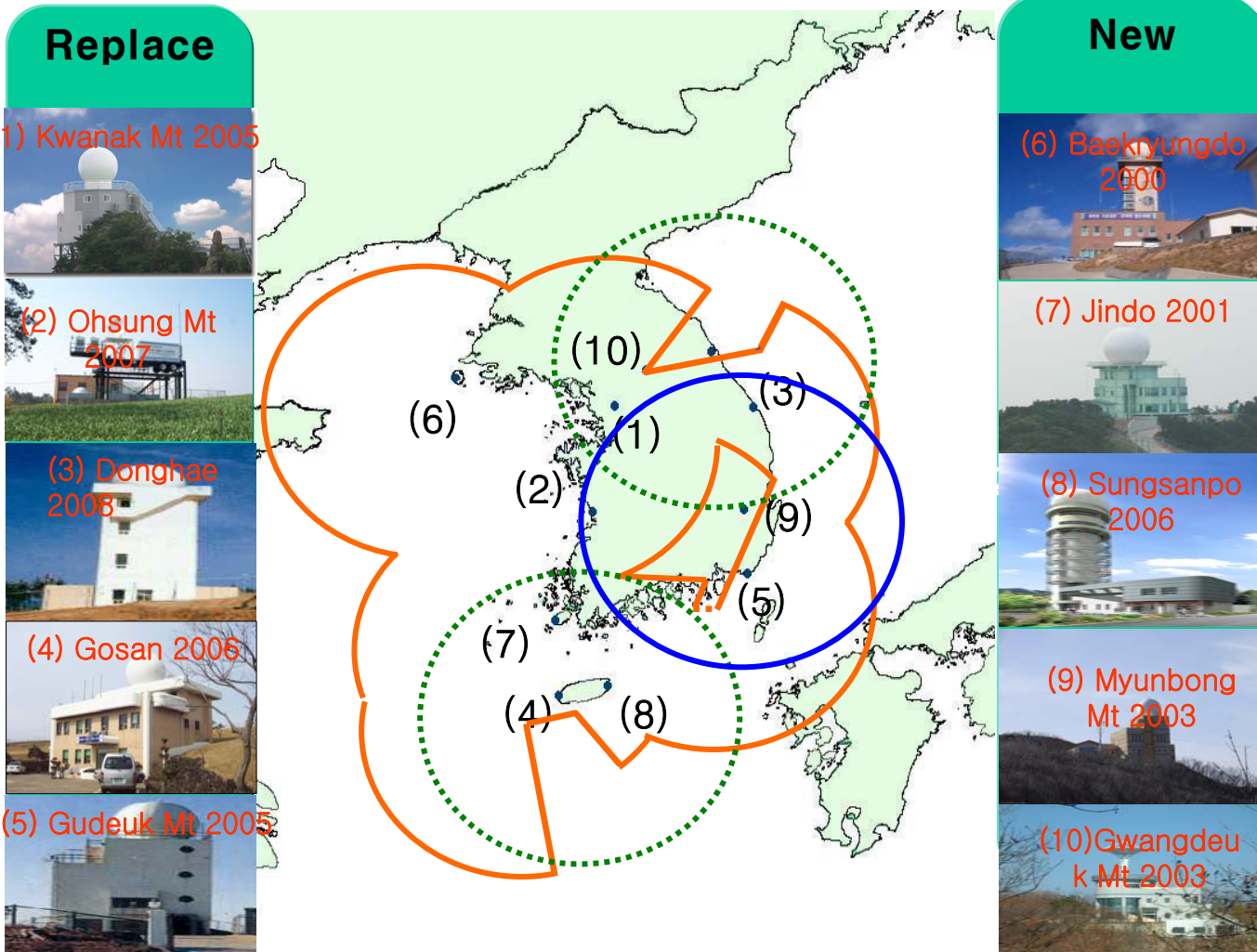
[경북남부동해안] 포함



[경북남부동해안] 청하



Weather Radar Network



Hydrologic Data Observation

Raingage Station Distribution

Stage Station Distribution

Table. Number of telemeter stations

Item	Area (km ²)	%	Raingage No.	Stage No.
FCC				
Han R.	26,018	26.1	158	67
Nakdong R.	23,817	23.9	162	83
Keum R.	9,810	9.9	81	29
Seomjin R.	4,897	4.9	23	24
Youngsan R.	3,371	3.4	14	25
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Legend

— Watershed Boundary

● Telemeter raingage station

Legend

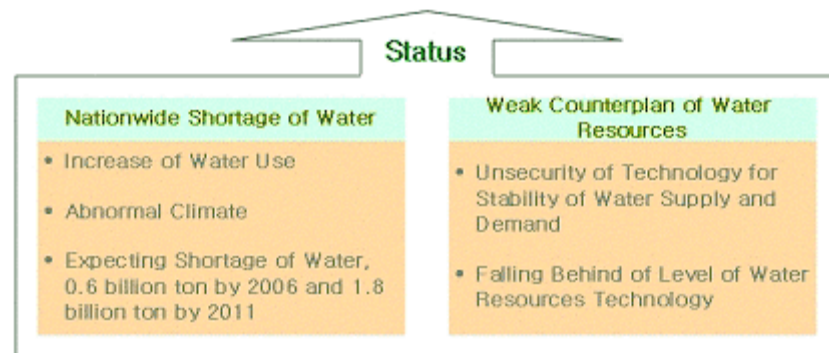
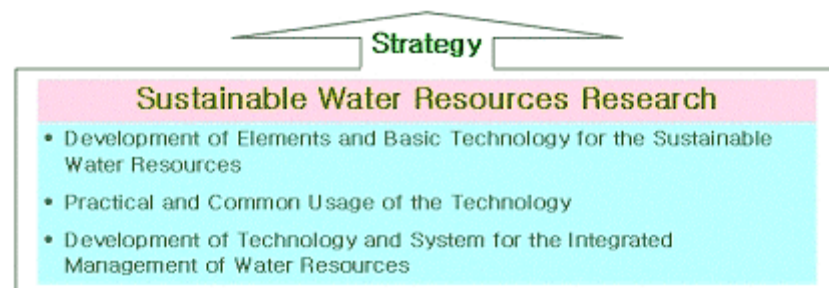
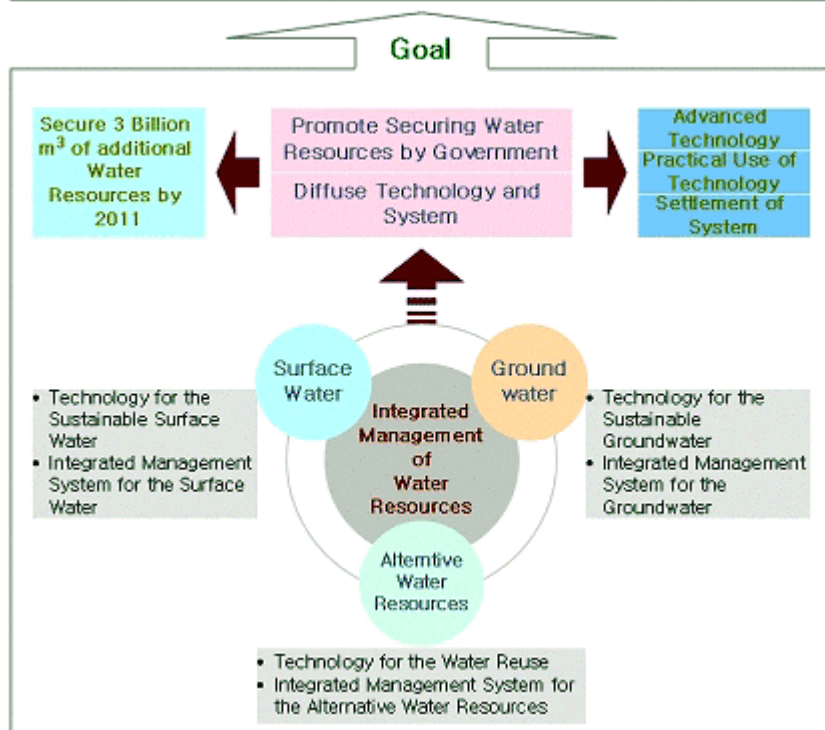
— Watershed Boundary

● Telemeter stage station

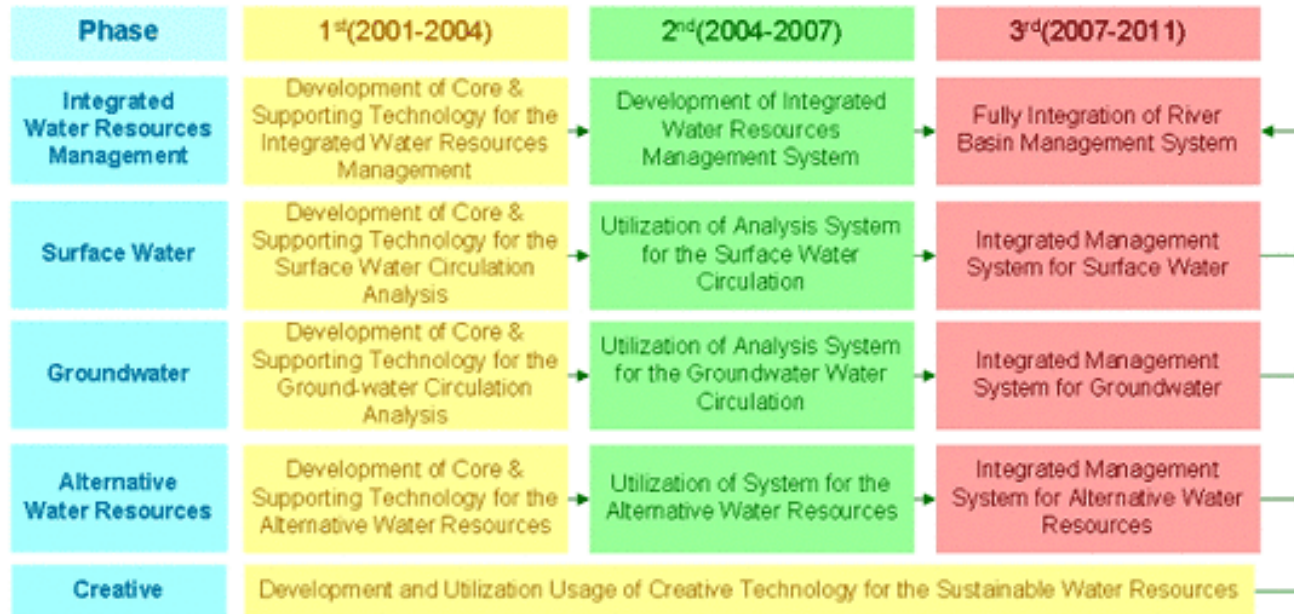
21C Frontier R&D Program Outlines

- **Title: Sustainable Water Resources Research Program**
- **Mission and Objective: Solve the water shortage problem in Korea by improving the water resource technology**

Settle the Shortage of Water by Stabilizing the Water Supply and Improve Quality of Life



Technological Roadmap



Expected Results

- The successful execution of the research will secure about 3.0 billion m³ of additional water resources through integrated utilization of water resources
- It is also expected to improve our river environments through integrated management of water resources

□ Introduction to one subtopic for 1st Phase (2001-2004)

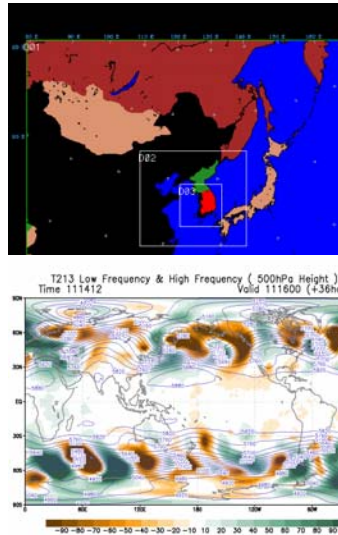
Water Resources Application of Short- and Long-Term Weather Forecast System (Project Leader: D.H. Bae)

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.



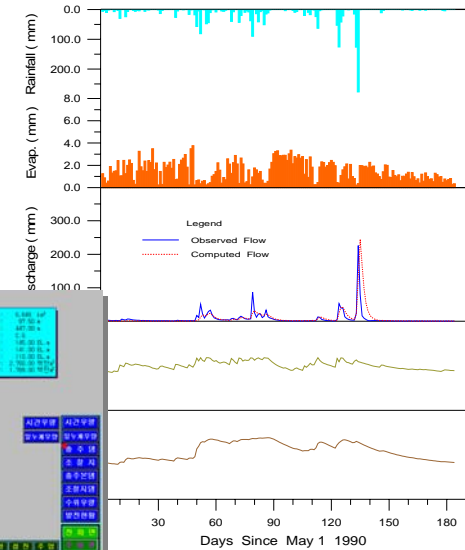
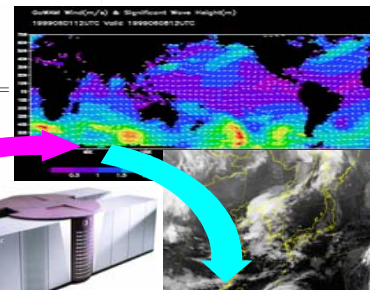
$$\frac{d\vec{V}}{dt} = \vec{F}$$

$$C_v \frac{dT}{dt} + P \frac{dq}{dt} =$$

$$\nabla \cdot \vec{V} = 0$$

$$P = RT/\rho$$

$$\frac{dq}{dt} = S_p - S_r$$



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

□ Introduction to one subtopic for 2st Phase (2004-2007)

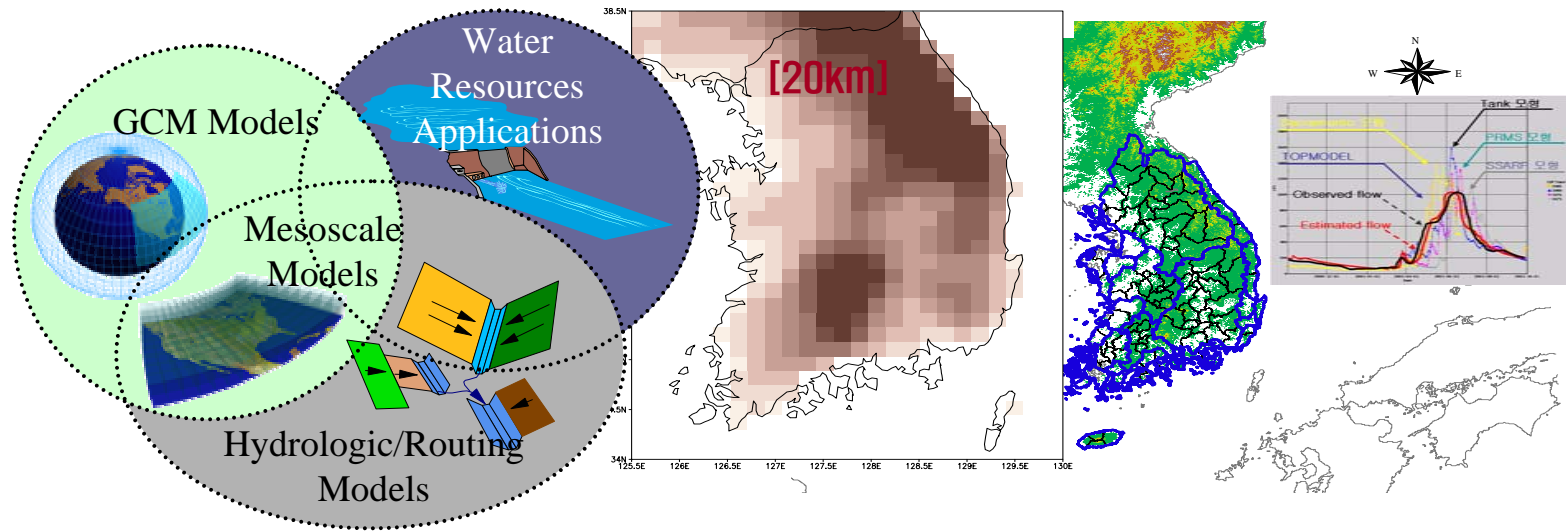
Technology for Climate Change Impact Assessments on Water Resources (Project Leader: D.H. Bae)

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 approximately 1,000km² 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