Development of a Real-time Wireless Internet Data Acquisition System for Typhoon and Flood Disaster Prevention

2004. 2. 13

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Movitation

❖ The damages by consecutive typhoons (2002 & 2003)

1. Typhoon RUSA (2002)

- The most powerful typhoon to Korea since typhoon Sarah in 1959.
- 28,100 houses and 85,000 hectares of farmland ruined by typhoon RUSA
- Forcing 70,000 people to flee their homes

Date	August 31, 2002
Air Pressure	960hPa
Wind speed	35m/s
24hr Max Rainfall	880mm (Kangnung,Korea)
Economic Loss	5,147 billion won
Human Loss	246

❖ The damages by consecutive typhoons (2002 & 2003)

2. Typhoon MAEMI (2003)

- The most powerful typhoon to Korea since the records began almost 100 years ago
- The declaration of special disaster zones; 14 major cities and provinces, 156 smaller cities and districts, and 1,657 towns and villages

Date	September 12, 2003
Air Pressure	950hPa
Wind speed	60m/s (Jeju, Korea)
24hr Max Rainfall	452.5mm (Namhae,Korea)
Economic Loss	4,781billion won
Human Loss	132

❖ The presence of powerful mobile & Internet infrastructures

The number of Internet users : 26,270,000
(55.1% of total population)

The households using Internet : 10,400,000
(70% of total household)

Mobile telecommunication service users : 32,520,000
(70% of total population)

(Ministry of Information and Communication, 2002)

25 50 75 100(%)

An Advanced Disaster Warning System

- Development of an efficient real-time disaster warning system for typhoons and floods using advanced mobile & Internet technologies.

System Setup

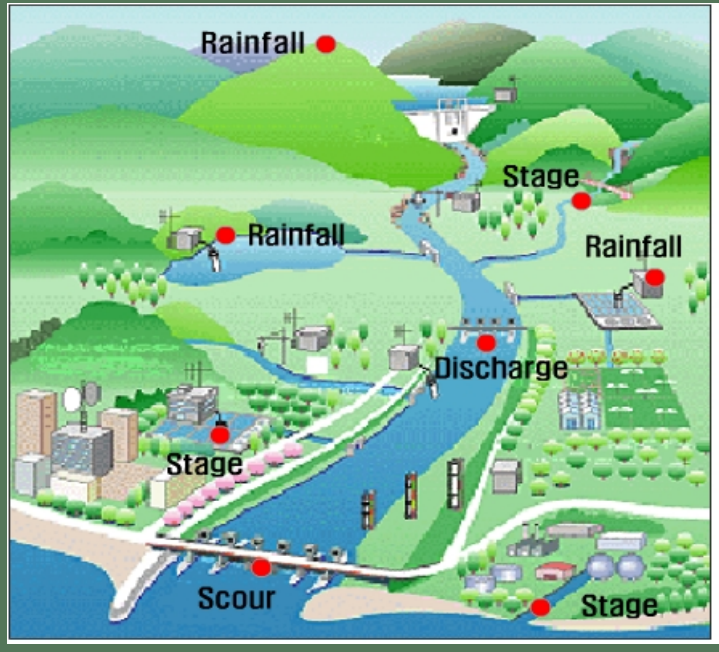
- Synchronized real-time data collection from multiple sites

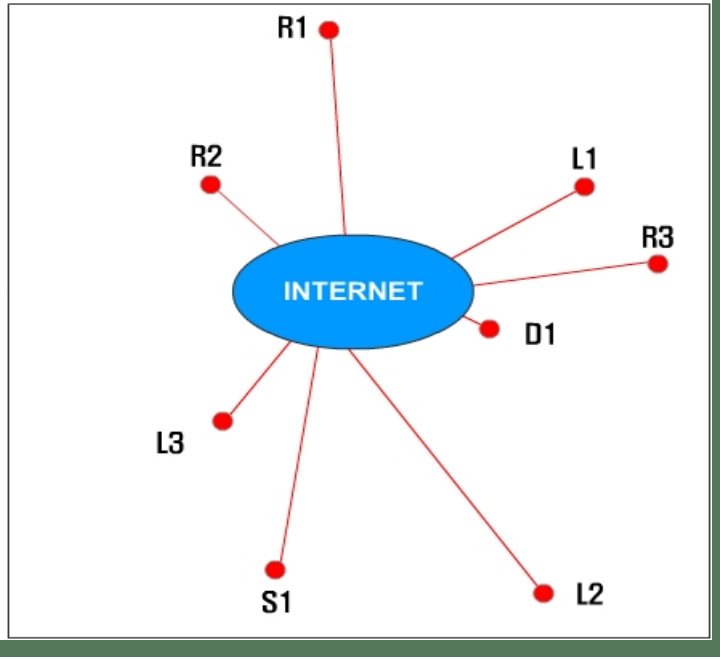
  - Old dedicated wireless telemetering (VHF)
    - Each node 1 sec took
    - 250 nodes 250 secs took ≒ 4 mins 10 secs
  - Wireless Internet telemetering (PCS)
    - Each node 5～10 secs took
    - 250 nodes 5～10 secs took

❖ mobile & Internet characteristics

☞ **Ubiquitous nature**

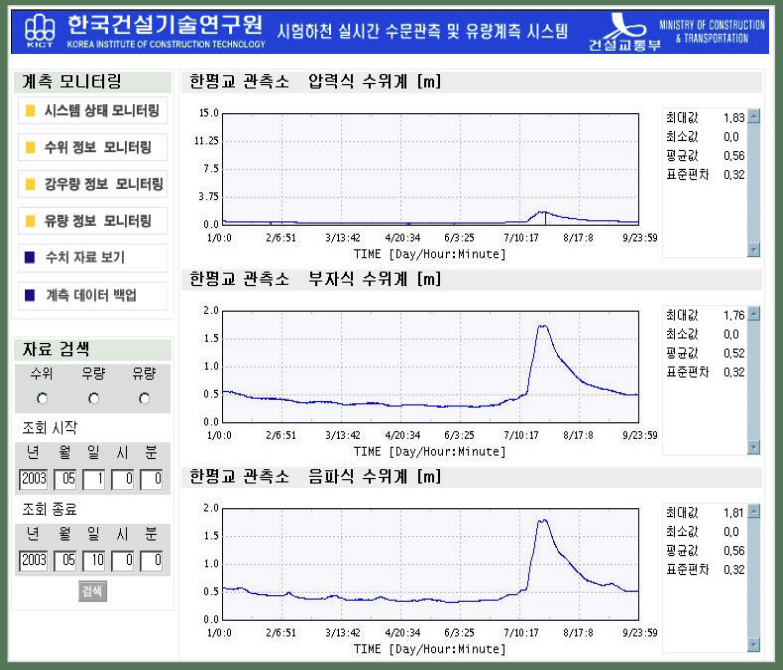
❖ anywhere ❖ anytime ❖ anydevice

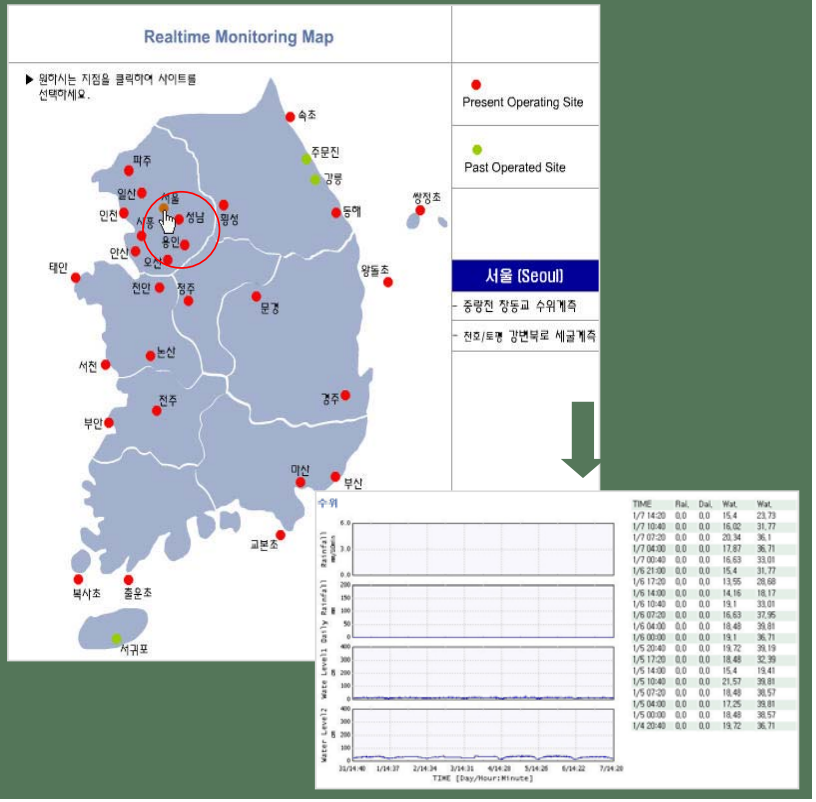




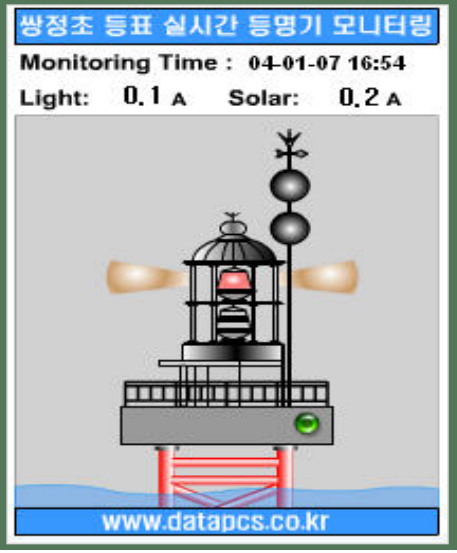
❖ The realtime monitoring through the WEB

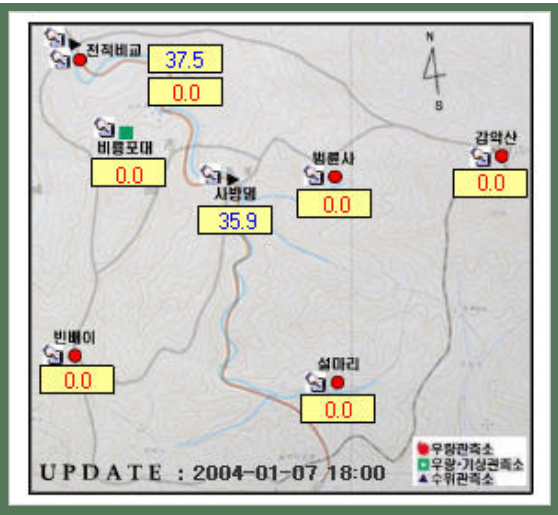
(www.datapcs.co.kr)

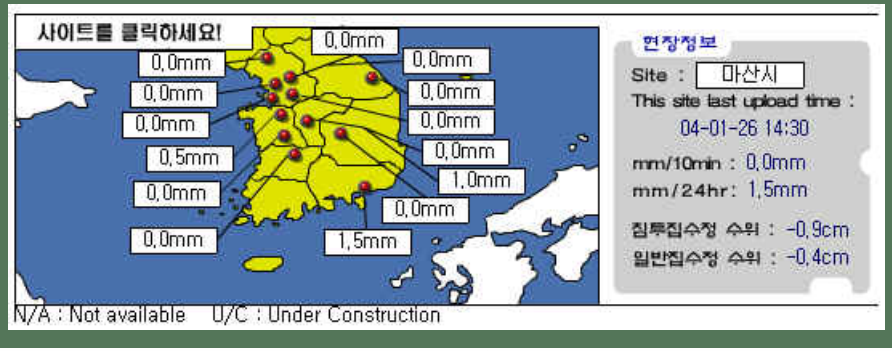




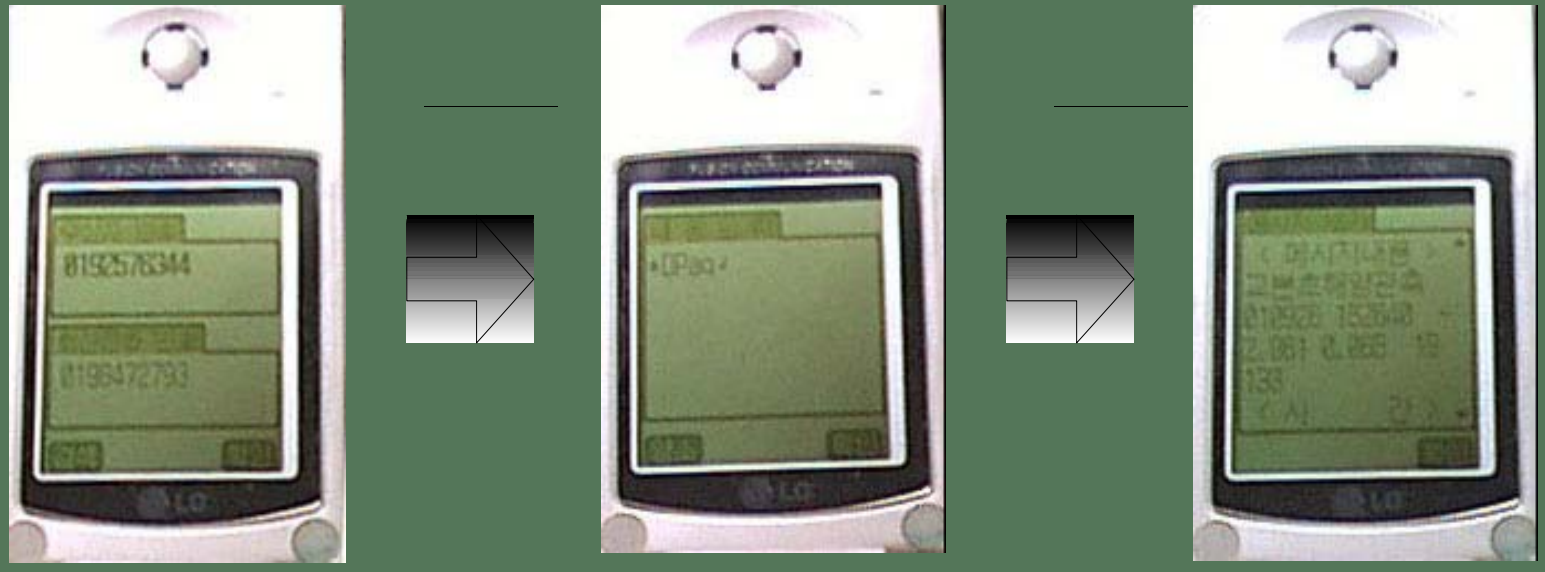
❖ The realtime monitoring through the Flash banner







❖ The personalized warning messages using SMS



❖ The realtime monitoring using WAP service

DATAPCS

1. Coastal monitoring
2. River monitoring
3. Disaster monitoring
4. Frontier

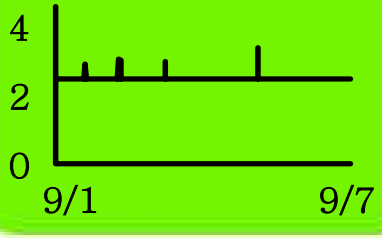
1. Bridge scour
2. Stage measurement
3. Rainfall
4. Pump station

1. Pier 7
2. Pier 16
3. Pier 18
4. Pier 29

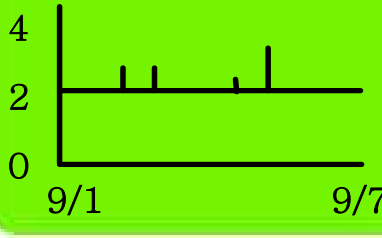
UT : 2002/ 9/ 5 17:00

Pier 7 Stage : 2.2 m

P7 Stage [m]



P16 Stage [m]



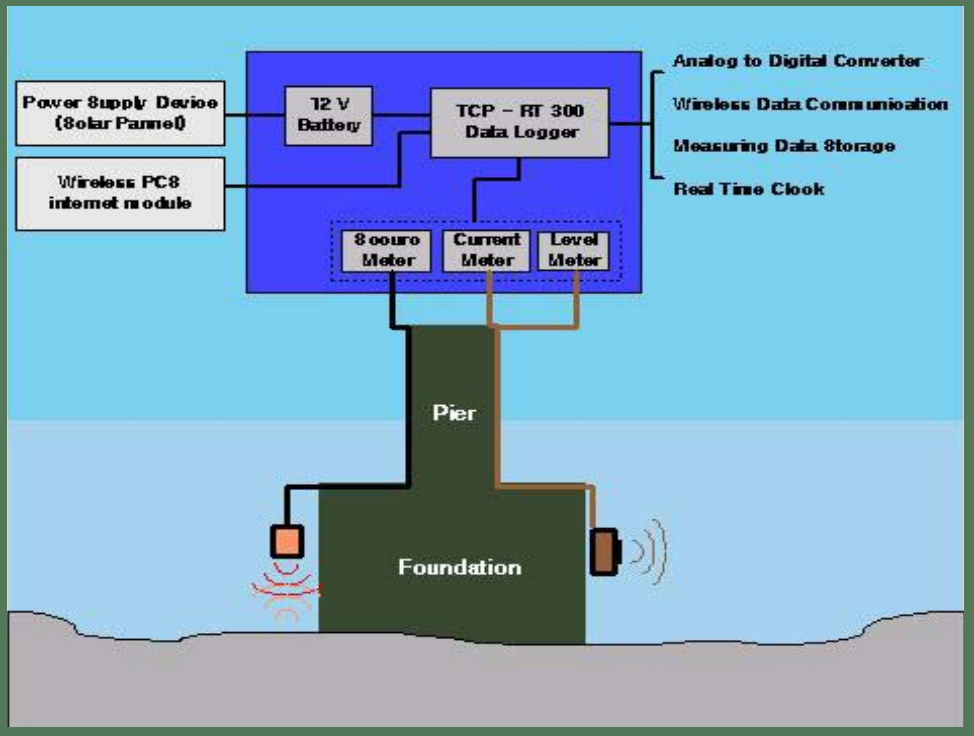
Real implementations

☞ The Korea coastal observation system

- Provide various coastal information required to reduce natural disaster damages
- Detection of early typhoon movements
- Less power hogging and more compact and anywhere deployable system

❖ Bridge scour monitoring in flood condition

☞ The real-time bridge scour monitoring system



Setup

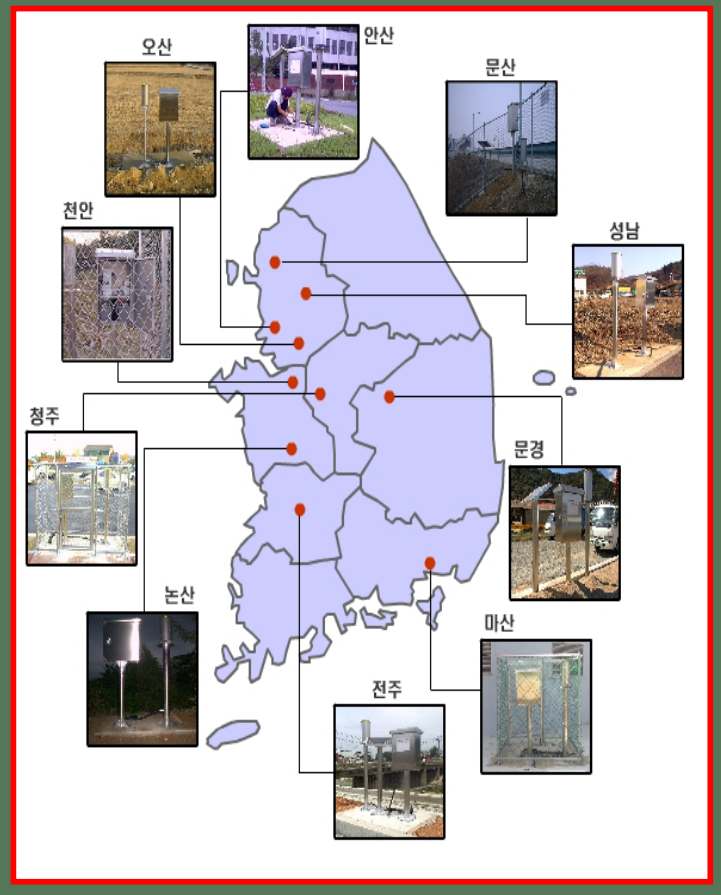
Data

- Excellent tool for figuring out the bridge scour trends in short and long time scales.

❖ Mobile webcam for remote surveillance

Remote observation of flooding scenes

❖ Urban runoff reduction monitoring system



❖ Urban flash flood monitoring

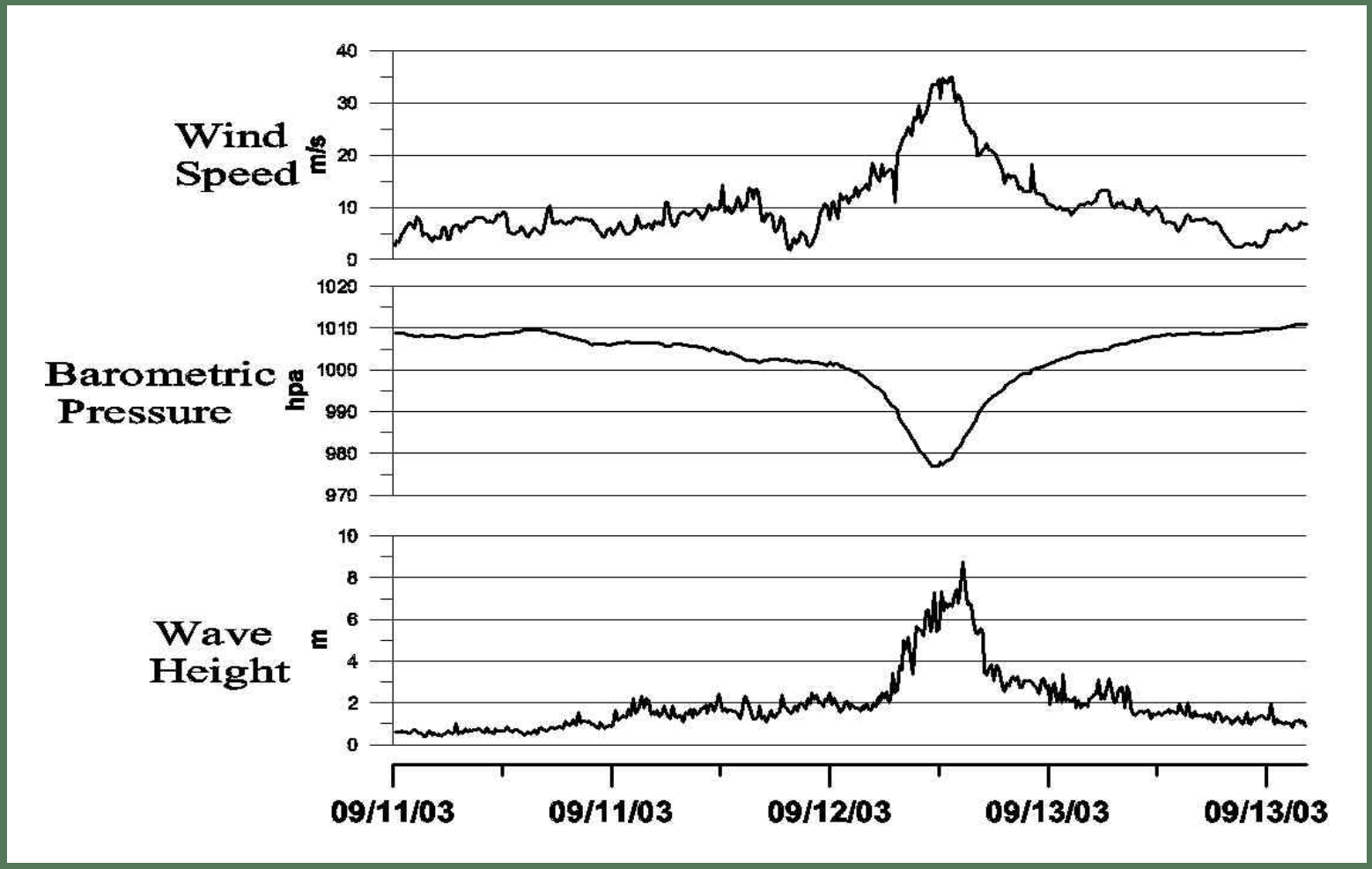
River stage measurement
in Changdong bridge,Seoul

River stage measuerement
in Gumi bridge, Seongnam

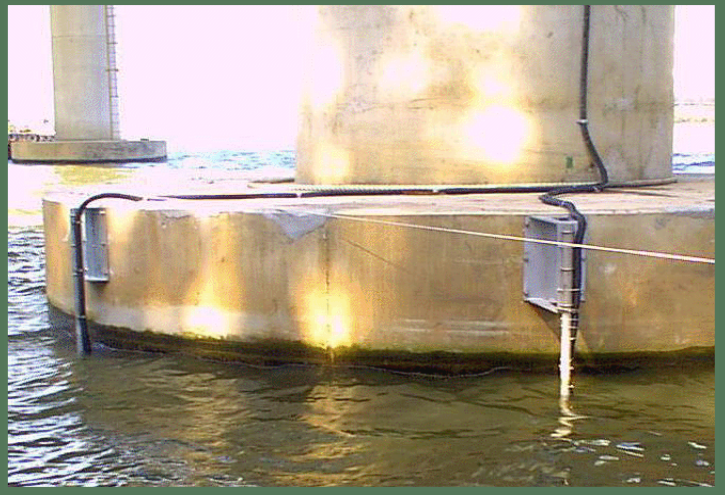
Conclusions

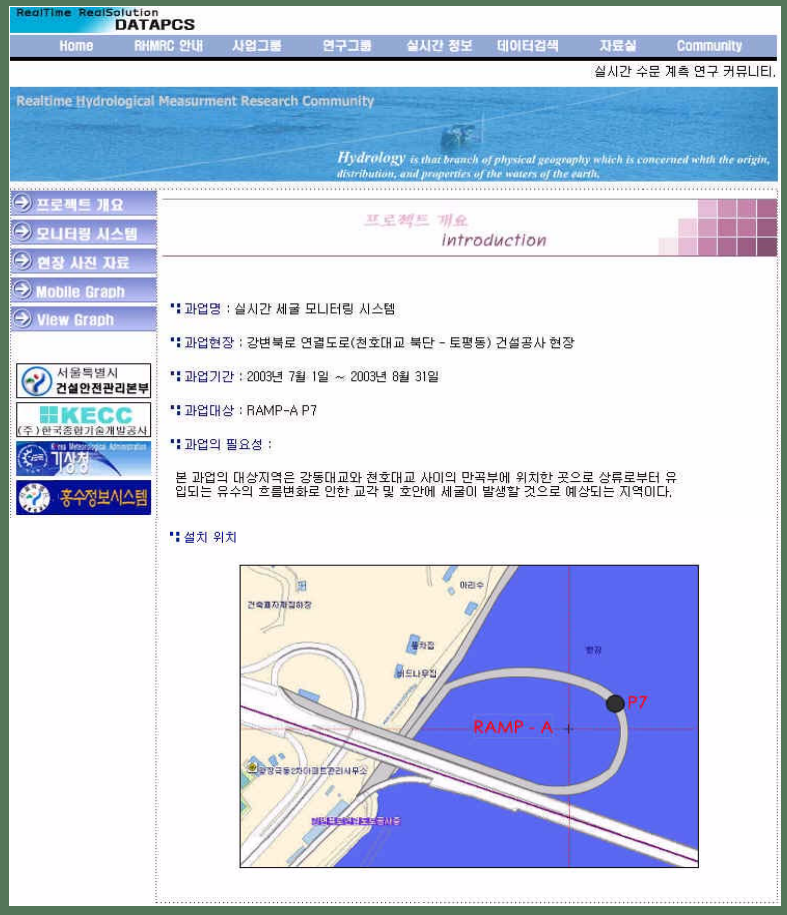
- **A very efficient real-time disaster warning system developed based on mobile & Internet technologies.**
- **The system can integrate all stations in a single friendly frame; Internet.**
- **The outcome exhibits many possibilities for other real-time monitoring purposes.**

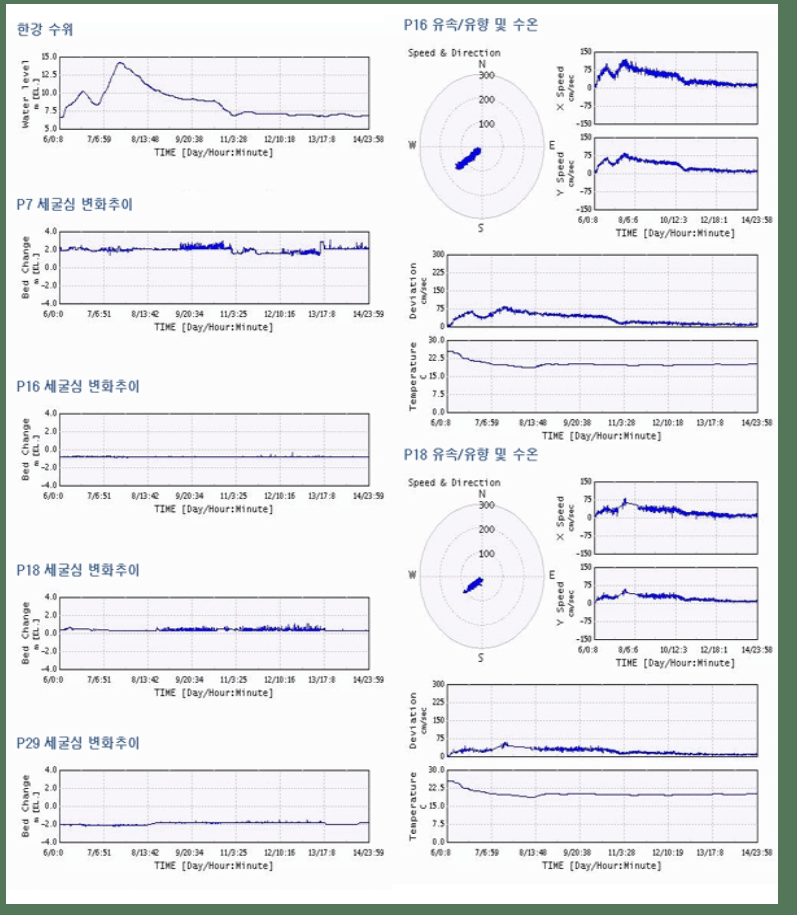
Thank you for attention



The weather and wave conditions measured at a coastal observation station (Typhoon MAEMI)





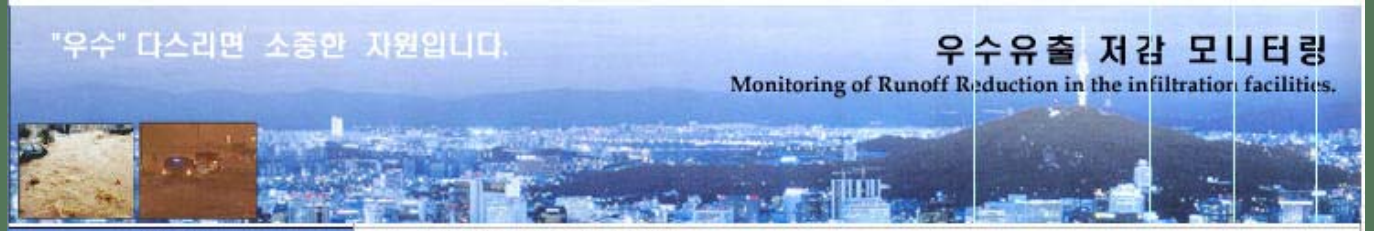


The scour monitoring homepage (www.hydrology.co.kr)

NIDP 국립방재연구소 Monitoring of Runoff Reduction in the infiltration facilities.

Home | 모니터링 | 저감시설 | 침투통 | 실시간 모니터링 | Analysis | 모바일 서비스 | Community

National Institute for Disaster Prevention



로그인

아이디:
비밀번호: 로그인

회원으로 가입하기

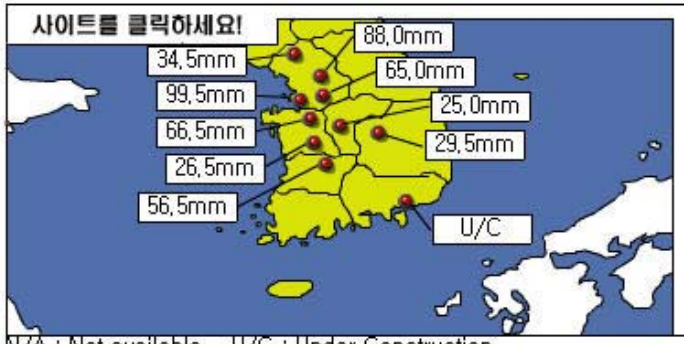
방문하신 분은 총 1080 명입니다 .

국립방재연구소 NIDP for your Safety National Institute for Disaster Prevention

▶▶ 보도 자료

::관련보도 (KBS 9시 뉴스)

▶▶ Real time Site Window



현장정보

Site : 오산시

This site last upload time :
03-08-27 17:30

mm/10min : 1.5mm
mm/24hr : 65.0mm

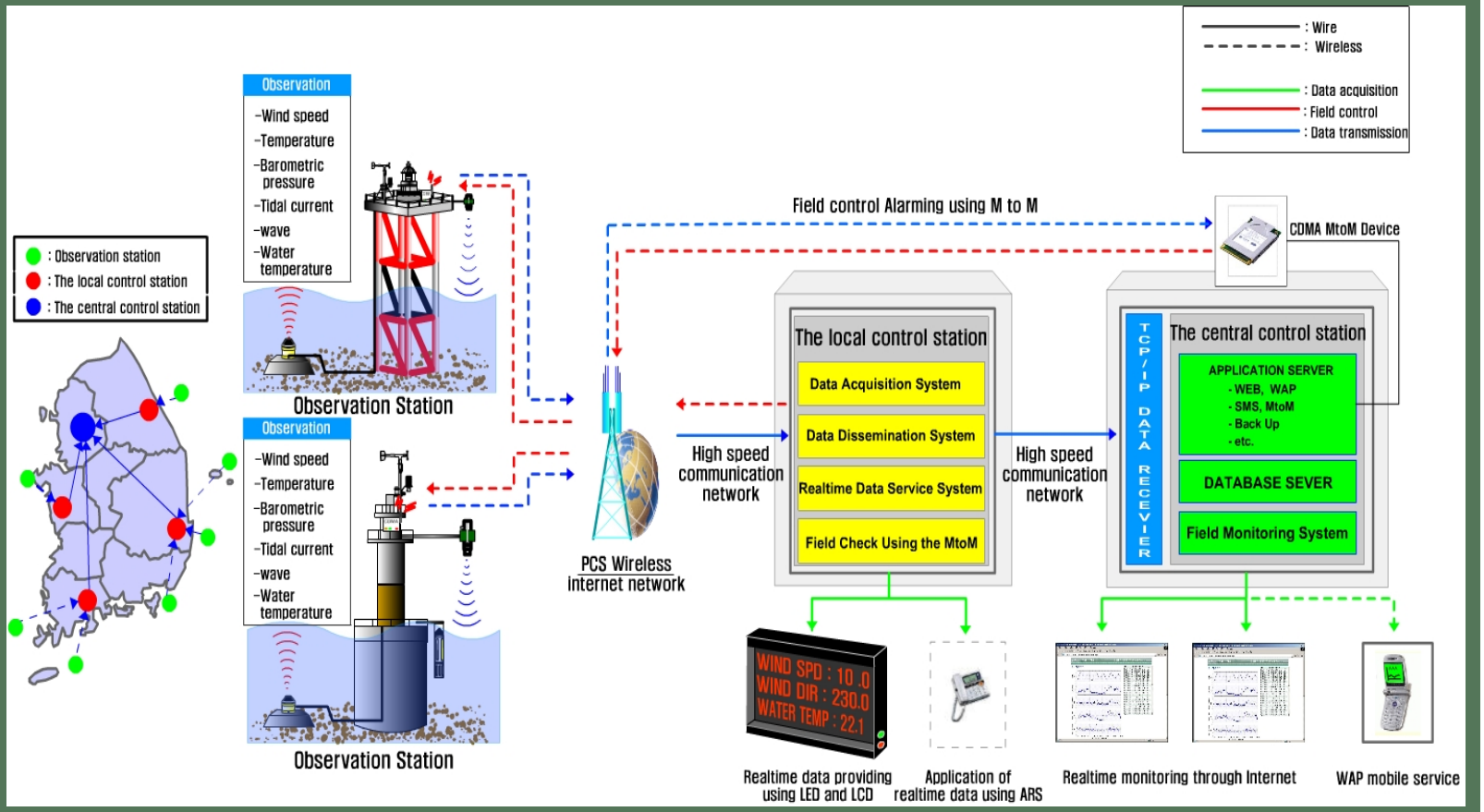
침투집수정 수위 : 9.0cm
일반집수정 수위 : 9.1cm

N/A : Not available U/C : Under Construction

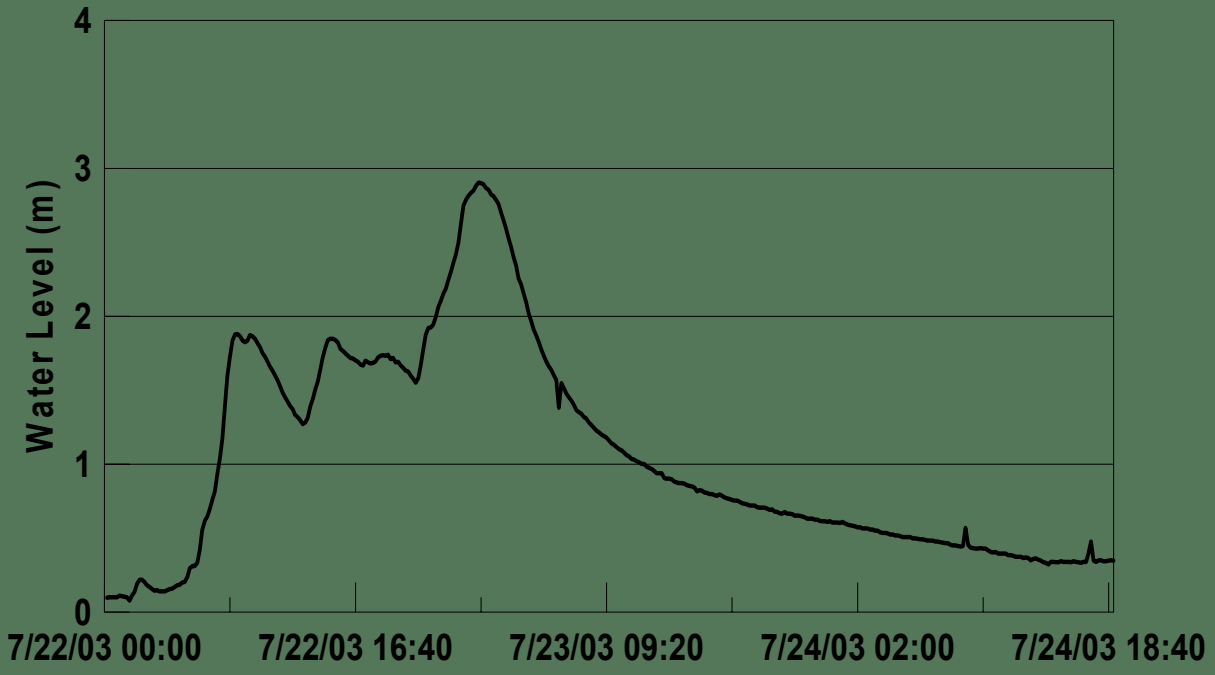
▶▶ Notice

▶[2003-08-27] [청주]운영 소프트웨어/데이터로거 PIC 교체
▶[2003-08-26] [청주지점 강우량 표시 오류]
▶[2003-08-26] [홈페이지 출력방법] 여백을 조정해야합니다.
▶[2003-08-20] 청주농고앞 우수유출 모니터링 시스템 센서교체 완료
▶[2003-07-15] 강우량계의 유지관리

❖ An advanced real-time disaster warning system

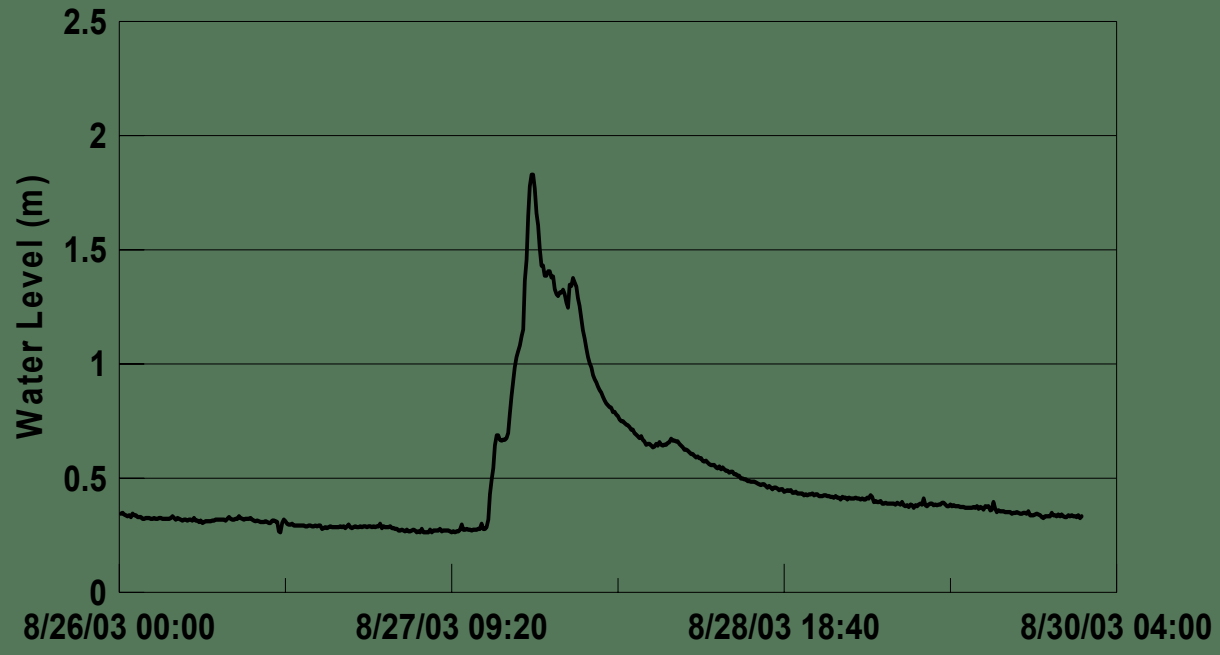


❖ The water level variation at Changdong bridge



- Increased flow due to urbanization and industrialization.
- Unexpected flood level increase and shortened time of arrival

❖ The water level variation at Kumi bridge



- The shortened arrival time due to giant Apt. complex
- Decreased storage capacity of upstream watershed