Use of Korean HAB data for the joint ICES/PICES HAE-DAT database

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Major topics of this presentation

I. Introduction

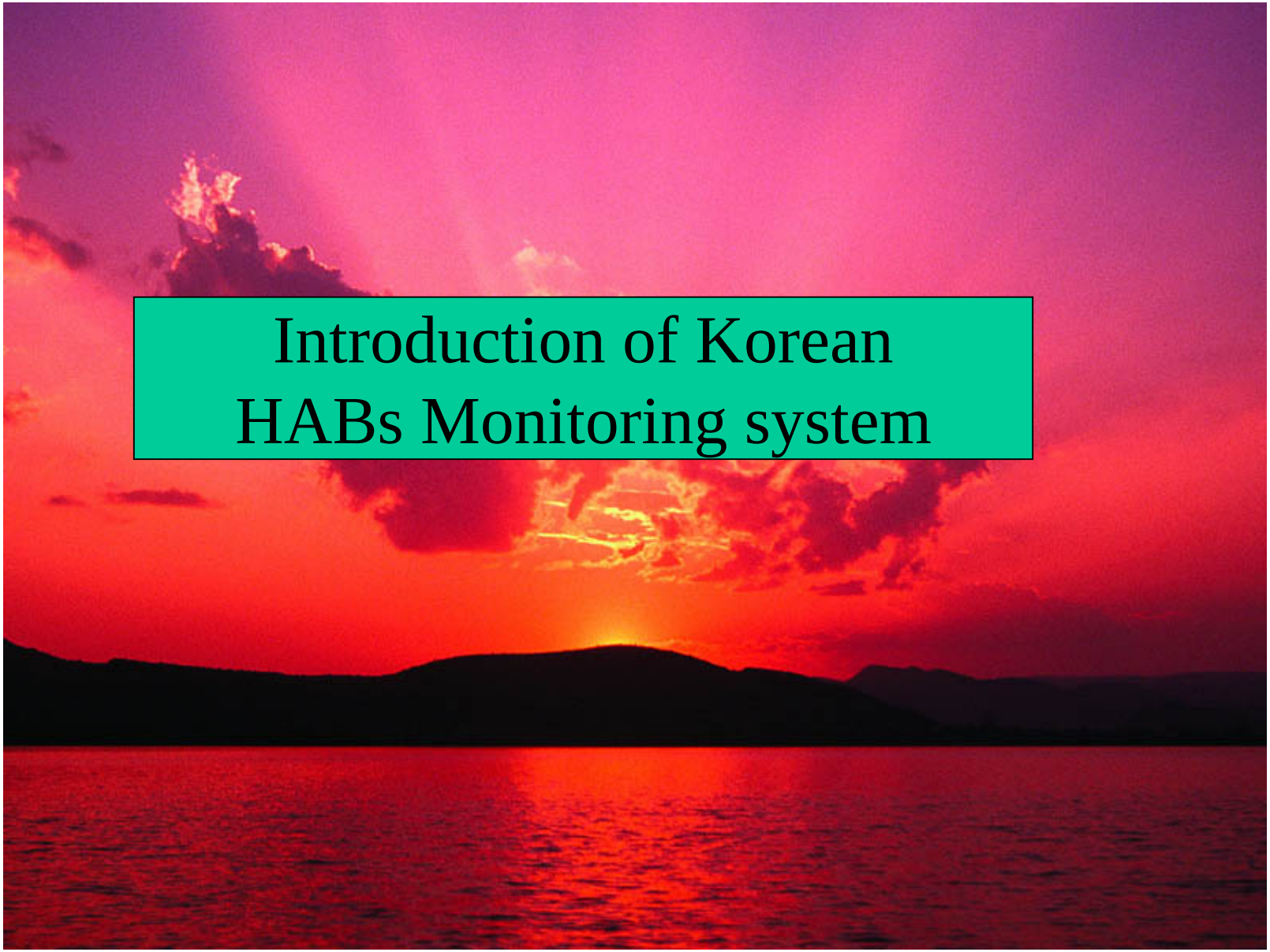
II. Briefs –HABs monitoring system

III. HABs & nutrients data collection

IV. Data compilation & analysis

V. HABs in 1988 in Korea

VI. **Recommendations**


Introduction of Korean
HABs Monitoring system

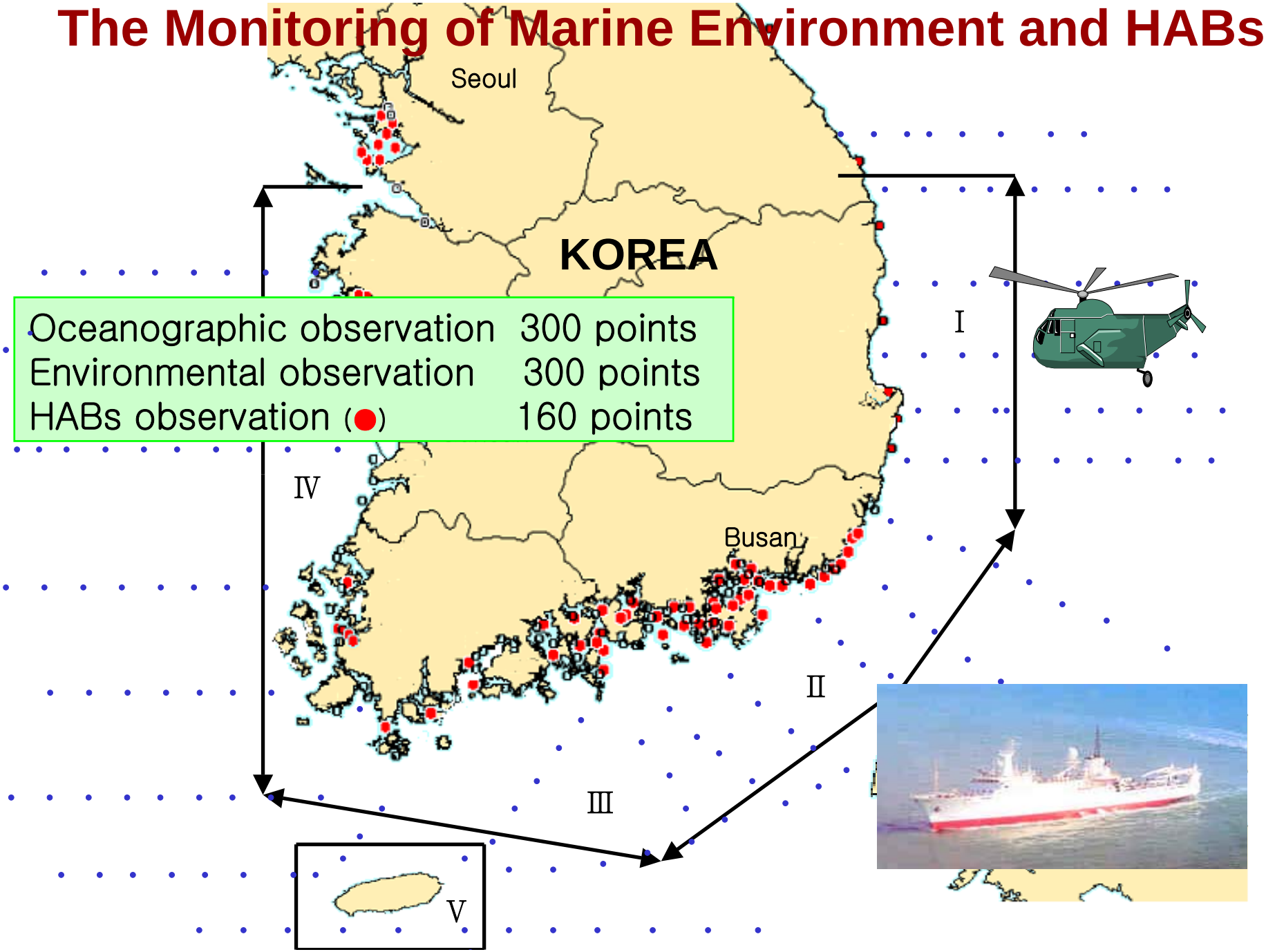
Major HABs Monitoring Projects

Project	Area	Frequency	Targets
Red Tide	South, Eastern coast	daily, weekly, monthly	phytoplankton
Shellfish poisoning	South, Eastern coast	weekly, monthly	PSP,DSP,ASP
Environment quality	All coast	Seasonal	Biotic and abiotic factors
Ocean dynamics	Korean waters	bimonthly	Physical, chemical and biological

Korean HABs Monitoring System

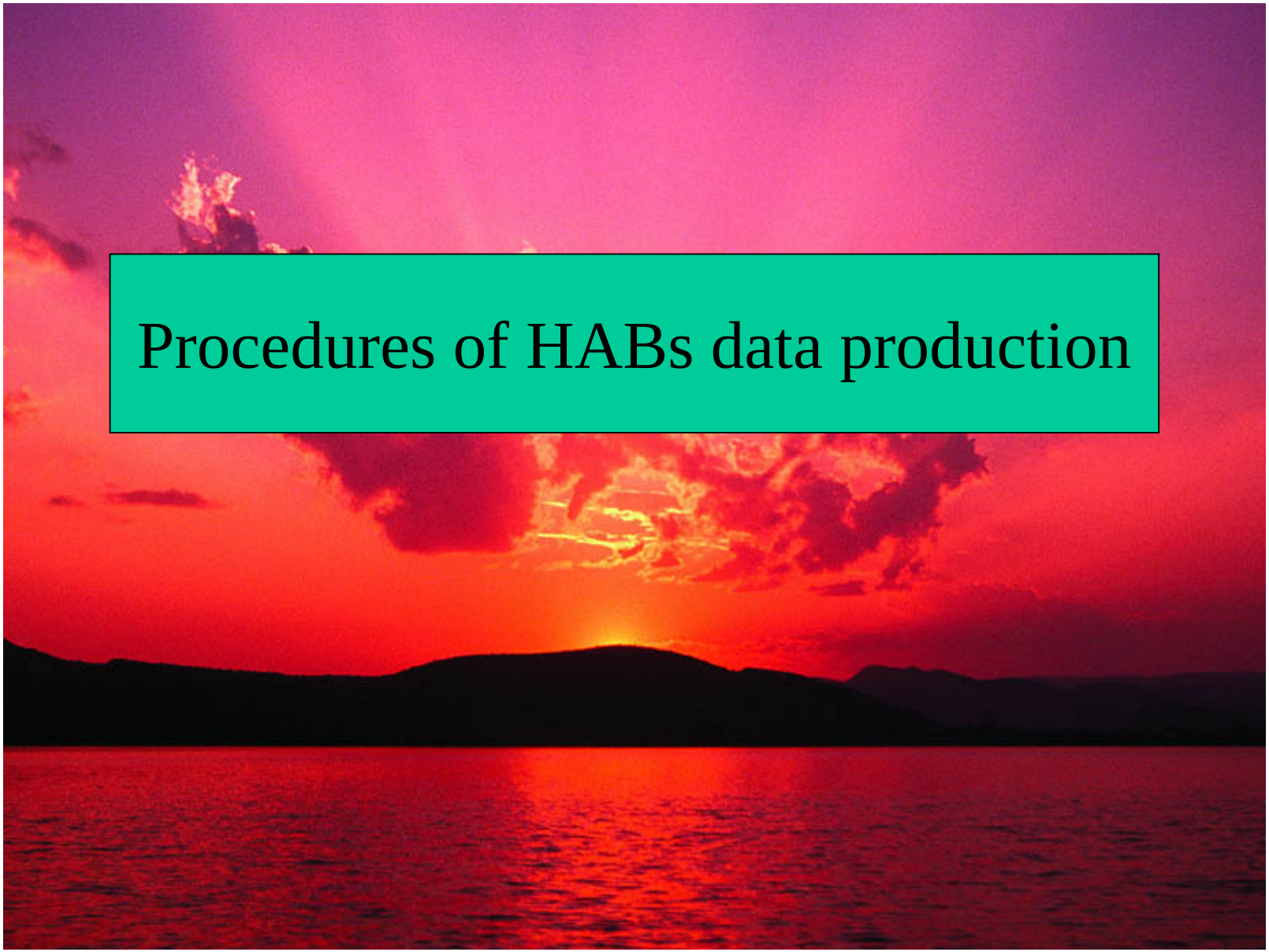
Terms	Till 1980	1981-1994	Since 1995
Facilities	Ship cruise Coast patrol	Ship cruise Coast patrol Remote sense	Ship cruise Coast patrol Aircrafts Remote sense
Surveillance area	Partial area	Widespread in South Sea	Widespread overall coast
Surveillance terms	Monthly	Biweekly/monthly	Daily, weekly, monthly

The Monitoring of Marine Environment and HABs



Present Korean HABs Monitoring System - Focused on *Cochlodinium* blooms

- **Precautionary Monitoring : Less than 300cells/ml**
  - 5 susceptible areas to initiate the bloom
  - To begin in June till the first bloom at the density of more than 300cells/ml
- **Regular Monitoring (over 300cells/ml)**
  - Regular Cruise : weekly, biweekly at 70 stations from Mar. to Nov.
  - Emergent Cruise : daily observation in *Cochlodinium* blooms area


Procedures of HABs data production

HABs & nutrients data collection

Harmful phytoplankton taxonomy

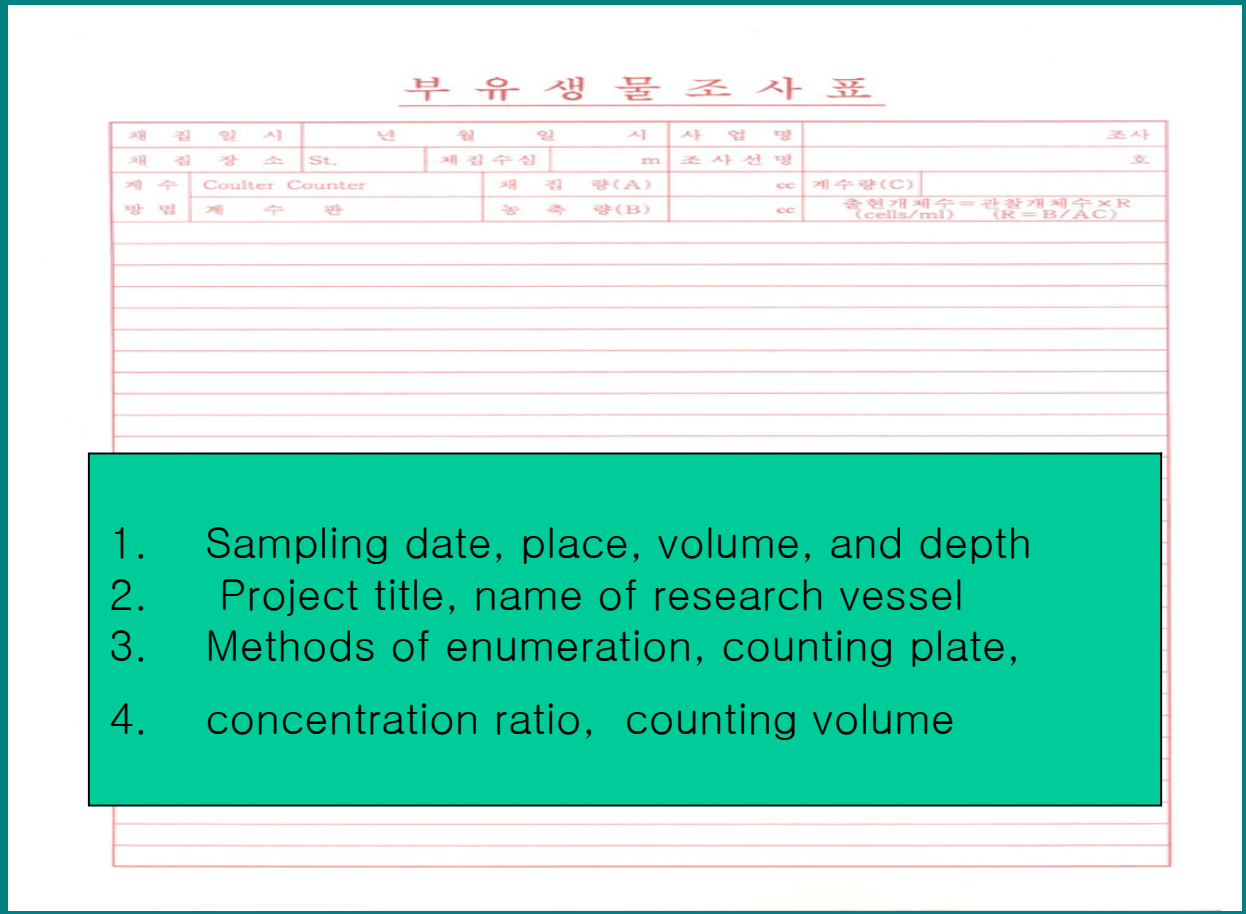
Shellfish poisoning data

Nutrients


Use of Korean HAB data for the joint ICES/PICES
HAE-DAT database
海洋汚染 및 赤潮調査 指針
Manual of Methods for Research and Monitoring of Marine Pollution and Red Tide
朴 周 錫
金 鶴 均
李 劍 哲
編 集
1985. 12.
國立水産振興院
韓國沿岸의 赤潮生物
金鶴均 · 朴周錫 · 李三根 · 安京鎬 編集
國立水産振興院
1993年 7月
韓國 沿岸의 赤潮
- 最近 赤潮의 發生原因과 對策 -
Recent Red Tides in Korean Coastal Waters
國立水産振興院
National Fisheries Research & Development Institute
Republic of Korea
January 1991
한국의 적조연구 편람
Handbook of Marine Harmful Algal Blooms in Korean Waters
국립수산과학원
National Fisheries Research & Development Institute
Republic of Korea
2002. 5


한국연안 적조생물
Microorganisms Responsible for HABs in Korean Waters
SIGMA ALDRICH KOREA

List of phytoplankton identified



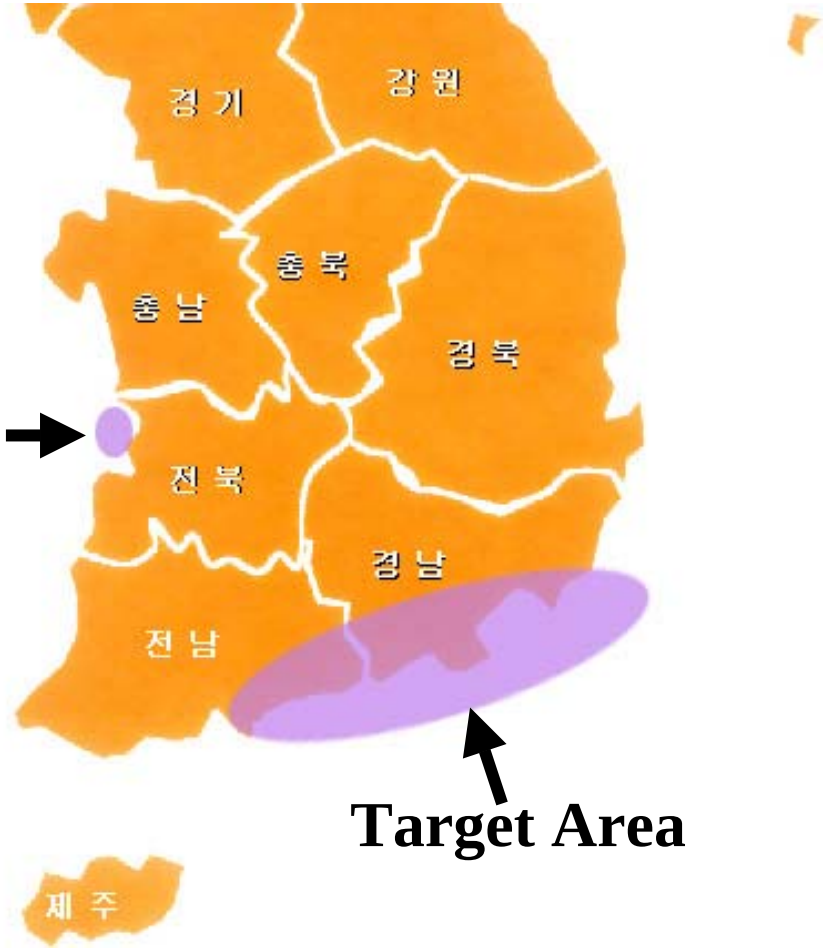
부 유 생 물 조 사 표

채 집 일 시	년 월 일 시		사 업 명	조사	
채 집 장 소	St.	채집수심 m	조 사 선 명	호	
계 수	Coulter Counter	채 집 량(A)	cc	계수량(C)	
방 법	계 수 판	농 축 량(B)	cc	출현개체수 = 관찰개체수×R (cells/ml) (R = B/AC)	

1. Sampling date, place, volume, and depth
2. Project title, name of research vessel
3. Methods of enumeration, counting plate,
4. concentration ratio, counting volume


JEOL
JSM - 35CF
SCANNING MICROSCOPE
Polaroid
545i
Polaroid
Polapan 52

Target Area for the Monitoring of Shellfish Toxin in Korea



Current Shellfish Toxin Monitoring Portfolio in Korea

	Prevailing season	Occurring area	Starting year
PSP	From March to May	South coast (Jinhea Bay and adjacent area)	Since 1980
DSP	Sporadic	Not specified	Since 1995
ASP	Sporadic	Not specified	Since 1995

Number of Sampling Station and Monitoring Frequency

- **Number of sampling station**
  - PSP : 55 stations
  - DSP : 15 stations
  - ASP : 40 stations
- **Frequency of shellfish toxin**
  - Once a month : All the year round
  - Every week : Toxic season (Usually Mar. to May)
- **Monitoring target shellfish species**
  - Blue mussel(*Mytilus edulis*), oyster (*Crassostrea gigas*), ark-shell (*Scapharca broughtonii*), short necked clam (*Ruditapes philippinarum*) and etc.

Detection Methods for Shellfish Toxins

- **Paralytic shellfish poisoning (PSP)**
  - Mouse bioassay
- **Diarrhetic shellfish poisoning (DSP)**
  - Mouse bioassay and HPLC
- **Amnesic shellfish poisoning (ASP)**
  - HPLC

Environmental Monitoring to Assess Eutrophic Level

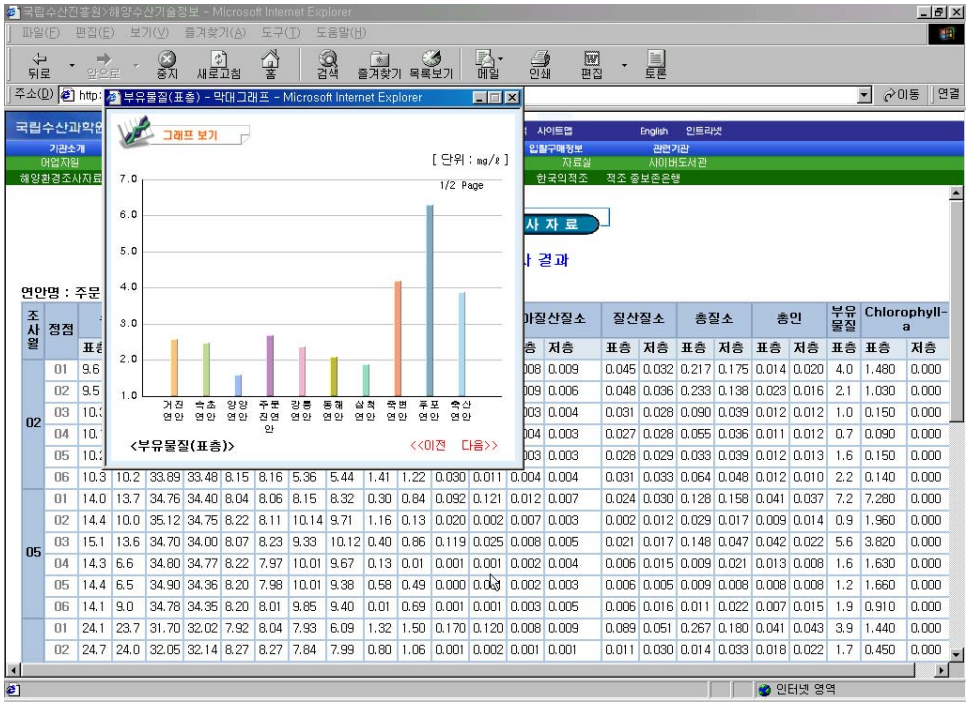
- Offshore : 40, coastal area : 256

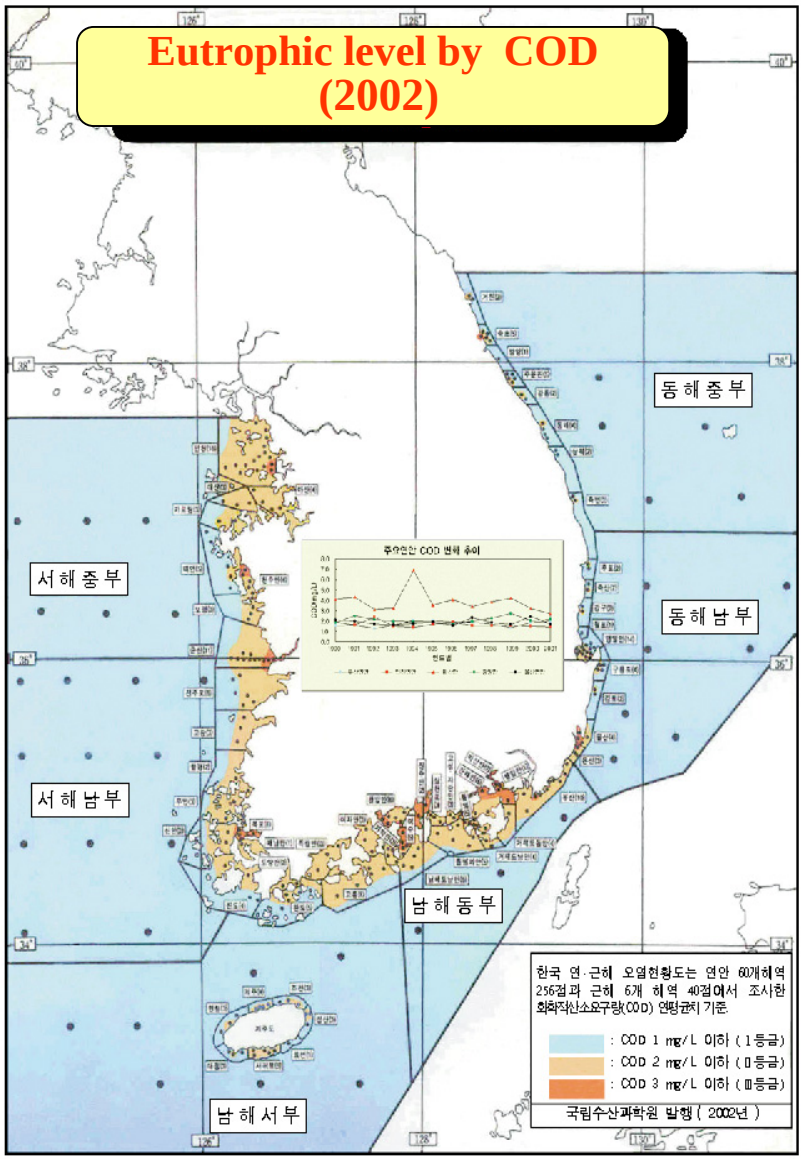
Sampling period : Seasonal survey

- Offshore : Summer

Result service : Website and reports

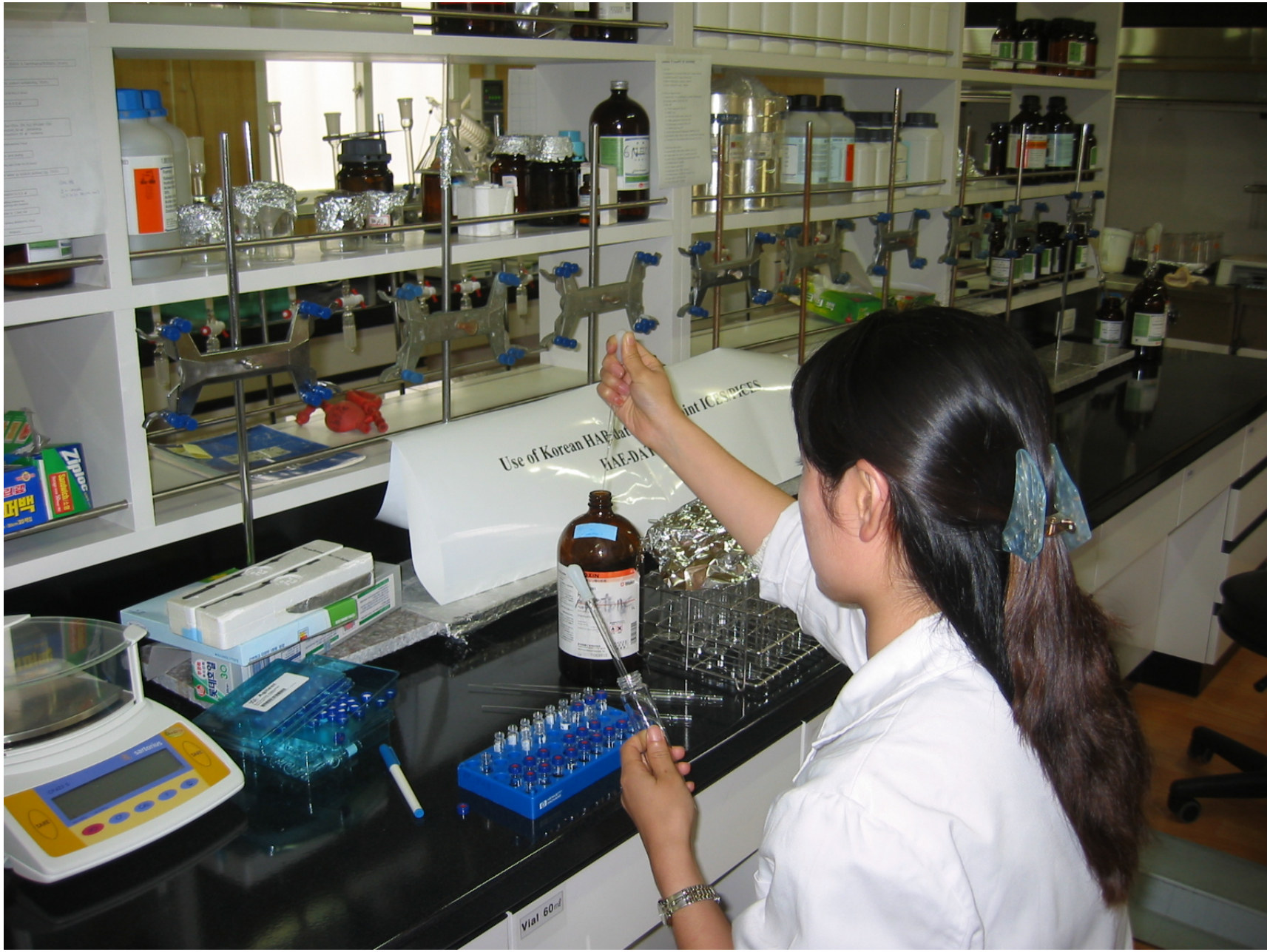
Scientific committee : Annual meeting



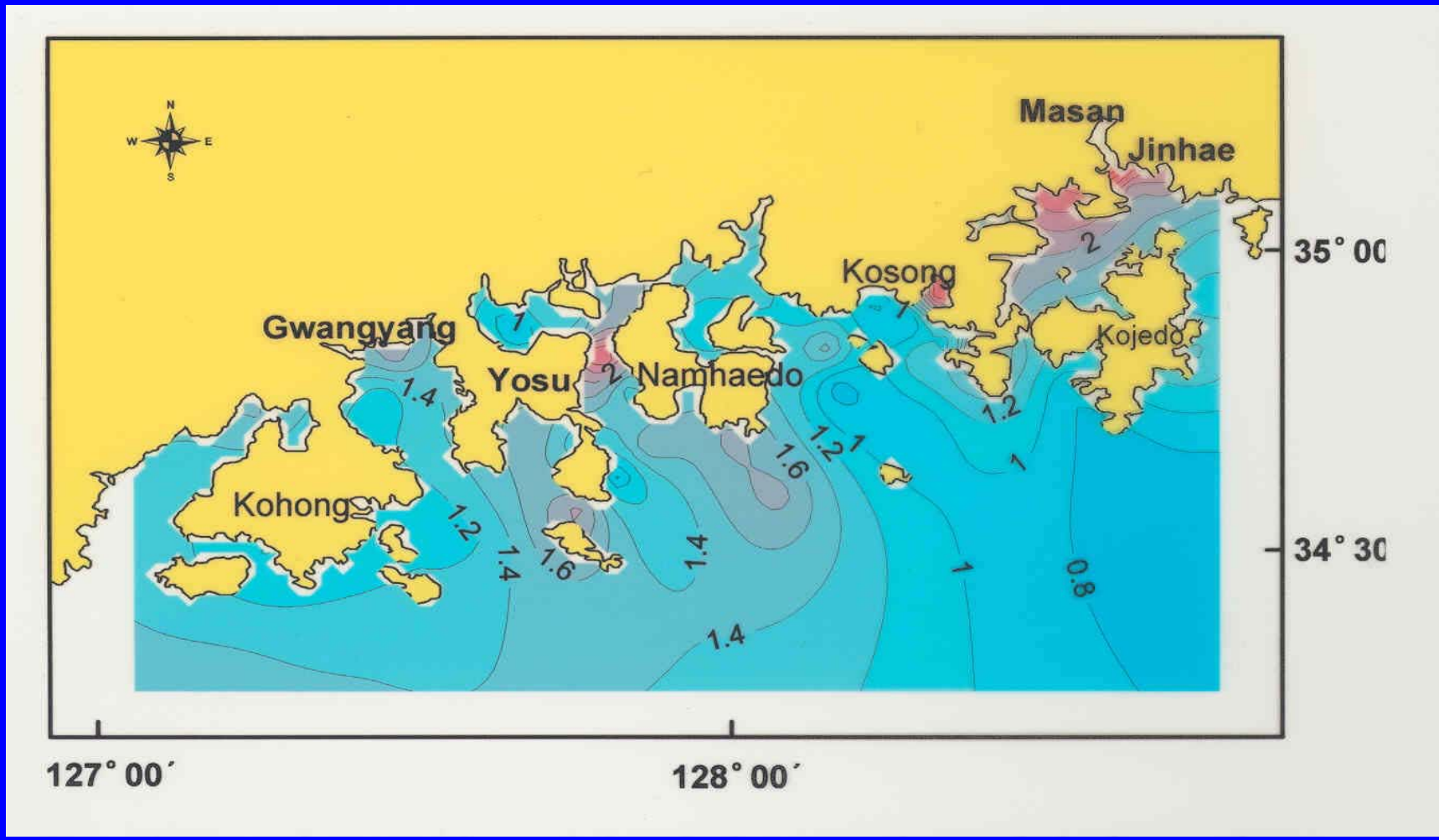


Monitor components for Korean marine environment

Monitoring requirement		Required monitoring components
SEAWATER (21factors)	General items	SST, Salinity, pH, DO, COD, TN, TP, NO2 - N, NO3 - N, NH4 - N, PO4 - P, SS, Oil & Grease, Clearness
	Trace metal	Cu, Pb, Zn, Cd, Cr^{+6}, total Hg, As, CN
	Organic contaminants	PCBs, TBT
SEDIMENT (12factors)	General items	Particle size, IL, AVS, COD
	Trace metal	Cu, Pb, Zn, Cd, Cr^{+6}, total Hg, As, CN
	Organic contaminants	PCBs, TBT, Pesticides, PAHs, PCDDs/DFs
ORGANISM (15factors)	General items	Chl *a*
	Trace metal	Cu, Pb, Zn, Cd, Cr^{+6}, total Hg, As, CN
	Organic contaminants	PCBs, TBT, Pesticides, PAHs, PCDDs/DFs


Use of Korean HAP
Vial 60ml

Eutrophic level COD in Aug. 2001



Compilation of oceanographic and meteorological data and information

Remote sensing data

Aerial observation

Water movement and currents

Meteorological information

Marine Remote Sensing System (NFRDI, KOREA)

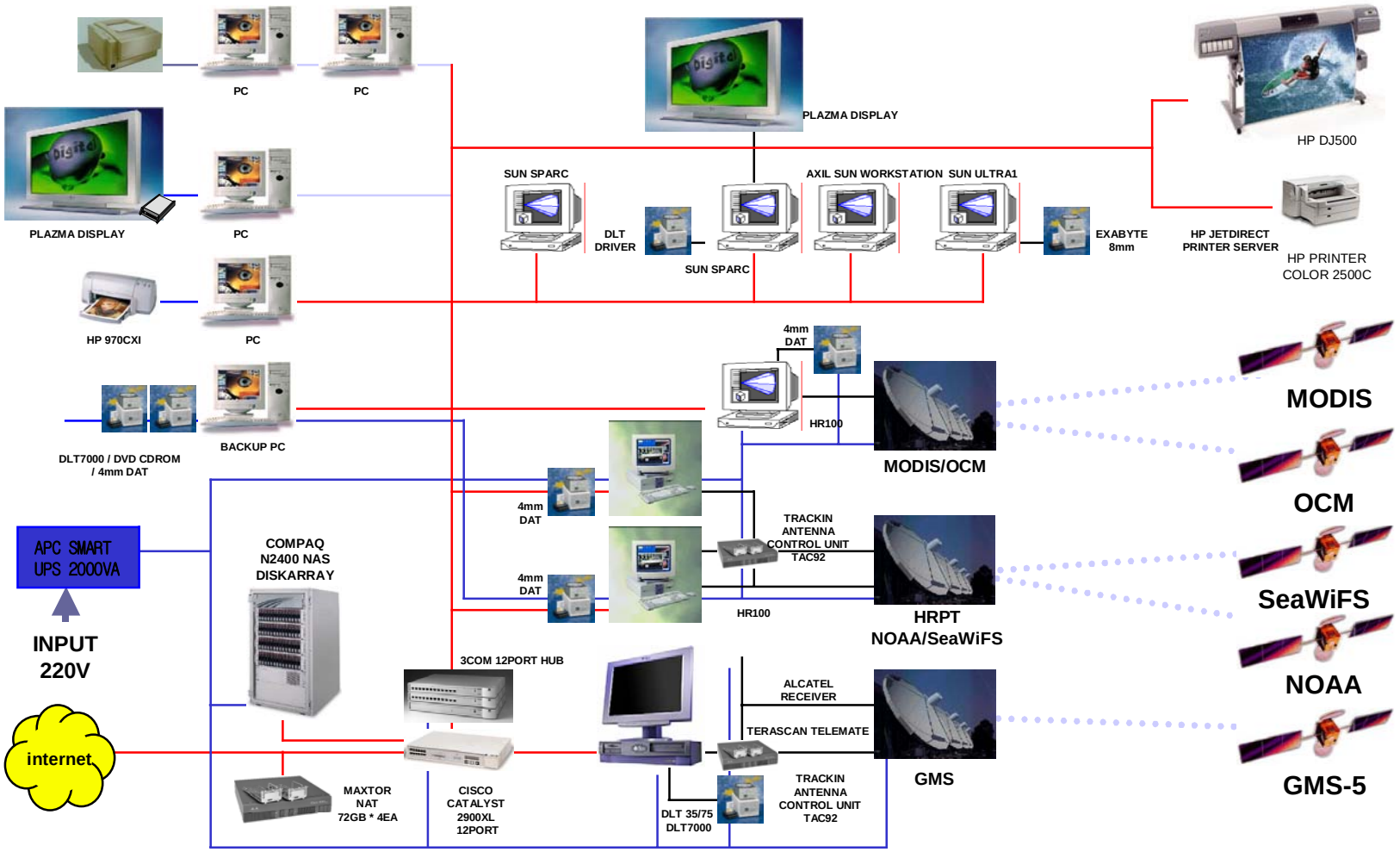
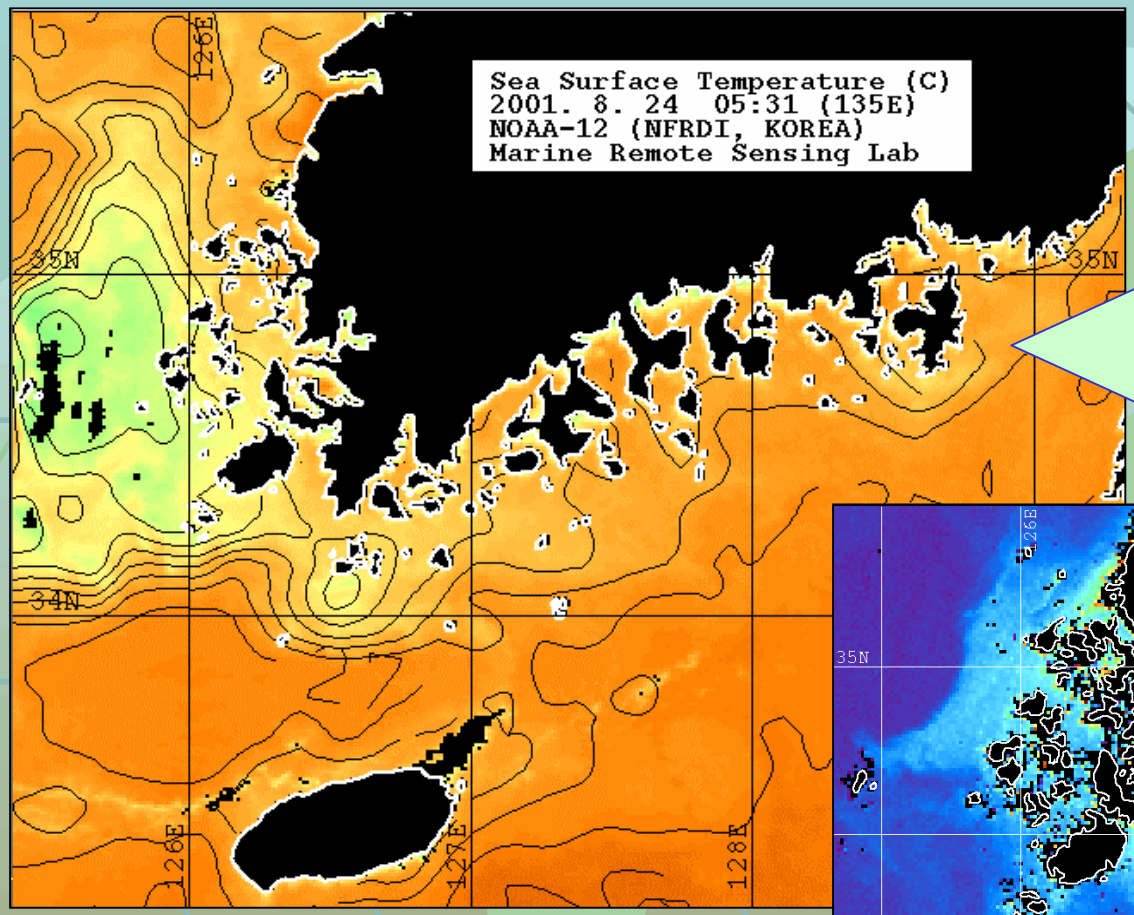


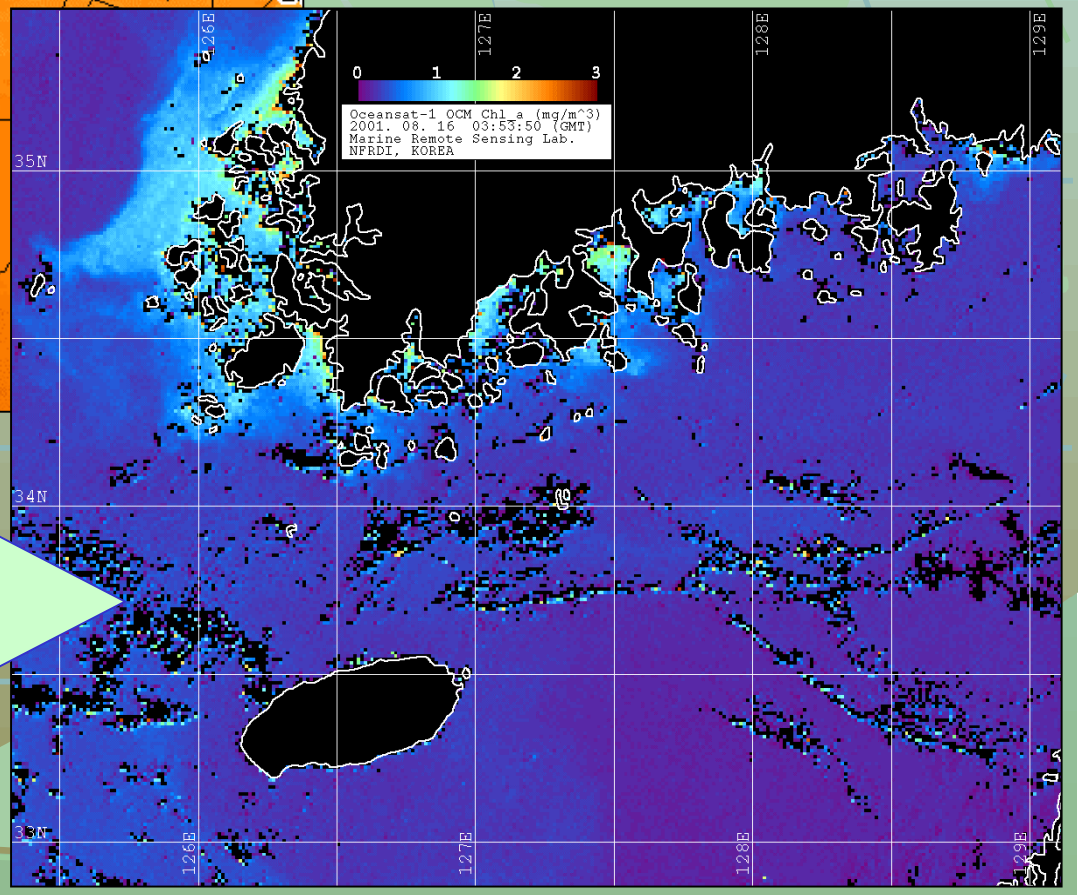
Fig. Marine remote sensing system of NFRDI, Korea

Real-time Satellite Oceanographic Information



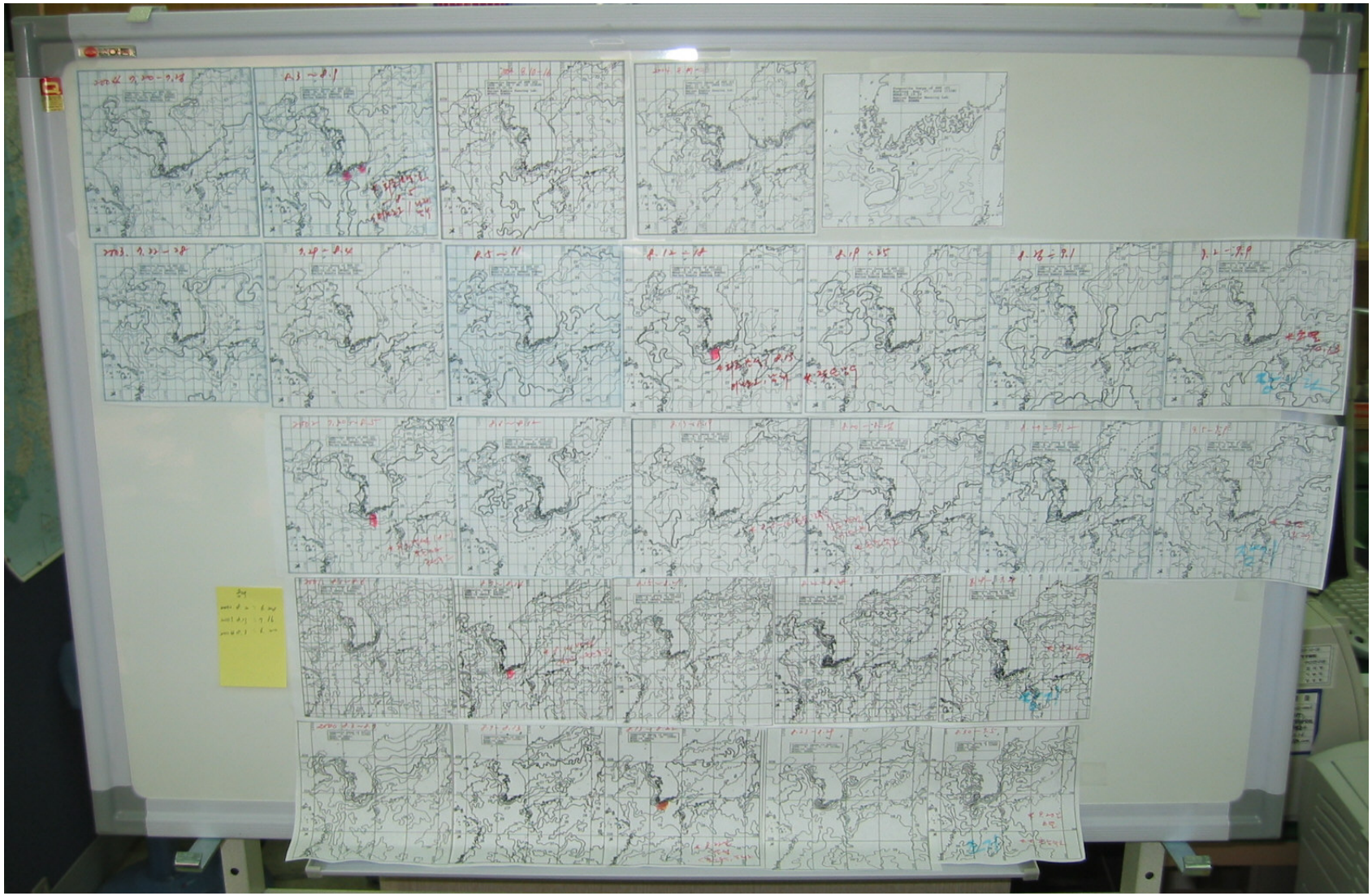
NOAA

Sea Surface Temperature



OCM

Chl. a concentration



적조 항공감시 ('98. 9월)
Red tide monitoring using aircraft.
South coast of Korea, Sept. 1998

감시를 끝내고 귀원 ('98. 9월)
Return office after aerial monitoring.
Suyong heliport, Sept. 1998

1995년도 적조

Cochlodinium polykrikoides blooms

미역양식장 뒤덮은 적조대 적조와 기름으로 바다가 신음하고 있는 가운데 29일 부산 靑砂浦 앞바다에 검붉은 적조대가 미역양식장을 뒤덮고 있다。<부산시 소방본부헬기=朴熙萬기자>

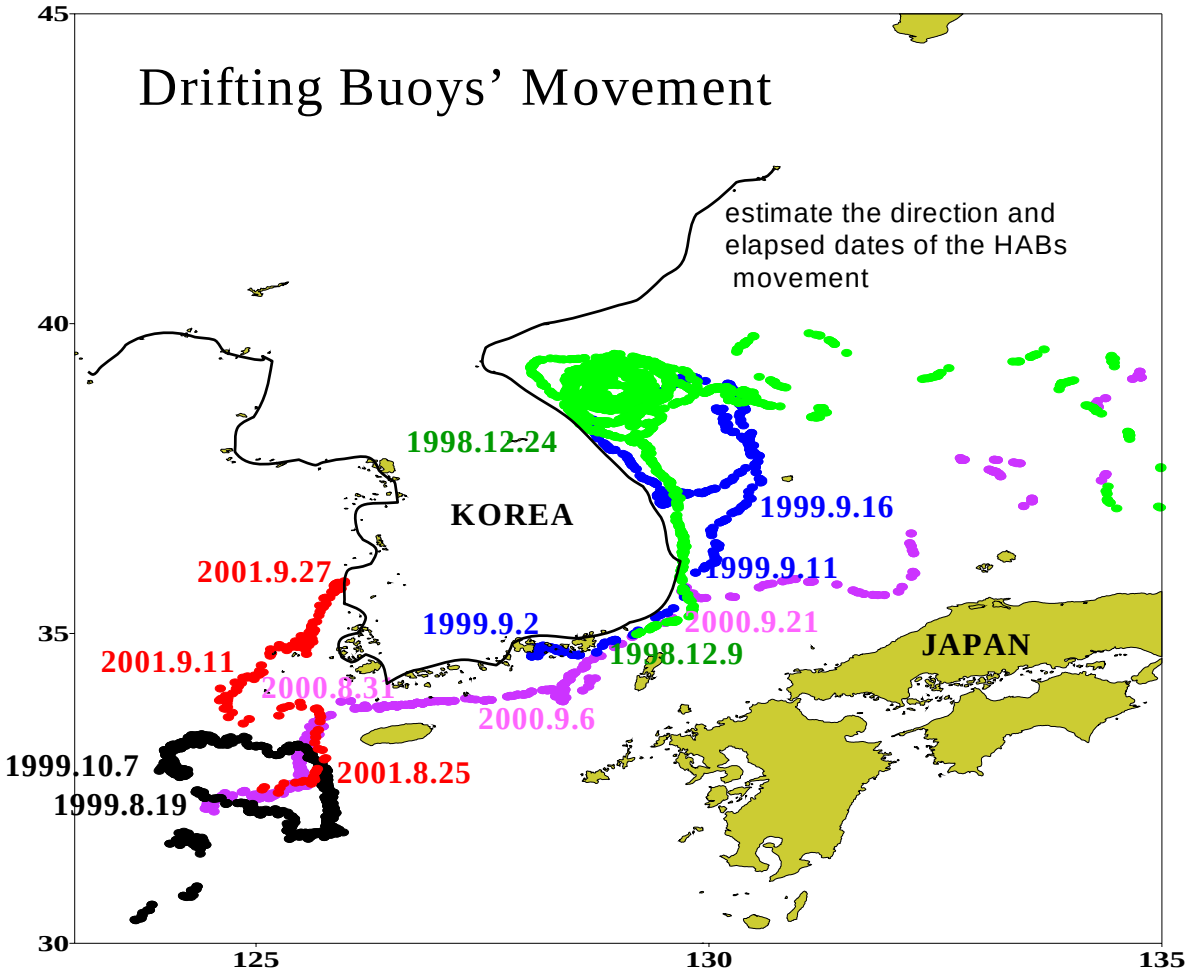


Fig. Drifting buoy trajectories in Korean Waters.

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제18호 태풍 송다(SONGDA) 정보

2004. 9. 06. 10:30 발

□ 태풍상황

○ 현 재 위 치(10시현재) : 30.5 N, 127.1 E(일본 오키나와 북북서쪽 약240 km 부근 해상

○ 진행 방향 및 속도 : 북북서, 10km/h

○ 최대풍속 및 중심기압 : 40m/s, 940 hPa

○ 풍속 25m/s 반경 : 태풍중심 반경 약 200km이내(서쪽 반경 약300km 이내)

○ 풍속 15m/s 반경 : 태풍중심 반경 약 600km이내(서쪽 반경 약500km 이내)

□ 예상위치

○ 06일 21시 : N30.0° E127.0°(서귀포 남쪽 약 320km 부근 해상)을 중심으로 반경 100Km 원내(최대풍속 및 중심기압 : 40m/s, 940hpa)

○ 07일 09시 : N32.7° E131.7°(부산 남쪽 약 230Km 부근 해상)을 중심으로 반경 250Km 원내(최대풍속 및 중심기압 : 39m/s, 945hpa)

○ 08일 09시 : N44.0° E140.7°(일본 삿포로 북서쪽 약 230km 부근 해상)을 중심 반경 280Km 원내(최대풍속 및 중심기압 : 34m/s, 970hpa)

□ 경계사항

○ 제18호 태풍 "송다"(SONGDA)의 강도는 [제주 강] 크기는 [대형] 임

○ 오늘16일) 밤 북북서진 하면서 동해상으로 진출 할 것으로 예상됨

○ 태풍의 영향으로 제주도 남쪽먼바다는 3~6m의 높은 파도가 예상되니 모래(8일)에는 동해상으로 진출 할 것으로 예상됨

○ 오전까지 남해와 동해상을 중심으로 강한 바람과 높은 파도가 예상되는 선박은 주의하시기 바람.

○ 오늘 오후부터 제주도, 대일부터는 영남과 동해안지방을 중심으로 돌아한 많은 비가 예상됨.

□ 특보발효현황

○ 태풍주의보 : 제주도남쪽먼바다, 제주도, 제주도앞바다 - 6일 14시 발표

남해안해상 - 6일 15시 발표

동해남부전해상 - 6일 15시 발표

○ 풍랑주의보 : 부산, 울산, 경남지방 - 6일 밤

□ 예비특보

○ 태풍주의보 : 부산, 울산, 경남지방 - 7일 아침

경북동해안

강원도, 울릉도, 독도, 동해중부전해상 -

○ 풍랑주의보 : 서해남부먼바다 - 6일 밤

제16호 태풍 차바(CHABA) 정보

□ 태풍상황

2004. 8. 27. 10:30 발

○ 현 재 위 치(09시현재) : 20.1 N, 136.0 E(일본 오키나와 동쪽 약720 km 부근 해상)

○ 진행 방향 및 속도 : 북, 11km/h

○ 최대풍속 및 중심기압 : 49m/s(175km/h), 930 hPa

○ 풍속 25m/s 반경 : 태풍중심 반경 약 200km이내

○ 풍속 15m/s 반경 : 태풍중심 반경 약 780km이내(북쪽 반경 약500km 이내)

□ 예상위치

○ 28일 09시 : N27.7° E132.2°(일본 가고시마 남동쪽 약 900km 부근 해상)을 중심 반경 150Km 원위(최대풍속 및 중심기압 : 46m/s, 940hpa)

○ 29일 09시 : N29.1° E132.2°(일본 가고시마 남남동쪽 약 720Km 부근 해상)을 중심 반경 250Km 원위(최대풍속 및 중심기압 : 44m/s, 945hpa)

○ 30일 09시 : N31.1° E129.7°(일본 가고시마 서남서쪽 약 100km 부근 해상)을 중심 반경 400Km 원위

□ 경계사항

○ 제16호 태풍 "차바"(CHABA)의 강도는 [제주 강] 크기는 [대형] 임

○ 앞으로 북-북서진 하면서 29일경 일본 규슈지방 부근으로 접근할 것으

○ 이 태풍은 북상하면서 점차 세력이 약화되고 있으며 태풍의 영

향을 받는 주세력 있으나, 예전의 세력이 강하고 영향범위가 넓어

○ 앞으로 북위 30°을 넘어 진행될 가능성이 높으나, 진로는 아

앞으로 발표되는 기상정보에 각별히 유의하시기 바람.

○ 태풍의 중심부근에서는 제주 강한 바람이 불고, 10~14m 의

임고 있으니 부근 해상을 지나는 선박들은 주의하시기 바람.

□ 특보발효현황

○ 풍랑주의보 : 제주도남부, 제주도서부앞바다, 제주도남쪽먼바다

□ 예비특보

○ 없음

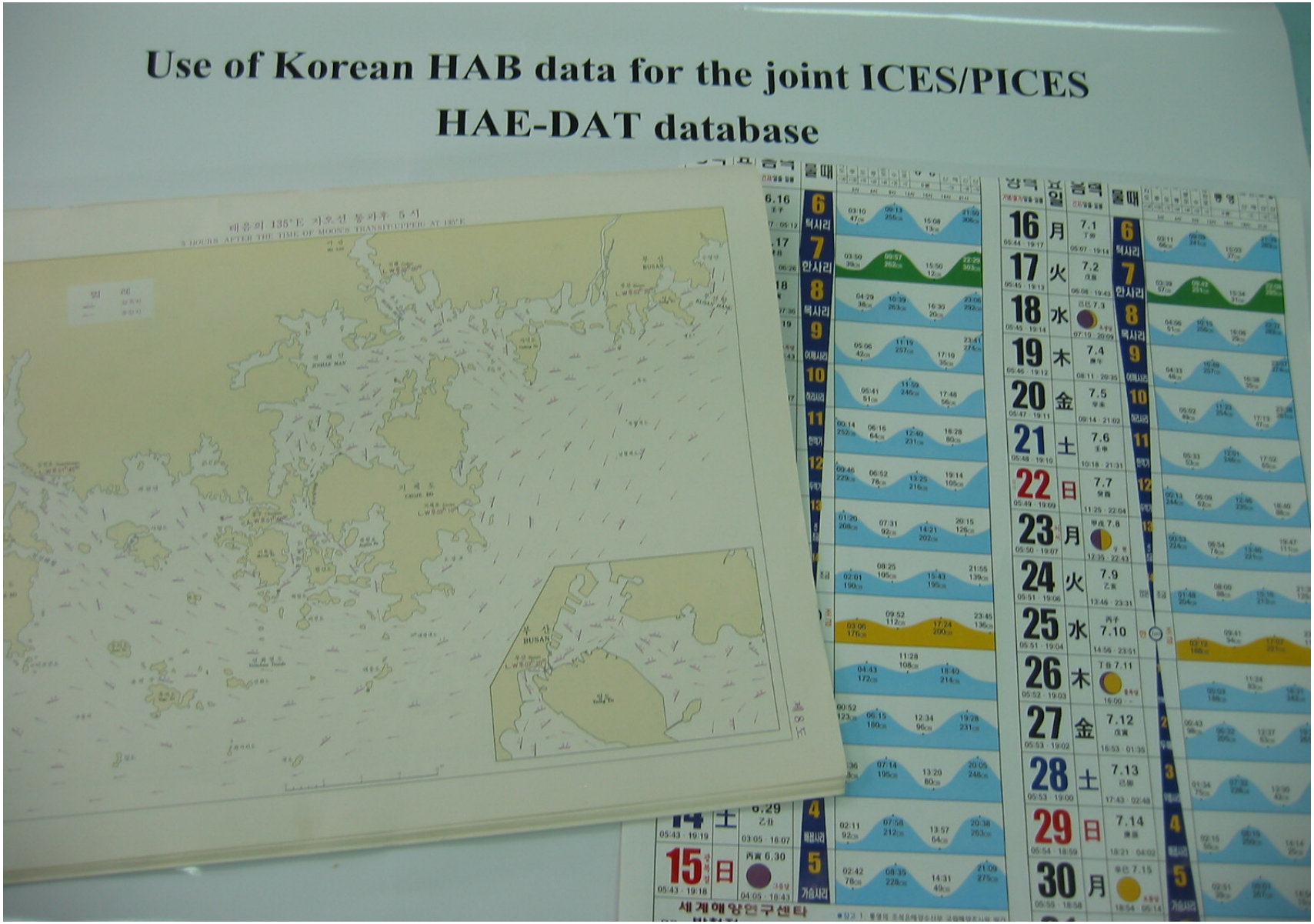
□ 참고사항

제 16호 태풍 "차바(CHABA)"는 대국에서 제출한 이름으로 [

-2003년 제14호 에어(MAEMI) 중심기압 950 hpa, 최대풍속 41m/s 로 제

제공 : 국립

Use of Korean HAB data for the joint ICES/PICES HAE-DAT database



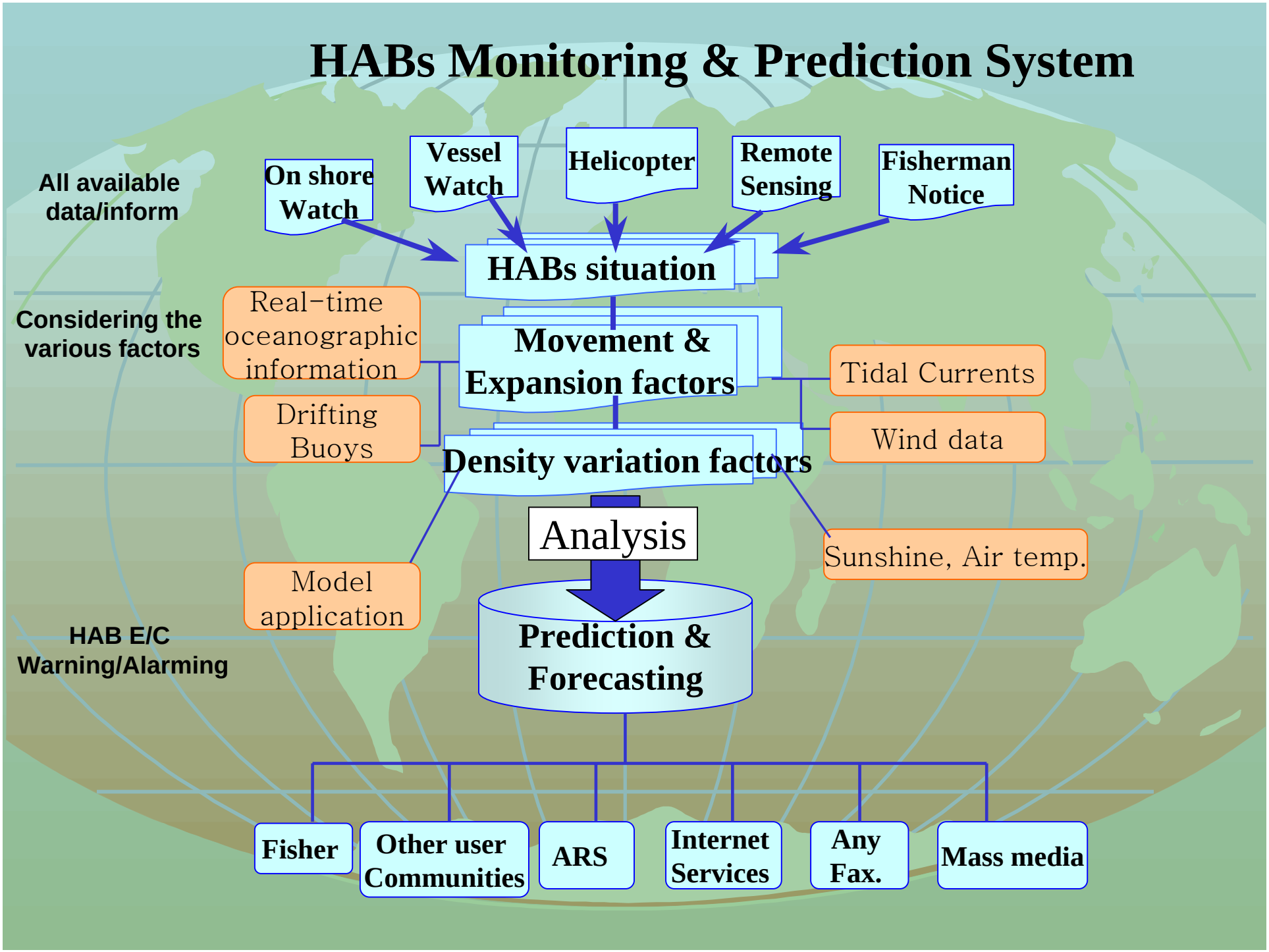
HABs data analysis and dissemination to all stakeholders

Forecasting

Service by paper documents & on-line


바다환경보전
어장 환경 개선
Amelioration of Coastal Environment
Bottom Plowing
Bottom Aeration
Clay and Lime Dispersion
적조상황실
화기 담당책임자
점 김 귀 영
부 강 성 철

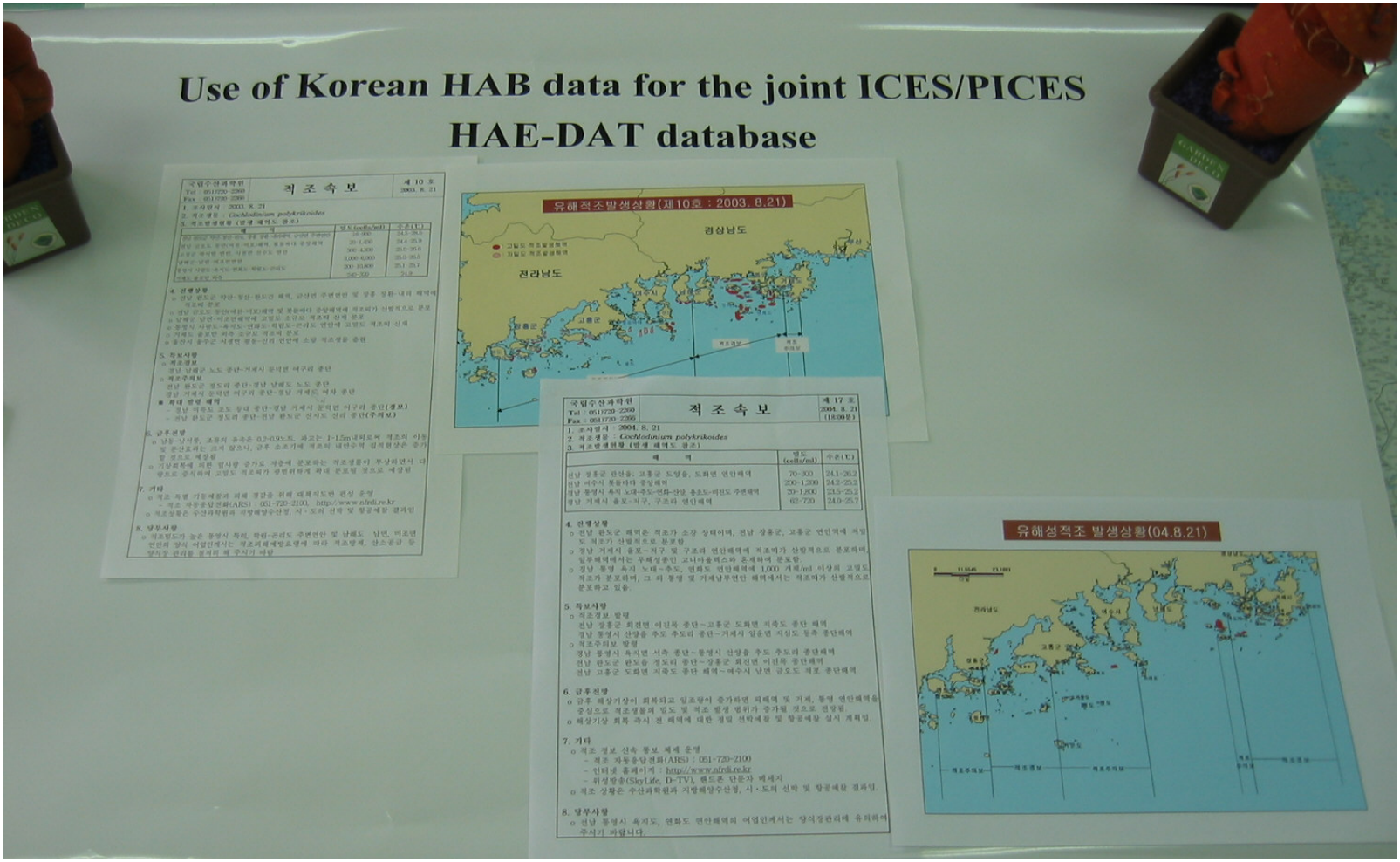
HABs Monitoring & Prediction System



Real time HABs Service

Services	Available channels	Destinations
Easy Fax.	TV, Radio, Newspaper	Aquaculturists, fisherman, administratives, fish consumers, journalists, fisheries shareholders
ARS	12 lines since 6 May 1996	
Internet access	http://www.nfrdi.re.kr	

Use of Korean HAB data for the joint ICES/PICES HAE-DAT database




SAMSUNG

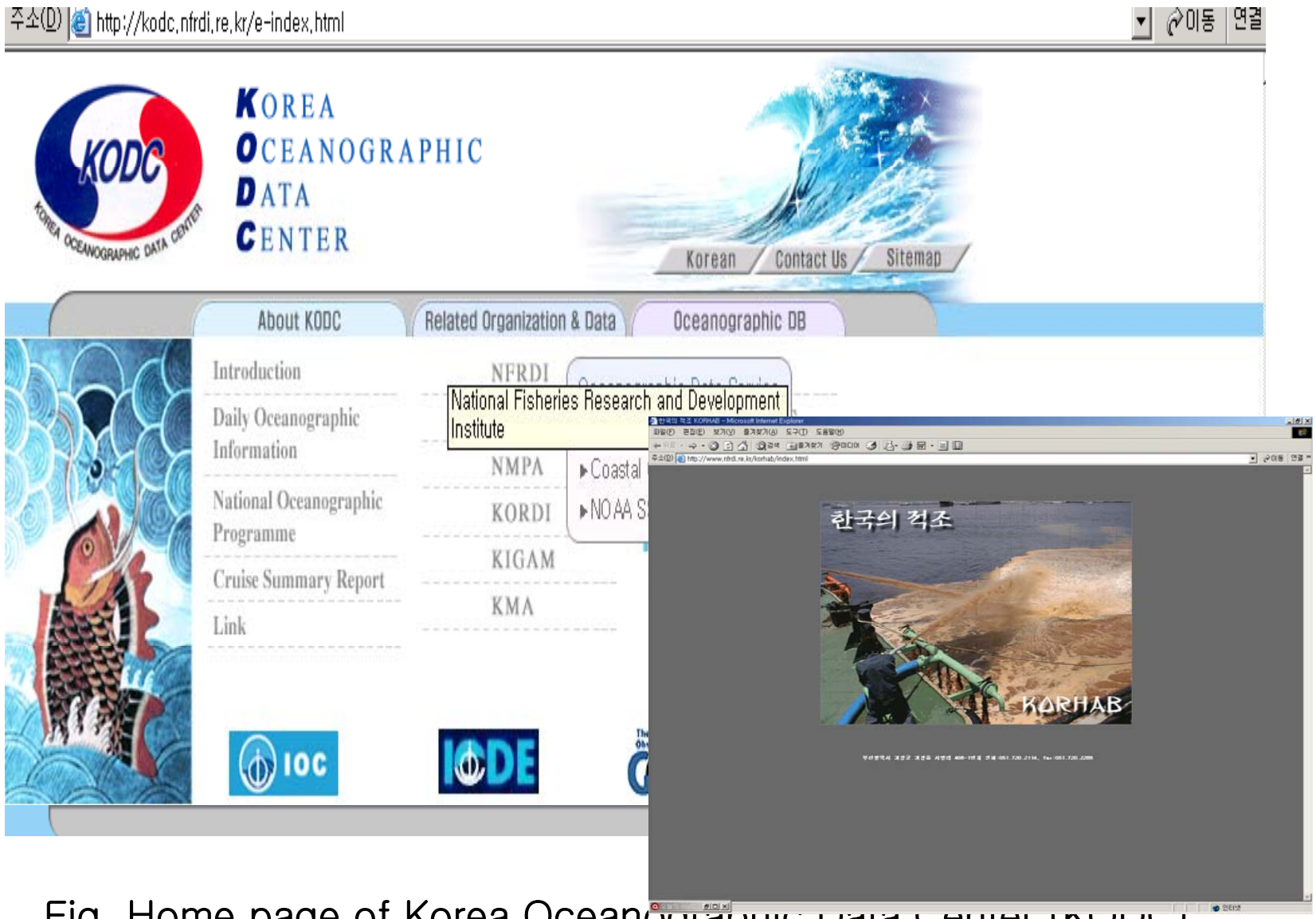
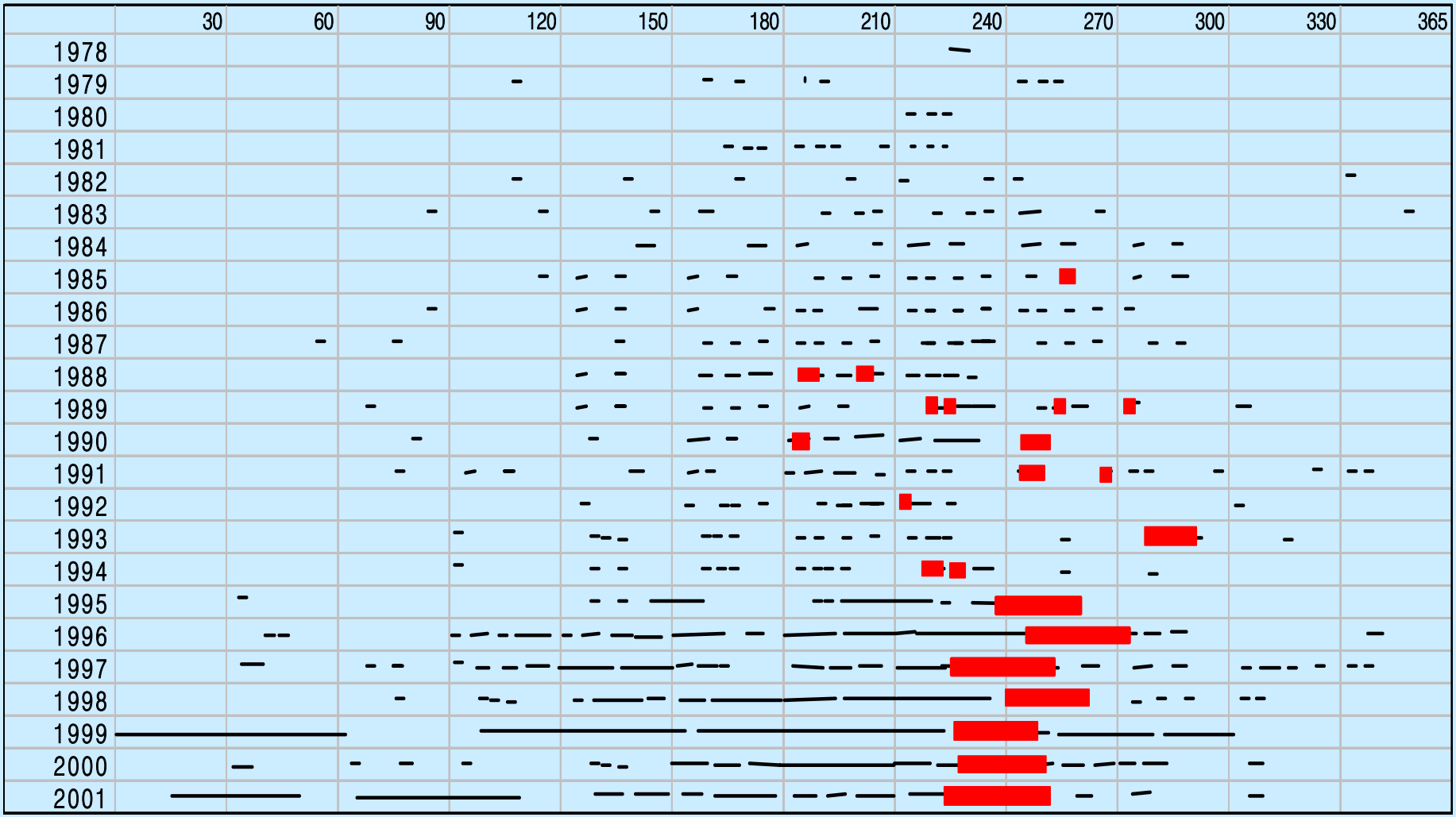


Fig. Home page of Korea Oceanographic Data Center (KODC)

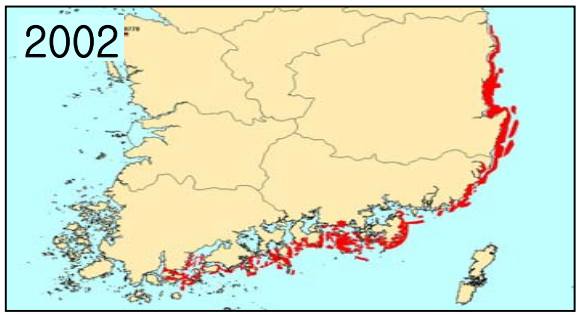

Korean HABs in 1998 & recent trends

Annual distribution in the periods of HABs in Korean coastal waters since 1978.

: *Cochlodinium*



Annual Changes of the Area Affected by the *C. polykrikoides* Blooms in Korean Waters



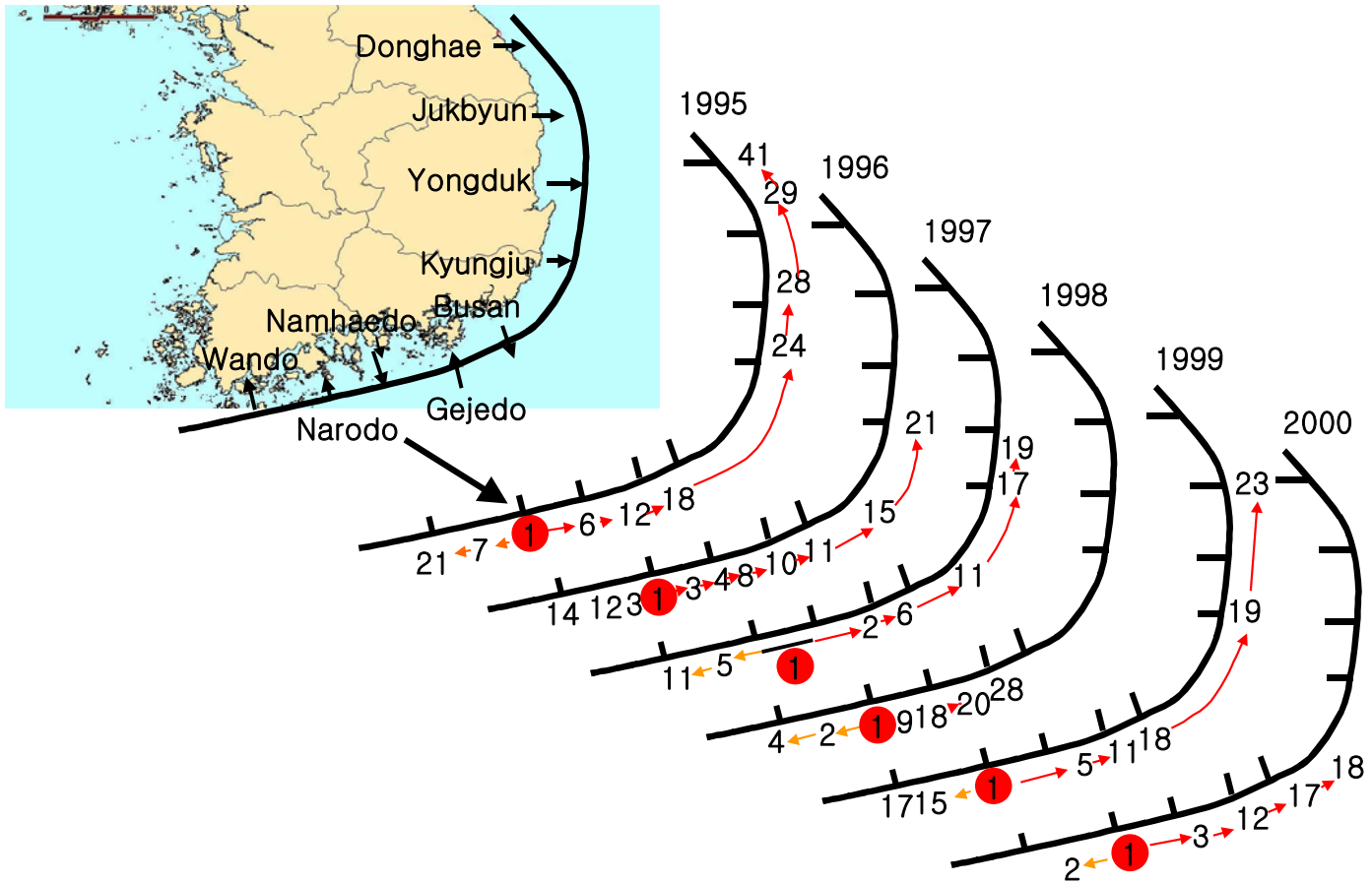


Fig. Year to year variations of the movement of HABs. Red circles and numbers denote the first outbreak area and the elapsed dates respectively.

Two decadal progress of *Cochlodinium* blooms in Korean Waters

Terms	1982-1988	1989-1994	Since 1995
Spatial distribution	Partial area Jinhae Bay	South Sea to Kijang in East Sea	Widespread overall coast
Highest density(cell/ml)	Less than 8,700	Less than 25,000	Up to 48,000
Persistency	10days	20days	Up to 62days

The characteristics of 1998 *Cochlodinium* blooms in Korean waters

- Typical scale in spatial -Good example -magnitude, density, and persistency
- Periods : 25 Aug. –22. Sep.(34days)
- High density : 20,000cells/ml
- Spatial distribution : South Sea

Harmful Algal Event Report - HAE-DAT
PICES test form

COUNTRY :	Korea
Region :	I
Year :	1988

1 - GENERAL INFORMATION

Please note: NOT all information requested on this form is required. Some respondents may choose to stop at the end of the first page, but others may wish to add detailed bloom information, as requested on page 2. Any information you provide is of value.

Indicate the nature of the reported harmful event:

Water discoloration	High Phyto concentration	Seafood toxin
Mass mortalities	Foam/mucilage in the coast	Other:

Has the event directly affected?

Planktonic life	Shellfish	Birds	Natural Fish	Humans
Benthic life	Aquatic mammals	Seaweeds	Aquaculture Fish	Other terrestrial :

Has any toxicity been detected?	Yes No If yes, approximate range:
Associated syndrome	PSP DSP ASP AZP NSP CFP Other:
Unexplained toxicity	Yes No If yes, comments:

If intoxications occurred, please indicate the species implicated in the transmission of toxins (Transvector):

Additional comments:

Is this report the outcome of a monitoring programme? Yes No

If yes, which programme(s)?

Has this event occurred before in this location? Yes No If yes, comments:

Individual(s) to contact (name, address, e-mail, web page, etc.):

2 - LOCATION AND DATE

Location (if a single site)	Latitude:	° N	° S	
	Longitude:	° E	° W	

PICES **HAE-DAT**

- General information
  - nature, toxin/toxicity, monitoring/history, contact point
- Locations and date
  - Location, date, quarantine level General information
- Microalgae
  - Species identification, co-occurring species, Chlorophyll
- Environmental conditions
  - Weather, physical parameters, current, nutrients, max.℃
- Toxin assay information
  - Target species, detection methods, economic loss, measures taken

KOREAN **HAE-DAT**

Items	Red tides	Shellfish poisoning
General information	Yes	Yes
Locations and date	Yes	Yes
Microalgae	Dominant species, Surface chlorophyll	Sometimes
Environmental conditions	Monitor weekly, daily	Temperature
Toxin assay information	Economic loss	Yes

PICES **HAE-DAT**

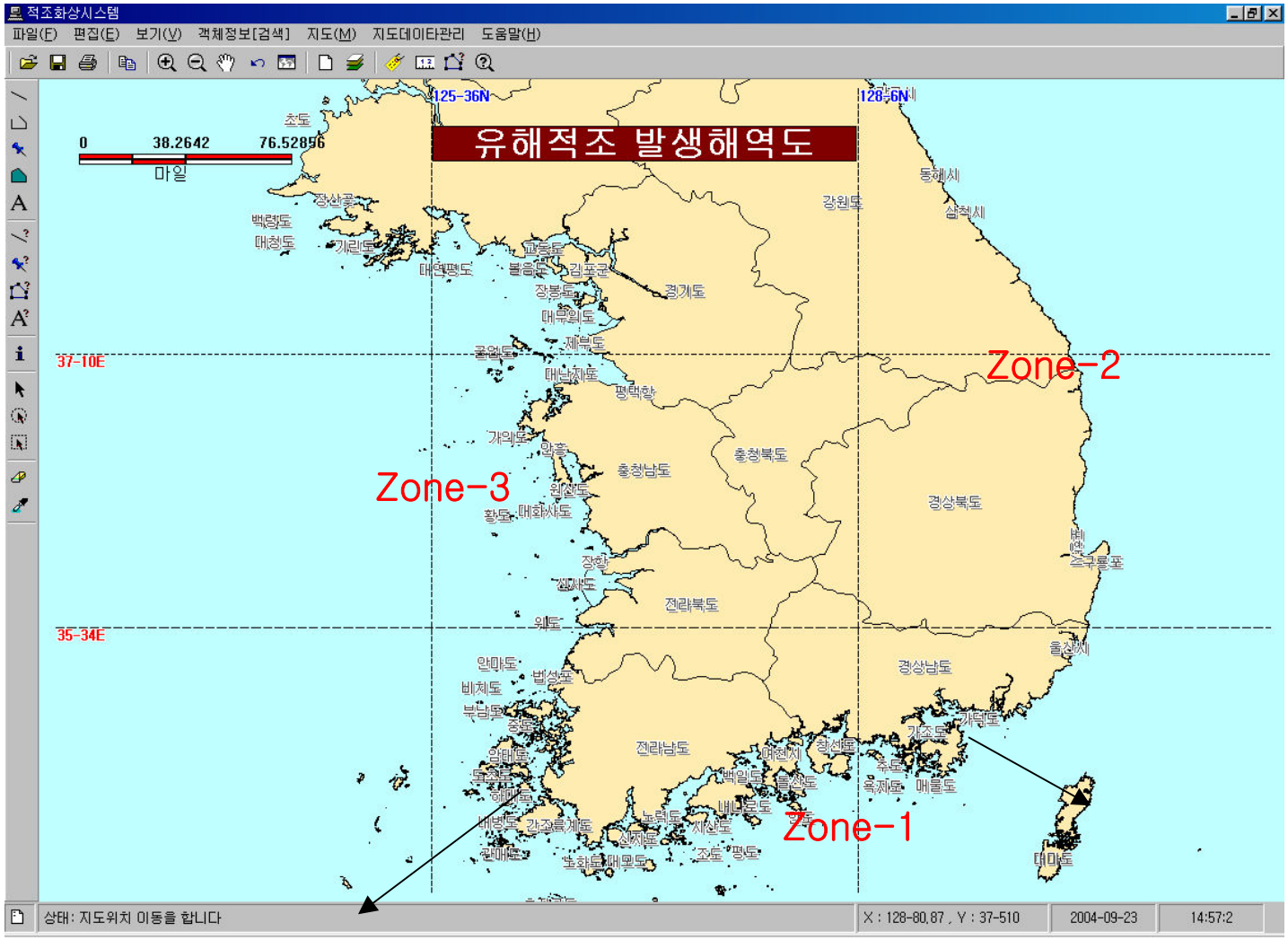
- Make monitoring and research effective, predictive and mitigative
- Benefit from building common data resources among PICES nations
- Central tasks are ;

- – ascertain the data base process
- – identify the difficulties in delivery
- – assess web-based window
- – further modification to encompass Pacific

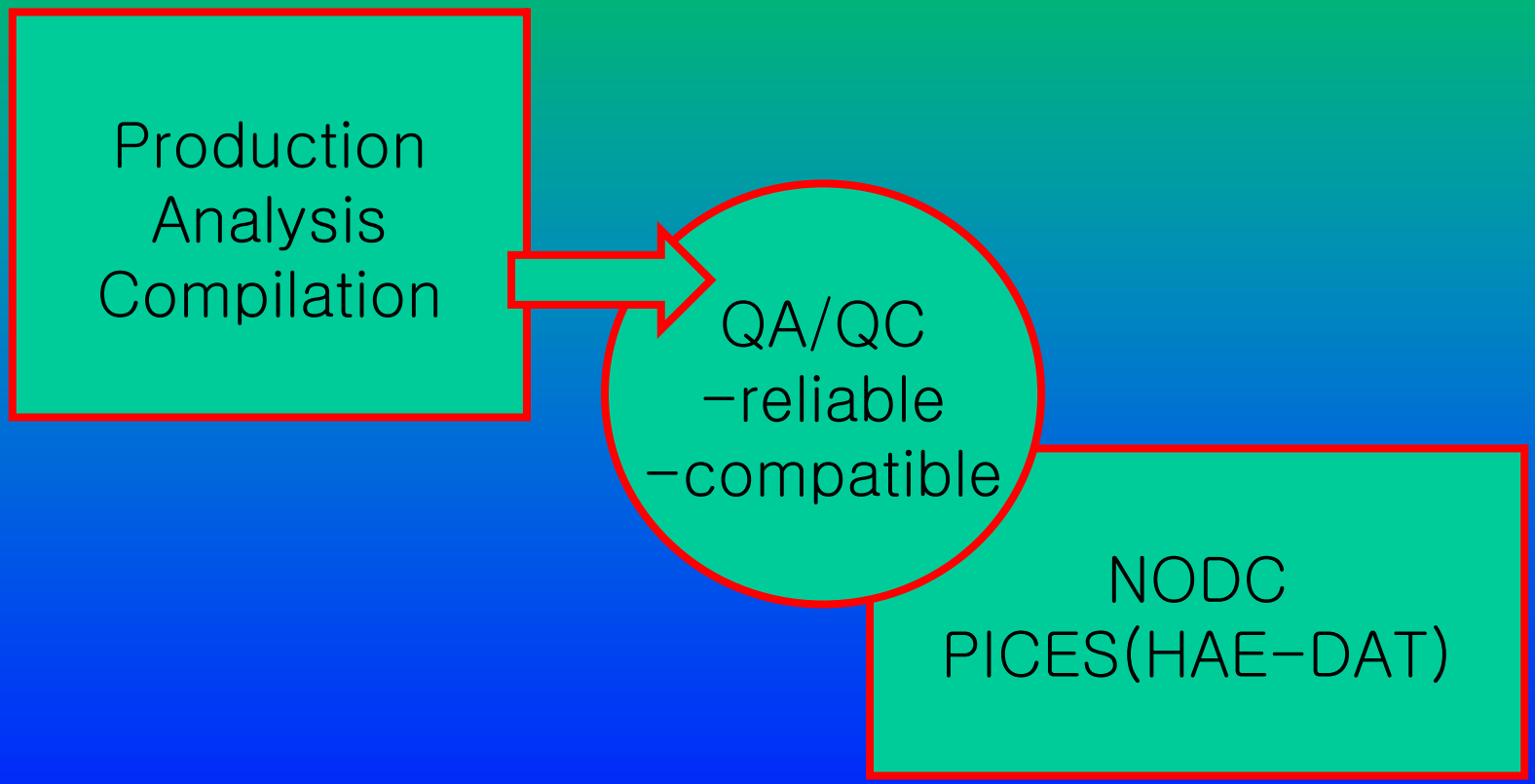
Recommendations

- It needs to segment the NOWPAP area
- It needs specified format for red tide and PSP events.
- Data format can cover successional changes of the blooms
- It needs to cover multi-lingual HABs data
- Should develop to cover both delayed and real-time mode

HAE-DAT 해역구분


적조화상시스템
파일(F) 편집(E) 보기(V) 객체정보[검색] 지도(M) 지도데이타관리 도움말(H)
유해적조 발생해역도
0 38.2642 76.52896
마일
125-36N
128-6N
37-10E
35-34E
Zone-1
Zone-2
Zone-3
상태: 지도위치 이동을 합니다
X : 128-80.87 , Y : 37-510
2004-09-23
14:57:2

Data exchange, communication network, and databank



Let

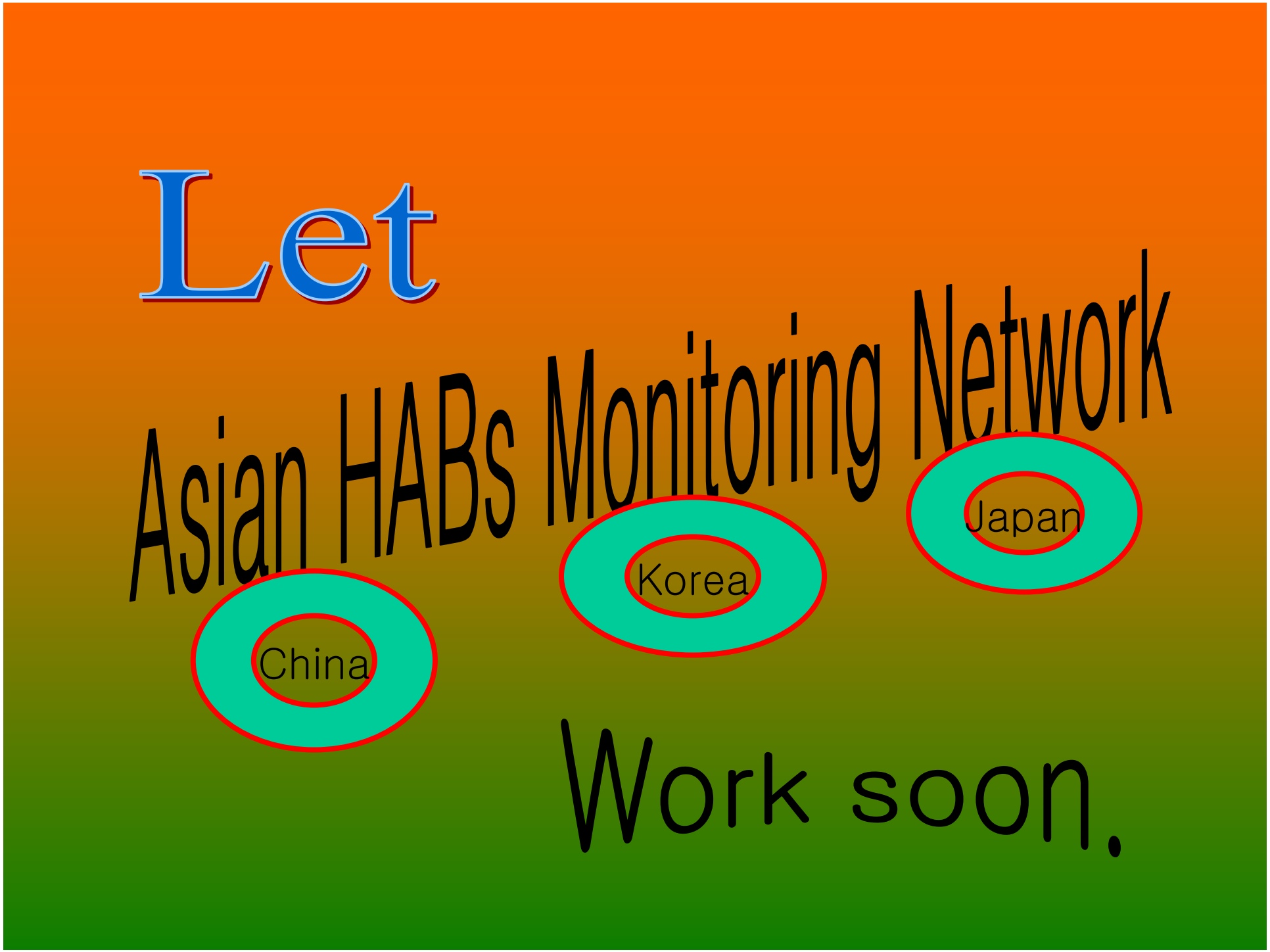
PICES HAE-DAT Network

Work soon.

Thank you

Nong-ak : farmer’s dance


If we harm the
environment,
it will harm us in return


Let
Asian HABs Monitoring Network
China
Korea
Japan
Work soon.