United Nations
Environment
Programme

UNEP(OCA)/MED WG.43/2
3 March 1992

Original: ENGLISH

MEDITERRANEAN ACTION PLAN

First Meeting of the Task Team on
Implications of Climatic Changes
on Cres-Losinj Islands

Rijeka, 2-3 March 1992

REPORT
OF THE FIRST MEETING OF THE TASK TEAM ON IMPLICATIONS OF CLIMATIC CHANGES ON CRES/LOSINJ ISLANDS

UNEP
Athens, 1992

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BACKGROUND

The greenhouse effect is among man's potentially most pressing long-term environmental problem, one which presents major scientific challenges which span a wide range of disciplines. Changes in global climate between now and the middle of the 21st century are likely to be dominated by the influence of global warming due to increasing concentrations of carbon dioxide and other "greenhouse gases" in the atmosphere. These greenhouse gases individually and collectively change the radiative balance of the atmosphere, trapping more heat near the earth's surface and causing a rise in global-mean surface air temperature and as a consequence substantial global warming is virtually certain.

In spite of uncertainties surrounding predicted climatic changes, greenhouse gases seem to have accumulated in the magnitude of the atmosphere to such a level that the changes may have started already and their continuation may now be inevitable.

The Second World Climate Conference (Geneva, 29 October-7 November 1990) concluded that without actions to reduce emissions, global warming is predicted to reach 2 to 5 degrees C over the next century, a rate of change unprecedented in the past 10,000 years. The warming is expected to be accompanied by a sea level rise of 65 cm ± 35 cm by the end of the next century. There remain uncertainties in predictions, particularly in regard to the timing, magnitude and regional patterns of climatic change, as well as in the numerous secondary effects of this warming and sea level rise.

In view of the importance of this issue, the Oceans and Coastal Areas programme Activity Centre (OCA/PAC) of the United Nations Environment Programme (UNEP) in co-operation with several intergovernmental and non-governmental organisations, launched, co-ordinated and financially supported a number of activities designed to contribute to an assessment of the potential impacts of climatic changes and to the identification of suitable policy options and response measures which may mitigate the negative consequences of the expected impacts.

As part of these efforts, Task Teams on the implications of climatic changes were established in 1987 for six regions covered by the regional seas programme (Mediterranean, Wider Caribbean, South Pacific, East Asian Seas and South East Pacific regions) with the initial objective of preparing reviews of expected climatic changes on coastal and marine ecosystems, as well as on the socio-economic structures and activities within their respective regions. Three additional Task Teams were established later, two in 1989 (for the West and Central African region and for the East African region) and one in 1990 (for the Kuwait Action Plan region). The establishment of Task Teams for the Black Sea and for the Red Sea is under consideration.

In the framework of the activities of the Mediterranean Task Team six site specific case studies were prepared (deltas of the rivers Ebro, Rhone, Po and Nile, and for Thermaikos Gulf and Ichkeul/Bizerte lakes) in the period from 1987 to 1989. Since 1990 second generation site specific case studies (Island of Rhodes; Kastela Bay; Syrian coast; Izmir Bay; Malta; Cres/Losinj islands) have been and are being developed.

REPORT OF THE MEETING

Opening of the meeting - Agenda item 1

The meeting was opened by Mr A. Randic, Head of the Office for the Adriatic of the Ministry of Environment, Physical Planning, Housing and Communal Affairs who welcomed the participants on behalf of the Minister, Dr Ivan Cifric and expressed his Governments' appreciation for the support of the United Nations Environment Programme (UNEP) and of the Co-ordinating Unit for the Mediterranean Action Plan in preparing for the first meeting of the Task Team on the Implications of Climatic Changes on Cres-Losinj Islands. The opening address is attached as Annex I to this report. Mr A. Randic, also, welcomed the participants on behalf of the host institution.

Dr L. Jeftic, Senior Marine Scientist in the Co-ordinating Unit for the Mediterranean Action Plan (MAP) welcomed participants on behalf of Dr M. K. Tolba, Executive Director of UNEP, and expressed his appreciation of the support provided by the Ministry. He thanked Mr A. Randic for hosting the meeting. He continued by briefly outlining the background and scope of the meeting and expressed the hope that both the meeting and the work of the Task Team on the implications of climatic changes on Cres-Losinj Islands would be successful.

The meeting was held at the Office of the Adriatic on 2nd March and at the premises of the Municipality of Cres-Losinj, Losinj Island on 3rd March. The meeting participants and Task Team members are listed in Annex II to this report.

Election of Officers - Agenda Item 2

The meeting unanimously elected Mr A. Randic as Chairman, and Dr J. Pernetta as Rapporteur of the meeting. Dr L. Jeftic acted as technical secretary.

Adoption of the Agenda - Agenda Item 3

The provisional agenda as proposed by the secretariat was adopted and appears as Annex III to this report.

Overview of the implications of climatic changes - Agenda Item 4

Dr L. Jeftic presented an overview of the current consensus views concerning the greenhouse effect; past and predicted changes in global mean temperature and sea level; as well as the range of possible climatic change impacts which might occur in the case study area (Annex IV). He also referred to the activities organised by the Oceans and Coastal Areas Programme Activity Centre (OCA/PAC) of UNEP and MAP concerning the evaluation of the implications of climatic changes.

Dr L. Jeftic informed the meeting that the Climate Research Unit of the University of East Anglia is working on a set of regional scenarios of climatic changes for the Mediterranean region and had agreed to provide sub-regional scenarios in support of the Mediterranean case studies. As part of this work, sub-regional scenarios of future climates for the Island of Rhodes, Kastela Bay and the Island of Malta were already prepared and a scenario for the Cres-Losinj Islands study will be prepared by the end of March 1992. Mr Randic and Dr K. Pandzic were already in touch with Dr J.P. Palutikof of the Climate Research Unit in order to ensure that available data sources are taken into account in the preparation of the sub-regional scenario for Cres-Losinj Islands.

<u>Implications of expected climatic changes on Cres-Losinj Islands</u> - agenda item 5

Project outline - Agenda Item 5.1.

Dr L. Jeftic presented some basic information on the Cres and Losinj Islands (Annex V to this report) together with a map of the study area (Annex VI to this report). He then made a detailed presentation of the objectives, assumptions and outputs of the study (Annex VII). The proposed outline for the final report of the project was presented by Ms G. Dorcic Silovic and was adopted following discussion (Annex VIII of this report).

General Workplan and timetable - Agenda Item 5.2.

The proposed general workplan and timetable for the project was presented by Ms G. Dorcic Silovic, was discussed and amended. The final agreed workplan and timetable appear in Annex IX of this report.

Detailed workplan for each Task Team member - Agenda Item 5.3.

Tasks and workplan for each Task Team member were briefly discussed and the lead authors for individual sections of the report were agreed by the meeting (Annex VIII). Details of the approaches to be used during the study were also agreed upon. These would include, where possible, appropriate cost-benefit analyses for alternative response options and an integrated approach to impact assessment and sectorial evaluations.

<u>Adoption of the report</u> - Agenda Item 6

The draft report, including its substantive annexes, was considered and adopted by the meeting, as it appears in this document.

<u>Closure of the meeting</u> - Agenda Item 7

In his closing remarks, Dr L. Jeftic expressed satisfaction with the results of the meeting, with the enthuisiasm expressed by the Municipality of Cres-Losinj for the study and the constructive spirit in which the meeting had been conducted. He also thanked the participants, Chairman and Rapporteur for their hard work, and the Ministry of Environment, Physical Planning, Housing and Communal Affairs, together with the Municipality of Cres-Losinj and the staff of the Office for the Adriatic for technical and logistic assistance and their warm hospitality.

An exchange of courtesies followed after which the Chairman closed the meeting on 3rd March 1992.

ANNEX I

OPENING STATEMENT BY

Mr A. Randic

**on behalf of the Minister of Environment, Physical Planning,
Housing and Communal Affairs**

Dr Ivan Cifric

On behalf of the Minister, Dr Ivan Cifric, who unfortunately cannot be with us today I should like to emphasize the importance of the Project "Implications of Expected Climatic Changes on selected Adriatic islands" for Croatia.

We consider the Croatian coast, its' islands and the sea, as our most valuable resources. We are also aware of the fact that there are few countries in the World with such an extensive, indented and beautiful coastline and so many islands. We should like to revitalize them all through development, without destroying their fundamental economic and ecological resources.

We consider the project important, due to the fact that our existing physical plans have not taken into consideration the implications of expected climatic changes which we are going to talk about today.

In the future this problem will require considerable attention because many of our settlements and economic enterprises are situated along the coasts of both the islands and the mainland.

Last, but not least I should like to express our gratitude to the United Nations Environment Programme for their initiative and financial support to the development of this collaborative project.

ANNEX II

LIST OF PARTICIPANTS AND TASK TEAM MEMBERS

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ANNEX III

AGENDA

1. Opening of the meeting

2. Election of officers

3. Adoption of the agenda

4. Overview of greenhouse effect and its implications

5. Implications of expected climatic changes on Cres/Losinj Islands

    5.1. Project outline
    5.2. General workplan and timetable
    5.3. Detailed workplan for each Task Team member

6. Adoption of the report

7. Closure of the meeting

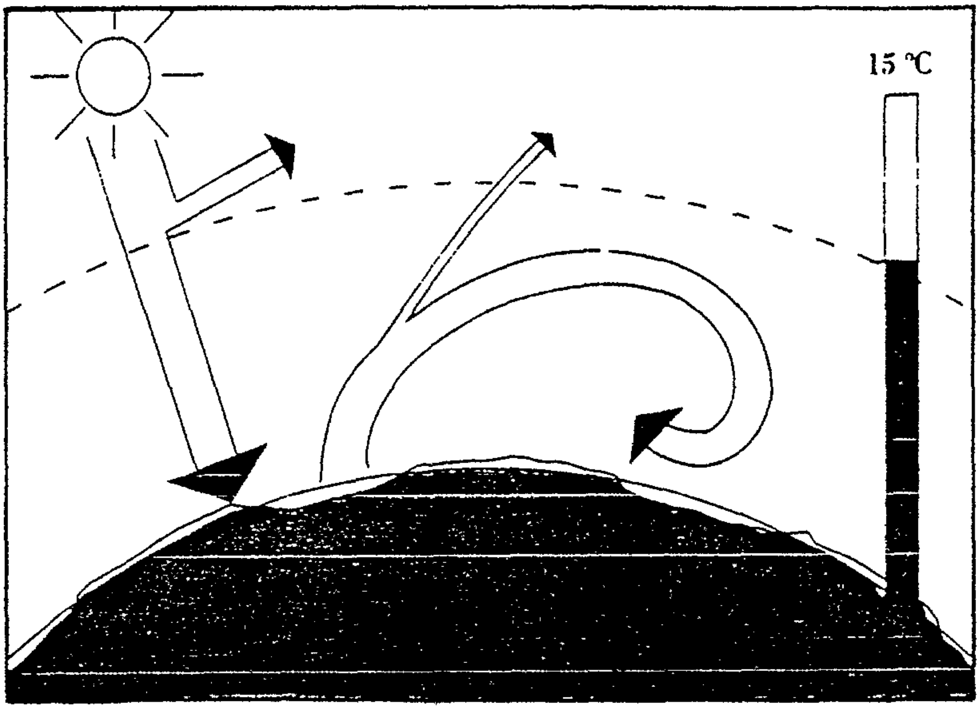
ANNEX IV

OVERVIEW OF THE GREENHOUSE EFFECT AND ITS IMPLICATIONS

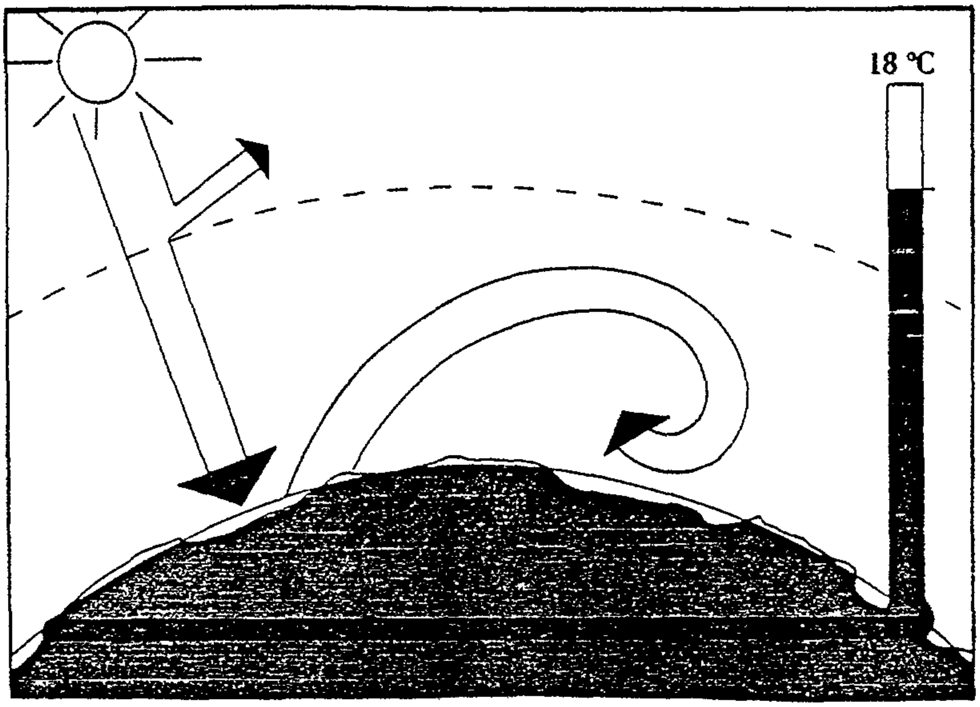
This Annex contains copies of transparencies reviewing:

- the basics of the greenhouse effect;
- past and predicted changes in temperatures and sea level;
- work of the Climatic Research Unit (CRU) of the East Anglia University, UK, on the development of Mediterranean scenarios (with sub-regional specifics) of future changes in temperature and precipitation;
- possible implications of climatic changes;
- activities organised by the Oceans and Coastal Areas Programme Activity Centre (OCA/PAC) of UNEP and MAP concerned with studying the implications of climatic changes in coastal areas;
- work carried out by the Mediterranean Task Team on climatic changes and its results;

Since these transparencies were prepared for oral presentations only, by using various sources of open and grey literature, in a number of transparencies the source of information was not cited.



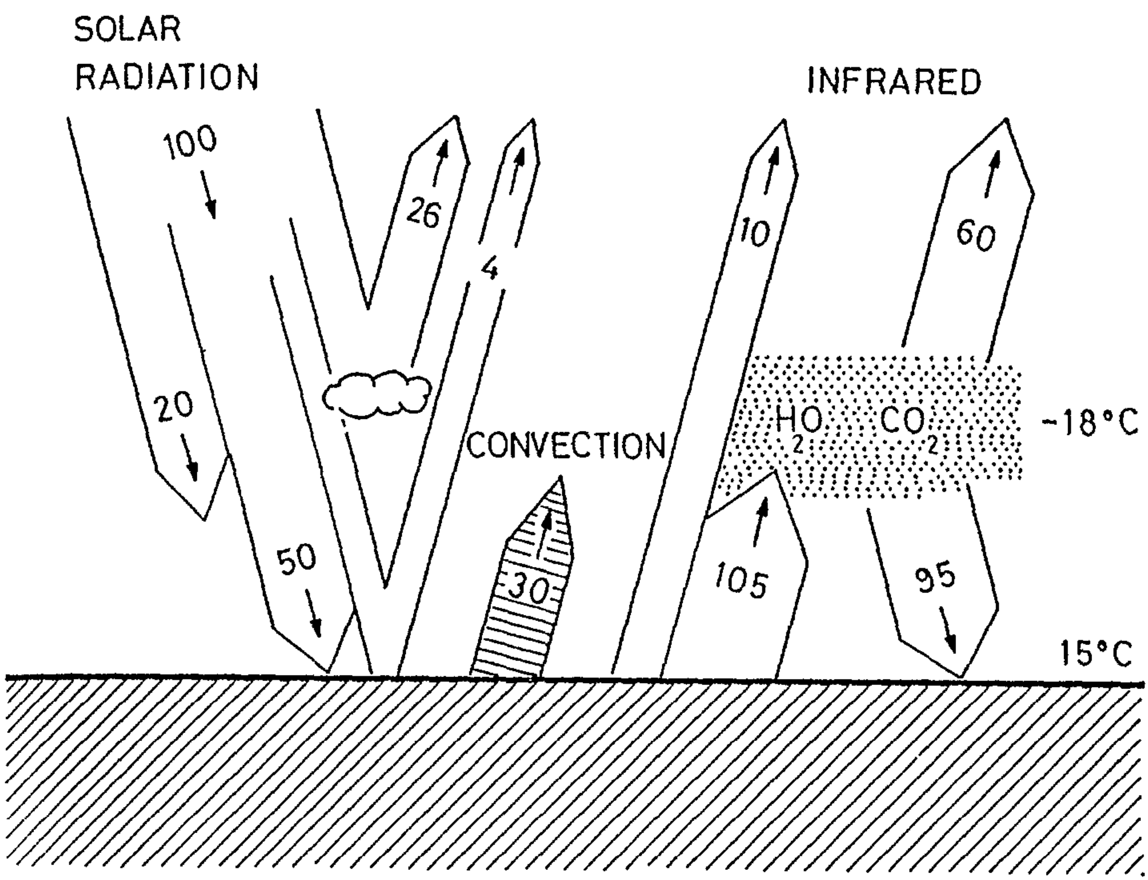
GREENHOUSE EFFECT AT PRESENT



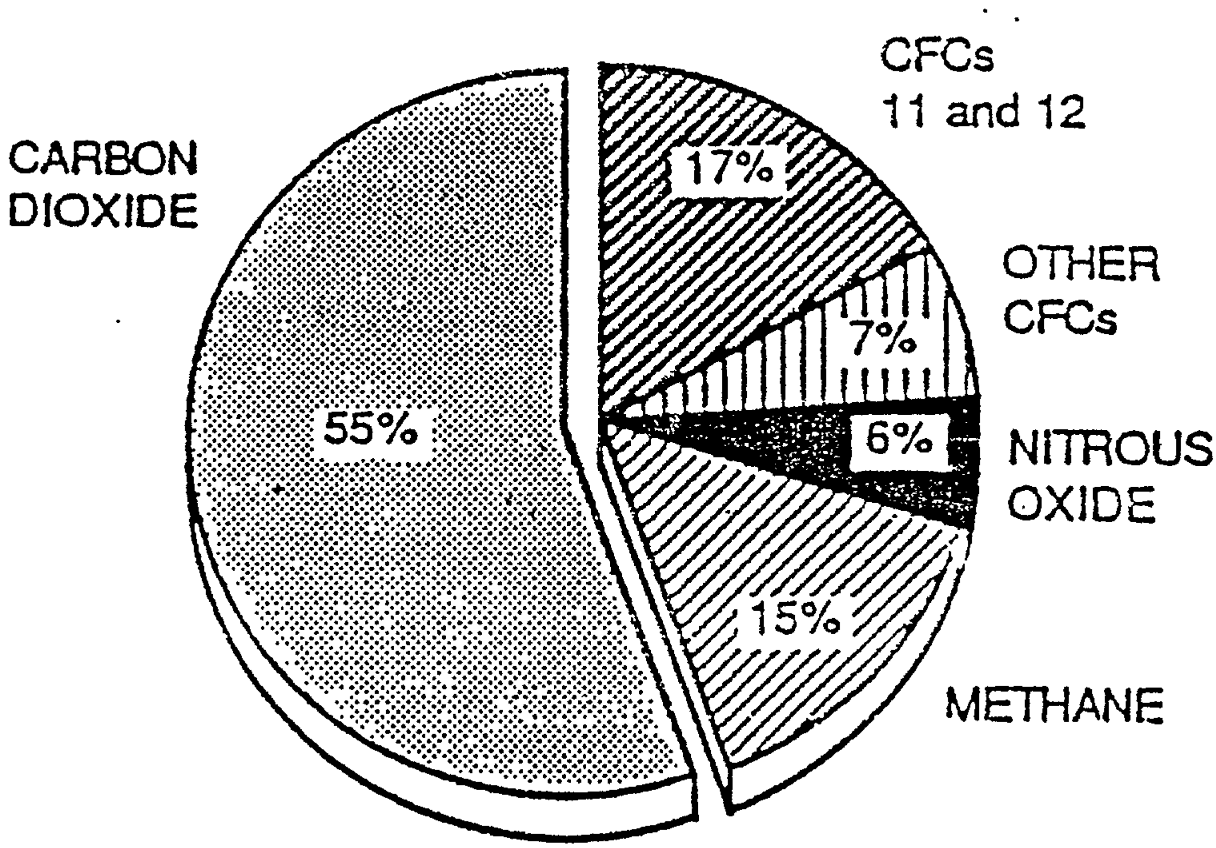
GREENHOUSE EFFECT IN THE FUTURE

(From Maîtriser le réchauffement de la planète, Agence pour la Qualité de L'air, Paris)

Proceedings of the Second World Climate Conference



Schematic representation of the greenhouse effect
The total incoming solar radiation is arbitrarily set at 100 units


CFCs
11 and 12
17%
CARBON
DIOXIDE
OTHER
CFCs
7%
55%
6%
NITROUS
OXIDE
15%
METHANE

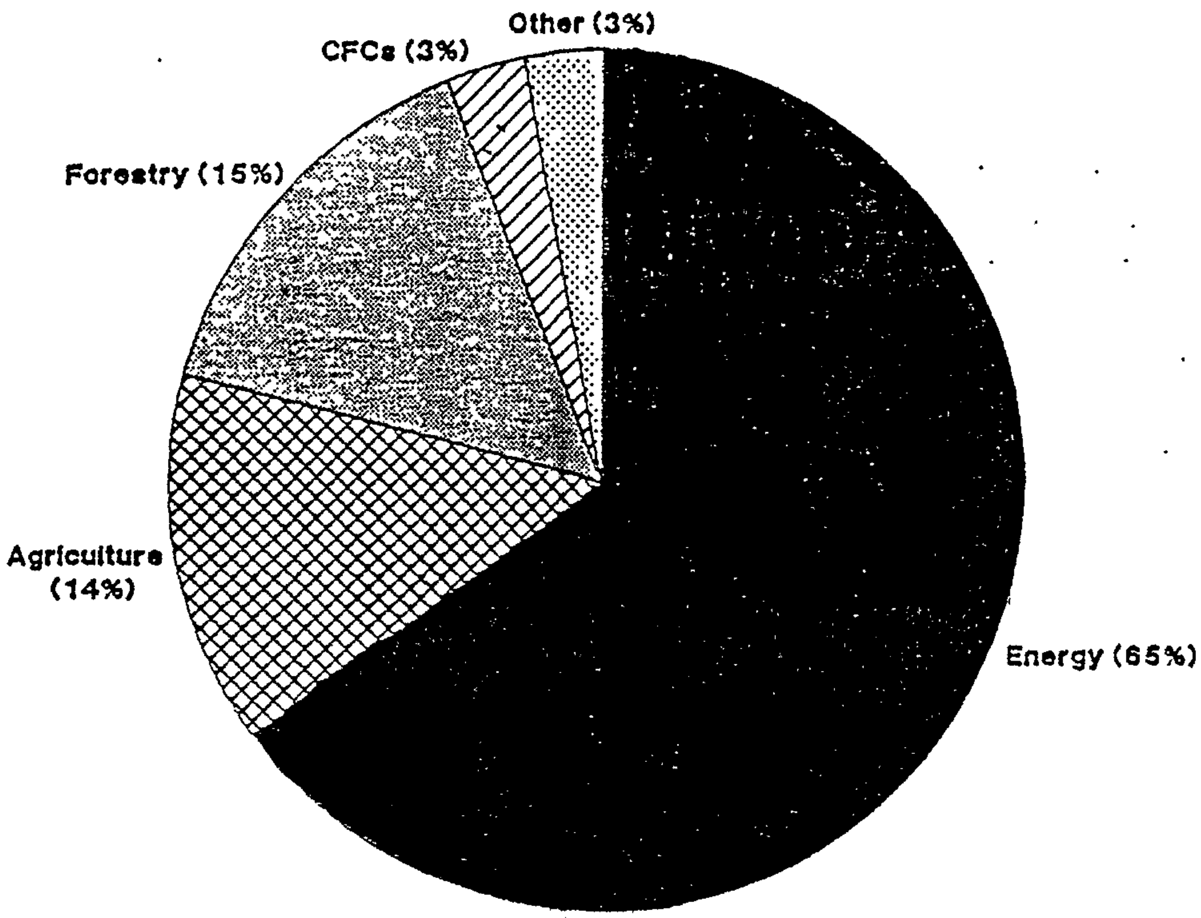
SUMMARY OF KEY GREENHOUSE GASES AFFECTED BY HUMAN ACTIVITIES

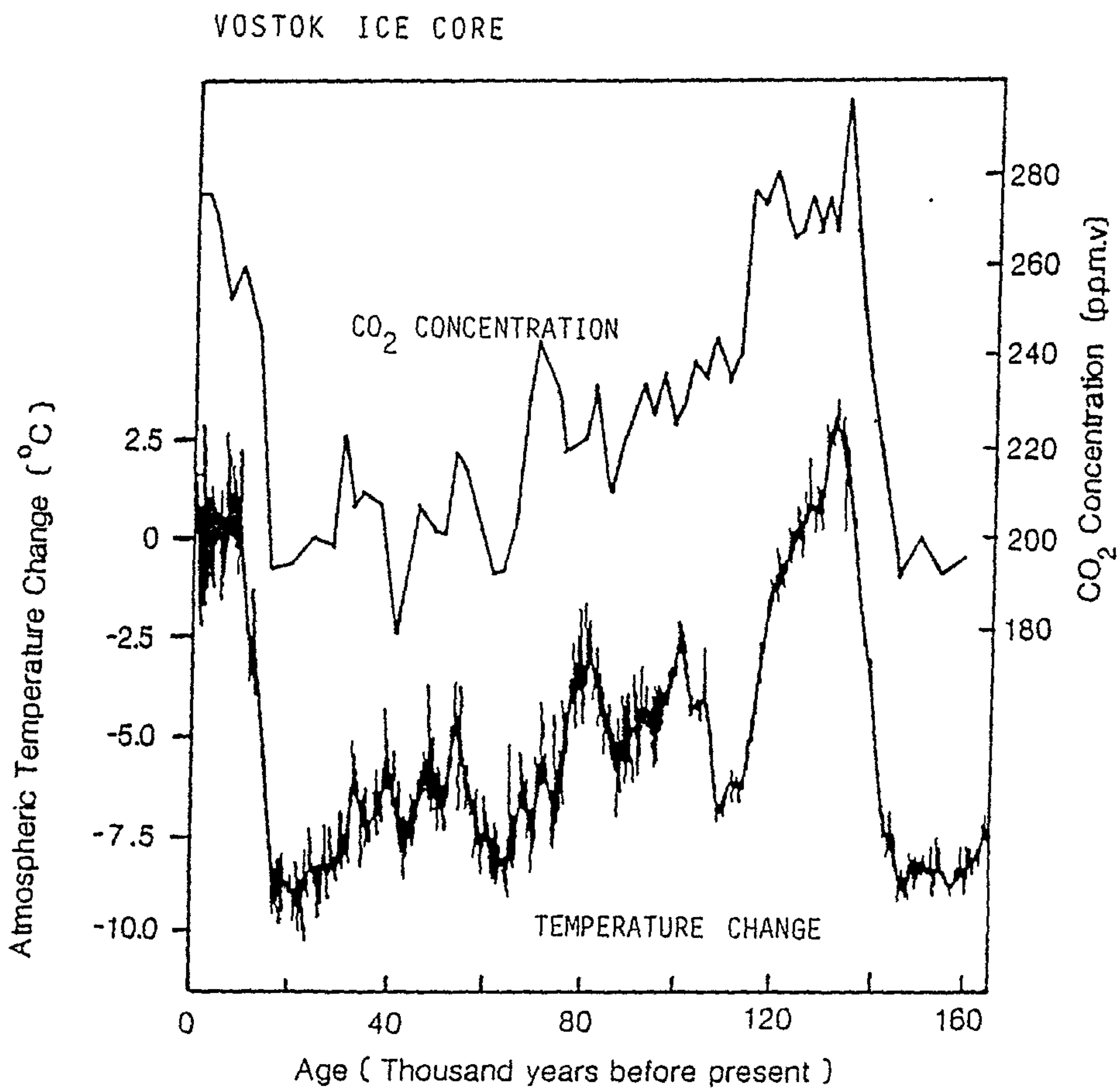
	Carbon Dioxide	Methane	CFC-11	CFC-12	Nitrous Oxide
Atmospheric concentration	ppmv	ppmv	pptv	pptv	ppbv
Pre-industrial (1750-1800)	280	0.8	0	0	288
Present day (1990)	353	1.72	280	484	310
Current rate of change per year	1.8 (0.5%)	0.015 (0.9%)	9.5 (4%)	17 (4%)	0.8 (0.25%)
Atmospheric lifetime (years)	(50-200)†	10	65	130	150

ppmv = parts per million by volume;
ppbv = parts per billion (thousand million) by volume;
pptv = parts per trillion (million million) by volume.
† The way in which CO_2 is absorbed by the oceans and biosphere is not simple and a single value cannot be given; refer to the main report for further discussion.

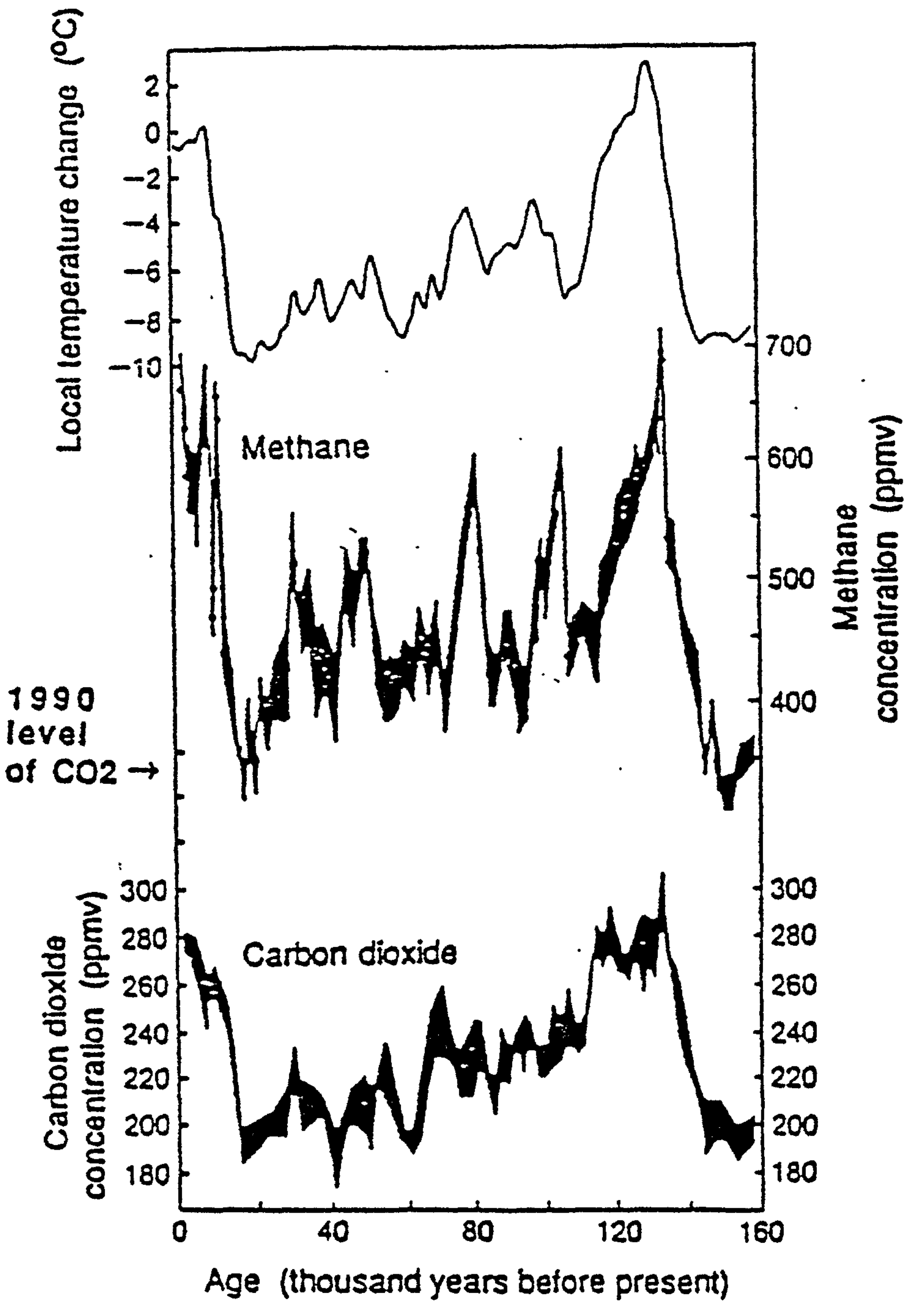
CONTRIBUTION TO RADIATIVE FORCING BY SECTOR: 2025 EMISSIONS

(Based on Global Warming Potentials For 100-Year Time Horizon)

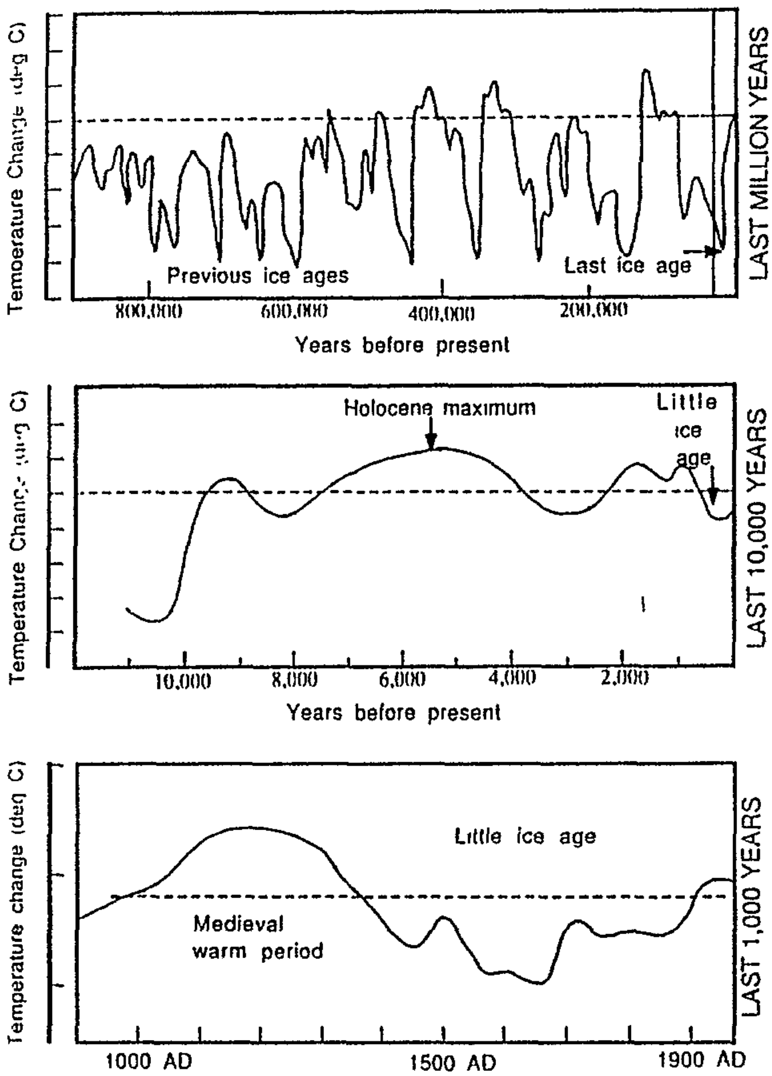




Source: Barnola (1987).

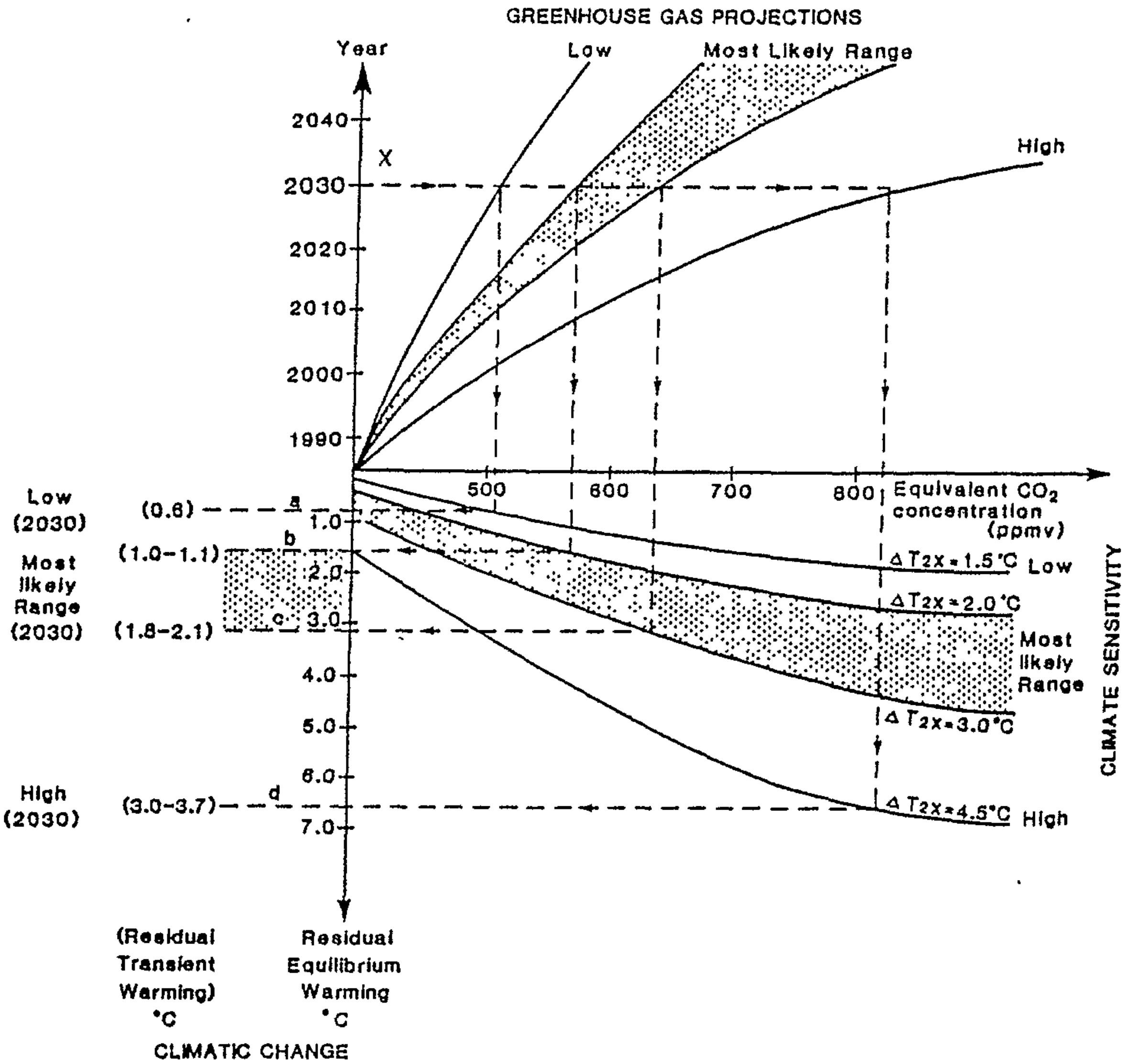

Local temperature change (°C)
2
0
−2
−4
−6
−8
−10
Methane
700
600
500
400
Methane concentration (ppmv)
1990 level of CO2 →
Carbon dioxide
300
280
260
240
220
200
180
Carbon dioxide concentration (ppmv)
0
40
80
120
160
Age (thousand years before present)

Proceedings of the Second World Climate Conference



Schematic diagrams of global temperature variations since the Pleistocene on time-scales. The dashed line nominally represents conditions near the beginning of the twentieth century.

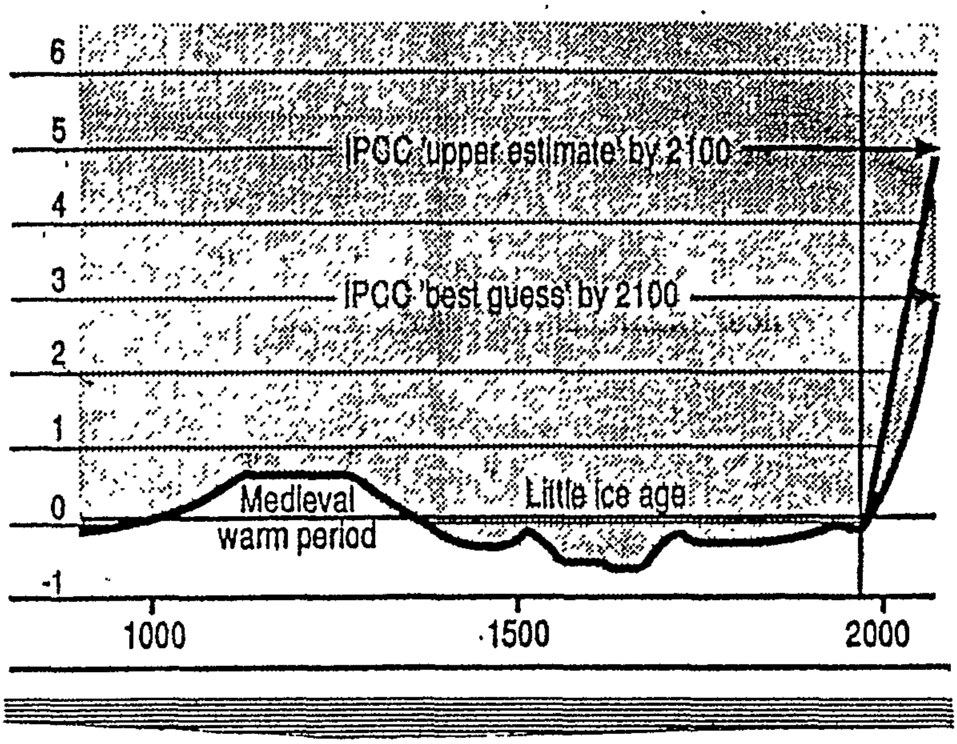
Estimates of the Climate Sensitivity

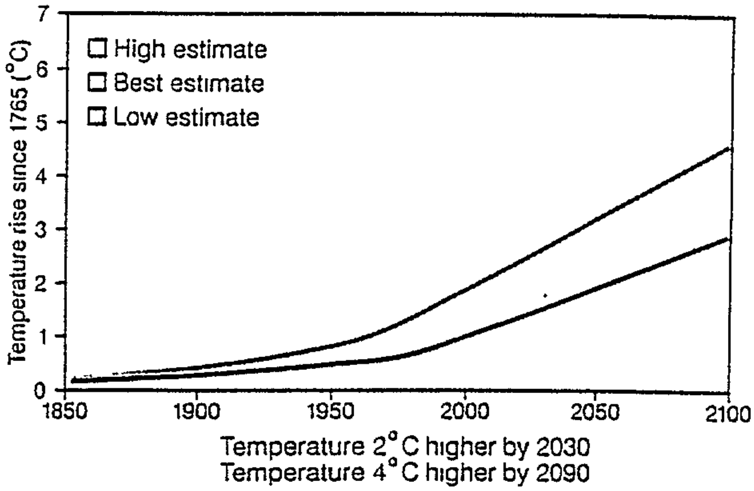


= 1.5 - 4.5°C warmer
for a CO_2 doubling

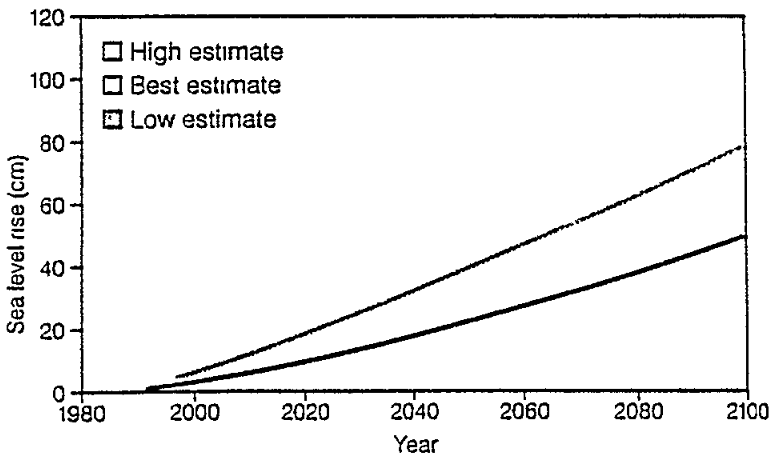
UN prediction of climate changes

Temperature change (°C) from today's average





Temperature rise. IPCC Business as Usual Scenario



Sea Level rise. IPCC Business as Usual Scenario

ESTIMATES FOR CHANGES BY 2030

(IPCC Business-as-Usual scenario; changes from **pre-industrial**)

The numbers given are based on high resolution models, scaled to be consistent with our best estimate of global mean warming of 1.8E by 2030. For values consistent with other estimates of global temperature rise, the numbers below should be reduced by 30% for the low estimate or increased by 50% for the high estimate. Precipitation estimates are also scaled in a similar way.

Confidence in these regional estimates is low

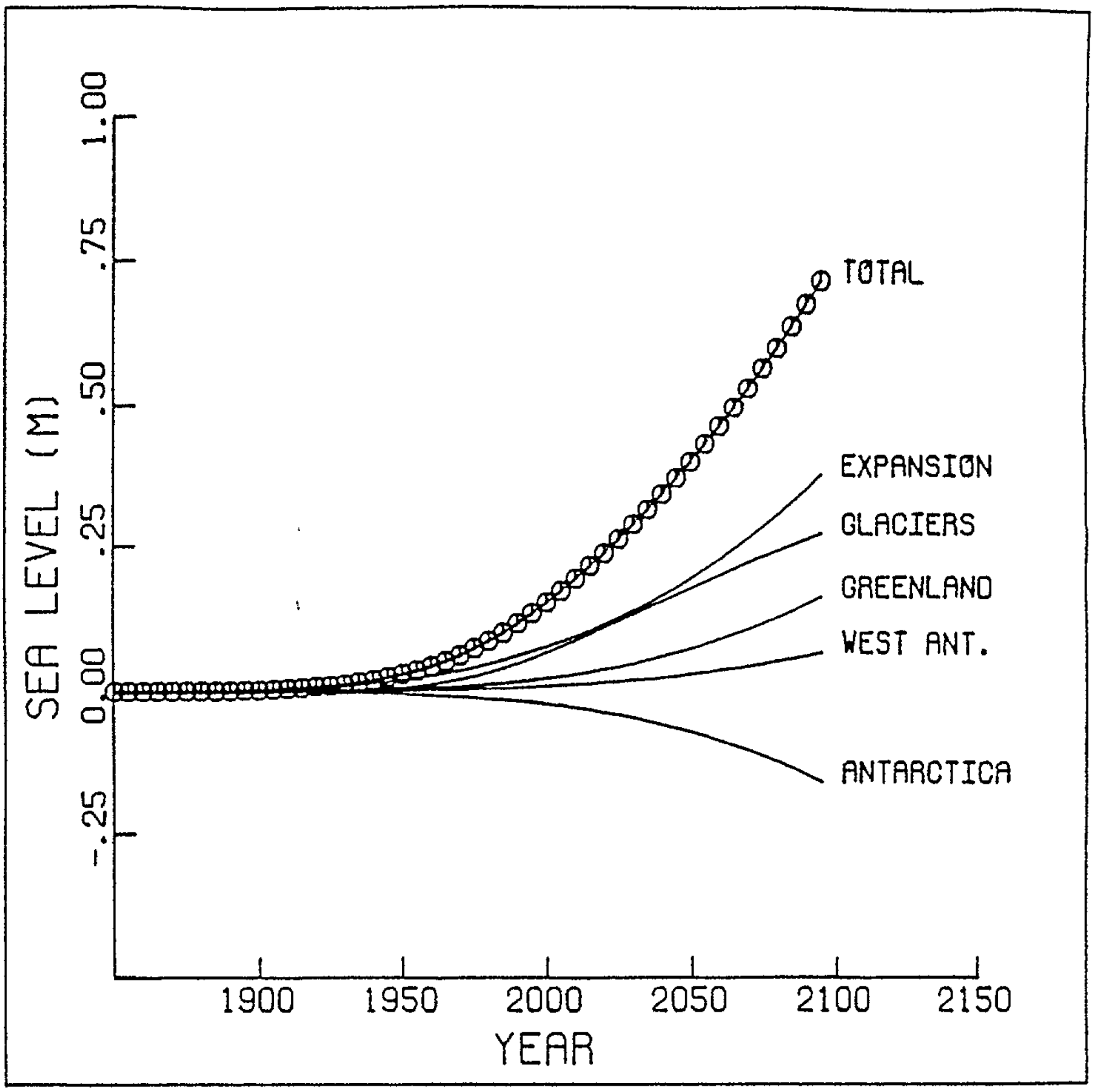
Central North America (35E-50EN 85E-105EW)
The warming varies from 2 to 4EC in winter and 2 to 3EC in summer. Precipitation increases range from 9 to 15% in winter whereas there are decreases of 5 to 10% in summer. Soil moisture decreases in summer by 15 to 20%.

Southern Asia (5E-30EN 70E-105EE)
The warming varies from 1 to 2EC throughout the year. Precipitation changes little in winter and generally increases throughout the region by 5 to 15% in summer. Summer soil moisture increases by 5 to 10%.

Sahel (10E-20EN 20EW-40EE)
The warming ranges from 1 to 3EC. Area mean precipitation increases and area mean soil moisture decreases marginally in summer. However, throughout the region, there are areas of both increase and decrease in both parameters throughout the region.

Southern Europe (35E-50EN 10EW-45EE)
The warming is about 2EC in winter and varies from 2 to 3EC in summer. There is some indication of increased precipitation in winter, but summer precipitation decreases by 5 to 15%, and summer soil moisture by 15 to 25%.

Australia (12E-45ES 110E-115EE)
The warming ranges from 1 to 2EC in summer and is about 2EC in winter. Summer precipitation increases by around 10%, but the models do not produce consistent estimates of the changes in soil moisture. The area averages hide large variations at the sub-continental level.


SEA LEVEL (M)
1.00
.75
.50
.25
0.00
-.25
1900
1950
2000
2050
2100
2150
YEAR
TOTAL
EXPANSION
GLACIERS
GREENLAND
WEST ANT.
ANTARCTICA

PROJECTED GLOBAL MEAN SEA LEVEL RISE

1985-2030 (CMS)

(from Raper et al., 1988)

GLOBAL MEAN SEA LEVEL RISE RESULTING FROM	LOW	BEST GUESS	HIGH
THERMAL EXPANSION	4	8 to 14	17
ALPINE GLACIERS	2	5 to 13	21
GREENLAND	1	1 to 2	3
ANTARCTICA*	-2	-3 to -1	3
	5	11 to 28	44

* Values chosen from analysis to maximise range

IMPACTS RESULTING FROM CLIMATIC CHANGES

FIRST ORDER IMPACTS

INCREASED AIR TEMPERATURE

INCREASED SEA SURFACE TEMPERATURE

CHANGES TO LOCAL CLIMATES AND WEATHER:

- CHANGED PATTERNS OF RAINFALL IN TIME AND SPACE;
- CHANGED PATTERNS OF WINDS IN TIME AND SPACE

IMPACTS RESULTING FROM CLIMATIC CHANGES

SECOND ORDER IMPACTS

CHANGES IN RELATIVE HUMIDITY

CHANGES IN RUN-OFF AND RIVER FLOW RATES

CHANGES IN SOILS

CHANGES IN LARGE SCALE COASTAL BIOME DISTRIBUTION

CHANGES IN COASTAL CURRENT AND WAVE REGIMES, AND STRATIFICATION/MIXING

CHANGES IN THE LOCATION AND/OR PERSISTENCE OF OCEANIC FRONTAL SYSTEMS

CHANGES IN SALINITY AND COASTAL WATER CHEMISTRY

CHANGES IN GEOGRAPHIC DISTRIBUTION, INTENSITY AND FREQUENCY OF STORMS

CHANGES IN PATTERNS OF COASTAL FLOODING AND OTHER EPISODIC EVENTS

CHANGES IN HUMAN COMFORT OF SPECIFIC LOCATIONS

IMPACTS RESULTING FROM CLIMATIC CHANGES

HIGHER ORDER IMPACTS

CHANGES IN RAINFALL AND TEMPERATURE WILL AFFECT RELATIVE HUMIDITY WHICH WILL ALTER EVAPO-TRANSPIRATION RATES HENCE AFFECTING:

- THE HYDROLOGICAL CYCLE AND LOCAL WATER BALANCE; WHICH WILL:
    - AFFECT VEGETATION DISTRIBUTION AND ABUNDANCE; HENCE AFFECTING:
        - ANIMAL DISTRIBUTION AND ABUNDANCE;
        - PRODUCTIVITY OF NATURAL AND AGRICULTURAL SYSTEMS;
        - SOIL DECOMPOSITION PROCESSES AND FERTILITY;
- HUMAN DRINKING WATER SUPPLIES; AND
- FRESHWATER MANAGEMENT PRACTICES;
- COASTAL WATER SALINITY AND MIXING; LEADING TO:
    - CHANGES IN COASTAL MARINE ECOSYSTEMS;
    - CHANGES TO FISHERIES PRODUCTIVITY AND MARICULTURE;

ALL OF WHICH WILL HAVE:

- SOCIAL AND ECONOMIC IMPACTS

IMPACTS RESULTING FROM SEA-LEVEL CHANGE

FIRST ORDER IMPACTS

INCREASED FREQUENCY OF FLOODING

INCREASED INLAND EXTENT OF FLOODING

REARRANGEMENT OF COASTAL UNCONSOLIDATED SEDIMENTS AND SOILS

INCREASED SOIL SALINITY IN AREAS PREVIOUSLY UNAFFECTED

CHANGED WAVE CLIMATES

ACCELERATED DUNE AND BEACH EROSION

UPWARD AND LANDWARD RETREAT OF THE BOUNDARY BETWEEN FRESHWATER AND BRACKISH WATERS

GREATER UPSTREAM INTRUSION OF SALTWATER WEDGES

CHANGES TO BANK AND WETLAND VEGETATION

CHANGES IN THE PHYSICAL LOCATION OF THE TERRESTRIAL-AQUATIC BOUNDARY

CHANGES IN COASTAL WATER CLARITY

CHANGES IN COASTAL WATER CIRCULATION PATTERNS, AND

CHANGES IN SEDIMENT SINK VOLUMES

IMPACTS RESULTING FROM SEA LEVEL CHANGE

SECOND ORDER IMPACT

CHANGES IN OFFSHORE BOTTOM PROFILES

CHANGES IN MARINE PRIMARY PRODUCTION, AND

CHANGES IN TERRESTRIAL (COASTAL) PRIMARY PRODUCTION

CHANGES IN SEDIMENT AND NUTRIENT FLUX RATES

IMPACTS RESULTING FROM SEA LEVEL CHANGE

HIGHER ORDER IMPACT

CHANGES IN BEACH PLAN FORM WILL ALTER:

- LOCAL CURRENT AND WAVE REGIMES; HENCE:
    - LOCAL PATTERNS OF EROSION AND DEPOSITION; AND
    - LOCAL DISTRIBUTION OF COASTAL SUBSTRATE TYPES; AND HENCE,
        - THE DISTRIBUTION PATTERNS OF BENTHIC ORGANISMS.
- SUSCEPTIBILITY OF THE COASTLINE TO WAVE ATTACK;
- CHANGE THE VULNERABILITY OF COASTAL AREAS TO EPISODIC FLOODING AND/OR SEASONAL OR PERMANENT INUNDATION; HENCE
    - AFFECTING CAPITAL INVESTMENT IN INFRASTRUCTURE; AND
    - SUITABILITY OF THE COASTLINE FOR HUMAN SETTLEMENT.

CHANGES IN MARINE PRIMARY PRODUCTION WILL AFFECT:

- ENERGY FLOW TO HIGHER TROPHIC LEVELS; HENCE
    - STANDING STOCKS OF HIGHER TROPHIC LEVELS; AND
    - OVERALL RATES OF SECONDARY PRODUCTION; AND ULTIMATELY
        - FINFISH AVAILABILITY FOR HUMAN CONSUMPTION.

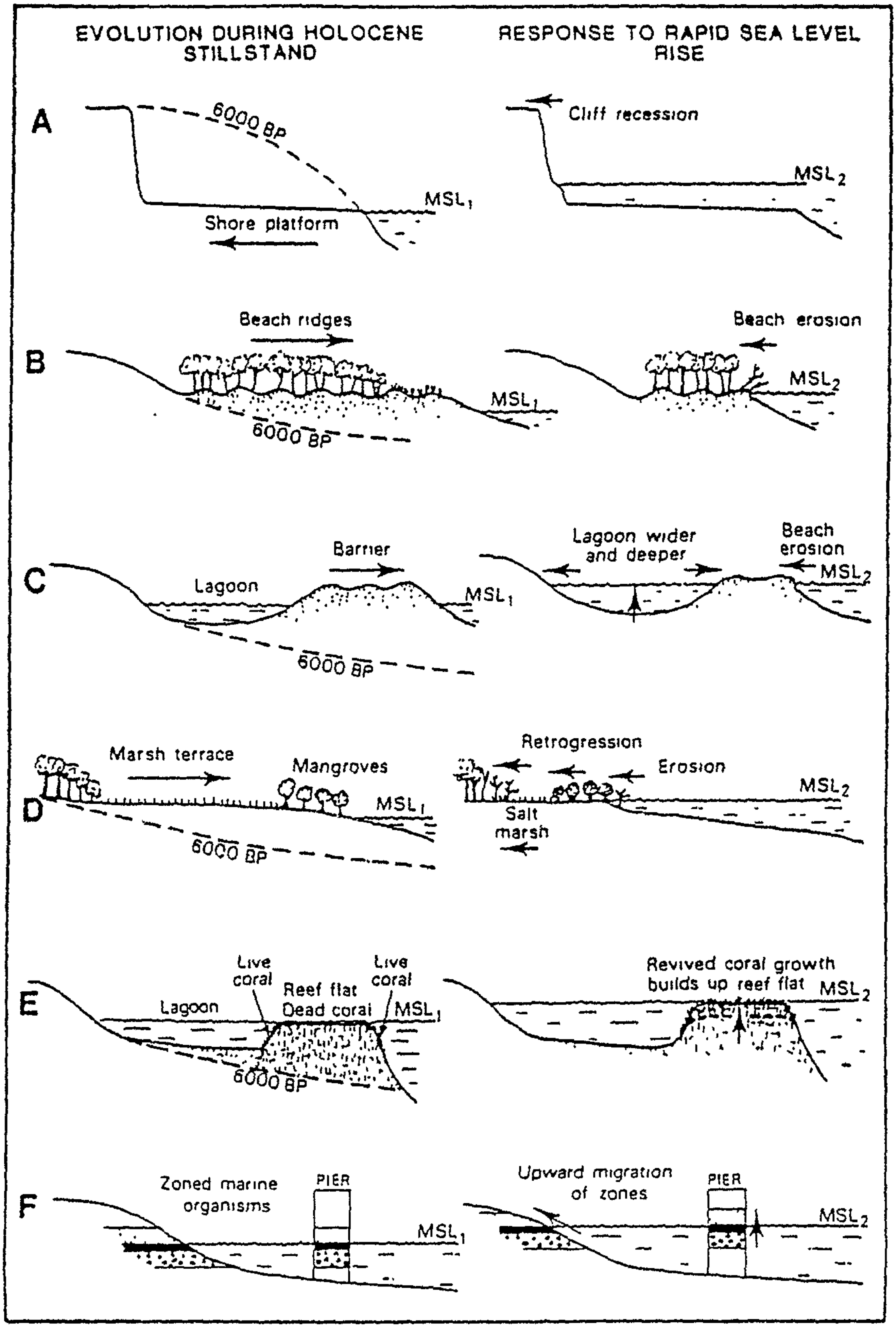
SEA LEVEL CHANGE
HIGHER ORDER IMPACT (2)

CHANGES IN COASTAL/TERRESTRIAL VEGETATION AND WETLANDS WILL:

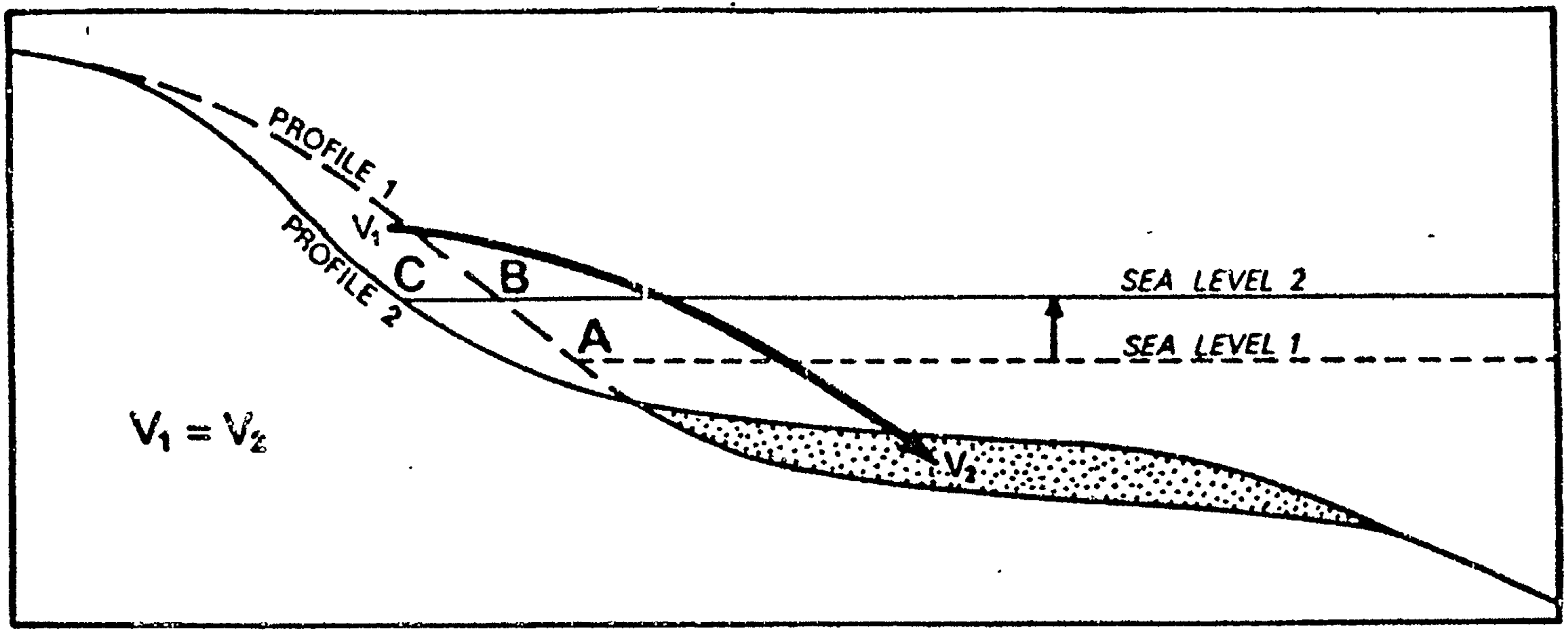
- **ALTER THE DISTRIBUTION AND ABUNDANCE OF DEPENDENT ANIMALS;**
- **AFFECT ECONOMIC ACTIVITIES BY AFFECTING COMMERCIALLY IMPORTANT SPECIES SUCH AS PENAEID PRAWNS AND SHRIMP;**
- **ALTER THE FLUX OF SEDIMENTS AND NUTRIENTS INTO THE MARINE ENVIRONMENT;**
- **ALTER DISTRIBUTIONS OF HUMAN DISEASE VECTORS; HENCE,**
  - **CHANGING THE EPIDEMIOLOGY OF VECTOR BORNE DISEASES.**

CHANGES IN NUTRIENT LEVELS IN COASTAL WATERS WILL CHANGE MARINE BASED PRIMARY PRODUCTIVITY; AND

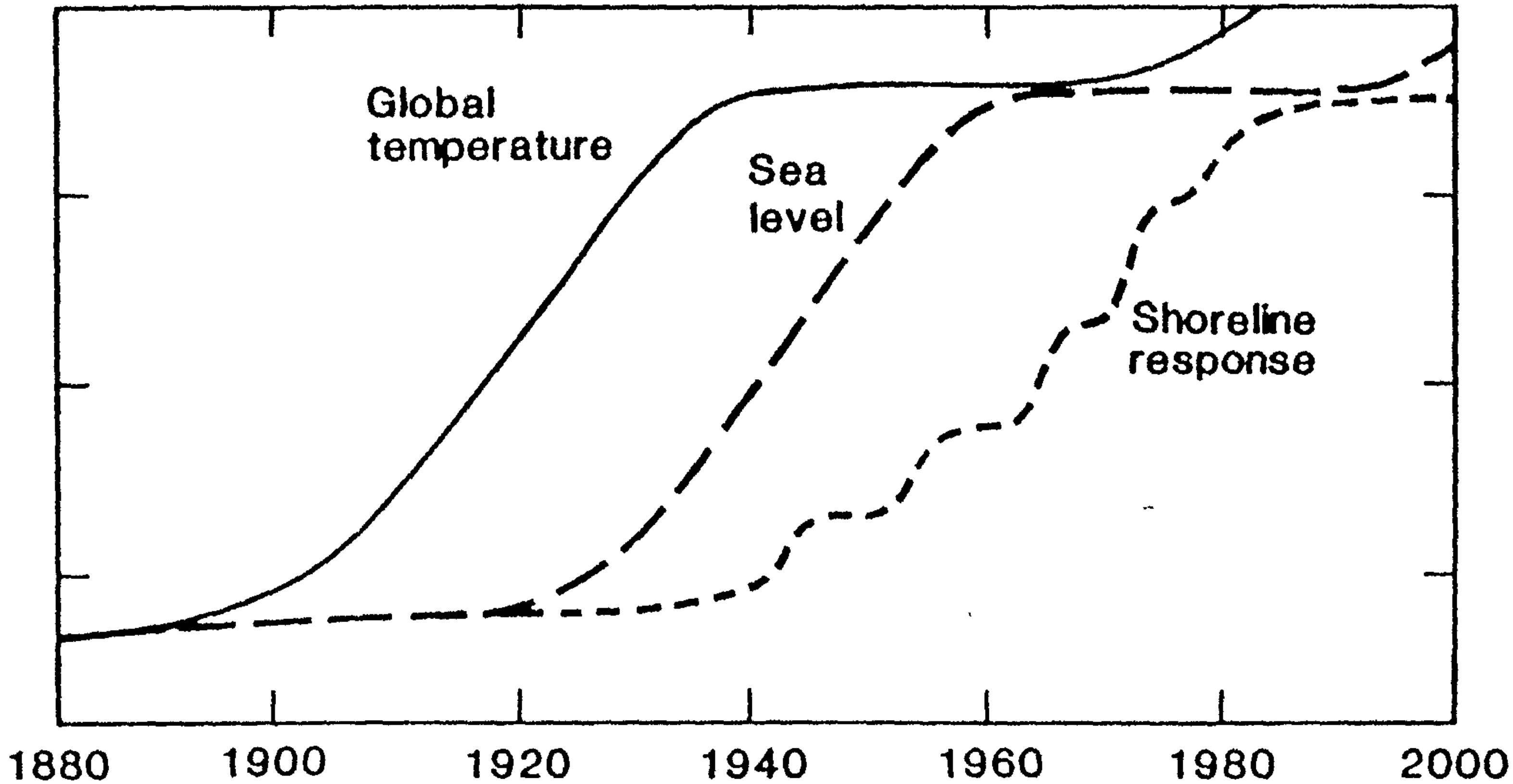
- **MAY CHANGE THE FREQUENCY OF HARMFUL ALGAL BLOOMS; WHICH MAY:**
  - **IMPACT FISH AND SHELLFISH RESOURCES; AND MAY THEREFORE:**
    - **AFFECT SUBSISTENCE AND COMMERCIAL ACTIVITIES IN HUMAN SOCIETIES.**



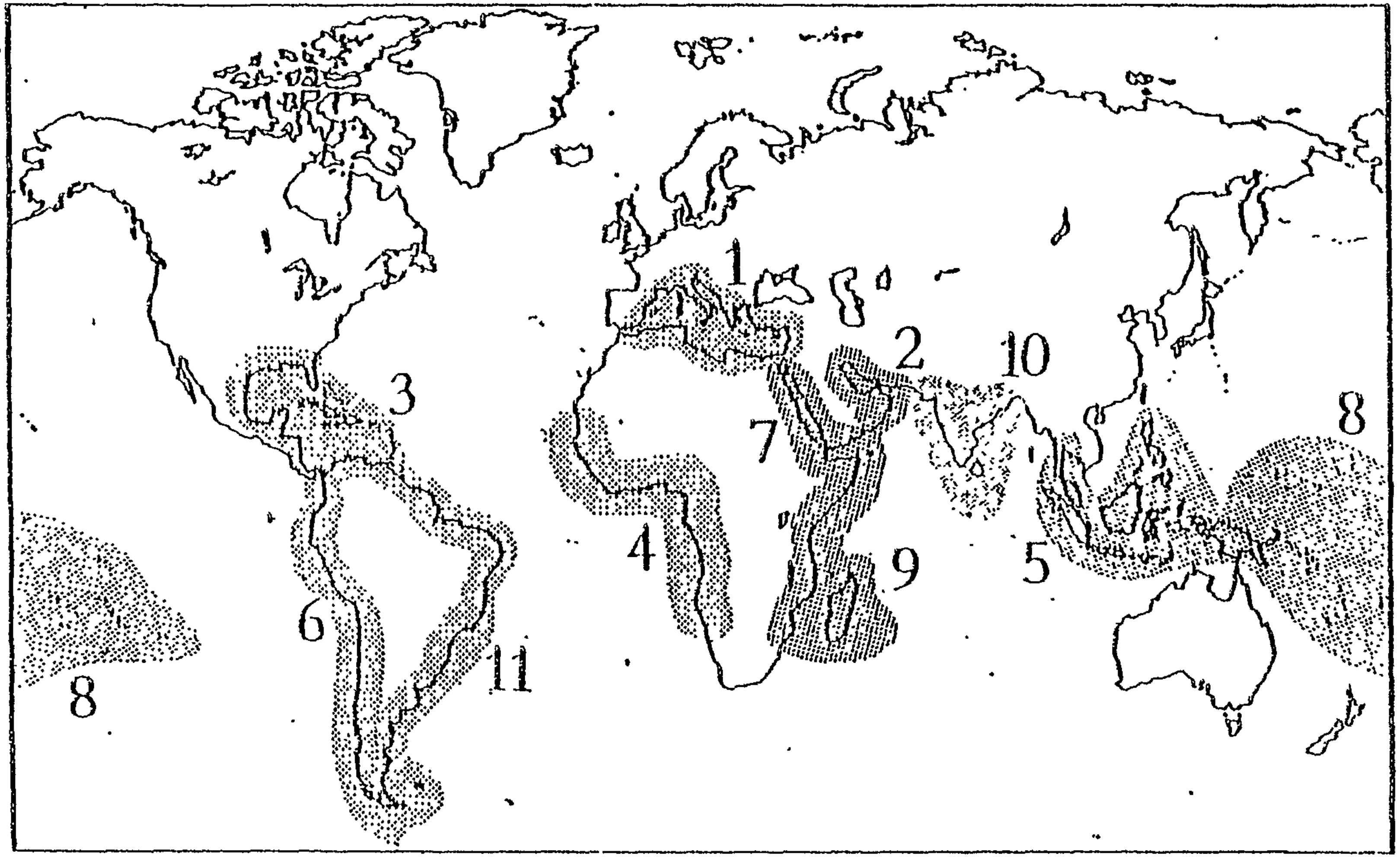
Response of coastal features to a sea-level rise.
(From G.I. Pearman (Ed.), Greenhouse, Planning for climate change, CSIRO, 1989).



Brunn model of response of an equilibrium beach to a sea-level rise. The coastline retreats from A to C as the pre-existing transverse profile is restored by seaward transference of beach sediment. (From G.I. Pearman (Ed.), Greenhouse, Planning for climate change, CSIRO, 1989).

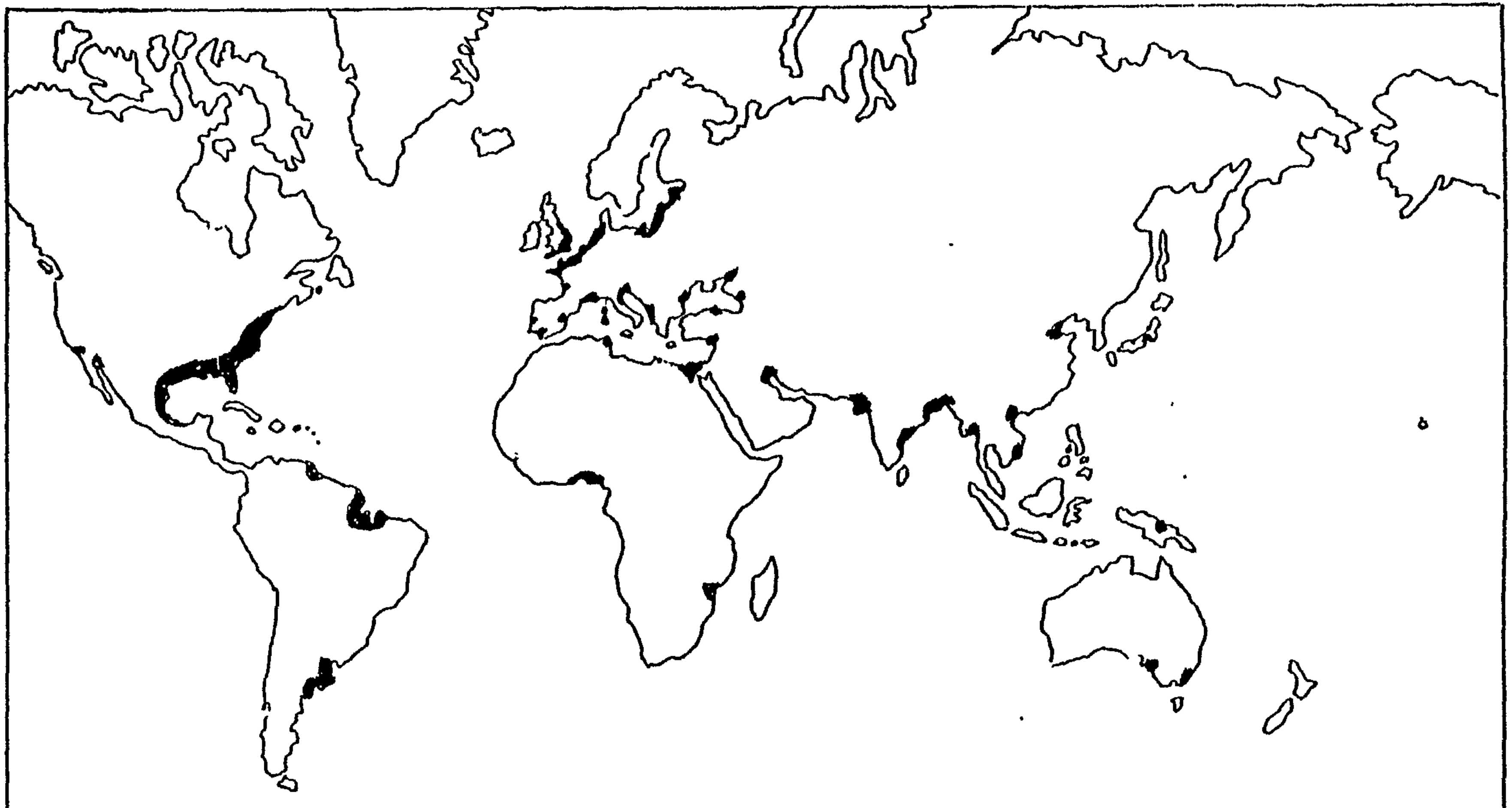


Schematic representation of the relationships between global warming(°C), sea-level rise (m) and shoreline response (m). The latter is a step function associated with major storms. (From G.I. Pearman (Ed.), Greenhouse, Planning for climate change, CSIRO, 1989).

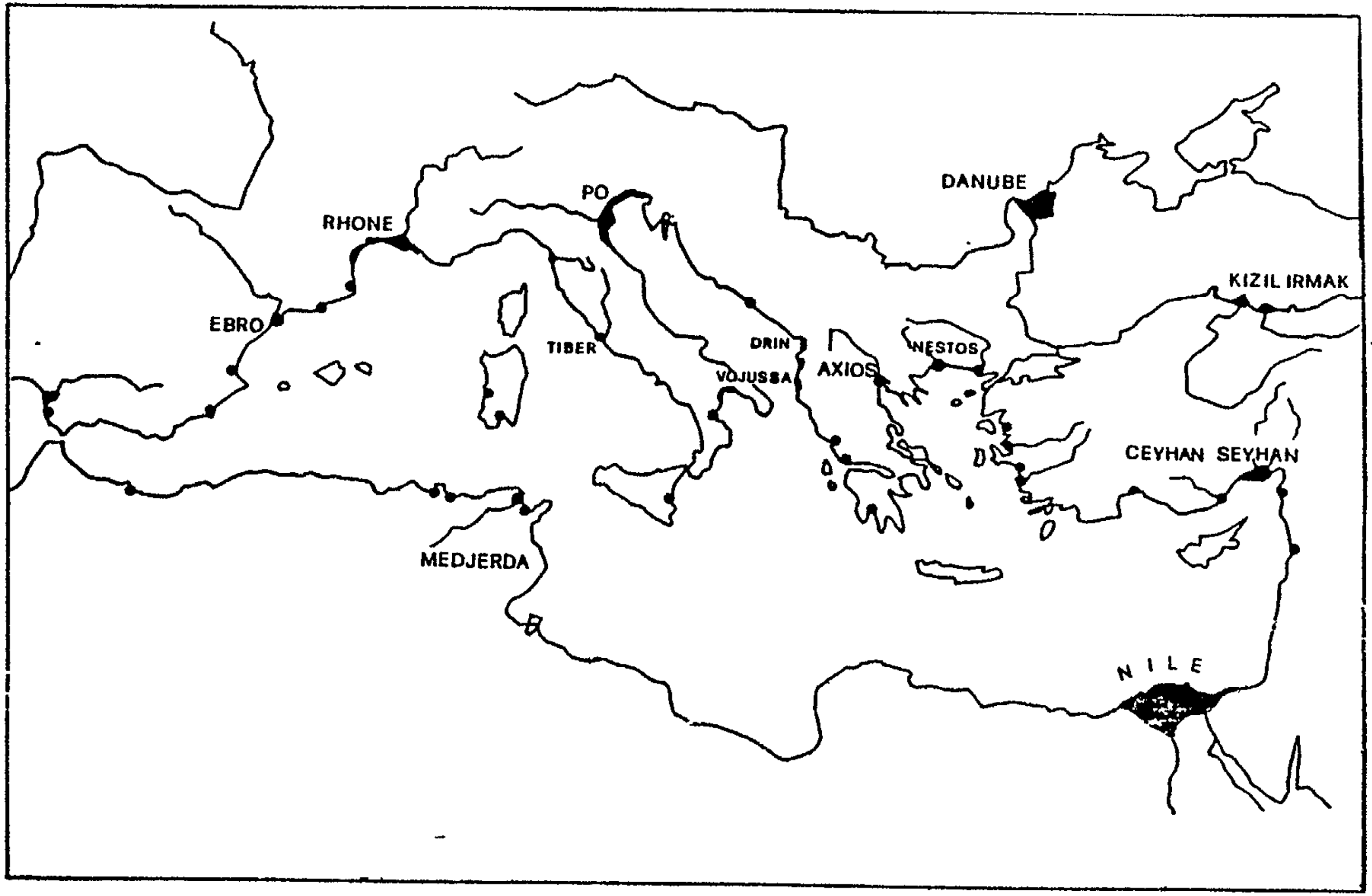


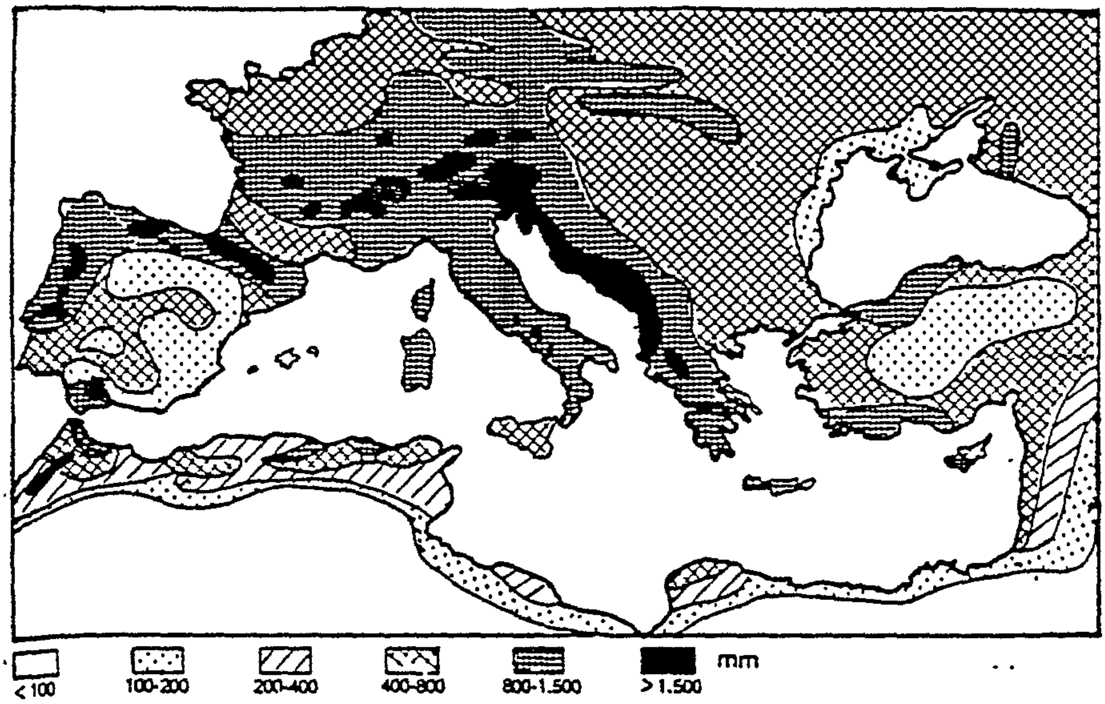
1. Mediterranean Region
2. Kuwait Action Plan Region
3. Wider Caribbean Region
4. West and Central African Region
5. East African Region
6. South East Pacific Region
7. Red Sea and Gulf of Aden Region
8. South Pacific Region
9. Eastern African Region
10. South Asian seas Region
11. South West Atlantic Region

Fig. 1 - Geographic coverage of UNEP Regional Seas Programme

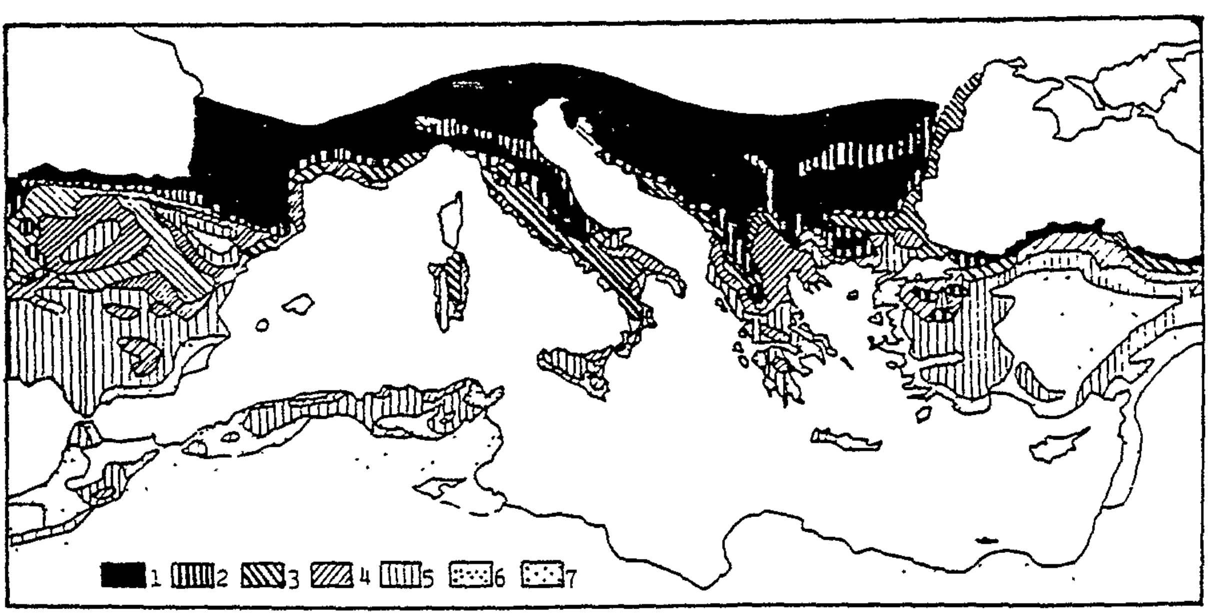


LOW-LYING AND SUBSIDENT ALLUVIAL-DELTAIC COASTLINES


DANUBE
RHONE
PO
KIZIL IRMAK
EBRO
TIBER
DRIN
NESTOS
AXIOS
VOJUSSA
CEYHAN
SEYHAN
MEDJERDA
NILE



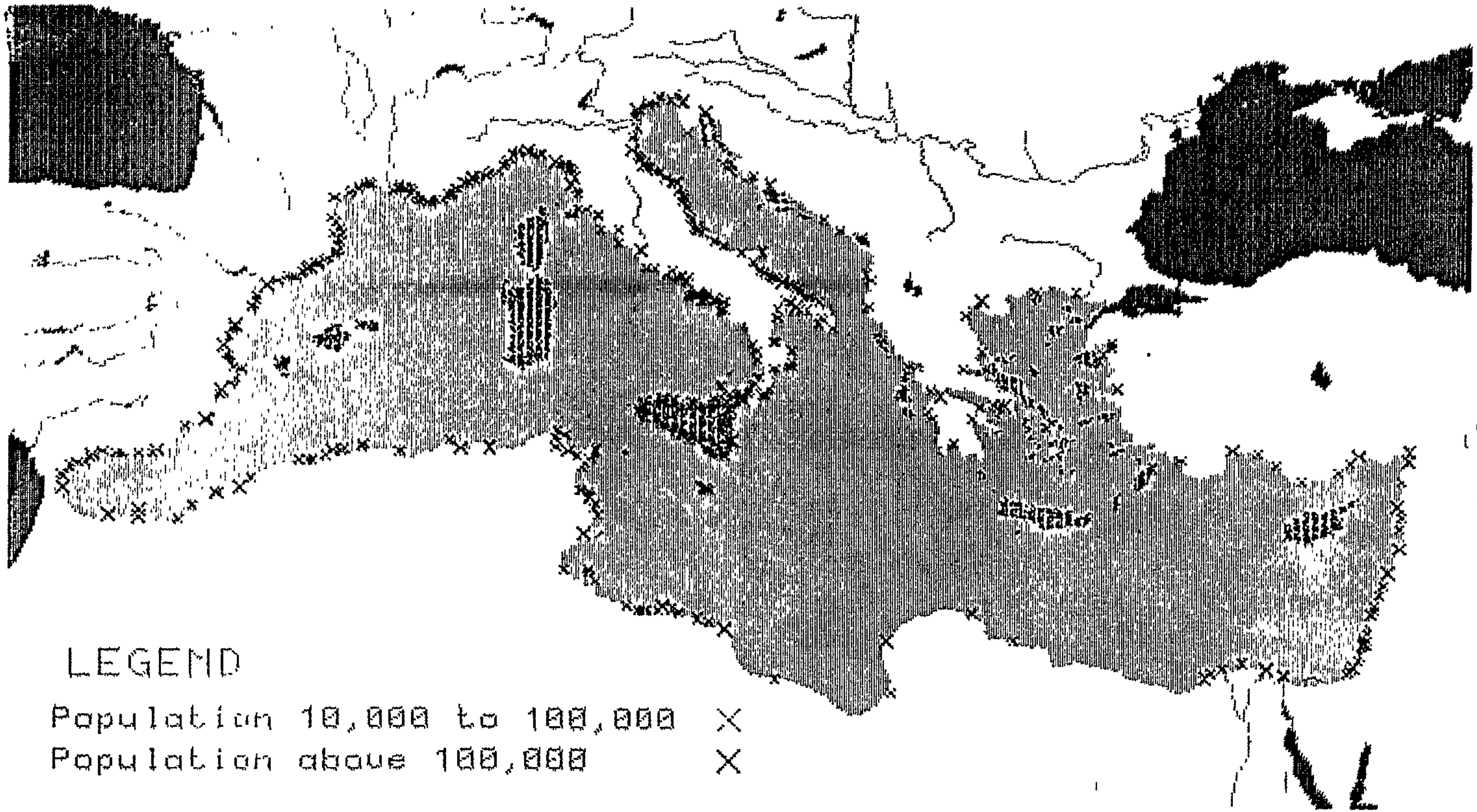
Distribution of annual rainfall in the Mediterranean region



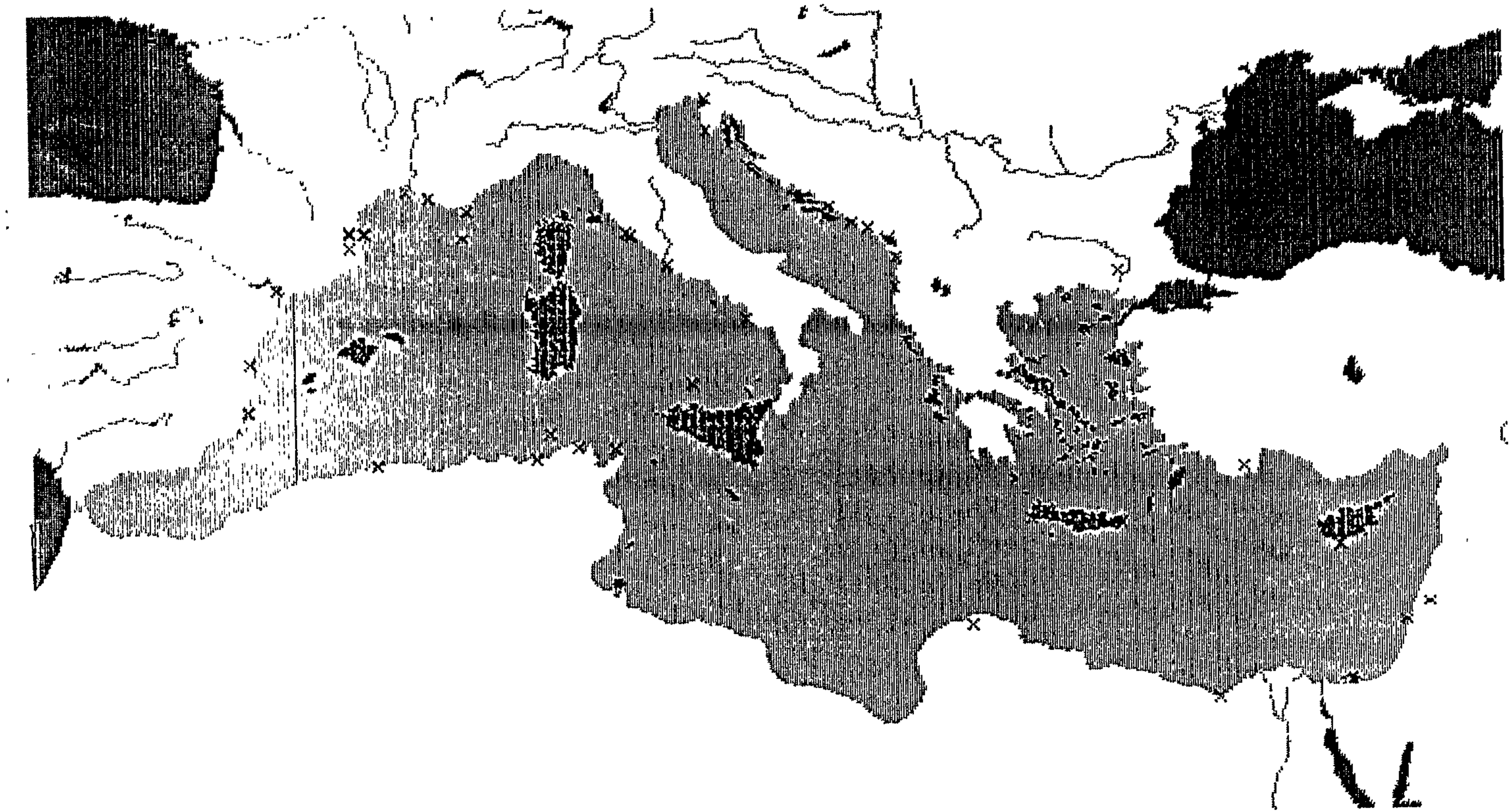
Extent of the dry season in the Mediterranean region (number of dry months: 1. None 2. One-two 3. Two-three 4. Three-four 5. Four-five 6. Five-seven 7. More than seven).

Mediterranean Coastal Cities

(Population above 10,000)

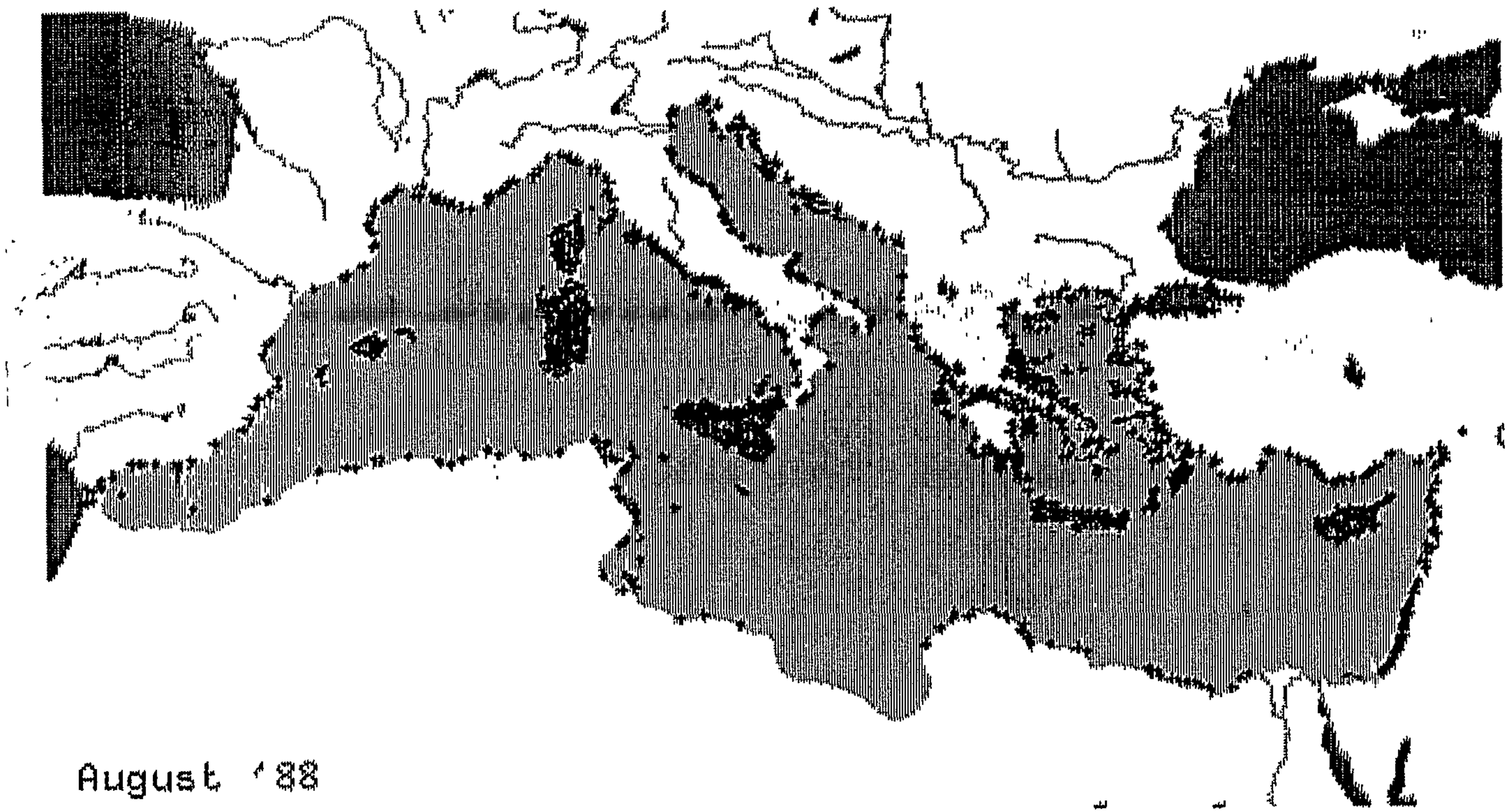


Mediterranean Specially Protected Areas

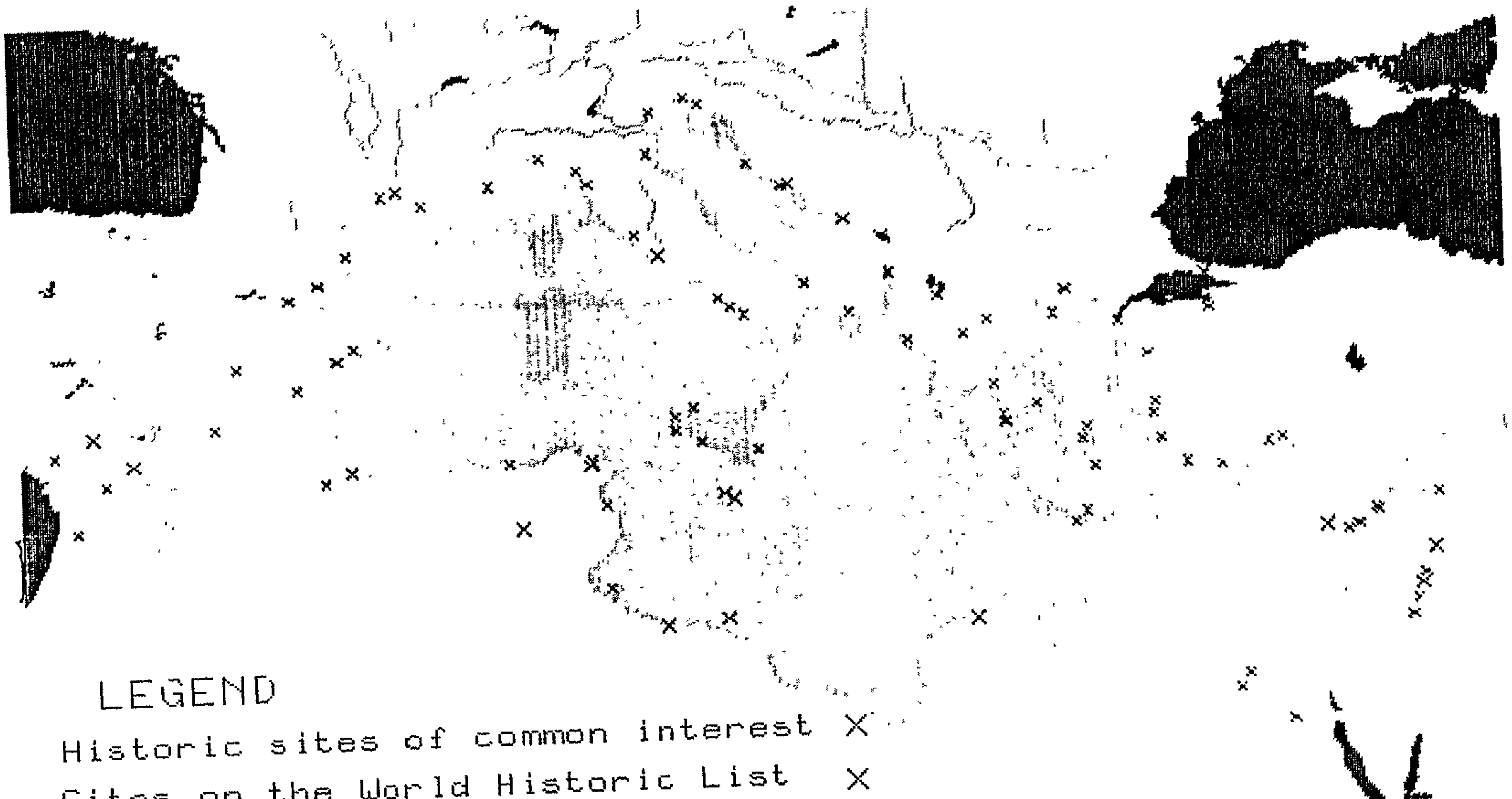


Coastal Archaeological Sites in the Mediterranean

(Source: N.C. Flemming)



Mediterranean Historic Sites



REGIONAL IMPACT ASSESSMENTS

1. CLIMATE CHANGE
2. SEA LEVEL CHANGE
3. OCEANOGRAPHY
4. COASTAL LOWLANDS
5. HYDROLOGY
6. LAND DEGRADATION
7. VEGETATION
8. SOCIO-ECONOMIC

CASE STUDIES

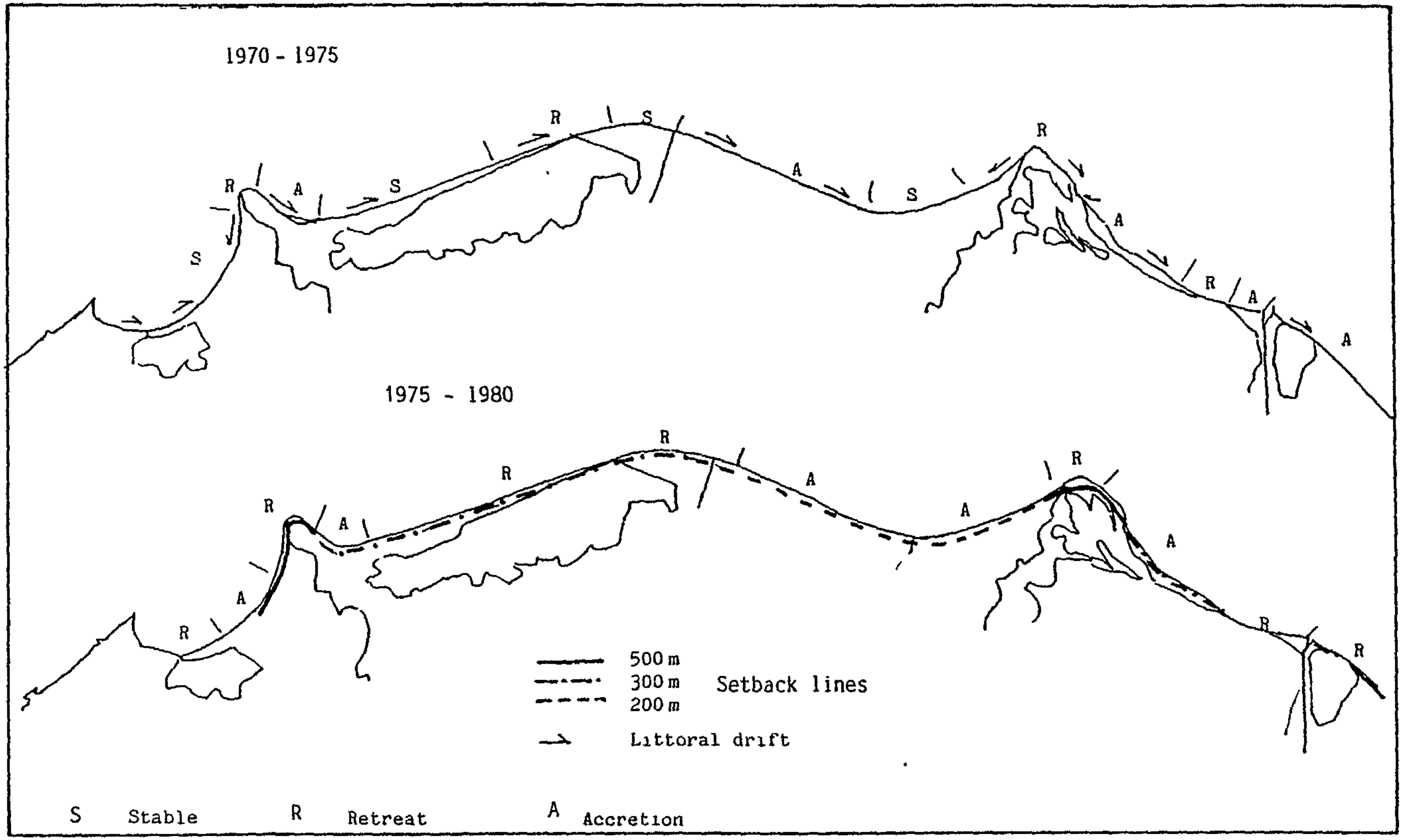
1987-1989

1. EBRO DELTA
2. GULF OF LION-RHONEDELTA
3. PO DELTA, VENICE LAGOON
4. THERMAIKOS GULF
5. NILE DELTA
6. LAKES ICHKEUL/BIZERTE

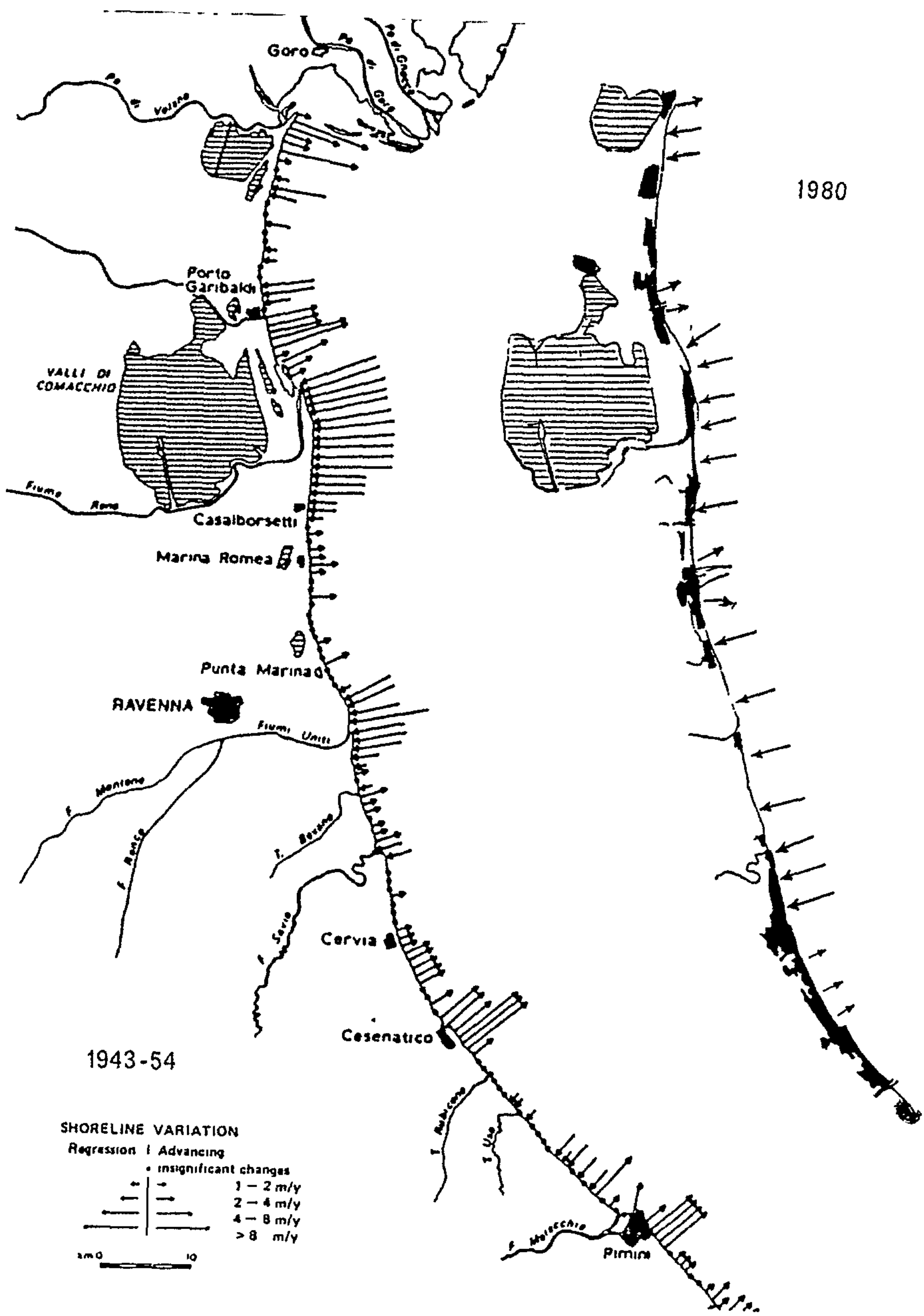
1990-1992

7. MALTA ISLAND
8. CRES/LOSINJ ISLANDS
9. KASTELA BAY
10. IZMIR BAY
11. RHODES ISLAND
12. SYRIAN COAST

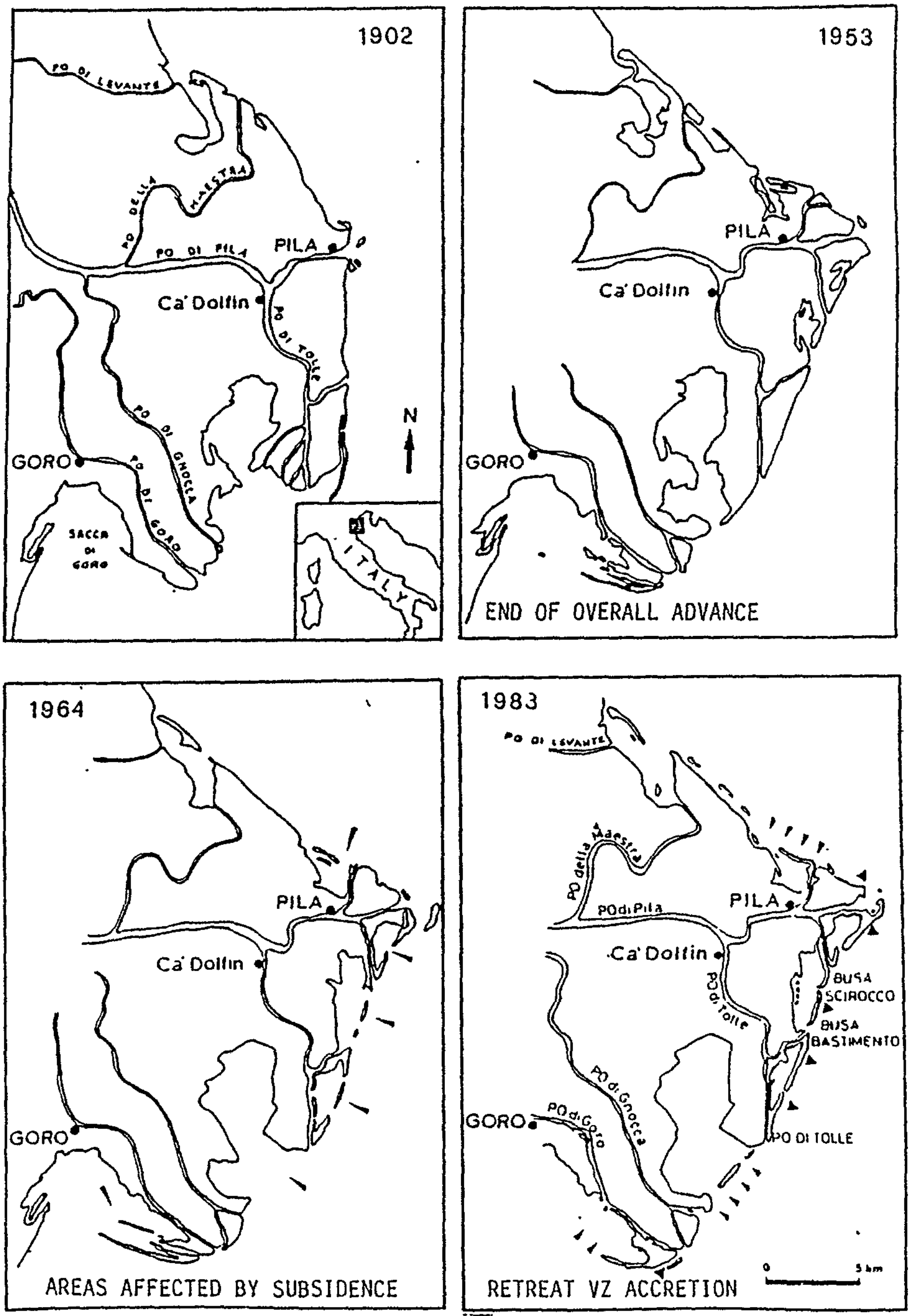
The Mediterranean Region. Regional impact assessments. Case studies

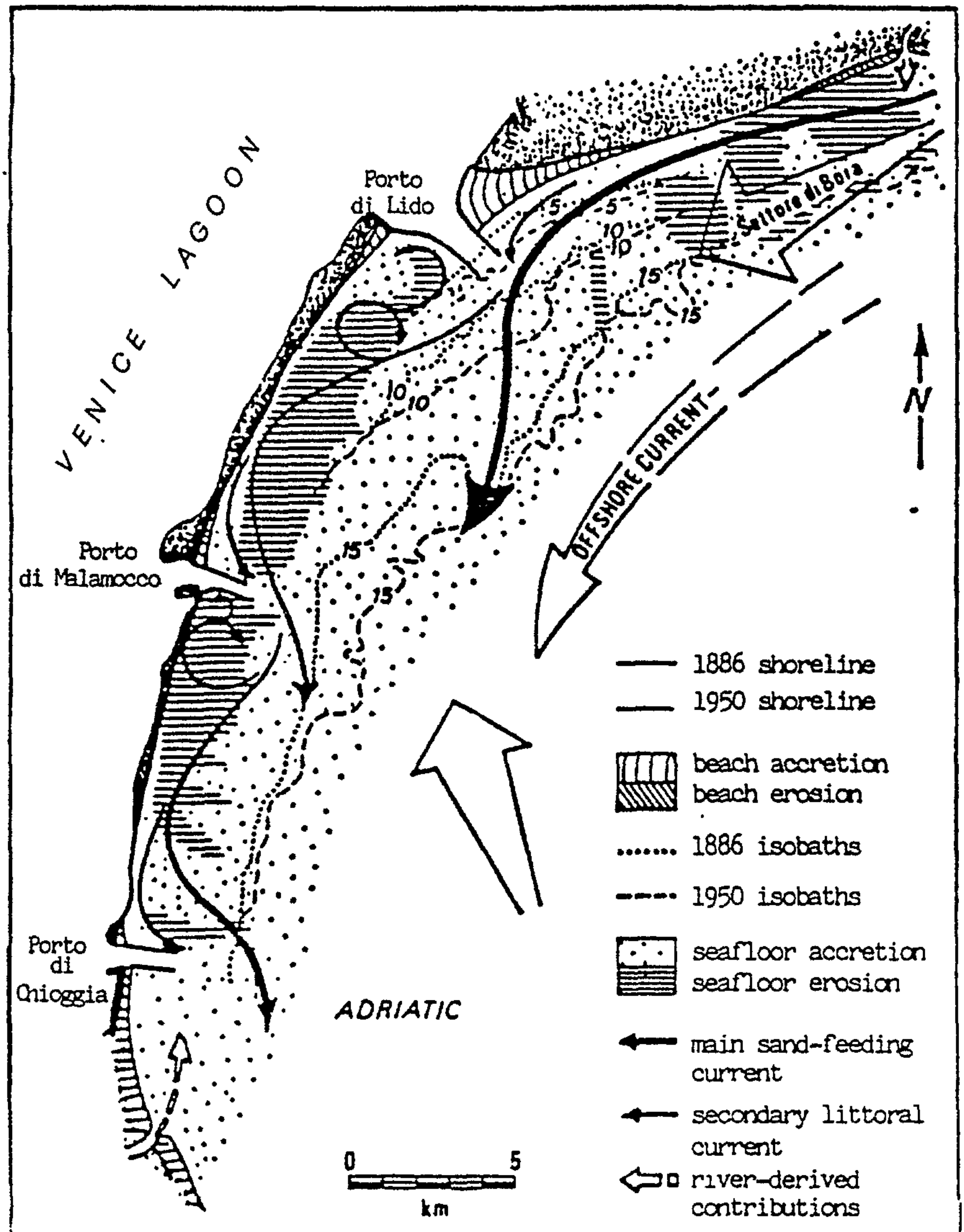


Erosion-Accretion state of the Nile Delta shoreline. Top: from UNDP/UNESCO 1978; bottom, from Tetratech 1986 (based on Coastal Research Institute studies). Proposed setback lines, from Coastal Protection Master Plan.



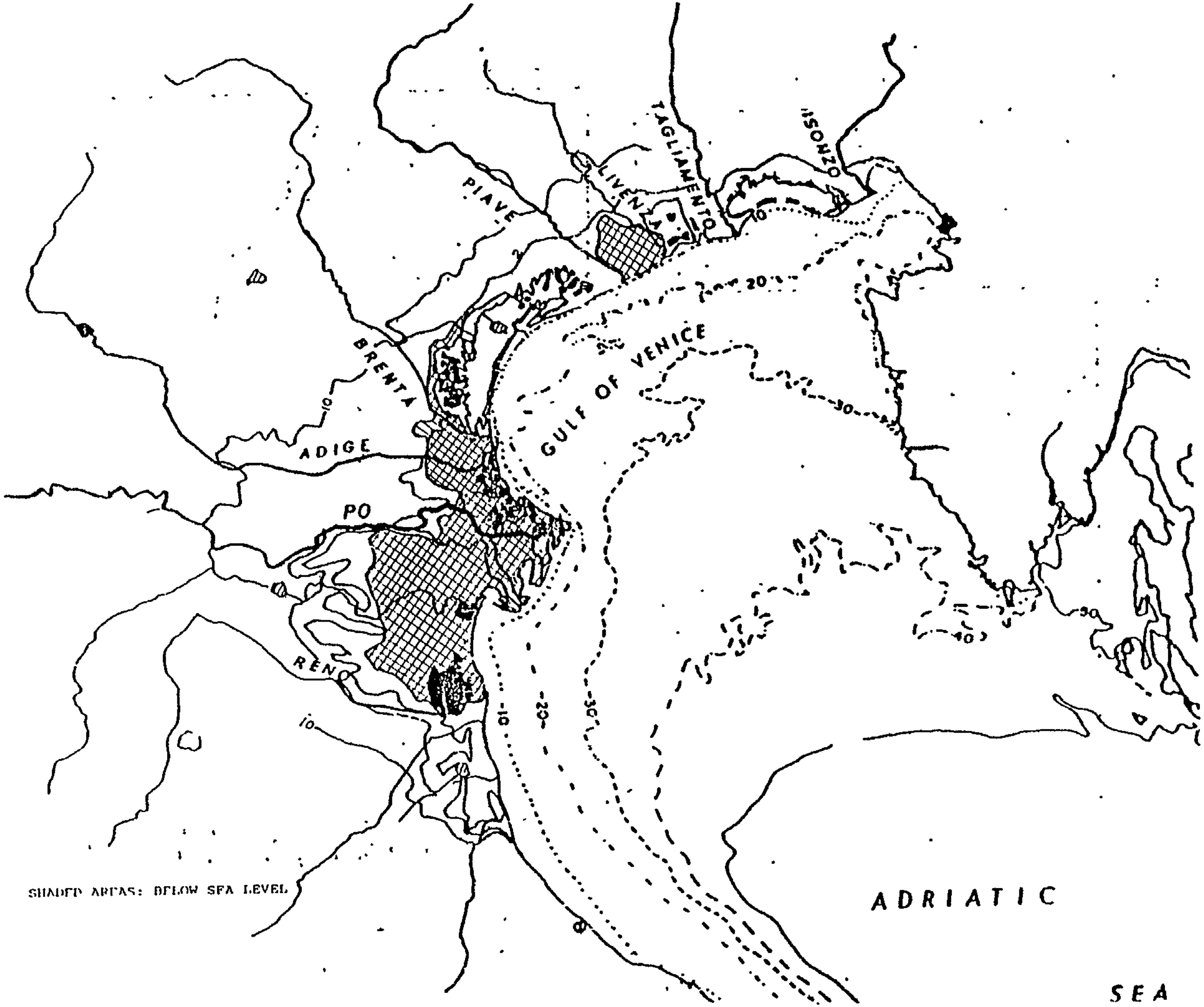
Summary of the state of erosion/accretion on the Romagna coast
(From Cencini et al 1979, CNR 1985)

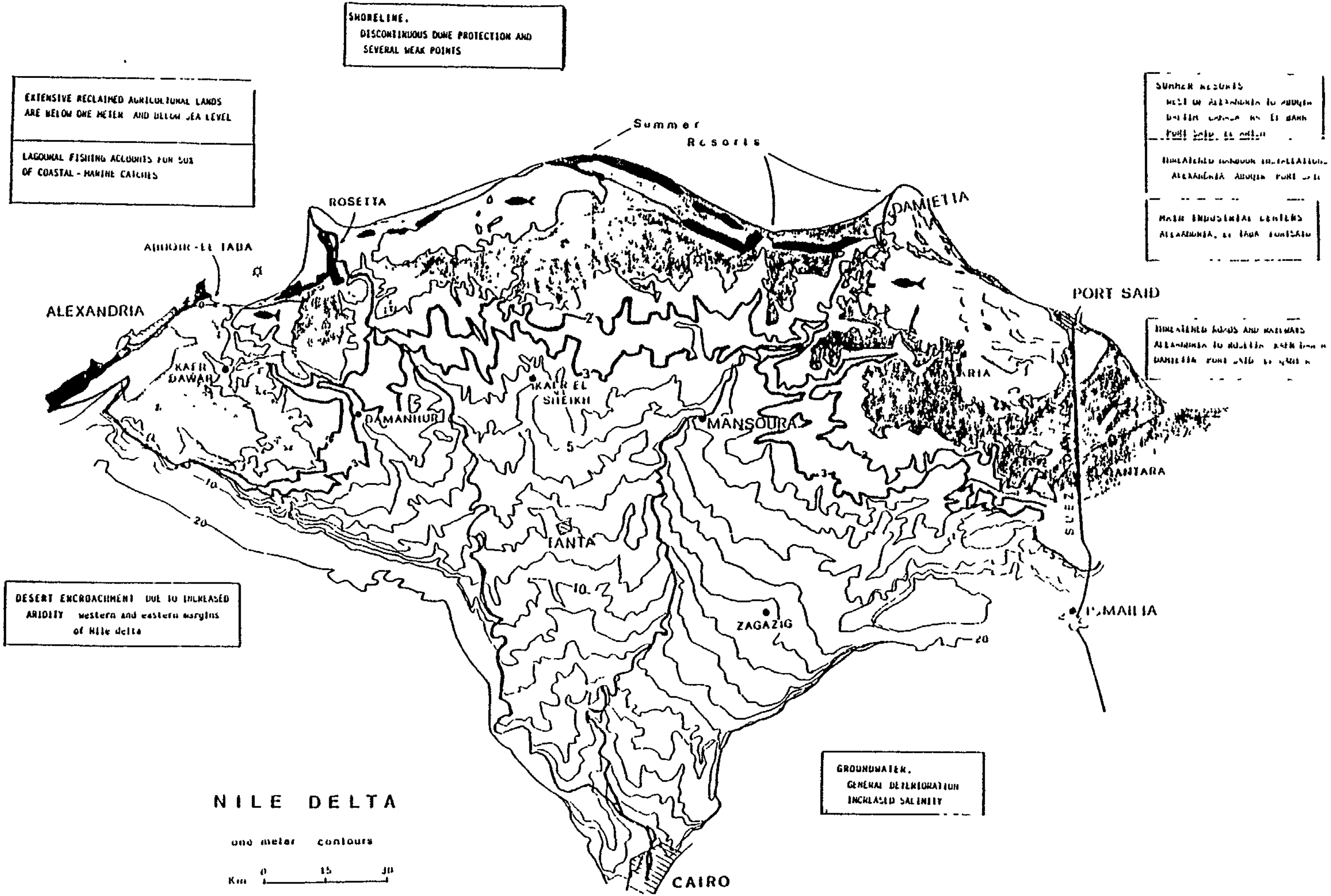

1902
PO DI LEVANTE
PO DELLA MAESTRA
PO DI PILA
PILA
Ca' Dolfin
PO DI TOLLE
PO DI GNOCCA
PO DI GORO
GORO
SACCA DI GORO
N
ITALY
1953
PILA
Ca' Dolfin
GORO
END OF OVERALL ADVANCE
1964
PILA
Ca' Dolfin
GORO
AREAS AFFECTED BY SUBSIDENCE
1983
PO DI LEVANTE
PO della Maestra
POdiPila
PILA
Ca' Dolfin
POdiTolle
BUSA SCIROCCO
BUSA BASTIMENTO
PO DI TOLLE
POdiGnocca
POdiGoro
GORO
0
5 km
RETREAT VZ ACCRETION

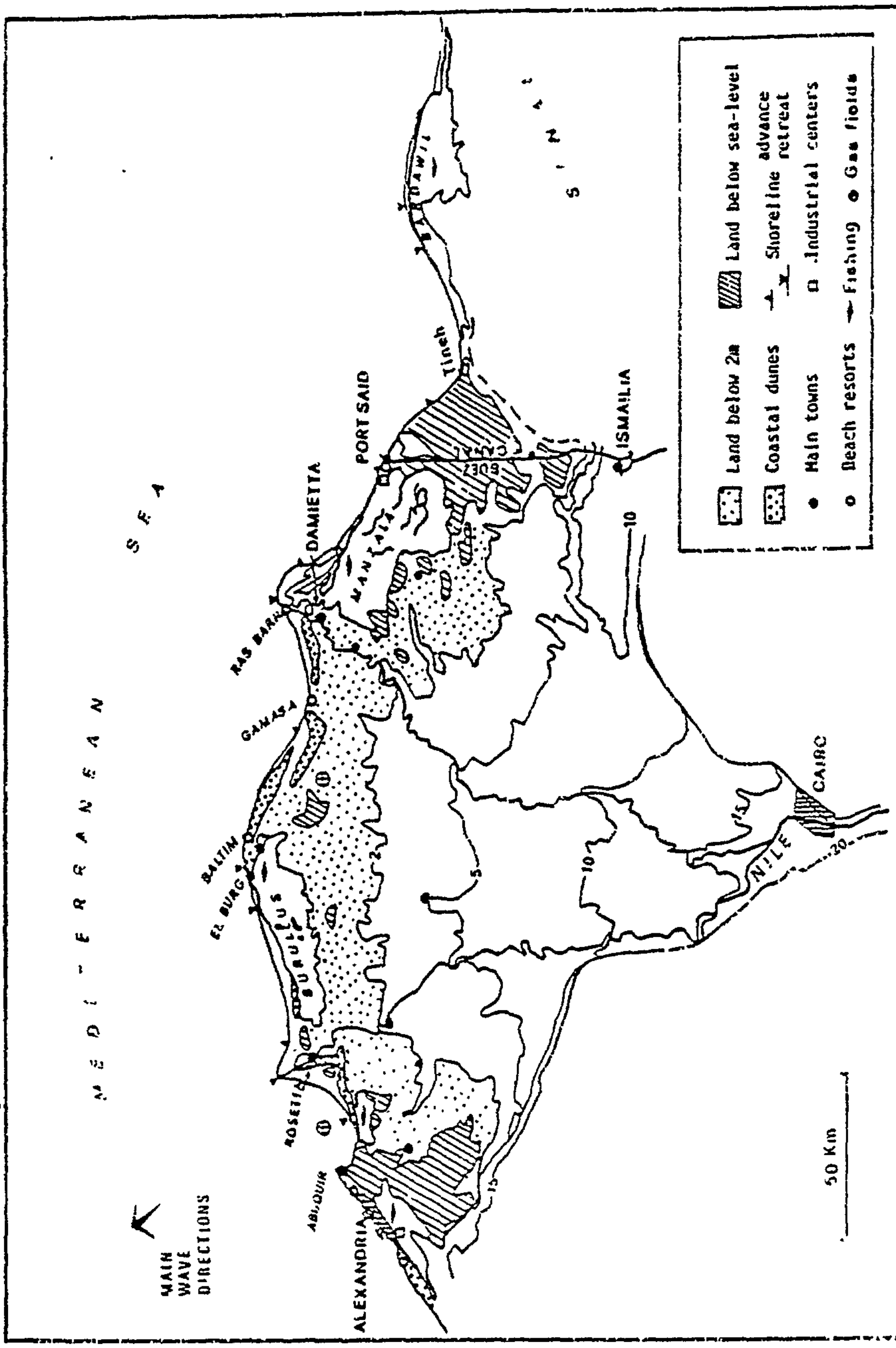


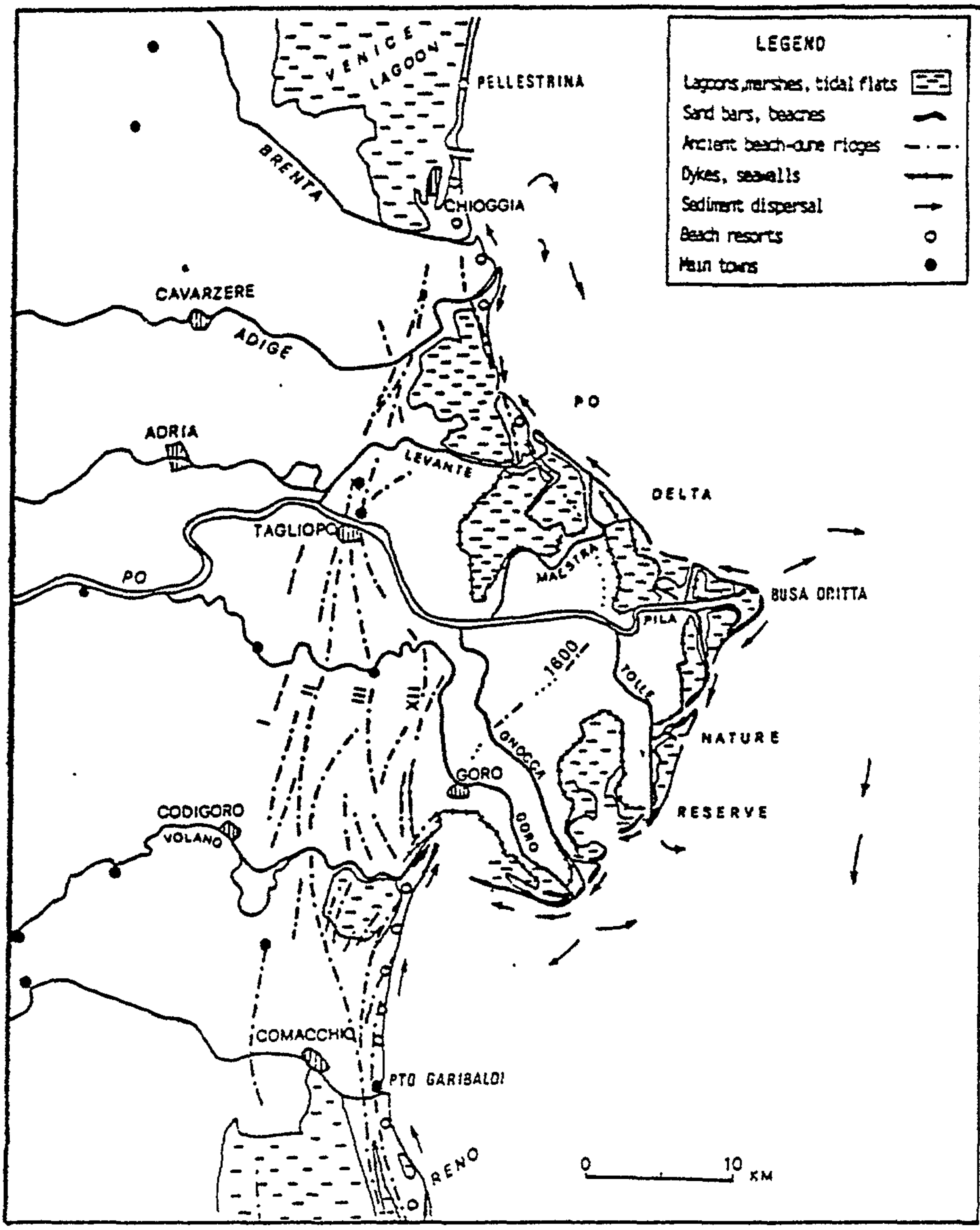
NEARSHORE CIRCULATION

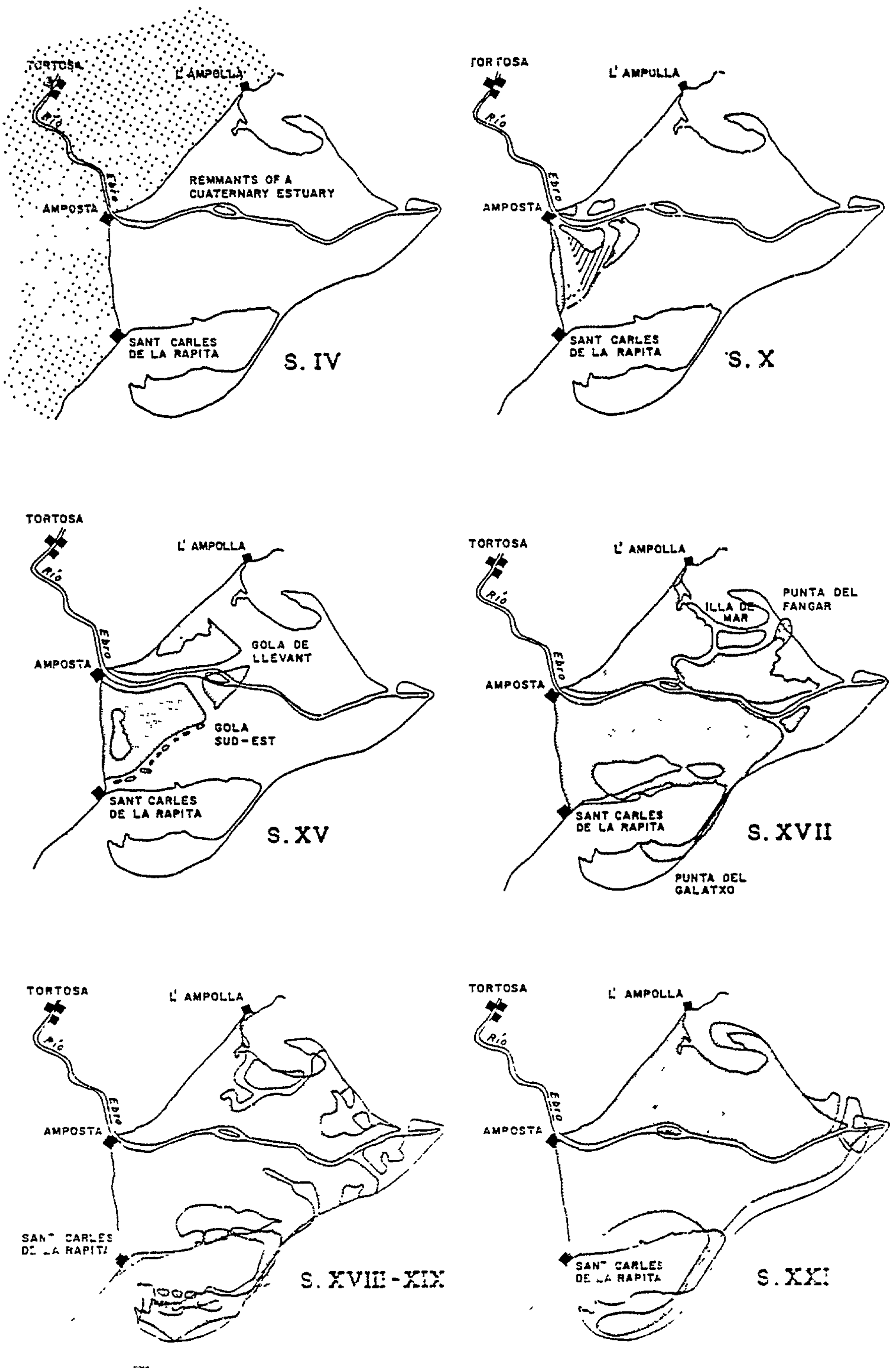
AND SEDIMENT MOVEMENT OUTSIDE THE LAGOON OF VENICE


TAGLIAMENTO
ISONZO
LIVENZA
PIAVE
BRENTA
ADIGE
PO
RENO
GULF OF VENICE
ADRIATIC
SEA
10
20
30
40
SHADED AREAS: BELOW SEA LEVEL

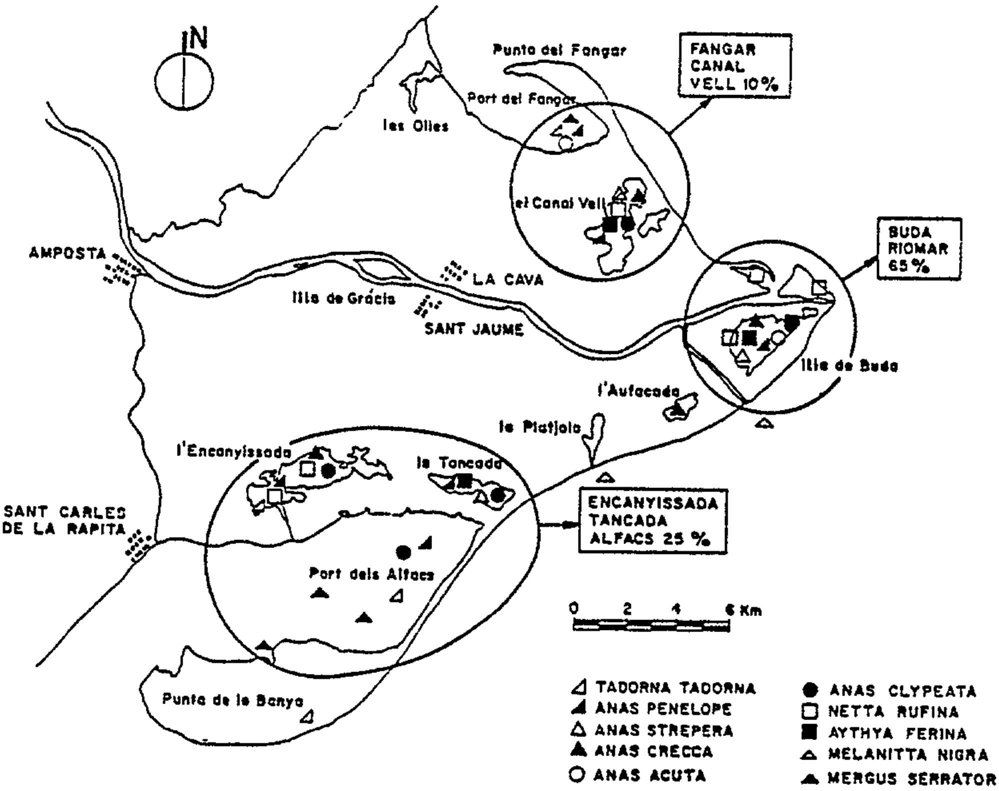

SHORELINE,
DISCONTINUOUS DUNE PROTECTION AND
SEVERAL WEAK POINTS
EXTENSIVE RECLAIMED AGRICULTURAL LANDS
ARE BELOW ONE METER AND BELOW SEA LEVEL
LAGOONAL FISHING ACCOUNTS FOR 50%
OF COASTAL - MARINE CATCHES
SUMMER RESORTS
MAIN INDUSTRIAL CENTERS
THREATENED ROADS AND RAILWAYS
Summer
Resorts
ROSETTA
DAMIETTA
PORT SAID
ALEXANDRIA
KAFR DAWAR
DAMANHUR
KAFR EL SHEIKH
MANSOURA
TANTA
ZAGAZIG
ISMAILIA
CAIRO
SUEZ
DESERT ENCROACHMENT DUE TO INCREASED
ARIDITY western and eastern margins
of Nile delta
GROUNDWATER,
GENERAL DETERIORATION
INCREASED SALINITY
NILE DELTA
one meter contours
Km 0 15 30


MEDITERRANEAN SEA
MAIN WAVE DIRECTIONS
ALEXANDRIA
ROSETTA
BURULLUS
BALTIM
GAMASA
DAMIETTA
MANZALA
PORT SAID
SUEZ CANAL
ISMAILIA
Tineh
BARDAWIL
SINAI
CAIRO
NILE
50 Km
Land below 2m
Land below sea-level
Coastal dunes
Shoreline advance retreat
Main towns
Industrial centers
Beach resorts
Fishing
Gas fields

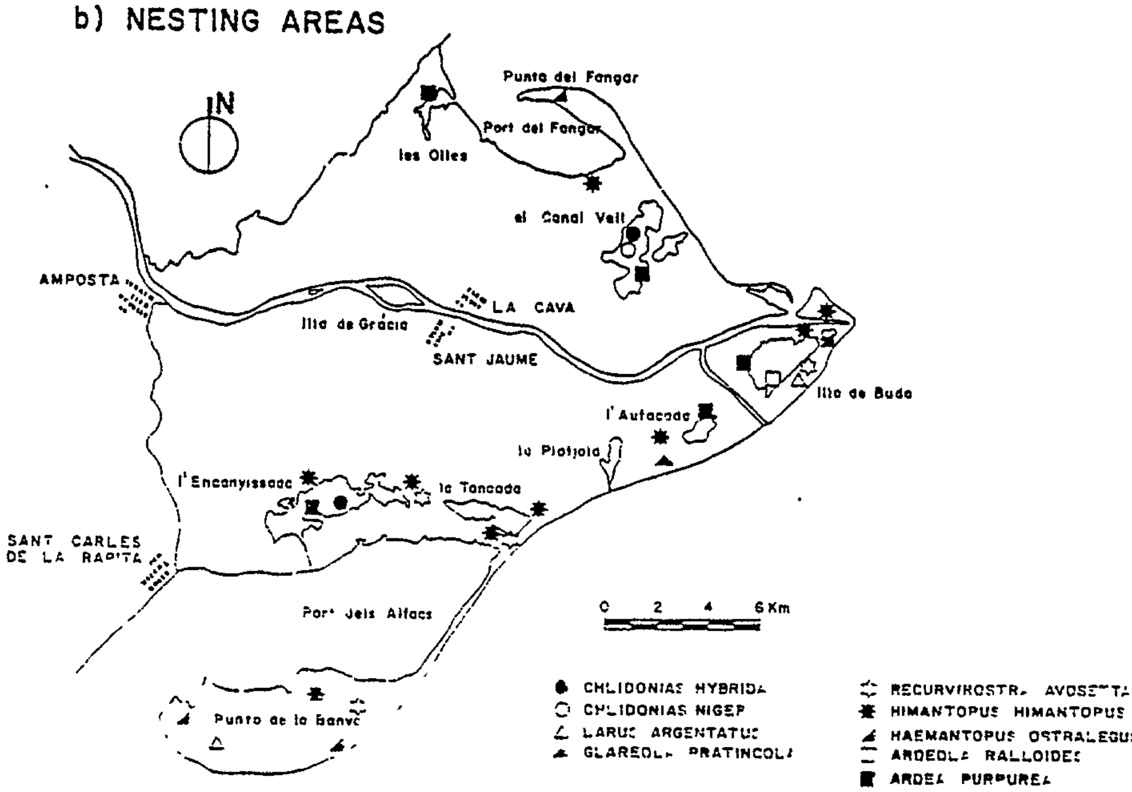

LEGEND
Lagoons, marshes, tidal flats
Sand bars, beaches
Ancient beach-dune ridges
Dykes, seawalls
Sediment dispersal
Beach resorts
Main towns
VENICE LAGOON
PELLESTRINA
BRENTA
CHIOGGIA
CAVARZERE
ADIGE
PO
ADRIA
LEVANTE
DELTA
TAGLIOPO
PO
MAESTRA
BUSA DRITTA
PILA
1600
TOLLE
NATURE
RESERVE
GNOCCA
GORO
GORO
CODIGORO
VOLANO
COMACCHIO
PTO GARIBALDI
RENO
0
10 KM

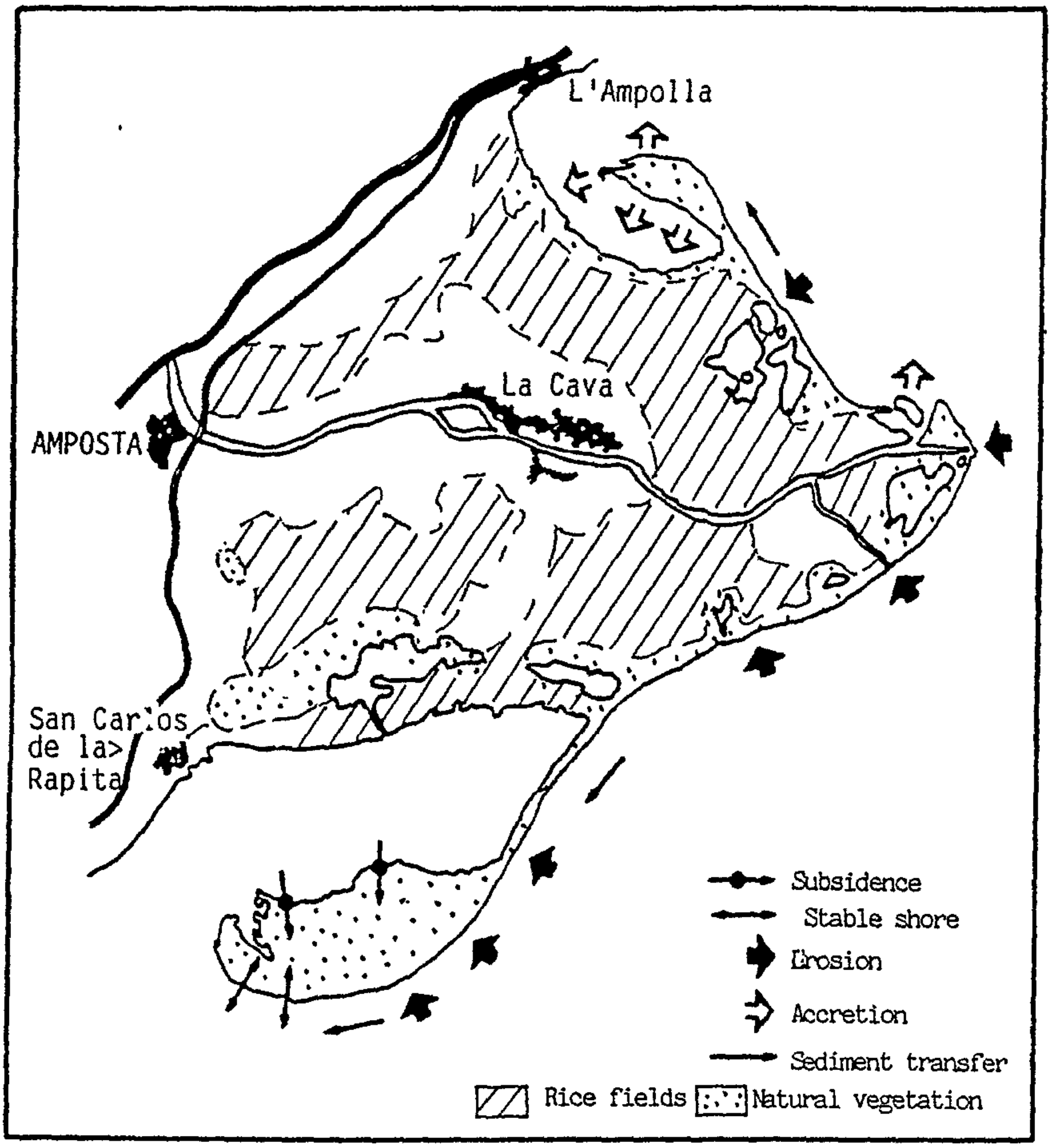

TORTOSA
L' AMPOLLA
Río
Ebro
REMMANTS OF A
CUATERNARY ESTUARY
AMPOSTA
SANT CARLES
DE LA RAPITA
S. IV
TORTOSA
L' AMPULLA
Río
Ebro
AMPOSTA
SANT CARLES
DE LA RAPITA
S. X
TORTOSA
L' AMPOLLA
Río
Ebro
GOLA DE
LLEVANT
AMPOSTA
GOLA
SUD-EST
SANT CARLES
DE LA RAPITA
S. XV
TORTOSA
L' AMPOLLA
PUNTA DEL
FANGAR
ILLA DE
MAR
Río
Ebro
AMPOSTA
SANT CARLES
DE LA RAPITA
S. XVII
PUNTA DEL
GALATXO
TORTOSA
L' AMPOLLA
Río
Ebro
AMPOSTA
S. XVIII-XIX
TORTOSA
L' AMPOLLA
Río
Ebro
AMPOSTA

a) MAIN CONCENTRATION AREAS



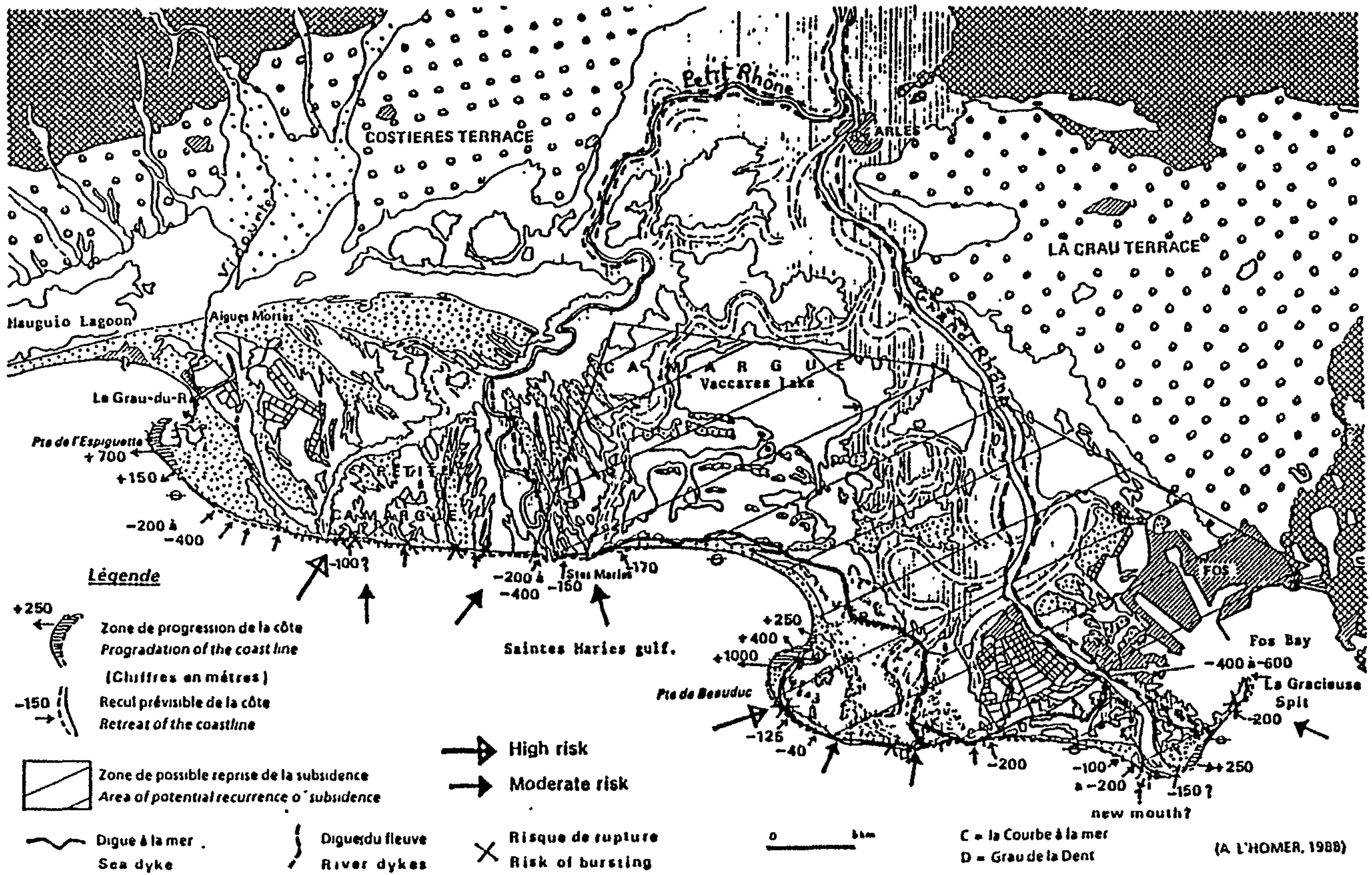
b) NESTING AREAS



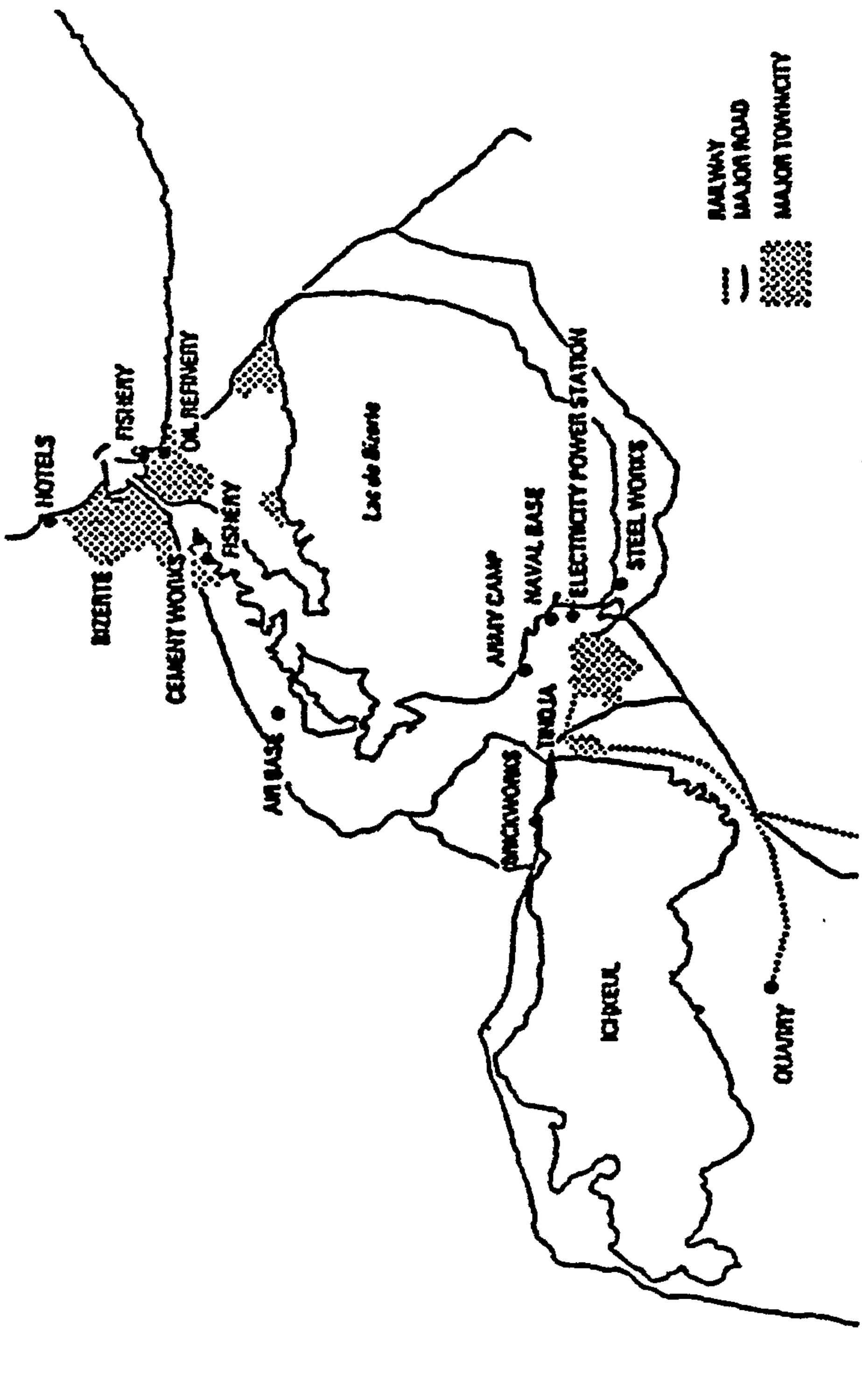


THE EBRO DELTA

Projection du littoral à l'horizon 2025



'Les chiffres indiqués sur la figure tiennent compte des effets des aménagements récents en particulier de ceux effectués pour protéger le littoral de la Petite Camargue'.



Major installations in the study area

IMPACT OF CLIMATIC CHANGE

Changed mean annual and seasonal temperature, general air circulation and precipitation will affect:

(a) surface and groundwater flow and river regimes, that is surface and ground-water availability, the incidence of floods and the amount of sediment transported and delivered to the sea;

(b) the movement of marine water masses (waves, currents, tides), especially in terms of direction and intensity of storms (i.e. erosion of the coasts) and of tidal range;

(c) natural ecosystems, due mainly to increased temperature and its effects on water and soil qualities;

(d) occupation and use of the coastal lowland regions (0-5 m) because of sea-level rise, and altered parameters of agriculture, fishing, industry, tourism and the quality of the environment.

SUMMARY OF IMPACTS

Potential evapo-transpiration will increase throughout the Mediterranean, coupled with a possible decrease in precipitation in the south and an increase in the northern part. Climatic changes generally will occur gradually and will not be specifically manifested for another 3-4 decades. Hot dry summers and exceptional events of drought or rainfall and floods, marine storms, tidal surges and of water stagnation and eutrophication, however, could increase in frequency.

Increase in temperature would lead to an increase of land degradation, deterioration of water resources, decline in agricultural production and damage to natural terrestrial and aquatic ecosystems. Salinization of irrigation water would have negative consequence on sensitive grain yield. Consequently new varieties of crops have to be introduced, adapted to the new natural setting and yield standards.

Marine circulation could be altered both in the Mediterranean and the Atlantic, thus affecting marine productivity and the pattern of pollutant dispersal.

Generally marine and land weeds are expected to benefit from warmer, CO_2 richer atmosphere. Flora and fauna of the wetlands will be forced to a gradual adaptation to induced conditions which might be crucial for the species that possess reduced tolerance to high salinities. As bioclimatic zonation will gradually shift northwards, several species will migrate to the north, and insect populations might increase. There will be favourable conditions for an increasing risk of agricultural pests, bacteria and diseases, especially in the swamps.

SUMMARY OF IMPACTS (2)

The effects of sea level rise are most predictable even though the extent of sea level rise is difficult to foresee: 1) direct wave impact on exposed coasts (e.g. the Venice lagoon coastal barrier, beach resorts) and on harbour installations (Alexandria, Port Said, La Golette-Tunis, etc); 2) flooding of estuaries, canals, lagoons, which should be more serious for agriculture than for the increasingly more valuable lagoonal fishing. Degradation of lagoons (e.g. Venice Lagoon), however, could seriously affect wildlife and fish resources; 3) a sea level rise of 10-20 cm will aggravate existing shore erosion problems.

A global mean eustatic rise in sea level of about 20 cm by 2025 would not, in itself, have a significant impact in the Mediterranean, except locally (e.g. lagoons). However, local sea level changes could be up to five times this amount because of natural land subsidence, that could be enhanced by excessive groundwater withdrawal. Particularly negative effects of this impact will be felt in low lying areas, deltas and coastal cities.

The future impacts on Mediterranean society by non-climatic factors (e.g. population increases, present development plans) may far exceed the direct impacts of climate change. Non-climatic factors will cause continuous increases in society's vulnerability to climatic stress, particularly in the south. Together, these demographic and climatic changes should increase the probability of catastrophic events and hasten their occurrence.

Most of the deltaic lowlands of the Mediterranean Sea are experiencing serious environmental problems because of agricultural, industrial, urban and tourist developments during the last two decades. Problems range from water pollution and salinization to land subsidence, shoreline erosion, and restriction and deterioration of wildlife habitats. This vulnerability is increased by adverse socio-economic conditions, the effect of which will be superimposed upon those of climatic change.

FUTURE STRATEGIES

To develop a strategy for responding to the impacts of change, it is essential to identify those parts of the Mediterranean coastal regions where knowledge is still inadequate.

The physical impact of sea level rise on the Mediterranean lowland coasts can be predicted, even modelled quantitatively on the basis of the present parameters of morphology, hydrodynamics, sediment budgets, land subsidence and the effects of artificial structures. Equally, the impacts of altered rainfall distribution on surface and groundwater could be modelled quantitatively, and the effects of increased air temperatures and changed soil-water parameters on biosystems can be estimated, at least qualitatively, which then give some idea of impacts on agriculture and fisheries. What is much more difficult to estimate, however, is the impact of these physical and biological changes on the future socio-economic framework of the threatened lowlands.

Coastal zone management must be based on "cost-effectiveness", which means an assessment of the "value" of the threatened land uses, not only in terms of their present functions, in the context of the local needs and of the importance of the lowland concerned to its hinterland and further, but especially of those of decades ahead.

Regarding sea level change, perspective actions can be either preventive or reactive. For example, entire coasts and lagoon margins can be walled in, or choices must be made between irreplaceable coastal uses (e.g. national and military harbours, towns of historical-artistic value, lagoonal resources, specialized agriculture) and adaptations. Examples of such relative actions would be (a) shifting land uses and (b) a different approach to beach recreation (i.e. less urbanized), the replacement of extensive, uneconomical crops in sub-zero lands, with lagoons destined to aquaculture and nature reserves. The lagoons would act as a buffer belt, since their inner margins can be more easily protected than the exposed coast.

FUTURE STRATEGIES (2)

Close attention needs to be paid to the conservation of soil, groundwater and wetlands resources in the Mediterranean, because they contribute substantially to environmental stability. The overall adverse effects on downstream human settlements and ecosystems by large dam schemes have not been considered sufficiently in past planning. Future water management plans must be scrutinized more closely in relation to climatic change.

Studies of the frequencies of extreme events (high temperatures, high and low precipitation events, storms surges, etc), and how these frequencies relate to mean climatic conditions, are required to help predict probabilities of occurrence.

The implications of climate impacts for some regions and processes are of very high complexity and therefore systems analysis seems to be the best approach to their study.

Attention should be given to identifying and accessing data that can be used for climatic impact assessment. The value of long-term data series is stressed. Monitoring programmes to collect such data should be maintained and/or extended.

Of particular importance is the need to initiate research on all climatically-induced changes and to control and plan coastal development well in advance of the postulated sea-level rise in order to minimize the negative effects of man-made dis-equilibriums already experienced in many parts and to make future protection cost-effective.

It is recommended that organisational and legal instruments be developed to control coastal development, land reclamation and groundwater exploitation. Lowlands could be analysed and zoned in high, medium and low risk categories.

EXPERIENCE OF THE MEDITERRANEAN TASK TEAM IN BRINGING ITS FINDINGS TO THE ATTENTION OF THE RELEVANT NATIONAL AUTHORITIES

Three of the completed site specific case studies (deltas of Nile, Po and Ebro) prepared by the Mediterranean Task Team were presented to national seminars in 1988 and 1989. Although the seminars were found interesting by their participants and in spite of the high quality of the presented studies, the seminars and the studies had very little impact on national policies, even in cases when they were well attended (e.g. in Cairo) by numerous local experts and by representatives of national authorities.

Due to insufficient interest on the part of the national authorities, two of the three remaining site specific case studies prepared by the Mediterranean Task Team (Thermaikos Gulf and Delta of Rhone) have been awaiting presentation to national seminars since 1988.

The study of the potential impact of expected climate change was successfully incorporated into four coastal zone management projects (Izmir Bay, Island of Rhodes, Kastela Bay and Syrian Coast) being carried out in the framework of the Mediterranean Action Plan.

The general conclusion was that in spite of the high quality of the task teams's products, the impact of the task teams' work on national authorities and international bodies and programmes was, in most instances, below the expected level. This was largely due to the strategies used for the:

- preparation of regional overviews which generally lacked a strong involvement of national authorities; and

- selection of sites for site specific case studies on the basis of the importance or vulnerability of the site as perceived by the task teams, and without close consultation and involvement of "end-users" in the preparation of the case studies.

PRINCIPLES FOR THE PREPARATION OF FUTURE SITE SPECIFIC CASE STUDIES

SINGAPORE MEETING ADOPTED THE FOLLOWING ELEMENTS OF A GENERAL STRATEGY FOR THE PREPARATION OF FUTURE SITE SPECIFIC CASE STUDIES (UNEP 1990):

- **case studies should be prepared either at the explicit request of the prospective end-users or after a firm confirmation of support has been received from a potential user of the case study; in both cases the intended use of the case study should be clearly stated;**

- **the potential end-user(s) should be involved in the formulation of the outline of the study and should participate in carrying out the study, i.e. the study should not be done "for him" but "with him" with the assistance of the task team;**

- **if at all possible, the study should be prepared within the framework of an integrated coastal zone management plan;**

- **each case study should have a section containing specific recommendations for policy options and measures which may mitigate or avoid the negative implications of the predicted impact of expected climate change;**

- **the form in which the results and recommendations of the study are expressed should be clear, unambiguous and easily understandable by the prospective user(s) of the study;**

- **the studies should not contain material irrelevant to the study, i.e. material which is not being used for supporting the conclusions and recommendations of the study;**

- **no study should be considered complete if it is without social and economic considerations;**

- **the counterpart representative of national authorities, associated with the work of the task team, should be made responsible for ensuring the co-ordinated involvement of relevant national authorities in the preparation of the study; and**

- **the counterpart representative of local authorities, associated with the work of the task team, should be expected to contribute to the preparation of the study, at least in kind and services.**

METHODOLOGY OF CONSTRUCTION OF SUB-GRID-SCALE TEMPERATURE AND PRECIPITATION SCENARIOS FOR MALTA REGION

A generalized computer programme that would be applicable throughout this geographically complex area, and could be used with meteorological records of variable length and density was required. After investigating a number of approaches to the problem, the procedure was adopted which is summarized below:

1. Data sets of monthly mean temperature and total precipitation have been compiled for the area surrounding the Mediterranean Basin. Where possible, each record should be complete for the period 1951-88. Any station with a record length less than 20 years in the period 1951-88 for over six months out of twelve was immediately discarded.

2. Then, for every valid station, the temperature and precipitation anomalies from the long-term (1951-88) mean were calculated. For this part of the work, which is the first step in the construction of the regression equations (the calibration stage), only the data for 1951-80 were used. The 1981-88 data were retained to test the performance of the regression models (the verification stage, see Final Report).

3. The individual station anomalies for temperature and precipitation are used to calculate regionally-averaged anomalies. The procedures described from here to the end of Point 6 are station-specific, and must be repeated for each station in the data set.

4. Regression analyses were performed using station temperature and precipitation anomalies as the predictants. These analyses were carried out on an annual and seasonal basis. The predictor variables are the regionally-averaged anomalies of temperature and precipitation.

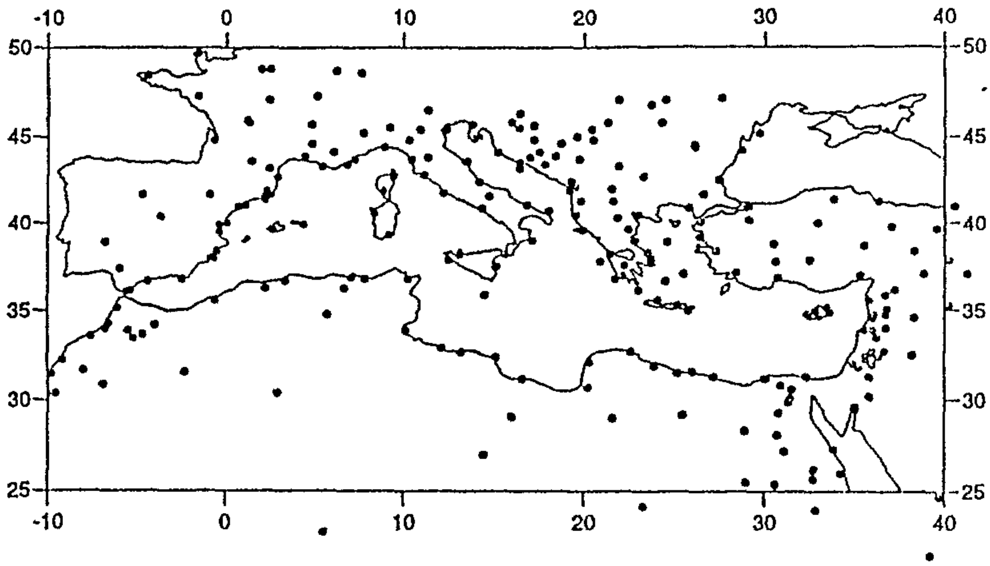
5. In order to determine the perturbation due to the greenhouse effect at each station, the results from GCMs were employed. It is assumed that a GCM grid-point temperature or precipitation value is equivalent to a regionally-averaged value derived from observational data. For each of the four GCMs (GFDL, GISS, OSU and UKMO), the perturbed run and control run grid-point temperature (t) and precipitation (p) values are interpolated to the station position.

   The values for "temperature anomaly" and "precipitation anomaly" for each GCM are then substituted in the regression equations to obtain a prediction for the station perturbation of temperature (°C) and precipitation (%) due to CO_2.

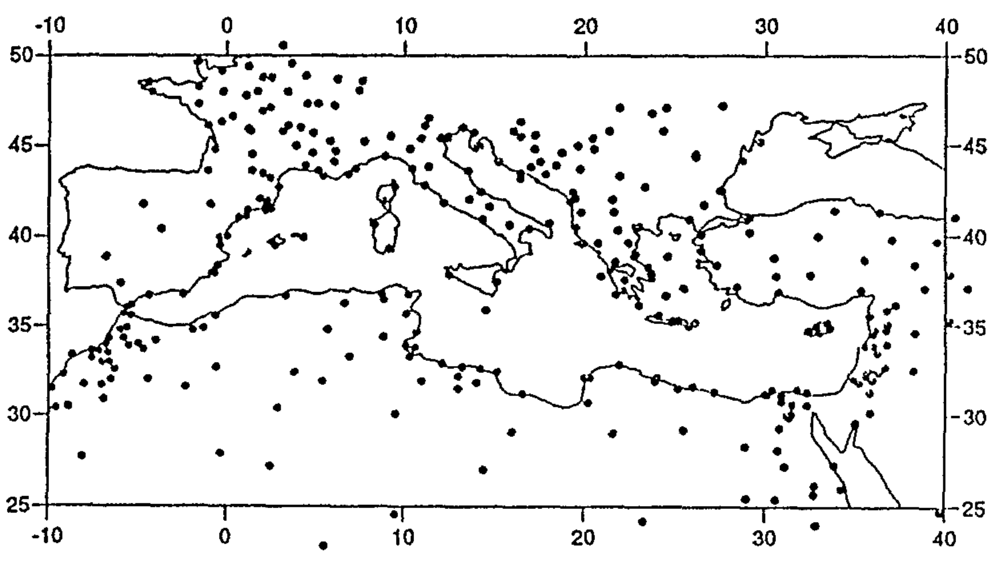
6. The predicted change in temperature and precipitation for each model is divided by the equilibrium (global mean) temperature change for that model. The results are then averaged across the four models to obtain a composite value.

7. The procedures from Points 3 to 6 is repeated for each station throughout the Mediterranean. The results can then be plotted and contoured to obtain a map of the expected patterns of temperature and precipitation change due to the greenhouse effect.

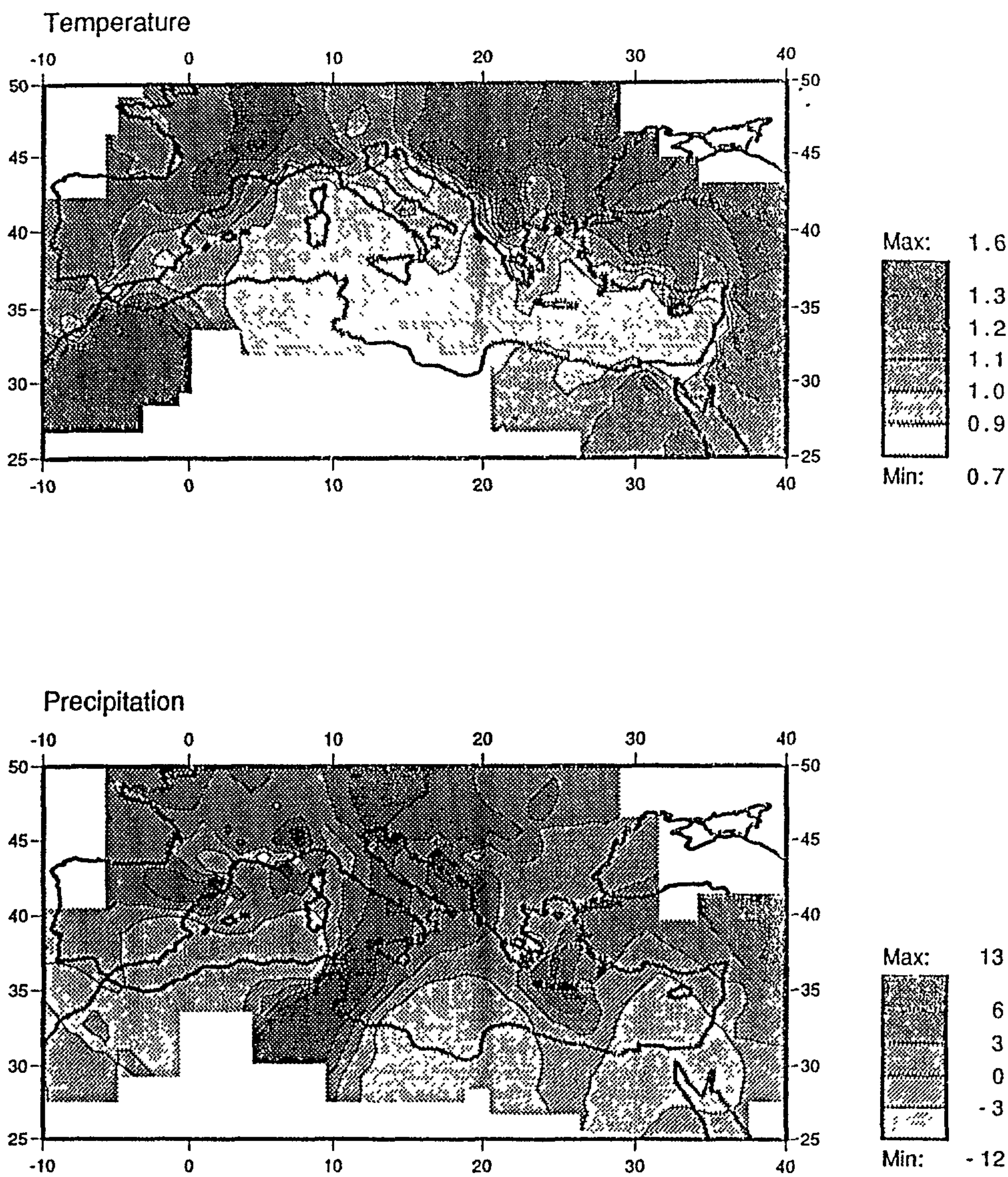
Temperature network



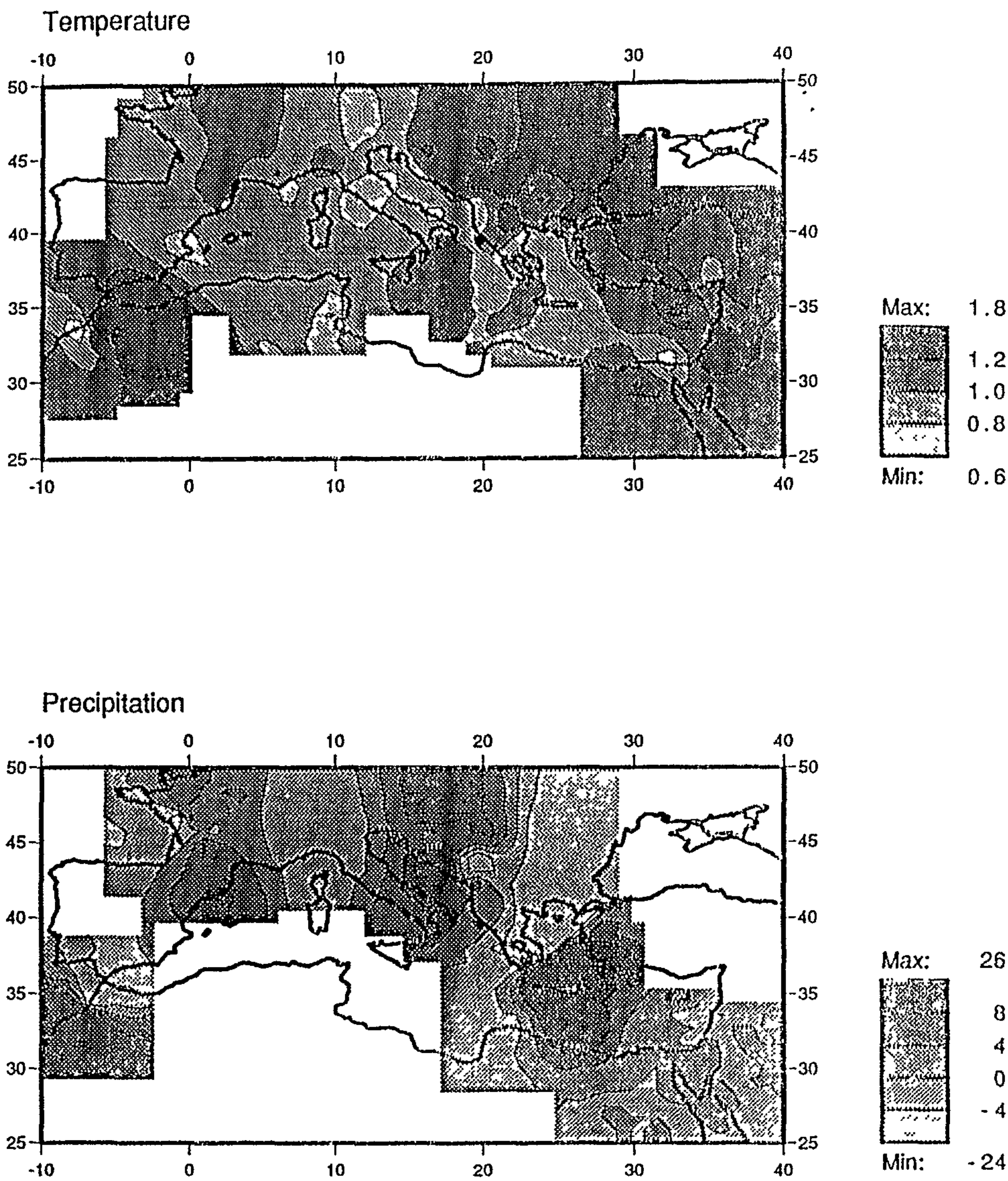
Precipitation network



Network of temperature (above) and precipitation (below) measuring stations (Palutikof et al., 1991)

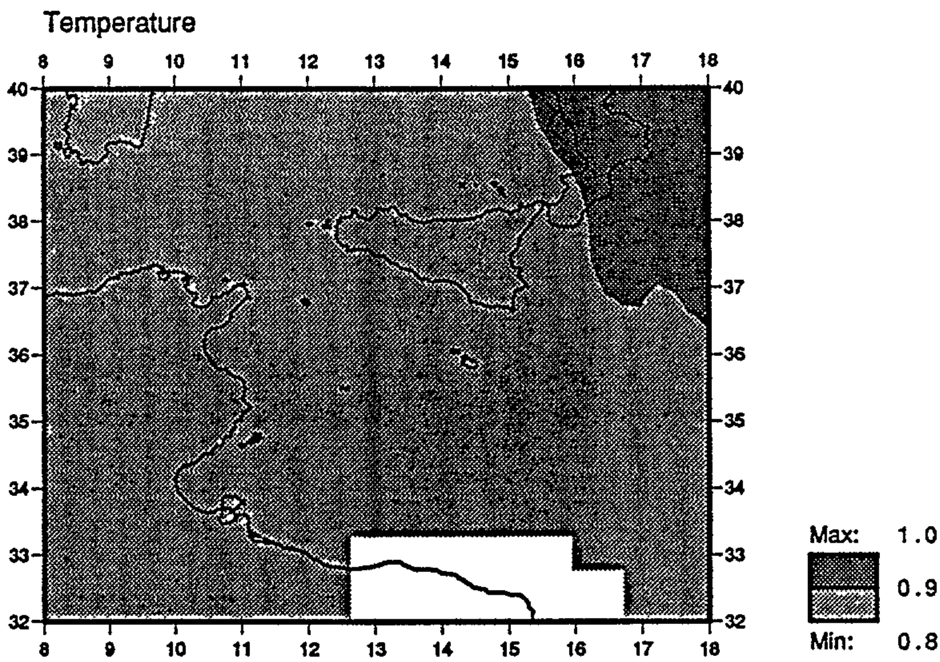


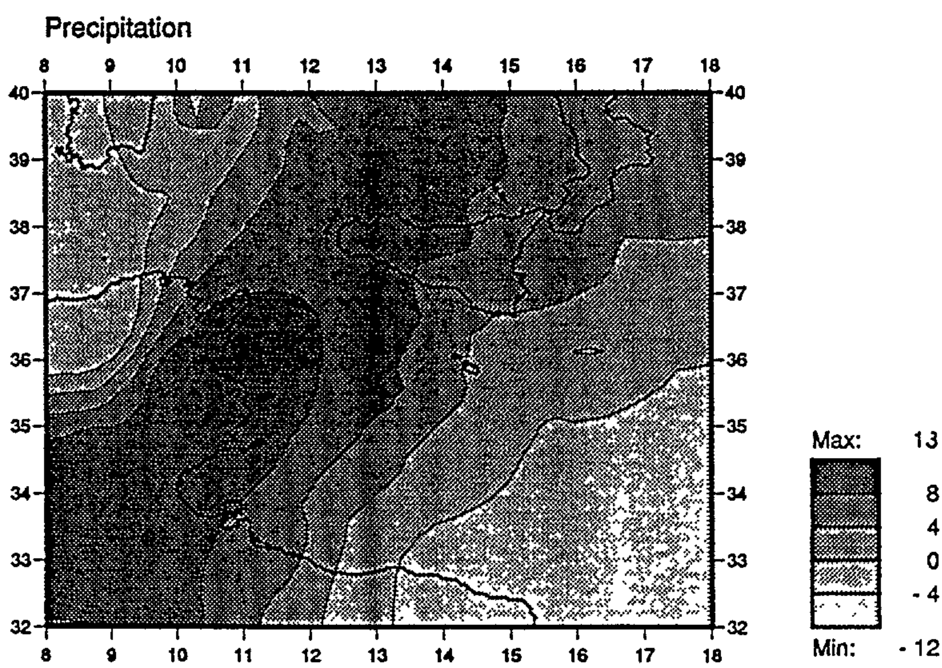
Sub-grid scale scenarios of annual temperature (°C) and precipitation (mm) change per °C change in global-mean temperature (Palutikof et al., 1991)



Sub-grid scale scenarios of summer temperature (°C) and precipitation (mm) change per °C change in global-mean temperature (Palutikof et al., 1991)

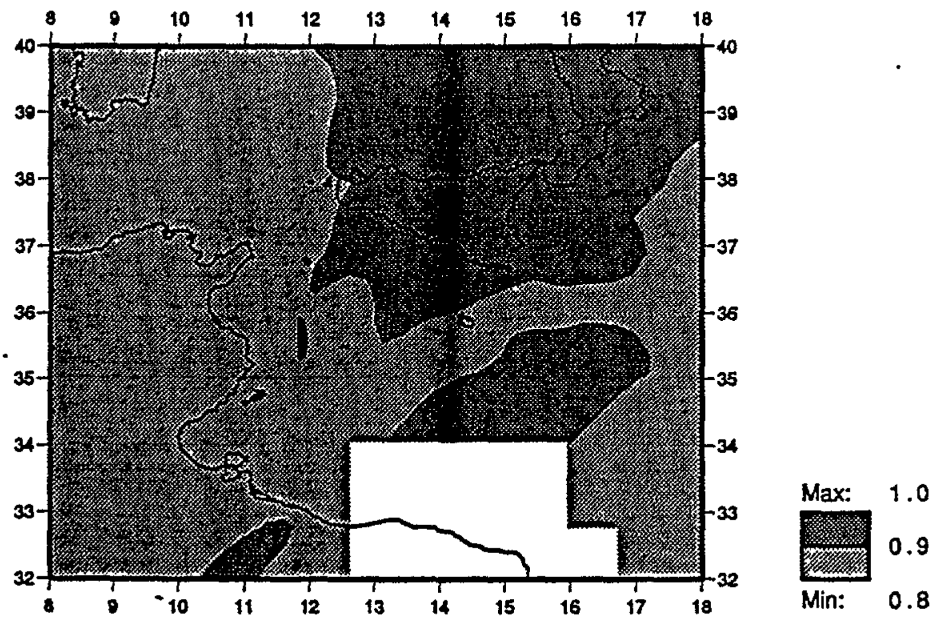
Regional climate scenarios for the Malta region: annual.
Temperature in units of °C per degree global change;
precipitation in units of % per degree global change.



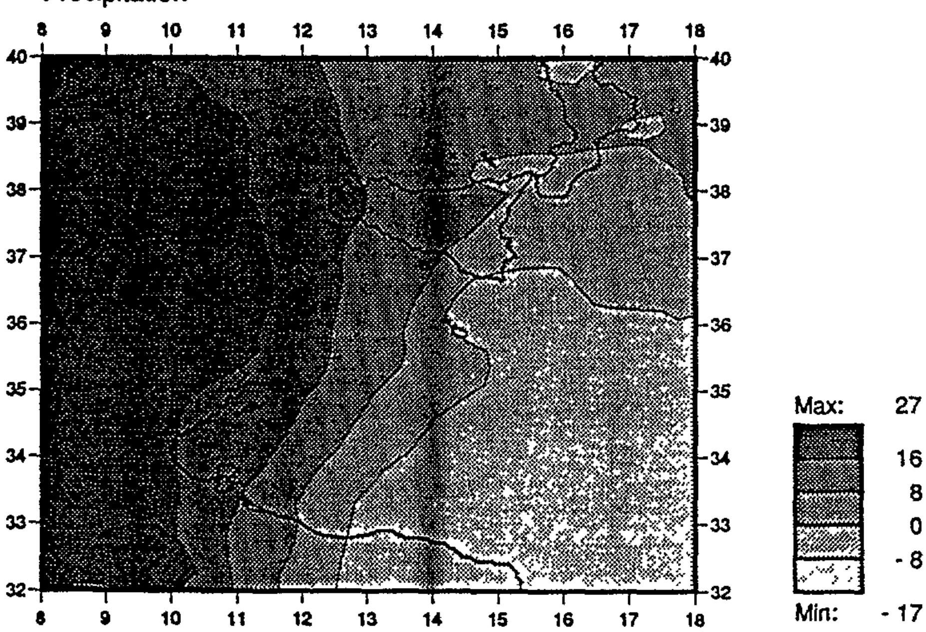


Regional climate scenarios for the Malta region: winter.
Temperature in units of °C per degree global change;
precipitation in units of % per degree global change.

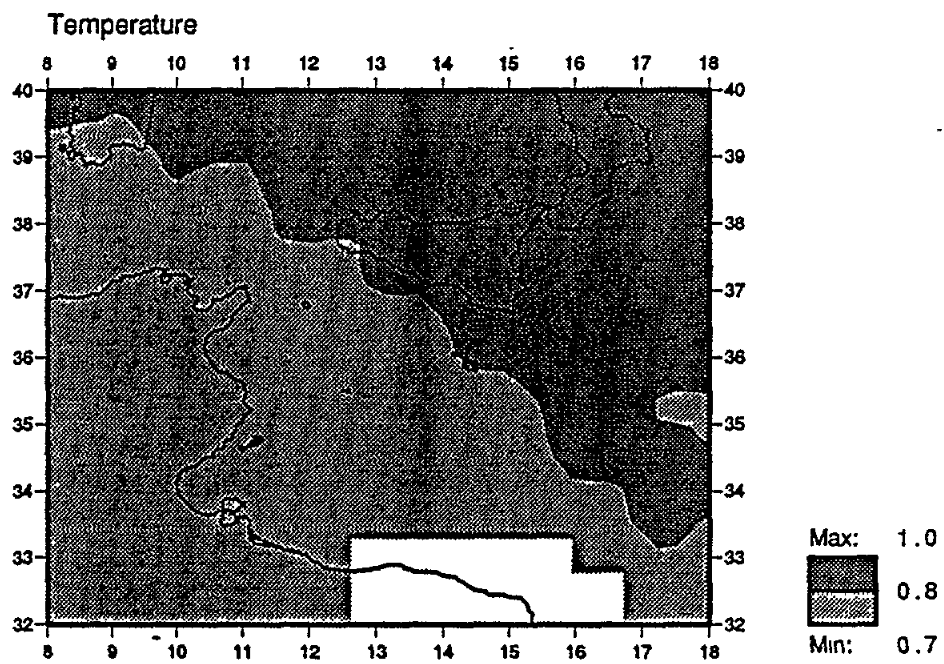
Temperature

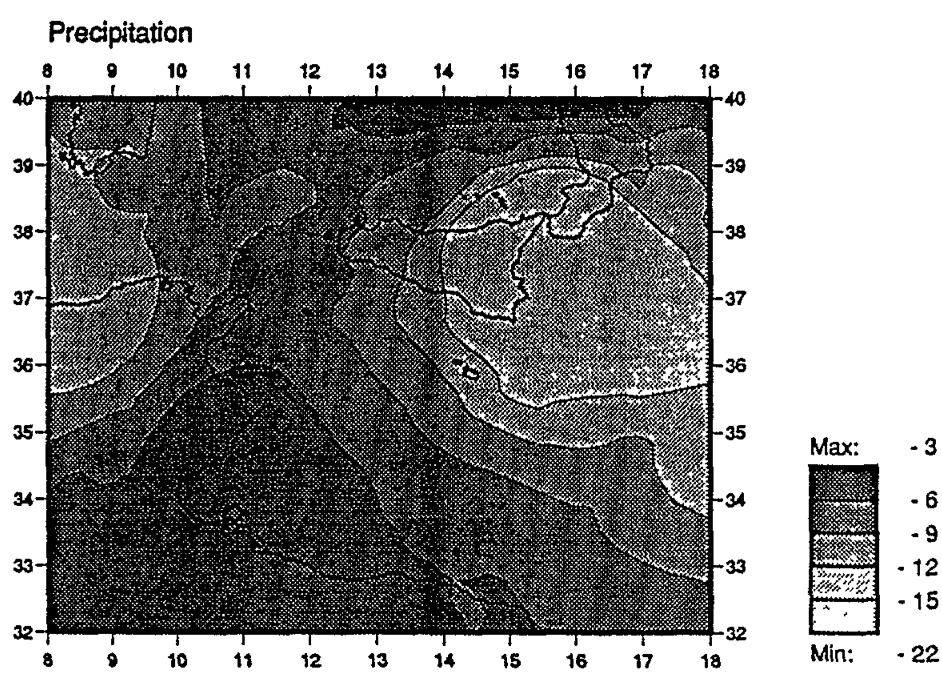


Precipitation



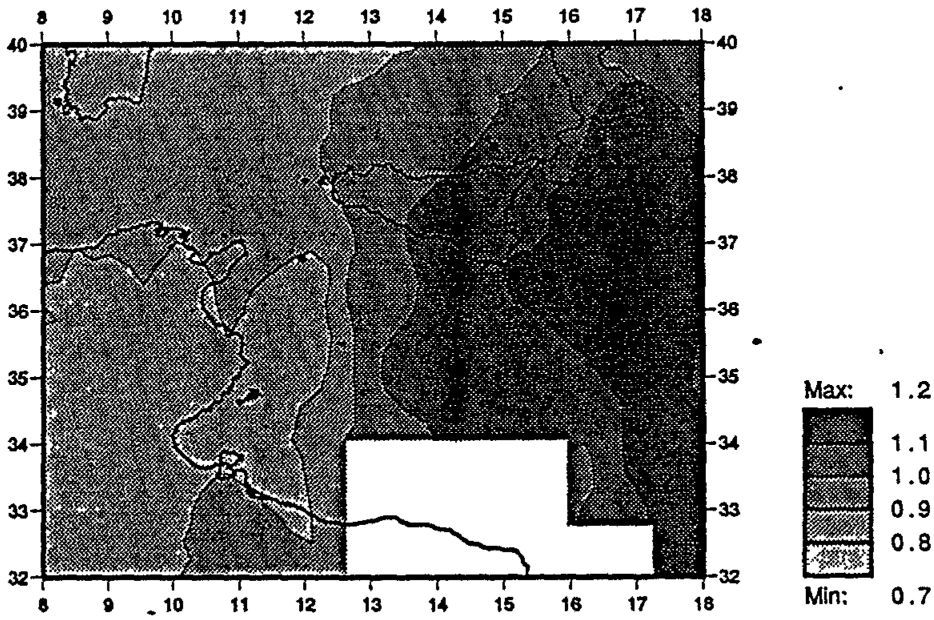
Regional climate scenarios for the Malta region: spring. Temperature in units of °C per degree global change; precipitation in units of % per degree global change.



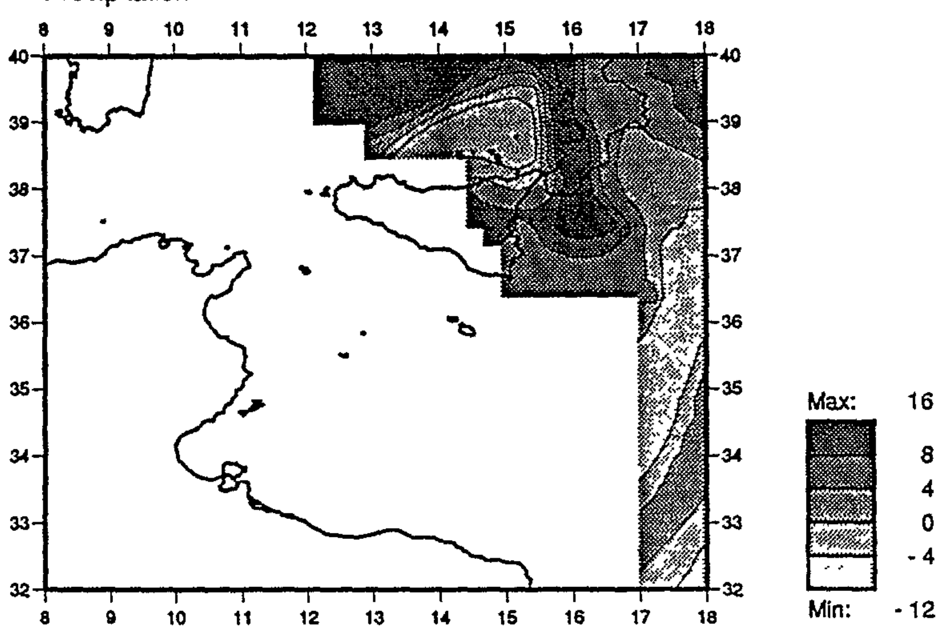


Regional climate scenarios for the Malta region: summer.
Temperature in units of °C per degree global change;
precipitation in units of % per degree global change.

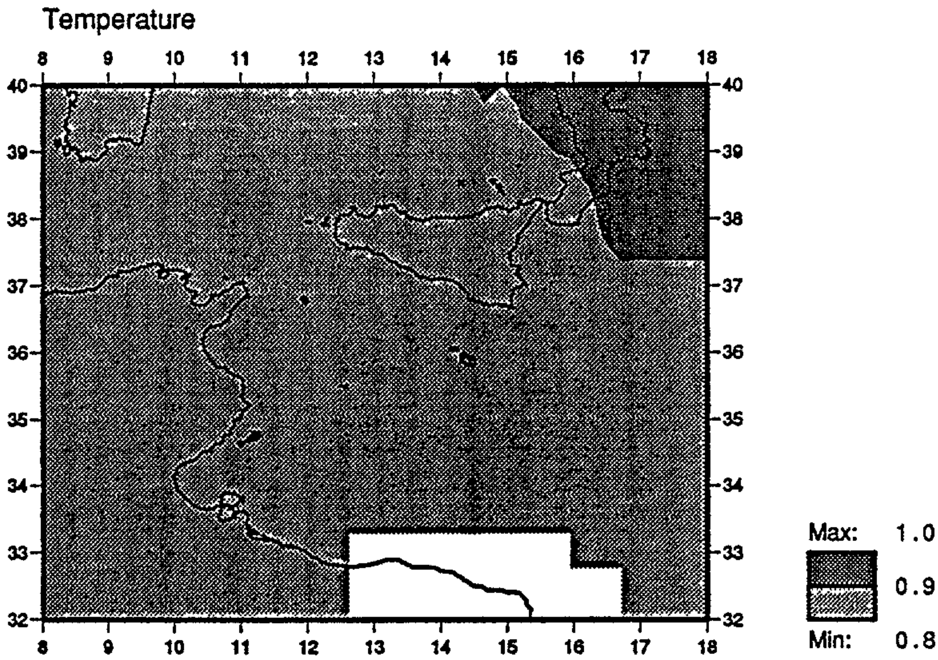
Temperature

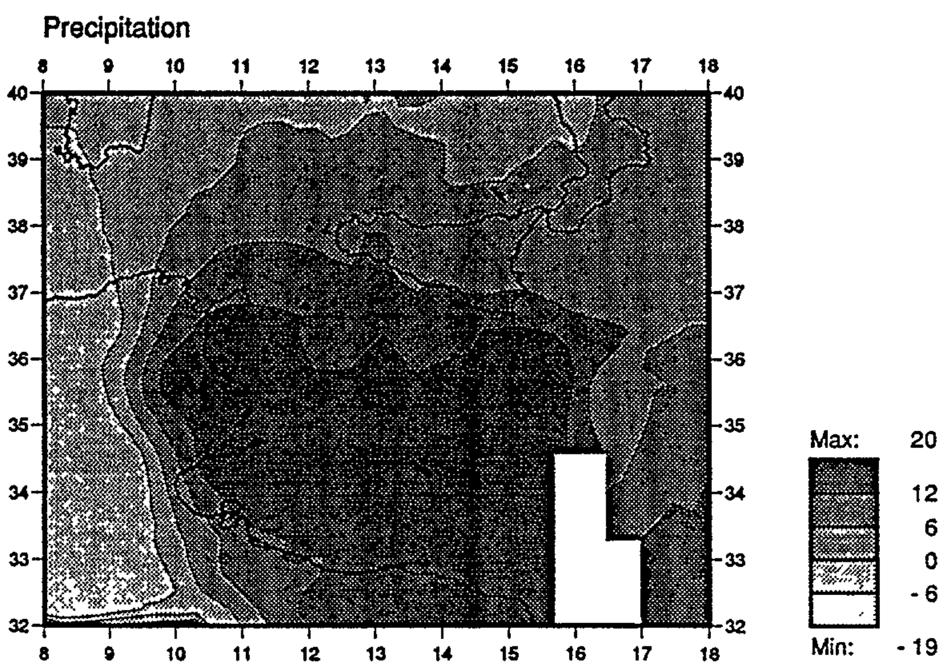


Precipitation



Regional climate scenarios for the Malta region: autumn. Temperature in units of °C per degree global change; precipitation in units of % per degree global change.





ANNEX V

BASIC FACTS ABOUT CRES/LOSINJ ISLANDS

The Cres-Losinj archipelago consists of two medium-sized and several small islands, which display a variety of the features typical of Mediterranean, limestone and sandy islands.

As a consequence, the results of this study should be of considerable interest for the whole Mediterranean community, while at the same time being of importance to the local island inhabitants, for future sound environmental management and planning.

The ecosystems of these islands are very complex and vulnerable entities of inter-related species, where every aspect of climate change and sea level rise will cause a wide range of environmental impacts.

The islands of Cres and Losinj are connected by a bridge over the narrow strait of Osor which separates them. Together with a group of smaller islands near-by (Unije, Male and Vele Srakane, Susak, Ilovik) these islands make up the western part of the Kvarner Island Group. The great variety of landscapes, vegetation and soils (mostly karst but also fertile land on sand), together with their extremely attractive coastlines and such unique features as the Vrana lake (a fresh water source below sea level), makes these islands important tourist areas. The environmental conditions are representative of all the typical and specific landscapes found on the Adriatic islands.

The archipelago includes the islands of Cres (404.3 km^2) and Losinj (74.7 km^2), Unije (16.8 km^2), Male i Vele Srakane (2 km^2), Susak (3.7 km^2), Ilovik (5.9 km^2), Zeca (2.9 km^2), and Sv.Petar (0.9 km^2):

- inhabited as early as the Bronze Age; the ancient Greek ports of Cres and Osor (the place of junction of the Islands of Cres and Losinj) existed, were later used as merchant ports for the amber trade;

- the islands are reached by sea with ferry-boat connections at two places (approximately 5.5 km) and a shipping line from Rijeka (the regional centre - 26 km);

- climate: moderate and with low diurnal and seasonal variation; low precipitation in summer; daily average of 10 sunshine hours; prevailing winds are the "Bora" (NE) and the "Jugo" or "Sirocco" (SE);

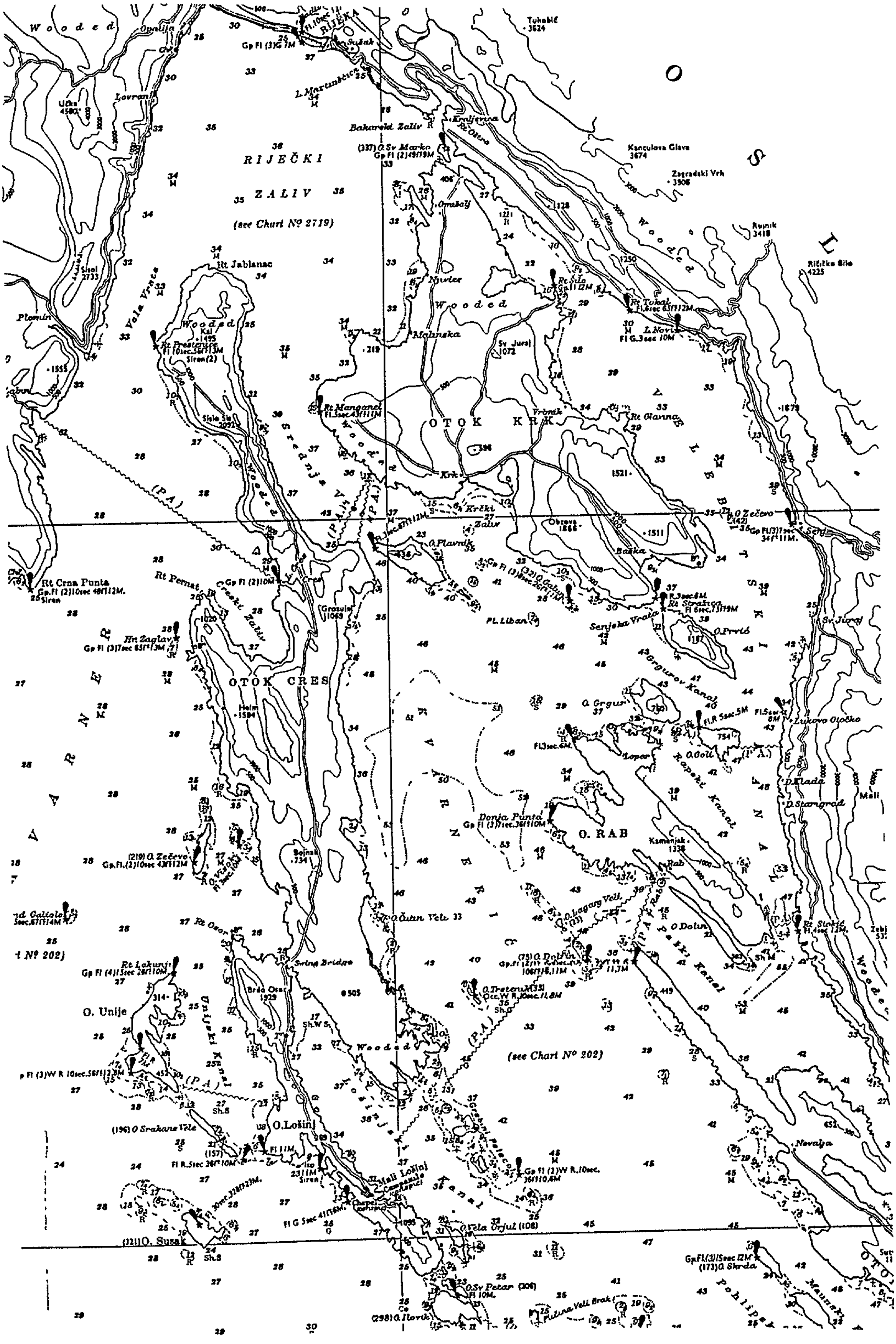
- vegetation: great landscape variety, ranging from the bare karst terrain and the maquis vegetation of Cres, to the Mediterranean pine woods of Losinj and with individual, specific environmental units, such as a the sandy island of Suzak with many vineyards;

- the only fresh water resource is the Lake of Vrana with a surface area of 575 hectares - 10 m above sea level, maximum depth 75 m, which is 65 m below sea level;

- there are 39 settlements and 11,639 inhabitants on the islands; the total number of tourist beds is 36,044, while the annual number of tourists is 328,000.

ANNEX VI

MAP OF THE STUDY AREA



ANNEX VII

OBJECTIVES, ASSUMPTIONS AND OUTPUTS OF THE STUDY

OBJECTIVES

Long-term objective

Sound environmental management and planning of land use and the use of resources on the Island Group, typical for the Adriatic as well as for the Mediterranean islands of medium and small size in the conditions of climate change.

Short term objectives

- To identify and assess possible implications of expected climatic changes on the terrestrial, aquatic and marine ecosystems, populations, land-use and sea-use practices and other human activities;
- To determine areas or systems which appear to be most vulnerable to the expected climatic changes;
- To give recommendations for planning and management of coastal areas and resources, as well as for planning and design of major infrastructure and other systems;
- To provide an input into other projects and developments relevant to the subject of the study.

The findings should serve for:

- methodological guidelines in studying climate change impact on other Adriatic and Mediterranean islands of medium and small size;
- development strategies for the islands in the changed climate conditions;
- methodological guidelines for land-use, town planning and environmental management on the Island Group and on other Adriatic and Mediterranean medium and small-size islands;
- further work on coastal zone management studies in the frame of UNEP/MAP;
- information for the public, economists, policy and decision makers.

ASSUMPTIONS

For the specific purpose of the study a sea level rise of 24-52 cm and a temperature elevation of 1.5 to 3 degrees Centigrade by the year 2050 will be used, taking into account:

- The best available information, knowledge and insights into the problems relevant to the Island Group area including major projects, planned or under consideration;

- The assumptions accepted at the Second World Climate Conference (1990), ie an increased temperature of 2-5EC and sea level rise of 65 ± 35 cm before the end of the 21st Century;

- The IPCC statement concerning potential changes to the climate of Southern Europe (35E - 50EN 10EW - 45EE) that: " warming would be about 2EC in winter and would vary from 2E to 3E C in summer. There is some indication of increased precipitation in winter but summer precipitation decreases by 5 to 15%, and summer soil moisture by 15 to 25%.";

- The expected results of the University of East Anglia's Scenario analysis for the Mediterranean Basin with sub-regionally specific scenarios.

OUTPUTS

- Identified impacts of predicted climatic changes and sea level rise;

- An assessment of the magnitude and implications of the identified impacts;

- Proposed policies and measures to mitigate or avoid the predictable consequences of expected climatic change;

- Development strategies for studied islands in the changed climate conditions;

- Digitized (computerized) environmental data sets (topography, land-water boundaries, boundaries of the geographic and the administrative units, hydrology, land-use, sea-use), relevant for the focal areas of the Island Group, to be prepared in close co-operation with the PAP/RAC;

- Standard graphic displays, digitized maps, "lay-out method" graphic displays of the basic data sets, as well as of the resulting data to be prepared in close co-operation with the PAP/RAC.

ANNEX VIII

OUTLINE OF THE REPORT

EXECUTIVE SUMMARY - A. Randic

1. INTRODUCTION - A. Randic

1.1. Background
1.2. Basic Facts about Selected Adriatic Islands
1.3. Methodology and assumptions used in the Study

2. IDENTIFICATION AND ASSESSMENT OF THE POSSIBLE CONSEQUENCES OF CLIMATIC CHANGE

2.1. Climate Conditions - K. Pandzic
2.2. Lithosphere - B. Biondic
2.3. Hydrosphere - B. Biondic
2.4. Atmosphere - S. Vidic
2.5. Natural Ecosystems including specially protected areas - Nature Prot. Dept. of the Ministry
- 2.5.1. Terrestrial Ecosystems - E. Draganovic
- 2.5.2. Freshwater Ecosystems - B. Biondic
- 2.5.3. Marine Ecosystems - N. Smodlaka

2.6. Managed Ecosystems
- 2.6.1. Agriculture - to be advised
- 2.6.2. Fisheries - D. Balenovic
- 2.6.3. Aquaculture - N. Smodlaka
- 2.6.4. Sylviculture - Nature Prot. Dept. of the Ministry

2.7. Energy and Industry - M. Losinj/ M. Mastrovic
2.8. Tourism - M. Losinj
2.9. Transport and Services - M. Salaj
2.10. Health and Sanitation - M. Losinj/M. Mastrovic
2.11. Population and Settlement Pattern - N. Karajic/to be advised

3. SYNTHESIS OF FINDINGS - A. Randic

3.1. Present Situation - G. Dorcic
3.2. Major Expected Changes and their Impacts - G. Dorcic

4. RECOMMENDATIONS FOR ACTION - A. Randic

4.1. Preventative Policies and Measures - G. Dorcic
4.2. Adaptive Policies and measures - G. Dorcic

REFERENCES

ANNEX IX

WORKPLAN AND TIMETABLE *

-	Nomination of the Co-ordinator of the Task Team	June 1991
-	Establishment of the Task Team	July 1991
-	First (preparatory) meeting of the Task Team	March 1991
-	Collection of data and relevant documentation by the members of the Task Team	March-July 92
-	Analysis and evaluation of data and documentation by the members of the Task Team	March-July 92
-	Preparation of the first outline of individual substantive sections (Chpt. 2 of the outline) by the members of the Task Team, highlighting the main issues	April 1992
-	Second meeting of the Task Team to review the first outlines of substantive sections	April 1992
-	Preparation of extended versions of substantive sections by the members of the Task Team	March-July 92
-	Submission of individual substantive sections by the Task Team members to the Co-ordinator	August 1992
-	Third meeting of the Task Team, with external participation, to review and revise the substantive sections of the report, and prepare the conclusions and recommendations	September 1992
-	Preparation of the final draft report, by the Co-ordinator of the Task Team	October 1992
-	Fourth meeting of the Task Team to finalise and adopt the report	November 1992
-	Publication of the report by the Co-ordinating Unit of the Mediterranean Action Plan	December 1992
-	Presentation to the national and local authorities	January 1993

* In addition to the formal meetings of the Task Team it is envisaged that the core members will meet frequently between meetings of the full Team. The Co-ordinator of the Task Team will keep the external members informed of progress on a regular basis, by providing them with materials produced by the Core members of the Task Team.