NEWSLETTER

of the

EUROPEAN CENTRE ON PREVENTION AND FORECASTING OF EARTHQUAKES

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ATHENS

- RESEARCH PROJECTS
- SEMINARS – WORKSHOPS
- TECHNICAL HANDBOOKS

Council of Europe
Conseil de l' Europe

Cover Sheet Photo:
Lesbos - Ruined Castle, Drawing by M.A. Walker, Old Tracks and New Landmarks, London 1897.
Melos - Ruins of the Theatre, Drawing by L.N.P.A. Forbin, Voyage dans le Levant, Paris 1819.

CONTENTS

EUR-OPA MAJOR HAZARDS AGREEMENT OF THE COUNCIL OF EUROPE

The Committee of Ministers of the Council of Europe adopted Resolution (87) 2 in March 1987 establishing an intergovernmental Open Partial, Agreement. It is named "Open" because any non-member State of the Council of Europe may apply to accede to it.

This Open Partial Agreement has to date 23 member States: Albania, Algeria, Armenia, Azerbaijan, Belgium, Bulgaria, France, Georgia, Greece, Italy, Lebanon, Luxembourg, Malta, Republic of Moldova, Monaco, Morocco, The Former Yugoslav Republic of Macedonia, Portugal, Russia, San Marino, Spain, Turkey, Ukraine. Japan has the status of observer. The European Commission, UNESCO, WHO and the Office for co-ordination of Humanitarian Affairs (OCHA) of the United Nations, participate in the Agreement. The International Federation of Red Cross and Red Crescent Societies is associated in its work.

The EUR-OPA Major Hazards Agreement **main objectives** are:

- reinforce and promote co-operation between member States in a multi-disciplinary context to ensure better prevention, protection and organisation of relief in the event of major natural or technological disasters by calling upon present day resources and knowledge to ensure an efficient and interdependent management of major disasters;
- use the Agreement as a suitable platform for co-operation between Eastern Europe, the South of the Mediterranean and Western Europe in the field of major natural and technological disasters.
- ensure a direct interest and participation of the member States by fostering the creation of European Centres. These structures facilitate the implementation of the objectives of the Agreement and the different partners, through European information, training, research and expertise programmes.

The activities are situated at three levels:

- the political level where the policity of the Agreement, the cooperation programmes and the budgetary proposals are decided through meetings of:
  - the Ministers of the Agreement
  - the Committee of Permanent Correspondents
  - the "programme" sub-committee
  - the "audit" sub-committee
- scientific and technical permanent activities:
  - the ''European Warning System''
  - the ''European Advisory Evaluation Committee for Earthquake Prediction''
  - the ''European Network of Specialised Centres'' (21 centres)
- specific programmes:
  - The ''Communication and Information'' Programme EDRIM: Electronic discussion group for Risk Management
  - The use of space technology to assist risk management: the STRIM Programme
  - The Euro-Mediterranean programme on training in the field of risk sciences: the FORM-OSE programme.

EDRIM - ASSISTING DECISION MAKERS IN EMERGENCY SITUATION MANAGEMENT AND CO-OPERATION: EARTHQUAKE'S EMERGENCIES

J. - P. MASSUÉ
Executive Secretary, EUR-OPA Major Hazards Agreement, Council of Europe

1. BUILDING A TELECOM PIPELINE TO CIRCULATE INFORMATION TO HELP DECISION MAKING AND CO-OPERATION

In the framework of the Council of Europe EUR-OPA Major Hazards Agreement, the EDRIM *(Electronic Discussion for Risk Management)* concept is now being developed.

What is the main aim of EDRIM?

The main aim of EDRIM is to set up a new permanent telecommunications network between risk managers with the objective to assist with decision-making and foster co-operation in the field of risk management.

The EDRIM programme, first proposed by the Spanish delegation at the Ministerial Meeting in Monaco on 24-25 November 1997, was introduced in the framework of the Council of Europe EUR-OPA Major Hazards Agreement.

It is based on the use of the new information and communication technologies (NICTs) and is aimed at setting up a permanent telecommunications network between national risk managers in order to foster international co-operation and assistance in decision-making in the field of risk management.

Based on the use of the INTRANET system, it facilitates communication between national risk managers at several levels (see Fig. 1):

- traditional communications: audio and video-conferencing facilities making it possible to hold virtual meetings with the support of ancillary tools: text presentation, images, animated images, simultaneous work by participants on a shared document, for example in the field of the telemedecine.
- access to pooled knowledge sources subject to authorized access and prior agreement on exchange and/or storage formats: concept of a "distributed universal library":
  - general codes for basic data processing, in particular using geographical and meteorological information systems. Meteorology is one of the most operation sectors, especially in Europe, for assisting decision-making in risk management,
  - specialised codes, in particular for modelling (runoff, precipitation, effects of earthquakes on particular sites, etc),
  - the concept of distributed resources accessible by any authorised person, opening the way to all kinds of distance learning,
  - setting up of an authorisation system at all levels (passwords, etc and/or locks) providing protection and security in the exchange of information in a restricted access network.

In the experimental phase of setting up the EDRIM programme in 1998, a prototype 5-point video-conferencing system associated with an electronic information exchange platform was set up between the civil protection authorities of Spain in Madrid, Portugal in Lisbon, Greece in Athens, Paris in France and the premises of the Executive Secretariat of the Council of Europe EUR-OPA Major Hazards Agreement in Strasbourg.

The experimental EDRIM network was tested in an exercise held in Draguignan on 1 December 1998. The experimental EDRIM network was activated between the civil protection authorities of Lisbon, Paris and Athens and the Executive Secretariat of the EUR-OPA Major Hazards Agreement in Strasbourg.

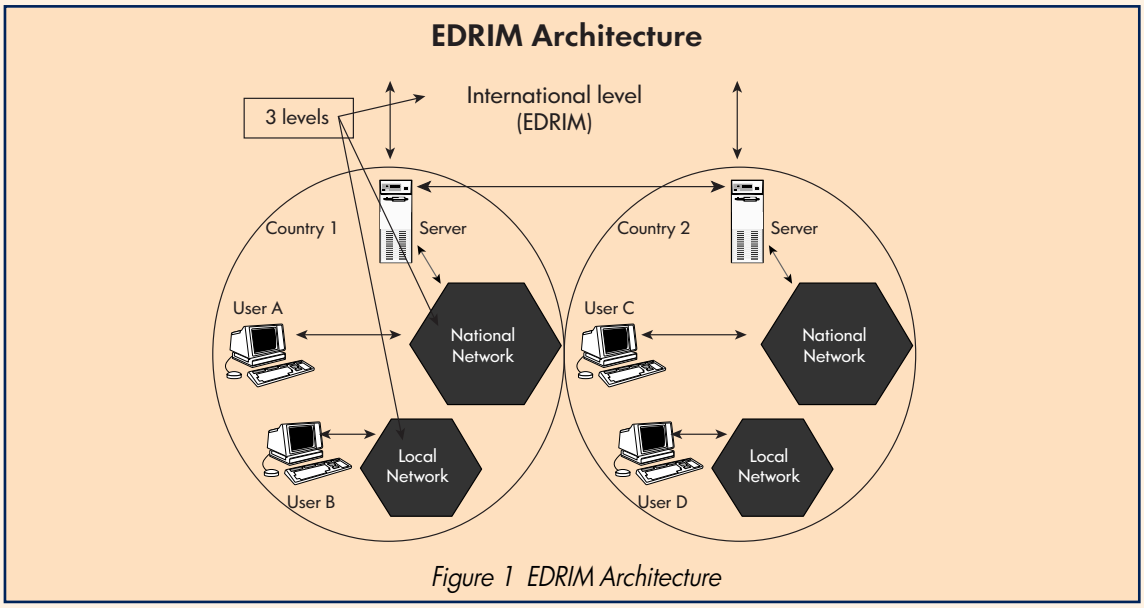

Figure 1 EDRIM Architecture

2. USEFUL INFORMATION TO BE CIRCULATED IN THE PIPELINE IN CASE OF EARTHQUAKES' EMERGENCIES

On the occasion of the 8th Ministerial session of the Council of Europe's EUR-OPA Major Hazard Agreement in Athens (21-22 February 2000) the Ministers adopted a Resolution on the economic and social consequences of the recent earthquakes in Turkey and Greece.

With a view to assisting in decision making process and cooperation and on the basis of intended development of the permanent telecommunication system between the national Authorities, the Ministers instructed the Executive Secretariat of the EUR-OPA Major Hazard Agreement to implement a plan for making this system available to the Greek and Turkish Authorities responsible for risk management based on:

- "Making available to them a map of earthquake risk areas, regularly up-dated with the help of space images;
- An early warning system;
- A geographical information system providing data on earthquake-prone regions; and,
- Information regarding the evaluation of damage in regions affected by an earthquake for providing assistance in crisis management and rehabilitation".

Concerning this latter point, a meeting was organized in Moscow (June 29th - July 1st, 2000) on the contribution to decision-making process in seismic risk management of models for earthquake damage assessment. In the conclusion of this meeting it was recognized that the System for earthquake damage assessment "Extremum" of EMERCOM of Russia with its worldwide data base was the only one at present time able to provide a quick estimate of damage and casualties due to major earthquakes all over the world.

It was suggested that during a six months period, starting 1 August 2000, the "Extremum" System be used to provide quick information on damage and casualties assessments of any earthquake (magnitude higher or equal to 5.5 for Euro-Mediterranean region, magnitude higher or equal to 6.5 worldwide) to the network of the Euro-Mediterranean

Centers of Agreement and to specific national institutions appointed by national authorities and to the Executive Secretariat of the Agreement.

On September 24-26, 2000 a meeting was organized in Valetta (Malta) in order to make a first evaluation of the use of the "Extremum" System for earthquake damage assessment resulting from an earthquake different recommendations have been adopted.

At the occasion of the meeting on Assisting decision makers in emergency situation management and co-operation, held in Toulouse on 13-15 November 2000, the following recommendations were adopted.

It is important to realize that this approach and these estimates can not be an alternative to the fundamental role covered by national seismic networks and seismological research, that play a basic role in prevention and mitigation of seismic hazard. The Extremum system in the present form is only intended as a support for the planning of the rescue operations.

At the present situation based on the available seismograph networks, the accuracy of the epicentre and specially hypocentre determinations could not be improved, thus the dependence of the model on these parameters introduce a significant scatter in the estimates.

Special attention is to be given to the problem of depth and its impact on damage estimates; specific recommendations regarding influence of depth on damage estimations are as follows:

- install dense observational networks within the earthquake-prone zones; collected observations should be reported in emergency mode to relevant agencies;
- specify very explicitly the input depth when circulating damage estimations; specify also whether the depth has been computed from observations or arbitrarily fixed:
  - when depth hasn't been computed from observations, make the forecast using a likely depth provided by the agency issuing the rapid determination parameters
  - if necessary, conduct computations of possible damage using several likely assumptions for focal depth.

Since the Malta meeting, a few events have induced the issuing and dissemination of damage estimates through Extremum system. The most significant event, in terms of damage estimation, has been the earthquake occurred in Japan on 6 October 2000; another event has been somehow significant in spite of the low level of damage caused: the earthquake occurred in northern Algeria on 10 November; it has, paradoxically, been a good illustration of the importance of negative information (no damage expected, and actual low level of damage reported in the field).

The next evaluation will result to adopting conclusion on the test.

** This text is based on the paper presented in the Workshop "Mitigation of Seismic Risk: Support to the Recently Affected Countries" that was organized by DG JRC, ISIS and DG Environment of EC in Belgirate, Italy on November 27-28, 2000.*

GREECE IN EUR-OPA MAJOR HAZARDS

Greece is one of the countries establishing the EUR-OPA Major Hazards Agreement of the Council of Europe in 1987. Since then it is an active member. The National Representation of Greece in EUR-OPA falls within the responsibilities of the General Secretariat for Civil Protection of Greece (G.S.C.P.).

Ms. M. Dandoulaki, Vice Director of the E.C.P.F.E. is appointed as the National Permanent Correspondant of Greece in EUR-OPA and Dr. G. Galanopoulos, Geophysisist in G.S.C.P. as the Deputy National Permanent Correspondant.

More information on the activities of Greece in EUR-OPA Major Hazards can be found at the website of G.S.C.P. www.civilprotection.gr.

THE EUROPEAN CENTRE ON PREVENTION AND FORECASTING OF EARTHQUAKES

A. SCOPE AND OBJECTIVES

The European Centre on Prevention and Forecasting of Earthquakes (E.C.P.F.E.) tackles various aspects of earthquake protection. The Centre fosters research on a number of issues with a view to earthquake mitigation, it promotes earthquake education and training, it cooperates with European and international agencies in the field of disaster protection.

E.C.P.F.E. operates within the framework of EUR-OPA Major Hazards Agreement which was ratified by the Greek Law in 1992. It belongs to the European network of Specilised Centres and it is based in Athens, Greece. For the time being the Centre is accomodated and run at Earthquake Planning and Protection Organisation's (EPPO) headquarters.

More informationn about EPPO can be found at the website www.oasp.gr

B. STRUCTURE AND ORGANISATION

The Centre is administrated by an Administration Committee and it is supported by a Scientific Committee, both appointed by the Greek Government on the basis of the proposals put forward by the Council of Europe.

The President of the Administration Committee is Dr. G. Stavrakakis, Director of the Institute of Geodynamics in National Observatory of Athens and the Vice President of the Administration Board of E.P.P.O. is Dr. P. Sivenas, Geologist and member of the Administration Board of E.P.P.O. Prof. D. Papanikolaou who currently serves as the General Secretary of Civil Protection in Greece, is the Chairman of the Scientific Committee of the E.C.P.F.E. The Director of E.P.P.O. Mr. N. Papadopoulos is appointed as the Director of E.C.P.F.E.

More information on E.C.P.F.E. can be found at the website of EUR-OPA Major Hazards www.europarisks.coe.int and shortly at our site www.ecpfe.gr.

C. RECENT AND CURRENT ACTIVITY

RESEARCH PROJECT

Relationship between hydrothermal fluids and microseismic activity on the coast of Milos island

By: Valsami-Jones E.[3], Baltatzis E.[1], Delibasis N.[2], Pirli M., Baier B.[4] and Drougas J.[2]

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The island of Milos is situated in the central part of the southern Aegean Sea and belongs to the active Hellenic Volcanic Arc. Milos is one of a small number of hot spots. This area stands out for its diversity in volcanic formations and chemical composition of rocks, composed of basalts, andesites and rhyolites. In general, the subsoil of Milos island disposes a variety of minerals for specific uses, such as sulphur, porous stone, trachite, caolin, pumice, alum and others. The old Plio-Quaternary magmatic activity favored the development of a high enthalpy geothermal field, which is considered to be the most important one in Greece (Fytikas and Marinelli, 1976).

Apart from the geothermal field existing on the island, the area in question is also characterized by a relatively small seismic activity, which from time to time increases, both in numbers and magnitude. According to the few papers dealing with the seismic activity on Milos island (Drakopoulos and Delibasis 1973, Sachpazi and Hirn 1991, Sachpazi 1991, Delibasis and Drakopoulos 1993), this particular activity is due to the activation of fault zones and to a lesser extent, to earthquake swarms, especially those occurring in volcanic areas.

The main objective of the present work is to investigate the possible relationship between microseismic activity and fluctuations in the concentration of particular elements in the hydrothermal solutions discharging in Milos. The curves in figures 3 and 4 show the correlation number of earthquakes per between the month and the concentrations of certain chemical elements.

A sampling program of solutions discharging from hydrothermal vents situated in Palaeochorion Bay of Milos island is under way. The hydrothermal solution samples collected have been analysed at the Natural History Museum (NHM), London.

From the results, it is apparent that certain elements show a rising trend for a period of time, followed by an abrupt fall, and then another rise. This is mainly observed in K, Li and Ca. Both K and Li are known to be relatively easy to leach out of rock, and are therefore the first to be released from rock freshly exposed to the hydrothermal solution, due to formation of new cracks.

Figures 3 and 4 show a good relationship for K and Li, particularly for the months May-July-September-October; there is also a differentiation in Ca concentrations for October. It has to be noted, however, that problems related to retrieving the data from the seismological stations prevented us from carrying out a more systematic sampling of the vents, e.g. immediately after a seismic event was recorded.

This is the first time a correlation between seismic activity and hydrothermal water chemistry is observed in this area, and the scientific importance has to be emphasized. This correlation is interpreted as the result of new pathways for the hydrothermal solutions being opened as a result of the microseismic activity.

Aiming to the monitoring of the microseismic activity on the island of Milos and particularly for the area of Palaiochorion, a small seismological network consisting of three portable seismographs was installed on May 1999. In particular, three analog magnetic tape seismological MLR-II stations were installed. The locations of the three seismological stations are shown in figure 1.

Figure 1 Geomorphological map of Milos Island with the seismic epicenters of the time period May-December 1999.

Each MLR-II station has the ability to record continuously on magnetic tapes for a time period of 3 weeks. Seismic signals are being recorded on three different gain levels while time base is given by a crystal clock controlled by DCF time signal.

The locations of the stations cover a broad area of the south-east part of the island. The operation of the network lasted until the end of December 1999.

During the six months period operation of the seismological network, a significant number of microearthquakes was recorded. For the time interval May-December 1999 a total amount of 76 microearthquakes has been recorded. For the time period January-October 2000 the records of the permanent seismological station of the E.P.P.O. have been used, as our small network was uninstalled due to malfunctions of the stations. Nevertheless, the permanent station also suffered various problems and hence operated only for a few days. Totally, during the first ten months of the year 2000, 26 earthquakes, with an S-P interval less than 2.5 sec, were recorded. The station located at the site Amygdalies (AMG), which operated continuously, recorded 37 events (figure 2) with S-P interval less than 2 sec.

The earthquake distribution pattern in figure 1 clearly indicates an east-west trend. The epicenters are mainly concentrated along a zone, which extends through the central part of the island with a NW-SE trend.

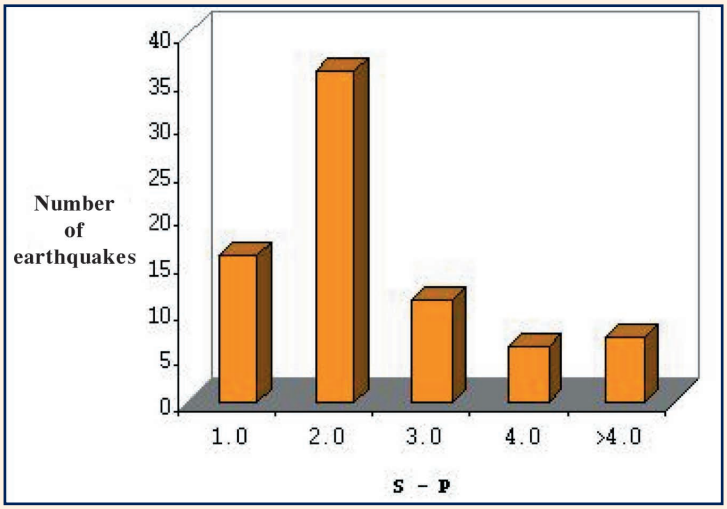


Figure 2 Distribution of earthquakes with S-P interval for the total amount of microearthquakes recorded by the Milos Island seismological network.

The temporal distribution on the seismic activity confirms the idea that the nature of the episode in the region resembles more to swarm activity than an afterschock sequence.

From the whole processing of seismological data recorded by the seismological network of the island of Milos, it is quite obvious that seismic activity on the island was small. A relevant increase was seen in May and October 1999 with 21 microearthquakes and in April 1999 with 13 events (figure 3). This shows that we are referring to the time period with the smallest microseismic activity.

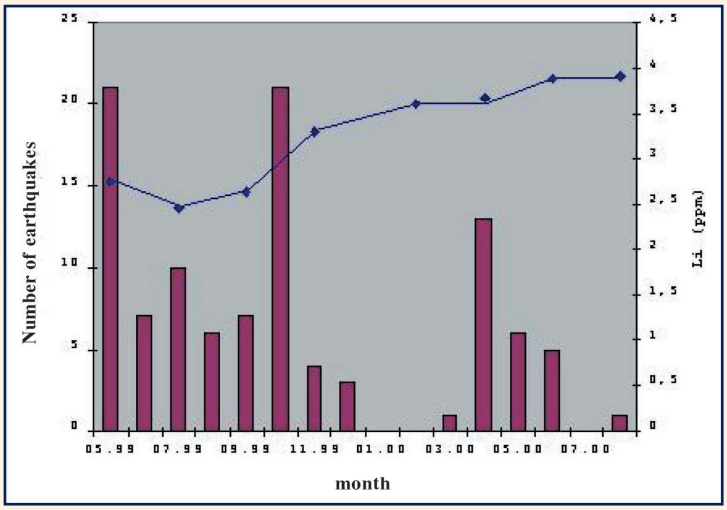


Figure 3 Correlation of the number of earthquakes per month with the Li content in hydrothermal fluids.

Having considered all the available information on the geological, geophysical and particularly the seismic and geochemical data, the conclusions are the following:

1. The seismic activity which occurred in the past on the island of Milos was due to the island's tectonic evolution and was characterized by the presence of both tectonic earthquakes and swarm activity which is related to the high enthalpy geothermal field of the region.

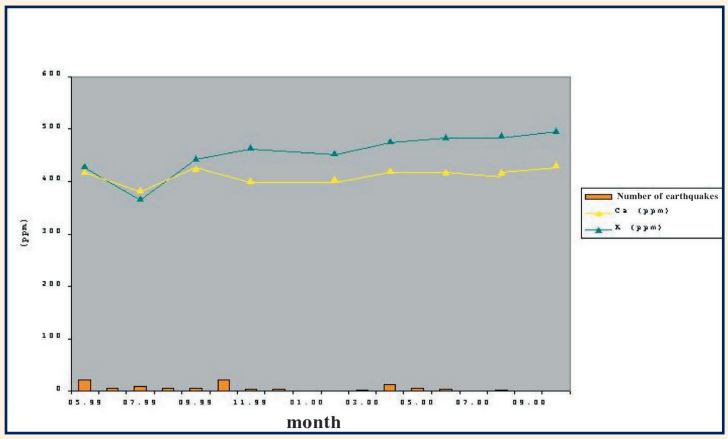


Figure 4 Correlation of the number of earthquakes with the K and Ca content in hydro-thermal fluids.

2. The microseismic activity on the island, although the seismological network installed showed many problems, appears to be non continuous, especially the swarm activity, which is the result of inhomogeneity and of the effort of hot fluids and gases to find sway to the surface. During the present period, microseismic activity was very small and confined mainly at the southeast part of the island.

3. The concentrations of chemical elements found in the hydrothermal fluids do not show any major changes at present, with the exception of Ca, K and Li and to a lesser extend Mg and Fe.

4. Such small fluctuation for these elements indicate a possible correlation between microseismic activity and hydrothermal water chemistry, particularly for the moths May-June-September(-October) 1999. This correlation may be due to the flow of hydrothermal solutions through freshly opened microfractures, resulting from the microseismicity. In order to confirm such relationship, records of microseismic activity and geochemical analyses need to be continuous and to extend for a longer timeframe (no less than two years).

ANNOUNCEMENT OF THE INTERNATIONAL FIELD SEMINAR
Neotectonic Mapping

The island of Milos is one of the most characteristic active structures within the present Aegean Volcanic Arc. Its geological configuration comprises an alpine blueschist basement, covered by Neogene and Quaternary sediments and volcanic sequences. Active volcanism on the island began at 3.5 Ma BP and has been active in the Quaternary, with the most recent volcanic eruption dated at 3.5 ka BP.

The metamorphic rocks, volcanic outcrops and post-alpine deposits on the island are cross-cut by a multitude of faults with composite kinematics and geometry, forming successions of horsts and graben. The low to average seismicity of the island and its environs is mainly due to the reactivation of these fault zones, while earthquake clusters are known to occur on these mapped fault zones. One recent example was the 1992 (M=5) earthquake.

All these make Milos a model area for neotectonic research, both for the localization and mapping of active faulting and the study of kinematic indicators and associated landforms in active areas. Meanwhile, the correlation of all these with geophysical and remote sensing data, and focal mechanism solutions can give a complete picture of the contemporary seismotectonic setting and the neotectonic evolution of the island.

The European Centre for Prevention and Forecasting of Earthquakes (ECPFE) and the Earthquake Protection and Planning Organization (EPPO), in collaboration with the Department of Dynamic, Tectonic and Applied Geology of the University of Athens, are organizing an international field seminar on Neotectonic Mapping. The seminar will be a comprehensive overview and training on the procedures involved in neotectonic mapping, namely:

- Neotectonic fault analysis: geometrical, kinematic, dynamic and chronological.
- Fault block analysis, with special emphasis on individual and combined block movements –uplift, subsidence, tilting.
- Paleogeographic reconstruction: rates of movement, direct and indirect dating methods (morphological indicators, volcanic markers, etc.). Particular attention will be given to the relationship between active faulting and associated landforms.
- Morphotectonic analysis: planation surfaces, drainage patterns, river incision, coastline changes, etc.
- Volcanosedimentary sequence stratigraphy and recognition of volcanic and related forms: domes, lava flows, lahar, pyroclastic flows, debris and breccia deposits, tuffites, etc.

The Seminar will take place in Milos island the period from 29 April to 6th May, 2001. Lectures as well as fieldwork in groups will take place.

The Seminar

The Seminar instructors are professors, researchers and renowned experts from European Universities, E.U. organizations and research centers involved in neotectonics, seismic risk and hazard assessment.

The trainees are mainly post-graduate students from the relevant University departments and the European Network of Research Centres (EUR-OPA).

The selection of trainees will be done by the Seminar Committee, based on the applicants' qualifications and relevance of study/research area. Priority will be given to the applicants who are with institutes belonging to the Open Partial Agreement for European Institutions (EUR-OPA).

ANNOUNCEMENT OF THE INTERNATIONAL WORKSHOP

"Restoration of hiistoric buildings in seismic areas: The case of settlements in the Aegean"

Nowadays, a major international effort haç been made to identify, conserve, strengthen and often re-use the cultural heritage of numerous civilisations and populations. Monuments and historic structures of various centuries are now systematically studied. The primary aim is to identify appropriate structural consolidation and renewal patterns, compatible to demands posed by contemporary uses. Thus, intervention and rehabilitation policies need to comply: a) with requirements defined by actual cultural values embodied in each structure, and b) with contemporary structural resistance-safety and living standards.

However, this overall international effort has been facing numerous obstacles and difficulties that hamper its continuity and effectiveness. At the present time, it is not easy at all to sustain locally an intervention that can be compatible to the design and structural particularities of a historic building. On the one hand, traditional techniques are either not applicable or disappearing, traditional skills are not evolving and the appropriate building materials are not deliverable through the existing market mechanisms. On the other hand, globalised market systems and widely adopted technical education programmes tend to undermine the historic building as a specific investment and research niche. As a result, the dominant internationalised (design and structural) patterns seem to aggressively push communities away from their local archetypes.

In addition, to all the aforementioned adverse conditions, one should also consider the catalytic impact of earthquake disasters. In fact, an earthquake disaster affecting a region, an island, a town or a neighbourhood might easily mean (among others) an absolute loss of the historical heritage of the given area. There are many factors that -combined with the physical event (building age and decline, structural deterioration due to past events, inappropriate structural interventions etc.) - produce irreversible structural failures. In this respect, particular attention must be paid to one specific factor - as experience in Greece well illustrated - which appears to be the a most critical in stipulating vulnerability conditions: The modern intervention procedure for historic structures in seismic zones.

In this frame of mind, the European Centre on Prevention and Forecasting for Earthquakes, the Earthquake Planning and Protection Organisation, the University of the Aegean (Department of Geography), the National Technical University of Athens (School of Architecture) and the Kapodistrian University of Athens (Department of Geology) organise the international seminar "Restoration of Historic Buildings in Seismic-Areas: The Case of Settlements in the Aegean", which is to be held in Mytilene (Island of Lesvos) on 24-26 May 2001.

It is strongly believed, that the international seminar will provide a platform of systematic scientific debate and exchange of opinions and experiences concerning:

- identification and registration systems of historic structures;
- structural analysis of historic buildings;
- causes and evolution of building pathology and
- repair and consolidation patterns of historic structures in compliance with international regulations and agreements.

In the Scientific and Organising Committee of the Seminar take part: P.Touliatos, Ass.Prof. NTUA, P.Delladestimas, Ass.Prof. University of the Aegean, D.Papanikolau, Prof. NKUA, M.Dandoulaki, Vice Director ECPFE.

The Organising Committee will be able to cover the travel expenses within Greece and living expenses in Lesvos.

Proceedings of the Worksop will be published by the end of 2001.

INTRODUCTION TO THE TECHNICAL HANDBOOK

Emergency evacuation, escape, refuge and sheltering operations in earthquakes

By: P. Sapountzaki

Lecturer Harokopeio University, Department of Geography

In the environmental hazards field, the traditional risk management strategies have been based on either physical corrective engineering or the post-event emergency responses. The relief period covers the first few "golden" hours or days after the impact. After the initial rescue of survivors, it is concerned with the importation of basic supplies (food, water, clothing, shelter, medical care) to ensure no further loss of life.

However, without adequate feedback, risk management and emergency responses are unlikely to be fully effective. The figure following illustrates the sequential disaster processes in a way which highlights the learning element. A closing of the disaster mitigation cycle through the education of people, both victims and managers at all levels, is essential if individual responses are to be successful.

Earthquake in Chios, Greece, April 1881: Distribution of relief in Chios, ruined town in background. Boscowitz, A. Earthquakes. London, 1890, p.286

Public safety and the satisfaction of the fundamental needs of the population immediately after a seismic disaster event must be top priority of emergency planning. This specific sector of earthquake management and planning for the mitigation of seismic impacts is concerned with pre-disaster and post-disaster actions and measures focusing on the effectual performance of emergency population evacuation, escape, shelter providing and relocation operations.

Instinctive evacuation processes, after a sudden seismic event, are usually faced with a series of obstacles and difficulties undermining eventual success: Panic generates un-necessary and/or aimless movements; simultaneous pedestrian and vehicular traffic towards varying and diverse directions produces traffic chaos; ignorance about the safety standards of evacuation routes and refuge places leads up to risky conditions for the evacuees; lack of information about the advisable term of stay in these temporary refuge places and the next destination of the refugees causes anxiety and confusion.

The only means to overcome difficulties arising from impulsive reactions under conditions of panic is knowledge acquisition, determination and materialization of key-standards, status and infrastructure of pedestrian evacuation routes and refuge places as well as supply of the relevant information and guidance. These key-properties refer to: (a) land use status of the potential refuge places during normal periods, (b) their available population capacity compared to the demandable, (c) the term of stay during the emergency periods, (d) the location of the prospective refuge places, (e) their accessibility, (f) maximum distance from the ordinary or the expected positions of the evacuees, (g) safety standards of the accessibility routes and the refuge places, (h) their land ownership status and (i) the standards of their technical equipment.

Similarly to the problems of instinctive evacuation, improvised encampments on the basis of individual groups' and families' initiatives, lead up to equally serious problems of disorder, disorganization and disintegration:

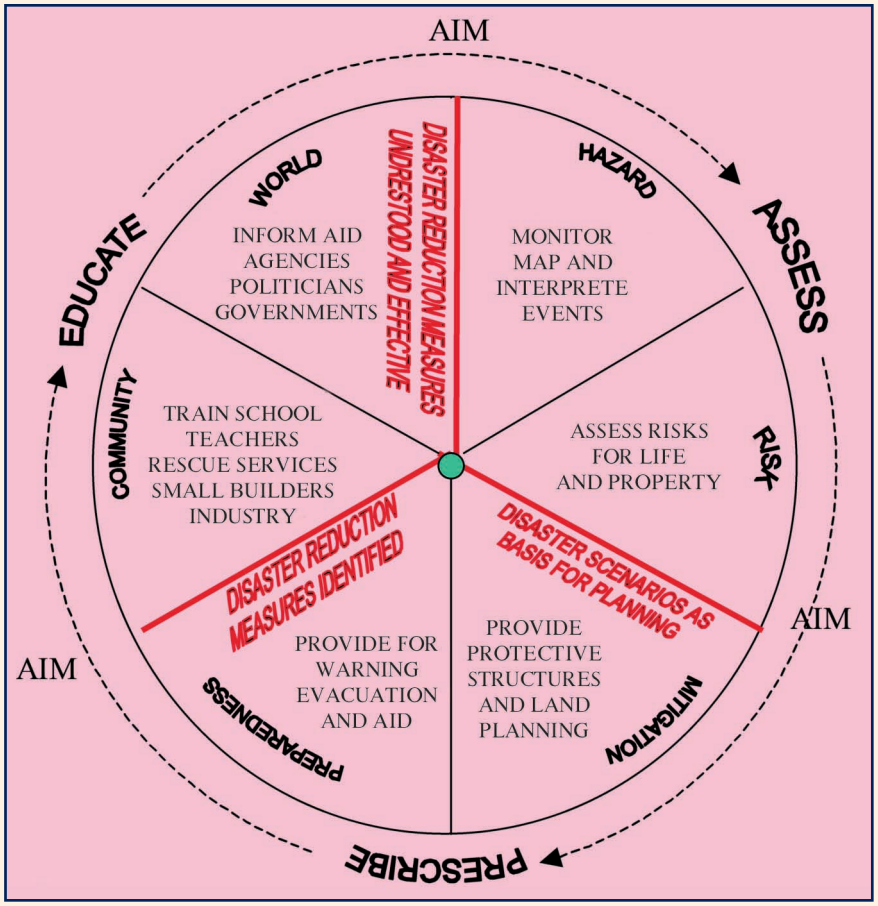


Figure: The risk management cycle showing the sequence of assessment, response and education which is essential for successful disaster reduction. Source: "Environmantal hazards", Keith Smith, Routledge, 1996 (2nd edition)

Improvised encampments prove often to be hazardous due to nearby dangerous installations, crumbling walls, etc; food and water distribution turns to be an extremely time-consuming procedure due to the scattered arrangement of the encampments and/or long distances from the primary road axes (possibly the only passable ones); emergency healthcare and welfare systems are hardly implemented and do not work effectively; last but not least, functions and services such as fire safety, control and prevention of epidemics, drainage, all these and other services turn to be hardly attainable tasks due to inconvenient tent (or other shelter) dispositions.

Just as in the case of refuge places, prospective encampment spaces (or generally spaces for emergency shelters) and the relevant accessibility routes should be determined, de-limited, organized in a unified system and equipped, in advance, that is before the disaster event. The key-features and basic infrastructure of the spaces intended for emergency sheltering are essentially different from those of the refuge places; yet there may be some overlaps between the sites aimed at accommodating the two types of emergency land uses.

Beyond the spatial planning aspects of the encampment spaces, equally important are the organizational aspects of the emergency operations taking place on the respective sites, namely "the distribution and pitching of tents" (or whatever the emergency shelter), "the distribution of foodstuffs and water", as well as "the provision of health care and welfare services". It is essential for the earthquake prone society to build and assimilate beforehand, knowledge about modes and the necessary steps for grouping the encampments into sectors, for the formation of encampment committees, for assigning tasks to sector-leaders and the committees, localizing and stocking the focal points of the sectors, localizing the alternative sources of food and water under conditions of disruption of the major lifelines, making provisions for appropriate means of transportation and areas of storage, for recording, checking and distributing food stuffs, etc.

Within the broader context of planning for population evacuation, relocation and emergency shelter special provisions are made for particularly vulnerable groups, namely the injured, the hospitalized sick, the aged, the pregnants, the inmates of restrictive institutions such as jails and mental clinics, the disabled and so on. The

competent spaces and places to accommodate these vulnerable groups (ships, railway coaches, public or private buildings after requisition, caravans of the Welfare Municipal Services etc) differ considerably from the encampment places of the general population with respect to the prerequisite technical standards, accessibility, location, land ownership status, infrastructure and equipment.

Earthquake in Zakynthos, Greece, February 1893: Above, the town before the quake - Below, temporary shelters and the ruins of the town. L. 'illuustration, Journall Universel, 13 May 1893, p. 393

PARTICIPATION OF E.C.P.F.E. IN THE WORKSHOP

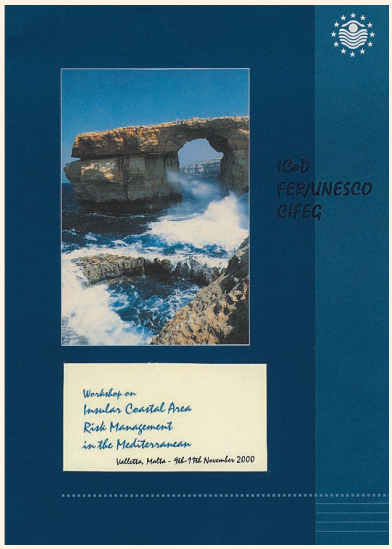
Insular Coastal Area Risk Management in the Mediterranean

Valletta, Malta 9-11 November 2000

Considering the great complexity of environmental characteristics of the various Mediterranean islands and the lack of co-ordination between the specialists and research organisations in the area, and taking into account the potential for serious catastrophes, E.C.P.F.E. accepted with pleasure the invitation to participate in the Workshop on Insular Coastal Area Risk Management that was organised by the Euro-Mediterranean Centre on Insular Coastal Dynamics in Valetta, Malta on November 9-11, 2000.

The Workshop aimed to bringing together representatives from Mediterranean islands and European experts on risk management of natural hazards to discuss:

- Risk management problems having particular relevance to insularity (utilising existing Euro-Mediterranean experience in this field).
- The impact of natural hazards (e.g. seismic events, coastal erosion, flooding and wind/sea storm events) on sustainable development.
- The need to set-up a network for exchange of information, transfer of technology, capacity building and increased co-operation on mitigation of natural hazards.



The event offered an opportunity for a comparative approach to risk related issues regarding a vast range of hazards in various island contexts was made. The cases of Croatian islands, Sicily, the Greek islands, Malta, the Balearic Islands and also the islands in the Caribbean, were presented.

The concerns raised by E.C.P.F.E. were related to seismic risk mitigation and earthquake protection in an island context. A case study was presented with the aim to highlight the significance of islands as a risk context and more specifically as an earthquake risk context. Earthquake planning in island regions undoubtedly constitutes a distinct context due to the inherent environmental and socio-economic features of the areas involved. The main features identified, have to do with the a number of facts; islands present distinctive accessibility problems, the human geography of the islands changes significantly during the summer due to tourism and to the return of non-permanent residents, on many islands there is a large proportion of old building stock, poorly maintained, especially in small settlements with dwindling numbers of inhabitants, there are a good many towns and villages that retain features of the old traditional urban tissue and building stock, the demographic composition of the islands as a rule shows particular regional characteristics such as the aging of the population, a large proportion of dependent persons, the concentration or unequal distribution of the population.

Taken these into account one needs to underline that earthquake policies for island regions cannot be designed with the same terms and with the same criteria that are adopted for any other inland region in a country.

As a conclusion, the Workshop recognised the crucial need for the sustainable development of insular coastal areas through the integration of economic, cultural and natural resource concerns. Since individual characteristics of Mediterranean islands are reflected as different vulnerability to common hazards, a need was felt to develop risk mitigation tools for specific Mediterranean island concerns. It was therefore agreed that a multidisciplinary project proposal addressing regional island problems must be developed, to enhance transboundary co-operation through the participation of island experts.

D. JOINT WORKSHOP ON «LESSONS LEARNT FROM THE 1999 EARTHQUAKES IN TURKEY AND GREECE»

Several earthquake disasters hit European countries recently. Although the consequences were more or less similar, there were also specific characteristics in each one that made each disaster a unique case. Emergency response and reconstruction policy varied respectively.

These earthquake disasters if examined thoroughly, offer an opportunity to expand our knowledge on earthquake mitigation and reconstruction, as welll as on emergency planning. Experience transfer and information exchange is a step towards a better understanding of earthquake disasters and their management, as well as of the processes of reconstruction and mitigation.

Although, there are several ways towards a better understanding of the response, aid provision and reconstruction processes, it seems that live communication and exchange of views offer a better ground to explore a variety of features associated with the event, as well as with the built environment and the socio-economic context, that seem significant for disaster protection. Workshops of persons involved in disaster management and protection with the participation of experts who worked on emergency response and reconstruction in recent earthquake disasters in Europe, offer the opportunity to exchange experience, draw lessons and promote co-operation regarding earthquake protection in Europe in respect to a broad series of issues.

The Committee of Permanent Corespondents of the EUR-OPA Major Hazards Agreement after noticing with great interest the proposal submitted by the European Centre on Prevention and Forecasting of Earthquakes (E.C.P.F.E.) in Athens and the European Natural Disasters Training Centre (A.F.E.M.) in Ankara, instructed the General Secretary to organise in co-operation with the Turkish delegation a seminar in Ankara in August 2001 and in Athens on September 2001 a seminar on lessons learnt from the earthquakes that occurred in these two countries in 1999.

The Seminar in Athens will be focussed mainly on earthquake reconstruction and mitigation issues. The following topics will be discussed:

- Consequences of the 1999 earthquakes in Turkey and Greece: Similarities and differences, chain effects, effects on manmade environment.
- Reconstruction process: Policies and measures, steps to promote risk mitigation through reconstruction.
- Institutional framework for prevention and reconstruction: The role of public bodies, private bodies, NGOs, International Organisations.
- Housing aspects: Permanent and temporary housing after earthquakes.
- Land use issues (physical and urban planning, seismic microzonation etc.).
- Geology and engineering aspects of the reconstruction.
- Prevention and mitigation of earthquake risk: Earthquake risk assessment and management, policies and measures for risk mitigation, implementation issues.
- The improvement of earthquake protection policies through taking into account the experience gained and lessons learnt from the 1999 EQ disasters in Turkey and Greece.

The expected results from the Seminar are the networking of experts and promotion of co-operation between agencies involved in disaster planning and management in Europe. The proceedings of the workshop will be published in paper and CD.

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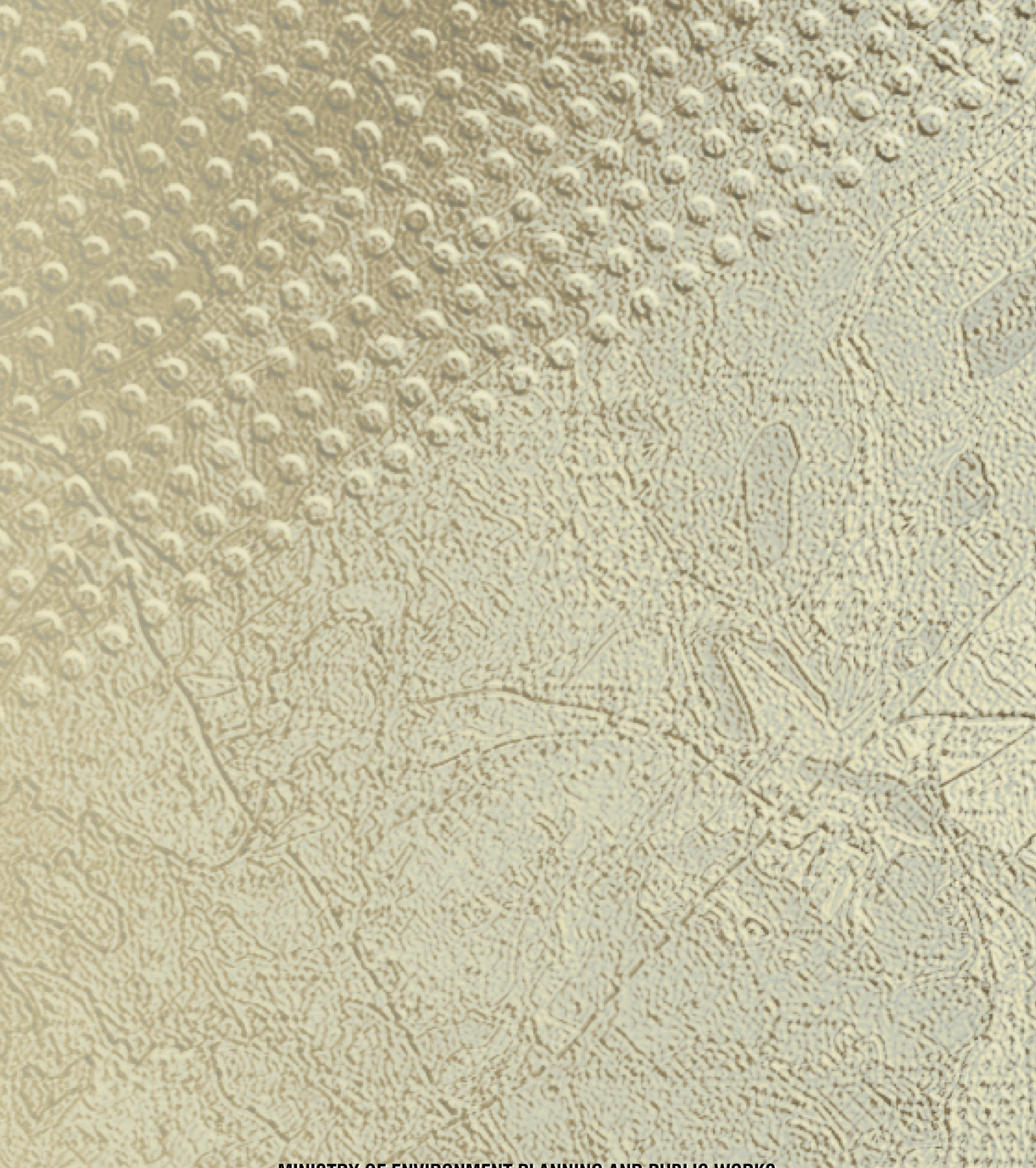

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