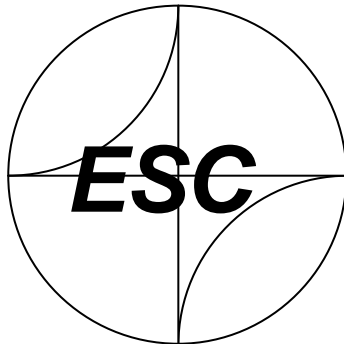


IUGG International Union of Geodesy and Geophysics
IASPEI International Association of Seismology and Physics
of the Earth's Interior

EUROPEAN SEISMOLOGICAL COMMISSION

Activity Report 1996-1998
and
Proceedings of the XXVI General Assembly 1998
Tel Aviv, Israel



Web: www.gserg.nmh.ac.uk/esc/

Edited by

P. Suhadolc
Secretary General

and

Alice B. Walker
Assistant Secretary

1998

PREFACE

The XXVI General Assembly 1998 was held at the Hotel Dan Panorama in Tel Aviv, Israel, by invitation of the Geophysical Institute of Israel. The location provided an excellent place to convene 33 symposia and workshops with almost 300 papers for about 250 participants. 59 papers were also printed in a book before the conference and distributed to the participants.

The weather was excellent for most of the conference time, but in spite of this the symposia attracted the participants more than the nearby beaches. The Local Organizing Committee and its chairman Dr. Avi Shapira worked very hard to make the meeting a success and we would like to express our most sincere thanks to them. In particular, Rami Hofstetter deserves a special recognition for his organizational efforts. The technical part of the organisation was taken up by ORTRA Ltd. who performed it very professionally.

The ladies' program was well organized and had some extremely interesting and rewarding tours to world-known historic places in Tel-Aviv and Jerusalem. An excursion to Jerusalem for all participants took place during the meeting and several post-conference excursions within Israel and to Jordania were organized after the meeting.

Due to the substantial support granted by UNESCO and the Israeli Government a number of scientists, mainly from the Middle East countries and the Palestinian National Authority Territories, could be hosted during the meeting. Without this generosity many of them could not have managed to attend. The Bureau of ESC wants to express its deepest gratitude and appreciation.

The hosting institution, the Geophysical Institute of Israel, organised, a few days before the General Assembly, the Second ESC Training Course for Young Seismologists. This time the topic was site effects. About 20 young people attended. Financial support from IASPEI is gratefully acknowledged.

Some important changes took place this time in the ESC-Bureau. We have a new President, Prof. Luis Mendes-Victor and a new Vice President, Prof. Domenico Giardini. We have to express our deep gratitude to our Past-President, Dr. Guennady Sobolev, for his leading the ESC during the last two administrative periods. The Subcommittee on "Source Physics" has changed its chairperson and the Subcommittee on "Deep Seismic Sounding" has changed its name to "Crust and Upper Mantle Structure" and has been completely restructured. We are looking forward to new and important work to be done in these and other Subcommittee topics.

The ESC Homepage on the Internet is regularly updated and has grown into an excellent reference for seismologists, thanks to the efforts of our Assistant Secretary Alice Walker. I urge everybody to regularly check it in order to read the latest ESC related news and be thus informed of the ongoing ESC activities.

ESC is looking forward to its XXVII General Assembly in the city of Lisbon and appreciates very much the related interest and efforts of Portuguese colleagues.

Peter Suhadolc
ESC Secretary General

THE XXVI ESC GENERAL ASSEMBLY
Tel Aviv, 23 - 28 August 1998
Hotel Dan Panorama

Meeting of the ESC Bureau

Sunday, August 23, 1998, 16:00-17:00

Participants: G Sobolev, A Shapira, P Suhadolc and A Walker

Agenda

1. Changes in Bureau
2. Appointments
3. Titular Members
4. Next GA
5. Reykjavik Administrative Proceedings
6. Sub-commissions
7. Open Partial Agreement (nomination of members)
8. EGS and ESC joint meetings
9. Miscellanea

1. Changes in Bureau

G. Sobolev (President) and R. Stefansson (Vice-president) are resigning having served two terms.

2. Appointments

Nominating Committee: F. Scherbaum, J. Havskov, D Slejko

Resolutions Committee: R. Musson, L. Mendes-Victor, J. Sileny

3. Titular Members

Four titular members are newly appointed: J. Havskov (Norway), M. Herak (Croatia), D. Giardini (Switzerland) and G Shamir (Israel).

P Suhadolc will be the proxy for D Skoko (Croatia) and C Eva (Italy)

A Walker will be the proxy for B Jacob (Ireland)

H Dufumier will be proxy for A Deschamps (France)

J Niewiadomski will be the proxy for S Gibowicz (Poland)

J Havskov will be the proxy for S Mykkeltveit (Norway)

D Giardini will be the proxy for D Mayer-Rosa (Switzerland)

P Suhadolc reported that Malta would like to become a titular member and therefore they will apply to IUGG for membership.

Since very few reports of Titular members have been received, P Suhadolc emphasised the need to establish "national" homepages by Titular members or at least a link to several prominent seismology homepages in their countries.

4. Next General Assembly

One invitation has been received from the University of Lisbon to hold the XXVII General Assembly in the year 2000.

5. Reykjavik Administrative Proceedings

The new procedure of publishing papers before the conference and administrative proceedings after, proved to be fast and well received and P Suhadolc recommended that this procedure is adopted for all future assemblies.

6. SC

All sub-commission reports have been received, except sub-commission E (earthquake prediction, Responsible: J Zschau). P Suhadolc was disappointed in the slow response of the sub-commission chairpersons in producing the final reports. SC-D will meet during the Tel Aviv conference to discuss the removal of working groups 1-5.

7. Advisory Board for Earthquake Prediction, Open Partial Agreement (Council of Europe)

P Suhadolc informs the Bureau about the next partial replacement of members of the Advisory Board for Earthquake Prediction in the framework of the Open Partial Agreement. After a brief discussion it is decided that the Secretary-General, consulting with the President, will propose to OPA a list of new names.

8. EGS and ESC joint meetings

P Suhadolc informed the Bureau about an initiative of the IASPEI President, C Froidevaux, who has raised the problem of the co-ordination of Earth Science meetings at the European scale. According to him it might be a good idea to have some meetings in common with either EGS or EUG. There have been some exchanges of e-mail by P Suhadolc with both A Richter, EGS Executive Secretary, and Sierd Cloetingh of EUG. P Suhadolc summarised a letter from A Richter outlining the way ESC meetings could become part of a topical meetings programme organised by EGS. After a brief discussion the ESC Bureau proposed that such an EGS topical meeting might be held sequentially with the ESC meeting and decided to discuss the problem more thoroughly at the ESC Executive meeting.

Meeting of the ESC Executive and Local Organising Committees
Sunday, August 23, 1998, 17:00-18:30

Present: G Sobolev, A Shapira, P Suhadolc, A Walker, A Ansall, H Aichele, C Froidevaux, C-I Trifu, R Hofstetter, C Browitt and D Slejko

Apologies: K Makropoulos, J Zschau, A Guterch, R Stefansson and B Dost

Agenda

1. The Tel-Aviv 26th General Assembly
2. Reykjavik 1996 Proceedings
3. Changes in the Bureau and Sub-commissions
4. SC & WG
5. Nominations
6. EGS and ESC joint meetings
7. Miscellanea

1. The Tel-Aviv 26th General Assembly

The printed programme of the Tel-Aviv General Assembly is presented and all the facilities are explained by R Hofstetter, of the Local Organising Committee. All the conference papers received by the LOC have been printed in a separate volume.

The Executive acknowledges with thanks the excellent work done so far.

2. Reykjavik 1996 Proceedings

The Reykjavik Administrative Proceedings have been published and were distributed in early 1997. The Executive Committee acknowledges with thanks the effort in the timely publication and distribution.

3. Changes in the Bureau and Subcommissions

G. Sobolev (Pres.) and R. Stefansson (Vice-Pres.) have already served two terms and are not eligible for re-election. The Executive acknowledges with thanks the work which they have done throughout their terms of office.

4. SC & WG

Reports of the activities of the SCs and WGs have been received except for SC-E. P Suhadolc explained that there was a delay in publishing the proceedings from Reykjavik owing to the late arrival of sub-commission reports. He strongly urged those present to make sure that the reports are sent to him by the end of November and that they take this message back to those who were not present. A Shapira

echoed this request and explained that he would lose the money set aside for printing, if there was a delay.

Foreseen changes in WG

WG-A4. Historical Earthquake Data.

Resp.: R Gutdeutsch (Austria)

R Gutdeutsch expressed his will to step down.

WG-A5. Volcanism and Earthquakes.

Resp.: J. Neuberg (UK), R. Carniel (Italy)

Neuberg and Carniel are willing to replace Schick and Martinelli

WG-C1. Paleoseismicity.

Resp.: M Meghraoui (Italy), K Atakan (Norway)

Atakan is willing to replace Lindholm (Norway)

5. Nominations

P Suhadolc announced the names for the nominations committee - F Scherbaum, J Havskov and D Slejko - and the Resolutions committee - J Sileny, L Mendes-Victor and R Musson. He explained that resolutions should be given to the resolutions committee by Wednesday evening so that they can be typed and presented to the ESC Council on Thursday afternoon. A Walker will continue to represent ESC on the EMSC executive, P Suhadolc will represent the ESC on the ORFEUS board of directors and D Slejko will represent ESC in EAEE. These appointments are valid until the year 2000 as stated in the Reykjavik proceedings.

6. EGS and ESC joint meetings

P Suhadolc asked C Froidevaux to inform the Executive about his initiative related to the co-ordination of Earth Science meetings at the European scale.

C Froidevaux reported about his initiative to talk to EGS and EGU representatives regarding more coordination. He noted that as a geophysicist, one could attend many conferences in one year (this year being exceptionally busy). On the other hand, IASPEI has recently established the ASC on the model of ESC and IASPEI is proud of these commissions; the ESC is in its 26th Assembly. In the past, EGU and EGS attempted to have joint meetings but it failed. P Suhadolc summarised a letter from Richter of EGS outlining the way ESC meetings could become part of a topical meetings programme. EGS would organise them. The ESC Bureau proposed that such an EGS topical meeting might be held sequentially with the ESC meeting. H Aichele reminded the executive that the ESC is the only recognised sub-commission of IASPEI/IUGG; EGS is not.

A Shapira noted that the last joint ESC/EGS meeting was at Kiel in 1986 and the decision was taken to abandon such joint meetings for the future. C Browitt considered that EGS/ESC would not be a natural marriage and if ESC were to ally itself more closely with another European group, he would prefer it to

be the EAEE (European Association of Earthquake Engineers). A Ansall noted that the joint ESC/EAEE coordinating committees/working groups were working well.

C Froidevaux noted that, originally, he saw ESC as a possible catalyst between EGS and EGU, but this appeared to be impractical. It was noted that any associated topical meeting must add value to the ESC assembly and not compete with it.

7. Miscellanea

D Slejko asked, on behalf of others, whether there should be some limit on the number of papers presented by any one individual during a session. C-I Trifu responded by stating that convenors must act responsibly and professionally in this and other aspects; thinking of their audiences and the costs. He added that the ESC must retain its independence, that associations should add value and that a closer collaboration with the engineers is welcomed. H Aichele suggested that the Bureau should issue guidelines to sub-commission chairmen and, through them, to the convenors. A Shapira noted that posters are as good as oral presentations and they should be encouraged at future assemblies. A Ansall reported that at the EAEE 15% of presentations were oral, the remainder were posters. This stimulates more relevant discussion.

Opening Plenary

Monday, August 24, 1998, 09:00-10:30

1. General Activity Report of the ESC President

Ladies and gentlemen,

Let me present a short review of ESC activities in the years 1996-1998.

The Proceedings of the XXV General Assembly of the European Seismological Commission in Reykjavik were edited, printed and distributed. Analytical reports of subcommission activities during the XXV ESC General Assembly, presented by K. Makropoulos, L. Vinnik, H. Aichele, U. Luosto, G. Sobolev, and V. Schenk, were included in the Proceedings for the first time. We congratulate the whole editorial staff, particularly R. Steffanson, B. Thorkelsson, P. Suhadolc and A. Walker, and express our sincere thanks to them.

The ESC Bureau met twice since the Assembly in Reykjavik: in August 1997 during the Thessaloniki 29th General Assembly of IASPEI and in May 1998 in Tel Aviv to prepare this Assembly. A business meeting was held in Thessaloniki, where a number of suggestions for the scientific programme of this Assembly were discussed. The second training course for young seismologists prior to the Tel Aviv Assembly was approved and some financial support from IASPEI granted.

G. Sobolev introduced the concept of the ESC virtual (or logical) INTERNET network to improve the structure sources of relevant information on the Web. The procedure could be for Titular Members to nominate national centres that might join the network. A. Walker would approach them and promote the

concept. She has made a few changes to the ESC home page, in particular the links page, to provide a number of links to organisations dealing with seismology in Europe and the world.

A draft of the IASPEI resolution on virtual network, proposed by ESC and accepted by the delegates is as follows: "Considering the benefit of INTERNET for the dissemination of seismological information and its limitations because of its potential for non-systematic, variable quality providers, IASPEI recommends that for the European Mediterranean Region a virtual network of such information providers be established and co-ordinated within the ESC, with a possible link to IASPEI in the future".

During the last two years (1996-1998), most of the Subcommissions and Working Groups were active either organizing workshops or participating in international conferences, such as the 29-th IASPEI Meeting in Thessaloniki, Greece.

A joint ESC-EAEE WG on "Strong Motion Studies" was discussed and initiated at that General Assembly. The purpose of the group is to retrieve, assess and study strong-motion information in Europe for seismological and engineering purposes. During the short period since its formation, this group, consisting of scientists from Greece, Iceland, Italy, Switzerland and Turkey has identified and stored data from these countries. It is also hoped that additional contributions from other parts of Europe will assist in the preparation of a databank, hopefully in due course to be made available to the users on CD-ROM.

The first meeting of the IASPEI Working Group on the International Seismological Data Centers took place during the 29-th General Assembly in Greece and was chaired by N. Kondorskaya. In accordance with recommendations of the participants of this meeting the initiative group from Russia suggests the organisation of a teleconference provisionally named "Virtual Seismological Observatory (Seismological Data and Observation Practice)". The teleconference is now starting its functions and is available on WWW-site <http://socrates.wdcb.rssi.ru/wdcwg/>.

In accordance with the resolution proposed by SC-A and adopted by the ESC General Assembly in Reykjavik, the members involved in the activities of WGs 1 and 3 are now working to finalize the first limited European Parametric Earthquake Catalogue, anticipating that this effort will continue and expand to include the whole European area.

The WG "Data Processing and Interpretation" of SC-B succeeded in organizing a workshop on "Methods of artificial intelligence in seismology" held at the Institute of Geosciences of Potsdam University in October 1997.

In 1996, the ESC WG on "Expert Systems and Seismic Risk Mitigation" of SC-F published the Proceedings of its Second Workshop held the previous year in Walferdange, Luxembourg (Vol. 12, Cahiers du Centre Europeen de Geodynamique et de Sismologie). It comprises 23 papers and 11 abstracts plus the final Activity Report of the WG.

In 1997, the ESC WG on "History of Seismometry" of SC-B published the Proceedings of its Workshop held the previous year in Walferdange, Luxembourg (Vol. 13, Cahiers du Centre Europeen de Geodynamique et de Sismologie). It includes 21 paper and 3 abstracts plus the WG Recommendations for preserving historical material related to seismology, also as a follow-up of the related recommendation adopted by the ESC General Assembly in Reykjavik in 1996.

Following the tradition started at the previous Assembly in Reykjavik, several papers to be presented at this Assembly have been already published in a book you have received at registration.

Several institutes and individual scientists participating in the Subcommittee's workgroups submitted a number of joint proposals for the EU-INCO-Copernicus projects. Some of the proposals were approved, including "Assessment of Seismic Potential in European Large Earthquake Areas", "European Network on Seismic Risk Vulnerability Scenarios" and "Tectonic Early Warning System Through Real Time Radon (Rn) Monitoring". Their implementation envisages participation of colleagues from Albania, Armenia, Bulgaria, Czech Republic, France, Greece, Hungary, Italy, Poland, Romania, Russia, Slovak Republic, Slovenia, the Netherlands and the United Kingdom. The main activities on these projects will be presented during this General Assembly.

The application of the EMS-92 was supported by the WG for the study of historical and recent earthquakes. The prominent earthquakes, to which the new scale was applied, were the Cariaco Venezuela earthquake of 1997 and the main shocks in central Italy of September/October 1997. Two special WG meetings were held on the executive Board level (November 1996 and January 1998) to prepare the final version of the EMS, which will include the experiences obtained from its worldwide applications. Those parts of the EMS-92 that were introduced tentatively could now be replaced by more precise ones.

Following the strategy agreed in Thessaloniki for the final GSHAP phase, the compilation of the preliminary SHA map for the ESC area is progressing along the following schedule: A preliminary hazard map (PGA) is being compiled by GFZ, Potsdam, merging the results of individual regions and test areas, as a part of the final GSHAP global compilation. The regional compilation will be discussed during the present Assembly and will be included in the GSHAP final volume, scheduled for publication in the fall of 1998.

However, not all Working Groups were active during the period under discussion. James Mechie, Chairman of SC-D "Deep Seismic Sounding", received a positive report from only one of the six working groups. He raised several questions, such as: What should be the future role of "Deep Seismic Sounding" SC within the ESC; What internal structure, if any, should the "Deep Seismic Sounding" SC have in the future; Should we work more closely with other organizations; e.g. the European Geophysical Society, the Commission for Controlled Source Seismology, the Deep Reflections Group, etc..The discussion is to take place during this Assembly.

Suggestions concerning closer coordination ties with other European Scientific Organizations were also made by Prof. Claude Froidevaux, the IASPEI President; for example, to keep some meetings jointly with either EGS or EUG. This idea will be discussed during this Assembly at a kind of "round table" session. Several problems, of course, will occur. ESC meets bi-annually at a different location (upon invitation), usually in fall. EGS meets annually at a different location usually in spring. EUG meets biannually at a fixed location. ESC, as a IASPEI Commission, works on the basis of Titular Members, has no membership fee and the budget is comprised of only IASPEI money. Both EGS and EUG have membership fees. Both EGS and EUG have an attendance of roughly 3,000 to 5,000 people, while the ESC meetings collect from 250 to 500 participants and meetings are usually held on University premises. There is a possibility of having joint EGS-ESC meetings every two years, during which the seismology

part would be run by ESC in the framework of the EGS assembly. But scientists seem to prefer smaller meetings, because it is easier to meet people and have informal discussions.

I trust that the tremendous work accomplished by the Local Organizing Committee and the active and productive participation of scientists from many countries will ensure the success of this Assembly.

2. Obituaries

Stephan Mueller (1930-1997)

Stephan Mueller passed away at the age of 66, only one and a half years after his retirement in 1995 from the chair of Geophysics and directorship of the Swiss Seismological Service at the Swiss Federal Institute of Technology (ETH) and from the chair of Geophysics at the University of Zurich. He developed pneumonia after an intestinal operation.

He was born in Marktredwitz, Bavaria (Germany) and studied physics at the University of Stuttgart (Diploma in 1957) and electrical engineering at Columbia University in New York (M.Sc. in 1959). Wilhelm Hiller, a classical seismologist and head of the State Seismological Service in Stuttgart aroused Stephan's interest in geophysics. After his studies at Columbia University, he completed a PhD thesis on Synthesis of Normally Dispersed Wave Trains by Means of Linear System Theory under Hiller in close co-operation with Maurice Ewing in Lamont. The structure of the earth's lithosphere-asthenosphere system and especially its seismic properties dominated his lifetime research.

After 1962, Stephan spent two more years in Stuttgart with several extended research visits to the Southwest Center for Advanced Studies in Texas. Together with Mark Landisman, he postulated the widespread existence of zones with reduced seismic velocities in the continental crust during this time.

From 1964 to 1971, he was full professor and head of the new Geophysical Institute at the University of Karlsruhe. There Stephan worked with Karl Fuchs and Henning Illies on the structure and evolution of rifts, a topic that became another favourite in his broad spectrum of lithospheric research. He participated in the ongoing European co-operative deep seismic sounding experiments as part of the International Upper Mantle Project. He was one of the founders of the Black Forest Observatory (BFO) for the study of long period surface waves, free earth oscillations, and earth tides. He was also responsible for the operation of the new Seismological Central-Observatory Graefenberg, Erlangen (SZGRF) in its critical initial years.

The next challenge for Stephan came in 1971 with the call from the Swiss Federal Institute of Technology (ETH) to succeed Fritz Gassmann as head of the Institute of Geophysics and Director of the Swiss Seismological Service. With his characteristically encompassing vision, he addressed in the succeeding time almost all branches of geophysics. Following his initiative, a professorship of rock- and palaeomagnetism was created at the ETH. Besides his main responsibilities for the Swiss Seismological Service and Experimental Seismology, he built up research groups in geothermics and gravity. In 1977, he was also appointed full Professor of Geophysics at the University of Zurich. In 1992, thanks to his insistence, a third full professorship in applied geophysics was installed at the ETH. During all this time he enthusiastically taught undergraduate students and supervised more than sixty doctoral theses in all fields of geosciences.

He vigorously pursued the installation of a seismic telemetry station network for the Swiss Seismological Service. His education in electrical engineering enabled Stephan to understand and promote advanced strategies for modern research and monitoring tools in earthquake sciences.

Stephan Mueller's academic activities can hardly be separated from his scientific interests and achievements. Based on a large number of crustal deep seismic soundings, he developed in 1977 a basic model of the continental crust. Probing the earth from the surface to the upper mantle transition zone by refraction seismics, and analysis of seismic surface waves in many different areas, showed that lateral variability was obviously related to tectonic evolution in time and space. After years of analysing phase velocities of surface waves, Giuliano Panza, Stephan, and Gildo Calcagnile produced in 1980 the first map of lithospheric thickness and lithospheric and asthenospheric shear-wave velocities of Europe. They also documented the presence of a deep-reaching high-velocity body beneath the Alps.

To unravel the tectonic evolution of the Alps Stephan with other colleagues initiated a coordinated Swiss National Research Project (NRP20) on the Deep Structure of the Swiss Alps in 1983. Near-vertical reflection seismic techniques were used for the first time to obtain continuous regional transects across an active continental collision zone. He supported and guided this national project actively throughout its twelve year running time.

Supported by the European Science Foundation, in 1982 Stephan and Rudolf Trumphy initiated a project of integrated studies of the structure, physical properties, composition, and evolution of the continental lithosphere from northern Scandinavia to central Tunisia over a distance of 4600 km. This European Geotraverse (EGT) project became one of the most prestigious recent large-scale international earth science projects. The EGT investigated all processes through which continental crust is built up, maintained, and destroyed along provinces occurring in succession geographically as well as in time.

Stephan's broad interest appears again in his studies of crust-mantle evolution, structure, and dynamics of the Mediterranean ranging from Turkey to the Eastern Atlantic. In his capacity as Chief Project Scientist of the WEGENER-MEDLAS project in 1981-1991, he focused on the relationships between lateral variations of lithospheric structure, stress distribution, and ongoing crustal movements. He also contributed to the world-wide compilation undertaken by the working group on Continental Rifts: Evolution, Structure, and Tectonics (CREST).

Stephan possessed many talents: a deep and broad scientific knowledge; the insight to define open scientific questions and the intuition to formulate future research directions; the ability to find appropriate methods to tackle these problems and to synthesise the results with other earth-science disciplines. Stephan had the capacity to bring scientists to work together and to mediate between ambitious scientific plans and constraints imposed by funding and administration.

The European Seismological Commission (ESC) elected him as President for the period 1972 - 1976. In this position, together with the long time Secretary General Elie Peterschmitt, he took a major part in modernisation of the ESC by significantly increasing the number of member countries. He established the politically difficult links between eastern and western European countries by fostering joint working groups and projects. It was his personality, with a strong sense for international relations, which helped him to develop the ESC into a successful and well recognised European organisation.

Among many national and international organisations he presided over during his active life, the Governing Council of the International Seismological Centre (1975-1985), the European Geophysical Society (1978-1980), and the International Association of Seismology and Physics of the Earth's Interior (1987-1991) should be mentioned. He was a member of the Executive Committee of the Academia Europaea from 1988 to 1992.

Stephan Mueller published more than 150 papers and served as editor and co-editor of a great number of important journals and books. His outstanding contributions to earth sciences have been acknowledged with numerous awards and honourable appointments. Among others, he was Elected Fellow and Foreign Associate of the Royal Astronomical Society; Honorary Member of the European Geophysical Society; Elected Fellow of the American Geophysical Union; Elected Member of the Deutsche Akademie der Naturforscher LEOPOLDINA; Honorary Fellow of the Geological Society of London; Personal Member of the Swiss Academy of Sciences; Gustav Steinmann Medalist of the Geologische Vereinigung; Alfred Wegener Medalist of the European Union of Geosciences; Bearer of the Medaille de l'Ordre Grand-Ducal Luxembourgeois de la Couronne de Chene.

Stephan Mueller's work was characterised by his never ending scientific curiosity and his quest for a better understanding of the earth as a system. With this goal in mind he never forgot the human aspect and abilities of his students and colleagues. Many of us remember long fruitful discussions until after midnight with Stephan. We lost a remarkable scientist, a stimulating mentor and teacher, and last, but not least, a very good friend.

Stephan is survived by his wife Doris, two sons and their families.

His memory will always live in our hearts.

(Jörg Ansorge and Dieter Mayer-Rosa)

Boris Viktorovich Kostrov (1933-1998)

On May 17, 1998, Boris Viktorovich Kostrov, one of the outstanding seismologists of the world, passed away after a long struggle with a severe illness. Since 1958 he worked at the O.Yu. Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, in Moscow and acquired world recognition by working in the field of dynamic theory of electricity, destruction mechanics, and their applications in seismology.

He introduced a new approach in theoretical seismology of application of the methods of destruction mechanics to the theory of tectonic earthquake focus and acquired extensive international recognition for his pioneer research on the seismic moment tensor. In later years Kostrov concentrated his efforts on inverse problems of the earthquake source.

Kostrov was an active participant in the work of the European Seismological Commission and for a number of years worked with the Subcommittee on Earthquake Source Physics. During the ESC Assembly in Athens, in 1994, he delivered a keynote lecture on "Inverse Problems of Earthquake Source Using Teleseismic Data".

He was a true champion of science and dedicated to science all his efforts to the very last days. We shall always remember the strong impact of his brilliant personality.

(Guennady Sobolev)

Albert Prozorov (1944-1997)

It was on 20 May 1997 that Albert Prozorov, that versatile scientist, died. He has left a memorable trace in statistical seismicity, his name being associated with terms that have become folklore, like random catalog, eliminated aftershocks, or creepex. He died while heading a big international research project.

Albert Prozorov was born in 1944 in Yaroslavl. He grew up during the hard postwar years without his father, entered the Faculty of Mechanics and Mathematics, Moscow University, learning under I.M. Gelfand. Afterwards V.I. Keilis-Borok engaged him in work on the analysis of seismicity and earthquake prediction. In those years that area of study was in its infancy and offered but risky rewards. However, his first research was noticeable, independent and fruitful.

Albert was the first in 1968 to introduce the notion of a randomized catalog into the statistical analysis of seismicity. This has served in his hands as a tool to investigate for significance observed phenomenological patterns in earthquake catalogs. The device was a very timely response to the challenge of computerization in science, while the method itself begins to look natural only today, when one becomes accustomed to a fractal treatment of seismicity and when the 'bootstrap' technique has been established in mathematical statistics.

Prozorov made it his lifetime's object to search for time-space relations between seismic events. In 1972 he put forward and investigated a bold hypothesis of distant 'aftershocks' which arise immediately after a main earthquake in the location of a future catastrophic event, possibly very far from the first shock. The conventional concepts then prevalent did not admit of the possibility of distant interaction. However, some recent events, among them the 1992 Landers, California earthquake, have confirmed that the Prozorov hypothesis is tenable. Also Albert has been proven right in making us think of the essence of prediction in a broader light, thereby initiating the development of a general theory of optimal strategies in earthquake prediction.

A. Prozorov was the first to propose ways for correct aftershock identification to stimulate further work in this field. A special place in his legacy is due to the creepex ('creep' and 'explosion') research cycle (1974-1996). Creepex is defined by residuals in the orthogonal magnitude regression (M_s , m_b) and contains information on the relation between low and high frequencies radiated by the earthquake source. That amazingly simple parameter, which consists of well-known ideas and of 'waste' from empirical activities in magnitude standardisation, has now become a physically meaningful tool to examine various aspects of earthquake generation (the relation to tectonic setting and detection of phases in the precursory phenomena of a seismic event).

The above episodes graphically portray the leading characteristic of A. Prozorov as a researcher: simplicity of analysis tools, physical feeling, and constancy in his endeavor. His unorthodox ideas were a boon to those around him and helped maintain an elevated scientific environment. Alik, as we all

familiarly called him, was reliable, stood out among his colleagues by his ability of discussing quietly, without undue heat, could good-naturedly listen to arguments being put forward and was able to couch his objections mildly without taking offense at small things. This must mark nobility of character of men that have always been few. Alik Prozorov was and will forever remain such a man in our memory.

(Igor Kuznetsov)

Richard Maass (1929-1998)

He studied mathematics at the Universitaet Jena and joined the former Jena "Institute for Soil Dynamics and Earthquake Research" in 1956. He was working at the Jena Institute, which later often changed its name and affiliation (until in 1990 it became part of the Central Institute of Physics of the Earth of the Academy of Sciences of the GDR, later the Institute for Geosciences of the University of Jena), until his death.

His mostly theoretical contributions to seismology and seismometry, mainly in collaboration with the late Prof, Sponheuer, Dr Teupser, Dr Ullmann and with Dr Neunhoefer, covered many aspects such as the application of vector algebra in analytical presentations of layered geological surfaces; the location procedures for rock bursts and regional seismic events; theoretical investigations of the interaction between a mechanical seismic receiver and a harmonic longitudinal plane wave; the determination of Shida's number from extensometer records, the development of a heuristic function for describing the seismic energy density of an earthquake and its application to an improved quantitative presentation of seismicity and seismic activity; the projective presentation of spatial seismicity and the automatic drawing of isolines, contributions to the macroseismic determination of the source depth; the refined determination of the parameters of the log-normal energy-frequency law; algorithms for the self-control and automatic identification of malfunctioning seismometer components using a redundant 4 component seismometer; and theoretical contributions to the inversion of surface wave data and to seismic hazard assessment. We will always remember him.

(Peter Bormann)

E. Unterreitmeier (1939-1997)

He had studied physics at the University of Jena and joined the then Institute of Geodynamics of the Academy of Sciences of the GDR in Jena in 1967. He was working throughout his career in the field of theoretical seismometry and instrument development, for many years together with the late Dr Teupser, the father of seismic instrumentation in former East Germany. His main contributions concerned the investigation of temperature disturbances of long-period vertical seismometers and their compensation (PhD thesis); the transmission of dynamic disturbances in seismograph systems; the development of transducers and construction principles (with many patents); and the development of the first medium period broadband seismometers TSJ-1 and EDS-2 with remote electronic parameter control. During his years in Jena he took the initiative to collect old seismometers and recorders and to install them in a specific cabinet at the castle museum at Burg Ranis near the seismological observatory of Moxa together with original paintings by August Sieberg, illustrations about global seismicity and earthquake hazard and photographs of the modern Moxa station and its equipment. This unique collection still exists and enjoys great popularity.

After the unification of Germany, he moved in 1992 to the newly established GeoForschungsZentrum Potsdam and worked there in the section for geoscientific instrument development, mainly concerned with the application of fibre optics for the development of very small and robust deformation sensors for seismic measurements in deep boreholes and extreme p-T conditions in general. In the German Geophysical Society he joined the working group on the "History of Geophysics" and still chaired his session at the DGG-meeting in 1997. We shall always remember him.

(Peter Bormann)

3. Call of Titular Members

Country	Titular member	Confirmed or proposed	Proxy
Algeria	M Benhallou	06.08.96	-
Austria	W Lenhardt	31.07.96	+
Belgium	Th Camelbeeck	14.09.94	-
Bulgaria	D Jordanov	13.06.96	-
Croatia	D Skoko	15.09.94	Suhadolc
Czech rep.	J Sileny	02.09.96	+
Denmark	E Hjortenberg	19.08.96	Havskov
Egypt	M Dessokey	16.07.96	-
Finland	P Heikkinen	13.08.96	-
France	A Deschamps	09.02.94	Dufumier
Germany	F Scherbaum	12.09.96	+
Greece	J Drakopoulos	12.09.94	Makropoulos
Hungary	T Zsiros	16.09.94	-
Iceland	R Stefansson	23.07.96	+
Ireland	A W Jacob	12.08.96	Walker
Israel	A Hofstetter	25.08.96	+
Italy	C Eva	26.07.96	Suhadolc
Jordan	Z El-Isa	12.09.96	-
Lebanon	C Tabet	07.08.96	-
Luxembourg	J Flick	31.07.96	-
Macedonia FYRO	V Mihailov	04.09.96	+
Monaco	P. Mondielli	03.10.96	-
Morocco	D Ben Sari	16.08.96	-
Netherlands	R Sleeman	12.09.96	+
Norway	S Mykkeltveit	12.09.96	Havskov
Poland	S Gibowicz	30.08.96	Niewiadomski
Portugal	L Mendes Victor	10.07.96	+
Romania	D Enescu	18.08.96	-
Russia	Y Tyupkin	13.08.96	+
Slovakia	P Moczso	12.08.96	-
Slovenia	J Lapajne	02.03.94	+

Spain	J Badal	10.07.96	Canas
Sweden	O Kulhanek	15.08.96	-
Switzerland	D Mayer-Rosa	21.02.94	Giardini
Tunisia	M Allouche	08.09.94	-
Turkey	R Yilmaz	28.01.94	-
UK	I Stimpson	08.04.94	+
Malta	P. Galea	observer	-
Albania	B. Muco	observer	-

+ = present

- = absent

4. Activity Reports of the Subcommissions

Short activity reports of the Subcommissions are delivered by:

SC-A: "Seismicity" - K. Makropoulos

SC-B: "Data Acquisition and Interpretation" - H. Aichele

SC-C: "Source Physics" - H. Dufumier

SC-D: "Deep Seismic Sounding" - U. Luosto

SC-F: "Engineering Seismology" - D. Slejko

The full reports, as received, are to be found in the Subcommission section.

5. Announcements

- The Nominating and Resolutions Committees are announced

Nominating Committee

F Scherbaum

J Havskov

D Slejko

Resolutions Committee

R Musson

L Mendes-Victor

J Sileny

Resolutions are adopted by the ESC-Council (should be transmitted in writing to the Resolution Committee on the day before the Council) and are posted at least 12 hours before the Closing plenary.

6. Opening of the General Assembly

The President declares the 26th General Assembly of the European Seismological Commission open, and wishes much success to all participants.

Opening Ceremony
Monday, August 24, 1998, 10:00-10:30

Welcome speeches by:

President of the LOC, Dr. A Shapira

Welcome speech of the Minister of the National Infrastructure Ministry, Mr. A. Sharon, given by Dr. M Beyth

Ladies and Gentlemen, Distinguished guests,

It gives me a great honor to welcome you all to Israel and to the General Assembly of the European Seismological Commission.

It seems that we are quite lucky here in Israel, to learn about the earthquake phenomenon by mainly watching what happens in other countries. However, our region has a long documented history of destructive earthquakes, and the people living along the Dead Sea Rift, are vulnerable to future strong earthquakes. Your being here with us to exchange ideas and to learn from each other's experience and knowledge, is not only an important contribution to Seismology and related fields of Earth Sciences, but is also important for a better understanding of earthquake phenomena in our region and consequently help to mitigate their effects.

The Israel ministry of National Infrastructures, through our Earth Sciences Research Administrations and its associated institutions, is striving to achieve a better understanding of the earthquake processes and its effects on the safety and economical welfare of our society. The Israel Geological Survey and the Seismology Division of the Geophysical Institute of Israel are currently active in geological and geophysical mapping of the surface and subsurface, as well as continuous and routine monitoring of the seismicity in and around Israel. A wealth of research studies on the neotectonics, and on crust movements across the country, is being performed. This important research is mainly aimed to better quantify the earthquake hazard and risk in our region. Much of what has been done in Israel will probably be presented to you during the scientific discussions of this conference.

Earthquakes transcend all political boundaries. We have no doubt that if and when a strong earthquake occurs in our region, it will require a fully cooperated response by all nations living along the active zones of the Jordan- Dead Sea faults. This cooperation has to begin much before the earthquake strikes. In that respect, it should be noted that minutes after the signing of the Peace treaty between the Hashemite Kingdom of Jordan and the State of Israel, the two seismological networks of Jordan and Israel were linked. We look forward for further strengthening the scientific and technical cooperation between all the national and regional seismological institutions in the Middle East and we trust that the seismological, geological and geophysical European scientific communities, will contribute towards this goal.. At this point I have to mention the combined effort by the US Geological Survey and UNESCO Reduction of Earthquake Losses in the Eastern Mediterranean Region (RELEMR) program, for coordination of seismological studies in the region.

On the occasion of celebrating Israel's 50th anniversary, and in view of the great progress made here in all fields, I invite you to take the opportunity of being here for the conference, to travel across our country and to see for yourself what we have accomplished here in all spheres of living.

I wish you all a very productive conference, and a memorable and enjoyable stay in Israel on our 50th anniversary.

Welcome speech by Director of the Geophysical Institute of Israel, Dr. Y Rotstein

President of IASPAI,

Members of the Bureau of the European Seismological Commission

My ESC colleagues

On behalf of the Geophysical Institute of Israel, home of the local seismology group, I would like to extend a warm welcome to all of you and wish you a very fruitful conference and an enjoyable time in Israel.

Members of the seismology division in the Institute, in particular Dr Hofstetter and Dr Shapira, have worked literally day and night to ensure the success of this meeting and I am sure that their efforts will enable us too have a smooth meeting in a relaxed atmosphere.

GII has been involved in seismological work for some 20 years. We started with a handful of people and a small monitoring network. Twenty years later, due to the dedication and talent of the people involved, as well as continuous support from the government, we can proudly present a large and able seismological group, with a rounded curriculum which includes Earthquake monitoring, Strong motion observations, Broad Band stations, a micro-array, a strong research group and more. I am sure that in your coming visits you will see new and improved capabilities of this dynamic group.

As you can guess, our keen interest in seismological research stems from the fact that we live next to an active plate boundary, the Dead Sea fault system. We devote much attention and resources to the study of this geological phenomenon, not only using seismological tools, but also using seismic exploration tools, namely multichannel seismic reflection lines. Using this technique, we now have a pretty good idea as to the location and extent of most of the many active faults in the Dead sea rift which, together comprise the complex puzzle which we call the Dead Sea Rift System.

Israeli scientists, including our seismologists, are widely traveled usually and must have had the opportunity of enjoying the hospitality of so many of your countries and, indeed, of so many of you yourselves.

It is with pleasure, thus, that we try to reciprocate and extend to you the same warm welcome that we enjoy in your countries. I am sure that you will find this warm welcome is characteristic also of the people you meet wherever you go in the country and it will make you wish to visit with us some more.

Let us all have some serious discussions and a lot of good time!

Welcome speech by President of ESC, Prof. G. Sobolev

Ladies and gentlemen,

It is a great privilege for me to express our sincere gratitude for the invitation to hold the XXVI General Assembly of the European Seismological Commission here in Israel. For the first time the General Assembly of seismologists of Europe is held in this comparatively young State that came into its own in this ancient land with a fascinating history.

As we know, this State is exerting great efforts to secure the safety of the lives of the citizens of Israel following the motto that "not a single citizen shall perish". This also refers to seismic hazards. In the struggle against this natural disaster, due attention is given to all its basic components: seismic hazard, microzonation, and prediction. Moreover, the standard of antiseismic construction inspires us with an admiration.

Allow me to make a very brief review of the ESC activities.

In the course of the last few years, a scientific-technical revolution took place in the facilities for distribution and exchange of information through the INTERNET system. It is gratifying to note that the seismologists started to actively employ this device primarily for exchanging catalogs and making numerous "Home Pages". The IASPEI resolution on the virtual network was proposed by ESC during the IASPEI General Assembly in Thessaloniki and was accepted by the delegates. The purpose is to improve the quality of seismological information. The procedure could be for the ESC Titular Members to nominate national centres that might join the network.

In accordance with the resolution adopted by the ESC General Assembly in Reykjavik, members involved in the activities of SC-A are working in order to finalize the first limited European Parametric Earthquake Catalogue.

Several European institutes and individual scientists involved in the activity of the commission started new EU-INCO-Copernicus projects. Their implementation involves the participation of partners from Albania, Armenia, Bulgaria, Czech Republic, France, Greece, Hungary, Italy, Poland, Romania, Russia, Slovak Republic, Slovenia, The Netherlands, and United Kingdom. Some results of activities on these projects will be presented during this General Assembly.

The preliminary ESC hazard map (PGA) is being prepared as a part of the final GSHAP global compilation by merging the results of individual regions and test areas. The regional compilation will be discussed during the present Assembly and will be included in the GSHAP final volume.

The ESC Bureau and LOC have given much effort to organize a second " Training Course for Young Seismologists " in the frame of the Assembly, which took place two days before. The main goal of that Training Course was to expose the students to site effects and standard hazard analysis.

The presented papers have been published before the Assembly, which practice already forms a part of the ESC tradition.

Prof. Claude Froidevaux, the IASPEI President, suggested a discussion of questions concerning closer coordination with other European Geophysical and Geological Scientific Organizations. It could be arranged during the Assembly at a kind of "round the table" session.

Ladies and gentlemen, it is a great honor for me to welcome many outstanding participants and guests of the Assembly not only from Europe, but also from Africa, America, and Asia. We are glad to greet here the representatives of the Government, of the City of Tel Aviv, of the Ministries, and scientific and social institutions, and of the media of Israel.

I believe that the participants of this General Assembly, in addition to the scientific program, will have time not only to visit the famous historical highlights of Israel, but also to render their due to the admirable technical achievements reached through the efforts of the State and public organizations. The unique drop irrigation system, giving life to hundreds of thousands of trees, alone counts for a lot. Through painstaking labour, the one-time semidesert is transformed into a flourishing orchard covering a considerable part of the territory of this country.

I trust that the tremendous work accomplished by the Local Organizing Committee under the guidance of Dr. Avi Shapira, Vice President of ESC, and Dr. Rami Hofstetter, the active and productive participation of scientists from many countries, and the wonderful facilities in the Panorama Hotel will ensure the success of the Assembly.

Meeting of the ESC Council
Thursday, August 27, 1998, 17:00-19:30

Present: Titular Members and Executive Committee

The ESC President welcomes all the participants.

1. Presence of a quorum

P Suhadolc ascertains the presence of the quorum. 36 out of 52 are present.

2. Appointment of the Election Chairman and tellers

C Froidevaux is proposed as Election Chairman, W Lenhardt and R Sleeman as tellers. The proposal is approved.

3. ESC General Assembly in 2000

P Suhadolc informs the Council that one invitation has been received by the ESC Bureau for the organisation of the XXVII General Assembly in the year 2000, from the Institute of Geophysics of the University of Lisbon (Portugal). No other candidates are proposed from the floor. There being no objections to a public vote, the nomination was carried unanimously by a show of hands; 36 votes in favour, none against and no abstentions.

In response to a request from C Froidevaux, Luis Mendes Victor says a few words of introduction to the organisation of the Lisbon Assembly.

The 2000 ESC General Assembly will be, therefore, organised by the Institute of Geophysics of the University of Lisbon (Portugal). Contact person: Luis Mendes Victor.

4. Elections

The Nominating Committee presents the candidates in sequential order.

Results of the elections:

Bureau:

President: L Mendes Victor is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands. L Mendez Victor is elected (votes: 35 yes, 0 no, 1 abs.)

Vice-Presidents: For the first of the two Vice-presidents A Shapira is presented. No further candidates are raised from the floor. Election is carried out by show of hands. A Shapira is reelected (35 yes, 0 no, 1 abs.)
For the second of the two Vice-presidents D Giardini is presented. No further candidates are raised from the floor. Election is carried out by show of hands. D Giardini is elected (35 yes, 0 no, 1 abs.)

Secretary General: P Suhadolc is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands. P Suhadolc is elected by show of hands (35 yes, 0 no, 1 abs.)

Assistant Secretary: A B Walker is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands. A B Walker is elected by show of hands (35 yes, 0 no, 1 abs.)

L Mendes Victor accepted the Presidency noting his vision that satellite scientists would be brought into collaboration with seismologists and that the issue of hazard and vulnerability would be addressed.

P Suhadolc thanked L Mendes Victor for his contribution and gave warm words of thanks to G Sobolev for his past four years of presidency and R Stefansson for his vice presidency and for organising the successful Reykjavik Assembly.

G Sobolev congratulated the new president and vice presidents on their election and underlined the quality of these scientists in whose hands the ESC was now placed.

Subcommissions

- SC-A: K B Makropoulos is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (35 yes, 0 no, 1 abs.) K B Makropoulos is elected.
- SC-B: L Vinnik is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (35 yes, 0 no, 0 abs.). L Vinnik is elected.
- SC-C: C-I Trifu is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (36 yes, 0 no, 0 abs.). C-I Trifu is elected.
- SC-D: J Mechie is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (36 yes, 0 no, 0 abs.). J Mechie is elected.
- SC-E: J Zschau is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (35 yes, 0 no, 1 abs.). J Zschau is elected.
- SC-F: D Slejko is presented as candidate. No further candidates are raised from the floor. Election is carried out by show of hands (35 yes, 0 no, 1 abs.). D Slejko is elected.

P Suhadolc asked the subcommission chairpersons to deliver a short summary of their activities and report any changes in the sub-commission.

For SC-A, K Makropoulos reported that M Stucchi will replace R Gutdeutsch as the chairman of the working group on "Historical Earthquake Data" and that another working group has been created called "Important Historical Earthquakes" with C Hammerl as chairman.

In response to a question from D Giardini, K Makropoulos outlined the aims of the new working group on "Important Historical Earthquakes" led by C Hammerl; that is, those which had an impact across borders and which warranted a very detailed study. In response to a query by D Slejko, he also outlined the scope of the other working group led by M Stucchi. The two scopes are seen to be complementary by SC-A members. L Mendes Victor recommended that the new working group should find an alternative title, not using the word "important", to avoid confusion. D Giardini argued that splitting working groups in this way was not desirable. P Suhadolc noted that the issues of working groups are the responsibility of the sub-commissions and should be discussed outside this meeting. After a brief discussion the Council recommended that the two working groups are to become sections of a common working group under the name "Historical Seismology" which will have M Stucchi and C Hammerl as responsables.

For SC-B, H Aichele reported that B Dost has replaced B Feignier as chairman of the working group on "Data Centres and Data Exchange".

For SC-C, H Dufumier reported that C-I Trifu is the new chairperson of the subcommission, Anne Deschamps is Vice Chairperson and H Dufumier is secretary.

For SC-D, C Lund reported a change in the name of the subcommission from "Deep Seismic Sounding" to "Crust and Upper Mantle Structure" and that only one working group "Surface wave and tomographic studies of lithospheric structure" was continuing within the subcommission. Within this working group the following topics would be researched: "Surface wave tomography", Responsible: T. Yanovskaya, Russia; "P-wave travel time tomography", Responsible: E. Kissling, Switzerland; "Refraction/wide angle reflection", Responsible: M Grad, Poland; "Deep near vertical reflection", Responsible: C Juhlin, Sweden; "Receiver function", Responsible: G Bock, Germany; and "Seismicity", Responsible: S Gregerson, Denmark.

For SC-E, J Zschau reported the following changes: a new working group on "Field observations", (Responsible: A V Ponomarev, Russia and M Westerhaus, Germany) replaces the working groups on "Precursors" and "Field observations and Techniques". A new working group on "Non-linear structures and processes", (Responsibles: V Smirnov, Russia and C Godano, Italy), has been created.

For SC-F, D Slejko reported that the working group on "Macroseismic Scales" is no longer operating, having fulfilled all its tasks.

5. Titular Members

The Bureau then proposes the confirmation of Titular Members appointed by their respective countries. P Suhadolc reports that he has not received the official letters of appointment for the Titular members of Belgium, France, Greece, Hungary, Luxemburg, Slovenia, Spain, Tunisia, Turkey and the UK. P Suhadolc points out to the Council the newly appointed Titular members: M Herak (Croatia), J Havskov (Norway), G Shamir (Israel), D Giardini (Switzerland). The Bureau proposes to the Council that Th Camelbeeck is appointed Titular member for Belgium, A Deschamps for France, J Drakopoulos for Greece, T Zsiros for Hungary, J Trampert for Luxemburg, J Lapajne for Slovenia, F Vidal for Spain, M Allouche for Tunisia, R Yilmaz for Turkey and I Stimpson for the UK, pending their approval by their respective National Committees for IUGG. The Council approves the proposal (votes: 32 yes 0 no and 0 abs.). P Suhadolc also urged titular members to inform him of any changes in e-mail or address so that they can be posted on the home page.

The List of Titular Members for the Administrative period 1998-2000 is therefore:

Country	Titular member	Confirmed
Algeria	M Benhallou	06.08.96
Austria	W Lenhardt	31.07.96
Belgium	Th Camelbeeck	14.09.94*
Bulgaria	D Jordanov	13.06.96
Croatia	M Herak	05.06.98
Czech rep.	J Sileny	02.09.96
Denmark	E Hjortenberg	19.08.96
Egypt	M Dessokey	16.07.96
Finland	P Heikkinen	13.08.96
France	A Deschamps	09.02.94*
Germany	F Scherbaum	12.09.96

Greece	J Drakopoulos	12.09.94*
Hungary	T Zsiros	16.09.94*
Iceland	R Stefansson	23.07.96
Ireland	A W B Jacob	12.08.96
Israel	G Shamir	25.08.96
Italy	C Eva	26.07.96
Jordan	Z El-Isa	12.09.96
Lebanon	C Tabet	07.08.96
Luxembourg	J Trampert	27.08.98*
Macedonia FYRO	V Mihailov	04.09.96
Monaco	P Mondielli	12.09.96
Morocco	D Ben Sari	16.08.96
Netherlands	R Sleeman	12.09.96
Norway	J Havskov	31.07.98
Poland	S Gibowicz	30.08.96
Portugal	L Mendes Victor	10.07.96
Romania	D Enescu	18.08.96
Russia	Y Tyupkin	13.08.96
Slovakia	P Moczó	07.08.98
Slovenia	J Lapajne	02.03.94*
Spain	J Vidal	25.08.98*
Sweden	O Kulhanek	15.08.96
Switzerland	D Giardini	21.06.98
Tunisia	M Allouche	08.09.94*
Turkey	R Yilmaz	28.01.94*
UK	I Stimpson	08.04.94*
Observer status		
Albania	B Muco	27.08.98*
Malta	P Galea	31.07.98

6. Resolutions

Each resolution is presented by J Sileny, President of the Resolutions Committee. With minor amendments the following resolutions have been adopted.

ESC Meetings

Recognising

the need to improve the scheduling of ESC meetings, and to increase the possibility of giving more time to individual speakers

the ESC recommends

that conveners should consider limiting speakers to two oral presentations within the same symposium/workshop, and should encourage greater use of poster presentations.

Dissemination of data

Considering

the need to facilitate seismological research by the free dissemination of data, and to promote co-operation in research within the ESC and between the ESC and related scientific communities, and noting the benefits already obtained from some datasets that have been made freely available online,

the ESC recommends

that in future all seismological datasets (strong motion databases, earthquake catalogues, etc) that are compiled under the auspices of projects connected to ESC Working Groups should be made available to the international scientific community for scientific research purposes, with the proviso that users are obliged to acknowledge the source of the data and that, in some circumstances, restrictions on the use of the data may be applied by the donor.

Earthquake prediction

Recognising

that so far the predictability of large earthquakes has neither been proved nor disproved, and

recognising

the wide interest in this important seismological field of investigation,

the ESC recommends

that earthquake prediction research should be continued in order to establish the circumstances under which earthquakes can be predictable, as well as the degree to which prediction might be achievable, and

the ESC encourages

scientists in the field of earthquake prediction research:

to continue field observations and laboratory studies, as well as mathematical and physical modelling, and

to continue and improve work on the scientific application and testing of proposed earthquake prediction methods in real time.

Thanks

Acknowledging

the excellent work done by the Local Organising Committee in arranging the XXVI General Assembly of the ESC in Tel Aviv, the first such General Assembly to be held in a Near Eastern country, and noting the successful sessions and very enjoyable social programme, the ESC Council

Thanks

and congratulates the LOC for all their efforts, which have resulted in such a successful conference.

8. *Discussion*

D Giardini expressed his dissatisfaction at the absence of three sub-commission chairpersons. P Suhadolc explained that this was the first time that an ESC General Assembly had been held in August rather than in September. As a result, two chairpersons were involved in field work; the other could not find the funds to attend.

D Giardini carried a message from D Mayer-Rosa expressing his apologies for not being able to attend. P Suhadolc noted that he would be sending a postcard with the best wishes of those attending the Assembly.

In response to a procedural question raised by L Mendes Victor in connection with the Council of Europe, P Suhadolc noted that the ESC secretary general is required to nominate a list of names to the Open Partial agreement which is approved by the Council of Ministers. They can adjust the list. It is required that each 3 years, 50% of that list be rotated.

G Sobolev closed the meeting with his thanks to all delegates.

Closing Plenary

Friday, August 28, 1998, 16:00-16:30

1. Address by ESC President

The President thanks all participants for the scientific contributions and the Local organising committee, in particular

Avi Shapira

Rami Hofstetter

for the successful work done during this meeting.

2. The new Bureau 1998-2000

The new ESC Bureau 1998-2000 is introduced:

President:	L Mendes-Victor (Portugal)
Vice President:	A Shapira (Israel)
Vice President:	D Giardini (Switzerland)
Secretary General:	P Suhadolc (Italy)
Assistant Secretary:	A B Walker (UK)

3. Confirmation of the Subcommittee Chairpersons

SC-A: "Seismicity"	K Makropoulos
SC-B: "Data Acquisition and Interpretation"	L Vinnik
SC-C: "Source Physics"	C-I Trifu
SC-D: "Crust and Upper Mantle Structure"	J Mechie
SC-E: "Earthquake Prediction"	J Zschau
SC-F: "Engineering Seismology"	D Slejko

4. Confirmation of Titular Members

The General Assembly confirms the ESC Titular members (see list under point 5 of ESC Council meeting) for 1998-2000.

5. The next General Assembly

The next General Assembly in Lisbon 2000 is announced with thanks to the Portuguese National Committee for Geodesy and Geophysics, Lisbon (Portugal).

6. Adoption of resolutions

The resolutions accepted by the ESC-Council are read one by one and adopted by the General Assembly.

7. Closing words of the ESC President

The President G Sobolev thanks, on behalf of the ESC, all participants, the Local Organising Committee, the staff of ORTRA Ltd. and the Hotel Dan Panorama for the excellent conference and invites everybody to attend the XXVII ESC General Assembly in Lisbon.

ESC SUBCOMMISSIONS AND WORKING GROUPS ACTIVITY REPORTS

SC-A: Seismicity of the European Region

Bureau 1996-1998

Chairperson: K. Makropoulos (Greece)

Vice Chairperson: J. Bonnin (France)

Secretary: Z. Schenkova (Czech Republic)

Working Groups 1996-1998

1. European Earthquake Catalogue. Responsible: J. Bonnin (France)
2. Ibero-Maghrebian Region. Responsible: L. Mendez-Victor (Portugal)
3. Historical Earthquake Data. Responsible: R. Gutdeutsch (Austria)
4. Central and Eastern Europe. Responsible: Z. Schenkova (Czech Republic)
5. Volcanism and Earthquakes. Responsible: R. Schick (Germany), B. Martinelli (Switzerland)
6. Seismotectonic Analysis. Responsible: C. Eva (Italy)
7. Statistical Models of Earthquake Occurrence. Responsible: G. Papadopoulos (Greece)
8. Personal Computers in Seismicity Studies. Responsible: M. Garcia-Fernandez (Spain), N. Voulgaris (Greece)

Activity Report 1996-1998 by K. Makropoulos

During the Reykjavik XXV General Assembly five scientific sessions, three special symposia and two workshops were held under the Subcommission's auspices with a total of two hundred (200) oral and poster presentations. A fruitful discussion took place about future activities, and the advantages and opportunities for closer cooperation and new initiatives, offered now by the European Union through the INCO-COPERNICUS and similar projects were highlighted. These propositions were finally adopted by the ESC Council.

Following the above recommendations several institutes and individual scientists involved in the Subcommission's workgroups worked together and submitted a number of proposals in the EU-INCO-Copernicus project. Several proposals were approved including ASPELEA (Assessment of Seismic Potential in European Large Earthquake Areas), ENSeRVES (European Network on Seismic Risk Vulnerability Scenarios) and others. Their implementation involves the participation of partners from Albania, Bulgaria, Czech Republic, France, Greece, Hungary, Italy, Poland, Romania, Russia, Slovak Republic, Slovenia, The Netherlands, United Kingdom. The main activities of these projects will be presented during the XXVI ESC General Assembly in Tel-Aviv.

During the last two years (1996-1998), most of the Working Groups were active by either organizing workshops or participating in international conferences like the XXIX IASPEI Meeting in Thessaloniki, Greece (August 1997).

Following discussions on the scaling of historical earthquakes due to problems of data inhomogeneity and varying methods of intensity determination applied in different European countries, Working Group 3 is presently elaborating a revision of the recommendations of historical earthquake studies, which has been adopted during the 1988 ESC General Assembly in Sofia.

In December 1997 a volume dedicated to the 3rd Workshop on the Statistical Models of Earthquakes (Thera 1995), organised by WG 7, was circulated (co-editors G.A. Papadopoulos and K.C. Makropoulos).

Finally, in accordance with the resolution proposed by SC-A and adopted by the ESC General Assembly in Reykjavik, members involved in the activities of WG's 1 and 3 are working along these lines in order to finalise a first limited EPEC European Parametric Earthquake Catalogue, anticipating that under the coordination of the SC-A this effort will continue and expand to include the whole European area.

Bureau 1998-2000

Chairperson: K. Makropoulos (Greece)

Vice Chairperson: J. Bonnin (France)

Secretary: Z. Schenkova (Czech Republic)

Working Groups 1998-2000

1. European Earthquake Catalogue. Responsible: J Bonnin (France)
2. Ibero-Maghrebian Region. Responsible: L Mendez-Victor (Portugal)
3. Historical Seismology. Responsibles: C Hammerl (Austria), M Stucchi (Italy); Sub-topics and responsibles: Important Historical Earthquakes (C Hammerl, Austria), Historical Earthquake Data (M Stucchi, Italy)
4. Central and Eastern Europe. Responsible: Z Schenkova (Czech Republic)
5. Volcanism and Earthquakes. Responsible: J Neuberg (UK), R Carniel (Italy)
6. Seismotectonic Analysis. Responsible: C. Eva (Italy)
7. Statistical Models of Earthquake Occurrence. Responsible: G. Papadopoulos (Greece)
8. Personal Computers in Seismicity Studies. Responsible: M. Garcia-Fernandez (Spain), N. Voulgaris (Greece)

SC-B: Data Acquisition, Theory and Interpretation

Bureau 1996-1998

Chairperson: L Vinnik (Russian Fed.)

Vice Chairperson: H Aichele (Germany)

Secretary: B Dost (Netherlands)

Working Groups 1996-1998

1. Data Centers and Data Exchange. Responsible: B. Feignier (France)
2. Data Processing and Interpretation. Responsible: F. Scherbaum (Germany)
3. Microseisms. Responsible: E. Hjortenbergt (Denmark)
4. Theory of Seismic Wave Propagation and Deep Earth Structure. Responsible: P. Malischewski (Germany)
5. History of Seismometry. Responsible: G. Ferrari (Italy)
6. IASPEI Manual on Seismological Observatory Practice. Responsible: Bormann (Germany)

Activity Report 1996-1998 by L Vinnik

This report is based mainly on the materials supplied by the working group chairmans.

The WG-1 was initiated at the 25th ESC assembly in Reykjavik in 1996. During the reported period, activities were focused essentially on the theme of formats for data exchange. Several meetings took place during the 25th ESC Assembly. They led to the definition of a preliminary format. A technical description of this format was published in the EMSC Newsletter, vol 12.

The second main activity dealt with rapid data exchange. The project allowed the development of two schemes for rapid data retrieval. The first one consists of using a standard software, called AutoDRM, to automatically exchange data between local seismological centers and the EMSC. As part of the project, an AutoDRM interface was implemented at the KNMI (De Bilt, The Netherlands) giving real-time access to automatically picked arrival times. This technique proved to be very efficient and could easily be extended to other seismological institutes. All the parametric data collected are then accessible through the EMSC Web page. The second scheme consists of automatically retrieving broadband waveform data from various data centers and making them available to the community. The software is expected to become operational by mid-1998. These two developments will be discussed, among others, at the workshop 'Rapid warning systems' during the 26th ESC Assembly in Tel Aviv.

The main activity of the WG-2 consisted in organization of a workshop on 'Methods of artificial intelligence in seismology' held at the Institute of Geosciences of the University of Potsdam between Oct. 27-30, 1997. The main topics were: single trace detection (classical detection theory, pattern recognition); seismological networks (coincidence tests by voting, expert systems); seismic arrays (fundamentals, phase association by expert systems, mini-arrays); self learning approaches. The lectures were interleaved by numerous exercises covering topics from optimization of trigger parameters up to

exercises with advanced software packages like Sonodet and Coassein, written by Dr. Joswig. Similar subjects will be discussed at WS-5 during the 26th ESC Assembly in Tel Aviv.

At the Reykjavik meeting, WG-3 organized a symposium on seismic noise. Some of the proceedings of the symposium are published in 'Seismology in Europe'. An informal international meeting was held in Copenhagen on 29 July 1997 to discuss a revitalization of the old ESC project of issuing a bibliography on microseisms. Such a bibliography is so much more needed now that ISC has stopped its bibliographical services. During the ESC Subcommittee meeting at the IASPEI General Assembly in Greece in 1997, this subject was presented as well. During the 26th General Assembly of ESC in Tel Aviv, the topics of the WG-3 will be discussed at the SC-B2 symposium.

Significant activity was demonstrated by WG-6. This working group, like WG-1 was initiated at the 25th ESC Assembly in Reykjavik. WG-6 had organized at the Reykjavik meeting the session, which has been attended by several tens of people. P. Bormann produced an introduction to and a revised list of contents for the new edition of the MSOP (Manual of Seismological Observatory Practice). This provided the basis for the workshop held during the 29th Assembly of IASPEI in Greece. The following subjects were discussed at the workshop: WWW publication of the manual; aims and scope of the new MSOP; earthquake signals and seismic noise; seismic arrays in the new MSOP; communication and seismic networks; digital routine seismic analysis; FIR digital anti-alias filters; magnitude calibrating functions for core phases; seismic intensity and scales; earthquake damage inspection forms; and genetic algorithm and transfer function. In conjunction with this workshop a meeting of the IASPEI manual working group was held, and attended by most of the ESC WG-6 members. Since the Thessaloniki meeting some progress was made, for example, by critical reviews of first drafts of the manual submitted by J. Fyen, J. Schweitzer and A. Trnkoczy to P. Bormann, or by the agreement of G. Asch to join the working group in 1998 as a coordinator and contributor for the chapter 'Seismic recorders'. At the Tel Aviv ESC meeting WG-6 will organise the workshop WS-3 with oral and poster presentations.

WG-4 is making progress in reviving a tradition of the wave-theoretical approach to the problems of seismology within ESC. At the 26th ESC Assembly WG-4 organizes a symposium: Theory of Wave Propagation and New Techniques of Data Processing. WG-5 organizes workshop WS-6: Earthquake-Related Phenomena in Late 19th Century: Research, Recovering and Exploitation of Historical Scientific Observations.

Bureau 1998-2000

Chairperson: L Vinnik (Russian Fed.)

Vice Chairperson: H Aichele (Germany)

Secretary: B Dost (Netherlands)

Working Groups 1998-2000

1. Data Centers and Data Exchange. Responsible: B Dost (Netherlands)
2. Data Processing and Interpretation. Responsible: F Scherbaum (Germany)
3. Microseisms. Responsible: E Hjortenberga (Denmark)
4. Theory of Seismic Wave Propagation and Deep Earth Structure. Responsible: P Malischewski (Germany)

5. History of Seismometry. Responsible: G Ferrari (Italy)
6. IASPEI Manual on Seismological Observatory Practice. Responsible: Bormann (Germany)

SC-C: Earthquake Source Physics

Bureau 1996-1998

Chairperson: A Deschamps (France)
Vice-Chairperson: C-I Trifu (Romania)
Secretary: E Buforn (Spain)

Working Groups 1996-1998

1. Paleoseismicity. Responsible: M Meghraoui (Algeria) and K Atakan (Norway)
2. Focal Parameters Determinations. Responsible: C-I Trifu (Romania)

Activity Report 1996-1998 by A Deschamps and C-I Trifu

The sub-commission and its participants were satisfied by the scientific participation at the Reykjavik meeting, during which the two main sessions; the first one on source processes, the second one on paleoseismicity were a great success and took advantage of the good coordination of the dynamic discussions between researchers in different research communities.

The Paleoseismicity Working Group was very active during the 2 year period, mainly organizing workshops where new observations and methods of analysis were presented to the global European community working on the subject.

The Working Group on Paleoseismology was established originally during the ESC XXIV General Assembly in Athens in 1994, as an open forum for discussions in paleoseismology within the European context. It has been growing constantly since then with increased participation of interested scientists either actively working in paleoseismology or interested in the subject because of its implications in other fields, such as, seismic hazard assessment, fault behaviour and the physics of the earthquake faulting etc. European experience in paleoseismology has started with the trenching experiments performed on important earthquakes occurred during the last two decades in seismically active areas in the Mediterranean region. A few well studied earthquakes which occurred in Italy, Greece and Algeria have opened a new potential for improvement in understanding the fault behaviour as well as in estimating the seismic hazard. Since then, activities have increased steadily and there are now established groups or individuals working actively in paleoseismology in Belgium, France, Germany, Greece, Israel, Italy, Netherlands, Norway, Morocco, Spain and Turkey.

The activities of the working group are detailed below:

Following the examples from the seismically active parts of Europe and around the Mediterranean, activities were extended to northern Europe as well. A pilot paleoseismic study performed at the Bree fault escarpment, along the Feldebiss Fault in Belgium, by the Royal Observatory of Belgium has demonstrated the importance of paleoseismic studies in areas of low seismic activity.

Experiences gained during the study of the Bree fault scarp in Belgium, have initiated a number of important activities in areas of present day low seismicity in northern Europe. As a result a major European project 'PALEOSIS' (Evaluation of the potential for large earthquakes in regions of present day low seismic activity in Europe) is funded by the EC-DG XII Environment and Climate Programme, where groups from Belgium, France, Germany, Italy, Netherlands, Norway and Spain collaborate in paleoseismology.

Another important European project 'FAUST' (Faults as a seismologists' tool) was also funded by EC-DG XII Environment and Climate Programme, which involves groups from Greece, France, Italy, Spain and UK.

It was actively involved in the recent Summer School on 'Active Tectonics and Paleoseismology' arranged in Luxembourg, in July 1998. This was an occasion where the students or interested professionals from different parts of Europe participated in a concentrated school in paleoseismology which involved formal lectures given by distinguished scientists in the field as well as a well-prepared field-work involving exercises in high resolution geophysics, geomorphology and trench interpretations along the Bree fault escarpment in Belgium. A special report about this important activity is enclosed (Appendix I).

Recent earthquakes which occurred in Grevena, Greece in 1996, French Pyrenees in 1996 and the more recent earthquake sequence in central Italy in 1997 have initiated a number of interesting paleoseismological investigations. Results from these studies are published (or being published) in different scientific journals.

A number of sessions related to active faulting and paleoseismology were organised during the international or European Conferences held in Europe, such as: the EUG Conference in Strasbourg (1996), ESC General Assembly in Reykjavik (1996), IASPEI General Assembly in Thessaloniki (1997), EGS Conference (1997), and the last ESC General Assembly in Tel Aviv (1998). All these sessions involved active participation of the members of the WGP through oral or poster presentations.

There has been efforts to publish special issues dedicated to paleoseismology. Proceedings of the session S10 'Earthquakes, paleoseismology and active tectonics' during the IASPEI General Assembly in Thessaloniki (1997), will be published in Tectonophysics as a special issue on paleoseismology. Guest Editors are D. Pantosti, S. Pavlides and P. Zhang. Additionally, the proceedings of the Summer School in Luxembourg is also planned to be published. A special issue of the Journal of Seismology is being considered and negotiations still continue.

A successful field-trip was organised by Aykut Barka to the North Anatolian Fault Zone in August 1997. A number of individuals from the WGP participated in this trip.

It has established close contacts with the ILP Task Group II-5 'Earthquake recurrence through time' through active participation of few European scientists. Contact person is Daniela Pantosti.

Some of the WGP members served in the ILP activities, such as the dedicated training workshops organised in Venezuela in 1997 and Nicaragua in 1998.

There are a number of WEB-pages dedicated to paleoseismology in Europe connected to individual European projects supported by EC, such as 'PALEOSIS' (<http://www.oma.be/KSB-ORB/PALEOSIS/Welcome.html>) and 'FAUST' (<http://faust.ismes.it/>), or to other groups such as the Summer School in Luxembourg (<http://www.ecgs.lu/>).

Moment tensor inversions have been acknowledged for quite a while as a powerful tool in the study of source mechanisms. Numerous techniques are currently used, over a wide range of applications, including global, regional and local seismicity, and induced seismic sources. Although the advantages of this methodology have been clearly outlined, its implementation has not been generalized, mainly due to the lack of relatively simple standardized algorithms. It is obvious that such algorithms would significantly increase the number of studies that use moment tensor inversions, a fact which will generally lead to a better understanding of the seismic process in the context of the local, regional or global tectonics. Therefore, at this time, the aims of the working group is to stimulate discussions, debates and new ideas among European scientists interested in this area of research, in order to facilitate the process of algorithm evaluation for various applications and possible standardization. There is clearly a need to share methodological approaches, and a strong collaboration with SC-B working groups will have to be arranged.

The main activity of the Focal Parameter Determinations working group, was organising the symposium and workshop at the XXVI General Assembly in Tel Aviv which is discussed in a later section. In Tel Aviv the working group was renamed 'Moment Tensor Inversions' with Rami Hofstetter Responsible.

Bureau 1998-2000

Chairperson:	C-I Trifu (Romania)
Vice-Chairperson:	A Deschamps (France)
Secretary:	H Dufumier (France)

Working Groups 1998-2000

1. Paleoseismicity. Responsibles: M Meghraoui (Italy), K Atakan (Norway)
2. Moment Tensor Inversions. Responsible: R Hofstetter (Israel)

SC-D: Crust and Upper Mantle Structure (formerly Deep Seismic Sounding)

Bureau 1996-1998

Chairperson: J Mechie (Germany)
Vice-Chairperson: A Guterch (Poland)
Secretary: C-E Lund (Sweden)

Working Groups 1996-1998

1. Synthesis. Responsible: K Prodehl (Germany), K Osypov (Russian Fed.)
2. Region N-Europe. Responsible: M Sellevoll (Norway), C-E Lund (Sweden)
3. Region SW-Europe. Responsible: P Giese (Germany), A Hirn (France)
4. Region E-Europe. Responsible: A Ostrovsky (Russian Fed.)
5. Deep Reflections. Responsible: K Fuchs (Germany)
6. Surface wave and tomographic studies of lithospheric structure. Responsible: T Yanovskaya (Russian Fed.)

Activity Report 1996-1998 by James Mechie

I sent out an e-mail on 11th March asking for short reports from the persons responsible for the various working groups. In this e-mail I emphasized the necessity for a critical appraisal of the usefulness of the various working groups. The answers received can be summarized as follows.

1. I received an answer from only four of the six working groups. None of the persons responsible for working groups 3 and 4 replied.
2. I only received a positive report from one of the six working groups (number 6) and even in this case T. Yanovskaya was unaware that she was the responsible person for this working group.
3. The replies from working groups 1, 2 and 5 can be summarized as follows:
 - (i) I did not know I was the person responsible for this working group
 - (ii) I do not think that these working groups ever really came into existence
 - (iii) If any of these working groups ever really did exist then they have not really functioned properly since the 1970s.

The above summary of the answers I received indicates that these working groups in their present form are of no use at all!

Thus the next questions in my opinion should be:

1. What should be the future role of the "Deep Seismic Sounding" sub-committee within the ESC and

2. What internal structure, if any, should the "Deep Seismic Sounding" sub-commission of the ESC have in the future?

Before making my recommendations I should like to make the following points:

1. The ESC is not the most popular meeting for scientists in the deep seismic sounding community at present. At Reykjavik there were only 19 papers submitted to the Deep Seismic Sounding sessions. For Tel Aviv there have only been 7 papers submitted for presentation within the Deep Seismic Sounding sessions.
2. The activity report is the most useful output of the "Deep Seismic Sounding" sub-commission at present.
3. At the European Geophysical Society (EGS) meeting in April 1998 Claus Prodehl (Karlsruhe, Germany) is trying to continue a new initiative started at the EGS meeting last year and has called a meeting for European Seismology Field Experiments. The idea is to make known to interested persons:
 - a) the instruments which are available in Europe and
 - b) the major field projects which are taking place or planned.I hope that the results of this meeting can be reported at the next ESC meeting in August 1998. Perhaps this could serve as a first link between the ESC and the EGS.
4. At the Reykjavik meeting there was some discussion about the future of the "Deep Seismic Sounding" sub-commission as a whole which can be summed up as follows (see also the report of C.E. Lund below)
 - to organize workshops
 - to transform old data to new media
 - to collect publications (reference list).

My recommendations at present are set out below.

1. The working groups should be dis-banded (dis-continued) except for no. 6 as T. Yanovskaya is prepared to take on the responsibility of working group 6. Working Group 6 should thus be re-named Working Group 1.
2. A discussion should take place in Tel-Aviv concerning the future role of the "Deep Seismic Sounding" sub-commission within the ESC.
3. For the present I would suggest that the sub-commission concentrates on continuing to produce its bi-annual (two yearly) activity report as this seems to be one of the few signs (perhaps the only sign) that this sub-commission is still alive and it also seems to be one of the most useful functions (if not the most useful function) of the sub-commission at present.
4. Try and work more closely with other organizations e.g. European Geophysical Society, Commission for Controlled Source Seismology, Deep Reflections Group which also now holds a very popular bi-annual meeting.

A general recommendation is not hold the meeting in the middle of the summer. It is the only time of the year when deep seismic sounding scientists can carry out experiments in some of the more remote areas of the world. For example, I shall be in Tibet this year during the Tel-Aviv meeting. If the Tel-Aviv meeting had even been in September I could have attended it.

Bureau 1998-2000

Chairperson: J Mechie (Germany)
Vice-Chairperson: A Guterch (Poland)
Secretary: C-E Lund (Sweden)

Working Groups 1998-2000

1. Surface wave and tomographic studies of lithospheric structure. Responsible: T. Yanovskaya (Russia).
Sub-topics and responsables: Surface wave tomography (T Yanovskaya, Russia), P-wave travel time tomography (E Kissling, Switzerland), Refraction/wide angle reflection (M Grad, Poland), Deep near vertical reflection (C Juhlin, Sweden), Receiver function (G Bock, Germany), Seismicity (S Gregersen, Denmark).

SC-E: Earthquake Prediction

Bureau 1996-1998

Chairperson: J Zschau (Germany)
Vice-Chairperson: G Sobolev (Russian Fed.)
Secretary: G Martinelli (Italy)

Working Groups 1996-1998

1. Precursors. Responsible: G Sobolev (Russian Fed.), T Chelidze (Georgia)
2. Field Observations and Techniques. Resp.: J Zschau (Germany), A Prozorov (Russ. Fed.)
3. Algorithms and Models of Earthquake Prediction. Responsible: G Purcaru (Germany)
4. Man-made Earthquakes. Responsible: P Knoll (Germany)

Activity Report 1996-1998 by J Zschau

According to the recommendations of the ESC meeting in Reykjavik 1996 on the strengthening of the EU support of research programs and wider geographic cooperation in order to assure a faster development in earthquake prediction the following activity should be noted:

1. The implementation of the Project INCO Copernicus "Tectonic Early Warning System Through Real Time Radon (Rn) Monitoring; A Geophysical Method for Forecasting Earthquakes" in

which Albania, Armenia, Great Britain, Greece, and Russia participate has been started. In accordance with the major goals of the Project, independent sensors of Rn content and radiotelemetric equipment transferring data to the processing centers in real time are being set up in the Mediterranean belt. To date, the sensors have been set up in the chosen sites of the Northern Caucasus, Transcaucasia, Greece, and Albania and experimental recording has been started. At the same time a seismological database is being compiled to compare the data obtained with geophysical and geochemical data. Algorithms and software are being worked out to analyze series obtained and to study their structure. It is supposed that nature and mechanisms of Rn content variations will be studied and those data will be used in earthquake prediction.

2. As a result of the joint activities of Russian scientists (The Institute of Physics of the Earth, RAS, the Institute of Information Transference Problems, Moscow State University) and Chinese scientists from the State Seismological Bureau of China, geophysical data stored for many years on an experimental test site in China were processed. With the use of the adapted computer system GEOTIME, the dynamic fields of precursors of large intraplate earthquakes were constructed from different physical fields. It was demonstrated that the precursor field can be of local and of regional nature and the latter is apparently determined by the general tectonic activity of the region. The model of the Tanshan earthquake of 1976 was developed from empirical correlations of attenuating features of the precursor, and its time - space evolution was revealed. It was established that the earthquake precursor migrated to the epicenter of the future event.
3. Repeated field GPS measurements in the Northern Caucasus and Transcaucasia in the collision zone of the Euroasian and Arabian tectonic plates were conducted to study the stress state of the lithosphere of the region and to estimate deformation precursors in the long-term earthquake prediction. It was shown that the character of the deformation field becomes considerably nonuniform as we move northwards from the Greater Caucasus. Preliminary analysis showed that displacement vectors are determined with an accuracy of the order of 1 - 1.5 mm/year.

In the frame of the German-Turkish Project on Earthquake Prediction Research an international symposium on “Earthquake Research in Türkiye-State of the Art” took place in Ankara from Sept. 28 to Oct. 5th, 1996 (co-ordinators J. Zschau, Potsdam, O. Ergünay, Ankara). It brought together 161 scientists from France, Germany, Japan, Turkey, United Kingdom and the US who gave a comprehensive overview about the state of the national and international research activities within Turkey related to earthquake prediction research.

Further international symposia and workshops where subcommission members were involved in the organisation are:

IASPEI General Assembly, August 18-28, 1997, Thessaloniki

S7- Time and Non-Time Dependent Seismicity Models and Their Application
in Seismic Hazard Assessment (Conv: Papazochos, Bonnin, Mulargia, Purcaru, Rundle, Papoulia)

W19- Multi-Parameter and Multi-Scale Analysis of Seismicity and Related Fields (Conv: Sobolev, Main, Smirnov, Tsokas).

EGS Meeting, April 20-24, 1998, Nice

NH3.2 Earthquake Risk Mitigation: Seismic Hazard Evaluation in High Seismicity Areas by Observing Precursory Phenomena (Conv.: Contadakis, Zschau)

International IDNDR-Conference on Early Warning Systems for the Reduction of Natural Disasters, Sept. 7-11, 1998, Potsdam (Chairman: Zschau)

The Second International Conference on Earthquake Hazard and Seismic Risk Reduction, Sept. 15-21, 1998, Yerevan (Intern. Organ. Committee: Sobolev, Zschau among others).

The Collaborative Research Center (CRC) 461 “Strong Earthquakes: A Challenge for Geosciences and Civil Engineering” has been established in 1996 in Karlsruhe, Germany. It aims at strategic research in the field of strong earthquakes with regional focus on the Vrancea events in Romania (co-ordinator F. Wenzel, Karlsruhe).

In 1998 the PRENLAB-Project (Earthquake-Prediction Research in a Natural Laboratory, co-ordinator R. Stefánsson, Reykjavik) has proceeded to its second phase. The multidisciplinary approach and methods developed during PRENLAB1 is applied in PRENLAB2 to the specific areas in Iceland where catastrophic earthquakes are likely to occur.

In the frame of the “German Task Force Programme Earthquakes (co-ordinator Zschau, Potsdam) immediate post earthquake expeditions had been undertaken for the M=6.8 Ariaco earthquake of July 9th, 1997, in Venezuela as well as for the M=6,2 Adana-Ceyhan earthquake of June 27th, 1998 in eastern Turkey. Aftershock activity, strong ground motion, post earthquake movements from GPS measurements, and variations in thermal and mineral waters, have been monitored and are currently interpreted as relevant information for earthquake prediction research. In the case of the Ariaco post earthquake task force action, Europe was represented by a French geological team, and after the Adana-Ceyhan earthquake by a Swiss earthquake engineering team. Aftershocks of the M=5.6 earthquake in Umbria (Italy) of Sept. 26th, 1997, were observed among others in the frame of a task force campaign by a French-Italian team.

In the meeting of the IASPEI Subcommission on Earthquake Prediction on August 22nd 1997, in Thessaloniki, Greece, the ESC SC-E was represented by its Chairman Zschau and its Vice-Chairman G. Sobolev. Among others, a resolution was formulated that IASPEI should endorse additional international test areas for earthquake prediction research in areas where IASPEI recognizes major, high level research efforts are already in progress. Accordingly, the currently active international test areas (1) Mudurnu Valley along the North Anatolian fault (plate boundary strike-slip), (2) South African deep mines (largest laboratory scale), and (3) Vrancea (intermediate depth activity) should be augmented by (4) Kamchatka (plate subduction), (5) Iceland (plate spreading), (6) Yunan (intercontinental strike-slip), (7) Gulf of Corinth (continental rifting), (8) Beijing (intra-continental). It was proposed to change the designation of these test areas to “International Test Sites for Research on the Physics of the Earthquake Rupture and Prediction”.

The possibility of actively seeking additional nominations for the IASPEI preliminary list of significant precursors was considered, but declined.

Bureau 1998-2000

Chairperson: J Zschau (Germany)
Vice-Chairperson: G Sobolev (Russian Fed.)
Secretary: G Martinelli (Italy)

Working Groups 1998-2000

1. Field observations. Responsibilities: A V Ponomarev (Russia), M Westerhaus (Germany)
2. Algorithms and Models of Earthquake Prediction. Responsible: G Purcaru (Germany)
3. Man-made Earthquakes. Responsible: P Knoll (Germany)
4. Non-linear structures and processes. Responsibilities: V Smirnov (Russia), C Godano (Italy)

SC-F Engineering Seismology

Bureau 1996 - 1998

Chairperson: D Slejko (Italy)
Vice Chairperson: M Garcia-Fernandaz (Spain)
Secretary: I Cecic (Slovenia)

Working Groups 1996 - 1998

1. Macroseismic Scales. Responsible: G Gruenthal (Germany)
2. Strong Motion. Responsible: N N Ambraseys (UK)
3. Earthquake Hazard. Responsible: D Giardini (Switzerland)
4. Microzonation. Responsible: A Marcellini (Italy)
5. Macroseismology. Responsible: R Musson (UK)

Activity Report 1996 - 1998 by D Slejko, G Gruenthal, N N Ambraseys, D Giardini, A Marcellini and R Musson

The subcommission F "Engineering Seismology" consists of five Working Groups which have been active in various ways in recent years. For most of them the efforts made to disseminate information about their activity, especially by the constitution of proper WWW home pages, should be emphasised. In addition, the subcommission benefits from current activity in the framework of various international projects (e. g.: GSHAP) to produce in the near future new products especially oriented to seismic hazard research.

The goal of the WG "Macroseismic Scales" was concentrated since 1992 on the preparation of the European Macroseismic Scale (EMS-92) as an improved and robust tool in macroseismic practice as well as on promoting the worldwide introduction of this new scale. The application of the EMS-92 was supported by the WG for the study of historical and recent earthquakes. Prominent earthquakes, where

the new scale has been applied, were the Cariaco Venezuela earthquake of 1997 and the main shocks in central Italy of September/October 1997. Two special WG meetings were held at executive board level (November 1996 and January 1998) for preparing the final version of the EMS, which will include the experiences from its worldwide applications. Those parts of the EMS-92 which were introduced tentatively, can now be replaced by more precise and constrained ones.

A joint ESC-EAEE WG on "Strong Motion Studies" was discussed and initiated at the IASPEI meeting in Thessaloniki late in 1997. The purpose of the group is to retrieve, assess and study strong-motion information in Europe for seismological and engineering applications. During the short period since its formation the group, consisting of Greece, Iceland, Italy, Switzerland and Turkey, has identified and stored data from these countries. It is also hoped that additional contributions from other parts of Europe will assist in the preparation of a databank, hopefully in due course to be made available to users on CD-ROM.

The goal of the WG "Earthquake Hazard" for the 1996-2000 period is to produce a regional seismic hazard assessment for the European-Mediterranean area. The project will improve the integration of the geological input in seismic hazard assessment and apply a probabilistic seismotectonic approach throughout the ESC area to produce a common regional earthquake source-zone model and seismic hazard map in PGA. The strategy is based on the integration and coordination of existing programs and test-areas for multi-national SHA operating in the ESC area: Ibero-Maghreb, Central-Northern Europe, DACH, CPANG (Balkans), ADRIA, RELEMR (Middle East), CAUCAS, SESAME. The ESC WG "Earthquake Hazard" acts in close coordination with the ILP/ICSU Global Seismic Hazard Assessment Program (GSHAP; UN/IDNDR demonstration project; implementation 1992-1998) and with the UNESCO/IUGS International Geological Correlation Program n.382: Seismotectonics and Seismic Hazard Assessment in the Mediterranean Region (SESAME; implementation 1996-2000) for the integration of the regional results into a homogeneous hazard mapping for the whole ESC region. Indeed, the first two phases of the program are conducted under GSHAP coordination, and the activities for the Mediterranean basin will be coordinated by SESAME.

All reports, maps and databases produced up to 1998 will be published under GSHAP coordination as detailed below. Maps and summary reports are being loaded on the ETH homepage at <http://seismo.ethz.ch>.

The following schedule has been adopted:

Phase I: 1996-1997

- complete the regional mapping in the different test-areas;
- present the regional results at the 29th IASPEI Assembly (Thessaloniki, 8/1997).

Phase II: 1997-1998

- refine the regional maps;
- merge the regional maps into a preliminary ESC map;
- present the Mediterranean map at the 26th ESC Assembly (Tel Aviv, 8/1998);
- publish the GSHAP volume with regional maps and reports, global map, databases on CD-ROM.

Phase III: 1998-2000

- refine and integrate the Mediterranean earthquake catalogue, source zones, attenuation laws;
- produce the source zones database and map for the ESC region;

- produce the final SHA map for the ESC region;
- present the Mediterranean map and databases at the 27th ESC Assembly.

Progress in regional SHA in the ESC region during the period 1996-98 is briefly summarized in the following.

CENTRAL-NORTHERN EUROPE

The GSHAP implementation in Central-Northern Europe is coordinated by the GFZ Regional Centre in Potsdam, including the whole territory north of 46°N. In 1996 the regional seismic catalogue was completed with the addition of the database for Fennoscandia and of the SIRENE catalogue for France. Workshops were held in Potsdam (7/1993) and in De Bilt (12/1994). The first hazard zonation has been presented in 1996 at the ESC assembly (Reykjavik, 9/1996) and the final SHA map at the IASPEI assembly (Thessaloniki, 8/1997). As part of Northern Europe, the unified hazard assessment for the German speaking countries (DACH: Germany-Austria-Switzerland) has been produced by national teams including seismologists and engineers, under the coordination of GFZ at Potsdam, as preparatory work for the implementation of the new European seismic building construction code (EC8). Regular meetings have been held in the last years towards the preparation of the final map produced in 1996.

IBERO-MAGHREB

The CSIC of Barcelona has coordinated the activities for the first generation of SHA for the area (Spain, Portugal, Morocco, Algeria, Tunisia). Planning meetings were held in Granada (5/94) and Rabat (12/95); technical workshops were held in Barcelona (12/1996, 5/1997), with partial IGCP support, the first in conjunction with the UNESCO/USGS 6th International Forum on Seismic Zonation: First Ibero-Maghreb Region Conference. The preliminary regional SHA is now completed. In 1996, the CNCPRST of Rabat succeeded with GSHAP support in setting up the Centre Euro-Mediterranean d' Evaluation et de Prevention du Risque Sismique (CEPRIS) in Rabat under the Open Partial Agreement on Natural Disasters of the European Council, with the mandate of coordinating activities in the Ibero-Maghreb and Western Mediterranean areas; CEPRIS initiated its activities in 1997, with planning meetings in Rabat (3/1997) and Thessaloniki (8/1997).

ADRIA

This project includes all countries bordering the Adriatic Sea (Italy, Switzerland, Austria, Slovenia, Croatia, Albania, Greece) coordinated by OGS of Trieste. Seismic zoning maps and earthquake catalogues have been compiled during a series of regional workshops (Trieste 7/1994, Athens 9/1995, Ljubliana 10/1995); preliminary hazard mapping was presented at the ESC (Reykjavik, 9/1996) and IASPEI (Thessaloniki, 8/1997) assemblies and has been completed in the final ADRIA meeting held in Pisa (2/1998, with partial IGCP support).

BALKANS

The European Copernicus project Quantitative seismic zoning of the Circum-Pannonian region (CPANG; EC CIPA CT.94-0238) is completing the re-evaluation of the seismotectonics and seismic hazard assessment in the whole Balkanic-Carpathian region. The regional model of seismic source zones was released in fall 1997, and the hazard assessment map is expected for March 1998.

EASTERN MEDITERRANEAN

The IGCP-SESAME and the UNESCO/USGS project reducing earthquake losses in the Eastern Mediterranean Region (RELEMR) are coordinating their activities toward a unified hazard mapping for the whole area (Turkey, Syria, Lebanon, Cyprus, Israel, Jordan, Egypt, Saudi Arabia, Yemen, Oman). Several planning, review and working meetings have been held. SESAME has organized two Training workshops on seismotectonics and seismic hazard analysis in the Eastern Mediterranean countries (Cairo, 12/1996 and 12/1997). RELEMR planned activities include also hazard mapping; a first planning workshop was held in Cyprus (12/1996); a special RELEMR session was hosted at the IASPEI Assembly (Thessaloniki, 8/1997); a second workshop (Cyprus, 10/1997) has reviewed the available SHA mapping for the area, in preparation for the compilation of the first preliminary regional map for the area (in PGA), expected in spring 1998.

CAUCAS

The INTAS Test Area for Seismic Hazard Assessment in the Caucasus (CAUCAS; Ct.94-1644; 1995-97), with IASPEI endorsement, joined the main seismological institutions from Caucasian Republics (Georgia, Armenia, Azerbaijan, Ukraine, Turkmenistan), Russia, Turkey and Iran. Starting in 1993, multinational working groups produced an integrated regional earthquake catalogue (historical and instrumental), a new model of seismic lineaments and seismic zoning, and comparative SHA. Workshops were held in Tehran (1/1993), Moscow (9/1993), Ashkabad (10/1994), Tehran (5/1995), Yerevan (7/1996) and Tbilisi (7/1997). The final report, presented at the IASPEI Assembly (Thessaloniki, 8/1997), compares hazard mapping obtained using six independent methodologies and codes (deterministic, seismotectonic probabilistic, areal probabilistic, mixed deterministic-probabilistic) starting from the same initial source and lineament models and seismic catalogue. The NATO-ARW Historical and prehistorical earthquakes in the Caucasus was held in Armenia (Ct.95-1521, 7/1996) and produced a comprehensive proceedings volume published by Kluwer.

NORTHERN EURASIA

The JIPE of Moscow is coordinating the seismic hazard mapping for the whole FSU territory. This five-year program, initiated before the FSU break-up and interrupted during the period of more intense political turmoil, has been restarted, leading to the compilation of the seismic catalogue and the SHA, using for the first time a probabilistic approach. Technical workshops are held routinely in Moscow. The whole area has been subdivided into five blocks, and the release of the final maps of intensity scale is expected in the spring of 1998.

Following the strategy agreed in Thessaloniki (8/1997) for the final GSHAP phase, the compilation of the preliminary SHA map for the ESC area is progressing along the following schedule:

- The preliminary ESC hazard map (PGA) is being compiled by GFZ, Potsdam, merging the results of individual regions and test areas, as part of the final GSHAP global compilation; most of the PGA regional maps have already been contributed, and the remaining are forthcoming; in addition, the official national maps of Turkey and Greece have been included. The regional compilation is expected to be completed in May, for final presentation at the ESC assembly (Tel Aviv, 8/1998).
- The regional reports, describing the regional product will be included in the GSHAP final volume, scheduled for publication in the fall 1998; reports, including a detailed description of databases and

procedures, are to be submitted by March 31, 1998, following common guidelines. The volume will include a CD-ROM with the regional databases and a large print of the global map.

- Summary regional reports and maps will be displayed on the web at <http://seismo.ethz.ch>.

The SESAME key event of 1997 took place during the 29th IASPEI Assembly (Thessaloniki, August 14-28): in symposium W17 the different test areas active in the ESC region presented their progress and regional maps, as reviewed before; one of the two IASPEI Association Lectures was devoted to the GSHAP implementation, including the Euro-Mediterranean; a joint SESAME and ESC-WG/SHA review and planning symposium was held on August 25.

The key 1998 event will be at the 26th ESC Assembly (Tel Aviv, 8/1998), where the session SC-F2 Seismic Hazard Mapping for the European-Mediterranean region will review the regional products and present the preliminary regional hazard map for the ESC area. Following ESC, the third phase of the program will begin, to refine the databases and hazard maps.

The WG "Microzonation" succeeded only in starting the preparation of the book on microzonation. This is the index of the book "AN INTRODUCTION TO MICROZONATION", established after Reykjavik and after consultations with the WG members via E-mail.

CHAPTER 1. SEISMICITY

- 1.1. GLOBAL SEISMICITY (distribution of seismicity in the world; plate tectonics; seismicity and risk; seismicity in Europe; seismic risk in Europe).
- 1.2. WAVE PROPAGATION (wave equation; P and S waves; surface waves; waves in layered media; wave attenuation).
- 1.3. SEISMIC SOURCES (earthquake mechanism; quantification of earthquakes; source models).

CHAPTER 2. SEISMIC HAZARD

- 2.1. INTRODUCTION (objectives of seismic hazard analysis; general description of the approaches; deterministic methods; probabilistic methods).
- 2.2. EVALUATION OF INPUT PARAMETERS (seismic sources; temporal behavior of seismicity; constant rate models; time-dependent rate models; magnitude distribution (Gutenberg Richter relationship; the characteristic earthquake model); attenuation laws for PGA, response spectra, and intensity attenuation law).
- 2.3. HAZARD ANALYSIS METHODS (deterministic models; probabilistic models (summary of concepts of probability; classical approaches; Bayesian approach); time predictable, slip predictable).
- 2.4. EVALUATION OF RESULTS (PGA; uniform response spectra).

CHAPTER 3. GEOTECHNICAL ASPECTS

- 3.1. CYCLIC BEHAVIOR OF SOILS
- 3.2. LABORATORY AND IN-SITU TESTS
- 3.3. STRESS-STRAIN AND SHEAR STRENGTH PROPERTIES
- 3.4. METHODS OF SITE RESPONSE ANALYSIS

CHAPTER 4. ZONATION WITH RESPECT TO SOIL AMPLIFICATION

- 4.1. EXPERIMENTAL METHODS (direct observations (macroseismic observations and damage survey; strong motion data); earthquake recordings (reference site techniques; non-

reference site techniques; empirical Green's function); microtremors (microtremor spectra and spectral ratios; H/V ratio or "Nakamura's" technique; array recordings)).

4.2. NUMERICAL METHODS (numerical techniques (hand calculations; one-dimensional response of soil columns; two- and three-dimensional methods); preliminary geotechnical and geophysical surveys (active methods to infer the local structure; S-wave seismics, surface wave measurements with single stations or arrays)).

4.3. EMPIRICAL METHODS (surface geology; geotechnical parameters; topography).

4.4 CASE STUDIES

4.5. RECOMMENDATIONS

CHAPTER 5. ZONATION WITH RESPECT TO LIQUEFACTION

CHAPTER 6. ZONATION WITH RESPECT TO SLOPE STABILITY

CHAPTER 7. CASE STUDIES

CHAPTER 8. CONCLUSIONS

Unfortunately, it was not possible to convene a meeting of the WG "Macroseismology" since the last ESC meeting at Reykjavik, however, this has not prevented the WG from being active through Internet connections. A WWW home page of the WG has been set up at <http://www.gserg.nmh.ac.uk/~phoh/escmac1.htm> and a mailing list has been formed. As well as providing a central focus for the activities of the WG, the home page also serves as a means of disseminating reports on recent earthquakes or topics of interest. Notable activities have included work on the chapter on macroseismic methods for the new Manual of Seismological Observatory Practice (which is in advance of most of the other chapters of this project). Also a survey is underway into a comparison of macroseismic monitoring procedures in the different ESC countries.

Bureau 1998-2000

Chairperson: D Slejko (Italy)
Vice Chairperson: M Garcia-Fernandaz (Spain)
Secretary: I Cecic (Slovenia)

Working Groups 1998-2000

1. Strong Motion. Responsible: N N Ambraseys (UK)
2. Earthquake Hazard. Responsible: D Giardini (Switzerland)
3. Microzonation. Responsible: A Marcellini (Italy)
4. Macroseismology. Responsible: R Musson (UK)

REVIEW OF SUBCOMMISSION ACTIVITIES DURING THE XXVI GENERAL ASSEMBLY OF THE EUROPEAN SEISMOLOGICAL COMMISSION, TEL AVIV, AUGUST 23-28, 1998

Subcommission A

By K. Makropoulos

A. Scientific

During the XXVI General Assembly held in Tel Aviv, Israel, from August 23 to 28, 1998, the main activities of SC-A working groups during the last two years (1996-1998) were presented through 4 scientific sessions (SC-A0, A1, A2, and A3), 2 workshops (WS-4 and WS-5) and one special symposium (SS-3) with a total of 78 oral and poster presentations. This corresponds to about 27% of the scientific work presented during the Assembly. The latter, coupled with similar activities presented during the 19-th IASPEI, Thessaloniki 1997, and the 23-rd EGS, Nice 1998, General Assemblies shows the relevance of the field and of the scientists involved.

In the Open Session SC-A0, 10 oral and 1 poster contributions were presented covering a variety of topics such as: relations between structure, mass distribution and geophysical environment and the level of seismicity with examples from the Urals territory; ways and means of evaluating sources of global and regional seismic data (earthquake catalogues), and assessment of the spatial, long-term seismic potential in tectonically different areas.

Despite the “open character” of the topics presented in this session, the common feature of almost all presentations was the problem of inherent uncertainties and their due consideration in the obtained parameters.

In the session SC-A1 (Seismotectonics of the Middle-East and Eastern Mediterranean region), 12 oral and 4 poster papers dealing with the seismotectonic regime of the area were presented. The complicated tectonic setting of the Eastern Mediterranean due to the interactive effect of the Africa, Eurasia and Arabia plates was stressed by almost all presentations. Moreover, the deployment of local, temporary seismic networks as well as GPS stations proved to be very useful tools in a better understanding of the kinematics and the associated tectonic and seismic activity of the whole area.

In the session SA-A2 (Intraplate Earthquake Activity), with 5 oral and 2 poster presentations, the problem of assessing the intraplate seismicity due to the rarity of strong earthquakes in the continental interiors was addressed. Methods to overcome, to a certain degree, this problem such as the use of extra-regional seismotectonics, deployment of local seismic networks, geophysical data and historical documented cases, were proposed.

The session SC-A3 was devoted to the “Regional earthquake activity as an evidence of geodynamic processes in the lithosphere”. 11 oral and 3 poster presentations addressed different aspects of the matter and stressed the interrelation between earthquake activity and recent geodynamic phenomena observed in neotectonics, volcanology, geodesy, hydrogeology etc. The necessity of multidisciplinary studies for understanding the long-term processes was the clear message that emerged from this session.

The special symposium SS-3 was devoted to “CTBT monitoring by Euro-Mediterranean seismic systems”. The 14 oral presentations demonstrated the efforts to eliminate the problems arising from the use of teleseismic phases for monitoring relatively small events ($M < 4$). Even at a regional scale, regional distance phases are quite sensitive to the crustal and uppermost mantle heterogeneities, resulting in unrealistic P/S ratio earthquake-explosion discrimination. This could result in false alarms under the CTBT. New algorithms, array configurations and pluralistic processing methods were presented to eliminate this problem.

Finally, the workshops WS-4 (Rapid warning systems for earthquakes), and WS-5 (Recent advances in the automated seismic surveillance), with 10 and 6 presentations, respectively, demonstrated the efforts made in different parts of European Centres towards automating the seismic monitoring and transferring data to national and international centres.

B. Administrative

During the business meeting, with five out of eight WG chairpersons present, the letters received from Prof. R. Gutdeutsch, chairman of the WG “Historical Earthquake Data” and Prof. R. Schick, chairman of the WG “Volcanism and Earthquakes”, announcing their decisions to be replaced by other members of the groups, were presented by the chairman of the SC-A Prof. K. Makropoulos. The members accepted their resignations and expressed their appreciation and gratitude to both of them for the long successful and constructive contribution to the Subcommittee’s activities.

Next, the chairpersons present at the meeting, Prof. J. Bonnin, Prof. L. Mendes – Victor, Prof. R. Gutdeutsch, Dr Z. Schenkova and Dr G. Papadopoulos, briefly summarised the activities of their groups during the past two years. A fruitful discussion about future activities and initiatives took place and opportunities for closer co-operation through several research projects were highlighted.

As for the responsibility of the above mentioned two WGs:

- a. For the WG “Volcanism and Earthquakes”, the candidacy of Dr Juergen Neuberg, Dept. of Earth Sciences, The University of Leeds, U.K. proposed by Prof. R Schick in his letter, was unanimously accepted.
- b. For the WG “Historical Earthquake Data”, Dr. Max. Stucchi, Inst. di Ricerca sul Rischio Sismico CNR, was unanimously elected as the new chairman.
Prof. R. Gutdeutsch proposed the creation of a new WG with the title “Important Historical Earthquakes in Europe”, with the main objective to study large, destructive, transfrontier, events. The proposal passed and Dr. C. Hammerl, Inst. fur Meteorologie and Geophysik der Universitat Wien, was elected as chairperson.

However, after a thorough discussion during the ESC Council meeting, the Council recommended to SC-A that the two working groups are to become sections of a common working group under the name “Historical Seismology” with Dr. Max. Stucchi and Dr. Christa Hammerl as responsables. The recommendation of the ESC Council was accepted by the SC-A.

Subcommission B

By H Aichele

As a general result it was realised that no activities of the working groups between the General Assemblies took place. On the other hand the activities during this assembly showed very clearly that the topics of concern for the Subcommittee B are still of great interest, and presenting the results obtained during the time between the meetings supports the scientific character of the assembly.

During the symposia directly initiated by SC B more than 15 oral papers and 5 posters were presented. In addition, symposia topics of other subcommittees showed overlap, and cooperation and joint discussion was stimulated (e.g. on CTBT, macroseismic observations, and seismicity). Besides the subcommittee symposia, three of the workshop topics were also topics of the SC. The workshop on regionalisation and especially the workshop on the New Manual of Seismological Observatory Practice continue for the European region tasks initiated by the IASPEI Commission on Practice, and the results will be presented to the Commission. The workshop on historical scientific observations stimulated very lively discussions.

After the inglorious end of the ISOP project it became very clear that the appropriate use of digital broad band data is a long term project. The extraction of the parameters for the data centers, the data transmission and the use in combination with new possibilities of networks and arrays is still at an early stage. Very promising discussions with the managers of the data centers support the hope that the discussions and results obtained in the Subcommittee can help to improve the future results. The contributions on wave theory as well as the work on seismic noise were stimulated by new technical possibilities.

The Subcommittee held its administrative meeting on Wednesday August 26, 1998. Apart from the change of chairmanship of WG 1 between the representative of EMSC and ORFEUS, no other personal changes were requested.

As an activity within the task of the Subcommittee the workshop on array seismology was announced: date February 22 - 26 at the Graefenberg observatory in Erlangen, Germany.

The announcement should be on the ESC homepage.

The composition of the subcommittee remained as follows:

Lev Vinnik (Chairman), Helmut Aichele (vice chairman), Bernard Dost (Secretary)

WG 1: Data Centers and Data Exchange (Dost)

WG2: Data Processing and Interpretation (Scherbaum)

WG3: Microseism (Hjortenberg)

WG4: Theory of Seismic Wave Propagation and Deep Earth Structure (Malischewski)

WG5: History of Seismometry (Ferrari)

WG6: IASPEI Manual on Seismological Observatory practice (Bormann)

Subcommission C

C-I. Trifu, M. Meghraoui and K. Atakan

Based on the proposals made during the sub-commission meeting at the XXVI General Assembly in Tel Aviv, C-I. Trifu was elected as President of the SC-C, A. Deschamp as Vice-President, and R. Dufumier as Secretary.

The main activity of the Working Group on Moment Tensors (formerly called Focal Parameters Determinations) was the organization of a first symposium / workshop on this topic during the XXVI General Assembly in Tel Aviv (chairpersons C-I., Trifu, J. Sileny, G. Bock, and R. Hofstetter). This scientific session gathered oral and poster contributions from scientists in Canada, Czech Republic, France, Israel, Italy, Netherlands, Norway, Romania, Turkey, and United Kingdom. Additionally, it is worth noting that the majority of the discussions held during the sub-commission meeting in Tel Aviv were directly related to the organization of future activities of the working group, outlining the strong interest and support of numerous researchers. The discussions revealed that on the one hand there is an increasing demand for on-line, fast, possible standardized methods to be applied for source characterization via moment tensor inversions. On the other hand, however, it was mentioned that in spite of the diversity of techniques currently used for this purpose, the reliability and robustness of the results obtained is uncertain. As such, it was concluded that two main directions of research need to be better represented in the future: one, related to the analysis and characterization of the confidence level attained in the results derived, the other, involving the comparison between evaluations using various techniques.

It was agreed to investigate the possibility of publishing a special volume of *Tectonophysics*, based on the contributions presented in the working group symposium in Tel Aviv (responsible C-I. Trifu).

In order to stimulate contributions in the above direction of research, it was decided that working group organize an Internet access oriented database (responsible R. Hofstetter). The database will be made up of a few well recorded seismic events (earthquakes and induced events), all corresponding waveforms being made available via ESC web page, under sub-commission C activities. It is believed that this will not only stimulate, but also provide the means for comparative studies that could be presented at the next working group symposium.

It was decided to organize a second working group symposium during the XXVII General Assembly that will be held in Lisbon in 2000. The exact title, scope and chairpersons of this scientific session will be defined at a later date.

Future plans

- A dedicated session (workshop) during the forthcoming ESC General Assembly in Portugal in 2000 is planned.
- A short (2-days duration) course in paleoseismology may be arranged during the planned Young Seismologist Training Course in connection with the ESC General Assembly in Portugal in 2000. Application regarding this will be forwarded to the ESC secretariat.

- The success of the summer school in Luxembourg, has stimulated the idea to arrange another summer school in the future. Preparations regarding this are underway.

Subcommission D

By Carl-Erik Lund

An 'Activity Report' (pp 140), in the field of Deep Seismic Sounding projects was prepared before the meeting. The Report included most of the wide-angle reflection and refraction as well as near vertical-angle reflection seismic projects, both ongoing and carried out during the last two years by European Universities and Institutes. Besides being useful to European Universities this kind of report has also been asked for by some European organizations like the CTBO (Preparatory Commission for the Comprehensive Test-Ban-Treaty Organisation) in Vienna.

During the conference the sub-commission organised an Open Session on Deep Structure. The session included 8 papers.

During the sub-commission meeting in Tel-Aviv, August 26,1998, the future role and structure of the sub-commission was discussed in depth. The following was decided.

- The sub-commission changed its name to *sub-commission D: Crustal and Upper Mantle Structure*.
- For the time being the sub-commission has one Working Group *WG1:Tomography and Other Seismic Methods*, covering the fields
 - Surface wave tomography
 - P-Wave travel-time tomography
 - Refraction/ wide-angle reflection
 - Deep near vertical reflection
 - Seismicity
- The future goals for the sub-commission were summarised as follows,
 - Work towards complex crustal and upper mantle models based on different kinds of seismic data.
 - Develop and exchange methodology.
 - Promote active collaboration with other sub-commissions.
 - Promote work within the SC using internet.
 - Prepare a bi- annual Activity Report
 - Exchange information about new experiments, especially of big shots.

The new structure of the SC was adopted by the General Assembly.

Subcommission E

By J Zschau

Three open symposia were organised during the conference:

- *SC-EO* Open Session (Convenors JZschau, G.Sobolev, G.Martinelli, G.Steinitz)
- *SC-EI* Space-Time Self Similarity of Seismicity: Statistical Regularities and the Physical Nature (Convenors V.Smirnov, C.Godano, V.Lyakhovsky)
- *SCE-2* Dynamics of Earthquakes and Models in Earthquake Forecasting (Convenors Burcaru, M. Merzer)

and one workshop

- *WS-6* Earthquake-Related Phenomena in Late 19th Century: Research, Recovering and Exploitation of Historical Scientific Observations (Convenors G. Ferrari, Martinelli)

A total of 54 oral and 6 poster presentations were delivered during the conference. A business meeting was held in which 17 colleagues participated. Major subjects of the fruitful discussion were related to

- the present controversial opinions and discussions on the question of whether earthquakes are in principle predictable or not.
- the necessity and possibility of setting up a distributed information system for serving the ESC scientific community. The corresponding discussion was based on a proposal by G. Sobolev and Yu. S. Tyupkin who in this connection introduced the Russian Virtual Network RVGN;
- the importance of the non commercial exchange of geophysical data between all members of the geophysical community;
- a reorganisation of the working groups
- a proposal for a workshop to be held at the next IUGG meeting.

Based on these discussions, the subcommission recommended to the ESC-Bureau:

A resolution on the importance of carrying on earthquake prediction research *Recognising* that so far the predictability of large earthquakes has neither been proved nor disproved, *and recognising* the wide interest in this important seismological field of investigation *the ESC recommends* that earthquake prediction research should be continued in order to establish the circumstances under which earthquakes can be predictable, as well as the degree to which prediction might be achievable, *and the ESC encourages* scientists in the field of earthquake prediction research: to continue field observations and laboratory studies, as well as mathematical and physical modelling, and to continue and improve work on the scientific application and testing of proposed earthquake prediction methods in real time.”

A restructuring of the subcommission by merging working group 1 (Precursors) with 2 (Field Observations and Techniques) as the new working group 1 with name “Field Observations” to be chaired by A.V. Ponomarev (Russian Fed.) and M.Westerhaus (Germany); adding an additional working group “Nonlinear Processes in Multiscale Seismicity and Earthquake Prediction” to be chaired by V.Smirnov (Russian Fed.) and C.Godano (Italy); keeping working groups 3 and 4 as they were and keeping the chair vice chair and secretary as they were before.

For the next IUGG meeting in Birmingham it was proposed to hold a workshop on “Real Time Earthquake Prediction: Successes and Failures”. This proposal was also discussed during the meeting of the European Advisory Evaluation Committee for Earthquake Prediction on Sep4th and 5th in Potsdam Germany, and the committee suggested the organisation of a workshop on “Evaluating Real Time Earthquake Predictions” jointly with ESC and IASPEI in 1999.

For the next EGS meeting on April, 19-23, 1999, in The Hague, the subcommission is involved in organising the symposia

- NH8 Seismic Hazard Evaluation and Precursory Phenomena (Conv. Contadakis, Zschau)
- NH9 Reliability of Predictions in Seismic Hazard (Conv. Zschau, Madariaga, Roca).

Following a suggestion of the meeting of the IASPEI Subcommission on Earthquake Prediction in August 1997 in Thessaloniki, the ESC-ESubcommission members G Sobolev and J. Zschau have taken the responsibility for organising a symposium on “Space Time Patterns of Seismicity and Related Geophysical Fields” to be held at the next IUGG meeting in Birmingham.

According to recommendations of the ESC meeting in Reykjavik 1996 on the strengthening of the EU support of research programs and wider geographic cooperation in order to assure a faster development in earthquake prediction the following activity should be noted:

Subcommission F

by D. Slejko, E. Faccioli, D. Giardini, G. Gruenthal, A. Marcellini, and R. Musson

During the 26th General Assembly of the European Seismological Commission, held in Tel Aviv, Israel, from August 23 to August 28, 1998, the Subcommission F "Engineering Seismology" presented the activity of its Working groups through 6 scientific sessions and one special symposium. The scientific sessions covered the following themes: SC-F0 "Engineering Seismology", SC-F1 "Strong-motion databanks and databases for design purposes", SC-F2 "Seismic hazard mapping for the European - Mediterranean region", SC-F3 "Macroseismic databanks - a resource for seismic hazard and risk studies", SC-F4 "The European macroseismic scale EMS-92: latest updates and applications", and SC-F5 "Site effects, design ground motion and microzonation". The special symposium was entitled SS-1 "Earthquake risk and earthquake scenario". In total 86 papers and posters were scheduled for presentation and only a few were cancelled.

Session SC-F0 "Engineering seismology" was intended by the convenors Slejko, Garcia-Fernandez and Cecic, as a poster session to collect all the papers which did not fit the themes of the sessions organized by the working groups. Actually 6 oral presentations were given to stimulate the discussion, and discussed general hazard aspects in different regions of the world: Greece, Italy, Bulgaria, Slovenia, and Jordan. Specific aspects of engineering seismology were presented by the 7 posters, where less regional emphasis was given in favour of more theoretical and experimental discussion.

Session SC-F1 "Strong-motion databanks and databases for design purposes" was organised by Ambraseys and Sousa-Oliveira and consisted of three papers and one poster. The first two papers were

presented by Bonnin and described the strong motion database prepared in Moscow and available via the Internet. The last presentation described an automated system for data and information dissemination. The poster presented the data of a recent earthquake in Slovenia collected by a regional accelerometer network.

Session SC-F2 "Seismic hazard mapping for the European - Mediterranean region" was organized by Giardini, Papaioannou and Qader Amrat, co-sponsored by the International Lithosphere Project and by the International Geological Correlation Program n.382. Goals of this special symposium were to provide an overview of seismic hazard assessment in the ESC area and to summarise the progress achieved by the ESC Working Group on Seismic Hazard. The aim in the period 1996-2000 is to compute a homogeneous seismic source zoning and seismic hazard assessment for the ESC area, in coordination with the ILP's Global Seismic Hazard Assessment Program and with the IGCP n.382.

The first part of SC-F2 was dedicated to the invited presentations on the preliminary PGA map of the Mediterranean and on the results of the different multidisciplinary projects cooperating in the compilation: Ibero-Maghreb, Adria, Central-Northern Europe, Czech Rep./Poland/Slovakia, Northern Eurasia, Caucasus, Greece, Turkey, Circum Pannonian, African Rift and Near-East. The second part was contributed by individual scientific teams working in seismic hazard in different European areas. The afternoon discussion focused on the definition of the goals and work schedule for 1998-2000 for the Working Group on Seismic Hazard.

Session SF-F3 "Macroseismic databanks - a resource for seismic hazard and risk studies" was organised by the WG Macroseismology. The convenors were Musson and Mucciarelli. The session was held on the afternoon of Monday, 24th August. A total of seven oral presentations were given, with two posters in the poster session.

The session began with an invited paper by B. C. Papazachos, Papaioannou, C. B. Papazachos and Savaidis, "The Southern Balkan databank of macroseismic information", presented by Papaioannou. This paper described the macroseismic databank compiled at the University of Thessaloniki. The databank is held as an ASCII file, and is restricted to shallow events, since intermediate depth events can be seen to have a totally different attenuation pattern. The databank has a total of 35000 observations from 872 earthquakes. In addition, each site is given a site factor parameter reflecting local conditions.

The second paper was by Gasperini and Valensise, entitled "Objective definition of the source of large Italian historical earthquakes using macroseismic databases", presented by Gasperini. The paper focused on the derivation of source parameters for earthquakes in five steps: (i) location; (ii) moment; (iii) the source dimensions; (iv) the orientation/azimuth; (v) the representation of the source (as a rectangle which is a projection of the fault on the surface). The reliability could be affected by the lower bound of the intensity values used for determination of the azimuth, which could be I_{max} only, or $I_{max}-1$, or no lower bound. In some cases this choice could give different results.

The third paper, by Mucciarelli and Stucchi, was entitled "Expedite damage scenarios based on the use of macroseismic databases", and was given by Mucciarelli. He emphasised that the use of macroseismic databases could enable damage scenarios to be prepared in an expeditious manner when results were needed quickly. Data from past events could be combined with data derived from attenuation (where observed data are lacking) and then overlaid on demographic data to estimate future losses.

This was followed by a paper by Stucchi, Ercolani, Molin, Peruzza and Valensise, "New release of the 'Map of maximum observed intensities in Italy'". The paper was presented by L Peruzza in the absence of M Stucchi. As in the previous paper, it was shown that real observed intensity data could be combined with estimated data from attenuation. The standard deviation of the difference was about one intensity degree. The policy adopted when preparing the final figures was to substitute the estimated value over the observed one if the former was higher.

A paper, "The UK national database of macroseismic data", by Musson, Marrow and Henni, was presented by Musson. In contrast to the Italian and Greek presentations, it described work in progress in the construction of a database, and showed how problems could be inherited from earlier work not done with a database end product in view. The use of a relational database rather than a flat file was recommended.

The paper by Aptikaev and Frolova, "Extreme estimations of seismic effect and social losses due to earthquakes" was presented by Frolova, and showed correlations between intensity and instrumental parameters as modal and maximum values. Fatalities were correlated with intensity, and the envelope of maximal values considered as a useful measure. It was also noted that the ratio of killed to injured seems to vary as a function of intensity.

The final paper in the session was "Seismic field equations based on isoseismals", by Timiovska. This presented an analysis of intensity attenuation for the Balkan region. An interesting point was the inclusion of a magnitude-related term for source dimension in the model used.

The two posters were "Mining natural hazards data" by Hittelman and Dunbar, and "Macroseismic methods applied to the evaluation of recent and historical earthquake parameters", by Scotti and Levret. The first of these gave a description of some of the types of data held by the NGDC, while the latter described the use of the SIRENE database of macroseismic data in France to evaluate earthquake parameters.

In summary, this was an interesting and useful symposium. A subject common to several of the presentations was that of intensity attenuation. Clearly this is very important in applying macroseismic methods to seismic hazard and risk it is felt that this is an area where there is still a lot of work to be done, for instance:

- comparing different functional forms
- examining the role of site effects in determining residuals
- comparing results from different countries and regions
- making comparisons with geology
- finding a solution to the problem of intermediate focus earthquakes

These are topics that can be looked into for future work.

Finally, at the business meeting of Subcommission F, it was agreed that the WG Macroseismology should take over responsibility for any future business concerning the European Macroseismic Scale, since the WG "Macroseismic scales" has now been dissolved, having successfully accomplished its task.

During the session SC-F4 "The European Macroseismic Scale EMS-92: latest updates and applications", organised by Gruenthal, Schwarz and Spence, the final version of the scale was presented and discussed.

The need for reliable seismic hazard and risk assessments, as well as the growing importance of earthquake scenarios, require precise intensity assignments of both future and past macroseismic data. It is essential to continue to improve the use of macroseismic scales in a situation of very diverse and rapidly changing building stock. During the recent updating of the 1992/93 European Macroseismic Scale, to include engineered buildings, it became clear that it had valuable potential as a tool for predicting damage levels expected in any settlement with an identified building topology. Use of the EMS scale definitions in this way can feed information into the hazard assessment process.

The Session was devoted to the detailed presentation of the innovations made to the Scale since 1993. Other objectives of the Workshop were in particular: (1) to review EMS-92 applications worldwide, (2) to summarize the behaviour of non-engineered building types based on damage survey data, (3) to identify, based on damage survey data, the key features affecting vulnerability and their significance, and (4) to identify the behaviour of earthquake resistant designed structures.

Five presentations were given during the Session, while one additionally was displayed as a poster. (One paper had to be cancelled because of the absence of the speaker.) Three papers were devoted to applications of the EMS-92 (Central Italy 1997/98, Cariaco/Venezuela 1997), one paper on the assignment of vulnerability classes of structures, one on the inverse use of the EMS for converting hazard into risk assessments, and one paper on the innovations made in the EMS-98. The broad interest in the matter, expressed in a large audience and in intense constructive discussions, was used as an opportunity to convene a special workshop planned for autumn 1999 in Weimar/Germany.

Session SC-F5 "Site effects, design ground motion and microzonation" was organized by Marcellini, Ansal and Zaslavsky. Twenty papers were selected for presentation at the assembly; the contributions came from the following countries: Albania (1 paper), Bulgaria (1), Israel (3), Israel and Turkmenistan (1), Italy (6), Italy and Greece (2), Italy and Turkey (1), Netherlands (1), Norway and Zimbabwe (1), Russia (1), and Turkey (2). Contributing authors came from different scientific and professional backgrounds (namely: geology, seismology, geotechnical engineering, and land-use planning): this can be considered the most relevant aspect of the session, because the attendees had the opportunity to compare a variety of approaches and ways of thinking. It was noted that all the cited disciplines are involved in site effects and microzonation for both urban planning and building design. In the past, problems have been, lack of exchange of information and experience between the different specialists.

As expected, according to the present state of art in site effects, the majority of papers focused on the validity of the so called "non-intrusive" method, in particular the Nakamura approach validation (or rejection) was one of the key points of the session (easy to understand: if it works we will have a method unbelievably cheap and fast). At least ten papers were dedicated to this subject: in some cases comparing spectral ratios and HVSR with synthetic signals (paper by Triantafyllidis et al.), in others with

recorded earthquakes (Arzi et al., Zaslavsky et al., Singh et al.). In particular, Singh et al. showed results obtained in Latur (India) using recorded aftershocks and Zaslavsky et al. demonstrated the applicability of spectral ratios to assess topographic effects. Other authors compared the results between SSR and HVSR with those obtained using traditional direct approaches (Ansal et al.). Direct classical approaches (Vs determination, input motion assessment by using recorded earthquakes, SHAKE computer codes) were adopted by de Crook et al. Comparison between classical approach, SSR and recorded motion both at surface and depth was presented by Marcellini et al. Besides site effects, the influence of source and path in design ground motion were particularly considered by Ansal et al. and Marrara et al. Attempts to overcome the linearity limitations were made by Arzi et al. and Mucciarelli et al., whilst a purely theoretical approach to evaluate site effects was discussed by Godano et al. Microzonation approaches were presented by Boykova, Marcellini et al. and Lobatskaja et al. Menoni introduced the audience to the planner's point of view in coping with seismic risk.

The special symposium SS-1 "Earthquake risk and earthquake scenario" was organised by Faccioli, Faeh and Malitzky with the main aim of providing a critical overview of current research work (and applications) carried out in Europe in the field of earthquake hazard and risk scenarios, and related topics. Some fifteen papers were given in the session. A number of the contributions presented focused on scenario studies in specific urban areas of Europe. These included:

- Barcelona (Spain), as a representative case for cities exposed to moderate-to-low seismicity (I=3DVII MCS), for which extensive field work has been performed on dynamic characterisation of reinforced concrete buildings;
- Catania (Italy), exposed to high seismicity (I=3DIX-X MCS) and a history of past destructive earthquakes, for which a large seismic scenario project is being carried out in Italy, covering a broad spectrum of topics from the seismic source to the vulnerability and damage assessment of buildings;
- cities in Crimea (Russia), like Soci, also exposed to high seismic risk, for which advanced probabilistic techniques were applied on different aspects of hazard and damage estimation.

Other contributions strictly related to the main topic of the session included the seismic microzoning of the city of Basel (Switzerland), the inversion of observed intensity fields of historical earthquakes for defining the characteristics of scenario earthquake sources, and the use of different, advanced numerical modelling methods for calculating synthetic seismograms appropriate for detailed building analyses in seismic scenario studies.

In conclusion, although some interesting work is now in progress in Europe, the development and use of earthquake scenarios should be strongly stimulated, being an irreplaceable tool for enacting appropriate loss mitigation policies.

ESC TRAINING COURSE FOR YOUNG SEISMOLOGISTS

By A B Walker

The ESC, with the financial support of IASPEI and UNESCO, has sponsored two training courses for Young Seismologists in order to expose them to data acquisition, processing techniques and empirical evaluation of site effects under the tutorship of many established seismologists throughout Europe and the world. The recent training course in Tel Aviv took place in the two days before the General Assembly and focused on empirical evaluation of site effects. The lecturers, Avi Shapira, Sam Frydman, Pierre-Yves Bard and Kuvvet Atakan, each covered their specialist subjects.

Thirteen students from nine countries attended the course. Questionnaires were distributed amongst the students inviting them to comment on the overall impression of the course together with level struck by each individual lecturer. The responses indicated a high rating for the course, overall, although the individual lecture questionnaires produced a mixed reaction with regard to the level of difficulty and detail, and these constructive comments will be taken into account for future training courses. Distribution of lecture notes before the course was recommended in order to expose the students to the material and allow them to prepare for the lectures. An extension of the course to three days was also proposed by many of the students who felt that too little time was allocated to each subject.

It was clear that the students had a varied level of experience and background knowledge, a situation which is always difficult to cater for. The lecturers are, therefore, commended for the acknowledged overall success of the course which resulted from their care and attention to content and providing the students with lecture notes (a recommendation from the YSTC in Reykjavik).

It is recommended that, in future, lecturers receive prior information on participants' experience. Lecture notes should be distributed prior to the training course to allow students to review material before attending. These notes will also serve as a reference set when students have returned to their institutes.

Following receipt of a positive report on the training course, the ESC Bureau thanked the lecturers and organisers on behalf of ESC members and endorsed a proposal to hold a third training course before the next General Assembly in Portugal (3–8 September, 2000).