

Distribution : limited

IOC/ITSU-VII/3
Paris, 25 March 1980
Original : English



INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of Unesco)

International Co-ordination Group for the
Tsunami Warning System in the Pacific

Seventh Session

Viña del Mar, Chile, 3-7 March 1980

SUMMARY REPORT

EXECUTIVE SUMMARY

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) held its Eleventh Session in Viña del Mar, Chile, from 3 to 7 March 1980. The Group, after having reviewed national activities and the activities of the International Tsunami Information Center (ITIC), in Honolulu, adopted two resolutions and six recommendations :

By Resolution 1 the ICG/ITSU decided to establish an ITSU Task Team on a Study of Tsunami Watch and Warning Procedures, and by Resolution 2, a Task Team on Regional Tsunami Warning Centres.

Recommendation 1 asks Member States to continue to make an effort to second an Associate Director to ITIC; Recommendation 2 asks the extrabudgetary funding to improve the network; Recommendation 3 refers to tsunami research; Recommendation 4 asks Member States to strengthen their efforts to elaborate, improve and implement educational programmes; Recommendation 5 contains a proposed programme and budget for 1984/85, and Recommendation 6 asks for post-tsunami surveys. The Group agreed to hold its next session in Fiji, in 1982.

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1. Opening of the Session

The Seventh Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) was convened at Hotel Miramar in Viña del Mar, Chile, on Monday, 3 March 1980, at 10.00.

The Instituto Hidrográfico de la Armada de Chile served as host for the meeting, and made arrangements for logistical support.

The Chairman of the Group, Mr. G.C. Dohler, welcomed the participants and introduced the speakers. The welcome speech was given by the Director of the Hydrographic Institute of the Navy and Head of the Chilean Delegation, Capitán de Navío Mariano A. Sepúlveda (Annex V). The Chairman, on behalf of the Group, thanked the Chilean authorities for their kind invitation to hold the meeting in Viña del Mar.

Dr. Günter Giermann, Deputy Secretary of the Commission and representative of Unesco, welcomed the Group in the name of the Director General of Unesco and the Secretary of IOC, and thanked the Government of Chile for hosting the meeting and providing such fine facilities.

The official opening address was given by the Commander in Chief of the Navy and Member of the Honourable Government Junta, First Admiral José Toribio Merino Castro.

Representatives of the following Member States attended the session : Canada, Chile, Ecuador, Fiji, France, Indonesia, Peru and USA. WMO was also represented (see Annex IV, List of Participants).

2. Adoption of the Agenda and Election of the Rapporteur

The Group adopted the Agenda (Annex I). Mr. Sydney O. Wigen, delegate of Canada, was elected rapporteur. The Chairman, Mr. G.C. Dohler, outlined the activities of the Group during the intersessional period (Annex III).

3. State of implementation of resolution EC-X.14 and of recommendations from the sixth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific (Manila, 20-25 February 1978)

In resolution EC-X.14, the Executive Council approved the report and the recommendations of the sixth Session, urged Member States to accelerate the preparation and widest dissemination of tsunami educational material for the general public, and instructed the Secretary to investigate means of obtaining additional financial support for the preparation and dissemination of such material.

The Secretary reported on the proposed activities planned for 1980 to be funded through the Unesco Regular Budget. These activities include :

- The Meeting of the Seventh Session of the ICG/ITSU,
- Visits of the Director and Associate Director ITIC to Member States,
- Post-tsunami surveys by ITIC,
- The visiting scientists programme to ITIC (2 scientists for a 6 week period),
- The catalogue of tsunami marigrams,

- Narrated slides for educational purposes, and
- A financial contribution to the publication of the proceedings of the IUGG Tsunami Committee meeting in Canberra, December 1979.

The total expenses in 1980 will amount to approximately US \$ 30,000.

The Secretary further informed the Group that the Unesco financial period 1981-1982 had been extended to 1981-1983. During this period ITSU might expect to receive approximately US \$50,000 annually from Unesco's Regular Budget of which training and education aspects (TEMA-ITSU) will absorb more than 50 per cent.

These funds will cover :

Funding of the Eighth Session of the IOC/ITSU; run-up surveys by ITIC, immediately after the occurrences of major tsunamis; ITIC staff travel; ITIC contractual services; publications; a Workshop; preparation and publication of educational material; a training course on technology needed for an effective warning system; visiting scientists programme.

The Secretary pointed out that because of the increasing demands extrabudgetary funds should be sought, such as from UNDP, UNEP or the Interim Fund for Science and Technology. Although members indicated that they might desire to review 1981-1983 allocations and perhaps have options of making changes in accordance with new priorities, the Secretary pointed out that allocations for 1981-1983 can only be changed through interventions at the next Unesco General Conference.

In coming to the budget for 1984-1985, which is addressed in detail in agenda item 14, the Chairman pointed out the importance of having clearly defined action items for this forthcoming period, recalling the past very successful budgetary exercise for the 1981-1982 period.

In order to better organize the session, the Chairman called for the establishment of four ad hoc groups to study specific agenda items and to prepare draft resolutions and recommendations.

The following groups were established and their Chairmen designated :

1. Budget 1984-1985 : USA, France and Chile. Chairman : Mr. Thompson (USA)
 2. Extra-budgetary Funding : ITIC, Chile, Peru, Ecuador; Chairman : Dr. Pararas-Carayannis (ITIC)
 3. Education : Chile, Peru, Fiji and Indonesia; Chairman : Cap. Sepúlveda (Chile)
 4. Associate Director - ITIC : Canada, USA, Indonesia, Chile and ITIC; Chairman : Mr. Wigen (Canada)
4. Activity Report by the Director, International Tsunami Information Center (ITIC)

The Director ITIC, Dr. G. Pararas-Carayannis, presented a detailed report outlining activities of ITIC over the last 2 years. He stated that the Center had been working to meet the responsibilities designated by ITSU-VI, and to meet the requirements as set forth in the mandate of ITIC. He commended

the work of the previous Associate Directors, Mr. Wigen and Mr. Ridgway, and stated that the lack of Associate Director since June 1979 has had an adverse effect. ITIC is one of the most effective units of IOC, but it is difficult for it to carry out all work with the present support. He drew attention to a number of highlights of the Center's recent activities. A Tsunami Report series is being published regularly to provide information on the tsunamis as soon as possible after their being generated. A bibliography of tsunami literature is nearing completion. Results of tsunami investigations are being computerized in order to have them accessible for decision-making at the Pacific Tsunami Warning Center. The production of time charts has been computerized and two charts have been produced in the last year. Production costs for charts are in the order of US \$ 1,500 - 2,000. New members have been brought into ITSU, specifically Fiji, Hong-Kong (UK), Singapore and Western Samoa. Visits have been made to provide liaison with Member States and to countries needed in ITSU, to foster the development of regional warning systems. A damage and disaster survey was made in Colombia after the earthquake on 12 December 1979.

The Director ITIC circulated to Member States a new ITIC publication, "A Guide for a Post-Tsunami Survey". The guide stresses the necessity of tsunami surveys as soon as possible after inundations have taken place and also the need for accuracy and reliability, since much of the direct or indirect evidence disappears with time. The report gives guidance on the conduct of a survey and the great variety of circumstances, problems to be expected and suggestions on logistics.

The recommendation that Member States participate in post-tsunami surveys was supported by the Group which adopted Recommendation 6 to that effect.

5. National activity reports

The representatives of the Member States reported on developments in their respective countries. Written reports were presented by the delegates of Canada, Chile, Fiji, Indonesia, Peru and USA. The delegate from Ecuador announced that his report would be distributed later. The Secretary read the national report from Japan, which was received by mail. The delegate of France informed the Group that his national report had been mailed but not received and it will also be distributed later directly to Member States. These reports are not annexed to the Summary Report, but will be made available, on request, by the Secretary IOC, Paris, or the Director ITIC, Honolulu.

Significant questions were raised relevant to several reports. The delegate of Chile informed the Group that the Chilean seismic stations are organized into 4 local networks with 8-19 stations in each.

Arrangements between Chile, Ecuador, Peru and USA are being made for the installation of 4 automated tidal stations to operate in the Tsunami Warning System using the GOES satellite.

Regarding tidal stations, the Indonesian delegate informed the Group that Indonesian gauges provide records, which are transmitted to headquarters with a certain delay, and that data are not available in real time. With reference to the alarm system, the delegate of Peru informed the Group that seismic (not tidal) records are transmitted by phone from the agency responsible for the seismic network.

The USA and the Chilean delegates emphasized the importance of close correlation of seismic and tidal information. In many countries these seem to be handled separately, and Member States are therefore invited to look for closer co-operation between their respective agencies.

In response to questions, the USA delegate informed the Group that his country will maintain its present level of support to ITIC and it would be unrealistic to expect any substantial increases at this time. In response to a question regarding the speed with which the Pacific Tsunami Warning Center (PTWC) can locate the epicentre of any earthquake, the USA delegate replied that location near the Hawaiian Islands can be established without delay by 6-8 local seismic stations. As for the rest of the Pacific, responses are received from the Alaskan Tsunami Warning Center and a few other stations and it takes about 15 minutes to gather data and locate the epicentre. 90 per cent of the initial positioning is correct within 1 degree latitude and longitude but less accuracy is experienced for earthquakes in the South East and South West Pacific. Regarding the Water Level Telemetry System, some tide stations can automatically be switched to a tsunami mode in which data can be stored at 30 second intervals for 3 hours. At present, these records are used only for tsunami determination, but the possibility of storing these data for later tsunami research is now under consideration. With regard to tidal data platforms which can transmit via satellite, the USA has specifications on the instrumentation available: if Member States wish to obtain such equipment, the USA can supply these specifications, and the sources from which the instruments can be purchased. The Director ITIC reported that some of this information is contained in the January 1980 Newsletter.

A film "In Search of Tsunamis" was shown to the Group, which had been commercially produced. It may be possible to purchase a copy of this film from the producers.

The Canadian delegate was questioned regarding the statement in his report on studies using the SEASAT Radar Altimetry and the suggestion that tsunami data may be observable from the National Oceanic Satellite System (NOSS). It was questioned whether an orbiting satellite would provide significant data. In response, the Canadian delegate pointed out that research in progress on the satellite radar data would be directed specifically to tsunamis whenever one should occur; if it is found that the tsunami waves are detected in passes of the satellite, it may be worth considering including such instrumentation in a geostationary satellite. The date for the Bamfield tidal gauge to become instrumented for interrogation by the Geostationary Operational Environmental Satellite System (GOES) was questioned, but because of mechanical difficulties no date could be given.

6. Decision of the IOC Assembly at its Eleventh Session on the Associate Director for ITIC (Resolution XI-23)

The Secretary read for the meeting Resolution XI-23 referring to the problem of the vacancy in the Associate Director position at ITIC. The Director recognized the necessity of having an Associate Director in order for the work of the Center to be carried out effectively. He identified three possible solutions: (a) funding the position through the IOC budget; (b) through the IOC Trust Fund; (c) through Member States making short-term assignments, for a few months only, with IOC support for travel and subsistence. Assignees would then work on special projects. The Director made it clear, however, that he had a definite preference for long-term postings

rather than the short-term assignments. The Chairman then invited delegates to express their views on this matter. Without exception delegates stressed that they prefer to have the Associate Director serve under a long-term assignment, recognizing, however, that the short-term assignment may be acceptable for an interim period. They did not favour being dependent on trust fund support. At the same time delegates were unable to nominate a candidate under the existing terms which require his full funding by the nominating country. The delegate of Chile identified financing as the essence of the discussion with other comments irrelevant until this is resolved.

Discussions proceeded on alternatives of funding the Associate Directorship, such as regarding the post as for training and seeking TEMA support. The Secretary pointed out that this again would only be possible through contributions to the IOC Trust Fund.

An option was considered of having either the Director or Associate Director of ITIC receive full Unesco status. The Secretary outlined that this proposal might be taken into account when preparing the 1984/85 budget.

Such an arrangement will open the post to all Member States of the Commission and of Unesco.

The ad hoc Group presented as an alternative the funding of an Associate Directorship by assessment among all Member States of ITSU. By such procedure the country of the appointee will continue to pay salary and normal supplementary benefits, while other costs would be shared from the assessment funds. Member States were questioned as to the reaction they expected their country will give to such a proposal and their responses were divided.

Through a motion by the delegate of the USA, the Group agreed that it had no real solution to the problem, other than retaining the present arrangement.

If no Associate Director is nominated from the Member States, possibilities of some relief may come by staffing the position through extra-budgetary project as discussed under Agenda item 8. The Group adopted Recommendation 1 on this Agenda item.

7. Consideration of Recommendations from the IUGG Tsunami Committee Meeting held in Canberra, Australia, December 1979

A summary of the results of the IUGG Tsunami Committee Meeting, held in Canberra, Australia, in December 1979 was presented by the Director ITIC. A full description of the meeting is contained in his report to the Session and also in the January 1980 issue of the Tsunami Newsletter. The Group expressed the concern that, in some respect, the co-ordination between the IUGG Committee and ITSU had been lacking. To correct this situation, it was suggested that the Commission and ITSU hold its meetings in conjunction whenever possible, as had been done on previous occasions. The Group noted that IUGG had recommended the formation of National Committees. These Committees would certainly provide an opportunity for co-ordination on the national level between the Committees and ITSU National Contacts, and such co-operation is urgent. Further, the Group felt that ITSU would benefit if delegations to its meetings were to include tsunami researchers. These researchers may appropriately be sought from the IUGG National Tsunami Committees. In view of the above, the Chairman was requested to convey the Group's concern and need for co-operation

between the two bodies to the Chairman of the IUGG Commission and to suggest that future meetings be arranged in conjunction. The Secretary was also to take this into consideration when arranging future sessions of ITSU.

Finally, the Group wished to express its thanks to Dr. Soloviev, retiring Chairman of the IUGG Tsunami Committee, for his continued efforts to keep close working relationships with the IOG/ITSU on research. The Chairman was requested to convey this expression of thanks to Dr. Soloviev on behalf of the Group.

8. Proposals for further expansion of the Tsunami Warning System in the Pacific (TWS)

- a) Tide and seismic stations
- b) Regional warning centres

The Director ITIC reviewed from his report to ITSU sections dealing with existing tide and seismic station systems and proposed to increase the number of stations. Some have been added by recent increases in ITSU membership and others through recent liaison visits.

Primary needs for additional stations lay in the South Pacific, where for lack of prompt information, warnings presently cannot be given in less than 2 hours.

Queried about tide stations being operated in the islands of the South Pacific by the University of Hawaii, he stated that with one or two exceptions these stations duplicate gauges already in the system.

A request was made by the US delegate for ITIC to produce additional travel time charts for tide stations entering the Tsunami Warning System. This was objected to by the Canadian delegate as being outside the scope and responsibility of ITIC, according to its mandate and functions. Since the resources of ITIC are very limited, it is essential that its work be directed to its primary responsibilities of information, liaison, research support and monitoring the Tsunami Warning System on behalf of Member States.

The representative of the USA outlined a proposal for a revision in the procedures for the dissemination of watches and warnings. The revision concerns warning selected areas rather than the entire Pacific, unless it is necessary. At present, watch messages are generated for those earthquakes of magnitude 7.5 or greater in the Pacific area and 7.0 or greater in the Aleutian area. When a watch is initiated, tide stations in the immediate vicinity of the epicentre have already been queried for tsunami data. If a Pacific-wide tsunami has been generated, a warning would be issued. If not, a final watch supplement would be issued thus ending the investigation. This final supplement would again be disseminated to all recipients of tsunami information throughout the Pacific.

The change would be to warn those areas in the vicinity of the epicentre immediately with subsequent areas placed in a watch status thus eliminating the need to disseminate information to the various recipients who are not in immediate danger.

The watch and warning areas would be established by analyzing the relationship among the water wave travel times, Pacific earthquake-generating areas, and the tide-gauge locations. The study will also consider problem areas of implementation such as communications feasibility; education of the new watch and warning procedures for all participants in the tsunami warning system; over-warning; the restructuring of the software for message generation; and the increased workload in generating these messages by the Pacific Tsunami Warning Center staff.

The Group decided to form a Task Team, consisting of Fiji, Chile, France and USA, to prepare a plan and implementation programme for the modification of procedures for the issuance of tsunami watches and warnings. The Task Team will submit this plan to the Member States in approximately nine months and it is expected that a test of the new procedures will be carried out by PTWC in 1981. Resolution 1 was adopted accordingly.

9. Proposals for further technical improvements of the Tsunami Warning System in the Pacific

- a) Rapid data and watch and warning dissemination
- b) Implementation of satellite telemetry system

The Delegate of Chile presented a major proposal for extending and automating its seismic network, with the addition of 25 seismic stations. Further discussions followed on the technical aspects of the Chilean earthquake proposal. In discussions it was agreed to be a very ambitious programme, involving not only the seismic centres, but also the microwave, radio and land line link for communication. A question was raised whether tide gauge data transmission would be incorporated and the delegate from Chile pointed out that the tidal measurements were a separate responsibility. Present tidal coverage is not all that is desired, but it is being improved gradually and sites are being planned. Discussion then focused on seeking extrabudgetary funds for technological improvement of the Tsunami Warning System. The Chairman pointed out that although progress has been made over the past ten years, we are only now approaching the stage where the Pacific Tsunami Warning Center can interrogate some tide and seismic stations in near-real time. Only with such facility can we provide necessary warnings. The Secretary advised of the prospect of funding through one of the United Nations agencies and it was recognized that such funds could upgrade and automate the existing system only, but would not be adequate for developing regional networks. By consensus it was decided to proceed in two stages, upgrading the present system now and soliciting funds to develop regional centres at a later date (Recommendation 2 and its appendix (see Annex VI), which was endorsed by the Group, refer).

The delegate of Ecuador suggested that as an immediate stage, a telex system could be established from the Galapagos Islands to Ecuador. The Director ITIC concurred with the need for response from these Islands and suggested that the United States consider installing a telex receiver at the Pacific Tsunami Warning Center.

The delegate of Fiji spoke on the need of a regional communication network so that within the Islands of the South West Pacific each could be advised quickly about locally generated tsunamis.

The Group identified the need to develop a plan for regional warning centres. The ad hoc Group chaired by the Director ITIC was requested to prepare a first proposal. The Member States wishing to participate in this work are : Chile, Ecuador, Indonesia, Peru and Canada. The Director ITIC agreed to co-ordinate this work. Resolution 2 was adopted accordingly.

10. Tsunami Warning System Operations

The Director ITIC reported that in the past 2 years the Pacific Tsunami Warning Center had felt 51 events. Some changes have come about on system automating included with many computer installations at Alaska and Hawaii. The first satellite transmitting tide stations and seismic stations are in operation and others will be established in 1980.

11. World Data Center A-Tsunami

The delegate of USA drew the attention of the participants to the ICSU Guide to International Data Exchange and circulated a revised list of tide stations for which tsunami data are requested.

Member States are encouraged to co-operate in systematic tsunami data submission. The Secretary is requested to circulate the list to all IOC Member States, asking for updating. The updated list will then be transmitted to ICSU for inclusion in the Guide.

12. Proposals for research on tsunamis

The Director ITIC provided a summary of tsunami research activities discussed at the recent Pacific Scientific Congress, the tsunami symposium of IUGG at Canberra and of a workshop funded by the National Science Foundation. He made reference to a variety of research activities proposed in his report to the Group. In view of the Group's concern with operational problems, two related proposals were considered. The most urgent, a study of tsunami-risk estimation in highly populated areas and ITIC's historical study on tsunamis. Recommendation 3 was adopted on this subject.

13. Proposals for a tsunami educational programme

The Chairman read from the resolution of the 1978 ITSU Meeting, urging each Member State to undertake a pilot education study. The Director ITIC drew attention to the tsunami warning poster which was sent to all the Member States and also to a list of educational materials received by ITIC, as shown in his report, Annex 12.

In order to make these publications more widely available, the Secretary advised that he may be able to arrange translation of some of these into the official languages of IOC. A number of countries reported on their educational programmes and the delegate of Canada reported on a commercially produced film. He drew attention also to a recent workshop for civic officers, from which educational material may be prepared.

The delegate of Fiji reported that Fiji was running a tsunami educational series in a teacher's magazine, providing source material for use in classrooms. National disaster seminars had been hosted by the National Red Cross and other organizations. Indonesia began translations of pamphlets from ITIC into local languages and asked also that ITIC provide instructional material for Member States.

ITIC conducted a workshop for weather observers from Micronesia, and the programme is included as Annex 13 of the Director's report. Chile has been developing training programmes to provide specialists with the publication on how to react to a variety of disasters. The Education Department is responsible for emergencies and evacuations of schools and

instructing students in types of risks to be expected. This training has a multiplier effect, since children are discussing this type of training at home. An amount of approximately US \$ 200,000 was proposed to be included in the programme forecast for 1984/85 to cover the training of specialists on tsunami and of educators as stated in Recommendation 4.

14. Programme Forecast (budget)

The ad hoc Group preparing the 1984-85 budget forecast presented its report.

The Group placed particular emphasis on training of technical specialists and educators.

The Group adopted the budget proposal for 1984-85 with a total of \$ 400,000 of which \$ 120,000 are under Regular Programme. Recommendation 5 was adopted accordingly.

15. Date and Place of the Eighth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific

The Delegate of Fiji, on behalf of his government, suggested Fiji as the host country of the Eighth Session of the ICG/ITSU, in 1982.

This invitation was accepted with thanks and appreciation.

16. Election of the Chairman and Vice-Chairman

The Secretary read the Guidelines for Subsidiary Bodies of the Commission as adopted by the Eleventh Session of the IOC Assembly. Moved by Fiji and seconded unanimously, the present Chairman, Mr. G. Dohler, of Canada, was re-elected Chairman for one additional term of office. Moved by Chile and seconded unanimously, the present Vice-Chairman, Mr. C. Vargas, of Peru, was re-elected Vice-Chairman for one additional term of office.

17. Adoption of the Summary Report and Recommendations

The Summary Report and the resolutions and recommendations (Annex II to the Report) were adopted.

18. Closure of the Session

The Session was declared closed by the Chairman on 7 March 1980 at 17.00.

ANNEX I

A G E N D A

1. Opening of the Session
2. Adoption of the agenda and election of Rapporteur

REVIEW

3. State of implementation of resolution EC-X.14 and of recommendations from the sixth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific (Manila, 10-25 February 1978)
4. Activity report by the Director, International Tsunami Information Center (ITIC)
5. National activity reports
6. Decision of the IOC Assembly, at its Eleventh Session, on the Associate Director of ITIC (Resolution XI-23)
7. Consideration of recommendations from the IUGG Tsunami Committee meeting, held in Canberra, Australia, December 1979.

NEW ACTIVITIES

8. Proposals for further expansion of the Tsunami Warning System in the Pacific (TWS)
 - a) Tide and seismic stations
 - b) Regional warning centres
9. Proposals for further technical improvements of the Tsunami Warning System in the Pacific
 - a) Rapid data and watch and warning dissemination
 - b) Implementation of satellite telemetry system
10. Tsunami Warning System operations
11. World Data Center-A Tsunami
12. Proposals for research on tsunamis
13. Proposals for a tsunami educational programme
14. Programme forecast (budget)
15. Date and Place of the Eighth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific
16. Election of the Chairman and Vice-Chairman
17. Adoption of the Summary Report and Recommendations
18. Closure of the Session.

ANNEX II

RESOLUTIONS AND RECOMMENDATIONS ADOPTED BY THE INTERNATIONAL
CO-ORDINATION GROUP FOR THE TSUNAMI WARNING SYSTEM IN THE PACIFIC
AT ITS SEVENTH SESSION

RESOLUTION ITSU-VII.1

ITSU TASK TEAM ON A STUDY OF TSUNAMI WATCH AND WARNING PROCEDURES

The International Co-ordination Group for the Tsunami Warning System
in the Pacific (ICG/ITSU),

Being concerned that the present Pacific-wide Warning System is
not meeting the needs of Member States in regard to local tsunamis,

Having considered a proposal by the USA to revise the procedures
for the issuance of tsunami watches and warnings in a more timely
manner,

Decides to establish an ITSU Task Team on a Study of Tsunami Watch
and Warning Procedures, having the terms of reference appended to
this resolution, to develop a plan for the improvement of procedures
for issuing tsunami watches and warnings.

ANNEX TO RESOLUTION ITSU-VII.1

Terms of Reference for the ITSU Task Team on a Study of Tsunami Watch and
Warning Procedures

Members: Chile, Fiji, France and USA.

The Task Team will :

- Devise a scheme for the issuance of tsunami watch and warning
messages on a selected area basis;
- Assess the impact of changes on the operation of the Pacific
Tsunami Warning Center (PTWC);
- Assess the impact of changes on national warning procedures;
- Organize a test of the recommended procedures.

Work Schedule

January 1981 - Study and recommendations submitted to Member States of
ITSU for comment.

July-December 1981 - Operational test of recommended procedures.

April-June 1982 - Final report and recommendations submitted to ITSU-VIII

RESOLUTION ITSU-VII.2

ESTABLISHMENT OF A TASK TEAM ON REGIONAL TSUNAMI WARNING CENTRES

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Noting the interest expressed by Member States in the establishment of regional tsunami warning centres for the mitigation of the effects of locally generated tsunamis,

Instructs the Director ITIC, in close co-operation with authorities in Canada, Chile, Ecuador, Indonesia and Peru, to examine the feasibility of establishing regional tsunami warning centres in critical areas of the Pacific, and to explore the possibility of international funding for that purpose.

RECOMMENDATION ITSU-VII.1

ASSOCIATE DIRECTOR ITIC

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Recognizing that continuity in the staffing of the post of Associate Director ITIC is essential to fulfilment of duties and responsibilities set forth in the "Mandate and Functions of ITIC",

Recognizing further that since June 1979 no Member State has been able to nominate a candidate and pay all his expenses if selected,

Stressing that voluntary contributions through the IOC Trust Fund, as requested at previous ITSU meetings, are necessary to subsidize a posting,

Recommends that Member States continue to make an effort to second an Associate Director to ITIC, taking into account the fact that the full salary for the incumbent has to be paid by the seconding country; and

Recommends further that Member States be urged to contribute to the IOC Trust Fund, to cover the post adjustment and travel costs of the incumbent.

RECOMMENDATION ITSU-VII.2

EXTRABUDGETARY FUNDING

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Recognizing that the coastal population and industries in the developing countries of the Pacific are threatened by tsunamis and that the Tsunami Warning System, as it exists presently, is still unable to issue warnings to many places within two hours of the originating event,

Recognizing further that the socio-economic development of Pacific countries is closely related to the mitigation of the effects of natural disasters such as tsunamis, and that expedient relief could be brought about through the establishment of regional tsunami warning centres and through intensified public education and preparedness,

Recommends that developing ITSU Member States should apply for extra-budgetary funds such as UNDP funds or the International Fund for Science and Technology to support :

- The establishment of a denser network of automated tide gauges around the Pacific;
- Communication and telemetry links between seismic and tide gauges, the Pacific Tsunami Warning Center in Honolulu, and existing National Centres;
- Training of personnel to handle and maintain the instruments and the communication system;
- Maintenance of the system for a period of further two years after its establishment;
- A programme of tsunami preparedness;

Recommends further that the Secretary IOC approach the relevant financing organizations informing them of the urgency of implementing this project (*) because of the continuous threat to life and property in the Pacific region.

(*) A preliminary proposal is appended to this recommendation and contained in Annex VI of the Summary Report.

RECOMMENDATION ITSU-VII.3

TSUNAMI RESEARCH

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

In view of the potential for great loss of life in large coastal cities,

Urges the IUGG Tsunami Commission to encourage applied research in studies that will provide information in designated danger areas, specifically the resonance analysis of harbours and the historical study of tsunamis;

Recommends that any tsunami symposia take into account these subjects, including the proposed Tsunami Symposium planned for Ofunato, Japan, in May 1981.

RECOMMENDATION ITSU-VII.4

TRAINING AND EDUCATION

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Noting with interest that Resolution 33/22 of the United Nations General Assembly requested UNDP to review the possibility of including activities of technical co-operation for preparedness of disasters and for prevention of disasters in UNDP Regional and Inter-Regional programmes,

Recognizing that training of specialists on tsunamis and education of the public in countries threatened by this risk, is of greatest importance for the success of any programme on preparedness for, and prevention of, this kind of disaster;

Recalling Recommendation ITSU-VI.2 on educational material, and

Noting a decision of the IUGG Tsunami Committee to recommend the establishment of national tsunami committees,

Recommends that Member States strengthen their efforts to elaborate, improve and implement Educational Programmes in their respective countries, covering three aspects :

- a) Education of the community, beginning with the education of school children and covering the different adult organizations;
- b) Training of specialists participating in emergency operations;
- c) Dissemination of scientific knowledge to the world scientific community.

Recommends further that these training and education programmes on tsunamis be a permanent and distinct function to be carried out by national tsunami committees, or their equivalents, the establishment of which should receive high priority by Member States.

RECOMMENDATION ITSU-VII.5

PROPOSED PROGRAMME AND BUDGET

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Having reviewed the projected ITSU programme activities and their associated costs for the years 1984 and 1985,

Recommends the ITSU Programme Forecast attached hereto, be accepted by the Commission.

ANNEX TO RECOMMENDATION ITSU-VII.5

<u>Programme Forecast 1984-85</u>	<u>Regular Programme</u>	<u>Trust Fund</u>
9th Session of ITSU - 1984	\$ 20,000	-
International Tsunami Information Center Activities - Staff support, Contractual services, Run-up surveys, Printing.	\$ 40,000	-
Training, Education and Mutual Assistance - Training of technical specialists and educators (approximately \$200,000), workshops, printing of educational materials, maintenance of bibliography of training materials, visiting scientists programme.	\$ 45,000	\$280,000
Technical Studies related to : Communications, observations, automations, prediction methods, and/or warning centre operations.	\$ 15,000	-
	<hr/>	<hr/>
TOTAL :	\$120,000	\$280,000

RECOMMENDATION ITSU-VII.6

POST-TSUNAMI SURVEYS

The International Co-ordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU),

Recognizing the need to document each catastrophic tsunami in order to learn as much as possible about this infrequent but devastating natural phenomenon,

Being aware of the difficulties of arranging surveys of affected areas in a timely manner,

Believing that the carrying out of post-tsunami surveys should be a national function assisted by the ITIC,

Noting that a guide for post-tsunami surveys has been prepared by the ITIC,

Recommends that Member States of ICG/ITSU develop action plans for the conduct of comprehensive and expedient post-tsunami surveys, including the designation of a survey co-ordinator who will work in close co-operation with the Director ITIC;

Recommends further that ITIC provide appropriate training, participate in the surveys when necessary and assist in survey documentation.

ANNEX III

REPORT OF THE CHAIRMAN TO THE SEVENTH
SESSION OF THE ICG/ITSU

It was a great pleasure to represent the International Co-ordinating Group for the Tsunami Warning System in the Pacific (ITSU) at the Tenth Session of the IOC Executive Council, in Rome. The Summary Report of our Sixth Session was regarded as an example to be followed by other subsidiary bodies of IOC, and according to statements made by members of the Council, the report was prepared in a good business-like manner. The Co-ordinating Group now has 20 members on its roster. Fiji, Indonesia, Singapore, Hong Kong, Western Samoa and Mexico have joined since our last session in Manila, and no doubt other nations will follow in the years to come. Increasing membership will benefit all of us in providing the services needed in carrying out our tasks to establish and to co-ordinate the programmes most beneficial to those countries whose coastal areas are potentially threatened by Tsunamis.

We highlighted, during the Sixth Session, several action items :

- That a guide for tsunami damage and survey procedures be prepared and that Member States should submit their ideas
- To explore the possibility of utilizing U.N.D.P. or other international funds for the expansion of the Tsunami Warning System
- To have Canada and the United States investigate the use of satellites and to prepare a report for the ITIC Newsletter and that the USSR and Japan advise on such systems
- To review communication facilities between Tsunami Warning System Gauges and the Pacific Tsunami Warning Center
- The Tsunami Warning Gauges needed to verify the existence of tsunamis within one hour
- To have descriptive material prepared on existing gauging equipment and any planned improvements
- To prepare and distribute emergency and evacuation plans and educational material

The dates for which the action was required have presented some problems; however, we will have most of the reports available for discussion during this session.

I am concerned about the problems we have in filling the post of the Associate Director of ITIC and it is hoped that a solution can be found when dealing with this matter during our deliberations.

Some work has been carried out on the educational part of tsunami hazards and how to react to warnings given by national, regional and international warning centres. Our close co-operation with the IUGG Tsunami Committee provided some of the basic research needed to improve the warning system and to deal with the human factor and the educational requirements by all those subscribing to the system.

I was asked by the Chairman of the IUGG Tsunami Committee if funds could be made available for the preparation of its Canberra proceedings and, in consultation with the IOC Secretariat, an amount of \$3,000.00 has been set aside for this purpose.

We must thank the United States National Weather Service for the offer to install and to maintain tsunami detection platforms to monitor water level changes via Geostationary Satellites at a few key locations outside the U.S. territory. In addition, the continued support of the International Tsunami Information Center (ITIC) is very much appreciated.

The Director of ITIC has visited several Member States exploring the establishment of national and international Tsunami Warning Centres and carried out Run-up Surveys in Colombia and Ecuador.

Much progress has been made since the establishment of our group and improvements to the warning systems through better instrumentation and communication may provide, in the near future, access to the data and information needed to deal with tsunami propagation and subsequent warning on a real-time basis.

Our educational programme must be intensified and earthquake and tsunami prediction research is required for a better and more effective protection of life and property along the shores of the Pacific.

I am sure you will share with me our concern and sympathy over the loss of life and the damage to property caused by tsunamis during the intersessional period.

G.C. Dohler
Chairman, ITSU

ANNEX IV

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ANNEX V

WELCOMING ADDRESS BY THE HEAD OF THE CHILEAN DELEGATION,
CAPTAIN MARIANO A. SEPÚLVEDA

With remorseless regularity, catastrophes of varying magnitude strike the environment in which man pursues this existence.

The enormous efforts made by man throughout history have not sufficed, and never will suffice, to prevent the occurrence of such catastrophes, with their tragic aftermath of ruin and destruction.

This indisputable fact forces the conclusion that the human race must learn to live with such sudden disruptive events, just as the biological organism survives the illnesses and accidents which suddenly threaten its integrity, its normality or its very existence.

Human society must therefore equip itself to face such catastrophes and survive them, despite all the destruction they bring, while at the same time endeavouring to explain these phenomena, so as to be able to forecast and "diagnose" them in good time and to minimize their terrible effects through systematic, planned measures.

Of all the assaults to which mankind is subject, war is without doubt the most critical and profound social phenomenon, and it is precisely in order to regulate and, if possible - despite the paradoxical, Utopian nature of the undertaking - to humanize its tragic manifestations, with a view to sparing the human race such dreadful damage and suffering, that States acting in concert have established various organizations and procedures aimed at safeguarding civilization.

The United Nations is, indeed, the principal response to this great need of human society. And while there can be no doubt that its efforts to preserve world peace have been seriously obstructed by the particular interests of the hegemonistic powers, it will continue nevertheless to represent a valid hope for universal justice, as long as its work is guided by the noble ideals which inspired its foundation.

At all events, one has to recognize the important role of the United Nations in creating and supporting the work of various subsidiary bodies, which have been instrumental in alleviating many ills and preventing the destruction of mankind's spiritual and material heritage.

One such body, which is linked to the United Nations through the Intergovernmental Oceanographic Commission (IOC) and the United Nations Educational, Scientific and Cultural Organization (Unesco) is our International Co-ordination Group for the Tsunami Warning System in the Pacific, whose Seventh Session is beginning today, with every prospect of doing much fruitful work, in the presence of representatives of national authorities, and Member States of the System, from all parts of the Pacific basin, as well as visitors from our scientific and academic communities and the mass media.

The very name "Tsunami Warning System in the Pacific" prompts a whole series of important considerations which I feel it appropriate to present to such a distinguished gathering.

The system is designed to forewarn, which means it has to do with safeguarding and protecting. Its aims, then, are profoundly humanitarian and thus lofty and noble. The co-operation of Member Nations in the project and their valuable contributions to these meetings, bear witness to this lofty and altruistic spirit.

Any other consideration running counter to these worthy objectives and inhibiting Member Nations from lending their full technical and scientific support to the development of the System, will appear petty and ignoble.

Moreover, the fact that the System involves the Pacific is not only a geographical circumstance associated with the characteristic seismicity of its geology but, also provides us with the opportunity to meet and liaise through this common oceanic link which, in fact, not only does not separate us but brings us closer and closer together as the Pacific acquires more and more importance in the historical evolution of mankind.

In particular, the communities bordering on this Ocean of ours, legitimately concerned as they are with preserving and protecting all their various maritime interests, are looking expectantly to us to concert our efforts at this meeting in order to bring them peace of mind, confidence in their work and a boost towards prosperity.

On behalf of the Government of Chile, represented on this occasion by the Commander-in-Chief of the Navy, a Member of the Governing Council of the Republic, its Authorities and the entire population, I should like to bid you a most cordial welcome, a welcome heartfelt and sincere such as has always been accorded by our people to those visiting it, in a spirit of good will. We are grateful to you for the confidence you have placed in us in accepting our offer to host this meeting and for the recognition thus shown for the contribution that Chile has made to the work of the Group. Finally, I trust that, despite the crowded agenda of the meeting, you will have an opportunity to appreciate the cordial and affectionate nature of our people and the charms of this beautiful city, whose coastal situation lends an air of infinite horizons. Thus, when you return to your respective homelands at the end of this meeting, you will take with you not only the satisfaction of having made a valuable contribution to the international aims pursued, but also the memory of an enjoyable stay among people who welcomed you as distinguished servants of a worthy cause.

ANNEX VI

Appendix to ITSU-VII/Rec.2

PRELIMINARY PROPOSAL FOR EXTRABUDGETARY FUNDING

Submitted by : The Governments of Chile, Perú, Ecuador, Guatemala, Mexico,
Philippines, Indonesia, Western Samoa, and Fiji.

Section 1

- 1.1 Title of the Project : Tsunami Warning System in the Pacific
- 1.2 Proposed starting date : January 1981
- 1.3 Completion : January 1984
- 1.4 Duration of the Project: Three years
- 1.5 Government implementing agencies : relevant oceanographic, hydrographic, geophysical, or meteorological departments
- 1.6 Executing Agency : Unesco - Intergovernmental Oceanographic Commission, with the assistance of the International Tsunami Information Center (ITIC)

Total Cost of Project : \$ 3,200,000

Section 2 OBJECTIVES.

2.1 Long-term objectives

Coastal populations and industries in the developing countries of the Pacific are threatened by tsunami waves produced both in active seismic and volcanic zones within the region and from distant sources. The socio-economic development of Pacific nations is closely related to the mitigation of the effects of natural disasters such as tsunamis. The long-term objectives are to create a network of instruments and communications that will permit the rapid identification of imminent tsunamis for the purpose of passing tsunami warning information to the authorities and population of a threatened coastline in order to save lives and minimize damage to property. A programme of public education on the tsunami hazard and a programme of preparedness will be carried out as such programmes are essential in achieving these objectives.

2.2 Immediate objectives

The immediate objective will be to establish an updated and comprehensive network of instruments, telemetry and communications in each developing member country. Additionally an action programme will be drafted for each country for the education of officials and technicians responsible for the maintenance of the system. A programme of tsunami preparedness will be developed for the general public along with guidelines for evacuation zones and emergency procedures.

Section 3 PROJECT DESCRIPTION

3.1 Background data

The need to improve tsunami warning services for the Pacific was identified at several sessions of the International Co-ordination Group for the Tsunami Warning System in the Pacific. At least six major tsunamis have occurred in the last five years in the Pacific resulting in great loss of life and property (29 August 1975, Hawaii, 2 lives lost; 17 August 1976, Philippines, 8,000 lives lost, 19 August 1977, Indonesia, 189 lives lost; 18 July 1979, Indonesia, 540 lives lost; 12 September 1979, New Guinea, 100 lives lost; and 12 December 1979, Colombia, an estimated 500 lives lost). In each case the Pacific Tsunami Warning Center in Honolulu was unable to provide tsunami warning to these areas in time to be of usefulness. However, it is believed that these great losses would have been minimized if a denser network of reporting stations and better communications existed, if regional warning centres had been established and if programmes of tsunami preparedness were in effect. Unfortunately this was not the case and unnecessary loss of life occurred.

3.2 Description of project :

In order to mitigate the effects of tsunamis on the socio-economic development of the developing countries of the Pacific and in order to minimize future loss of life, it is proposed that :

- 1) A denser network of automated tide gauges around the Pacific be established;
- 2) Communication and telemetry links be established between seismic and tide gauges, the Pacific Tsunami Warning Center in Honolulu, and existing National Tsunami Warning Centres;
- 3) A programme be undertaken to train personnel in the handling and maintenance of the instruments, telemetry and communication network;
- 4) The system be maintained for a period of two years after its establishment;
- 5) A programme of Tsunami Preparedness and Public Education be undertaken in all the developing countries of the Pacific.

3.3 Work plan and timetable

Upon approval of the project the following work will be performed in the following chronological order :

January 1981 : Signature of final project document by Member States.

March 1981 : Establishment of Project Office.

April 1981 : Meeting of experts and national contacts from Member States with Project Co-ordinator to discuss details of establishing necessary instrumentation telemetry and communications. An Action Plan for each country will be developed regarding logistical support, permits and bases of operations. A training course will be held concurrently for the technical aspects of the programme as well as for public education and tsunami preparedness.

- May 1981 : Contract bids for necessary instrumentation and telemetry will be solicited by the office of the Project Co-ordinator. Bids and specifications will be reviewed by a technical advisory committee established by the office of Project Co-ordinator.
- October 1981 : Contracts will be issued.
- January 1982 : Begin installation of instrumentation and telemetry in Member States.
- February 1983: Completion of installations. Testing and calibration of the system. Review and adoption of operating procedures.
- May 1983 : Second training course on technical aspects of the system, particularly on trouble shooting and routine maintenance. Training course on tsunami preparedness and emergency procedures for each participating country. Preparation of educational materials.
- October 1983 : Final inspection and acceptance of the network by technical experts of participating countries and by the office of Project Co-ordinator.
- November 1983: Project is operational.
- January 1984 : Convene final training course to be attended by up to 3 representatives from each participating country with specialists brought in to assist in planning programmes of action for national warning systems.

3.4 Budget

- Project personnel component	\$
Project Co-ordinator (3 years)	150,000
Administrative support personnel	150,000
- Travel	50,000
- Training component	300,000
- Educational component	250,000
- Equipment component	1,000,000
- Installation component	1,000,000
- Post-installation maintenance component	200,000
- Miscellaneous component	100,000
GRAND TOTAL :	<u>\$ 3,200,000</u>

Counterpart contributions

Participating countries will provide logistical support and the services of appropriate personnel in assisting with initial installation of proposed

instrumentation and communications. Participating countries will provide the physical locations for the installation of such instruments and will integrate proposed systems into existing facilities. Furthermore, participating countries will undertake a programme of Tsunami Preparedness and will establish Emergency Procedures for each region. At the end of the project, participating countries will take over maintenance of the system and will be responsible for its effective operation.

Over the years, the counterpart contribution of participating countries is expected to be several orders of magnitude greater than the contribution provided by the international funding agency.

Developed countries of the Pacific will continue to provide support to the Tsunami Warning System. This counterpart support of the developed countries cannot be quantified precisely, but it is estimated to be several million dollars per year, at the present time. This support is provided in the form of regional centres of existing seismic and tidal stations and of established telemetry and communications.