

**APPENDIX 1B**

**Letters of Comment**

**on**

**Science Plan for a New Global  
Seismographic Network**



# NATIONAL ACADEMY OF SCIENCES

2101 CONSTITUTION AVENUE WASHINGTON, D. C. 20418

OFFICE OF THE PRESIDENT

April 27, 1984

Professor Adam M. Dziewonski  
Chairman  
Seismological Laboratory, 252-21  
Pasadena, California 91125

Dear Adam:

Thanks for letting me see the Science Plan for a Global Seismographic Network. It is an excellent piece of work and makes a very convincing case. You and your colleagues have shown good sense in organizing IRIS to promote and manage a possible world program.

With best regards.

Yours sincerely,



Frank Press  
President



# United States Department of the Interior

GEOLOGICAL SURVEY  
RESTON, VA. 22092

In Reply Refer To:  
WGS-256484  
Mail Stop 905

MAY 30 1984

Professor Adam M. Dziewonski  
Chairman, Standing Committee for the  
Global Seismographic Network  
California Institute of Technology  
Pasadena, California 91125

*Adam*  
Dear Professor ~~Dziewonski~~:

This is written in response to your letter of April 15, 1984, with which you forwarded a science plan describing a new initiative for a global seismograph network. The plan is quite impressive in its quality and completeness; however, the purpose of this letter is not to comment on specific items in the plan, but rather to give you our perspective on some of the policy issues regarding the role of the U.S. Geological Survey (USGS) in existing and proposed global networks.

The USGS has supported the operation and maintenance of worldwide seismograph networks for the past decade under various program justifications. We view such activities, providing data for wide scientific use, as a proper role for Government science agencies. We view the scientific achievements and potential based on global seismological data, as described in your plan, as an endorsement of our efforts in this area.

Speaking to the new initiative being developed by the Incorporated Research Institutions for Seismology (IRIS), we fully support this effort and would welcome USGS involvement in the implementation of the initiative under suitable arrangements with IRIS and other funding agencies such as the National Science Foundation. We understand that discussions are proceeding between members of the IRIS Board of Directors and the USGS. It seems most logical that any new initiative be built on the foundation of existing stations that the USGS now maintains, with addition and deletion of stations as appropriate, and that the USGS be involved in the development and operation of the modernized network. Under mutually agreeable conditions, resources we are now providing to maintain stations and to review, reformat, and distribute data would be redirected to support the new network.

Professor Adam M. Dziewonski

2

We urge that you continue the planning effort with the USGS staff. We congratulate you on the excellent science plan you have already prepared, and we look forward to working with you to realize the goals set down in that plan.

Sincerely yours,



Dallas L. Peck  
Director

Copy to: Dr. James F. Hays  
Department of Earth Sciences  
National Science Foundation  
1800 G Street, N.W.  
Washington, D.C. 20550

# ISEM

INSTITUTE FOR THE STUDY OF EARTH AND MAN • AT SMU

29 May 1984

Professor A. Dziewonski  
Dept. of Geological Sciences  
Harvard University  
20 Oxford Street  
Cambridge, MA 02138

Dear Adam:

I have now read the Science Plan for the New Global Seismic Network. It is an excellent document. It is balanced and extraordinarily comprehensive. It is equally extraordinarily well-written. You can rest assured that if the Network does not receive support it is not because the case for the Network was not presented properly.

It is apparent that the "mere males from Scripps, Caltech and Harvard" and several other places did a hell of a lot of hard work between January and April, 1984. They are to be congratulated.

The document is so good that it ought to be required reading for all graduate students in geophysics. In fact, there are very few things I would cavil at in this document. However, I shall make three comments. 1.) In section 3.5 you say "It is the only dataset which provides any constraints on the radial distribution of density within the earth". This is true, but I have an uncomfortable feeling that the constraints on the radial distribution of density are provided as much by the premises introduced in the starting model of the inversion as by the data. 2.) In the section 3.6.1 on Geodynamics Convection and the Geoid you remark that "Flow in the mantle results from lateral variations in density caused primarily by lateral variations in temperature". This is only half of the story. The lateral variations in temperature will also be associated with lateral variations of viscosity. These will be equally important in determining flow patterns. Flow in the mantle is driven by gravity but the flow tends to be concentrated in the regions where the viscosity is low. 3.) In the caption for figure 3.2 you say "Adequate fits are obtained in both phase and amplitude for all depths, even for the complex interferences observed in the records from deeper events". Comparison of the observed body wave amplitudes on this set of records with the synthetic body wave amplitudes shows that these are not well fit. The same criticism can be made of many synthetic record sections used in support of upper mantle models.

There are a few typographical errors which could be corrected if, as I expect, this paper is so much in demand that it has to be reprinted. (a) On page 51 there is a reference to Section 2.4. There is no Section 2.4. (b) In the caption for fig. 3.33 "first" should be "fast".

Once again congratulations to you all on a superb document.

Yours sincerely,

*Anton*

Anton (HALES)

TEXAS A&M UNIVERSITY

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Department of  
GEOPHYSICS

(409)-845-1371  
FTS-857-1371

May 5, 1984

Dr. J. Berger  
Institute of Geophysics & Planetary Physics  
Scripps Institution of Oceanography, A-025  
La Jolla, CA 92093

Dear Jonathan,

I am referring to the letter of April 15 from Adam concerning IRIS. You may know I like the programme. I may add that the global network allows to make quick estimates with simple methods of source parameters such as stress drops and fault sizes which would be of great help in statistical studies of these parameters. These statistics have at least two important uses; first they may help in detecting precursors of earthquakes as indicated in one of the enclosed papers (paper #1). But they could also help in estimating the earthquake induced acceleration of the ground (paper #2) and therefore in the mitigation of the effect of earthquakes through a better engineering of the constructions. It seems to me, that both aspects of the seismological problem have not been emphasized enough in the science plan. The latter is certainly one of the most important scientific problems of seismology of today and tomorrow; the latter is certainly appealing to any financing institution.

~~\$2500~~ This University has been very glad to join IRIS; I hear that ~~\$11,000~~ has been sent, and the Dean of the College Dr. Mel Friedman will be the representative member in the Board of Directors.

Please keep me informed of the progress, as it was kindly done in the past.

Very sincerely,



Michele Caputo  
Harris Professor of Geophysics

MC/mas

xc: Prof. A. Dziewonski  
Prof. M. Friedman  
Prof. E. Hoskins



May 11, 1984

Professor Adam M. Dziewonski, Chairman  
Institute of Geophysics & Planetary Physics  
Scripps Institution of Oceanography, A-025  
La Jolla, California 92093

Attn: Dr. Jonathan Berger

Dear Adam,

I read the science plan for the global digital network with interest but I feel that the 5 Hz upper limit proposed for the recording is too low to cover the range of frequencies observed in teleseismic signals. Teleseismic P waves have been shown to contain significant energy, above the background noise level, up to at least 8 Hz along many paths crossing the upper mantle under shield areas. It is not clear where the upper limit is for teleseismic arrivals. In conversations with some of the workers at NORESS they indicated to me that they have seen significant seismic energy in some teleseismic signals above 10 Hz. The high frequency content in teleseismic P waves appears to be related to lateral variations of Q in the upper mantle, enabling us to map such variations. Our ability to do this would be seriously hampered if the global network is unable to record any energy above 5 Hz because the wave properties at lower frequencies are less sensitive to Q and more to other factors. The resolution of the admissible forms of frequency dependence of Q in the Earth depends critically on constraints imposed by high frequency data. Until recently, relatively few seismologists had access to reliable data from seismometers with responses suitable

for detection of such high frequencies. Should the new network provide such data it would open the way for exciting new areas of research, and the interest in the problems mentioned will increase. Partial cause for the lack of interest in high frequency energy was the fact that data in this frequency range are not amenable to strict causal, deterministic modelling. There have been new advances, however, in "stochastic seismology" that models the Earth as consisting of media with random variations. Theoretical models of seismic codas, and apparent attenuation due to scattering have been extensively studied recently. The availability of high frequency data would greatly stimulate progress in such areas of research and enable us to separate attenuation due to scattering and anelasticity.

I realize that extending the bandwidth of recording I advocate involves serious technical problems. The amount of data would be prohibitive if continuous recording is used. Since we are mostly interested in signals it appears to be quite possible to increase the sampling rates only if signals are detected. Other compromise solutions are also possible. At some locations no energy is detectable above the frequency of 5 Hz in teleseisms. The option exists, therefore, to reduce the sampling rates at such sites. Given the present state of microcomputer technology I can see no prohibitive obstacles.

It may not be feasible to cover the frequency range up to 10 Hz with a single broad band instrument type, in which case dedicated short period instruments may be installed. The data from several instruments may then be merged digitally to form a broad band recording or recorded separately upon triggering. High frequency short period instruments are

generally stable, rugged and inexpensive and their addition to any installation does not involve great costs. The extended signal band will overlap that covered by the instrumentation proposed by the lithospheric study group and the observatories may be used as reference points in some studies. Some of these solutions may seem quite impractical and awkward but we have to think in terms of the next 10-15 years of seismology and the possibilities offered by technological progress in this time period. I am sure that practical solutions to such problems may be found today.

I urge you to consider these arguments. I feel that an important opportunity may be lost should we limit the capabilities of the global network right at the beginning and the progress in some important research areas may be inhibited.

Sincerely yours,



Zoltan A. Der

ZAD:lal



AV. ARENALES 431 OF. 702  
APARTADO 11363  
LIMA 14 - PERU  
CABLES: CERESIS  
TELEX: IGPLIM 2550  
TELEF: 247421

Centro Regional de Sismología para América del Sur

May 22, 1984


Dr. Adam M. Dziemowski  
Chairman  
California Institute of Technology  
Seismological Laboratory, 252-21  
Pasadena, CA 91125  
U. S. A.

Dear Dr. Dziemowski:

Thank you very much for the copy of the Science Plan for a Global Seismographic Network. I should have written sooner but I have been consulting with the institutions of the nine countries that constitute CERESIS at present and I find enthusiastic support everywhere. I am sure that the proposed network will benefit greatly from the experience of our institutions and scientists throughout South America and I am urged to state that CERESIS is willing and anxious to cooperate with you in all ways.

I am enclosing a brochure on Project STSRA which you may find of interest. It is one of the activities of CERESIS. We are holding a Regional Meeting in San Juan, Argentina, next September. I think it would be most opportune if you could attend the meeting or Dr. Berger and give us a talk on the Global Network. At the same time it would be useful to discuss the ways and means whereby CERESIS can be helpful to the project. Could you please let me know if you would need travel support and to what extent?

With best regards,

  
Alberto A. Giesecke  
Director

avh  
Enclosure



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DEPARTMENTS OF: SEISMOLOGY, GEOMAGNETISM, PHYSICS OF ATMOSPHERE,  
CENTRAL GEOPHYSICAL OBSERVATORY AT BELSK

Our ref.: IGF .....-211-20/34

Date: May 9th, 1964

Your ref.: \_\_\_\_\_

Chairman

Prof. Adam Dziewoński

California Institute of Technology  
Seismological Laboratory 252-21

Pasadena, CA 91125

USA

Dear Adam,

We have received your excellent Science Plan for a Global Network. We would like to support the ideas involved in the Plan which will surely respond to actual and future needs of modern seismology.

We would be delighted to be informed on the further development of this Plan and of course we would like to take part in further discussions which will involve the international aspects of planning and implementation.

Sincerely yours

*Roman*  
Roman

Teisseyre

*Jerzy*  
Jerzy

Jankowski

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DES SECOURS EN CAS DE CATASTROPHE



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Palais des Nations  
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REF.: DPR 122/21 (7)

8 May 1984

Dear Dr. Dziewonski,

Thank you for your letter of 15 April. I have read your Science Plan for a Global Seismographic Network and agree that a qualitative change in seismic data recording and processing should be put into effect soon so that recent technical developments can be applied to the study of earthquake foci, earthquake generating processes and structure and the composition of the Earth.

Your document is well formulated; nothing seems to be forgotten, except a few items, e.g. an estimate of the annual budget, and benefits for the members. It follows from the by-laws that the membership is restricted to U. S. research institutions, whereas the stations will be dispersed all over the globe.

I wish you success in implementing your very well-founded idea.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'V. Kárník', written in a cursive style.

Vít Kárník  
Chief

Prevention and Support Services Branch

Professor Adam M. Dziewonski  
Chairman, Standing Committee for the Global Seismographic Network  
Incorporated Research Institutions for Seismology  
California Institute of Technology  
Seismological Laboratory, 252-21  
Pasadena, California 91125  
U. S. A.

UNIVERSITE PIERRE ET MARIE CURIE  
INSTITUT DE PHYSIQUE DU GLOBE

LABORATOIRE D'ETUDE GEOPHYSIQUE  
DE STRUCTURES PROFONDES  
ASSOCIE AU C.N.R.S. N° 195

Dr. Jonathan BERGER  
I.G.P.P.  
Scripps Institution of Oceanography  
A-025  
LA JOLLA, CALIFORNIA 92093  
=====

U.S.A.  
  
April 30, 1984

Dear Jon,

I have just received a copy of the "Science Plan for a New Global Seismographic Network".

In response, there are a number of points which I feel obliged to comment on as they convey a misleading impression concerning the GEOSCOPE project.

On page 1.1, under the section "Introduction", the report classifies GEOSCOPE together with other existing networks as obsolete because, in particular, of insufficient dynamic range and narrow bandwidth. I would like to remind you of the following specifications of GEOSCOPE :

1. Three component worldwide network.
2. High quality instrumentation (STS - Wielandt and Streckeisen, BSSA 1982) with dynamic range 140 Db.
3. Very long period and broad band digital recording with high dynamic range.
4. 5 installations worldwide as of May 15, 1984, of which 3 in original locations.
5. Will have 8 installations by the end of 1984.
6. Quasi real time teletransmission of data is being experimented now at Saint Sauveur in France.

It is clear that GEOSCOPE shares many of the objectives set by the Science Plan for the projected IRIS network and does not quite fit the section on the "limitations of existing global networks".

In the spirit of International Cooperation as put forward on page 1.6, it is therefore desirable that your internationally distributed document give due credit to the developing GEOSCOPE network by :

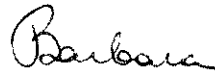
1. Mentioning its actual specifications. (For further details see attached copy of "GEOSCOPE: A French initiative in worldwide three component seismic networks", Romanowicz et al., Oct. 1983)
2. Indicating the existing stations. These are (see figure attached) :

SSB Saint Sauveur, Central France  
PCR La Reunion  
PAF Kerguelen  
TAM Tamanrasset, Algeria  
WAL Wallace Observatory, M.I.T.

Finally, concerning Chapter 5, it is interesting to note that the Science Plan does not consider any other form of International Cooperation than the providing of sites and maintenance for the IRIS network.

Hoping that my remarks can somehow be incorporated in the Science Plan.

Sincerely yours,



Barbara ROMANOWICZ  
GEOSCOPE Project Manager

C.C.

C.J. ALLEGRE  
M. CARA  
A.M. DZIEWONSKI  
F. GILBERT  
C. KISSLINGER  
R. MADARIAGA  
E. WIELANDT





DR. K.N. KHATTRI  
Professor in Geophysics

DEPARTMENT OF EARTH SCIENCES  
UNIVERSITY OF ROORKEE, ROORKEE-247 667  
India      Telex. No. 0597-201      Telephone : 2623

NO.ES/ 15 /90/84

DATED : 28th April, 1984

Dear Prof. Dziewonski,


Thank you for sending me a copy of the Science Plan for Global Seismographic Network. This will be a most useful reference to all of us here engaged in scientific research.

Perhaps you are aware that we are operating a 3 component Wide Band Seismological Observatory using Streckeisen Seismometer system. Currently, this Observatory is having only analog recording, but we have taken steps to instal a digital recording system which may become operational by the end of the current year.

With kind regards,

Prof. Adam M. Dziewonski  
Chairman  
California Institute of Technology  
Seismological Laboratory, 252-21  
Pasadena, CA 91125  
(818) 345-6945

Yours sincerely,



(K. N. KHATTRI)



Dr. Jonathan Berger  
Executive Secretary  
Incorporated Research Institutions  
for Seismology  
Institute of Geophysics and Planetary Physics  
Scripps Institution of Oceanography, a-025  
La Jolla, CA 92093

your letter of: 15 April 1984

de bilt, 3 July 1984

your reference:

our reference:

subject: Science Plan Global Seism.Netw. enclosure(s): abstract

Dear Dr. Berger:

I am replying to your letter accompanying the admirable proposal for advanced worldwide digital seismometry, and requesting comment.

Unfortunately, I have not been able to give a written reply until now, but I did discuss the matter with Dr. Dziewonski during the recent AGU Spring Meeting. I repeat these comments herewith.

- (1) for such a large-scale plan I would regret to have the seismic information cut off at 5 Hz. I agree that in many places, especially those with low Q, little seismic energy might come through, yet in some places interesting information, e.g., useful in seismic discrimination, is found in frequencies around 10 Hz. Although I realize that higher-frequency recording would increase the data-processing and storage load, I feel that an advanced data-acquisition system should be able to accommodate this.
- (2) the same argument holds for amplitude resolution. Although the proposed resolution is more than compatible with systems to-date, it may be worthwhile to consider a higher resolution (more digitization levels) in order to register fine signal signature phenomena such as multiple-signal interference. The latter may be indicative of kinematic and dynamic source mechanics such as discrete rupture propagation.
- (3) I would like to call your attention to our recently initiated project on long-range controlled-source seismology (abstract enclosed). Its objective is to measure explicit seismic wave propagation characteristics over distances of at least 200 km, using the exact knowledge of the artificially transmitted source signal. If our experiments are successful, and the range can be increased to the order of 1000 km, installation of a worldwide network of artificial sources could be contemplated for seismic surveillance. We feel that this project could greatly enhance lithosphere research, and open up new research areas. In this technique, the artificial signals are to be retrieved at very low signal-to-noise ratios, by means of long-term coherent stacking and correlation. A high resolution in digital recording would strongly enhance this technique.

your letter of: de bilt,  
your reference: our reference:  
subject: enclosure(s):

Furthermore, as a foreign scientist, I am most interested in international cooperation in this matter, and I would like to contribute where possible in this development. In view of my recent work in Argentina (1979-82), I may be able to be of assistance in station placement in South America. In this respect, I recommend that copies of the report be sent (using my name if you wish) to:

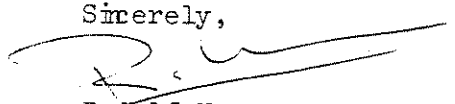
- (1) Ing. J.S. Aguirre Ruiz  
Director  
Instituto Nacional de Prevención Sísmica (INPRES)  
Roger Ballet 47 Norte  
4500 San Juan  
Argentina
- (2) Ing. F.S. Volponi  
Director  
Instituto Sismológico ZONDA  
Universidad Nacional de San Juan  
Avda. Libertador San Martín 1109 Oeste  
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Argentina
- (3) Ing. P. Sierra  
Director  
Observatorio Astronómico  
La Plata  
Argentina
- (4) Ing. A.A. Giesecke  
Director  
Centro Regional de Sismología para América del Sur (CERESIS)  
Lima  
Peru

I hope that these comments still may be of use in your project. In any case, I would appreciate it very much if I could be kept informed on further developments and progress. With best wishes for a successful undertaking,

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wilhelminalaan 10  
tel.: +31 30 76 6911  
telex 47096

Sincerely,

  
Rudolf Unger

SEISMOLOGICAL SECTION  
BOX 12019  
S-741 12 UPPSALA  
SWEDEN

Uppsala, May 6, 1984

Dr. Jonathan Berger  
Institute of Geophysics & Planetary Physics  
Scripps Institution of Oceanography, A-025  
La Jolla, CA 92093  
U.S.A.

Dear Dr. Berger:

Prof. Adam Dziewonski has sent me the "Science Plan for A New Global Seismographic Network", prepared by IRIS, asking me to send my comments to you.

First of all, this is an immensely important project, which has my full support. I have always had a great interest in such developments, not only by the installation of the Swedish network in 1949-1971, but also on a global scale - an interest that culminated in the 1960's, partly in connection with several UNESCO conferences. This interest also stimulated several publications (enclosed), now perhaps more of a "historical" interest.

The new project naturally incorporates several new items (such as digital, broad-band, dynamic range, satellite, in short terms), but beyond this there are several of the older suggestions that still remain to be fulfilled. This concerns especially the request for global distribution of stations:

- (1) Geographically, for political reasons: The uneven distribution of WSSN on the Euroasian continent is a striking example. If negotiations could lead to a better distribution, this would be extremely important.
- (2) Geographically, for technical reasons. The mainly empty oceanic areas are emphasized in the project, but apparently still it will take some time before they are adequately covered. Experience from a North Sea installation could be helpful (A.R. Ritsema and A. Gürpınar, Eds., Seismicity and Seismic Risk in the Offshore North Sea Area, Reidel, 1983).
- (3) Borehole seismometers are briefly mentioned in the report, but I am convinced that much more emphasis should be laid on this point, not only to avoid surface noise but also to detect smaller events (cf. enclosed paper).

The satellite data transmission is fine. In fact, I suggested such transmission from buoys connected to ocean-bottom seismometers in a Paris UNESCO conference already in 1963, but the suggestion was dismissed as considered unrealistic at that time!

The Science Plan is an excellent treatment of modern seismology - today and tomorrow - and I have just a few marginal comments to make, which you could ignore if you like. Anyway, here they are:

- (1) On p. 41, it is stated that  $M_s$  saturates beyond about  $M_s = 7 \frac{3}{4}$ , but on p. 1 it says that saturation occurs for  $M_w > 6.5$ . Are these two statements compatible with each other?
- (2) P. 7: "...beginning in 1923, of the ISS..." Perhaps it should be said that the ISS tabulation starts with 1918, even though the work started in 1922.
- (3) P. 45: the Tangshan 1976 earthquake is said to have caused 500,000 deaths. At first, such and even higher figures circulated in the press, but after a few years an official Chinese statement gave 242,000 deaths. This figure, which has to be regarded as most reliable, will also reduce the statement of 800,000 lives on p. 16. Still, the Tangshan earthquake remains as one of the greatest disasters.

- (4) P. 33: "a 150-kt underground nuclear explosion has an  $m_b$  of about 6". Does this mean that the agreement of 1974 has been violated as explosions of larger  $m_b$  have occurred, e.g. in Semipalatinsk?
- (5) P. 35: in the figure, sP is marked in one place, but I believe that pP is even better, moreover occurring in all records except the top one.
- (6) P. 39: it could be said that longperiod airwaves are also recorded seismically (cf. EOS, 63(11), p. 193, March 16, 1982).
- (7) P. 43: the great Tangshan earthquake occurred on July 27, 1976, not July 26. Moreover,  $M_w = 7.4$  appears questionable, because  $M_s = 7.8-8.2$ .
- (8) P. 60: the figure reminds of the extensive research of Rayleigh wave dispersion by the "crossing-path method" made by T. Santó. His Uppsala works are published in Pure Appl. Geophys., vol. 62, 1965, pp. 49-80, and vol. 63, 1966, pp. 40-59. - I suppose that in the Science Plan, references have been limited to very recent works only.
- (9) P. 63: concerning attenuation, also Lg is mentioned. In that case, the breakdown of constructive interference may be even more efficient in "killing" the amplitudes.
- (10) P. 70 and other places: the question whether convection occupies the whole mantle or only part of it, turns up at several places. It would be good to know to what extent the Coriolis force sets a limit to the extent of circulations, both vertically and horizontally, just as it happens in the atmosphere.
- (11) Pp. 85 and 87, bottom lines: proportionality between velocity and density must involve some density relations for the elastic parameters as well (proportionality to the third power of density).

In conclusion, I hope you take it that my comments reflect my interest in your excellent publication. I wish you every success in the further development of this enormously significant project.

With kindest regards,

Sincerely yours,



Markus Bâth  
professor

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ZENTRALOBSERVATORIUM  
GRÄFENBERG

GRF

Seismologisches Zentralobservatorium  
852 Erlangen · Krankenhausstraße 1

Dr. Jonathan Berger  
Institute of Geophysics & Planetary  
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Geschäftsstelle Erlangen (09131) 25900  
Meßstation Haidhof (09197) 329

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9.5.1984

Ai/H

Dear Joe,

Thank you very much for sending us the science plan for a new global seismographic network. On the occasion of a scientific meeting of German seismologists the plan was discussed and Prof. Berckhemer from the University of Frankfurt who is the chairman of this working group will write to you, too.

In my opinion the international cooperation is the most important precondition for the realisation of the plan, and for to achieve that the station distribution will be better than for the existing networks like WWSSN and GDSN. Therefore the IASPEI would be the appropriate body to promote the plan, as soon as the design studies to determine the optimal network are available.

Another item concerns the question of array stations. Temporary arrays may be very helpful to investigate the structural situation at potential station sites. But it should also be discussed to what extent the additional information on slowness and azimuth, that array stations give is desired as continuous data, and therefore if, and how many permanent array stations should be incorporated into the new network.

If you compare the specifications for the new network with the technical specification of our digital broad band array, you can see that our observatory already fulfills the requirements for the new system. As we operate the full array since 1980, and have broad band recordings since 1976, probably this data base can be of some help

for further investigations. We would be glad to make our data available for those who are interested to use it. I would appreciate it very much, if you would inform me on the progress of the project and the further discussions.

Very truly yours

A handwritten signature in cursive script, appearing to read 'H. Aichele'.

(Dr. H. Aichele)



Dr. Jonathan Berger  
Institute of Geophysics and Planetary  
Physics  
Scripps Institution of Oceanography, A-025  
La Jolla, CA 92093  
USA

Your ref.:                      Your letter of:                      Our ref.:                      Date:                      3 May 1984

Dear Dr. Berger,

I acknowledge receipt and thank you for a copy of the Science Plan for a New Global Seismographic Network.

The approach and objectives of the Science Plan are similar to those submitted to the Committee on Disarmament by the Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events. However, I feel that the Science Plan has progressed further toward achieving its goals. Nevertheless, it may be possible to adopt some of the recommendations of the Group of Scientific Experts on the international aspects of planning and implementation (Section 5) which seems somewhat weak in the Science Plan.

I understand that my colleague, Professor E.S. Husebye of NORSAR, has written to you and enclosed our proposal for an affordable, portable and data-adaptive seismic array. This package concept could fit in nicely with the development and operation of the new Global Seismographic Network. Many of the design tasks of our system are common with requirements for the Network listed in Section 4 of the Science Plan. An immediate application of the system might be in new site selection and noise monitoring of new and established sites for setting levels on the station event detectors.


I believe that the Incorporated Research Institutions for Seismology has covered admirably all pressing scientific objectives for the new network. However, I feel that too much emphasis has been placed on the development of large super-computing facilities even though such facilities have not been included in the initial budget estimate. While I agree that some large 'number-crunching' jobs should be performed at the data centres, most participating research institutions will conduct their own research on their own machines. It may be possible to investigate communications between the data centres and the participating research institutions by satellite telemetry along the lines suggested in the Husebye et al pre-print. This would give everybody 'real-time' access to the data.



As a final suggestion, the Science Plan is an excellent document which unfortunately has only a limited distribution. If it has not already been done, would it be possible to publish it in edited form in one of the international journals such as JGR or BSSA? Strange as it may seem, I have met some members of the seismological community who are not even aware of the initiative set down in the Science Plan.

I hope that these informal comments may be of some use to you. Please keep me informed of future developments. In the meantime, I remain

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'Shane F. Ingate', with a long horizontal flourish extending to the right.

Shane F. Ingate



*Universidad Nacional de San Juan*

**INSTITUTO SISMOLOGICO ZONDA**

Av. Lib. San Martín 1109 Oeste

5400 San Juan

Argentina



ISZ N°0287

San Juan,  
Argentina, 31 de Julio de 1984

Dr. Jon BERGER  
IGPP A-025  
University of California  
Scripps Institution of Oceanography  
La Jolla, California 92093  
U.S.A.

Thank you for your sending of a copy of "A NEW GLOBAL SEISMOGRAPHIC NETWORK"

We would be glad to participate in the New Global Seismic Network, if possible,

Waiting news from you I remain,

Yours, sincerely



INE. FERNANDO VOLPONI  
DIRECTOR



# INSTITUTO DE GEOFISICA

CIUDAD UNIVERSITARIA

DELEGACION DE COYOACAN

CODIGO 04510 MEXICO, D.F.

UNIVERSIDAD NACIONAL  
AVENIDA

July 17, 1984.

Dr. Jonathan Berger  
IGPP  
P. O. Box 109  
La Jolla, CA.92093  
U.S.A.

Dear Jon:

Thank you for sending me the new proposal for the Global Seismographic Network. I am asking Alex Nava to study the document and to prepare a seminar for discussion among the RESMAC group.

I could offer a number of preliminary comments on the international aspects of the project, but I understand that the proposal is aimed at U.S. funding agencies and hence the international aspects are perhaps deliberately downplayed.

I for one should like to see IRIS avoid some of the pitfalls of the earlier analog networks. A place could easily be found for co-operating foreign institutions within the proposed structure of IRIS, perhaps by setting up an advisory committee of representatives of these institutions. National networks, as in France or Mexico, could play a role in helping set up IRIS stations in their respective regions. Seismic risk studies remain important scientific priorities in seismic regions; they should at least be mentioned among the objectives in acknowledgment of the global character of the network.



# INSTITUTO DE GEOFISICA

CIUDAD UNIVERSITARIA

DELEGACION DE COYOACAN

CODIGO 04510 MEXICO, D.F.

UNIVERSIDAD NACIONAL  
AVP N° MA

2.

These comments are quite preliminary and may be off the mark. The fact is, I have not had a chance to talk with Adam or with any of the main proponents of IRIS. I feel certain that much more thought has been given to international aspects than appears in the document.

As to the role of RESMAC, we are prepared to go broadband and to make our parameters compatible with IRIS standards. Thanks to broad government support, we shall go satellite after 1986. Hard-line data transmissions into the U.S. are also a possibility. And, because of our connections with Latin America, we could easily expand our network southward and eventually integrate all of Central and South America with IRIS. This would take a subcontract, including a VAX machine to replace our outworn 11/40's. Our foreign currency restrictions could be easily circumvented once Mexico is allowed to express a substantive interest in the project.

With best regards,

*Cinna*

Cinna Lomnitz  
Professor of Seismology

Dr. J. Berger

Inst. of Geophysics and Planet.  
Physics, Scripps Inst. of  
Oceanography, A-025

La Jolla, CA 92093. U.S.A.

Váš dopis značky / ze dne

Naše značka

Vyřizuje/linka

Praha

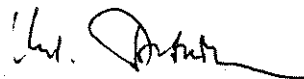
May 24, 1984

Věc

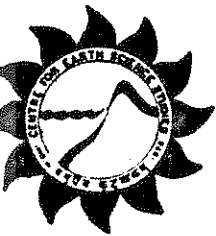
Dear Dr. Berger,

This is mainly to thank you for the copy of the Science Plan for a Global Seismographic Network, which I read with great interest. The Project is very timely and it will enhance capabilities of the international seismological research enormously. There is now a convergence of scientific need for proceeding from simple images of the Earth's interior to more realistic three-dimensional models and available technology that will permit us to understand the Earth better. As I believe, the seismic waves are sensitive enough to bring a necessary detailed information, providing an adequate observational systems are created. Therefore, I wish you all the best in your endeavor.

Sincerely Yours,



Vladislav Babuška  
Geophysical Inst., Czechosl.Acad.Sci.  
141 31 Praha 4. Czechoslovakia.



Phone: Off. 68083  
Res. 68176  
Grams: ERTHSIENS

## CENTRE FOR EARTH SCIENCE STUDIES

Dr. HARSH K. GUPTA  
DIRECTOR

P. B. No. 2235  
SASTHAMANGALAM  
TRIVANDRUM-695 010, INDIA

Date May 30, 1984.

Dear Prof. Dziewonski,

Many thanks for your letter of April 15, 1984 and a copy of the Science Plan for 'A New Global Seismographic Network'. The Government of India gave me the responsibility of leading the Third Indian Scientific Expedition to Antarctica and that has kept me away from Trivandrum for the past several months and hence the delay in responding to your letter.

I have not yet gone through the Plan in detail. However, I have glanced through it and found it to be a most desirable effort. I shall offer more detailed comments, if any, at a later date. Please do let me know if I would be of any help.

With kind regards,

Yours sincerely,

(H. K. Gupta)

Prof. Adam M. Dziewonski,  
Chairman,  
Standing Committee for the Global  
Seismographic Network,  
California Institute of Technology,  
Seismological Laboratory, 252-21,  
Pasadena, CA 91125 (USA)  
(818) 356-5945.

cc: Dr. Jonathan Berger  
Executive Secretary, Standing Committee for the Global  
Seismographic Network, Institute of Geophysics &  
Planetary Physics, Scripps Institution of Oceanography,  
A-025 La Jolla, CA 92093. (619) 452-2889. (USA)

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Internationales  
Seismologisches Zentrum

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Newbury, Berkshire, RG13 1LZ, United Kingdom

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1984 May 21st

Prof A M Dziewonski  
California Institute of Technology  
Seismological Laboratory, 252-21  
Pasadena  
CA 91125  
U S A

Dear Adam

I was naturally very interested to receive the publication putting your case for the Global Seismograph Network, and explaining the work and aims of IRIS.

Let me say right away that I find it an extremely well-conceived plan and that no-one would disagree with its objectives. As you say, the old WWSSN system has served well, and if we can move on, we must. At ISC we are not competent to comment on the technical details of the equipment you specify, but what you propose seems most satisfactory.

I feel, however, that I can offer some comment on the international aspects of your plan and also on how we see the future role of ISC.

We all realise that the funding of such a scheme must come from the US and that naturally the US will want to keep a major part of the control. The international participation is essential at various stages. Firstly, other states will have to agree to having instruments sited on their territory, and secondly to the release of information recorded there. This might be somewhat more difficult than it was for WWSSN, particularly if data are to be transmitted in real-time by satellite. Nevertheless, for only 100 stations, I hope enough suitable sites can be found where this co-operation can be obtained. Free access to all data was a major contribution from WWSSN, and I am sure that such provision will be an essential part of your planned system. The final point on international aspects is to what extent non-US agencies will be involved in the planning and operation. Initially, I think other countries expecting to accommodate stations on their territories will want to be involved in planning the network and choosing sites, and for many countries their participation will be much easier in an internationally sponsored scheme than in a purely US one.


In order to obtain the maximum technical and financial co-operation from different states, perhaps the Earth Sciences Division of Unesco, being the appropriate inter-governmental body, be asked to convene an international committee to advise. I am aware that this action might have difficulties due to poor relations between the US and Unesco. At non-governmental level, IASPEI might be asked to undertake a similar task. It is worth remembering the ISC's current funding system, constitution and international co-operation in data exchange stemmed from Unesco activity in 1970.

On the technical side, I gather that the new system will locate events down to about magnitude 5 or so, with the smaller events being recorded by relatively few stations. Your scheme will provide excellent coverage for these major events, but I still see a need for an organization such as ISC to refine positions later, and to act as collecting agency on a global scale for events too small to be adequately dealt with by your system. I am sure, for instance, that detailed seismicity studies of specific areas are still best carried out by national and regional networks, with co-ordination by such a body as ISC. Note that we still list about three times the numbers of events that PDE do. I also feel that there is still much value in the short-period location derived from large numbers of stations. Also the ISC service is valued for its continuity over many years as a successor to the ISS.

I hope these comments will be useful to you. They have been put together after discussion with David McGregor and Robin Adams.

In the meantime, I wish you all success with your aims, and congratulate you on the concept of the scheme and its presentation to date.

Yours sincerely



ANTHONY A HUGHES  
Director

cc: Dr J Berger





## BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

CNR CONSTITUTION AVENUE AND ANZAC PARADE, CANBERRA

Postal address: P.O. Box 378, Canberra City, A.C.T. 2601

Please address all communications to the Director

Telephone: 49 9111

Telegrams: BUROMIN

Telex: 62 109

Department of ~~Natural Resources~~  
and Energy

Resources

In reply please quote: 84/379

9 MAY 1984

Dr Jonathan Berger  
Institute of Planetary Physics  
Scripps Institution of Oceanography, A-025  
La Jolla, CA 92093  
U.S.A.

Dear Dr Berger

Plan for a new global seismographic network

I was very pleased to receive a copy of this plan from Adam Dziewonski, and our Section of Earthquake Seismology has read it with interest.

At this stage we can comment only in general terms. Firstly, we commend the Incorporated Research Institutions for Seismology (IRIS) for their initiative and for the well-presented plan. It is clear that broad-band digital seismometry offers powerful and exciting means for seismological research. It is equally clear that standardisation of recordings and formats is vital and as with the WWSSN, implementation of your plan would provide an excellent basis.

The Bureau of Mineral Resources has been an enthusiastic participant in previous global networks such as the WWSSN and GDSN/SRO; from a scientific viewpoint participation in the proposed networks should be equally beneficial. Please keep us informed of developments and best wishes for success.

Yours sincerely

M W McElhinny  
Chief  
Division of Geophysics

皇家香港天文台

九龍彌敦道



ROYAL OBSERVATORY  
HONG KONG

NATHAN ROAD, KOWLOON.

In reply please quote : ROS 24/46 V

7 May 1984

Dear Dr. Berger,

Science Plan for a New Global  
Seismograph Network

Thank you for your invitation to join the captioned plan.

Our seismograph is part of the WSSN network and is an analog-recording system. Due to financial limitations, it is not possible for us to upgrade our system to a broad-band digital-recording system in the near future. I regret that we cannot participate in the plan.

However, we are very much interested in the progress and outcome of the plan and would be grateful if you could put our name in your mailing list for all the technical information.

Also please be informed that Dr. Fong has been transferred to another section. For future correspondence please address to :

Officer in charge  
Seismology Section  
Royal Observatory  
Hong Kong

With my best regards,

Yours faithfully,

A handwritten signature in cursive script, appearing to read 'M.C. Wong'.

(M.C. Wong)

for Director of the Royal Observatory

Dr. Jonathan Berger  
Institute of Geophysics & Planetary Physics,  
Scripps Institution of Oceanography, A-025,  
La Jolla, CA 92093,  
U.S.A.

MCW/kc



1834-1984

OBSERVATOIRE ROYAL  
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VAN  
BELGIE

3 avenue Circulaire, 1180 Bruxelles

Ringlaan 3, 1180 Brussel

11 May 1984

Dr. Jonathan BERGER  
Institute of Geophysics & Planetary Physics  
Scripps Institution of Oceanography, A-025  
La Jolla CA 92093

Dear Dr Berger,

It is with a great pleasure that I read the Science Plan for a new global seismographic network. Just like you, the Royal Observatory of Belgium, which is responsible for whole the seismology in Belgium, is restructurating completely ~~the~~ old-fashioned seismic network ... but at a smaller scale !

Of course, we will be using recent technological developments like digital data acquisition, large dynamic range of the instruments, real-time link with the central computer system ...

In this context, it should be a good opportunity to install one of the stations of your new network in Belgium.

As I have read the conditions upon which such a station should be installed somewhere in the world, I can insure you that many aspects of such an installation can be satisfied in our country : the local support can be done by the competent scientists of the Royal Observatory who have the habit to take care of seismic stations. Concerning the site selection, Belgium has many quite places with outcrops of old stable massive in order to lower the noise of the seismic stations. Just a few remarks :

- From my own practice in gravimetry and seismology I would like to insist very much on the very precise calibration of the instruments, which is absolutely fundamental for the coherence of such a worldwide network.
- As far as I know, it seems actually difficult to transmit seismological data (at a high rate) through satellites above Europe. The case of the U.S.A. is a very privileged one.

Finally, from the contacts I had with scientists of Burundi, I would like to propose you the candidature of this country too. The University of Burundi, in cooperation with belgian scientists, <sup>is</sup> developing a project of installation of a few stations in this country where, until now, no seismic stations exist at all. In the context of a better coverage of the world by seismological measurements and taking into account the high seismicity of this part of Africa, I suppose that it should be a very interesting place to install a station of your worldwide network.

With best regards

Very Sincerely Yours

Prof. Paul MELCHIOR  
Director a.i.

INSTITUT FÜR  
METEOROLOGIE UND GEOPHYSIK  
JOHANN WOLFGANG GOETHE - UNIVERSITÄT

FELDBERGSTRASSE 47  
D-6000 FRANKFURT a.M. 1  
TELEFON (0611) 798 2375  
TELEX 413 730 mepif d

Prof. Dr. H. Berckhemer

10. 5. 1984 Sch

Professor Adam M. Dziewonski  
California Institute of Technology  
Seismological Laboratory, 252-21  
Pasadena, CA 91125

Dear Adam,

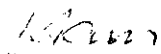
I had the opportunity to discuss the "Science Plan for a New Global Seismographic Network" with the Scientific Advisory Group and the Governing Board of the Central Seismological Observatory of the Federal Republic of Germany some days ago at Erlangen. As the chairman of both groups I have been asked to give you briefly their opinion on the GSN-Project.

The US initiative for the creation of a global seismic network with broad band, high dynamic range digital seismographs was very welcome by all my colleagues. It is considered a timely and important step towards a new era of quantitative global seismology. It was noticed with satisfaction that the technical specifications of the network stations are almost identical with those of the Gräfenberg Array (GRF) and therefore a cooperation and data exchange between GRF and GSN should probably be unproblematic and fruitful for both sides. I should like to mention that it is intended to expand GRF to a regional broad band array of several hundred kilometers aperture by equipping a dozen existing observatories with PCM broad band, high dynamic range seismograph systems. Our group has also just worked out technical guide lines for broad band digital observatories to be installed in countries with modest level of development. Such stations, if established, would also be compatible with GSN. We offer our full cooperation with GSN and, if desired, our ten years experience in broad band, high dynamic digital earthquake recording.

The new technical aspect of GSN is data transmission via satellite. There can be no doubt that this is, especially from an operational view point, an ideal concept. We see no problems for transmission of seismic data from stations in

our country to USA, but from our experience with some other countries we consider this concept unrealistic, and from the standpoint of international partnership also one-sided. It is probably necessary to envisage local digital recording at all the stations and telemetry from some keystations. This is more than indicated in Section 4.2.4. The project is national by funding and operation, but international by installation and the source of the data. It, therefore, requires a broad international consent. We believe that the necessary international backing can best be achieved through IASPEI, may be by some specific panel.

Yours sincerely



Hans Berckhemer

c.c. Dr. Berger



DIPARTIMENTO DI GEOFISICA E VULCANOLOGIA  
DELL'UNIVERSITA' DEGLI STUDI DI NAPOLI

4.9.1984

80138 NAPOLI  
LARGO S. MARCELLINO, 10  
TEL. (081) 204184 - 204442

Dr. J Berger  
IGPP  
Scripps Institute  
A - 02J  
LA JOLLA  
California 92093, USA

Dear Sir,

I am referring to the IRIS seismic Network.

The Faculty of Geology of the Somali National University is now on the way of realizing a seismic network in the Somali Republic, which will be limited, at the beginning to only three stations. The project is under the sponsorship and partial financial support of the Italian Ministry of Foreign Affairs, Department of Cooperation.

I am one of the responsible of the project, and will be very glad to receive information about IRIS. I am now exploring the possibility of inserting this Somali, in a more global network. The Somali network will cover an area where a practical lack of seismic information exists. Compatibility of data, exchange of information between the two network and even the care of one of the IRIS station can be accomplished by us.

I will be very glad to receive soon your reply and remain,

Your sincerely

Prof. Antonio Rapolla