

CRUISE REPORT

SHIP UTILIZATION DATA

UNOLS
Rev 1/83

SHIP NAME <u>Robert Conrad</u>		OPERATING INST. <u>L-DGO</u>		PARTICIPATING PERSONNEL			
CRUISE (LEG) NO. <u>2705</u>		DATES <u>20 June-5 July 1986</u>		CODE	NAME	TITLE	AFFILIATION
AREA OF OPERATIONS: <u>Sri Lanka continental margin and northern end of Ninetyeast Ridge</u>		PORT CALLS:		1.			
		PLACE	DATES	2.	See attached		
		Colombo	lve 20 June	3.			
		Colombo	arr 5 July	4.			
DAYS AT SEA <u>14 1/2 - 15</u>	DAYS IN PORT <u>N.A. 3</u>	Use Reverse If Additional Space Required.					

WAS RESEARCH CONDUCTED IN FOREIGN WATERS? yes, in part COUNTRY: Sri Lanka

PRIMARY PROJECTS (those which govern the principal operations, area and movements of the ship)

PROJECT TITLE AND PRINCIPAL INVESTIGATOR	SPONSORING ACTIVITY	GRANT OR CONTRACT NUMBER	PARTICIPATING PERSONNEL (AS CODED ABOVE)
Joseph R. Curray Sri Lanka continental margins	NSF	OCE 85-01574	Same
DISCIPLINE			

ANCILLARY PROJECTS (which are accomplished on a not-to-interfere basis and contribute to the overall effectiveness of the cruise)

PROJECT TITLE AND PRINCIPAL INVESTIGATOR	SPONSORING ACTIVITY	GRANT OR CONTRACT NUMBER	PARTICIPATING PERSONNEL (AS CODED ABOVE)
Joseph R. Curray ODP site surveys, northern end Ninetyeast Ridge	NSF	OCE 85-01574	Same

SIGNATURE Joseph R. Curray
CHIEF SCIENTISTDATE 28 July 1986TOTAL SCIENTISTS 6 TOTAL TECHNICIANS 11TOTAL GRAD STUDENTS 1 TOTAL STUDENTS/OBSERVERS 2

ATTACH PAGE SIZE CRUISE TRACK

COST ALLOCATION DATA

DAYS CHARGED	AGENCY OR ACTIVITY CHARGED	GRANT OR CONTRACT NUMBER
<u>18</u>	<u>N.S.F.</u>	<u>OCE 83-16163</u> <u>LDGO 5-24982</u>

SIGNATURE John R. CurrayDATE 4 Aug 86

1. Dr. Joseph R. Curray, Chief Scientist, Professor, SIO
2. Dr. Shanthi Wickremaratne, Geologist, NARA
3. Dr. Gamini Ranatunge, Geologist, NARA
4. Mr. N.P. Wijeyananda, Geologist, NARA
5. Mr. Tissa Munasinghe, Graduate Student, SIO
6. Mr. Dixon De Silva, Senior Hydrographer, NARA
7. Mr. T.M. Tillakaratne, Hydrographer, NARA
8. Mrs. M.A. Curray, Technician, SIO
9. Mr. Andrew Muthumani, Technician, NARA
10. Mr. P.G. Perera, Technician, NARA
11. Mr. James A. Smith, Science Officer, Technician, L-DGO
12. Mr. John S. Freitag, Technician, U.R.I.
13. Mr. Peter Lemmond, Technician, U.R.I.
14. Mr. Frank Robinson, Technician, L-DGO
15. Mr. Martin Iltzche, Technician, L-DGO
16. Mr. R. Qali Maiwiriwiri, Technician, L-DGO
17. Mr. David Caplan, Technician, L-DGO
18. Mr. Leonid Monakov, Technician, L-DGO
19. Mr. Melvin Broadus, Observer, USNOO
20. Mr. Gary Geddes, Observer, USNOO

Aug. 4, 1986

TO:

Barbee, W.D.	- UNOLS
Dudley, J.	- LDGO
Gerard, S.	- LDGO
✓Hayes, D.	- LDGO
Leyden, R.	- LDGO
Lotti, R.	- LDGO
Raleigh, B.	- LDGO
Ruddiman, W.	- LDGO
Ryan, W.F.B.	- LDGO
Sykes, L.R.	- LDGO
Takahashi, T.	- LDGO
Science Officer	- CONRAD
Captain	- CONRAD

RESEARCH CRUISE REPORT

R/V ROBERT D. CONRAD 27-05

Attached is a copy of a cruise report for the above CONRAD cruise.

Ann Burns

Ann Burns
Marine Office

Enc.



SCRIPPS INSTITUTION OF OCEANOGRAPHY

GEOLOGICAL RESEARCH DIVISION
LA JOLLA, CALIFORNIA 92093

PRELIMINARY CRUISE REPORT

SHIP NAME: R/V Robert D. Conrad OPERATING INSTITUTION: L-DGO

DATES: 20 June - 5 July 1986 PROJECT TITLE: Sri Lanka
Continental Margins

CHIEF SCIENTIST: J.R. Curray CLEARANCE COUNTRIES: Sri Lanka

FOREIGN PARTICIPANTS: See attached PORT CALLS: Colombo to Colombo

DESCRIPTION OF SCIENTIFIC PROGRAM:

This project was arranged and negotiated as a cooperative project between scientists of the Scripps Institution of Oceanography (SIO) and the National Aquatic Resources Agency (NARA). A formal memorandum of understanding was signed by representatives of the two organizations prior to departure of the cruise (Attachment 1). In addition, a supplementary letter was signed by the chairman of NARA and agreed to by the representative of SIO regarding priorities of some of the data from the cruise for dissertation research by Mr. Tissa Munasinghe (Attachment 2). Finally at the conclusion of the cruise, the representative from SIO submitted to the representative from NARA, a concurrence in this agreement regarding priority use of some of the data for dissertation research for Mr. Munasinghe and a brief review of results of the cruise (Attachment 3).

There were two principle objectives to this short cruise. The first was a study of the tectonic evolution of the the Sri Lanka continental margin; the second was a site survey of two prospective drilling sites on the northernmost exposed end of the Ninetyeast Ridge. The latter of these two objectives was conducted in international waters and was funded for the express purpose of supplying interpreted data for use by the Ocean Drilling Project and its advisory structure for selection of a possible drilling site for about 1988. This part of the cruise is not involved in this international agreement.

The geological and geophysical investigation of the Sri Lanka continental margin was planned jointly by representatives of NARA and SIO. The primary objective was a study of the rifting history and tectonic evolution of the continental margin following separation from the Antarctic continent in early Cretaceous time. Supplementary objectives were the search for a seamount located near the Sri Lanka continental margin and study of the surface sediments of the Sri Lanka continental shelf and upper continental slope.

DATA OBSERVATIONS AND SAMPLES COLLECTED:

Underway geological and geophysical data collected included 3.5 kHz echo sounding, seabeam echo sounding, magnetics, gravity, seismic reflection, and wide-angle sonobuoy seismic reflection measurements. Station geological data collected include sediment cores and rock dredges. All underway data are currently being given preliminary post cruise processing at Lamont-Doherty Geological Observatory. Further processing will be done at the Scripps Institution of Oceanography. Sediment and rock samples were divided on the ship between NARA and SIO.

INFORMATION ADDRESS:

Dr. Hiran Jayawardene, Chairman
National Aquatic Resources Agency
Crow Island, Mattakkuliya
Colombo 15, Sri Lanka

Dr. Joseph R. Curaray
Scripps Institution of
Oceanography, A-015
La Jolla, CA 92093

SCHEDULE OF DELIVERY FOR ALL DATA RESULTS AND REPORTS:

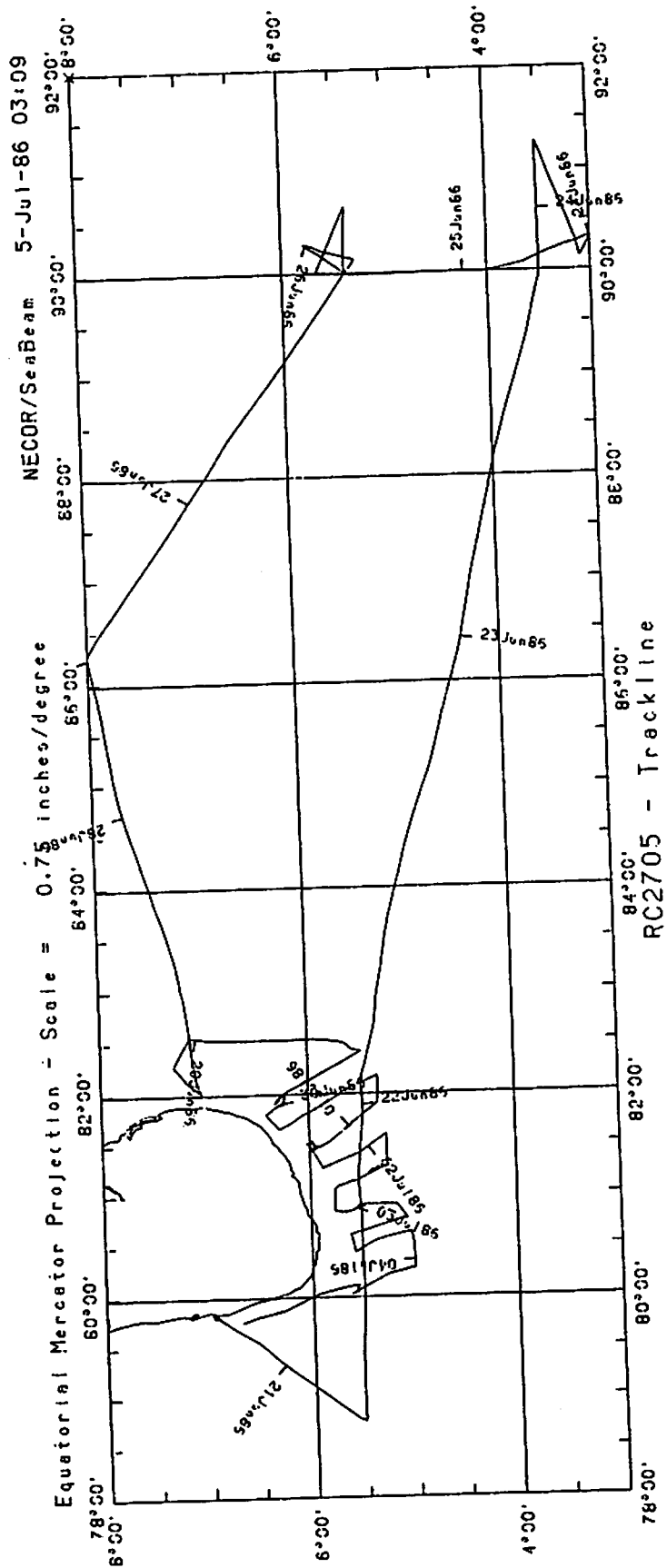
Data Collected

Analog seismic reflection
Digital seismic reflection

Gravity
Magnetics
3.5 kHz
Seabeam
Sediment Cores
Rock Dredges
Ninetyeast Ridge Report
Sri Lanka Margin Summary

Delivery to Host Country

Paper copies - about Oct 1986
Paper copies, after processing -
about Feb 1987
Map plots - about Jan 1987
Map plots - about Jan 1987
Paper copies - about Oct 1986
Already delivered
Already shared
Already shared
About Jan 1987
Munasinghe thesis -
about Jun 1988



1. Dr. Joseph R. Curray, Chief Scientist, Professor, SIO
2. Dr. Shanthi Wickremaratne, Geologist, NARA
3. Dr. Gamini Ranatunge, Geologist, NARA
4. Mr. N.P. Wijeyananda, Geologist, NARA
5. Mr. Tissa Munasinghe, Graduate Student, SIO
6. Mr. Dixon De Silva, Senior Hydrographer, NARA
7. Mr. T.M. Tillakaratne, Hydrographer, NARA
8. Mrs. M.A. Curray, Technician, SIO
9. Mr. Andrew Muthumani, Technician, NARA
10. Mr. P.G. Perera, Technician, NARA
11. Mr. James A. Smith, Science Officer, Technician, L-DGO
12. Mr. John S. Freitag, Technician, U.R.I.
13. Mr. Peter Lemmond, Technician, U.R.I.
14. Mr. Frank Robinson, Technician, L-DGO
15. Mr. Martin Iltzche, Technician, L-DGO
16. Mr. R. Qali Maiwiriwiri, Technician, L-DGO
17. Mr. David Caplan, Technician, L-DGO
18. Mr. Leonid Monakov, Technician, L-DGO
19. Mr. Melvin Broadus, Observer, USNOO
20. Mr. Gary Geddes, Observer, USNOO

SCRIPPS INSTITUTION OF OCEANOGRAPHY, U.S.A. -
NATIONAL AQUATIC RESOURCES AGENCY, SRI LANKA

MEMORANDUM OF UNDERSTANDING

The National Aquatic Resources Agency (NARA) acting on behalf of the Government of the Democratic Socialist Republic of Sri Lanka as the sole national institution responsible for oceanographic research has had a longstanding contact with the Scripps Institution of Oceanography (SIO) to co-operate in areas of common interest.

In March 1986 the Embassy of the United States of America (Note No.55) made a formal request to the Ministry of Foreign Affairs of the Democratic Socialist Republic of Sri Lanka for diplomatic clearance for the research vessel Robert D. Conrad to carry out scientific research off the coast of Sri Lanka.

After the exchange of several notes between the Ministry of Foreign Affairs of the Democratic Socialist Republic of Sri Lanka and the Embassy of the United States of America, the Sri Lanka Government has agreed to grant permission to the SIO to carry out research within the continental margin and Exclusive Economic Zone of Sri Lanka during the period June to July not exceeding 15 days providing the SIO agrees to the following conditions to be incorporated in this joint memorandum with the National Aquatic Resources Agency.

- (1) Requisite arrangements for participation of Sri Lanka Scientists in the cruise programme and the analysis of data which shall result in joint publication.
- (2) Adjustment of the cruise programme to take account of any specific and reasonable requirements of NARA scientists from Sri Lanka who participate in the cruise.
- (3) Access to all data gathered within the continental margin and the Exclusive Economic Zone of Sri Lanka which should be made available in a useable form.

In order to fulfil abovementioned conditions the representative acting on behalf of the SIO undertakes the following:

(a) Participation:

Seven Sri Lankan Scientists and one technician to participate in the cruise.

(b) Joint Cruise Plan: Leg - RC 27-05

In addition to the main SIO proposed cruise plan research will be carried out on a track for NARA between Colombo - Seamount (Lat. $05^{\circ}31'$ - Long. $78^{\circ}45'$).

(c) Additional Cruise Research Activities of specific interest to NARA:

- (1) Underway bathymetry (Seabeam) and 3.5 KHz
- (2) Underway reflection seismics, magnetics and gravity measurements
- (3) One piston core sample on the shelf off Panadura (Lat. $06^{\circ}37'$ - Long. $79^{\circ}47'$).
- (4) At the Seamount (Lat. $05^{\circ}31'$ - Long. $78^{\circ}45'$) attempts will be made to locate the summit.

(d) Post-Cruise Activities:

The following data collected during the cruise will be handed over in Colombo on completion of the cruise or as soon as possible thereafter.

- (1) Copy or duplicate map of the ship's track giving details of time and location of fixes.
- (2) Copies or duplicate of all underway chart recordings, (i.e. bathymetric (seabeam) and 3.5 KHz echo sounding recording traces, reflection seismics recording traces, magnetometer and gravimeter recordings traces) and original recordings on the track from Colombo to the Seamount.
- (3) To share the piston core and dredge samples (as per requirements and not exceeding half the sample).
- (4) To make available to NARA data on bathymetry, seismics, magnetics and gravity surveys in its final processed form.
- (5) Participation of NARA scientists in the analysis of data at the SIO.
- (6) To publish jointly scientific papers resulting from this cruise.

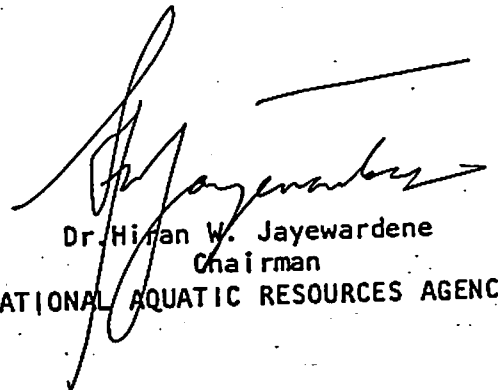
The National Aquatic Resources Agency and SIO while making use of this data collected within the EEZ of Sri Lanka agrees to :

- Publish scientific papers resulting from this cruise only with the joint authorship of NARA and SIO.
- Not transfer the data or samples to any other organisation or body except as required by regulations of the United States National Science Foundation which Agency is funding the cruise and Colombian University which owns the ship board scientific equipment and operates the vessel.

Both sides agree that similar projects should be carried out in the future.



Dr. Joseph R. Curran
Prof. of Geology
SCRIPPS INSTITUTION OF OCEANOGRAPHY



Dr. Hiran W. Jayewardene
Chairman
NATIONAL AQUATIC RESOURCES AGENCY.

Colombo,
16th June, 1986.

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தேசிய நீரியல்வள முகாமை

NATIONAL AQUATIC RESOURCES AGENCY

කාක දූපත,
මට්ටක්කුලිය,
කොළඹ - 15.

காக்கை தீவு,
மட்டக்குளி,
கொழும்பு-15.

CROW ISLAND,
MATTAKKULIYA,
COLOMBO - 15.

දුරකථන/தொலைபேசி/Telephone
590000, 590005,-9,
590881, 590914, 590932

19th
June,
1986.

Dr. Joseph R. Curray,
Prof. of Geology,
Scripps Institution of Oceanography,
University of California,
San Diego, La Jolla,
California 92093,
U.S.A.

Dear Dr. Curray,

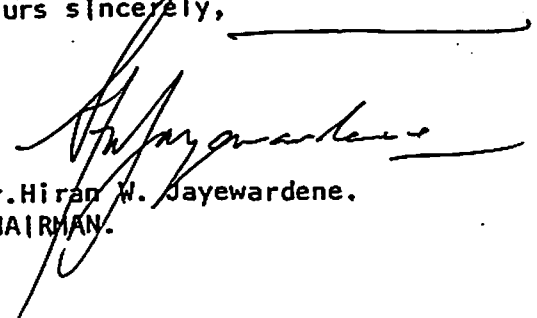
Cruise Leg RC 27-05 - Research by Mr. Tissa Munasinghe
Priority on use of certain data gathered on cruise

Further to the joint discussion conducted on the
Memorandum of Understanding with the Agency, I wish
to have your confirmation that -

- Nothing be published by any party concerned which
will jeopardise the priority use of these data
by Mr. Tissa Munasinghe for his Ph.D. Thesis
collected during the cruise, excluding the data
obtained on the additional track run for NARA
from Colombo to the Seamount.

Likewise I hereby grant the assurance that this condition
will govern the relevant activities of the personnel of
the Agency in this connection.

Yours sincerely,


Dr. Hiran W. Jayewardene.
CHAIRMAN.



SCRIPPS INSTITUTION OF OCEANOGRAPHY

GEOLOGICAL RESEARCH DIVISION
LA JOLLA, CALIFORNIA 92093

July 4, 1986

Dr. Hiran Jayawardene, Chairman
National Aquatic Resources Agency
Crow Island, Mattakkuliya
Colombo 15. Sri Lanka

Dear Hiran:

This is to acknowledge receipt of your letter of 19 June 1986 regarding "Cruise Leg RC 2705 - Research by Mr. Tissa Munasinghe; priority on use of certain data gathered on cruise." As you have requested, I give my confirmation to the agreement that:

"Nothing be published by any party concerned which will jeopardize the priority use of these data by Mr. Tissa Munasinghe for his PhD Thesis collected during the cruise, excluding the data obtained on the additional track for NARA from Colombo to the seamount."

greatly appreciate your agreement to this priority use of the data collected on the cruise from the continental margin of Sri Lanka. As you know, the proposal which funded this cruise leg was written for the purpose of providing Mr. Munasinghe with data and samples for his thesis. Prior publication of the data or conclusions drawn from the data by some one else could possibly preclude their use in his thesis.

We specifically request priority for Mr. Munasinghe's thesis of the data and/or interpretations of the bathymetry, gravity, magnetics, seismic reflection observations, and samples and/or interpretation of the piston core at 50 22'N, 810 14'E or any of the rock dredges. These data and samples, combined with older data will constitute the principal basis for Mr. Munasinghe's thesis. After completion of his thesis we hope that a series of joint publications will be forthcoming with other NARA scientists.

Data and samples which we specifically exclude from this priority list are the geophysical and bathymetric data from the additional line from Colombo to the possible seamount location, the core which we will attempt on the shelf near Panadura, and the bathymetric data from a survey which we will do if time permits of the canyon near Panadura.

In the discussions of our agreement prior to the cruise, we did not specifically consider the two days of site survey for the Ocean Drilling Project on the Ninetyeast Ridge, far from the Sri Lanka EEZ. Having accepted the funds from the National Science Foundation to do

that survey, I am obligated to provide the data and my interpretations to the ODP Data Bank and to the appropriate ODP and JOIDES panels. I presume that no one has interpreted the requirement for joint publication as applying to those surveys, and I will proceed accordingly following processing of the data.

I regret that we did not find the seamount reported on the British Admiralty Charts from a 1924 sounding. I had suspected before the cruise that this was perhaps a valid sounding depth, but with an erroneous position. Such errors are common on published charts, but cartographers do not like to remove them until they are proven to be in error, because of the possible hazards to navigation. I believe that our navigation was good enough that if the seamount did exist within five kilometers of the reported position to the northwest, west, southwest, or south, or if it lay within five kilometers of our search lines out and back, we would have found it. My suggestion now is to concentrate some research in surveying the confirmed seamount located a few kilometers to the northwest of that position. The shoal summit which was reported in 1924 may in fact lie on the confirmed seamount, which to my knowledge has not been properly surveyed.

I would also like to suggest that Samudra Maru be used in the proper season to search for phosphate on the shelf where we searched with two dredge hauls. I suspect that we were looking in water too deep and with an inappropriate tool.

I am especially pleased with both the work at sea and with the results of that work. The group from NARA performed in a highly professional manner. Without their assistance and consultation, we could not have accomplished what we did. I wish to extend my personal thanks to all of them with copies of this letter, which can also serve as a reminder of our agreements. I look forward to working with Tissa closely for about the next two years as he completes his thesis, and I look forward to working with the other scientists from NARA in our collaboration on samples and data from this cruise. I sincerely hope that we can do more work in collaboration, possibly as a continuation of this very successful cruise.

Sincerely,



Joseph R. Curray

cc. Munasinghe
Wickremaratne
Ranatunga
Wijayananda
De Silva
Tillakaratne
Muthumani
Perera