

SCIENTIFIC REPORT OF
TWENTY SECOND
INDIAN ANTARCTIC EXPEDITION

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Maitri, Antarctica

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सत्यमेव जयते

प्रधान मंत्री
PRIME MINISTER

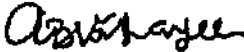
MESSAGE

[For Dr. Arun Hanchinal, Station Commander and all the Members of XX winter Team 'Maitri' Antarctica]

I send my warm greetings to the Indian Antarctic Station 'Maitri' on the occasion of the Antarctic Mid-Winter Day, June 21. The National Antarctic Programme owes its success to the devotion and courage displayed by you all. Your relentless efforts in pursuit of scientific knowledge in the harsh conditions of Antarctica will certainly keep India's image bright and high in the international arena. The people of India admire your determination and grit.

Best wishes for a successful stay and happy journey back home.

New Delhi
May 20, 2003


(A.B. VAJPAYEE)



सत्यमेव जयते

डॉ. मुरली मनोहर जोशी

DR. MURLI MANOHAR JOSHI

विज्ञान एवं प्रौद्योगिकी तथा

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नई दिल्ली-110 001

MINISTRY OF SCIENCE AND
TECHNOLOGY & OCEAN

DEVELOPMENT

GOVT. OF INDIA

NEW DELHI-110001

May, 2003

MESSAGE

Dear Dr. Hanchinal,

I am delighted to send my warm greetings to the Indian Antarctic station "Maitri" on Annual Mid-Winter Day at Antarctica. The National Antarctic Programme owes its success to the sincerity and devotion displayed by you and your colleagues. Your relentless efforts in pursuit of scientific knowledge in the harsh conditions of Antarctica is keeping image of India bright and high in the international arena. The people of India admire your courage and grit.

Best wishes for a successful stay and safe return home.

With best wishes

Yours sincerely

(MUKLIMANO HAR JOSHI)

Dr. Arun Hanchinal
Station Commander and
all the members of XX wintering
team "Maitri"



सत्यमेव जयते

सचिव

SECRETARY

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DEPARTMENT OF OCEAN DEVELOPMENT
MAHASAGAR BHAVAN, BLOCK-12, C.G.O. COMPLEX,
LODHI ROAD,, NEW DELHI-110003

June, 2003

MESSAGE

My dear friends,

You all are warmly remembered on the Mid Winter Day for your extraordinary conec of purpose and fortitude. Your courage and determination to explore in the most hostile conditions and keep the national flag flying is a matter of pride. We send you all our most affectionate greetings and good wishes on behalf of numerous well wishers, families, friends and every one in the Department. We look forward to your safe return after accomplishing the mission on which you have gone.

Yours sincerely

(H.K. Gupta)

Dr. Arun Hanchinal
Station Commander and
all the members of XX wintering
teairTMaitri"



डॉ. शैलेश नायक
DR. SHAILESH NAYAK

सचिव
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FOREWORD

Antarctica is the coldest place on earth. It holds secrets of many scientific puzzles and therefore its significance has been perceived internationally. India has been an active partner in the Antarctic research since 1981 and has been launching annual launching of scientific expeditions to this icy continent. The National Centre for Antarctic and Ocean Research (NCAOR), coordinates this activity.

Each expedition is a challenge in itself as it involves handling multi-disciplinary and multi-institutional science programmes that call for massive infrastructure support. The present report highlights the achievements of 22nd scientific Expedition to the Antarctica led by Dr. Arun Ianchina! a physicist by profession at the Indian Institute of Geomagnetism, Mumbai.

Among the most notable achievements of 22nd expeditions are, the successful unearthing of the concealed hanger accommodation at the Dakshin Gangotri for retrieving the ice core stored there, the installation of digital fluxgate magnetometer for the first time and the demonstration of the use of ground penetrating radar in unraveling the sub-surface features below the ice cover.

On November 23, 2003 about 120 people from different part of the world witnessed the very rare event Total Solar Eclipse (TSE) near Maitri. India deputed a team of five specialists to set up eclipse observation equipments and conduct variety of experiments.

The successful surgery performed on winter member with limited medical back up to save precious life has been another achievement worth mentioning. The doctors and the entire team deserve appreciation for such a wonderful achievement.

I compliment Dr. Hanchinal for successfully accomplishing the objectives set for his expedition and bringing out a detailed technical report on his expedition, which I am sure will be useful reference for Polar Science community at large.

SP Nayak
(Shailesh Nayak)

राष्ट्रीय अंटार्कटिक एवं
समुद्री अनुसंधान केन्द्र
पृथ्वी विज्ञान मंत्रालय
(भारत सरकार)
हेड लैण्ड सडा, वास्को-डा-गामा
गोवा - ४०३ ८०४, भारत



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PREFACE

The forty eight member expedition, which sailed to icy continent under the leadership of Shri Arun Hanchinal of Indian Institute of Geomagnetism, spent nearly fourteen months at Maitri accomplishing all the assigned scientific and logistic tasks.

Among the noted scientific achievements were the installation of a digital fluxgate magnetometer of 0.1 nT sensitivity, operation of Ground Penetrating Radar for subsurface studies, geological mapping of the interior ranges of Muhlig-Hoffmann mountains of central Dronning Maud land and collection of lichen specimens from Schirmacher and its adjoining areas apart from other ongoing projects.

During the expedition, the ice cap south of Maitri witnessed congregation of more than a hundred people from across the world, assembled to witness a rare spectrum of total solar eclipse in November. India too sent a team of astronomers and space scientists to study the eclipse. The Team at Maitri lent a helping hand to make this event a success.

The collective work put in by one and all in the expedition resulted in producing some exciting science, a glimpse of which can be had from the papers included in the present report compiled by Shri Hanchinal.

I am sure the report will serve the link between the previous studies undertaken and the future work planned in this part of Antarctica.


(Rasik Ravindra)

CONTENTS

	<i>Psige No.</i>
MESSAGES	
Prime Minister	iii
Dr.Murali Manohar Joshi	v
Secretary	vii
Foreward	ix
Preface	xi
THE TEAM	xvii
Diary of Important events of Twenty Second Indian Antarctic Expedition	xix
Important events of The Twenty Second Indian Antarctic Expedition <i>Arun Hanchinal</i>	1-13
Scientific and Logistic Objectives and Achivements of 22nd Indian Antarctic Expedition <i>Arun Hanchinal</i>	15-36
ATMOSPHERIC SCIENCE	
Geomagnetic and RIOmeter observations at Maitri during 22 nd Expedition <i>Arun Hanchinal, Ajay Dhar, A.K. Singh and BM.Pathan</i>	39-52
Application of Global Positioning System (GPS) for Glacier studies at Schirmacher oasis, East Antarctica <i>P.S. Sunil, CD. Reddy, M. Ponraj and Ajay Dhar</i>	53-62
Study of Meteorological Parameters and Ozone Hole phenomena at Schirmacher Oasis, Antarctica during 22 nd Antarctic Expedition 2003-2004 <i>Chatar Singh and S.P. Sharma</i>	63-93
Observations of Carbon Monoxide in Antarctic Troposphere at Maitri, Antarctica <i>S. L. Jain, B. C. Arya, Ashok Kumar, Sachin D. Ghude and V. B. Gupta</i>	95-102

Total Water Vapour Column Measurement Over Schirmacher Region, East Antarctica <i>S. L. Jain, B. C. Arya, Ashok Kumar and Sachin D. Ghude</i>	103-108
Ozone Hole during 2002 and 2003: A comparison <i>S. L. Jain, B. C. Arya, Sachin D. Ghude, Ashok Kumar and V. B. Gupta</i>	109-116
Online Measurement of Surface Air Concentration of CH ₄ and CO ₂ at Maitri, Antarctica <i>S. L. Jain, B. C. Arya, Ashok Kumar, V. B. Gupta* and Sachin D. Ghude</i>	117-124
Study of Generation Mechanism and Propagation Characteristics of VLF/ELF Emission at Sub Auroral Zone MAITRI, Antarctica <i>Shailendra Saini, P. K. Purohit and A. K. Gwal</i>	125-138

EARTH SCIENCES, GLACIOLOGY & GLOBAL CHANGE

Studies on Seismotectonics and Geodynamical processes between India and Antarctica <i>G.S. Srinivas, S.V.R.R. Rao , G.B. Navinchandei; A. Akilan, E.G. Malaimani and N. Ravikumar</i>	141-153
Ground Penetrating RADAR Survey in Antarctica <i>Rajib Kumar Sinharay</i>	155-170
Dielectric Properties of Antarctic Ices and Soils at 5 GHz Frequency <i>M.L.Kurtadikar</i>	171-175
Geological Studies in Western Muhlig-Hofmann Mountains, Central Dronning Maud Land, East Antarctica <i>Dharwadkar, R. Asthana, K. Kachroo, L.K. Oberoi and Arun Chaturvedi</i>	177-189
Glaciological Observations during the 22nd Indian Antarctic Expedition <i>Arun Chaturvedi, R. Asthana, K. Kachroo, L.K. Oberoi and Amar Singh</i>	191-197

CONTENTS

xv

First attempt at motorised Ice Core Drilling during the Antarctic Summer Season 199-211
Arun Chaturvedi and Amar Singh

Large Scale Mapping in Schirmacher Oasis in Antarctica 213-217
Rajesh Kumar Pal and Sanjay Kumar Shandilya

Naval Hydrographic Survey in XXII Indian Antarctic Expedition, Work and Achievements 219-223
A.Banerjee, R.Bhaskaran and F.D, Coasta

BIOLOGIY & ENVIRONMENTAL CONSERVATION

Distribution and Diversity of Lichens in Schirmacher Oasis and Neighbouring Nunataks, East Antarctica 227-241
Sanjeeva Nayaka and Dalip Kumar Upreti

Environmental Status at Indian Antarctic Station - Maitri 243-255
Prashannt Bhave and Medha Dixit

THE TEAM

XXII WINTER TEAM

S	I.	Name of the Member	Organisation
1.		Dr. Aran Hanchinal (Leader)	Indian Institute of Geomagnetism
2.		Shri G.S. Srinivas	National Geophysical Research Institute
3.		Shri Chatar Singh	Indian Meteorological Department
4.		Shri. S.P. Sharma	Indian Meteorological Department
5.		Shri Ashok Kumar	National Physical Laboratory
6.		Capt. Kumar Parakram	Indian Army (EME)
7.		Nb/Sub Tech 'B' Veh Naresh Kumar	Indian Army (EME)
8.		HMT 'B' Veh. Banwari Lai Gujar	Indian Army (EME)
9.		L/Nk VM (MV) Ram Bax	Indian Army (EME)
10.		HMT Elect (MV) Ram Bax	Indian Army (EME)
11.		Hav Elect (MV)Ramesh Chandra Guranani	Indian Army (EME)
12.		Nk EE Mech. Kashi Ram Jat	Indian Army (EME)
13.		Hav. EE Mech. Venugopalan K.M.	Indian Army (EME)
14.		Capt.K.S.R.Reddy	Indian Army (ES 8)
15.		Hav/OEM,R.C. Kumar	Indian Army (ES 8)
16.		Nk. Sohanveer Singh	Indian Army (ES 8)
17.		Lnk/Elect Satendra Kumar	Indian Army (ES 8)
18.		Lnk/C&JGulzar	Indian Army (ES 8)
19.		Shri.I.P.Juyal	Defence Electronics Application Laboratory
20.		Shri Sunil Kumar Sharma	Defence Electronics Application Laboratory
21.		Dr. Pradeep Malhotra	Central Government Health Scheme
22.		Dr. A.K. Aggarwal	Central Government Health Scheme
23.		Ct/CK Naresh Chandra Tiwari	Indo Tibet Border Police

THE TEAM

XXII SUMMER TEAM

Sl.	Name of the Member	Organisation
1.	Shri Rajesh Asthana	Geological Survey of India
2.	Shri Lalit Kumar Oberoi	Geological Survey of India
3.	Shri Kuldeep Kachroo	Geological Survey of India
4.	Shri Arun Chaturvedi	Geological Survey of India
5.	Shri Amar Singh	Geological Survey of India
6.	Shri A. Akilan	National Geophysical Research Institute
7.	Shri Rajib K. Sinharay	CWPRS
8.	Shri Rajesh Kumar	Survey of India
9.	Shri Sanjay Kumar	Survey of India
10.	Dr. M.L. Kurtadikar	JES College
11.	Shri Sanjeeva Nayaka	National Botanical Research Institute
12.	Shri Prashant P. Bhawe	Veer Jeejamata Technological Institute
13.	Dr. MedhaJ.Dixit	Veer Jeejamata Technological Institute
14.	Dr.J.K.De	Zoological Survey of India
15.	Shri Ajay Dhar	Indian Institute of Geomagnetism
16.	ShriP.S.Sunil	Indian Institute of Geomagnetism
17.	Shri P.K. Purohit	Barakatullah University
18.	Shri Shailendra Saini	Barakatullah University
19.	Dr.B.C.Arya	National Physical Laboratory
20.	Dr. Jaswant Singh	National Physical Laboratory
21.	Lt. A. Banerjee	National Hydrography Office
22.	POSRIRBhaskaran	National Hydrography Office
23.	LSSRIFSD'Costa	National Hydrography Office
24.	Shri. DhanPrakash	Defence Electronics Application Laboratory
25.	Ct./Ck. Rajendra Kumar Kaloni	Indo Tibet Border Police

Diary of Important events of Twenty Second Indian Antarctic Expedition

Date	Events
1 January 2003	Arrival at Goa . Stay at Tourist Hostel.
2 to 4 January 2003	Briefing , Insurance , Fire fighting etc.
4 January 2003	22nd IAE Launching ceremony at NCAOR
5 January 2003	Departure from Goa to Mumbai.
6 January 2003	Departure from Mumbai to Cape Town via Johannesburg
7 January 2003	Arrival at Cape Town
7 to 14 January 2003	Stay at Cape Town.
14 January 2003	Ship sails off from Cape Town for Antarctica.
16 January 2003	Ship crosses 40°S
19 January 2003	Crossed Antarctic Circle
22 January 2003	Reached Antarctica
26 January 2003	Republic Day celebrated on the ship.
27 January 2003	First Sortie to MAITRI
27 January 2003	Summer Camp started at Maitri.
10 to 24 February 2003	Maitri - common Galley duties
25 February 2003	Maitri Station Taking over
28 February 2003	First (Joint) Convoy leaves Maitri
15 March 2003	Summer Camp of 22 IAE closed
17 March 2003	First Convoy reaches Maitri safely
18 March 2003	Ship sailed off for Cape Town - start of a Long WINTERING at Maitri.
25 March 2003	Second Convoy left Maitri
29 March 2003	Second Convoy reaches Maitri
7 April 2003	Third Convoy left Maitri
12 April 2003	Third Convoy reaches back safely
19 April 2003	Fourth Convoy left Maitri
27 April 2003	Fourth Convoy reaches Maitri safely
21 May 2003	Last Sunrise - start of the long POLAR NIGHTS.
21 June 2003	MID WINTER DAY
5 July 2003	Capt KSR Reddy - Surgery
22 July 2003	First Sunrise - end of Polar Nights
15 August 2003	Independence Day Celebrated

Date	Event
20 September 2003	Table Tennis Tournament played at NOVO and WON.
10 October 2003	Fifth convoy left Maitri
15 October 2003	EME Core Day
17 October 2003	Fifth convoy reaches back safely
26 October 2003	Arrival of SKUWA at Maitri
27 October 2003	Sixth & last convoy left
5 November 2003	The Army Team returns safely to Maitri after successful completion of 6th Convoy. The Convoytask has been accomplished completely.
7 November 2003	First IL 76 flight lands at Antarctica for 2003-04
9 November 2003	Arrival of PENGUIN at Maitri
10 November 2003	5 Indian Scientists arrive by IL 76 (Total Solar Eclipse team)
18 November 2003	Engineers Core Day
23 November 2003	TOTAL SOLAR ECLIPSE
27 November 2003	TSE team leaves by IL 76
5 December 2003	23 IAE team reports at NCAOR , Goa.
9 December 2003	23 IAE leaves for Cape town
11 December 2003	Clouds descending , total fog cover at Maitri
19 December 2003	Ship Sails off from Cape town for Antarctica with 23 IAE team.