

SCIENTIFIC REPORT OF
NINETEENTH
INDIAN ANTARCTIC EXPEDITION

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NATIONAL CENTRE FOR ANTARCTIC & OCEAN RESEARCH
(DEPARTMENT OF OCEAN DEVELOPMENT)
HEADLAND SADA, VASCO
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INDIA
2005

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सत्यमेव जयते

प्रधान मंत्री

PRIME MINISTER

MESSAGE

FOR: SHRI ARUN CHATURVEDI, STATION COMMANDER
AND ALL THE XVIII WINTER TEAM 'MAITRI
ANTARCTICA

I SEND MY WARM GREETINGS TO THE INDIAN ANTARCTIC STATION "MAITRI" ON THE OCCASION OF ANTARCTIC MID-WINTER DAY, JUNE 21. THE NATIONAL ANTARCTIC PROGRAMME OWES ITS SUCCESS TO THE SINCERITY AND DEVOTION DISPLAYED BY YOU ALL. YOUR RELENTLESS 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 COURAGE AND GRIT.

BEST WISHES FOR A SUCCESSFUL STAY AND SAFE RETURN HOME.

(A.B. VAJPAYEE)

NEW DELHI
JUNE 19, 2000



डॉ. हर्ष क. गुप्ता
DR. HARSH K. GUPTA

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FOREWORD

Indian Antarctic research programme is one of the finest examples of a coordinated long term research effort of key national research institutions. It is also an important component of international scientific community's effort to understand this remote icy continent. Antarctica plays a key role in the global climate. It is one of the remaining frontiers on this planet, which may provide answers to earth's complex ecological processes, life support systems and past climate changes. Pristine environmental conditions of Antarctica, at the same time, also act as a benchmark for global environmental parameters.

The XIX Indian Scientific Antarctic Expedition (1999-2000) is a milestone as it completes two decades of our scientific endeavour in Antarctica, which made a modest but confident beginning in 1981. This expedition is also unique in the sense that it was the first time to launch an expedition from Cape Town, South Africa, saving a considerable amount of time and money. The first ever wintering by an Indian lady doctor at Maitri, has also opened up new horizons for Indian women scientists in the exciting field of polar sciences. The expedition had a multidisciplinary team of forty-eight personnel from fifteen scientific institutions and four logistics organizations, including a geoscientist from Peru. A new discovery of 'glacio-fluvial signatures' on the pebbles in the glacial environment of Antarctica, reported in this publication is noteworthy. During this expedition, a safe surface-route from Maitri to the polar plateau along the highly crevassed Somovken glacier has been charted, which will provide impetus to our research work in this area.

The 21st Century will be focusing more on ecosystem and environmental safeguards. Global warming will have an immediate impact on Antarctic environment and therefore we need to carry out studies and closely monitor polar ice cover. Programmes like long term monitoring of glaciers of polar ice front in Schirmacher Range, study of snow-met parameters and estimation of surface-energy budget over continental shelf near Maitri will be of greater significance in coming years. The findings and results of various ongoing and new projects reported here, add significantly to our existing knowledge about Antarctica. The dynamic leadership provided by Dr. Arun Chatarvedi, a seasoned and distinguished polar scientist, and the efforts taken by his dedicated team in bringing out this technical report are commendable.


(H.K. Gupta)

राष्ट्रीय अंटार्कटिक एवं
समुद्री अनुसंधान केन्द्र
(महासागर विकास विभाग
भारत सरकार)
हेड लैण्ड सदा, वास्को डा गामा
गोवा- ४०३ ८०४ भारत



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ANTARCTIC & OCEAN RESEARCH
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MESSAGE

The Antarctic continent is a crucial component of the earth's system and is a global laboratory for science and international collaboration. India through her sustained effort has contributed significantly to the knowledge of Antarctic science both by launching the expedition and mounting the experiments and also by doing desktop analysis of the data obtained by enabling technologies. Involvement of more than seventy national institutes in the Antarctic programme is a testimony of the growing popularity of the Indian Antarctic Programme and a legacy, which our future generation will use to explore the continent in more detail and push the frontiers of polar science.

The XIX Indian Antarctic Expedition (IAE) is a turning point in the history of our Antarctic effort; launching shifted from Goa to Cape Town, a lady doctor wintered in Antarctica. Participation of a scientist from Peru, visit of Norwegian environmental team at Maitri and their appreciation of environmental cleanliness at Maitri specially the concept of "**Shramdan**" have all impressed them. This shows our commitment to environment protection in Antarctica.

All this has happened under the able leadership of **Dr. Aran Chaturvedi**, a veteran Antarctic scientist and leader of the expedition along with enthusiastic team of dedicated scientists and logistic team drawn from across the country. The technical document is a record of the findings of various planned activities in Antarctica and will be a very useful resource for global scientific community, which is circulated to all nations involved in Antarctic affairs.


(P. C. Pandey)

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THE TEAM: 19th INDIAN ANTARCTIC EXPEDITION

Sl. No.	Name	Organization
WINTERING Component (December 1999 to March 2001):		
1.	Sh Arun Chaturvedi Leader & Station Commander	Geological Survey of India
2.	Sh Y.V.V.B.S.N. Murthy	National Geophysical Research Institute
3.	Sh K. Jeeva	Indian Institute of Geomagnetism
4.	Sh Mahender Kumar	Snow & Avalanche Study Establishment
5.	Sh E. Kulandaivelu	India Meteorological Department
6.	Sh S. Venkateshwara Rao	India Meteorological Department
7.	Dr (Mrs) Kanwal Vilku	Central Health Services
8.	Dr RK. Behera	Central Government Health Services
9.	Sh Raj Pal Singh	Defence Electronics Applications Lab.
10.	Sh M. Yunus	Defence Electronics Applications Lab.
11.	Maj Ravi Sangwan, Dy. Leader	Indian Army
12.	Capt Kapil Taneja	Indian Army
13.	Nb Sub H.K. Gurung	Indian Army
14.	Nb Sub K.C. Alex	Indian Army
15.	Nb Sub T. Sunder	Indian Army
16.	Nb Sub Balwinder Singh	Indian Army
17.	HMT A. Joseph	Indian Army
18.	Hav CD. Pandey	Indian Army
19.	Hav Sultan Singh	Indian Army
20.	Hav Iqbal Singh	Indian Army
21.	Hav Lekh Ram	Indian Army
22.	NkMegh Raj	Indian Army
23.	L/Nk Pavithran	Indian Army
24.	CT Subhash Chand	Indo-Tibetan Border Police

(Contd.)

Sl. No.	Name	Organization
SUMMER Component (December 1999 to March 2000):		
25.	Sh M. Javed Beg, Dy. Leader	Geological Survey of India
26.	Dr A. V. Keshava Prasad	Geological Survey of India
27.	Sh U.Gouri Shankar	National Geophysical Research Institute
28.	Sh Nirmalendu Kumar	Survey of India
29.	Sh Subhash Kumar	Survey of India
30.	Sh P.S. Negi	Snow & Avalanche Study Establishment
31.	Dr S.K. Bera	Birbal Sahni Institute of Paleobotany
32.	Sh C.P. Selvan	Indian Institute of Geomagnetism
33.	Sh Sunil Singh	Barkatullah University
34.	Dr A.K. Sanyal	Zoological Survey of India
35.	Dr Jagdish Lai	Botanical Survey of India
36.	Sh Anoop Tiwari	National Environ. Eng. Research Institute
37.	Sh Sunil Kulkarni	National Environ. Eng. Research Institute
38.	Sh B.S. Ashoka	National Aerospace Laboratories
39.	Sh G. Nanjunda	National Aerospace Laboratories
40.	Sh K. Harinath	Defence Institute of Physiology & Allied Sc.
41.	Sh A.K. Singh	Institute of Nuclear Medicine & Allied Sc.
42.	Sh P.R. Mithapalli	Research & Development Establishment
43.	Sh Anand Kumar	Research & Development Establishment
44.	Maj Anand Swaroop	Indian Army
45.	Capt R. Rajesh Bhat	Indian Army
46.	CT Tulsi Ram	Indo-Tibetan Border Police
47.	Ms Nora Nelly	Lima University-Peru
48.	Sh T.V.P.Bhaskara Rao	NCAOR-DOD Observer

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15. Central Health Services, Nirman Bhawan, New Delhi,
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17. Research & Development Establishment, Dighi, Pune- 411 015.
18. Directorate of Military Operations, Army Headquarters, Sena Bhawan, New Delhi.
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