

NATIONAL CENTRE FOR ANTARCTIC & OCEAN RESEARCH

(Department of Ocean Development, Government of India)
Headland Sada, Vasco da Gama, Goa 403 804

Subject: Invitation for scientific proposals for
Annual Indian Scientific Expeditions to Antarctica

1. The National Centre for Antarctic & Ocean Research (Department of Ocean Development) sends scientific expedition to Antarctica every year. The Twenty-fourth Indian Scientific Expedition to Antarctica will be launched in December 2004 and will consist of a summer team which will return to India in March 2005 and a winter team which will return to India in March 2006. Subsequent expeditions shall be launched accordingly.

2. The National Centre for Antarctic & Ocean Research (NCAOR) invites scientists/researchers/engineers to submit research proposals (in enclosed PRESCRIBED FORMAT) for undertaking front ranking scientific experiments in Antarctica in various inter-disciplinary fields/themes for 24th (2004–2005), 25th (2005–2006) and 26th (2006–2007) Indian Antarctic expeditions. Thrust areas under various themes of polar science are provided below:

(i) Meteorology & Atmospheric Sciences

- Whistler/VLF, riometer, electrical and geomagnetic studies.
- Sky image camera for optical aeronomical & auroral studies.
- Sophisticated instrumentation of digital ionosonde and phase path observation. The ionosonde can form a major element of space weather programme.
- Ground based (Brewer Spectrophotometer) and balloon borne studies of ozone and other trace gases including UVB radiation.
- The experiments on aerosol radiative forcing as a part of climate studies/change program.
- A LIDAR program for monitoring polar stratospheric clouds (ozone depletion) and monitoring middle atmospheric temperatures, waves and polar vortex (for ozone depletion and global warming studies).
- Infrared gas analyser, gas chromatograph and Fourier transform spectrometer for measuring of greenhouse gases including water vapour.
- Climatological data archival and data utilisation for predictive modelling.
- Planetary boundary layer studies to monitor long term changes if any, and also assess environmental impact, if any.
- Katabatic flow, snow drift and energy balance radiation studies using AWS.
- Studies on ice sheet – atmosphere interaction and surface climatology of Antarctica for modelling studies (tele-connections with monsoons).
- Automated tracking of synoptic and mesoscale weather system using operational satellite systems for now casting.
- Southern hemisphere cyclones and sea-ice links.
- Astronomical/Astrophysical observations.

(ii) Earth Science & Glaciology

- Geological & geophysical studies.
- Thematic studies of granulitic rocks, Proterozoic metamorphites, charnokites, orthogneisses, intrusive granite, mafic dykes, anorthosite, etc.
- Correlation between east and west parts of CDML as also with other areas of east Antarctica and related Gondwanaland fragments.
- Ice core drilling for paleo-environmental studies (mission mode project).
- Studies of lacustrine sediments/cores for palaeo environmental studies.
- Airborne/landborne geophysical surveys with multi sensors, including ice probe radar-transects and grid survey.
- Studies on Antarctic neotectonics activities employing GPS, seismic and other tools.
- Studies of satellite imageries for ice sheet fluctuations.
- Fluid inclusion studies on high-grade granulites.

(iii) Biology & Environment Sciences

- Primary, secondary production and population dynamics of lakes.
- Carbon cycle of lake eco-systems.
- Interaction between lake and glacial melt water inputs.
- Role of benthic algal mats in the nutrient cycle.
- Sea-ice microbial community structure and biodiversity.
- Contribution of microbial community to water column productivity.
- Dynamics and energetics of these communities.
- Study of physiological and molecular basis of adaptation of the flora and fauna.
- Identify and isolate enzymes which are active at low temperatures (mission mode).
- Identify and isolate molecules which have an anti microbial activity.
- GIS based wildlife census and cataloguing of shore line and pack ice regions.
- Population dynamics and behaviour of avian fauna.
- Temporal variation of wildlife as an environmental index.
- Identification of areas of SPA and SSSI on the basis of wildlife value.
- Continuous monitoring and conservation of soil, water and air qualities.
- Environmental audit and impact of waste management protocol.
- Develop oil handling, storage, spill and other emergency handling protocols.
- To extend assessment of EIA from local to regional levels.
- Generate baseline data for CEE/EIA studies in new areas of operation.

(iv) Human Physiology & Medicine

- Studies on molecular mechanism of acclimatisation.
- Assessment of nutritional requirement of expedition members.
- Study of apoptosis and ageing factor under cold conditions.
- Study of magnetic influence on psycho-physiological aspects.
- Framing out of work–rest schedule for members.
- Comparative studies of human behaviour and physiological/psychological changes in Antarctica with that of Arctic region.

(v) Engineering & Communication

- Application of non-conventional energy sources (wind, solar, fuel cells).
 - Application of VLF and ULF propagation as communication tools.
 - Development of long distance and cold region communication technology.
 - Development of incinerators, vehicles, life support systems for cold region utility.
 - Automatic conditioning monitoring and remotely operated systems.
 - Video conferencing.
 - Development of indigenous kit clothing for cold region utility.
3. Research programme in the field of Southern Ocean Oceanography & allied branches of science including logistics requirement may also be submitted which may be considered for the future southern Ocean cruises as and when planned. Besides the above themes & thrust areas, a sound proposal in any other scientific field/topic may also be submitted for consideration.
4. Those organisations who have already submitted their LONG TERM programme to NCAOR last year (2003) need not submit their proposal afresh. However, if any additional programme/information is proposed, the same can be submitted to NCAOR giving the reference of the earlier submitted proposal. Those who had submitted their proposal only for 23rd IAE and were not recommended need to submit their research proposal afresh if they intend to participate in the 24th IAE. All these organisations/P.Is have to present their proposal before the Group of Experts as and when invited. All those who intend to participate henceforth in any Antarctic expedition have to provide a Declaration (in enclosed PRESCRIBED FORMAT) duly endorsed by the Head of their respective Organisation for depositing a copy of all data, samples (as far as is practicable), information collected/generated during or after the expedition is over to NCAOR/DOD for the data archival at National Antarctic Data Centre of NCAOR, Goa.

5. Proposals for summer and winter periods are invited in the above areas of research. While framing the proposal, repetition of scientific work already carried out from the Indian station 'Maitri' in Antarctica should be avoided. Due consideration has to be given to the fact that the experiments have to be carried out within the logistic infrastructure available at 'Maitri' and should be limited to around 150 kms radius of the station. The proposal should be succinct, indicating the following:

- (i) the scientific aims and objectives with illustrations and references;
- (ii) expected results and their relevance;
- (iii) state-of-the art experiments in the international scenario;
- (iv) if an on-going programme, its accomplishments till date;
- (v) time frame of the project (summer/winter) with milestones;
- (vi) the team component (summer/winter) & logistic requirements;
- (vii) any national/international collaborations envisaged;
- (viii) proposal should have the complete biodata of the proposer(s) in enclosed prescribed format along with names of two referees. The P.I. should be a permanent employee and must have sufficient experience in the relevant field.
- (ix) There should be a long term research programme (2–4 yrs) to be undertaken by concerned PI/ Organisation/Institute with institutional commitment.

5(a) The regular participating organisations (like NGRI, GSI, BSI, ZSI, SASE, NPL, BU, IMD, DIPAS, IIG, NBRI & others) have to submit their long term **research programme for 3 years** (if not submitted so far). However, year wise (expedition wise) proposed activities should be properly spelled out.

(b) Those organisation/Institutes which are submitting their proposal for the first time should submit their long term research programme for 3 years. However, year wise (expedition wise) proposed activities should be properly spelled out. The new proposal with the commitment of their respective institutes for long-term research programme to be undertaken in Antarctica shall be given preference.

(c) Nominees recommended should be physically fit to work in extreme sub-zero temperatures and harsh conditions and should not have any ailments and illnesses which is likely to have an adverse effect or related problems. A medical fitness certificate from a Civil Surgeon of a Government Hospital must accompany all nominations. Nominations without such medical certificates will be summarily rejected.

(d) Nominees must be able to and willing to cooperate in cargo handling operations and station maintenance activities. They should also be willing to assist in expedition activities outside their assigned scientific tasks.

(e) All nominated members should be prepared to stay in accommodation on sharing basis, as may be available in the ship or in the Antarctic Station/Camps.

(f) All nominated scientists, especially those likely to be involved in outdoor activities must be able to cook a simple meal, and should have knowledge of first aid.

(g) It is also necessary to ensure that summer nominees have a work programme which is likely to take at least 45 days time on main-land Antarctica or in the polynya which should not be merely sample collection activity.

6. (i) The proposals would be scrutinised through a multi-tier selection mechanism and only those recommended for final inclusion will be informed for fulfilling other requirements. No correspondence in regard to selection will be entertained; (ii) "All approved proposals shall be implementable subject to guidelines/instructions/rules/regulations of Department of Ocean Development/NCAOR".

7. NCAOR/DOD makes arrangements for travel to Antarctica from Goa and back, accommodation in the ship and in Antarctica, food, special polar clothing requirements and personal insurance cover. All other expenses including those related to procurement of scientific equipments, attending pre-Antarctic trainings & briefings, Hard Duty Allowance, etc. will have to be borne by the participating organisations. This may be taken into account while forwarding the nominations.

8. NCAOR/DOD is also looking for the promising candidates having sufficient Antarctic stay experience and the qualities of leadership, team building and human resource management to be considered as the LEADER of the ensuing 24th Indian Antarctic Expedition. Such candidates need to be nominated by their respective organisation. Details of bio-data and professional experience of nominated candidate may kindly be sent to Director, NCAOR along with nomination.

9. Deadline for receiving proposals: **Three copies of the proposals are to be forwarded institutionally through proper channel** and must reach **The Director, National Centre for Antarctic & Ocean Research, Headland Sada, Vasco da Gama, Goa 403 804 by 15 March 2004**. Nominations received after this date will not be entertained. Such information is also available on our website www.ncaor.org.

Advt No. NCAOR/01/2004

Date: 12 January 2004

(Dr N. Khare)
Program Director (Science)
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Fax: 0832-252 0877, 252 0873
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Prescribed format to be used for submission of Research Proposal to participate in Indian Antarctic Expedition
(All columns have to be filled compulsorily and should be neatly typed)

1. Theme :
2. Field of investigation :
3. Project title :
4. Principal investigator with full Address Office/Res. (Tel. No., Fax No., email) :
5. CO-PI. with full address (Tel. No.———, Fax No.———, email———, Mobile———) :
6. Place of work :
7. Project summary :
8. Duration of project :
9. Total budget :
10. Source of funding provided from P.I's Organization, Sought from NCAOR/DOD :
11. Scientific aims & objectives :
12. Region of investigation in Antarctica :
13. International status :
14. National status :
15. Importance of the proposed project :
16. Review of expertise available in the proposed investigation :
17. Methodology :
18. Instruments/equipments to be used, self reliant, otherwise mention source :
19. Logistics requirements to carry out proposed scientific activities :
20. Whether helicopter support is needed. If yes, appox. No. of Flying hours needed :
21. Type of data to be generated :
22. Keywords of Meta data to be generated :
23. If an ongoing programme, its accomplishments till date :
24. Suggested plan of action for utilization of research outcome expected from the project :
25. Time schedule of activities (summer/winter) with milestones; :
26. The team component (summer/winter) (Name and addresses of actual participants) :
27. Any national/international collaborations envisaged :
28. Any other information in support of participation :

Signature of the Principal Investigator

(Endorsement from the Head of the Institute/Organisation)

1. Certified that the Institute has no objection in the implementation of the above project with long-term commitment and the participation of the above officials in Indian Antarctic Expedition.
2. Certified that the infrastructural and administrative facilities will be extended to PI throughout the duration of above mentioned project.
3. Certified that Institute will take financial and management responsibilities of the project as per the existing rules of the Institute.

4. Certified that all other expenses including those related to procurement of scientific equipments, attending pre-Antarctic trainings, medicals & briefings, Hard Duty Allowance, etc. will have to be borne by the participating organisations.
5. Certified that an undertaking in prescribed format regarding data submission to NCAOR/DOD shall be provided.

Name and Signature of
Head of the Institute/Organisation
SEAL

(Please note in case there is no input, use N.A or NIL as applicable)

BIO-DATA OF PRINCIPAL INVESTIGATOR

(Brief in 2–3 pages only)

- | | |
|------------------------------------------------------------------------------------|---|
| 1. Name & Address (Office/Res.) (in BLOCK LETTERS) | : |
| 2. Designation | : |
| 3. Date of Birth | : |
| 4. Name of Institution | : |
| 5. Academic qualification | : |
| 6. Details of research career | : |
| 7. Type of works engaged | : |
| 8. Details of research work carried-out and major achievements | : |
| 9. Publications | : |
| 10. Sponsored project completed/in progress | : |
| 11. Consultancy/Contract Research/Contract Training services rendered | : |
| 12. Memberships/Fellowships of Scientific/Professional bodies/Societies/Academies | : |
| 13. Honours/Distinctions, if any, received in recognition of the research activity | : |
| 14. Involvement in the administrative/organisational activities of the Institute | : |

Signature of the Principal Investigator

DECLARATION

(to be provided on official letterhead by the participating expedition member/s)

1. I/We _____ (Name of the expedition member/s) member/s of Summer/Winter team of 23rd Indian Antarctic Expedition do hereby Solemnly affirm that I/We shall hand over all Data (Raw as well as processed) generated during and after the Expedition in which I/We participated to NCAOR within the stipulated time as decided by NCAOR/DOD.
2. I/We also affirm that I/We shall provide a part of the Samples (with details & locations) as far as practicable collected by me/us during my/our stay in Antarctic Expedition to NCAOR on my/our return to be used as reference material at NCAOR.
3. I/We also affirm that I/We shall provide all possible details including methodology, equipments used etc. in generating Data/Samples collection.
4. I/We shall acknowledge DOD/NCAOR in all publications arising out of Data generated during my/our Expedition.
5. I/We shall provide a copy of all publications on Antarctic Research immediately to NCAOR.
6. I/We shall abide by the guidelines/policies of DOD/NCAOR related to Indian Antarctic Expedition issued from time to time and provide all possible inputs to DOD/NCAOR as and when required related to Antarctic Expedition.

Signature of the Head of the organization
with official Seal
Dated:

Name & Signature of
Participating Expedition Member/s