

# NATIONAL CENTRE FOR ANTARCTIC AND OCEAN RESEARCH

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

Advt No. NCAOR/5/2003

Date: 10 March 2003

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

1. The National Centre for Antarctic and Ocean Research (Department of Ocean Development) sends scientific expedition to Antarctica every year. The twenty-third Indian Scientific Expedition to Antarctica will be launched in December 2003 and will consist of a summer team which will return to India in March 2004 and a winter team which will return to India in March 2005. Subsequent expeditions shall be launched accordingly.

2. The National Centre for Antarctic and Ocean Research (NCAOR) invites scientists/researchers/engineers to submit research proposals for undertaking front-ranking scientific experiments in Antarctica in various inter-disciplinary fields/themes for 23rd (2003–2004), 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 and Atmospheric Sciences*

- Whistler/VLF, riometer, electrical and geomagnetic studies; Sky image camera for optical aeronomical and 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); Infra-red gas analyser, gas chromatograph and Fourier transform spectrometer for measuring of green house 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 access 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 casting; Southern hemisphere cyclones and sea-ice links.

### *(ii) Earth Science and Glaciology*

- Geological and 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 and Environment Sciences*

- Primary, secondary production and population dynamics of lakes; Carbon cycle of lake ecosystems; 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 wild life census and cataloguing of shore line and pack ice regions; Population dynamics and behaviour of avian fauna; Temporal variation of wild life as an environmental index; Identification of areas of SPA and SSSI on the basis of wild life 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 and 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 and Communication*

- Application of non-conventional energy sources (wind, solar, fuel cells); Application 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 and allied branches of science including logistics requirement may also be submitted. Besides the above themes and thrust areas, the sound proposal in any other scientific field/topic may also be submitted for consideration.

4. 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) and logistic requirements; (vii) any national/international collaborations envisaged; (viii) proposal should have the complete biodata of the proposer(s) 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, B.U., IMD, DIPAS, IIG NBRI and others) have to submit their long-term research programme for 4 years. However, year wise (expedition wise) proposed activities should be properly mentioned.

(b) Those organisation/Institutes which are submitting their proposal for the first time should submit their long-term **research programme for 4 years**. However, year wise (expedition wise) proposed activities should be properly mentioned. 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 are likely to have an adverse effect or related problems. A medical fitness certificate from a Civil Surgeon of 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 and 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 and 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. Deadline for receiving proposals: Three copies of the proposals are to be forwarded institutionally through proper channel and must reach the Centre Director, National Centre for Antarctic and Ocean Research, Headland Sada, Vasco da Gama, Goa 403 804 by **30th April 2003**. Nominations received after this date will not be entertained. Such information is also available on our website [www.ncaor.org](http://www.ncaor.org).

Contact: Dr N. Khare, Program Director (Science), Ph: 0832-2520861, Fax: 0832-2520877, 2520873, E-mail: [khare45@hotmail.com](mailto:khare45@hotmail.com).

(Dr N. Khare)