

India in the Antarctic

On 11 April 2008, the 27th Indian Scientific Expedition to Antarctica returned home. This expedition was launched from Marmagoa Port Trust, Goa on 6 December 2007 on-board *MV Emerald Sea*, under the coordination and supervision of the National Centre for Antarctic and Ocean Research (NCAOR), Goa. Specific scientific tasks were undertaken at Larsemann hills where a third research station is proposed, as well as at Maitri, India's permanent research base in Central Dronning Maud Land. Scientists from over 20 research laboratories and institutes participated in the expedition.

Antarctica, the icy continent, is unique in having 98% of the land mass covered with ice. The continent was once contiguous with India as a part of the Gondwana land mass, some 120 million years ago.

Antarctica was the last continent to be discovered by man on earth. This continent is remote and has a harsh climate and inhospitable terrain and was therefore inaccessible for long¹. It is now emerging as an important research location for the understanding of global environmental concerns. Scientists can now find answers to certain unanswered questions, like the ones related to the origin of continents, climate change, meteorology and pollution.

India marked its presence in Antarctica in December 1981, when the first expedition was flagged-off from Goa. Since then the Department of Ocean Development (DOD), now upgraded to Ministry of Earth Sciences, Government of India has been launching scientific research expeditions annually to Antarctica in order to explore its environment for scientific investigations on palaeoclimate, atmospheric science, depletion of ozone layer, etc. In 1983, India constructed its permanent base 'Dakshin Gangotri' on the ice shelf off the Princess Astrid coast in central Dronning Maud land. This station continued to shelter the members of the Indian expedition to Antarctica until the summer of 1989, when it had to be decommissioned due to excessive snow accumulation.

The second research station Maitri was set up in 1988–89 on the ice-free rocky

foundation of the Schirmacher oasis. The oasis offered an ideal location to carry out multifaceted scientific expeditions in the upper atmosphere, meteorology, geomagnetism, seismology, solid rock geology and geophysics, metamorphic petrology, limnology, structure and tectonics, geomorphology and glaciology. Maitri is equipped with scientific laboratories, GPS station, seismological observatory, ice drilling, etc.

Till date India has sent 27 expeditions to Antarctica, including one to the Weddell Sea and one to the Southern Ocean for krill exploration.

NCAOR, an autonomous R&D institution under the Ministry of Earth Sciences, established in 1998, is designated as the nodal organization for coordination and implementation of the Indian Antarctic programme, including maintenance of India's permanent station in Antarctica. The University of Goa and University of Mangalore recognize NCAOR as a research centre for doctoral research. The centre also houses the first polar R&D laboratory with a low-temperature laboratory complex at -20°C for preservation and analysis of ice core and snow samples.

With the growing concern about climate change and global warming, there cannot be a better place than Antarctica to study these effects. Ice cores are obtained by drilling into thick sheets of ice. These ice cores retrieved from the continent are a treasure house of information on the palaeoclimate and eco-history of the earth as records of wind-blown dust, volcanic ash or radioactivity are preserved in the ice as it gets accumulated over time. The ice-core laboratory research team at NCAOR has obtained several ice-core samples from Antarctica for analysis and processing. With a storage temperature of up to -20°C , the ultra cold room can store ice cores transported from Antarctica in storage cases made of expanded poly propylene for protecting the ice cores from fluctuations in temperature².

India's contribution to scientific activities in Antarctica has evolved into a comprehensive ongoing programme. India was admitted to the Antarctic treaty

on 19 August 1983. It is a member of the Scientific Committee on Antarctica Research and Standing Committee on Antarctic Logistics, and party to the Convention on Conservation of Antarctic Marine Living Resources.

The Indian Antarctic programme is a multidisciplinary and multi-institutional programme. Various disciplines of polar science research are being covered by India in Antarctica, such as atmospheric sciences, biological, earth, chemical and medical sciences. From scientists to academicians, and from engineers to medical practitioners, members from around 60 leading institutions, universities and research laboratories across the country have been part of the Indian Antarctic expeditions and more institutions are joining the mission. In addition, support from the Army, Navy and Air Force is worth mentioning. They provide logistics, including maintenance of station, transportation over ice and snow, maintenance of snow vehicles and medical cover¹.

A third research station is proposed to be set up shortly. A special task force, as a part of the XXIII Indian Antarctic expedition was constituted by NCAOR under the leadership of Rasik Ravindra, to find a suitable place for the third station. The team that undertook a voyage to Amery ice shelf, Prydz Bay region in February 2004, examined the area between 66°E and 78°E longitudes. The construction will commence after obtaining the necessary clearances from international and national bodies.

1. Chaturvedi, S., Khare, N. and Pandey, P. C., *India in the Antarctic – Scientific and Geopolitical Perspectives*, South Asian Publishers, 2005.

2. www.ncaor.org

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