

Achievements During XXV Indian Scientific Expedition to Antarctica

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Scientific

1. Ice core output of 65.04 meters was recovered from the Humbolt Glacier, Cape Ice at Lat: 71 deg 20' 38"S, 11 deg 35' 38" E and 74.98 meters was recovered from the Shelf at Lat: 70 deg 11' 57.4" S, 12 deg 27' 25.1" E.
2. Acquired the depth profiles with coordinate tags for three fourth of Priyadarshani Lake. Crevasse detection on way to establishing the Ice Core drilling camp about 70 Km south of Maitri by using GPR measurements.
3. Carried out bathymetric survey of Priyadarshini Lake using Echo sounder.
4. Magnetotelluric investigations were carried out in 8 selected sites in and around Schirmacher Oasis.
5. Concurrent/non-concurrent ground truth data collection over cap ice with respect to IRS P6 satellite passes, with the indigenously developed radio meters which will be used for the onboard radiometric calculation of IRS P6 AWiFS sensor.
6. Construction of Seismometer Pier inside the Vault for the Installation of Seismometers and up gradation of the Broad Band Seismic System with Geotech KS2000M sensor and Smart24R Digital acquisition system.
7. Continuous operation of the Seismological Observatory without any interruption. 440 Earthquake Events recorded during the year 2006.
8. Turbo Rouge GPS receiver was in operation on a continuous basis throughout a permanent marker at Maitri.
9. Continuous operation of the following systems through out the year.
 - i. Two flux gate magnetometers, one at Maitri and one at shelf.
 - ii. Digital Proton Precession Magnetometer operation at Maitri to measure the total magnetic field with sampling rate of 5 seconds.
 - iii. 30 MHz Riometer at Maitri for D-region absorption studies and the data sampled for every second with an averaging of one minute and one hour.

- iv. For GEC studies an electrometer with a 500 second atmospheric relaxation time was in operation to measure the Air-Earth current. A Field mill to measure the vertical potential and a Passive Antenna electrometer to measure the electric potential at one meter height was also in operation.
- v. Installed and operation of GPS (Leica system 1200 with MET tower) at Maitri, with a data sampling of 30 seconds, for TEC studies.
10. A newly fabricated Gerdian Condenser is operational from December 2006 to measure the atmospheric conductivity, both positive and negative, with a sampling rate of 4 seconds.
11. Observation and recording on a continuous basis various metrological parameters for the whole year.
 - i. 3 hourly synoptic observations at Maitri and 6 hourly synoptic observations for GTS (Global Communication System).
 - ii. Surface Pressure, D.B. Temperature, Wind Speed, Wind direction, Cloud Coverage, Surface Ozone and Diffused & Direct Solar Radiation through self recording instruments and their computation and tabulation has been done for the whole year.
12. 42 Ozone Sonde ascents for vertical profile for the study of ozone.
13. Operation of Brewer Spectrophotometer for measurement of total Ozone, UVB, SO₂ and NO₂ on all the days of clear sky conditions.
14. Installed New APT (Automatic Picture Transmission) System for reception of low resolution cloud imageries from satellites and made fully operational.
15. Temporal and Spatial variations of energy balance of different snow and ice media in Antarctica using RRTS (Radio based Remote Telemetry System) for the whole year.
16. Provided uninterrupted email and telecommunications services throughout the expedition.
17. Magnetotelluric investigations were carried out in 8 selected sites in and around Schirmacher Oasis.
18. Carried out the psychological tests for the entire summer members of the 25th ISEA during the ship voyage and also few members of 25th ISEA.

19. Three phases of psychological assessments were conducted during pre-winter, winter and post-winter period.
20. Detailed mapping of approximately 2 sq kms area in the Schimarchar Oasis has been completed.
21. Identification and Re-observation of 28 GPS stations around Schirmacher Oasis.
22. Ionospheric Scintillation & TEC monitoring permanent station was build at location 70° 46' 1.7" S and 11° 44' 7.4".

Logistics

1. Overnight unloading of cargo from the ship and loading of the back loading containers.
2. Completion of Cargo and Fuel from the shelf to the Station in Six Convoys well before the onset of Polar nights.
3. Modification of the cooling system of 125 KVA generators which had provided a permanent solution to the age old 'Over heating problem of these generators. This has given the impetus to synchronize the entire electrical load of the station on one single generator as against two generators which was in practice till now. Thus leading to a whopping saving of 75 Kl high cost fuel per year.
4. Overhaul of all the 12 generators (2 x 125 KVA, 8 x 62.5 KVA, 2 x 30 KVA) in a systematic and phased manner, a mammoth task carried out through the toughest period of Antarctic weather conditions during Polar Nights.
5. Establishment of summer camp with ten living modules and two bath modules, a huge exercise which involved transportation of the living modules from the shelf, leveling of ground, electrification, and plumbing works.
6. Construction of New Pump House with proper foundation and housing for the pumps, motors and other accessories creating additional space for working.
7. Fabrication and establishment of 'Sauna', a dream come true for any Martian and a fine example of resource management.
8. The largest number of convoys carried out with the largest cargo handling operation which also includes four convoys for the establishment of Ice Core drilling camps.

9. Reconnaissance for the Ice – Core drilling by helicopters keeping in view the safety measures.
10. 80 KI aviation fuel was transported from the Russian Barrier to Novo air-base at very crucial juncture to project the Indian support for the DROMLAN Project.
11. Preparation of 20 back loading containers through Shramdaan with the participation of all members of the station.
12. Relocation and renovation of gymnasium.
13. Fabrication of storage racks for all spare parts in the containers thus creating more space for storage and optimum utilization of the containers available.
14. Renovation of communication room.
15. Renovation of kitchen.
16. Snow clearance on the airfield.
17. Maintenance of the complete fleet of Pisten Bullies by service engineer from the manufacturer M/s Kassbohrregelenderfeug. First of this kind in Indian Antarctic Expeditions.
18. Strengthening of columns below Maitri, giving it an additional life.
19. Use of Anti-Freeze coolant meant for piston bully vehicles, in the central heating system making it more efficient and maintenance free.
20. Maiden Aerial visit to Vostok, the Russian station by four members from Maitri by the ALCI IL-76 flight.