National Centre for Polar & Ocean Research
Indian Scientific Expedition to Antarctica (ISEA)

MAITRI- Indian Research Station at Schirmacher Oasis, Antarctica

Since 1983 the Indian scientific endeavours in Antarctica have been sustained on a year-round basis, from the Indian Permanent stations “Dakshin Gangotri” (1983-89) and “Maitri” (1989 – till date). In the year 1988 an ice free, rocky area on the Schirmacher Oasis was selected to build the Second Research Station “Maitri” (-70.76683367 and 11.73078318). It is an inland station about 100 km from the shore at an elevation of about 117 meters above sea level.

Maitri during austral summers

Maitri Stations after blizzard

The building was erected on steel stilts, and has since stood the test of time. The infrastructure available at the station has enabled the scientists to conduct research in various disciplines such as Atmospheric Sciences &

Meteorology, Earth Sciences including Glaciology, Human Biology & Medicine, Biology & Environmental Sciences etc.

Maitri also serves as a gateway to one of the largest mountain chains in central Dronning Maud land, located south of Schirmacher. About 20,000 sq. km. area in Wohlthat, Orvin, and Muhlig Hoffmann Ranges have been geologically mapped by Indian scientists, making Maitri as their base Station. Several research programs initiated by India in the Schirmacher oasis and its environs have also contributed directly to global experiments mounted under the aegis of the Scientific Committee on Antarctic Research (SCAR). It has a capacity to accommodate 65 persons in summer and 25 in winter.

Maitri is approachable by sea route between November and March of the succeeding calendar year (Austral Summer season) from Cape Town. The voyage plan varies annually depending on the operational requirement. Alternately, Maitri is also approachable by chartered flights between Cape Town and Novolazarevskaya (Novo) air strip under the aegis of Dronning Maud Land Air Network (DROMLAN) between November and February of the succeeding calendar year. Cape Town-Novo flights (ILLUSION-76 aircrafts) take about 5.5 hours. Flight operations require intricate planning and are not available as a matter of choice, but based on operational requirements.

1. MODE OF TRANSPORT AROUND MAITRI

To provide logistical support and smooth transportation for carrying out field work and for collecting samples from far off locations, transport / earth movers /load hauling vehicles are available at the station. These can be used with the prior permission from the Leader at the station. Two helicopters remain onboard ship and provide a

convenient and quick way for field work.

However, Schirmacher Oasis (area ~32 km^2) for field work and sample collection is approachable on foot.

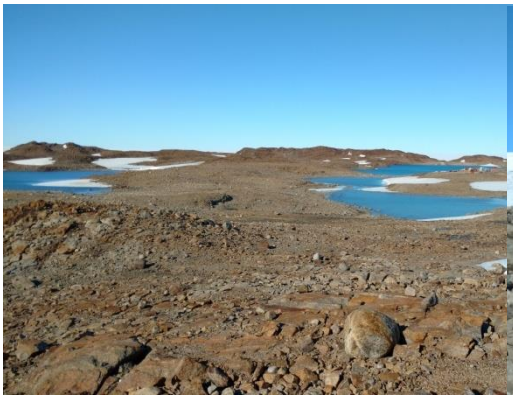

Table: Available assets at Maitri Station

S. No.	Vehicles	Number
1	Pisten Bully	12
2	Snow Scooter	06
3	Toyota arctic truck	01
4	Tata Xenon – XT	02
5	Bulldozer (BD-50)	01
6	Mantis Crane 50 MT/27 MT/18 MT	06
7	Excavator- R340L	01
8	Trailer	23
9	Sledge	14
10	Side loader	02

2. OPERATIONAL EXPERIMENTS AT MAITRI STATION

Apart from the experiments performed during the previous expeditions following experiments/ instruments are running in and around the Maitri station;

2.1. Moveable Atmospheric Radar for Antarctica (MARA)

MARA is very high frequency (VHF) radar operating at frequency 54.5 MHz. It provides continuous measurements of full height profiles of turbulence, waves, winds and static stability in the boundary layer, free troposphere, lower stratosphere and in the mesosphere near-mesopause. [NCPOR]

2.2. Ionospheric Scintillation and TEC Monitoring:

For the ionospheric scintillation and total electron content monitoring GSV-4004B GISTM receiver is operational. It is a dual-frequency 12 channel GPS receiver and specifically configured

to measure amplitude and phase scintillation from L1 frequency along with Ionospheric Total Electron Content (ITEC) from the L1 & L2 frequencies. All-sky camera additionally observed clouds and auroral activity. [NCPOR]

2.3. Magnetometers:

Different types of magnetometers (Digital Fluxgate magnetometer – DFM, Proton Precision magnetometer – PPM, Induction Coil magnetometer – ICM) are continuously monitoring terrestrial magnetic field. Magnetic observations are vital for understanding the electromagnetic changes in the near-Earth environment due to internal or external origin. [IIG]

2.4. Imaging Riometer:

Cosmic radio waves reaching to the Earth's surface are monitored by Imaging Riometer at 38.2 MHz. Strength of the cosmic radio signal varies with the changing ionospheric density, which is affected by various space weather events. Riometer in turn provides a method to passively study the ionospheric conditions and dynamics. [IIG]

2.5. Grating-cum-prism (GRism) Spectrograph

A grating-cum-prism based spectrograph (ultra-fast f/2.8 optics, field-of-view ~180 deg and spectral coverage ~385-725 nm) aims to record aurora and airglow spectra. It helps understand the Solar wind-Magnetosphere-Thermosphere-Ionosphere coupling and associated changes in the Polar Region-Auroral Oval and high-latitudes.[IIG]

2.6. Global Atmospheric Electricity:

Extremely weak return current is observed in the fair-weather regions, which is driven by thunderclouds in the troposphere. Long-wire antenna and electric field mill monitor atmospheric current and electric field, which in turn provides global pattern of thunderclouds. [IIG]

2.7. Meteorological observations:

Automatic weather station (AWS) continuously monitors atmospheric parameters, for example, temperature, pressure and humidity. Balloons are periodically launched from Maitri to record altitude profile of temperature and ozone content. [IMD]

2.8. Seismograph:

Seismograph located at 70° 45′ 56.21" S and 11° 44′ 10.78 " E records ground vibrations in the frequency range of 0 to 500 Hz. Mainly used for studying the seismic waves, earthquakes and deep interior of earth. [NGRI]

2.9. Global positioning system (GPS):

GPS takes signals from satellite and provide accurate coordinates and their temporal variation.It receives signals in the frequency range of 1176-1575 MHz and is located at 70° 45′ 56.21" S and 11° 44′ 10.78 " E. Useful in studying the crustal deformation and plate movements.[NGRI]

2.10. Atmospheric Aerosol:

A suit of instruments such as aethalometer, nephelometer, aerodynamic particle sizer (APS), sunphotometer regularly monitor the local and long-range transport of anthropogenic emissions. [NCPOR].

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Please feel free to get in touch for clarifications with our team,

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