

5. Maitri II – Science & Technology

The Finance Ministry has approved Maitri II, India's upcoming Antarctic research station, marking a major milestone in India's polar research programme under the Ministry of Earth Sciences (MoES).



Introduction to India's Antarctic Programme (IAP)

Initiation – India Antarctic Programme (IAP) was launched in 1981 to strengthen India's presence in Antarctica and support scientific research in extreme environments.

Objectives –

1. Promote multidisciplinary scientific research in areas like climate change, glaciology, oceanography, atmospheric sciences, and marine biology.
2. Establish a sustainable, long-term Indian presence in Antarctica.
3. Facilitate international collaboration under the Antarctic Treaty System (ATS).

Implementing Agency – National Centre for Polar and Ocean Research (NCPOR), Goa, under the Ministry of Earth Sciences (MoES).

Research Stations –

1. **Dakshin Gangotri** – India's first base, operational from 1983, now abandoned due to ice submergence.
2. **Maitri** – Second base, operational since 1989.
3. **Bharati** – Third base, established in 2013.
4. **Maitri II** – Fourth base, proposed for completion by January 2029.

Annual Expeditions – India conducts seasonal expeditions for research, logistics, and international cooperation.

Antarctic Treaty System (ATS)

Established – 1959; came into force in 1961.

Key Principles – Antarctica is a peaceful, scientific preserve. Prohibition of military activity and mineral exploitation. Promotion of scientific research and data sharing among nations.

India's Compliance – Aligns its research, resource usage, and environmental protection with ATS principles. Antarctica Act, 2022 provides India with a legal framework to regulate expeditions, ensure environmental protection, and enforce penalties for violations.

Maitri Research Station (Existing Base)

Operational Since – 1989, succeeding Dakshin Gangotri.

Location – Schirmacher Oasis, East Antarctica, about 100 km inland.

Infrastructure – Laboratories for meteorology, atmospheric sciences, and glaciology. Living quarters and fuel storage. Summer camp facilities for seasonal operations.

Achievements – Hosted hundreds of scientific expeditions. Advanced knowledge in seismology, glaciology, and climate studies. Strengthened India's global role in polar research.

Challenges – Design life of 10 years exceeded; now over three decades old. Structural integrity and waste management issues.

Future Role – Once Maitri II is operational, the existing Maitri will function as a summer camp, supporting seasonal scientific activities.

Maitri II Research Station

Proposal and Timeline – India's fourth Antarctic research base.

Targeted completion – January 2029.

Estimated cost – ₹2,000 crore.

Location – Eastern Antarctica, strategically chosen to enhance research coverage.

Objectives – Strengthen India's long-term scientific presence. Support multidisciplinary research in –

1. Meteorology
2. Glaciology
3. Geology
4. Oceanography
5. Climate change studies

Sustainability Features

Green and energy-efficient design – Harness solar and wind energy. Incorporate advanced waste management systems. Minimise ecological footprint to comply with Antarctic environmental norms.

Technological Upgrades – Automated instruments capable of continuous data collection and transmission, even during harsh winter months when unmanned. Supports remote monitoring and real-time research data sharing with India.

Strategic Significance of Maitri II – Enhances India's scientific footprint in Antarctica, increasing research output and collaboration opportunities. Strengthens India's ability to monitor climate change impacts, polar ice dynamics, and oceanography. Promotes technology-driven, sustainable, and resilient research infrastructure in extreme conditions. Supports India's commitments under the Antarctic Treaty System and Protocol on Environmental Protection.

Antarctica Act, 2022 – Provides legal framework for India's Antarctic operations.

Key provisions –

1. Regulation of Indian expeditions to Antarctica.
2. Ensures environmental protection and sustainable research.
3. Controls resource usage and prohibits illegal exploitation.
4. Enforces penalties for violations, aligning domestic law with international treaties.

Contributions to Science

1. Maitri and Bharati Bases – Provided data for climate modeling, polar glaciology, seismology, and atmospheric research. Hosted international collaborations under ATS guidelines.

Expected from Maitri II –

1. Support long-term multidisciplinary research.
2. Enhance data collection during winter months via automated systems.
3. Promote research in emerging areas like climate resilience, polar microbiology, and oceanography.

Conclusion

Maitri II represents a strategic, scientific, and sustainable expansion of India's Antarctic programme. Complements existing bases by increasing year-round research capacity. Aligns with India's global scientific ambitions, ATS commitments, and environmental sustainability goals. Once operational, Maitri II will strengthen India's leadership in polar research, support international collaboration, and enhance understanding of climate and polar ecosystems.

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