



## India's Tryst with Antarctica

This editorial is based on “[Southern sojourn: On the 46th Antarctic Treaty Consultative Meeting in India](#)” which was published in The Hindu on 25/05/2024. The article brings into picture the 46th Antarctic Treaty Consultative Meeting in Kochi, where delegates focused on regulating rising tourism in Antarctica to protect its environment and address territorial concerns.

**For Prelims:** [Antarctica](#), 46<sup>th</sup> Antarctic Treaty Consultative Meeting, A23a iceberg, [IceCube Neutrino Observatory](#), [Penguin](#), [Antarctic Treaty](#), Maitri and Bharati

**For Mains:** Significance of Exploring Antarctica For India, Measures for India to Enhance its Role and Contributions in Antarctica

The icy expanse of [Antarctica](#), untouched by human civilization and teeming with unique life forms, has long held a sense of mystery. This remoteness, however, is rapidly changing. Tourism to the continent has seen a phenomenal rise, with visitor numbers jumping from **8,000 in 1993 to over 1,05,000 in 2022**. This surge has ignited concerns about the continent's delicate ecosystem, prompting the ongoing **46<sup>th</sup> Antarctic Treaty Consultative Meeting (ATCM) held in Kochi, Kerala** to debate the very future of tourism in this pristine wilderness.

The debate at the ATCM represents a critical juncture for Antarctica. India, as a rising power with a growing stake in the continent's future, has a unique opportunity to **champion responsible tourism** and ensure that the pristine beauty of Antarctica remains accessible for generations to come.

### Why is Antarctica Becoming Increasingly Significant?

- **Climate Change Implications:** Antarctica plays a crucial role in Earth's climate system, and the **melting of its ice sheets** has far-reaching consequences for global sea levels and weather patterns.
  - The recent satellite pictures showed that the **Antarctic iceberg called A23a** was moving beyond the northern tip of the Antarctic Peninsula.
- **Resource Potential:** Antarctica is believed to hold significant reserves of valuable minerals, including **rare earth elements, coal**, and potentially **untapped oil and gas deposits**.
  - With the growing global demand for resources and the depletion of traditional sources, the potential for responsible and sustainable resource exploration in Antarctica has gained attention.
- **Scientific Research Opportunities:** Antarctica's unique and pristine environment offers unparalleled opportunities for scientific research across various disciplines, including **glaciology, astronomy, geology, and biology**.
  - As technological advancements enable more sophisticated research methods, the scientific value of Antarctica continues to increase.
  - Example: The [IceCube Neutrino Observatory](#), located at the Amundsen-Scott South Pole

Station in Antarctica.

- **Rising Geopolitical Interests:** As nations seek to establish their presence and influence in strategically important regions, Antarctica has become an area of growing geopolitical interest.
  - Countries are vying for a stronger voice in the governance and decision-making processes related to the Antarctic region, driven by potential resource opportunities and a desire for global influence.
  - The USA has three stations in Antarctica. China opened its 5<sup>th</sup> station (**Qinling Station**) in Antarctica in **February, 2024**
- **Environmental Monitoring and Conservation:** Antarctica serves as a critical indicator of global environmental changes, and monitoring its ecosystems and wildlife provides valuable insights into the health of the planet.
  - The Antarctic Peninsula is one of the regions experiencing the fastest warming on Earth, leading to significant changes in [penguin and krill populations](#).
- **Tourism and Adventure:** As adventure tourism continues to grow, Antarctica's unique and untouched landscapes have become an attractive destination for travelers seeking extraordinary experiences.
  - According to the **International Association of Antarctica Tour Operators (IAATO)**, a record 105,331 people visited Antarctica over the 2022-23 season.

## What is the Antarctic Treaty?

- **About:** Signed in **1959** by 12 countries active in Antarctic research during the **International Geophysical Year (1957-58)**.
  - Currently has **57 member nations** including **India** (joined the treaty in 1983).
- **Key Provisions:**
  - **Peaceful Use:** Antarctica is dedicated to peaceful purposes only (Article I).
  - **Scientific Collaboration:** Freedom of scientific investigation and cooperation are encouraged (Article II).
  - **Information Sharing:** Scientific observations and results must be exchanged and made readily available (Article III).
- **Territorial Claims:**
  - Seven signatory countries (**Argentina, Australia, Chile, France, New Zealand, Norway, and the UK**) have overlapping territorial claims.
    - Other countries do not recognize these claims.
  - The US and Russia maintain a "**basis of claim**" without asserting it.
  - Article IV maintains the status quo by:
    - Disallowing any existing activity to be used to support or deny territorial claims.
    - Prohibiting new or expanded territorial claims while the Treaty is in force.
- **Inspection Regime:**
  - To ensure adherence to the Treaty, all areas of Antarctica, including stations and installations, are subject to inspection by any Party at any time (Article VII).

## What is the Significance of Exploring Antarctica For India?

- **Advancing India's Space Program:** Antarctica's unique location and conditions make it an ideal testing ground for India's space technologies, such as [landers, rockets and remote sensing systems](#).
  - Conducting environment-friendly experiments and trials in the harsh Antarctic environment could help India refine its space technologies for future missions.
- **Securing Energy and Mineral Resources:** With India's growing [energy demands](#) ( **third-largest consumer of energy** in the world) and the need for [critical minerals](#), Antarctica's potential for responsible and sustainable resource exploration could help address the **country's long-term resource security needs**, subject to the Antarctic Treaty System's regulations.
- **Advancing Climate Change Research and Adaptation:** India's geographical location (**Cap of [Himalayas](#) to North and Sandal of Seas in South**) that increases its vulnerability to climate change impacts make it crucial to understand the changes in Antarctica climate systems.

- **Strengthening India's Maritime Capabilities:** India's involvement in Antarctic logistics and operations could provide valuable opportunities to enhance its maritime capabilities, including navigation in **icy waters, ship-building for polar environments, and developing advanced icebreaker vessels.**
  - This would bolster India's strategic interests in the Indian Ocean region and beyond.
- **Exploring Bioprospecting Opportunities:** Antarctica's unique ecosystems have the potential to yield novel microorganisms, enzymes, and bioactive compounds with applications in industries such as [pharmaceuticals](#), **biotechnology, and agriculture**. Indian researchers could explore bioprospecting opportunities in Antarctica, contributing to the **country's [bioeconomy](#).**

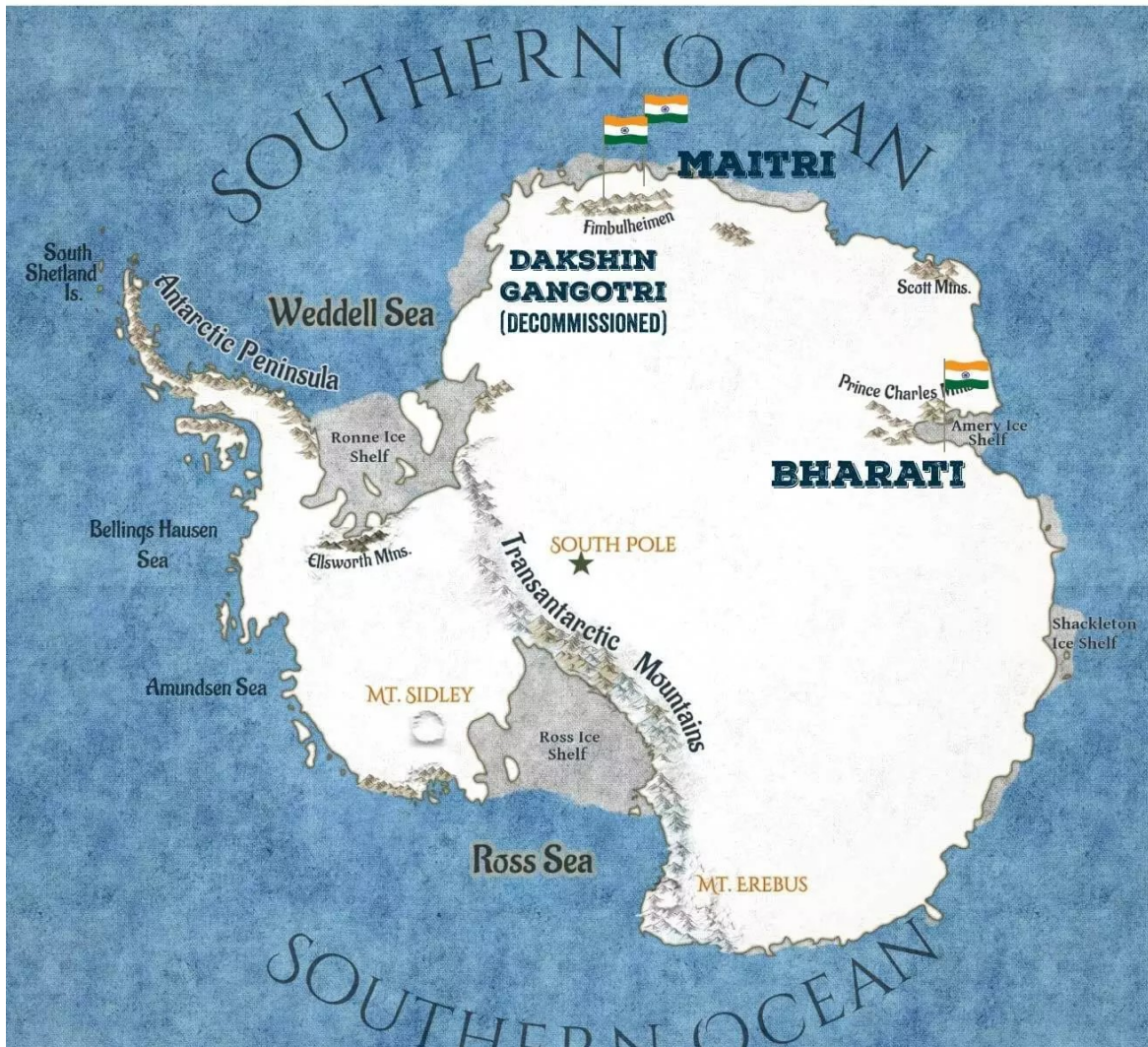
## How can India Enhance its Role and Contributions in Antarctica?

- **Developing Advanced Autonomous Systems for Polar Exploration:** India can be a frontrunner in developing advanced autonomous systems leveraging robotics and [artificial intelligence](#), such as [unmanned aerial vehicles \(UAVs\)](#) and underwater vehicles (AUVs), specifically designed for polar exploration.
  - These systems could be used for **mapping, surveying, and monitoring** by different countries, enhancing **India's scientific diplomacy.**
- **Collaborate on Rare Earth Element (REE) Exploration:** With the growing demand for rare earth elements in high-tech industries, India could collaborate with other nations to conduct geological surveys and assessments of potential [REE deposits](#) in Antarctica.
  - This could position India as a key player in future responsible and sustainable REE exploration efforts, **subject to the [Antarctic Treaty System's regulations](#).**
- **Invest in Sustainable Infrastructure Development:** India could invest in developing sustainable infrastructure in Antarctica, such as renewable energy systems, waste management facilities, and **eco-friendly transportation solutions.**
  - This would not only support India's research and logistical operations but also demonstrate its commitment to minimizing environmental impacts in the region.
  - Currently, [Maitri and Bharati](#) are the two active research stations that India operates in Antarctica.
    - In April 2024, the **Department of Posts** opened a second branch of the post office at the Bharati research station in Antarctica after almost four decades.
- **Promote Responsible and Sustainable Antarctic Tourism:** India could collaborate with international partners to develop guidelines and best practices for responsible and sustainable Antarctic tourism.
  - This could involve training Indian tour operators and guides on **minimizing environmental impacts**, adhering to strict regulations, and offering educational experiences that raise awareness about the region's unique ecosystems and the importance of conservation.
  - **India**, in the **46<sup>th</sup> Antarctic Treaty Consultative Meeting**, pressed for a proposal to introduce a regulatory framework governing tourism in the continent.

**Note:** In 1984, India established its first post office in Antarctica at **Dakshin Gangotri**, which was also its first research station. Unfortunately, in **1988-89**, Dakshin Gangotri was submerged in ice and subsequently decommissioned.

- [National Centre for Polar and Ocean Research \(NCPOR\)](#) is India's premier R&D institution responsible for the country's research activities in the Polar and Southern Ocean realms.

# INDIAN RESEARCH STATION IN ANTARCTICA



## **Drishti Mains Question:**

Discuss the strategic and scientific significance of Antarctica for India and elaborate on how India can enhance its contributions and leadership in the region.

## **UPSC Civil Services Examination, Previous Year Question (PYQ)**

### *Mains:*

**Q.** How do the melting of the Arctic ice and glaciers of the Antarctic differently affect the weather patterns and human activities on the Earth? Explain. **(2021)**

**Q.** Why is India taking keen interest in resources of Arctic region? **(2018)**

