

ANTARCTICA: A NATURAL LABORATORY AND WORLD PARK

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INTRODUCTION

Antarctica is the 5th largest of all the seven continents. The total surface area is about 14.2 million square kilometer. In a winter Antarctica double in size due to the sea ice. It is larger than Europe and makes the one-tenth of earth's land. The temperature in Antarctica has reached -89°C (-129°F). Antarctica is a unique continent in that it does not have a local population. There are no countries in Antarctica.

RESEARCH METHODOLOGY

Research Design:

The present study is analytical in nature and comprises secondary data which is collected from books, periodicals, journals and news papers. Information has also been taken from the websites.

Objectives of the Study:

- The objectives of this research are as follows-
- To study the unique characteristics of the Antarctic
- To understand the Antarctica as a Natural Laboratory.
- To understand the role of Antarctica in Global Eco System

Geological history

Many years ago it was part of the supercontinent Gondwana. Antarctica as known and famous today was developed 25 million years ago. It was very different from what it is today. Sir Robert Falcon Scott and Ronald Amundsen led separate blows on the South Pole in 1911. All members of Scott's team died on their arrival. Several accounts have chronicled this "race to the South Pole" with different approaches - all are interesting but all have the same sad ending for Scott's team.

Antarctica: Unique characteristics

- Antarctica is a huge continent, covering 14 million square kilometers or 10 percent of the Earth's land area.
- Antarctica and the surrounding area are natural laboratories for scientific research that cannot be done anywhere else on Earth.
- It influences an even greater area - extending beyond the equator - in the form of cold air, water currents and migratory sea birds and marine mammals.
- With an average elevation of 2300 metres, Antarctica is the highest and driest of all continents. It is also the coldest - the average annual temperature at the South Pole is - 49° Celsius.
- The continent is almost completely covered by ice with an average thickness of over 2000 meters. This is the storehouse for 70 percent of the world's fresh water.
- In winter the formation of sea ice more than doubles the size of Antarctica. This seasonal change has a profound influence on atmospheric and water temperatures and weather patterns.
- Antarctica plays a vital role in the functioning of the global ecosystem.
- It should be little surprise then that Antarctica is an important place for science - the pursuit of knowledge about the physical and natural world.
- Antarctica is a remarkable continent. Remote, hostile and uninhabited.
- Antarctica is a platform to understanding how our world works, and our impact upon it.
- Antarctica is essential component for science because of its profound effect on the Earth's climate and ocean systems.
- The Antarctic has a crucial role to play in our understanding of global climate change.
- The Antarctic region has an important role in global climate processes. It is an integral part of the Earth's heat balance.

Antarctica: A Natural Laboratory

Antarctica is the ideal location for the following research:

Aeronomy:

The polar regions have been called Earth's window to outer space. With the discovery of polar approaches its environmental limits. While below the surface and along the coast, ocean ecosystems teem with life that is rich, complex, and abundant.

Geology:

Much of the story of Antarctica is written beneath the ice, in the rocks that make up about 9 percent of Earth's continental crust. Geologic evidence indicates that at one time the continent

had a temperate climate and was part of an ancient, considerably larger land mass, known as Gondwanaland.

Glaciology:

An ice sheet covers all but 2.4 per cent of Antarctica's 14 million square kilometers. This ice contains 70 percent of the entire world's fresh water. In order to predict the ice sheet's future behavior and its effect on global climate, glaciologists must have a understanding of its history, current state, and internal dynamics.

Meteorology:

The weather systems that constantly circle Antarctica drive storms across the Southern Ocean and beyond, while the seasonal formation and melting of sea ice has an important effect on the world's weather. Antarctic stations generate data that are used for weather forecasting.

Oceanography:

The Antarctic Convergence divides the cold southern water masses from the warmer northern waters, creating the world's largest current flowing at an average speed of half a knot eastward around the continent. In addition, sea ice forms outward up to 1500 kilometers from the continent every winter. Oceanographic studies focus on these two interrelated phenomena and their effects on marine ecosystems and Earth's climate patterns. Stratospheric ozone depletions, a window previously thought "closed" (the ultraviolet window) is now known to "open" in certain seasons. Current research focuses on stratospheric chemistry, aerosols, and the vital role played by ozone.

Astrophysics:

Antarctica is an astronomer's dream come true. The Amundsen-Scott South Pole Station is arguably one of the best places on earth to study the stars. Observers there take advantage of the unique characteristics of the South Pole to study the evaluation and structure of the universe.

Biology:

Conditions on the frozen Antarctic surface are so harsh that few life forms survive year-round above the ice. Of particular interest to biologists, the McMurdo Dry Valleys represent a region where life

Antarctica: the World Park

At this time Antarctica has become a popular place for ecotourism. The most recent figures for the 2013-14 season shows that there were 37,405 visitors. Without a governing body the tour operators (from all countries) have formed a set of rules and unite themselves for the safeguard of the tourists. The leaders of Antarctica commonly talks on radio and provides information about weather and negotiate their routes so that only one tour operator will be in each of the popular areas. This helps to reduce the impact on the environment as well as to make the tourists feel like they are the only ones "At the End of the Earth".

It is considered as world's most significant innate laboratory, it is also a place of beauty and admiration. About 30,000 tourists now visit the Antarctic each year.

Antarctic tourism has grown substantially in the last few years, with roughly 41,000 visitors coming to the region in 2010. Officials worked closely with the International Association of Antarctica Tour Operators (IAATO) to establish better practices that would reduce the carbon footprint and environmental impact of tour ships. These include ordinances and restrictions on: numbers of people ashore; planned activities; wildlife watching; pre- and post-visit activity reporting; passenger, crew, and staff briefings; and emergency medical-evacuation plans. Climate change disproportionately affects the Antarctic region, as evidenced by reductions in the size of the Antarctic Ice Sheet and the warming waters off the coast. The ACTM recommended that treaty-states develop energy-efficient practices that reduce the carbon footprint of activities in Antarctica and cut fossil fuel use from research stations, vessels, ground transportation, and aircraft.

The Negative Impact of Visitors:

- **Invasive species:** accidentally bringing in insects or seeds on boots, cloths, in food, cargo etc.
- **Impact on breeding birds-** One of the major negative impact of eco-tourism is impact on breeding birds due to the regular and close visit of visitors.
- **Erosal or disturbance of fragile environment:** Many feet walking over the same piece of ground and routes will leave paths and others scars.
- **Oil spills from ships and boat:** there may be spill due to hitting ice rupturing a holding tank or if the vessel sinks, all the polluting fluids will eventually escapes.

CONCLUSION

Climate change is the greatest environmental challenge which we are facing today. The Antarctic has become a symbol of climate change. Antarctica is the ideal location for research on Agronomy, Geology, Glaciology, Metrology, Oceanography Astrophysics and Biology. It needs urgent conservation action. It is also a beautiful destination of eco-tourism but it should be done in limited and controlled policy. We urgently need to balance protection and exploitation of the Antarctica's marine resources and protect marine habitats and wildlife from excessive human interference.

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