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Waste Generation and Management in Antarctica

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Abstract

Antarctica is the coldest continent on the earth. The Indian Ocean, Pacific Ocean and Atlantic Ocean surround the continent. Antarctic continent covers 10% of the earth surface and has a surface area of nearly 14 million square kilometer. It also has 70% of the world's fresh water resources in the form of ice sheets. Thick ice sheets cover the whole continent (almost 98%). As a result of the environmental conditions, the remaining (2%) fraction without ice cover is basically the barren soil and rocks.

Many countries have set up scientific research stations in Antarctica. There are about 65 scientific research stations in summer and 30 research stations in winter, which are currently operating for scientific investigations. India has two permanent scientific research stations in the Antarctica located in Schirmacher Oasis in Central Dronning Maud Land and in Larsemann Hills, East Antarctica. However, the activities due to operation and maintenance of the research station in Antarctica have impacts on the Antarctic environment. Besides, the scientific stations also generate waste materials and a significant part of it is discharged into the Antarctic environment, which may create impacts on the Antarctica. The assessment of waste materials emanating from various sources was carried out. The present paper attempts to highlight the environmental parameters observed during ISEA austral summer at Maitri and Bharti station, East Antarctica.

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1. Introduction

Antarctica is a huge continent, covering 14 million square kilometers or 10 percent of the Earth's land area. 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 (Bharti and Gajananda, 2013). With an average elevation of 2300 meters, Antarctica

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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 (Bharti et al., 2015).

Most of what makes Antarctica so valuable for research also makes it difficult for the scientists who are stationed there. The isolation and extreme climate are difficult for many people to endure for extended periods of time. Antarctica is both the coldest and the windiest continent. These two things combine to make an extremely hostile environment. The research stations that are maintained on Antarctica use state of the art technology to both protect scientists from the environment and to provide a level of comfort which enables them to live and work there relatively safely and comfortably (SIIR, 2012).

1.1 Maitri Station:

The India Scientific station 'Maitri' is located at Latitude 70°45' 53" South; Longitude 11° 44' 03" East in the Schirmacher Oasis in Central Dronning Maud Land of east Antarctica. It is approximately 80 km from the ice edge. It is situated in an area of barren rock and is surrounded by a number of lakes. The closest station to the Maitri is the Russian Station Novolazarevskaya (Russian Station). Maitri is relatively large station complex, spanning an area of approx. 1000x500 meter (SIIR, 2006).

1.2 Bharti Station:

The Larsemann Hills is an ice-free area of approximately 50 km², located halfway between the Vestfold Hills and the Amery Ice Shelf on the south-eastern coast of Prydz Bay, Princess Elizabeth Land, East Antarctica (69°30'S, 76°19'58"E). The ice-free area consists of two major peninsulas (Stornes and Broknes), four minor peninsulas, and approximately 130 islands. The Larsemann Hills area contains more than 150 lakes at different Islands and peninsulas (SIIR, 2012).

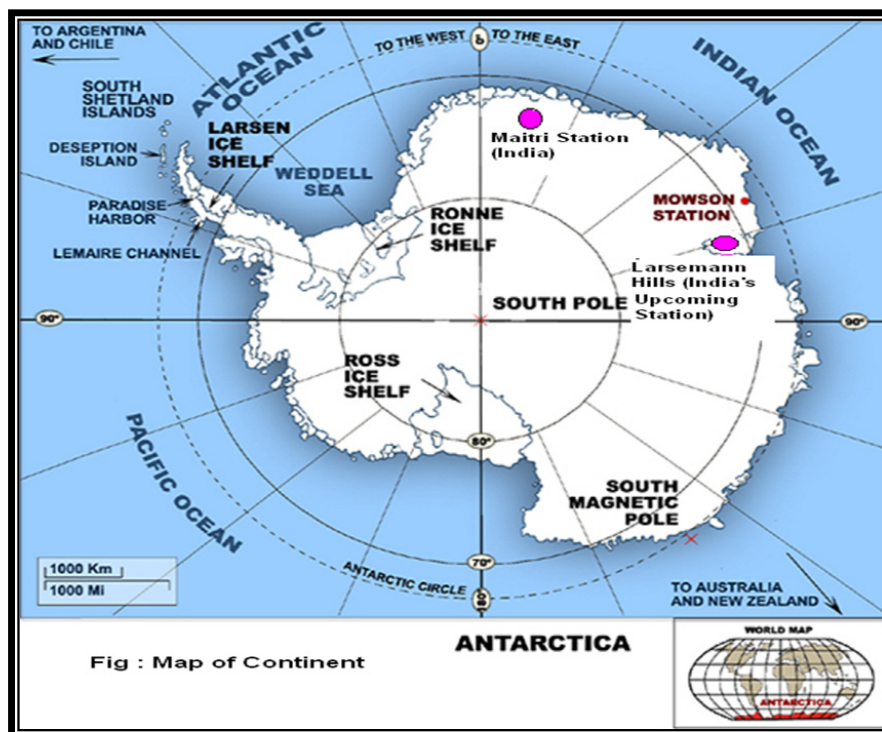


Fig. 1. Map of Antarctica with location of Indian stations

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