Perspectives of Polar Weather Monitoring and Research Efforts of India Meteorological Department

The Polar meteorology plays a significant role in the global climate system. In recent years, there has been an unprecedented level of interest in the climate and environmental conditions of the Polar Regions. Moreover, climate model predictions indicate that high-latitude areas will warm more than any other region over the next century as a result of increasing levels of greenhouse gases. Shrinking sea-ice, melting ice sheets, the discharge of glaciers and thawing of permafrost are all dramatic changes that have been taking place in the Polar Regions owing to the global warming. Changes at high latitudes can have an impact on ecosystems and human society through factors such as sea-level rise and variations in atmospheric and oceanic circulations.

India Meteorological Department (IMD) started meteorological observations since the very first expedition of India to Antarctica. IMD operates meteorological observatory at Maitri and Bharati round the clock throughout the year. This presentation reviews the progress of India's scientific research in polar meteorology. The analysis of 25 years meteorological data collected at Maitri station for the period 1991–2015 is presented in the paper. The observed trend in the temperature data of 19 Antarctic stations obtained from READER project for the period 1991–2015 has also been examined. The 25 years long term temperature record shows cooling over Maitri station. The Maitri station showed cooling of 0.054 °C per year between 1991 and 2015, with similar pronounced seasonal trends. The nearby Russian station Novolazarevskaya also showed a cooling trend of 0.032 °C per year. The trend analysis of other meteorological parameters for the period 1991–2015 is also presented. The Antarctic Peninsula and almost all of West Antarctica showed warming during 1991–2015. The majority of stations in East Antarctica close to the coast show cooling or no significant trend. The analysis also found slight decreasing trend in the pressure over the 1991–2015 time periods which is not statistically significant. The wind speed, however, does show a significant declining trend of 0.14 knots/year over the same period.