ABSTRACT

The concentration of pollutants in the atmosphere in and around the Belgaum city has been monitored using a set of dust samplers, APM-450, APM-550 and APM-433. Pollutants considered to judge the quality of air were concentration of Sulphur dioxide (SO$_2$), Nitrogen dioxide NO$_2$, Ammonia (NH$_3$), Particulate Matter 10 (PM$_{10}$) and Particulate Matter 2.5 (PM$_{2.5}$). The data were collected from five sampling sites of the city. These locations were chosen such that measurement at these places helps to judge pollution levels in the entire city. The sites of sampling include industrial, heavy traffic, commercial, residential and less populated areas. Monitoring of air was done for 24 hours on an 8 hourly basis in three different seasons in 2013-14 and 2014-15. In Belgaum city, Pollutants SO$_2$, NO$_2$, NH$_3$ were found to be below permissible limits set by National Ambient Air Quality Standards (NAAQS). Concentration of PM$_{10}$ was found to be equal to the permissible limits in commercial area and small scale industrial area and exceeded permissible limits in large scale industrial area. Concentration of PM$_{2.5}$ was found to be greater than permissible limits in heavy traffic and commercial areas and almost twice more than the limits in the large scale industrial area and lies far below the permissible limits in other sampling sites of the city. Annual Air Quality Index of the selected sites has been determined to evaluation the degree of atmospheric pollutions.

Annual Air Quality index has been calculated to evaluate the level of atmospheric pollution in which correlations have been achieved between the contents of pollutants and the physical parameters associated with atmosphere such as wind speed, rain fall, temperature and relative humidity.

It is for the first time that Air Quality in and around Belagavi city has been studied scientifically and data analysed thoroughly. Correlation between pollution level and atmospheric physical parameters were established.
The present thesis entitled “Physical Studies of Air Pollution in and around Belagaum City Karnataka India” is written into five chapters.

**Chapter 1** contains history of air pollution, composition of air, importance of air pollution, industrial air pollution, vehicular air pollution, road growth, global air pollution and green house effect. And also consist of a brief discussion on air pollutants and effects of air pollutants, emission sources, description of pollutants under study, air quality index, air pollution problem in India.

**Chapter 2** contains the air pollution and meteorology in brief that is, description of earths atmosphere, meteorological factors influencing air pollution, effects of meteorological parameters on transport and diffusion of air pollutants are discussed. atmospheric stability, temperature lapse rates and thermodynamics of formation of Sulphur and Nitrogen oxides have been discussed.

**Chapter 3** deals with description of the sampling sites, air pollution monitoring criteria, details of sampling locations, photographs of sampling sites and collected samples, meteorological data and graphs of meteorological data.

**Chapter 4** provides experimental methodology, methods used for the collection of pollutants, sampling duration, methodology, details of instruments for collecting different types of pollutants and detailed explanation of different methods used in the analysis of absorbed gaseous pollutants, methods followed for calculation of
concentrated gaseous pollutants, methods used for measuring particulate pollutants and procedure followed in the calculation of particulates have been discussed in detail.

**Chapter 5** includes complete results and discussion shown graphically with respect to individual pollutants in different seasons at each sampling site during the study period 2013-14 and 2014-15. Statistical correlated values between pollutants and meteorological parameters have been discussed with the help of graphs.

The overall conclusions drawn are mentioned in a separate section. The scope for further possible work is highlighted at the end of the thesis.