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Analysis of Air Pollution Index and Human Health Risk Assessment in Tibet Area

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Abstract: With the acceleration of urbanization in Tibet and the continuous improvement of people's living standard and quality, citizens are increasingly concerned about environmental issues, human health, traffic safety and holiday travel. Therefore, based on monitoring data of air pollutants such as PM10, SO_2, NO_2, PM2.5, O_3 and CO in the urban area of Lhasa from June 2000 to December 2017 for the past 17 years, the pollutant index is calculated. And the AQI index data of seven cities in Tibet are also analyzed. Combined with precipitation, temperature, wind, solar radiation and other meteorological elements of the same period, this paper analyzes and statistically evaluates the impact of ambient air quality, meteorological conditions and human health in major cities and towns in Tibet. The results show that the AQI index of Nagqu is the highest among seven main cities of Tibet, followed by the Shigatse region. The two regions are dominated by biomass fuel in Tibet's pastoral areas which roughly reflects the pollution discharge characteristics. The lack of vegetation, windy and dry climate caused the increased concentration of particulate matter, which have a great impact on human health. The distribution of the six pollutants with seasons is as follows: the winter half year (November $\sim$ April) is more serious, the summer half year (May $\sim$ October) has 38% less pollutant concentration than the winter half year. From 2000 to 2017, the concentrations of NO_2 and PM2.5 increased, the concentrations of PM10 decreased, and the concentrations of O_3 and SO_2 changed insignificantly, the concentrations of CO just increased significantly in winter. The concentration of CO has bimodal daily variation which was higher in early morning and at nightfall. The daily concentration of CO was highly correlated to the diurnal variation of locality emission, wind direction frequency and atmospheric mixed layer height. According to the national air quality standard, the days with excellent air quality accounted for 22.7%, the days with good air quality accounted for 62.7%, the days with mild pollution accounted for 11.3%, and the days with moderate or severe pollution accounted for 0.6%. Meteorological conditions such as precipitation, wind speed, visibility and total solar radiation all have significant impacts on the status of air pollution. In addition, smoke, dust and urban heat island effect have obvious correlation with air pollution status.
Key words: Air pollutant [U+FF1B] Human Health [U+FF1B] Risk Assessment