

Impact of land use and land cover changes on atmospheric environment in Hangzhou, China

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Since the international geosphere-biosphere program (IGBP) and the international human dimension of global environmental change program (IHDP) jointly proposed the land use and land cover (LUCC) research program in 1995, LUCC has become key components in global environment changes. China, a rapid developing country, is facing serious issues of rapidly changing land use and land cover. In particular, land use and land cover changes due to urbanization have become major concerns of many scholars. In addition, the environment problem caused by changes in land use and land cover in urban areas has become a constraint factor in the sustainable economic development.

Hangzhou lies in the southeast of China, in Zhejiang Province. The total area is 16,596 square kilometers. The resident population is 8,844,000 in 2013. It is one of the central cities in the Yangtze River Delta economic circle. The rapid economic development promotes the rapid expansion of urban space, along with rapidly changing land use changes, as well as urban environmental quality. Studying the impact of land use changes on atmospheric environment is conducive to the ecological environment improvements and economic development.

In this study, we got the land use planning data in Hangzhou for two periods, and got the land use/cover classification maps from Landsat data. Regarding the air pollutant, we got the aerosol optical depth (AOD) in the ground level using a MICROTOPS II sun photometer, and got atmospheric parameters including CH₄ and CO₂ from NASA website. In addition, we retrieved the air pollutant data including PM_{2.5}, PM₁₀, O₃, CO, SO₂, NO₂ in 11 stations located in Hangzhou from Ministry of Environmental Protection of the People's Republic of China. Based on these data, we will analyze the characteristics of land use/cover and atmospheric environment in Hangzhou, also we will quantitatively discuss the impact of land use on atmospheric environment.