

A Study on Air Flow Structure by Wind Profiler Observation in South Taiwan

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Taiwan is located between the Asian Continent and Pacific Ocean with strictly-high Mountains. Developing with the industrial area, especially in southern Taiwan, air pollution becomes more and more serious in the past years. Probing the air quality and correlating the meteorological fields, we focus on the concentration of air pollutants and distribution within different meteorological conditions. It is interesting to study the variation of three-dimensional air flows with leading force. One of the meteorological key issues on the air flow is the terrain effect, both of high mountain terrain and thermal difference from surface characteristics could influence the flow structure tremendously. Several instruments, including a 915 MHz wind profiler, have been set-up in the southern Taiwan to observe atmospheric environment in the spring and autumn from 2003 to 2005. The main goal of the field experiment is to understand how the flow structure related to transportation and transmission of air pollutants. We find that the flow structure in the southern Taiwan split into 3 layers within the northeastern synoptic system: 1). Local circulation in boundary layer below 1500 m, 2). Wake flow from 1500 m to 2500 m, 3). Westerly upper than 3000 m. These significant structures were strongly related with the occurrence of serious air pollution episodes. The dynamic and thermodynamic of flow patterns are analyzed in this paper.