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Field study of observational wind profile in a complex terrain

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To develop and test models of transport and diffusion of pollutants in complex terrain area, it is necessary to know the structure of mesoscale wind and its seasonal and diurnal variation. in this paper we tried to study occurrence, evolution and dissipation time, peak time, maximum height of katabatic and anabatic wind, return flow and vertical wind profile (up to 600 m) to recognize mesoscale structure in a point in Tehran megacity (metropolitan of IRAN). For this aim we use Sodar data in Geophysics station in Tehran University and three surface meteorological stations in low-lying, central and top lying of Tehran and two towers in upstream and downstream for whole 2006. Wind profiles which have diurnal and seasonal variation show west-south daily conventional anabatic wind and east-north nocturnal stable katabatic wind over station. Except winter when synoptic systems are dominant, wind structure generally varies at sunrise, sunset and transition times (upward at sunrise and downward at sunset). In these time many meteorological parameters has sharp change that directly or indirectly affect pollution concentration.

Since in urban area combination of thermal and dynamical effects affect wind structure, so for examining the physical mechanism which affects variation in convergent terrain and down slop flow (heat island). We study the thermal variations in some other station in Tehran. 5 0C Temperature gradient in summer and 4 0C in winter exhibit heat island effect on wind structure in this region.

Study of local flow and its effects on transportation and dispersion of pollutants and its diurnal and seasonally changes for Jun and July, shows that at transition time when katabatic blows pollution increases and when anabatic wind blows, pollution decreases.