

عنوان مقاله:

Solar radiation effects on pollutant dispersion in an urban street canyon

محل انتشار:

هشتمین همایش ملی انرژی (سال: 1390)

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خلاصه مقاله:

This paper investigates the impacts of the street canyon thermal conductance on pollutant dispersion in Canyon Street. In the work Presented here, will be consider solar radiation that heats faces and ground in canyon. The results show that heating surfaces lead to strong buoyancy forces close to surfaces receiving solar radiation. This buoyancy force changes the air flow circulation in street canyon. This study considers a 3-D canyon model in MASHHAD (a city in Iran) to investigate the influence of solar radiation in different hours in a day. The research method employs the numerical algorithm of computational fluid dynamics (CFD-code). This is based on finite volume discretization of equations of motion. Based on the Reynolds Averaged Navier–Stokes (RANS) equations coupled with the RNG k– ϵ turbulence model and the transport equation for pollutant concentration. The model sittings of validation study accomplishes by comparing the simulation wind field in a canyon with wind tunnel data. This paper assumes a uniformly distributed pollutant release at street level to simulate a source generated by vehicles. The results indicate that in the evening the windward wall is warmer than the air, an upward buoyancy flux opposes the downward advection flux along the wall, and accumulation of pollution is inclined to the leeward side. In the morning the leeward wall is warmer than the air, the buoyancy flux adds to the upward advection flux along the wall strengthening the original vortex. In the noon the flow structure is extended to a large vortex in canyon, therefore there is not accumulation of pollution on a special side and pollutants will be emitted within the canyon.

کلمات کلیدی:

Solar radiation, pollutant dispersion, street canyon

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