Environmental Fluid Mechanics

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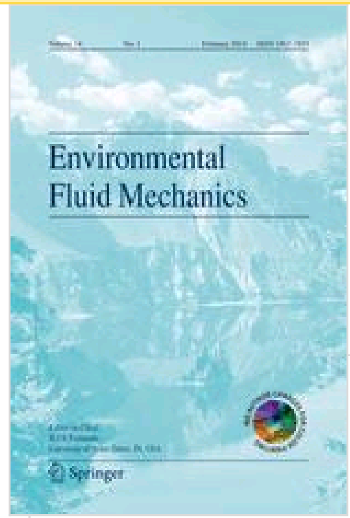

Description

Environmental Fluid Mechanics is devoted to the publication of basic and applied studies broadly relating to natural fluid systems, particularly as agents for the transport and dispersion of environmental contamination. Understanding transport and dispersion processes in natural fluid flows, from the microscale to the planetary scale, serves as the basis for the development of models aimed at simulations, predictions, and ultimately sustainable environmental management. Within this scope, the subject areas are diverse and may originate from a variety of scientific and engineering disciplines: civil, mechanical and environmental engineering, meteorology, hydrology, hydraulics, limnology, and oceanography.

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Abstract It has long been known that the urban surface energy balance is different to that of a rural surface, and that heating of the urban surface after sunset gives rise to the Urban Heat Island (UHI). Less well known is how flow and turbulence structure above the urban surface are changed during different phases of the urban boundary layer (UBL). This paper presents new observations above both an urban and rural surface and investigates how much UBL structure deviates from classical behaviour. A 5-day, low wind, cloudless, high pressure period over London, UK, was chosen for analysis, during which there was a strong UHI. Boundary layer evolution for both sites was determined by the diurnal cycle in sensible heat flux, with an extended decay period of approximately 4 h for the convective UBL. This is referred to as the "Urban Convective Island" as the s
Mixing height magnitude depended on
surface temperature. Given the daytin
inversions in the temperature profile,
trends over the period, resulting in a fact
jets undergoing inertial oscillations wer
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once the UBL had become stable. Th
Island reducing shear. Analysis of tu
showed "upside-down" boundary layer
growth of the convective UBL. Durin

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