

Abstract Submitted
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Flow Pattern within Cubical Arrays of Obstacles - Water Channel

Results MARKO PRINCEVAC, HANSHENG PAN, XIANGYI LI, University of California, Riverside, MICHAEL BROWN, Los Alamos National Laboratory — Flows within simple 3 by 3 and 5 by 5 cubical arrays were studied. A Particle Image Velocimetry (PIV) system was used for comprehensive flow measurements in the laboratory for Environmental Flow Modeling at the University of California, Riverside. The obstacles were reproduced using acrylic blocks whose refraction index is the same as the refraction index of salty water. Such setup allowed for laser sheet illumination through the obstacles enabling detailed measurements between the cubes. This is the first time that such detailed measurements of the flow between the obstacles were performed. A flow channeling at right angles to the incoming flow direction was noted. This novel flow feature, lateral channeling, observed and quantitatively measured within the array of cubes will be presented and discussed. The sideways channeling becomes less pronounced as array size increases which may be the reason why this phenomenon was not reported in the past. The sideways channeling becomes more intense when the mid-array cube is higher. This lateral flow channeling may be accountable for a significant initial plume spread observed when the plume encounters an urban area. The pattern was reproduced by k- ϵ model.

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