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The Influence of the Discharge Point Position on the Pollutant Dispersion

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Abstract : The distribution characteristics of pollutants released at different vertical inlet positions of an open channel are investigated with a three-dimensional numerical model. Pollutants are injected from time-dependent sources in a turbulent free surface flow. Numerical computations were carried out using ANSYS Fluent which is based on the finite volume approach. The air/water interface was modeled with the volume of the fluid method (VOF). By focusing on investigating the influences of flow on pollutants, it is found that pollutant released from the bottom position of the channel takes more time to disperse in the longitudinal direction of the flow in comparison with the case of pollutant released near the free surface. On the other hand, the pollutant released from the bottom position generates a vertical dispersion with decreased amplitude. These findings may assist in cost-effective scientific countermeasures to be taken for accident or planned pollutant discharged into a river.

Keywords : numerical simulation, pollutant release, turbulent free surface flow, VOF model
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