Abstract Submitted
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Flow hydrodynamics and contaminant transport in the flow past a lateral square cavity[1] CRISTIAN ESCAURIAZA, JUAN IGNACIO POLANCO, Pontificia Universidad Catolica de Chile, OLIVIA AUGUST, DIOGO BOLSTER, University of Notre Dame — Turbulent flows past lateral cavities play an important role in the transport of contaminants in rivers and streams. Cavities are surface storage zones, where large-scale unsteady coherent structures are the leading mechanisms that produce longer residence times and control the fate of contaminants in the river. In this work we study the recirculating flow and mass transport in a lateral square cavity, by performing numerical simulations with a hybrid URANS/LES turbulence model (DES-LR). We focus on the dynamics of the coherent structures and their impacts on the transport and storage of a passive scalar. In addition, we use the numerical results to develop new 1D models that improve the description of the evolution of the averaged concentration inside the cavity. By transferring the information to larger spatial scales, we provide new insights on the mechanisms of contaminant transport and analyze the overall effects of surface storage zones in open channel flows.

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