

Abstract Submitted
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Turbulent mixing in a river confluence controls the fate of contaminated sediments CRISTIAN ESCAURIAZA, CHRISTIAN GONZALEZ, PAULA GUERRA, PABLO PASTEN, GONZALO PIZARRO, Hydraulic and Environmental Engineering Department, Pontificia Universidad Catolica de Chile — A river confluence in a 40-degree angle and a high momentum ratio ($M=12.8$) mixes water with different chemical compositions favoring the formation of arsenic-rich particles. The dynamics of turbulent coherent structures at the mixing interface between both streams controls the transport and fate of these particles. Motivated by these field measurements, we integrate an experimental investigation in the laboratory with numerical computations based on the detached-eddy simulation (DES) approach. Streamwise helical vortices and shear layers have a significant effect on the size and deposition of the particles and their interaction with bed sediment. Through this study we provide new insights on the dynamics of coherent structures in confluences and the influence of turbulent mixing on chemical processes and contaminant fate in aquatic environments.

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