Abstract Submitted
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Formation and fate of contaminant particles controlled by turbulent coherent structures and geochemistry in a reactive river confluence[1] CRISTIAN ESCAURIAZA, CHRISTIAN GONZALEZ, PAULA GUERRA, PABLO PASTEN, GONZALO PIZARRO, Pontificia Universidad Catolica de Chile — A river confluence in a 40-degree angle and with a high momentum ratio (M=12.8) generates the hydrodynamic mechanisms that control the formation and fate of arsenic-rich particles in an extremely arid region in northern Chile. Based on the conditions measured in the field, we carry out detached-eddy simulations (DES) and laboratory experiments for a simplified confluence, providing new insights on the effects of the streamwise helical vortices and recirculating regions on the turbulent mixing. A Lagrangian model is also developed to study the influence of large-scale coherent structures on particle transport, computing statistics of trajectories in the flow field and determining the characteristic time-scales of the flow. This investigation helps to clarify the complex interactions between the 3D vortical structures in the flow field and the geochemical reactions, which are the controlling mechanisms of particle formation and fate of the contaminants in the river.

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