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Three-phase flow LES of flash floods in a real-life desert stream ALI KHOSRONEJAD, KEVIN FLORA, Stony Brook University, ALI KHOSRONEJAD TEAM — We present a fully coupled three-phase flow model of air-water-sediment to simulate numerically the propagation of flash floods in field-scale dry-bed desert streams. The turbulent flow and free surface of the flash flood are computed using large-eddy simulation (LES) level-set method, respectively. The evolution of stream morphology, due to the propagating flood on the mobile bed, is calculated using an Eulerian morphodynamics model based on the curvilinear immersed boundary method. We demonestarte the capabilities of our numerical framework by applying it to simulate a flash flood event in a 0.65 km-long reach of a desert stream in California. The simulated region of the stream includes a number of bridge foundations. Simulation results of the model for the flash flood event revealed the formation of highly complex flow field and scour patterns within the stream. Moreover, our simulation results show that most of the scour processes takes place during the steady phase of the flash flood. The transient phase of the flash flood is rather short and contributes to a very limited amount of erosion within the desert stream. **Acknowledgment:** support for this work is provided by NSF award EAR-1823121.

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