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Inverse modeling: reconstructing the initial conditions of a turbidity current LUTZ LESSHAFFT, BRENDON HALL, ECKART MEIBURG, Department of Mechanical Engineering, University of California at Santa Barbara, BEN KNELLER, Department of Geology and Petroleum Geology, University of Aberdeen, ALISON MARSDEN, Mechanical and Aerospace Engineering, University of California at San Diego — A new approach is introduced for generating models of submarine sediment deposits laid down by turbidity currents (turbidites). Initial conditions of the original turbidity current are reconstructed via a derivative-free optimization algorithm based on information of the deposit properties at isolated control points; where the problem is in the subsurface (e.g. in an oil or gas field), this information is typically obtained from well data. Towards this end, results from successive numerical flow simulations are matched against the available partial well data. Upon convergence, these simulations provide a process-based estimation of the properties of the entire deposit. The validity of the approach is demonstrated in the context of particle-driven lock-exchange flows, simulated via DNS.

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