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Prediction of Rheological Parameters using Surrogate Models with Neural Networks[1] JAMES HEWETT, MATHIEU SELLIER, DALE CUSACK, BEN KENNEDY, MIGUEL MOYERS-GONZALEZ, University of Canterbury, JEROME MONNIER, INSA Toulouse — Directly measuring the rheology of fluids in adverse conditions, such as lava flowing from an eruption, can be both challenging and impractical. Instead, an inverse problem is posed, where rheology of the lava can be inferred in situ from tracking the free surface velocity of the flow, by minimising the discrepancy between the observed and model output velocity field. Solving the full numerical simulations for the optimisation problem is computationally expensive. Therefore, we explore the use of surrogate models that are capable of predicting the output of the expensive simulation, by training a neural network.

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