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Acoustic-Friction Networks and the Evolution of Shear Ruptures in Laboratory Earthquakes H.O. GHAFFARI, R.P. YOUNG, Department of Civil Engineering and Lassonde Institute, University of Toronto — The evolution of shear rupture fronts in laboratory earthquakes are analysed with the corresponding functional networks, constructed over photo-elastic, real-time contacts and acoustic emission friction-patterns. We show that the mesoscopic and transport characteristics of networks follow the same trends for the same type of the shear ruptures in terms of rupture speed, while also comparing the results of four different friction experiments. The classified fronts–obtained from a saw-cut fault and natural faulted Westerly granite - regarding friction network parameters show a clear separation into two groups, indicating two different rupture fronts. With respect to the scaling of local ruptures' durations with the networks' parameters, we show that the gap is related to the possibility of a separation between slow and regular fronts. Based on our results, we develop a statistical based method to model the evolution of functional damage networks while we consider that any rupture flows in a critical plane with two main fixed points.

H.O. Ghaffari
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