Neoproterozoic Fault-Bounded Sandstone Injectites in Plutonic Basement Host Rock: An Investigation of Sedimentological Characteristics and Depositional Environment

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The purpose of this experiment was to analyze how the density of igneous rock and the rate of injection of liquefied sediment would impact the sedimentary structures created in fault-bounded clastic intrusions into plutonic basement rocks. This was tested by creating desiccated gelatin-water mixtures with varying concentrations of gelatin in each mixture. By increasing the gelatin concentration, the density of the sample also increases, which decreases the permeability of the mixture. Samples of the experiment could also be aided by a replica fracture, which simulated the geologic features and characteristics that were analyzed in the field. Samples were injected with plaster-of-paris as a substitute for liquefied sediments. In samples excluding a fracture, dominant tabular bodies were present in all sample densities, and no tubular structures were created; secondary tabular bodies or fluted structures could be present, but were not as common. In fracture-aided samples, the injection followed the fracture and created complex sedimentary structures, ranging from tubular to fluted. Regardless of injection rate and density, all samples without a fracture exhibited a range of 1-4 tabular structures, 0 tubular structures, and 0-2 fluted structures; all samples with a fracture exhibit a range of 1-2 tabular structures, 1-6 tubular structures, and 1-2 fluted structures. Samples with a fracture overall exhibited more sedimentary structures, regardless of sample density. This demonstrates a high correlation of numerous, complex sedimentary structures to pre-existing fractures, that were created in response to the agitation caused by fault zone earthquake episodes.

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