Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Fracture scaling in columnar cornstarch LUCAS GOEHRING, STEPHEN MORRIS, University of Toronto — We have studied fracture spacing in desiccated cornstarch slurries, which exhibit columnar jointing. This fracture process creates long hexagonal pillars, and is famous for causing spectacular geologic features such as the Giants Causeway. The columnar pattern is formed as a planar network of cracks pass through a cooling or drying body. Even in simple 2D shrinkage fracture experiments it can be difficult to explain the spacing between cracks, however, in this case it is generally believed that the crack spacing depends on the average crack advance rate. Using computerized feedback, we controlled the desiccation rate of starch slurries. Continuous measurements of sample mass were converted into estimates of crack position and crack advance rate. After drying, direct measurements of crack spacing were made throughout the sample by cutting up the colonnade. With a constant crack advance rate, the jointing selects a particular scale after a transient coarsening. The selected scale does not uniquely depend on the final crack advance rate, but rather shows a type of memory inherited from its transient initiation. We present our investigations into this scaling, and how it depends on the fracture advance rate.

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Date submitted: 30 Nov 2005 Electronic form version 1.4