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BRITTLE IMBRICATE WEDGES CONTROL OUTCROP-SCALE GEOMETRY OF PSEUDOTACHYLYTES IN THE IKERTÔQ SHEAR ZONE, GREENLAND: AN NSF REU STUDY

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Previous studies have described the geometry of pseudotachylyte-bearing faults in the Ikertôq shear zone (ISZ) as “paired shears.” This study found these are more complex structures formed in preexisting, wedge-shaped, imbricate damage zones. As part of an NSF REU, this project conducted outcrop-scale mapping in part of the 50-km ISZ pseudotachylyte system on Sarfannguit Island in southwestern Greenland. The pseudotachylyte system is comprised of master oblique-reverse faults concordant to strongly foliated host gneisses linked through discordant strike-slip relay faults. Within the imbricate wedges, pseudotachylytes are complexly distributed around rotated and folded gneissic blocks between stacked systems of master reverse faults.

This study mapped five imbricate wedges using high resolution drone imagery in map view and hand photography on vertical outcrops. This resulted in a new geometrical three-dimensional perspective. Wedges form where foliation is platy, typically between more coherent hanging wall and footwall blocks. Preliminary calculations indicate average rotations of eight to eighteen degrees within the damage zones. Field measurements suggest the upper fault in the imbricate wedge is approximately planar, while the lower fault splays off the upper fault at a twenty to thirty degree angle, creating a

concave-up cuspate geometry. Both faults have the same shear sense, with fold axes and pseudotachylyte slickenlines indicating reverse oblique offset, usually with a component of dextral shear. Initial deformation and brecciation of the blocks is interpreted as forming prior to the pseudotachylyte-forming event.