EVIDENCE FOR AN IMPACT STRUCTURE IN THE SANGRE DE CRISTO MOUNTAINS NEAR SANTA FE, NEW MEXICO.

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Introduction: Shatter cones discovered in 2005 in road cuts on NM 475 in the Sangre de Cristo Mountains equal those of Sudbury and Vredefort in cm-to-m size. Breccias in Proterozoic crystalline basement and fault blocks of Mississippian-Pennsylvanian carbonates are now being examined to determine whether their distribution is compatible with development stages observed in other large impact structures including: 1) Excava-tion stag**e -** Ejecta blanket, fall-back breccia, *in situ* breccias of crater wall and floor. 2) Breccia dikes and pseudotachylites in-jected into the crater wall and floor, subsequent to the shock wave responsible for shatter cones. 3) Landslide blocks and megabreccias (clasts >1 m) from collapse of the crater wall dur-ing the enlargement stage.

As NM 475 rises into the mountain, it passes into deeper structural levels. Breccias encountered are tentatively in-terpreted a progressing from crater wall to floor to subfloor. Dis-tances to key exposures are in miles, tentative interpretations in *italics*:

0.0 Santa Fe, intersection of NM 475 and NM 590.

4.1 Curve. *Allochthonous km-size carbonate blocks carried by a crater-collapse debris avalanche:* Blanket of matrix-supported megabreccia, with clasts of Proterozoic crystal-line rocks, separates brecciated *in situ* Proterozoic from Paleozoic carbonates. This zone is bleached within 10 m of the contact, as seen across the valley as well. Near foot of next ridge north, a megabreccia tongue penetrates basal carbonates. It incorporates carbonate clasts with mm-wide fractures, injected by granite grains with multi-ple fracture sets in quartz. Preliminary optical examina-tion of these fractures (which need to be confirmed by other methods) suggest that these are PDFs.

4.3 Cross bridge. *Collapse megabreccia:* Elongated (max 10+ m) steeply dipping brecciated granite clasts and m-size clasts of sheared mafic schist. Similar megabreccias oc-cur along I-25, 20 km south of this location.

Down creek 50 m: *Breccia dike injected from above, in a fluidized medium***:** Breccia wall, angular decimeter granite clasts supported by comminuted granite matrix; sparse rounded decimeter-to-m clasts of mafic schist in accre-tionary envelopes.

5.9 *Subfloor:* Shatter cones in autochthonous granite and schist, best developed in granite

Conclusions: In view of the complex tectonic history of the region, the significance of various breccias remains uncertain. However, the presence of PDF's (if confirmed) and shatter cones indicates that impact played a role. The maximum age of the event is Mississippian, actual age and extent of the structure are undetermined. Accumulating field evidence suggests that this could be a substantial structure with regional implications.