PETROLOGY OF EJECTA FROM THE CARANCAS (PERU) CRATER: INSIGHTS INTO THE DYNAMICS OF AN "UNUSUAL" IMPACT EVENT. R. S. Harris[1], P. H. Schultz[1], G. Tancredi[2], and J. Ishitsuka[3], [1]Department of Geological Sciences, Brown University, Providence,RI 02912 (scott_harris@brown.edu), [2]Departmento Astronomíca, Facultad de Ciencias, Iguá 4225, 11400 Montevideo, Uruguay, [3]Instituto Geofisico del Perú, Calle Badajoz #169, Mayorazgo IV Etapa, Ate Vitarte, Lima, Peru.

Introduction: On September 15, 2007, an ordinary chondrite (H4/5) at least one meter across struck the Altiplano of southeastern Peru [1-5]. The collision created a circular crater approximately 15 meters wide a few meters deep into channel and bank deposits of a narrow arroyo. The shock-excavated crater observed (opposed to a penetration funnel or pit) had not been anticipated for small, stony bolides. We are investigating proximal and distal ejecta to help constrain the dynamics of the Carancas impact event.

Field Observations: Beyond the WNW to NW crater rim (downrange) the largest ejecta blocks (Fig. 1A) are overturned and resting in a blanket of powdery material 30-50 cm thick. The exposed "underbellies" of some blocks are riddled with *embedded* fragments of the impactor (Fig. 1). This observation suggests that the bolide fragmented and dispersed beneath the surface just ahead of excavation.

Microscopic Observations: Quartz grains extracted from a narrow interval at the bottom of the WNW ejecta blanket (i.e., the first material ejected) exhibit one to two sets of planar microstructures (Fig. 2) similar to those produced experimentally by Stöffler et al. [6] in hypervelocity impacts into loosely consolidated sediment.

Small glassy and lapilli-like particles (Fig. 3) were collected ~10 to 50 m from the crater. They are breccias composed of meteoritic and target materials. Similarly mixed, gray-colored breccias were found on the crater rim.

Conclusions: Our analyses, thus far, support the hypothesis that the Carancas event involved a fully coupled hypervelocity (1-3 km/s) collision of a largely intact body with the surface resulting in the excavation of a small, but otherwise typical, impact crater.

References: [1] Macharé J. et al. (2007) La Caida del Meteorito Carancas (Informe inicial oficial de INGEMET),www.ingemmet.gob.pe/paginas/07_09_21_Carancas_meteorite.pdf. [2] Tancredi G. et al. (2008) *LPS XXXIX*, 1216. [3] Schultz P. H. et al. (2008) *LPS XXXIX*, 2409. [4] Harris R.S. et al. (2008) *LPS XXXIX, 2446*. [5] Brown P. et al. (2008) *Earth Planet. Sci. Lett*., submitted. [6] Stöffler D. et al. (1975) *JGR, 80*, 4062–4077.

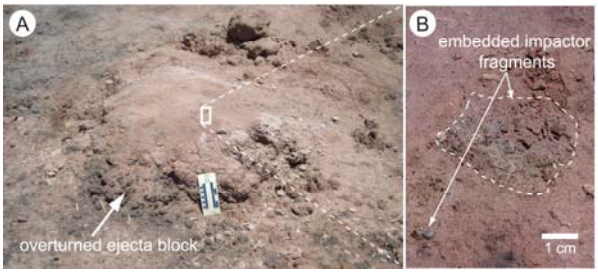

Figure 1. Impactor "buckshot". A) Photograph of an overturned ejecta block outside the NW carter rim. B) Close-up showing examples of embedded meteorite fragments.

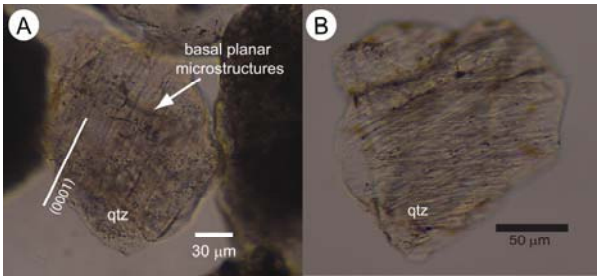

Figure 2. Mineral deformation in downrange ejecta. A) Photomicrograph (PPL) of quartz containing basal planar microstructures. B) Photomicrograph (PPL) of quartz exhibiting two sets of planar microstructures.

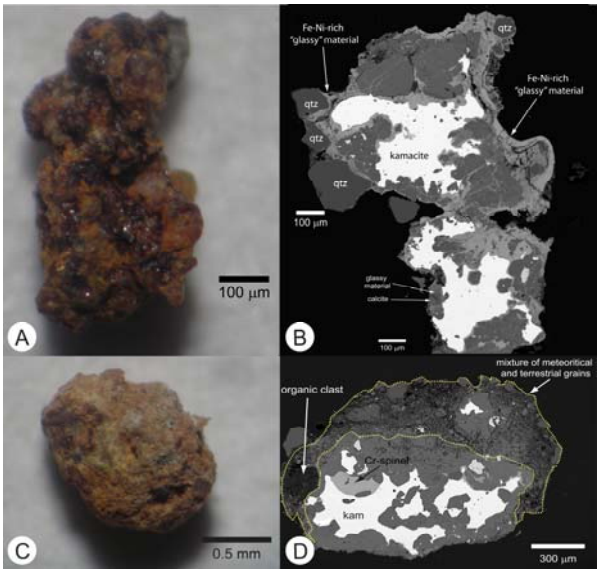

Figure 3. Minature impact breccias. A,B) Photograph and BSE image of glassy ejecta found ~10 m from the Carancas crater. C,D) Photograph and BSE image of lapilli-like ejecta collected ~50 m from the crater.