NO EVIDENCE OF SHOCK METAMORPHISM IN CUBA AT K/T BOUNDARY; B.F. Bohor¹, R. Brett², R.A.F. Grieve³, and D. Stöffler⁴
1. U.S. Geological Survey, Box 25046, MS 972, Denver, CO 80225
2. U.S. Geological Survey, National Center, MS 917, Reston, VA 22092
4. Institut für Planetologie, Universität Münster, Wilhelm-Klemm Strasse 10, D-4400 Münster, Germany

A thick spherule-bearing marine unit at the K/T boundary in Haiti, previously described as a volcaniclastic turbidite [1], has been subsequently identified as impact ejecta [2, 3]. The thickness of this ejecta unit, along with previously determined lateral variations in ejecta thickness [4] and increasing maximum diameter of shocked minerals [5] southward in Western Interior sites, led to the supposition that the K/T impact crater was located somewhere in the Caribbean region south of the North American continent. Hildebrand and Boynton [2, 3] postulated on geochemical grounds that the putative bolide struck oceanic crust, and proposed a site in the Colombian basin north of Venezuela as the impact crater. Mineralogical evidence, however, demanded that the target rocks were continental silicic crust [6], and could not have been derived from a deep ocean impact. Bohor and Seitz [7] postulated that the impact may have occurred off the southwestern coast of Cuba, based on clues from the geological literature about this island. In order to test this hypothesis in the field, an international consortium of geologists with experience in impact crater studies was formed under the auspices of the International Union of Geological Sciences (IUGS), Commission on Comparative Planetology. The consortium, consisting of the present authors, was given permission to visit sites in Cuba in June 1991.

The consortium visited >15 sites in three areas of western and central Cuba. A total of about 8 days was spent in field investigations. We visited sites displaying olistostromes, turbiditic "megabeds", serpentinites, polymict breccias, tuffs and diorites at or near the K/T boundary in the provinces of Sierra del Rio, La Habana, Mantanzas and Las Villas. The field trips were sponsored by the Cuban Academy of Sciences and led by geologists from the National Museum of Natural History, the Center for Geological Investigations and Development of Petroleum, the Institute of Geology and Paleontology, and the Institute of Geophysics and Astronomy.

Results. We made thin sections of 51 hard-rock samples and disaggregated 15 softer samples to study their coarse-grained residues. We did not find evidence of shock metamorphism in any of these samples. Most of the blocks in the olistostrome and polymict breccia samples are representative of intermediate to basic (mafic) volcanic rocks, displaying typical volcanic (felted) textures and mineralogies (calcic plagioclases with little quartz), with metamorphic overprints. The tuffs also display intermediate to basic volcanic features. The diorites appear to be intrusive igneous rocks. The turbiditic "megabeds" are composed of fining-upwards calcarenites to calcilutites. M. Iturrade-Vinent and the rest of our Cuban colleagues...
NO SHOCK IN CUBAN K/T: Bohor, B.F. et al.

soon convinced us that the "Big Boulder Beds" of Palmer [8], supposedly containing exotic blocks, are really spheroidal weathering features of the calcarenite. Palmer's "exotic blocks" that he described from these units may have been components of olistostromes emplaced over these beds. We did not get to visit the Isle of Pines, the proposed central uplift of the hypothetical crater [7]. A sample of quartz vein (pegmatite?) from the Isle of Pines was supplied to us by M. Iturralde-Vinent. It displayed undulose extinction of the quartz grains, but no planar deformation features (PDF).

Summary. An initial cursory examination of samples from units at or near the K/T boundary in western and central Cuba by one of us (BFB) has not revealed any PDF or field evidence for nearby impact. Further detailed study of these samples by other consortium members will be undertaken, but at present the premise that these samples represent proximal impact ejecta does not look promising. This study confirms the brief field survey results of Dietz and McHone [9], who also found no evidence of proximal impact ejecta in Cuba. The problem remains unanswered of why no identifiable impact ejecta, either proximal or distal, is to be found at the K/T boundary in this part of Cuba. Perhaps erosion or tsunamis have removed all traces of impact.

Acknowledgements. This investigation was partially supported by NASA Grant T5715-P to the first author. The other authors acknowledge partial support from their respective institutions for this study. We wish to thank the Cuban Academy of Sciences, our Cuban colleagues, and the IUGS for their cooperation and enthusiastic support. We also thank William Betterton of the USGS in Denver for his laboratory assistance.