

THE CHICXULUB MEGA-EARTHQUAKE: EVIDENCE FROM COLOMBIA, MEXICO, AND THE UNITED STATES

BERMUDEZ, Hermann D.^{1,2}, VEGA, Francisco J.³, MARTINI, Michelangelo⁴, DEPALMA, Robert.⁵⁻⁶, ROSS, Catherine.⁷⁻⁸, BOLIVAR, Liliana.², VEGA-SANDOVAL, Francisco A.⁹, GULICK, Sean P.S.^{7-8,10}, STOCKLI, Daniel F.⁷, DE PALMA, Maurizia¹, CUI, Ying¹

(1) Department of Earth and Environmental Studies, **Montclair State University**, Montclair, New Jersey 07043, USA; (2) **Grupo de Investigación Paleoexplorer**, 400 Lincoln St, Dupont, Pennsylvania 18641, USA; (3) Departamento de Procesos Litosféricos, **Universidad Nacional Autónoma de México**, Ciudad Universitaria, C.P. 04510, CDMX, Mexico; (4) Instituto de Geología, **Universidad Nacional Autónoma de México**, Ciudad Universitaria, C.P. 04510, CDMX, Mexico; (5) Department of Earth and Environmental Sciences, **University of Manchester**, Manchester, M13 9PL, United Kingdom; (6) Department of Geosciences, **Florida Atlantic University**, Boca Raton, FL 33431; (7) Department of Geological Sciences, Jackson School of Geosciences, **University of Texas at Austin**, 22275 Speedway Stop C9000, Austin, TX 78712; (8) Institute for Geophysics and Department of Geological Sciences, Jackson School of Geosciences, **University of Texas at Austin**, TX 78758; (9) Facultad de Ciencias, **Universidad Nacional Autónoma de México**, Ciudad Universitaria, C.P. 04510, CDMX, Mexico; (10) Center for Planetary Systems Habitability, University of Texas at Austin, Austin, TX 78712

The Chicxulub asteroid impact (~66 Ma) is one of the catastrophic events most studied by science in recent decades. This event coincides with the Cretaceous-Paleogene boundary and is the probable trigger for the last mass extinction in Earth's history. The magnitude of the impact released energy equivalent to 10^{23} joules, enough to generate gigantic earthquakes (Magnitude 10+), mega-tsunamis, and form a crater of 180 - 200 km in diameter in the Yucatan Peninsula. Although numerous studies report catastrophic sedimentation related to the seismicity associated with the Chicxulub impact, there is no detailed record of the effects and timing of the impact on the terminal Maastrichtian sedimentary record. This is especially relevant in the western hemisphere, where the effects of the mega-earthquakes (and aftershocks) associated with Chicxulub would have been more noticeable. To test this, we have examined in detail the sedimentary record of K/Pg sections from Colombia, NE Mexico, and the United States. Abundant stratigraphic and sedimentological evidence was described, analyzed, and fully illustrated. In all the sections studied, the uppermost Maastrichtian and the K/Pg boundary deposits were affected by in-situ liquefaction, intense soft-sediment deformation, and bed disruption, illustrating the magnitude of seismotectonic activity as a consequence of the Chicxulub asteroid impact. The results prove intense seismic activity for weeks to months after the bolide impact affecting even the K/Pg boundary strata. This data help explain the geologic evidence that records the end of the Cretaceous and the beginning of the Cenozoic and characterizes one of the biggest earthquakes experienced by our planet during the Phanerozoic.