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THE CRETACEOUS/PALEOGENE BOUNDARY DEPOSITS IN GORGONILLA ISLAND

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A ~20 mm thick spherule bed representing Chicxulub impact ejecta deposits and marking the Cretaceous/Paleogene (K/Pg) boundary was recently discovered on the Gorgonilla Island (Gorgona National Natural Park, Pacific of Colombia). This discovery represents the first confirmed record of the K/Pg event in Colombia, South America, and the Eastern Pacific Ocean.

The deposit consists of extraordinarily well preserved glass spherules (microtektites and microkrystites) reaching 1.1 mm in diameter. Importantly, the Gorgonilla spherule bed is unique with respect to other K/Pg boundary sites in that up to 90% of the spherules are intact and not devitrified, and the bed is virtually devoid of lithic fragments and microfossils. The spherules were deposited in a deep marine environment, possibly below the calcite compensation depth. The preservation, normal size-gradation, presence of fine textures within the spherules, and absence of bioturbation or traction transport indicate that the Gorgonilla spherules settled within a water column with minimal disturbance. Thus, it may represent one of the first parautochthonous primary deposits of the Chicxulub impact known to date.

⁴⁰Ar/³⁹Ar dating and micropaleontological analysis reveal that the Gorgonilla spherule bed was a result of the Chicxulub impact (the weighted mean of all plateau ages is $66.051 \pm 0.031/0.054$ Ma). This dating is supported by the presence of earliest Danian planktic foraminiferal assemblages just above the spherule bed. Intense soft-sediment deformation and bed disruption in Maastrichtian sediments of Gorgonilla Island K/Pg section provide evidence for seismic activity triggered by the Chicxulub bolide impact 66 million years ago. It is also notable that the basal deposits of the Danian in the Colombian locality present the first evidence of a “fern-spike” following the Chicxulub impact from a tropical habitat.



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