

Calculating Extinction: The Meteor Impact that Killed the Dinosaurs

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In the fossil record of the history of life on earth, there are several events of catastrophic mass extinctions. The most recent of these events is the "K/T" boundary which defines the end of the Cretaceous (K) Period - when dinosaurs last ruled the earth — and the beginning of the Tertiary (T) Period— the age of mammals. Mounting evidence points compellingly to an asteroid impact as the cause of this great extinction event: the worldwide iridium anomaly, soot deposits in the K/T bedding plane, the Chicxulub crater in the soft sediment of the Yucatan Peninsula, and tsunamic deposits in the Caribbean and North America, all dated to the same time as the boundary in the fossil record - 65 million years ago.

The role of computer simulations in recreating events like this is to show how the observed facts are linked to one another and to the event that produced them. We make guesses about how big the asteroid was, what its speed and trajectory were, and then we run a calculation. Comparing the calculation's results with the geological evidence helps us to refine those guesses.

We have used a Los Alamos Crestone project computer code, RAGE, to perform detailed 3-dimensional simulations of the K/T impact event. I will discuss our simulations and compare them with simulations we have done of smaller impact events, and with simulations others have done.