Chicxulub crater

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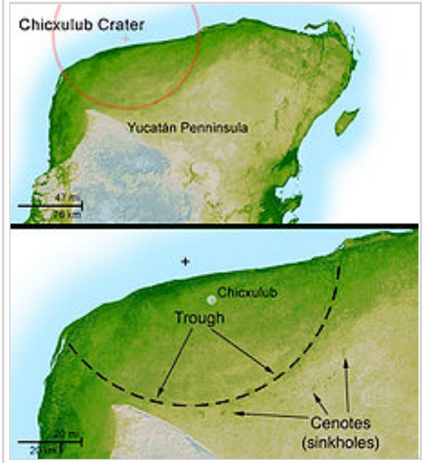
Coordinates: 21°24′N 89°31′W



Radar topography reveals the 180 kilometer (112 mi) ring of the crater; clustered around the crater's trough are numerous sinkholes, suggesting a prehistoric oceanic basin in the depression left by the impact (Image courtesy NASA/JPL-Caltech).

The **Chicxulub Crater** (IPA: [tʃikʃuˈlub]) is an ancient impact crater buried underneath the Yucatán Peninsula in Mexico. Its center is located near the town of Chicxulub, after which the crater is named—as well as the rough translation of the Mayan name, "the tail of the devil."[1] The crater is more than 180 kilometers (110 mi) in diameter, making the feature one of the largest confirmed impact structures in the world; the impacting bolide that formed the crater was at least 10 km (6 mi) in diameter.

The crater was discovered by Glen Penfield, a geophysicist who had been working in the Yucatán while looking for oil during the late 1970s. Evidence for the impact origin of the crater includes shocked quartz, a gravity anomaly, and tektites in surrounding areas. The age of the rocks and isotope analysis show that this impact structure dates from the end of the Cretaceous Period, roughly 65 million years ago. The impact associated with the crater is implicated in causing the extinction of the dinosaurs as suggested by the K–T boundary, although some critics argue that the impact was not the sole reason[2] and others debate whether there was a single impact or whether the Chicxulub impactor was one of several that may have struck the Earth at around the same time. Recent evidence suggests that the impactor may have been a piece of a much larger asteroid that broke up in a collision in distant space more than 160 million years ago.[3]

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Discovery

In 1978, geophysicist Glen Penfield was working for the Mexican state-owned oil company Petróleos Mexicanos, or Pemex, as part of an airborne magnetic survey of the Gulf of Mexico north of the Yucatán peninsula.[4] Penfield's job was to use geophysical data to scout possible locations for oil drilling.[5] Within the data, Penfield found a huge underground arc with 'extraordinary symmetry' in a ring 70 kilometers (40 mi) across.[1] He then obtained a gravity map of the Yucatán made in the 1960s. A decade earlier, the same map suggested an impact feature to contractor Robert Baltosser, but he was forbidden to publicize his conclusion by Pemex corporate policy of the time.[6] Penfield found another arc on the peninsula itself whose ends pointed northward. Comparing the two maps, he found the separate arcs formed a circle, 180 kilometers (111 mi) wide, centered near the Yucatán village Chicxulub; he felt certain the shape had been created by a cataclysmic event in geologic history.

Pemex disallowed release of specific data but let Penfield and company official Antonio Camargo present their results at the 1981 Society of Exploration Geophysicists conference.[7] That year's conference was underattended and their report attracted scant attention. (Ironically, many experts in impact craters and the K-T boundary were attending a separate conference on Earth impacts.) Although Penfield had plenty of geophysical data sets, he had no rock cores or other physical evidence of an impact.[5]

He knew Pemex had drilled exploratory wells in the region in 1951; one bored into what was described as a thick layer of andesite about 1.3 kilometers (4,200 ft) down. This layer could have resulted from the intense heat and pressure of an Earth impact, but at the time of the borings it was dismissed as a lava dome -- a feature uncharacteristic of the region's geology. Penfield tried to secure site samples but was told such samples had been lost or destroyed.[5] When attempts at returning to the drill sites and looking for rocks proved fruitless, Penfield abandoned his search, published his findings and returned to his Pemex work.


Penfield with the sample of shocked quartz found at Well #2, Chicxulub.

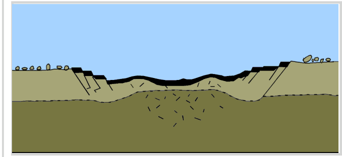
At the same time, scientist Luis Walter Alvarez put forth his hypothesis that a large extraterrestrial body had struck Earth; and in 1981, oblivious to Penfield's discovery, University of Arizona grad student Alan R Hildebrand and faculty adviser William V Boynton published a draft Earth-impact theory and were seeking a candidate crater.[8] Their evidence included greenish-brown clay with surplus iridium containing shocked quartz grains and small weathered glass beads that looked to be tektites.[9] Thick, jumbled deposits of coarse rock fragments were also present, thought to have been scoured from one place and deposited elsewhere by a kilometers-high tsunami likely resulting from an Earth impact.[10] Such deposits occur in many locations but seem concentrated in the Caribbean basin at the K–T boundary.[10] So when Haitian professor Florentine Morás discovered what he thought to be evidence of an ancient volcano on Haiti, Hildebrand suggested it could be a telltale feature of a nearby impact.[11] Tests on samples retrieved from the K–T boundary revealed more tektite glass, formed only in the heat of asteroid impacts and high-yield nuclear detonations.[11]

In 1990, Houston Chronicle reporter Carlos Byars told Hildebrand of Penfield's earlier discovery of a possible impact crater.[12] Hildebrand contacted Penfield in Apr 1990 and the pair soon secured two drill samples from the Pemex wells, stored in New Orleans.[13] Hildebrand's team tested the samples, which clearly showed shock-metamorphic materials.

A team of California researchers including Kevin Pope, Adriana Ocampo, and Charles Duller, surveying regional satellite images in 1996, found a sinkhole (Cenote) ring centered on Chicxulub that matched the one Penfield saw earlier; the sinkholes were thought to be caused by subsidence of the impact crater wall.[14] More recent evidence suggests the actual crater is 300 kilometers (190 mi) wide, and the 180 kilometer ring an inner wall of it.[15]

Impact specifics

The impactor's estimated size was about 10 km (6 mi) in diameter and may have released an estimated 400 zettajoules (4×10^{23} joules) of energy, equivalent to 100 teratons of TNT (10^{14} tons),[16][17] on impact. By contrast, the most powerful man-made explosive device ever detonated, the Tsar Bomba or Emperor Bomb, had a yield of only 50 megatons,[18] making the Chicxulub impact 2 million times more powerful.[19] Even the largest known explosive volcanic eruption, which released approximately 10 zettajoules and created the La Garita Caldera,[20] was substantially less powerful than the Chicxulub impact.



An animation showing the impact, and subsequent crater formation (University of Arizona, Space Imagery Center).

Effects

The impact would have caused some of the largest megatsunamis in Earth's history, reaching thousands of feet high. A cloud of super-heated dust, ash and steam would have spread from the crater, as the impactor burrowed underground in less than a second.[21] Excavated material along with pieces of the impactor, ejected out of the atmosphere by the blast, would have been heated to incandescence upon re-entry, broiling the Earth's surface and possibly igniting global wildfires; meanwhile, enormous shock waves spawned global earthquakes and volcanic eruptions.[22] The emission of dust and particles could have covered the entire surface of the Earth for several years, possibly a decade, creating a harsh environment for living things to survive in. The shock production of carbon dioxide caused by the destruction of carbonate rocks would have led to a dramatic greenhouse effect.[23] Another consequence of the impact is that sunlight would have been blocked from reaching the surface of the earth by the dust particles in the atmosphere, cooling the surface dramatically. Photosynthesis by plants would also have been interrupted, affecting the entire food chain.[24][25]

Geology and morphology

In their 1991 paper, Hildebrand, Penfield, and company described the geology and composition of the impact feature.[26] The rocks above the impact feature are layers of marl and limestone reaching to almost 1,000 meters (3,300 ft) in depth. These rocks date back as far as the Paleocene.[27] Below these layers lie more than 500 m (1,600 ft) of andesite glass and breccia. These andesitic igneous rocks were found only within the supposed impact feature; similarly, quantities of feldspar and augite, normally only found in impact-melt rocks, are present,[28] as is shocked quartz.[27] The K–T boundary inside the feature is depressed between 600 and 1,100 m (2,000–3,600 ft) compared to the normal depth of about 500 m (1,600 ft) depth 5 km (3 mi) away from the impact feature.[29] Along the edge of the crater are clusters of cenotes or sinkholes, which suggest that there was a water basin inside the feature during the Tertiary period, after the impact.[29] Such a basin's groundwater dissolved the limestone and created the caves and cenotes beneath the surface.[30] The paper also noted that the crater seemed to be a good candidate source for the tektites reported at Haiti.[31]

Origin

On September 5, 2007 a report published in *Nature* proposed an origin for the asteroid that created Chicxulub Crater.[24] The authors, William F. Bottke, David Vokrouhlický, and David Nesvorný, argued that a collision in the asteroid belt 160 million years ago resulted in the creation of the Baptistina family of asteroids, the largest surviving member of which is 298 Baptistina. They proposed that the "Chicxulub asteroid" was also a member of this group. The connection between Chicxulub and Baptistina is supported by the large amount of carbonaceous material present in microscopic fragments of the impactor, suggesting the impactor was a member of a rare class of asteroids called carbonaceous chondrites, like Baptistina.[3] According to Bottke, the Chicxulub impactor was a fragment of a much larger parent body about 170 km (105 mi) across, with the other impacting body being around

60 km (40 mi) in diameter.[32][3]

Chicxulub and mass extinction

The piece of clay, held by Walter Alvarez, which sparked research into the impact theory. The second green band from bottom (third band up) is extremely rich in iridium.

The Chicxulub Crater lends support to the theory postulated by the late physicist Luis Alvarez and his son, geologist Walter Alvarez, that the extinction of numerous animal and plant groups, including dinosaurs, may have resulted from a bolide impact. The Alvarezes, at the time both faculty members at the University of California, Berkeley, postulated that the extinction event roughly contemporaneous with the postulated date of formation for the Chicxulub crater, could have been caused by just such a large impact.[33] This theory is now widely, though not universally, accepted by the scientific community. Some critics, including paleontologist Robert Bakker, argue that such an impact would have killed frogs as well as dinosaurs, yet the frogs survived the extinction event.[34] Gerta Keller of Princeton University argues that recent core samples from Chicxulub prove the impact occurred about 300,000 years *before* the mass extinction, and thus could not have been the causal factor.[35]

The main evidence of such an impact, besides the crater itself, is contained in a thin layer of clay present in the K–T boundary across the world. In the late 1970s, the Alvarezes and colleagues reported[36] that it contained an abnormally high concentration of iridium. In this layer, iridium levels reached 6 parts per billion by weight or more compared to 0.4[37] for the Earth's crust as a whole; in comparison, meteorites can contain around 470 parts per billion[38] of this element. It was hypothesised that the iridium was spread into the atmosphere when the impactor was vaporized and settled across the Earth's surface amongst other material thrown up by the impact, producing the layer of iridium-enriched clay.[39]

Multiple impact theory

In recent years, several other craters of around the same age as Chicxulub have been discovered, all between latitudes 20°N and 70°N. Examples include the Silverpit crater in the North Sea[40] and the Boltysh crater in Ukraine.[41] Both are much smaller than Chicxulub, but likely to have been caused by objects many tens of metres across striking the Earth.[42] This has led to the hypothesis that the Chicxulub impact may have been only one of several impacts that happened nearly at the same time.[43] Another possible crater thought to have been formed at the same time is the Shiva crater, though the structure's status as a crater is contested.[44]

The collision of Comet Shoemaker-Levy 9 with Jupiter in 1994 demonstrated that gravitational interactions can fragment a comet, giving rise to many impacts over a period of a few days if the comet should collide with a planet. Comets frequently undergo gravitational interactions with the gas giants, and similar disruptions and collisions are very likely to have occurred in the past.[45] This scenario may have occurred on Earth 65 million years ago.[43]

In late 2006, Ken MacLeod, a geology professor from the University of Missouri–Columbia, completed an analysis of sediment below the ocean's surface, bolstering the single-impact theory. MacLeod conducted his analysis approximately 4,500 kilometers (2,800 mi) from the Chicxulub Crater to control for possible changes in soil composition at the impact site, while still close enough to be affected by the impact. The analysis revealed there was only one layer of impact debris in the sediment, which indicated there was only one impact.[46] Multiple-impact proponents such as Gerta Keller regard the results as "rather hyper-inflated" and do not agree with the conclusion of MacLeod's analysis.[47]

See also

- Permian–Triassic extinction event
- Wilkes Land crater
- Vredefort Crater
- Deccan Traps

Notes

1. ^ *a b* Penfield.
2. ^ Bakker interview. "Does the [impact theory] explain the extinction of the dinosaurs? There *are* problems..."
3. ^ *a b c* Bottke, Vokrouhlicky, Nesvorny.
4. ^ Verschuur, 20-21.
5. ^ *a b c* Bates.
6. ^ Verschuur, 20.
7. ^ Weinreb.
8. ^ Mason.
9. ^ Hildebrand, Penfield, et al.
10. ^ *a b* Hildebrand interview: 'Similar deposits of rubble occur all across the southern coast of North America [...] indicate that something extraordinary happened here.'
11. ^ *a b* Morás.
12. ^ Frankel, 50.
13. ^ Hildebrand interview.
14. ^ Pope, Baines, et al.
15. ^ Sharpton & Marin.
16. ^ Covey *et al*.
17. ^ Bralower *et al*.
18. ^ Adamsky and Smirnov, 19.
19. ^ Adamsky and Smirnov, 20.
20. ^ Mason, *et al*.
21. ^ Milosh, interview.
22. ^ Milosh. "On the ground, you would feel an effect similar to an oven on broil, lasting for about an hour [...] causing global forest fires."
23. ^ Hildebrand, Penfield, *et al*; 5.
24. ^ *a b* Perlman.
25. ^ Pope, Ocampo, *et al*.
26. ^ Hildebrand, Penfield, *et al*; 1.
27. ^ *a b* Hildebrand, Penfield, *et al*; 3.
28. ^ Grieve.
29. ^ *a b* Hildebrand, Penfield, *et al*; 4.
30. ^ Kring, "Discovering the Crater".
31. ^ Sigurdsson.
32. ^ Ingham.
33. ^ Alvarez, W. interview.
34. ^ Kring, "Environment Consequences".
35. ^ Keller, *et al*.
36. ^ Alvarez.
37. ^ Web Elements.
38. ^ Quivx.
39. ^ Mayell.
40. ^ Stewart, Allen.
41. ^ Kelley, Gurov.
42. ^ Stewart.
43. ^ *a b* Mullen, "Multiple Impacts".
44. ^ Mullen, "Shiva".
45. ^ Weisstein.
46. ^ Than.
47. ^ Dunham.

References

- Adamsky, Viktor; Smirnov, Yuri (1994). "Moscow's Biggest Bomb: the 50-Megaton Test of October 1961". *Cold War International History Project Bulletin* (4): 19–21, http://web.archive.org/web/20000826213607/http://cwihp.si.edu/pdf/bull4b.pdf.
- Alvarez, W.; L.W. Alvarez, F. Asaro, and H.V. Michel (1979). "Anomalous iridium levels at the Cretaceous/Tertiary boundary at Gubbio, Italy: Negative results of tests for a supernova origin". Christensen, W.K., and Birkelund, T. *Cretaceous/Tertiary Boundary Events Symposium* **2**: 69.
- Bates, Robin (series producer), Chesmar, Terri and Baniewicz, Rich (associate producers). (1992). *The Dinosaurs! (http://imdb.com/title/tt0103400/) Episode 4: "Death of the Dinosaur"* [TV-series]. PBS Video, WHYY-TV.
  Bakker, Robert T. Interview: *The Dinosaurs: Death of the Dinosaur*. 1990, WHYY.
  Hildebrand, Alan. Interview: *The Dinosaurs: Death of the Dinosaur*. 1992, WHYY.
  Milosh, Gene. Interview: *The Dinosaurs: Death of the Dinosaur*. 1992, (1990): WHYY.
  Moras, Florentine. Interview: *The Dinosaurs: Death of the Dinosaur*. 1992, (filmed 1990): WHYY.
  Penfield, Glen. Interview: *The Dinosaurs: Death of the Dinosaur*. 1992, WHYY.
- Bottke, W.F.; Vokrouhlicky, D., Nesvorny, D. (September 2007). "An asteroid breakup 160 Myr ago as the probable source of the K/T impactor" (PDF). *Nature* **449**: 23–25. doi:10.1038/nature06070, http://www.boulder.swri.edu/~bottke/Reprints/Bottke_2007_Nature_449_48_Baptistina_KT.pdf. Retrieved on 3 October 2007.
- Bralower, Timothy J.; Charles K. Paull and R. Mark Leckie (April 1998). "The Cretaceous–Tertiary boundary cocktail: Chicxulub impact triggers margin collapse and extensive sediment gravity flows" (PDF). *Geology*: 122–124, http://www.geosc.psu.edu/people/faculty/personalpages/tbralower/Braloweretal1998.pdf. Retrieved on 25 September 2007.
- Covey; et al. (1994). "Global climatic effects of atmospheric dust from an asteroid comet impact on Earth". *Global and Planetary Change, 9 (1994)*

263-273 **9**: 263. doi:10.1016/0921-8181(94)90020-5.

- Dunham, Will (2006-11-30). "Single massive asteroid wiped out dinosaurs: study (http://geology.physadvice.net/2006/12/05/) ". *physadvice.net*. Retrieved on 2007-09-29.
- Frankel, Charles (1999). *The End of the Dinosaurs: Chicxulub Crater and Mass Extinctions*. Cambridge University Press, 236. ISBN 0521474477.
- Grieve, R. (1975). "Petrology and Chemistry of the Impact Melt at Mistastin Lake Crater". *Geological Society of America Bulletin* **86**: 1617–1629. doi:10.1130/0016-7606(1975)86<1617:PACOTI>2.0.CO;2.
- Hildebrand, Alan R.; Penfield, Glen T.; Kring, David A.; Pilkington, Mark; Zanoguera, Antonio Camargo; Jacobsen, Stein B.; Boynton, William V. (September 1991). "Chicxulub Crater; a possible Cretaceous/Tertiary boundary impact crater on the Yucatan Peninsula, Mexico". *Geology* **19** (9): 867–871. doi:10.1130/0091-7613(1991)019<0867:CCAPCT>2.3.CO;2, http://geology.geoscienceworld.org/cgi/content/abstract/19/9/867.
- Ingham, Richard (2007-09-05). "Traced: The asteroid breakup that wiped out the dinosaurs (http://afp.google.com/article/ALeqM5jz3TGi2zcsmdYQDxwbdCwq2kanMA) ". *AFP*. Google News. Retrieved on 2007-09-27.
- Keller, Gerta; Adatte, Thierry; Berner, Zsolt; Harting, Markus; Baum, Gerald; Prauss, Michael; Tantawy, Abdel; Stueben, Doris (2007). "Chicxulub impact predates K–T boundary: New evidence from Brazos, Texas" (PDF). *Earth and Planetary Science Letters* **255**: 1–18. doi:10.1016/j.epsl.2006.12.026, http://geoweb.princeton.edu/people/faculty/keller/Keller_et_al_%20EPSL_2007.pdf. Retrieved on 25 September 2007.
- Kelley, Simon P.; Gurov, Eugene (2002). "The Boltysh, another end-Cretaceous impact" (abstract). *Meteoritics & Planetary Science* **37** (8): 1031–1043, http://www.uark.edu/~meteor/abst37-8.htm#kelley.
- Kring, David A. (2003). "Environmental consequences of impact cratering events as a function of ambient conditions on Earth". *Astrobiology* **3** (1): 133–152. doi:10.1089/153110703321632471. PMID 12809133.
- Kring, David A.. "Discovering the Crater (http://www.lpl.arizona.edu/SIC/impact_cratering/Chicxulub/Discovering_crater.html) ". *lpl.arizona.edu*. Retrieved on 2007-10-12.
- Mason, Ben G.; Pyle, David M. and Oppenheimer, Clive (2004). "The size and frequency of the largest explosive eruptions on Earth" (PDF). *Bulletin of Volcanology* **66** (8): 735–748. doi:10.1007/s00445-004-0355-9.
- Mason, Moya K. (2007). "In Search of a Key Paper (http://www.moyak.com/researcher/resume/papers/key.html) ". *moyak.com*. Retrieved on 2007-10-03.
- Mayell, Hillary (2005-05-15). "Asteroid Rained Glass Over Entire Earth, Scientists Say (http://news.nationalgeographic.com/news/2005/04/0415_050418_chicxulub.html) ". *National Geographic News*. Retrieved on 2007-10-01.
- Mullen, Leslie (2004-11-04). "Deep Impact — Shiva: Another K–T Impact?". *Astrobiology Magazine*, http://www.spacedaily.com/news/deepimpact-04r.html. Retrieved on 29 September 2007.
- Mullen, Leslie (2004-10-21). "Did Multiple Impacts Pummel Earth 35 Million Years Ago? (http://www.spacedaily.com/news/deepimpact-04p.html) ". *spacedaily.com*. Retrieved on 2007-09-29.
- Perlman, David (2007-09-06). "Scientists say they know where dinosaur-killing asteroid came from (http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/09/06/MNVFRUVCK.DTL) ". *San Francisco Chronicle*. Retrieved on 2007-10-03.
- Pope KO, Baines KH, Ocampo AC, Ivanov BA (1997). "Energy, volatile production, and climatic effects of the Chicxulub Cretaceous/Tertiary impact". *Journal of Geophysical Research* **102** (E9): 245–64. doi:10.1029/97JE01743. PMID 11541145.
- Pope KO, Ocampo AC, Kinsland GL, Smith R (1996). "Surface expression of the Chicxulub crater". *Geology* **24** (6): 527–30. doi:10.1130/0091-7613(1996)024<0527:SEOTCC>2.3.C PMID 11539331.
- Qivx Inc. (2003). "Periodic Table: Properties of Iridium (http://www.qivx.com/ispt/elements/ptw_077.php) ". *qivx.com*. Retrieved on 2007-09-25.
- Rojas-Consuegra, R., M. A. Iturralde-Vinent, C. Díaz-Otero y D. García-Delgado (2005). "Significación paleogeográfica de la brecha basal del Límite K/T en Loma Dos Hermanas (Loma del Capiro), en Santa Clara, provincia de Villa Clara. I Convención Cubana de Ciencias de la Tierra.". *Geociencias* **8** (6): 1–9. ISBN 959-7117-03-7.
- Sharpton VL, Marin LE (1997). "The Cretaceous–Tertiary impact crater and the cosmic projectile that produced it". *Annals of the New York Academy of Sciences* **822**: 353–80. doi:10.1111/j.1749-6632.1997.tb48351.x. PMID 11543120.
- Stewart, S. A. (2005). "3D seismic reflection mapping of the Silverpit multi-ringed crater, North Sea". *Geological Society of America Bulletin* **117** (3): 354–368. doi:10.1130/B25591.1, http://www.gsajournals.org/perlserv/?request=get-document&doi=10.1130%2FB25591.1.
- Stewart S. A., Allen P. J. (2002). "A 20-km-diameter multi-ringed impact structure in the North Sea". *Nature* **418** (6897): 520–3. doi:". PMID 12152076.
- Than, Ker (2006-11-28). "Study: Single Meteorite Impact Killed Dinosaurs (http://www.livescience.com/animals/061128_dinosaur_extinct.html) ". *livescience.com*. Retrieved on 2007-09-29.
- Verschuur, Gerrit L. (1996). *Impact!: The Threat of Comets and Asteroids*. Oxford University Press (U.S.). ISBN 0195119193.
- Web Elements (2007). "Geological Abundances (http://www.webelements.com/webelements/elements/text/Ir/geol.html) ". *webelements.com*. Retrieved on 2007-09-26.
- Weinreb, David B. (March 2002). "Catastrophic Events

in the History of Life: Toward a New Understanding of Mass Extinctions in the Fossil Record — Part I (http://www.jyi.org/volumes/volume5/issue6/features/weinreb.html) ". *jyi.org*. Retrieved on 2007-10-03.
- Weisstein, Eric W. (2007). "Eric Weisstein's World of Physics — Roche Limit (http://scienceworld.wolfram.com/physics/RocheLimit.html) ". scienceworld.wolfram.com. Retrieved on September 5, 2007.

External links

- Satellite image of the region (http://maps.google.com/maps?q=http://bbs.keyhole.com/ubb/download.php?Number=1226046&t=k&om=1) (from Google Maps)
- Numerous sinkholes (Cenotes) marked around Chicxulub crater. (http://bbs.keyhole.com/ubb/download.php?Number=1226046) Opens in Google Earth
- NASA JPL: "A 'Smoking Gun' for Dinosaur Extinction" (http://www.jpl.nasa.gov/news/features.cfm?feature=8) , March 6, 2003
- Chicxulub, Crater of Doom (http://phobos.physics.uiowa.edu/~srs/2952_EXW/Addend9_EXW.htm)

Cretaceous–Tertiary extinction event	
Proposed K-T boundary craters	
Boltysh crater	Chicxulub Crater
Shiva crater	Silverpit crater

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