

Thème 1 – La Terre dans l'Univers, la Vie, l'évolution du vivant
Le domaine continental et sa dynamique

Death at Ashfall, Nebraska.

Using the documents and your knowledge, you will explain what consequences some geological catastrophes can have on biodiversity.

Document 1. Ten million years ago, the area around Ashfall, Nebraska, held water holes within a savannah setting, flat grassland like some classic wildlife areas in Africa today. Large herds* of animals migrated to the water holes to drink: three-horned deer, giant camels, three-toed horses, oreodonts, four-tusked elephants, weasels, bear dogs, rhinoceroses and many other species. Their daily routines were changed for the worse one day when a huge volcanic eruption blasted forth 1,300 km away. The eruption came from the Yellowstone hot spot, but 10 million years ago, it sat beneath Idaho.

Winds carried volcanic ash and blanketed Nebraska with a layer of ash about 1 ft thick. After its initial deposition, local winds picked up and blew ash around in grey blizzards. Large amounts of reworked ash settled in the water holes.

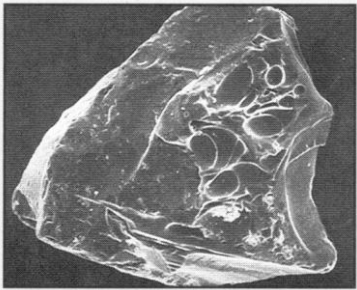
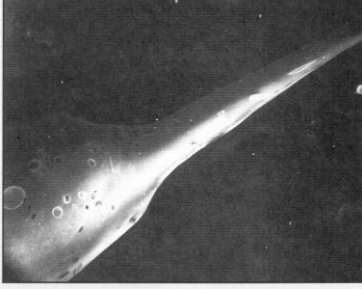
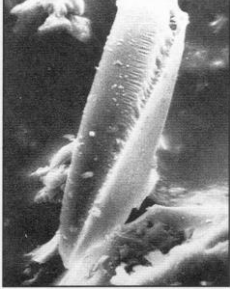
Fossil bones of large animals at Ashfall show irregular growth, evidence that they were not getting enough oxygen to grow normal bones.

Fossil preservation at Ashfall is superb, with whole animal skeletons joined together as they were in life. The layers of fossil-containing ash show the death sequence. In the lowest ash layer are the remains of [...] birds and turtles. In overlying ash layers are the fossils of musk deer and small carnivores. Some of the next animals to perish were the horses and camels. A herd of about 100 rhinoceroses kept returning to the water holes, kicking up and breathing volcanic ash clouds each time, until they too died. Their fossils include a mother rhino who died before her suckling youngster lying next to her. As ash continued to blow about, it ultimately buried the water hole death sites.

*herd: group

Document 2.

[...] The high magnification of a scanning electron microscope reveals that volcanic ash is composed of sharp, jagged, angular pieces of glass and rock [...].

a. Glass fragment from Katmai, Alaska (scale = 0.04 mm)	b. Tail of cool droplet from Kilauea, Hawaiï (scale = 0.01 mm)	c. Angular glass fragment, Mount Mayon, Philippines (scale = 0.01 mm)
		

Source (all documents): Natural disasters, from Patrick L. Abbott (San Diego State University)