

10 million years needed to recover from mass extinction

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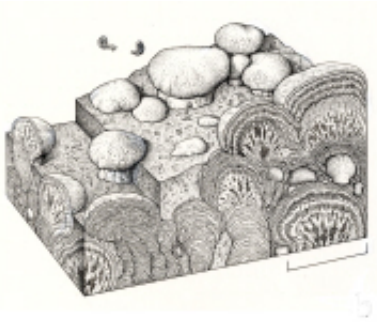


Illustration of a microbe-dominated ecosystem immediately after the end-Permian period of mass extinction. Image by John Sibbick

(Phys.org) -- It took some 10 million years for Earth to recover from the greatest mass extinction of all time, latest research has revealed.

Life was nearly wiped out 250 million years ago, with only 10 per cent of [plants and animals](#) surviving. It is currently much debated how life recovered from this cataclysm, whether quickly or slowly.

Recent evidence for a rapid bounce-back is evaluated in a new review article by Dr Zhong-Qiang Chen, from the China University of Geosciences in Wuhan, and Professor Michael Benton from the University of Bristol. They find that recovery from the crisis lasted some 10 million years, as explained today in *Nature Geoscience*.

There were apparently two reasons for the delay, the sheer intensity of the crisis, and continuing grim conditions on Earth after the first wave of extinction.

The end-Permian crisis, by far the most dramatic biological crisis to affect [life on Earth](#), was triggered by a number of physical environmental shocks - global warming, [acid rain](#), ocean

acidification and ocean anoxia. These were enough to kill off 90 per cent of living things on land and in the sea.

Dr Chen said: "It is hard to imagine how so much of life could have been killed, but there is no doubt from some of the fantastic rock sections in China and elsewhere round the world that this was the biggest crisis ever faced by life."

Current research shows that the grim conditions continued in bursts for some five to six million years after the initial crisis, with repeated carbon and oxygen crises, warming and other ill effects.

Some [groups of animals](#) on the sea and land did recover quickly and began to rebuild their ecosystems, but they suffered further setbacks. Life had not really recovered in these early phases because permanent ecosystems were not established.

Professor Benton, Professor of Vertebrate Palaeontology at the University of Bristol, said: "Life seemed to be getting back to normal when another crisis hit and set it back again. The carbon crises were repeated many times, and then finally conditions became normal again after five million years or so."

Finally, after the environmental crises ceased to be so severe, more complex ecosystems emerged. In the sea, new groups, such as ancestral crabs and lobsters, as well as the first marine reptiles, came on the scene, and they formed the basis of future modern-style ecosystems.

Professor Benton added: "We often see mass extinctions as entirely negative but in this most devastating case, [life](#) did recover, after many millions of years, and new groups emerged. The event had re-set evolution. However, the causes of the killing - global warming, acid rain, [ocean acidification](#) - sound eerily familiar to us today.

Perhaps we can learn something from these ancient events."

More information: 'The timing and pattern of biotic recovery following the end-Permian mass extinction' *Nature Geoscience*, May 27, 2012.

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Provided by University of Bristol

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