

MASS EXTINCTIONS AND THEIR CAUSES

Summary

Mass extinctions are relatively brief interval of geologic time distinguished by a distinctive increase in the extinction rate experienced by more than one geographically wide-spread higher taxon, resulting in a transient drop of the global biodiversity (and several other ecosystem perturbations, including carbon cycling). Macroevolutionary role of the catastrophic events has attracted an enormous attention, but this is involved in many highly controversial matters. The incompleteness and biases of the fossil record are comprehensively discussed recently for the global diversity statistics, but, as shown by sampling standardization and more reliable counting strategies, they do not essentially obscure recognizing peaks of extinction rate. On the other hand, other metrics of past loss of evolutionary history are requested, as well as more common application of phylogenetic

approaches. Information on biological selectivity must be combined with regional environmental and geographic patterns to indentify the actual complexity of extinction events and ways of the ecosystem recovery, also in the context of ongoing biodiversity crisis promoted by the anthropogenic greenhouse effect. Even the “big five” mass extinctions are certainly heterogeneous group in effect and in cause, and primary kill mechanisms are still conjectural. Volcanic greenhouse scenario, with a stimulating role for CO₂ emissions and release of methane from gas hydrate reservoirs due to the eruption of large igneous provinces, seems to be an emerging paradigm in place of so previously highlighted impact theory. Volcanism → global warming → oceanic anoxia → mass extinction model is therefore currently seen as a main determining factor in the biosphere history.