

Journal of Sedimentary Research

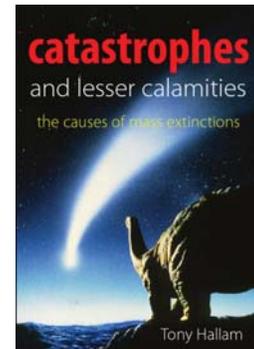
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Catastrophes and Lesser Calamities—The Causes of Mass Extinctions, by Tony Hallam, 2005. Oxford University Press, Great Clarendon Street, OXFORD, OX2 6DP United Kingdom. Paperback, 240 pages. Price GBP 8.99. ISBN0-19-280668-8.



“Planet Earth” has just faced a 9.3-magnitude earthquake and its induced tsunami, and a series of powerful cyclones, two kinds of disasters in terms of loss of human beings and destruction of human works. Such events, with respective internal and climatic origins, may be called “catastrophes” as they are instantaneous on a human scale. A broader concept of “catastrophe” is developed here by Tony Hallam: “perturbation of the biosphere that appears to be instantaneous when viewed at the level of detail that can be resolved in the geological record.” In search of the causes of the mass extinctions which punctuated the latter, Hallam is presenting and analyzing an exhaustive list of terrestrial and extra-terrestrial processes, or groups of linked processes, responsible for these catastrophic steps of Life’s evolution at the surface of the Earth.

The disappearance of large amounts of living species, and especially Raup & Sepkoski’s “big five” extinctions (end-Ordovician, Frasnian/Famennian boundary, end-Permian, end-Triassic, end-Cretaceous) are the main topic of Hallam’s book, with special attention paid to the Permian–Triassic boundary, which he personally investigated, and also to the great debate on the Cretaceous–Tertiary boundary.

Before considering the main groups of possible causes of mass extinction, Chapters 1–3 are dedicated to a presentation of the concept of mass extinctions and its birth, and the initial gradualism vs catastrophism opposition. This introductory part insists on the necessity of careful sedimentological and stratigraphical analysis as any discussion on a geological change or “event” requires the most accurate time control. Two other preliminary points are discussed by Hallam: the definitions and criteria used by paleontologists and micropaleontologists to define a mass extinction, and the global synchronism of these changes. In Chapters 4–8, the major possible causes of mass extinction are presented: impacts by comets and asteroids, sea-level changes, oxygen deficiency in the oceans, volcanic activity. Each is presented with its analytical tools and a historical aspect: succession of discoveries, points of view from debating specialists. Phenomena as far from each other as the destabilization of oceanic methane hydrates and the crossing of the galactic Oort Cloud by the solar system are described and their impact is discussed. The final confrontation of the different theories is the core of Chapter 9,

followed by two more philosophical discussions on the Evolutionary Significance of Mass Extinctions (Chapter 10) and the Influence of Humans (Chapter 11).

Humour and personal opinions on present geological sciences are not absent from a beautifully written book. Non-specialist readers, earth-science students, as well as senior geologists will enjoy, and profit from, the dense and pertinent content of Tony Hallam's book: up-to-date data, very clear explanations, accurate discussions about the complex interaction of various factors, and objective confrontation of theories. Opening this fascinating geological inquiry led by a great 'detective', and following him to the last line, is a privilege.

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