Earth scientists have been in pursuit for long to find the truth about: (1) What killed dinosaurs at the end-Cretaceous? and (2) Had the mass extinction during the geological history been abrupt or is a gradual process? The objective of this paper is an attempt on the basis of data collected from the Barmer Basin, Rajasthan, to find a plausible answer to these two questions.

The palaeontological analysis done by Sepkoski (1992) reveals that the Earth has suffered five major mass extinctions during its history: during Late Ordovician, the Devonian, the Permian, the Triassic and the Cretaceous. It is generally believed that the species become extinct when their rate of adaptation is not able to compete with the environmental stress. The Earth has suffered many such episodes when its environment got highly deteriorated and became unsuitable for the then thriving species. The records of such events are often preserved in the sedimentary deposits of the Earth. The geological boundaries in the stratigraphical scale are therefore, manifestations of the physical, chemical and biological changes that Earth suffered during its long history. If we take into consideration a recent trend in the extinction of the species we find that there has been a rapid annihilation of many of the species in the past few hundred years. Thirty of the species became extinct in the 17th century while forty species lost their existence in the 18th century. In the 19th century 100 species were wiped off from the globe and the same number of species vanished in the 20th century. The culprit responsible for this catastrophe is often interpreted as ‘Man’. This may partly be true as man’s activities towards a developed world are resulting in a severe environmental stress leading to inability for many of the species to adapt to the recurring changes. Many of the scientists have shown their apprehension that this is a period of sixth major mass extinction. One of the prime reasons for this extinction is probably perturbation in the delicate balance of nitrogen (78%), oxygen (21%) and other gases (1%) in the atmosphere. All these changes are getting recorded in the Earth in the form of fossils, chemical anomalies and as distortion in the morphology of the Earth.

If we imagine a scenario of the post 65 Ma era, it is possible that the intelligent being of the future era may find these changes incorporated in a thin sedimentary layer with no lateral continuity, and may fall into the trap of interpreting tens of thousand years as a very very small time period. It is to be noted that the enormity of dinosaurs must have caused extinction of many of the species of the Cretaceous Period. Though, final blow responsible for complete deterioration in the environment could be an impact that led to the death of dinosaurs.

The Barmer Basin is a narrow N-S trending graben. Its western margin is defined by a NNW-SSE trending fault exposed in the west of Barmer town where clastics of the Barmer Hill Formation are down faulted against Malani Rhyolite. Its southern extension is restricted by a NE-SW trending fault scarp exposed near Sarnu. A ridge exposing Fatehgarh Formation underlain by Lathi Formation shows its northern limit while its eastern margin is not observed. The sediments of the Barmer Basin are classified as pre-rift, syn-rift and post-rift that deposited on the Late Proterozoic Malani Igneous Suite (Sisodia and Singh, 2000). The pre-rift sediments are represented by: 1. Randha Formation (Siliceous facies). 2. Birmania Formation (Calcareous facies) and 3. Lathi Formation. The syn-rift sediments include Barmer Hill Formation and Fatehgarh Formation. The Fatehgarh Formation shows a mixed sand and mud tidal flat environment, it comprises besides other sediments a phosphorite bed with micro vertebrate fossils of Late Cretaceous age such as Igdabatis along with forms of Semionodontid, Lapisosteum, Enchodontid (Mathur et al. 2005). A thin unit called Siliceous Earth overlies Fatehgarh Formation. Siliceous Earth is basically a volcanic ash that represents a sequential time deposit accumulated over a short span of time close to the Cretaceous-Tertiary Boundary event (Sisodia et al. 2005). Most of the Barmer Basin has been filled up with post-rift sediments constituting the Mataji-ka-dungar Formation and
This type of sediments are mostly a product of impact origin. The analysis of shales and lignites of Akli Formation yielded unusual spherules consisting of opaque material. One possibility is that Chixculub impact was placed totally isolated in the Indian Ocean. The discovery of iridium anomaly and impactsites at Um Sohrygkew, Meghalaya (Bhandari et al. 1987) and at Anjar (Bhandari et al. 1996) however does not strongly support this possibility and necessitates rethinking for a plausible but judicious answer to the K/T extinction. May be! We should look for another crater in the Indian Peninsula. Shiva Crater in offshore western India has already been proposed (Chatterjee and Rudra, 1996). At the same time it is also necessary to note that since Chixculub did not trigger Deccan Volcanism (Bhandari et al. 1995) there is a leeway that this — another crater may be a candidate that triggered Deccan Volcanism; and both catastrophes together changed the history of life on the Earth!!

References


