Microspherules from the infratrappean Gondwana sediments below Deccan volcanic covered Killari earthquake region, Maharashtra (India)

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Rare occurrence of spherules in sedimentary strata is known to provide interesting clues to the nature of paleo-crustal evolution, influenced by meteoritic influxes. Such spherules are usually produced by the high temperature melting and vaporization of both the impacted crust, as well as the extraterrestrial object. Our detailed investigations on the thin infratrappean sediment layer, encountered below 338 m thick 65 Ma Deccan volcanic sequence in Killari borehole, located at 18º03'07"N, 76º33'20"E in Maharashtra (India), resulted into finding of a microspherule. Palynological studies indicate the burial of this sedimentary sequence, that rests over 2.57 Ga amphibolite to granulite facies mid crustal basement, in dysoxic to anoxic conditions, having close proximity with Gondwana sediments [1, 2].

We studied this microspherule through scanning electron microscope and energy dispersive X-ray diffraction (EDX) in order to decipher the images, morphology and its elemental composition, which reflect the nature of the vapourized impacted rocks. The studied spherule was found to be of mafic/ultramafic in nature, enriched in Fe (18-19 wt %), Ti (1.2-1.5 wt %) and Mg (3.3-3.9 wt %). In contrast, background host sedimentary rocks contain much lower Fe (1.8- 4.1 wt %) and Ti (0.14 to 0.19 wt %), suggesting that the spherule is detrital in nature**.** The study suggests possible asteroidal impact over the Indian terrain during the Gondwana sedimentation period. There are indications of the presence of spherules in similar P/T beds of northeast India that coincides with the most severe biological mass extinction in the earth's history [3, 4].

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