

CORRESPONDENCE

SHIVA CRATER

The short account on "Shiva Crater" in the August '97 issue of the Journal has brought to light an impact crater of global importance nearer home on the western margin of India, antipodally located with respect to the Chicxulub crater of Mexico across the globe. The view expressed to the effect that Deccan volcanic activity took place prior to the impact of a meteorite with the Earth may be viewed from the plate tectonics angle.

Dating of the magnetic lineament patterns of the Indian ocean-floor suggests that while Malagasay (Madagascar) separated from the west coast of India at 100-80 Ma, the separation of Seychelles from India was later, at 40 Ma. On this basis, it is reasonable to think that the meteorite impact with the Earth, at about 65 Ma, predated the separation of Seychelles and that the impact was on continental crust in the western margin of India, with Seychelles still as a part of it. Accordingly, the impact on the continental crust could have given rise to generation of stupendous dust clouds, ushering in a "nuclear winter".

The positioning of the two halves of the Shiva crater, one half on the western margin of India and the other half in the Amirante arc of Seychelles, both equidistant on either side of the north-south running Carlsberg ridge, is interesting. Their present position in space is attributable to sea-floor spreading, as a result of generation of crust along the Carlsberg ridge.

The moot point to consider is whether the extinction of faunal species at the K-T boundary is solely attributable to a "nuclear winter", arising out of a meteorite impact. Extensive and thick spreads of flood basalts are known in South America (Cretaceous in age), Africa (Jurassic-Cretaceous in age) and India (Cretaceous). The stupendous addition of hot basaltic mantle material would have resulted in tremendous thermal stresses and gases like CO₂, N₂, SO₂, Cl₂ would have been exhaled from the basaltic lava, resulting in large-scale atmospheric pollution. The emanation of such gases is known in the Kilauea volcano in Hawaii.

It is but reasonable to conclude that atmospheric dust pollution, arising out of the impact of a meteorite and addition of lethal gases, as also creation of thermal stresses as a result of widespread extrusion of basalts in the southern continents could have given rise to drastic environmental changes, inimical to the sustenance and proliferation of some species of life forms, including dinosaurs and ammonites.

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JABALPUR EARTHQUAKE OF MAY 22, 1997

1. Mr. A.P. Agarwal and V.K. Khanna have mentioned at Sr.No.7 of their letter about the change in groundwater level near the fault planes (in Tikamgarh district ?) and opening of groundwater sources in tube wells of Tikamgarh district situated approximately 200 km NW of Jabalpur. The latter seems to be rather unconceivable for the area of maximum damage due to Jabalpur earthquake admeasured 25x15 km only. The attenuation characteristics at a distance of 200 km from the epicentre are unable to open up groundwater sources in tube wells.

If this is taken as correct then it goes to prove that this earthquake has the focus along a NE-SW or N-S trending fault cutting across the ENE-WSW Narmada-Son lineament.

2. It is to be understood that the water level of Bargi reservoir which is about 25 km from Jabalpur city, was about 1m below (R.L. 406.60m) the crest level (R.L. 407.50 m). The Full Reservoir Level (FRL) of Bargi dam is R.L. 422.76 m. No damage is observed /reported by the team of officers from the Central Water Commission and Madhya Pradesh who inspected the Bargi dam on 24-5-97, i.e., immediately after the Jabalpur earthquake. Thus the question of Reservoir Induced Seismicity (RIS) is ruled out.

3. Mr. B. Ramchandran while referring to the Jabalpur earthquake has tacitly indicated the possibility of RIS due to Bargi Reservoir. On the other side he rules out the possibility of RIS in his second correspondence titled 'High Dams in Central Himalayas' by stating that dams in Himalayan region under the geological and seismotectonic set ups similar to those at Tehri Dam are functioning satisfactorily for nearly twenty to thirty years. While corroborating this statement he further quotes the dams from abroad and states that in that region the seismic activity has been in decline, in the light of isostatic balance created by the water reservoirs. He also props up his statements by statistics mentioning that a very low percentage of failures of dams because of seismicity. In my opinion Mr. Ramchandran should clarify his stand on Bargi dam vis-a-vis the Jabalpur earthquake. The height of Bargi dam is 69 m. Water head therefore, cannot be more than 100 m as stated by Mr. Ramchandran. Misinformation should be avoided.

4. Mr. Ramchandran has recommended to provide adequate seismic factors for all buildings and structures as per the IS code in future. The point is well taken. As regards dams, the design is done adopting various criteria laid down including the seismic ones. Jabalpur earthquake was a natural event, i.e., tectonic earthquake and had no relation with any man made activity. For scientific reasons the area of Jabalpur earthquake need be monitored as rightly pointed out by Dr. H.K. Gupta et al. in their paper titled 'The Jabalpur Earthquake of May 22, 1997'. The authors do deserve compliments for prompt scientific publication on a very vital subject.

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ANNOUNCEMENT

INDIAN GEOLOGICAL CONGRESS: XI Convention and National Seminar on conceptual models on the evolution of "Granite Greenstone Belts, Granulite Terranes and Associated Mineral Deposits": February, 4-6, 1998. Organised by Department of Studies in Geology, University of Mysore, Mysore. Original research contributions are invited in the fields of: a) Structure and Tectonics, b) Sedimentation, magmatism and metamorphism, c) Geochemistry including Stable and Radiogenic, d) Mineral deposits, including industrial raw materials and radioactive minerals and e) fluid flow and processes in the Earth's crust. Besides, research contributions are invited for the various technical sessions during the XI IGC. For further details contact Dr. C. Srikantappa, Convenor, XI IGC, Department of studies in Geology, University of Mysore, Manasagangotri, Mysore 570 006, Tel: 543033 (R), (0821) 515256(O); Fax: 0821 - 521263/421550.