

## **GEO PARKS OF INDIA** *museum of natural sculptures*

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**"There is a need to develop and conserve them as museum of natural sculptures more vigorously by providing geotourism guide books, maps, multimedia kits and integrated geotourism packages in coordination with State Governments."**

Nature has sculptured many eye-catching features by geological processes. India has been bestowed with a large number of such magnificent geological sites spread throughout its length and breadth and spanning over the entire length of the geological time scale. These sites attract not only the earth scientists but also the common man. These natural exquisite land sculptures have become nature lover's delight and are gaining importance as tourist spots and promoting geotourism. Promotion of these geosites, several of which have been declared as National Geological Monuments in India by Geological Survey of India (GSI), have potential to attract tourists. There is a need to develop and conserve them as museum of natural sculptures more vigorously by providing geotourism guide books, maps, multimedia kits and integrated geotourism packages in coordination with State Governments.

In addition to these monuments, there are several other important and picturesque geological features and sites which need preservation and protection from human developmental activities. Several state government departments and GSI have been taking a leading role in preserving and protecting such sites of rich scientific values by declaring them as geological monuments and preserving them within its resources. GSI, during its 150th anniversary celebrations in 2001 has published a Special Volume on National Geological Monuments which gives detail account of locations, geology, palaeontology and stratigraphy of all the monuments supported by pictorial illustrations. Of the 26 National Geological Monuments in India, 7 have been declared as Geological Parks. All of these are, in fact, Fossil Parks. Out of these seven fossil parks three are Fossil Wood Parks, two Stromatolite Parks and one each vertebrate and invertebrate fossil park.

### **NATIONAL GEOLOGICAL MONUMENTS**

#### **ANDHRA PRADESH**

1. Natural Arch, Tirumala Hills, Chittoor District
2. Eparchaeon Unconformity, Tirumala-Tirupati road, Chittoor District
3. Bedded Barytes, Mangampeta, Cuddapah District

#### **CHHATTISGARH**

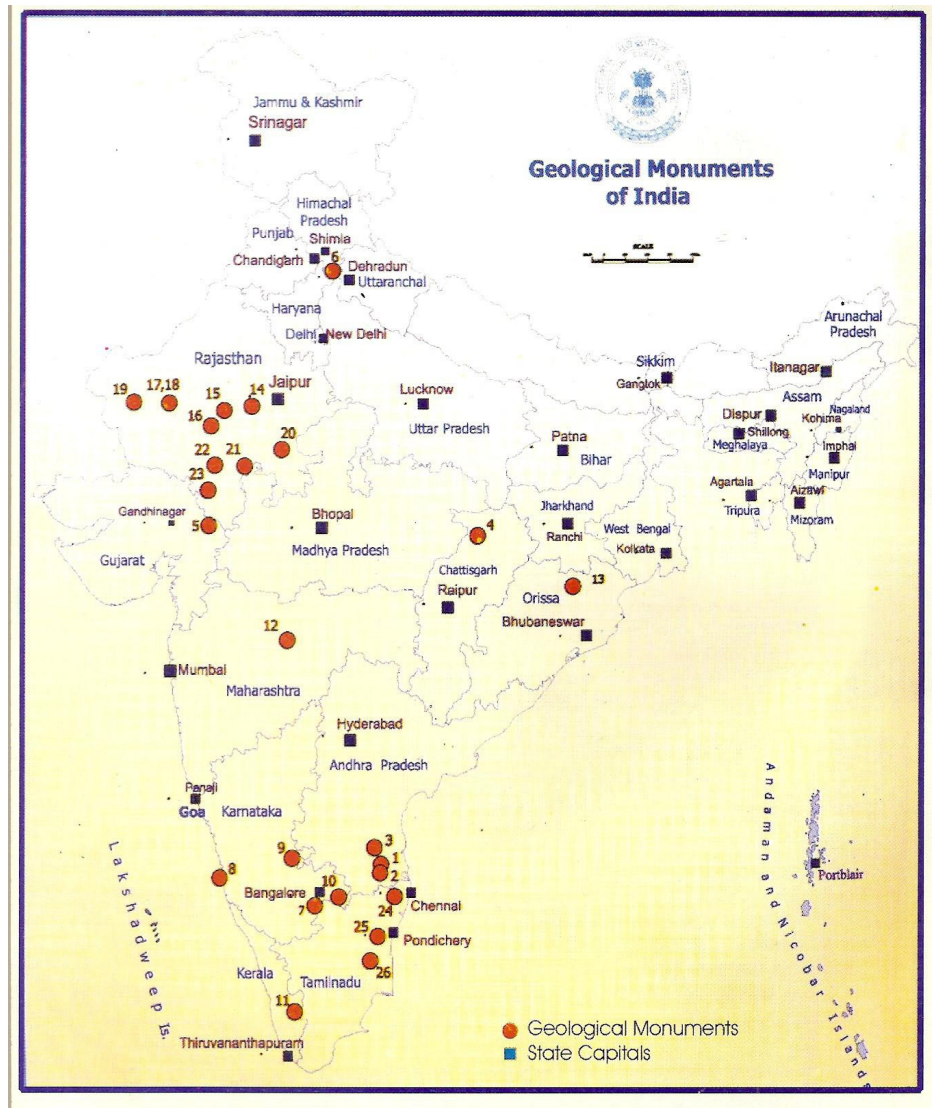
4. Marine Gondwana Fossil Park, Manendragarh, Sarguja District

#### **GUJARAT**

5. Eddy Current Markings, Panchmahal District

#### **Himachal Pradesh**

6. Siwalik Fossil Park, Saketi, Sirmur District



#### **KARNATAKA**

- 7. Peninsular Gneiss, Lalbagh, Bangalore
- 8. Columnar Basaltic Lava, Coconut Island (St. Mary's island), Udupi District
- 9. Pillow Lavas, Maradihalli, Chitradurga District
- 10. Pyroclastic Rocks, Peddapalli, Kolar District

#### **KERALA**

- 11. Laterite, Angadipuram, Malappuram District

#### **MAHARASHTRA**

- 12. Lonar Lake, Buldana District

#### **ORISSA**

- 13. Pillow Lava, Iron Ore Belt, Nomira, Keojar District

#### **RAJASTHAN**

- 14. Nepheline Syenite, Kishangarh, Ajmer District
- 15. Sendra Granite, Pali District
- 16. Bar Conglomerate, Pali District
- 17. Jodhpur Group- Malani Igneous Suite Contact, Jodhpur District
- 18. Welded Tuff, Jodhpur District
- 19. Akal Fossil Wood Park, Jaisalmer District

- 20. Great Boundary Fault at Satur, Bundi District
- 21. Stromatolite Park, Bhojunda, Chittaurgarh District
- 22. Gossan, Rajpura- Dariba, Rajsamand District
- 23. Stromatolite Park, Jhamarkotra, Udaipur District

**TAMIL NADU**

- 24. Charnockite, St. Thomas Mount, Chennai
- 25. National Fossil Wood Park, Tiruvakkarai, Vellupuram District
- 26. National Fossil Wood Park, Sattanur, Perambalur District

**Siwalik Fossil Park, Saketi**

The Geological Survey of India in collaboration with Himachal Pradesh State Government has developed the Siwalik Fossil Park. The basic concepts behind the creation of the Siwalik Fossil Park are scientific, educational and recreational which are being achieved in a phased manner. The creation of the fossil park visualised protection of fossil sites, fabrication of life-size models of the extinct prehistoric animals at the sites of their fossil occurrences, their display in their natural habitat, creation of the surroundings with floral aspect of their times, and construction of a field museum for exhibiting the fossil collections and depiction of the Siwalik biotic diversity during the last 16 million years.

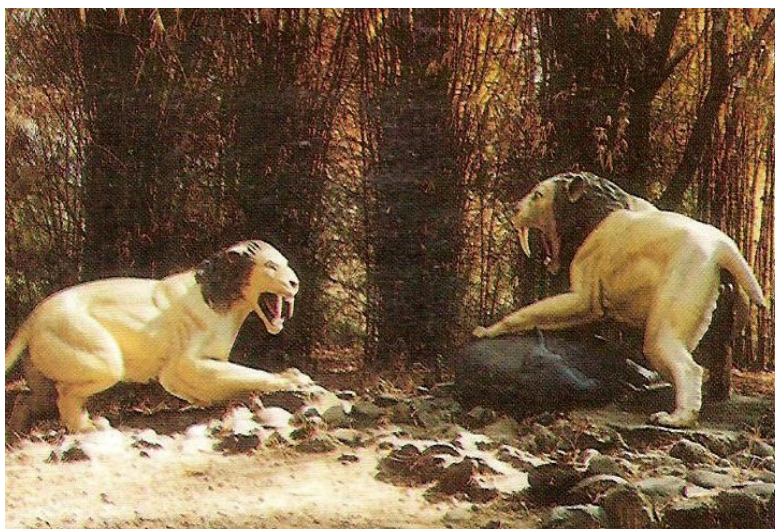
The Siwalik Fossil Park at Saketi, spread over an area of about 1.5 sq. km amidst picturesque exposures of Siwalik Hills in the Markanda in Sirmur district of Himachal Pradesh, was opened to public on 23 rd March 1974. The park displays life size fiberglass models of six of the prehistoric animals that thrived in the area about 1 to 2.5 million years ago, their fossilised remains being recovered from Saketi and neighbouring region. A large and rare collection of vertebrate fossils recovered from Siwalik Hills in Saketi and adjacent area has been displayed in a field museum in the park.







**Life size restoration of Sivatherium**



**Life size restoration of Paramachoerodus**

**Marine Gondwana Fossil Park, Manendragarh, Sarguja District, Chhattisgarh**

A 5 m thick fossiliferous bed was discovered in 1954 on the right bank of Hasdeo River under the railway bridge near the village Ammakherwa, about 2.5 km SE of Manendragarh Railway Station in Sarguja district (Chhattisgarh). This bed is full of the fossil shells of the marine bivalve molluscs, *Eurydesma* and *Aviculopecten*. The fossiliferous bed has also yielded several other kinds of pelecypods and gastropods in addition to brachiopods, bryozoans and crinoids. The fossil faunal assemblage is indicative of transgression of sea in this part of India about 20 crores of years ago (Permian). Similar fossiliferous beds have been found in India at Rajhara (Jharkhand), Darjeeling (West Bengal), Khemgaon (Sikkim) and Subansiri (Arunachal Pradesh). This fossiliferous marine bed at Manendragarh was declared

a National Geological Monument by G.S.I. in 1982. This fossil park is approachable throughout the year except during rains.



**National Fossil Wood Park, Tiruvakkarai, Vellupuram District,  
Tamil Nadu**

In Tiruvakkarai, (155 km SSW of Chennai) over 200 well silicified fossil tree trunks varying in length from 3-15m are preserved and are found embedded in Cuddalore Sandstone of Mio-Pliocene age (about 2 crores of years old). Some of the silicified tree trunks are upto 28 m in length and 5 m in girth. Majority of the fossil wood belong to conifers, gymnosperms and angiosperms. Fine woody texture, the annular rings, the pit structures and the knots are intricately preserved. Earliest record of occurrence of the silicified fossil tree trunks in this area is in 1781 by European naturalists. An area of about 8 sq km where many of these tree trunks are found embedded has been cordoned and declared as National Geological Monument.





## **Fossil wood park maintained by G.S.I.**



**Silicified fossil wood in the park**

## **National Fossil Wood Park, Sattanur, Perambalur District, Tamil Nadu**

Petrified Tree trunks of conifers and gymnosperms (non-flowering plants) measuring up to 18 m length are found embedded in Upper Cretaceous rocks exposed near Sattanur in Cauvery Basin of Tamil Nadu. The Fossil Park is about 700 m north of the village Sattanur and was first reported in 1940. The fossil tree trunks are about 10 crores of years old.



**Silicified fossil wood, Sattanur**

## **Akal Fossil Wood Park, Jaisalmer District, Rajasthan**

The Akal Fossil Wood Park, occupying an area of about 21 hectares is located 18 km SE of Jaisalmer town, on the NH 15 Jaisalmer-Barmer highway). The park exposes a number of gymnospermous fossil wood logs of Lower Jurassic age (about 18 crores of years old). To protect the fossil logs from the removal by scores of visitors, these have been preserved inside the wired metallic cages. Individual logs upto about 13 m length. The fossil park was declared a National Geological Monument in 1977.



**General view of Akal fossil wood park**



**In situ fossil wood log in the park**



## Stromatolite Park, Jhamarkotra, Udaipur District, Rajasthan

The Jhamarkotra Stromatolite park is located 25 km SE of Udaipur in Rajasthan. The rock phosphate horizon in the park is associated with one of the largest and richest bio-strome development known as stromatolites. Stromatolites are the structures produced by blue-green algae associated with carbonate rocks of shallow water origin. Locally people call these *magar machhi bhata* as these give the appearance of crocodile skin. These fossils are 70 to 165 crores of years (Riphean) old. To preserve this unique occurrence of bio-strome structures from mining and other human activity area has been fenced and declared as National geological Monument in 1978. Department of Mines and Geology, Rajasthan are maintaining the site.



## Stromatolite Park, Bhojunda, Chittaurgarh District, Rajasthan

The Stromatolite Park, Bhojunda, is located about 6 km SW of Chhitaugarh. The park is spread in an area of about 8 acres and declared a the National Geological Monument in 1976. The stromatolites of different species are exposed within the massive Bhagwanpura Limestone of Lower Vindhyan age (Riphean). The site is being maintained and protected by Sheep and Wool authority of Rajasthan.





## CURRENT DEVELOPMENTAL ACTIVITIES

### **Development of Dinosaur Park, Rajholi:**

The dinosaur sites at Rahioli in Gujrat discovered in the year 1981 has drawn a world wide attention of academicians and public. No single site in the world has so far produced dinosaur nest and skeletal remains of such an abundance and diversity as found in Khera area. Dinosaur remains occur in Lameta sediments of Late Cretaceous age. To conserve the dinosaurian remains the site has been declared as “*prohibited area for illegal digging, sale and theft of dinosaur fossil*” under the State Act on the 6<sup>th</sup> December, 1997 and is being developed as Geopark. This site has rich palaeontological value and offers most potential area for researchers on dinosaurs.

### **National Geological Park and Museum, Raipur:**

GSI has launched an ambitious project of developing a National Geological Park and Museum at Raipur, the capital city of Chhatisgarh, which envisaged setting up of

- a rock garden consisting of about 200 large blocks of various important rocks from different parts of the country.

- Animal Parks showing 10 to 15 life size fibre glass models of extinct animals.
- A 3-D fibre glass model showing geology and mineral resources of country.
- A high tower showing life through ages and other themes and
- Six museum galleries showing various themes of Geo-sciences.

The Geoparks will also have recreational facilities for children in aesthetically appealing landscape.

### **Lonar Lake, Buldana District:**

The Lonar crater in Deccan basaltic rocks of Cretaceous-Eocene age is a circular depression cradling a saline water lake in its central portion. The crater is 1830m in diameter and is 137 m deep. The site is being developed as Geopark.

Similarly, the National Geological Monument of Peninsular Gneiss inside the famous Lalbagh park in Bangalore in Karnataka and Natural Arch in Tirumala Hills, Chittoor district, Andhra Pradesh are also visited by thousands of tourists every year due to their proximity to other tourist / religious places.

Similar possibility is being explored for in several other Geological Monuments / geosites of India, viz. Columnar Basalt at Coconut Island (Karnataka), Dinosaur site at Jabalpur (Madhya Pradesh), Upper Gondwana Rajmahal Fossil Park (Jharkhand), Kaimur Stromatolite Park (U.P.), etc.

To popularise the dinosaurs, several life-size fibre glass models of dinosaurs have been erected in several zoological gardens in India. Also a fossil skeleton of a dinosaur, *Kotasaurus* collected from the Upper Cretaceous (about 7 crores of years old) of Adilabad district (Andhra Pradesh) has been restored and displayed in a museum at Hyderabad. Another fossil skeleton of a dinosaur, *Barapasaurus* collected from about 16 crores of years old rocks of Chandrapur district, Maharashtra has been restored in the museum of the geological studies unit of the Indian statistical institute, Kolkata.

The geological monuments are of great educative and scientific value and serve to disseminate information to the students and tourists on the natural processes operating on the earth and there is enormous scope to develop them as sites of geotourism.

States of India over the years have evolved and developed several natural sites for geotourism. Efforts are being made to explain the natural process, which have played the key role in formation of natural features making these sites not only picturesque but also educative.

Wealth of important geological, geomorphological sites in India makes for an enormous potential for geotourism and it can be developed as a model geotourist destination which will provide an additional source of revenue not only to the state but also generate a consumer market for local populace and elevate the living conditions of common man. Smaller scale geoantiquities with less protection often suffer from vandalism and illegal sampling. Protection of the small-scale geoantiquities / geopark can be ensured by involvement of local population in their maintenance, which will be helpful in preservation of the geological features and environment.

### **About the Author**

**Dr.V.P.Mishra**, a vertebrate palaeontologist of repute, is the Director, Palaeontology Division, Geological Survey of India, Lucknow. He has made important discoveries in the field of vertebrate palaeontology and published several research papers in national and international journals. A keen supporter to popularise Earth Sciences among the common people, Dr.Mishra has delivered several radio and TV talks and published popular articles. He is also in charge of Siwalik Fossil Park, Saketi, Sirmur District, H.P.

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