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Jaisalmer basin in Thar Desert: potential for developing a geopark in Rajasthan, west India

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As per charter of functions, Geological Survey of India (GSI) has been mandated to identify, preserve and make initial and sustained efforts in conservation and protection of the unique geoheritage sites in the country. Consequently GSI has been making programmed attempts in studying and protecting natural sites of rare and unique geological (including geomorphologic) significance. Such endeavours were initiated way back in 1951, and presently 35 geoheritage sites have been part of an integrated concept of protection, education and sustainable development. Jaisalmer city, in western Rajasthan, was founded in 1156. Located within the western Thar Desert in India, it has been on a historical trade route between Delhi and west Asia. It is presently a famous tourist destination, very well connected by rail, road and air. The entire city, with over 60,000 inhabitants, is built with yellow-coloured of the Jurassic siliceous limestone Jaisalmer Formation. It includes a world famous, over five centuries old Golden Fort built on a 100 m high Trikuta Hill. Several historical buildings called Havellis, or the private mansions built by merchants, have intricately carved yellow sandstone facades. Other tourist attractions include the Jain and Hindu temples, built during the 12th and 15th centuries. In addition, owing to the presence of a diverse range of geological phenomena including, amongst many others, unique stratigraphic units, structures, minerals and fossils, the Jurassic Jaisalmer Basin and geomorphological landforms forming part of the present dryland environment in western India is a potential candidate for becoming a geopark.

Presently, a delineated territory of about 3162 km² constitutes the Desert National Park (DNP), as a unique and fragile ecosystem in dryland environment. DNP harbours a wide array of flora and fauna species and naturally supports the symbolic and protected Rajasthan State bird (Great Indian Bustard), animal (Camel), tree (Khejri) and flower (Rohida). It also has fossil evidences dating back to the Jurassic period indicating hot and humid climate characterized by dense forests. 180 million years old fossils of animals and plants are preserved at Wood Fossil Park at Akal, situated 17 km away from Jaisalmer city. The Jaisalmer Basin formed part of the southern shelf of the Neotethys during the Jurassic. The area is well known for its rich geodiversity, both in terms of landscapes and outcrops of rock types and the variety of fossils that these rocks have preserved. Lithostratigraphy of the mapped formations, namely the Lathis, Baisakhi and Bhadasar formations, is well established, and displays an array of Jurassic siliciclastic, mixed carbonate-siliciclastic, and carbonate rocks that range in age from Early Jurassic to Tithonian. A variety of depositional environments ranging from continental fluvial to near-shore and off-shore deep marine are well established and documented. The desert landscape include a variety of stable and active dune fields including parabolic, linear transverse and barchans of different size and generations, desiccated rocky plains and pebble-boulder spreads as deflation lag deposits and salt lakes.

Besides the prevalent traditional water harvesting practices, application of modern geotechnical knowledge in dryland setting of western India has facilitated inter-basin transfer of perennial Himalayan fresh-water of the Sutluj River through Indira Gandhi Nahar Priyोजना – a system of canals and distributaries, thereby addressing the scarcity and availability of drinking water for human settlements

within the Thar Desert. Various distinctive geological and geomorphological features preserved within the delineated territory showcase ideal palaeo-environmental settings in time and space and offer primary tools for geoscientific research, education, training and geotourism for socio-economic development of the region. Therefore, efforts are launched for enlisting this territory of Jaisalmer Basin as a national geopark.

