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Report of the Field workshop on "Depositional dynamics and their role in sequence development, Vindhyan Supergroup, central India" under the aegis of Indian Association of Sedimentologists (IAS), 16th -20th February, 2026

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The Field workshop on *"Depositional dynamics and their role in sequence development, Vindhyan Supergroup, central India"* was organized under the aegis of the Indian Association of Sedimentologists (IAS) from 16.02.2026 to 20.02.2026.

The primary goal of this workshop is to enhance participants' understanding of sedimentation dynamics and their role in sequence development within the extensive Vindhyan succession. In order to achieve the objectives of this programme, carefully selected, well-preserved, and well-exposed sections of the Vindhyan Supergroup were studied, as they provide a comprehensive archive of Proterozoic sedimentary processes. The study addressed both carbonate and siliciclastic rocks, as well as the processes through which these two sedimentary systems may interact and mix in nature. The majority of the sections were chosen for this purpose are exposed in and around Maihar, central India. The uppermost formation of the Lower Vindhyan Group, along with the entire Upper Vindhyan formations and members, is well exposed near Maihar and was examined during our field sojourn. Certain localities showcase excellent exposures of representative sections, offering clear insights into specific formations and members. A key focus was on correlating the causal factors influencing processes, thereby providing insights into basin evolution. Altogether 26 participants including faculties and research scholars joined in the field workshop. The participants included teachers and Research scholars from IIT(ISM) Dhanbad, IISER Bhopal, IIT Bombay, IIT Kharagpur, IIT Gandhinagar, Manipur University, Jadavpur University, University of North Bengal, Durgapur Govt. College, Presidency University, PRL Ahmedabad and BSIP Lucknow (Fig.1).

Fig. 1.Participants of the Field workshop on "Depositional dynamics and their role in sequence development, Vindhyan Supergroup, central India" under the aegis of Indian Association of Sedimentologists (IAS)

The workshop commenced on 16th February 2026 with a two-hours lecture on the Vindhyan Supergroup, followed by a brainstorming discussion. The fieldwork conducted along the selected traverses in and around Maihar, central India—an area renowned for its exceptional vertical and bedding-plane exposures (Fig.2). The fieldwork commenced on the following day, marking the beginning of the practical phase of the programme.

BADHANPUR TO SARALANAGAR TRAVERSE (17.02.2026)

During this traverse, participants were introduced to sections of the Lower Vindhyan succession as well as the lower part of the Upper Vindhyan succession. The entire Rohtas Limestone, along with the Kaimur and Rewa Formations, was covered during this traverse. The study began with the identification of sedimentary structures and their significance in interpreting depositional dynamics. This was followed by an introduction to the concept of facies development and their spatio-temporal variation within stratigraphic successions. Participants were shown how changes in lithology and sedimentary facies record

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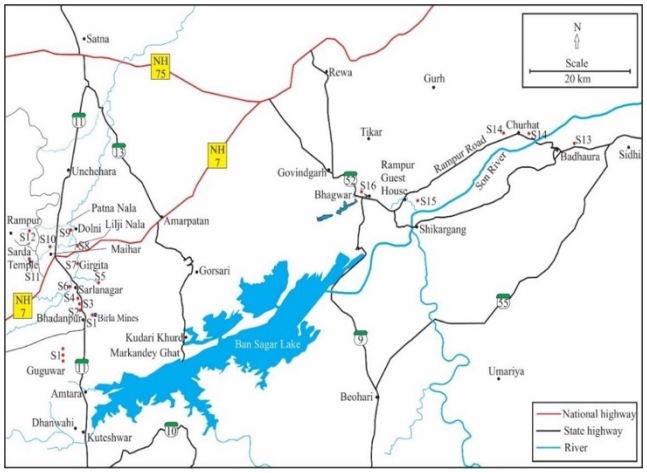

Fig. 2. Location map of the studied area at and around Maihar MP

shifts in depositional environments. This subsequently led to a detailed discussion on succession-building processes, including transgression–regression cycles, progradation, retrogradation, and aggradation. Participants were introduced to the two major facies associations of the

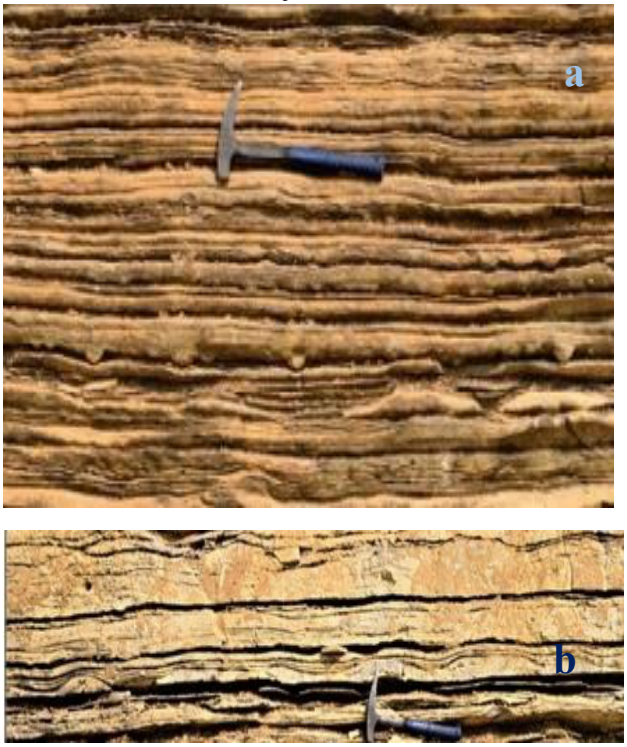

Fig. 3. Alternations of planar and ripple laminations present within lower facies association of the Rohtas Limestone (a). Hummocky Cross-stratification present within the upper facies association of thhe Rohtas Limestone (b).

Rohtas Limestone. The lower facies association indicates deposition in a relatively quiet environment, whereas the upper facies association frequently exhibits cross-stratification, planar laminae, hummocky cross-stratification, and wave ripples, reflecting deposition under high-energy conditions. In addition, graded and massive bedding, flat-pebble conglomerates, and various types of soft-sediment deformation structures are very common in this part of the Rohtas limestone (Fig.3 a, b).

The Kaimur and Rewa formations studied along a road-cut on both sides of the SH 11 joining Bhadanpur and Maihar. A porcellaneous shale/siltstone interval occurs below the Kaimur Formation, although not at the direct contact. The well sorted, medium- to fine-grained Kaimur sandstone is entirely cross-stratified is overlain by a thin granular lag likely to be a transgressive lag. The participants traced the thin unit as well as the overlying Rewa Shale unit and confirmed it. The marginal marine and continental part of the Rewa Sandstone exposed superbly along the road cut and within some nala sections discussed in detailed for the understanding of the depositional processes. The well-sorted marginal marine sandstone exhibits large-scale cross-stratification and planar lamination. The unidirectional, large-scale (set thickness varying from 80 cm to 2 m) cross-stratifications change its style laterally in a rhythmic fashion, from sigmoidal convex -to concave-up. The planar-laminated units, varying in thickness from 60 to 90 cm, alternate with large-scale cross-stratified sandstones. The bedding plane surface is carved with parting lineations and current crescents. The unidirectional largescale cross-stratified unit form by the migration of sand waves. The rhythmic changes in the cross-stratification pattern closely resemble a tidal sequence. The planar-laminated sandstone in close association, decorated with parting lineations and current crescents, closely resembles a high energy beach (Fig.4).

The Upper Rewa Sandstone is nicely exposed on the western side of SH 11. The sandstones of this part of the Upper Rewa are fine- to coarse-grained, even granule-rich. Some contain rip-up mud clasts. Textural characteristics of these rocks differ from those in the lower marginal marine association of the Upper Rewa Sandstone. The sandstone is strikingly ill sorted and is thoroughly cross-stratified in this section. The participants conducted a comparative analysis of the two segments of the Upper Rewa Sandstone to interpret depositional dynamics and reconstruct the associated paleogeography.

Fig. 4. Discussing the depositional dynamics of the marginal marine part of Rewa Sandstone

SONWARI-GIRGITA-AMYLIA- DOLNI SECTIONS ALONG THE BANKS OF THOMAS RIVER (18.02.2026)

Fig. 5. Inclined Stomatolites column present within te Bhander Limestone, Amiliya River Section

This traverse offers some of the best exposures for studying a variety of physical sedimentary structures and syn-depositional deformation features preserved within the carbonate deposits. In addition, stromatolites are exceptionally well exposed at several sections of the Bhander Limestone. The gradational contact between the red-coloured Ganurgarh Shale and the Bhander Limestone, prominently exposed along the banks of the Thomas River, is another noteworthy feature of the traverse. The Bhander Limestone is well exposed in several quarries and river sections. The Girgita limestone quarry and the river sections near Amiliya and Dolni villages representing some of the best exposures available. Most of the facies that constitute the Bhander Limestone can be observed in this region. The limestone occurs in a variety of forms, including cross-stratified, plane-laminated, ripple-laminated, brecciated, and stromatolitic varieties. Stromatolite mounds are also occasionally well exposed in these sections. Detailed facies analysis carried out by the participants, along with their interpretations, indicates that the deposition of the Bhander Limestone took place under shallow marine conditions. Stromatolite columns are locally inclined in certain exposures, suggesting the influence of currents during their growth. Molar-tooth structures are abundant at selected stratigraphic intervals, further indicating deposition in carbonate-rich Precambrian marine environments. The stromatolite facies dominate the Amilya River section of the Bhander Limestone. The stromatolites display wide variations in size and morphology. Variations in stromatolite size, shape, and orientation have been correlated with depositional dynamics and fluctuations in water depth during the deposition of the Bhander Limestone (Fig.5).

The participants also observed and measured cyclicity within certain stromatolite horizons, indicating repeated environmental or depositional changes during carbonate sedimentation.

Several horizons exposed in the Dolni village river section of the Bhander Limestone exhibit syn-depositional deformation features. Convolute laminations occur within several limestone beds, some of which are laterally persistent over considerable distances. The thickness of these convolute-laminated beds shows significant variation and some of the beds are laterally persistent. These deformed layers underlying and overlying by undisturbed limestone beds suggesting possible seismic events operating immediate after sedimentation. After considering all the characteristic features of the Bhander Limestone, the participants, at the end of the day's fieldwork, interpreted the nature and evolutionary development of the Bhander carbonate platform.

LILJI RIVER TO RAMPUR HILL TRAVERSE (19.02.2026)

Excellent exposures of the Lower Bhander Sandstone occur along the Lilji Nala, just beside the New Maihar court, around 2km from the Maihar town. The Lower Bhander Sandstone constituted by conglomerate, sandstone and mudstone. The dip of the sandstone is ca. 3–4° towards NW. The primary sedimentary structures present on the bed surface are well preserved all through the exposure. Sandstone beds exhibit excellent preservation of delicate structure like rain imprints and salt pseudomorphs (Fig. 6). The contact between the Lower Bhander Sandstone and the Sirbu Shale occurs along the downdip direction. At the contact the participants identified some ooid horizon along with large headed stromatolites. The Sirbu shale exposes along the slope of

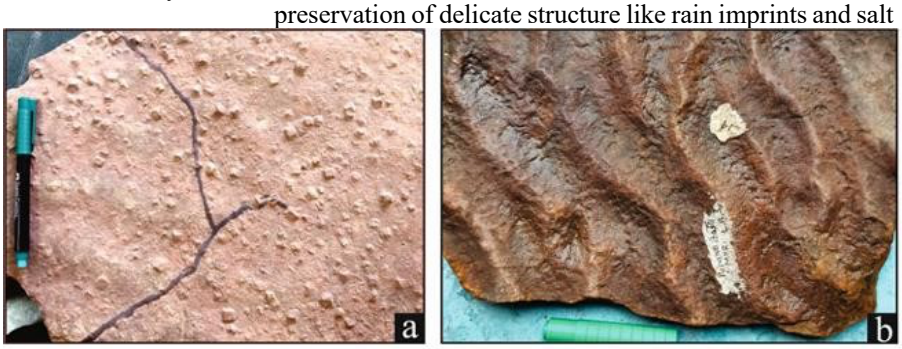

Fig. 6. (a) Salt pseudomorphs and (b) Ripple lamination present within Lower Bhander Sandstone. Note, the rain imprints present on the bed surface (b).

the hill ranges provides a rare opportunity to learn facies analysis even within fine grained shale deposit. On the basis of presence of sandstone, the Sirbu shale can be subdivided into number of facies and interpret their palaeogeography successfully. The excellent preservation of a progradational contact between the Sirbu Shale and the Upper Bhander Sandstone is well exposed in this traverse. The partly marginal marine and terrestrial upper Bhander Sandstone is well exposed across the top part of the Rampur hill section.

MAIHAR–UNCHEHARA–BEETA TRAVERSE (20.02.2026)

This traverse covers mostly the Upper Vindhyan succession with some remarkable features indicating episodic sedimentation, north of Maihar town. Most of the exposures occur within 200 m on both sides of the Maihar–Satna highway. Near the Beeta village a poorly sorted sandstone, possibly a product of some episodic event is present within the Sirbu shale exposed in the Nala section just beside the Maihar Nagod highway. The sandstone is non-repetitive and is present only at this location. An unusually thick (c.a 1.5 m), medium- to fine-grained sandstone is encased within the greenish grey shale. The base of the sandstone is undulatory. Large-scale ripples occur on sandstone bed surfaces. The upper contact of the sandstone with the shale is also very sharp. The sandstone is characterized by hummocky cross-stratification as well as parallel laminae. This sandstone is laterally traceable up to half a kilometer along the river section. To integrate all the concepts discussed in the field the participants were exposed to reconstruct panel diagrams in well-developed stratigraphic sections. These diagrams illustrated lateral and vertical facies relationships, sediment dispersal patterns, and the temporal and spatial evolution of depositional environments. Through this exercise, they developed skills in correlating stratigraphic units, reconstructing their respective depositional history and visualizing thereby sequence stratigraphic development. Besides fieldwork activities, participants attended daily evening discussion sessions to review observations, clarify concepts, and integrate field data with theoretical understanding.

VALEDICTORY SESSION

The field workshop concluded with a valedictory session conducted at the field site on the afternoon of 20th February, 2026 marking the successful completion of the program (Fig.7). All the participants expressed their happiness and conveyed a very positive response to the program. They felt that organizing such field workshops on a regular basis would be highly beneficial to the geological community of the country from a broader perspective. They also requested the Indian Association of Sedimentologists (IAS) to organize similar programs in the future.

Fig. 7. Participants with certificates during the valedictory session at a field spot near Maihar town MP