Proterozoic Basins of Peninsular India: Status within the Global Proterozoic Systems

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This compilation is intended to present a snap-shot of the current status of the knowledge on the Proterozoic sediments and tectonic events that are preserved in Peninsular India; on the backdrop of the growing understanding of global events and environmental evolution during that period. Proterozoic sediments in Peninsular India are found in two contrasting categories of basins. Narrow linear intercratonic belts host terrigenous and marine sediments, often interbedded with volcanics and volcaniclastics; that are deformed, metamorphosed and occasionally intruded by granitic bodies. These belts abut with a tectonic contact with wide, unmetamorphosed platform sediments from epicratonic basins with limited igneous activity associated within them; clubbed as the Purana Basins of Peninsular India. Although traditionally the former (mobile belts) were considered to be older and different from the latter, emerging geochronological data demonstrates that they were coeval products of basins evolving adjoining each other in diverse tectonic setting. Available knowledge on these basins is summarised within the framework of the emerging understanding of the Proterozoic geohistory punctuated by assembly and break-up of supercontinents, progressive oxygenation of the atmosphere, changes in the sea-water chemistry; establishment of the continental free-board and the generic environments that laid the foundation of biotic evolution. Although significant advances have been made in the last decade in the knowledge of these sediments, much more is required to achieve the desired precision and resolution.

Keywords: Proterozoic; Tectonics; Sedimentation; Peninsular India

Introduction

The Archean history of Peninsular India is recorded in the five distinct cratonic nuclei, namely Rajasthan, Bundelkhand, Bhandara (also named Bastar/Central Indian/Deccan by some authors), Singhbhum and Dharwar (Naqvi and Rogers, 1987; Sharma, 2009; Ramakrishnan and Vaidyanadhan, 2010; Meert et al., 2010; Valdiya, 2016). Constituted of a series of greenstone and high-grade metamorphic belts embedded in tonalite-throndhjemite gneissic complexes, their terminal Archaean accretion is marked by a major event of granitic activity that occurred around 2.5±0.1 Ga. The cratonisation of the Bhandara nucleus appears to have continued through the Paleoproterozoic time culminating with the Dongargarh Granite and equivalents at around 2.2±0.1 Ga.

It is around these cratonic blocks of gneissic - greenstone complexes that subsequent Proterozoic events have unfolded, with the cratons providing the source of terrigenous sediments to the basins that evolved around them in diverse tectonic settings. Fig. 1 depicts the geographic distribution of the various independently recognisable Proterozoic belts/basins in Peninsular India.

These Proterozoic sediments have been a subject of some exciting additions to our knowledge in the last couple of decades. Major changes have been effected in the conventional correlations between...
Fig. 1: Simplified map of the Precambrian terrains of Peninsular India (modified after Naqvi and Rogers, 1987; Sharma, 2009; with some updates (in nomenclature) from works cited in this paper. The cratonic nuclei and Archean Gneissic complexes listed on the left are dominantly constituted of TTG-Granite Greenstone terrains. The Proterozoic mobile belts (hosting metamorphosed and deformed suites) are depicted with darker shading for Paleoproterozoic belts and green shades for the Mesoproterozoic belts). The Marwar basin (earlier termed as ‘Trans-Aravalli Vindhys’) is arguably the host of the youngest Proterozoic sediments (Neoproterozoic – Cambrian transition) in Peninsular India.
these sequences as a result of growing geochronological data. Sedimentological and structural studies have been supplemented by a series of biotic findings that have forced a reassessment of many established concepts. A greater appreciation of the basinal structure of these sedimentary suites has led to the recognition that traditional assumptions need to be replaced by modern concepts.

It would not be possible to discuss in depth the contributions made on each of them, but a precis of what is new to knowledge is enumerated here. Ramakrishnan and Vaidyanadh (2010) provided a compilation of the state of the art for Indian Geology that was supplemented by the reviews of Meert et al. (2010), status reports of Bhowmik et al. (2012) and Chakraborty et al. (2012); followed by compilations in Sharma, Banerjee and Santosh–Eds (2014: Special Issue Journal of Asian Earth Sciences no: 91: Proterozoic Basins of India), Mazumder and Eriksson – Eds (2015: Geological Society London Memoir no. 43: Precambrian Basins of India – stratigraphic and tectonic context) and Valdiya (2016). For sake of brevity (without diluting any credit from the individual contributors), the citations made in these compilations are not listed individually here unless specific points require.

**Age Data**

Modern precision geochronological methods have helped create a robust data-base that permits correlations across continental blocks, leading to major revisions in the traditional equivalences of stratigraphic units. The available age data on various Proterozoic sequences is compiled in Fig. 2. The sources of the ages/correlations used in compiling this are listed in the figure title. The available geochronology is at best capable of providing the broad age ranges in which the deposition occurred, often using indirect data eg: ages of intrusives in them or their basement (Pradhan et al., 2012; Kumar et al., 2015) or detrital zircon ages (Malone et al., 2008; Bickford et al., 2011; Amarsinghe et al., 2014; McKenzie et al., 2014; 2013; Basu and Bickford, 2015; Joy et al., 2015) to constraint the upper and lower ages of the component Groups from the various basins. Direct dating of the sediments and associated rocks (eg: Zachariah et al., 1999; Conrad et al., 2011; Gopalan et al., 2013; Tripathi and Singh, 2015) is sparse. The overall geochronological data lacks the resolution that would enable their precise inter-basinal correlation, akin to Phanerzoic correlations.

It is equally important to note that their preserved thicknesses suggest that a large majority of these sequences were deposited in time-spans of less than 10-20 million years, even if liberal estimates of subdued sedimentation rates are clubbed with very low preservation potential (see Kale and Phansalkar, 1991; Kale, 2015). The depositional environments of these sediments do not indicate muffled rates of accumulation if compared to modern analogues; barring exceptional horizons like black shales and glauconitic beds. Therefore while it is possible to bracket various ‘Groups’ as being within the same range of ages; it will be premature to consider them as being coeval (*sensu stricto*). These uncertainties are depicted in the chart by diagonal boundaries that also emphasis the possibility of their being time-transgressive.

**Biotic Contents**

These sequences have been reported to yield a diverse biotic record including stromatolitic assemblages, micro-organic remains, ichnofossils, casts and impressions of carbonaceous and other biotic forms.

Stromatolitic forms have been profusely reported from most of these Proterozoic sedimentary sequences, particularly those from the Purana basins. Till about 20 years back, stromatolite biostratigraphy (established in the Russian and Canadian Proterozoic platform deposits as well) appeared to have taken root in correlating these sequences and establishing a broad chronological framework. Over the years, this line of evidence appeared to yield diminishing returns and has now been almost abandoned in recent literature. The cyanobacterial material, carbonaceous bedding-plane markings, and microfossils reported from the stromatolitic strata is yielding significant information on the biotic remains preserved in these sedimentary sequences (Sergeev et al., 2012). Similarly, microbial mat-related structures are being recorded in wider areas across these sediments (eg: Sarkar et al., 2014) and there is a fair chance that some of the earlier interpreted dubio-structures may be explained by such mechanisms that accept the presence of microbial life but question the preservation of the body-form in the host sediments.
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Age in Ga. 0.5 1.0 1.5 2.0 2.5 3.0

(Figure caption on page no. 465)
Proterozoic Basins of Peninsular India

There is a series of findings of ichnofossils, bedding plane markings and dubiofossils from the Vindhyan, Chattisgarh, Bhima, Kaladgi and Cuddapah basins (Kulkarni and Borkar, 2004). While such forms provide a better understanding of the depositional systems, they have failed to yield concrete pointers to the age of the host sediments. On the other hand, the controversial findings of small shelly fauna from the Vindhyan (Azmi et al., 2008; Bengtson et al., 2009) have resulted in a reappraisal of the age-ranges of some of these forms. The discovery of fossils of distinctive Cambrian affinities from the Vindhyan (Azmi et al., 2008) has resulted in a reappraisal of the age-ranges of some of these forms. The discovery of fossils of distinctive Cambrian affinities from the Marwar basin (Kumar and Pandey, 2008; Kumar, 2012; Sharma et al., 2014b and references therein) have demonstrated that these sediments (earlier termed as the Trans-Aravalli Vindhyan) need to be recognised separately and are the youngest of all Proterozoic sediments from Peninsular India.

The possibility of these sequences hosting a systematic record of biotic forms through the Mesoproterozoic is not too remote (Patranabis-Deb et al., 2007; Bengtson, 2009, Sharma et al., 2014a &b). However, these studies need to be tempered with caution and collaborated with isotopic (eg: Banerjee et al., 2006; Bhattacharya and Dutta, 2015; Patranabis-Deb et al., 2015) and sedimentological studies to ensure that such organic remains are methodically and unambiguously documented. They present the promise of hosting one of the best assemblages of the roots of the Phanerozoic biotic explosion.

Unconformities

As the geochronological data emerged in the last 20-30 years, it also became evident that the erstwhile “Great Eparchean Unconformity” that was presumed to separate the crystalline metamorphic rocks (of ?Archean age) and the unmetamorphosed sedimentary cover (equated with the Proterozoic) is not a tenable entity. Several metamorphic sequences are much younger than 2.5 Ga, putting them well inside the Proterozoic Eonothem. All the Proterozoic sequences in Peninsular India rest on the crystalline cratonic basement, separated by an unambiguous angular and erosional unconformity. This points to a protracted period of emergent erosion and weathering of the cratonic blocks. Notwithstanding its diversity in age (as is evident in Fig. 2) for various basins, this basal unconformity is established to have contributed to the evolution of significant placer deposits of diamonds and noble metals, notably in the Vindhyan, Chattisgarh, Bastar, Cuddapah and Kaladgi basins.

What has emerged in the last couple of decades is the association of this unconformity with radioactive mineralisation. Unconformity related uranium and thorium deposits are now recorded from the Kaladgi, Bhima, Cuddapah basins in particular by the Atomic Minerals Directorate of Exploration and Research (Singh et al., 1990; Dhana Raju et al., 2002; Kumar, et al., 2012b; Sridhar et al., 2014; Thomas et al., 2014). What appears to be a critical factor is the thermal rejuvenation of the basement by intrusion of either fertile granites or basic intrusives, followed by a phase of weathering that left behind a paleosol capable of hosting the enrichment of the radioactive minerals through epigenetic processes.

There is a strong case made out for assessing the paleosol horizons occurring atop the basement of these sequences. (eg: Och and Shields-Zhou, 2012; Mukhopadhyay et al., 2014) This could throw significant light on the continental regimes prior to the

Fig. 2: Ages of Proterozoic and Neoarchean sequences in the Indian Peninsula. Data compiled based on Kale (1995) with updated age data from (1) Sharma et al., 2014 b; (2) McKenzie et al., 2013, Meert et al., 2010 & Roy and Purohit, 2015; (3) Sharma et al., 2014 a; (4) Mondal et al., 2002, Pradhan et al., 2012 (5) Chakraborty et al., 2015; (6) Rasmussen et al., 2002; Ray et al., 2002; (7) Gopalan et al., 2013; Tripathy and Singh, 2015; (8) Roy and Devarajan, 2000; (9) Dhurandhar et al., 2005; (10) Upadhyay et al., 2014; Meert and Pandit, 2015; (11) Roy et al., 2002a&b; De et al., 2015, (12) Ramakrishnan and Vaidyanadhan, 2010, (13) Roy et al., 2002a; 2006 (14) Eriksson et al., 2006; Valdiya, 2016; (15) Das et al., 2009; Bickford et al, 2011; (16) French et al., 2008, Srivastava and Gautam, 2009; (17) Sarkar et al., 1990; (18) Sarkar et al., 1994; (19) Ghosh et al., 1996; (20 & 21) Krishnamurthy, 1990, Sarkar et al., 1994; (22) Sarkar, 1994; (23) Bandopadhyay et al, 1990; (24) Ratre et al., 2010, Pisarevsky et al., 2012; (25) Roy et al., 2006; (26) Mukherjee et al., 2012 (27) Ratre et al., 2010; (28) Santosh et al., 2004; Amarsinghe et al., 2014; (29) Dharma Rao et al 2014; (30) Mezgar and Cosca, 1999; (31) Paul et al., 1990; (32) Valdiya, 2016; (33) Kumar et al., 2015; (34) Kumar et al., 2012a; (35) Srivastava et al, 2014; (36) Yang and Santosh, 2015; (37) Bidyananda et al., 2003; (38) Kumar et al., 1996, Ramakrishnan and Vaidyanadhan, 2010; (39) Clark et al., 2009
transgressions that yielded the capping sediments. These paleosols and the basal conglomeratic beds in the sequences of different ages have the potential to yield critical data on the evolution of the climatic and weathering conditions through the Proterozoic for the Indian Peninsula.

Another interesting feature emerging from the compilation of the age data is the presence of an intrabasinal unconformity in all the sedimentary basins occurring around 1.1±0.2 Ga. This unconformity separates the younger and older sequences in the Vindhyanchal, Chattisgarh, Bastar, Pranhita-Godavari, Cuddapah and Kaladgi basins. The implications of this on the classification of the Purana sequences (into bipartite or tripartite) is a matter of separate discussion (eg. Basu and Bickford, 2015; Meert and Pandit, 2015). What is remarkable is that it corresponds to the age of metamorphism, often involving anatectic granite emplacements in the adjoining Mesoproterozoic mobile belts (eg. Delhi, Sausar-Sakoli, Kolhan, Mahakoshal and Nellore).

**Sedimentary Contents**

The Proterozoic basins from Peninsular India exhibit an overwhelming dominance of quartzitic arenite (with subsidiary rudaceous components)-argillite-carbonate associations that characterise ‘passive extensional basins’ occurring on the edge of continental blocks. Although the relative proportions of the individual components is variable in different constituent ‘Groups’ (Kale, 1991) they are absent by exception only. For example, the Rewa Group (from the Vindhyanchal basin) is totally devoid of carbonate sedimentation.

These sediments are assigned to an array of supra-tidal, shore-face, inter-tidal and off-shore depositional systems, with occasional incidence of aeolian, evaporitic and euxinic environmental conditions. Some of the coarser detrital deposits are recognised to represent alluvial and off-shore (slope-break) fans; while most are attributed to either deltaic or shore-face/coastal deposition. The argillaceous and carbonate deposits have been recognised generally to be associated with the mud-flat, shelf or lagoonal environment with some being ascribed to lacustrine origin.

The outstanding feature emerging from the review of the depositional environments deciphered for these sediments is their deposition in relatively shallow waters of less than 25 m depths (with maximum estimates of the deeper deposits being less than 100 m water columns).

Although sporadically recorded earlier, the occurrence of synsedimentary deformation in these sequences (eg: Kale et al., 1998; Patil Pillai and Kale, 2011) provides an insight into the fact that these sequences cannot be assigned to transgressive events alone, but that such marine incursions on the stabilised and eroded basements were aided by tectonically driven subsidence of the basin-floor. The presence of chert-breccias in several of the Proterozoic basins has also been interpreted to evidence synsedimentary tectonics (Kale and Patil Pillai, 2011).

The presence of associated basic volcanics is observed in the Mesoproterozoic sequences (Gwalior, Bijawar, Abujhmar, Papaghni) older than 1.5 Ga. The post 1.5 Ga sequences from mobile belts (eg: Delhi, Kolhan, Nellore) do however have interbedded magmatic rocks testifying to their evolution in collisional tectonic regimes. Other sequences younger than 1.0 Ga are however characterised by a remarkable absence of associated igneous rocks (barring the tuffaceous horizons), suggesting that they were deposited on pericratonic platforms akin to extensional passive margins.

**Basinal Histories**

Traditional views interpreted many of these Proterozoic sequences (using the erstwhile correlations) as being the product of a series of marine incursions on the Indian shield at different times (eg. Singh, 1980). Based on their contents, geometries and structural patterns, the Purana basins were recognised as independent epicratonic basins created in dominantly an extensional tectonic setting (Kale, 1991). It was also pointed out that their structural characters diagnostically demonstrate that they cannot be clubbed into a singular basin. Each of these sequences has a diverse subsidence history, geometry and contents. Nor does the age data support the assumption of unity.

That they are all ‘supracrustal’ (in the sense that they rest on crystalline continental crust) and none is an oceanic basin (using the classification of Allen
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et al., 2015) is attested to by their basement and basal unconformities separating them from older supracrustal rocks. The terrigenous origin of most of the constituent sediments from these Proterozoic basins is unambiguous. The diversity in their structural patterns and sedimentary – igneous contents indicates that the individual basins, perhaps initiated as extensional supracrustal, (?) pericratonic basins, that underwent changes in their characters in course of their evolution. Some (like the Aravalli, Delhi, Mahakoshal, Satpura and Nellore) eventually suffered compressive tectonism and metamorphism; yielding the mobile belts; while others (~ Purana Basins) remained undeformed (except along some of their margins). The Bagalkot Group from the Kaladgi Basin may be considered as a ‘incomplete fold belt’ with strong axial folding (see Kale, 1991; Jayaprakash, 2007) that is analogous to folding encountered in the mobile belts, but lacks the degree of metamorphism suffered by them. Taken together, it is essential to point out that all the Proterozoic basins qualify as ‘polyhistory’ basins in context of the classifications of sedimentary basins, barring those (like the Bhima, Indravati) that are constituted of singular sequences. Miall et al. (2015) have refined the basinal classification of these basins based on modern concepts.

The association of the mobile belts adjoining them indicates that the tectonic histories of the Vindhyan Chal (with the Aravalli – Delhi belt on the west and the Mahakoshal belt in the south), Bastar (with the Eastern Ghats on the east) and Cuddapah (with the Nellore belt on the east) were unquestionably tempered with the events of compressive (?) collisional tectonics occurring along their margins (eg: Collins et al., 2014). This aspect has implications on the global reconstructions of Proterozoic supercontinental assemblies.

The Proterozoic Systems

As against the traditional view of the Proterozoic being a ‘gradual transitional period’ between the hot, oxygen-deficient, hyperactive Archean crustal and atmospheric regimes and the cooler, oxygenated and slower Phanerozoic regimes, the dramatic changes that happened during these ~2000 million years of the “earth’s middle ages” are nothing short of fascinating (see Cawood and Hawkesworth, 2014). The understanding of the Proterozoic environment and crustal history that has unfolded in the last 10-15 years has led to several significant modifications in earlier established concepts. A graphical summary of the key crustal and environmental characters as well as the tectonic features that are documented through the Proterozoic is given in Fig. 3.

The Proterozoic period shows that the crustal history is more episodic and punctuated with events than was earlier believed. Supercontinental assemblies and break-ups (based on paleomagnetic data that demonstrates proximity of cratonic blocks during specific time intervals and supported by tectonostratigraphic similarities in the constituent blocks) manifest these events on a global scale. Several contributions to the Proterozoic sequences of Peninsular India have attempted to establish their connection with these supercontinental cycles.

Distribution of zircon ages (Fig. 3A) have been used by several authors to identify such supercontinental cycles during the Proterozoic. The names of these assemblies have undergone changes in the last decade. Recent compilations of large data-sets of a variety of geological events by Evans (2013), Condie and Kroner (2013), Cox and Hawkesworth (2014), Rooney et al. (2015), Condie et al. (2015, 2016) appear to conclude that the Proterozoic record is marked by Kenorland (~2.7–2.4 Ga); Nuna (erstwhile Columbia: ~1.8–1.5 Ga), Rodinia (1.1–0.9 Ga) and nascent Gondwana – Laurentia (starting around 0.7 Ga) supercontinental assemblies. Kenorland may have been preceded by ‘Ur’ (~ 3.0 Ga) during the Archean. These analyses of the temporal distribution of various tectonic and environmental parameters through the Proterozoic (Fig. 3) show that:

- Number of cratons has reduced during the Archean – Proterozoic transition (Fig. 3B)
- The number of collisional orogens display distinctive peaks starting with the break-up of the existing supercontinents and reducing with the period of amalgamation and stability (Fig. 3C)
- Mantle temperatures (determined from the crystallisation of non-arc basalts) have reduced progressively through time (Fig. 3D)
- Passive margin abundance increases with time,
Fig. 3: Temporal distribution of Proterozoic environmental conditions and crustal features. Compiled from Kah and Riding, 2007; Evans, 2013; Cawood and Hawkesworth, 2014; Condie and Kroner, 2013; Rooney et al., 2015; Condie et al.; 2015, 2016
but is punctuated by periods of supercontinental assemblies when there is an abrupt decrease in them (Fig. 3E).

All these features contribute to a revision in the assumption of a systematic (and progressively decelerating) growth of the continental crust through time. They indicate that it may be more appropriate to consider the possibility of an aperiodic stepped growth model (as shown in the 2 curves (modified after Eriksson et al., 2006 and Condie and Kroner, 2013) in Fig. 3E. The thicker and cooler continental crusts also have contributed to a slower cooling rate of compressive orogens over time, although it does not seem to have affected intracontinental and transpressional orogens (Fig. 3F). These crustal characters have obvious effects on the environments that existed during the Proterozoic.

During periods of supercontinental assembly, sea-levels are likely to be lower, with a dominance of continental climates promoting aridity and generally

Fig. 4: (A) Projected configuration of supercontinent assemblies of UR and Arctica at the Archean – Proterozoic boundary as compiled by Rogers and Santosh (2004). This assembly is now recognised as the Kenorland supercontinent

Fig. 4: (B) Assembly of continental blocks at around 2.0 Ga based on paleomagnetic data reconstructed by Piper (2013). The contemporary supercontinental assembly is now recognised as the Nuna supercontinent

Fig. 4: (C) Assembly of continental blocks at around 1.0 Ga based on paleomagnetic data reconstructed by Piper (2013). The Mesoproterozoic supercontinental assembly is termed as Rodinia in recent literature. Note the ‘overturning’ of the Indian peninsular that is required for it to fit into the “Rodinia (eventually East Gondwana)” assembly.
cooler environments that may lead to continental glaciations. On the other hand, dispersals promote higher sea-levels, increasing prevalence of wetter climates and higher temperatures (due to heat loss at spreading centres adding to existing solar insolation) leading to greenhouse-like environments. An added feature that results due to low gradients of the continental shelf systems is that small rises in sea-levels will lead to larger flooded areas on the continents (Eriksson et al., 2006; Bradley, 2011). The available global records of volumes of iron formations (as a proxy of chemical weathering systems on continents) as well as glaciations (Fig. 3 G & H) are consistent with these projections; but are characterised by a major gap of almost a billion years between 1.75 Ga and 0.8 Ga. The correlation of the global glaciation in the Paleoproterozoic (~ 2.2 Ga) and the late Neoproterozoic (Sturtian [0.72-0.66 Ga] and Marinoan (~ 0.63 Ga): Rooney et al., 2015) with Kenorland and Rodinia bears out this proposition rather strongly. The earlier assumption of progressive oxygenation of the atmosphere through the Proterozoic has also undergone significant revision, with the recognition of the ‘great oxygenation event’ (Och and Shields-Zhou, 2012; Lyons et al., 2014) that occurred during the Archean - Proterozoic transition (Fig. 3 H). There is now a far better understanding of the changes that occurred during the Proterozoic in the sea-water chemistry in terms of ($^{87}$Sr/$^{86}$Sr ratios as a proxy of) the volume of continental runoff contributions to primitive sea water, dissolved salts (or salinity) of the sea water (Fig. 3I) and the CO$_2$ levels in the environment.

**Supercontinental Assemblies**

Notwithstanding the fact that there have been attempts to correlate the events from the Indian subcontinent with global cycles (eg: Naqvi and Rogers, 1987; Meert et al., 2010; Basu and Bickford, 2015; Valdiya, 2016); Proterozoic paleomagnetic data and the paleo-positions of the Indian subcontinent have remained poorly studied. A sample of the ‘fits’ of the Indian peninsular block in projected assemblies of Kenorland (~ 2.5 Ga); Nuna (2.0 Ga) and Rodinia (1.0 Ga) is given in Fig. 4. Apparently, this block has undergone several twists and turns in its position during the Proterozoic. Kumar et al. (2012b), Radhakrishna et al. (2013) Belica et al. (2014: Fig. 16), and Pirajno and Santosh (2015: Fig. 15) have reinforced the fact that the peninsular block displays a very high mobility in terms of its pole-position deduced from paleomagnetic data. Was the Indian Peninsular block indeed so mobile, while other blocks display only a limited movement during equivalent periods of time? This requires a re-appraisal to say the least.

All these assemblies assume that the entire peninsular shield of India was unified throughout the Proterozoic. The collisional tectonics recorded in the Aravalli - Delhi, Sausar – Sakoli, Dhanjori – Dalma – Kolhan and Eastern Ghats – Nellore belts (earlier clubbed as the MPMB by Radhakrishna and Naqvi, 1986) suggest that this singularity may be open to debate. It is not unlikely that the smaller segments (=Rajasthan – Bundelkhand; Bhandara and Singhbhum) of the Peninsular India remained as independent nuclei separated from the Dharwar craton during the Paleoproterozoic times and assembled only during Neoproterozoic times. Analogy is drawn from the emerging data and interpretations that demonstrate that smaller constituent blocks of African, Laurentian, Chinese shields were actually separated from each other and operated as independent nuclei until their assembly in Rodinia (Collins and Pisarevsky, 2005; Piper, 2013; Radhakrishna et al., 2013); while the entire Indian Peninsular continues to be shown as a single block.

A serious reassessment of this notion is not only desired, but also essential. A better justification of the accretionary tectonics (including its merger with the East Antarctic block) along the mobile belts during the Mesoproterozoic period leading to the development of ‘Greater India’ may emerge through this evaluation. The record of the unmetamorphosed sediments available in the adjoining Purana basins testify to a limited break-up of the accreted cratons, leading to elevated sea levels that flooded on the eroded continental crust.

**Concluding Remarks**

The Proterozoic record in the Indian Peninsula is an episodic one. It holds promise of hosting significant evidences of the contemporary atmospheric, oceanic, continental and biospheric systems. Bits and pieces of this have started to emerge and are yielding exciting and encouraging results. While fully appreciating the contributions that have been made to their knowledge in the last few decades (including numerous that
remain uncited in this compilation for want of space) and the exponentially increasing data that is emerging, it remains short of the desired precision and unambiguous repeatability. The requirement is of a sustained, focussed and dedicated effort to look at these sequences in an integrated manner.

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