This publication has arrived at a time when the mineral-focused private sector in the country is debating on the usefulness of the new Mineral Concession Rules-2016. The general consensus of the Indian private sector as well as overseas investors is that the Auction mode of granting Mining Lease and Composite License is not good enough to encourage private sector to invest in mineral exploration in the country.

Yes, India has the right geological environment for making new discoveries as may be noticed in all the papers published in the Special Volume of the Journal of Geoscience Research under review. The extant laws, namely MM(D&R)Act-2015, MC Rules-2016 and National Mineral Exploration Policy (NMEP)-2016 are least helpful to the private explorers. The complex auction-related licence granting procedures adopted by the Ministry of Mines would only serve to drastically slow down exploration and development of new mines in the country. The international best practice adopted by most countries in the world for grant of licences for exploration is first-cum-first serve (FCFS), not auctioning. Govt of India’s mineral policy should recognise the important fact that GSI has been continuously making new mineral discoveries and such discoveries should immediately become available to the private sector and PSUs on FCFS basis for detailed exploration and conversion of mineral Resources into mineable Reserves.

The auction mode of grant of licenses appears to have been adopted by the Ministry of Mines on the premise of Resource Nationalism and revenue-generating potential of known Mineral Resources and new mineral discoveries. In so doing, the Government of India seems to have over looked the fact that a large portion of the over 1,000,000 sq km of OGP area (officially 5.71 lakh sq km) would require detailed prospecting to G3/G2/G1 levels by GSI/MECL and State GDMs and subsequent packaging of individual prospects to throw them open for auctioning. This would be a very slow process in the hands of the Government Departments engaged in mineral exploration. Just about 25 areas have been auctioned in the last 2 years most of which are bulk minerals. It also involves expenditure of the order of a few thousand crores of rupees. Why should the Government of India spend taxpayers money on mineral prospecting when the private sector, both Indian and international, is willing to invest provided the Ministry adopts international best practices.

The potential for developing several gold mines in the country was realized as long ago as 50 years, in Aug. 1960, when Mr. Sardar Swaran Singh, the then Union Minister of Steel & Mines, inaugurated the first all India Seminar on Gold Mining Industry in India convened by the Geological Society of India, Bangalore. Subsequently, in year 1993, the Government of India realized the pressing need for privatizing and reforming mineral exploration and mining in the country especially for gold, diamond, platinum, nickel, base metals and defence related strategic metals. This realization led the Govt. of India to adopt the first ever liberalized National Mineral Policy (NMP) in 1993. The corresponding amendments to the Mines & Minerals Development & Regulation Act were adopted in 1994 and 2000. The NMP-1993 was further refined in 2008 but it’s intentions did not see the light of the day in the form of Acts and Rules. In place of NMP-2008, NMEP-2016 with auction-mode as the principal mode of granting mineral concessions came to be adopted.

Inordinate delays, lengthy procedures, very high taxation and corruption have triggered flight of the Indian private investments into overseas mineral-friendly destinations. FDI and inflow of technical expertise have dried up. Stand-alone commercial mineral exploration in the country has come to a standstill. There is no stock-exchange dedicated for listing of mineral exploration companies. As a result of all these deficiencies new mineral resource-discoveries, specifically of precious metals, base metals, defence-related strategic metals, fertilizer minerals, Rare Metals and REEs have become a thing of the pre-2008. At the same time, the pace of conversion of known Mineral Resources into mineable Mineral Reserves has also slowed down. In the most recent “Annual Mining Destination Survey-2016” the Frazer Institute has ranked India very low.

The papers published in the special volume under review cover a range of minerals and metals besides dealing with National Mineral Exploration Policies. The editors – A.M.Pophare, H.S.Kale and M.L.Dora have provided an excellent review of all the full papers published in this JGR Special volume. A total of 5 papers including abstracts deal with the new policy and strategies for future exploration and development in the country. There are 5 papers on gold; 5 on copper, lead, zinc; 4 on Ni + PGE; 7 papers on uranium; 9 on coal; 9 papers deal with Niobium, Tantalum (COLTAN), REE and tungsten; 4 on iron ores; one on graphite; 1 on limestone and 2 on bauxite. There are 4 papers on shale gas and CBM and one on petroleum. This is an excellent coverage of all the mineral resources. There is an abstract dealing with diamond. I present my review of the published papers under the following headings.

NMEP-2016: The leading paper is on the National Mineral Policy by Randiv et al. from Nagpur University. They have provided a detailed historical account of the development of mineral related policies since 1948. S.N.Meshram, Additional Director General and Head of National Mission-II, GSI has provided a review of the National Mineral Exploration Policy (NMEP-2016). The author says that the NMEP-2016 is innovative and meant to encourage participation of the private investors in mineral exploration and development. A.K.Chatterjee, who earlier headed GSIs Mission-II has written about new strategies and goals for mineral sector in the country. S.K.Wadhawan, K.Koteswara Rao, D.S.Jeer and P.Tarafdar have contributed on strategies for mineral resources development through enhancing the rate of mineral exploration in the country under NMEP-2016.

Gold & Basemetal: Chakravarti et al. have discussed QPC hosted gold mineralization in Singhbhum craton. The QPC has considerable dimension in the field, therefore, should be thrown open for exploration
by private investors. Mousoma Khatun and Sahendra Singh have drawn our attention to the significant content of (260 ppb) Pt+Pd associated with Ni and Cu within mafic rocks of Ghottitola area in Amgaon gneissic complex.

S.R. Baswani et al. have drawn our attention to the Ni-Co-PGE mineralisation through gravity and magnetic surveys which have indicated up to 4 km depth extension of the mafic-ultramafic intrusive in parts of Betul belt.

**U-REE:** In a series of papers on uranium and REE mineralization Atanu Mukherjee et al., have pointed to the utility of lime kankar as surface signature for concealed dykes while planning for locating drill holes for uranium mineralization in southwestern part of Cuddapah basin.

K.K. Jain et al. of AMD have explained the utility of palaeocurrent analysis in combination with radio-elemental distribution in uranium exploration citing example of their studies in Motur Formation, Satpura basin. K.K. Pandey et al. through their studies on zoned pegmatites of Gopalpur-Karunapali area, Odisha, have emphasized that high grade metamorphic terrains are also conducive for columbite-tantalite mineralization, hence, should not be ignored. On this basis they have proposed that a vast area of EGMB in Odisha should be treated as a potential target prospecting for COTLAN in pegmatites.

N.K. Panda et al. have dealt with distribution of REE in beach placer garnets of Kalingapatnam coast and their potential for HREE. G.G. Wadapalliwar and H.S. Kale have evaluated REE and HFSE constraints of serpentinitized peridotite from Sukinda ultramafic complex. Yamuna Singh et al. are of the opinion that the presence of Ta-rich minerals of Nb-Ta oxides indicate highly fractionated nature of host pegmatites at Pipilya and Ailinyawas in Ajmer district, Rajasthan. M.K. Mukherjee and K. Modak have described the implications of structural geometry for exploration of uranium and hydrocarbons in Kaladgi basin.

**Coal:** R.K. Gedam et al. have drawn our attention to the significant uses of geophysical logging of bore holes in coal and sulphide mineral exploration citing examples of new sub-surface discoveries made by them. D.B. Malpe et al. have explained the utility of integrated remote sensing and GIS in exploration for coal. Such integrated exploration has helped in discovery of coal prospects at shallow and deeper horizons below the Deccan Traps. Subhasis Sen has reviewed exploration strategies and phases of coal exploration and evaluation of Indian Gondwana coal with particular emphasis on coal core evaluation keeping in mind industrial application of coal and impact on environment. V.A. Mendhe et al. have contributed 2 papers, one on shale gas and another on CBM. The authors have found that the Barren Measures shale beds are suitable for exploration and recovery of gas considering their large cumulative thickness, significant TOC content, thermal maturity, good sorption capacity and favourable pore size and pore structures for gas transport. With regard to CBM, Mendhe et al. conclude that in-situ gas content and its composition is controlled by thermal maturity and maceral group in East Bokaro CBM block, Jharkhand. R.R. Naik et al. conclude that the proximity of coal seams to external heat sources like dykes as the reason for coal seams attaining high thermal maturity in Pench Valley Coalfield.

**Limestone & Iron Ore:** N. Kutumb Rao et al. have drawn our attention to a new type of occurrence of iron formation in Pagnost Limestone of Pranitha-Godavari (P-G) basin and conclude that the role of sedimentary and hydrothermal processes cannot be ruled out at the contact of Archaean-Proterozoic terrains. They have reported existence of limestone breccias in Proterozoic sediments from Gojoli area of P-G basin.

**Bauxite:** K.K. Chatterjee et al. have briefly described Raster-based 2D Resource modelling citing bauxite resource from Guinea. P.G. Bhukte et al. have presented an excellent review paper on the beneficiation of low grade bauxite and lateritic bauxite resources of India. They say that India is endowed with 3,480 million tonnes of lateritic bauxite resources.

**Hydrogeochemistry:** In a short but comprehensive paper Y.A. Murkte and S.P. Joshi have deliberated on the use of hydrogeochemistry in mineral exploration giving a historical perspective.

**Groundwater:** Water has become a most important natural resource as never before in the country today. Abhishek Sen of Datacode International, Nagpur has described the role of Remote Sensing and GIS in locating potential zones of groundwater. D.K. Kuity takes a look at the abandoned mine pits to solve the problem of water scarcity.

In order to truly encourage private sector investment in minerals and mineral based industries there is an urgent need for reform of extant investment-inhibiting laws to facilitate freedom of choice of exploration worthy lands and time-bound grant of licenses on FCFS basis. FCFS is a global best practice. The private sector is capable of identifying and selecting potential areas for exploration on their own merit. All that the Ministry of Mines has to do is to keep posting all mineral-related exploration and basic geoscience data on websites coming under its control. Mining in India is highest taxed in the world. If the Ministry is serious of encouraging large scale investments into mineral exploration and mining of innumerable small mineral deposits and low grade large tonnage metaliferous mineral resources it has to do away with auction mode of granting licenses, revenue sharing mechanism, do away with contributions to DMF and NMET. The legislative/regulatory framework should evolve continuously in response to market forces. Only then would the country be able to attract the inflow of capital from the private sector.

I congratulate the Gondwana Geological Society and Department of Geology, Nagpur University for so thoughtfully convening a symposium and publishing papers on topics of National importance. The Editors deserve our appreciation and gratitude.

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