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COMPLETED

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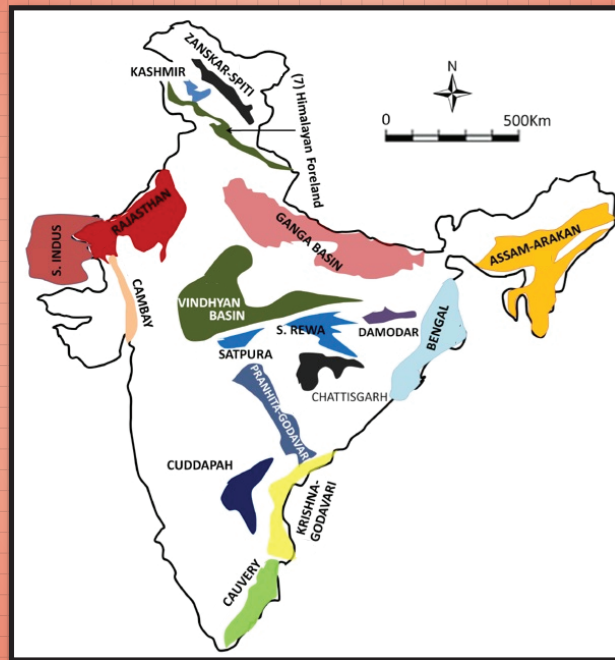
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Project I 01028



May 11, 2016 11:02 AM

**Indian Subcontinent Shale
Resource Plays | Phase 1**
Regional Characteristics & Play Modeling



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- I 01028 -

EGI Energy & Geoscience Institute



EXECUTIVE SUMMARY

The India Shale Resource report provides an in-depth understanding of three shale units from three discrete sedimentary basins:

- Cambay,
- Damodar, and
- Himalayan Foreland Basins (HFB).

The three basins vary in size and tectonic setting, from an intracratonic Gondwana (Damodar) to an intracratonic rift basin (Cambay), and finally a thrust belt (HFB). The shale units range in age from Permian (Barren Measures Formation, Damodar Basin) to Paleogene (Subathu Shale, HFB; and Cambay Shale, Cambay Basin). The Subathu and Cambay shales are shallow marine to near-shore paleoenvironmental depositional systems, while the Barren Measures shale is largely lacustrine with some marine influence. A combination of geological and geochemical investigations on a set of outcrop, borehole, and well samples were carried out in laboratories in the U.S.A. (EGI, Salt Lake City and Weatherford Laboratories, Houston), EGI's Slovakia lab, and the National Geophysical Research Institute, India. An extensive database for these basins and shales has been created on an ArcGIS 10 platform, based on sample analyses, international literature, and local literature from India.

Detailed geochemical analyses indicate maturity ranges from oil, to wet gas-condensate, in to the dry gas window. Shale characterization performed on selected samples, via petrology and SEM/QEMSCAN®, identified specific porosity characteristics and a ranking for the hydraulic fracturing (fracability) potential of the studied shales is included.

Based on the results from detailed geochemical analyses conducted in this study, EGI has created a prioritization for unconventional exploration of the basins described in the report. An ArcGIS database is included and provides spatial context and analysis of the available data.

RESEARCH TEAM

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SPONSORS



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Research Interests

- High-resolution biostratigraphy, chronostratigraphy and geochronology
- Reconstructing past environments using microfossils
- Microfossil record of oceanic anoxic events

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Sudeep joined EGI in 2005 as a Research Scientist with the Chronostratigraphy Unit. He earned his undergraduate degree (B.Sc.) and Masters (M.Sc.) at the University of Delhi, India. He subsequently earned a double masters (M.Sc.) and Ph.D. in Micropaleontology from University College London in the U.K. In 2014 Sudeep also earned an MBA from the University of Utah David Eccles School of Business.

Through EGI's Corporate Associate program, he has gained a decade of industry experience in applied chronostratigraphy with companies worldwide (USA, South America, Europe, Asia, and Africa).

Microscopy & Composite Standard Database

Sudeep's expertise in microscope work extends across the Mesozoic (Cretaceous) and Tertiary (Paleogene & Neogene) nannofossil biostratigraphy. He is a member of the International Nannoplankton Association (INA) and the North American Micropalaeontological Society (NAMS).

He conducts high-resolution bio- and chronostratigraphic analysis using multiple microfossil disciplines through EGI's composite standard database and graphic correlation methodology. This integrated approach to interpretation provides results that identify periods of rock accumulation, chronostratigraphic hiatuses, and depositional environments in absolute time.

Microfossil Record of Major Oceanic Events

Evaluating the microfossil (especially nannofossil) record across oceanic anoxic events (OAE's) that contribute to source rocks in marine hydrocarbon systems is a primary focus for Sudeep. These events are considered global (e.g., OAE 2) even though some of them are considered local in occurrence (e.g., OAE 1b, 1c, 1d). Calibrating the spatial and temporal extent of these events is critical in understanding source rock evaluation.

Global Experience

Worldwide industry and academic (teaching) experience in biostratigraphy including:

- India (east and west passive margins),
- East Africa (Somalia to Mozambique),
- West Africa (Ghana), Ivory Coast
- North Africa (Libya),
- Trinidad,
- South America (Suriname, French Guiana, Argentina – Neuquén and San Jorge Basins)
- South Atlantic Ocean