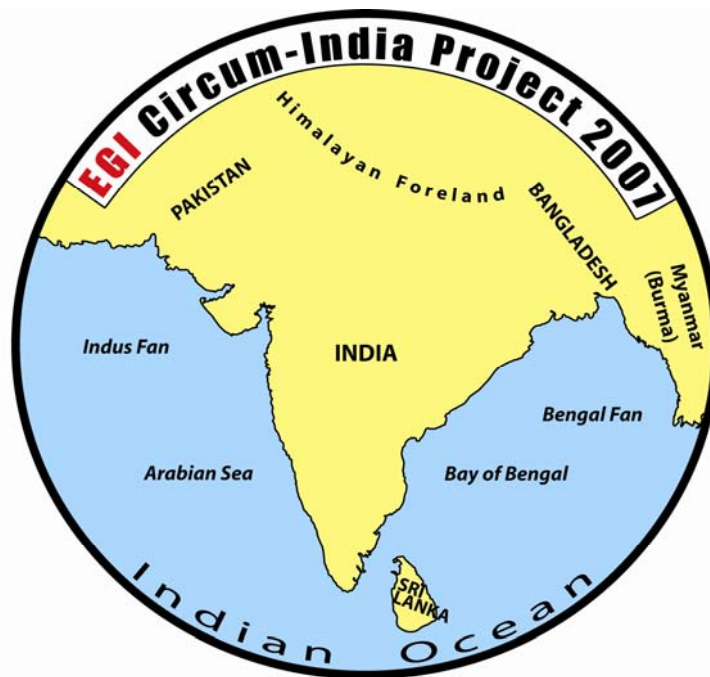


## ***Circum-India Basins Project***

### ***Project Proposal***

#### ***Phase I – East India Margin Basins***



#### **PRINCIPAL INVESTIGATORS**

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# **CIRCUM-INDIA BASINS PROJECT**

## **Phase I. Tectono- and Biostratigraphic Correlations and Paleogeographic Reconstructions for the East India Margin Basins**

### **INTRODUCTION**

This research proposal is for an EGI project entitled “*The Circum-India Basins Project: Phase I. Tectono- and Biostratigraphic Correlations and Paleogeographic Reconstructions for the East India Margin Basins*”.

The Indian subcontinent contains some of the most prolific petroliferous basins in South Asia with exploration dating back to the 19<sup>th</sup> century. According to India’s Directorate General of Hydrocarbons (DGH), the total hydrocarbon resources of the country including deep water basins amount to 205 billion barrels oil and oil-equivalent gas. The twenty-six sedimentary basins of India, onland and offshore, have an areal extent of ~3.14 million sq. km., of which about 30% remain unexplored and the rest hold significant potential for E&P. India is increasingly showing hydrocarbon hotspots with some world-class discoveries over the last 5 years such as those in the Krishna-Godavari deep waters in the Bay of Bengal and the onshore Rajasthan Basin. Moreover, the implementation of various phases of India’s New Exploration Licensing Policy (NELP) since 1999 have opened new vistas of oil and gas exploration activity, both for Indian and foreign companies.

The Principal Investigators (PI’s) presented the idea of the Circum-India Basins Project at the 2006 EGI Corporate Associates Meeting held in Salt Lake City. A workshop on this theme organized by EGI and hosted by ConocoPhillips was subsequently held in Houston on 1 November 2006. This workshop was attended by delegates from seven oil companies and laid the foundation for this project. At the workshop, it emerged that the overall aim of the project would be to develop a ‘circum-India’ study towards synthesizing and digitizing data and providing a knowledge base for the stratigraphy and evolution of the sedimentary basins of India (East and West Indian Margin, Andaman-Nicobar, Assam-Arakan, Indus and Bengal Basins) in a multi-phased approach. The project results, encompassing data from various publications and especially from local sources in India, will form a knowledge base delivered in ArcGIS.

### **RATIONALE FOR THE PROJECT**

India contains a multitude of proven and prospective petroliferous sedimentary basins, onshore to deepwater. Given the vast amount of scientific literature (publications, theses, reports, etc.) available in the public domain and scattered in various journals, universities and research institutes within India, a synthesis of knowledge focused on stratigraphy and its integration with the structural evolution and petroleum systems of the Indian basins in

a user-friendly, digital format is needed. The project will address this issue by systematic data mining, collation, integration and evaluation of the stratigraphic (litho-, bio-, chrono- & tectono-) and basin evolution information of the circum-India basins, and present results in a series of tectonostratigraphic correlative charts, paleogeographic (paleofacies and paleoenvironmental) maps, and selected structural transects (onshore to offshore, data permitting).

## **GEOGRAPHIC & STRATIGRAPHIC COVERAGE OF THE PROJECT**

Phase I of the project will include the East Indian Margin Basins, comprising the following six basins (onshore to deepwater, data permitting):

- Cauvery
- Palar
- Krishna-Godavari
- Pranhita-Godavari
- Mahanadi-NEC
- Purnea

The entire stratigraphic range recorded in these basins (Precambrian to Recent) will be considered for data collection, synthesis, and interpretation.

## **DATA SOURCE**

The primary data source for the project will include published and other non-proprietary literature (journal articles, book volumes, conference proceedings, university dissertations, reports, etc.) not only from international sources but especially from local sources in India (such as universities, DGH, Oil and Natural Gas Commission, Geological Survey of India, Geological Society of India, Birbal Sahni Institute of Paleobotany, etc.). In addition, any data available through hydrocarbon institutions in India or contributed by private companies will be incorporated in the project results. Active involvement of experienced geoscientists from India will be sought as this will facilitate access to local knowledge and expertise.

## **PROJECT TASKS & DELIVERABLES**

The methodology of the project will be systematic data mining, quality check, coherent synthesis and interpretation of data relevant to stratigraphy (litho-, bio-, chrono- and

tectono-stratigraphy) of the study basins. This database will also be used for constructing structural transects, paleogeographic maps (basin-scale tectonic and facies maps) and play concepts. In addition, available data relevant to petroleum systems (source rock data, heat flow data, etc.) will be incorporated in the project results. Stratigraphic data synthesis and interpretation will constitute a major component (around two-thirds) of the project.

Based on our understanding of the project, the deliverables for the East Indian Margin study (Phase I) will include the following:

- (1) ~12 integrated stratigraphic charts (including petroleum systems data and tectonic time-events) for each of the six basins.
- (2) ~3 regional structural transects from onshore to deepwater (data permitting) for the East Coast of India.
- (3) Paleogeographic (paleofacies and paleoenvironmental) correlative maps for ~10 time horizons for the East Indian Margin, encompassing the Proterozoic to Recent time interval.
- (4) Articles and other data gathered for the project will be included in the database in PDF or other digital format, as appropriate.

ArcGIS 9 will serve as the platform for the project deliverables. After acquisition of data from India, project deliverables will be revisited, and as appropriate, redefined in consultation with the sponsoring companies at an interim project meeting in April/May 2007.

## **PROJECT PARTICIPANTS**

**Dr. Sudeep Kanungo** (EGI), Principal Investigator (bio and chrono-stratigraphy)  
[B.Sc. and M.Sc., 1994-99, India; M.Sc., London, 2000; Ph.D., London, 2005; Research Scientist, EGI, 2005-present]

**Dr. Rasoul Sorkhabi** (EGI), Principal Investigator (tectonics, paleogeography and petroleum systems)  
[B.Sc., 1983, India; M.Sc., India; Ph.D., 1991 Japan; Post-Doctoral Fellow and Research Associate 1992-97, Arizona State University; Senior Geologist, Japan National Oil Corporation, 1998-2003; Research Professor, EGI, 2003-present]

**Christopher Kesler** (EGI), ArcGIS specialist

2 Technical Staff (EGI) and 2 students from the University of Utah

2 geoscientists from India

## **PROJECT TIME-LINE**

The duration of Project Phase I (Circum-Indian Basins, East Indian Margin) will be 12 months, starting in February 2007 or as soon as signed contracts from the five sponsoring companies are received.

Three project meetings will be held during the Phase I study. The first meeting will be held in Salt Lake City in April/May 2007 after collection of data from India. One project meeting will be preferably held in India (Oct/Nov 2007) in conjunction with a field excursion, prior to the final meeting and delivery of the project report in March 2008.

## **BUDGET**

The total budget for Project Phase I is estimated to be US\$363,890; and the cost per sponsoring company is **US\$72,778** based on 5 sponsors and the project tasks outlined in this proposal. Table 1 (page 6) summarizes the budget for Project Phase I.

With additional sponsorship, extra research as agreed with the sponsoring companies will be carried out at no extra cost to the companies participating in the project. Any remaining funds at the end of Phase I will be directed toward the Phase II research program (West Indian Margin study).

## **PROJECT PHASE II: WEST INDIA MARGIN**

Our work will be extended to basins on the West Indian Margin as Phase II of the project. The West Indian Margin study will include the Rajasthan, Vindhyan, Cambay-Kutch, Mumbai Offshore and Kerala-Konkan Basins. It is anticipated that the West Indian Margin study (Phase II) will be similar to the East Indian Margin (Phase I) although details of the project tasks and deliverables will be finalized in consultation with the sponsors at the end of Project Phase I.

Project Phase II will have a new project proposal and budget. The sponsoring companies of Phase I may sign an Amendment Agreement if they decide to join Project Phase II.

**Table 1.** Budget summary for Phase I (12 months)

<b>Circum-India Basins Project - Phase I Budget Item</b>	<b>Cost (US\$)</b>
EGI staff salary (7, including students) Sudeep Kanungo (PI, research) Rasoul Sorkhabi (PI, research) Christopher Kesler (EGI ArcGIS specialist) Sumer Bivens & Jesse Ellis (EGI Technical Staff) 2 geology students (University of Utah, data processing)	161,405
Project Consultants from India (2)	40,000
Travel 2 trips to India for PI's + domestic travel within US	24,000
Supplies and Data Acquisition	15,000
Project Meetings	3,000
University overhead (49.5%)	120,485
<b>Total Budget</b>	<b>363,890</b>
<b>Cost per Sponsoring Company</b>	<b>72,778</b>

## **EGI CONTACTS**

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