

Project Portfolio

Current Projects

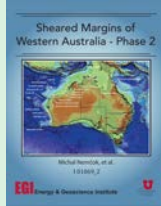
Completed/Immediate Delivery

- Guyana-Suriname Basin

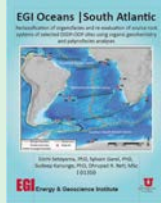
In Progress / Development

- Gas Basins of Africa
- Source Rocks of the North & Central American Basins
- EGI Oceans - Organofacies Machine Learning Model
- Eastern Mediterranean Basin Synthesis (EMBS)
- Red Sea and Gulf of Suez Basins
- Source Rocks of Gondwana Continents & Margins
- Karoo Basin Reservoir Characterization
- East African Basins & Petroleum Systems
- Natural Hydrogen Knowledge Platform
- Ultra-Deepwater plays
- Lithium from Oil & Gas, Geothermal, and Lacustrine Fields

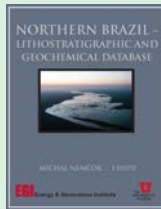
Now Available to All EGI Members



I 01069_2 Sheared Margins of Western Australia Supplement to Phase 1: Sealed Versus Leaky Structural Highs Of The Late Jurassic, Aptian/Albian, Turonian, And Cretaceous/Paleocene West Australia | Additional Controls And Interpretation
Released 11-October-2023



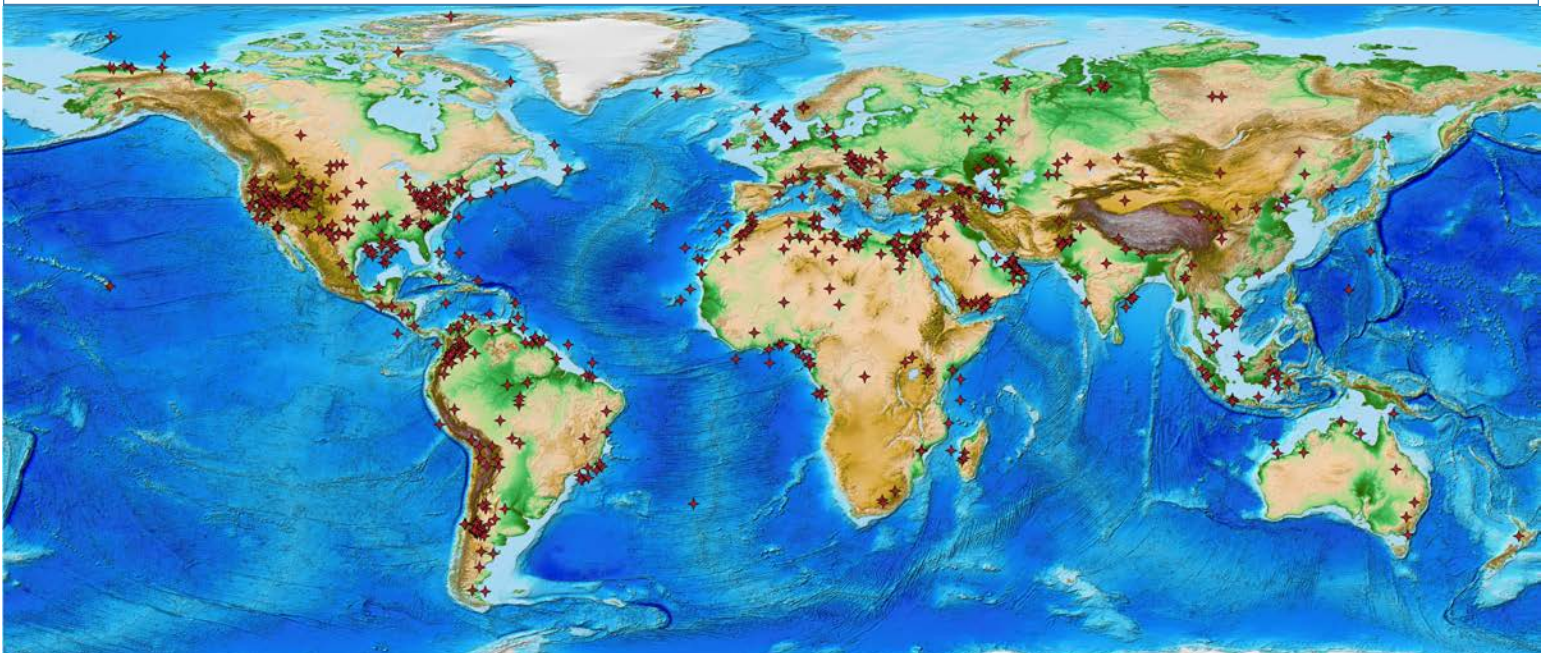
I 01350 EGI Oceans South Atlantic: Reclassification of Organofacies and Re-Evaluation of Source Rock Systems of Selected DSDP-ODP Sites and Brazil-Gabon Industry Wells Using Organic Geochemistry and Palynofacies Analyses
Released 18-September-2023



I 01070 Northern Brazil - Lithostratigraphic and Geochemical Database ArcGIS Project
Released 15-April-2023

Open for Sponsorship

Recently Released, Now Available to all Members



EGI's Corporate Associate Members gain immediate access to EGIconnect, our members-only online database of EGI reports, technical documents, and onshore and offshore data from study sites worldwide. EGI adds new data, other technical reports, and new EGI reports to EGIconnect.

Scientific collaboration with industry specialists and corporate associates drives scientific innovation. Access knowledge that lowers the cost of exploration and enhances production.

Important updates:

The EGI library catalog presented through the EGIconnect platform is undergoing updates that help define the study area and scope of reports, articles, dissertations, theses and maps more clearly. This update process enables the new EGIconnect search tool to quickly return available EGI library items within or near a client's area of interest. EGIconnect also has a new EGI library summary tool that generates a list and optional report of all available EGI library items within a client defined area of interest. Lastly, as a reminder, the map layers presented through EGIconnect can always be consumed by client-side GIS applications and ArcGIS online accounts.

850+ EGI Reports & 17,000+ Additional Geoscience Documents

Via EGIconnect.com EGI Members access our entire Online Global Database from the convenience of their office. Along with > 850+ research reports and 17,000+ geoscience documents our online database contains 350,000 km+ of 2D seismic data and 7,000+ well logs with locations. The 850+ EGI research reports are represented on the map with a red star.



EXCLUSIVE ACCESS TO EGI MEMBERS

egi.utah.edu/egi_connect

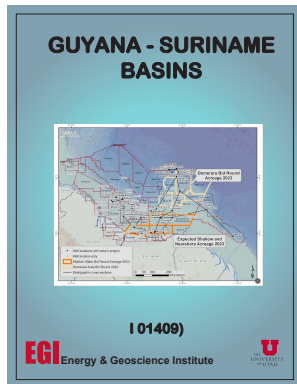
(Note: EGIconnect supports Internet Explorer 10+, Google Chrome, Mozilla Firefox & Safari)

Contact Information:

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GUYANA - SURINAME BASIN

Completed/Immediate Delivery| Open For Sponsorship



(I 01409)

Full Title: GUYANA - SURINAME BASIN DATABASE

Estimated Investment & Timetable: \$40k (USD) per non-CA sponsor
\$32k for EGI CA members.

Duration: 12 months

EGI Contacts:

Rasoul Sorkhabi, Ph.D. Research Professor

Email: rsorkhabi@egi.utah.edu

Eiichi Setoyama, Ph.D. Research Scientist

Email: esetoyama@egi.utah.edu

Summary & Purpose

- Recent discoveries offshore Guyana-Suriname have placed this petroleum province in the spotlight. These discoveries indicate massive occurrence of oil and gas in the region and the need for regional synthesis and quantitative geologic and geochemical data on petroleum systems for further exploration.

Deliverables

ArcGIS integration and display of stratigraphic, geochemical, and well data and maps, including access to publicly-available seismic images.

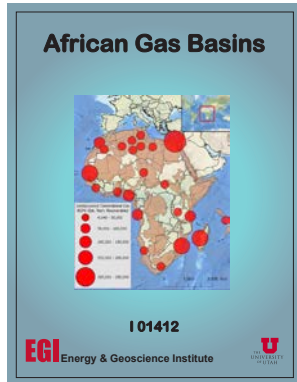
Characterization of the offshore petroleum systems in the region by new geochemical and paleofacies data.

This EGI study report is designed to:

- (1) Integrate all of data from EGI reports as well as research papers in a coherent schema.
- (2) Compile geochemical data and add new geochemical analyses on samples from 51 wells
- (3) Construct new paleofacies maps for key stratigraphic horizons from onshore to deepwater.
- (4) Construct litho-chrono-biostratigraphic columns for the wells.
- (5) Assemble structural and geophysical data on a unified, easy-to-use platform.

GAS BASINS OF AFRICA

In Development | For Sponsorship



I 01412

Full Title: African Gas Basins

Estimated Investment & Timetable: \$40k (USD) per non-CA sponsor \$32k for EGI CA members.

Duration: 12 months

EGI Contacts:/Authors

Eiichi Setoyama, Ph.D. Research Scientist
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Bryony Richards, Ph.D. Research Scientist
Email: brichards@egi.utah.edu

Rasoul Sorkhabi, Ph.D. Research Professor
Email: rsorkhabi@egi.utah.edu

Value

- This study report aims to assist energy E&P companies to diversify their portfolio and increase their natural gas supply sources and routes from African basins.

Deliverables

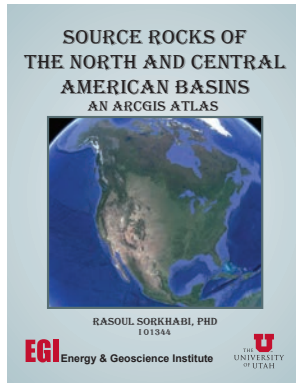
- ArcGIS geodatabase compiled from EGI reports, public data sources, and the literature with reference linking.
- Report with convenient, accessible evaluation of all African gas basins, including information on their geology, natural gas field development, production, future upside and potential markets.

Regional Framework and Study Rationale

This EGI study report is a new evaluation of the African basins both onshore and offshore in terms of their natural gas pools and potential (Figure 1). The database is harvested from EGI archive as well as other survey reports and research papers, and includes geologic, geochemical and geophysical information, natural gas field development and production, and basinal and infrastructure maps (Figure 2). The report will enhance the E&P investigations and decision-making activities.

Source Rocks of the North & Central American Basins

In Development | Open for Sponsorship



I 01411

Full Title: Source Rocks of the North and Central American Basins: An ArcGIS Atlas

Investment & Timetable: \$40k (USD) for non CA members. \$32k for CA members.

Duration: 18 months

EGI Contacts:

Dr. Rasoul Sorkhabi | Research Professor | Principal Investigator
Tel. (801) 587-9070 | Email: rsorkhabi@egi.utah.edu

Eiichi Setoyama, Ph.D. Research Scientist
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Project Rationale & Significance:

North and Central Americas contain world-class petroleum provinces and have historically been prominent producers of oil and gas. USA alone is a pivotal market for oil and gas globally.

An appraisal of organic-rich and thermally mature sedimentary rocks lies at the base of the petroleum system analysis for both conventional (migrated) and unconventional (self-sourced) hydrocarbon plays. A quantitative knowledge of the distribution of source rocks in space and through time has important implications not only for the inventory of rich source-rock formations but also evaluating the geologic conditions favorable for source-rock sweet-spots and the generation of oil and gas in a basin.

The present study aims to assemble and digitize geospatial, geologic, and geochemical data on source-rock formations of various basins in North and Central Americas in a user-friendly and query searchable ArcGIS platform enhanced with geological, geophysical, and paleofacies maps.

EGI, with its 46 years of research work in various basins and regions around the world, holds an impressive archive of >850 reports plus thousands of non-EGI reports and papers. The main objective of this study is to assemble and standardize a source-rock database primarily from EGI sources supplemented by newer, public sources.

Value

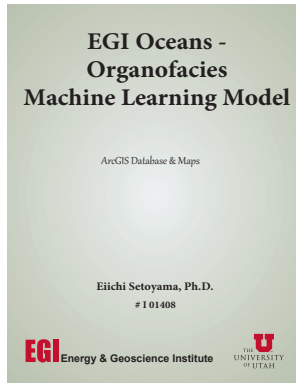
- By better understanding the source rock characteristics of sedimentary basins in North & Central Americas based on a user-friendly database, explorationists can mitigate the risk of charge potential and hydrocarbon generation as part of the overall petroleum system.
- A quick assessment tool for conventional and unconventional play analysis based on source rocks and for assessing data-poor and/or by-passed plays based on basin-scale correlatable source rocks.

Key Deliverables

- An ArcGIS database of source rocks of North & Central American basins (USA, Canada, Mexico and Cuba and certain relevant countries) including basinal, stratigraphic, sedimentological, and geochemical attributes (e.g. TOC, Ro, kerogen type, pyrolysis, HC type, etc.) compiled from EGI's proprietary data archive, DSDP-ODP sites as well as from other technical publications.
- ArcGIS maps highlighting distribution of source rocks in space and through geologic history.

EGI Oceans - Organofacies Machine Learning Model

In Development | For Sponsorship



101408

Full Title: EGI Oceans - Organofacies Machine Learning Model

Mineral matrix effect correction and refined organofacies prediction utilizing the South Atlantic and the Central & North Atlantic EGI Oceans datasets

Investment & Timetable: TBD

Duration: 12 months

Authors/Principal Investigators:

Eiichi Setoyama, Ph.D. | Email: esetoyama@egi.utah.edu | 801-585-9768

Authors

Eiichi Setoyama, Ph.D., Sylvain Garel, Ph.D., Dhruvad R. Beti, Ph.D., Bryony Richards, Ph.D.

Value:

A machine learning (ML) model trained using EGI Oceans data to detect and correct for mineral matrix effect (MME) and predict organofacies and OM composition without performing additional analysis (e.g., pyrolysis on isolated kerogen and palynofacies)

A hierarchy of variables/factors (e.g., TOC, HI, benthic foraminiferal species diversity, rock type, rock color, sub-mm lamination, and bioturbation intensity) influencing accurate organofacies and organic matter (OM) composition prediction.

Benefits to Sponsors

- This project will be of interest to groups seeking to more tightly constrain organofacies and its distribution on the Atlantic margins.
- It will also benefit those companies seeking to develop better predictive capability using advanced ML/digitalization techniques.

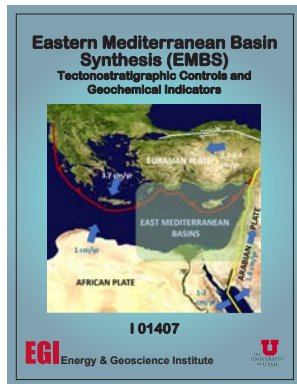
Key Deliverables

Maps with predicted organofacies and OM composition for IODP sites in the South, Central, and North Atlantic for selected stratigraphic intervals.

Organofacies ML model which includes MME correction function

Eastern Mediterranean Basin Synthesis (EMBS)

In Development | For Sponsorship



101407

Full Title: Eastern Mediterranean Basin Synthesis (EMBS) | Tectonostratigraphic Controls and Geochemical Indicators

Estimated Investment & Timetable: \$68k (USD) per Sponsor
Duration: 12 months

EGI Contacts:

Rasoul Sorkhabi, Ph.D. Research Professor
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Eiichi Setoyama, Ph.D. Research Scientist
Email: esetoyama@egi.utah.edu

Value

- Better understanding of the geodynamic tectono-sedimentary evolution of the Eastern Mediterranean basins for oil and gas exploration with a focus on how tectonic and stratigraphic forces have controlled the key petroleum system elements from source rocks to traps.
- An ArcGIS assessment and easy-to-use tool for analysis of the regional geology and petroleum plays in the region based on an integrative database that can be augmented with internal databases of the sponsoring companies.

Deliverables

- An integrative digital database for the Eastern Mediterranean distilling a huge amount of information and publications that are currently scattered. The database would also evaluate and standardize the information on the region bordered by eight different countries in the region, from Egypt and Lebanon to Cyprus and Turkey.
- An easy-to-use geologic knowledge-base with a focus on basin evolution, structural framework, paleofacies distribution, geochemical evaluation, and origin of oil and gas accumulations.
- Play fairway mapping of hydrocarbon prospectivity in selected key areas based on regional synthesis of information from wells, seismic, biostratigraphic, and geochemical data.

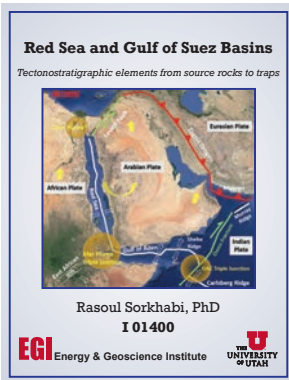
Regional Framework and Study Rationale

Situated at the intersections of Africa, Asia, and Europe, the Mediterranean Sea with a surface area of 2.5 million sq. km includes 12 local seas and gulfs as well as over 3300 islands. The Mediterranean is also connected through narrow straits to the Atlantic on the west, the Black Sea to the north, and the Red Sea to the south. Moreover, 22 countries in Europe, North Africa, and West Asia face the Mediterranean. This geographic setting has given the Mediterranean a geostrategic position in the world both politically and economically. Indeed, the very term “Mediterranean” (Latin, “interior of Earth’s landscape”) signifies its key position historically.

In the past two decades, the Eastern Mediterranean has witnessed the discovery of several major gas fields such as Aphrodite, Leviathan, Tenin, Tamar, Karish, Dalit, and Zohr in the Levant Basin. These, in addition to the classic oil and gas fields of the Nile Delta and Western Desert basins in Egypt, indicate the existence of a prolific petroleum province for exploration with proximity to major markets in Europe. Nevertheless, many aspects of the petroleum systems in the Eastern Mediterranean are little known, such as the distribution of source rocks and reservoir in space and time, the causes of microbial (biogenic) vs. thermogenic gas fields, the impact of the Messenian Salt Giants on petroleum systems, and the nature of deep plays. Some of these problems can be investigated through integration of geologic, geophysical, and geochemical data from both onshore and offshore areas. In this way, petroleum systems can be viewed against the background of tectono-sedimentary evolution of the Eastern Mediterranean basins.

Red Sea and Gulf of Suez Basins

In Development | For Sponsorship



I 01400

Full Title: Red Sea and Gulf of Suez Basins: Tectonostratigraphic elements from source rocks to traps

Investment & Timetable: \$140k (USD) per non CA member; \$120k (USD) CA members

EGI Contacts:

Dr. Rasoul Sorkhabi | Research Professor | Principal Investigator
Tel. (801) 587-9070 | Email: rsorkhabi@egi.utah.edu

Project Rationale & Significance:

Tectonic forcing of sedimentary evolution and facies distributions is well established in petroleum basins; therefore, it is important to decipher the various tectonic models for the Red Sea Basin (RSB). To do this, we will consider (1) internal structural framework and complexities in RSB, (2) the linkages of RSB to its surrounding structures: Dead Sea and Gulf of Suez to the north, the EAR to the south, and the Gulf of Aden to the east, and (3) relationships between the normal plate tectonics and the deep-seated plume tectonics in the region (for instance, the differences between the Afar triple junction and the Owen-Aden-Carlsberg triple junction, and their influences on the rifting processes).

Value

- Better understanding of the tectono-sedimentary evolution of the Red Sea and Gulf of Suez basins for petroleum exploration with a focus on key petroleum systems elements from source rocks to traps.
- An ArcGIS quick assessment and easy-to-use tool for analysis of petroleum plays in the region based on an integrative database that can be augmented to the internal databases of the sponsoring companies. This would help to assess data-poor frontier or deeper plays based on regionally correlatable plays.

Deliverables

- An integrative geologic model for the opening of the Red Sea and Gulf of Suez with a focus on the impact of tectonics on synrift depositional facies, and high-resolution, standardized stratigraphic correlation of the region bordered by six different countries (Egypt, Saudi Arabia, Sudan, Yemen, Eritrea, and Djibouti) which use different stratigraphic terminologies.
- An evaluation of pre-salt (pre-Late-Miocene) and pre-rift (Jurassic-Eocene) sedimentary packages and petroleum plays in the Red Sea basin constrained by paleofacies reconstruction and correlatable source rocks and geochemical data.
- An examination of geologic factors for the success of giant fields in the central Gulf of Suez sub-basin as an analog for similar possibilities in the Red Sea basin
- Play fairway mapping of hydrocarbon prospectivity in selected key areas in the Red Sea based on a synthesis of information from wells, seismic, and other data.
- An atlas of seismic, stratigraphic, and well data for quick reference and use.

Source Rocks of Gondwana Continents & Margins

In Development | For Sponsorship



I 01345

Full Title: Source Rocks of Gondwana Continents and Margins: ArcGIS Database and Maps Version 2023

Investment & Timetable: \$60k (USD) non CA members; \$50k (USD) CA members

Duration: 12 months

EGI Contacts:

Dr. Rasoul Sorkhabi | Research Professor | Principal Investigator
Tel. (801) 587-9070 | Email: rsorkhabi@egi.utah.edu

Project Rationale & Significance:

An appraisal of organic-rich and thermally mature sedimentary rocks lies at the base of the petroleum system analysis for both conventional (migrated) and unconventional (self-sourced) hydrocarbon plays. A quantitative knowledge of the distribution of source rocks in space and through time has important implications not only for the inventory of rich source-rock formations but also evaluating the geologic conditions favorable for source-rock sweet-spots and the generation of oil and gas in a basin.

The present study aims to assemble and digitize geospatial, geologic, and geochemical data on source-rock formations of various basins on Gondwana continents and margins in a user-friendly and query searchable ArcGIS platform enhanced with geological, geophysical and paleofacies maps.

EGI, with its 46 years of research work in various basins and regions around the world, holds an impressive archive of >850 reports plus thousands of non-EGI reports and papers. In addition, EGI Geochem Lab has over the decades analyzed rock and oil samples from several regions such as South America, Caspian Sea, etc. The main objective of this study is to assemble and standardize a source-rock database primarily from EGI sources supplemented by newer, public sources.

Value

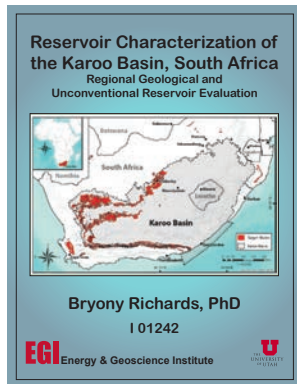
- By better understanding the source rock characteristics of regional and local basins based on a user-friendly database, explorationists can mitigate the risk of charge potential and hydrocarbon generation as part of the overall petroleum system.
- A quick assessment tool for conventional and unconventional play analysis based on source rocks and for assessing data-poor frontier and/or by-passed plays based on regionally correlatable source rocks.

Key Deliverables

- ArcGIS database of source rocks across Gondwana's Continents and Margins (South America, African, Arabian Peninsula, India and Australia) including basinal, stratigraphic, sedimentological, and geochemical attributes (e.g. TOC, Ro, kerogen type, pyrolysis, HC type, etc.) compiled from EGI's proprietary data archive, DSDP-ODP sites as well as from other technical publications.
- ArcGIS maps highlighting distribution of source rocks in space and through geologic history.

Karoo Basin Reservoir Characterization

In Development | For Sponsorship



I 01242

Full Title: Reservoir Characterization of the Karoo Basin, South Africa | Regional Geological & Unconventional Reservoir Evaluation

Estimated Investment & Timetable: \$80k (USD) per Sponsor
Duration: 24 months

EGI Contacts:

Dr. Bryony Richards | Senior Petrologist | Principal Investigator
Tel. (801) 585-0599 | Email: brichards@egi.utah.edu

Project Rationale & Significance:

Recent estimates of unconventional resources in the Karoo Basin, suggest widely variable recoverable shale gas in-place from ~30 Tcf to ~500 Tcf (i.e. Decker and Marot, 2012). Potentially large gas reserves; coupled with the present energy shortfall in South Africa, has led to shale gas becoming an attractive new energy prospect, with much of the renewed exploration focus falling on the Karoo Basin shales.

Value

- The integration of three key technical areas to establish an unparalleled understanding of shale resources in South Africa's Karoo Basin.
- Core through Pore™ Integrated Petrological Workflow for cutting-edge interpretation of composition, texture, fabric, porosity, permeability, micro-tectonics, micro-facies/depositional evolution and diagenetic history.
- Geophysical & Petrophysical Data: integrated within the gross tectonic structural framework, taking into account the correlation of available gravity and magnetic data within the fundamental sequence stratigraphic framework of the basin.
- Organic Petrology: Evaluation of key samples using rock-Eval, TOC, and biomarkers with the integration of inorganic (petrological) analyses and regional (geophysical/petrophysical) data.

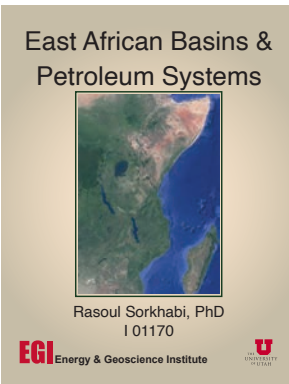
Deliverables

Project deliverables are proposed to focus on the critical assessment of potential shales in key areas of the basin, using available literature, geological modeling and new analyses of samples, including:

- Comprehensive petrological analyses using the Core through Pore™ integrated analytical approach using optical microscopy, XRD, XRF, QEMSCAN®, SEM, FIB-SEM and TEM/STEM.
- Geochemical and petrological databases and charts (Excel).
- Integrated assessment of analysis with available well log and magnetic data.
- Delivered on ArcGIS platform with GIS catalog delivered in Excel format.
- Analog table containing key shale parameters and potential analogous North American reservoirs (Excel).
- Documentation from interim and final project presentations

East African Basins & Petroleum Systems

In Development | For Sponsorship



I 01170

Full Title: East African Basins & Petroleum Systems

Investment & Timetable: \$55k (USD) per Sponsor
Duration: 14 months

EGI Contacts:

Dr. Rasoul Sorkhabi | Research Professor | Principal Investigator
Tel. (801) 587-9070 | Email: rsorkhabi@egi.utah.edu

Project Rationale & Significance:

The East African region from Sudan as far south as Mozambique encompasses a sedimentary record from the Late Carboniferous to Recent times. The relative distribution and preservation of these sediments were largely controlled by tectonic events as the region evolved from an inter-cratonic basin at the heart of Gondwana in the late Paleozoic through the rift-drift fragmentation of Gondwana during the Jurassic-Cretaceous to its present settings as an onshore continental rift and offshore passive margin. This project constructs a regional framework for the paleogeographic, structural and petroleum-system evolution of East Africa (onshore to deepwater).

Value:

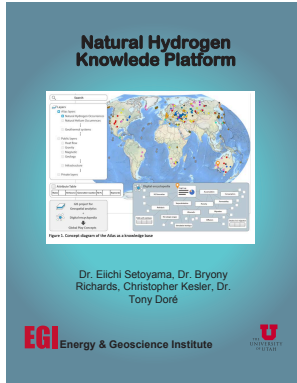
The project results will integrate the onshore and offshore basins of East Africa, will compare and contrast the East African margin with its corresponding Gondwana margins (including India and Madagascar) in terms of petroleum systems, and will analyze the superimposition of the Cenozoic rift basins on the underlying Cretaceous sediments and the effects of East African rift tectonics on the overall sedimentary and structural evolution of the East African margin. The work will be conducted in collaboration with institutions in selected East African countries.

Deliverables:

The ArcGIS deliverables will include detailed integrated stratigraphic charts, structural cross-sections, well-controlled paleogeographic facies reconstructions (Carboniferous-Recent), play fairway maps, basin modeling, and geochemistry of oil samples.

Natural Hydrogen Knowledge Platform

In Development | For Sponsorship



Full Title: Natural Hydrogen Knowledge Platform

Investment & Timetable: \$50k (USD) per Sponsor Duration: 2 years

January 2024–December 2025 | **\$40k for Corporate Associate Members**

EGI Contacts:

Dr. Eiichi Setoyama, Dr. Bryony Richards, Christopher Kesler,

The Natural Hydrogen Knowledge Platform is a knowledge base consisting of a GIS project of global natural hydrogen fields (Fig. 1) and a collection of interlinked documents, such as field summaries and natural hydrogen-related entries.

Objectives:

- To determine key geological conditions required for economic accumulations of natural hydrogen, and to propose play concepts
- To build a knowledge base with global natural hydrogen analogues 1) to aid in learning about natural hydrogen systems, 2) to facilitate the evaluation of natural hydrogen exploration and production feasibility, and 3) to support innovation of new exploration and production technology and methods

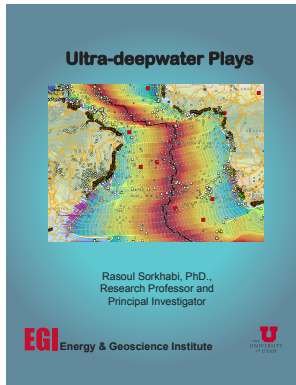
Deliverables:

- ArcGIS project
- Digital encyclopedia on natural hydrogen with a bibliography for each entry and topic
- Global play concepts for natural hydrogen

Preliminary deliverables will be made available upon signing and will be updated regularly

Ultra-deepwater Plays Atlas

In Development | For Sponsorship



Full Title: Ultra-deepwater Plays: An ArcGIS Atlas for Equatorial and South Atlantic Basins

Investment & Timetable: \$50,000 (USD) for non-CA members. \$40,000 for CA members.

Duration: 12 months

EGI Contacts:

Team members: Rasoul Sorkhabi, Ph.D., Eiichi Setoyama, Ph.D., and Christopher Kesler, and EGI Affiliate Scientists and Students

Scientific Outcome and Exploration Value:

- An expanded understanding of the basin-specific geologic, geophysical, and geochemical knowledgebase for exploration of various ultra-deepwater prospects
- Tectonostratigraphic styles and basin evolution of the transitional crust to the ocean crust
- Development of effective source rocks and petroleum systems in magma-rich vs. magma-poor margins
- Interplay of plate tectonics and mantle plumes in basement/basinal development along passive continental margins
- Feasibility assessment of migration pathways from the source to the reservoirs
- Factors that impact the size and compartmentalization of ultra-deepwater prospects and development of structural vs. stratigraphic traps
- Workflows, attribute maps, ranking schemes for success/failure of ultra-deepwater prospects that enable cross-basinal comparisons

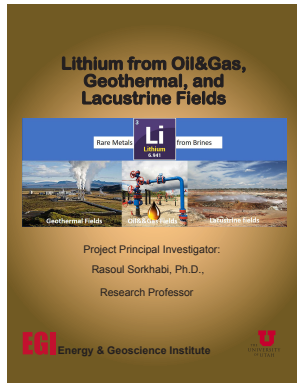
Key Deliverables and Project Results:

The project results will be delivered on ArcGIS and described in a companion report for the following deliverables:

- Standardized stratigraphic charts constrained by stratigraphic data and integrated with petroleum system elements
- Structural maps incorporating crustal geophysics, delineate underlying crustal types and structural grains, & cover deformational styles
- Geohistory analysis and evaluation of petroleum basin longevity based on charge-accumulation criteria
- Play concepts for ultra-deepwater exploration incorporating along-strike variations
- Play fairway maps for ultra-deepwater targets
- Conjugate-margin comparative maps for development of petroleum systems on symmetric and asymmetric basins
- Paleofacies maps for selected basins

Lithium from Oil&Gas, Geothermal, and Lacustrine Fields

In Development | For Sponsorship



Full Title: Lithium from Oil&Gas, Geothermal, and Lacustrine Fields

Investment & Timetable: US \$45,000 per company. \$36,000 for CA members.

Duration: 10 months

EGI Contacts:

Project Principal Investigator: Rasoul Sorkhabi, Ph.D., Research Professor

Collaborative project between EGI Dept. of Chemical Engineering and Dept. of Material Science

Rationale:

The global energy landscape is undergoing a massive and rapid transformation due to plans to reduce carbon dioxide emissions, energy security and economic growth, and technological developments. Electrification lies at the heart of this energy transition, but its success will depend on feasible supplies of battery-grade substances such as lithium and other rare metals. By tapping into brines from oil and gas fields, geothermal fields, hot springs and lake basins, the global energy industry can benefit from a substantial feedstock of rare metals and, at the same time, help environmental cleanup and sustainability. This project offers a massive database, exploration workflow, and technological assessment for lithium extraction from various geosources.

Key Deliverables and Project Results:

(1) ArcGIS DATABASE AND EXPLORATION WORKFLOW FOR RARE METALS FROM BRINES

Extraction of lithium and other rare metals from subsurface brines (geothermal, produced oilfield water, springs, saline paleolakes, etc.) is becoming a significant source for production of these battery-grade materials. This unconventional source for rare metal production also helps environmental cleanup and efficient use of these (often) waste and toxic waters. The study will consist of (1) a geological and geochemical database of various brine types reported from the USA and overseas, together with reservoir geologic information to serve as analog studies; (2) a geologic analysis of rare metal enrichment in brines, which would help their assessment and exploration. Geographic coordinates and bibliographic information for the data will be included.

(2) TECHNOLOGICAL ASSESSMENT OF LITHIUM EXTRACTION METHODS FROM BRINES

Given that evaporative extraction of lithium from salt brines takes one to two years, has a huge environmental footprint, and is destructive of water resources, various "direct extraction methods" using electrochemical principles are being developed as environment-friendly and efficient alternatives. These methods are in various stage of development and "technological readiness levels." This report will review these current or emerging technologies, describe their scientific basis, and assess their upscaling potential and economic and environmental merits along with "who's who" and bibliographic information.