

IN DEVELOPMENT

South China Sea Petroleum Systems

Basin Analysis & Play Fairway Analysis

Principal Investigator:

Prof. Shu Jiang

Research Associate Professor &
Coordinator for China Program
Development

Email: sjiang@egi.utah.edu

Investment per Sponsor

\$99k (USD)

Duration

24 months

Project I 01163

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VALUE

- An expanded understanding for the regional geology and petroleum systems including yet to find resources of the South China Sea (SCS).
- Catalog the parameters of producing reservoirs including porosity, permeability, net/gross, reservoir type, depositional facies, hydrocarbon type, trap type, and size.
- Quantify the key parameters for discovered fields and a re-examination of previously failed exploration areas.
- Develop the petroleum system models across parts of SCS using Chinese and English literature, theses, dissertations, research of multi-national institutes, and our original studies.
- Assess potential and predict future hydrocarbon resources based on an integrated study including a comprehensive play fairway analysis.

KEY DELIVERABLES

1. Regional depositional, structural, and thickness maps to address the reservoir and source rock distribution by amalgamating the diverse data available in different basins, depressions, and regions.
2. GIS map database that will include geographic information, topography, shaded relief, satellite image, basin outline, protected areas, surface geologic map, well locations, oil and gas fields, petroleum infrastructure, key information from data sources, data and sample locations.
3. Atlas of oil and gas fields
4. Interpretations derived from the Atlas generation.
5. Preliminary assessment of risk for each petroleum system.

SIGNIFICANCE & RATIONALE

Compared to the U.S. Gulf of Mexico, West Africa margins, and the South Atlantic margin, the South China Sea (SCS) is an exploration frontier region. Based on Energy Information Administration (EIA) and U.S. Geological Survey (USGS) estimates, the SCS contains proven or probable reserves of approximately 11 billion barrels of oil (bbl) and 190 trillion cubic feet (Tcf) of gas and may have an additional, undiscovered 12 bbl of oil and 160 Tcf of gas resources. Recent discoveries in Yinggehai Basin and Pearl River Mouth Basin located in the northern continental margin, Cuu Long in western SCS, and Reed Bank in southeastern SCS have spurred exploration efforts in the region. The current exploration status differs from basin to basin due to the variety of geologic settings, and a lack of regional studies to characterize the differences in those basins. The study objectives are to understand the regional tectonic and depositional evolution and petroleum systems in SCS. Figure 1 outlines the study basins.



Figure 1: Basins included in the South China Sea study area.

PROJECT SCOPE

- Evaluate regional geology of the SCS hydrocarbon bearing and potential basins (yet to find). Compile regional depositional, structural, and thickness maps to address the reservoir and source rock distribution by synthesizing the diverse studies in different basins, depressions, and regions.
- Analyze the discovered fields and re-examine failed exploration areas.
- Catalog the parameters of producing reservoirs including porosity, permeability, net/gross, reservoir type, depositional facies, hydrocarbon type, trap type, and size.
- Develop the petroleum system models across parts of SCS using Chinese and English literature, theses, dissertations, research of multi-national institutes, and our original studies.
- Predict future hydrocarbon potentials based on this integrated study and play fairway analysis.

DELIVERABLES – ARCGIS & DIGITAL REPORT

1. Stratigraphic charts, structural and depositional evolution maps;
2. Atlas of oil/gas fields;
3. Petroleum system elements and play fairway maps (e.g., source rock, reservoir, caprock).

PROJECT TIMELINE, REPORT & INVESTMENT

Duration: 2 years

Investment per sponsor: \$98,694 (USD)

Interim meetings with data uploads and final report delivered after the final meeting.

EGI TECHNICAL CONTACTS

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Research Interests

- Petroleum geology for conventional and unconventional resources
- Geothermal geology
- Sequence stratigraphy
- Basin analysis
- Lacustrine to deepwater sedimentary geology
- Petroleum systems
- Reservoir characterization
- Lacustrine to deepwater depositional systems
- Seismic interpretation integration of geology, geophysics, geochemistry, and engineering

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Shu Jiang, PhD

RESEARCH ASSOCIATE PROFESSOR

COORDINATOR FOR CHINA PROGRAM DEVELOPMENT

Senior Research Scientist and Research Associate Professor Shu Jiang joined EGI in 2010. He earned his Ph.D. in Petroleum Geology from China University of Geosciences at Wuhan and completed postdoctoral research at the University of Colorado at Boulder. He worked at CNOOC in Beijing for two years where he was involved in a significant gas discovery in Bohai Bay, China.

Shu has over 20 years experience in petroleum geology, sedimentary geology, basin analysis, sequence stratigraphy, petroleum systems, lacustrine to deepwater depositional systems, and unconventional reservoirs research spanning geology, geochemistry, geophysics and petroleum engineering. He is a Certified Petroleum Geologist (CPG), active member of AAPG, SEG, IAS, and GSA and has more than 90 publications to his credit. He also serves as an Advisory Member of the AAPG Shale Gas & Liquids Committee and has convened and chaired many international meetings.

Sequence Stratigraphy, Basin Analysis & Petroleum Systems for Conventional and Unconventional Reservoir Prediction

Shu conducts innovative and applied research in sequence stratigraphy and basin analysis in various tectonic settings by integrating core, well logs, seismic data, outcrop, etc. He proposes practical depositional models and suggest potential drilling targets for both conventional and unconventional reservoirs by integrating petroleum system analysis.

Lacustrine to Deepwater Depositional Systems

Shu’s studies include the ancient and modern lacustrine to deepwater siliciclastic sediments transportation from source to sink and characterization of spatial and temporal evolution of depositional element architecture to predict deepwater reservoirs. Projects integrate structural, sedimentological and geomorphic studies and bridge both fundamental and petroleum geosciences.

Reservoir Description & Characterization

His work achieves successful reservoir model characterization by accurate property and architecture of all the siliciclastic depositional elements and uses state-of-the-art interpretation tools on a wide range of outcrop and subsurface data-sets to predict stratigraphic occurrence, 3-D geometry, and geophysical attributes of sandstone, CMB and shale reservoirs from lacustrine to deepwater setting.

Global Experience

Shu has worldwide industry and academic experiences from continental to deepwater setting basins (from East China lacustrine rifted basins, Northern China Cratonic basin, West China foreland basins, to South China Sea passive margin basin, basins in SE Asia, the Rocky Mountains, onshore Africa, and South America ,through deepwater GOM, Angola, Australia basins).