

## THESIS INFORMATION

PhD. Student: **NGUYEN TUAN**  
Thesis title: **SANDSTONE PROVENANCE IN LOWER MIOCENE  
SEDIMENTS OF NORTHWESTERN AND CENTRAL  
REGIONS IN CUU LONG BASIN**  
Major: **PETROLEUM ENGINEERING**  
Major code: **9520604**  
Scientific supervisors: **ASSOC. PROF. DR. TRAN VAN XUAN  
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### THESIS ABSTRACT

This thesis presents the results of "**Sandstone provenance in Lower Miocene sediments of Northwestern and Central regions in Cuu Long basin**".

The thesis was conducted based on the results of field research analysis, seismic data (2D & 3D), geological documents, U-Pb zircon isotopic age, and relevant oil and gas exploration documents (well logging data, paleo-geochemical, petrology, isotopic analysis, etc.). Additionally, the author also utilized the results from related publications in the research area, scientific reports, and production data from Vietnam Geological Mapping Division, as well as Oil and Gas Corporations.

Building upon a comprehensive review of the domestic and international research, and combining suitable approaches, the author proposes a comprehensive research methodology. This includes the synthesis of literature, sedimentary petrology, U-Pb zircon isotopic age analysis using LA-ICP-MS, seismic analysis, well logging interpretation with the support of geochemical and statistical methods, studying the process of forming sedimentary systems in the Miocene epoch of the Northwestern and Central regions of the Cuu Long Basin. The aim is to evaluate and direct further in-depth studies to ultimately determine the connection between continental sedimentary source material and sedimentary systems in continental margin basins.

The thesis makes clearly the existence, mechanism, and origin of the sandstone layers in the Lower Miocene of the Northwestern and Central regions of the Cuu Long Basin, contributing to predicting the distribution characteristics of high-quality reservoir areas within the research scope. The thesis focuses on addressing the following tasks: studying

the tectonic characteristics and evolution processes of the mainland and continental shelf of Vietnam; analyzing the morphological characteristics, conditions, and origin of sandstone layers in the Lower Miocene; studying the process of forming sandstone systems in the Lower Miocene in the research area; and, through analysis, determining the source of the Lower Miocene sandstone to illuminate the potential structures and reservoir qualities in the peripheral areas of Central and Northwestern Cuu Long Basin. The thesis has achieved its research objectives, obtaining several key results, including:

- Contributing to understanding the evolution of magma-sediment in the research area and its vicinity. The dominant component of magma in the study area is brittle granite prone to fragmentation. Seafloor spreading and climate changes during the Miocene causing sea levels to rise facilitated the deposition and accumulation of material, providing a clear indication of magma evolution and the formation of Early Miocene sediment in the research area.
- Introducing the first study to use sandstone core samples in the Miocene epoch in the continental shelf of Vietnam for U-Pb zircon isotopic age analysis. The results show that the sandstone system in the Lower Miocene of the Northwestern and Central regions of the Cuu Long Basin was formed during the Cretaceous period, with ages ranging from 83 to 126 million years, concentrated primarily around 106-110 million years.
- Contributing to elucidating the origin and conditions for the formation of fragmented Miocene sediment in the Northwestern and Central regions of the Cuu Long Basin, with source material from the weathering, erosion, transportation, and accumulation processes of predominantly sediment-magma systems from the Southeastern continental margin of the Indo-China active continental margin.
- Clarifying the development trends and distribution characteristics of hydrocarbon reservoirs in the Lower Miocene fragmented sediment in the Northwestern and Central regions of the Cuu Long Basin, providing insights for directing exploration and expansion towards prospective structures in the peripheral areas of the Central and Northwestern Cuu Long Basin, as well as neighboring basins with greater efficiency.

**Scientific supervisors**

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