INVESTIGATING THE CHARACTERISTICS OF THE STRUCTURE AND STRATIGRAPHY OF TU CHINH-VUNG MAY BASIN IN CENOZOI, EAST VIETNAM SEA BY MULTI-SEISMIC AND GRAVITY DATA

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Introduction

Tu Chinh - Vung May basin is located at the southwest of the East Vietnam sea (South China Sea) where the sea water depth ranges from some hundreds meter to 2000 meters (Fig.1). It is bounded by the Nam Con Son basin in the west, the Spratly archipelago in the east and Natuna basin in the south. The Tu Chinh - Vung May is located on the stretched continental crust through during late Eocene–Oligocene stage. During the structural-stratigraphic history of the Tu Chinh – Vung May basin is related to the tectonic seafloor spreading of the East Sea. The South Sea oceanic basin is 'V'-shaped (Fig.1). The basin shows an irregular triangular shape with a Southwest pointing apex, which manifests a preceding propagating rift (Huchon et al. 2001) [2]. The beginning of seafloor spreading in the South China Sea (SCS) is now established from IODP drilling Leg 349 at 33Ma. Chron 12 (32Ma) is the oldest chron identified in the SCS [3]. Rifting continued and subsequent breakup of the southwest subbasin took place in the Late Oligocene at about 25 Ma [1]. Vietnam Oil and Gas Group has basic researches this basin, however, they are not interested in the level of sediment deformation periods and detailed analysis of fault systems in Cenoizoi. Based on interpretation of multi-seismic profile and gravity data, this paper have clarified the characteristics of geological structure and stratigraphy of the Tu chinh – Vung May basin.

Data and Methods

The paper selected various seismic reflection profiles that cut through the main structural zones in the region with different profiles network from 8kmx8km to 32kmx32km to illustrate in more detail the combination gravity anomaly data and a well on structure high in the western area. In addition to facilitating the stratification of stratigraphic boundaries, some additional results of wells in the Nam Con Son basin were used. The methods are included vary methodologies such as seismic - stratigraphic and methodological methods to study structure - tectonic and gravity anomalies to serve the process of analysis and interpretation of the seismic sections.

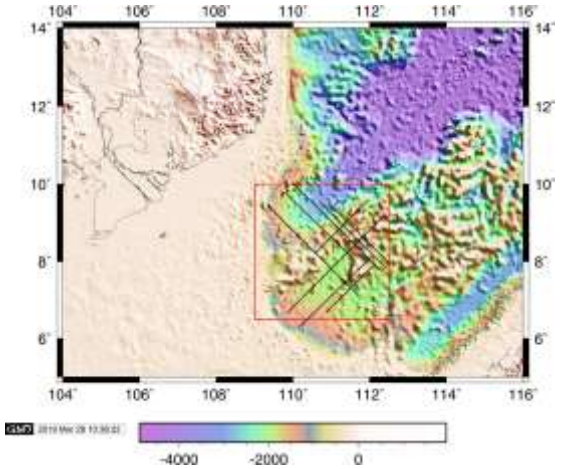

Fig 1. Bathymetric map of Tu Chinh – Vung May deepwater and surrounding region, showing the location of well and seismic profiles mentioned in the text

Results

1. Tu Chinh – Vung May basin was established sediments in grabens, semi-grabens which are controlled by faults listric NE – SW. The grabens, semi-grabens are filled by Oligocene sediments deposited in continental environments.

2. Cennozoi sediments are divided into three layers based on deformation:, Oligocene - Middle Miocene, Upper Miocene, and Pliocene. In which Oligocene - Middle Miocene sediments Cenozoic sediments are most strongly deformed and compressed in parallel. Upper Miocene sediments are caused by young tectonic activity but still keep their structure. Regional Middle Miocene Unconformity (MMU) is strongly erosion and represents a major break in sedimentation of this basin. Pliocene sediments has horizontal characteristics in parallel, some areas of sediment are folded due to young volcanic activity.

3. In the Tu Chinh – Vung May includes four main fault systems with trending NE-SW, NW- SE, N- S and E-W, in which controlling the formation of those basins are normal listric faults (Fig 2).

4. Tu Chinh - Vung May basin divided into 5 main structural units: 1) Tu Chinh - Phuc Nguyen high structure; 2) Distinguished structure of Da Lat - Da Tay, 3) Tay Vung May basin; 4) Southeast Tu Chinh Basin; 5) Vung May high structure.

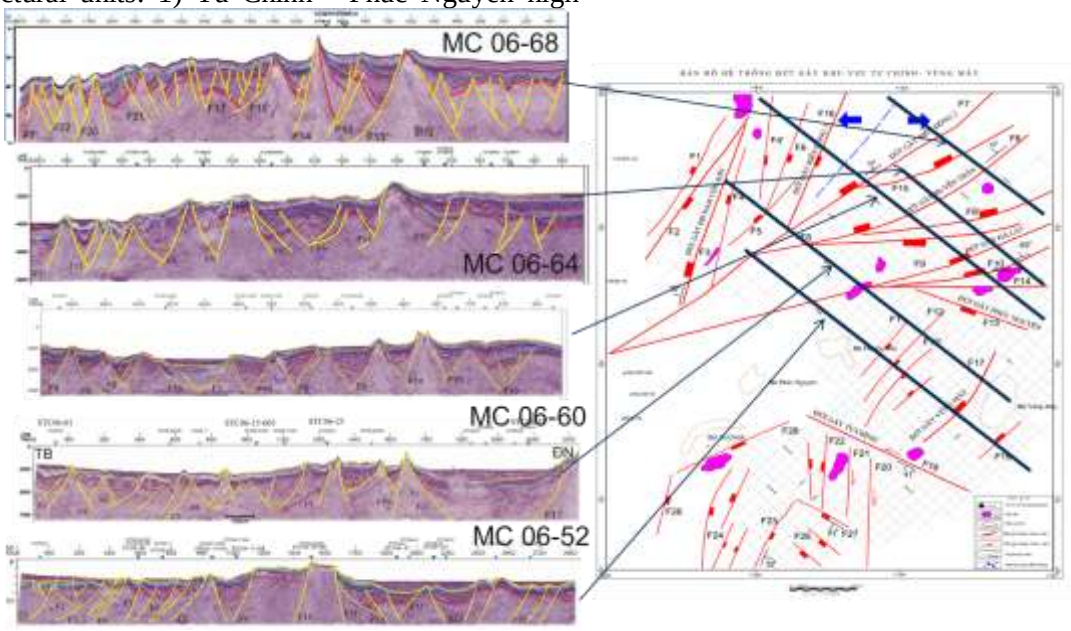

Fig 2. The Northwest-Southeast seismic sections are interpreted across the Tu Chinh – Vung May basin showing the main features of the stratigraphy and structure.

Conclusions

1. We interpreted some multi-channel seismic profiles to study structure and stratigraphy. In Cenozoi sediments have five sedimentary units were identified with different reflectors and lithologies: Pliocene, Upper Miocene, Middle Miocene, Early Miocene and Oligocene.
2. Tu Chinh - Vung May basin formed during the seafloor spreading in the Oligocene. Oligocene - Middle Miocene sediments deformeds strongly and marked the end of spreading by the unconformity middle Miocene.
3. The most litrics faults were ceased late Middle Miocene. Pliocene - Quaternary phase tectonic activity strongly, a series of fault reactivation did for upward magma path, erupted and caused the folding of sediments.

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Abbreviations: NE-SW: *Northeast-Southwest*, NW- SE: *Northwest-Southeast*, N-S: *North-South, E-W:East-West, MMU: Middle Miocene Unconformity*

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