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Coupling Relationship between Basin Evolution and Hydrocarbon Reservoirs in the Northern Central Myanmar Basin: Insights from Basin and Petroleum System Modeling

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Abstract: The Myanmar region experienced the subduction of the Indian Ocean plate to the West Burma block and suffered from the land–land collision between the Indian continent and the West Burma block that occurred from the Late Cretaceous to the Cenozoic. Its tectonic evolution has been complex; thus, oil and gas exploration is difficult, and the overall degree of research has been low. Recent exploration has been hindered by a lack of knowledge on the evolution of the petroleum system. To address this, we conducted hydrocarbon generation and accumulation modeling using both the 2D MOVE and Petro-Mod software 2017 for a complex tectonic section in the Northern Central Myanmar Basin. The results show that the maturity threshold depth of the Cretaceous source rocks in the study area is shallow, and the underground depth of 1200 m to 1400 m has reached the hydrocarbon generation threshold, indicating the start of hydrocarbon generation. Since 48 Ma, the Ro of the source rocks has reached 0.7%, became mature quite early. The Late Cretaceous Paleocene and Eocene formation, located in the southeastern part of the study area, migrated and accumulated hydrocarbons towards the western arc zone in the Eocene and Miocene, respectively. It is worth noting that although the oil and gas potential of each layer in the island arc uplift zone is relatively low, which is conducive to the migration and accumulation of oil and gas generated by the source rocks of the depression towards the island arc zone, shallow areas with developed extensional faults should be avoided. This study is the first to conduct a preliminary assessment and prediction of oil and gas resources, which will provide exploration guidance and reference for the study area and its surrounding areas in the future.

Keywords: basin evolution; Central Myanmar Basin; hydrocarbon generation; hydrocarbon migration and accumulation

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1. Introduction

The Tethys tectonic domain is widely recognized as an oil- and gas-rich area worldwide [1]. However, the Myanmar region of this tectonic domain not only experienced the subduction of the Indian Ocean Plate and the West Burma Block but also suffered from the land–land collision between the Indian continent and the West Burma Block in the mid to Late Cenozoic Era [2–6]. Its tectonic evolution is complex, and oil and gas exploration is challenging, with an overall low level of research. Due to objective factors, access to the region has been restricted in recent years. There are few reports on oil and gas exploration in Myanmar, and most of the reports focus on the southern part of the Central Myanmar Basin (CMB). Aung conducted a systematic study on the oil and gas system in the eastern Salin Sub-Basin of Myanmar and concluded that the Salin Sub-Basin is one of Myanmar's largest petroliferous onshore sub-basins [7]. Khin Zaw affirmed the massive potential of resources in Myanmar and other Southeast Asian regions in the future [8]. In the past decade, significant exploration discoveries have also been made both onshore and offshore in Myanmar, with the gas field in the Magway F.M. block of the Salin Sub-Basin and the atmospheric field in the deep-water area of the Rakhine Basin Shwe Yee Htun 1 block being typical examples [9] indicating that there is still significant room for development in the exploration of oil and gas resources in Myanmar.

Due to the complex geological background and limitations of geological data, resource exploration in the northern part of the basin is currently stagnant. Myanmar has a wide distribution of jungles, mainly swamps and tropical rainforests on land. The increasing energy demand has led to oil and gas exploration shifting from land to shallow/deep water entering the mountainous and jungle areas from plains [10–12]. In the early days, it was difficult for people to enter uninhabited swamps and primitive rainforest areas for exploration. With the development of high-resolution three-dimensional seismic technology and the widespread application of remote sensing technology, these new layers, highly heterogeneous reservoirs, and other extremely hidden oil and gas reservoirs have been continuously identified and discovered [13–15]. Benefiting from the China National Offshore Oil Corporation's (CNOOC) extensive geological surveys in Myanmar in the early days and its ability to process, analyze, and interpret seismic and geological data using computer technology today, we can avoid direct physical contact. This combines relatively mature basin analysis and simulation software to assist us in studying the economic reserves of hydrocarbons.

Therefore, this study closely combines geological background, geological, and geophysical methods; analyzes seismic data through comprehensive geophysical techniques; and uses software such as 2D MOVE to simulate the evolution process of hydrocarbons to obtain a geological model of hydrocarbons in the northern basin to estimate the scale and economic potential of oil and gas reservoirs.

2. Geological Setting

The CMB overlies the West Myanmar Block, divided by the West Myanmar Arc Belt into two antithetical parallelism units, namely the forearc depression zone and the back-arc depression zone, forming a typical arc–basin system. From north to south, the fore-arc areas consist of the Chindwin Sub-Basin (CSB), Salin Sub-Basin (MSB), and Pyay Sub-Basin (PySB), respectively [16–18]. The research area is located in the northern part of the Union of Myanmar, with an area of 26,506 km^2. It is located in the Shwebo Sub-Basin in the northern part of the CMB, connected to the CSB by an island arc belt in the west, separated by the Sagaing strike-slip fault that separates the Shan Plateau and the CMB in the east and separated from the Pegu Sub-Basin by a low rise in the south (Figure 1). Due to its location near the island arc zone formed by oceanic subduction, the stress mechanism is complex, and the structural styles are diverse, with both compression and thrust structures and tension and strike-slip structures developed. In the northern part of the structural belt, the A–B section shows horst structure; anticline structure can be seen on C–D section; and to the south of the structural belt, the E–F section shows a monoclinic structure (Figure 2). This controls the migration and accumulation of oil and gas to a certain extent. Due to strong tectonic activity, the study area was uplifted in the Late Oligocene, and strata appeared with a compression nappe structure. The Oligocene sedimentary strata were denuded, and the Eocene strata were in unconformable contact with the Miocene. Existing research has shown that the basement is a Cretaceous metamorphic rock, and the overlying strata are thick Cenozoic sediments with a thickness of more than 20 km [19]. From bottom to top, it is divided into five sets of strata: Cretaceous–Paleocene, Eocene, Oligocene, Miocene, and Pliocene (Irrawaddy group). Among them, three hydrocarbon source rocks were evaluated in the research area: Cretaceous mudstone, Paleocene mudstone–Carbonaceous mudstone, and Eocene mudstone–Carbonaceous mudstone. In recent years, exploration has mainly focused on onshore regions, showing great potential from the forefront of oil and gas exploration without drilling and regions with lower exploration levels. At the same time, deep-water exploration is currently a hot topic, and large-scale gas fields have been discovered in the Rakhine deep-water area of Myanmar [9,20–22].

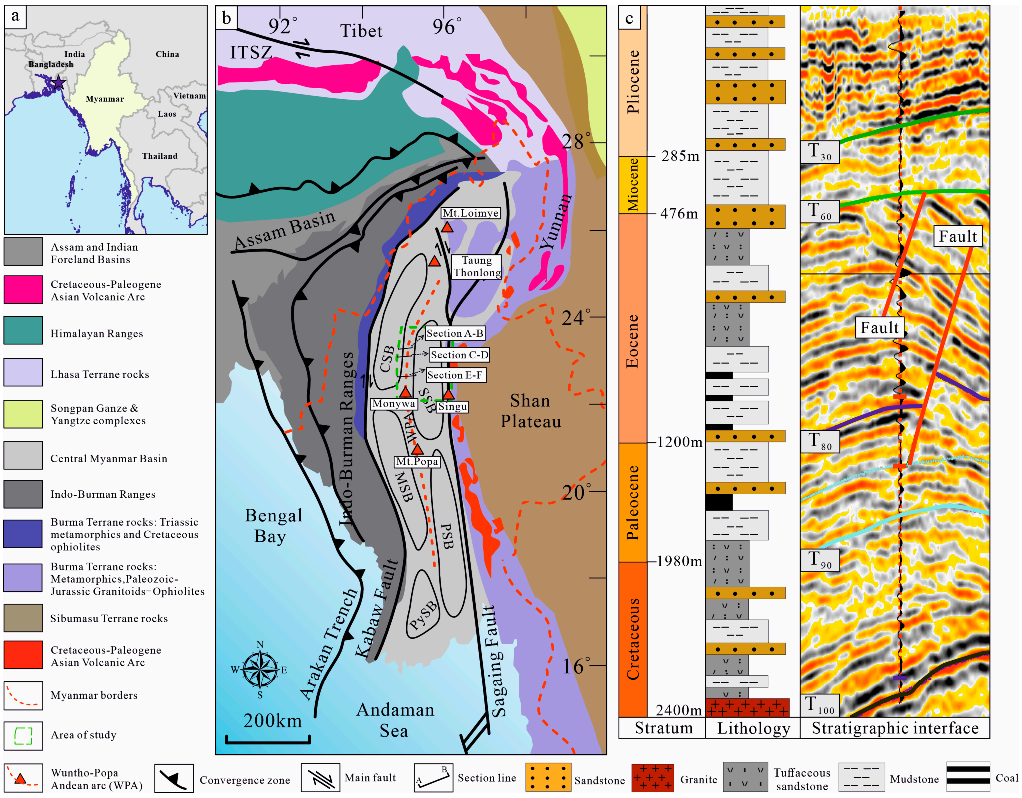

Figure 1. Structural location, stratigraphic development characteristics of the CMB. (**a**) Geographic location of the CMB; (**b**) geological map of the CMB [23]; (**c**) comprehensive stratigraphic column of the study area.

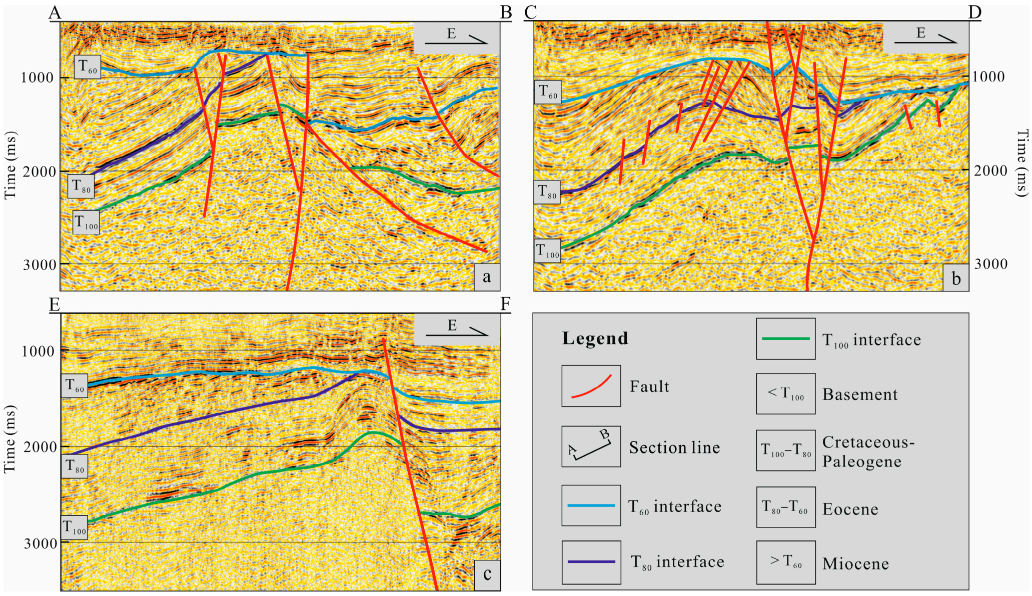

Figure 2. Seismic profile across the Northern Central Myanmar Basin. (**a**) The location of the section line A–B in the CMB is given in Figure 1b; (**b**) the location of the section line C–D in the CMB is given in Figure 1b; (**c**) the location of the section line E–F in the CMB is given in Figure 1b.

3. Date and Analytical Method

3.1. Seismic Data

Drilling data were used to calibrate seismic sequence stratigraphic interfaces to achieve precise seismic sequence stratigraphic interpretation. The seismic data used for structural interpretation come from the latest 2D seismic data from 2010 to 2011. The primary target layer frequency of the Pre-Cretaceous Eocene is 15–25 Hz, and the measurement network density reaches 2×3 km. By using synthetic drilling records for stratigraphic seismic calibration, the study area identified the Upper Neogene bottom interface T_{30}, Middle Neogene bottom interface T_{60}, Eocene bottom interface T_{80}, Paleogene bottom interface T_{90}, and Cretaceous bottom interface T_{100}. The 2D seismic profile shows reflection axes with relatively vital energy and good continuity at each interface, especially the bottom interface of the Miocene (T_{60}), which is a regional unconformity interface that can be continuously tracked and compared.

3.2. Dynamic Historical Evolution Simulation of Hydrocarbon

Based on the stratigraphic structure, thermal evolution parameters, and published geochemical parameters of source rocks, with essential constraints such as stratigraphic thickness, sedimentary age, lithology data, and critical period erosion thickness, one-dimensional simulation with Petro-Mod software was used to achieve single-well temperature, pressure, and maturity simulation [19]. The EASY%-Ro method was used for thermal history simulation [24]. Adjusting parameters to fit the simulated vitrinite reflectance with the measured Ro can establish a typical well-source rock thermal evolution history and hydrocarbon generation history model. Based on qualitative analysis, a close combination of qualitative and quantitative methods should be achieved so that the source rock evaluation system has qualitative, semi-quantitative, and quantitative indicators. By establishing geological and mathematical models to simulate the formation and evolution of basins quantitatively, multi-level model accuracy can achieve evaluation and resource calculation from the level of a single oil reservoir to the entire basin. It has a wide range of applications in comprehensive oil and gas geological research, exploration risk assessment, and resource prospect evaluation [25–28].

3.3. Two-Dimensional MOVE for Growth Strata Modeling

The seismic profiles in the basin interior are imaged well so that we can track the reflectors reliably [29,30]. A balanced cross-section technique was used to restore the deformation and determine the deformation magnitudes using 2D MOVE software 2019. The 2D MOVE^{TM} software (APEX Limited, Houston, TX, USA) was used to forward model basement faults to verify the validity of the model of the basement fault structure. The ultimate structural process involves fault movement, stratigraphic stacking, and stratigraphic deformation. By introducing the previous characteristics of hydrocarbon evolution in the basin and combining them, we obtained a complete hydrocarbon evolution model superimposed by the tectonic geological background.

4. Results

4.1. Calculation of Residual Thickness by Combining Well and Seismic Data

Ancient uplifts, slopes, and unconformity surfaces are the central locations for oil and gas migration and enrichment. Unfortunately, due to the influence of tectonic movements, the geomorphic shaping process and morphology during geological history are often inconsistent with the modern geomorphic shaping process and current geomorphic morphology. The original strata are often complex to preserve fully, especially in tectonic uplift and erosion areas [31,32]. By drilling and logging data and seismic data for stratigraphic calibration, the seismic layers of the Cretaceous Paleocene (T_{80}–T_{100}), Eocene (T_{70}–T_{80}), Oligocene (T_{60}–T_{70}), and Miocene (T_{30}–T_{60}) were traced. Based on the establishment of the Cretaceous Miocene seismic stratigraphic sequence, each sequence's bottom and top depths were subtracted to obtain the residual stratigraphic thickness map of the corresponding sequence (Figure 3).

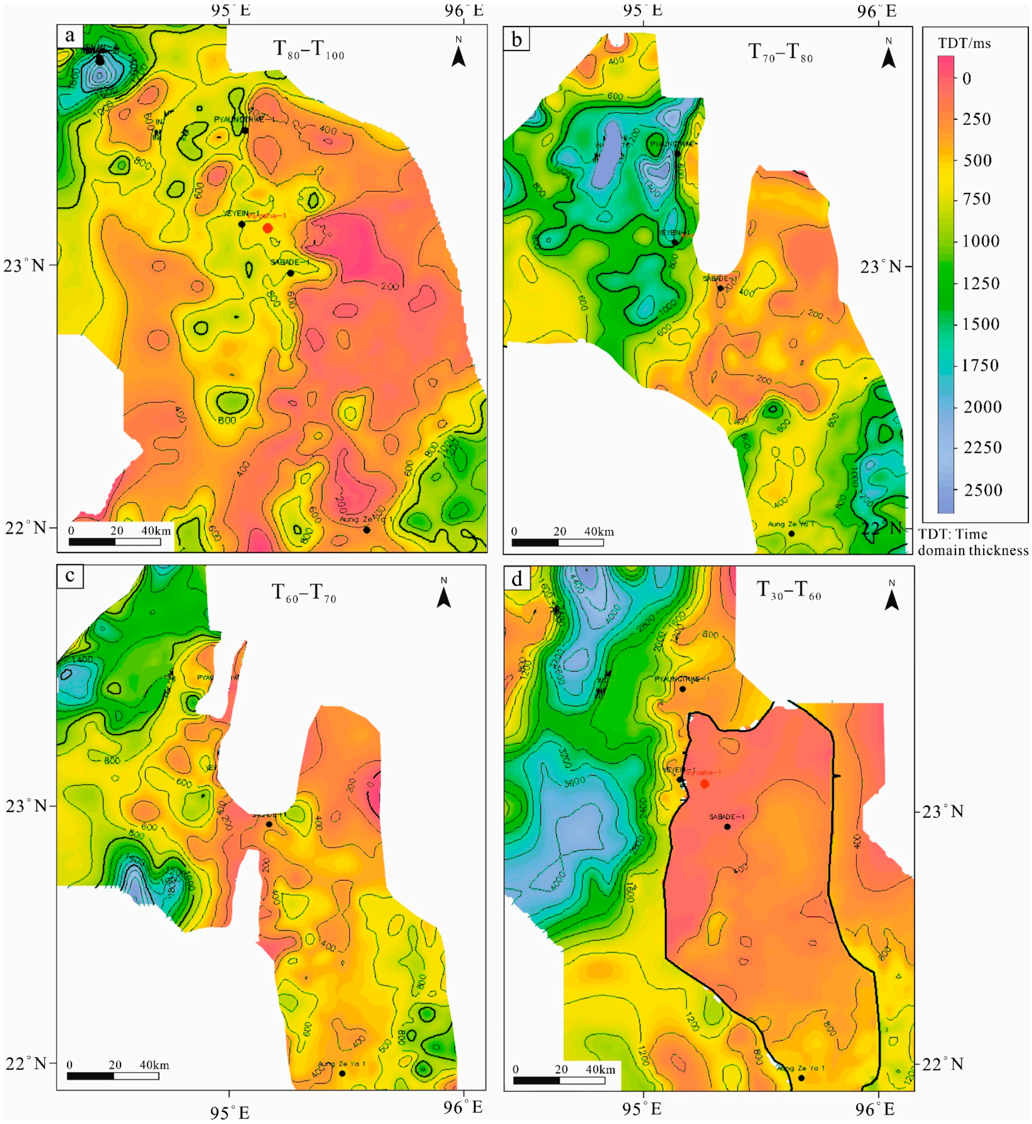

Figure 3. Distribution of formation residual thickness map in the Late Cretaceous to Miocene in the north part of the CMB. (**a**) Cretaceous–Paleocene (T_{80}–T_{100}); (**b**) Eocene (T_{70}–T_{80}); (**c**) Oligocene (T_{60}–T_{70}); (**d**) Miocene (T_{30}–T_{60}).

During the Cretaceous Paleogene period, the distribution range of residual strata was the widest, showing thickness in the northwest–southeast without being significantly different in the middle. During the Eocene period, the northwest–southeast was the main sedimentary center, and the residual thickness increased. However, at this time, influenced by the Indo-Burmese orogenic belt [3,4,6], the strata in the northeast of the study area began to be uplifted and eroded. It was not until the Oligocene period that the tectonic uplift activity was the greatest, and the strata during this period gradually became thinner until they were pinched out and missing. Starting from the Miocene, the thickness of the residual strata reached its maximum, reaching nearly two thousand meters, distributed in the northwest of the study area.

4.2. Thermal Evolution of Source Rocks

4.2.1. Maturity (Ro) Distribution Characteristics

Based on data such as pyrolysis of source rocks and organic matter types, the PetroMod numerical simulation technology was applied to study source rocks' characteristics and history of thermal evolution. Ro represents the maturity of organic matter. Based on the measured reflectance Ro of vitrinite, the corresponding relationship equation was fitted using Ro. The Ro values corresponding to different depths were calculated using logging depth and reflection interface construction. Then, the distribution of the planar Ro contour lines was drawn to analyze the degree of thermal evolution of organic matter in different layers and zones. Analysis of the Ro contour maps for each layer of the Eocene (T_{70}), Paleocene (T_{80}), and Cretaceous (T_{100}) showed that the organic matter maturity is distributed along the NW–SE direction, gradually increasing in the southeast direction. The maximum Ro at the sedimentary center reaches 2.5%, and the distribution range gradually increases. The source rocks below the Eocene formation are all mature to over-mature (Figure 4).

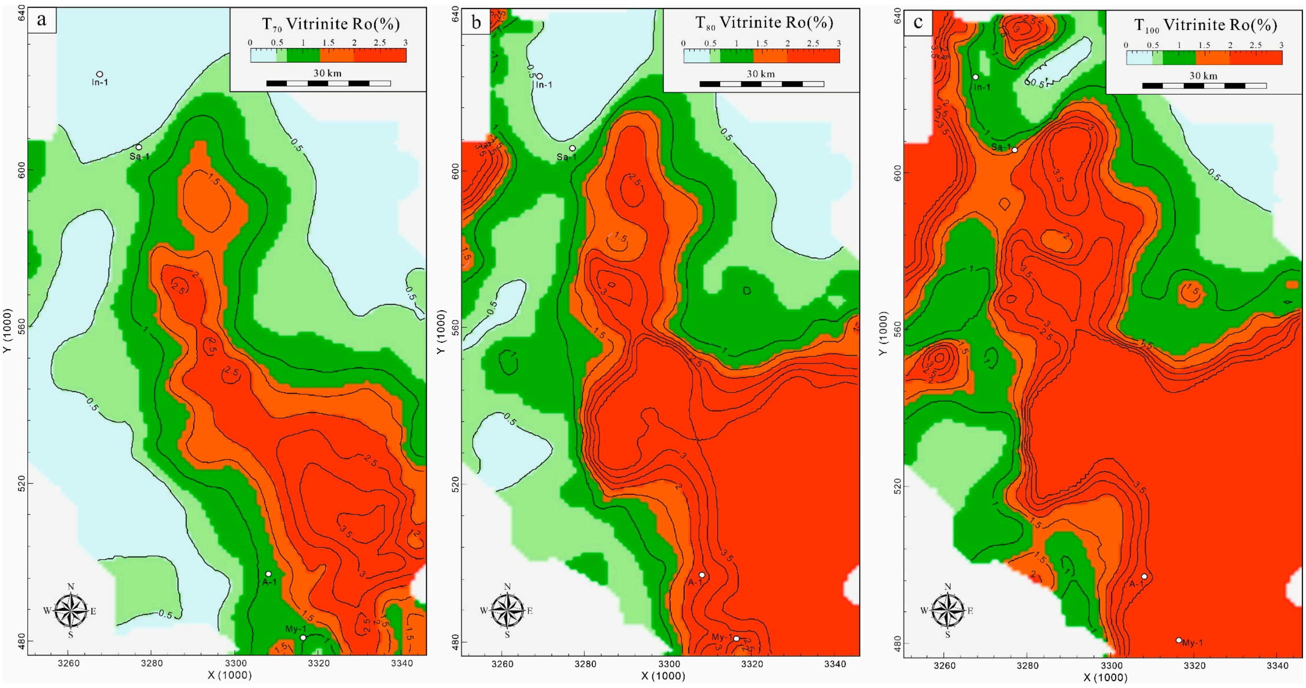

Figure 4. Ro (%) distribution map of various source rocks in the Late Cretaceous to Eocene in the north part of the CMB. (**a**) During the Eocene Epoch; (**b**) during the Paleocene Epoch; (**c**) during the Late Cretaceous Epoch.

4.2.2. Thermal Evolution History of Source Rocks

Based on the geochemical indicators of hydrocarbon source rocks, using Basin-Mod to simulate the burial and thermal evolution history of typical single wells (with a geothermal gradient of 4.0 °C/100 m), the simulated Ro values are in good agreement with the measured Ro values, and the simulation results accurately reflect the actual geological situation. The results indicate that the maturity threshold depth of the Cretaceous source rocks in the study area is shallow, and the underground depth of 1200 m–1400 m has reached the hydrocarbon generation threshold, indicating the start of hydrocarbon generation. At around 48 Ma, Ro reached 0.7% and entered medium-maturity hydrocarbon generation; around 42 Ma, Ro reached 1.0 and entered the high-maturity hydrocarbon generation stage. Since 35 Ma, the source rocks have been in the stage of thermal cracking to generate moisture. The source rocks below the Eocene are currently in a mature to over-mature stage (Figure 5).

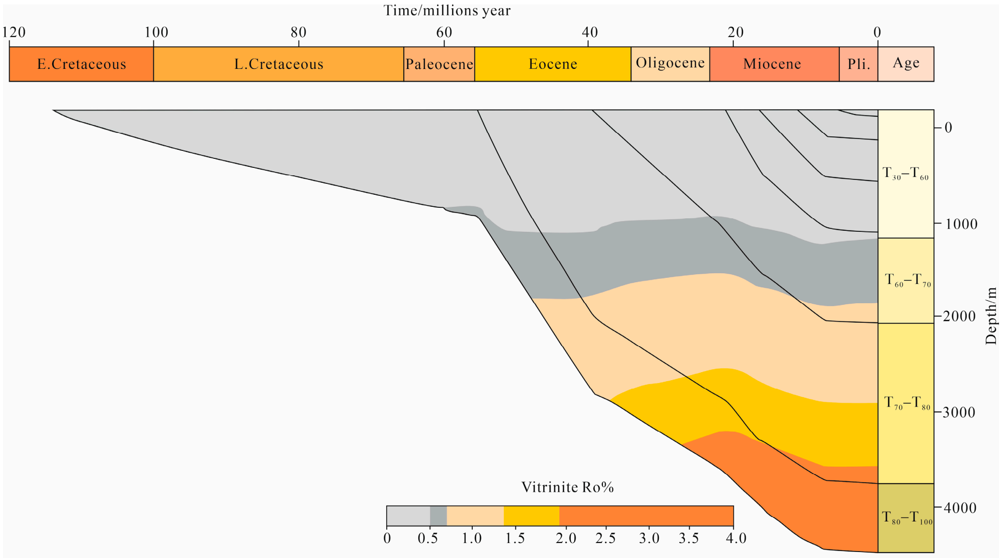

Figure 5. Typical X1 well thermal evolution and burial history diagram in the north part of the CMB.

4.3. Intensity and Migration Trend of Hydrocarbon Generation and Expulsion

The analysis of the hydrocarbon generation and expulsion history of source rocks is of great significance for the formation and distribution of oil and gas reservoirs and is also an essential content for the long-term evaluation of basin oil and gas resources [33,34]. Since the evolution of Ro is not affected by erosion, a relatively simple and practical Ro expulsion rate method was used in this study to quantitatively restore the expulsion history of two sets of source rock formations in the Late Cretaceous Paleocene and Eocene of the study area. The basic principle of the Ro hydrocarbon expulsion rate method is to calculate the hydrocarbon expulsion amount based on the thermal evolution degree Ro of the source rock, and different Ro values correspond to different hydrocarbon (oil or gas) expulsion rates. By combining the thickness of mudstone in the entire area with the data points obtained from the hydrocarbon generation and expulsion pattern map, the cumulative hydrocarbon generation and expulsion intensity of each layer in the study area can be obtained, and then, a plan map of hydrocarbon generation and expulsion intensity can be drawn. From the hydrocarbon expulsion intensity map of the Upper Cretaceous to Eocene source rocks, it can be seen that the Upper Cretaceous has a high oil expulsion intensity, up to 1.3 mmbbl/km^2. The Paleocene and Eocene are mainly characterized by gas expulsion, while the Paleocene has a higher hydrocarbon expulsion intensity than the Eocene, with the Paleocene reaching 360 bcf/km^2 and the Eocene reaching 90 bcf/km^2. The southeastern part of the research area, as the main hydrocarbon generation center, has the highest hydrocarbon expulsion intensity and the highest maturity stage of the source rock, which is consistent with the previous simulation results of the thermal evolution history of the source rock (Figure 6).

Through the analysis of the hydrocarbon expulsion history chart and cumulative hydrocarbon expulsion curve, it was shown that the peak period of hydrocarbon expulsion from the Late Cretaceous–Paleogene source rocks was in the Eocene, with a gas displacement of 740 tcf. Since the Oligocene, hydrocarbon expulsion has accounted for 30% of the total hydrocarbon expulsion, and since the Miocene, it has accounted for 20%. Compared to Late Cretaceous Paleocene source rocks, Eocene source rocks have shallower burial depths, lower hydrocarbon generation potential and maturity, and a correspondingly later expulsion time. The peak period of hydrocarbon expulsion from the Eocene source rocks is from the Oligocene to the Miocene, with mainly exhaust gas, with a displacement of 148 tcf. Since the Miocene, the hydrocarbon expulsion has accounted for about 50% of the total, and since the Pliocene, it has accounted for about 4% (Figure 7). When the source rock does not enter the hydrocarbon expulsion threshold, only a small amount of hydrocarbon is expelled by diffusion phase and water-soluble phase. When the source rock enters the hydrocarbon expulsion threshold, it can expel a large amount of hydrocarbon in free phase, resulting in two peaks shown in the history chart of hydrocarbon expulsion.

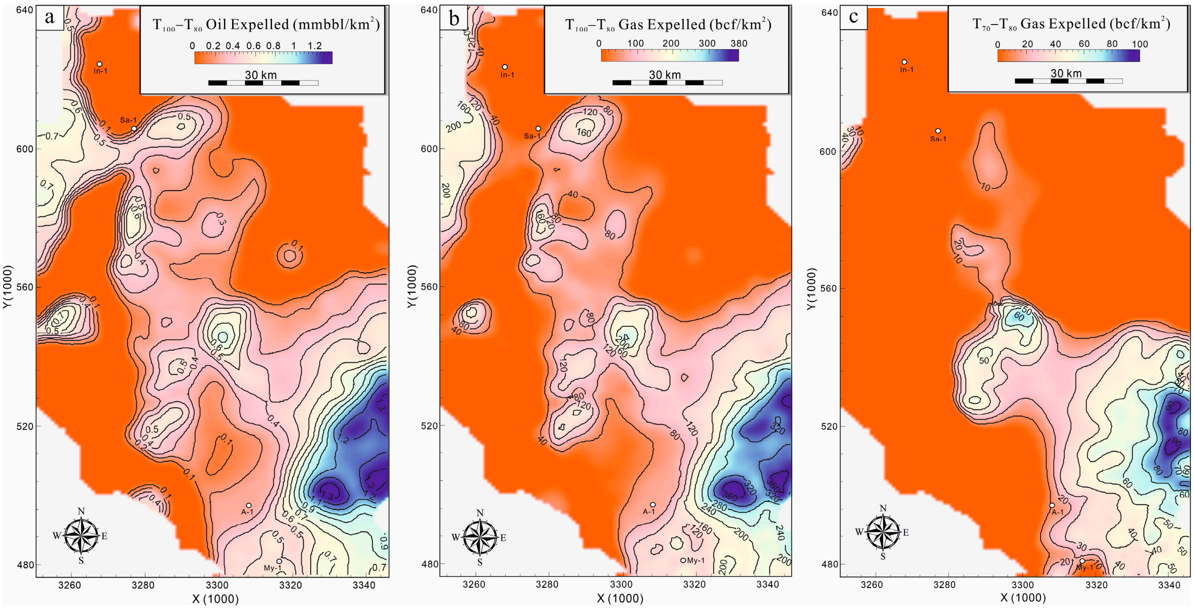

Figure 6. Different degrees of hydrocarbon expulsion intensity of source rocks during the Late Cretaceous to Eocene in the north part of the CMB. (**a**,**b**) During the Late Cretaceous to Paleocene Epoch; (**c**) during the Eocene Epoch.

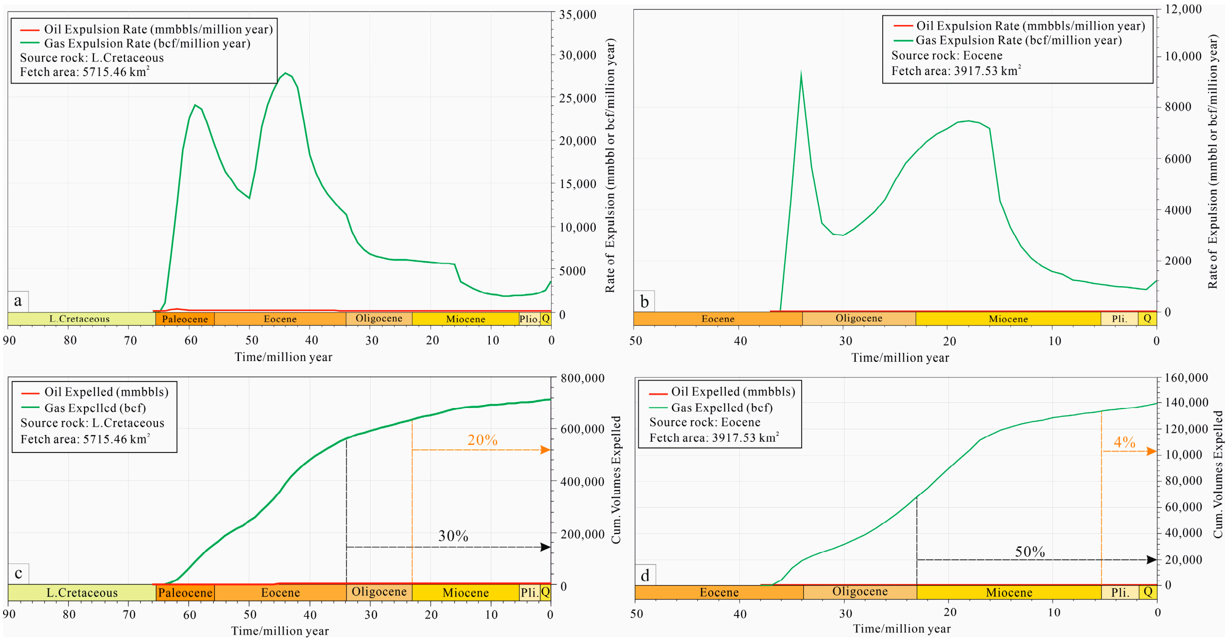

Figure 7. Late Cretaceous–Paleocene and Eocene source rock expulsion history and cumulative expulsion curve in the north part of the CMB. (**a**) The source rock expulsion history during the Late Cretaceous to Paleocene Epoch; (**b**) the source rock expulsion history during the Eocene Epoch; (**c**) the source rock cumulative expulsion curve during the Late Cretaceous to Paleocene Epoch; (**d**) the source rock cumulative expulsion curve during the Eocene Epoch.

The simulation of oil and gas migration trends shows multiple dominant migration directions for oil and gas from the hydrocarbon expulsion center in the southeast to the edge. There are signs of oil and gas migration in the Late Eocene, Late Oligocene, Late

Miocene, and present. In the Late Eocene to Late Miocene, oil and gas mainly migrated and accumulated in the western island arc zone, and there was also accumulation in the northeast slope zone of the study area. Local accumulation areas can be seen in the southeast, and currently, they mainly accumulate in the western island arc zone (Figure 8). The deep depression in the southeast is the main source of hydrocarbon supply.

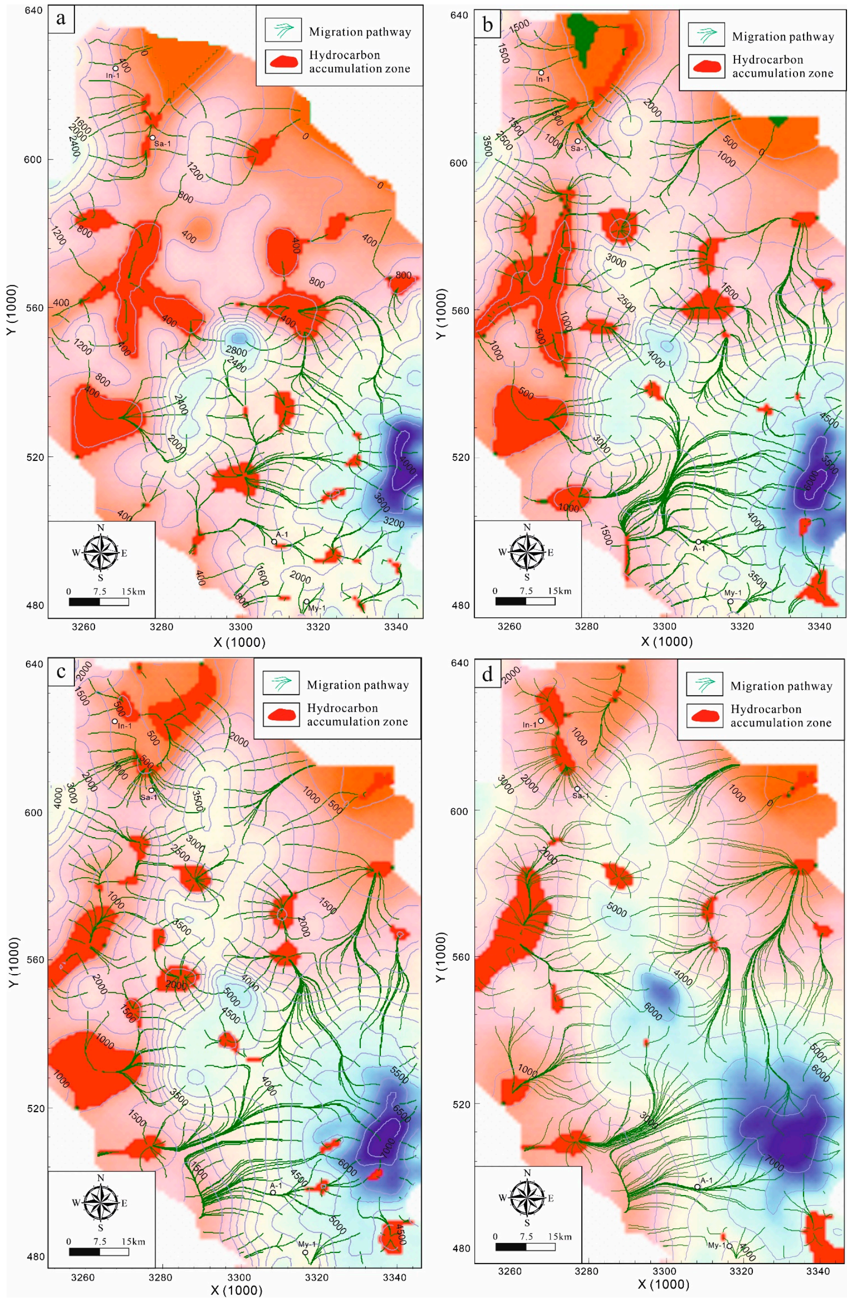

Figure 8. Trends of hydrocarbon migration in different periods in the north part of the CMB. (**a**) During the Late Eocene Epoch; (**b**) during the Late Oligocene Epoch; (**c**) during the Late Miocene Epoch; (**d**) at present.

5. Discussion

5.1. Abnormal Thermal Evolution of Source Rocks?

Under complex and unique geological backgrounds, the measured source rock Ro and simulated values indicate that the source rock has reached the hydrocarbon generation threshold at 1200 m–1400 m. However, the low geothermal gradients in the basin, ranging from 18 to 30 deg C/km, indicate the top and bottom oil window depths at 4.5 km and 6.6 km in the Central Myanmar Basin, respectively. What causes the high-maturity evolution of source rocks in the study area? The research area is located in the volcanic island arc tectonic zone in the northern part of the basin, and the development of volcanic rocks is one of the main characteristics of the lithology in this area. It is generally believed that the maturity evolution of source rocks is controlled by depth and pressure. Combined with the unique tectonic geological background of the study area, frequent volcanic activity and volcanic materials promote the maturity of source rocks. Abnormal geothermal energy plays a favorable role in the thermal evolution of organic matter in source rocks. The burial depth of the hydrocarbon source rocks in this area is only about 1200 m to 1400 m. Due to the roasting effect of the intrusive rock mass on the source rocks, the overall oil generation threshold has been reached, and the deep source rocks in the depression are in a stage of high maturity to over-maturity.

Previous studies have shown that since the Middle Cretaceous, the Western Myanmar Arc, or Popa-Loimye Magmatic Arc, located in the western part of the SSB has been formed. The northward subduction of the Neo-Tethys oceanic crust induced the West Burma Arc to develop two primary magmatisms during the Middle Cretaceous (108–90 Ma) and Early-Middle Eocene (42–36 Ma), respectively, which had an essential impact on the development of Late Cretaceous, Paleocene, and Eocene formation in the SSB and its surrounding area [3,35–37]. The seismic data identify multiple volcanic units in the island arc zone, with chaotic seismic reflections in the volcanic channel phase, clear seismic reflection characteristics in the explosive and overflow phases, clear layered reflection wave groups, and multiple periods of eruption superimposed seismic reflection characteristics (Figure 9a). The tuned energy inversion profile shows that the volcanic sedimentary facies are far from the volcano crater, volcanic ash is deposited, the layering is intense, and the tuning energy is gradually increasing. The volcanic channel phase exhibits the characteristics of disordered in-phase axes, multi-phase stacking, and divergent tuning energy values (Figure 9b). Vertically, the strata generally deposit tuffaceous mudstone containing volcanic debris (Figure 1c) [19]. Therefore, even in the context of low geothermal gradients, the thermal effects of igneous rocks and the catalytic effects of hydrothermal fluid materials carried by volcanic activity jointly affect the maturity evolution of source rocks.

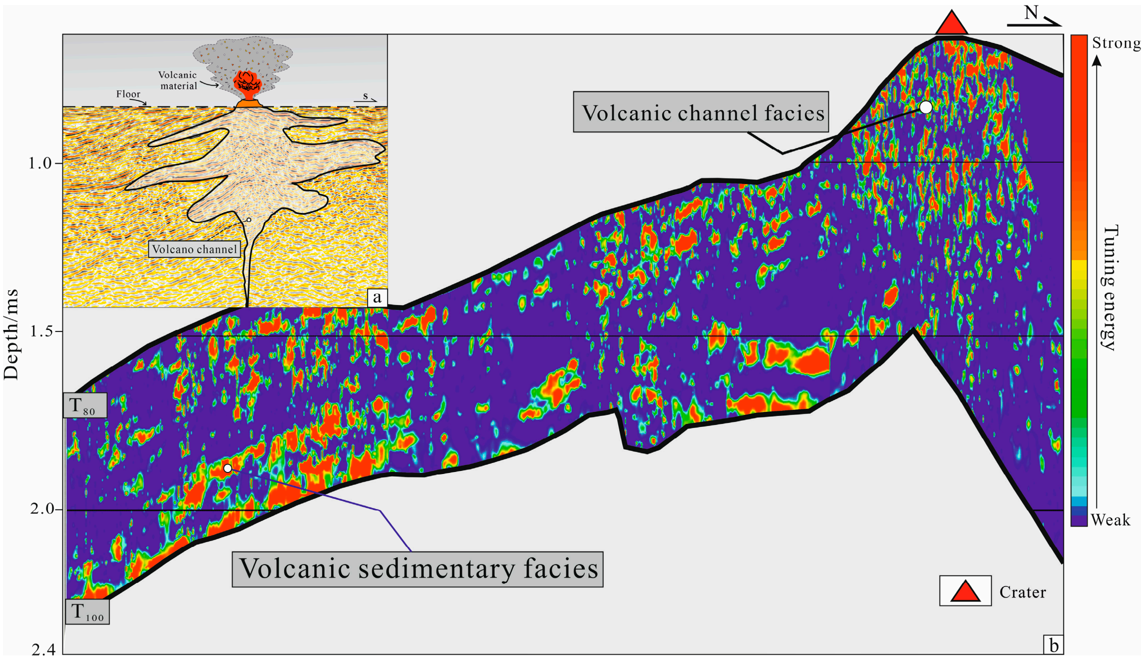

Figure 9. Seismic data identification of multiple volcanic edifices in the north part of the CMB. (**a**) Seismic reflection characteristics of volcanic institutions; (**b**) tuned energy-inversion profile of Eocene formation near volcanic edifice.

5.2. Inversion of Stratigraphic Structure Evolution and Reservoir Model

The balanced profile can reflect the evolution process of basin sedimentation and erosion [29,30,38]. The tectonic evolution history of the research area is equivalent to the basin-filling evolution history, mainly formed by two periods of tectonic evolution. Before the sedimentation of the Cretaceous–Paleocene, the oceanic and continental crust collided in soft contact, and the CSB and SSB Sub-Basins were connected coastal basins. Before the deposition of the Eocene, the oceanic crust subducted beneath the continental crust, causing volcanic activity and the central island arc belt to take shape. Before the deposition of the Oligocene, large-scale volcanic activity occurred, and the western accretion wedge began to develop. The island arc zone continued to build and grow. Before the sedimentation of the Miocene, in the Late Oligocene, the volcanic island arc belt was shaped, uplifted, and eroded, and volcanic activity was intense. The eastern part of the Yingchun structure was uplifted, and the strata were compressed and pushed and began to undergo weathering and erosion. Before the deposition of the Upper Neogene, the CSB, SSB, and island arc zones were affected by regional structures and experienced overall subsidence. Before the Pleistocene deposition, the influence of neo-tectonic movements resulted in a large uplifted and depressed tectonic pattern in the CSB. The SSB developed a dextral strike-slip fault zone (Figure 10).

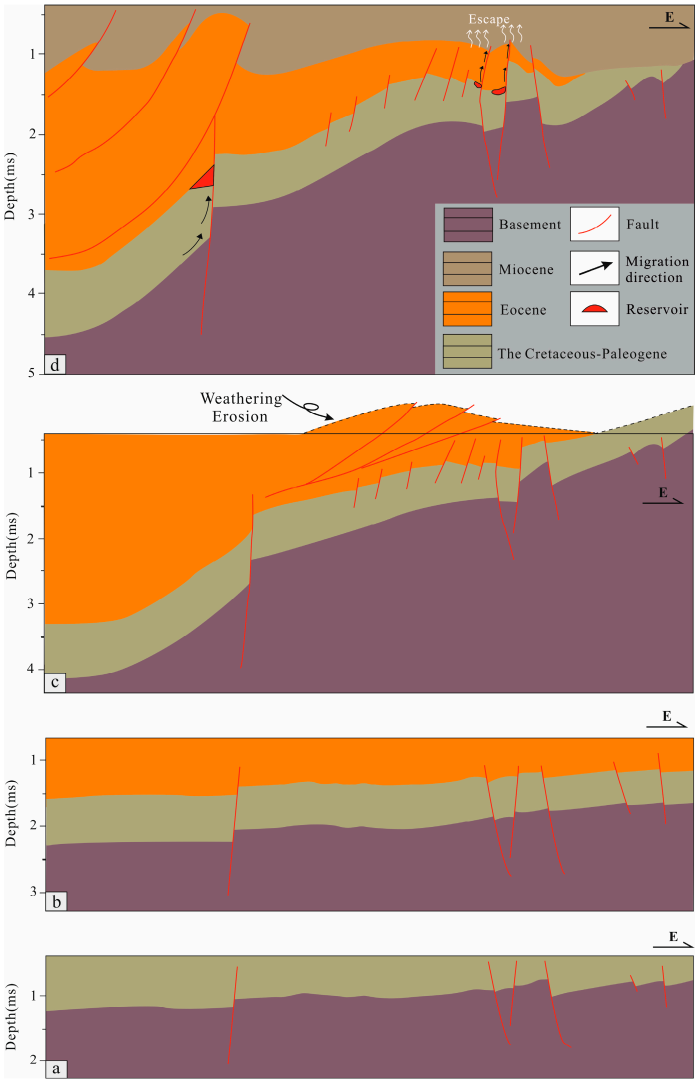

Figure 10. Restoration of balanced profile and reservoir migration model in the north part of the CMB. (**a**) During the Paleocene Epoch; (**b**) during the Eocene Epoch; (**c**) during the Oligocene Epoch; (**d**) at present.

The research area is a faulted anticline structure, with two high points in the north and south on the east side of the plane controlled by the second-level faults in the northwest to southeast direction. The east–west section shows the characteristic of a "west gentle east fault". The first and second-level faults are distributed in a nearly north–south direction and parallel in the plane. The profile mainly shows a steep single-fault structural style. The third-level faults are distributed along the NWW direction in this area, making the structure more complex. On the plane, the third-level faults intersect with the second-level faults at an acute angle, forming a broom shape, which controls oil and gas transportation and accumulation. Based on the thermal evolution of source rocks and the trend of planar hydrocarbon migration, there are multiple dominant migration directions for oil and gas from the center of the depression to the edge. Oil and gas can migrate along the migration channels of the bottom of the Cretaceous (T_{100}) and the Miocene (T_{60}) to the high-structural parts of the study area.

5.3. Migration and Accumulation Process

As mentioned above, since 64 Ma, the Late Cretaceous–Paleocene source rocks begin to generate and expel hydrocarbons. The Late Cretaceous source rock mainly hydrocarbon expulsion period is between 48–42 Ma, when it reached the peak. The faults formed in this period intersect at an acute angle, and oil and gas migrate vertically along the fault, which is conducive to oil and gas accumulation. The Paleocene source rock mainly hydrocarbon expulsion period is relatively late, accounting for nearly half of the total hydrocarbon expulsion during the period of 22–15 Ma. Although structural traps were formed, active volcanic activity at the end of Oligocene period caused the uplift and erosion of Oligocene formation and the development of tensile faults, perhaps due to which the hydrocarbon expulsion in this period cannot be accumulated and preserved, and it is easy to escape at the top of the anticline. Combined with the matching relationship of hydrocarbon accumulation factors, oil and gas from the Late Cretaceous source rocks may be accumulated in the western island arc belt and the northeast slope belt. Although the oil and gas data are well logged, as a preliminary resource assessment, more drilling data are needed to supplement in the future to obtain more accurate results.

6. Conclusions

As an oil- and gas-rich area in Tethys, Myanmar has a low exploration degree and great oil and gas exploration potential. The evolution history of the source rocks confirms the hydrocarbon generation and expulsion ability of the two sets of source rocks in the Late Cretaceous–Paleocene and Eocene. Although the source rocks were buried shallowly and were thermally catalyzed by volcanic activity, they reached the peak of hydrocarbon generation and expulsion during the 48–42 Ma and 22–15 Ma periods, respectively.

Under the complex geological structure background, fault channels and unconformities that can supply oil and gas are formed. Monoclinic and anticline formed by tectonic compression force are favorable places for oil and gas accumulation. The simulation of oil and gas migration shows that the western island arc zone and the northeast slope zone are the dominant areas for oil and gas migration and accumulation. At the same time, shallow areas with developed extensional faults should be avoided in exploration. Although the exploration results in recent years show that Myanmar has good oil and gas resource potential, based on the low exploration degree and complex geological background in the study area, logging data, actual sample data, and reasonable matching relationships of oil and gas reservoir-forming factors should be comprehensively considered in the evaluation of oil and gas reservoir potential in the future.

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