Introduction

The geological history of Myanmar is summarized in a sequential order in 39 stages. The approach is mainly descriptive and only partly interpretative. The plate tectonic reconstruction are kept to a bare minimum partly because these are more or less conjectural (particularly for the Precambrian and Paleozoic eras) and partly because the descriptive geological events are considered to be more interesting than the paleo-plate movements and past whereabouts of the Myanmar region. Four stages in the paleogeographic evolution are shown in a diagram. A graphic summary of the main geological events and a simplified geological map of Myanmar are also appended.

Sequence of Major Events

During the Precambrian and Paleozoic eras, Proto-Myanmar region was a part of Sinoburmalaya that probably was a fragment of northern Gondwanaland in Southern Hemisphere. This linear block was roughly aligned NW-SE.

Late Precambrian

1. Existence of a crystalline basement in northeastern Proto-Myanmar (Eastern Kachin Metamorphics) that extended northwards into Proto-Yunan, and probably southeastwards into the Mogok Gneiss.
2. Later, deposition of very thick Chaung Magyi sediments under deep sea conditions in Proto-Shan region.
3. Orogeny at the end of Precambian causing fairly intense deformation, low-grade regional metamorphism, and uplift; thus, a part of northeastern Proto-Myanmar first became land.

Early Paleozoic

The Paleo-Tethys oceanic plate probably moved from NE to SW and subducted below Sinoburmalaya. Shallow marine sediments were deposited in an apparently passive continental margin of Sinoburmalaya.

1. Deposition of Ngwetaung and Pangyun sandstones and Molohein sandstones in the northern and southern parts of Proto-Shan region, respectively, on a stable sheft during Late Cambrian: eruption of the Bawdwin volcanics with associated volcanogenic massive sulphide (VMS) lead-zinc-silver deposit in the same period.
2. Deposition of thick Ordovician limestones and siltstones under littoral and shelf conditions in Proto-Shan region, together with stratabound carbonate-hosted lead-zinc deposits (e.g., at Bawzaing) and barite deposit (e.g., at Ani-sakan and Kyauktup)
3. Continuous depositional of Silurian phacoidal limestones and clastics, locally with some tuff and ash beds in southern Proto-Shan region; deposition of Mergui sediments probably began during Silurian in Proto-Tanintharyi region

Devonian

1. Continuous sedimentation from Silurian to Devonian in some parts of Proto-Shan region as black limestone, black shale and reefal limestone were deposited at thin units of limited distribution under lagoonal and restricted marine conditions.
2. Deposition of a limestone unit (later dolomitized into Maymyo Dolomite) began in Proto-Shan region, especially in the northern part. That deposition continued into Carboniferous.
3. Deposition of Mergui sediments continued in Proto-Tanintharyi region.

Early Carboniferous

Separation of Sinoburmalaya from Gondwanaland, and its initial movement northeastwards in the Paleo-Tethys in Carboniferous times.

1. Continued deposition of Mergui sediments, locally with tuff and agglomerate beds, under deep-sea conditions in Proto-Tanintharyi-Mon region. (The depositional site extended northwestwards into the western marginal part of southern Proto-Shan region where Lebyin clastics were deposited)
2. Orogeny at the end of Early Carboniferous resulting in the deformation and low-grade regional metamorphism of Mergui Group, and possibly the intrusion of some granite plutons in Proto-Shan region \_e.g., Taung-baing Granite). The fairly widespread small-scale antimony mineralization in the Lebyin and Taungnyo clastics (e.g., at Lebyin and Natsan mines) was possibly related to this igneous activity.

Late Carboniferous-Middle Triassic

1. Deposition of a thick limestone sequence (Plateau Limestone, Moulmein Limestone, and Kamawkala Limestone), later partially dolomitized, in a wide warm shallow sea that covered most of Proto-Shan-Kayah-Kayin region. (This wide carbonate platform extended into Proto-Yunnan in the northwest, and into Proto-Western Thailand in the east). A thin clastic wedge was also deposited in some parts of Proto-Mon-Kayah region during Late Permian.
2. Earth movements, intrusion of granited in eastern Proto-Shan region, and initial emergence of Proto-Shan-Tanintharyi region at the end of Middle Triassic.

Middle-Late Triassic

Continued northeastward movement of Sinoburmalaya in the Neo-Tethys. Southwest of the emerging land lay a deep sea in which flysch beds were laid down. The northeastward-moving ocean floor then began to subduct below the emerging Proto-Shan-Tanintharyi landmass.

1. Depositional of a thick deep-sea flysch unit containing fossils of *Halobia* and *Daonella* and locally ophiolites (Thanbaya Formation) along the northeastern margin of Proto-Rakhine-Chin region.
2. Concurrently, depositional of thin units of evaporates (lower) and shales and bone beds (upper) in a few small enclosed basins in northern Proto-Shan region which partially had become a landmass.

Jurassic

1. Flysch deposition most probably continued in Proto-Rakhine-Chin region.
2. Concurrently, there was deposition of shallow-sea and deltaic sediments in a few down-faulted intermontane basins and shallow seas within and along the western part of the still rising Proto-Shan Plateau—turbidites with coal seams in Proto-Kalaw Basin; sandstones, shales and limestone in Proto-Kinda-Kyaukse area; limestone and red beds in Proto-Lashio Basin.
3. Subduction related large-scale intrusion of granitoid plutons and batholiths (locally with volcanics) with associated tin-tungsten mineralization along Proto-Tanintharyi and the western marginal zone of Proto-Shan Plateau (e.g., at Hermyingyi, Mawchi, Padatchaung) during Late Jurassic.
4. Late Jurassic orogeny causing tight folding of the incompetent Jurassic beds; limited metamorphism along the western marginal zone of Proto-Shan Plateau.

Cretaceous

During Early Cretaceous, the northeast-moving Sinoburmalaya collided and combined with Indochina Block along Nan Suture to form Proto-Southeast Asian Peninsula, the southeastern part of Eurasian Plate. At about that time, Indian Plate started to move northeastwards and there was more subduction of the ocean floor beneath Sinoburmalaya.

1. Continued deposition of thick flysch, with *Globotruncana*-bearing limestone locally in the upper part, in the subduction trench; and there was deposition of a thin unit of *Orbitolina*-bearing limestone in some places of the shallow sea (of the fore-arc basin) that lay between the said subduction trench and Proto-Shan Plateau.
2. In contrast, a unit of red fanglomerates and siltstones (Kalaw Red Beds) was laid down in an oxidizing continental environment in the Kalaw Basin in the western part of southern Proto-Shan Plateau.
3. Intrusion of more granitoid plutons, also with associated tin-tungsten mineralization, again along Proto-Tanintharyi and the western marginal zone of Proto-Shan Plateau during Late Cretaceous.
4. In contrast, during Late Cretaceous-Early Paleocene, intrusion of small and medium-sized ultramafic bodies along the eastern flank of Proto-Rakhine-Naga region (Serpentinite Line) and in Proto-Kachin region, with associated nickel-chromium mineralization in northern Proto-Chin Hills (notably at Mwe-taung) and jadeite mineralization in western Proto-Khanti and Proto-Tawmaw areas.
5. Beginning of igneous activity in the northern part of Central Igneous Line (i.e., in Proto-Wuntho area) at the close of Cretaceous.
6. Epirogenic movements and final uplift of Proto-Shan-Tanintharyi region to become a high landmass at the end of Cretaceous.

Paleocene-Eocene

1. Continued deposition of very thick flysch, locally with radiolarite and ophiolites, in Proto-Rakhine-Chin trench that had been receding southwestwards as indicated by the gradual younging of the flysch sequence in the same direction.
2. Concurrently, thick upper Paleocene-Eocene molassic sediments were laid down as a lateral tecto-facies in Proto-Chindwin and Proto-Minbu basins which lay in the intervening region between the said trench and Proto-Shan Plateau. In Chindwin Basin, the Eocene sediments were deposited under fluvial and deltaic conditions (thus with coal seams, e.g., in Kalewa area) by Proto-Ayeyarwady and Proto-Chindwin rivers. In Minbu Basin, very thick Eocene sequence was laid down in delta and shallow sea in the north, and in a deeper sea in the south. Earliest anthropoid primates (*Amphipithecus* and *Pondaungia*) lived along some river valleys in Proto-Pondaung area during Late Eocene.
3. Intrusion of some more granitoids along the western margin of Eastern Highlands in Early Eocene.
4. Collision of NNE- moving Indian Plate and the southern part of Eurasian Plate in Late Eocene, resulting in Himalayan orogeny and initial clockwise rotational movement westwards of Proto-Southeast Asian Peninsula. That orogeny caused the folding, large-scale overthrusting and rise of the Western Ranges, and uplift of the Central Belt and formation of pre-Oligocene unconformity.

Oligocene

1. Further development of the Chindwin and Minbu basins in the subsiding graben that lay between two risen landmass during Early Oligocene, and the deposition of Oligocene sediments (Lower Pegu Group) mainly in Minbu Basin where the facies pattern was similar to that of the Eocene sequence.
2. During Late Oligocene, middle phase of Himalayan orogeny caused fairly intense metamorphism along a narrow belt (Mogok Belt) in which rubies and sapphires of Mogok Stone Tract were formed; uplift of the Central Belt and formation of pre-Miocene unconformity.

Miocene

Further rotational westward movement of southeast Asian Peninsula, and by Early Miocene it nearly reached its present position.

1. Subduction-related volcanism along Central Igneous Line during Miocene formed a volcanic arc that became a substantial barrier separating the graben into two troughs in which thick Miocene sediments (Upper Pegu Group) were laid down separately as two fairly different sequences. Concurrently, molassic sediments were also being laid down in the northern part of the Rakhine Coastal Belt—the southern extension of Assan Basin in northeast India.
2. Northward movement of the oceanic crust from a spreading center in the Andaman Sea since Middle Miocene, resulting in the development of “Burma Plate”—a microplate bounded on the east by the Sagaing Fault and on the west by the Andaman Thrust.
3. Late phase of Himalayan orogeny during Late Miocene, resulting in the folding and uplift of Central Belt, particularly the Bago Yomas; oil and natural gas migrated and accumulated in the folded Eocene and Pegu sandstones along the eastern side of Minbu Basin (e.g., at Chauk, Mann, Letpando); intrusion of younger granites (mainly microgranite, e.g., Kabaing Granite) along the Mogok Belt.

Pliocene

1. Continued northward movement of Burma Plate as Irrawaddy sandstones with fairly abundant fossil wood and vertebrate remains were laid down under fluvial conditions along the Ayeyarwady and Chindwin river valleys as the low-lying Central Belt was finally filled up. The present outline of Myanmar first took shape.
2. More volcanism along Central Igneous Line; porphyry copper mineralization in the dacites and andesites of the Monywa area.

Quaternary

1. Deposition of Uyu boulder conglomerates, plateau gravels, and river terraces along big river valleys in northern Central Belt during Pleistocene.
2. Renewed volcanism (mainly andesites and basalts) along Central Igneous Line, e.g., at Mt. Popa and Twindaung, during Pleistocene and Early Holocene.
3. Depositions of newer alluvium and denudation have been going on side by side since the beginning of Holocene to form the present the present landscape of Myanmar.