Geology of the Caucasus is largely determined by its position between the still converging Eurasian and Africa-Arabian lithosphere plates, within the wide zone of a continent-continent collision.

Within the region, there are sedimentary, magmatic and metamorphic complexes dated back throughout the Late Proterozoic-Phanerozoic. Their formation occurred under the various environments: oceanic and small oceanic basins, active and passive continental margins. Studies conducted over many decades gave grounds for division of the region into two large-scale geological provinces: the Southern and Northern Tethyan ones. Throughout Mesozoic and during Early Cenozoic, the Southern and Northern provinces distinctly differ from each other. The boundary between the above-said provinces runs along the Lesser Caucasian ophiolitic suture belt.

**Southern province.** The Triassic sediments of the southern province are represented mainly by shelf organogenic limestones, marls and dolomites (the south of Armenia, Nakhchevan), while the northern part of this province (Jermanis, Armenia) hosts sediments of the other, terrigene-coal-bearing Upper-Triassic formation. The Jurassic deposits of the southern province are rare and are represented by shelf facies. Data on Early Cretaceous facial environment are very scanty. It can be considered that the domain during this time represent a shallow marine basin, while the Upper Cretaceous deposits are widely spread and also represent shallow-marine formations. The Paleocene-Eocene deposits represented by sandy-argillaceous-limestone facies of shallow marine are tightly associated with the Upper Cretaceous ones.

Environment of the sedimentation within the basin has significantly changed by the second part of Eocene: this time starts the period of intensive volcanic eruptions going on under submarine environment of shallow-sea basin. Volcanic activity during the end of Middle-Late Eocene sharply diminishes and under shallow-marine environments there occurs accumulation of mainly sandy-argillaceous and carbonatic sediments including coral limestones.

**Boundary zone** – the ophiolitic suture belt. The Mesozoic sedimentary rocks of the suture belt are met in the melange. The oldest are Upper Triassic limestones and calcareous sandstones with ammonites, basaltic and radiolarite associations with Late Triassic radiolarians. In the allochthonous ophiolitic complex A.Kniper distinguished Middle Jurassic-Lower Cretaceous and Albian-Lower Coniacian associations. Effusive-radiolarite part of the ophiolitic association, in some localities, hosts lenses of Upper Jurassic-Neocomanian reef limestones. The younger ophiolitic association starts with transgressive Albian-Senomanian, which is represented by flysch and olistostromes. At the higher levels they are followed by basalts and radiolarians.

Neautochthonous complex of the ophiolitic belt starts with transgressive formation of Coniacian-Santonian clastics. The higher limestone formations of Senonian-Lower Paleogene were formed in the analogous basin, as well as sandy-argillaceous deposits of Paleocene-Lower Eocene and calc-alkaline andesitic volcanic formations, terrigene clastics and carbonates of Middle and Upper Eocene.

**Northern Province.** The extreme southern tectonic unit of the Northern Province - “Transcaucasion massif” in Triassic-Eocene times has been developing as a relatively uplifted structural-morphological unit of present-day-island-arc type. Within it (the Georgian block, Artvin-Bolnisi block), there occurred accumulation of mainly shallow-water, lagoon-lacustrine, coal-bearing and saliferous deposits accompanied by volcanic eruptions of island-arc type. The Mesozoic
sedimentary cover starts with subaerial volcanoclastics of rhyolitic composition. The Lower Jurassic and Aalenian layers are built up of arkosic terrigene clastics and shallow-water organogenic limestones. Bajocian stage is represented by tuff-turbidites with rare bands of calc-alkaline andesite-basalts. The Bathonian deposits are made up of freshwater-lacustrine coal-bearing sandy-argillaceous rocks followed by variegated lagoonal Callovian-Upper Jurassic deposits.

Along the southern and northern margin of Artvin-Bolnisi and Georgian blocks (respectively) environment of sedimentation significantly changes: the Lower Jurassic-Aalenian limestone facies are replaced by terrigenic turbidites of deep sea. The Bajocian tuff-turbidites are replaced by coarse volcanoclastics and lavas of calc-alkaline andesite-basaltic and dacite-rhyolitic composition.

The Lower Cretaceous facies are rather uniform: basal conglomerate-quartz sandstones are followed by dolomites, limestones of Urgonian facies, organogenic limestones and marls. In Bayburt-Karabakh zone limestones are replaced by basalt-andesite-dacite-rhyolitic volcanic rocks of island-arc and intraplate types.

The Upper Cretaceous, Paleocene and Eocene deposits are built up mainly of neritic organogenic limestones and marls. There are locally developed formations of alkaline basalts and volcanoclastics. However, to the south in the Upper Cretaceous section are mainly reported volcanic rocks: basalts, andesites, dacites and rhyolites of calc-alkaline series.

Throughout Maastrichtian and Early Paleocene at the whole territory of the Transcaucasian massif (also in the Sevan ophiolitic belt and Southern Province) under shelf-sea environment, there were formed uniform limestone-marly facies. However, in Paleocene-Eocene within the Transcaucasian massif (island-arc), north of the Early Paleogene andesitic belt there originated “rear basaltic troughs”.

The Mesozoic-Early Cenozoic basin of the Great Caucasus located behind the island-arc basin of the Transcauscasus inherited was developing at least from Middle Paleozoic. In the upper part of the section, there is developed the terrigene-turbiditic formation with intercalations of carbonatic rocks whose Upper Triassic age was established by corals and foraminifer. The Hettangian-Sinemurian terrigene turbidites conformably follow Triassic rocks. The tholeiitic basalts of MOR-type are also confined to this level. The higher strata of Lower and Middle Jurassic are composed of terrigene turbidites. There are developing two, en echelon-type-located flysch basins: the eastern and western, in which turbiditic sedimentation lasts almost uninterruptedly throughout Late Jurassic, Cretaceous, Paleocene and Eocene. Here, the thick formations of predominantly carbonatic turbidites (Oxfordian-Valanginian, Turonian-Senonian) alternate with the terrigene turbidites (Hauterivian-Senomanian, Paleocene-Eocene).

The Northern side of the back-arc basin of the Greater Caucasus during Mesozoic-Cenozoic is featured by development of continental-shelf deposits. The Triassic, Jurassic, Paleocene and Eocene sections are made of shallow-marine and continental rocks. Gaps, stratigraphic and angular unconformities, basal conglomerates are frequent.

**Syn- and post-collisional stages, Late Cenozoic.** The end of Eocene-Oligocene is traditionally considered as beginning of syn-collisional (or orogenic) stage of development of the Caucasus. This time, paleogeographic environment changes significantly. Firstly, this becomes apparent in inversion of the relief: in the place of deep-water basins are formed mountain ranges of the Great Caucasus, Achara-Trialeti, Talysh, and Lesser Caucasus. The domains of shallow-water basins of platformal type of pre-collisional stage sink turning into intramountain depressions where is going accumulation of molassa deposits – the products of denudation of arising mountain ranges. Starting from Late Miocene (~12 Ma ago) and as far as the end of Pleistocene, in the central part of the region, simultaneously with formation of molassa troughs and accumulation of coarse molasses, there occur volcanic eruptions in subaerial conditions.