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Main Stages of Geodynamic Evolution of the Caucasian Segment of the Alpine-Mediterranean Belt

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Within the oceanic area of Tethys, with a typical oceanic crust, in geological past relatively small continental or subcontinental plates (terranes) were situated. The Greater Caucasian, Black Sea – Central Transcaucasian, Baiburt - Sevanian and Iran – Afghanian accretionary terranes, which in geological past represented island arcs or microcontinents, are identified in the Caucasian segment of the Alpine-Mediterranean belt. They are separated by ophiolite sutures (relics of small or large oceanic basins) of different age. During the Late Precambrian, Paleozoic and Early Mesozoic these terranes underwent horizontal displacement in different directions and ultimately they joined the Eurasian continent. New LA-ICP-MS U-Pb zircon dating along with available geologic, petrologic and geochemical investigations, allow to trace with confidence the main stages of regional metamorphism, granite formation and, consequently, pre-Alpine continental crust making within the Caucasus. At the pre-Grenville stage (1200 Ma and more) between the Baltica and Gondvana ancient continents, on the oceanic crust of Prototethys accumulation mainly of terrigenous sediments and of basic volcanites took place. At the Grenville stage (1000-800 Ma) subcontinental or primitive continental crust (gneiss-migmatite complex and synmetamorphic grenitoids of sodium series) were formed in suprasubduction conditions by both sides of Proto-Paleotethys and along the northern peripheries of comparatively small oceanic basins of the Arkhiz and Southern Slope of the Greater Caucasus. At the Baikalian stage (650-550 Ma) plagiogneissic complex has been cut by Precambrian gabbroids and intruded by large bodies of quartz-diorites. The next, Late Baikalian stage (540-500 Ma) is determined by the intrusion of Cambrian basites and Late Baikalian granitoids and by manifestation of intensive suprasubduction regional metamorphism. Late Baikalian tectogenesis is accompanied by contraction of the small oceanic basin of the Southern slope of the Greater Caucasus and obduction of its oceanic crust on the island arc of the Greater Caucasus. With the Early Variscan (Bretonian) orogeny regional metamorphism of the most Lower-Middle Paleozoic rocks of the Caucasus and formation of synmetamorphic granitoids is con-nected. Saurian orog¬eny (seemingly in Turneasian) corresponds to the most important pre-Alpine time of nappe formation in the Caucasus. And here, at last, Late Variscan orogeny with processes of intensive granite formation took place. Early Cimmerian (Indosinian) orogeny completes the formation of the Caucasian pre-Alpine structure. In the rear of the gradually closing Paleotethys generation of Mesotethys (Neotethys) had been taking place already since the Triassic. But Lesser Caucasus branch of the latter was formed since the end of the Middle Jurassic. In terms of geologic and paleomagnetic data Paleotethys became entirely closed only in the Bathonian phase of compression. The movement of the Austrian phase closed the Lesser Caucasian branch of Neotethys. In Alpine time one can distinguished: pre-orogenic (Adigean, Andean, Austrian, Subhercynian, Laramian and Pyrenean), early orogenic (Styrian and Attic) and Late orogenic or collision (Rodanian, Wallachian, Pasadenian) folding stages. In Late Alpine time maximum compression vast transsecting transverse fissures of extention, responsible for the penetration of orogenic volcanism far into the continent, in a zone of Transcaucasian transverse uplift occurred.