Correlation of the Main Tectonic Units and Paleotectonic Reconstructions of the Eastern Black Sea – Caucasian – South Caspian Region

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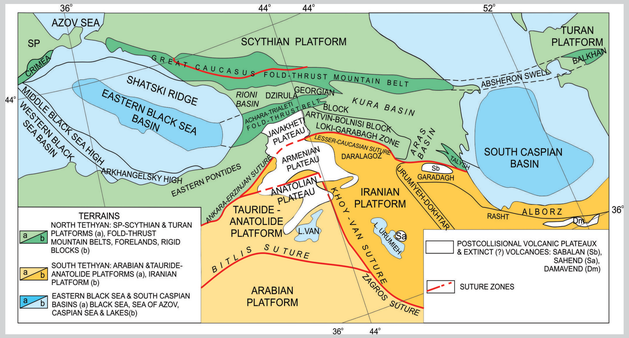
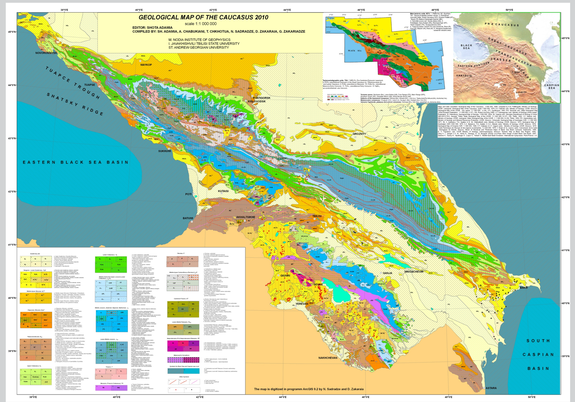
Correlation of the Main Tectonic Units



The Region sited at the central part of the collisional zone between Eurasian and Africa-Arabian continents, represents a collage of lithosphere fragments of oceanic Tethys and its northern and southern continental margins.

The Tethys ocean was not a single continuous oceanic plate but rather developed in branches separating continental terrains of different sizes,which rifted and drifted away from the Gondwana margin and eventually collided with Laurasia.



Within the region, there existed systems of island arc, oceanic island arc, intra-arc and back-arc units. Several events of supra-subduction, MOR and withinplate types magmatic activity and obduction of oceanic crust, lateral displacement of lithosphere fragments took place during the Neo-Proterozoic, Paleozoic, Mesozoic and Early Cenozoic. Final closing of the oceanic and back-arc basins, continent-continent collision, topographic inversion and formation of the present-day structure of the Caucasus was accomplished in the Late Cenozoic.

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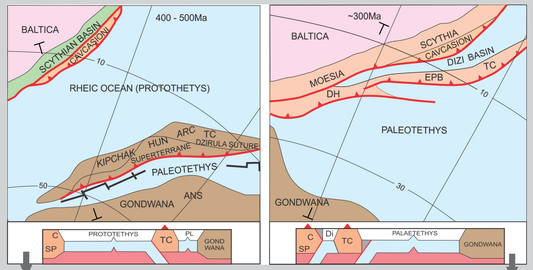
Paleotectonic Reconstructions

Late Proterozoic-Middle Paleozoic

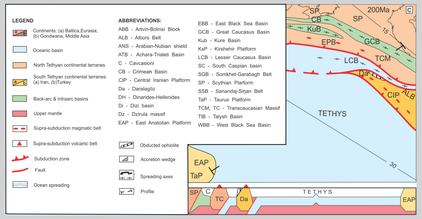
The Arabia-Nubian Shield, at the end of the Proterozoic, experienced granitization related to the final stages of the Pan-African cycle of tectogenesis. In contrast to the southern Lesser Caucasus (Daralagöz), the Transcaucasian Massif did not undergo this process because it broke away from the Arabia-Nubia Shield and, during Cambrian–Devonian times, drifted deep into the Prototethys toward the northern (Baltica) continent (Zakariadze et al., 1998; Stampfli, 2000; Adamia et al., 2011)



During the early–middle Paleozoic, in the wake of northward-migrating Gondwanan fragments, the Paleotethyan basin formed, and, in the Ordovician, along its border with the Transcaucasian Massif, subduction of oceanic crust occurred and was accompanied by suprasubduction volcanic eruptions of rhyolites, topographic inversion, and denudation of the massif.

Northward migration of the Transcaucasian Massif throughout the Paleozoic caused narrowing of the Prototethys and its transformation into an oceanic back-arc (Dizi) basin. Fragments of the Paleotethyan crust are found along the southern border of the Transcaucasian Massif, within the accretionary complexes of the Lesser Caucasus ophiolite suture, and in the Pontides.

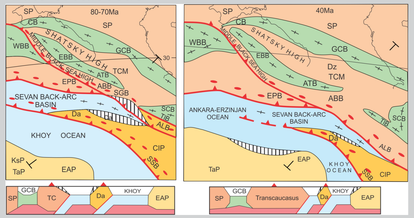
Early Jurassic



During the Mesozoic–Cenozoic, Daralagöz (South Armenia and Nakhchevan-Azerbaijan) was not a part of the Turide-Anatolian platform, but represented the northwesternmost margin of the Central Iranian platform

In the late Paleozoic–early Mesozoic, the oceanic basin separating the Africa-Arabian continent from the Taurus-Anatolian-Iranian platformal domain was gradually extending (Stampfli et al., 2001). During this phase, only the Central Iranian terrane separated from Gondwana, drifted northward,and collided with the Eurasian continent in the Late Triassic

Late Cretaceous *Eocene*



The prolongation of the Achara-Trialeti Cretaceous-Paleogene back-arc **basin** towards the deep part of the Black Sea.

The Taurus-Anatolian terranes separated from Gondwana later, in the Early–Middle Jurassic. It is believed that the Neotethys formed in the middle–late Mesozoic. Northward displacement of the Taurus-Anatolian terrane resulted in a gradual approach to the Pontian-Transcaucasian-Iranian active continental margin, narrowing of the Paleotethys and its transformation into a back-arc basin, and formation of the suture between the Taurus-Anatolian terran and the Central Iranian terrane (Barrier and Vrielynck, 2008). The suture belt, apparently, is marked by fragments of ophiolite mélange of the Van-Urumiyeh Lakes and Khoy region or Van ophiolite

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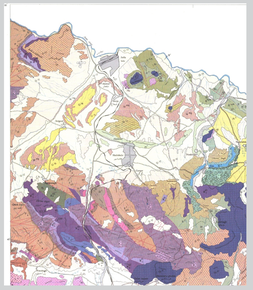
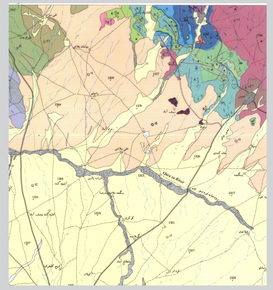
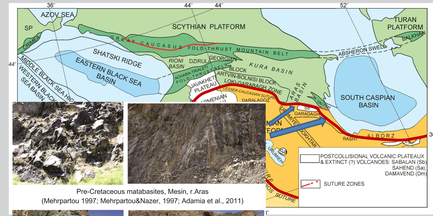
Central Iranian microcontinent together with Daralagöz incorporated into Eurasia in Early Mesozoic. This is evidenced by the Upper Triassic-Liassic coal-bearing **Shemshak** formation in Armenia (Azaryan 1963), Nakhchevan (Abdullaev, Bagirbekova, 2007) and NW Iran (see 1:100 000 scale Geological Maps of Iran: Qara-Ziaddin – Oskuie, Hajialilu, 1995; Marand - Asadian, A. O., Mirzace, A. R., Mohajjel, B. M. and Hadjialilu, B., 1994; Julfa – Abdolahi, M. R & Hosseini, M., 1996; Tabriz – Asadian, A. O, 1994; Ardabil – Khodabandeh, A. A. & Amani Fazl, A., 1997)





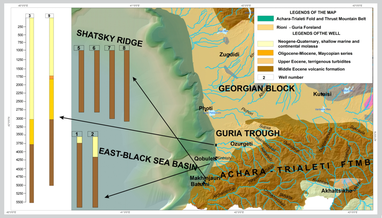
Mesozoic-Early Cenozoic submarine supra-subduction-type volcanic formations associated with very thick (~ 10-15km) turbiditic deposits [e.g. Moghan zone, Mehrpartou & Nazer, 1999] are widespread along the Transcaucasus-Talysh border in the north and along Iranian Garadagh in the south (Manafi et al., 2013).



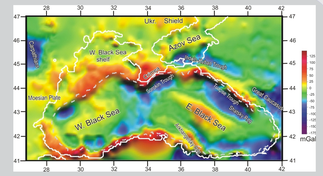
Pre-Cretaceous matabasites, Mesin, r.Aras
(Mehrpartou 1997; Mehrpartou&Nazer, 1997; Adamia et al., 2011)

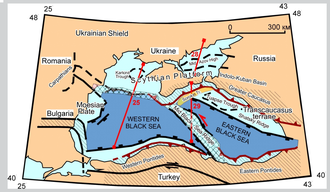
Pre-Late Cretaceous Ophiolitic Mélange
(Babakhani and Nazer, 1991; Adamia et al., 2014)

Outcrops of Mesozoic and pre-Mesozoic metabasites and ophiolite mélange are found within Iranian Garadagh (see geological maps of IRAN, scale 1:100 000: Siahrud, Varzaghan, Kaleibar, Lahrud; Mehrpartou et al., 1992, 1997; Mehrpartou and Nazer, 1999; Babakhani & Nazer, 1991).



Deep drilling conducted within the on-shore zone of the Achara-Trialeti belt, has shown that the part of the Middle Eocene volcanic formation located below the modern level of the sea is about 3-km-thick





The pattern of anomalous gravitational and magnetic fields agree well with the geological data regarding the prolongation of the Achara-Trialeti - Cretaceous-Paleogene back-arc basin - towards the deep part of the Black Sea.
T. Yegorova, 2009

NEAR TOP/PRE-TERTIARY DEPTH MAP, OFFSHORE GEORGIA/BLACK SEA
According to the data of the seismic profiling and drilling conducted by Georgian Oil and Anadarko at on-shore and off-shore zones of the Black Sea, the subaerial structures of the Georgian Block (TCM) have their immediate submarine prolongations.