GEOCHEMICAL AND GEOCHRONOLOGICAL (40Ar/39Ar) CONSTRAINTS
ON THE EVOLUTION OF THE LESSER CAUCASUS (ARMENIA) AND SE
ANATOLIA (SE TURKEY) TRANSECT: TIMING AND NATURE OF
TECTONIC EVENTS

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supports from the Institute of Geological Sciences in Yerevan and the METU of Ankara (in
2006).

As it was well described by previous works, the Lesser Caucasus (in Armenia) preserves
obducted series of tethyan oceanic crust (the Sevan-Akera and Vedi ophiolites). We present
the results of our researches on: 1) the type of these ophiolites (LOT or HOT ?), 2) their
ages, 3) the P-T-t path of metamorphic rocks associated to the subduction/collision and 3)
the geochemistry of magmatic rocks associated with ophiolites.

The interpretation of these data and results are also discussed by Sosson et al. (this issue).

In Armenia the field works allowed us to characterized lithological features of slow-
spreading oceanic crust (LOT type ophiolites):
- serpentinites are frequently exposed and hydrothermalized at sea-floor level
- magmatic rocks are rare and differentiated with mafic norites evolving to gabbros
  and plagiogranites,
- normal faults have exposed some of the deep magmatic rocks at sea-floor level
- magmatic rocks and serpentinites are unconformably overlain by doleritic pillow
  lavas and radiolarites.

Geochemically, slight calc-alkaline features are superposed to those generally expected
for MORBs: enrichments in LILE and negative anomalies in Nb-Ta and Ti, isotopic
compositions of Pb, Sr and Nd more radiogenic than MORB.

Precise 40Ar/39Ar age on amphibole from gabbros evidence Lower to Mid- Jurassic age
for oceanic crust formation in Sevan and Vedi areas. All these features argue for all the
Armenian ophiolites to be remnants of only one obducted sequence of oceanic crust.

This oceanic crust formed in a back-arc basin (SSZ above a N-dipping subduction
between the South Armenian Block (SAB, a microplate) of Gondwanian origin and the
Eurasian Active margin. Above the back-arc series, we found the succession of (1) alkaline
lavas (Lower Cretaceous), and (2) calc-alkaline lavas (Upper Cretaceous: Cenomanian-
Coniacian). The alkaline lavas are thought to be remnants of an OIB source oceanic
plateau, while the calc-alkaline lavas are related to volcanic arc activity due to the intra-
oceanic subduction of the Neotethys ocean.

Closure of this oceanic domain by subduction is constrained by the age of blueschists
found in the Stepanavan area (NW Armenia): indicate maximal burial pressure of ~ 1.2 GPa
(c. 35 km) and 550°C at 95-90 Ma. This event is followed by retrogression at ~ 0.6 GPa (c. 20 km) and 500°C at 73.5 - 71 Ma, which is ascribed to the first stages of the SAB collision with the Eurasian margin. To the South, part of the ophiolite sequence has been obducted over the SAB. Geological and paleontological evidence show that this event can be bracketed to the Coniacian-Santonian. The frontal part of obducted series can be observed in the Vedi region of Armenia, while the upper section outcrops in the N (Sevan) and NE (Karabakh) regions along the suture zone. The upper section could correspond to a paleo subduction channel.

The Southern rim of the SAB corresponds to the eastward extension of the Taurus domain (Tauride-Anatolide block, a microplate) in SE Anatolia (Turkey) and was itself an active margin, as shown by calc-alkaline magmatism and HT metamorphism dated to the Cretaceous in the SAB.

In SE Turkey, previous works and our preliminary geological investigations show that most of the metamorphism and magmatic activity has taken place in the Upper Cretaceous. Magma emplacement and related HT metamorphism in the Tauride-Anatolide block (Malatya Metamorphics) were dated by 40Ar/39Ar on muscovite at 73.8 ± 0.3 Ma. Gabbros sampled south of Malatya and north of Puturge unit slight MORB and calc-alkaline geochemistry and age of 79 ± 1 Ma (40Ar/39Ar on amphibole).

We interpret these gabbros formed in a small marginal basin, which opened in response to the subduction of the Neotethys oceanic domain south of the Tauride-Anatolide block. Age of subduction / collage of the Puturge/Bitlis domain south of the Tauride-Anatolide block. Age of subduction / collage of the Puturge/Bitlis/puturge onto the Arabian plate.