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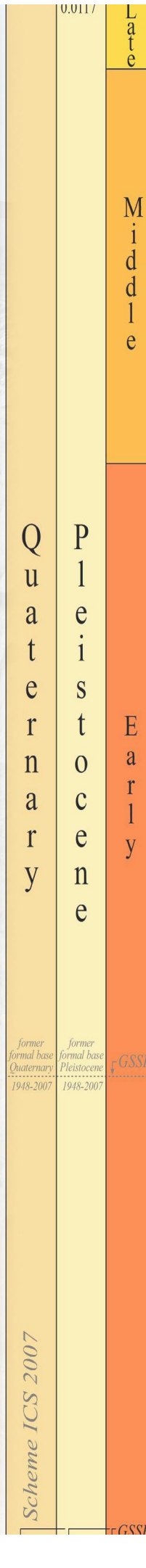

QUATERNARY GEOLOGY AND ORIGIN OF THE SHIRAK BASIN, NW ARMENIA

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The Shirak Basin developed since the Upper Pliocene till the early Middle Pleistocene and was drawn in total uplift of the Lesser Caucasus later. Basaltic trachiandesites poured into the southern part of the basin in Pliocene from the Kars-Digor Highland in the west. A thick lacustrine formation was accumulated in the more northern part of the basin in the Late Pliocene and perhaps the early Gelasian, according to the Yu.V. Sayadyan data. In the late Gelasian (2.3–2.0 Ma), basaltic trachiandesites penetrated into the northern Shirak Basin from the Javakheti Highland. More than 150-meter thick terrigenous deposits were accumulated in the basin in the Calabrian and early Middle Pleistocene. They are differentiated to the Karakhach, Ani and Arapi units. The 20-meter thick Karakhach unit consists of sand-pebble alluvium in the upper part and mostly fine-grained deposits lower that were formed by stagnant, partly lake waters. The Ani and Arapi units represent sedimentary cycles. Each cycle begins by lacustrine clays, silts and diatomite and finishes mainly by alluvial sands, gravels and pebbles. The Karakhach unit covers the northern margin of the basin. The Ani unit is incised at 50–70 m into the Karakhach unit surface to the north and has the highest thickness (up to 150 m) in the northern part of the basin. The Arapi unit (up to 75 m) is incised at 50–80 m into the Ani unit surface to the north and covers central and southern parts of the basin, spreading to the south farther than the Ani unit. This demonstrates the successive uplift of the northern Shirak Basin and migration of the lacustrine sedimentation area to the south. The unit ages were determines by combined using of the data on remanent magnetic polarity of the deposits, finds of stone industry of the earliest Paleolithic in the Karakhach unit, faunas of mollusks in the Ani and Arapi units and small mammals in the Arapi unit as well as results of the spore-pollen analysis and K-Ar dating of tuffs and lavas. The age of the Karakhach unit corresponds to the late Olduvai paleomagnetic subchron and the early Calabrian. The Ani unit is dated to the late Calabrian and the earliest Middle Pleistocene (~1.25–0.75 Ma) and the Arapi unit is dated to early Middle Pleistocene (0.7+0.05 Ma). The Shirak Basin is bounded to the north by the Kaps flexure-fault zone, and to the east by the flexure-fault zone of the Trans-Caucasus transverse uplift. The Javakheti Ridge volcanic chain is situated in the northern continuation of the uplift and the Mets-Sharailer (Calabrian?) and Aragats (~1–0.4 Ma) volcanoes mark its southern continuation. These zones of deformation do not correspond to the Late Cenozoic faults caused by collision. At the same time, volcanic eruptions occurred in the basin surroundings during whole epoch of its subsidence. Synchronism of these processes can justify genetic links of the basin subsidence and the mantle motion and transformation manifested by volcanism.