

A new chronostratigraphy (^{40}Ar - ^{39}Ar and U-Pb Dating) for the Middle Section of the Burdur-Fethiye Shear Zone, SW Turkey

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There are few basins containing younger rocks along the Burdur-Fethiye Shear Zone, such as the Burdur, Tefenni, Eşen and Acı göl basins. The middle section of the Burdur-Fethiye Shear Zone, where Neogene sediments predominate, includes three modern basins: the Acı payam, Çameli and Gölhisar basins. All these basins represent portions of larger carbonate lakes. A considerable number of studies suggested controversial Neogene stratigraphy of these basins and environs. In most cases, the local river and alluvial fan deposits were mapped together with the lacustrine sediments. According to most studies, the lacustrine deposits are of Pliocene age, except in small areas north and east of Acı payam Basin. Our field observations revealed two distinct young sedimentary sequences that unconformably overlies the pre-Neogene basement in the middle section of the Burdur-Fethiye Shear Zone. The first sequence begins with meandering- and braided-river sediments, which transition upward into lacustrine sediments. The uppermost part of the lacustrine sediments consists mostly of red-wine-coloured claystones and silty carbonates including caliche. This sequence is overlain by alluvial fan conglomerates, mudstones and claystones.

In the northern part of Acı payam Basin at elevations of ~1500-1600 m, the lamproites cut or overlie both fluvial conglomerates and lacustrine marls, claystones and limestones. In addition, a tuff level was found in the lacustrine sediments south-west of Çameli Basin. We provide new geochronological data from these volcanic rocks. Zircon U-Pb results from tuff level yielded age of 6.933 ± 0.041 Ma. The lamproites are dated at 5.06 ± 1.44 , 5.69 ± 2.34 , 6.08 ± 0.48 , 6.43 ± 0.29 , 6.94 ± 0.35 , 6.98 ± 0.31 and 6.88 ± 0.22 Ma by $^{39}\text{Ar}/^{40}\text{Ar}$ dating method.

Consequently, a Messinian age is suggested for the uppermost part of the river deposits. Field relations show that the lacustrine sediments are upper Miocene-lower Pliocene in age and the widespread exposures of the lacustrine sediments indicate the presence of an extensive warm late Miocene lake. This lake likely evaporated due to the Messinian salinity crisis. After the Messinian, the lake began to break up into smaller lakes as a result of the evolution of the Burdur-Fethiye Shear Zone. The Acı payam, Çameli and Gölhisar basins are the parts of this lake. These new ages also allow us to correlate the lacustrine sediments in the middle part of the Burdur-Fethiye Shear Zone with sedimentary sequences of other basins.