

## **Late Miocene termination of tectonic activity on the detachment in the Alaşehir Rift, Western Anatolia: Depositional records of the Göbekli Formation and high-angle cross-cutting faults**

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Western Anatolia is a well-known province of continental extension in the world. Most distinctive structural elements of the region are E-W trending grabens. The Alaşehir Rift/Graben is an asymmetric rift/graben trending E-W between Ahmetli and Turgutlu in its western part and continues eastwardly in a NW-SE direction to Alaşehir (Philadelphia in ancient Greek). The stratigraphy of the region consists of metamorphic rocks of the Menderes Massif (Paleozoic-lower Cenozoic) and the syn-extensional Salihli granitoid (middle Miocene) forming the basement unit and overlying sedimentary cover rocks of Neogene-Quaternary. These rocks are cut and deformed by the Karadut detachment fault and various low-angle normal faults (antithetic and synthetic faults of the Karadut detachment fault), which are also cut by various younger high-angle normal faults.

It is possible to observe two continuous sequences of different time intervals in that Miocene deposits of the first rifting phase are covered by Plio-Quaternary sediments of second rifting phase with a “break-up” unconformity. In lower levels of a measured stratigraphic section (583 m) of the Göbekli formation which has lower age of late Miocene and upper age of early Pliocene, the presence of angular to sub-angular clasts of the blocks and conglomerates suggests alluvial-fan origin during an initial stage of deposition. Existence of normal-reverse graded, cross-bedding, pebble imbrications in layers of the pebbly sandstone demonstrates fluvial environment in following levels of the sequence. Existence of lenses and normal graded conglomerates in pebbly sandstones and fine grained sandstones strata evidences a low energy environment. Observed siltstone-claystone intercalations on the middle levels of the sequence indicate an environment with low dipping morphology to be formed as flat plains during this period. In the uppermost levels of the sequence, existence of the pebble imbrications inside pebbly sandstones overlying sandstones in place of siltstone-claystone intercalations indicates fluvial environment to be controlled flat plains during depositional time of the levels in Göbekli Formation.

Depositional records of the Göbekli Formation indicate that its deposition was formed in dissimilar depositional environments with different tectonic activity. The evidence for the unconformity is hidden in the depositional records of the Göbekli formation. The lower levels of the Göbekli formation were formed as alluvial-fan deposits under influence of tectonic activity of the Karadut detachment fault and low-angle antithetic and synthetic normal faults. The middle and upper sections of the sequence were however formed as fluvial controlled flat plain deposits without any tectonic activity of the Karadut detachment fault during early Pliocene. The Miocene sediments were overall deposited under the influence of the Karadut detachment system; however the detachment ceased its activity during the deposition of the middle and upper levels of the Göbekli formation. This view is also supported by Plio-Quaternary sediments which were deposited under the influence of high angle faults, thereby, leading to the unconformity between the Miocene and Plio-Quaternary sediments and a two-stage rift system.